

CATALOGUE
of
Eugene Dietzgen Co.

ELEVENTH EDITION

DRAWING
MATERIALS



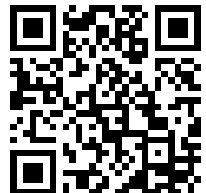
SURVEYING
INSTRUMENTS
MEASURING TAPES

CHICAGO-NEW YORK
SAN FRANCISCO
NEW ORLEANS
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ELEVENTH

EDITION

CATALOGUE OF

EUGENE
DIETZGEN
• CO. •

MANUFACTURERS
DRAWING
MATERIALS

SURVEYING
INSTRUMENTS

MEASURING
TAPES



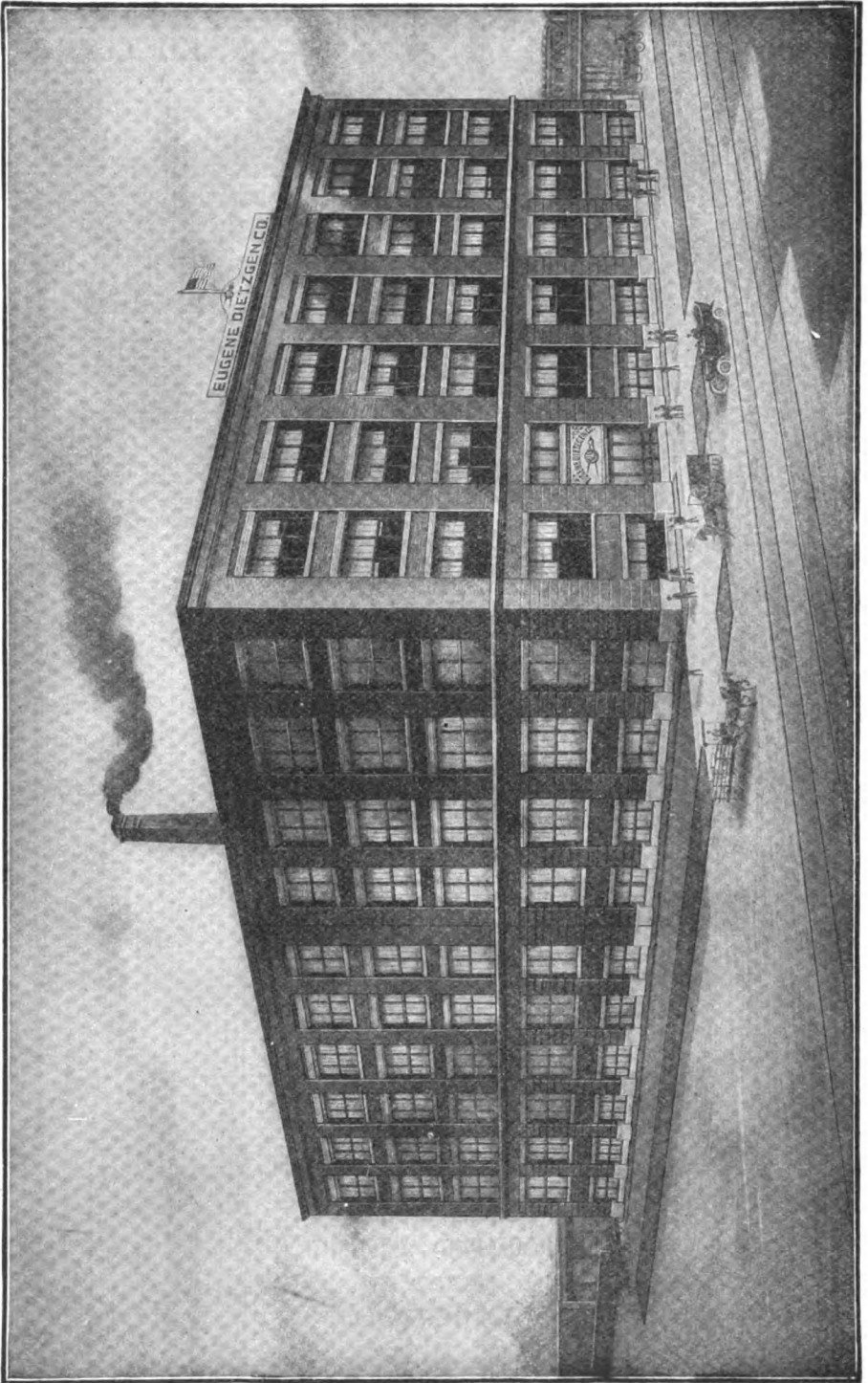
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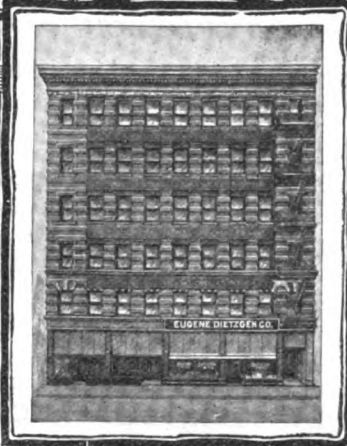


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CHICAGO



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of
Eugene
Dietzgen
Co.



316 CAMP ST. NEW ORLEANS



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839103

Introductory

IN presenting this, the Eleventh Edition of our catalog, we wish to thank our many friends for their kind support, and to assure them that a continuance of their patronage will be merited by our established and recognized policy of **REASONABLE PRICES, SERVICE and SATISFACTION.**

Our prices are and will continue to be the lowest consistent with the selected stock and the unsurpassed workmanship that enters into all of our product.

To those who are as yet unacquainted with us or our line, we wish to say that all of our goods are guaranteed to be exactly as described. A trial order is respectfully solicited as the best means of proving that we are a firm in all respects worthy of your confidence.

Our goods may be obtained from our branches in **CHICAGO, NEW YORK, SAN FRANCISCO, NEW ORLEANS and PITTSBURGH,** from our sales offices in **PHILADELPHIA and WASHINGTON,** and from the leading dealers in other cities of the United States, in Canada, in Mexico and in other countries.

EUGENE DIETZGEN CO.

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Notice

Ordering

When ordering, always give the catalog number of each article desired and, on certain articles, like papers, the size, thickness, color, etc. An omission of any of these important particulars often causes a delay of several days, as it is necessary, before we can fill the order correctly, to write for this information. If you have had the goods before and wish to order them again, specify on your order the description as given on our bill, or give the date of the bill.

Shipping Directions

State whether you wish the goods sent by parcel post, express or freight; if by freight, designate the route preferred. Small packages or parcels weighing less than 50 to 60 pounds can be forwarded more safely, more expeditiously and, in most instances, equally as cheap by express as by freight.

Parcel Post: Parcel Post packages will be forwarded at purchaser's risk, and cost of postage added to the invoice; if desired, these packages will be insured, and fee added to the invoice.

Express: Express shipments will, if desired, be forwarded prepaid, and charges added to the invoice.

Freight: Freight shipments usually require packing boxes; these will be billed at cost.

When no shipping directions are given, we send goods according to our best judgment.

As we exercise the greatest care in preparing shipments and in forwarding as directed, we are not responsible for goods damaged or lost in transit. Every assistance will, however, be given in tracing shipments which have not been delivered promptly.

Remittances

Remittances may be made either by bank draft payable to our order, or by post-office money order, or by cash sent by any of the express companies. If cash is forwarded by mail, the letter should be registered. When goods are ordered by express, C. O. D., a remittance to cover packing and express charges both ways must accompany the order, and express charges for collection will be added to the invoice. Collection charges will be saved and goods delivered quicker by remitting in full with order.

Accounts

If you have never had an account with us and wish to order goods, either send a remittance with the order or give references. Failure to remit or to give references compels us to make inquiry as to the responsibility of the party ordering, thus delaying the shipment until we receive satisfactory information.

Guarantee

All our goods are guaranteed to be exactly as described, and if any article is found to be otherwise it may be returned for replacement or for money refund.

We ask co-operation to the extent that if any cause for complaint arises that we be notified immediately.

All prices subject to change without notice.



Drawing Papers in Sheets

Whatman Hand Made

The Whatman Drawing Papers are made with three different surfaces, H. P., C. P. and R., as follows:

H. P., or "Hot Pressed," has a smooth surface: used principally for pencil, ink and free-line drawings.

C. P., or "Cold Pressed," has a finely grained surface: used for general drawings and water-color work.

R., or "Rough" (Torchon Paper), has a coarsely grained surface: used for water-color work, sketching, and very bold drawings.

When ordering, always specify size and surface wanted—H. P., C. P. or R.

No. 1. Whatman Drawing Paper. With H. P. or C. P. surface.

Cap,	13 × 17 inches,	. . . . .	Ream, \$	Quire, \$
Demy,	15 × 20 "	. . . . .	"	"
Medium,	17 × 22 "	. . . . .	"	"
Royal,	19 × 24 "	. . . . .	"	"
Super Royal,	19 × 27 "	. . . . .	"	"
Imperial,	22 × 30 "	. . . . .	"	"
Double Elephant,	27 × 40 "	. . . . .	"	"
Antiquarian,	31 × 53 "	. . . . .	"	"
"	31 × 53 "	. . . . .		Sheet,

2. Whatman Drawing Paper. With R. surface (Torchon Paper).

Royal,	19 × 24 inches,	. . . . .	Ream, \$	Quire, \$
Imperial,	22 × 30 "	. . . . .	"	"
Double Elephant,	27 × 40 "	. . . . .	"	"

3. Whatman Drawing Paper. Extra heavy, with H. P., C. P. or R. surface.

Imperial,	22 × 30 inches,	. . . . .	Ream, \$	Quire, \$
Double Elephant,	27 × 40 "	. . . . .	"	"

Mounted Whatman Papers listed under Nos. 125-126.

Samples of Sheet Papers mailed on request.

See Price List in back of Catalog.

Drawing Papers in Sheets

Our different brands of Sheet Papers have been chosen after a careful and exhaustive study covering our many years of experience of the requirements of such papers, and our stock as listed meets all of the demands of exacting draftsmen. They are manufactured exclusively for us in modern, specially equipped mills, and are made from selected raw material.

No. 5. Napoleon Cold Pressed Drawing Paper. A hard, smooth, pure white paper of uniform surface, especially adapted for map work and for complicated drawings. Of great strength and durability. Perfect erasing qualities. Will not discolor. An exceptional paper for the highest class of Mechanical Drawing.

Royal,	19 × 24 inches,	Ream, \$	Quire, \$
Imperial,	22 × 30 " "	"	"
Double Elephant,	27 × 40 " "	"	"

9. Standard Drawing Paper. A pure white paper of exceptional quality. Largely used by Mechanical and Architectural draftsmen. For School and College use it is unequalled. Strong, with uniform surface and excellent erasing properties. A perfect pencil paper, suitable for both ink and water-color. The thickness is in proportion to the size of the sheet: the smallest size is the thinnest.

Cap,	14 × 17 inches,	Ream, \$	Quire, \$
Demy,	15 × 20 " "	"	"
Medium,	17 × 22 " "	"	"
Royal,	19 × 24 " "	"	"
Super Royal,	19 × 27 " "	"	"
Imperial,	22 × 30 " "	"	"
Double Elephant,	27 × 40 " "	"	"

10. Union Drawing Paper. White. Very suitable for school use. Slightly grained surface.

Cap,	14 × 17 inches,	Ream, \$	Quire, \$
Demy,	15 × 20 " "	"	"
Medium,	17 × 22 " "	"	"
Royal,	19 × 24 " "	"	"
Imperial,	22 × 30 " "	"	"
Double Elephant,	27 × 40 " "	"	"

11. Saxon Drawing Paper. Light Cream Color. Slightly grained surface. Strong, does not become brittle, stands erasing exceptionally well, and takes ink, pencil and water-color.

Royal,	19 × 24 inches,	Ream, \$	Quire, \$
Imperial,	22 × 30 " "	"	"
Special,	24 × 36 " "	"	"
Double Elephant,	27 × 40 " "	"	"

11B. Fulton Drawing Paper. Light Green. Smooth, hard surface. Takes both ink and pencil. Does not become brittle, and stands erasing to the greatest extent. The light green color is very agreeable to work on.

Royal,	19 × 24 inches,	Ream, \$	Quire, \$
Imperial,	22 × 30 " "	"	"
Special,	24 × 36 " "	"	"
Double Elephant,	27 × 40 " "	"	"

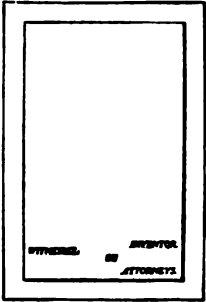
See Price List in back of Catalog.

Drawing Papers in Sheets

- No. 13. Strathmore White Drawing Paper. Medium surface. For pen and ink sketching and water-color work. Of excellent erasing properties.**
 14½ × 23 inches, 100 sheets, \$
 23 × 29 " "
- 13A. Strathmore Gray Drawing Paper. Medium surface. For pen and ink sketching and water-color work. The gray tint gives a very pleasing effect to pen and ink drawings.**
 23 × 29 inches, 100 sheets, \$
- 14. Strathmore 2-Sheet White Drawing Board. Medium surface. For pencil, pen and water-color drawings.**
 14½ × 23 inches, 100 sheets, \$
 23 × 29 " "
- 14A. Strathmore 2-Sheet Gray Drawing Board. Medium surface. For pencil, pen and water-color drawings.**
 23 × 29 inches, 100 sheets, \$
- 15. Strathmore 2-Sheet White Drawing Board. Smooth surface. For pen and ink drawings.**
 14½ × 23 inches, 100 sheets, \$
 23 × 29 " "
- 16. Strathmore 3-Sheet White Drawing Board. Medium surface. For pencil, pen and water-color drawings.**
 14½ × 23 inches, 100 sheets, \$
 23 × 29 " "
- 16A. Strathmore 3-Sheet Gray Drawing Board. Medium surface. For pencil, pen and water-color drawings.**
 23 × 29 inches, 100 sheets, \$
- 16B. Strathmore 3-Sheet White Drawing Board. Smooth surface. For pen and ink drawings.**
 14½ × 23 inches, 100 sheets, \$
 23 × 29 " "
- 16C. Strathmore White Illustrating Board. Medium. Water-color paper mounted on heavy board.**
 22 × 28 inches, 100 sheets, \$
 30 × 40 " "
- 16D. Strathmore White Illustrating Board. Light weight (one side only).**
 22 × 30 inches, 100 sheets, \$
- 19. Strathmore Charcoal Paper. White.**
 Royal 19 × 25 inches, Ream, \$ Quire, \$
- 19B. Michallet Charcoal Paper. White.**
 Royal 19 × 25 inches, Ream, \$ Quire, \$

See Price List in back of Catalog.

Dietzgen Bristol Boards



No. 21.

Each Sheet
Stamped



Dietzgen Patent Office Bristol Board is of the thickness, quality, tint and size required by the United States Patent Office.
It can be rolled without injury, and has a hard, white surface that stands erasing perfectly.

- | | | | |
|---------|--|----------------|--|
| No. 20. | Dietzgen Patent Office Bristol Board. White. 3-ply. Plain.
10 × 15 inches, U. S. Standard, Dozen, \$
15 × 20 " English " " | | |
| 21. | Dietzgen Patent Office Bristol Board. White. 3-ply. Printed with border, etc.
10 × 15 inches, U. S. Standard, Dozen, \$ | | |
| 24. | Dietzgen Ivory White Bristol Board. 3-ply. For pen and ink drawings.
22½ × 28½ inches, Dozen, \$ | | |
| 26. | Reynolds White Bristol Board. Smooth Surface. Plain. | | |
| | 10 × 15 inches, Dozen, \$ | 2-ply | 3-ply 4-ply |
| | 12½ × 15¼ " " | | |
| | 14¾ × 18¼ " " | | |
| | 16½ × 20¾ " " | | |
| | 18¼ × 22¾ " " | | |
| | 21½ × 28¾ " " | | |
| 27. | Reynolds White Bristol Board. Printed with border, etc.
10 × 15 inches, U. S. Standard, 2-ply, . Gross, \$ Dozen, \$
10 × 15 " " 3-ply, . " " | | |
| 30. | White Mounting Board. | | |
| | 22 × 28 4-ply. | 22 × 28 6-ply. | 22 × 28 8-ply. 28 × 44 10-ply. 30 × 40 in. 16-ply. |
| | Dozen, \$ | | |
| | Sheet, | | |

Printing Frames for Patent Office Drawings listed under Nos. 4260-4261.

See Price List in back of Catalog.

School Drawing Tablets



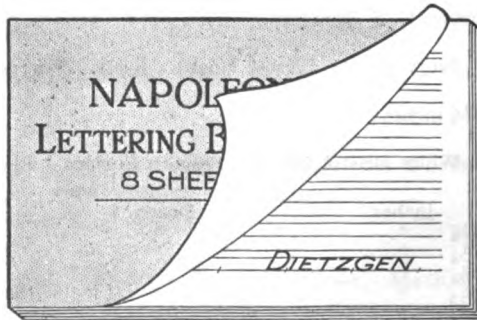
No. 31.



32.

- No. 31. **Union School Drawing Tablet.** Made of No. 10 Union Drawing Paper, 9 × 12 inches, 16 sheets, heavy manila envelope with each tablet, Dozen, \$ Each, \$
32. **Standard School Drawing Tablet.** Made of No. 9 Standard Drawing Paper, 9 × 12 inches, 16 sheets, heavy manila envelope with each tablet, Dozen, \$ Each, \$

Napoleon Lettering Blocks and Sheets



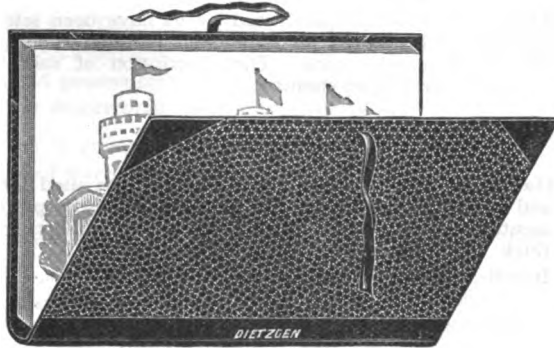
No. 33A.

- No. 33A. **Napoleon Lettering Block.** Made of No. 5 Napoleon Drawing Paper, 5 × 6¾ inches, engraving 4¼ × 6 inches, 8 sheets, cardboard back, Dozen, \$ Each, \$
- 33B. Like No. 33A, but 12 sheets, " "
- 33C. **Napoleon Lettering Sheet.** Made of No. 5 Napoleon Drawing Paper, 10 × 13½ inches, engraving 8¼ × 11½ inches, . . . Dozen, \$

The Napoleon Lettering Blocks and Lettering Sheets will prove of great advantage to all students interested in freehand lettering, as they are a valuable aid for learning the subject thoroughly.

See Price List in back of Catalog.

Solid Sketch Blocks



No. 36.

Solid Sketch Blocks—24 Sheets—Plain

Sizes, 5 × 7 7 × 10 9 × 12 10 × 14 14 × 20 in.

No. 34. Standard Paper, Doz., \$

Each,

No. 35. Whatman " Doz., \$

Each,

Solid Sketch Blocks—24 Sheets—Bound Leather Back and Corners, Cloth Sides, Pencil Loop

Sizes, 5 × 7 7 × 10 9 × 12 10 × 14 14 × 20 in.

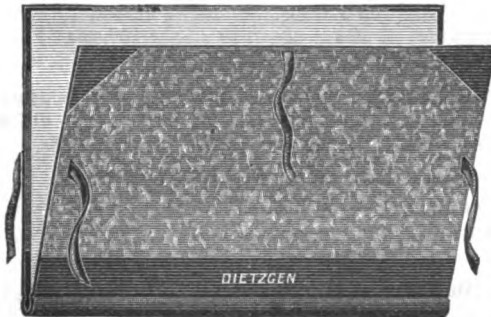
No. 36. Standard Paper, Doz., \$

Each,

No. 37. Whatman " Doz., \$

Each,

Portfolios



No. 38.

No. 38. Paper Sides, Cloth Back and Corners.

Sizes, 12 × 16 14 × 18 17 × 22 20 × 26 23 × 31 in.

Doz., \$

Each,

No. 39. Cloth Sides, Leather Back and Corners.

Sizes, 12 × 16 14 × 18 17 × 22 20 × 26 23 × 31 in.

Doz., \$

Each,

See Price List in back of Catalog.

Manila and Detail Papers in Rolls

The Manila and Detail Papers listed by us have been selected with great care, and are especially well adapted for detail and preliminary drawings, their qualities not being excelled in manila stock. The description of each grade is guaranteed representative of the properties claimed.

Manila Paper

- No. 50. Hampton Manila Paper. Smooth.** Can be used for detail drawings, but will not stand much erasing. Used principally by pattern makers and ornamental glass workers for stencils and patterns. Three weights: Medium (X); thick (XX); and extra thick (XXX).
 In rolls of about 75-100 lbs., 36, 40, 44, 48 in. wide, . . . Pound, \$

Detail Drawing Papers

Huron (Light Color) Detail Paper. Of selected manila stock, made specially for drafting purpose. Slightly grained surface. Erases reasonably well and is suitable for both ink and pencil drawings.

- No. 53A. Huron (Light Color) Detail Paper. Medium.**
 In rolls of about 100-120 lbs., 36 and 42 in. wide, . . . Pound, \$
 36 inches wide 100 yds., \$ 50 yds.,
 42 " " 100 " 50 "

- 53B. Huron (Light Color) Detail Paper. Thick.**
 In rolls of about 100-120 lbs., 36, 42, 48 in. wide, . . . Pound, \$
 36 inches wide, 100 yds., \$ 50 yds.,
 42 " " 100 " 50 "
 48 " " 100 " 50 "

- 53C. Huron (Light Color) Detail Paper. Extra Thick.**
 In rolls of about 100-120 lbs., 36 and 42 in. wide, . . . Pound, \$
 36 inches wide, 100 yds., \$ 50 yds.,
 42 " " 100 " 50 "

Orion (Buff Color) Detail Paper. The best manila drafting paper. Slightly grained surface. Good erasing quality. Adapted for both ink and pencil drawings. The buff tint permits of considerable handling without soiling.

- No. 54A. Orion (Buff Color) Detail Paper. Medium.**
 In rolls of about 100-120 lbs., 36 and 42 in. wide, . . . Pound, \$
 36 inches wide, 100 yds., \$ 50 yds.,
 42 " " 100 " 50 "

- 54B. Orion (Buff Color) Detail Paper. Thick.**
 In rolls of about 100-120 lbs., 36, 42, 48, 54 in. wide, . . . Pound, \$
 36 inches wide, 100 yds., \$ 50 yds.,
 42 " " 100 " 50 "
 48 " " 100 " 50 "
 54 " " 100 " 50 "

- 54C. Orion (Buff Color) Detail Paper. Extra Thick.**
 In rolls of about 100-120 lbs., 36 and 42 in. wide, . . . Pound, \$
 36 inches wide, 100 yds., \$ 50 yds.,
 42 " " 100 " 50 "

See Price List in back of Catalog.



Drawing Papers in Rolls

In determining the Roll Drawing Papers to be catalogued, we have kept in view the fact that no two papers listed should combine the same features; but that each paper in the assortment should possess certain special characteristics, so that the draftsman may select from the line represented a paper suitable for his particular uses.

Careful attention is given to maintaining uniformity in both the thickness and the surface of our papers.

This feature is of great importance; it has been attained by having the papers made from selected raw material, and manufactured solely for us in modern, specially equipped mills.

Each paper catalogued is guaranteed by us to be of the highest quality in its respective brand, and to be exactly as represented under its description.

After each paper listed will be found a brief explanation of its various properties, thus enabling any one not familiar with our goods to choose a paper best adapted for the intended purpose.

No. 55. Trevon Drawing Paper. Thick. A low-priced white paper, suitable for preliminary work. Strong, with good erasing properties. Slightly grained surface. Will take ink and water-color.

In rolls of about 40-45 lbs., 30, 36, 42 inches wide,	.	.	Pound,	\$
			50 yds.	25 yds.
			10 yds.	
30 inches wide,	.	.	.	\$
36 " "	.	.	.	.
42 " "	.	.	.	.

56. Milon Drawing Paper. Medium. An extremely tough, white sketching paper, with smooth surface. Will not break in folding. With best erasing qualities, and suitable for pencil, ink and water-color work. Moderate in price.

In rolls of about 40-45 lbs., 36 or 42 inches wide,	.	.	Pound,	\$
			50 yds.	25 yds.
			10 yds.	
36 inches wide,	.	.	.	\$
42 " "	.	.	.	.

58. Toulon Drawing Paper. Thick. Similar to No. 56, but of much heavier stock.

In rolls of about 40-45 lbs., 36 or 42 inches wide,	.	.	Pound,	\$
			50 yds.	25 yds.
			10 yds.	
36 inches wide,	.	.	.	\$
42 " "	.	.	.	.

Our Roll Drawing Papers cut into any size sheets desired, at prices but little higher than for roll stock.

Samples of Roll Papers mailed on request.

See Price List in back of Catalog.

Drawing Papers in Rolls

No. 59B. Havlon Drawing Paper. An excellent high grade buff color paper, with slightly grained surface. Strong, durable and of good erasing properties. Will stand rough handling.

In rolls of about 40-45 lbs., 30, 36, 42, 54, 62 inches wide, . Pound, \$

	100 yds.	50 yds.	10 yds.
30 inches wide,	\$		
36 " "			
42 " "			
54 " "			
62 " "			

61. Fulton Drawing Paper. Light green in color, with smooth, hard surface. Takes both ink and pencil. Does not become brittle, and stands erasing to the greatest extent. On account of its color, it is more agreeable to work on than either white or cream papers.

In rolls of about 40-45 lbs., 30, 36, 42, 62 inches wide, . Pound, \$

	50 yds.	25 yds.	10 yds.
30 inches wide,	\$		
36 " "			
42 " "			
62 " "			

65. Standard Drawing Paper. A pure white paper of exceptional quality. Uniform in thickness and surface. Strong, with excellent erasing properties. Suitable for ink, pencil and water-color.

In rolls of about 40-45 lbs., 36, 42, 62 inches wide, . Pound, \$

	25 yds.	10 yds.	Yard.
36 inches wide,	\$		
42 " "			
62 " "			

70. Double Force Drawing Paper. White. The toughest paper made. Has a cold pressed but somewhat smooth surface. Can be folded without breaking, and is specially adapted for drawings which will be handled roughly in machine shops or outdoors.

In rolls of about 40-45 lbs., 36, 42, 63, 72 inches wide, . Pound, \$

	25 yds.	10 yds.	Yard.
36 inches wide,	\$		
42 " "			
63 " "			
72 " "			

Our Roll Drawing Papers cut into any size sheets desired, at prices but little higher than for the roll stock.

Sheet Drawing Papers listed on pages 5-7.

See Price List in back of Catalog.

Mounted Drawing Papers

Mounted on Muslin

On account of the increased demand for Mounted Papers to be used for Recorders' plats, County and State maps, and all drawings which are of permanent value, we have greatly enlarged our facilities for this line of work.

Our Mounting Departments are large, modern and thoroughly equipped, and only the most expert mounters are employed.

All our papers are mounted stretched, and air-dried.

By this process the muslin and paper become inseparable, the paper adhering at the edges equally as well as in the center. Both the surface and strength of the paper remain the same as in the unmounted stock.

No. 98B.	Havlon Drawing Paper. Buff Color.	Mounted.	The same paper as described under No. 59B.
	36 inches wide,		10 yds. Yard.
	42 " "		\$
	54 " "		
	62 " "		
99B.	Fulton Drawing Paper. Light Green.	Mounted.	The same paper as described under No. 61.
	36 inches wide,		10 yds. Yard.
	42 " "		\$
	62 " "		
101.	Standard Drawing Paper. White.	Mounted.	The same paper as described under No. 65.
	36 inches wide,		10 yds. Yard.
	42 " "		\$
	62 " "		
105.	Double Force Drawing Paper. White.	Mounted.	The same paper as described under No. 70.
	36 inches wide,		10 yds. Yard.
	42 " "		\$
	63 " "		
	72 " "		
120.	Sharon Indestructible Paper Cloth. Smooth.		An article made of muslin to which paper pulp is applied. Pliable and very strong, takes both pencil and ink, and stands erasing to a serviceable extent.
	In rolls of 30-40 yds., 38 inches wide,		Yard, \$

Mounted Drawing Papers in Sheets

Furnished either with the muslin standing over on one or all edges, or with edges trimmed to the exact size of the sheet. Unless otherwise specified the sheets will be furnished with muslin trimmed on all edges.

No. 125.	Whatman Drawing Paper. Mounted. (Specify whether hot or cold pressed Surface.)
	Imperial, 22 X 30 inches, Sheet, \$
	Double Elephant, 27 X 40 " " "
126.	Whatman Drawing Paper. Double Mounted. (Specify whether hot or cold pressed surface.) For Map or Atlas work. Double mounted—muslin in the middle, with paper on both sides.
	Imperial, 22 X 30 inches, Sheet, \$
	Double Elephant, 27 X 40 " " "

See Price List in back or Catalog.

Tracing Cloths

No. 130. Excelsior Tracing Cloth, 24 yd. rolls, one side glazed, other dull. Very uniform and exceptionally transparent.

	Width,	30 in.	36 in.	42 in.
Roll,				\$
Yard,				



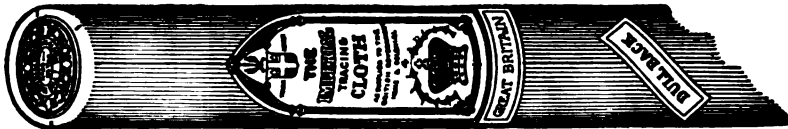
No. 133.

No. 133. Lion Tracing Cloth, 24 yd. rolls, one side glazed, other dull.

	Width,	30 in.	36 in.	42 in.
Roll,				\$
Yard,				

134. Clarion Tracing Cloth, 24 yd. rolls, one side glazed, other dull.

	Width,	30 in.	36 in.	42 in.
Roll,				\$
Yard,				



No. 135.

No. 135. Imperial Tracing Cloth, 24 yd. rolls, one side glazed, other dull.

	Width,	24 in.	30 in.	36 in.	38 in.	42 in.	48 in.	54 in.
Roll,								\$
Yard,								

136. Reliance Tracing Cloth, 24 yd. rolls, one side glazed, other dull.

	Width,	30 in.	36 in.	43 in.
Roll,				\$
Yard,				

The Reliance Tracing Cloth is heavier and less transparent than Nos. 130, 133, 134 and 135.

Pencil Cloth

No. 138. Excello Pencil Cloth, 24 yd. rolls. A strong, white cloth of moderate transparency. Very suitable for pencil tracings.

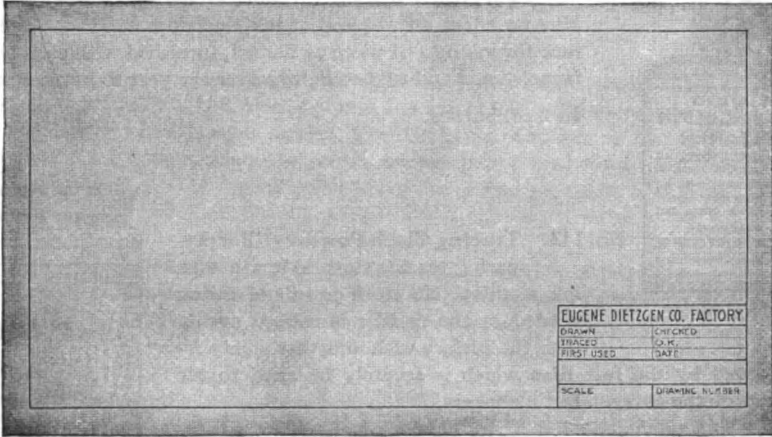
	Width,	30 in.	36 in.
Roll,			\$

Samples of Tracing Cloths mailed on request. Tracing Cloth Preparations listed on page 17.

See Price List in back of Catalog.

Tracing Cloths and Papers in Sheets

Plain or Printed with Borders, Titles, Etc.



Any of the Tracing Cloths or Papers listed by us can be furnished in sheet form, either plain or printed with border lines, titles, etc. Keloe ink is used for printing, as it is unequalled for density and permanency, being manufactured specially for work of this kind.

Experience has proved that no standardized printing display nor sheets of fixed dimensions will be acceptable to the general trade, owing to individual ideas and preferences. Consequently, we do not show list prices for either plain or printed sheets for reason that they would be misleading, as it is necessary, due to the conditions, to determine the cost of each and every requirement separately on basis of the stock desired, the size and quantity of the sheets, and the printing specifications.

However, on request we will give estimates for supplying either plain or printed sheets of any of the Tracing Cloths or Papers described in this catalog. Our facilities for work of this kind are unsurpassed, and the greatest care is exercised in following the specifications to the letter.

For Tracing Cloths, see Nos. 130 to 136; for Tracing Papers, see Nos. 170B to 198.

Special Forms Recommended by Government for Railroad and Highway Projects

We carry in stock, Profile Sheets and Station Maps as recommended by the Interstate Commerce Commission for Railroad Valuation; also Plate No. 1 and Plate No. 2, Plan Profile Sheets, and Plate No. 1 Cross Section Sheet, as recommended for the Federal Aid Road Projects.

Full information regarding these special forms will be furnished on request.

See Price List in back of Catalog.

Tracing Cloth Preparations



No. 140.

No. 140. Liquid Tracing Cloth Cleaner. Excellent for removing pencil marks, dirt, and grease spots from tracings. Has no effect on waterproof ink, and does not injure the surface for inking. A piece of flannel, furnished with each bottle, is moistened and rubbed lightly over the part to be cleaned.

In 2 oz. bottles, Each, \$

removed by the felt disc which is securely fastened to the top of the cover. In tin shakers.

Dozen, \$
 Each,

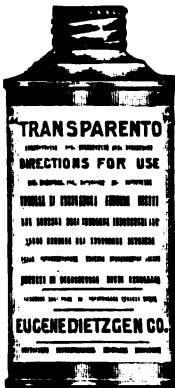


No. 142.

No. 142. Tracing Cloth Powder. For preparing tracing cloth so it will take ink readily. No cloth or tuft of cotton needed, as the powder is rubbed evenly over the surface with and thoroughly removed by the felt disc which is securely fastened to the top of the cover. In tin shakers.

No. 144. Instanto Ink Remover. Unequaled for quickly and effectively removing waterproof black drawing ink from tracing cloth. It positively cannot injure the tracings as the ingredients of "Instanto" are absolutely harmless to tracing cloth.

In bottles, 1 oz. 4 oz. 8 oz. 16 oz.
 Each, \$



No. 146.

No. 146. Transparento. For transparentizing drawings and tracings. Especially valuable to facilitate the printing of drawings made on bristol board or heavy white drawing paper. Also to increase the printing speed of cloth or paper Vandyke negatives, old or soiled tracings, or tracings of any kind. Does not affect ink or pencil marks, and will not cause paper or cloth to become brittle. It is not inflammable.

In cans, . . 4 oz. ½ Pt. Pt. Qt. ½ Gal. Gal.
 Each, . . \$

For Tracing Cloths, see page 15.

See Price List in back of Catalog.



Stamp-o-graph Process

The Stamp-o-graph Process enables Lettering, Designs and Standard Details to be stamped permanently on either Tracing Cloth or Tracing Paper—supplying a much needed want.

It consists of making an impression with an ordinary rubber stamp inked from the Stamp-o-graph Ink Pad, and then applying Black and White Powders according to the directions furnished with each outfit. The Lettering, Designs or Standard Details produced are jet black, gasoline proof, smear proof and ready for use, blue-printing perfectly. The operation requires but a few moments and gives perfect results.

We do not believe that there is any other ink or system of lettering now on the market which combines all of the remarkable features of the Stamp-o-graph Process. Some of these features are: Impression dries immediately; ink does not injure the rubber stamps; the stamp pad does not become hard.

Standard Titles and Details

of all kinds can be made up on rubber stamps and stamped quicker and more effectively than the work can be done by hand. The use of the Stamp-o-graph Process enables anyone to obtain perfect results with but very little practice, and therefore your skilled draftsmen can devote their time to work of greater importance than lettering, etc.

No. 148.	Stamp-o-graph Outfit; complete with Ink Pad $2\frac{3}{4} \times 4\frac{1}{2}$ in., bottle of Pad Ink, bottle of Black Powder and bottle of White Powder,	Each, \$
148-1.	Like No. 148, but Ink Pad 3×6 in.,	"
148-2.	" " 148, " Ink Pad $4\frac{1}{2} \times 7\frac{1}{2}$ in.,	"
148-3.	" " 148, " Ink Pad 4×9 ,	"
148-4.	Bottle of Pad Ink,	"
148-5.	" " Black Powder,	"
148-6.	" " White Powder,	"

Outfits with Printing Presses.

No. 148-13.	Stamp-o-graph Outfit; complete with Printing Press with Ink Pad $4 \times 6\frac{1}{2}$ in., bottle of Pad Ink, bottle of Black Powder and bottle of White Powder,	Each, \$
148-14.	Like No. 148-13, but Printing Press with Ink Pad $4 \times 8\frac{1}{2}$ in., "	"

The Printing Press Outfits facilitate more accurate and uniform stamping. Rubber Type and Holders can be furnished if desired.

See Price List in back of Catalog.



Tracing Papers in Rolls

Careful attention has been given to our selection of Tracing Papers, and we feel confident that the assortment as listed will meet all requirements.

While each Paper listed is followed by a brief explanation of its various properties, it is somewhat difficult to explain clearly and concisely the exact differences of the various papers, and we suggest that whenever possible the selection be made from our sample book.

- No. 170B. Orion Detail Tracing Paper.** Manila stock. Unglazed. Strong. Of moderate transparency.
 40 inches wide, Roll of 100 yds., \$
 48 " " " " 100 "
- 172. Zeta Tracing Paper.** Thin. Glazed. Very transparent. Popular for lithographic work.
 42 inches wide, Roll of 20 yds., \$
- 174. Triumph Tracing Paper.** Medium Thick. Transparent. Takes pencil and ink.
 42 inches wide, Roll of 20 yds., \$
- 175. Advance Tracing Paper.** Thin. Very transparent.
 42 inches wide, Roll of 20 yds., \$
- 176. Azure Tracing Paper.** Thin. Strong. Transparent.
 36 inches wide, Roll of 20 yds., \$
 42 " " " " 20 "
 58 " " " " 20 "
- 177. Preston Tracing Paper.** Thin. Dull finish. Very tough and transparent.
 42 inches wide, Roll of 20 yds., \$
- 177B. Briston Tracing Paper.** Medium Thick. Of high grade pure linen stock. Stands erasing well, and is of moderate transparency. Has great tensile strength, and is suitable for permanent records.
 36 inches wide, Roll of 20 yds., \$
 42 " " " " 20 "
- 177C. Lupton Tracing Paper.** An excellent thin, white tracing paper. Stands considerable erasing. Strong and transparent.
 36 inches wide, Roll of 50 yds., \$ 25 yds., \$
 42 " " " " 50 " 25 "
- 177½. Clayton Sketching Paper.** Medium Thick. Of unsurpassed strength and of moderate transparency. Especially adapted for machine drawings and other work requiring considerable handling.
 36 inches wide, Roll of 50 yds., \$ 25 yds., \$
 42 " " " " 50 " 25 "
- 178. Federal Tracing Paper.** Unglazed. The best for detail or full size tracings. Tough, has slight grain, and is suitable for both pencil and ink.
 57 inches wide, Roll of 44 yds., \$

Samples of Tracing Cloth and Papers mailed on request.

See Price List in back of Catalog.

Tracing Papers in Rolls

- No. 180. Natural Tracing and Sketching Paper. Medium Thick. An excellent paper, strong and tough, especially made for sketching and transferring. Stands erasing, and takes pencil, ink and color.**
- | | | |
|-----------------|--|---------------------|
| 30 inches wide, | | Roll of 50 yds., \$ |
| 36 " " | | " " 50 " |
| 42 " " | | " " 50 " |
| 72 " " | | " " 50 " |
- 180B. Newton Tracing and Sketching Paper. Thin. Like No. 180, but considerably thinner, and of greater transparency.**
- | | | |
|-----------------|--|---------------------|
| 30 inches wide, | | Roll of 50 yds., \$ |
| 36 " " | | " " 50 " |
| 42 " " | | " " 50 " |
| 72 " " | | " " 50 " |
- 181. Colton Tracing Paper. Medium Thick. Transparent.**
- | | | |
|-----------------|--|---------------------|
| 42 inches wide, | | Roll of 20 yds., \$ |
|-----------------|--|---------------------|
- 185. Kelton Tracing Paper. Medium Thick. Bluish in color. Very strong and transparent, and will take ink and colors without shrinking. Recommended for tracings that are to be reproduced by any solar printing process. An excellent substitute for tracing cloth.**
- | | | |
|-----------------|--|---------------------|
| 40 inches wide, | | Roll of 20 yds., \$ |
|-----------------|--|---------------------|
- 185A. Argus Tracing Paper. Medium Thick. Strong and transparent. Very fine for ink and color work. Excellent for erasing.**
- | | | |
|-----------------|--|---------------------|
| 36 inches wide, | | Roll of 20 yds., \$ |
| 42 " " | | " " 20 " |
- 185B. Crescent Tracing Paper. Like No. 185A, but of bluish tint.**
- | | | |
|-----------------|--|---------------------|
| 36 inches wide, | | Roll of 20 yds., \$ |
| 42 " " | | " " 20 " |
- 186. Premier Tracing Paper. Medium Thick.**
- | | | |
|-----------------|--|---------------------|
| 42 inches wide, | | Roll of 20 yds., \$ |
|-----------------|--|---------------------|
- 188. Sterling Tracing Vellum. Of exceptional strength and transparency. Very fine for ink and color work. Stands erasing perfectly and does not "buckle" nor deteriorate. Incased in strong tubes.**
- | | | |
|-----------------|--|---------------------|
| 36 inches wide, | | Roll of 20 yds., \$ |
| 42 " " | | " " 20 " |
- 189. Deeco Tracing Paper. Thin. Very transparent. Especially adapted for use in tracing from blue prints.**
- | | | |
|-----------------|--|---------------------|
| 42 inches wide, | | Roll of 20 yds., \$ |
|-----------------|--|---------------------|
- 192. Clinton Tracing Paper. Medium Thick. A strong, white bond paper, unglazed. Of medium transparency, and suitable for ink, pencil and color**
- | | | | |
|-----------------|--|---------------------|-------------|
| 30 inches wide, | | Roll of 50 yds., \$ | 25 yds., \$ |
| 36 " " | | " " 50 " | 25 " |
| 42 " " | | " " 50 " | 25 " |

Tracing Papers in Sheets

- No. 198. Crane Bond Paper.**
- | | | | |
|-----------------|-----------|--------|--------|
| | Thin | Medium | Thick |
| | No. 16 | No. 18 | No. 21 |
| 19 X 24 inches, | Quire, \$ | | |
| 19 X 30 " " | " | | |

See Price List in back of Catalog.

Solar and Electric Printing Departments

At our establishments in Chicago, New York, San Francisco, New Orleans and Pittsburgh, we operate large departments fully equipped for reproducing tracings and drawings both by sun and by electric light, thus enabling Engineers, Architects, and the general trade, located in any part of the country and having limited printing facilities, to obtain, quickly and at a reasonable price, any number of prints desired.

We specialize on the following kinds of prints, made on both paper and cloth:

Blue Prints, or white lines on blue background.

Positive Blue Prints, or dark blue lines on white background.

Positive Dark Brown Prints, or dark brown lines on white background.

Dark Brown Negative Prints, or white lines on brown background.

To overcome, as far as it is possible to overcome, the chance of prints fading when exposed to strong sunlight, all prints made by us are completely immersed in the bath, remaining there until all surplus chemicals are removed. This method of washing, while more laborious than the quick and convenient spraying process, gives results that have met with the general approval of our trade.

Tracings sent to us, with information regarding the kind of prints and number of copies desired, will be promptly reproduced and returned to sender.

On request, sample prints will be sent and prices quoted on any of the above processes.

Printing Equipment

Perfect equipments for printing by electric light have been installed in our different houses: both vertical and continuous Blue Print Machines of modern construction are used, and every improvement that facilitates printing by this process has been adopted. We are thus able to make prints rapidly and with perfect results.

For sun printing, our departments are equipped with our improved Vacuum Frames, by which the finest lines of a drawing are reproduced sharply and distinctly.

Special attention is given to map printing and mounting. Large Vacuum Frames, designed to meet all the requirements of map printing, have been installed; and our map work is noted for its sharp, distinct lines, and clear, unclouded backgrounds.

Maps, when desired, are mounted on muslin by our improved mounting process; and permanent, durable results are obtained. All of the joining edges of maps (when maps are in several sections) are accurately beveled, thus insuring strong, smooth, scarcely perceptible seams.

If ordered, maps will be attached either to plain or to spring rollers, at lowest prices.

Tubes for expressing or filing Tracings, Drawings, etc., listed under Nos. 4222A-4228C.

See Price List in back of Catalog.



Blue Print Papers

The sensitized Blue Print Papers listed on the following pages represent an assortment that will fulfill any requirement.

We pay particular attention to this part of our business, and as our coating methods are the result of improvements suggested by our many years of experience, we feel justified in saying that our departments for scientifically preparing sensitized papers are unequaled.

Only the purest chemicals are used, and the papers selected are those which extensive tests have proved to be the best adapted for the purpose. Expense has been entirely disregarded when it has been possible to utilize any device for the betterment of our product. By adhering to this policy; by taking advantage of improved processes; by keeping our machinery modernized in every respect,—we have developed our present splendid equipment. That our efforts in this direction are fully appreciated by our trade is proved conclusively by the extraordinary success attained by our product.

“RADIANT” Papers are manufactured for us by the **Johannot Mills**, in France, who have a world-wide reputation for making papers of unsurpassable excellence. They are the highest grade chemically pure stock, unequaled in tensile strength, always uniform in weight, and have a superior finish. These features, combined with our famous sensitizing solutions, produce a Blue Print Paper having printing and keeping qualities that defy comparison. All these papers bear our brand-name and the water-mark of the mill.

“HYPERION” Papers are high grade chemically pure stock, uniform in strength and finish, and of excellent printing and keeping qualities. These papers bear the brand-name and our initials.

“UNION” Papers are second grade stock, but the care with which they are manufactured makes them equal if not superior to many of the so-called “high grade” papers. They are produced to meet the demand for a cheap, dependable paper, suitable both for shop use and for general distribution.

Our Blue Print Papers are prepared for stock in four different solutions, described below; but we can sensitize them with any special solution which may be required to meet local conditions of sun or electric light.

Regular Printing.—Requires an exposure of about four minutes in bright sunlight. Best adapted for use during the summer and for making Positive Blue Prints from Vandyke Negatives. Unsurpassed in keeping quality. The prints produced have a deep, rich color, and clear, well-defined lines.

Rapid Printing.—Requires an exposure of about one minute in bright sunlight. Papers coated with this solution are invaluable for use in cloudy weather and for making prints quickly. The keeping and printing qualities are excellent.

Extra Rapid Printing.—Requires an exposure of thirty to forty seconds in bright sunlight. Especially adapted for printing under adverse weather conditions. Can be used also for electric light printing.

Electric Rapid Printing.—Requires an exposure of twenty to thirty seconds in bright sunlight. This solution is extremely sensitive, and is not recommended for use during the summer unless the printing is to be done by electric light, for which purpose it is specially adapted.

For richness and permanency of color; for sharpness of lines; for strength in water bath; and for superior keeping qualities,—our sensitized Blue Print Papers are unrivaled.

We have extensive sensitizing departments at our houses in Chicago, New York, San Francisco, New Orleans, and Pittsburgh. With these unparalleled coating facilities our trade in any part of the country is assured of obtaining freshly prepared paper at all times.

See Price List in back of Catalog.

Radiant Blue Print Papers

Prepared Daily



(Reduced facsimiles of our labels)

Sensitized with our Regular, Rapid, Extra Rapid or Electric Rapid Printing solutions.

No. 207. Radiant Satin. Medium Thick.

	Width,	30 in.	36 in.	42 in.
Roll of 50 yds., prepared,	.	\$		
" 10 " "	.			

209. Radiant Satin. Thick.

	Width,	30 in.	36 in.	42 in.	54 in.
Roll of 50 yds., prepared,	.	\$			
" 10 " "	.				

212. Radiant Parchment. Thin.

	Width,	30 in.	36 in.	42 in.	54 in.
Roll of 50 yds., prepared,	.	\$			
" 10 " "	.				

When ordering, always specify whether the Regular, Rapid, Extra Rapid or Electric Rapid Printing solution is desired.

For description of papers and solutions, see preceding page.

Photographic Blue Print Paper

For making prints of Furniture, Machinery, etc., where fine detail is required and glass negatives are used, we recommend our No. 215 Union Satin, Regular or Rapid Printing solution, as this stock is well adapted for work of this kind.

Tubes for preserving paper listed under Nos. 4222A-4228C. Blue Print Frames and Electric Blue Print Machines listed on pages 178-189.

Samples of Blue Print Papers mailed on request.

See Price List in back of Catalog.

Hyperion Blue Print Papers

Prepared Daily



(Reduced facsimiles of our labels)

Sensitized with our Regular, Rapid, Extra Rapid or Electric Rapid Printing solutions.

No. 218A. Hyperion Satin. Medium Thick.

	Width,	30 in.	36 in.	42 in.
Roll of 50 yds., prepared,	. . .			\$
" 10 " "	. . .			

218B. Hyperion Satin. Thick.

	Width,	30 in.	36 in.	42 in.
Roll of 50 yds., prepared,	. . .			\$
" 10 " "	. . .			

223. Hyperion Parchment. Thin.

	Width,	30 in.	36 in.	42 in.	54 in.
Roll of 50 yds., prepared,	. . .				\$
" 10 " "	. . .				

When ordering, always specify whether the Regular, Rapid, Extra Rapid or Electric Rapid Printing solution is desired.

For description of papers and solutions, see page 21.

Our roll Blue Print Papers cut into any size sheets desired, at prices but little higher than for the roll stock.

Blue Print Cloth listed under Nos. 226-226T.

Economy Box for safeguarding sensitized papers listed under Nos. 4220A-4220C.

Samples of Blue Print Papers mailed on request.

See Price List in back of Catalog.

Union Blue Print Papers

Prepared Daily



(Reduced facsimiles of our labels)

Sensitized with our Regular, Rapid, Extra Rapid or Electric Rapid Printing solutions.

No. 215. Union Satin. Medium Thick.

	Width,	30 in.	36 in.	42 in.
Roll of 50 yds., prepared,
" 10 "

216. Union Satin. Thick.

	Width,	30 in.	36 in.	42 in.	54 in.
Roll of 50 yds., prepared,
" 10 "

219. Union Parchment. Thin.

	Width,	30 in.	36 in.	42 in.
Roll of 50 yds., prepared,
" 10 "

When ordering, always specify whether the Regular, Rapid, Extra Rapid or Electric Rapid Printing solution is desired.

For description of papers and solutions, see page 21.

Our roll Blue Print Papers cut into any size sheets desired, at prices but little higher than for the roll stock.

Writing Fluids for making alterations on Blue Prints listed under Nos. 2700-2702. White Pencils for marking on Blue Prints listed under No. 3171.

Samples of Blue Print Papers mailed on request.

See Price List in back of Catalog.

Hyperion Blue Print Cloths

Prepared Daily



(Reduced facsimiles of our labels)

Sensitized with our Regular, Rapid, Extra Rapid or Electric Rapid Printing solutions.

No. 226. Hyperion Blue Print Cloth. Medium Thick.

	Width,	30 in.	36 in.	42 in.	54 in.
Roll of 50 yds., prepared,	.	\$			
" 10 " "	.				

226T. Hyperion Blue Print Cloth. Thin.

	Width,	30 in.	36 in.	42 in.
Roll of 50 yds., prepared,	.	\$		
" 10 " "	.			

When ordering, always specify whether the Regular, Rapid, Extra Rapid or Electric Rapid Printing solution is desired.

Unprepared Blue Print Cloths

No. 206. Hyperion Blue Print Cloth. Medium Thick. Unprepared.

	Width,	30 in.	36 in.	42 in.	54 in.
Yard,	.	\$			

206T. Hyperion Blue Print Cloth. Thin. Unprepared.

	Width,	30 in.	36 in.	42 in.
Yard,	.	\$		

Tubes for preserving sensitized cloth listed under Nos. 4222A-4228C. Blue Print Frames and Electric Blue Print Machines listed on pages 178-189.

Samples of Blue Print Cloths mailed on request.

See Price List in back of Catalog.



Vandyke Solar Papers and Cloths

The Vandyke Solar Papers and Cloths are unsurpassed for making **Dark Brown Negative Prints**, **Positive Blue Prints**, and **Positive Dark Brown Prints** on both paper and cloth.

In addition to producing prints that are unequalled in distinctness of outline, in clearness of copy, and in permanency of results, they possess the following valuable features and essential qualities:

1. Easily manipulated.
2. Print rapidly.
3. Save original tracings.
4. Do not become brittle.
5. Keep exceptionally well.
6. Reproduce Patent Office drawings quickly.

The Vandyke Solar Paper, introduced and perfected by us, still retains its title as the leading paper of its kind, regardless of the fact that many imitations are now on the market.

How to Use and Manner of Printing

From the original tracing a negative copy having white lines on an opaque dark brown background is made on thin Vandyke Paper or Cloth. This negative copy, which takes the place of the original tracing and thereby prevents it from becoming worn or damaged, is then used to make the following kinds of prints:

Positive Dark Brown Prints,
or dark brown lines on a white background.

Made by printing on Vandyke Paper or Cloth with an exposure of about five minutes in bright sunlight.

Positive Blue Prints,
or dark blue lines on a white background.

Made by printing on regular speed Blue Print Paper or Cloth with an exposure of about seven minutes in bright sunlight, or on rapid speed Blue Print Paper or Cloth with an exposure of about two minutes in bright sunlight.

The prints made from the negative copy are absolutely permanent, and can be **Colored, Altered and Added to**; the same as original drawings.

If properly protected from both light and moisture, the Vandyke Papers and Cloths will retain their strength and their printing qualities for many months.

Samples of sensitized papers and cloths mailed on request.

See Price List in back of Catalog.

Vandyke Solar Papers and Cloths



(Reduced facsimiles of our labels)

No. 227.	Vandyke Solar Paper. Medium Thick.	For positive prints.			
	Width,	30 in.	36 in.	42 in.	54 in.
	Roll of 50 yds., prepared,	\$			
	" 10 "	"			
229.	Vandyke Solar Paper. Thin.	For negative prints and for mailing.			
	Width,	30 in.	36 in.	42 in.	54 in.
	Roll of 50 yds., prepared,	\$			
	" 10 "	"			
231.	Vandyke Solar Cloth. Medium Thick.				
	Width,	30 in.	36 in.	42 in.	54 in.
	Roll of 50 yds., prepared,	\$			
	" 10 "	"			
232.	Vandyke Solar Cloth. Thin.				
	Width,	30 in.	36 in.	42 in.	
	Roll of 50 yds., prepared,	\$			
	" 10 "	"			

Prints made on our Thin Vandyke Cloth No. 232 are invaluable for shop records when the articles manufactured are standardized, as they erase well and may be added to like original drawings.

Directions and Fixing Salt supplied with each roll.

Vandyke Fixing Salt

For intensifying and fixing Vandyke Prints.

No. 233.	Vandyke Fixing Salt,	In cans,	2 oz.	4 oz.	Pound.
			\$		

Bichromate of Potash

For intensifying and fixing Blue Prints.

No. 234.	Bichromate of Potash,	In cans,	5 Pounds.	10 Pounds.
			\$	

By immersing Blue Prints in a Bichromate of Potash solution, the blues become deeper and more permanent.

Writing Fluid for making alterations on Vandyke Prints listed under No. 2703. Automatic Print Hanger for drying Vandyke Prints and Blue Prints. listed under Nos. 4232A-4232E.

See Price List in back of Catalog.



Perfect Profile Papers and Cloths

In Continuous Rolls

Plate A, 4 × 20 to one inch.

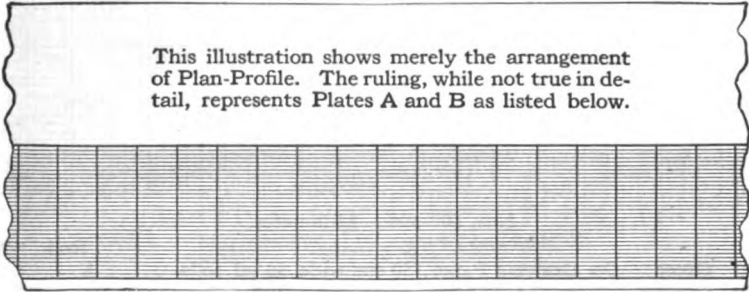
No.	Color.	Support.	Engraving.	20 in. wide,	50 yd. rolls,	Roll.	Yard.
270	Green.	On Drawing Paper,	20	in. wide,	50 yd. rolls,	\$	
270	Orange.	" "	20	"	50	"	
270½	Green.	" "	10	"	50	"	
270½	Orange.	" "	10	"	50	"	
271	Green.	Mounted on Muslin,	20	"	20	"	
271	Orange.	" "	20	"	20	"	
272	Green.	On Hyperion Cloth,	20	"	20	"	
272	Orange.	" "	20	"	20	"	
275	Orange.	Tracing Paper,	20	"	50	"	
275½	Orange.	" "	10	"	50	"	
276	Green.	Tracing Cloth,	20	"	20	"	
276	Orange.	" "	20	"	20	"	
276½	Green.	" "	10	"	20	"	
276½	Orange.	" "	10	"	20	"	

Plate B, 4 × 30 to one inch.

No.	Color.	Support.	Engraving.	20 in. wide,	50 yd. rolls,	Roll.	Yard.
280	Green.	On Drawing Paper,	20	in. wide,	50 yd. rolls,	\$	
280	Orange.	" "	20	"	50	"	
280½	Green.	" "	9	"	50	"	
280½	Orange.	" "	9	"	50	"	
281	Green.	Mounted on Muslin,	20	"	20	"	
281	Orange.	" "	20	"	20	"	
282	Green.	On Hyperion Cloth,	20	"	20	"	
282	Orange.	" "	20	"	20	"	
285	Orange.	Tracing Paper,	20	"	50	"	
285½	Orange.	" "	9	"	50	"	
286	Green.	Tracing Cloth,	20	"	20	"	
286	Orange.	" "	20	"	20	"	
286½	Green.	" "	9	"	20	"	
286½	Orange.	" "	9	"	20	"	

See Price List in back of Catalog.

Perfect Profile Papers and Cloths
In Continuous Rolls
Plan-Profile



Plan-Profile.

On Plan-Profile Papers and Cloths, the profile ruling with its lower margin occupies approximately one-half of the full width—which is 22 inches for paper and 24 inches for cloth ("Imperial")—the blank other half being usable for memoranda, sketching, etc.

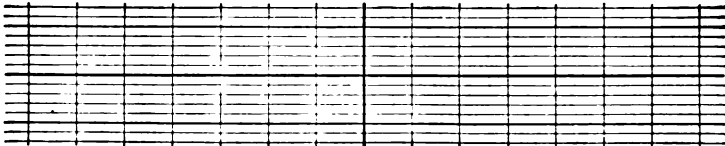


Plate A, 4 × 20 to one inch.

No.	Color.	On	Engraving.	Roll.	Yard.
270P	Green.	Drawing Paper,	10 in. wide, 50 yd. rolls,	· \$	
270P	Orange.	" "	10 " 50 "	·	
275P	Orange.	Tracing "	10 " 50 "	·	
276P	Green.	Tracing Cloth,	10 " 20 "	·	
276P	Orange.	" " "	10 " 20 "	·	



Plate B, 4 × 30 to one inch.

No.	Color.	On	Engraving.	Roll.	Yard.
280P	Green.	Drawing Paper,	9 in. wide, 50 yd. rolls,	· \$	
280P	Orange.	" "	9 " 50 "	·	
285P	Orange.	Tracing "	9 " 50 "	·	
286P	Green.	Tracing Cloth,	9 " 20 "	·	
286P	Orange.	" " "	9 " 20 "	·	

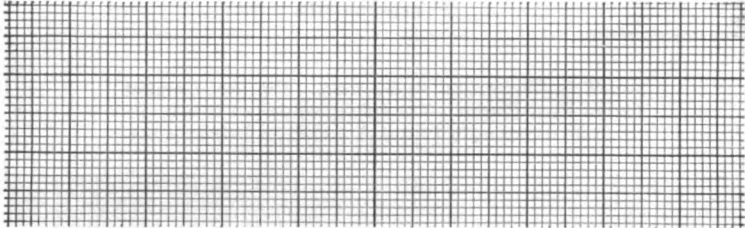
Samples of Plan-Profile Papers and Cloths mailed on request.

See Price List in back of Catalog.



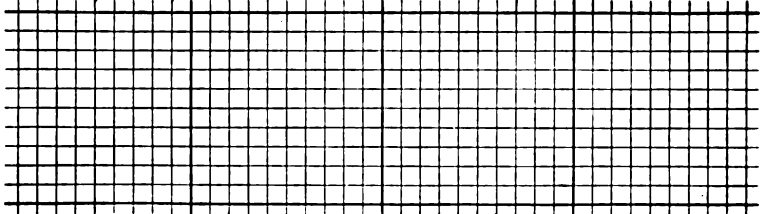
Perfect Cross Section Papers and Cloths

In Continuous Rolls



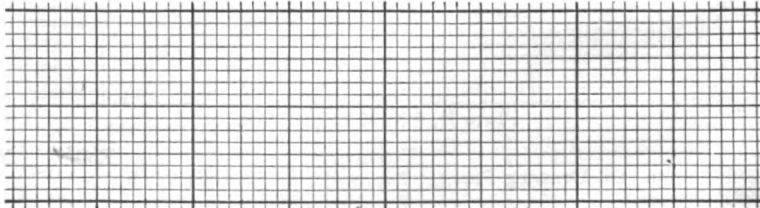
Nos. 300-306. Millimeter.

			Engraving.		Roll.	Yard.
No. 300	Green.	On Drawing Paper,	50 cm. wide,	50 yd. rolls,	.	\$
300	Orange.	" "	50 "	50 "	.	.
305	Orange.	" Tracing	50 "	50 "	.	.
306	Orange.	" Tracing Cloth,	50 "	20 "	.	.



Nos. 307-309½. 10 × 10 to one inch.

			Engraving.		Roll.	Yard.
No. 307	Green.	On Drawing Paper,	20 in. wide,	50 yd. rolls,	.	\$
307	Orange.	" "	20 "	50 "	.	.
308	Green.	Mounted on Muslin,	20 "	20 "	.	.
308	Orange.	" " "	20 "	20 "	.	.
308½	Green.	On Hyperion Cloth,	20 "	20 "	.	.
308½	Orange.	" " "	20 "	20 "	.	.
309	Orange.	" Tracing Paper,	20 "	50 "	.	.
309½	Green.	" Tracing Cloth,	20 "	20 "	.	.
309½	Orange.	" " "	20 "	20 "	.	.



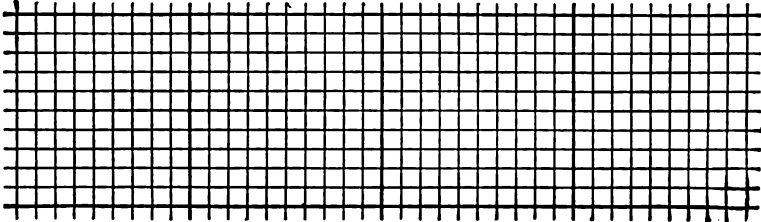
Nos. 315-317. 16 × 16 to one inch.

			Engraving.		Roll.	Yard.
No. 315	Green.	On Drawing Paper,	20 in. wide,	50 yd. rolls,	.	\$
315	Orange.	" "	20 "	50 "	.	.
317	Orange.	" Tracing	20 "	50 "	.	.

See Price List in back of Catalog.

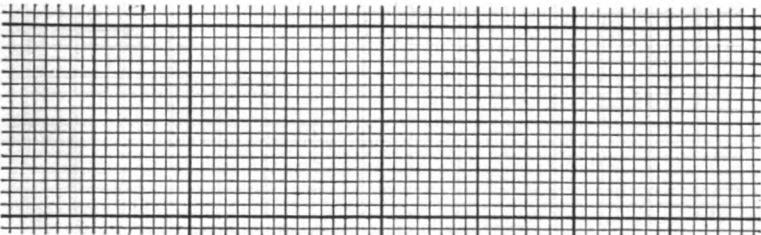
Perfect Cross Section Papers

In Sheets



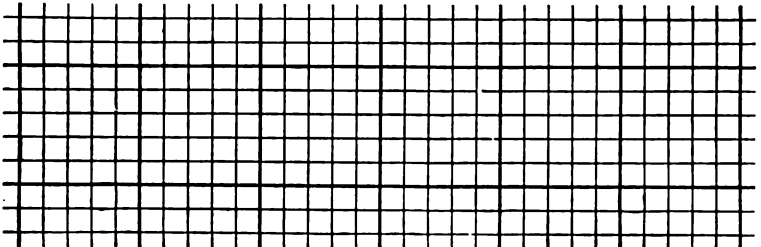
Nos. 325-326. 10 × 10 to one inch.

		Quire.	Sheet.
No. 325 Green.	On Drawing Paper, engraving 16 × 20 in., . . \$		
325 Orange.	" " " " 16 × 20 " . . .		
326 Orange.	" Tracing " " 16 × 20 " . . .		



Nos. 327-328. 16 × 16 to one inch.

		Quire.	Sheet.
No. 327 Green.	On Drawing Paper, engraving 16 × 21 in., . . \$		
327 Orange.	" " " " 16 × 21 " . . .		
328 Orange.	" Tracing " " 16 × 21 " . . .		



Nos. 330-331. 8 × 8 to one inch. Every fifth line heavy.

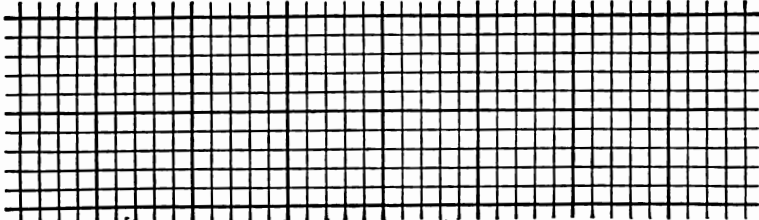
		Quire.	Sheet.
No. 330 Green.	On Drawing Paper, engraving 16 $\frac{1}{4}$ × 21 $\frac{7}{8}$ in., . . \$		
330 Orange.	" " " " 16 $\frac{1}{4}$ × 21 $\frac{7}{8}$ " . . .		
331 Orange.	" Tracing " " 16 $\frac{1}{4}$ × 21 $\frac{7}{8}$ " . . .		

Samples of Cross Section Papers mailed on request.

See Price List in back of Catalog.

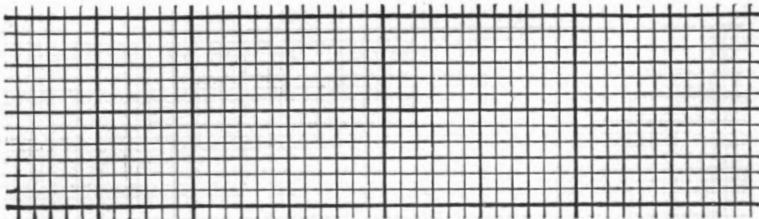
Perfect Cross Section Papers

In Sheets



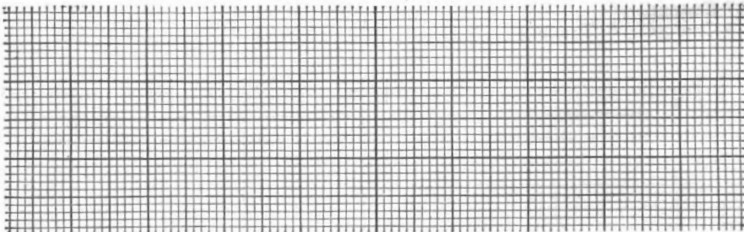
Nos. 332-333. 5 × 5 to ½ inch.

		Quire.	Sheet.
No. 332 Green. On Drawing Paper, engraving 16 × 20 in.,	.	\$	
332 Orange. " " " " 16 × 20 "	.		
333 Orange. " Tracing " " 16 × 20 "	.		



No. 335. 12 × 12 to one inch.

		Quire.	Sheet.
No. 335 Green. On Drawing Paper, engraving 16 × 20 in.;	.	\$	



Nos. 336A-339. Millimeter.

		Quire.	Sheet.
No. 336A Green. On Drawing Paper, engraving 15 × 20 cm.,	.	\$	
336B Orange. " Tracing " " 15 × 20 "	.		
337A Green. " Drawing " " 16 × 22 "	.		
337B Orange. " Tracing " " 16 × 22 "	.		
338 Green. " Drawing " " 40 × 50 "	.		
338 Orange. " " " " 40 × 50 "	.		
339 Orange. " Tracing " " 40 × 50 "	.		

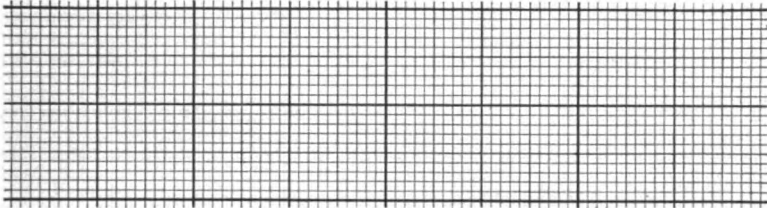
Samples of Cross Section Papers mailed on request.

See Price List in back of Catalog.



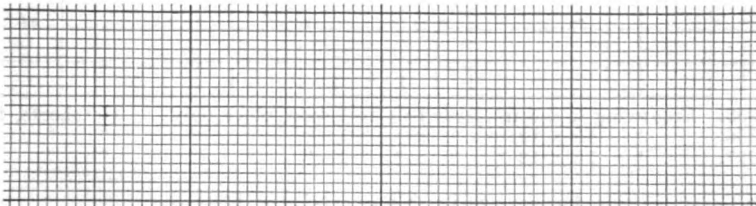
Constructors Cross Section Papers

For use of Students, Mechanical Engineers, Etc.



Nos. 344A-346DX. 10 × 10 to 1/2 inch. Every fifth line heavy.

					100 sheets.
No. 344A.	Engraving	5 × 7 1/2 in.	on drawing paper,	green,	\$
344B.	"	5 × 7 1/2 "	" tracing "	orange,	
344BX.	"	5 × 7 1/2 "	" " "	neutral tint,	
345.	"	7 × 10 "	" drawing "	green,	
346.	"	7 × 10 "	" tracing "	orange,	
346X.	"	7 × 10 "	" " "	neutral tint,	
346A.	"	7 1/2 × 10 "	" drawing "	green,	
346B.	"	7 1/2 × 10 "	" tracing "	orange,	
346BX.	"	7 1/2 × 10 "	" " "	neutral tint,	
346C.	"	10 × 15 "	" drawing "	green,	
346D.	"	10 × 15 "	" tracing "	orange,	
346DX.	"	10 × 15 "	" " "	neutral tint,	



Nos. 347-350X. 20 × 20 to one inch. Every tenth line heavy.

					100 sheets.
No. 347.	Engraving	5 × 7 in.	on drawing paper,	green,	\$
348.	"	5 × 7 "	" tracing "	orange,	
348X.	"	5 × 7 "	" " "	neutral tint,	
349.	"	7 × 10 "	" drawing "	green,	
350.	"	7 × 10 "	" tracing "	orange,	
350X.	"	7 × 10 "	" " "	neutral tint,	

Nos. 351-352X. 5 × 5 to one inch.

					100 sheets.
No. 351.	Engraving	8 × 10 in.	on drawing paper,	green,	\$
352.	"	8 × 10 "	" tracing "	orange,	
352X.	"	8 × 10 "	" " "	neutral tint,	

Samples of Cross Section Papers mailed on request.

See Price List in back of Catalog.

Record Sheets

Statistical Diagrammatic Charts for Progress of Work

JANUARY	FEBRUARY	MARCH	APRIL	MAY
5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25

Nos. 353-354.

- No. 353. Engraving 7 × 12 in., on drawing paper, green, . . . 100 sheets, \$
 354. " 7 × 12 " " tracing " orange, . . . " "

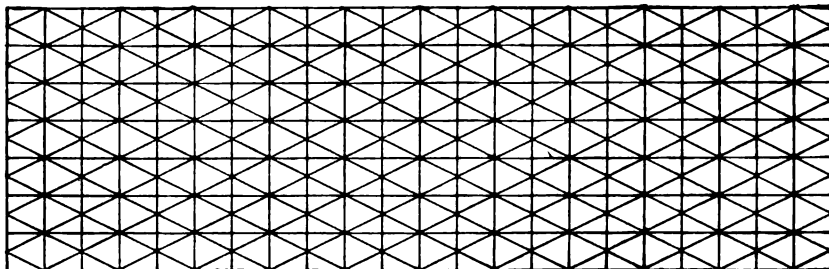
Township Paper

6	5	4	3	2	1
7	8	9	10	11	12

- No. 355. Engraving 6 × 6 in., scale 1 in. to 1 mile, black only, . . . 100 sheets, \$
 356. " 12 × 12 " " 2 " " 1 " " " " " " " "
 357. " 15 × 18 " " 3 " " 1 " " " " " " " "

Isometric Sketching Paper

For making Drawings and Sketches in Isometric Perspective. Ruled.

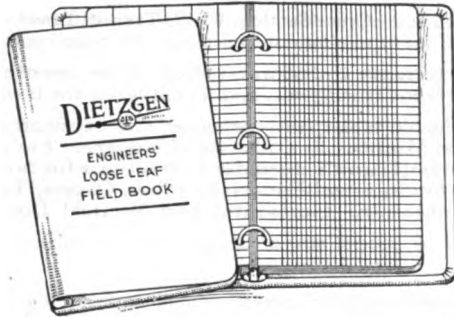


No. 358A.

- No. 358A. Ruled in green, in sheets 12 x 18 in., . . . 100 sheets, \$
 358B. " " " " pads of 40 sheets, 6 × 9 in., . . . Each,
 358C. " " " " " 40 " 9 × 12 " . . . "

See Price List in back of Catalog.

Engineers Loose Leaf Field Books



No. 386-3.

Our Engineers Loose Leaf Field Books are designed to meet the requirements of engineers working in the field, enabling them to send any of their notes to the office daily or weekly, and at the same time to continue using the books. They also permit of filing the notes of any particular survey together, and of filing notes of each survey in alphabetical order according to the names of clients.

The covers, $4\frac{1}{8} \times 7$ inches, are of fifty leaf capacity, have round corners, and are furnished in three bindings: Sheepskin, Fabrikoid and Black Morocco. The improved mechanism is very light and strong, composed of a narrow metal back with three rings, so arranged that they can be opened by one operation, permitting the leaves to be inserted or removed rapidly. When the book is open the leaves lie perfectly flat, and as the covers are very stiff the book can be held firmly and notes quickly entered and sketches rapidly made. The leaves are of the same high grade paper, with waterproof rulings, as furnished in our regular Engineers Field Books, described on pages 38-43.

No. 384.	Loose Leaf Cover only, Sheepskin binding,	Each, \$
384F.	“ “ “ “ Fabrikoid binding,	“
385.	“ “ “ “ Black Morocco binding,	“
386-1.	Loose Leaves, No. 389 ruling, 50 leaves in set,	Set,
386-2.	“ “ “ 401 “ 50 “ “ “	“
386-3.	“ “ “ 404 “ 50 “ “ “	“
386-4.	“ “ “ 406 “ 50 “ “ “	“
386-5.	“ “ “ 411 “ 50 “ “ “	“
386-6.	“ “ “ 422 “ 50 “ “ “	“
386-7.	“ “ “ 424 “ 50 “ “ “	“
387.	Transfer Binder for loose leaves,	Each,
387E.	Muslin Eyelets, gummed, for reinforcing the holes of loose leaves,	Box of 100,
388.	Field Book Tables, as described at top of pages 38-39; in pamphlet form, punched for loose leaf covers,	Each,
388A.	Alphabetical Index for loose leaf covers, good quality paper and leather tabs, 13 in set,	Set,

Engineers Bound Field Books listed under Nos. 389-424.

See Price List in back of Catalog.

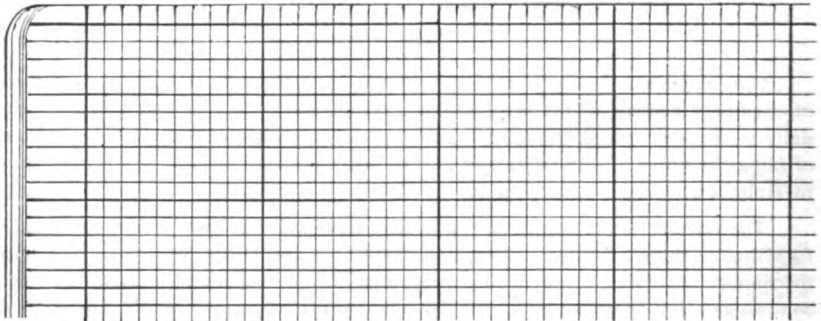
Engineers

Our Engineers Books,—Cross Section, Field, Transit, Level, Earthworks, Mining, covers, of a weight sufficient to eliminate warping, with round corners and round backs.

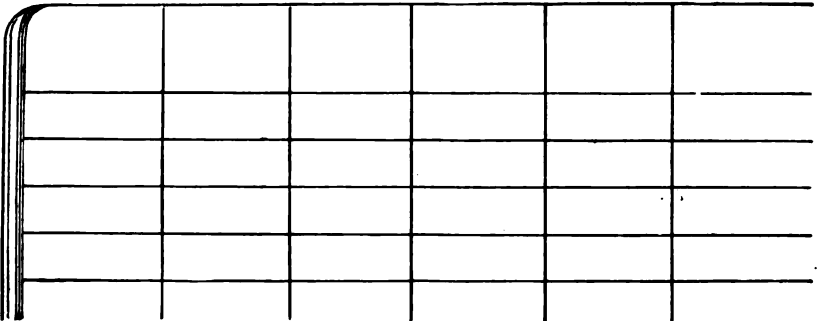
The leaves, with correctly spaced waterproof rulings, are of strong, superior grade specially bound to prevent tearing out, and lie flat when the books are open.

Revised and valuable tables, with examples and explanations for their use, are and Embankments; Minutes in decimals of a degree; Inches in decimals of a Corrections for Tangents and Externals; Corrections for Sub-Chords and Long tions; Natural Trigonometrical Functions (Sine, Cosine, Tangent, and Cotan-also Diagram for obtaining Horizontal and Vertical Distances from Stadia

Engineers Books of special size or design made to order in lots of not less than



- | | | | |
|----------|---------------------|---|--|
| No. 389. | Cross Section Book, | $4\frac{1}{2} \times 7\frac{1}{4}$ in., | 80 leaves, ruled 10 × 10 to 1 in.; with Tables |
| 390. | " | " $5\frac{1}{2} \times 7\frac{1}{2}$ " | 80 " " 10 × 10 " 1 " " " |
| 391. | " | " $6\frac{1}{2} \times 8\frac{1}{2}$ " | 80 " " 10 × 10 " 1 " " " |



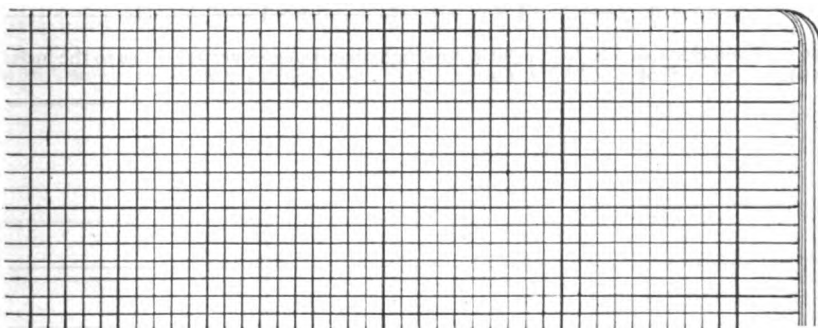
- | | | | |
|----------|-------------|---|--|
| No. 400. | Field Book, | $4\frac{1}{2} \times 7\frac{1}{4}$ in., | 80 leaves, right-hand page 4 × 4 to the inch; with |
| 401. | " | " $4\frac{1}{2} \times 7\frac{1}{4}$ " | 60 " " " 4 × 4 " " " " |

Engineers Loose Leaf Field

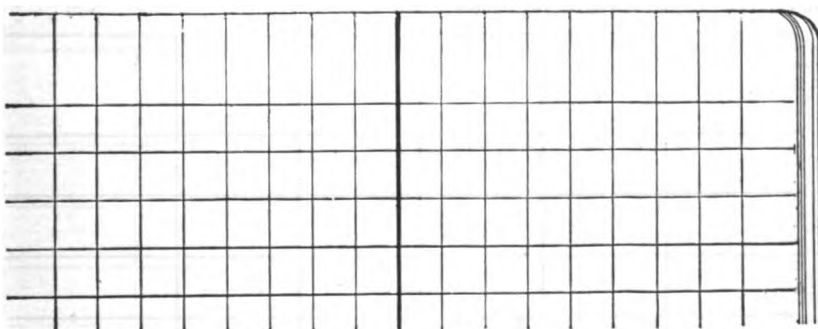
See Price List in

Field Books

and Topographical,—are substantially bound in sheepskin, and have firm, flat-opening paper which stands erasing perfectly and is suitable for both pencil and ink. They are contained in the different books, the complete tables being as follows: **Excavations foot; Radii, Ordinates, and Deflections; Tangents and Externals to a 1° curve; Chords; Curve Formulas; Middle Ordinates for Rails in Feet; Slope Reduc- (gent) for every 10' of arc; Trigonometrical Formulas; Calculation of Earthwork; Readings.** six dozen of a kind.



	Dozen. Each.
for Excavations, Embankments, and Calculation of Earthwork, .	\$
“ “ “ “ “ “ “ “ .	.
“ “ “ “ “ “ “ “ .	.



	Dozen. Each.
Complete Tables as described at top of page,	\$
“ “ “ “ “ “ “ “ .	.
“ “ “ “ “ “ “ “ .	.

Books listed under Nos. 384-388A.

back of Catalog.

Engineers

- No. 403. Field Book, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 80 leaves, right-hand page 8 vertical lines to the inch;
 404. " " $4\frac{1}{2} \times 7\frac{1}{4}$ " 60 " " " 8 " " " "

- No. 405. Transit Book, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 80 leaves; with Complete Tables as specified at
 406. " " $4\frac{1}{2} \times 7\frac{1}{4}$ " 60 " " " " " " "

- No. 410. Level Book, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 80 leaves; with Tables for Excavations, Embank-
 411. " " $4\frac{1}{2} \times 7\frac{1}{4}$ " 60 " " " " " "
 412. " " $4 \times 6\frac{1}{2}$ " 80 " " " " " "

Engineers Loose Leaf Field
See Price List in

Engineers

SECTION					
STA.	ELEVA.	GRADE	CUT OR FILL		
			LEFT	C	RIGHT

No. 420. Earthworks Field Book, 5 × 7¼ in., 80 leaves; with Complete Tables as

No. 422. Mining Transit Book, 4½ × 7¼ in., 80 leaves, right-hand page 8 × 8 to 1 inch;

No. 424. Topographical Book, 5 × 8 in., 80 leaves, right-hand page 4 × 4 to

Engineers Loose Leaf Field

See Price List in



Standard Blanks for the Building Trades

Blank Form Specifications and Reminder

For Frame and Brick Buildings Costing From \$500 to \$15,000

The Standard Blank Forms of Specifications, consisting of 14 sheets containing the following blank forms, are furnished in a strong manila cover, on which is printed a useful Architects Reminder:

Preamble	Galvanized Iron	Plumbers, Gas Fitters, Sewers
Masons, Cut Stone	Iron (Structural)	Agreement between Owner
Plasterers	Heating, Steam or Hot Water	and Contractor (with Bond)
Carpenters	Heating, Furnace	Contractor's Statement
Painters, Glaziers	Electric Wiring	

No.	Standard Specifications.	100 sets, \$	Dozen sets, \$	Set, \$
433.	Printed covers for Specifications, plain,	100,	100,	Doz.,
436.	Building Contracts,		"	"
436½.	Building Contracts with Bond,		"	"
437A.	Contractors Statements,		"	"
437B.	Mechanics Lien Notice,		"	"
437C.	Waiver of Lien,		"	"

Standard Documents

The Standard Documents of the American Institute of Architects replace the old Uniform Contract, which is discontinued and cannot be furnished.

No. 437-1.	Agreement and General Conditions,	100, \$		Each, \$
437-2.	General Conditions without Agreement,	"		"
437-2A.	Agreement between Contractor and Owner,	"		"
437-2B.	Agreement between Architect and Owner,	"		"
437-3.	Bond of Suretyship,	"		"
437-4.	Agreement between Contractor and Sub-contractor,	"		"
437-5.	Letter of Acceptance of Subcontractor Proposal,	"		"
437-6.	Complete Set, consisting of one each Nos. 437-1, 3, 4 and 5,	100 sets,		Set,

A heavy paper cover, on which valuable explanatory notes are printed, is given with each copy of the Agreement and General Conditions and with each Complete Set of the documents.

No. 440.	Architects Certificate Books. Board cover, cloth bound; 100 blanks on good quality bond paper, with stubs,	Each, \$
441.	Architects Certificate Books. Board cover; 100 blanks on ordinary paper, with stubs,	Each,

Sundries

No. 470.	Black Oil Cloth, for covers for drawings, 48 in. wide,	Yard, \$
475.	Legal Cap Paper,	Ream,
480.	Gelatine or Glass Paper, in sheets 16½ × 20½ in., medium thick,	Sheet,

See Price List in back of Catalog.



Drawing Instruments

In this issue of our Catalog, we have listed Drawing Instruments differently from the customary method.

It will be noted that all Ruling Pens of various grades and styles are listed together; all Bow Instruments of various grades and styles are listed together; etc.

This arrangement will, we believe, prove of advantage to our trade by making it easy for them to select and to order.

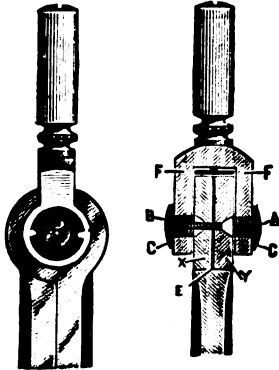
Table of Contents of Drawing Instrument section:

	Page
Description of Grades	46- 50
Ruling Pens	51- 56A 2
Bow Instruments	56A3- 56A12, 56A34
Dividers	56A13, 56A14
Compasses	56A15, 56A18
Beam Compasses	56A19- 56A24
Dotting Instruments	56A25
Proportional Dividers	56A26- 56A28
Gem Union Instruments in cases	56A29- 56A33
Excello " " "	56A34- 56A39
Premier " " "	56A40- 56A43
Champion " " "	56A44- 56A47
Federal " " "	56A48- 56A51
Universal " " "	56A52- 56A56
Dependo " " "	56A57- 56A60
Apprentice " " "	56A61, 56A62
Elementary " " "	56A63, 56A64

Our complete line comprises an assortment that fully meets all possible requirements of both the professional man and the beginner. On the pages following, the merits of each grade are explained in detail, and we leave a selection to the preference of the purchaser.

Description of Grades

GEM UNION: Made of cold rolled Nickel silver and the highest grade tool steel. The cold rolled Nickel silver is of the most select grade, and the instruments are cut (not cast or coined in die) from it, thus affording the greatest efficiency by combining strength, elasticity and lightness. The finish is remarkably fine, and so bright that the least flaw or fault in workmanship, form or quality of material would be evident.



UNION PIVOT JOINT

The Union Pivot Joint enables the weight of the forks "F" to be reduced, as the bolt "A-B" goes entirely through the legs and bolts the forks together, thus giving exceptional rigidity with light weight.

The conical-shaped parts of "A" and "B" form the pivot points which are securely held by lock nuts "C"- "C." "E" indicates a steel disc that acts as an anti-friction bearing for the heads of the legs "X" and "Y."

Adjustment can be readily made, for to apply tension only one of the lock nuts (C-C) need be loosened.

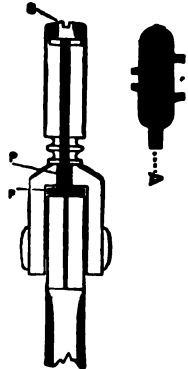
CLAMPING DEVICE

By a turn with key "A" the screw "S" is pressed down on pin "P" which is fastened to the small plate "P." The plate "P" rests on the top of the legs of the Compasses and Dividers, and when pressed down holds the legs firmly in any desired position.

Due to the steel bolt which connects the forks, it is impossible to injure the Gem Union Joint when using the clamping device, a possibility which exists when a clamping device is attached to a less sturdy joint.

A further advantage of our clamping device over other forms is that the handle remains perfectly rigid and there is no outside attachment to interfere with the easy handling of the instrument.

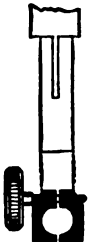
This device is valuable for spacing the same distances or for using the same opening of Compasses or Dividers repeatedly.



SHANK AND CLAMP SOCKET

In the round form the feathered shanks fit into side clamping spring sockets. By this construction the interchangeable parts of the Compasses are firmly locked twice. First, by the steel feather of the shank, and secondly, by the clamping sockets being drawn together with the screw.

In the pentagonal form, the shank is held in the socket by means of a screw. If the sharp corners of the shank wear, the pressure of the screw will not hold the shank rigidly. It is for this reason that the shanks of all interchangeable parts of the Gem Union instruments are made in the round feathered type as shown in the illustration.



SCREW-THREAD NEEDLE POINT

All Compasses, Bow Pencils and Bow Pens are fitted with our patent screw-thread needle points.

The screw-thread needle point possesses the obvious advantages of quick, minute and positive adjustment.

The portion "A" is threaded in the extremity of the leg.

The portion "B" is knurled, to be more easily turned with the fingers.

The thumb-screw "C" clamps the needle point rigidly.



RULING PENS

The Ruling Pen is used more than any other instrument and should be manufactured with the greatest care. We spare no effort to make our pens as nearly perfect as possible. The tool steel used in the Gem Union pens is properly tempered, and the points, accurately ground, are shaped to obtain the best results under all conditions of use.

BOW INSTRUMENTS

Gem Union Steel Spring Bow Instruments are made of one continuous piece of steel, carefully tempered and finished. The screws and handles are Nickel silver, and all threads are made with extreme care and uniformity. Bow Pens and Bow Pencils are equipped with micrometer screw-thread needle points.

Guarantee

Each Gem Union Instrument is guaranteed to satisfactorily perform the work for which it is intended, and to be absolutely perfect in every respect.

Every Gem Union Instrument bears our monogram, of which the following illustration is a facsimile:

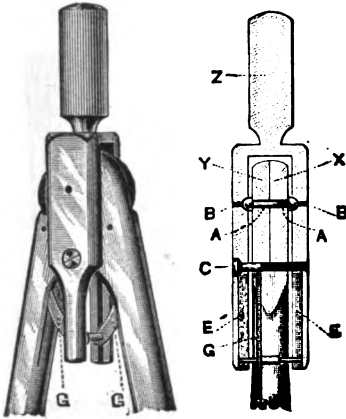


In addition, we stamp all Compasses, Dividers, Bow Instruments and Ruling Pens with their quality mark, "Gem Union."

EXCELLO: Made of selected quality cold rolled Nickel silver and the highest grade tool steel. For instruments of this form, the Excello stand superior to all others in workmanship, finish, and mechanical excellence, embodying special features of great practical value to draftsmen.

JOINT

The mechanical working of the Excello joint is perfect. The principles employed in its construction insure easy, rapid and exact adjustment, and a smooth motion at all times.

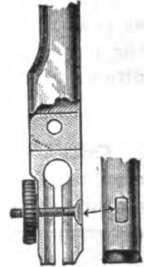


As shown by illustrations, the joint is constructed by two concentric pivots, "A-A," having a hemispherical head at each end; these heads rest in the recesses "B-B" drilled on the inner surfaces of the forks "E-E" to receive the pivots. The adjustment of the joint is simply and effectively regulated by the screw "C," which can be tightened or loosened at will, and by means of which any wear in the joint can be effectually compensated.

The Straightening Device, "G-G," holds the handle "Z" always perpendicular to the drawing surface, irrespective of the spread of the legs "X" and "Y."

T-BOLT CLAMPS

The Pen, Pencil and Divider parts are held in their sockets by clamps of the "T-Bolt" pattern. The principle of the socket, while simple, is very effective; and as all spindles and nuts are interchangeable, parts can be interchanged, or lost parts can be replaced without trouble and at a slight expense. A tight joint is assured, and the threads seldom if ever strip.

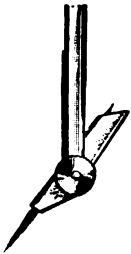


NEEDLE POINT LEG

The Needle Point leg is provided with our screw-thread needle point, held in a threaded sleeve, permitting of quick and easy adjustment.

An improved clamping screw with special washer insures rigidity of this part, and provides for clamping the needle point and the threaded sleeve with one operation.

The needle points of the needle point and divider part legs of the Compasses and the needle points of the Dividers are adjustable and reversible. In case of damage to the points, new needle points only are required.



CENTER TACK AND METAL HANDLE

All Excello case assortments contain a Center Tack and at least one Metal Handle holding reserve needle points.

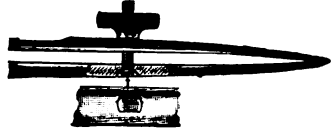


The Center Tack is of advantage when drawing concentric circles, as its use prevents large holes being made in the paper. It has a very fine point, and the top is notched at the center to receive the needle point of the Compasses.

The Metal Handle fits the pen, pencil and divider parts of the Compasses, and any one of these parts can, in connection with the handle, be used as a separate instrument.

RULING PENS

All Excello Ruling Pens are correctly tempered, and will hold their points exceptionally well under all conditions of use. The pressure of the thumb-nut is direct and positive, and on those pens where the design permits, the "T-Bolt" construction is used, thus overcoming any possibility of a lateral motion of the blades.



BOW INSTRUMENTS

Excello Bow Instruments are made of high grade steel and Nickel silver. All needle points are adjustable and reversible. In case of damage to the points, new needle points only are required.

The Circular Head style possesses a certain advantage by giving an absolutely even tension at any adjustment.

Guarantee

Each "Excello" Instrument is guaranteed to satisfactorily perform the work for which it is intended, and to be absolutely perfect in every respect.


Every "Excello" Instrument bears our monogram .

In addition, we stamp all Compasses, Dividers, Bow Instruments and Ruling Pens with their quality mark, "Excello."

PREMIER: The Premier Instruments, of a design somewhat similar to the Gem Union, rank next in quality to the Gem Union and Excello grades. The workmanship, finish and quality of materials used, combined with special points of design, permit of the most critical comparison with any Drawing Instruments of similar form, other than our Gem Union.

They are made of high-grade rolled Nickel silver and tool steel, carefully finished. The heads of Compasses and Dividers have pivot joints with steel lock nuts. Compasses and Bow Instruments are fitted with screw-thread needle points. All Ruling Pens and pen part of Compasses possess a "slide-catch" cleaning device. All Bow Instruments have metal handles.

We guarantee these instruments to be high grade, and to satisfactorily perform the work for which they are intended.

All Compasses, Dividers, Bow Instruments and Ruling Pens are stamped with their quality mark .

CHAMPION: The Champion Instruments, of a design similar to the Excello but not possessing certain exclusive characteristics of the latter, rank next in quality to the Gem Union and Excello grades. They are made of high-grade rolled Nickel silver and tool steel. When compared with any Drawing Instruments of similar form, other than the Excello, they will be found superior in materials, workmanship, finish and general mechanical excellence.



The head joint of the Compasses and Dividers, like the *Excello*, insures easy, rapid and exact adjustment, and a smooth motion at all times. Pen, Pencil and Divider parts are held in their sockets by the very effective "T-Bolt" method. The needle points of the needle point and divider part legs of the Compasses and the needle points of the Dividers are adjustable and reversible, making replacement easy in case of damage to the points. Bow Instruments have metal handles, and are of the Circular Head style, giving an absolutely even tension at any adjustment. All case assortments contain a Center Tack and at least one Metal Handle, as described on pages 48 and 49.

We guarantee these instruments to be high grade, and to satisfactorily perform the work for which they are intended.

All Compasses, Dividers, Bow Instruments and Ruling Pens are stamped with their quality mark .


FEDERAL: The Federal Instruments are made of rolled Nickel silver and steel. They are substantially constructed, carefully finished, and attractive in appearance. With proper care, they will give excellent service, and, prices considered, will be found unequaled in design, workmanship and finish.

Compasses and Bow Instruments are fitted with screw-thread needle points. Ruling Pens and pen part of Compasses are equipped with slide-catch cleaning device. All Bow Instruments have metal handles.

Each instrument is stamped with its quality mark .

UNIVERSAL: The Universal Instruments are of a form similar to our *Excello* and *Champion*, and are made of a good quality Nickel silver, the needle points being of steel. Ruling Pens and pen part of Compasses are equipped with slide-catch cleaning device. Bow Instruments have metal handles, and are of the Circular Head style, giving an absolutely even tension at any adjustment.

Their points of advantage make them specially adapted for use in Manual Training Schools and their construction insures satisfactory service.

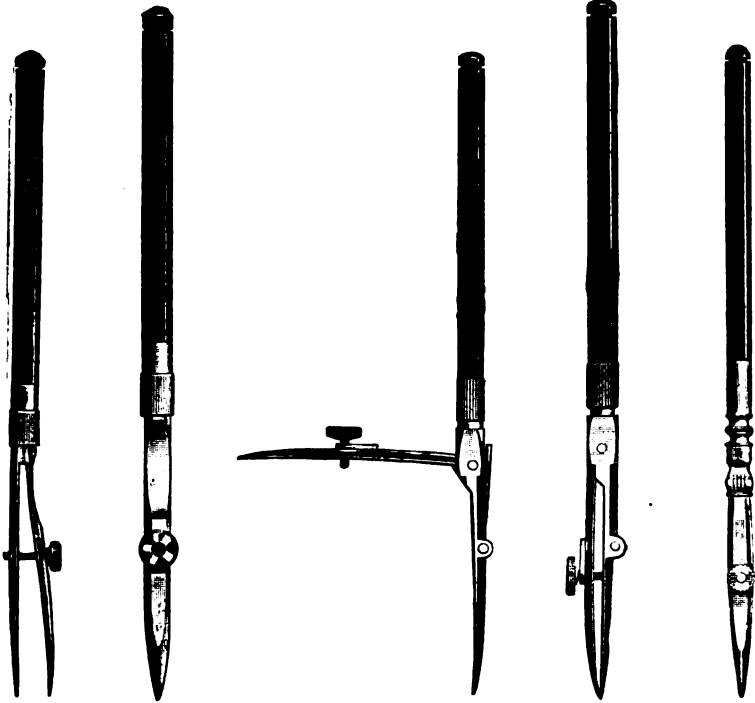
Each instrument stamped with its quality mark .

DEPENDO: The *Dependo* Instruments are made of Nickel silver, with steel points. The Compasses and Dividers, cylindrical in form, are easy to handle, having a nice balance. They are durable, well-finished, and will give good service. They will be found very satisfactory for use in Manual Training Schools, or for similar work.

APPRENTICE: The *Apprentice* Instruments, of Nickel silver and steel, will give better service over a greater length of time than any other instruments on the market which sell at the same price. Well-adapted for use in *Apprentice* schools or for elementary drawing.

ELEMENTARY: The *Elementary* Instruments are made of Brass, nickel-plated. They recommend themselves chiefly on account of their low prices.

Drawing Instruments



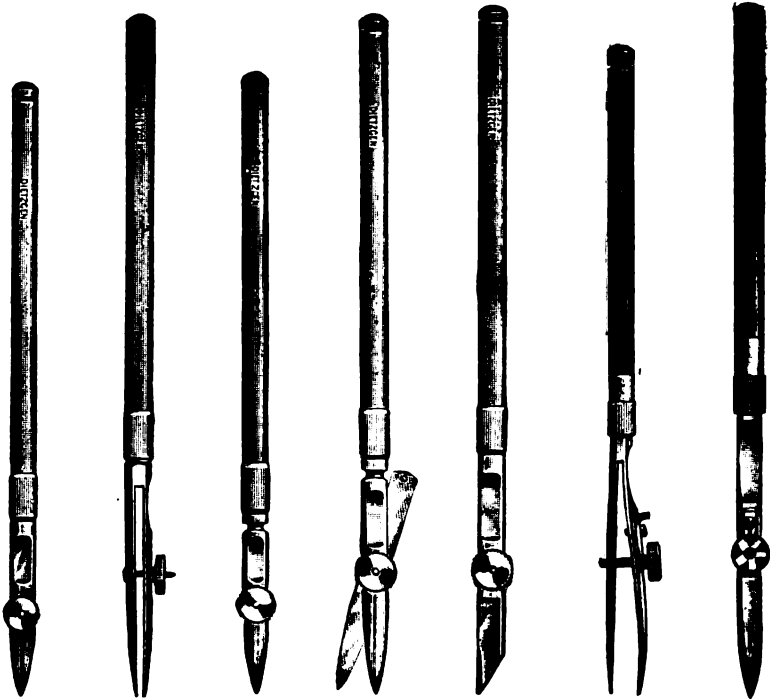
No. 618.
619.
622.
623.
626.

- No. 618. Gem Union Ruling Pen, 5 in., spring blade, polished ebony handle, Each, \$
- 619. Like No. 618, but 5½ in., “
- 622. Gem Union Ruling Pen, 5 in., jack-knife blade, polished ebony handle; as the upper blade of this pen can be completely opened, the blades can be easily cleaned or sharpened without disturbing the adjustment for width of lines, Each,
- 623. Like No. 622, but 5½ in., “
- 626. Gem Union Ruling Pen, 5 in., hinge joint for cleaning, pricker pin, polished ebony handle, Each,

Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Drawing Instruments



No. 630. 631. 634. 635. 638. 640. 641.

- No. 630. **Excello Ruling Pen**, 4¾ in., spring blade, aluminum handle, Each, \$
- 631. Like No. 630, but 5⅝ in., "
- 634. **Excello Ruling Pen**, 4¾ in., cross-joint blade, aluminum handle; the lower blade can be swung sidewise and the blades easily cleaned or sharpened without disturbing the adjustment for width of lines, Each,
- 635. Like No. 634, but 5⅝ in., "
- 638. **Excello Ruling Pen**, 5⅝ in., taper blades, aluminum handle; adapted for fine line work, Each,
- 640. **Premier Ruling Pen**, 5 in., slide-catch spring blade, polished ebony handle; the upper blade can be instantly opened by means of a slide-catch and the blades cleaned or sharpened without disturbing the adjustment for width of lines, Each,
- 641. Like No. 640, but 5½ in., "

Excello grade described on pages 47-49; Premier, page 49.

See Price List in back of Catalog.

Drawing Instruments



No. 644. 645. 648. 649. 652. 653. 657.

- No. 644. **Champion Ruling Pen**, 4 $\frac{3}{4}$ in., spring blade, black enameled aluminum handle, Each, \$
- 645. Like No. 644, but 5 $\frac{5}{8}$ in., "
- 648. **Federal Ruling Pen**, 5 in., slide-catch spring blade, ebony handle; the upper blade can be instantly opened by means of a slide-catch and the blades cleaned or sharpened without disturbing the adjustment for width of lines, Each,
- 649. Like No. 648, but 5 $\frac{1}{2}$ in., "
- 652. **Universal Ruling Pen**, 4 $\frac{3}{4}$ in., slide-catch spring blade, ebony handle; the upper blade can be instantly opened by means of a slide-catch and the blades cleaned or sharpened without disturbing the adjustment for width of lines, Each,
- 653. Like No. 652, but 5 $\frac{5}{8}$ in., "
- 657. **Dependo Ruling Pen**, 5 $\frac{1}{2}$ in., spring blade, ebony handle, "

Champion grade described on pages 49, 50; Federal, page 50; Universal, page 50; Dependo, page 50.

See Price List in back of Catalog.

Drawing Instruments

Champion Patent Fountain Ruling Pen



Point Protector



No. 665. 665E.

The Champion Patent Fountain Ruling Pen is a well made and practical pen.

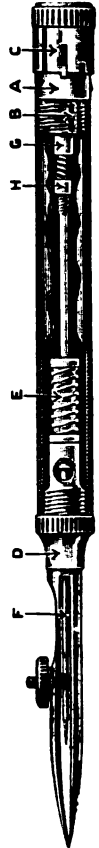
It can be used with any drawing ink, requires but one filling for a day's work, will neither leak nor clog, is simple in construction, and is not affected by ink acids.

Only the highest grade materials are used in its manufacture, and with proper care this pen will always operate satisfactorily and give excellent service.

The illustration shown at the right is an explanatory view: A is the metal top; B, the air escape; C, the cap; D, the pen socket; E, the plunger; F, the ink tube; G, the packing nut; H, the cap tension.

The barrel is filled by unscrewing the metal top and dropping the ink into the barrel by means of an ink dropper which is furnished with each instrument.

The ink is conveyed to the pen point by engaging the stud on the metal top in the longest slot in the cap and pressing the cap gently with the thumb or the forefinger. The intermediate slot is used when less ink is desired, and when the pen is not in use the stud is engaged in the smallest slot, thus preventing the cap from being pressed down accidentally.



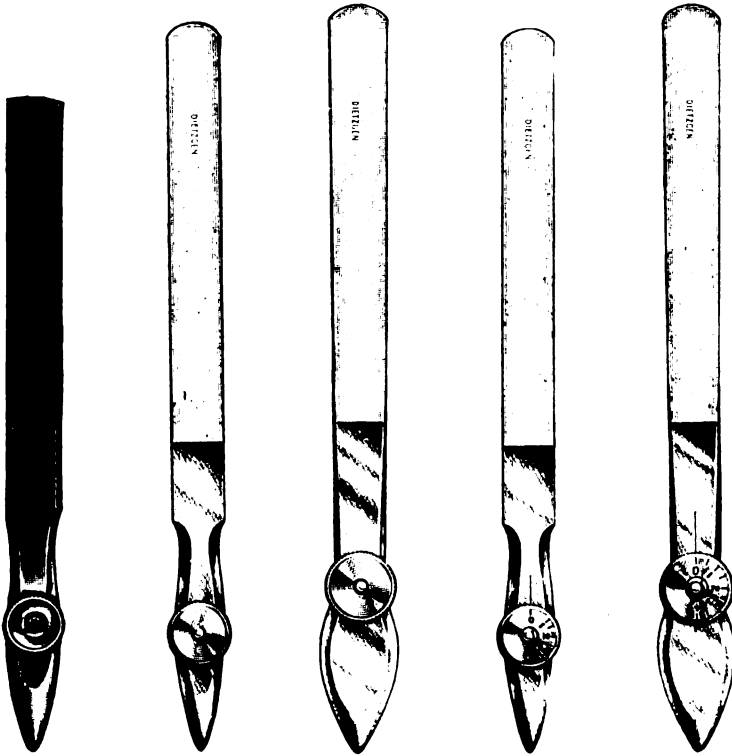
Explanatory View.

- No. 665. Champion Patent Fountain Ruling Pen, $5\frac{1}{4}$ in., with point protector and ink dropper, Each, \$
- 665E. Extra Pen Part for No. 665, with wide blades to hold sufficient ink for detail work, with point protector, Each,
- 665L. Leather Case for holding No. 665 when equipped with either the regular or the No. 665E pen part, Each,

Champion grade described on pages 49, 50.

See Price List in back of Catalog.

Drawing Instruments



No. 666. 670. 671. 672. 673.

- No. 666. Gem Union Detail Ruling Pen, 5 in., spring blade, polished ebony handle, Each, \$
- 667. Like No. 666, but 6 in., "
- 670. Excello Detail Ruling Pen, 6 in., spring blade, aluminum handle, Each,
- 671. Excello Detail Ruling Pen, 6 in., spring blade, aluminum handle, Each,
- 672. Excello Detail Ruling Pen, 6 in., spring blade, Miller graduated thumb-screw, aluminum handle, Each,
- 673. Excello Detail Ruling Pen, 6 in., spring blade, Miller graduated thumb-screw, aluminum handle, Each,

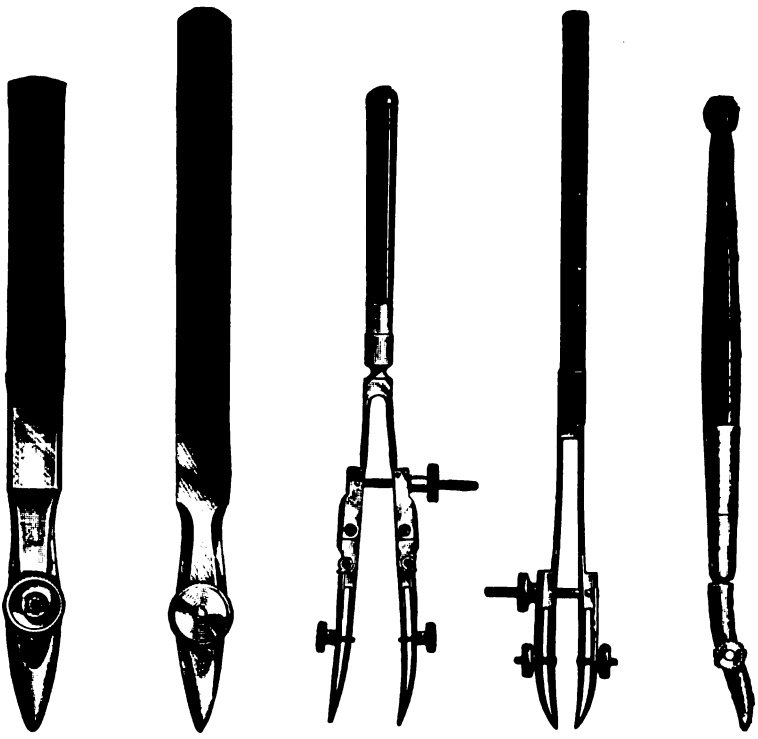
The Miller graduated thumb-screw on Nos. 672 and 673 Excello Detail Ruling Pens permits of drawing lines of similar width at different times, and will also be found of value in shading as lines can be uniformly graduated from the heaviest to the finest.

Detail Ruling Pens are especially adapted for drawing long or heavy lines, as they hold considerable ink.

Gem Union grade described on pages 46, 47; Excello, pages 47-49.

See Price List in back of Catalog.

Drawing Instruments



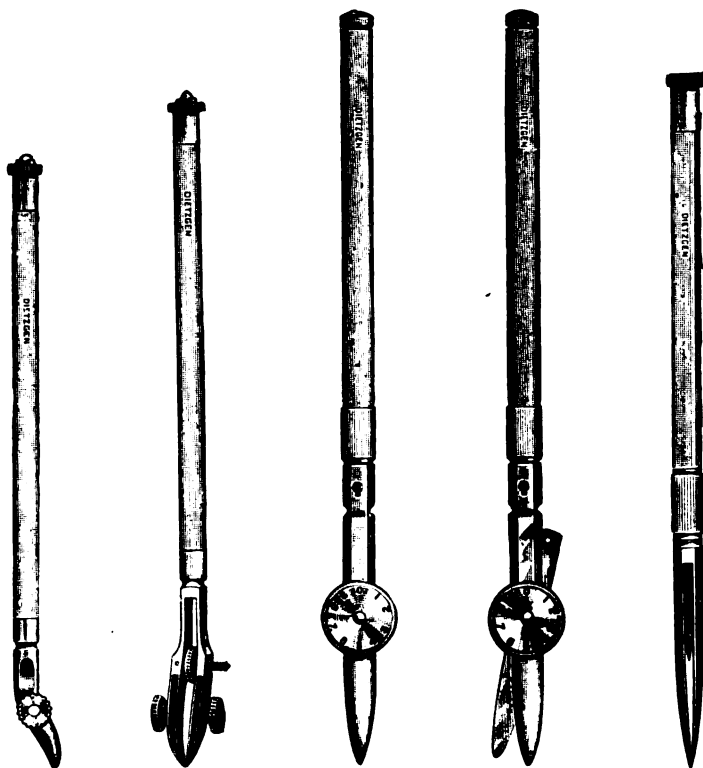
No. 676. 680. 684. 686. 688.

- No. 676. Premier Detail Ruling Pen, 5 in., spring blade, polished ebony handle, Each, \$
 - 677. Like No. 676, but 6 in., “
 - 680. Champion Detail Ruling Pen, 6 in., spring blade, black enameled aluminum handle, Each,
 - 684. Gem Union Railroad Pen, 5 in., polished ebony handle, “
 - 686. Excello Railroad Pen, 5½ in., aluminum handle, “
- Nos. 684 and 686 Railroad Pens are, on account of their design, particularly valuable for use in railroad drafting rooms, or for similar work.
- 688. Gem Union Curve Pen, 5 in., polished ebony handle; specially adapted for drawing curved lines, Each,

Gem Union grade described on pages 46, 47; Excello, pages 47-49; Premier, page 49; Champion, pages 49, 50.

See Price List in back of Catalog.

Drawing Instruments



No. 690.

692.

694.

696.

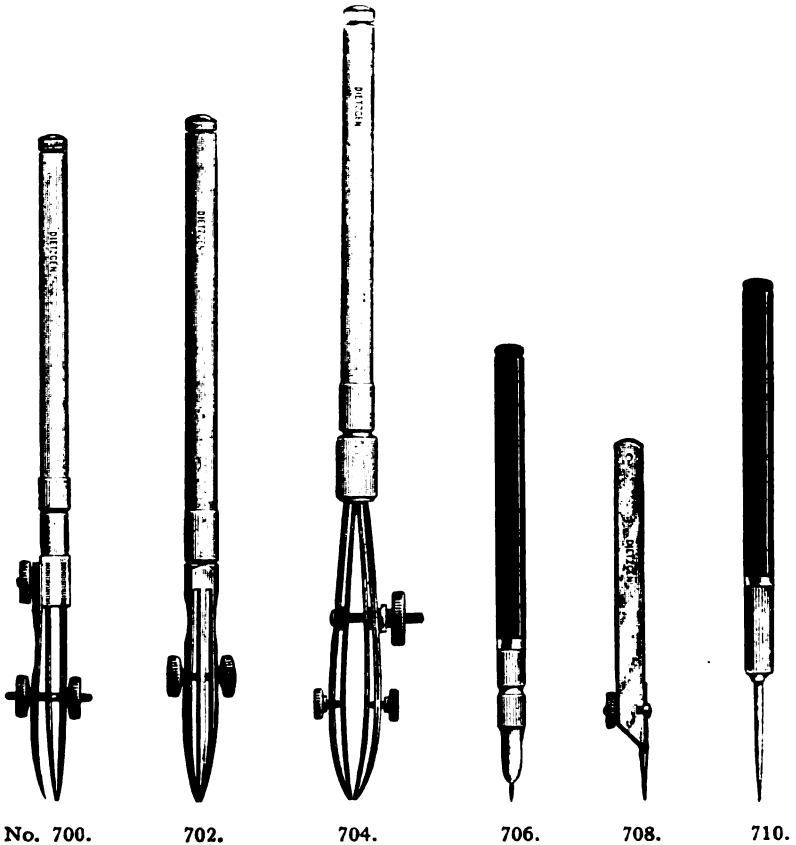
698.

- No. 690. **Excello Curve Pen**, $4\frac{3}{4}$ in., aluminum handle; by a small nut at the upper end, the pen part can be adjusted loose for drawing curved lines or locked for straight line work. Each, \$
692. Like No. 690, but $5\frac{1}{2}$ in., and two pair of blades, making it valuable for use in railroad drafting rooms or for similar work, . . . Each,
694. **Excello Ruling Pen**, $5\frac{3}{4}$ in., graduated thumb-screw, aluminum handle; the graduated thumb-screw permits of drawing lines of similar width at different times, and will also be found of value in shading as lines can be uniformly graduated from the heaviest to the finest, Each,
696. Like No. 694, but with cross-joint blade, making it easy to clean or sharpen the blades without disturbing the adjustment for width of lines, Each,
698. **Excello Wedge Pen**, $5\frac{1}{2}$ in., aluminum handle; blades opened or closed by thumb-screw at upper end of handle; specially adapted for delicate, fine line work, Each,

Excello grade described on pages 47-49.

See Price List in back of Catalog.

Drawing Instruments

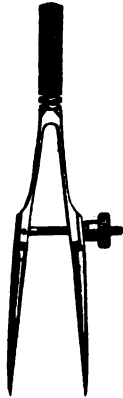


- No. 700. **Excello Third-Blade Pen**, $4\frac{3}{4}$ in., aluminum handle; adapted for cross hatching, as the lines can be minutely regulated, . . . Each, \$
702. **Excello Three-Tongue Pen**, $5\frac{1}{4}$ in., aluminum handle; the design of this pen is such that border or other heavy line work can be done rapidly with it, . . . Each,
704. **Excello Double Pen**, $6\frac{1}{4}$ in., aluminum handle; adapted for drawing either one broad line or two lines of equal or different thickness, thus being suitable both for border line work or for use in railroad drafting rooms, . . . Each,
706. **Gem Union Pricker**, $3\frac{5}{8}$ in., polished ebony handle, . . . “
708. **Excello Pricker**, $2\frac{3}{8}$ in., aluminum handle, . . . “
710. **Gem Union Tracer**, $3\frac{3}{4}$ in., polished ebony handle, . . . “

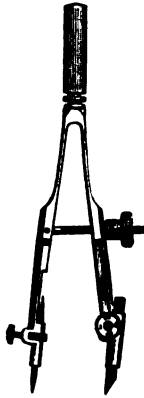
Gem Union grade described on pages 46, 47; Excello, pages 47-49.

See Price List in back of Catalog.

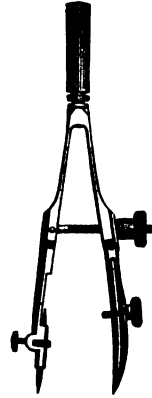
Drawing Instruments



No. 714A.

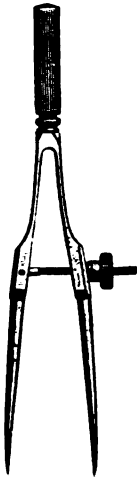


714B.

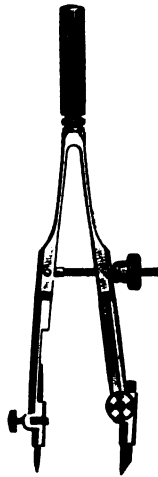


714C.

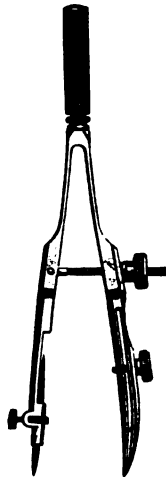
No. 714A.	Gem Union Bow Dividers,	3 in.,	side wheel,	. . . . .	Each, \$
714B.	" " " Pencil,	3 "	" " "	. . . . .	"
714C.	" " " Pen,	3 "	" " "	. . . . .	"



No. 716A.



716B.



716C.

No. 716A.	Gem Union Bow Dividers,	3½ in.,	side wheel,	. . . . .	Each, \$
716B.	" " " Pencil,	3½ "	" " "	. . . . .	"
716C.	" " " Pen,	3½ "	" " "	. . . . .	"

Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Drawing Instruments



No. 718A.

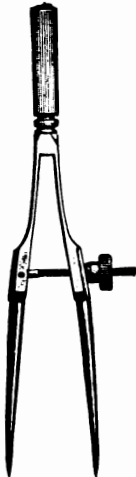


718B.

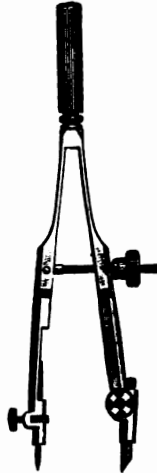


718C.

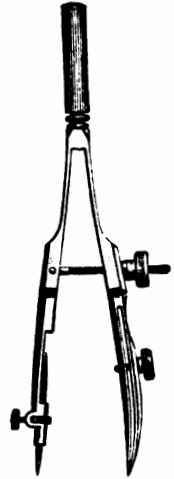
No. 718A.	Excello Bow Dividers, 3½ in., side wheel,	. . . . .	Each, \$
718B.	“ “ Pencil, 3½ “ “ “	. . . . .	“
718C.	“ “ Pen, 3½ “ “ “	. . . . .	“



No. 720A.



720B.



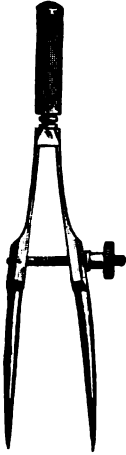
720C.

No. 720A.	Premier Bow Dividers, 3½ in., side wheel,	. . . . .	Each, \$
720B.	“ “ Pencil, 3½ “ “ “	. . . . .	“
720C.	“ “ Pen, 3½ “ “ “	. . . . .	“

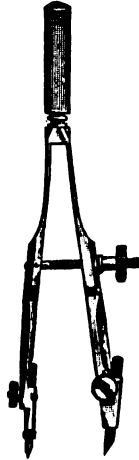
Excello grade described on pages 47-49; Premier, page 49.

See Price List in back of Catalog.

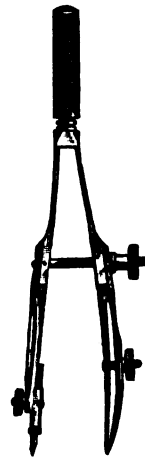
Drawing Instruments



No. 722A.

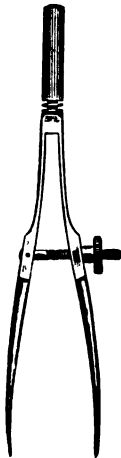


722B.

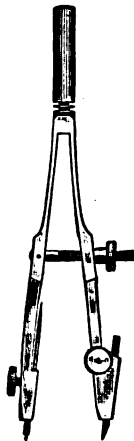


722C.

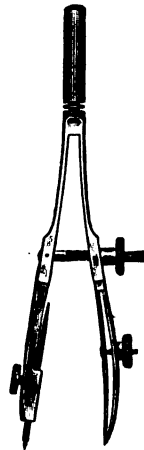
No. 722A.	Federal Bow Dividers,	3½ in.,	side wheel,	. . . . .	Each, \$
722B.	" "	Pencil,	3½ " " "	. . . . .	"
722C.	" "	Pen,	3½ " " "	. . . . .	"



No. 724A.



724B.



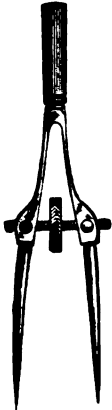
724C.

No. 724A.	Dependo Bow Dividers,	3½ in.,	side wheel,	. . . . .	Each, \$
724B.	" "	Pencil,	3½ " " "	. . . . .	"
724C.	" "	Pen,	3½ " " "	. . . . .	"

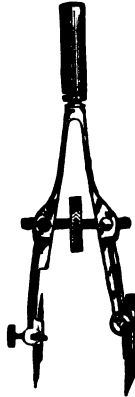
Federal grade described on page 50; Dependo, page 50.

See Price List in back of Catalog.

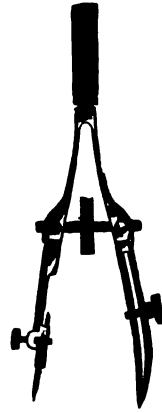
Drawing Instruments



No. 728A.

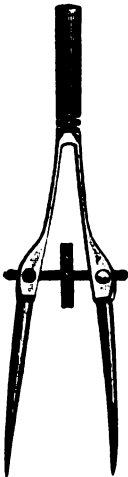


728B.

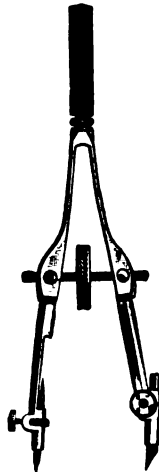


728C.

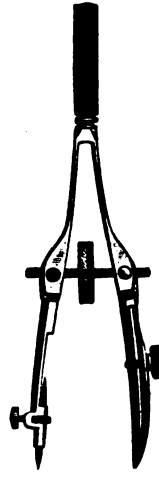
No. 728A.	Gem Union Bow Dividers,	3 in.,	center wheel,	. . .	Each, \$
728B.	" " " Pencil,	3 "	" "	. . .	"
728C.	" " " Pen,	3 "	" "	. . .	"



No. 730A.



730B.



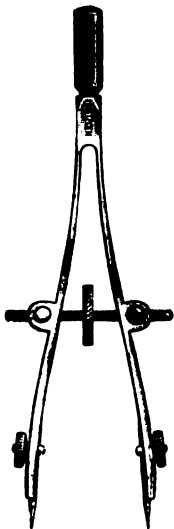
730C.

No. 730A.	Gem Union Bow Dividers,	3 1/2 in.,	center wheel,	. . .	Each, \$
730B.	" " " Pencil,	3 1/2 "	" "	. . .	"
730C.	" " " Pen,	3 1/2 "	" "	. . .	"

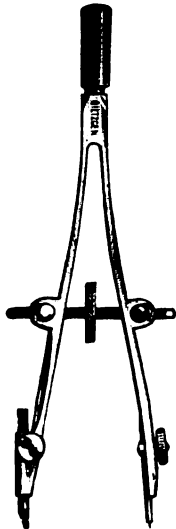
Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

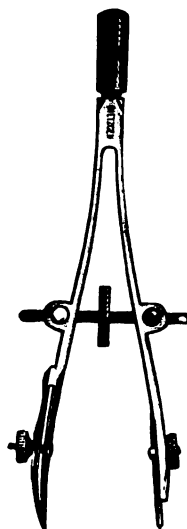
Drawing Instruments



No. 732A.

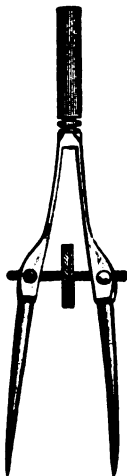


732B.

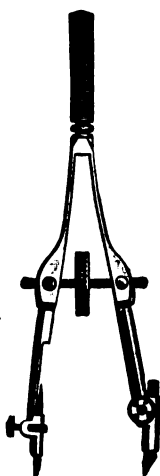


732C.

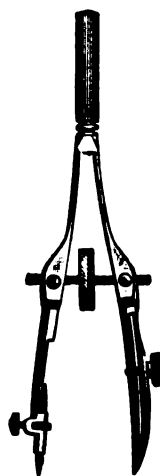
No. 732A.	Excello Bow Dividers,	4 $\frac{1}{4}$ in.,	center wheel,	. . . . .	Each, \$
732B.	" " Pencil,	4 $\frac{1}{4}$ "	" " "	. . . . .	"
732C.	" " Pen,	4 $\frac{1}{4}$ "	" " "	. . . . .	"



No. 734A.



734B.



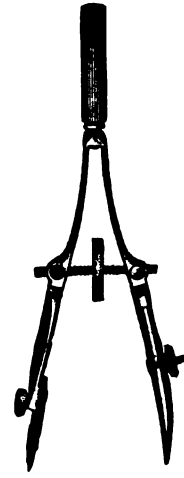
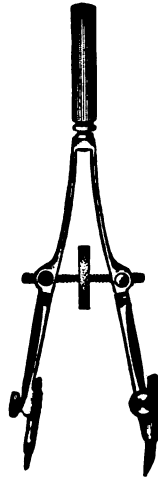
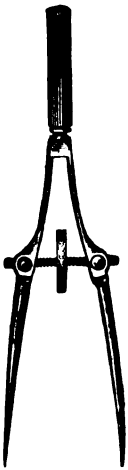
734C.

No. 734A.	Premier Bow Dividers,	3 $\frac{1}{2}$ in.,	center wheel,	. . . . .	Each, \$
734B.	" " Pencil,	3 $\frac{1}{2}$ "	" " "	. . . . .	"
734C.	" " Pen,	3 $\frac{1}{2}$ "	" " "	. . . . .	"

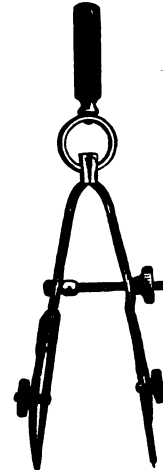
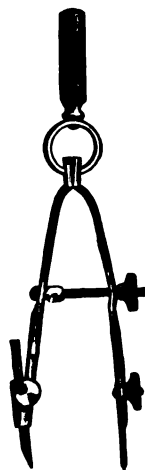
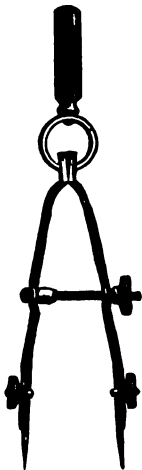
Excello grade described on pages 47-49; Premier, page 49.

See Price List in back of Catalog.

Drawing Instruments



- | | | | |
|-----------|-----------------------|--------------------------|----------|
| | No. 736A. | 736B. | 736C. |
| No. 736A. | Federal Bow Dividers, | 3 1/2 in., center wheel, | Each, \$ |
| 736B. | " " Pencil, | 3 1/2 " " " " | " |
| 736C. | " " Pen, | 3 1/4 " " " " | " |

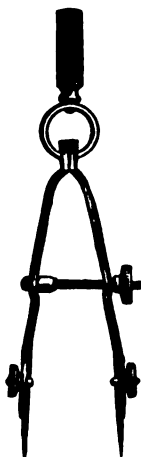


- | | | | |
|-----------|-----------------------|---------------------------------------|----------|
| | No. 738A. | 738B. | 738C. |
| No. 738A. | Excello Bow Dividers, | 3 1/2 in., side wheel, circular head, | Each, \$ |
| 738B. | " " Pencil, | 3 1/2 " " " " " " | " |
| 738C. | " " Pen, | 3 1/2 " " " " " " | " |
| 740A. | Like No. 738A, but | 4 1/4 in., | " |
| 740B. | " " 738B, " | 4 1/4 " " | " |
| 740C. | " " 738C, " | 4 1/4 " " | " |

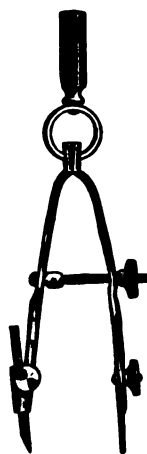
Exoello grade described on pages 47-49; Federal, page 50.

See Price List in back of Catalog.

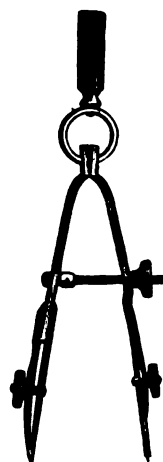
Drawing Instruments



No. 742A.

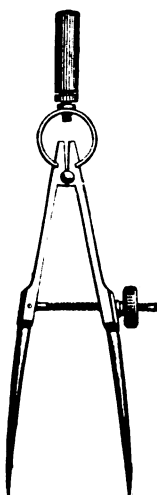


742B.

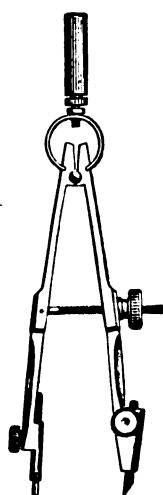


742C.

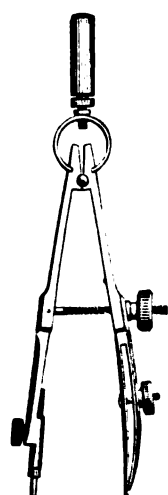
No. 742A. Champion Bow Dividers, 3½ in., side wheel, circular head, Each, \$
742B. " " Pencil, 3½ " " " " " " "
742C. " " Pen, 3½ " " " " " " "



No. 744A.



744B.



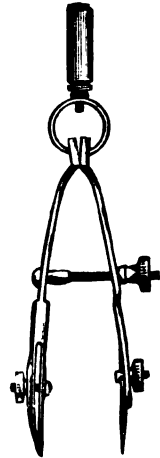
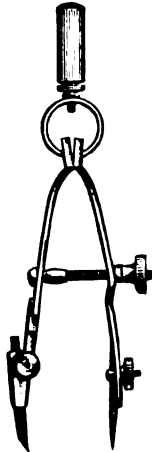
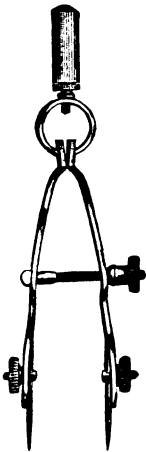
744C.

No. 744A. Federal Bow Dividers, 3½ in., side wheel, circular head, Each, \$
744B. " " Pencil, 3½ " " " " " " "
744C. " " Pen, 3½ " " " " " " "

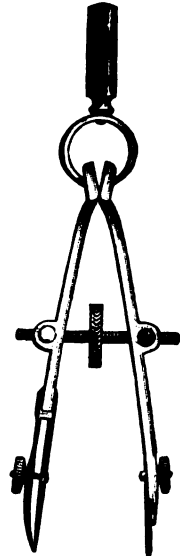
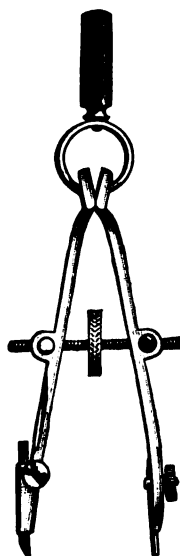
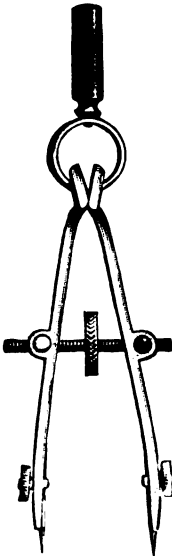
Champion grade described on pages 49, 50; Federal, page 50.

See Price List in back of Catalog.

Drawing Instruments



- | | | | |
|-----------|-------------------------|------------------------------------|----------|
| | No. 746A. | 746B. | 746C. |
| No. 746A. | Universal Bow Dividers, | 3½ in., side wheel, circular head, | Each, \$ |
| 746B. | " Pencil, | 3½ " " " " " " | " " |
| 746C. | " Pen, | 3½ " " " " " " | " " |

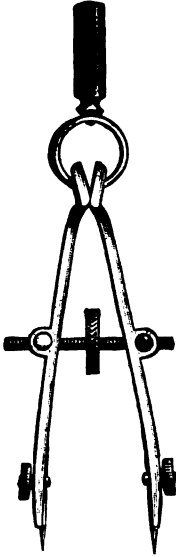


- | | | | |
|-----------|-----------------------|--------------------------------------|----------|
| | No. 752A. | 752 B. | 752C. |
| No. 752A. | Excello Bow Dividers, | 4¼ in., center wheel, circular head, | Each, \$ |
| 752B. | " Pencil, | 4¼ " " " " " " | " " |
| 752C. | " Pen, | 4¼ " " " " " " | " " |

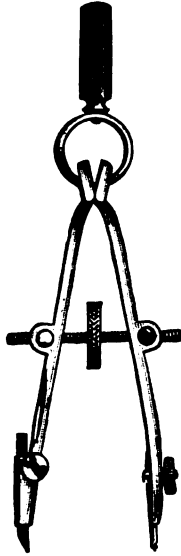
Excello grade described on pages 47-49; Universal, page 50.

See Price List in back of Catalog.

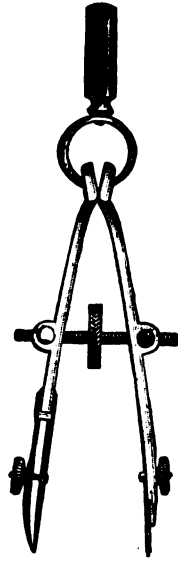
Drawing Instruments



No. 754A.



754B.

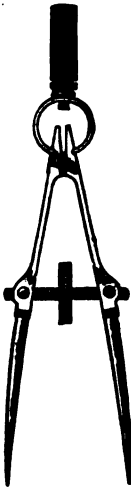


754C.

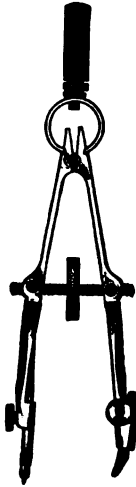
No. 754A. **Champion Bow Dividers**, $4\frac{1}{4}$ in., center wheel, circular head, Each, \$

754B. " " Pencil, $4\frac{1}{4}$ " " " " " " "

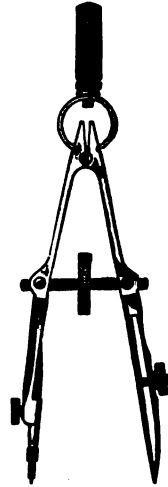
754C. " " Pen, $4\frac{1}{4}$ " " " " " " "



No. 756A.



756B.



756C.

No. 756A. **Federal Bow Dividers**, $3\frac{1}{2}$ in., center wheel, circular head, Each, \$

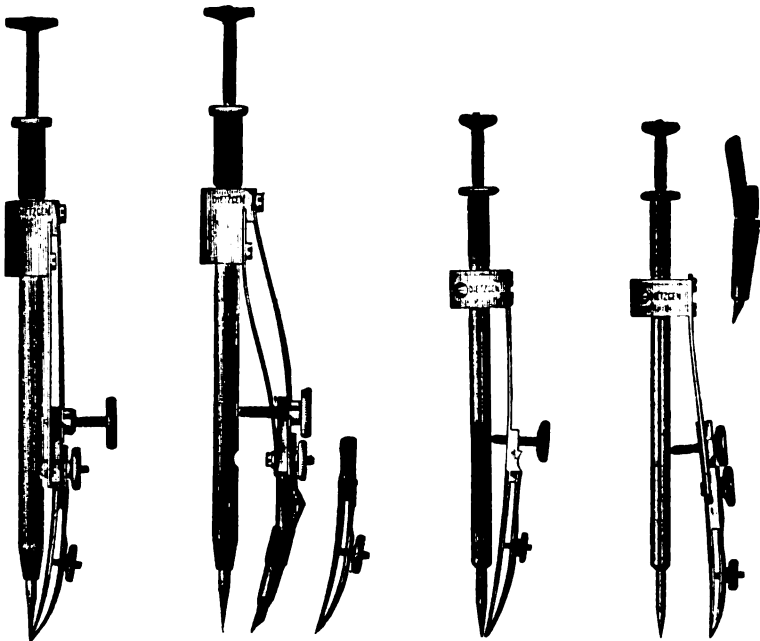
756B. " " Pencil, $3\frac{1}{2}$ " " " " " " "

756C. " " Pen, $3\frac{1}{2}$ " " " " " " "

Champion grade described on pages 49, 50; Federal, page 50.

See Price List in back of Catalog.

Drawing Instruments



No. 758.
759.
762.
763.

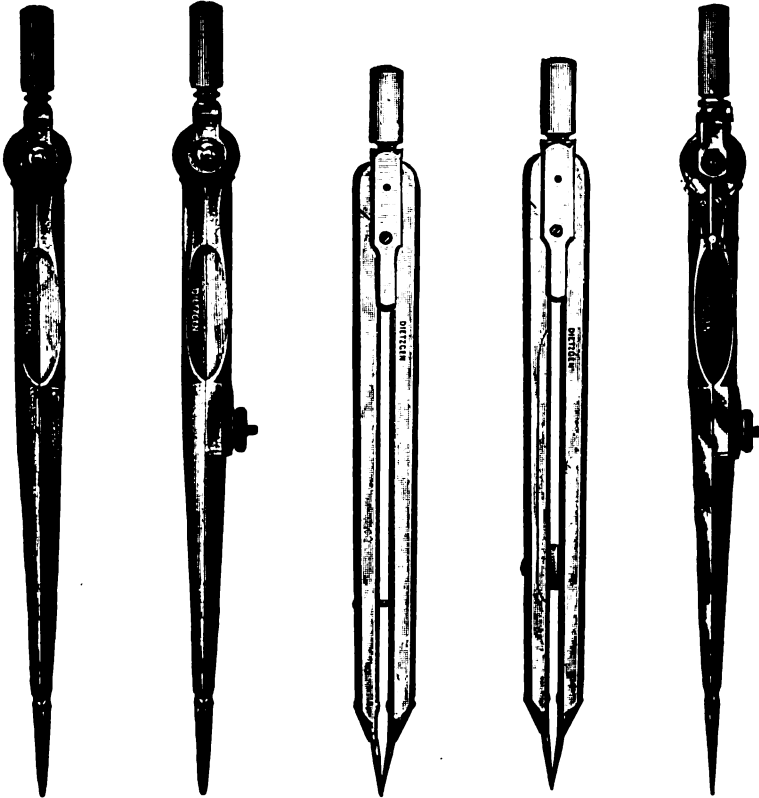
- No. 758.** Excello Self-Adjusting Drop Spring Bow Pen, 4 1/2 in., . . . Each, \$
- 759.** " " " " " " " " with Pencil Part, 4 1/2 in., Each,
- 762.** Premier Drop Spring Bow Pen, 4 in., self-adjusting, "
- 763.** " " " " " " with Pencil Part, 4 in., self-adjusting, Each,
- 767.** Champion Self-Adjusting Drop Spring Bow Pen with Pencil Part, 4 1/2 in. (like No. 759 in design), Each,

These Drop Spring Bow Instruments are unsurpassed for drawing small circles. The design of Nos. 758, 759 and 767 Self-Adjusting Spring Bows is, while unique, very practical. Two parallel springs hold the pen or pencil part in the same relative position regardless of the diameter of the circle to be drawn.

Excello grade described on pages 47-49; Premier, page 49; Champion, pages 49, 50.

See Price List in back of Catalog.

Drawing Instruments



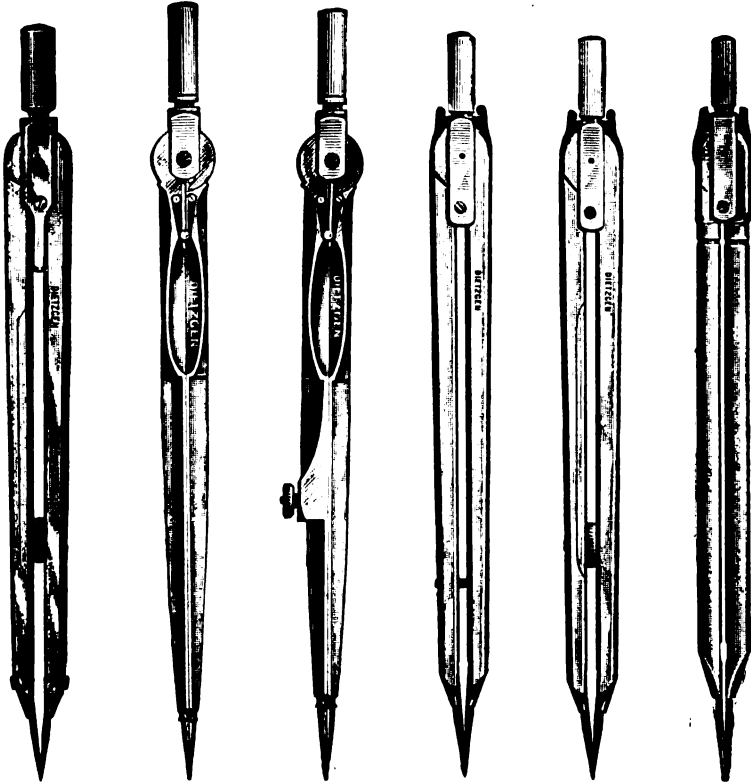
No. 773. 774. 777. 778. 782.

- No. 773. Gem Union Plain Dividers, 6 in., Union Pivot Joint and Clamp, Each, \$**
- 774. Gem Union Hairspring Dividers, 6 in., Union Pivot Joint and Clamp, Each,**
- 777. Excello Plain Dividers, 6 in., adjustable and reversible needle points, straightening device, Each,**
- 778. Excello Hairspring Dividers, 6 in., adjustable and reversible needle points, straightening device, Each,**
- 782. Premier Hairspring Dividers, 6 in., straightening device, “**

Gem Union grade described on pages 46, 47; Excello, pages 47-49; Premier, page 49.

See Price List in back of Catalog.

Drawing Instruments



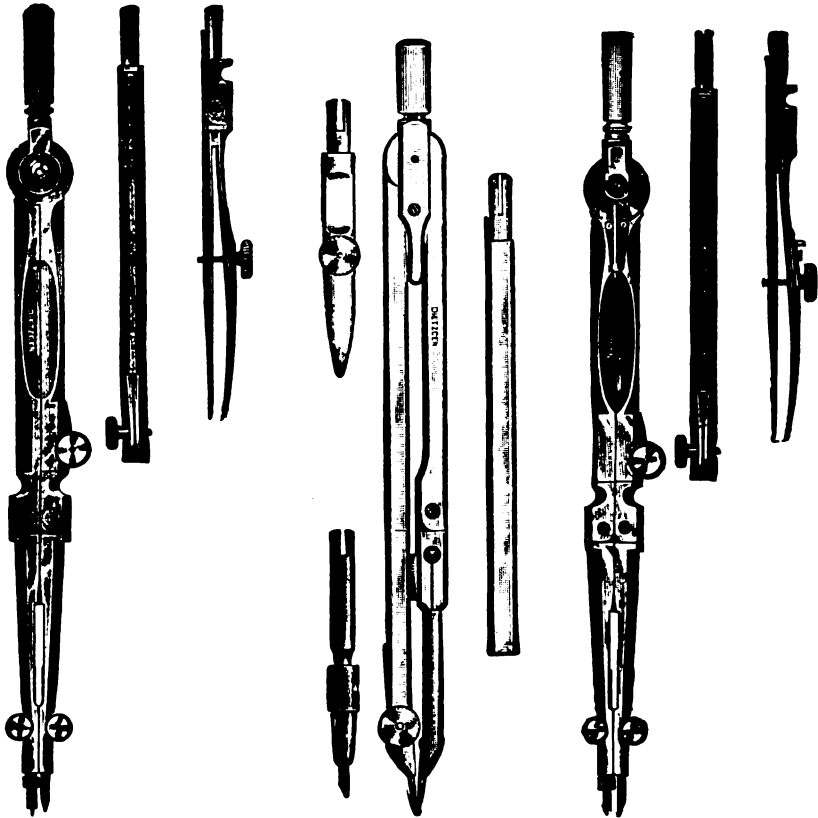
No. 786. 790. 792. 796. 797. 806.

- No. 786. **Champion Hairspring Dividers**, 6 in., adjustable and reversible needle points, straightening device, Each, \$
- 790. **Federal Plain Dividers**, 6 in., straightening device, "
- 792. **Federal Hairspring Dividers**, 6 in., straightening device, "
- 796. **Universal Plain Dividers**, 6 in., replaceable needle points, straightening device, Each,
- 797. **Universal Hairspring Dividers**, 6 in., replaceable needle points, straightening device, Each,
- 806. **Dependo Plain Dividers**, 6 in., replaceable needle points, straightening device, Each,

Champion grade described on pages 49, 50; Federal, page 50; Universal, page 50; Dependo, page 50.

See Price List in back of Catalog.

Drawing Instruments



No. 819.

823.

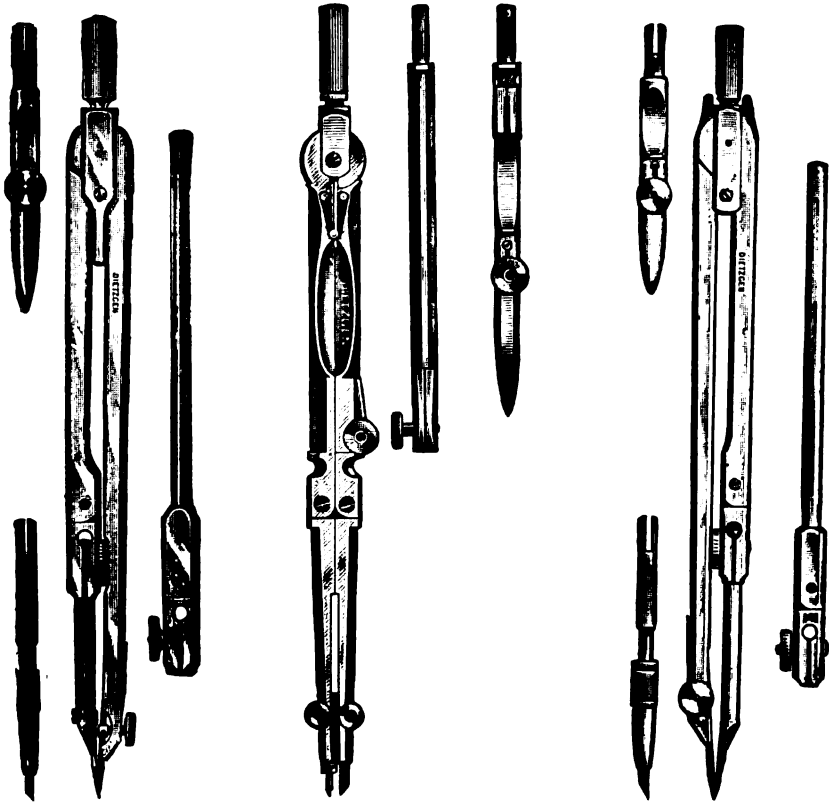
827.

- No. 819. Gem Union Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, lengthening bar, Union Pivot Joint and Clamp, Each, \$
820. Like No. 819, but with Hairspring, "
823. Excello Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device; lengthening bar fits into socket of removable needle point leg, Each,
827. Premier Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device, Each,
828. Like No. 827, but with Hairspring, "

Gem Union grade described on pages 46, 47; Excello, pages 47-49; Premier, page 49.

See Price List in back of Catalog.

Drawing Instruments



No. 831.

835.

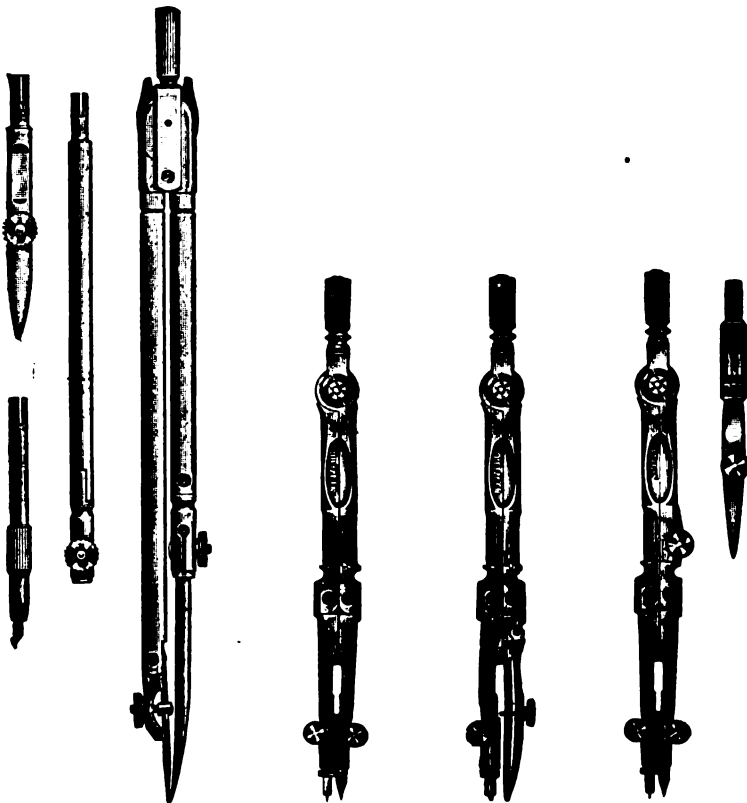
839.

- No. 831. **Champion Compasses**, 6 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device, Each, \$
835. **Federal Compasses**, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device, Each,
839. **Universal Compasses**, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device, Each,

Champion grade described on pages 49, 50; Federal, page 50; Universal, page 50.

See Price List in back of Catalog.

Drawing Instruments



No. 849.

859.

860.

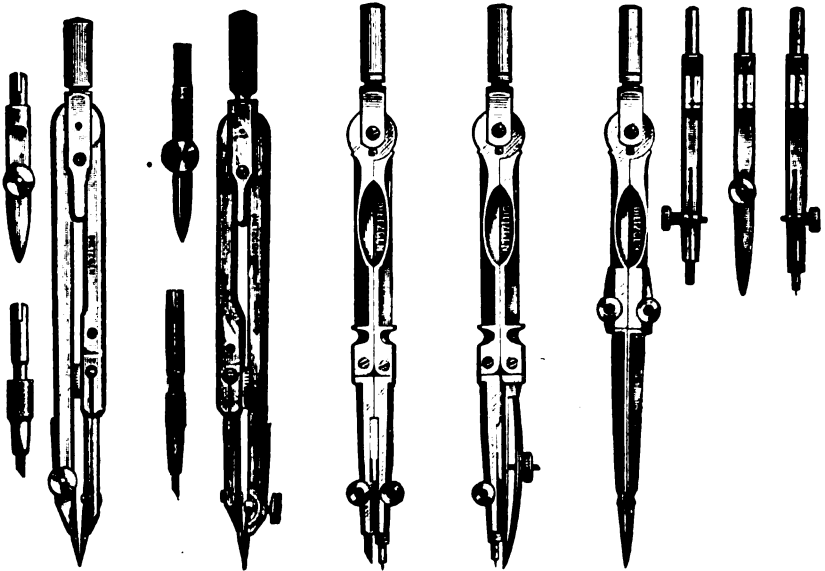
861.

- No. 849. Dependo Compasses, 6 in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar, straightening device, Each, \$
859. Gem Union Compasses, 4 1/4 in., fixed needle point and pencil part legs, screw-thread needle point, Union Pivot Joint and Clamp, Each,
860. Gem Union Compasses, 4 1/4 in., fixed needle point and pen part legs, screw-thread needle point, Union Pivot Joint and Clamp, Each,
861. Gem Union Compasses, 4 1/4 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, Union Pivot Joint and Clamp, Each,

Gem Union grade described on pages 46, 47; Dependo, page 50.

See Price List in back of Catalog.

Drawing Instruments



No. 865. 867. 869. 870. 872.

- No. 865. **Excello Compasses, 4 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, straightening device, Each, \$**

- 867. **Champion Compasses, 4 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, straightening device, Each,**

- 869. **Federal Compasses, 4¼ in., fixed needle point and pencil part legs, screw-thread needle point, Each,**

- 870. **Federal Compasses, 4¼ in., fixed needle point and pen part legs, screw-thread needle point, Each,**

- 871. **Federal Compasses, 4¼ in., fixed needle point leg, screw-thread needle point, pencil part, pen part, Each,**

- 872. **Federal Compasses, 4¼ in., two steel points, needle point part, screw-thread needle point, pencil part, pen part, Each,**

Excello grade described on pages 47-49; Champion, pages 49, 50; Federal, page 50.

See Price List in back of Catalog.

Drawing Instruments

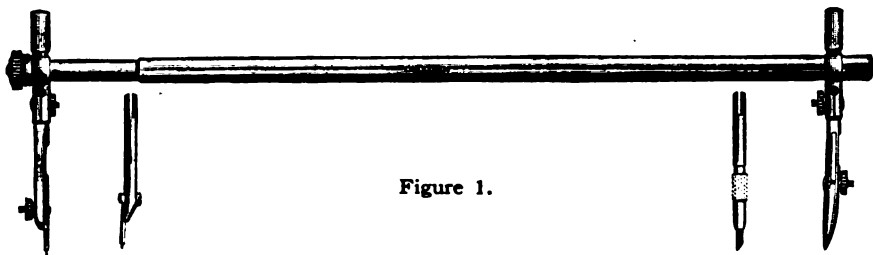


Figure 1.

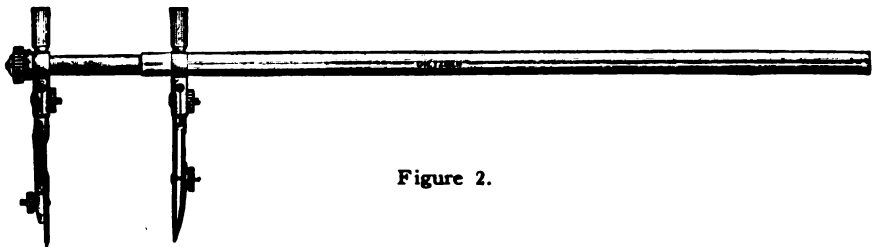


Figure 2.

No. 886S.

No. 886S. Excello Tubular Beam Compasses, Nickel silver, 10½ in. overall, with sliding extension to 19½ in. overall, micrometer needle point leg, plain needle point leg, pen and pencil parts; in velvet lined case, Each, \$

These Beam Compasses, of excellent workmanship and finish, are simple in design, durable in construction, and have an exceptional range.

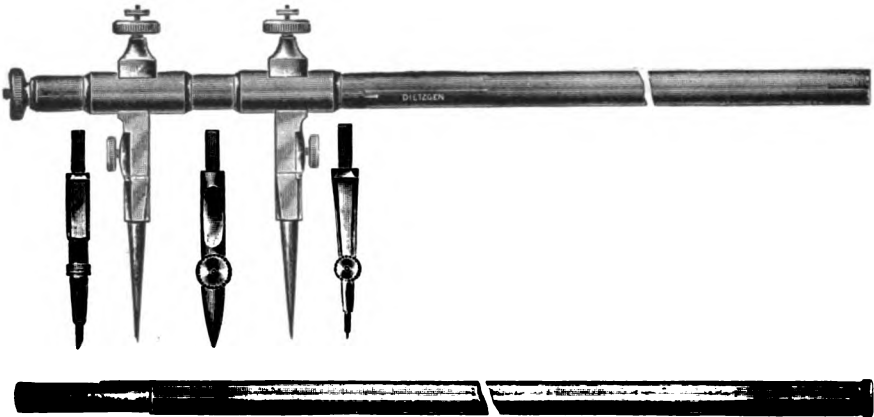
As shown by the illustrations, they are operated in two positions: when used in the position indicated by Figure 1, circles from 19½ to 37½ inches in diameter can be drawn; when used in the position indicated by Figure 2, circles from 1 to 19½ inches in diameter are obtainable.

The change from one position to the other can be rapidly made by simply removing the tubular bar from its sleeve and inserting into the other end of the sleeve. A very effective locking device, operated by a screw at one end of the tubular bar, permits of rigidly locking the compasses at any desired radius within the range of the instrument.

Excello grade described on pages 47-49.

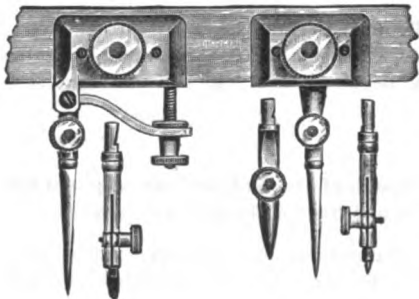
See Price List in back of Catalog.

Drawing Instruments



No. 887S.

- No. 887S.** Gem Union Tubular Beam Compasses, 18 in., micrometer adjustment, two round Nickel silver bars, two steel points, pen, pencil and needle point parts; in velvet lined case, Each, \$
- 888S.** Like No. 887S, but 24 in., and three bars, "
- 889S.** " " 887S, " 36 " " " " " "



No. 890S.

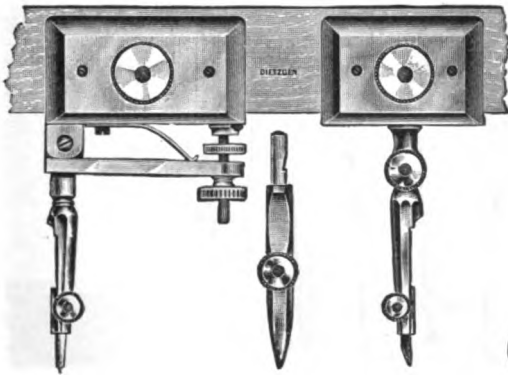
- No. 890S.** Gem Union Minute Beam Compasses, micrometer adjustment, two steel points, pen, pencil and needle point parts; in velvet lined case, Each, \$

Bars for Beam Compasses listed under No. 2119.

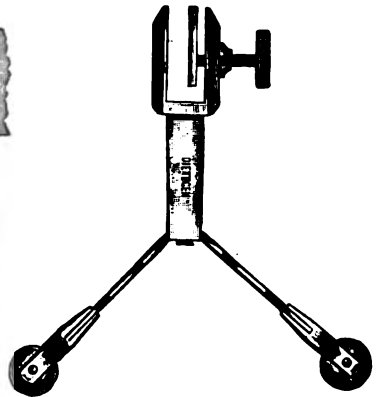
Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Drawing Instruments

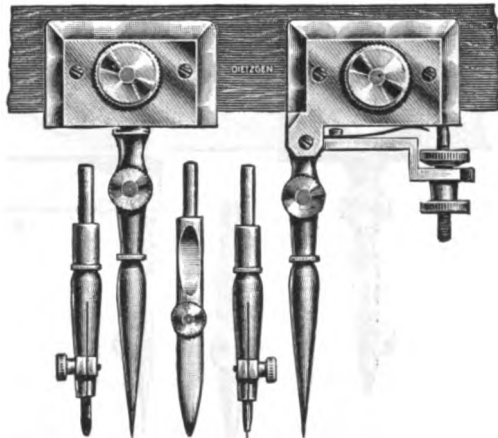


No. 891S.



892S.

- No. 891S. Gem Union Beam Compasses**, micrometer adjustment, two needle points, one exchangeable for lead, and pen part; in velvet lined case; fits any straight edge, Each, \$
- 892S. Wheel Attachment for No. 891S;** in velvet lined case, "



No. 893S.

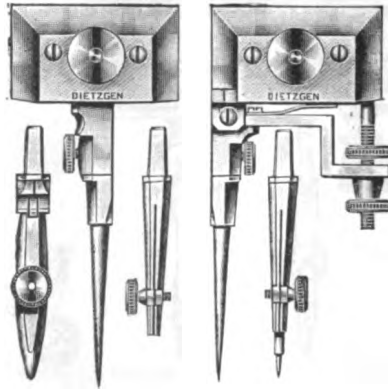
- No. 893S. Gem Union Beam Compasses**, micrometer adjustment, two steel points, pen, pencil and needle point parts; in velvet lined case; fits any straight edge, Each, \$
- 894S. Wheel Attachment for No. 893S;** in velvet lined case, "

Bars for Beam Compasses listed under No. 2119.

Gem Union grade described on pages 46, 47.

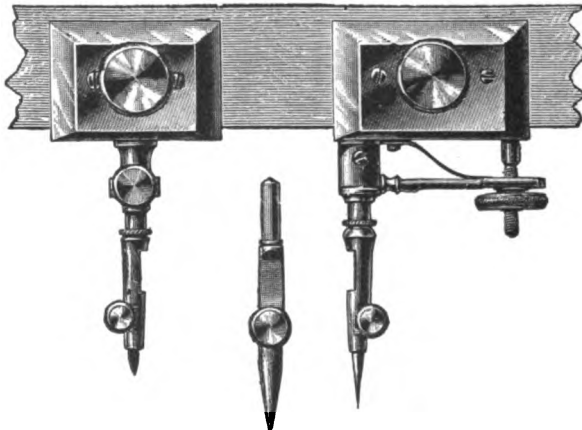
See Price List in back of Catalog.

Drawing Instruments



No. 895S.

No. 895S. Premier Beam Compasses, micrometer adjustment, two steel points, pen, pencil and needle point parts; in velvet lined case; fits any straight edge, Each, \$



No. 896S.

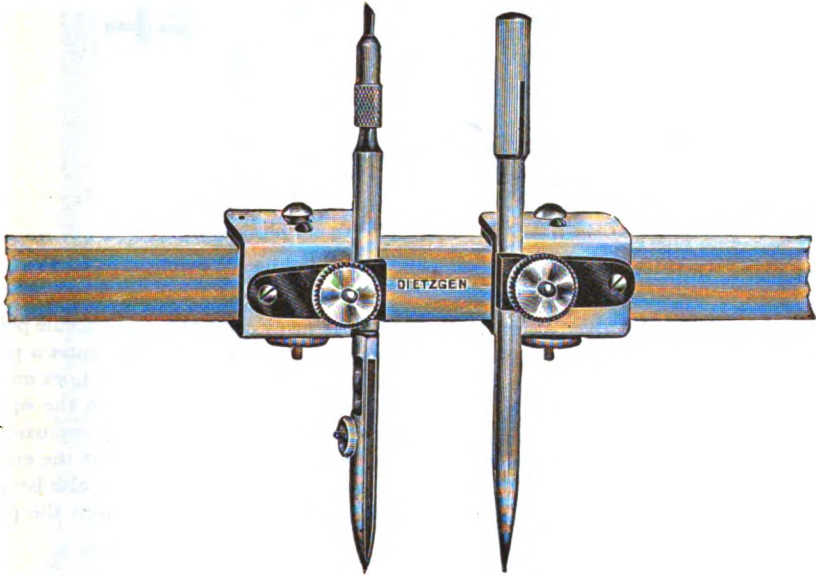
No. 896S. Federal Beam Compasses, micrometer adjustment, fixed needle point leg, pen and pencil parts, in velvet lined case; fits any straight edge, Each, \$

Bars for Beam Compasses listed under No. 2119.

Premier grade described on page 49; Federal, page 50.

See Price List in back of Catalog.

Drawing Instruments



No. 897S.

No. 897S. Excello Beam Compasses; in velvet lined case, . . . Each, \$

These Beam Compasses differ from and have the advantage over other forms of beam compasses due to the simplicity of design and ease of operation. No set screws, micrometer screws, etc., are required to set or adjust them.

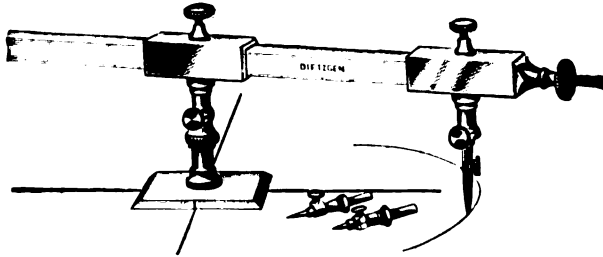
The part holding the combination pen and pencil part is adjusted by means of a miller roller, held in contact with the bar by a strong steel spring, and is brought into any desired position by operating the roller with the finger.

Bar listed separately under No. 2119, Style B.

Excello grade described on pages 47-49.

See Price List in back of Catalog.

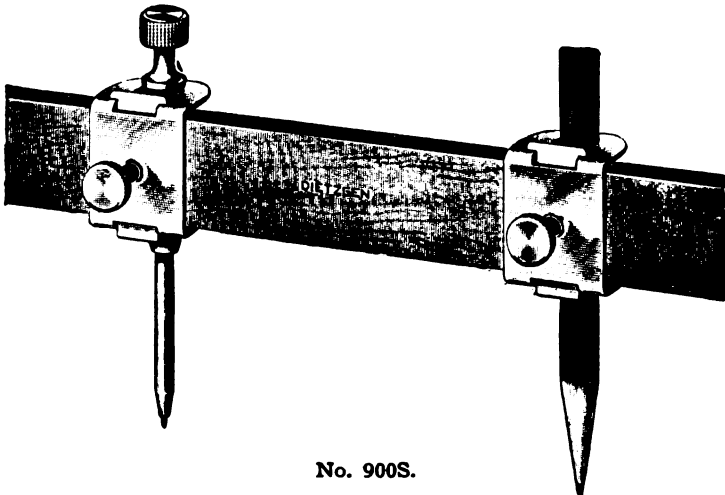
Drawing Instruments



No. 898S.

No. 898S. Unique Beam Compasses, pen, pencil and needle point parts, and wooden bar 36 in. long, Each, \$

An improvement over other forms, as it does away with the usual needle point, thus overcoming disfiguring the drawing by unnecessary holes, and substitutes a pillar which can be easily located over the exact center by means of two cross lines on the base plate. Pivoted to the top of the pillar is a bearing, through which the square bar of hardwood, clamped when desired by a set screw, slides for obtaining approximate adjustments. Fine adjustments are obtained by the milled-head screw at the end of the bar, the range being about $\frac{1}{2}$ inch. If preferred, this instrument can also be used like the ordinary beam compasses, by inserting the needle point part into the pillar socket.



No. 900S.

No. 900S. Simplicity Beam Compasses, Each, \$

The Simplicity Beam Compasses, while low in price, will be found very practical. They are made of dull nickel-plated steel, and consist of a socket which holds the steel needle point part and a socket for holding an ordinary lead pencil or a pen part.

Bar listed separately under No. 2119, Style C.

See Price List in back of Catalog.

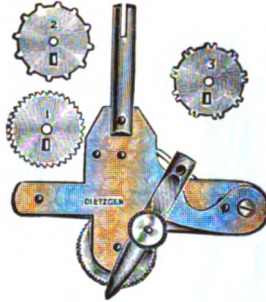
Drawing Instruments



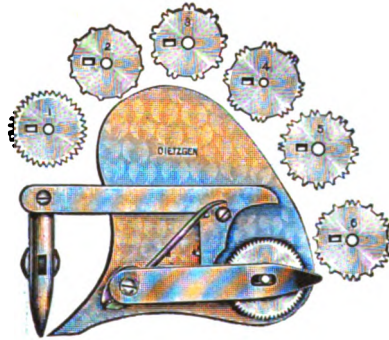
No. 928S.



930S.



No. 934S.



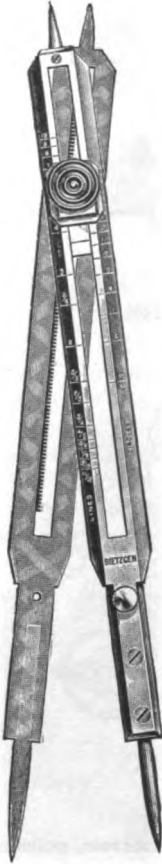
932S.

- No. 928S. Gem Union Dotting Pen, 6 in., 6 wheels, ink reservoir, polished ebony handle, Each, \$
- 930S. Gem Union "Knight" Dotting Pen, 4¾ in., 4 wheels, polished ebony handle, Each,
- 932S. Excello Dotting Instrument, 6 wheels, in case; operated by rolling along the edge of a T Square or Straightedge; the change from one wheel to another can be made rapidly, . . Each,
- 934S. Excello Dotting Instrument, 3 wheels, in case; adapted for use with No. 897S Beam Compasses, Each,

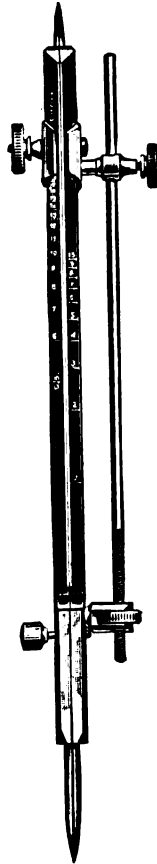
Gem Union grade described on pages 46, 47; Excello, pages 47-49.

See Price List in back of Catalog.

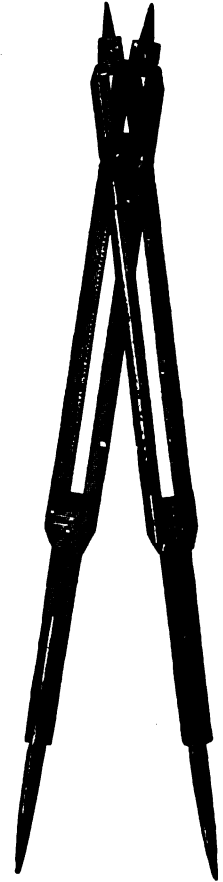
Drawing Instruments



No. 939S.



941S.



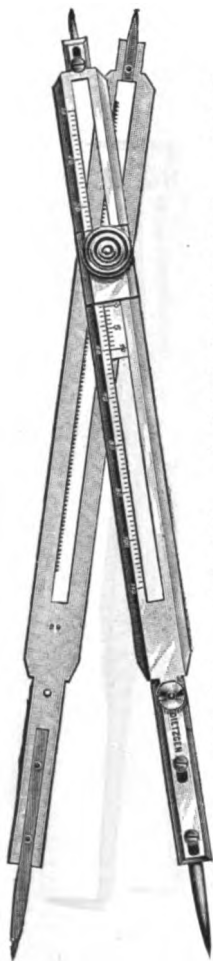
943S.

- No. 939S.** Gem Union Proportional Dividers, 8½ in., rack movement and exchangeable points, finely graduated for lines and circles; in velvet lined case, Each, \$
- 941S.** Gem Union Proportional Dividers, 9 in., micrometer adjustment and exchangeable points, finely graduated for lines, circles, planes and solids; in velvet lined case, Each,
- 943S.** Gem Union Proportional Dividers, 9 in., rack movement, exchangeable and adjustable points, finely graduated for lines and circles; in velvet lined case, Each,

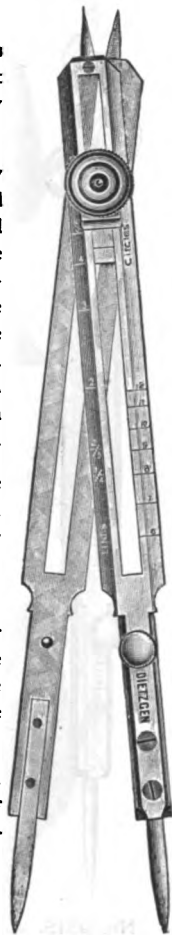
Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Drawing Instruments



No. 945S.



949S.

The Standard Proportional Dividers No. 945S are graduated in such a manner that with the aid of table furnished any ratio may be speedily and accurately set off.

The purposes for which these Dividers may be used are almost limitless. The engraved divisions run from 10 to 110 and with the aid of the vernier to 1,000. A table giving a large number of settings such as "Diameter and Circumference of a Circle," "Diameter of a Circle and Side of Inscribed Square," "Side of Cube and Diameter of Equal Sphere," "Miles and Kilometers," etc., etc., is furnished with each instrument, and by means of a simple formula any setting not given may be easily obtained.

After having obtained the setting for the desired ratio, the slide is moved to that point, when the ends of the dividers will indicate the ratio.

Thus:

According to the table, the setting for "Miles and Kilometers" is 767, and the slide being moved to that point with the aid of the vernier, the ends of the instrument will indicate the desired ratio.

Each division of the Standard Proportional Divider represents one 200th part of its entire length, but only 100 divisions appear on the instrument.

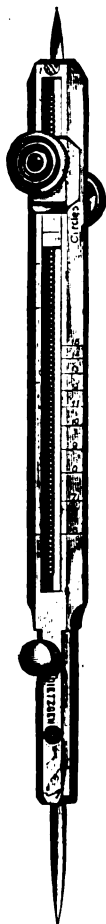
No. 945S. Gem Union Standard Proportional Dividers, 10 in., rack movement, exchangeable and adjustable points, and table of settings; in case, Each, \$

949S. Premier Proportional Dividers, 7¼ in., exchangeable points, graduated for lines and circles; in velvet lined case, . . . Each,

Gem Union grade described on pages 46, 47; Premier, page 49.

See Price List in back of Catalog.

Drawing Instruments



No. 951S.



953S.



957S.



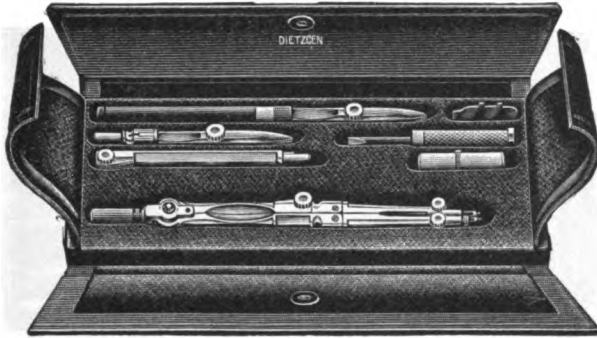
959S.

- No. 951S. Premier Proportional Dividers, $7\frac{1}{4}$ in., rack movement and exchangeable points, graduated for lines, circles, planes and solids; in velvet lined case, Each, \$
- 953S. Brass Proportional Dividers, $6\frac{1}{4}$ in.; in case, "
- 955S. Like No. 953S, but Nickel silver; in case, "
- 957S. Nickel Silver Proportional Dividers, 7 in., rack movement, graduated for lines and circles; in case, Each,
- 959S. Nickel Silver Proportional Dividers, 7 in., rectangular bent points, graduated for lines and circles; in case, Each,

Premier grade described on page 49.

See Price List in back of Catalog.

**Gem Union Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet**



No. 1002.

- No. 1002. Pocket Book Case, cont'g:**
 619 Ruling Pen, 5½ in., spring blade, polished ebony handle.
 819 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, lengthening bar, Union Pivot Joint and Clamp. Combination Key and Lead Box. Key. Box with extra Needle Points, Set, \$

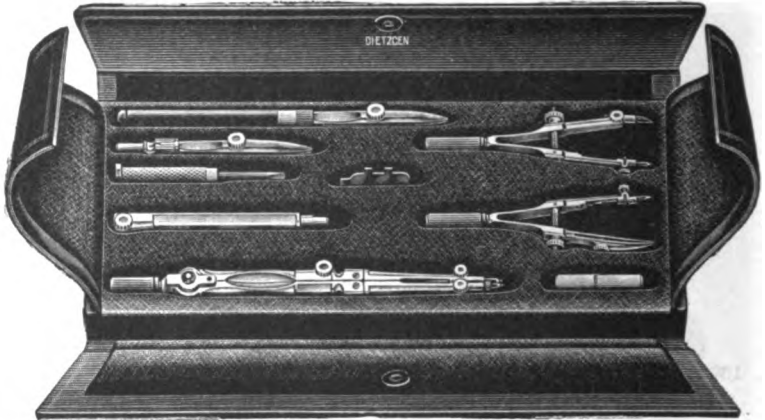


No. 1003.

- No. 1003. Pocket Book Case, cont'g:**
 619 Ruling Pen, 5½ in., spring blade, polished ebony handle.
 716C Bow Pen, 3¼ in., side wheel.
 819 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, lengthening bar, Union Pivot Joint and Clamp. Combination Key and Lead Box. Key. Box with extra Needle Points, Set, \$

See Price List in back of Catalog.

Gem Union Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1004.

No. 1004. Pocket Book Case, cont'g:

619 Ruling Pen, 5½ in., spring blade, polished ebony handle.

716B Bow Pencil, 3½ in., side wheel.

716C " Pen, 3½ " " "

819 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, lengthening bar, Union Pivot Joint and Clamp.

Combination Key and Lead Box.

Key.

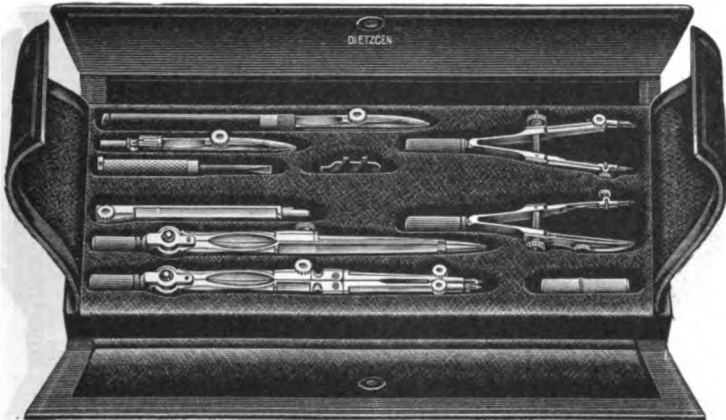
Box with extra Needle Points, Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 51, 56A-3, 56A-15.

Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Gem Union Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1005.

No. 1005. Pocket Book Case, cont'g:

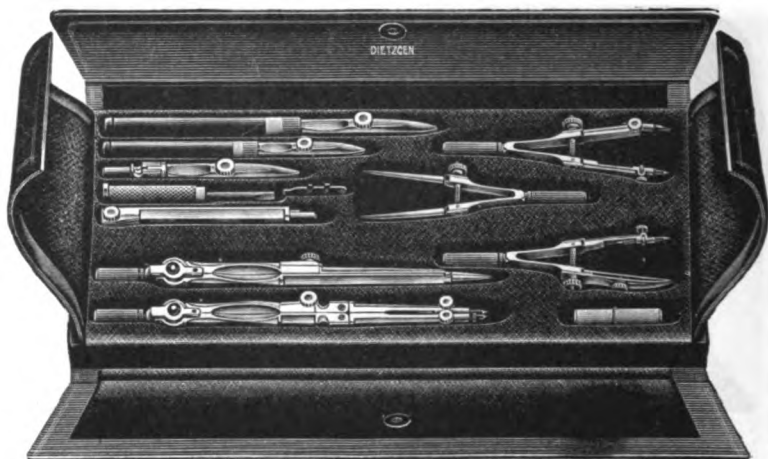
- 619 Ruling Pen, 5½ in., spring blade, polished ebony handle.
 - 716B Bow Pencil, 3½ in., side wheel.
 - 716C " Pen, 3½ " " "
 - 774 Hairspring Dividers, 6 in., Union Pivot Joint and Clamp.
 - 819 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, lengthening bar, Union Pivot Joint and Clamp.
- Combination Key and Lead Box.
- Key.
- Box with extra Needle Points, Set, \$

**Ruling Pen, etc., as shown in case, illustrated separately on
 pages 51, 56A-3, 56A-13, 56A-15.**

Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Gem Union Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1007.

No. 1007. Pocket Book Case, cont'g:

618 Ruling Pen, 5 in., spring blade, polished ebony handle.

619 " " 5½ in., " " " " "

716A Bow Dividers, 3½ in., side wheel.

716B " Pencil, 3½ " " "

716C " Pen, 3½ " " "

774 Hairspring Dividers, 6 in., Union Pivot Joint and Clamp.

819 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, lengthening bar, Union Pivot Joint and Clamp.

Combination Key and Lead Box.

Key.

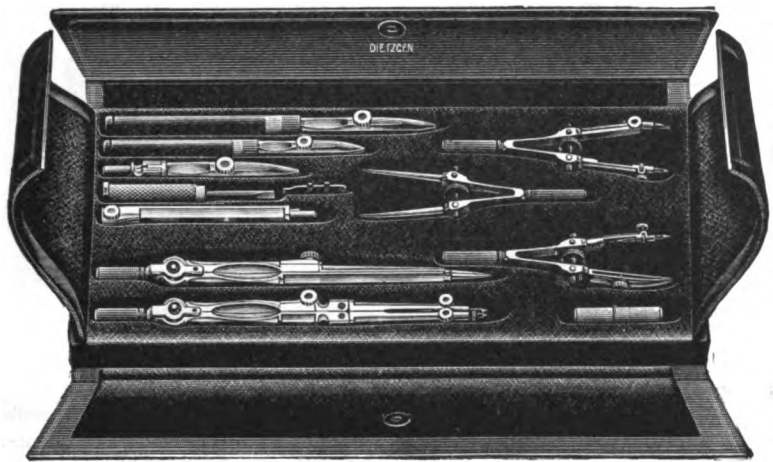
Box with extra Needle Points, Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 51, 56A-3, 56A-13, 56A-15.

Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Gem Union Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1007C.

No. 1007C. Pocket Book Case, cont'g:

- 618 Ruling Pen, 5 in., spring blade, polished ebony handle.
- 619 " " 5½ " " " " " "
- 730A Bow Dividers, 3½ in., center wheel.
- 730B " Pencil, 3½ " " "
- 730C " Pen, 3½ " " "
- 774 Hairspring Dividers, 6 in., Union Pivot Joint and Clamp.
- 819 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, pen part, lengthening bar, Union Pivot Joint and Clamp.

Combination Key and Lead Box.

Key.

Box with extra Needle Points, Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 51, 56A-6, 56A-13, 56A-15.

Gem Union grade described on pages 46, 47.

See Price List in back of Catalog.

Excello Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1011.

No. 1011. Pocket Book Case, cont'g:
 Combination Bow Compasses, 4 $\frac{1}{4}$ in., center wheel, fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part.
 Metal Handle with extra Needle Points, this handle fits the divider, pen and pencil parts, and any one of these parts can, in connection with the handle, be used as a separate instrument.
 Lead Box, Set, \$

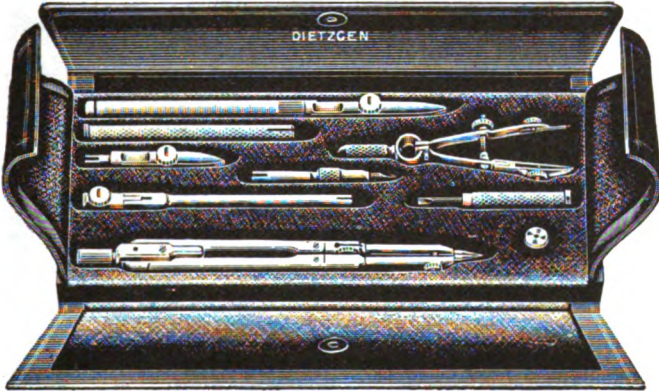


No. 1012.

No. 1012. Pocket Book Case, cont'g:
 631 Ruling Pen, 5 $\frac{5}{8}$ in., spring blade, aluminum handle.
 823 Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device. Combination Key and Lead Box. Center Tack. Metal Handle with extra Needle Points, Set, \$

See Price List in back of Catalog.

**Excello Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet**



No. 1013.

No. 1013. Pocket Book Case, cont'g:

- 631 Ruling Pen, 5 $\frac{5}{8}$ in., spring blade, aluminum handle.
- 738C Bow Pen, 3 $\frac{1}{2}$ in., side wheel, circular head.
- 823 Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 52, 56A-8, 56A-15.

Excello grade described on pages 47-49.

See Price List in back of Catalog.

Excello Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1014.

No. 1014. Pocket Book Case, cont'g:

- 631 Ruling Pen, 5 $\frac{1}{8}$ in., spring blade, aluminum handle.
- 738B Bow Pencil, 3 $\frac{1}{2}$ in., side wheel, circular head.
- 738C " Pen, 3 $\frac{1}{2}$ " " " " " "
- 823 Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

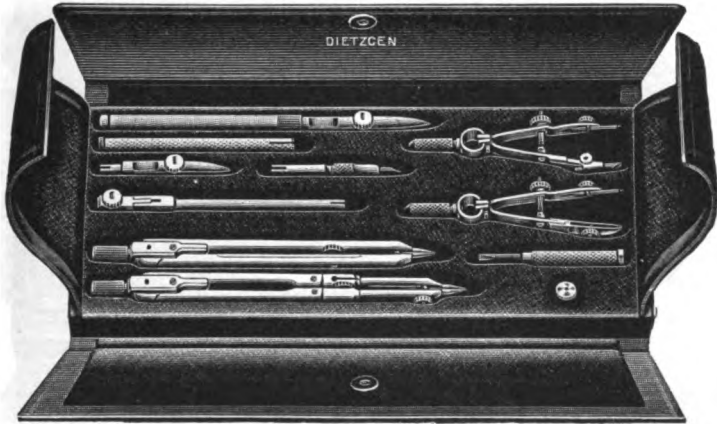
Ruling Pen, etc., as shown in case, illustrated separately on pages 52, 56A-8, 56A-15.

Excello grade described on pages 47-49.

See Price List in back of Catalog.

Excello Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1015.

No. 1015. Pocket Book Case, cont'g:

- 631 Ruling Pen, 5 $\frac{5}{8}$ in., spring blade, aluminum handle.
 - 738B Bow Pencil, 3 $\frac{1}{2}$ in., side wheel, circular head.
 - 738C " Pen, 3 $\frac{1}{2}$ " " " " " "
 - 778 Hairspring Dividers, 6 in., adjustable and reversible needle points, straightening device.
 - 823 Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

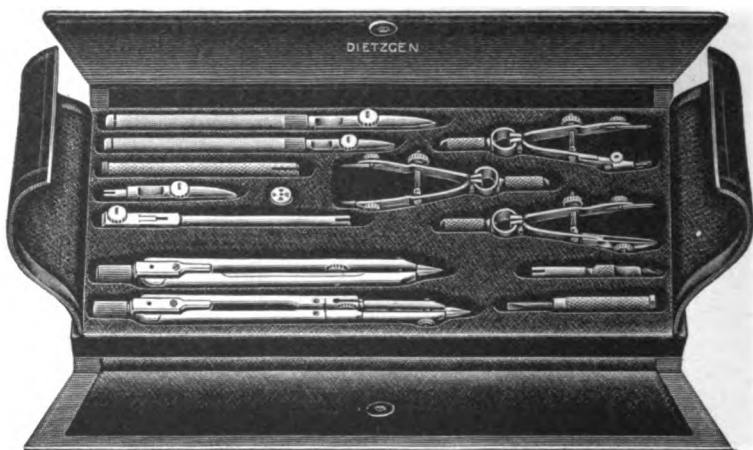
Ruling Pen, etc., as shown in case, illustrated separately on pages 52, 56A-8, 56A-13, 56A-15.

Excello grade described on pages 47-49.

See Price List in back of Catalog.



Excello Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1017.

No. 1017. Pocket Book Case, cont'g:

- 630 Ruling Pen, 4 $\frac{3}{4}$ in., spring blade, aluminum handle.
- 631 " " 5 $\frac{5}{8}$ " " " " " "
- 738A Bow Dividers, 3 $\frac{1}{2}$ in., side wheel, circular head.
- 738B " Pencil, 3 $\frac{1}{2}$ " " " " " "
- 738C " Pen, 3 $\frac{1}{2}$ " " " " " "
- 778 Hairspring Dividers, 6 in., adjustable and reversible needle points, straightening device.
- 823 Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

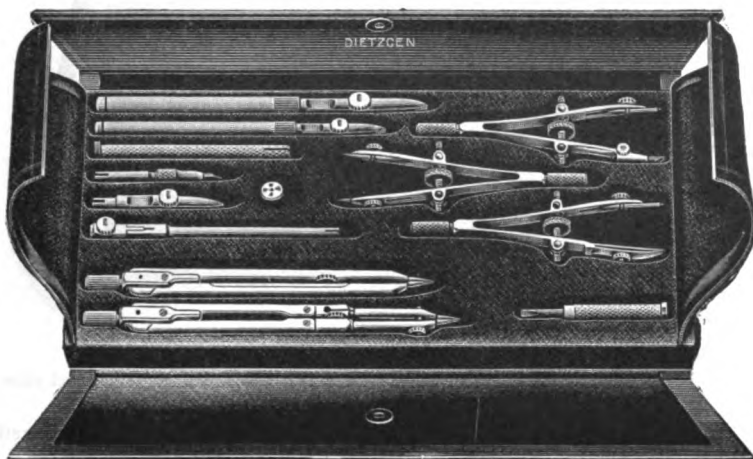
1017-1. Like No. 1017, but with 4 $\frac{1}{4}$ in. side wheel, circular head Bows, Nos. 740A, B and C, in place of Nos. 738A, B and C, Set,
 Ruling Pens, etc., as shown in case, illustrated separately on pages 52, 56A-8, 56A-13, 56A-15.

Excello grade described on pages 47-49.

See Price List in back of Catalog.

Excello Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1017C.

No. 1017C. Pocket Book Case, cont'g:

- 630 Ruling Pen, 4¾ in., spring blade, aluminum handle.
 - 631 " " 5⅝ " " " " "
 - 732A Bow Dividers, 4¼ in., center wheel.
 - 732B " Pencil, 4¼ " " "
 - 732C " Pen, 4¼ " " "
 - 778 Hairspring Dividers, 6 in., adjustable and reversible needle points, straightening device.
 - 823 Compasses, 6 in., removable needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 52, 56A-7, 56A-13, 56A-15.

Excello grade described on pages 47-49.

See Price List in back of Catalog.

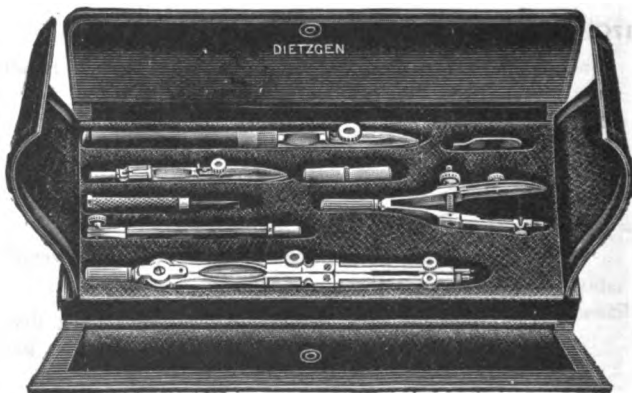
**Premier Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet**



No. 1022.

No. 1022. Pocket Book Case, cont'g:

- 641 Ruling Pen, 5½ in., slide-catch spring blade, polished ebony handle.
- 827 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device. Combination Key and Lead Box. Key. Box with extra Needle Points, Set, \$



No. 1023.

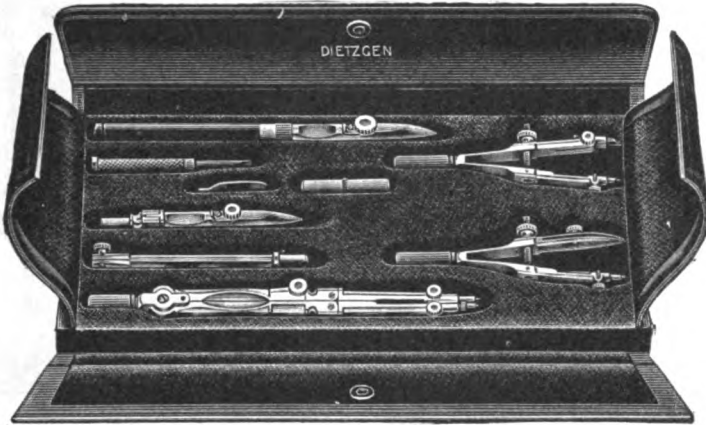
No. 1023. Pocket Book Case, cont'g:

- 641 Ruling Pen, 5½ in., slide-catch spring blade, polished ebony handle.
- 720C Bow Pen, 3½ in., side wheel.
- 827 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device. Combination Key and Lead Box. Key. Box with extra Needle Points, Set, \$

See Price List in back of Catalog.

Premier Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1024.

No. 1024. Pocket Book Case, cont'g:

641 Ruling Pen, 5½ in., slide-catch spring blade, polished ebony handle.

720B Bow Pencil, 3½ in., side wheel.

720C " Pen, 3½ " " "

827 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device.

Combination Key and Lead Box.

Key.

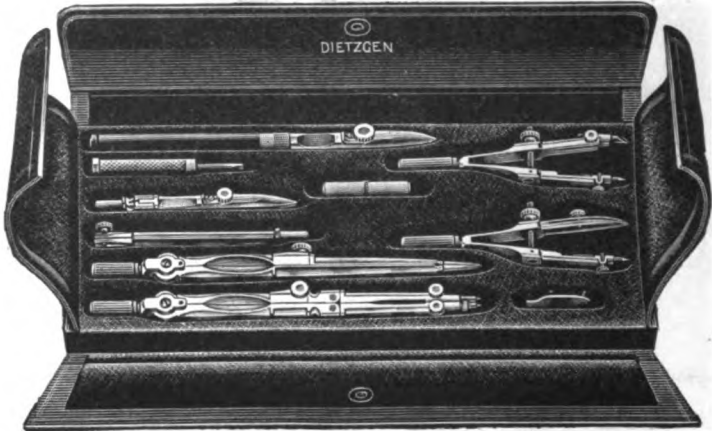
Box with extra Needle Points, Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 52, 56A-4, 56A-15.

Premier grade described on page 49.

See Price List in back of Catalog.

Premier Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1025.

No. 1025. Pocket Book Case, cont'g:

641 Ruling Pen, 5½ in., slide-catch spring blade, polished ebony handle.

720B Bow Pencil, 3½ in., side wheel.

720C " Pen, 3½ " " "

782 Hairspring Dividers, 6 in., straightening device.

827 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device.

Combination Key and Lead Box.

Key.

Box with extra Needle Points, Set, \$

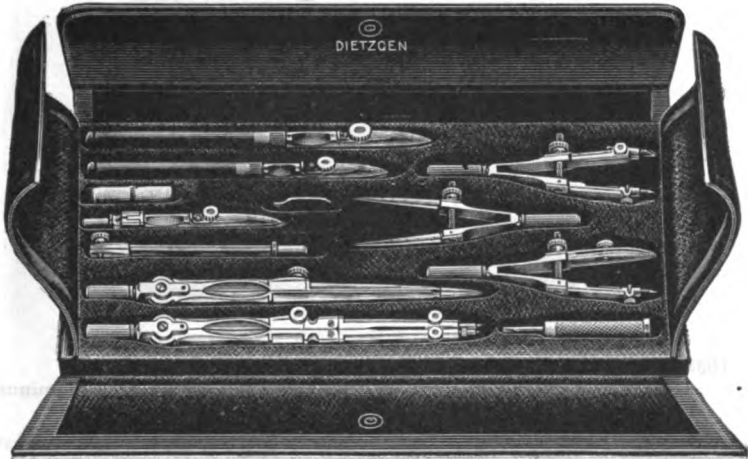
Ruling Pen, etc., as shown in case, illustrated separately on pages 52, 56A-4, 56A-13, 56A-15.

Premier grade described on page 49.

See Price List in back of Catalog.

Premier Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1027.

No. 1027. Pocket Book Case, cont'g:

640 Ruling Pen, 5 in., slide-catch spring blade, polished ebony handle.

641 Ruling Pen, 5½ in., slide-catch spring blade, polished ebony handle.

720A Bow Dividers, 3½ in., side wheel.

720B " Pencil, 3½ " " "

720C " Pen, 3½ " " "

782 Hairspring Dividers, 6 in., straightening device.

827 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device.

Combination Key and Lead Box.

Key.

Box with extra Needle Points, Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 52, 56A-4, 56A-13, 56A-15.

Premier grade described on page 49.

See Price List in back of Catalog.

Champion Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet

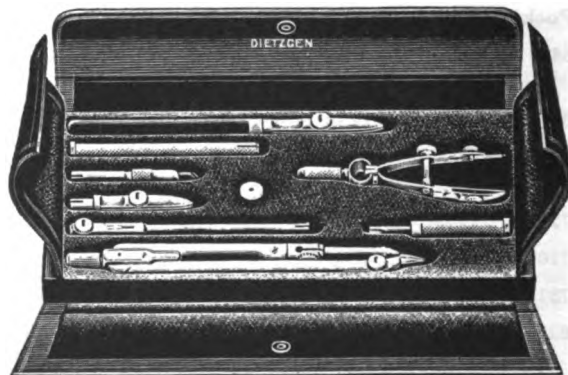


No. 1032.

No. 1032. Pocket Book Case, cont'g:

645 Ruling Pen, $5\frac{5}{8}$ in., spring blade, black enameled aluminum handle.

831 Compasses, 6 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device. Combination Key and Lead Box. Center Tack. Metal handle with extra Needle Points, Set, \$



No. 1033.

No. 1033. Pocket Book Case, cont'g:

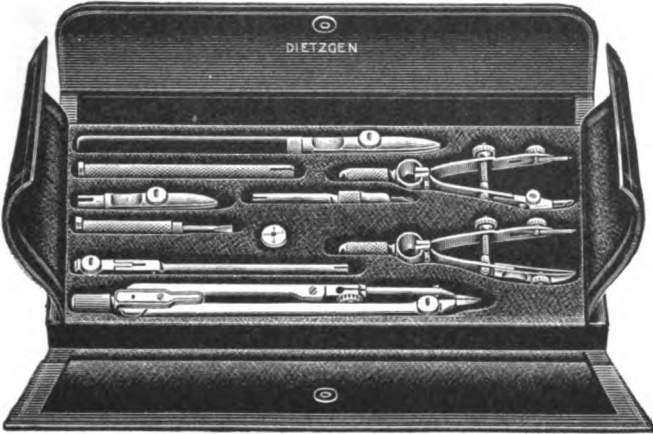
645 Ruling Pen, $5\frac{5}{8}$ in., spring blade, black enameled aluminum handle.

742C Bow Pen, $3\frac{1}{2}$ in., side wheel, circular head.

831 Compasses, 6 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device. Combination Key and Lead Box. Center Tack. Metal handle with extra Needle Points, Set, \$

See Price List in back of Catalog.

Champion Drawing Instruments
In Pocket Book Cases Lined with Silk Velvet



No. 1034.

No. 1034. Pocket Book Case, cont'g:

- 645 Ruling Pen, 5⁵/₈ in., spring blade, black enameled aluminum handle.
- 742B Bow Pencil, 3¹/₂ in., side wheel, circular head.
- 742C " Pen, 3¹/₂ " " " " " "
- 831 Compasses, 6 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

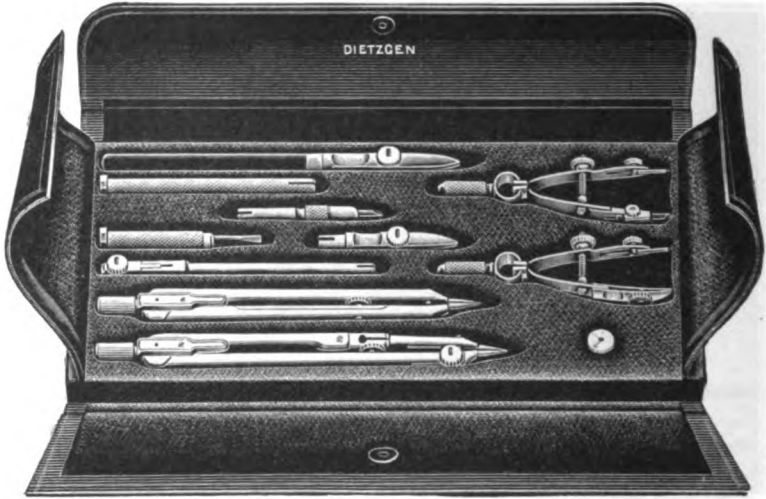
Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-9, 56A-16.

Champion grade described on pages 49, 50.

See Price List in back of Catalog.

Champion Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1035.

No. 1035. Pocket Book Case, cont'g:

645 Ruling Pen, 5 $\frac{5}{8}$ in., spring blade, black enameled aluminum handle.

742B Bow Pencil, 3 $\frac{1}{2}$ in., side wheel, circular head.

742C " Pen, 3 $\frac{1}{2}$ " " " " "

786 Hairspring Dividers, 6 in., adjustable and reversible needle points, straightening device.

831 Compasses, 6 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.

Combination Key and Lead Box.

Center Tack.

Metal Handle with extra Needle Points, Set, \$

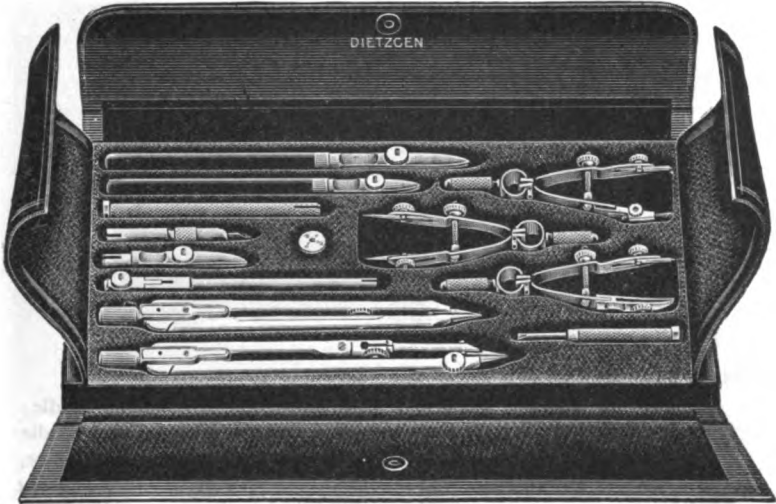
Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-9, 56A-14, 56A-16.

Champion grade described on pages 49, 50.

See Price List in back of Catalog.

Champion Drawing Instruments

In Pocket Book Cases Lined with Silk Velvet



No. 1037.

No. 1037. Pocket Book Case, cont'g:

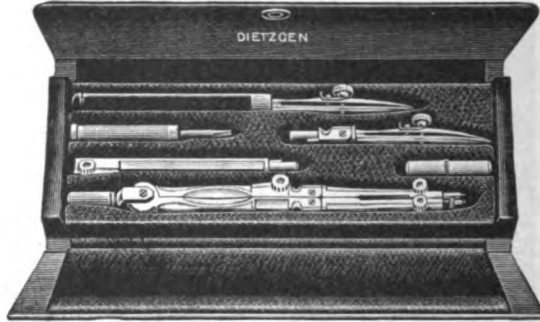
- 644 Ruling Pen, 4¾ in., spring blade, black enameled aluminum handle.
- 645 Ruling Pen, 5⅝ in., spring blade, black enameled aluminum handle.
- 742A Bow Dividers, 3½ in., side wheel, circular head.
- 742B " Pencil, 3½ " " " " "
- 742C " Pen, 3½ " " " " "
- 786 Hairspring Dividers, 6 in., adjustable and reversible needle points, straightening device.
- 831 Compasses, 6 in., fixed needle point leg, divider part, adjustable and reversible needle points, pen part, pencil part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Center Tack.
- Metal Handle with extra Needle Points, Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 53, 56A-9, 56A-14, 56A-16.

Champion grade described on pages 49, 50.

See Price List in back of Catalog.

Federal Drawing Instruments
In Pocket Cases Lined with Silk Velvet



No. 1042.

No. 1042. Pocket Case, cont'g:

- 649 Ruling Pen, 5½ in., slide-catch spring blade, ebony handle.
- 835 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device. Combination Key and Lead Box. Box with extra Needle Points, Set, \$



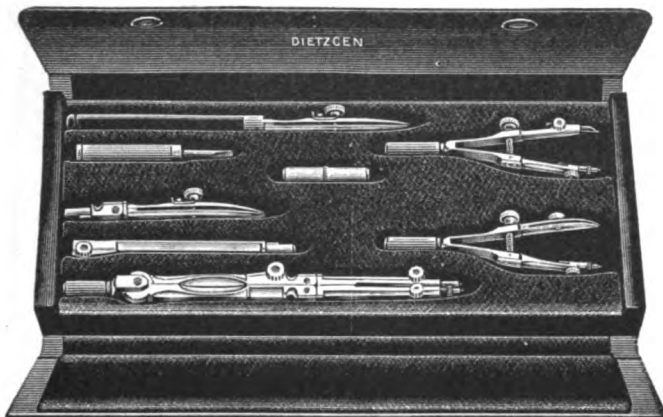
No. 1043.

No. 1043. Pocket Case, cont'g:

- 649 Ruling Pen, 5½ in., slide-catch spring blade, ebony handle.
- 722C Bow Pen, 3½ in., side wheel.
- 835 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device. Combination Key and Lead Box. Box with extra Needle Points, Set, \$

See Price List in back of Catalog.

**Federal Drawing Instruments
In Pocket Cases Lined with Silk Velvet**



No. 1044.

No. 1044. Pocket Case, cont'g:

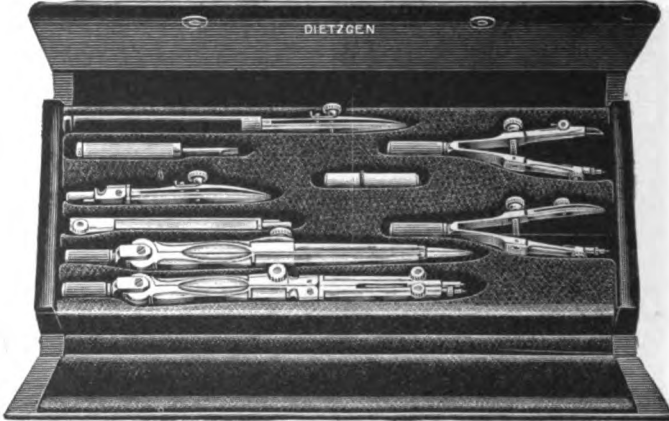
- 649 Ruling Pen, 5½ in., slide-catch spring blade, ebony handle.
- 722B Bow Pencil, 3½ in., side wheel.
- 722C " Pen, 3½ " " "
- 835 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Box with extra Needle Points, Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-5, 56A-16.

Federal grade described on page 50.

See Price List in back of Catalog.

**Federal Drawing Instruments
In Pocket Cases Lined with Silk Velvet**



No. 1045.

No. 1045. Pocket Case, cont'g:

649 Ruling Pen, 5½ in., slide-catch spring blade, ebony handle.

722B Bow Pencil, 3½ in., side wheel.

722C " Pen, 3½ " " "

792 Hairspring Dividers, 6 in., straightening device.

835 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device.

Combination Key and Lead Box.

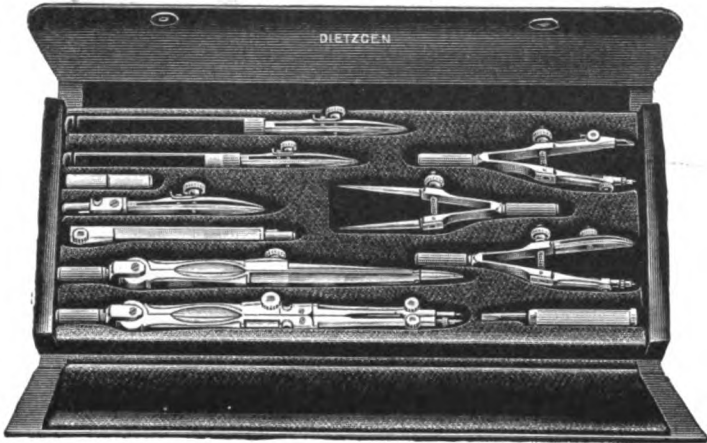
Box with extra Needle Points, Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-5, 56A-14, 56A-16.

Federal grade described on page 50.

See Price List in back of Catalog.

Federal Drawing Instruments
In Pocket Cases Lined with Silk Velvet



No. 1047.

No. 1047. Pocket Case, cont'g:

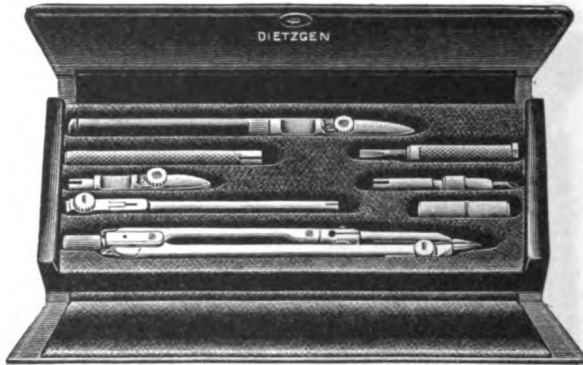
- 648 Ruling Pen, 5 in., slide-catch spring blade, ebony handle.
 - 649 " " 5½ in., " " " " " "
 - 722A Bow Dividers, 3½ in., side wheel.
 - 722B " Pencil, 3½ " " "
 - 722C " Pen, 3½ " " "
 - 792 Hairspring Dividers, 6 in., straightening device.
 - 835 Compasses, 6 in., fixed needle point leg, screw-thread needle point, pencil part, slide-catch pen part, lengthening bar, straightening device.
- Combination Key and Lead Box.
- Box with extra Needle Points, Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 53, 56A-5, 56A-14, 56A-16.

Federal grade described on page 50.

See Price List in back of Catalog.

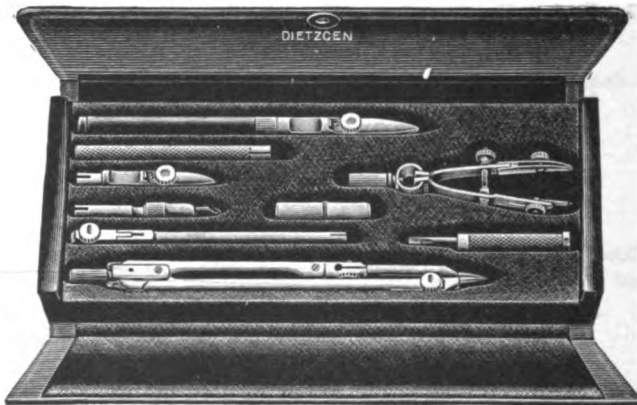
**Universal Drawing Instruments
In Pocket Cases Lined with Silk Velvet**



No. 1052.

No. 1052. Pocket Case, cont'g:

- 653 Ruling Pen, 5 $\frac{3}{8}$ in., slide-catch spring blade, ebony handle.
- 839 Compasses, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device. Combination Key and Lead Box. Box with extra Needle Points. Metal Handle for divider, pen and pencil parts, Set, \$



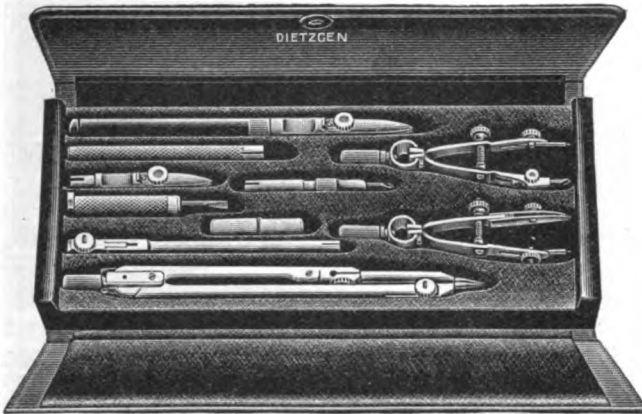
No. 1053.

No. 1053. Pocket Case, cont'g:

- 653 Ruling Pen, 5 $\frac{3}{8}$ in., slide-catch spring blade, ebony handle.
- 746C Bow Pen, 3 $\frac{1}{2}$ in., side wheel, circular head.
- 839 Compasses, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device. Combination Key and Lead Box. Box with extra Needle Points. Metal Handle for divider, pen and pencil parts, Set, \$

See Price List in back of Catalog.

Universal Drawing Instruments
In Pocket Cases Lined with Silk Velvet



No. 1054.

No. 1054. Pocket Case, cont'g:

653 Ruling Pen, 5 $\frac{5}{8}$ in., slide-catch spring blade, ebony handle.

746B Bow Pencil, 3 $\frac{1}{2}$ in., side wheel, circular head.

746C " Pen, 3 $\frac{1}{2}$ " " " " "

839 Compasses, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device.

Combination Key and Lead Box.

Box with extra Needle Points.

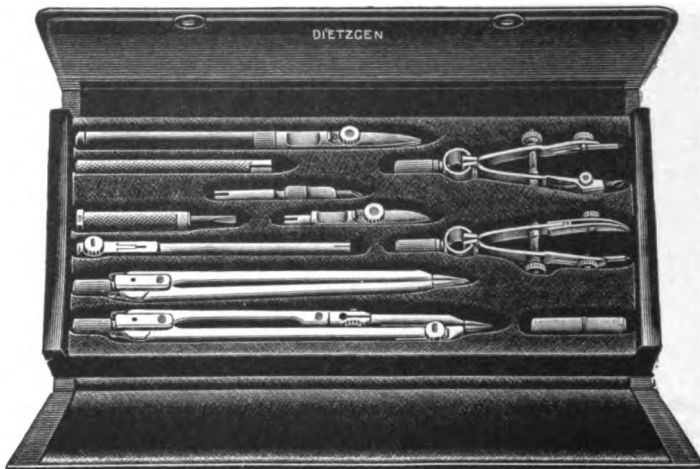
Metal Handle for divider, pen and pencil parts, . . . Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-10, 56A-16.

Universal grade described on page 50.

See Price List in back of Catalog.

Universal Drawing Instruments
In Pocket Cases Lined with Silk Velvet



No. 1055.

No. 1055. Pocket Case, cont'g:

653 Ruling Pen, $5\frac{5}{8}$ in., slide-catch spring blade, ebony handle.

746B Bow Pencil, $3\frac{1}{2}$ in., side wheel, circular head.

746C " Pen, $3\frac{1}{2}$ " " " " "

796 Plain Dividers, 6 in., replaceable needle points, straightening device.

839 Compasses, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device.

Combination Key and Lead Box.

Box with extra Needle Points.

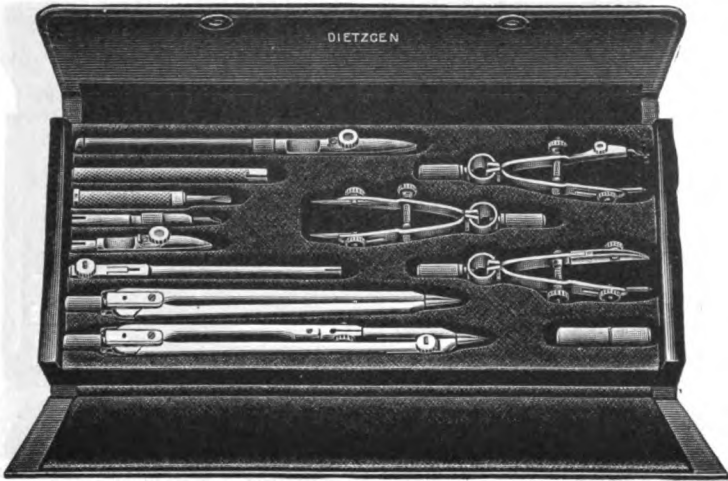
Metal Handle for divider, pen and pencil parts, . . . Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-10, 56A-14, 56A-16.

Universal grade described on page 50.

See Price List in back of Catalog.

Universal Drawing Instruments
In Pocket Cases Lined with Silk Velvet



No. 1056.

No. 1056. Pocket Case, cont'g:

653 Ruling Pen, 5 $\frac{5}{8}$ in., slide-catch spring blade, ebony handle.

746A Bow Dividers, 3 $\frac{1}{2}$ in., side wheel, circular head.

746B " Pencil, 3 $\frac{1}{2}$ " " " " "

746C " Pen, 3 $\frac{1}{2}$ " " " " "

796 Plain Dividers, 6 in., replaceable needle points, straightening device.

839 Compasses, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device.

Combination Key and Lead Box.

Box with extra Needle Points.

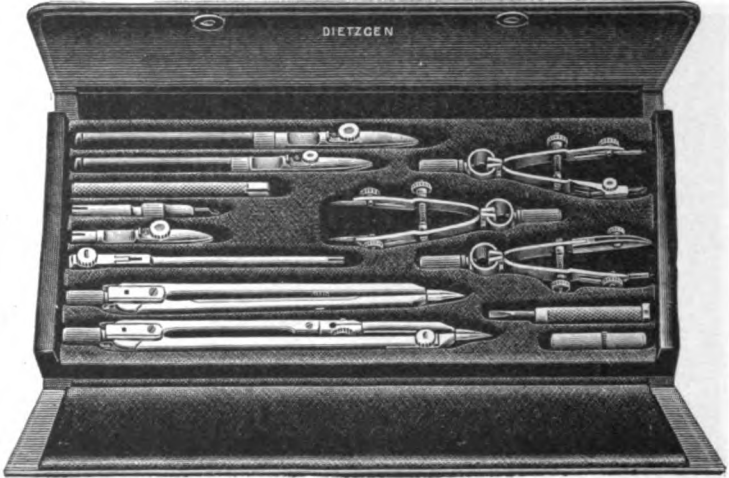
Metal Handle for divider, pen and pencil parts, . . . Set, \$

Ruling Pen, etc., as shown in case, illustrated separately on pages 53, 56A-10, 56A-14, 56A-16.

Universal grade described on page 50.

See Price List in back of Catalog.

**Universal Drawing Instruments
In Pocket Cases Lined with Silk Velvet**



No. 1057.

No. 1057. Pocket Case, cont'g:

652 Ruling Pen, $4\frac{3}{4}$ in., slide-catch spring blade, ebony handle.

653 " " $5\frac{5}{8}$ " " " " " " "

746A Bow Dividers, $3\frac{1}{2}$ in., side wheel, circular head.

746B " Pencil, $3\frac{1}{2}$ " " " " "

746C " Pen, $3\frac{1}{2}$ " " " " "

797 Hairspring Dividers, 6 in., replaceable needle points, straightening device.

839 Compasses, 6 in., fixed needle point leg, divider part, replaceable needle points, slide-catch pen part, pencil part, lengthening bar, straightening device.

Combination Key and Lead Box.

Box with extra Needle Points.

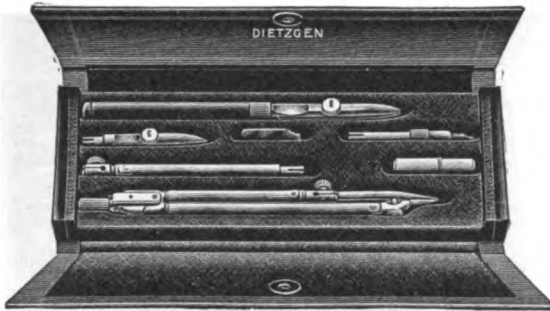
Metal Handle for divider, pen and pencil parts, . . . Set, \$

Ruling Pens, etc., as shown in case, illustrated separately on pages 53, 56A-10, 56A-14, 56A-16.

Universal grade described on page 50.

See Price List in back of Catalog.

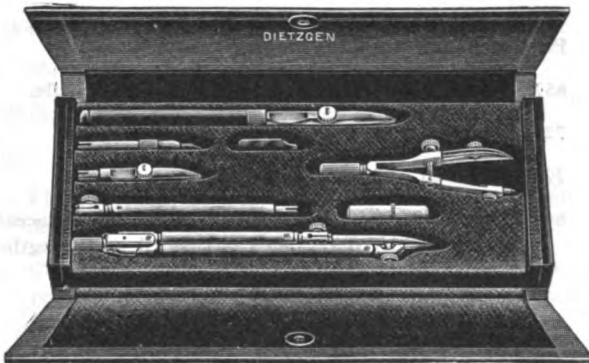
Dependo Drawing Instruments
In Pocket Cases Lined with Velvet



No. 1062.

No. 1062. Pocket Case, cont'g:

- 657 Ruling Pen, 5½ in., spring blade, ebony handle.
- 849 Compasses, 6 in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar, straightening device.
- Key and Lead Box, Set, \$



No. 1063.

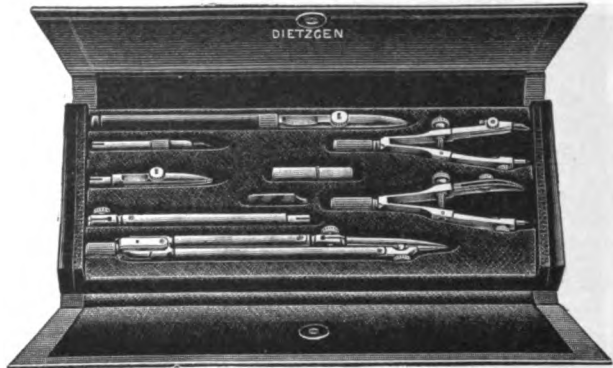
No. 1063. Pocket Case, cont'g:

- 657 Ruling Pen, 5½ in., spring blade, ebony handle.
- 724C Bow Pen, 3½ in., side wheel.
- 849 Compasses, 6 in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar, straightening device.
- Key and Lead Box, Set, \$

Dependo grade described on page 50.

See Price List in back of Catalog.

Dependo Drawing Instruments
In Pocket Cases Lined with Velvet



No. 1064.

No. 1064. Pocket Case, cont'g:

657 Ruling Pen, 5½ in., spring blade, ebony handle.

724B Bow Pencil, 3½ in., side wheel.

724C " Pen, 3½ " " "

849 Compasses, 6 in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar, straightening device.

Key.

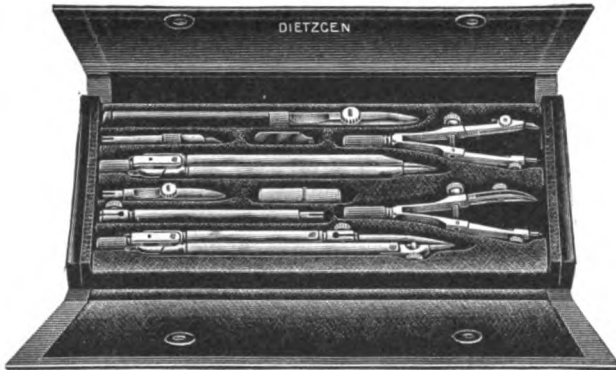
Lead Box, Set, \$

**Ruling Pen, etc., as shown in case, illustrated separately on
 pages 53, 56A-5, 56A-17.**

Dependo grade described on page 50.

See Price List in back of Catalog.

Dependo Drawing Instruments
In Pocket Cases Lined with Velvet



No. 1065.

No. 1065. Pocket Case, cont'g:

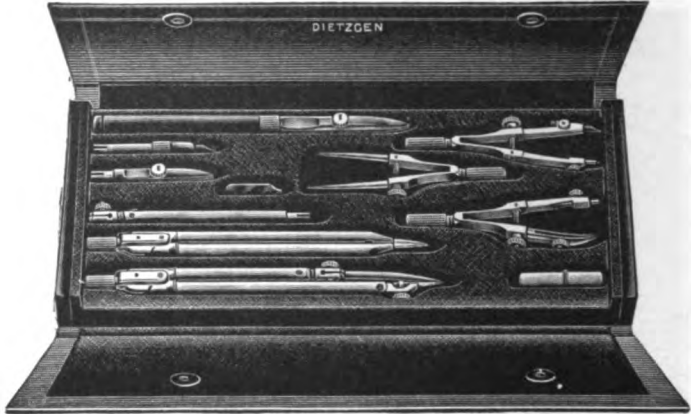
- 657 Ruling Pen, 5½ in., spring blade, ebony handle.
- 724B Bow Pencil, 3½ in., side wheel.
- 724C " Pen, 3½ " " "
- 806 Plain Dividers, 6 in., replaceable needle points, straightening device.
- 849 Compasses, 6 in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar, straightening device.
- Key.
- Lead Box, Set, \$

**Ruling Pen, etc., as shown in case, illustrated separately on
 pages 53, 56A-5, 56A-14, 56A-17.**

Dependo grade described on page 50.

See Price List in back of Catalog.

**Dependo Drawing Instruments
In Pocket Cases Lined with Velvet**



No. 1066.

No. 1066. Pocket Case, cont'g:

657 Ruling Pen, 5½ in., spring blade, ebony handle.

724A Bow Dividers, 3½ in., side wheel.

724B " Pencil, 3½ " " "

724C " Pen, 3½ " " "

806 Plain Dividers, 6 in., replaceable needle points, straightening device.

849 Compasses, 6 in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar, straightening device.

Key.

Lead Box, Set, \$

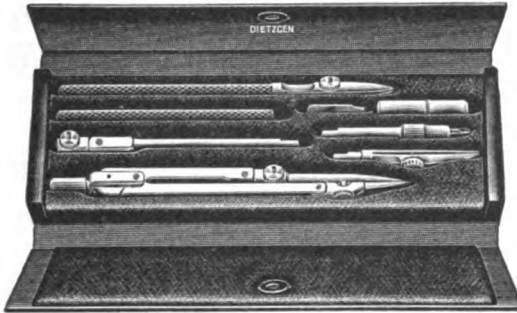
**Ruling Pen, etc., as shown in case, illustrated separately on
pages 53, 56A-5, 56A-14, 56A-17.**

Dependo grade described on page 50

See Price List in back of Catalog.

Apprentice Drawing Instruments

In Pocket Cases Lined with Velvet



No. 1072.

- No. 1072. Pocket Case, cont'g:**
 Ruling Pen, 5 in., metal handle.
 Compasses, 5 $\frac{1}{4}$ in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar.
 Key. Lead Box. Metal Handle for divider, pen and pencil parts, Set, \$



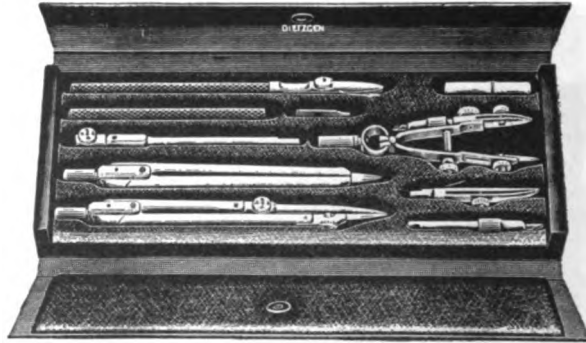
No. 1073.

- No. 1073. Pocket Case, cont'g:**
 Ruling Pen, 5 in., metal handle.
 Combination Bow, 3 $\frac{1}{2}$ in., reversible pen and pencil part.
 Compasses, 5 $\frac{1}{4}$ in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar.
 Key. Lead Box. Metal Handle for divider, pen and pencil parts, Set, \$

Apprentice grade described on page 50.

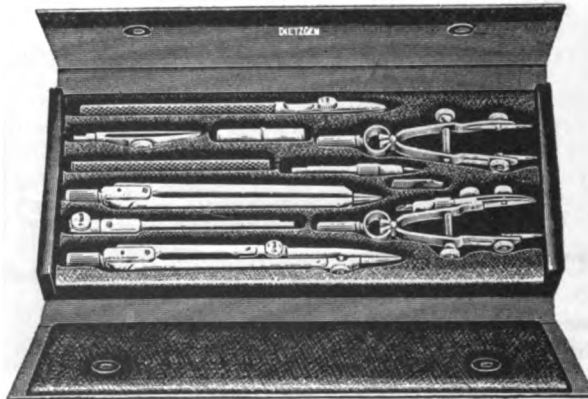
See Price List in back of Catalog.

Apprentice Drawing Instruments



No. 1074.

- No. 1074. Pocket Case, cont'g:**
 Ruling Pen, 5 in., metal handle.
 Combination Bow, $3\frac{1}{2}$ in., reversible pen and pencil part.
 Plain Dividers, $5\frac{1}{4}$ in., replaceable needle points.
 Compasses, $5\frac{1}{4}$ in., fixed needle point leg, replaceable needle point,
 divider part, pen part, pencil part, lengthening bar. Key. Lead
 Box. Metal Handle for divider, pen and pencil parts, . . . Set, \$



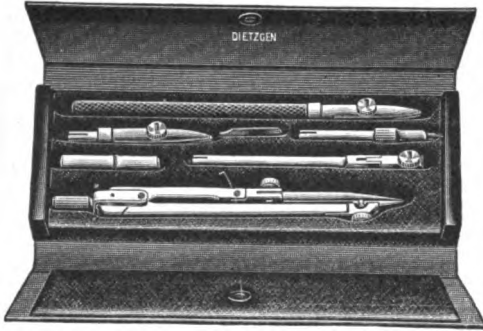
No. 1075.

- No. 1075. Pocket Case, cont'g:**
 Ruling Pen, 5 in., metal handle.
 Bow Divider, $3\frac{1}{2}$ in.
 Combination Bow, $3\frac{1}{2}$ in., reversible pen and pencil part.
 Plain Dividers, $5\frac{1}{4}$ in., replaceable needle points.
 Compasses, $5\frac{1}{4}$ in., fixed needle point leg, replaceable needle
 point, divider part, pen part, pencil part, lengthening bar. Key.
 Lead Box. Metal Handle for divider, pen and pencil parts, . . . Set, \$

See Price List in back of Catalog.

Elementary Drawing Instruments

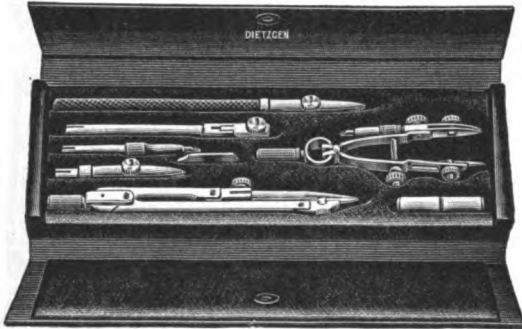
In Pocket Cases Lined with Velvet



No. 1092.

No. 1092. Pocket Case, cont'g:

- Ruling Pen, 5 in., metal handle.
- Compasses, $4\frac{3}{4}$ in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar.
- Key and Lead Box, Set, \$



No. 1093.

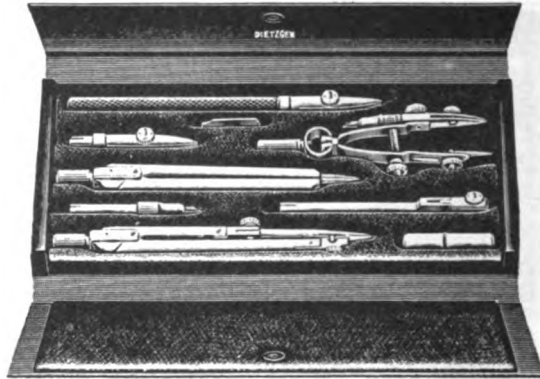
No. 1093. Pocket Case, cont'g:

- Ruling Pen, 5 in., metal handle.
- Combination Bow, $3\frac{1}{2}$ in., reversible pen and pencil part.
- Compasses, $4\frac{3}{4}$ in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar.
- Key and Lead Box, Set, \$

Elementary grade described on page 50.

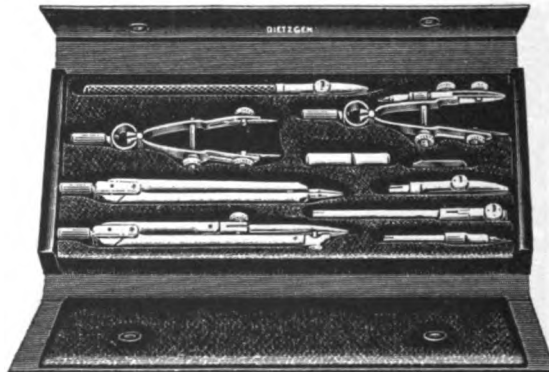
See Price List in back of Catalog.

Elementary Drawing Instruments



No. 1094.

- No. 1094. Pocket Case, cont'g:**
 Ruling Pen, 5 in., metal handle.
 Combination Bow, 3½ in., reversible pen and pencil part.
 Plain Divider, 4½ in., replaceable needle points.
 Compasses, 4¾ in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar. Key and Lead Box, Set, \$

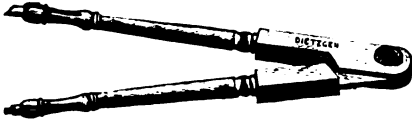


No. 1095.

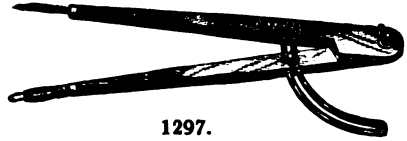
- No. 1095. Pocket Case, cont'g:**
 Ruling Pen, 5 in., metal handle.
 Bow Divider, 3½ in.
 Combination Bow, 3½ in., reversible pen and pencil part.
 Plain Divider, 4½ in., replaceable needle points.
 Compasses, 4¾ in., fixed needle point leg, replaceable needle point, divider part, pen part, pencil part, lengthening bar. Key and Lead Box, Set, \$

See Price List in back of Catalog.

Wooden Blackboard Dividers



No. 1296.



1297.

No. 1296. Blackboard Dividers, 18 in.,	Each,	\$
1297. " " 18 " with arc,	"	"

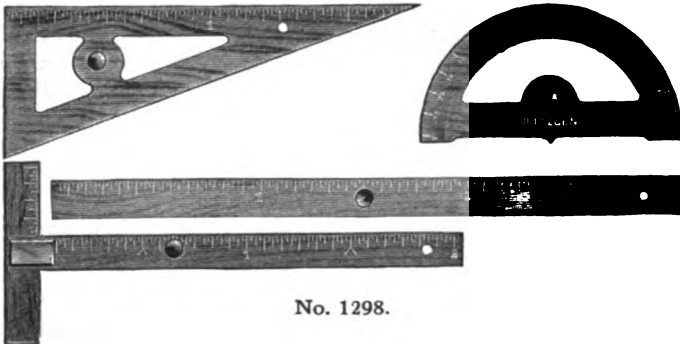


No. 1297½.

No. 1297½. Blackboard Dividers, 18 in.,	Each,	\$
---	-------	----

These Blackboard Dividers have a broad application because of their unique design. A swivel joint on one of the legs prevents the dividers from slipping and the rubber anchoring tip from crawling when the instrument is being used. An ejector clears the socket of all broken crayon and prevents the jaws from breaking. The jaws are surrounded by a tubular brass sleeve which, when given a half turn, presses the jaws firmly together and prevents the chalk from being pushed in or pulled out.

Wooden Blackboard Drawing Set



No. 1298.

No. 1298. Wooden Blackboard Drawing Set, consisting of 24 in. T Square, 36 in. Straight Edge, 24 in. Triangle, all divided to inches, and 15½ in. Protractor,	Set,	\$
---	------	----

1298A. T Square of above Set,	Each,	\$
1298B. Straight Edge " "	"	"
1298C. Triangle of " "	"	"
1298D. Protractor of " "	"	"

School Drawing Board Outfits listed under Nos. 4400-4402.

See Price List in back of Catalog.

Dietzgen Scales

Boxwood and White Edge

U. S. Standard Machine Divided

In manufacturing our scales special attention is given to carefully proportioning the dimensions of the different sizes: the perfect balance thus obtained not being equaled in any other make. The quality of the materials used; the accuracy in dividing; the clearness of numbering; and the superiority of finish,—cannot be excelled.

Each Scale stamped with our name and trade mark.

We list scales graduated in two different styles:

“Open Divided” and “Full Divided or Chain Scales.”

Open Divided Scales are those on which the main units are numbered along the whole length of the edge, only the end units being subdivided,—as shown on Fig. 1, which represents an open divided scale with four different divisions, two on each edge. On this scale two of the divisions are numbered to read from right to left, and two from left to right.

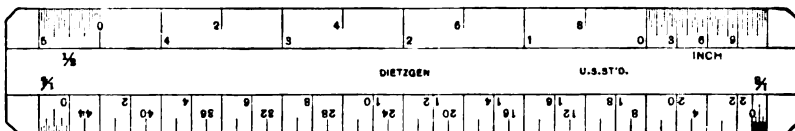


Fig. 1.

Full Divided or Chain Scales are those on which the main units are subdivided throughout the entire length of the edge,—as shown on Fig. 2, which represents a full divided or Chain Scale of 50 parts to the inch on one edge and 10 parts to the inch on the other edge, each division reading both ways, that is, from right to left and from left to right.

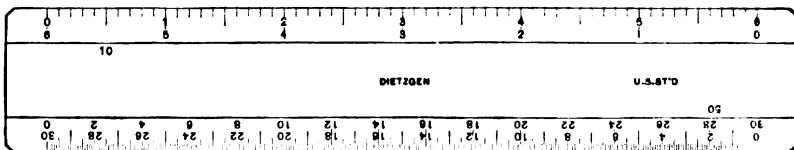


Fig. 2.

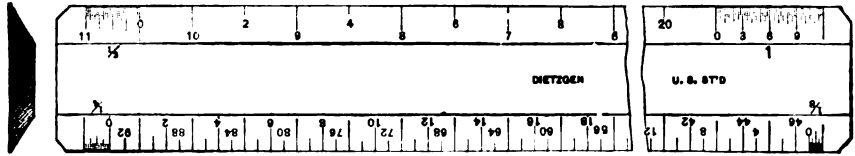
While our assortment of stock scales is exceptionally large, it quite frequently happens that special work requires scales of other sizes and of different division arrangement. We are prepared to promptly supply any special scales desired, provided a sketch is submitted which shows all of the necessary details,—length, divisions, numbering, shape, and whether scale is to be boxwood or boxwood with white edges.

Prices for Special Scales quoted on request.

See Price List in back of Catalog.

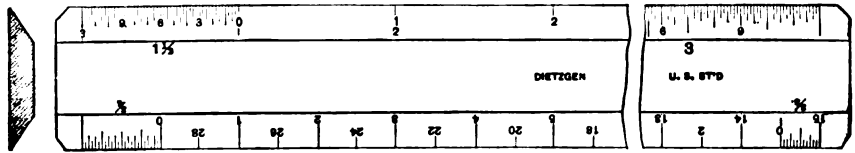
Flat Boxwood Scales

U. S. Standard Machine Divided



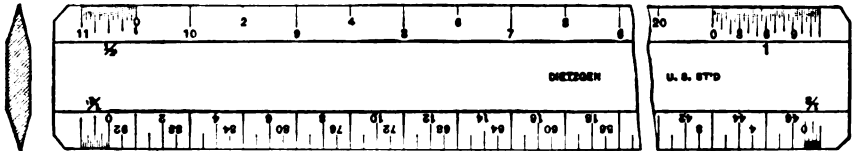
No. 1356. Open Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot.

- | | |
|--------------------------------------|----------|
| No. 1351. Flat Boxwood Scale, 6 in., | Each, \$ |
| 1356. " " " 12 " | " |
| 1366. " " " 24 " | " |



No. 1376. Open Divided: $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 3 inches to the foot.

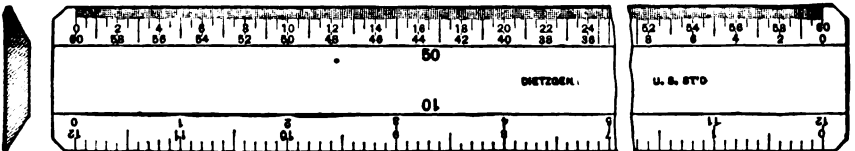
- | | |
|--------------------------------------|----------|
| No. 1371. Flat Boxwood Scale, 6 in., | Each, \$ |
| 1376. " " " 12 " | " |
| 1386. " " " 24 " | " |



No. 1396. Open Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $1 \times \frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 3 inches to the foot.

- | | |
|---|----------|
| No. 1394. Flat Boxwood Scale, 6 in., both sides bev. and div., in leather sheath, | Each, \$ |
| 1396. Flat Boxwood Scale, 12 in., both sides beveled and divided, | " |
| 1400. " " " 24 " " " " " " " " | " |

Chain Scales



No. 1426.

- | | |
|--|----------|
| No. 1420. Flat Boxwood Chain Scale, 6 in., div. 10 x 50 parts to the inch, | Each, \$ |
| 1421. " " " " 6 " " 20 x 40 " " " " " | " |
| 1422. " " " " 6 " " 30 x 60 " " " " " | " |
| 1423. " " " " 6 " " 80 x 100 " " " " " | " |
| 1426. " " " " 12 " " 10 x 50 " " " " " | " |
| 1427. " " " " 12 " " 20 x 40 " " " " " | " |
| 1428. " " " " 12 " " 30 x 60 " " " " " | " |
| 1429. " " " " 12 " " 80 x 100 " " " " " | " |

See Price List in back of Catalog.

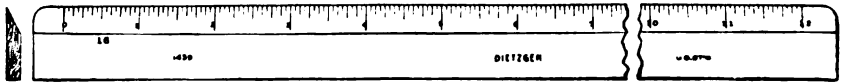
Flat Boxwood Scales

U. S. Standard Machine Divided

One Edge Beveled, with but one Division on each Scale

These Scales, somewhat narrower than the regular flat scales, are so designed that each scale is beveled on one edge only and has but one division, the graduations reading from left to right. This simple and convenient arrangement will be found of advantage for rapid work.

They are made of thoroughly seasoned boxwood, and are manufactured as carefully and accurately as the more expensive scales.



No. 1439. 12 in. long, divided to $\frac{1}{8}$ in.

Architects Scales, divided $\frac{3}{32}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, 4 or 6 in. to the foot.
Engineers " " 10, 20, 30, 40, 50 or 60 parts to the inch.

- | | | |
|-----------|---|----------|
| No. 1439. | Single Scale, 12 in., divided to $\frac{1}{8}$ in., | Each, \$ |
| 1439A. | " " 12 " " $\frac{1}{32}$ " | " |
| 1440. | " " 12 " division as selected, | " |
| 1444. | Set of 4 Scales, in case, divisions as selected, | " |
| 1445. | " " 8 " " " " " " " | " |
| 1446. | " " 12 " in polished wooden box, lined with felt, and stamped with divisions as selected, | " |

When ordering, always specify divisions desired.

- | | | |
|------------|--|-------|
| No. 1447A. | Single Scale, 12 in., like No. 1439, but with white beveled edge, | Each, |
| 1447B. | Single Scale, 12 in., like No. 1439A, but with white beveled edge, | " |

Miscellaneous Graduations

- | | | |
|-----------|--|----------|
| No. 1450. | Flat Boxwood Scale, 12 in., div. $\frac{1}{2} \times 1$ in. to the foot, | Each, \$ |
| 1451. | " " " 12 " " $\frac{1}{4} \times \frac{1}{8}$ " " " " " | " |
| 1452. | " " " 12 " " $\frac{1}{4} \times \frac{1}{8}$ " " " " $\frac{1}{16}$ in., | " |
| 1453. | " " " 12 " " 10 \times 16 parts to the inch, | " |
| 1454. | " " " 12 " " $\frac{1}{8}$, $\frac{1}{4} \times \frac{3}{8}$, $\frac{3}{4}$ in. to the foot, | " |
| 1455. | " " " 12 " " $\frac{1}{8}$, $\frac{1}{4} \times \frac{3}{4}$, $1\frac{1}{2}$ " " " " " | " |
| 1456. | " " " 12 " " 16 \times 32 parts to the inch, | " |
| 1457. | " " " 12 " " 16th inch \times mm., | " |

Special Scales, with divisions and numbering different from our regular stock scales, made to order; see page 58.

See Price List in back of Catalog.

Flat Boxwood Scales

U. S. Standard Machine Divided

Metric Scales

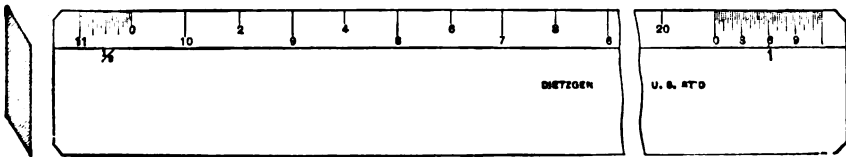
- | | | |
|-----------|---|----------|
| No. 1460. | Flat Boxwood Metric Scale, 10 cm., div. mm. × half mm., | Each, \$ |
| 1462. | " " " " 20 " " " " " " | " |
| 1464. | " " " " 30 " " " " " " | " |
| 1466. | " " " " 50 " " " " " " | " |

Inch and Metric Comparing Scales

- | | | |
|-----------|--|----------|
| No. 1468. | Flat Boxwood Inch and Metric Comparing Scale (not beveled),
30 cm., divided mm. × 16th in., | Each, \$ |
| 1469. | Like No. 1468, but 50 cm., | " |

Opposite Bevel Boxwood Scales

These Scales are an improvement over the regular flat shape, as they may be picked up more readily, and present but one graduated bevel when in use.



No. 1471.

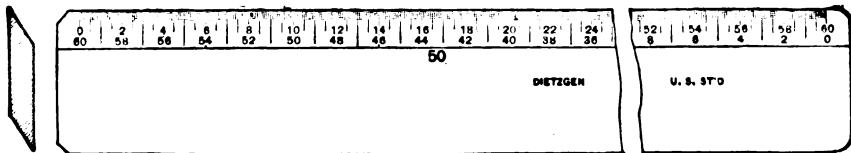
Open Divided: $\frac{1}{8}$, $\frac{1}{4} \times \frac{1}{2}$, 1 inch to the foot.

- | | | |
|-----------|--------------------------------------|----------|
| No. 1470. | Opposite Bevel Boxwood Scale, 6 in., | Each, \$ |
| 1471. | " " " " 12 " | " |

Open Divided: $\frac{3}{8}$, $\frac{3}{4} \times 1\frac{1}{2}$, 3 inches to the foot.

- | | | |
|-----------|--------------------------------------|---|
| No. 1474. | Opposite Bevel Boxwood Scale, 6 in., | " |
| 1475. | " " " " 12 " | " |

Chain Scales



No. 1485.

Divided: 10 × 50 parts to the inch.

- | | | |
|-----------|--|----------|
| No. 1480. | Opposite Bevel Boxwood Chain Scale, 6 in., | Each, \$ |
| 1485. | " " " " 12 " | " |

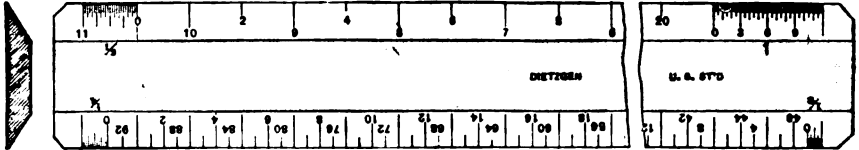
Special Scales, with divisions and numbering different from our regular stock scales, made to order; see page 58.

See Price List in back of Catalog.

Flat White Edge Scales

U. S. Standard Machine Divided

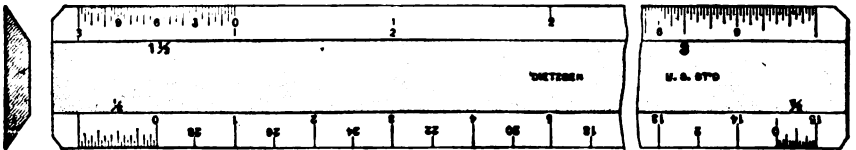
Our White Edge Scales are made of carefully selected, thoroughly seasoned box-wood, with inlaid celluloid facings upon which the divisions are machine-graduated. They are accurate and durable: the divisions are clear and sharp.



No. 1509.

Open Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot.

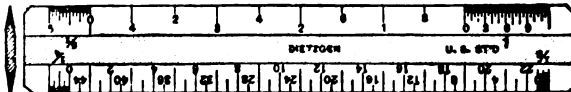
No. 1508.	Flat White Edge Scale,	6 in.,	Each, \$
1509.	" " " "	12 "	"
1513.	" " " "	24 "	"



No. 1517.

Open Divided: $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 3 inches to the foot.

No. 1516.	Flat White Edge Scale,	6 in.,	Each, \$
1517.	" " " "	12 "	"
1519.	" " " "	24 "	"



No. 1526.

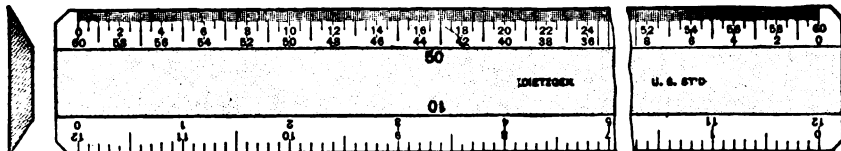
Open Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $1 \times \frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 3 inches to the foot.

No. 1526.	Flat White Edge Scale, 6 in., both sides beveled and divided, in leather sheath, less than one inch wide; very convenient for the pocket,	Each, \$
1527.	Flat White Edge Scale, 12 in., both sides bev. and div.,	"
1529.	" " " " 24 " " " " " " " "	"

Special Scales, with divisions and numbering different from our regular stock scales, made to order; see page 58.

See Price List in back of Catalog.

Flat White Edge Scales
 U. S. Standard Machine Divided
 Chain Scales

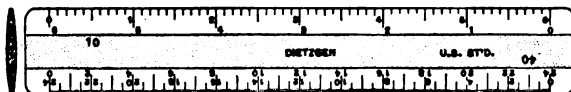


No. 1546.

- | | | | | | |
|------------------|------------------------------|--------|----------------------------|-------|----|
| No. 1541. | Flat White Edge Chain Scale, | 6 in., | div. 10 × 50 parts to in., | Each, | \$ |
| 1542. | " | " | " | " | " |
| 1543. | " | " | " | " | " |
| 1544. | " | " | " | " | " |
| 1546. | " | " | " | " | " |
| 1547. | " | " | " | " | " |
| 1548. | " | " | " | " | " |
| 1549. | " | " | " | " | " |

Foot Divided Decimally

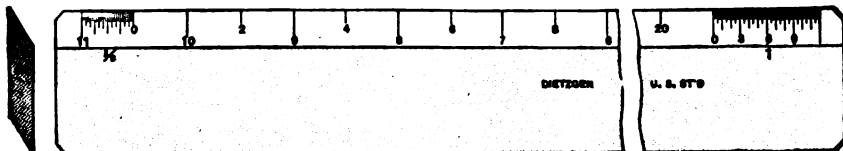
- | | | | | | |
|------------------|------------------------------|---------|------------------------------|-------|----|
| No. 1550. | Flat White Edge Chain Scale, | 12 in., | div. 100 × 500 parts to ft., | Each, | \$ |
| 1551. | " | " | " | " | " |
| 1552. | " | " | " | " | " |
| 1553. | " | " | " | " | " |



No. 1556.

- | | | | | | |
|------------------|------------------------------|-------------|---------------------------------------|--|-------------------------|
| No. 1556. | Flat White Edge Chain Scale, | 6 in., | both sides beveled and | | |
| | | | divided, | 10 × 40 and 30 × 50 parts to the in., | in leather sheath, less |
| | | | | | than one in. wide, |
| | | | | | Each, \$ |
| 1556A. | Like No. 1556, | but divided | 10 × 50 parts to the in., | and $\frac{1}{4} \times \frac{1}{8}$ in. | to the foot, |
| | | | | | Each, |
| 1556B. | Like No. 1556, | but divided | 10 × 20 and 30 × 50 parts to the in., | | |

Opposite Bevel White Edge Scales



No. 1562.

Open Divided: $\frac{1}{8}, \frac{1}{4} \times \frac{1}{2}$, 1 inch to the foot.

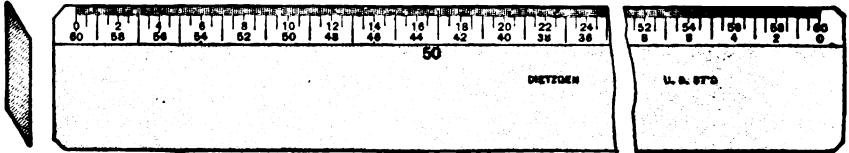
- | | | | | | |
|------------------|----------------------------------|--------|--|-------|----|
| No. 1561. | Opposite Bevel White Edge Scale, | 6 in., | | Each, | \$ |
| 1562. | " | " | " | " | " |
| | | | Open Divided: $\frac{3}{8}, \frac{3}{4} \times 1\frac{1}{2}$, 3 inches to the foot. | | |
| No. 1566. | Opposite Bevel White Edge Scale, | 6 in., | | " | |
| 1567. | " | " | " | " | " |

See Price List in back of Catalog.

Flat White Edge Scales

U. S. Standard Machine Divided

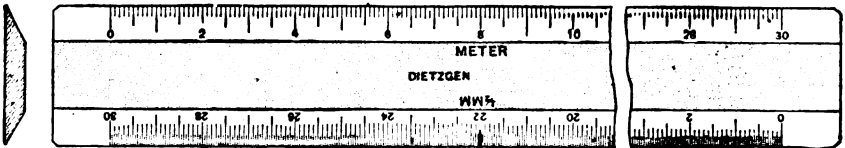
Chain Scales



No. 1572A.

No. 1571A.	Opposite Bevel W. E. Chain Scale,	6 in.,	div. 10	× 50 parts to in.,	\$	Each.
1571B.	"	"	"	"	6	20 × 40
1571C.	"	"	"	"	6	30 × 60
1571D.	"	"	"	"	6	80 × 100
1572A.	"	"	"	"	12	10 × 50
1572B.	"	"	"	"	12	20 × 40
1572C.	"	"	"	"	12	30 × 60
1572D.	"	"	"	"	12	80 × 100

Metric Scales



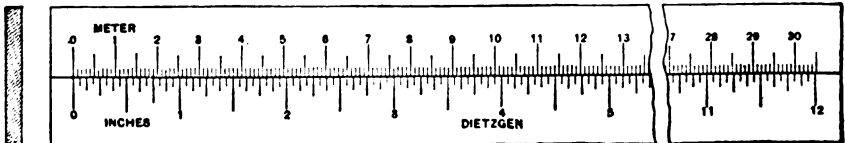
No. 1574C.

No. 1574A.	Flat White Edge Metric Scale,	10 cm.,	div. mm. and half mm.,	\$	Each.
1574B.	"	"	"	20	"
1574C.	"	"	"	30	"
1574D.	"	"	"	50	"

Inch and Metric Scales

No. 1575A.	Flat White Edge Scale,	30 cm.,	div. $\frac{1}{32}$ in. × half mm.,	Each, \$
1575B.	"	50 "	$\frac{1}{32}$ " × "	"

These scales are excellent for converting plans from one system to the other.



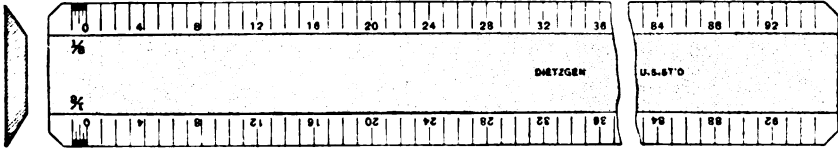
No. 1576A.

No. 1576A.	Flat Inch and Metric Comparing Scale, white facing (not beveled),	30 cm.,	divided mm. × 16th in.,	Each, \$
1576B.	Like No. 1576A, but 50 cm.,			"

See Price List in back of Catalog.

Flat White Edge Scales

U. S. Standard Machine Divided

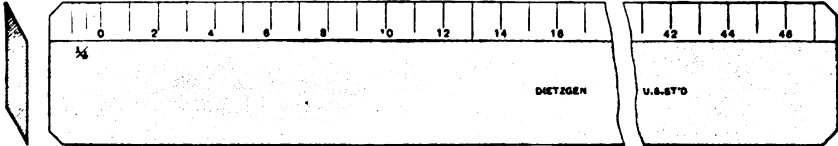


No. 1578A.

Nos. 1578A to 1578G are open divided and have the same scale on both edges: one edge is divided and numbered to read from left to right, and the other edge from right to left.

No. 1578A.	Flat White Edge Scale, 12 in., div. $\frac{1}{8}$ inch to the foot,	Each, \$
1578B.	" " " " 12 " " $\frac{1}{4}$ " " " "	" "
1578C.	" " " " 12 " " $\frac{3}{8}$ " " " "	" "
1578D.	" " " " 12 " " $\frac{1}{2}$ " " " "	" "
1578E.	" " " " 12 " " $\frac{3}{4}$ " " " "	" "
1578F.	" " " " 12 " " 1 " " " "	" "
1578G.	" " " " 12 " " $1\frac{1}{2}$ " " " "	" "

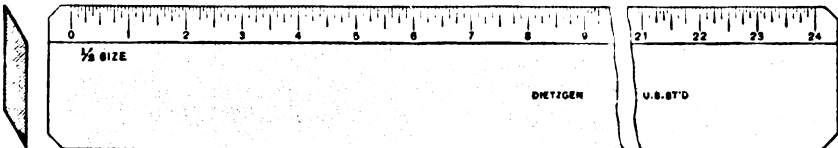
Opposite Bevel White Edge Scales



No. 1579B.

Nos. 1579A to 1579G are open divided and have the same scale on both edges: one edge is divided and numbered to read from left to right, and the other edge from right to left.

No. 1579A.	Opposite Bevel White Edge Scale, 12 in., div. $\frac{1}{8}$ in. to foot,	Each, \$
1579B.	" " " " 12 " " $\frac{1}{4}$ " " " "	" "
1579C.	" " " " 12 " " $\frac{3}{8}$ " " " "	" "
1579D.	" " " " 12 " " $\frac{1}{2}$ " " " "	" "
1579E.	" " " " 12 " " $\frac{3}{4}$ " " " "	" "
1579F.	" " " " 12 " " 1 " " " "	" "
1579G.	" " " " 12 " " $1\frac{1}{2}$ " " " "	" "



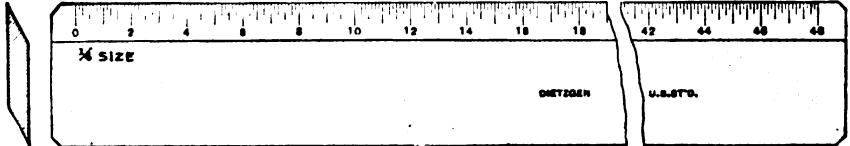
No. 1580M.

Nos. 1580K to 1580P are full divided and have the same scale on both edges: one edge is divided and numbered to read from left to right, and the other edge from right to left.

No. 1580K.	Opposite Bevel White Edge Scale, 12 in., div. $\frac{1}{8}$ in. to inch,	Each, \$
1580L.	" " " " 12 " " $\frac{1}{4}$ " " " "	" "
1580M.	" " " " 12 " " $\frac{1}{2}$ " " " "	" "
1580P.	" " " " 12 " " 1 " " " "	" "

See Price List in back of Catalog.

Flat White Edge Scales
U. S. Standard Machine Divided
Opposite Bevel White Edge Scales

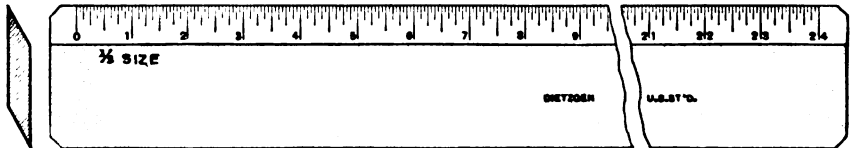


No. 1580R.

Full Divided: $\frac{1}{8} \times \frac{1}{4}$ inch to the inch.

No. 1580R is full divided and has a different scale on each edge: both edges are divided and numbered to read from left to right.

No. 1580R. Opposite Bevel White Edge Scale, 12 in., Each, \$



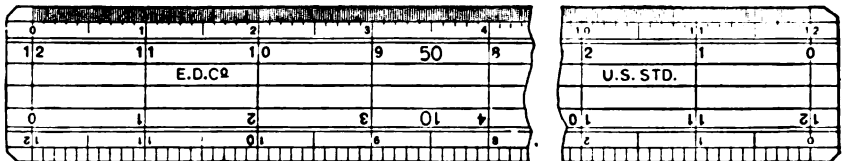
No. 1580S.

Full Divided: $\frac{1}{2} \times 1$ inch to the inch.

No. 1580S is full divided and has a different scale on each edge: both edges are divided and numbered to read from left to right.

No. 1580S. Opposite Bevel White Edge Scale, 12 in., Each, \$

Underwriters Scales



No. 1583B.

No. 1583A. Underwriters Scale, flat, transparent ambro, 6 in., both edges beveled and divided 10 \times 50 parts to the inch, Each, \$
 1583B. Like No. 1583A, but 12 inch, " "

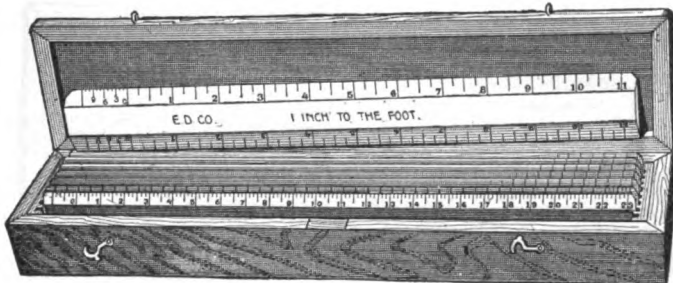
Miscellaneous Graduations

		Each
No. 1584A.	Flat White Edge Scale, 12 in., div. $\frac{1}{2} \times 1$ in. to the foot,	.
1584B.	" " " " 12 " " $\frac{1}{4} \times \frac{1}{8}$ " " " "	\$
1584C.	" " " " 12 " " $\frac{1}{4} \times \frac{1}{16}$ " " " "	.
1584D.	Opposite Bevel W. E. Scale, 12 " " $\frac{1}{4} \times 3$ " " " " $\frac{1}{8}$ in.,	.
1584DX.	" " " " 12 " " 16 \times 32 parts to the inch,	.
1584E.	Flat White Edge Scale, 12 " " 10 \times 16 " " " "	.
1584F.	" " " " 12 " " $\frac{1}{8}, \frac{1}{4} \times \frac{3}{8}, \frac{3}{4}$ in. to the foot,	.
1584G.	" " " " 12 " " $\frac{1}{8}, \frac{1}{4} \times \frac{3}{4}, 1\frac{1}{2}$ " " " "	.
1584H.	" " " " 12 " " 16 \times 32 parts to the inch,	.
1584J.	" " " " 12 " " 64 \times 100 " " " "	.

See Price List in back of Catalog.

Flat Boxwood Scales in Sets

U. S. Standard Machine Divided



No. 1585B.

Nos. 1585A to 1585C are open divided and have the same scale on both edges: one edge is divided and numbered to read from left to right, and the other edge from right to left.

- No. 1585A. Set of 4 Boxwood Scales, 12 in.
 Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot, Set, \$
- 1585B. Set of 8 Boxwood Scales, 12 in.
 Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 inches to the foot, "
- 1585C. Set of 12 Boxwood Scales, 12 in.
 Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, 4, 6 and 12 inches
 to the foot, "

Nos. 1586 and 1587 are full divided and have a different scale on each edge: each edge is numbered to read both ways.

- No. 1586. Set of 4 Boxwood Scales, 12 in.
 Divided: 10 and 50, 20 and 40, 30 and 60, 80 and 100 parts to
 the inch, Set, \$
- 1587. Set of 8 Boxwood Scales, 4 12 in. and 4 2 in. Offset to match.
 Divided: 10 and 50, 20 and 40, 30 and 60, 80 and 100 parts to
 the inch, "

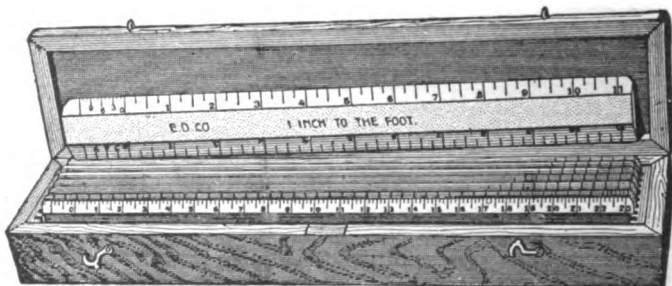
Nos. 1590 and 1591 are full divided and have the same scale on both edges: each edge is numbered to read both ways.

- No. 1590. Set of 6 Boxwood Scales, 12 in.
 Divided: 10, 20, 30, 40, 50, 60 parts to the inch, Set, \$
- 1591. Set of 8 Boxwood Scales, 12 in.
 Divided: 10, 20, 30, 40, 50, 60, 80, 100 parts to the inch, "

See Price List in back of Catalog.

Flat White Edge Scales in Sets

U. S. Standard Machine Divided



No. 1596.

No. 1595 to 1597B are **open divided** and have the same scale on both edges: one edge is divided and numbered to read from left to right, and the other edge from right to left.

- No. 1595. Set of 4 White Edge Scales, 12 in.
Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot, Set, \$
- 1595B. Like No. 1595, but with 4 **Opposite Bevel White Edge Scales**, 12 in., Set,
- 1596. Set of 8 White Edge Scales, 12 in.
Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 inches to the foot, Set,
- 1596B. Like No. 1596, but with 8 **Opposite Bevel White Edge Scales**, 12 in., Set,
- 1597. Set of 12 White Edge Scales, 12 in.
Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, 4, 6 and 12 inches to the foot, "
- 1597B. Like No. 1597, but with 12 **Opposite Bevel White Edge Scales**. 12 in., Set,

No. 1601 is **full divided** and has a different scale on each edge: each edge is numbered to read both ways.

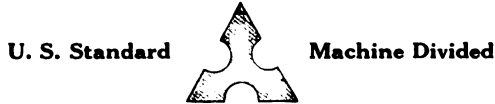
- No. 1601. Set of 4 White Edge Scales, 12 in.
Divided: 10 and 50, 20 and 40, 30 and 60, 80 and 100 parts to the inch, Set, \$

Nos. 1605 and 1606 are **full divided** and have the same scale on both edges: each edge is numbered to read both ways.

- No. 1605. Set of 6 White Edge Scales, 12 in.
Divided: 10, 20, 30, 40, 50, 60 parts to the inch, Set, \$
- 1606. Set of 8 White Edge Scales, 12 in.
Divided: 10, 20, 30, 40, 50, 60, 80, 100 parts to the inch, "

See Price List in back of Catalog.

Triangular Boxwood Scales



For explanation of "Regular Shape" Scales, see next page.

For Architects and Mechanical Engineers



No. 1626.

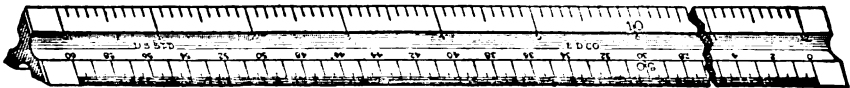
Open Divided: $\frac{3}{32}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 in. to the foot, $\frac{1}{8}$ in.

No. 1625. Triangular Boxwood Scale, 6 in., Regular Shape, . . . Each, \$
 1626. " " " 12 " " " . . . "

Open Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, 4 in. to the foot, $\frac{1}{8}$ in.

No. 1631. Triangular Boxwood Scale, 12 in., Regular Shape, . . . Each, \$
 1632. " " " 18 " " " . . . "
 1633. " " " 24 " " " . . . "

For Civil Engineers and Surveyors



No. 1636.

Divided: 10, 20, 30, 40, 50, 60 parts to the inch.

No. 1635. Triangular Boxwood Chain Scale, 6 in., Regular Shape, . . . Each, \$
 1636. " " " " 12 " " " " . . . "
 1637. " " " " 18 " " " " . . . "
 1638. " " " " 24 " " " " . . . "

Divided: 20, 30, 40, 50, 60, 80 parts to the inch.

No. 1640. Triangular Boxwood Chain Scale, 12 in., Regular Shape, . . . Each, \$
 1643. " " " " 12 " divided: 100, 200, 300, 400, 500, 600 parts to the foot, Regular Shape, . . . "

Triangular Boxwood Metric Scales

Divided: .01, .02, .03, .05, .025 and .0125.

No. 1647. Triangular Boxwood Metric Scale, 20 cm., Regular Shape, . . . Each, \$
 1648. " " " " 30 " " " " . . . "
 1649. " " " " 50 " " " " . . . "

Special Scales, with divisions and numbering different from our regular stock scales, made to order; see page 58.

See Price List in back of Catalog.

Triangular White Edge Scales

U. S. Standard Machine Divided



Regular Shape.

Our Triangular White Edge Scales are made in two styles: Regular and Relieved Facet shapes. The Regular shape scales permit the full surface of both facets to be in contact with the drawing, giving a wide bearing surface and thus preventing the divisions on the edges from wearing off as quickly as on the Relieved Facet shape. The visual angle of the latter style, however, enables an easier reading of the scales. Each style, therefore, has its advantages, and we leave the selection to the preference of the purchaser.



Relieved Facet Shape.

For Architects and Mechanical Engineers



No. 1656.

- | | | |
|-----------|--|-------|
| | Open Divided: $\frac{1}{2}$, $\frac{3}{8}$, $\frac{1}{4}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 3 in. to the foot, $\frac{1}{8}$ in. | Each. |
| No. 1655. | Triangular White Edge Scale, 6 in., Regular Shape, | \$ |
| 1655B. | “ “ “ “ “ 6 “ Relieved Facet Shape, | |
| 1656. | “ “ “ “ “ 12 “ Regular Shape, | |
| 1656B. | “ “ “ “ “ 12 “ Relieved Facet Shape, | |
| | Open Divided: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 2, 3, 4 in. to the foot, $\frac{1}{8}$ in. | |
| No. 1661. | Triangular White Edge Scale, 12 in., Regular Shape, | |
| 1661B. | “ “ “ “ “ 12 “ Relieved Facet Shape, | |
| 1663. | “ “ “ “ “ 24 “ Regular Shape, | |
| 1663B. | “ “ “ “ “ 24 “ Relieved Facet Shape, | |

For Civil Engineers and Surveyors



No. 1667.

- | | | |
|-----------|--|-------|
| | Divided: 10, 20, 30, 40, 50, 60 parts to the inch. | Each. |
| No. 1665. | Triangular White Edge Chain Scale, 6 in., Regular Shape, | \$ |
| 1665B. | “ “ “ “ “ 6 “ Relieved Facet Shape, | |
| 1667. | “ “ “ “ “ “ 12 “ Regular Shape, | |
| 1667B. | “ “ “ “ “ “ 12 “ Relieved Facet Shape, | |
| 1669. | “ “ “ “ “ “ 24 “ Regular Shape, | |
| 1669B. | “ “ “ “ “ “ 24 “ Relieved Facet Shape, | |
| 1681. | Triangular White Edge Chain Scale, 12 in., divided: 20, 30, 40, 50, 60, 80 parts to the inch, Regular Shape, | |
| 1681B. | Like No. 1681, but Relieved Facet Shape, | |
| 1682. | Triangular White Edge Chain Scale, 12 in., divided: 100, 200, 300, 400, 500, 600 parts to the foot, Regular Shape, | |
| 1682B. | Like No. 1682, but Relieved Facet Shape, | |

Triangular White Edge Metric Scales

- | | | |
|-----------|--|----------|
| No. 1683. | Triangular White Edge Metric Scale, 30 cm., divided: .01, .02, .03, .05, .025 and .0125, Relieved Facet Shape, | Each, \$ |
|-----------|--|----------|

See Price List in back of Catalog.

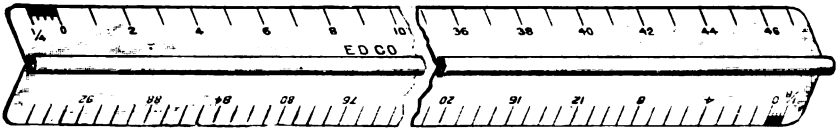
Triangular Metallic Scales

Regular Shape



No. 1685.

- No. 1685. Triangular Metallic Scale, Architects, 12 in., divided: $\frac{3}{8}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, 1, 1½, 3 in. to the foot, $\frac{1}{16}$ in., Each, \$
- 1686. Triangular Metallic Chain Scale, Engineers, 12 in., divided: 10, 20, 30, 40, 50, 60 parts to the inch, Each,
- 1687. Triangular Metallic Chain Scale, Engineers, 12 in., divided: 20, 30, 40, 50, 60, 80 parts to the inch, Each,



No. 1689A.

The form of these Scales makes them very convenient for many purposes. They are made of steel, nickered, with a dull finish, each scale weighing 2½ ounces. They are graduated on both edges: a separate scale on each edge.

No.	Metal Scale,	12 in., div.	in. to the foot,	Each,	\$
1689A.	"	"	$\frac{1}{8} \times \frac{1}{4}$	"	"
1689B.	"	"	$\frac{1}{4} \times \frac{1}{2}$	"	"
1689C.	"	"	$\frac{3}{8} \times \frac{3}{8}$	"	"
1689D.	"	"	$\frac{1}{2} \times 1$	"	"
1689E.	"	"	$\frac{3}{4} \times 1\frac{1}{2}$	"	"
1689F.	"	"	$1\frac{1}{2} \times 3$	"	"
1689G.	"	"	16 × 32 parts to the inch,	"	"
1689H.	"	"	32 × 64 " " "	"	"
1689J.	"	"	64 × 100 " " "	"	"

Triangular Scale Guard



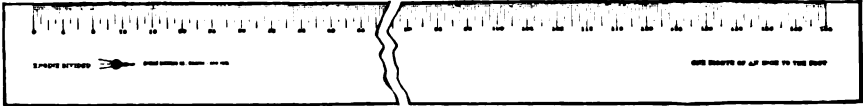
No. 1692.

- No. 1692. Triangular Scale Guard, nickel-plated, Each, \$

See Price List in back of Catalog.

Paper Scales

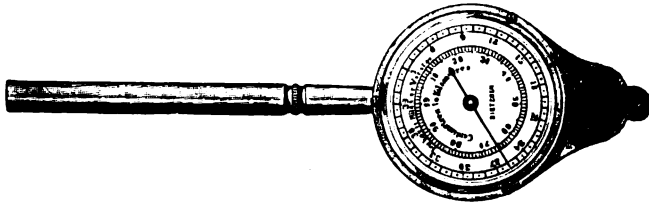
Printed on heavy Bristol Board Engine Divided



No. 1700.

- No. 1700.** Paper Scales, $18 \times 1\frac{3}{4}$ inches, full divided, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 inches to the foot, **Set of 8 scales, \$**
 Single Scales, **Each,**
- 1704.** Paper Scales, $18 \times 1\frac{3}{4}$ inches, full divided, 10, 20, 30, 40, 50, 60 parts to the inch, **Set of 6 scales,**
 Single Scales, **Each,**
- 1706.** Metric Paper Scales, $\frac{1}{2}$ meter long, divided in mm., "
1708. Metric and Inch Comparing Scale, $\frac{1}{2}$ meter long, "
1710. Scale of Proportional Inches, 12 in. long, div. $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{1}$, "

Map Measures



No. 1720.

- No. 1720.** Map Measure, $4\frac{1}{2}$ inches, metal handle, dial $1\frac{1}{8}$ inches. Registers inches to miles and centimeters to kilometers, **Each, \$**

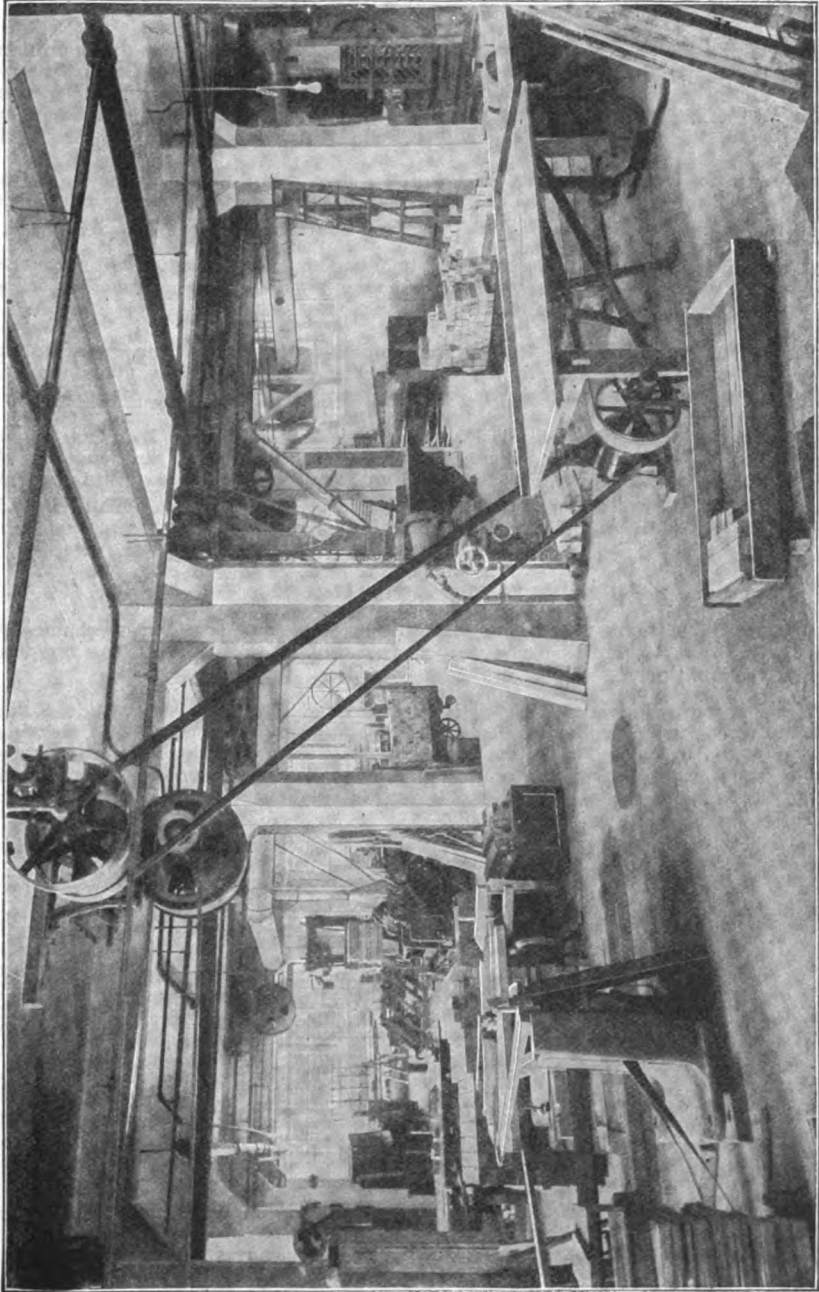


No. 1721.

- No. 1721.** Map Measure, watch pattern, dial $1\frac{3}{8}$ inches, with 2 rows of figures. Registers 25 feet in feet, inches and eighth inches, **Each, \$**

To measure a line, first set the instrument to O, then, holding the instrument vertically, follow the line carefully in one direction with the small projecting tracer wheel. The length of the line in feet, inches and eighths will be indicated by the index hands on the dial.

See Price List in back of Catalog.



Section of Woodworking Department—Factory

Slide Rules

The Slide Rule is an instrument for solving all problems involving multiplication and division and powers and roots without the mental effort and waste of time necessary by the usual process of arithmetic. Some idea of the saving of time effected by the rule may be gained from the fact that $2.13 \times 3.67^2 + 1.23$ can be solved as quickly as $2 \times 3^2 + 5$, and either problem more rapidly than by the usual process.

The principles to be mastered are few and simple, and a slight knowledge of the rule will convince anyone who has much calculating to do, of the folly of doing with the brain what can be done better and quicker in a mechanical way.

After the instructions for operation are understood, a little practice will make the setting and reading of the rule automatic, as it were, practically no mental effort being required for the mechanical operation.

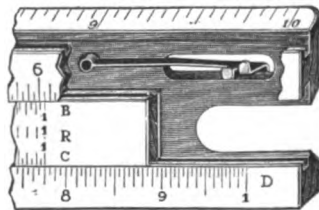
The usefulness of the Slide Rule is not confined to the work of the engineer, but may be used to equal advantage by the accountant, merchant, importer, manufacturer, auditor, freight agent, passenger agent, or by anyone who has calculations to solve.

A knowledge of the principles which underlie the workings of the Slide Rule is not necessary for its successful operation, but exhaustive, though brief, explanations of the subject will be found in the "Mannheim and Phillips Slide Rules," "Mannheim and Multiplex Slide Rules" and "The Mannheim Slide Rule." These books are published by us and will be found listed under Nos. 1776A to 1776D.

Automatic Adjustment

It is well known that the ordinary Mannheim Slide Rule is seldom mechanically perfect, and is also liable to become warped or shrunken, thus preventing a uniform movement of the slide.

These objectional features are entirely overcome in the improved Slide Rules manufactured by us. We illustrate below an explanatory view of these rules, showing the Improved Automatic Adjustment, this construction automatically adjusting the slide, preventing binding due to atmospheric changes, and insuring a positive and uniform slide movement.



Improved Automatic Adjustment

Three strong, flat springs, one of which is shown in the illustration, are imbedded into the body of the rule, under the section carrying the "A" scale. One half of each spring is firmly attached to the body, while the other half is movable in a slot. Two projections on the movable half of each spring are fastened to the section carrying the "A" scale, holding this section close to the body and permitting it to move sidewise.

Improved Slide Rules listed on pages 77-78.

See Price List in back of Catalog.

Phillips Slide Rule
With Improved Automatic Adjustment



No. 1759B.

- No. 1759A. Phillips Slide Rule, with Cube and Reciprocal Scales, 8 in., divisions on white ivorine, glass frameless Indicator and Dietzgen Improved Automatic Adjustment; in sewed leather case, with Book of Instructions, Each, \$
- 1759B. Like No. 1759A, but 10 in.; in morocco case, with Book of Instructions, Each, \$
- 1759C. Like No. 1759A, but 20 in., and subdivided closer; in morocco case, with Book of Instructions, Each, \$

The Phillips Slide Rule has two complete reversed or reciprocal scales in the center of the slide, progressing from the right hand index of scale B toward the left, this arrangement retaining the standard Mannheim graduations and giving an exceptional range. In addition, there is a cube scale located on the vertical edge of the rule, enabling a direct reading of cubes and cube roots.

This Rule not only solves, conveniently and rapidly, all of the arithmetical, trigonometrical and logarithmic examples which are within the range of the Mannheim, but it also possesses the following characteristic advantages:

1. Multiplication of three numbers in one setting.
2. Division of one number by two numbers in one setting.
3. More convenient solution of inverse proportion.
4. Direct solution in a single setting of a series of divisions with a constant dividend.
5. Direct reading of cubes and cube roots.
6. Direct reading of three-halves and two-thirds powers.
7. Direct solution in a single setting of many combined operations which require the slide to be shifted with the Mannheim rule.

Multiplex Slide Rule

With Improved Automatic Adjustment



No. 1760B.

- No. 1760A. Multiplex Slide Rule, with Cube and Reciprocal Scales, 5 in., divisions on white ivorine, glass frameless Indicator and Dietzgen Improved Automatic Adjustment; in sewed leather case, with Book of Instructions, Each, \$
- 1760B. Like No. 1760A, but 10 in., and subdivided closer; in morocco case, with Book of Instructions, Each, \$
- 1761B. Like No. 1760B, but without Cube Scale; in morocco case, with Book of Instructions, Each, \$

The Multiplex Slide Rule has a reversed or reciprocal scale substituted for the upper left scale on the slide, thus permitting a broader application than is possible with the ordinary Mannheim type.

The No. 1761B, which does not have the Cube Scale, is best adapted for those who do not require the solution of the more complex problems involving powers and roots.

Above Slide Rules furnished with Framed Indicator, shown on page 78, if preferred.

See Price List in back of Catalog.

Mannheim Slide Rule With Improved Automatic Adjustment



No. 1769.

- No. 1768. Mannheim Slide Rule, 5 in., divisions on white ivory, glass frameless Indicator and Dietzgen Improved Automatic Adjustment; in sewed leather case, with Book of Instructions, . . . Each, \$
- 1768L. Like No. 1768, but 8 in. and subdivided closer; in sewed leather case, with Book of Instructions, . . . Each,
- 1769. Like No. 1768L, but 10 in.; in morocco case, with Book of Instructions, . . . Each,
- 1770. Like No. 1768L, but 20 in. and subdivided closer; in morocco case, with Book of Instructions, . . . Each,

Union Pocket Slide Rule



No. 1772A.

- No. 1772A. Union Pocket Slide Rule (Mannheim), 5 in. divisions on white ivory, glass frameless Indicator; in morocco case, with Book of Instructions, . . . Each, \$
- 1772B. Like No. 1772A, but 10 in. and subdivided closer; in morocco case, with Book of Instructions, . . . Each,

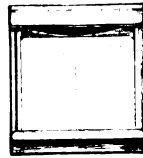
The Union Pocket Slide Rule No. 1772A is exceptionally compact, and specially adapted for carrying in the pocket. These Rules, both 5 and 10 in., have the scales A and D attached to a flexible back, substantially of the same material as the face of slide and the scales. This construction insures a uniform expansion and contraction under atmospheric changes; the slide remains true and works smoothly at all times.

Above Slide Rules furnished with Framed Indicator, shown below, if preferred.

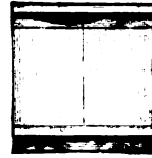
Glass Indicators for Slide Rules



Nos. 1773-1 and 2.



Framed Indicator



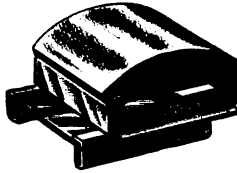
1773-5 and 6.

- No. 1773-1. Glass Frameless Indicator, all figures always visible, one hair-line; for Rules Nos. 1759A, 1759B and 1759C, . . . Each, \$
- 1773-2. Like No. 1773-1, but for Rules Nos. 1760A and 1760B, . . . "
- 1773-5. Glass Frameless Indicator, all figures always visible, one hair-line; for Rules Nos. 1761B, 1768, 1768L, 1769 and 1770, . . . Each,
- 1773-6. Like No. 1773-5, but for Rules Nos. 1772A and 1772B, . . . "

When ordering Glass Indicators, always specify catalog number of the Rule on which Indicator is to be used.

See Price List in back of Catalog.

Magnifiers for Slide Rules



No. 1774A.

- No. 1774A. Magnifier, complete with special Glass Frameless Indicator; for Rules Nos. 1759A, 1759B and 1759C, Each, \$
- 1774B. Like No. 1774A, but for Rules Nos. 1760A and 1760B, " "
- 1774E. " " 1774A, but for Rules Nos. 1761B, 1768, 1768L, 1769 and 1770, Each,

When ordering a Magnifier, it is advisable to send us the Slide Rule so that the special Glass Frameless Indicator can be fitted properly.

Leather Cases for Slide Rules

- | | | | |
|-------------|--|-----------|----------|
| No. 1775-1. | Sewed Leather Case for 8 in. Phillips Rules, | | Each, \$ |
| 1775-2. | " " " " 10 " " " " " " " " | | " |
| 1775-3. | " " " " 20 " " " " " " " " | | " |
| 1775-4. | " " " " 5 " Rules, | | " |
| 1775-5. | " " " " 8 " " " " " " " " | | " |
| 1775-6. | " " " " 10 " " " " " " " " | | " |
| 1775-7. | " " " " 20 " " " " " " " " | | " |

Leather Cases with Space for Magnifier

- | | | | |
|-------------|--|-----------|----------|
| No. 1776-1. | Sewed Leather Case for 8 in. Phillips Rules, with space for Magnifier, | | Each, \$ |
| 1776-2. | Like No. 1776-1, but for 10 in. Phillips Rules, | | " |
| 1776-3. | " " 1776-1, but for 20 in. Phillips Rules, | | " |
| 1776-4. | Sewed Leather Case for 5 in. Rules, with space for Magnifier, " " | | " |
| 1776-5. | " " " " 8 " " " " " " " " | | " |
| 1776-6. | " " " " 10 " " " " " " " " | | " |
| 1776-7. | " " " " 20 " " " " " " " " | | " |

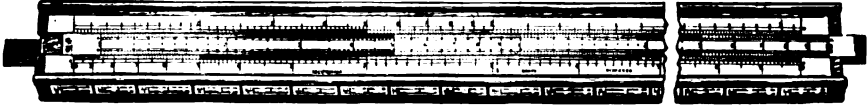
Books of Instruction for Slide Rules

- No. 1776A. "Mannheim and Phillips Slide Rules." Theory and practical application. 65 pages. (Furnished free with "Phillips" Slide Rules) Each, \$
- 1776C. "Mannheim and Multiplex Slide Rules." Theory and practical application. 65 pages. (Furnished free with "Multiplex" Slide Rules) Each,
- 1776D. "The Mannheim Slide Rule." Theory and practical application. 47 pages. (Furnished free with "Mannheim" and "Union" Slide Rules) Each,

See Price List in back of Catalog.

Engineers Slide Rule

Patented July 2, 1901



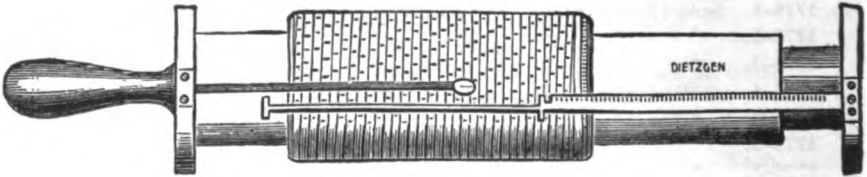
No. 1787.

No. 1787. Engineers Slide Rule, 24 in., Hardwood, with directions, . Each, \$

This is an improved Slide Rule, arranged by Edwin Thacher and E. M. Scofield, Bridge Engineers, in order to combine a maximum of speed with a maximum of accuracy. It is 24 inches long and comprises two complete rules upon one stick.

It multiplies three numbers at one setting, gives powers and roots and has an accuracy equal to a 48 inch rule for ordinary work. No runner is required. Directions for using are engraved on each rule.

Fuller Slide Rule



No. 1794.

No. 1794. Fuller Spiral Slide Rule, in mahogany box, with directions, . Each, \$

This form of Calculating Machine, which is the simplest yet made, greatly facilitates solving the numerous arithmetical calculations required in the office of the Engineer, Architect and Actuary.

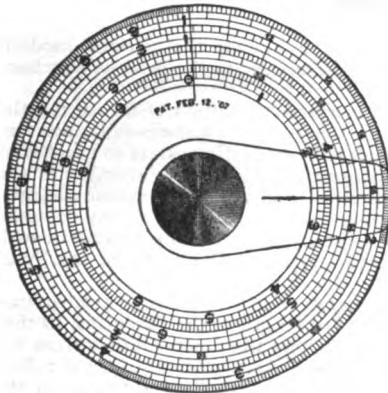
Its range is greater than that of most arithmetical machines. In addition to the operations of multiplication and division, which many instruments only can perform, results requiring the reciprocals, powers, roots, or logarithms of numbers, can be quickly and easily obtained by its use.

The Rule consists of a cylinder that can be moved up and down upon, and turned round, an axis. This axis is provided with a handle, so that the rule may be held in the hand or, if desired, the handle can be attached to the case and rule operated in this position. Upon the cylinder is wound in a spiral a single logarithmic scale. Fixed to the handle is an index. Two other indices, whose distance apart is the axial length of the complete spiral, are fixed to an inner cylinder. This inner cylinder slides inside the axis like a telescope tube, and thus enables the operator to place these indices in any required position relative to the logarithmic scale. Two stops are so fixed that when they are brought in contact the index points to the commencement of the scale.

The use of Slide Rules has been confined to roughly approximate calculations, as the length of scale hitherto made was sufficient only for about 160 divisions. On this rule the length of scale is 500 inches and the number of divisions 7,250, consequently the approximation obtained by its use is sufficient for most of the calculations required by Engineers and Architects, and for many of those required by Actuaries.

See Price List in back of Catalog.

Roto Rule



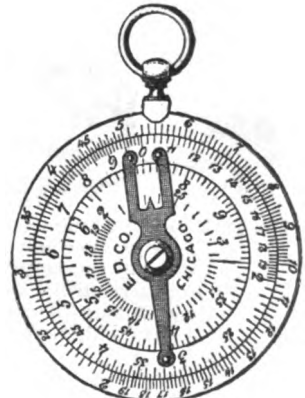
The Roto Rule is a circular slide rule, $3\frac{5}{8}$ in. diameter, made of heavy white celluloid. It consists of four concentric scales and two radial indices. The numbers on the second and third scales are the square roots of the numbers on the first or outside scale, and the numbers on the fourth scale are the logarithms of the numbers on the first scale. The ruling is clear and distinct, and as the divisions are of the same size as on a straight 10 in. rule, it can be easily and quickly read. The range is practically unlimited, as the scales are endless. The rule is well made, durable, and convenient to carry, weighing but one ounce.

No. 1795B.

No. 1795B. Roto Rule, in neat leather case, with directions, . . . Each, \$

Charpentier Calculator

The Charpentier Calculator is a circular slide rule, $2\frac{3}{8}$ in. diameter, with a circular slide which is revolved and set by the handle. This instrument reads scale against scale like the ordinary slide rule, and being made of metal, is but slightly affected by atmospheric variations. Square roots, sines, and tangents, as well as logarithms, may be found with it, and as the circular scale is equivalent to a straight one $5\frac{1}{8}$ in. long, results may be read off with a fair degree of accuracy. The small dimensions and light weight of the instrument make it very suitable for pocket use.



No. 1796.

No. 1796. Charpentier Calculator, . . . Each, \$



No. 1797.

Boucher Calculator

The Boucher Calculator is made similar to an ordinary stem-winding watch, with glass covered dials back and front. Ratios are set off by means of pointers which, as well as the movable dial, are turned by means of the "stem-winder" key. It is $2\frac{1}{2}$ inches in diameter by $\frac{1}{8}$ inch thick, and does not take up more room in the pocket than an ordinary watch.

No. 1797. Boucher Calculator, enameled cardboard dials, Each, \$

1797 $\frac{1}{2}$. Like No. 1797, but silvered metal dials, "

See Price List in back of Catalog.

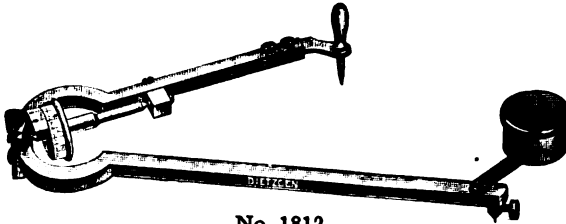
Planimeters

These ingeniously devised instruments rank high among the various modern mechanical aids to the calculations and computations necessary in the work of Mechanical, Civil and Naval Engineers.

The Planimeter affords the most simple and convenient method of measuring the area of plane surfaces on drawings and plans. The accuracy of the results which can be obtained, when the instrument is carefully made and properly used, is so great that the Planimeter is now an indispensable aid to a constantly increasing number of the most progressive members of the engineering profession. In cases of irregular surfaces, the results obtained by the Planimeter can not be equaled in accuracy by any compass and scale method of mensuration; and the time saved by using the instrument in such cases is very considerable. We carry in stock two types of Planimeters: the Polar Planimeter and the Rolling Planimeter.

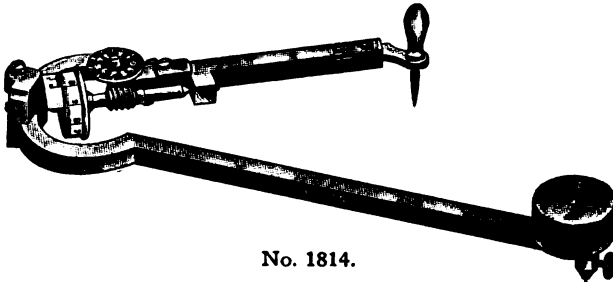
The Polar Planimeter, as its name implies, revolves with its tracer arm around a pole, and is therefore limited in its application by the length of the two arms, so that larger areas have to be measured in sections. The Rolling Planimeter differs from the Polar Planimeter in that it moves on two broad rollers. As the travel of these rollers is not limited, areas of any length, but not exceeding in width the movement of the tracer arm, can be measured in one operation.

Contrary to the prevalent idea, Planimeters are not difficult to use, but are, in fact, very simple to operate. Complete directions are furnished with each instrument.



No. 1812.

No. 1812. Polar Planimeter, Nickel Silver, tracer arm of fixed length, adjusted for vernier unit of .01 square inch. For measurements of areas up to 10 square inches, in square inches, 10ths and 100ths. Parts of square inches can be read by means of the vernier. Excellent for obtaining the area of Steam Engine indicator diagrams. In morocco case with directions, Each, \$



No. 1814.

No. 1814. Polar Planimeter, Nickel Silver, tracer arm of fixed length, adjusted for vernier unit of .01 square inch. A horizontal disc engaging with the measuring wheel records its revolutions up to 10, so that areas up to 100 square inches, in square inches, 10ths and 100ths can be measured. Very suitable for drawings made to scales 1:1, 1:10, 1:100, etc. In morocco case with directions, Each, \$

See Price List in back of Catalog.

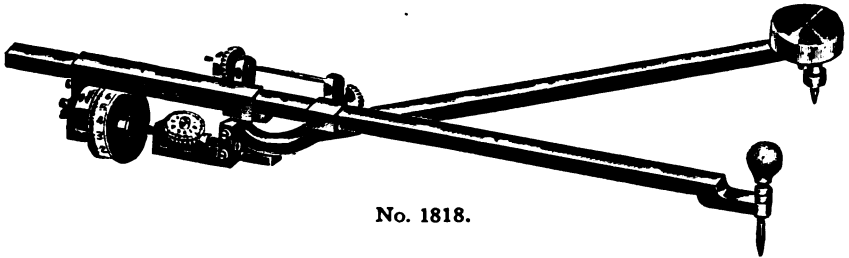
Planimeters



No. 1816.

No. 1816. Compensating Planimeter, Nickel Silver and Brass, tracer arm of fixed length, adjusted for vernier unit of .01 square inch on scale of 1:1. Table of vernier unit values for measurements in scales of 1 in. = 10 ft., 1 in. = 20 ft., 1 in. = 50 ft., etc., in lid of case. Pole arm about 6 $\frac{3}{4}$ in., improved pole weight, winged handle with adjustable support. In morocco case with testing rule and directions, Each, \$

1817. Like No. 1816, but with larger roller and longer tracer arm. Adjusted for vernier unit of .02 square inch on scale of 1:1. In morocco case with testing rule and directions, Each,



No. 1818.

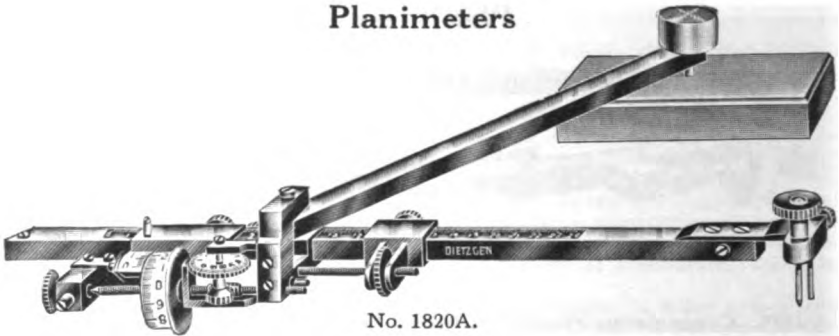
No. 1818. Polar Planimeter, Nickel Silver, adjustable tracer arm, effective length about 7 in., with clamp screw and micrometer, provided with index marks for different scales, such as 1 in. = 1 in., giving areas in square inches; $\frac{1}{8}$ in. = 1 ft., $\frac{1}{4}$ in. = 1 ft., $\frac{3}{8}$ in. = 1 ft., $\frac{1}{2}$ in. = 1 ft., giving areas in square feet; 6 in. = 1 mile, 1:2500, 1:500, giving areas in acres. Improved needle pole. In morocco case with directions, Each, \$

1819. Like No. 1818, but with steel points (protected by metal caps when not in use) on top of bar, for quickly finding the mean height of indicator diagrams. In morocco case with directions, Each,

Device for Finding the Mean Height of Indicator Diagrams explained on page 84.

See Price List in back of Catalog.

Planimeters

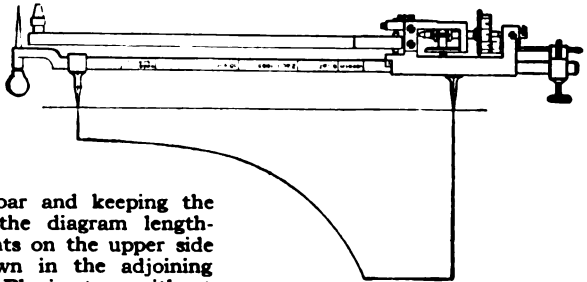


No. 1820A.

- No. 1820A.** Polar Planimeter, Nickel Silver, adjustable tracer arm fully graduated. By means of vernier and micrometer, very fine settings for any scale in U. S. Standard or any other measurement can be obtained. The tracer arm also bears proportion marks for a number of scales for inches and for metric measurements. With pole weight and testing rule, fitted into morocco case having lock and key, so that the instrument can be laid in while set to any proportion. With directions, Each, \$
- 1820B.** Like No. 1820A, but with steel points (protected by metal caps when not in use) on top of bar, for quickly finding the mean height of indicator diagrams. In morocco case with directions, Each,

Device for Finding the Mean Height of Indicator Diagrams

This device consists of two fine steel points, one attached to the upper side of the tracer-arm and the other to the surface of the carriage in which this arm slides. To find the mean height of indicator diagram take, by shifting the slide on the bar and keeping the Planimeter upside down, the diagram lengthwise between the steel points on the upper side of the instrument as shown in the adjoining figure. Then place the Planimeter without altering the relative position of slide and bar in the usual way upon the drawing—



needle point outside the diagram—and follow the outline of the diagram with the tracing point. The difference of the readings at the beginning and at the end of the operation divided by 0.4 is then the mean height of the diagram, expressed in inches.

Example:
 Second reading 2.361
 First reading — 1.913
 0.4) 0.448 = 1.12 ins. = mean height.

If the diagrams for up and down stroke are measured jointly, divide by 0.8 instead of 0.4.

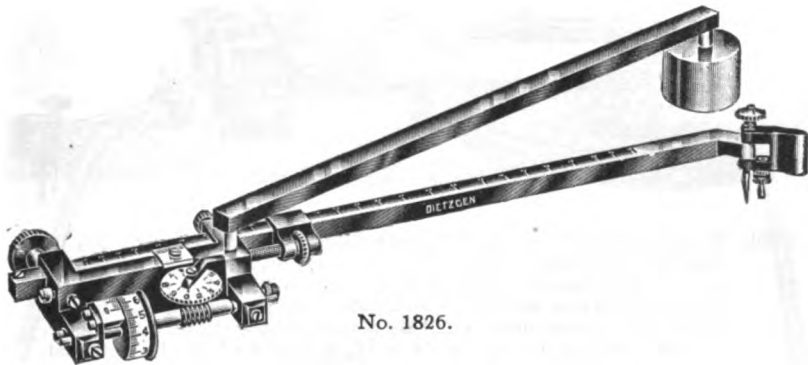
Mean pressure = Mean height × Scale of spring of indicator. Supposing the scale of the spring in the above example is 1" = 80 lbs. per sq. in., then

$$\text{Mean pressure} = \frac{0.448 \times 80}{0.4} = 89.6 \text{ lbs. per sq. in.}$$

The number of lbs. per inch of height being usually a multiple of 4, the arithmetical work is thus extremely simple.

See Price List in back of Catalog.

Planimeters



No. 1826.

These Compensating Polar Planimeters are constructed in a very novel manner. They consist of two separate parts: the tracer arm and the carriage with measuring and recording wheels; and the pole arm having the pole weight at one end and a steel ball at the other end, this steel ball forming a ball-joint with the wheel carriage. This construction gives the tracer arm a motion of 180 degrees right and left, whereas with other Planimeters a motion of about only 90 degrees can be obtained. By measuring a diagram with the pole on the left and then on the right of the tracer arm, and taking the mean reading, all instrumental errors are compensated.

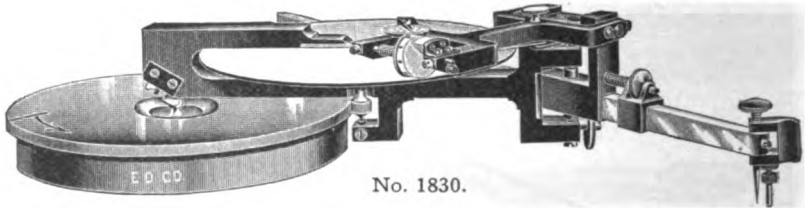
The mean height of indicator diagrams also is obtainable with these instruments. This is accomplished by removing the pole arm, then adjusting the tracer arm to the length of the base by placing the tracer point at the right-hand end of the base and moving it in its sleeve until the other end of the base becomes visible in the center of the small opening in the pole bearing.

No. 1826. Compensating Polar Planimeter, Nickel Silver and Brass, adjustable tracer arm fully graduated. By means of vernier and micrometer, accurate settings for any scale in U. S. Standard or any foreign measurement can be readily obtained. Allowance for shrinkage of drawings also can be made. Pole arm about $7\frac{1}{2}$ in., improved pole weight, winged handle with adjustable support. Table of settings and vernier unit values for various scales in lid of case. The case is so constructed that the instrument can be laid in while set to any proportion. In morocco case with directions, Each, \$

1827. Like No. 1826, but with adjustable pole arm bearing index marks for the different settings furnished with the instrument: this pole arm can be adjusted so that when the instrument is used with the pole inside of a figure, the constant is a round number 20,000 for any setting. It is used in the same way with the pole inside as with the pole outside, and by tracing the figure with the pole on the right and then on the left and taking the mean reading, large areas can be accurately measured. With the pole on the outside, very large figures can be measured, due to the wide range of the tracer arm and the extension feature of the pole arm. This instrument also can be used on a very small surface by simply reducing the length of the pole and tracer arms. In morocco case with directions, Each, \$

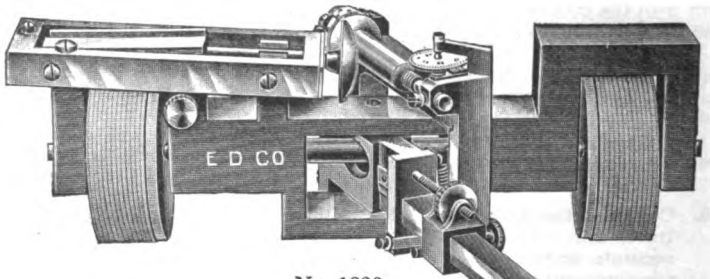
See Price List in back of Catalog.

Planimeters



No. 1830.

- No. 1830.** Precision Disc Planimeter, Nickel Silver and Brass, with $5\frac{1}{8}$ in. diameter aluminum paper-faced contact disc for the measuring wheel. The diameter of the pole disc, which is solid brass, is $5\frac{3}{4}$ in. Adjustable tracer arm is $13\frac{3}{4}$ in. long, fully graduated, and has an angular motion of about 90° . By means of vernier and micrometer, accurate settings for any scale in U. S. Standard can be obtained. The recording wheel is not affected by the condition of the paper on which the plan is drawn, as it comes in contact only with the revolving aluminum paper-faced disc, the surface of which is perfectly uniform and smooth. This type of Planimeter is, therefore, adapted for very accurate and reliable work. Complete with testing rule and directions, in morocco case with lock and key, . . . Each, \$

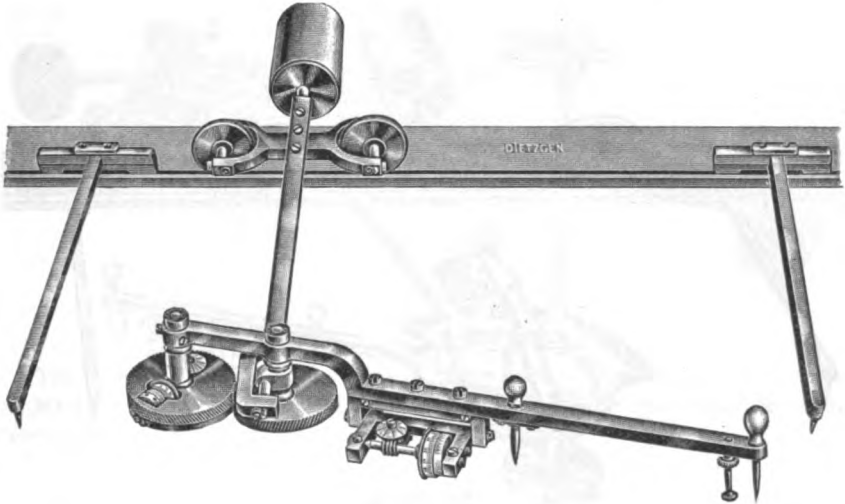


No. 1832.

- No. 1832.** Rolling Sphere Planimeter, Nickel Silver and Brass. The adjustable tracer arm, fully graduated, is $11\frac{3}{4}$ in. long, with an extension bar which makes the total length $19\frac{3}{4}$ in. By means of vernier and micrometer, accurate settings for any scale in U. S. Standard can be obtained. The angular motion is about 30° left and right of the base. As the extent of the movement in the direction of the base is unlimited, areas of any length and of a width which is not greater than the length of the extended tracer arm, can be measured in one operation. Improved winged handle with adjustable support. Table of settings and vernier unit values for various scales in lid of case. Complete with testing rule and directions, in morocco case with lock and key, . . . Each, \$
- 1833.** Like No. 1832, but smaller in all dimensions. The total length of tracer arm with extension bar is about 16 in. Complete with testing rule and directions, in morocco case with lock and key, . . . Each,

See Price List in back of Catalog.

Amsler Mechanical Integrators



No. 1838A.

These Integrators can be used in Naval Architecture for measuring displacement, center of buoyancy, volume and center of holds, and for calculations of stability. Two tracing points are provided: one for small and one for large figures. Large figures are measured in sections, and the area and moment of any figure drawn to scale can be quickly obtained. In general work, these instruments are valuable for determining areas, moments, centers of gravity of diagrams, or volumes of solids of rotation. They are simple in construction, easily operated, and complete directions are furnished with each instrument.

No. 1838A. Amsler Integrator, Nickel Silver, with two independent recording devices, one giving the moment of figure and the other the area. Two tracing points, two gauges for fixing axis of moments, and grooved steel rail. In polished hardwood case with directions, Each, \$

1838B. Like No. 1838A, but made of Brass, "

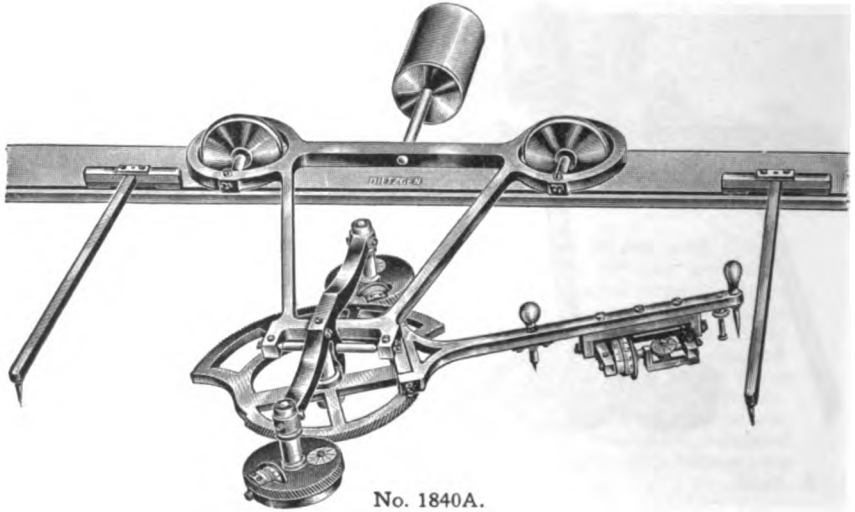
Dimensions:

Longitudinal range,	26 inches
Transverse range,	15 "
Length of Rail,	29 "
Distance from Rail to axis of moments,	7½ "

Grooved Steel Rails of other lengths furnished to order.

See Price List in back of Catalog.

Amsler Mechanical Integrators



No. 1840A.

These Integrators have three recording mechanisms, giving the **Area, Moment and Moment of Inertia**. They are provided with two tracing points and with two gauges for adjusting the instrument to axis of moments.

No. 1840A. Amsler Integrator, **Nickel Silver**, in polished hardwood case: grooved steel rail, 59 in. long, in separate case. Complete with directions, Each, \$

1840B. Like No. 1840A, but made of **Brass**, in hardwood case: grooved steel rail, 59 in. long, in separate case. Complete with directions, Each,

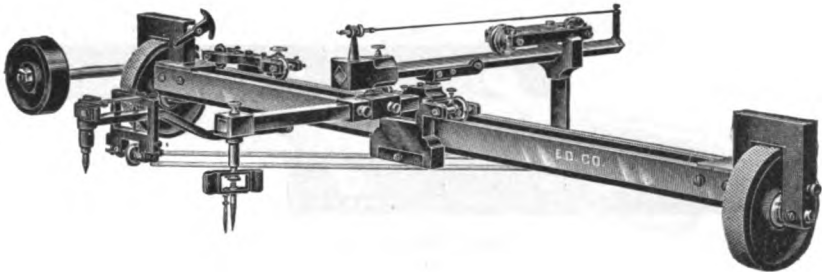
Dimensions:

Longitudinal range,	50 inches
Transverse range,	13 "
Length of Rail,	59 "
Distance from Rail to axis of moments,	7½ "

Grooved Steel Rails of other lengths furnished to order.

See Price List in back of Catalog.

Mechanical Integraph



No. 1844A.

The Integraph is of particular value to Naval Architects and of great aid to Civil and Mechanical Engineers. It is invaluable to the bridge builder as a help for rapidly ascertaining the moments of tensile strength, etc., of a bridge.

With this instrument, the different moments, curves of stability and inertia, can be readily computed, as with the Integrator; the Integraph, however, having the following advantage: It directly draws the curves on the paper, thus giving a graphical representation of the integration, while with the Integrator it is necessary to compute the several curves point by point and to construct them by means of the computed points.

It is very simple to use. The operator draws the principal points through the outlines of the different curves to be calculated. The pen or the pencil point automatically draws the integral curve, and it is possible not only to read the value of the ordinate of this integral curve on the graduated bar but also to measure off the value on the paper.

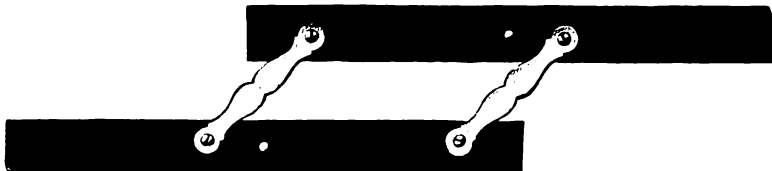
No. 1844A. Mechanical Integraph, Nickel Silver and Brass, improved construction and of great accuracy. The instrument rests on two broad rollers. Movement of the balances is 26 centimeters, the basis can be set from 2 in. to 5 in., and has a lateral movement of 10.3 in. The bar is graduated to $\frac{1}{10}$ inches with vernier reading to $\frac{1}{100}$ inches and micrometer screw. Pen and pencil point attached to the sliding rack of instrument. In walnut case with testing rule and directions, Each, \$

1844B. Like No. 1844A, but with possible setting from 4 in. to 8 in., and with lateral movement of $20\frac{1}{8}$ inches, Each,

See Price List in back of Catalog.

Parallel Rules

Highest Quality



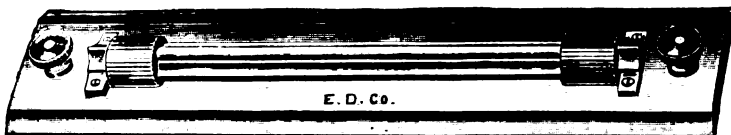
Nos. 1856A-1856F.

Ebony

No. 1856A.	Ebony Parallel Rules, nickel-plated bars, 6 in., . . .	Each, \$
1856C.	“ “ “ “ “ “ 12 “ . . .	“
1856E.	“ “ “ “ “ “ 18 “ . . .	“
1856F.	“ “ “ “ “ “ 24 “ . . .	“

Rolling Parallel Rules

Our Brass and Nickel Silver Rolling Parallel Rules are of the finest quality and so constructed as to insure the greatest possible accuracy of motion. The metal guard over the axle serves as a convenient handle.



Nos. 1858C-1861.

Brass

No. 1858C.	Rolling Parallel Rule, 12 in., weight about 32 oz., . . .	Each, \$
1858E.	“ “ “ 18 “ “ “ 54 “ . . .	“
1858F.	“ “ “ 24 “ “ “ 72 “ . . .	“

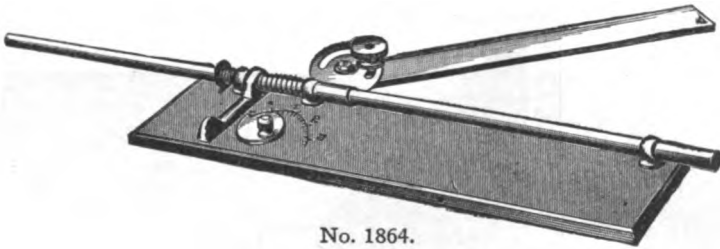
Nickel Silver

No. 1860C.	Rolling Parallel Rule, 12 in., weight about 32 oz., . . .	Each, \$
1860E.	“ “ “ 18 “ “ “ 54 “ . . .	“
1860F.	“ “ “ 24 “ “ “ 72 “ . . .	“
1861.	“ “ “ 24 “ “ “ 10 lbs., . . .	“

The Rolling Parallel Rule No. 1861 is approximately $\frac{3}{8}$ in. thick and $3\frac{1}{8}$ in. wide. It is extra heavy, and is fully recommended for dependable, accurate work.

See Price List in back of Catalog.

Practical Section Liner



No. 1864.

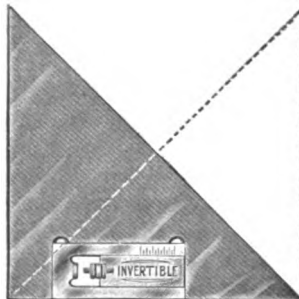
No. 1864. Practical Section Liner, Hardwood, nickel-plated mountings, hardwood blade 8 inches long, in case, Each, \$

1864½. Like No. 1864, but Transparent Ambro blade, one edge beveled, in case, Each,

Strong, simple and durable. Great range of work, permits spacing from 1-1000 to ½ inch, at any angle, without changing position.

Retains its place on the board by means of pins in the bottom of base, without the aid of T Square, Straight Edge, hands or weights.

Invertible Section Liner



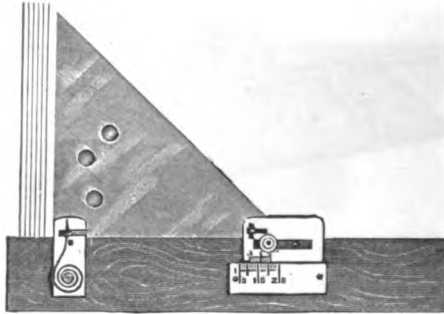
No. 1865.

No. 1865. Invertible Section Liner, Each, \$

An inexpensive, simple, durable, accurate Section Liner for use with Straight Edge. Made of transparent ambro, with perfect edges. Automatic Spacer is of metal, held in position by tongue and groove; invertible, allowing double use of hypotenuse and perpendicular of triangle. Simple to operate and adjust, with wide range of work.

See Price List in back of Catalog.

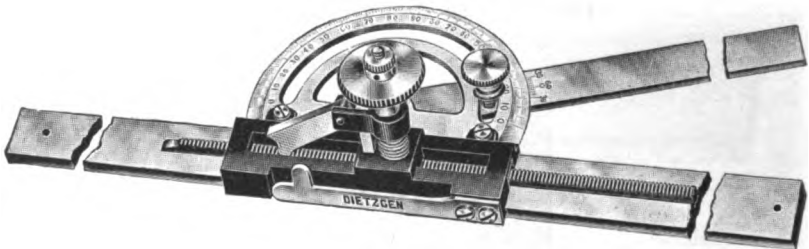
Patent Section Liner



No. 1865 $\frac{1}{2}$.

No. 1865 $\frac{1}{2}$. Patent Section Liner, Nickel Silver mountings; consists of transparent ambro Triangle and hardwood Straight Edge. A very reliable and simple instrument, requiring hardly any practice to manipulate. By the scale and vernier the smallest distances can be regulated, Each, \$

Section Liner and Scale Divider



No. 1866B.

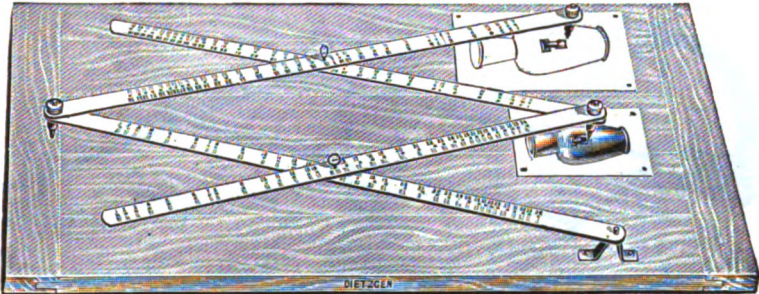
No. 1866B. Section Liner and Scale Divider, Nickel Silver, base 14 $\frac{3}{4}$ in., rack 9 in., with arm projecting 10 in. beyond the protractor, which is graduated to degrees with vernier reading to five minutes. In wooden case, with instructions for use, Each, \$

This Section Liner, of the finest workmanship and of substantial construction, can be operated rapidly and accurately. It consists of a flat rack bar or base, which bears an accurately cut rack and a carriage which slides on the rack bar. A semi-circular Protractor with a ruler arm is attached to the carriage, and by means of a simple mechanism from 4 to 200 parallel lines to the inch can be drawn. When the instrument is properly set, inch scales from $\frac{1}{8}$ to 3 inches to the foot, decimal scales up to 1000 to the foot, etc., can be quickly produced.

See Price List in back of Catalog.

Pantographs

For Enlarging and Reducing Drawings



No. 1879.

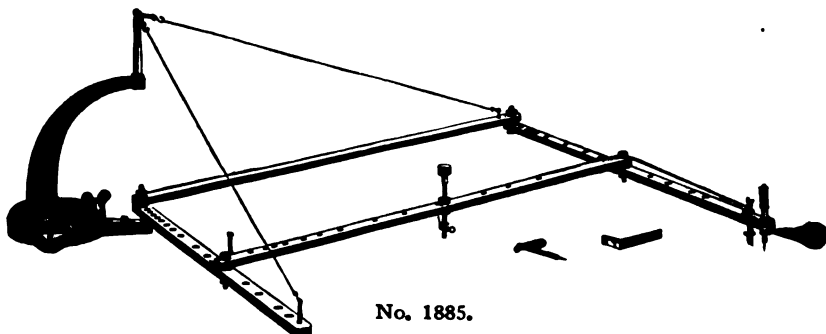
- No. 1875½.** Polished Hardwood Bars, 41 in. long, fancy lined, with metal fulcrum; tracer and lead points interchangeable in adjustable holders; joints formed by bolts and thumb nuts. For reducing and enlarging in 34 ratios, from 8:1 to $1\frac{1}{8}$:1 or vice versa. In box with directions, Each, \$
- 1876.** Polished Hardwood Bars, 21 in. long, with metal fulcrum; tracer and lead points interchangeable in adjustable holders. For reducing and enlarging in 34 ratios, from 8:1 to $1\frac{1}{8}$:1 or vice versa. In box with directions, Each,
- 1879.** Hardwood Bars, 21 in. long, with metal mountings; the lead pencil, carried in a tubular holder, is interchangeable with the tracing point. For reducing and enlarging in 34 ratios, from 8:1 to $1\frac{1}{8}$:1 or vice versa. In box with directions, Each,
- 1880.** Hardwood Bars, 20 in. long. For enlarging in 19 ratios. The trimmings are neat and substantial and the figures clean cut, Each,
- 1881.** Hardwood Bars, 16 in. long. For enlarging in 12 ratios. This instrument is recommended as an excellent means of familiarizing children with form and proportion, and will greatly assist them in learning to draw from objects, Each,

Complete directions furnished with each Pantograph.

See Price List in back of Catalog.

Suspended Pantographs

With Wooden Bars



No. 1885.

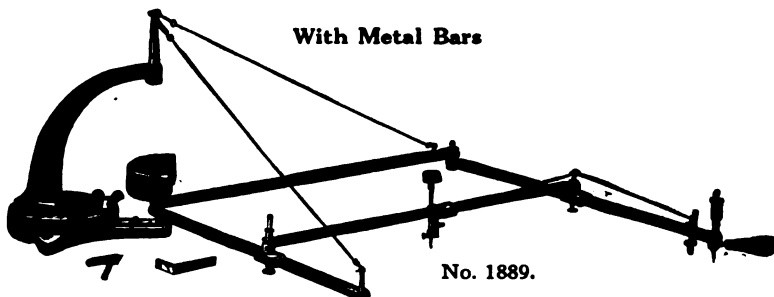
For Reducing and Enlarging in the following ratios:

5:4, 4:3, 3:2, 5:3, 2:1, 5:2, 3:1, 4:1, 5:1, 6:1, 8:1, 10:1, 12:1, 20:1, or vice versa.

Suspended Pantograph, made of well-seasoned pearwood bars connected by polished steel cone joints, with holes accurately drilled for the above ratios. Solid iron standard. Tracing and Pencil points are interchangeable. Instrument complete with adjustable tracing point, steel point, pencil point with 3 brass weights, adjusting angle and instructions for use. In wooden case with lock and key.

No. 1885.	Suspended Pantograph with wooden bars 28 in. long,	.	Each, \$
1887.	“ “ “ “ “ 38 “ “	.	“

With Metal Bars



No. 1889.

For Reducing from 20:1 to 5:4 or Enlarging from 1:20 to 4:5 in all ratios.

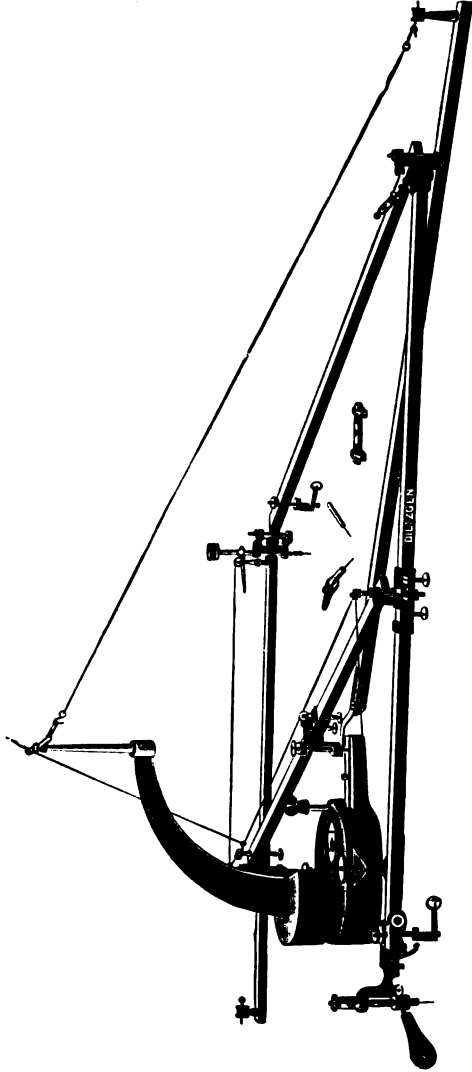
Suspended Pantograph, made of square hollow metal bars, fully divided and connected by cone joints, insuring an accurate and easy movement. The edges of the tubular slides are beveled to facilitate the reading of ratios. Solid iron standard with 1 extra weight. Tracing and Pencil points are interchangeable. Instrument complete with adjustable tracing point, steel point, pencil point with 3 brass weights, adjusting angle and instructions for use. In wooden case with lock and key.

No. 1889.	Suspended Pantograph with metal bars 28 in. long,	.	Each, \$
1890.	“ “ “ “ “ 33 “ “	.	“
1891.	“ “ “ “ “ 38 “ “	.	“

See Price List in back of Catalog.

Suspended Pantographs

Of Fine Mechanical Construction, Especially Adapted for Very Accurate Reproductions



No. 1892.

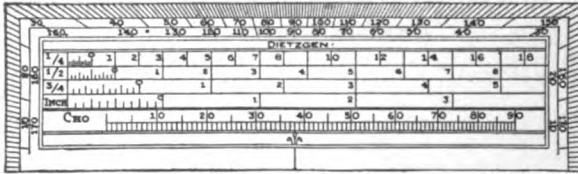
For Reducing from 20:1 to 1:1 or Enlarging from 1:1 to 1:20 in all ratios, or reproducing the original size.

Suspended Precision Pantograph, made of square hollow metal bars, connected by pivot joints. The bars are fully divided, with verniers on the tubular slides and micrometer movement for adjusting the proportions. Supporting bar and appliances for interchanging the pole with the pencil point to reproduce the original size. Convenient controlling arrangement for operating the pencil from the tracing point. Solid iron standard, with 1 extra weight, 2 leveling screws, and 2 spirit levels to adjust the instrument to a horizontal position. Instrument complete with adjustable tracing point, 2 steel points, pencil point with 3 brass weights, spirit level and instructions for use. In polished wooden case with lock and key.

<p>No. 1892. Suspended Precision Pantograph, with metal bars 33 inches long.</p>	<p>Each, \$</p>
<p>1893. "</p>	<p>33 " "</p>
<p>1893 1/2. Like No. 1893, but with reading glass,</p>	<p>38 " "</p>

See Price List in back of Catalog.

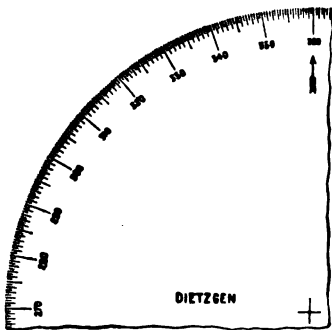
Boxwood Protractor



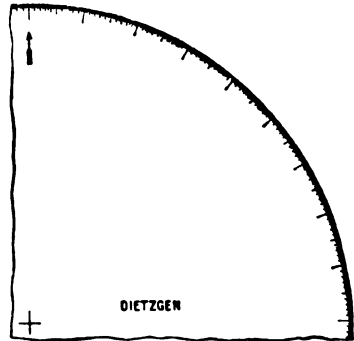
No. 1903.

No. 1903. Boxwood Protractor, oblong, 6 in. long, 1 3/4 in. wide, beveled edges, scales 1/4, 1/2, 3/4 and 1 inch to the foot. Scale of Chords. Diagonal scales, Each, \$

Paper Protractors



Imprint on No. 1909.



Imprint on No. 1910A.

Numbered 0-360

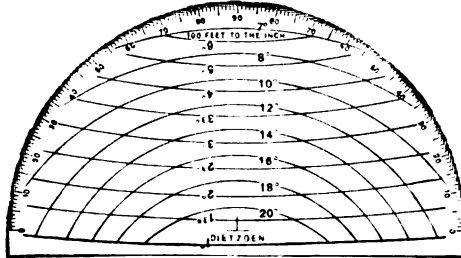
							Each.
No. 1909.	Circular Protractor, on	Drawing Paper,	8 in. diam.,	1/2°	.	.	\$
1910.	"	"	"	14 " "	1/4°	.	.
1911.	"	"	Bristol Board,	8 " "	1/2°	.	.
1912.	"	"	"	14 " "	1/4°	.	.
1913.	"	"	Tracing Paper,	8 " "	1/2°	.	.
1914.	"	"	"	14 " "	1/4°	.	.

Unnumbered

							Each.
No. 1909A.	Circular Protractor, on	Drawing Paper,	8 in. diam.,	1/2°	.	.	\$
1910A.	"	"	"	14 " "	1/4°	.	.
1911A.	"	"	Bristol Board,	8 " "	1/2°	.	.
1912A.	"	"	"	14 " "	1/4°	.	.
1913A.	"	"	Tracing Paper,	8 " "	1/2°	.	.
1914A.	"	"	"	14 " "	1/4°	.	.

See Price List in back of Catalog.

Transparent Ambro Protractors Railroad Curve Protractors

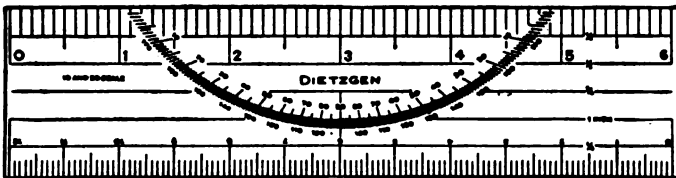


No. 1918B.

- No. 1918A.** Railroad Curve Protractor, Transparent Ambro, 8 in., divided to half degrees, with circular Curves, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, 5, 6, 7 and 8; scale 400 feet = 1 inch, Each, \$
- 1918B.** Like No. 1918A, but 10 in., with circular Curves, 1, $1\frac{1}{2}$, 2, 3, $3\frac{1}{2}$, 4, 5, 6, 7, 8, 10, 12, 14, 16, 18 and 20; scale 100 feet = 1 inch, Each,

Combination Scale and Parallel Ruler Protractors

Made of flexible transparent ambro, 6 inches long. Combine Scale, Parallel Ruler, Compass, and Protractor advantages. Lines can be drawn at any desired angle with or parallel to each other. Circles, $\frac{1}{4}$ in. to 6 in., can be quickly made by merely inserting a pin (to act as a pivot point) in one of the holes which are punched in the protractor and a pencil point in that one of the other holes which gives the desired diameter.



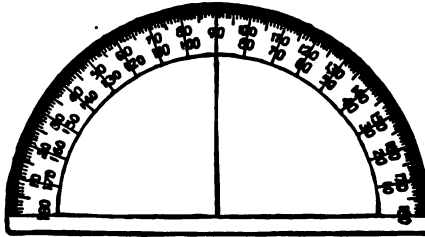
No. 1925-2.

- | | | |
|--------------------|--|----------|
| No. 1925-1. | Combination Protractor, 10 × 16 scales, | Each, \$ |
| 1925-2. | " " 10 × 20 " | " |
| 1925-3. | " " 10 × 20 " with zero in middle, | " |
| 1925-4. | " " 10 × 50 " | " |
| 1925-5. | " " 20 × 40 " | " |
| 1925-6. | " " 30 × 40 " | " |
| 1925-7. | " " 30 × 60 " | " |
| 1925-8. | " " 100 parts to foot; 10 parts to inch, | " |
| 1925-9. | " " 100 " " " 32 " " " | " |
| 1925-10. | " " $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 inch scales, | " |
| 1925-11. | " " $\frac{3}{4}$, $\frac{3}{8}$, $1\frac{1}{2}$ " 3 " | " |
| 1925-12. | " " 8ths, 16ths, 32nds and Centimeters, | " |
| 1925-13. | 1 inch to Mile, divided Yards; Metric scale, divided Centimeters; Mil Scale Protractor, divided 320 degrees, | " |

Nos. 2, 3, 4, 5, 6, 7 and 8 are for use of Civil Engineers and Surveyors, the No. 3, on account of division arrangement, being valuable for platting stadia notes; Nos. 10 and 11 are for Architects and Mechanical Engineers; Nos. 1, 9 and 12 for general purposes; No. 13 for use of Military students.

See Price List in back of Catalog.

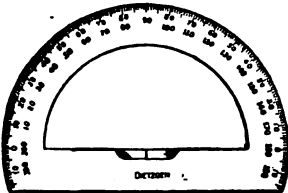
Transparent Ambro Protractors



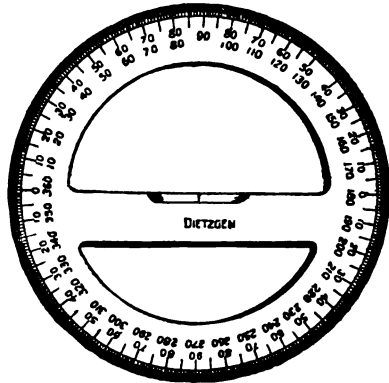
No. 1928A.

No. 1928A.	Semicircular Ambro Protractor, 5 in., div. to $\frac{1}{2}^\circ$, . . .	Each, \$
1928B.	" " " 6 " " " $\frac{1}{2}^\circ$, . . .	"
1928C.	" " " 7 " " " $\frac{1}{2}^\circ$, . . .	"
1928D.	" " " 8 " " " $\frac{1}{2}^\circ$, . . .	"
1929A.	Circular " " 6 " " " $\frac{1}{2}^\circ$, . . .	"
1929B.	" " " 8 " " " $\frac{1}{2}^\circ$, . . .	"

With Beveled Edges



No. 1930A.



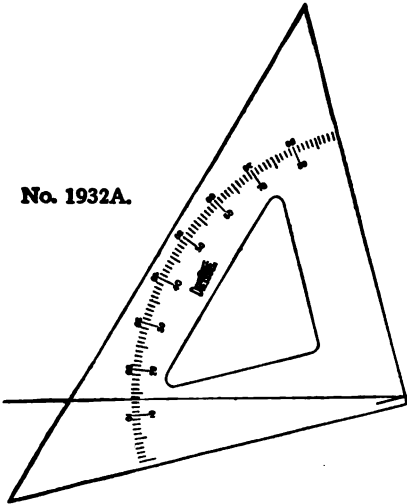
1931B.

No. 1930A.	Semicircular Ambro Protractor, 6 in., beveled edge, $\frac{1}{2}^\circ$, Each, \$
1930B.	" " " 8 " " " $\frac{1}{2}^\circ$, "
1931A.	Circular " " 6 " " " $\frac{1}{2}^\circ$, "
1931B.	" " " 8 " " " $\frac{1}{2}^\circ$, "
1931C.	" " " 10 " " " $\frac{1}{2}^\circ$, "

See Price List in back of Catalog.

Transparent Ambro Protractors Triangle Protractors

No. 1932A.



The Triangle Protractors Nos. 1932A and B can be used as a 45° Triangle, a 30° × 60° Triangle and a Protractor. The Protractor equals one of 11 inch diameter, is graduated to half-degrees, and by means of interpolation quarter-degrees can be easily determined.

They are well adapted for use in schools, enabling students to work more rapidly.

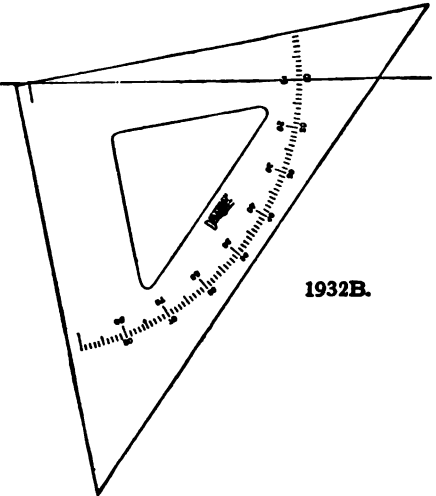
No. 1932A. For plotting angles east or west of north—to the right or left of a vertical line.

Size, 4 6 8 in.
Each, \$

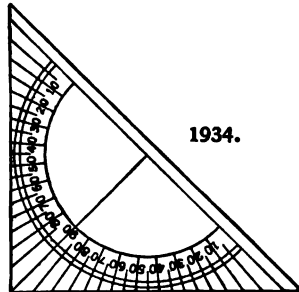
No. 1932B. For plotting angles up or down from a horizontal line.

Size, 4 6 8 in.
Each, \$

1932B.



No. 1933.

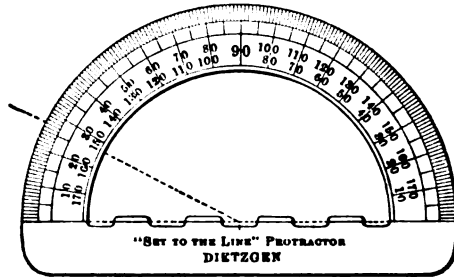


1934.

No. 1933. Triangle Protractor, 30° × 60°, 6 in., div. to 1°, . . Each, \$
1934. " " 45° 6 " " 1°, . .

See Price List in back of Catalog.

Enameled Metal Protractor

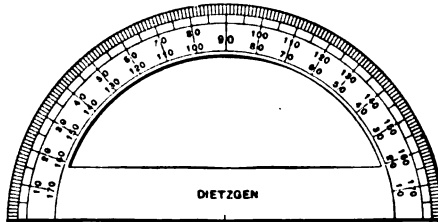


No. 1935D.

No. 1935D. Semicircular, Enameled Metal, 4 in., div. to 1°, . . . Each, \$

The No. 1935D, or "Set to the Line" Protractor, embodies the well-known "broken line" principle, and permits of obtaining accurate and rapid results. To use, simply "Set to the Line."

Brass and Nickel Silver Protractors



No. 1936.

Brass

No. 1935½.	Semicircular, Brass, 3½ in., div. to 1°,	. . .	Each, \$
1936.	" " 4¼ " " " 1°,	. . .	"
1937.	" " 5½ " " " ½°,	. . .	"
1938.	" " 6¾ " " " ½°,	. . .	"

Nickel Silver

No. 1940.	Semicircular, Nickel Silver, 4¼ in., div. to 1°,	. . .	Each, \$
1941.	" " " 5½ " " " ½°,	. . .	"
1941½.	" " " 6 " " " ½°,	. . .	"
1942.	" " " 6¾ " " " ½°,	. . .	"
1943.	" " " 7½ " " " ½°,	. . .	"
1944.	" " " 8½ " " " ½°,	. . .	"

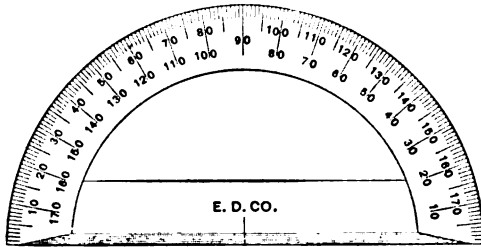
See Price List in back of Catalog.

Gem Union Protractors

Nickel Silver

Gem Union Protractors, popular for mapping and topographical work, are of the highest quality. They are made of Nickel silver, are accurately divided, and have clear, uniform graduations and engraved numbers.

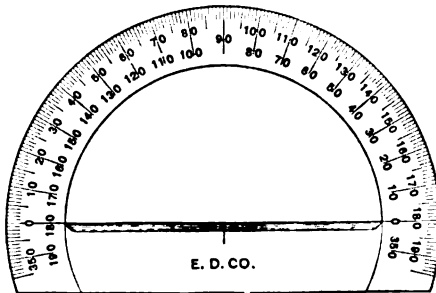
Protractors with an arm are preferable, as they permit of great accuracy and can be operated rapidly. The Protractors listed on pages 103-105 are equipped with an arm and vernier, and are especially valuable for dependable results. While the larger sizes, which have a vernier reading of one minute, are intended for and better adapted to close work, it is possible, with practice, to set off single minutes when using the smaller sizes having a vernier reading of three minutes.



No. 1951.

Center on Outer Edge

No. 1951.	Semicircular,	Nickel Silver,	5 in.,	beveled edge,	$\frac{1}{2}^\circ$,	. . .	Each, \$
1953.	"	"	6 "	"	$\frac{1}{4}^\circ$,	. . .	"
1955.	"	"	8 "	"	$\frac{1}{2}^\circ$,	. . .	"



No. 1961.

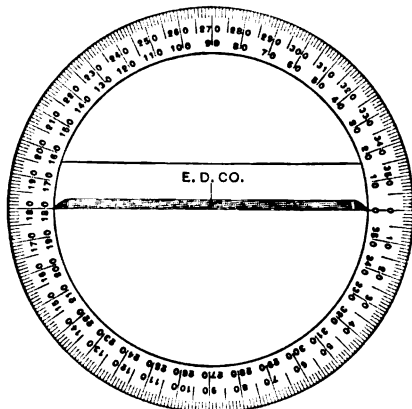
Center on Inner Edge

No. 1961.	Semicircular,	Nickel Silver,	5 in.,	beveled edge,	$\frac{1}{2}^\circ$,	. . .	Each, \$
1963.	"	"	6 "	"	$\frac{1}{4}^\circ$,	. . .	"

See Price List in back of Catalog.

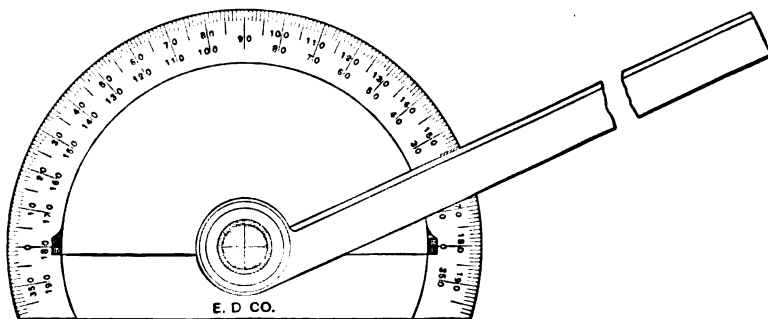
Gem Union Protractors

Nickel Silver



No. 1965.

No. 1965. Circular, Nickel Silver, 5 in., beveled edge, $\frac{1}{2}^\circ$, . . . Each, \$



No. 1970.

Semicircular with Movable Arm and Horn Center

No. 1970. Semicircular, Nickel Silver, 6 in., $\frac{1}{2}^\circ$, . . . Each, \$

Length of arm beyond outer edge of Protractor is 6 in.

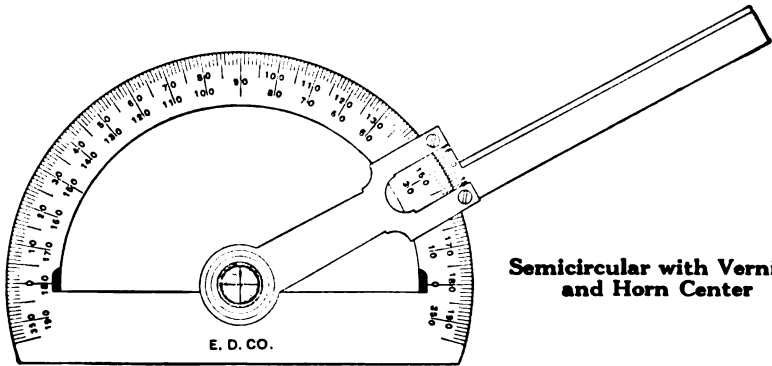
1971. Semicircular, Nickel Silver, 7 in., $\frac{1}{2}^\circ$, . . . " " " "

Length of arm beyond outer edge of Protractor is $6\frac{1}{2}$ in.

See Price List in back of Catalog.

Gem Union Protractors

Nickel Silver

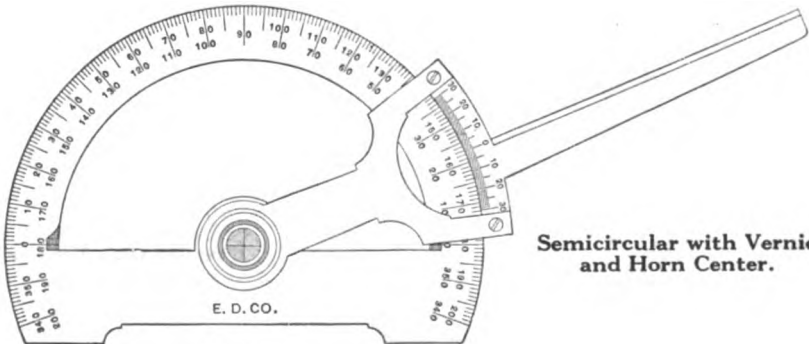


**Semicircular with Vernier
and Horn Center**

No. 1975.

No. 1975. Nickel Silver, 6 in., $\frac{1}{2}^\circ$, vernier reading to 3 min., . . . Each, \$
1976. " " 8 " $\frac{1}{4}^\circ$, " " " 1 " . . . " "

Length of arm beyond outer edge of Protractors. 1975, $5\frac{1}{2}$ in. 1976, 6 in.
Morocco leather case, silk velvet lined, . Each, \$ \$



**Semicircular with Vernier
and Horn Center.**

No. 1978.

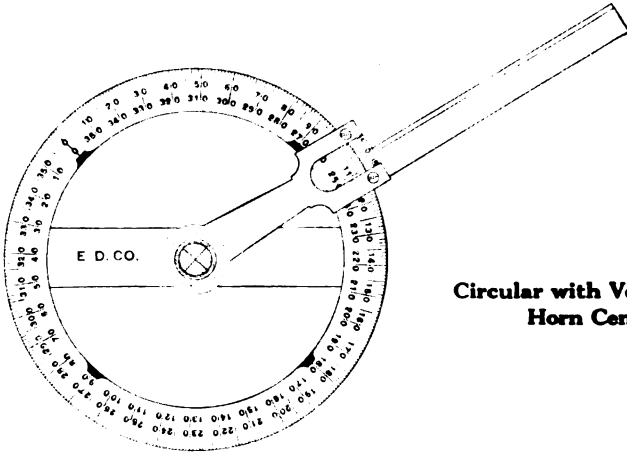
No. 1978. Nickel Silver, 8 in., $\frac{1}{2}^\circ$, vernier reading to 1 min., . . . Each, \$
1979. " " 10 " $\frac{1}{2}^\circ$, " " " 1 " . . . " "

Length of arm beyond outer edge of Protractors. 1978, 6 in. 1979, $6\frac{1}{2}$ in.
Morocco leather case, silk velvet lined, . Each, \$ \$

See Price List in back of Catalog.

Gem Union Protractors

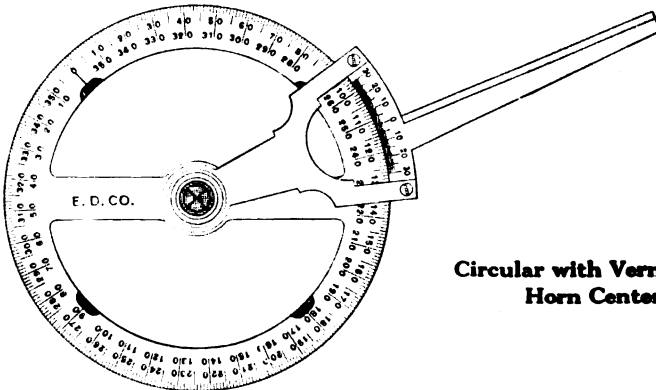
Nickel Silver



**Circular with Vernier and
Horn Center**

No. 1981.

No. 1981. Nickel Silver, 8 in., $\frac{1}{4}^\circ$, vernier reading to 1 min., . . . Each, \$
 Length of arm beyond outer edge of Protractor is 6 in.
 Morocco leather case, silk velvet lined, "



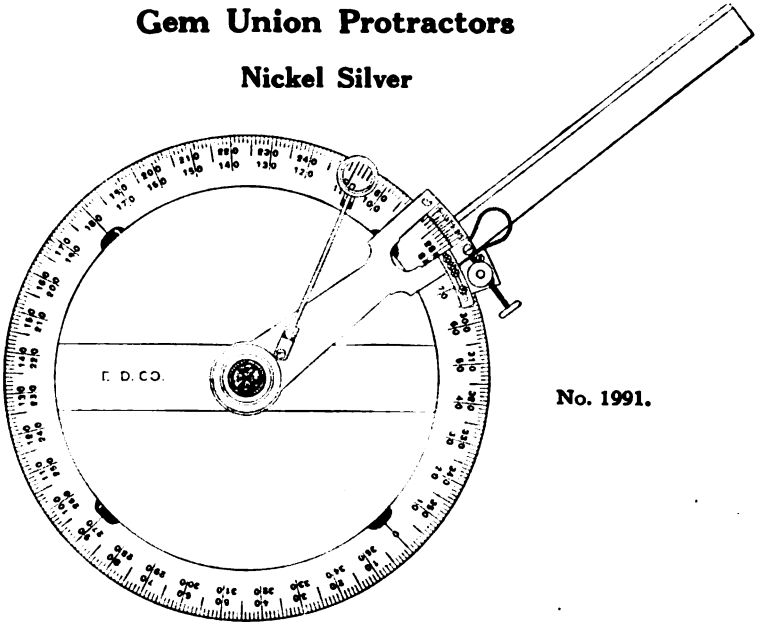
**Circular with Vernier and
Horn Center**

No. 1985.

No. 1985. Nickel Silver, 8 in., $\frac{1}{2}^\circ$, vernier reading to 1 min., . . . Each, \$
1986. " " 10 " $\frac{1}{2}^\circ$, " " " 1 " . . . "
 Length of arm beyond outer edge of Protractors, 1985, 6 in.; 1986, $6\frac{1}{2}$ in.
 Morocco leather case, silk velvet lined, Each, \$

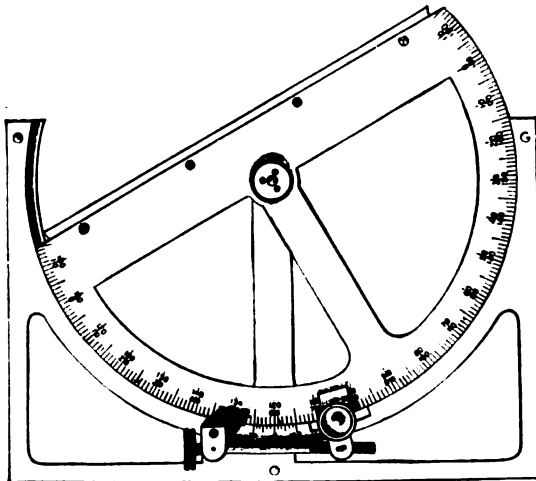
See Price List in back of Catalog.

Gem Union Protractors Nickel Silver



No. 1991.

- | | | |
|-----------|---|----------|
| No. 1991. | Circular, Nickel Silver, 8 in., $\frac{1}{4}^\circ$, vernier reading to 1 minute, with clamp screw, micrometer adjusting screw to vernier and magnifying lens, | Each, \$ |
| | Morocco leather case, silk velvet lined, | " |
| 1992. | Like No. 1991, but 10 in., | " |
| | Morocco leather case, silk velvet lined, | " |

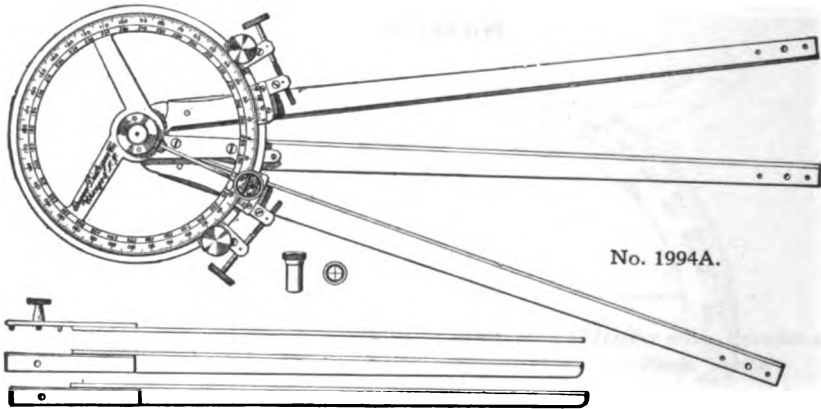


No. 1993.

- | | | |
|-----------|--|----------|
| No. 1993. | Crozet Protractor, Nickel Silver, 8 in., graduated to $\frac{1}{4}^\circ$, folded vernier reading to minutes, with clamp and tangent screws; in polished wooden case, | Each, \$ |
|-----------|--|----------|

See Price List in back of Catalog.

Three Arm Protractor

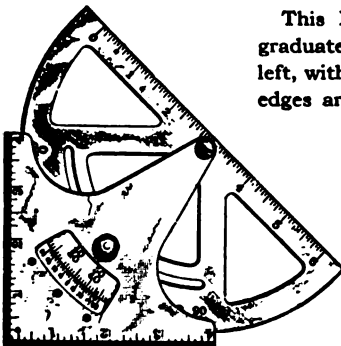


No. 1994A.

No. 1994A. Three Arm Protractor or Station Pointer, in hardwood case, with screw-driver and accessories, Each, \$

As made by us for the U. S. Navy. Circle $6\frac{1}{2}$ in. dia., bronze, graduated on solid silver, numbered by two rows of figures, reading in opposite directions, from 0 to 360. Nickel silver arm, 18 in. long, with extensions of $13\frac{1}{2}$ inches; the two movable arms have clamp and tangent screws and verniers reading to single minutes. Magnifier pivoted and hinged to center of circle, moving parallel to graduation. Instrument provided with three interchangeable cylindrical centers: one with glass bottom; one with horn bottom with small hole for pencil point; and one with spring needle point for locating the exact position.

Draftsmens Steel Protractors



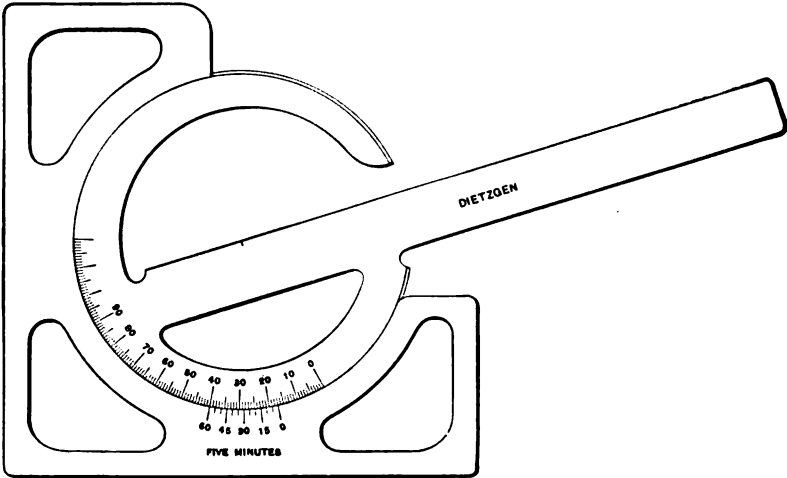
No. 1995A.

This Protractor, made of sheet metal, nickel-plated, is graduated in degrees and figured to read from either right or left, with vernier reading to five minutes. The three straight edges are graduated in inches and 16ths. The complement of an angle can be quickly obtained without re-setting by placing the opposite straight part of the stock against a T Square or a Straight Edge on a drawing board, and the reverse angle can be obtained by placing the straight part of the arc against the T Square or the Straight Edge. By slightly loosening the knurled locking nut, which acts as a handle for lifting the protractor, it is very easy to adjust the instrument to degrees.

No. 1995A. Draftsmens Steel Protractor, Each, \$
1995C. Like No. 1995A, but in leather case, "

See Price List in back of Catalog.

Draftsmens Steel Protractors

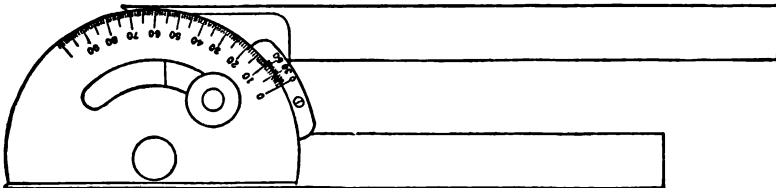


No. 1996A.

No. 1996A. Draftsmens Steel Protractor, with directions, Each, \$
 1996C. Like No. 1996A, but in morocco case, "

The No. 1996A Protractor is made of sheet steel. It has a blade $8\frac{1}{2}$ inches long, the graduations read to degrees, and the vernier reads to 5 minutes.

There are no projections on either face, and therefore it can be used on either edge of the blade or with either side up. This is an advantage when dividing circles, transferring angles, drawing oblique lines at right angles to each other, or laying off given angles each side of a vertical or a horizontal line without changing the setting.



No. 1997A.

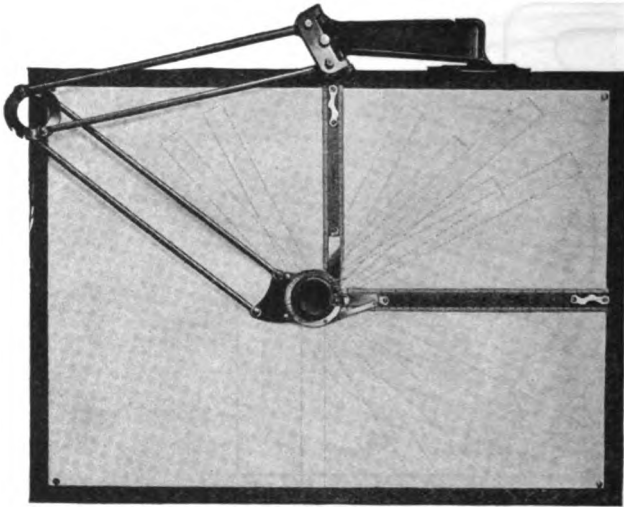
No. 1997A. Draftsmens Steel Protractor, Each, \$
 1997C. Like No. 1997A, but in mahogany case, "

The No. 1997A Protractor has spring-tempered blades about 9 inches long. The arc is four inches long, graduated to degrees, with vernier reading to 5 minutes. A clamping screw securely holds the blades at any angle and serves as a knob.

Either blade can be used in contact with a T Square, giving any angle and its complement from 0° to 90° , the instrument thus being usable as an adjustable triangle.

See Price List in back of Catalog.

Universal Drafting Machines



The Universal Drafting Machines are so well known that lengthy explanation of their merits is hardly necessary. Generally described, they consist of two parallelograms, a protractor, and a square having graduated edges. The two parallelograms joined together constitute an arm which, anchored to the board, gives the protractor and square a parallel motion about the drawing.

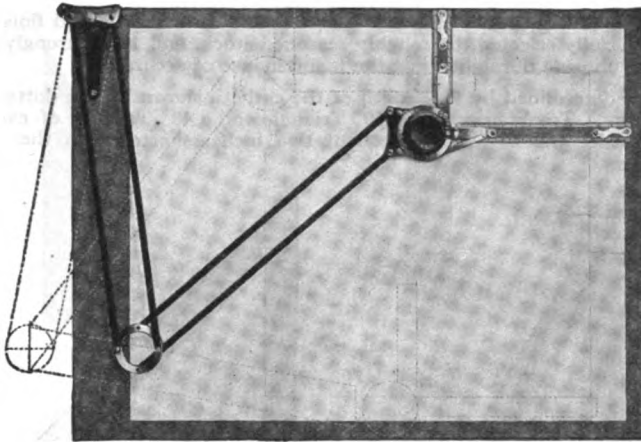
Two general types are made: first, the mid anchor type which requires no clearance at the end of the board, this type being shown in above illustration; second, the corner anchor type (see illustration opposite page) which is used wherever there is sufficient clearance at the end of the board, except in the case of the very large sizes where the mid anchor is sometimes used on account of its increased capacity for a given length of arm.

The Standard Protractor, 4 in. diameter, graduated to degrees and numbered every 10 degrees, is the controlling center of the machine, and most conveniently arranged. It permits the square to be set at various angles, always maintaining the same parallel motion about the board as when at zero. No matter what the angle may be, you simply set the protractor, move the zero to position, and draw the line its exact length. The Protractor, in addition to having a graduated arc which enables the draftsman to read and to clamp the square at the desired angle, possesses positive automatic stops for the most frequently used angles, so that such angles may be instantly obtained without stopping to read or to clamp the protractor. These angles are zero, 30°, 45°, 60° and 90°.

Scales used with the machines are specially manufactured for this purpose, being somewhat wider than scales are usually made, and are designed so that the numbering reads from the protractor out. The scales recommended for ordinary work on all drawings larger than 18 × 24 in. are the 18 in. horizontal scales and the 12 in. vertical scales; for smaller drawings, the 12 in. horizontal and the 6 in. vertical. Straight Edges, with ebony, maple or transparent ambro edges, are of standard lengths 12 in., 18 in., 24 in. and 36 in. The 24 in. is best adapted for general work, although some users prefer the 24 in. horizontal and the 12 in. vertical.

See Price List in back of Catalog.

Machines and Accessories



- No. 1998A. Mid Anchor type, for drawings 24 × 36, 30 × 42 and 36 × 50 in., Hardened Joint, Solid Rods, with Standard Protractor; without Scales or Straight Edges, Each, \$
- 1998B. Mid Anchor type, for drawings 24 × 36, 30 × 42 and 36 × 50 in., Ball Bearing Tubular Rods, with Standard Protractor; without Scales or Straight Edges, Each,
- 1999A. Corner Anchor type, for drawings 18 × 24, 24 × 36 and 30 × 42 in., Hardened Joint, Solid Rods, with Standard Protractor; without Scales or Straight Edges, Each,
- 1999B. Corner Anchor type, for drawings 18 × 24, 24 × 36 and 30 × 42 in., Ball Bearing Tubular Rods, with Standard Protractor; without Scales or Straight Edges, Each,

Scales, Straight Edges and Center Pull Tacks

	Each.
No. 2000A. Flat White Edge Boxwood Scales, 6 in. (see Graduations below), \$	
2000B. " " " " " " 12 " (" " " "),	
2000C. " " " " " " 18 " (" " " "),	
2000D. " " " " " " 24 " (" " " "),	
No. 1. $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$ and 3 in. to the foot. 8. $\frac{3}{8} \times \frac{3}{4}$ in. to the foot.	
2. $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ " 1 " " " 9. $\frac{1}{2} \times 1$ " " " "	
3. Full and half size. 10. $\frac{1}{4} \times \frac{1}{8}$ " " " "	

When ordering, specify catalog number of Scale and mention Scale Graduation desired,—No. 1, 2, 3, 8, 9 or 10.

No. 2001A. Straight Edges, Ebony or Maple lined, 12 in.,	Each, \$
2001B. " " " " " " 18 "	"
2001C. " " " " " " 24 "	"
2001D. " " " " " " 36 "	"

When ordering, specify catalog number of Straight Edge and mention lining desired,—Ebony or Maple.

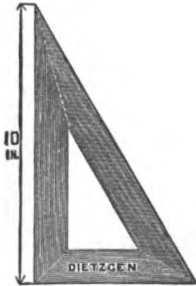
No. 2002A. Straight Edges, Transparent Ambro lined, 12 in.,	Each, \$
2002B. " " " " " " 18 "	"
2002C. " " " " " " 24 "	"
2002D. " " " " " " 36 "	"
2004. Center Pull Thumb Tacks,	Doz.,

See Price List in back of Catalog.

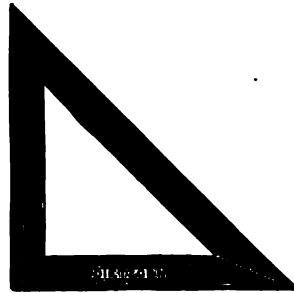
Wooden Triangles

Our wooden Triangles are of the highest quality in workmanship and finish. They are made of specially selected, thoroughly seasoned stock, and have strongly mortised joints, insuring unusual durability and the maintenance of accuracy.

The size is determined by the length of the catheti, shown by the dotted lines in illustration below. To obtain a 30° × 60° Triangle and a 45° Triangle of even size of hypotenuse, order the 45° Triangle about two inches shorter than the 30° × 60° Triangle.



No. 2008.

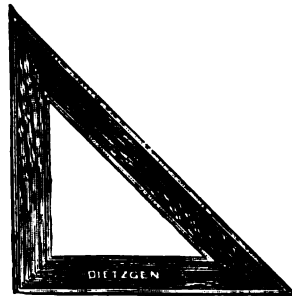


2009.

No. 2008.	Maple Triangles, strong mortised joints, 30° × 60°.				
Size,	.	8	10	12	14 in.
Each,	.	\$			
2009.	Maple Triangles, strong mortised joints, 45°.				
Size,	.	6	8	10	12 in.
Each,	.	\$			



No. 2010.



2011.

No. 2010.	Ash, Maple Lined Triangles, strong mortised joints, 30° × 60°.					
Size,	.	8	10	12	14	17 in.
Each,	.	\$				
2011.	Ash, Maple Lined Triangles, strong mortised joints, 45°.					
Size,	.	6	8	10	12	14 in.
Each,	.	\$				

See Price List in back of Catalog.

Transparent Ambro Triangles
Highly Polished



No. 2014.



2015.

30 × 60°, Plain.

No. 2014.	Thickness, .063 in.	Size,	4	6	8	10	12 in.
		Each,	\$				

45°, Plain.

2015.	Thickness, .063 in.	Size,	3	4	6	8	10	12 in.
		Each,	\$					



No. 2016A.



2017A.

30 × 60°, Beveled on Inner Edges.

No. 2016A.	Thickness, .063 in.	Size,	4	6	8	10	12 in.			
		Each,	\$							
2016B.	Thickness, .085 in.	Size,	4	6	8	10	12	14	16	18 in.
		Each,	\$							
2016C.	Thickness, .095 in.	Size,	4	6	8	10	12	14	16	18 in.
		Each,	\$							

45°, Beveled on Inner Edges.

2017A.	Thickness, .063 in.	Size,	3	4	6	8	10	12 in.		
		Each,	\$							
2017B.	Thickness, .085 in.	Size,	3	4	6	8	10	12	14	16 in.
		Each,	\$							
2017C.	Thickness, .095 in.	Size,	3	4	6	8	10	12	14	16 in.
		Each,	\$							

Nos. 2016A and 2017A Triangles can be furnished of Green Transparent Ambro, if desired, at same prices.

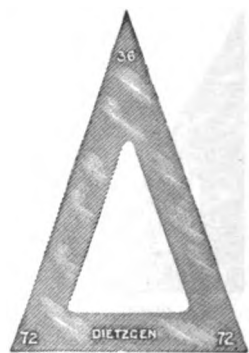
See Price List in back of Catalog.

Transparent Ambro Triangles

Highly Polished



No. 2023B.



2023 1/2.

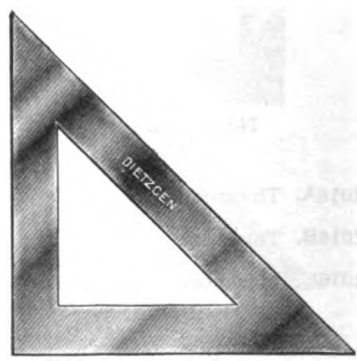
- No. 2023B. Transparent Ambro Triangles, $22\frac{1}{2}^\circ \times 67\frac{1}{2}^\circ$, beveled on inner edges.**
- | | | | | | | | |
|-----------------|----|---|---|----|----|----|--------|
| Size, | 4 | 6 | 8 | 10 | 12 | 14 | 16 in. |
| Each, | \$ | | | | | | |
- 2023 1/2. Transparent Ambro Triangles, isosceles, base angles 72° , vertical angle 36° .**
- | | | | | | |
|-----------------|----|---|---|----|--------|
| Size, | 4 | 6 | 8 | 10 | 12 in. |
| Each, | \$ | | | | |

The Isosceles Triangle was designed by John J. Quinn, a prominent teacher of mathematics and manual training, and is of practical value for designers, as by its use new designs involving the pentagon will be suggested. In Manual Training School work it will aid in obtaining many new designs, without the solving of difficult problems.

Steel Triangles



No. 2024.



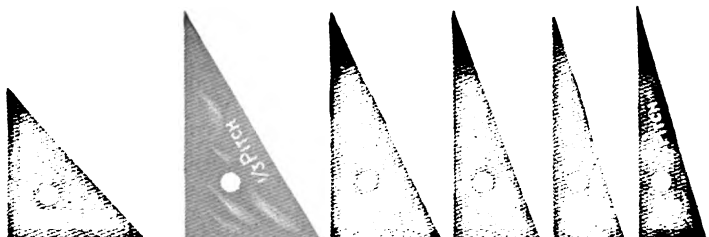
2025.

- No. 2024. Steel Triangles, nickel-plated, $30^\circ \times 60^\circ$.**
- | | | | | | |
|-----------------|----|---|---|----|--------|
| Size, | 6 | 7 | 8 | 10 | 15 in. |
| Each, | \$ | | | | |
- 2025. Steel Triangles, nickel-plated, 45° .**
- | | | | | | |
|-----------------|----|---|---|----|--------|
| Size, | 5 | 6 | 8 | 10 | 12 in. |
| Each, | \$ | | | | |

See Price List in back of Catalog.

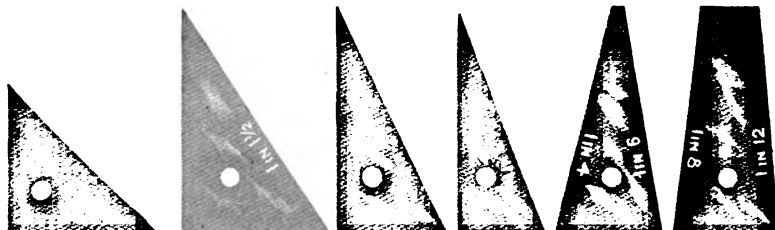
Triangles for Roof Pitches and Embankments

Highly Polished



No. 2026.

No. 2026. Triangles for Roof Pitches, Transparent Ambro, highly polished, 6 in set, Set, \$ Each, \$

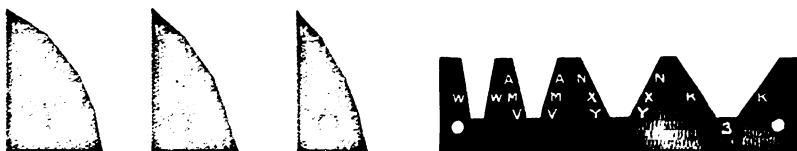


No. 2026 $\frac{1}{2}$.

No. 2026 $\frac{1}{2}$. Triangles for Embankments, Transparent Ambro, highly polished, 8 slopes on 6 templets, Set, \$ Each, \$

Lettering Angles

Highly Polished



No. 2028 $\frac{1}{2}$.

2029.

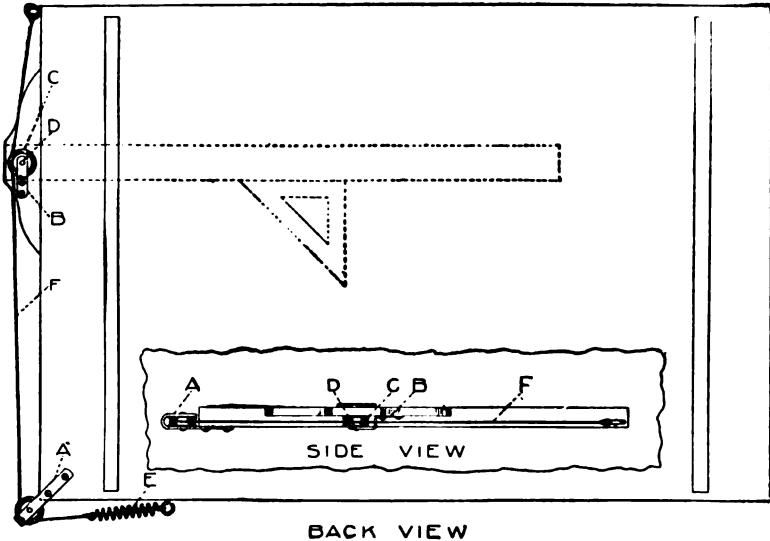
No. 2028 $\frac{1}{2}$. Lettering Angles, Transparent Ambro, highly polished, 3 $\frac{3}{4}$ in., set of 3, each angle having different slopes, Set, \$

2029. Lettering Angles, Transparent Ambro, highly polished, 1 $\frac{3}{4}$ in., set of 3, each angle having different slopes, Set,

The No. 2029 Lettering Angles facilitate rapid and accurate lettering because all slopes are in one horizontal line and in equal distances from the T Square or Straight Edge along which the Lettering Angles slide.

See Price List in back of Catalog.

"20th Century" Parallel Attachment



No. 2042.

This Parallel Attachment consists of one drawing board bracket with pulley (A); one T-Square bracket (B) with pulley (C); one escutcheon pin (D); one spring (E); one guide cord (F); two screw-eyes; and four screws.

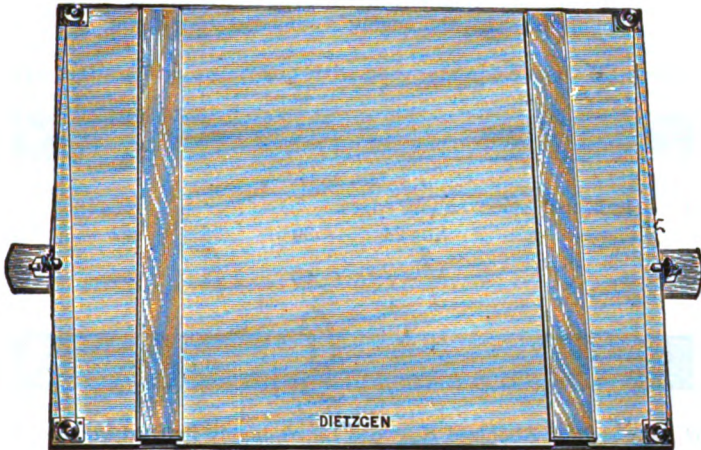
It has many meritable features, among which are the following:

1. Requires but a few minutes to attach to any drawing board or table.
2. Permits tilting the T-Square for drawing small horizontal angles, an advantage over parallel attachments of the usual form. As the T-Square is not permanently fastened to the board, it can also be used for drawing vertical lines when desired.
3. By removing the T-Square, paper can be quickly taken from or attached to the board. This advantage overcomes the annoyance that always results when the paper is slipped under a close-fitting Straight Edge, necessary with parallel attachments of the usual form.
4. Space to the right of the T-Square is convenient for keeping scales, tools, etc., ready for immediate use.

No. 2042. "20th Century" Parallel Attachment, Each, \$

See Price List in back of Catalog.

Parallel Attachments



View showing Parallel Attachments on drawing board.

These Parallel Attachments are simple in design, durable and neat in appearance. They are unequalled for obtaining a perfect parallel motion of a Straight Edge, and can be quickly attached to any drawing board having ledges beneath or on any frame having an opening into which a drawing board can be placed. The parts consist of two single and two double pulleys, two Straight Edge clamps, and a guide cord.

Attachments Only

No. 2043. Attachments only, for Drawing Boards $\frac{7}{8}$ to $1\frac{1}{2}$ in. thick, . . . Each, \$

Straight Edges

For use with Parallel Attachments



No. 2046 with No. 2047.

Straight Edges Only

- No. 2044.** Ash, Maple Lined Straight Edge, for Drawing Boards
 31 43 55 61 73 85 97 109 121 in. long.
 Ea., \$
- 2046.** Maple, Transparent Lined Stg. Edge, for Drawing Boards
 31 43 55 61 73 85 97 109 121 in. long.
 Ea., \$
- 2047.** Straight Edge Ledge, for holding pencils, etc., . . . Foot, \$

When ordering Straight Edges, always specify exact length of board.

Drawing Boards listed on pages 190-191.

See Price List in back of Catalog.



Wooden Straight Edges

To insure the desirable qualities of trueness and durability, our Straight Edges are made of carefully selected, thoroughly seasoned materials, and are of unsurpassed workmanship.

Each Straight Edge stamped with our name and trade-mark.



No. 2051.

No. 2051. Ash, Maple Lined, square edges.							
Size,	24	30	36	42	48	54 in.	
Each,	\$						
Size,		60	72	84	96	120 in.	
Each,		\$					



No. 2052.

No. 2052. Mahogany, Ebonized Boxwood Lined, highly finished, square edges.							
Size,	24	30	36	42	48	54	60 72 in
Each,	\$						



No. 2056.

No. 2056. Maple, Transparent Ambro Lined, highly finished, tongued and grooved joints, square edges.							
Size,	18	24	30	36	42	48	54 60 in.
Each,	\$						

Steel Straight Edges



No. 2057.

No. 2057. Steel, nickel-plated, highest quality, one edge beveled.										
Size,	15	18	24	30	36	42	48	54	60	72 in.
Width,	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	2	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$
Thickness, . . . . .	.07	.07	.07	.08	.08	.09	.09	.09	.09	.10
Each,	\$									



No. 2058.

No. 2058. Steel, nickel-plated, highest quality, square edges.										
Size,	15	18	24	30	36	42	48	60	72 in.	
Width,	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	
Thickness, . . . . .	.07	.07	.07	.08	.08	.09	.09	.09	.10	
Each,	\$									

Nos. 2057 and 2058 Steel Straight Edges can be furnished to order divided inches and tenths or inches and sixteenths, numbered every inch, Each foot, \$

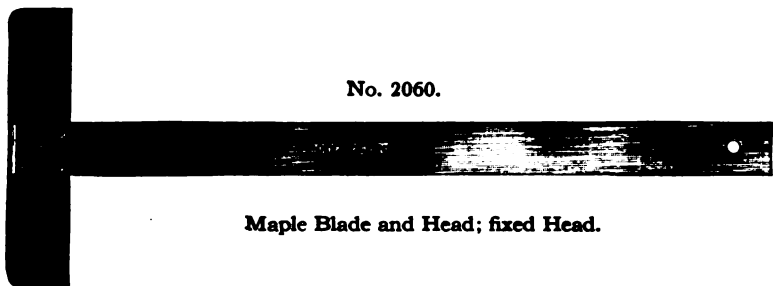
See Price List in back of Catalog.

Wooden T Squares

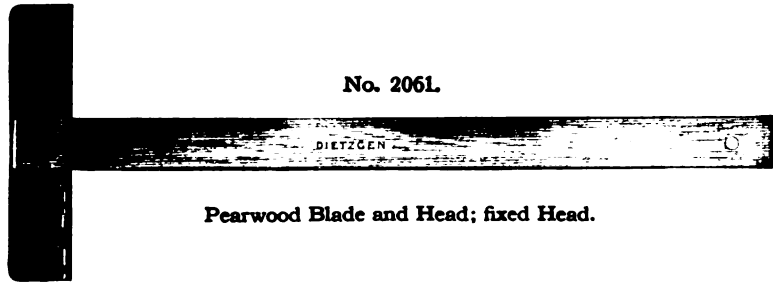
Highest Quality

Realizing the importance of trueness and durability in T Squares, we use in their manufacture only the most carefully selected and thoroughly seasoned stock, the stock being seasoned by a special process. This fact, combined with perfect workmanship and finish, results in these articles being of acknowledged accuracy and of unsurpassed quality. As an additional strength and rigidity precaution, the size and thickness of the heads and width and thickness of the blades are greater than customary, while the nicety of balance and ease of handling are unequaled.

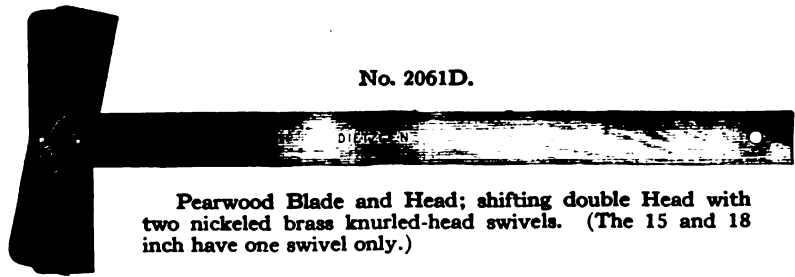
Each and every T Square is stamped with our name and trade-mark—a quality guarantee.



No. 2060.	Size, .	. 15	18	21	24	30	36	42	48 in.
	Each, ..	\$							



No. 2061.	Size, .	. 15	18	21	24	30	36	42	48 in.
	Each,	\$							

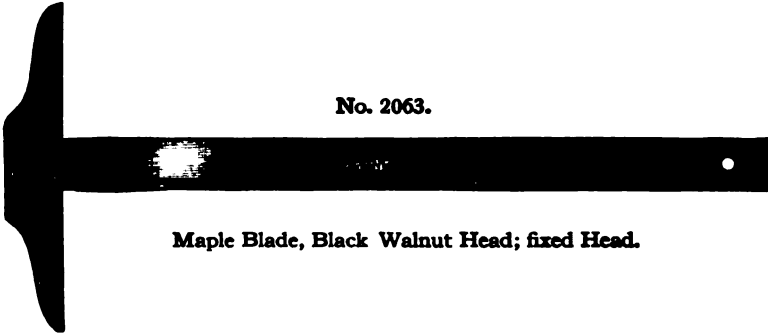


No. 2061D.	Size, .	. 15	18	21	24	30	36	42	48 in.
	Each,	\$							

See Price List in back of Catalog.

Wooden T Squares

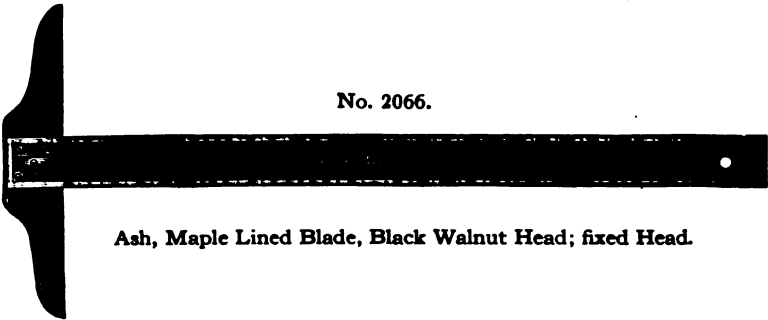
Highest Quality



No. 2063.

Maple Blade, Black Walnut Head; fixed Head.

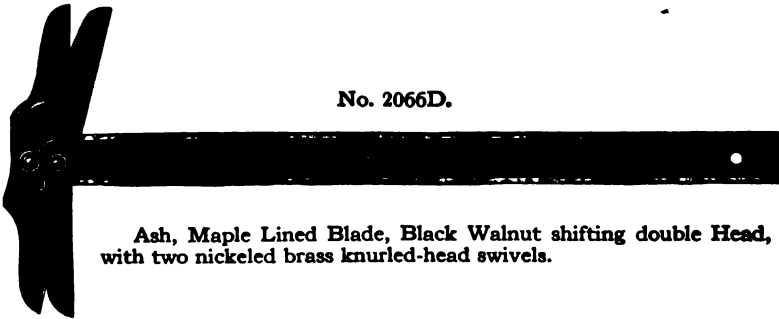
No. 2063.	Size, .	. . . . .	24	30	36	42	48	54 in.
	Each,	. . . . .	\$				



No. 2066.

Ash, Maple Lined Blade, Black Walnut Head; fixed Head.

No. 2066.	Size, .	. . . . .	24	30	36	42	48	54	60	72 in.
	Each, .	. . . . .	\$						



No. 2066D.

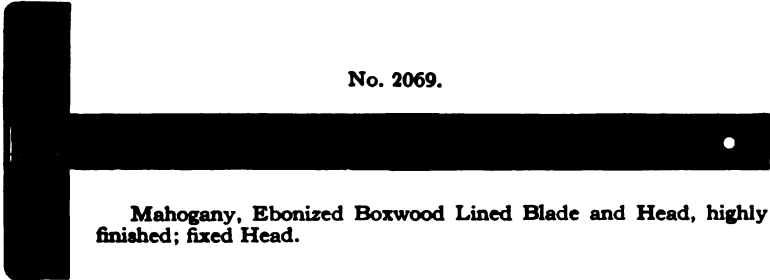
Ash, Maple Lined Blade, Black Walnut shifting double Head,
with two nicked brass knurled-head swivels.

No. 2066D.	Size, .	. . . . .	24	30	36	42	48	54	60	72 in.
	Each, .	. . . . .	\$.						

See Price List in back of Catalog.

Wooden T Squares

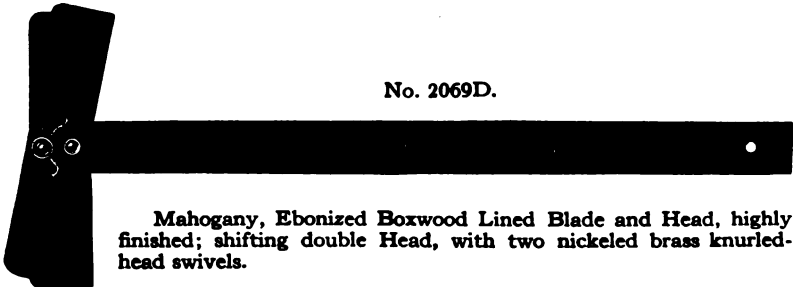
Highest Quality



No. 2069.

Mahogany, Ebonized Boxwood Lined Blade and Head, highly finished; fixed Head.

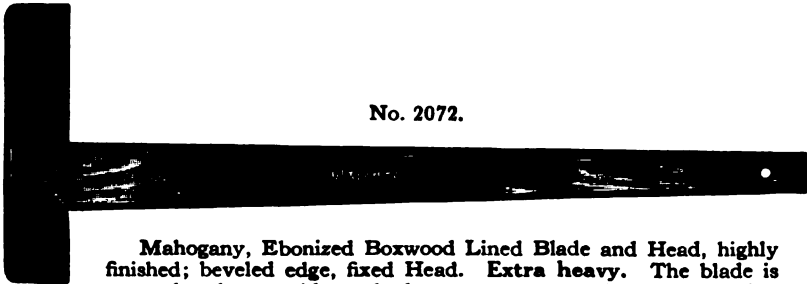
No. 2069.	Size,	24	30	36	42	48	54	60 in.
	Each,	\$						



No. 2069D.

Mahogany, Ebonized Boxwood Lined Blade and Head, highly finished; shifting double Head, with two nickeled brass knurled-head swivels.

No. 2069D.	Size,	24	30	36	42	48	54	60 in.
	Each,	\$						



No. 2072.

Mahogany, Ebonized Boxwood Lined Blade and Head, highly finished; beveled edge, fixed Head. Extra heavy. The blade is tapered and very wide at the base, to prevent spring at the further end. The drawing edge is in line with the middle of the head.

No. 2072.	Size,	36	42	48	54	60 in.
	Each,	\$				

See Price List in back of Catalog.

Transparent Ambro Lined T Squares

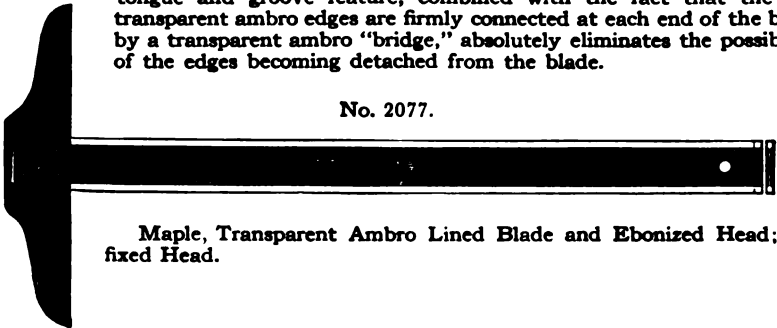
Highest Quality

Tongue and Groove feature.

Bridge at end of Blade feature.

The principal advantage of this improved construction is that the gluing surface has been almost doubled, thereby lessening the liability of the blade warping. The tongue and groove feature, combined with the fact that the two transparent ambro edges are firmly connected at each end of the blade by a transparent ambro "bridge," absolutely eliminates the possibility of the edges becoming detached from the blade.

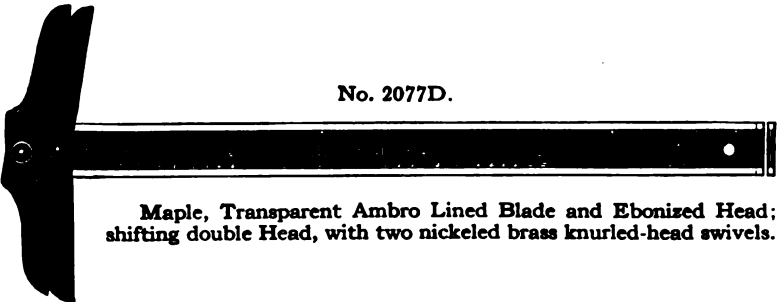
No. 2077.



Maple, Transparent Ambro Lined Blade and Ebonized Head;
fixed Head.

No. 2077.	Size,	18	24	30	36	42	48	54	60 in.
	Each,	\$							

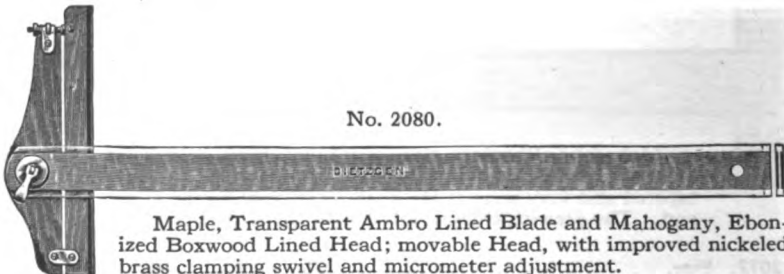
No. 2077D.



Maple, Transparent Ambro Lined Blade and Ebonized Head;
shifting double Head, with two nickeled brass knurled-head swivels.

No. 2077D.	Size,	18	24	30	36	42	48	54	60 in.
	Each,	\$							

No. 2080.



Maple, Transparent Ambro Lined Blade and Mahogany, Ebonized Boxwood Lined Head; movable Head, with improved nickeled brass clamping swivel and micrometer adjustment.

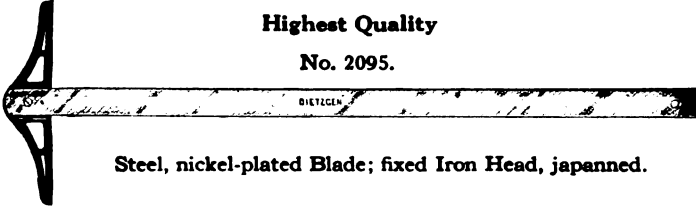
No. 2080.	Size,	.	.	.	.	.	.	.	36	42	48 in.
	Each,	.	.	.	.	.	.	.	\$

See Price List in back of Catalog.

Steel T Squares

Highest Quality

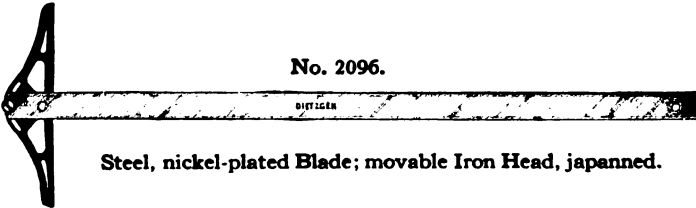
No. 2095.



Steel, nickel-plated Blade; fixed Iron Head, japanned.

No. 2095.	Size,	18	24	30	36	42 in.
	Width,	1¼	1¼	1½	1½	1¾
	Thickness, . . . . .	.05	.05	.06	.06	.07
	Each,	\$				

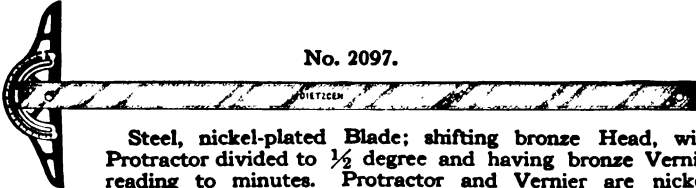
No. 2096.



Steel, nickel-plated Blade; movable Iron Head, japanned.

No. 2096.	Size,	18	24	30	36	42 in.
	Width,	1¼	1¼	1½	1½	1¾
	Thickness, . . . . .	.05	.05	.06	.06	.07
	Each,	\$				

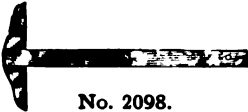
No. 2097.



Steel, nickel-plated Blade; shifting bronze Head, with Protractor divided to ½ degree and having bronze Vernier reading to minutes. Protractor and Vernier are nickel-plated.

No. 2097.	Size,	24	30	36	42 in.
	Width,	1¼	1½	1½	1¾
	Thickness, . . . . .	.05	.06	.06	.07
	Each,	\$			

Engravers T Squares



No. 2098.



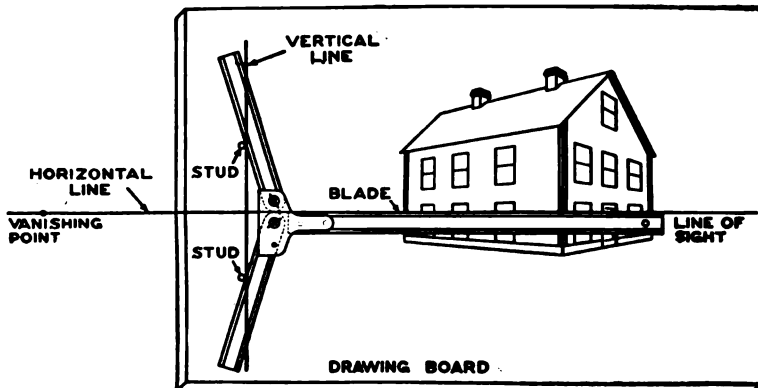
2099.

Engravers T Square, Steel Blade, fixed Head.						
No. 2098.	Size,	6	8	10	12 in.	
	Each,	\$				
Engravers T Square, Steel Blade, shifting Head with swivel.						
2099.	Size,	6	8	10	12 in.	
	Each,	\$				

See Price List in back of Catalog.

Perspective Lineads

Perspective Lineads are used to draw perspective lines of buildings, etc., whenever the vanishing point lies beyond the drawing board: the vanishing point is the point from which all lines of a perspective drawing radiate.



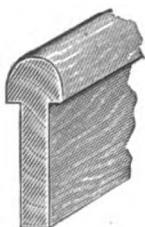
No. 2105.

- No. 2105. Perspective Linead, Mahogany, Ebonized Boxwood Lined Blade and Arms; nickel-plated swivels; 24 in. blade, 10 in. arms; with two studs, Each, \$
2106. Like No. 2105, but 30 in. blade and 11 in. arms, "
2107. " " 2105, " 36 " " " 12 " " "

Complete directions furnished with each instrument.

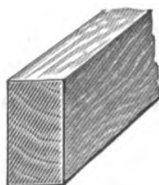
Bars for Beam Compasses

Hardwood



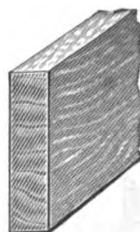
Style A.

$\frac{1}{8}$ in. thick.



Style B.

$\frac{1}{4}$ in. thick.



Style C.

$\frac{3}{8}$ in. thick.

No. 2119. Style A, B or C.

Size,		24	30	36	42	48	60 in.
Each,		\$					

Beam Compasses listed under Nos. 585-587.

See Price List in back of Catalog.

Transparent Ambro Curves

Illustrations $\frac{1}{5}$ to $\frac{1}{6}$ size.



No. 2152.

No. 2152. Transparent Ambro Curves, highly polished.

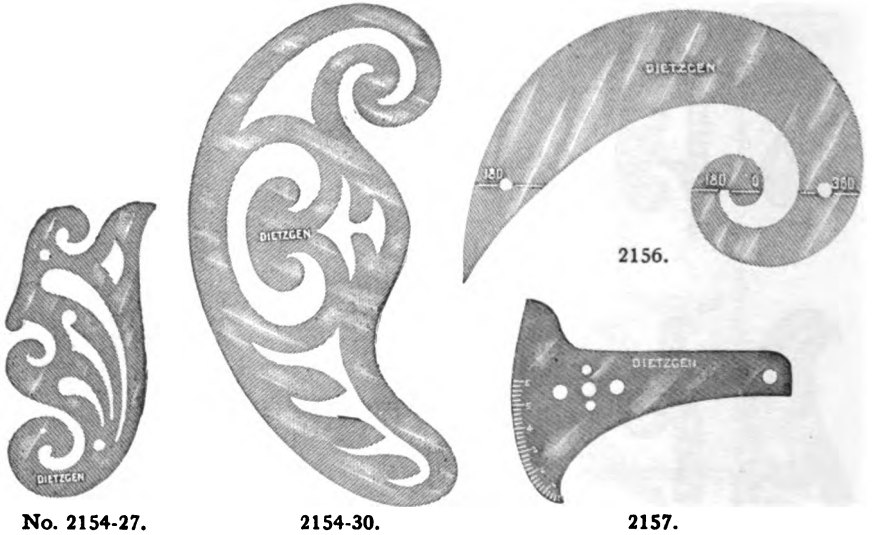
Nos.,	6	8	10	10B	13	14	15	16	17
Each,	\$								
Nos.,	17B	18	18B	19	20	21	23	24	25
Each,	\$								

Above Curves furnished of Green Transparent Ambro, if desired, at same prices.

See Price List in back of Catalog.

omitted from this Catalog.

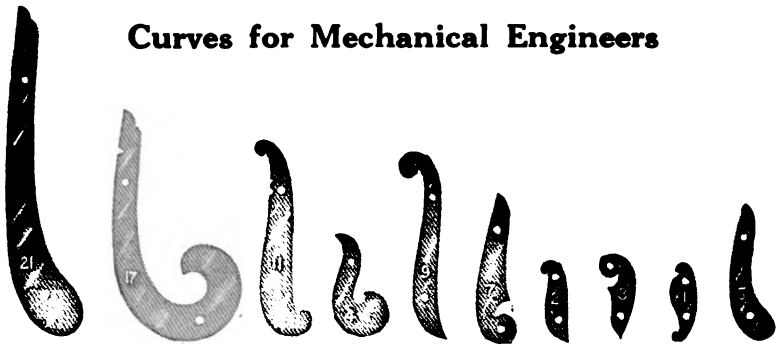
Transparent Ambro Curves



- No. 2154-27.** **2154-30.** **2156.**
No. 2154-27. Combination Curve, Transparent Ambro, highly polished, Each, \$
2154-30. " " " "
2156. Logarithmic Spiral Curve, "
2157. Templet Odontograph, Transparent Ambro, highly polished, for
 describing Teeth of Gear Wheels; a useful instrument for
 mechanical drawing; in case, with full description, Each,

The No. 2156 Logarithmic Spiral Curve is mathematically constructed and contains every curve within limit of its size. If used according to the very complete directions furnished, the most difficult calculations can be solved.

Curves for Mechanical Engineers



- No. 2158.**
- | | | | | | | | | | | | |
|------------------|--|---|---|---|---|---|---|----|----|----|----------------|
| No. 2158. | Transparent Ambro Curves, highly polished. | | | | | | | | | | |
| Nos., | 1 | 2 | 3 | 4 | 5 | 7 | 9 | 11 | 17 | 21 | |
| Each, \$ | | | | | | | | | | | |
| 2158C. | Set of 10 Curves, in polished wooden box, | | | | | | | | | | Set, \$ |

See Price List in back of Catalog.

Adjustable Curve Rulers



No. 2160.



No. 2161.

- No. 2160. Adjustable Curve Ruler, 14½ in. long, black rubber ruling edge, other parts nickeled, highest grade, Each, \$
2161. Adjustable Curve Ruler, 30 in. long, steel ruling edge, entire ruler of metal, nickel-plated, highest grade, Each,
2162. Adjustable Curve Ruler, 12 in. long, white rubber ruling edge, other parts nickeled, medium grade, Each,
2163. Like No. 2162, but 24 in. long, "

These Adjustable Curve Rulers consist of a ruling edge of rubber combined with a soft bar of lead, except No. 2161, which has a steel ruling edge. They will hold any curve to which they are bent.



No. 2165.



- No. 2165. Adjustable Curve Ruler, Double Edge, 7 in. long, Each, \$
2166. " " " " " 15 " " "
2167. " " " " " 31 " " "

The Nos. 2165-2167 Adjustable Curve Rulers can be instantly adjusted and retained to any form or curve. Both working edges are rounded, and by slightly inclining the pencil or the pen two or more parallel curves can be drawn without moving the ruler.

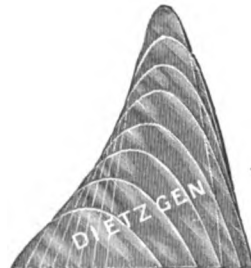
Hyperbolas and Parabolas

Transparent Ambro

Highly Polished



No. 2176.



2178.

- No. 2176. Hyperbolas, 8 in set, from 2 to 5½ inches, Set, \$
2178. Parabolas, 8 " " " 1¼ " 5½ " "
2179. " " " 3¼ " 14¼ " "

See Price List in back of Catalog.

Ellipses

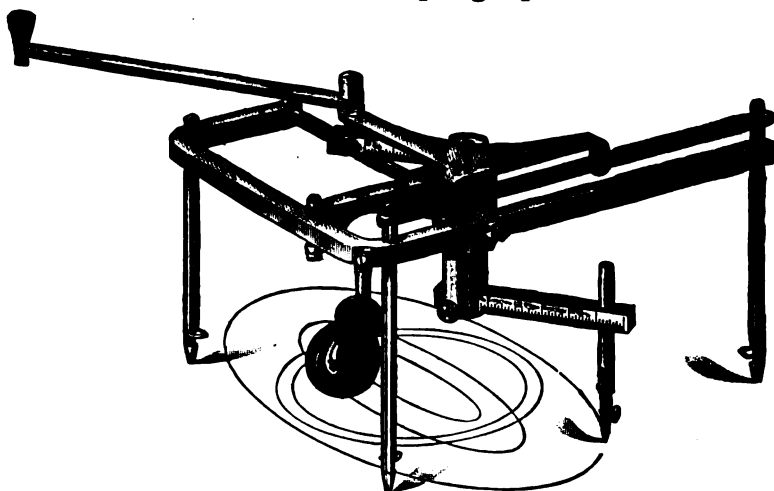
Transparent Ambro Highly Polished



No. 2180.

No. 2180. Ellipses, 10 in set, from 1½ to 6 inches,	. . . . .	Set, \$
2181. " 6 " " " 2 " 4½ "	. . . . .	" \$

Premier Ellipsograph



No. 2185.

This Instrument is unequalled for rapidly drawing Ellipses and Circles which are true in every sense. Adapted either for pen or for pencil work, with a range limit of 5 × 9 inches, it is invaluable for any design that contains elliptical forms, such as cams, wheel spokes, trade marks, etc. The dimensions of the major and minor axes being known, the desired ellipse can be produced in one operation.

Although rigidly constructed of metal, it weighs, complete, but two pounds. Directions for adjustment, care and use are furnished with each instrument.

No. 2185. Premier Ellipsograph, with Pencil and Pen attachments, . . . Each, \$

See Price List in back of Catalog.

Splines



No. 2189.

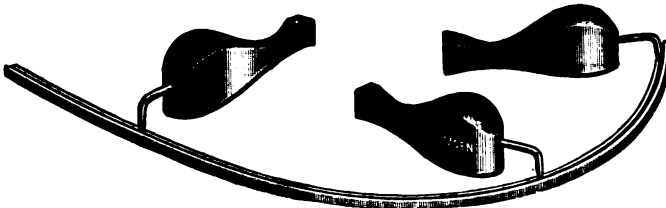
No. 2188. Maple Splines.

Size,	12	18	24	30	36	42	48	60 in.
Each,	\$							

No. 2189. Transparent Ambro Splines.

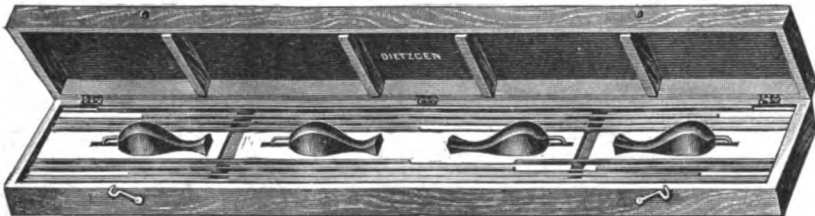
Size,	12	18	24	30	36	42	48 in.
Each,	\$						

Weights for Splines



No. 2192.

No. 2192. Weights for Splines, lead with finger, about 3½ lbs., . . . Each, \$
 2193. " " " " " " " 5 " . . . "



No. 2197.

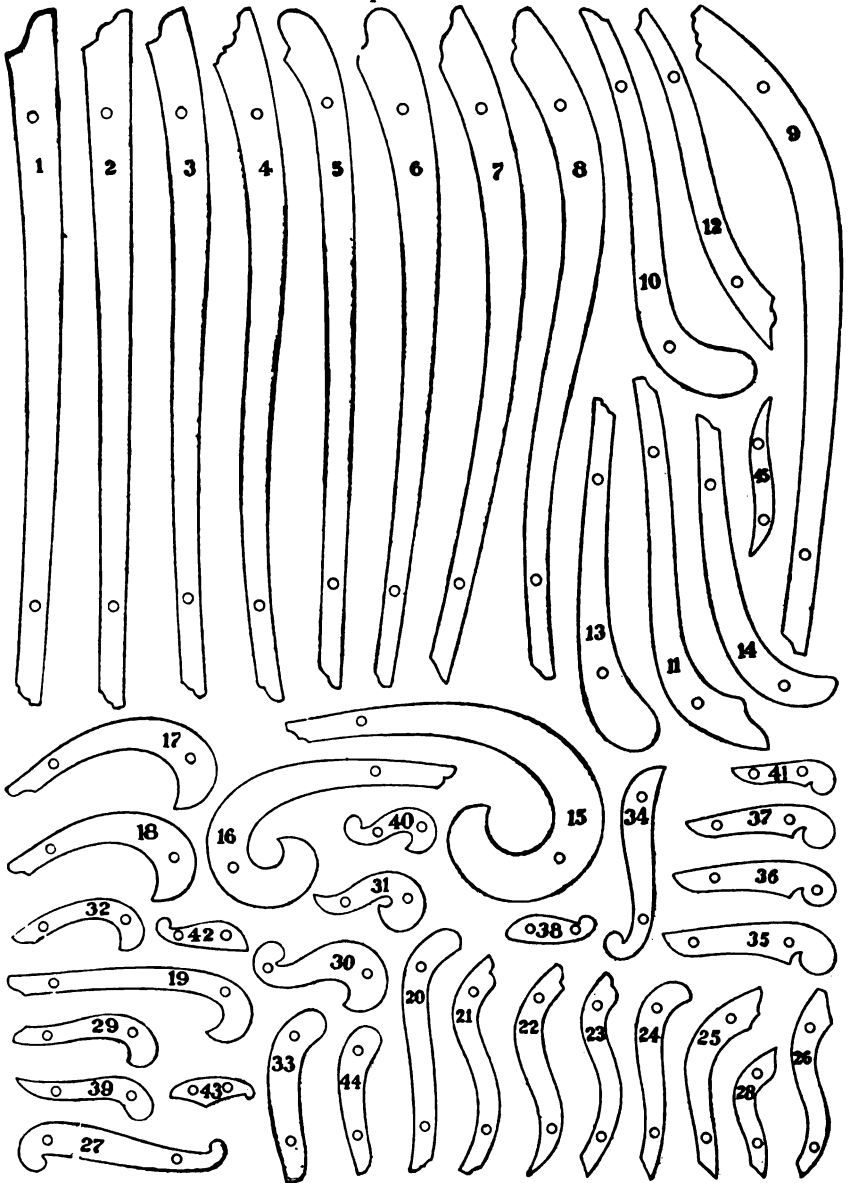
No. 2197. Set of Splines and Spline Weights, containing:

4 No. 2192 Weights for Splines.	
6 " 2188 Maple Splines; sizes, 12, 18, 24, 30, 36, 48 in.	
6 " 2189 Ambro " " 12, 18, 24, 30, 36, 42 "	
In wooden box,	Set, \$

See Price List in back of Catalog.

Copenhagen Ship Curves

Transparent Ambro



No. 2204.

No. 2204. Copenhagen Ship Curves, Transparent Ambro, highly polished;
45 Curves, as shown above, in case, Set, \$

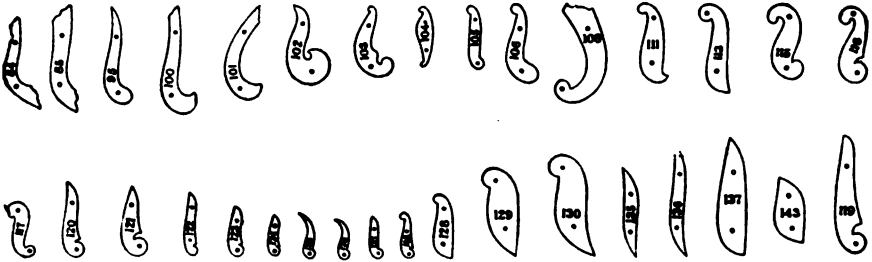
See Price List in back of Catalog.

Copenhagen Ship Curves

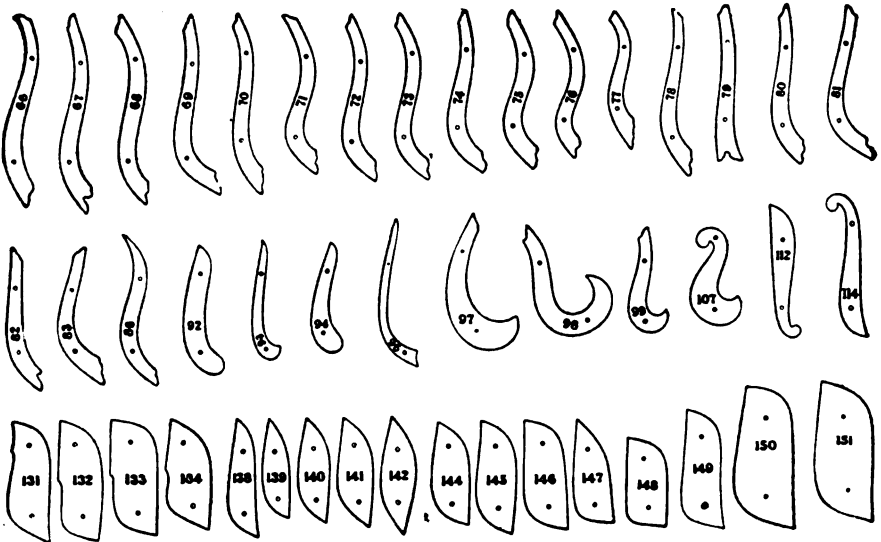
Single Curves

Transparent Ambro Highly Polished

Illustrations $\frac{1}{9}$ size.



No. 2210B. Copenhagen Ship Curves, Transparent Ambro, highly polished;
single Curves, as shown above, Each, \$



No. 2212B. Copenhagen Ship Curves, Transparent Ambro, highly polished;
single Curves, as shown above, Each, \$

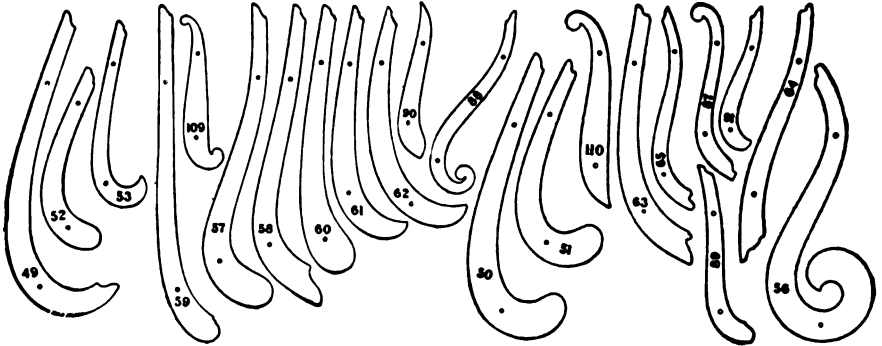
See Price List in back of Catalog.

Copenhagen Ship Curves

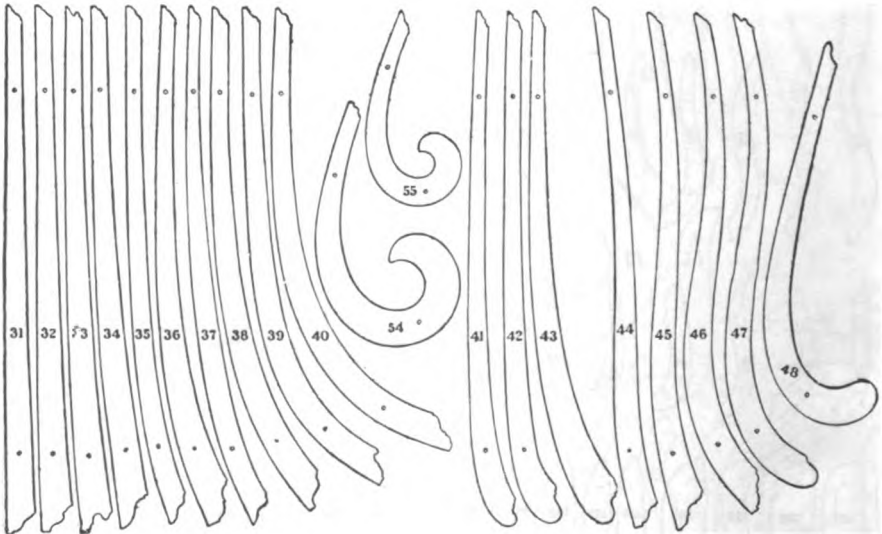
Single Curves

Transparent Ambro Highly Polished

Illustrations $\frac{1}{9}$ size.



No. 2214B. Copenhagen Ship Curves, Transparent Ambro, highly polished; single Curves, as shown above, Each, \$

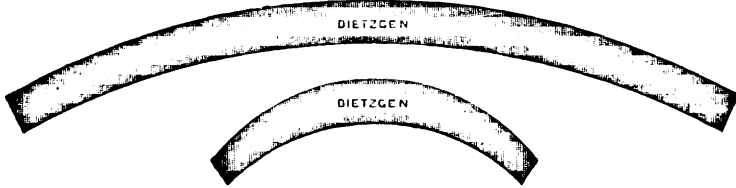


No. 2216B. Copenhagen Ship Curves, Transparent Ambro, highly polished; single Curves, as shown above, Each, \$

2218B. Copenhagen Ship Curves, Transparent Ambro, highly polished; complete set of 121 Curves, as shown under Nos. 2210B, 2212B, 2214B and 2216B, in hardwood case, Set,

See Price List in back of Catalog.

Railroad Curves



Nos. 2220-2224.

Wood

- No. 2220.** Wooden Railroad Curves, 10 in set, 12 to 120 inches radius, viz.: 12, 24, 36, 48, 60, 72, 84, 96, 108, 120 in., in wooden box, . . . Set, \$
- 2222.** Wooden Railroad Curves, 17 in set, 12 to 60 inches radius, viz.: 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60 in., in wooden box, Set,
- 2224.** Wooden Railroad Curves, 44 in set, 3 to 200 inches radius, viz.: 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36, 39, 42, 48, 54, 60, 66, 72, 78, 84, 90, 100, 110, 120, 130, 140, 160, 180, 200 inches, in wooden box, . . . Set,
- Single Railroad Curves of Wood, Each,

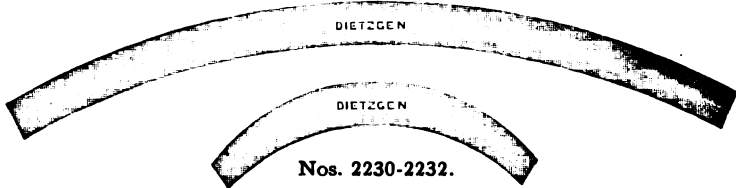
Cardboard

- No. 2227.** Card Board Railroad Curves, 30 in set, viz.: 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 35, 40, 45, 50, 60 inches radius, in wooden box, Set, \$
- 2228.** Card Board Railroad Curves, 50 in set, viz.: 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 10½, 11, 11½, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120 inches radius, in wooden box, Set,
- 2229.** Card Board Railroad Curves, 100 in set, viz.: 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 10½, 11, 11½, 12, 12½, 13, 13½, 14, 14½, 15, 15½, 16, 16½, 17, 17½, 18, 18½, 19, 19½, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120, 130, 140, 150, 160, 180, 200, 220, 240 inches radius, in wooden box, Set,

See Price List in back of Catalog.

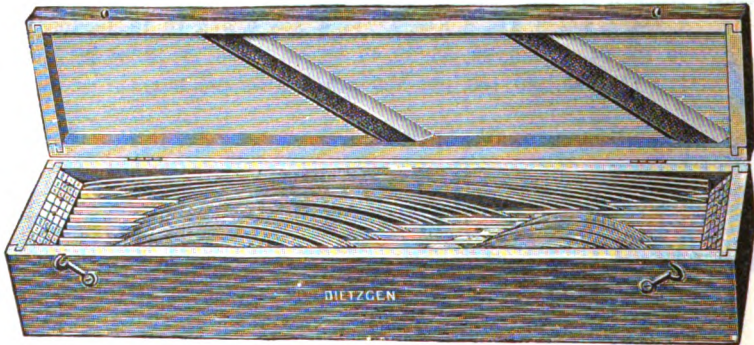
Railroad Curves

Metal



- No. 2230. Metal Railroad Curves, 10 in set, 12 to 120 in. radius, viz.: 12, 24, 36, 48, 60, 72, 84, 96, 108, 120 in., in wooden box, Set, \$
2232. Metal Railroad Curves, 17 in set, 12 to 60 in. radius, viz.: 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60 in., in wooden box, Set,
- Single Railroad Curves of Metal, Each,
- Other sets containing up to 100 Curves, furnished to order.

Transparent Ambro

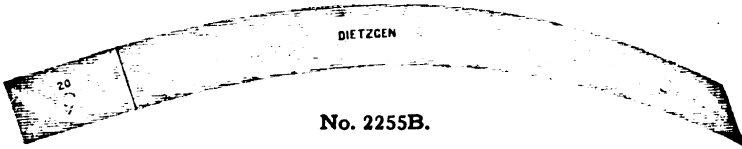


No. 2255A.

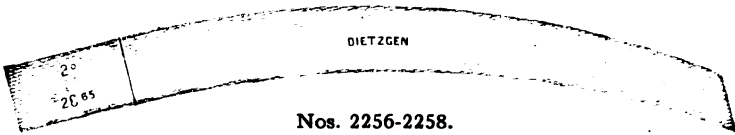
- No. 2252. Transparent Ambro Railroad Curves, highly polished, 17 in set, 12 to 60 in. radius, viz.: 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60 in., in wooden box, Set, \$
2254. Transparent Ambro Railroad Curves, highly polished, 30 in set, 1½ to 60 in. radius, viz.: 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 35, 40, 45, 50, 60 in., in wooden box with partitions, Set,
- 2255A. Transparent Ambro Railroad Curves, highly polished, 50 in set, 1½ to 120 in. radius, viz.: 1½, 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 10½, 11, 11½, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120 in., in wooden box with partitions, Set,
- Single Railroad Curves of Transparent Ambro, highly polished, Each,

See Price List in back of Catalog.

Railroad Curves Transparent Ambro with Tangent



No. 2255B. Transparent Ambro Railroad Curves, with Tangent, highly polished, 55 in set, 3 to 200 in. radius, viz.: 3, 3½, 4, 4½, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 34, 35, 36, 38, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200 in., in wooden box with partitions, Set, \$



No. 2256. Transparent Ambro Railroad Curves, with Tangent, highly polished, 41 in set, marked in degrees and inches to 100 feet scale, viz.:

0°.30' = 114.59 in.	3°.30' = 16.37 in.	6°.00' = 9.55 in.	8°.30' = 6.75 in.
1°.00' = 57.30 "	3°.45' = 15.28 "	6°.15' = 9.17 "	8°.45' = 6.55 "
1°.15' = 45.84 "	4°.00' = 14.33 "	6°.30' = 8.82 "	9°.00' = 6.37 "
1°.30' = 38.20 "	4°.15' = 13.48 "	6°.45' = 8.49 "	9°.15' = 6.20 "
1°.45' = 32.74 "	4°.30' = 12.73 "	7°.00' = 8.19 "	9°.30' = 6.04 "
2°.00' = 28.65 "	4°.45' = 12.07 "	7°.15' = 7.91 "	9°.45' = 5.88 "
2°.15' = 25.47 "	5°.00' = 11.46 "	7°.30' = 7.64 "	10°.00' = 5.74 "
2°.30' = 22.92 "	5°.15' = 10.92 "	7°.45' = 7.40 "	10°.30' = 5.48 "
2°.45' = 20.84 "	5°.30' = 10.42 "	8°.00' = 7.17 "	11°.00' = 5.22 "
3°.00' = 19.10 "	5°.45' = 9.97 "	8°.15' = 6.95 "	11°.30' = 4.99 "
3°.15' = 17.63 "			

In wooden box with partitions, Set, \$

No. 2258. Transparent Ambro Railroad Curves, with Tangent, highly polished, 55 in set, marked in degrees and inches to 100 feet scale, viz.:

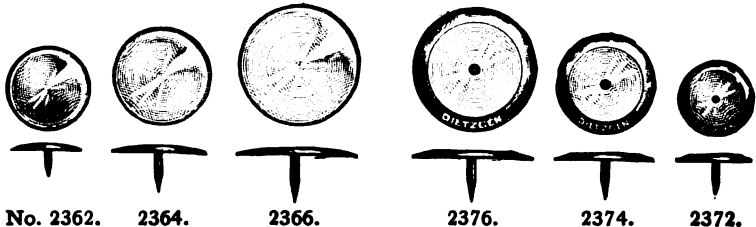
0°.15' = 229.18 in.	3°.45' = 15.28 in.	7°.15' = 7.91 in.	11°.30' = 4.99 in.
0°.30' = 114.59 "	4°.00' = 14.33 "	7°.30' = 7.64 "	12°.00' = 4.78 "
0°.45' = 76.39 "	4°.15' = 13.48 "	7°.45' = 7.40 "	12°.30' = 4.59 "
1°.00' = 57.30 "	4°.30' = 12.73 "	8°.00' = 7.17 "	13°.00' = 4.42 "
1°.15' = 45.84 "	4°.45' = 12.07 "	8°.15' = 6.95 "	13°.30' = 4.25 "
1°.30' = 38.20 "	5°.00' = 11.46 "	8°.30' = 6.75 "	14°.00' = 4.10 "
1°.45' = 32.74 "	5°.15' = 10.92 "	8°.45' = 6.55 "	14°.30' = 3.96 "
2°.00' = 28.65 "	5°.30' = 10.42 "	9°.00' = 6.37 "	15°.00' = 3.83 "
2°.15' = 25.47 "	5°.45' = 9.97 "	9°.15' = 6.20 "	16°.00' = 3.59 "
2°.30' = 22.92 "	6°.00' = 9.55 "	9°.30' = 6.04 "	17°.00' = 3.38 "
2°.45' = 20.84 "	6°.15' = 9.17 "	9°.45' = 5.88 "	18°.00' = 3.20 "
3°.00' = 19.10 "	6°.30' = 8.82 "	10°.00' = 5.74 "	19°.00' = 3.03 "
3°.15' = 17.63 "	6°.45' = 8.49 "	10°.30' = 5.48 "	20°.00' = 2.88 "
3°.30' = 16.37 "	7°.00' = 8.19 "	11°.00' = 5.22 "	

In wooden box with partitions, Set, \$
Single Railroad Curves of Transparent Ambro, with Tangent, Each,

Wooden Box with partitions illustrated under No. 2255A.

See Price List in back of Catalog.

Gem Union Thumb Tacks



The Gem Union Thumb Tacks Nos. 2362-2376 are made of carefully selected material, special attention being given to the proper design of the pins, an important feature. The form of the pins is such that they will not bend or cause disfiguring holes in the board, and while the tacks grip firmly, they can be easily inserted or removed. The Nickel silver heads, into which the pins are screwed and riveted, have firm, thin edges, thereby offering no obstruction to T Square or Triangles.

Packed one dozen on a card.

No. 2362.	Nickel Silver, Round Heads,	$\frac{3}{8}$ in. diam.,	. . . . .	Doz., \$
2364.	" " " "	$\frac{1}{2}$ " " "	. . . . .	"
2366.	" " " "	$\frac{5}{8}$ " " "	. . . . .	"
2372.	Nickel Silver, Beveled Heads,	$\frac{3}{8}$ " " "	. . . . .	"
2374.	" " " "	$\frac{1}{2}$ " " "	. . . . .	"
2376.	" " " "	$\frac{5}{8}$ " " "	. . . . .	"

Thumb Tacks with Riveted Steel Points



The Nos. 2401 to 2426 Thumb Tacks are inferior in quality to the Gem Union tacks, and while the pins are prevented from pushing through they are not screwed in.

Packed one dozen on a card.

No. 2401.	Nickel Silver, Round Heads,	$\frac{3}{8}$ in. diam.,	Gross, \$	Doz., \$
2403.	" " " "	$\frac{1}{2}$ " " "	. . . . .	"
2405.	" " " "	$\frac{5}{8}$ " " "	. . . . .	"
2422.	Brass, Round Heads,	$\frac{3}{8}$ in. diam.,	. . . . .	"
2424.	" " " "	$\frac{1}{2}$ " " "	. . . . .	"
2426.	" " " "	$\frac{5}{8}$ " " "	. . . . .	"

Simplex Brass Thumb Tacks



Packed one gross (loose) in cardboard box.

No. 2434.	Brass Round Heads,	$\frac{3}{8}$ in. diam.,	. . . . .	Box of one gross, \$
2435.	" " " "	$\frac{1}{2}$ " " "	. . . . .	" " " "
2436.	" " " "	$\frac{5}{8}$ " " "	. . . . .	" " " "

See Price List in back of Catalog.

Steel Stamped Thumb Tacks



No. 2440.



2441.



2442.

Our Steel Stamped Thumb Tacks are made of one piece of nickel-plated hard steel, and are of the best quality. They have needle-finished points, and are unequaled as a low-priced substitute for the regular thumb tacks.

Packed 100 (loose) in cardboard box.

No. 2440.	Steel Stamped, Round Heads, $\frac{5}{16}$ in. diam.,	. .	Box of 100, \$
2441.	" " " " $\frac{3}{8}$ " "	. .	" " 100,
2442.	" " " " $\frac{1}{2}$ " "	. .	" " 100,



No. 2440B.

Packed one dozen in round tin box.

No. 2440B.	Steel Stamped, Round Heads, $\frac{5}{16}$ in. diam.,	Doz. Boxes,	\$
2441B.	" " " " $\frac{3}{8}$ " "	" "	" "
2442B.	" " " " $\frac{1}{2}$ " "	" "	" "

Commercial Steel Thumb Tacks



No. 2450.



2451.



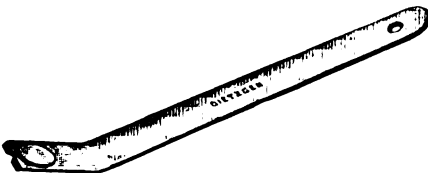
2452.

The Commercial Steel Thumb Tacks are made very strong and heavy. They are very serviceable for a low-priced article.

Packed 100 (loose) in round wooden box.

No. 2450.	Round Heads, $\frac{5}{16}$ in. diam.,	. . . . .	Box of 100, \$
2451.	" " " " $\frac{7}{16}$ " "	. . . . .	" " 100,
2452.	" " " " $\frac{9}{16}$ " "	. . . . .	" " 100,

Tack Lifter



No. 2460.

Made of metal, nickel-plated. Very convenient for pushing in or for extracting tacks from Drawing Boards, without injuring the points. The handle can be used as a paper cutter, and is also serviceable for pressing down the edges when stretching paper or for removing sheets which have been gummed to the board.

No. 2460.	Tack Lifter, nickel-plated,	Each, \$
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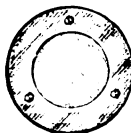
See also No. 3224, File and Tack Lifter.

See Price List in back of Catalog.

Horn Centers



No. 2465.

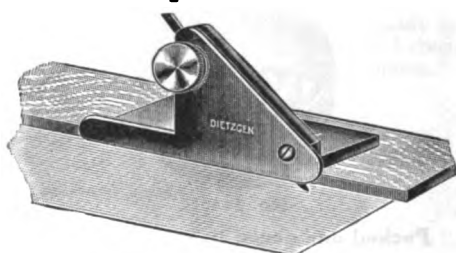


2466.



- No. 2465. Horn Center, plain, $\frac{1}{2}$ in. diam., Each, \$
 2466. " " Nickel silver rim, $\frac{3}{4}$ in. diam., "

Paper Cutter



No. 2471.

- No. 2471. Paper Cutter, nickel-plated, Each, \$

This Instrument is used for cutting drawings from the board; also for cutting any kind of paper or bristol board. It slides along a T Square or a Straight Edge without injuring the edge, and has a thumb-screw adjustment which can be set so that the knife cuts only the thickness of the paper and does not mar the board.

Paper Weights



No. 2480.



2486.

- No. 2480. Iron Paper Weight, round, with opening in center to hold ink bottle; weight, about 2 lbs., Each, \$
 2486. Lead Paper Weight, covered with leather, $4 \times 2\frac{1}{4} \times \frac{3}{4}$ in.; weight, about $2\frac{3}{4}$ lbs., Each,
 2488. Lead Paper Weight, covered with leather, $4\frac{1}{4} \times 2\frac{1}{2} \times 1$ in.; weight, about $3\frac{1}{4}$ lbs., Each,

See also Nos. 2738 and 2740, Ink Bottle Holders and Paper Weights.

See Price List in back of Catalog.

Chinese or Indian Inks

Our Own Direct Importation

Illustrations full size.



B

G

K

PX

R

No. 2600. Chinese or Indian Inks.

Each.

B.	Oval, black with Lion Head,	2 $\frac{3}{8}$ in. long, thick,	\$
C.	" " " " " "	3 $\frac{1}{4}$ " " " "	.
G.	Square, black, gilt figures,	2 $\frac{3}{4}$ " " " "	.
K.	" " Super Super,	2 $\frac{7}{8}$ " " " "	.
L.	" " " " " "	3 $\frac{5}{8}$ " " " "	.
PX.	Oblong, gilt,	3 $\frac{5}{8}$ in. long, extra fine quality,	.
R.	" black,	3 $\frac{3}{4}$ " " " " " "	.

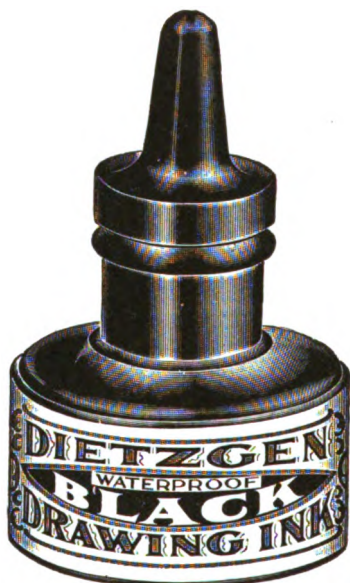
Practical Slabs for rubbing Chinese or Indian Inks uniformly and quickly listed under Nos. 3000 and 3005.

See Price List in back of Catalog.

Dietzgen Liquid Drawing Inks

For Draftsmen and Artists

Flows Freely Dries Quickly
Positively Waterproof



Full Size



Showing Original Wrapper

Dietzgen Improved Liquid Waterproof Drawing Ink is made by new processes and formulae, the result of a long series of careful experiments. It is manufactured in our own laboratories where, under expert supervision, the most delicate chemical and physical tests are made. The specific gravity, viscosity, solubility, opacity, drying speed, etc., are determined with the utmost accuracy. Before placing the Ink on the market it is properly stored for a certain period, in order that a ripening or closer union of the ingredients may take place. The Dietzgen Ink has stood the most rigid tests, and will be found to possess all the desirable features required in a reliable Ink for general drafting. It is smooth-flowing, contains no chemicals injurious to instruments, and is kept at a fixed standard of density and quality.

The **Waterproof Black Ink** is made from the highest grade of pure carbon; is of unsurpassed density, flows freely, dries quickly, and even the finest lines produced by it are absolutely opaque. It is perfectly waterproof when dry, so that color washes can be used safely over it.

The **Colored Inks** are dense, true and brilliant. They can be used for lines or washes, are waterproof when dry, and may be thinned with distilled water, or mixed with each other to produce other shades.

See Price List in back of Catalog.

Dietzgen Liquid Drawing Inks

No.	Dietzgen Waterproof Black Ink, \$	¾ oz.	4 oz.	½ Pt.	Pt.	Qt.
2681.	Dietzgen Waterproof Black					
2682.	" " Yellow					
2683.	" " Orange					
2684.	" " Scarlet					
2685.	" " Carmine					
2686.	" " Blue					
2687.	" " Green					
2688.	" " Brown					
2689.	" " Brick Red					
2690.	" " Vermilion					
2691.	" " Violet					

Empty Ink Bottles and Stoppers with Quills

No. 2692.	Empty Ink Bottles, ¾ oz.,	Doz., \$
2693.	Stoppers with Quills,	"
2694.	Empty Ink Bottles, ¾ oz., with Stoppers and Quills,	"

Blue Print and Brown Print Writing Fluids

For writing on and correcting Blue and Brown Prints.

No. 2700.	White Hyperion Blue Print Writing Fluid, 2 oz.,	Each, \$
2701.	Red Hyperion Blue Print Writing Fluid, 2 oz.,	Each,
2702.	Yellow Hyperion Blue Print Writing Fluid, 2 oz.,	Each,
2703.	White Vandyke Brown Print Writing Fluid, 2 oz.,	Each,



No. 2700.

Dietzgen Multi-Color or Hektograph Inks

No. 2715-1.	Black Hektograph Ink, ¾ oz.,	Each, \$
2715-2.	Blue " " ¾ "	"
2715-3.	Brown " " ¾ "	"
2715-4.	Green " " ¾ "	"
2715-5.	Purple " " ¾ "	"
2715-6.	Red " " ¾ "	"
2715-7.	Yellow " " ¾ "	"

As a substitute for Black Ink, the Purple is the best.

Instanto Ink Remover listed under No. 144.

See Price List in back of Catalog.

Higgins Liquid Drawing Inks



No. 2735.



2731.



2736.

No. 2730.	Higgins General Black Ink,	Each,	\$	$\frac{3}{4}$ oz.	$\frac{1}{2}$ Pt.	Pt.	Qt.
2731.	" Waterproof Black Ink,	"					
2732.	" Colored Inks, made in the following colors:	"					
	Blue,	Carmine,	Orange,	Violet,			
	Brick Red,	Green,	Scarlet,	Yellow,			
	Brown,	Indigo,	Vermilion,	White.			

When ordering No. 2732, always specify color desired.

No. 2735.	Higgins Eternal Ink,	Each,	\$	2 oz.	$\frac{1}{2}$ Pt.	Pt.	Qt.
2736.	" Engrossing Ink,	"					

Ink Bottle Tray



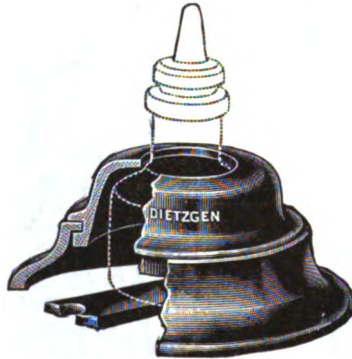
No. 2737.

No. 2737. Ink Bottle Tray, without ink; a practical and well-made tray, adapted for Dietzgen or Higgins $\frac{3}{4}$ oz. ink bottles, . . . Each, \$

Ink Bottle Holders listed on opposite page.

See Price List in back of Catalog.

Ink Bottle Holders



No. 2738.



No. 2740.



2742.

No. 2738. Iron Ink Bottle Holder and Paper Weight, coupling top, copper oxidized finish; weight about 8 oz., Each, \$

2740. Iron Ink Bottle Holder and Paper Weight, threaded top, copper oxidized finish; weight about 12 oz., Each,

The Nos. 2738 and 2740 Bottle Holders are adapted for Dietzgen or Higgins $\frac{3}{4}$ oz. ink bottles. They are not only very useful but also neat and attractive in appearance. The neck of the bottle projects, thus making it just as convenient to move, clean or fill the bottle as if it were not in the holder.

No. 2742. Clover Ink Bottle Holder, metal, for 3 bottles, Each, \$



No. 2480.

See also No. 2480, Iron Paper Weight, page 136.

See Price List in back of Catalog.

W. & N. Liquids and Preparations

**Johnston Snow White
Semple White**



No.	Description	2771.	Doz., \$
No. 2770.	Winsor & Newton Chinese White,		
2771.	“ “ Indian Ink,		“
2772.	“ “ Blue,		“
2773.	“ “ Carmine,		“
2774.	“ “ Indelible Brown Ink,		“
2775.	“ “ Prout's Brown,		“
2776.	“ “ Sepia,		“
2777.	“ “ Gold Ink,		“
2778.	“ “ Oxgall,		“
2778 1/2.	“ “ Vermilion,		“
2779A.	“ “ Chinese White in tubes, small,		“
2779B.	“ “ “ “ large,		“



No. 2779C.	2779D.	2779S.	2779W.	Doz., \$
No. 2779C.	“	“	“	“
	Winsor & Newton Albanine, a pure photographic white,			
	“ Process Black, an opaque dead black,			
	2779S. Semple White, a moist water color,			
	2779W. Johnston Snow White, for pen and brush,			

See Price List in back of Catalog.

Higgins Adhesives



No. 2787.



2790.

No.	Description	Quantity	Each, \$
2786.	Higgins Drawing Board and Library Paste,	3 oz.,	
2787.	“ “ “ “ “ “	6 “	“
2787B.	“ “ “ “ “ “	14 “	“
2788.	“ Photo Mounter,	. 3 “	“
2789.	“ “ “ . . . . .	. 6 “	“
2789B.	“ “ “	14 “	“
2790.	“ Office Paste,	. 4 “	“
2791.	“ “ “ . . . . .	. 8 “	“
2792.	“ Taurine Mucilage,	. 2 “	“
2793.	“ “ “ . . . . .	. 4 “	“
2794.	“ “ “ . . . . .	. 8 “	“

Carter Photolibrary Paste



No. 2796.

No. 2796.	Carter Photolibrary Paste, in spreader tube, 1½ oz.,	. Each, \$
2797.	“ “ “ “ “ “ 3 “	. “

Weis Brush Tube Mucilage

No. 2798.	Weis Brush Tube Mucilage, medium size,	. Each, \$
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See Price List in back of Catalog.

Winsor & Newton Water Colors



Whole Pan.



Half Pan.



Whole Tube.

Antwerp Blue.
Bistre.
Blue Black.
Brown Ochre.
Brown Pink.
Burnt Sienna.
Burnt Umber.
Charcoal Grey.
Chinese White.
Chrome Lemon.
Chrome Yellow.
Cologne Earth.
Deep Chrome.
Dragon's Blood.

Flake White.
Hooker's Green No. 1.
Hooker's Green No. 2.
Indian Red.
Ivory Black.
King's Yellow.
Lamp Black.
Light Red.
Mauve.
Naples Yellow.
Neutral Tint.
New Blue.
Olive Green.

Orange Chrome.
Payne's Grey.
Permanent Blue.
Prussian Blue.
Prussian Green.
Raw Sienna.
Raw Umber.
Roman Ochre.
Terre Verte.
Vandyke Brown.
Venetian Red.
Yellow Lake.
Yellow Ochre.

No. 2800P. Whole Pans, Doz., \$; Half Pans, Doz., \$
2800T. " Tubes (except Chinese White, see Nos. 2779A-B), Doz., \$

Alizarin Carmine.
Alizarin Crimson.*
Alizarin Green.*
Alizarin Orange.*
Alizarin Scarlet.
Alizarin Yellow.*

Brown Madder.
Carmine Lake.
Crimson Lake.
Emerald Green.
Gamboge.
Indigo.

Italian Pink.
Leitch's Blue.
Mars Yellow.
Neutral Orange.
Purple Lake.
Roman Sepia.

Ruben's Madder.
Sap Green.
Scarlet Lake.
Sepia.
Warm Sepia.

No. 2801P. Whole Pans, Doz., \$; Half Pans, Doz., \$
2801T. " Tubes, Doz., \$

Cadmium Orange.
Cadmium Yellow,
Deep.
Cadmium Yellow,
Extra Pale.
Cadmium Yellow,
Pale.
Cerulean Blue.

Cobalt Blue.
Cobalt Green.
Emerald Oxide of
Chromium.
French Blue.
Indian Purple.
Indian Yellow.
Intense Blue.*

Lemon Yellow.
Mars Orange.
Orange Vermilion.
Oxide of Chromium.
Oxide of Chromium,
Transparent.
Permanent Mauve.*

Permanent Violet.*
Pure Scarlet.*
Scarlet Vermilion.
Ultramarine Ash-
Grey.
Vermilion.
Viridian.

No. 2802P. Whole Pans, Doz., \$; Half Pans, Doz., \$
2802T. " Tubes, Doz., \$

Aureolin.
Aurora Yellow.
Burnt Carmine.
Carmine.

Field's Orange
Vermilion.
Gallstone.
Madder Carmine.
Madder Lake.

Pink Madder.
Primrose Aureolin.
Purple Madder.*
Scarlet Madder.

Rose Doree.
Rose Madder.
Violet Carmine.
Yellow Carmine.

No. 2803P. Whole Pans, Doz., \$; Half Pans, Doz., \$
2803T. " Tubes, Doz., \$

No. 2804P. Whole Pans, Doz., \$; Half Pans, Doz., \$
2804T. " Tubes, Doz., \$

Colors marked thus* are not prepared in Tubes.
When ordering, specify catalog series number and color desired.
See Price List in back of Catalog.

Bourgeois French Water Colors



These Jars contain more than double the quantity sold in whole pans of other manufacturers at about the same price. The colors are in a moist state.

Brown Ochre.	Indian Red.	Raw Sienna.
Brown Pink.	Italian Pink.	Raw Umber.
Burnt Sienna.	Ivory Black.	Terre Verte.
Burnt Umber.	Lamp Black.	Vandyke Brown.
Dragon's Blood.	Light Red.	Venetian Red.
Gamboge.	Naples Yellow.	Yellow Ochre.
Green Lake.	Olive Green.	

No. 2835. Bourgeois Colors, in Glass Jars, Doz., \$

Brilliant Yellow.	Emerald Green.	Payne's Grey.
Celestial Blue.	Hooker's Green.	Sap Green.
Chinese White.	Indigo.	Violet Light, Extra.
Crimson Lake.	Neutral Tint.	Violet Dark, Extra.
Dark Purple.		

No. 2836. Bourgeois Colors, in Glass Jars, Doz., \$

Antwerp Blue.	Chrome Yellow, Dark.	Rose Carthame, Light.
Brown Madder.	Cypress Green, Light.	Rose Carthame, Dark.
Cerulean Blue.	Cypress Green, Dark.	Scarlet Lake.
Chrome Green, Light.	Geranium Rose.	Sepia.
Chrome Green, Medium.	Lemon Yellow.	Ultramarine Blue, Light.
Chrome Green, Dark.	Prussian Blue.	Ultramarine Blue, Dark.
Chrome Yellow, Light.	Prussian Green.	Warm Sepia.

No. 2837. Bourgeois Colors, in Glass Jars, Doz., \$

Cadmium Deep.	Cobalt Blue.	Scarlet Vermilion.
Cadmium Yellow.	Madder Lake, Light.	Vermilion, Light.
Cadmium Lemon Yellow.	Madder Lake, Dark.	Vermilion, Dark.

No. 2838. Bourgeois Colors, in Glass Jars, Doz., \$

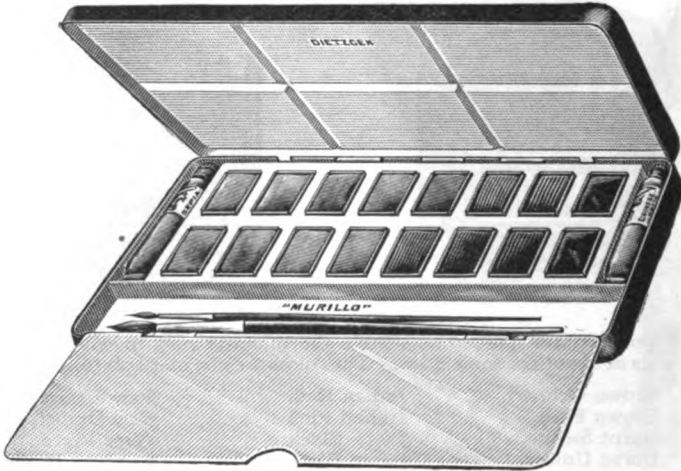
Carmine.	Indian Yellow.
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No. 2839. Bourgeois Colors, in Glass Jars, Doz., \$

When ordering, specify catalog series number and color desired.

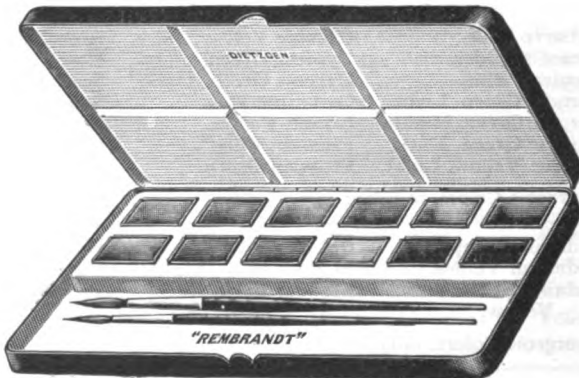
See Price List in back of Catalog.

Water Color Boxes



No. 2840.

- No. 2840.** Murillo Water Color Box, large, japanned tin box, $7\frac{1}{2} \times 3\frac{1}{4}$ in., with inside lid, 16 moist colors in metal pans, 1 tube each Chinese White and Sepia, 2 brushes, Dozen, \$
- 2841.** Murillo Water Color Box, small, japanned tin box, $6\frac{1}{2} \times 3\frac{1}{4}$ in., 12 moist colors in metal pans, 1 tube each Chinese White and Sepia, 2 brushes, Dozen, \$



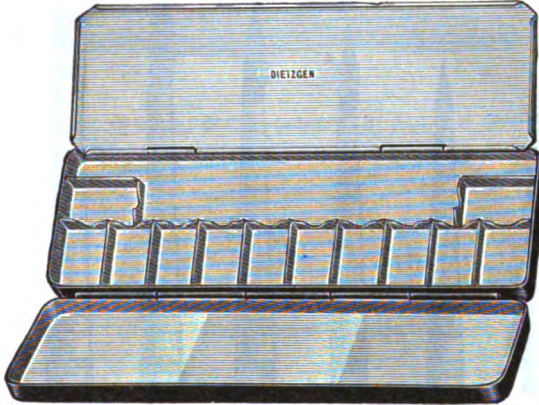
No. 2842.

- No. 2842.** Rembrandt Water Color Box, japanned tin box, $6\frac{1}{4} \times 2\frac{3}{4}$ in., 12 moist colors in metal pans, 2 brushes, Dozen, \$

See Price List in back of Catalog.

Empty Japanned Tin Boxes

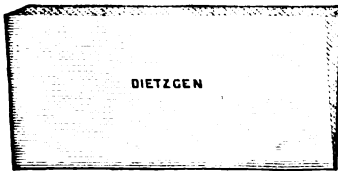
For Moist Colors in Pans



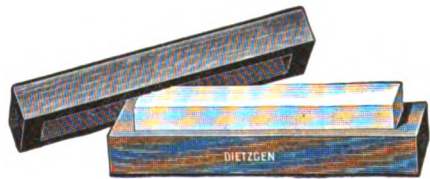
No. 2854.

No.	For	6 Whole or 12 Half Pans,	. . . . .	Each, \$
2851.	"	8 " " 16 " "	. . . . .	"
2853.	"	10 " " 20 " "	. . . . .	"
2854.	"	12 " " 24 " "	. . . . .	"
2855.	"	16 " " 32 " "	. . . . .	"
2857.	"	18 " " 36 " "	. . . . .	"
2858.	"	24 " " 48 " "	. . . . .	"

Arkansas Oil Stones



No. 2890.



2895.

No.	Arkansas Oil Stone, wedge shape slip,	. . . . .	Each, \$
2891.	" " " " about $1\frac{1}{4} \times 3$ in.,	. . . . .	"
2892.	" " " " " $1\frac{1}{4} \times 4\frac{5}{8}$ "	. . . . .	"
2895.	" " " in case, with cover, 3 in.,	. . . . .	"
2896.	" " " " " " 5 "	. . . . .	"

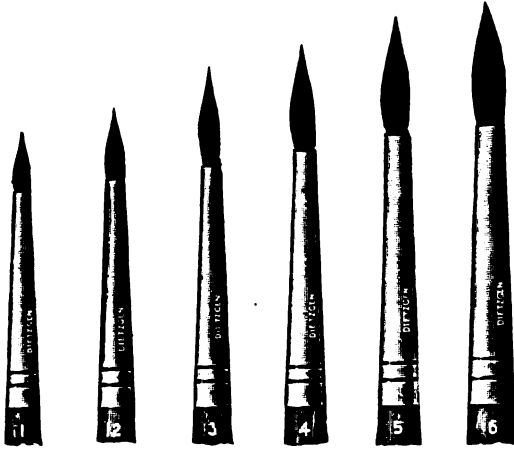
Brushes listed on pages 148-149.

Water Colors in Pans listed under Nos. 2800P-2804P.

See Price List in back of Catalog.

**Camel Hair Brushes
Extra Fine Quality**

In
nickeled
ferrules,
natural
polished
cedar
handles.

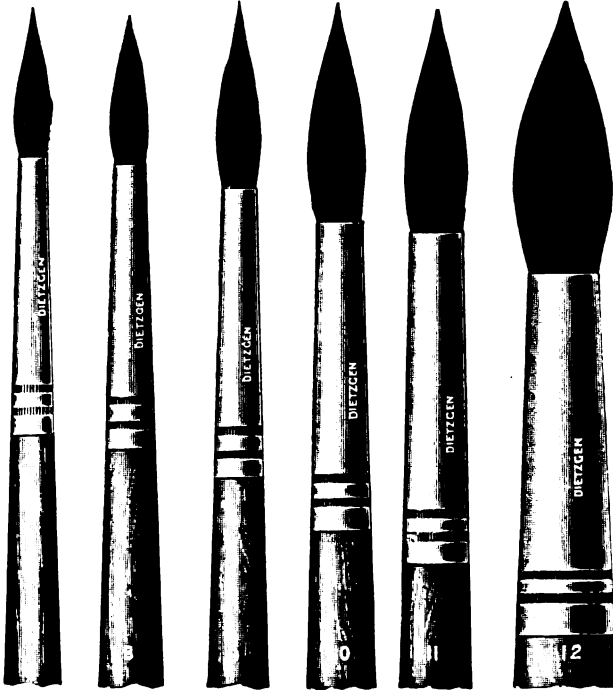


Illustrations
full size.

No. 2920. Camel Hair Brushes,

Nos. 1 2 3 4 5 6
Each, \$

In
nickeled
ferrules,
natural
polished
cedar
handles.



Illustrations
full size.

No. 2920. Camel Hair Brushes,

Nos. 7 8 9 10 11 12
Each, \$

See Price List in back of Catalog.

Double-Pointed Brushes

Camel Hair. Extra Fine Quality

Illustration $\frac{1}{2}$ size.



No. 2930-6.

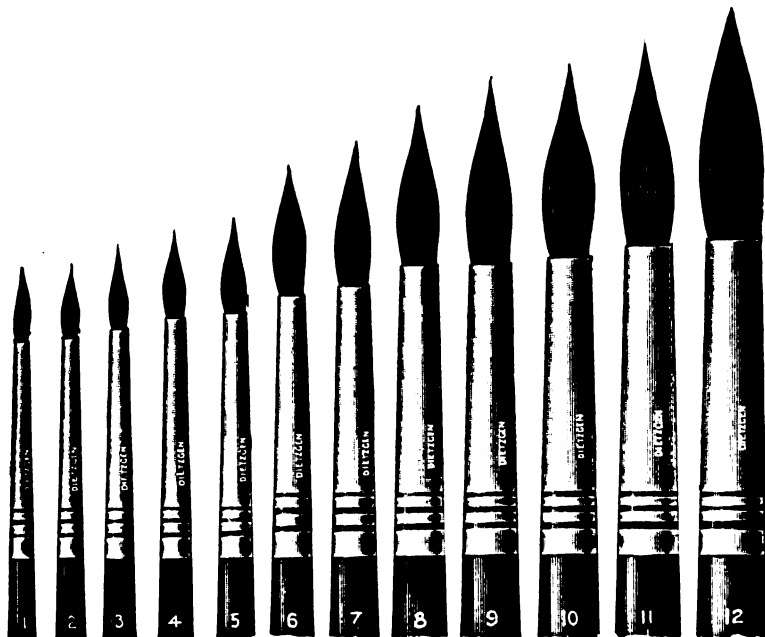
No. 2930. Camel Hair Brushes, double-pointed, in nickeled ferrules, natural polished cedar handles.

Nos.	. . . . .	1	2	3	4	5	6
Each,	. . . . .	\$				

Red Sable Brushes

Extra Fine Quality

Illustrations full size.



No. 2940.

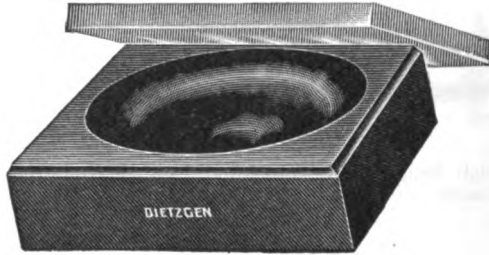
No. 2940. Red Sable Brushes, made of pure red sable hair in Albata ferrules, black polished cedar handles.

Nos.	. . . . .	1	2	3	4	5	6	7	8	9	10	11	12
Each,	. . . . .	\$										

We do not list Black Sable Brushes as they are more expensive and their points are not as firm as those of the Red Sable Brushes.

See Price List in back of Catalog.

Slate Ink Slabs



No. 3000.

The No. 3000 Slate Ink Slab is unsurpassed for rubbing Chinese and Japanese inks uniformly and quickly. The heavy plate glass cover fits air-tight, and has ground edges. The deep well in the center holds a quantity of ink that enables a pen to be filled conveniently and rapidly.

- No. 3000. Slate Ink Slab, 3½ in. square, with improved well, . . . Each, \$
 3005. Like No. 3000, but light plate glass cover with edges not ground, "

Nests of Cabinet Saucers



No. 3010.

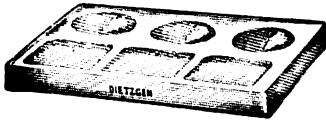
No. 3010.	Nest of Cabinet Saucers,	6 in set,	2⅝ in.,	. . . . .	Each, \$
3011.	" "	" 6	" 2⅝	"	"
3012.	" "	" 6	" 3¼	"	"
3014.	" "	" deep, 4 in set,	2⅝ in.,	"	"
3015.	" "	" 4	" 3¼	"	"
3016.	" "	" 4	" 3¼	"	"

A "Nest of 6" consists of 5 saucers and cover; a "Nest of 4" of 3 saucers and cover.

Chinese or Indian Inks listed on page 137.

See Price List in back of Catalog.

Ink and Color Slabs



No. 3025.



3032.

- | | | | |
|-----------|------------------------------------|---|----------|
| No. 3025. | Color Slabs, 3 wells and 3 slopes, | $2\frac{1}{2} \times 4$ in., | Each, \$ |
| 3026. | " " 5 " " 5 " | $4 \times 7\frac{1}{2}$ " | " |
| 3032. | Sloping Tiles, 5 divisions, | $3\frac{1}{8} \times 7\frac{3}{4}$ in., | " |
| 3033. | " " 6 " " 6 " | $3\frac{1}{8} \times 7\frac{3}{4}$ " | " |
| 3034. | " " 8 " " 6 " | $6 \times 7\frac{5}{8}$ " | " |

Color Cups



No. 3040.

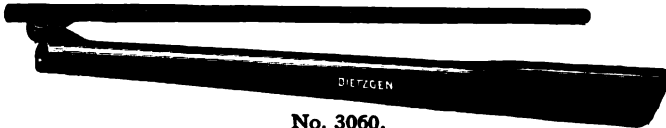
Artists Water Glass



3050.

- | | | | | |
|-----------|----------------------|--|----------------|--------------------------|
| No. 3040. | China Color Cups, | | $2\frac{1}{2}$ | 3 in. diam. |
| | Each, | | \$ | |
| 3050. | Artists Water Glass, | | | $2\frac{3}{8}$ in. diam. |
| | Each, | | | \$ |

Atomizer



No. 3060.

- | | | |
|-----------|----------------------------------|----------|
| No. 3060. | Atomizer, japanned tin, folding, | Each, \$ |
|-----------|----------------------------------|----------|

Fixatif

- | | | |
|-----------|--|----------|
| No. 3062. | Colorless Fixatif, for Crayon or Charcoal, 2 oz. bottle, | Each, \$ |
| 3063. | Colorless Fixatif, for Crayon or Charcoal, pint bottle, | " |



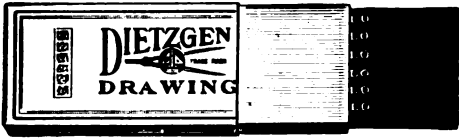
No. 3062.

Charcoal

- | | | |
|-----------|--|-----------------|
| No. 3070. | Dietzgen Raven Charcoal, 50 sticks in box, | Dozen boxes, \$ |
| 3072. | Venetian Charcoal, 50 sticks in box, | " " |

See Price List in back of Catalog.

Pencils



No. 3091.

Dietzgen Excello Pencils are well adapted for exacting technical work, as the leads are exceptionally uniform and the specified grading maintained throughout their entire length. Only the purest graphite is used, the pencils being manufactured by a special process which insures lead perfection and remarkable lasting quality.

No. 3091. Excello Pencils, Hexagon, Yellow Polish, Gold Stamped. In degrees as follows: 2B, B, HB, F, H, 2H, 3H, 4H, 6H, Doz., \$



No. 3093.

No. 3093. Eldorado Pencils, Hexagon, Yellow Polish, Gold Stamped. In degrees as follows: 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H, Doz., \$



No. 3096.

No. 3096. Vandyke Pencils, Hexagon, Yellow Polish, Gold Stamped. In degrees as follows: 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, Doz., \$



No. 3102.

No. 3102. Venus Pencils, Hexagon, Dark Green Polish, Gold Stamped. In degrees as follows: 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H, Doz., \$



No. 3112.

No. 3112. Venus Copying Pencils, Violet, Round, soft lead, Doz., \$
 3113. " " " " " hard, "

See Price List in back of Catalog.



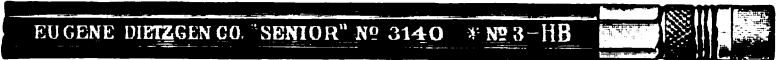
Pencils



No. 3138.

Dietzgen Hyperion Pencils are of a superior quality, correctly and uniformly graded, contain no grit and will hold their points.

- No. 3138. Dietzgen Hyperion Pencils, Hexagon, Yellow Polish, Silver Stamped.
In degrees as follows: 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, Doz., \$



No. 3140.

- No. 3140. Dietzgen "Senior" Pencils, Hexagon, Yellow Polish, Silver Stamped, with gilt metal ferrule and red rubber tip. Superior quality. In three degrees as follows: Nos. 2=B, 3=HB, 4=2H, . . . Doz., \$



No. 3142.

- No. 3142. Dietzgen "Junior" Pencils, Round, rubber tipped. Good quality. In one degree only, No. 2, Doz., \$



No. 3144.

- No. 3144. Dietzgen Detail Pencils, Hexagon. Good quality. In five degrees as follows: Nos. 1, 2, 3, 4, 5, Doz., \$



No. 3146.

- No. 3146. Dixon Cabinet Pencils, Hexagon, rubber tipped. In two degrees as follows: Nos. 2 and 3, Doz., \$



No. 3148.

- No. 3148. E. Faber Mongol Pencils, Hexagon, rubber tipped. In four degrees as follows: Nos. 1, 2, 3, 4, Doz., \$

See Price List in back of Catalog.



Paper Pencils



No. 3151.

- No. 3151. Blaisdell Paper Pencils, rubber tip. In one degree, No. 2, Doz., \$
 3152. " " " plain, " " " 2, " " \$

Artist Pencils and Leads



No. 3154.

- No. 3154. Venus Artist Pencils, metal tip, single pointed, in degrees 5B to 9H, with lead, Each, \$



No. 3156.

- No. 3156. Venus Leads for Artist Pencils, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H, Box of 6 Leads, \$

Colored Pencils



No. 3171.

- No. 3171. Dietzgen Finest White Pencils, Round, White Polished, Gold Stamped. Extra quality. Unequaled for making alterations on Blue Prints, Doz., \$
 3172. Dietzgen Finest Red Pencils, Round. Extra quality, " "
 3173. " Finest Blue " " " " "
 3174. " Finest Yellow " " " " "
 3175. " Finest Green " " " " "



No. 3176.

- No. 3176. Eagle Combination Red and Blue Pencils, Round, Doz., \$

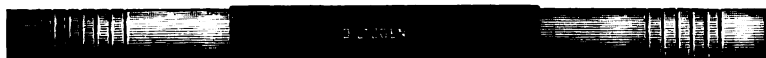
Colored Pencil Crayons listed on page 159.

See Price List in back of Catalog.

Pencil Holders



No. 3192.



No. 3194.

No. 3192.	Dietzgen Pencil Holder, single end,	. . . . .	Each, \$
3194.	“ “ “ double “	. . . . .	“



No. 3196.

No. 3196. E. Faber Pencil Holder, single end, slotted, with slide ring, Each, \$

Pencil Point Protectors



No. 3199.



No. 3201.

No. 3199.	Pencil Point Protector, metal, round,	. . . . .	Each, \$
3201.	“ “ “ “ “ with rubber,	. . . . .	“

Rubber Pencil Tips



No. 3203.

No. 3203. Rubber Pencil Tips, wedge-shaped, red, Doz., \$

See Price List in back of Catalog.

Pencil Pointers



No. 3208.

- No. 3208. Improved Pencil Pointer and Eraser Cleaner, with handle, emery paper pad $1\frac{1}{4} \times 3\frac{1}{4}$ in., 12 sheets, Each, \$
 3208P. Extra Pads, emery paper, for No. 3208, " "

This Pencil Pointer is a combination article. The pencil is pointed on the emery paper pad and the point smoothed by drawing through the velvet-lined slots shown in illustration. Slots on back are for cleaning rubber erasers rapidly and effectively. The emery pad is removable, and a new pad can be quickly inserted.



Nos. 3212 and 3216.



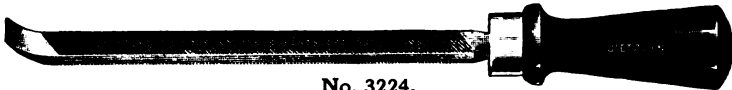
3213 and 3220.

Sand Paper

- No. 3212. Pencil Pointer, $1\frac{1}{4} \times 4$ in., 12 sheets, Each, \$
 3213. " " " $1\frac{1}{4} \times 4$ " 12 " with handle, " "

Emery Paper

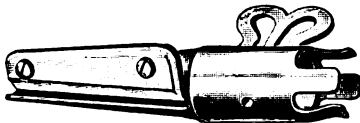
3216. Pencil Pointer, $1\frac{1}{4} \times 4$ in., 12 sheets, Each, \$
 3217. " " " $2\frac{1}{2} \times 4$ " 12 " " " " " "
 3220. " " " $1\frac{1}{4} \times 4$ " 12 " with handle, " "
 3221. " " " $2\frac{1}{2} \times 4$ " 12 " " " " " "



No. 3224.

- No. 3224. Pencil Pointer File and Tack Lifter, $6\frac{1}{2}$ in., Each, \$

Pencil Sharpeners



No. 3230.

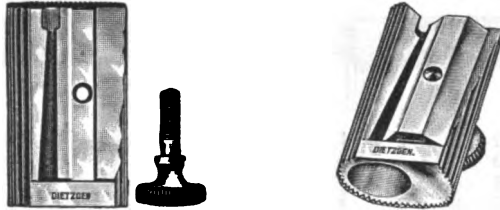


3233.

- No. 3230. Student Pencil Sharpener, removable steel blade, Each, \$
 3233. Spiro Pencil Sharpener, circular blade, ten cutting edges, "
 3233B. Extra Blades for No. 3233, " "

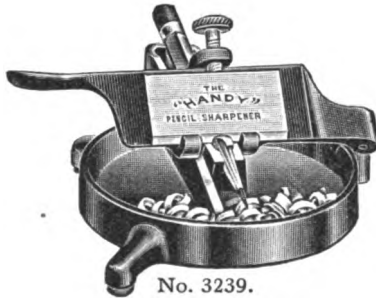
See Price List in back of Catalog.

Pencil Sharpeners



No. 3236.

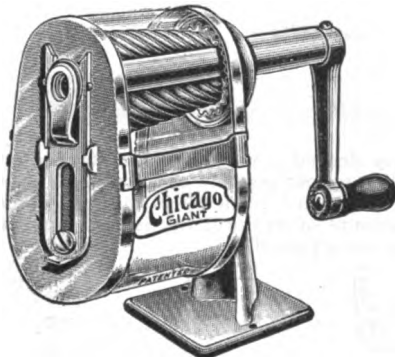
- No. 3236.** Simplicity Pencil Sharpener, double edge reversible blade, held in place by thumb screw, Each, \$
3236B. Extra Blades for No. 3236, "



No. 3239.

- No. 3239.** Handy Pencil Sharpener, tool steel blade, Each, \$
3239B. Extra Blades for No. 3239, "

This Sharpener is very easy to operate. Blade can be shifted, and thus used nearly its entire length, when it can be removed and sharpened. The base, a receptacle for chips, rests on rubber tips and will not mar the desk.



No. 3242.

- No. 3242.** Chicago Giant Pencil Sharpener, twin milling cutters, Each, \$

- 3242C.** Extra Twin Milling Cutters for No. 3242, . . Pair,

The Chicago Giant Pencil Sharpener is reasonable in price and very practical, sharpening every pencil and crayon from smallest to largest. It is the ideal Sharpener for general use. Automatically stops cutting when point is produced. Will not break leads. The shaving receptacle, of highly polished celluloid, metal trimmed, can not fall off as it locks securely, although it can be quickly removed when desired.

Clamp for fastening No. 3242 to table listed under No. 3249.

See Price List in back of Catalog.

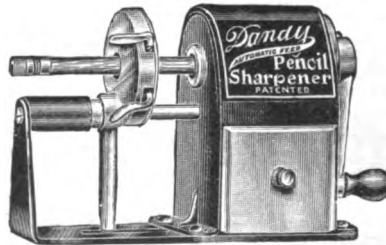
Pencil Sharpeners



No. 3245.

No. 3245. Dexter Pencil Sharpener,	Each, \$
3245C. Extra Twin Milling Cutters for No. 3245,	Pair,
3245D. Draftsmens Special " " 3245,	"

The Dexter Pencil Sharpener is of excellent workmanship and finish. Sharpens both pencils and crayons, and prevents waste as the cutting stops when proper point is obtained. Produces any desired point from blunt to fine. Automatically lubricates every working part. The shaving receptacle, of highly polished celluloid, metal trimmed, locks securely and is easily removed.



No. 3248.

No. 3248. Dandy Pencil Sharpener,	Each, \$
3248C. Extra Twin Milling Cutters for No. 3248,	Pair,
3248D. Draftsmens Special " " 3248,	"

The Dandy Pencil Sharpener produces any desired point from blunt to fine on both pencils and crayons. It stops cutting when proper point is obtained, and as it feeds automatically perfect pencil pointing and pencil economy is insured. This Sharpener is of all steel construction, and on account of its durability is very popular for use in schools. Workmanship and finish are unsurpassed.



No. 3249.

No. 3249. Clamp, for fastening Sharpeners Nos. 3242, 3245 and 3248 to table,	Each, \$
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See Price List in back of Catalog.



Dixon Crayons



No. 3266.

- | | | |
|-----------------|-----------------|------------------|
| 1. Pink. | 6. Blue. | 11. Green. |
| 2. Red. | 7. Light Blue. | 12. Olive Green. |
| 3. Carmine Red. | 8. Indigo Blue. | 13. Brown. |
| 4. Lake Red. | 9. Yellow. | 14. Sepia. |
| 5. Terra Cotta. | 10. Orange. | 15. Violet. |

No. 3266. Dixon Best Colored Pencil Crayons, Doz., \$



No. 3272C.

- | | | | | | | |
|------------|---------------------------|--------|--------|---------|-----------|----------|
| No. 3272A. | Dixon Best Solid Crayons, | Black, | round, | 7 in., | | Doz., \$ |
| 3272B. | " | " | " | Red, | " 7 " | " |
| 3272C. | " | " | " | Blue, | " 7 " | " |
| 3272D. | " | " | " | Yellow, | " 7 " | " |
| 3272E. | " | " | " | Green, | " 7 " | " |



No. 3274.

No. 3274. Dixon Solid Crayon Holder, nickel-plated, 6½ in., for Crayons Nos. 3272A-3272E, Doz., \$

Blaisdell Paper Crayons



No. 3277A.

- | | | | | |
|------------|--------------------------|--------|-----------|----------|
| No. 3277A. | Blaisdell Paper Crayons, | Black, | | Doz., \$ |
| 3277B. | " | " | Red, | " |
| 3277C. | " | " | Blue, | " |
| 3277D. | " | " | Yellow, | " |
| 3277E. | " | " | Green, | " |
| 3277F. | " | " | White, | " |
| 3277H. | " | " | Brown, | " |

Lumber Crayons listed on next page.

Colored Pencils listed under Nos. 3171-3176.

See Price List in back of Catalog.



Dietzgen Union Lumber Crayons

The Dietzgen Union Lumber Crayons are manufactured specially for the use of Surveyors and Engineers for making survey marks on wood, stone, metal, etc. Record marks made with these crayons will, under all weather conditions, outlast those made with any other crayons.



No. 3282C.

No. 3282A.	Union Lumber Crayons,	Black,	hexagon,	5 1/2 × 1/2 in.,	Doz.,	\$
3282B.	"	"	"	Red, "	5 1/2 × 1/2 "	"
3282C.	"	"	"	Blue, "	5 1/2 × 1/2 "	"
3282D.	"	"	"	Yellow, "	5 1/2 × 1/2 "	"
3282E.	"	"	"	Green, "	5 1/2 × 1/2 "	"
3282H.	"	"	"	Brown, "	5 1/2 × 1/2 "	"

Dixon Lumber Crayons



No. 3284A.

No. 3284A.	Dixon Lumber Crayons,	Black,	hexagon,	extra soft,	Doz.,	\$
3284B.	"	"	"	Red, " " "	"	"
3284C.	"	"	"	Blue, " " "	"	"
3284D.	"	"	"	Yellow, " " "	"	"
3284E.	"	"	"	Green, " " "	"	"
3284F.	"	"	"	White, " " "	"	"
3284G.	"	"	"	Terra Cotta, " " "	"	"

Metal Workers Crayon

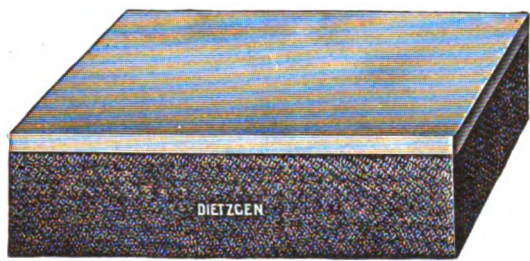


No. 3288.

No. 3288.	Metal Workers Crayon, 5 in.,	Doz.,	\$
-----------	------------------------------	-------	----

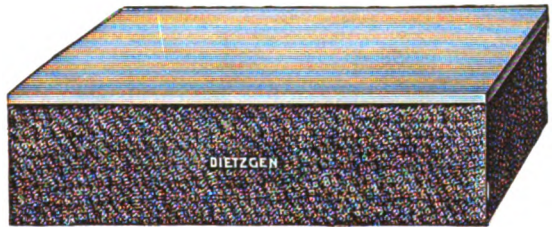
See Price List in back of Catalog.

Sponge Rubber Art Gum



No. 3321.

No. 3321. Sponge Rubber, medium, rubber back, $2\frac{1}{2} \times 1\frac{3}{4} \times \frac{5}{8}$ in., . . . Each, \$



No. 3322.

No. 3321A. Sponge Rubber, $1 \times 1 \times 1$ in., Each, \$
3321B. " " $2 \times 2 \times 1$ " " "
3322. " " $4 \times 2 \times 1$ " " "

The Nos. 3321 to 3322 Sponge Rubbers are specially adapted for cleaning drawings, etc., without disturbing drawn lines or figures or the surface of the paper.



No. 3324B.

For cleaning engravings, drawings, paintings, books and papers. Is soft, friable, and entirely free of grit. Wears away, but does not mar or scratch the surface on which it is used.

No. 3324A. Art Gum, $1\frac{1}{8} \times 1\frac{1}{8} \times 1\frac{1}{8}$ in., Each, \$
3324B. " " $2 \times 1 \times 1$ " " "
3324C. " " $2\frac{1}{4} \times 1\frac{1}{8} \times 1\frac{1}{8}$ " " "
3324D. " " $3 \times 2 \times 1$ " " "
3324E. " " $3 \times 3 \times 2$ " " "

See Price List in back of Catalog.

Rubber Pencil Erasers



No. 3332.

No. 3332. Viridian Eraser, green, oblong, beveled, 3 sizes.

Pieces to box,	48	24	12
Box,	\$		
Each,			

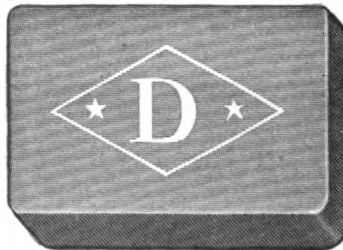


No. 3333.

No. 3333. Maroon Eraser, red, oblong, beveled, 3 sizes.

Pieces to box,	48	24	12
Box,	\$		
Each,			

The Nos. 3332 and 3333 Erasers are made of the finest quality erasive rubber. They are soft, flexible, and erase rapidly. Especially valuable for removing ink lines from Tracing Cloth, without injuring the surface to the slightest degree.



No. 3335.

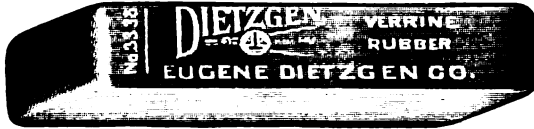
No. 3335. Dietzgen Flexible Eraser, gray, flat, 6 sizes.

3336.	pink, " 6 "						
Pieces to box,	40	30	20	12	8	4	
Box,	\$						
Each,							

The Nos. 3335 and 3336 Erasers are unequalled for erasing on Tracing Papers or other delicate stock, as their soft texture absolutely prevents injury to the surface. They are of excellent quality and erase pencil lines rapidly.

See Price List in back of Catalog.

Rubber Pencil Erasers



No. 3338.

No. 3338. Dietzgen Verrine Eraser, green, oblong, beveled, . . . Doz., \$



No. 3339.

No. 3339. Dietzgen Rubric Eraser, red, oblong, beveled, . . . Doz., \$



No. 3341B.

No. 3341B. E. Faber Emerald Eraser, medium, . . . Doz., \$
 3341C. " " " large, . . . "



No. 3343B.

No. 3343B. E. Faber Ruby Eraser, medium, . . . Doz., \$
 3343C. " " " large, . . . "



No. 3345.

No. 3344. E. Faber Kneaded Rubber, small, Box of 36, \$ Each, \$
 3345. " " " large, " " 12, "

See Price List in back of Catalog.

Rubber Ink Erasers



No. 3352.

No. 3352. Dietzgen Circular Eraser, Doz., \$



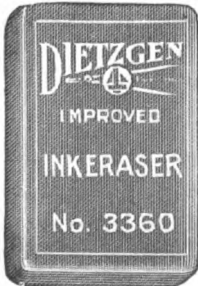
No. 3355.

No. 3355. Dietzgen Typewriter Eraser, small, Doz., \$
 3356. " " " large, "



No. 3359.

No. 3359. Dietzgen Ink and Pencil Eraser, Doz., \$



No. 3360.

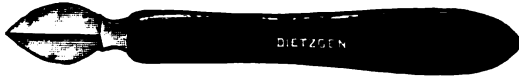


3368.

No. 3360. Dietzgen Ink Eraser, small, Box of 50, \$ Each, \$
 3361. " " " large, " " 25, "
 3362. " " " extra large, " " 12, "
 3368. E. Faber Vandyke Ink Eraser, Doz., \$

See Price List in back of Catalog.

Steel Erasers



No. 3369.

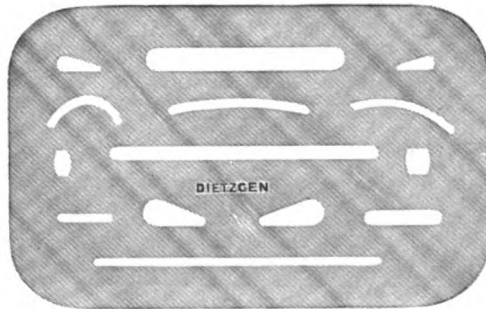
- No. 3369. Steel Eraser, coco handle, Each, \$
 3372. Like No. 3369, but white bone handle, "



No. 3373

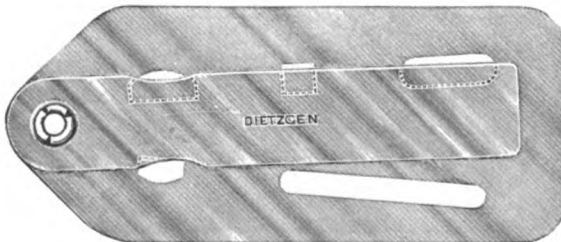
- No. 3373. Steel Eraser, coco handle, Each, \$
 3374. Like No. 3373, but white bone handle, "

Erasing Shields



No. 3378 $\frac{1}{2}$.

- No. 3378 $\frac{1}{2}$. Nickel Silver, highly polished, 2 $\frac{3}{8}$ × 3 $\frac{3}{4}$ in., 14 openings, . Each, \$



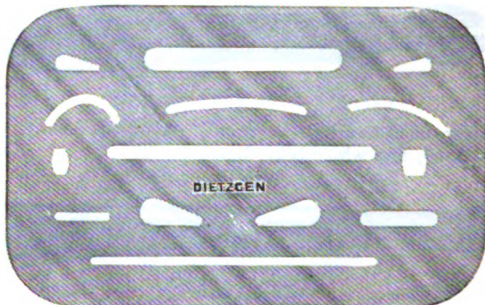
No. 3379.

- No. 3379. Nickel Silver, highly polished, 1 $\frac{7}{8}$ × 4 $\frac{1}{2}$ in., 5 openings, . Each, \$

By moving the adjustable arm over any opening in the shield part, an aperture of any desired size may be obtained, so that a line closely surrounded by others may be removed, neatly and quickly, without affecting the adjacent lines.

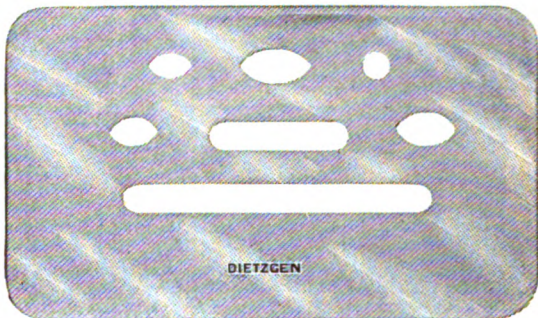
See Price List in back of Catalog.

Erasing Shields



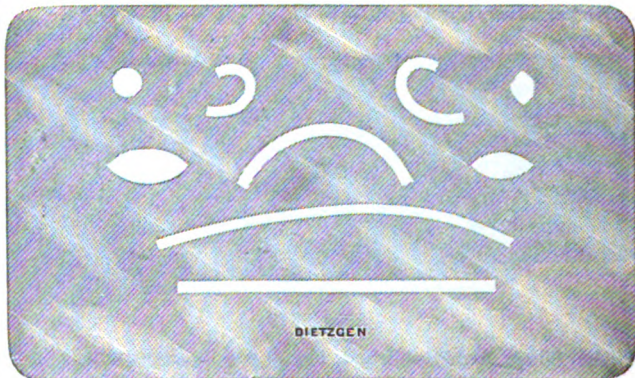
No. 3380.

No. 3380. Safety Razor Steel, highest grade, $2\frac{3}{8} \times 3\frac{3}{4}$ in., 14 openings, Each, \$
 This Shield is very thin and durable. The material used insures exceptional service.



No. 3381.

No. 3381. Transparent Ambro, $2\frac{1}{2} \times 4\frac{1}{4}$ in., 7 openings, Each, \$



No. 3383.

No. 3383. Transparent Ambro, 3×5 in., 9 openings, Each, \$

See Price List in back of Catalog.

Dietzgen Steel Pens

Dietzgen Drawing and Lettering Pens No. 3440 and Crow Quill Pens No. 3442 are designed specially for drawing and lettering on drawing paper. For this work they will be found superior to other makes, as they possess great elasticity, have longer nibs and not too sharp points, permitting rapid work without scratching or catching on the grain of the paper.

The Lithographic Pens No. 3444 have shorter, and consequently firmer, nibs, with extra fine points, and are therefore specially adapted for drawing and lettering on lithographic stones.



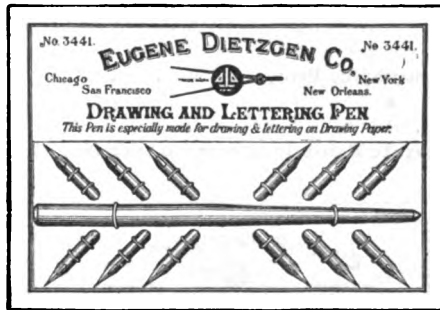
No. 3440.



3442.



3444.



No 3441.

No. 3440. Dietzgen Drawing and Lettering Pens, Box of 12, \$
 3441. " " " " " Card of 12 with holder,

Separate Penholder listed under No. 3468.



No. 3443.

No. 3442. Dietzgen Crow Quill Pens, Box of 12, \$
 3443. " " " " " Card of 12 with holder,

Separate Penholder listed under No. 3470.

See Price List in back of Catalog.

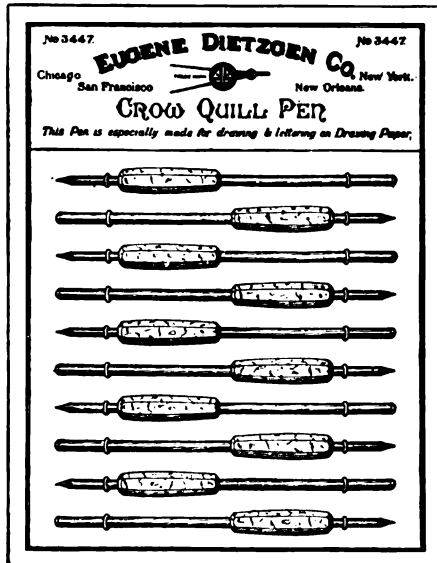
Dietzgen Steel Pens



No. 3445.

No. 3444. Dietzgen Lithographic Pens, Box of 12, \$
 3445. " " " Card of 12 with holder,

Separate Penholder listed under No. 3468.



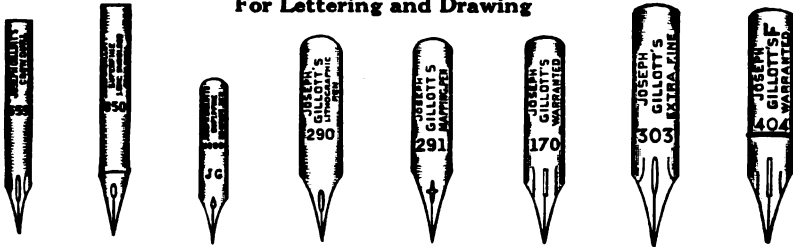
No. 3447.

No. 3447. Dietzgen Crow Quill Pens No. 3442, with improved holder having
 cork finger piece, Card of 10, \$; Each, \$

See Price List in back of Catalog.

Steel Pens

For Lettering and Drawing



- | No. | | Gross. | Doz. |
|--|---|--------|------|
| No. 3450. | Gillott Crow Quill Pens (659), doz. on card with holder, \$ | | |
| 3451. | " " " " (850), long shoulder, doz. on card with holder, | | |
| Separate Penholder listed under No. 3470. | | | |
| 3452. | Gillott Drawing Pens (1000), superfine, doz. on card with holder, | | |
| Separate Penholder listed under No. 3468. | | | |
| 3453. | Gillott Lithographic Pens (290), doz. on card with holder, | | |
| 3453½. | " " " (290), loose, | | |
| 3454. | Mapping " (291), doz. on card with holder, | | |
| 3454½. | " " " (291), loose, | | |
| 3455. | " " " (170), " | | |
| 3456. | " " " (303), " | | |
| 3457. | " " " (404), " | | |
| Separate Penholders listed under Nos. 3472-3475. | | | |
| 3460. | French Crow Quill Pens, doz. on card with holder to each pen, | | |

Wooden Penholders

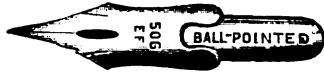
- No. 3468. Thin, 5 in., black finish, for Nos. 3440, 3444, 3452, . . . Each, \$
- No. 3470. Thick, 5½ in., natural finish, for Nos. 3442, 3450, 3451, . . . Each,
- No. 3472. Thick, 6 in., maroon finish, for Nos. 3453-3457, Each.
- No. 3473. Medium, 7 in., black finish, for Nos. 3453-3457, Each,
- No. 3474. Thin, 7 in., natural finish, rubber tip, for Nos. 3453-3457, . . . Each,
- No. 3475. Thick, 7 in., natural finish, cork tip, for Nos. 3453-3457, . . . Each,

See Price List in back of Catalog.

Leonhardt Ball Pointed Pens



No. 3540.



3542.



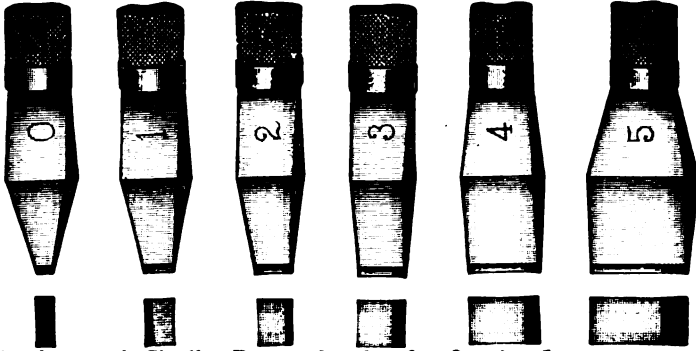
No. 3544.



3546.

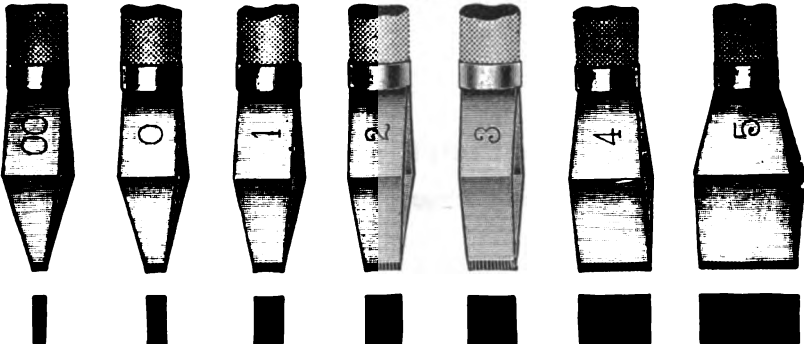
No. 3540.	Leonhardt Ball Pointed Pens,	506F,	.	.	.	Gross, \$
3542.	" " " " "	506EF,	.	.	.	"
3544.	" " " " "	516F,	.	.	.	"
3546.	" " " " "	516EF,	.	.	.	"

Automatic Shading Pens



No. 3560.	Automatic Shading Pens,	0	1	2	3	4	5	
	Width of nib,	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$ in.,	Each, \$

Automatic Marking Pens

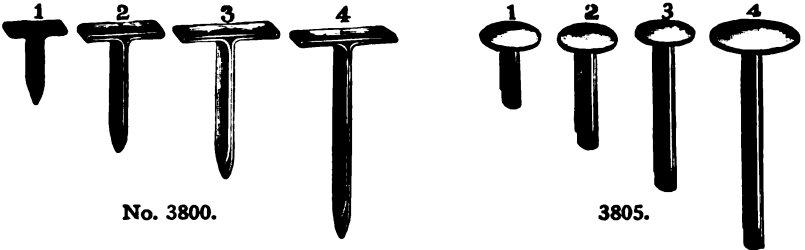


No. 3562.	Automatic Marking Pens,	00	0	1	2	3	4	5	
	Width of nib,	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$ in.,	Each, \$

3565. Shading and Marking Pen Ink, 1 oz. bottles.
 Black, Dark Blue, Green, Purple, Scarlet, Yellow, Orange,
 Dark Brown, Each,

**Books on Lettering, Alphabet Books, Etc., listed under Scientific Books.
 See Price List in back of Catalog.**

Paper Fasteners



No. 3800.

3805.

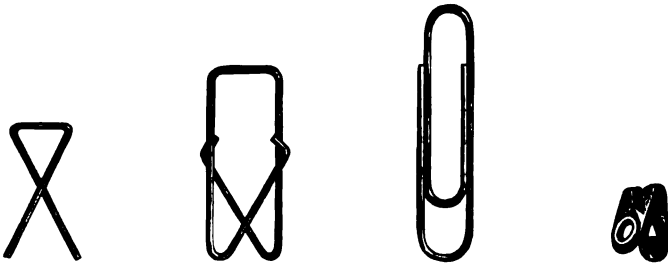
No. 3800. Paper Fasteners, flat heads.

Number,	1	2	3	4
Length,	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1 in.
Box of 100,	\$			
1000 (10 boxes of 100),				

3805. Paper Fasteners, round heads.

Number,	1	2	3	4
Length,	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1 in.
Box of 100,	\$			
1000 (10 boxes of 100),				

Paper Clips



No. 3810.

3811.

3814.

3816.

No. 3810. Clinch Clip, 250 in box,	Box, \$
3811. Ezeon " 100 " "	"
3814. Gem " 100 " "	"
3816. O. K. Paper Fastener, brass, No. 1B size, 100 in box,	Box, \$
1000 (10 boxes of 100),	\$

Eyelet Punch and Eyelets



No. 3818.



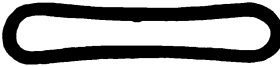
3819.

No. 3818. Eyelet Punch and Fastener,	Each, \$
3819. Eyelets, 250 in box, for No. 3818.	
Number,	
Length,	$\frac{1}{8}$ $\frac{2}{8}$ $\frac{3}{8}$ in.
Doz. boxes,	\$

See Price List in back of Catalog.

Rubber Bands

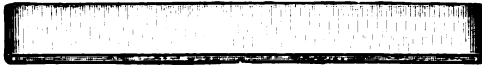
Highest Quality



No. 3820.



3822.



No. 3824.

No. 3820.	Width, $\frac{1}{8}$ in.;	length, $1\frac{1}{4}$, $1\frac{1}{2}$, 2 or $2\frac{1}{2}$ in., . . .	Box of $\frac{1}{4}$ lb., \$
3822.	" $\frac{1}{8}$ "	" $1\frac{1}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$ or 3 in., . . .	" " $\frac{1}{4}$ "
3824.	" $\frac{1}{4}$ "	" 2, $2\frac{1}{2}$ " 3 " . . .	" " $\frac{1}{4}$ "
3827.	" $\frac{1}{8}$ "	assorted lengths, . . .	" " $\frac{1}{4}$ "
3828.	" $\frac{1}{8}$ "	" " . . .	" " $\frac{1}{4}$ "
3829.	" $\frac{1}{4}$ "	" " . . .	" " $\frac{1}{4}$ "
3830.	Assorted widths and lengths, . . .		" " $\frac{1}{4}$ "

Adhesive Tapes



No. 3836.

No. 3836. Styk-um-phast Cloth. A mounting and binding tape, 50 feet long, $\frac{1}{4}$ in. wide, made of cloth coated on one side with a strong adhesive glue compound. Contained in box specially designed to fully protect the tape from atmospheric and other deteriorating effects.

Dozen, \$
 Each,

No. 3838. Styk-um-phast Paper. A transparent paper, 50 feet long, 1 in. wide, gummed on one side. Contained in box specially designed to fully protect the paper.

Dozen, \$
 Each,

3840. Dennison Adhesive Transparent Cloth Tape. A strip of cloth 30 feet long, $\frac{3}{4}$ in. wide, gummed on one side. On spool, and contained in special box which protects the tape from deteriorating.

Dozen, \$
 Each,



No. 3840.

See Price List in back of Catalog.

Dusting Brushes

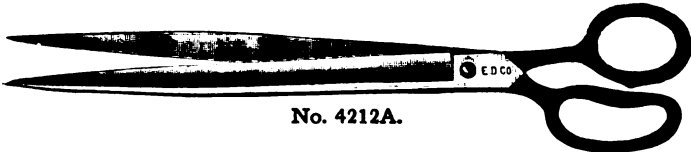
For removing crumbs of Rubber, Etc., from Drawings.



No. 4210.

- No. 4210. Dusting Brush, invisible wire drawn, 8 in. brush with 6 in. handle, good grade bristle, Each, \$
4211. Dusting Brush, finest white bristle, set in pitch, 10 in. brush with 6 in. handle, flat bevel style, which allows brush to lay flat or to be placed in a drawer or a pigeon hole, Each,

Trimming Shears

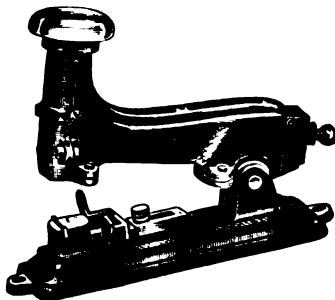


No. 4212A.

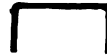
Specially adapted for trimming drawings, tracings, blue prints, etc. Best quality, with long thin blades of perfect temper and true cutting edges. Japanned handles, nickeled blades.

- No. 4212A. Trimming Shears, 14 in., Each, \$
- 4212B. " " 16 " "
- 4212C. " " 18 " "

Stapling Machine



No. 4216.



4217A.



4217B.

- No. 4216. Stapling Machine, japanned, excellent for binding blue prints, tracings, etc., when thickness is not greater than $\frac{1}{8}$ in., holds 100 staples, Each, \$
- 4217A. Staples, $\frac{1}{4}$ in., 5000 in box, for No. 4216, Box,
- 4217B. " $\frac{3}{8}$ " 5000 " " " " 4216, "

See Price List in back of Catalog.

Dietzgen Economy Box

(Patented)



No. 4220A.

No. 4220A.	Dietzgen Economy Box, 32 inches long,	. . . . .	Each, \$
4220B.	" " " 38 " "		"
4220C.	" " " 44 " "		"

The Economy Box is unequalled for economically and effectively protecting Blue Print Papers, etc., from light and moisture. It prevents waste, as any length of paper can be drawn from the roll contained in the box, the desired length being accurately measured by a spring tape attachment and quickly detached by means of a cutting edge which is part of the container.

Each box holds rolls of 50 yards or less, and is substantially made of heavy sheet metal, finished with black lacquer. Can be fastened to wall or table, and for simplicity, durability and general usefulness greatly surpasses the ordinary tin tube container. It is also adapted for holding rolls of Drawing and Tracing Papers, Tracing Cloth, Etc., not over 3¼ inches in diameter.

Air-Tight Metal Tubes



No. 4222A.

Made of tin, the covers fitting tightly. Excellent for keeping cut rolls of prepared papers and cloths dry and dark. Can also be used for filing valuable plans and tracings.

No. 4222A.	31 inches long,	4	in. diam.,	for 50-yd. rolls,	. . . . .	Each, \$
4222B.	37 "	"	4 "	" " 50 "	. . . . .	"
4222C.	43 "	"	4 "	" " 50 "	. . . . .	"
4222D.	55 "	"	4 "	" " 50 "	. . . . .	"
4224A.	31 "	"	2¼ "	" " 10 "	. . . . .	"
4224B.	37 "	"	2¼ "	" " 10 "	. . . . .	"
4224C.	43 "	"	2¼ "	" " 10 "	. . . . .	"
4224D.	55 "	"	2¼ "	" " 10 "	. . . . .	"

Prepared Blue Print Papers and Cloths listed on pages 22-25.

See Price List in back of Catalog.

Heavy Pasteboard Tubes

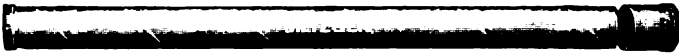


No. 4226A.

Made of extra-heavy pasteboard, one end having a metal screw-cap and the other end a metal fixed-cap. Dust proof, moist proof, light proof, and very durable. Excellent for expressing and filing drawings, tracings, etc.

No. 4226A.	32 inches long,	3 1/2 in. inside diameter,		Each, \$
4226B.	37 " " "	3 1/2 " " "		"
4226C.	43 " " "	3 1/2 " " "		"

Light Pasteboard Tubes

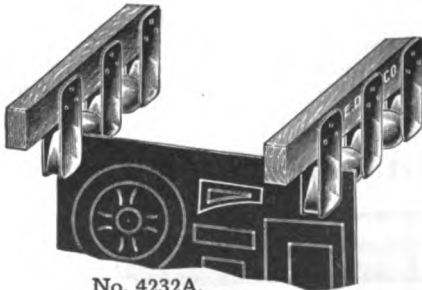


No. 4228A.

Well made, with pasteboard close-fitting cap at one end and pasteboard fixed-cap at the other end. Used for preserving rolls of prepared papers and cloths; also for the purpose of mailing and filing drawings, etc.

No. 4228A.	31 inches long,	2 in. inside diameter,		Each, \$
4228B.	37 " " "	2 " " "		"
4228C.	43 " " "	2 " " "		"

Automatic Print Hanger



No. 4232A.

No. 4232A.	Automatic Print Hanger,	bar with 10 holders,		Each bar, \$
4232B.	" " " " " "	" " " " " "	20 " " "	" "
4232C.	" " " " " "	" " " " " "	25 " " "	" "
4232D.	" " " " " "	" " " " " "	30 " " "	" "
4232E.	" " " " " "	" " " " " "	35 " " "	" "

This Print Hanger consists of rustless metal holders attached to a rigid wooden bar, each holder containing a ball. Print is slipped between edge of holder and ball, and when released is firmly held by weight of ball, being quickly removed by raising ball with the finger. Spacing of holders permits air to circulate freely, insuring rapid drying. For small or medium size prints, one or two bars should be used, but for large prints additional bars will be necessary to prevent prints from sagging.

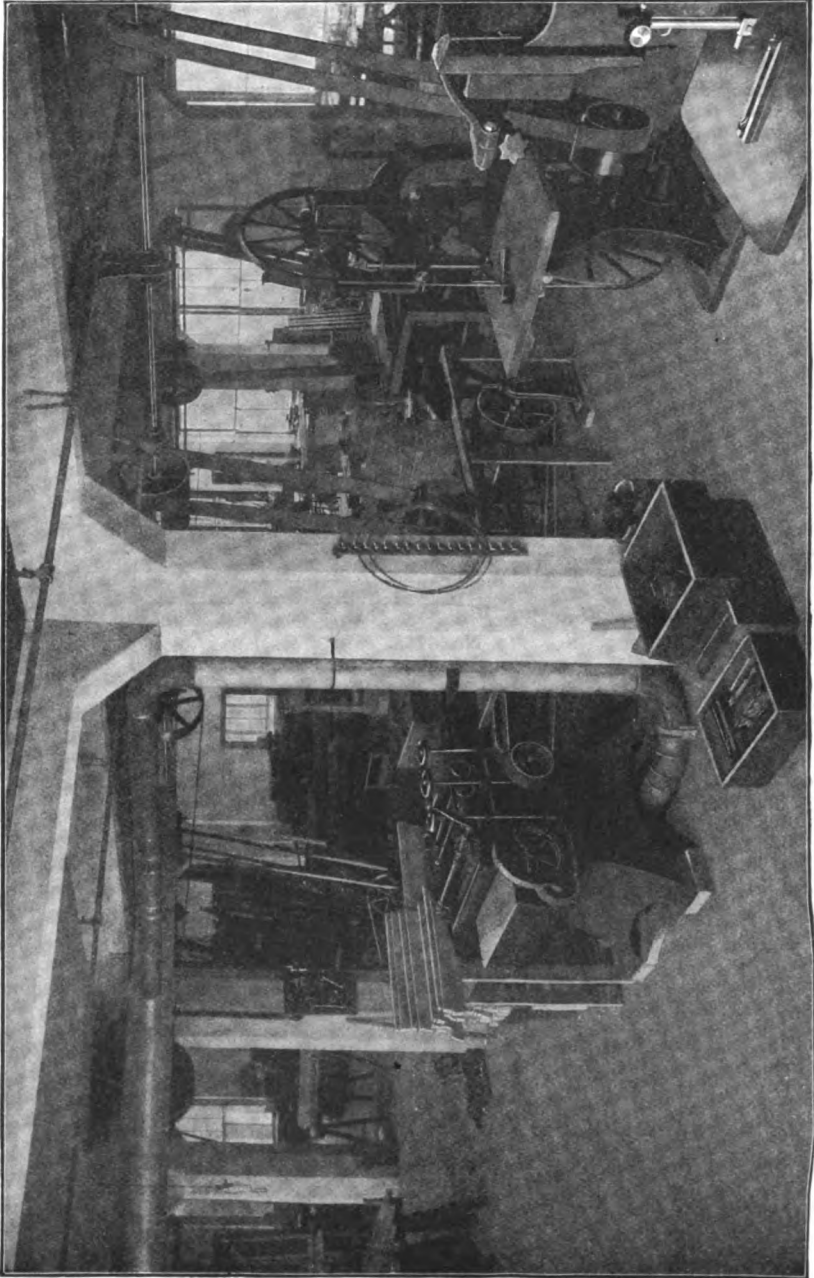
No. 4234.	Spring Clips,	for clamping prints when drying,		Doz., \$
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Spring Clips



4234.

See Price List in back of Catalog.

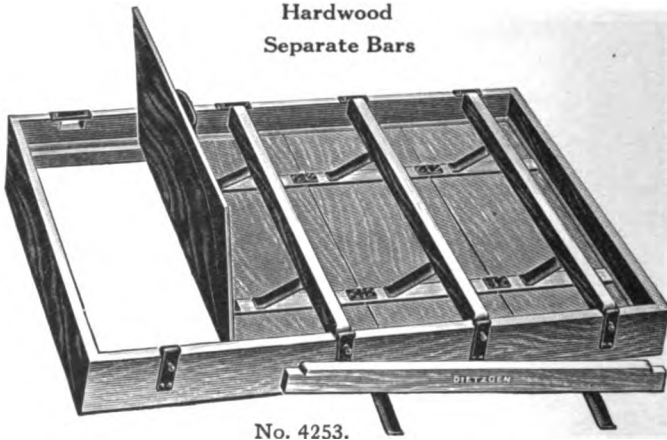


Section of Woodworking Department—Factory

Solar Printing Frames

Superior Quality

Our Solar Printing Frames are manufactured with great care. They are of unsurpassed workmanship, and as they are made of carefully selected and thoroughly seasoned stock the possibility of shrinking and warping, likely to happen in frames of cheaper construction, has been practically eliminated, thus preventing the glass from breaking. The springs, substantially made, will not rust, and their arrangement insures perfect contact.



No.	Printing Surface.	Each, \$	With Cotton		With Cotton		Approx.	
			Frame Only.	With Cotton Pad.	Pad and Double Thick Glass.	Pad and Polished Plate Glass.	Ship'g Wgt. Frame.	Glass.
4250.	20 × 24 in.						35	30 lbs.
4251.	24 × 30 "	"					40	40 "
4252.	24 × 36 "	"					50	45 "
4253.	30 × 42 "	"					70	60 "
4254.	36 × 48 "	"					85	80 "
4255.	36 × 60 "	"					120	100 "

Other sizes made to order.

When ordering Frames, always specify exactly what is desired, that is, Frame only, etc.

We recommend ordering the Plate Glass, as it is more perfect and lasting than the Double Thick Glass.

The Glass is carefully packed by an expert, but we are not responsible for breakage of glass in transit.

Frames for Patent Office, School and Home Use

No.	Size	Material	Each.	Approx. Ship'g Wgt.
4260.	11 × 16 in.,	hardwood, double thick glass, felt pad,	\$	15 lbs.
4261.	16 × 21 "	" " " " " " " "	"	22 "

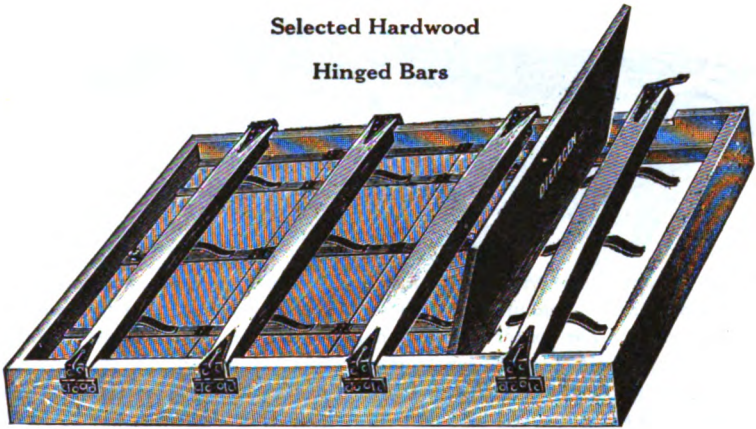
Cotton and Felt Pads listed under Nos. 4282C-4286.

See Price List in back of Catalog.

Solar Printing Frames

Selected Hardwood

Hinged Bars



No. 4269.

No.	Printing Surface.	Frame Only.	With Cotton Pad.	With Cotton Pad and Polished Plate Glass.	Approx. Ship'g Wgt. Frame.	Approx. Ship'g Wgt. Glass.
No. 4266.	24 × 36 in.	Each, \$			50	45 lbs.
4267.	30 × 42 "	"			70	60 "
4268.	36 × 48 "	"			85	80 "
4269.	36 × 60 "	"			120	100 "
4270.	42 × 60 "	"			140	120 "
4271.	42 × 72 "	"			170	140 "

Other sizes made to order.

When ordering Frames, always specify exactly what is desired, that is, Frame only, etc.

Pads for Solar Printing Frames

Cotton $\frac{3}{8}$ in. Thick.

No. 4282C.	Pad, for frames with printing surface	20 × 24 in.,	. .	Each, \$
4282D.	" " " " " "	24 × 30 "	. .	"
4282E.	" " " " " "	24 × 36 "	. .	"
4282F.	" " " " " "	30 × 42 "	. .	"
4282G.	" " " " " "	36 × 48 "	. .	"
4282H.	" " " " " "	36 × 60 "	. .	"
4282J.	" " " " " "	42 × 60 "	. .	"
4282K.	" " " " " "	42 × 72 "	. .	"

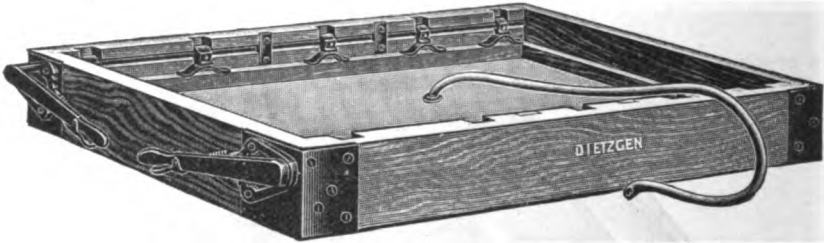
Felt $\frac{3}{8}$ in. Thick.

No. 4284A.	Pad, for frames with printing surface	11 × 16 in.,	. .	Each, \$
4284B.	" " " " " "	16 × 21 "	. .	"
4284C.	" " " " " "	20 × 24 "	. .	"
4284D.	" " " " " "	24 × 30 "	. .	"
4284E.	" " " " " "	24 × 36 "	. .	"
4284F.	" " " " " "	30 × 42 "	. .	"
4284G.	" " " " " "	36 × 48 "	. .	"
4284H.	" " " " " "	36 × 60 "	. .	"
4284J.	" " " " " "	42 × 60 "	. .	"
4284K.	" " " " " "	42 × 72 "	. .	"

No. 4286. Felt for Solar Printing Frames, 72 in. wide, $\frac{3}{8}$ in. thick, Sq. yd., \$

See Price List in back of Catalog.

Vacuum Solar Printing Frames



These Vacuum Solar Printing Frames are designed specially for reproducing very large drawings and for making Dark Brown Negative and Positive Prints when perfect contact is desired. The contact between negative and glass is obtained by exhausting the air from between a specially constructed rubber blanket and the glass by means of an exhaust pump. The rubber blanket is held in position by a wooden frame secured by springs which are controlled by clamping rods operated from one end by levers.

They are made of thoroughly seasoned hardwood, have steel mountings and are reinforced at the corners by steel plates.

Furnished with or without polished plate glass, in the following stock sizes, with printing surfaces:

30 × 42 36 × 48 36 × 60 42 × 72 54 × 96 54 × 108 in.

Prices quoted on request.

Other sizes made to order.

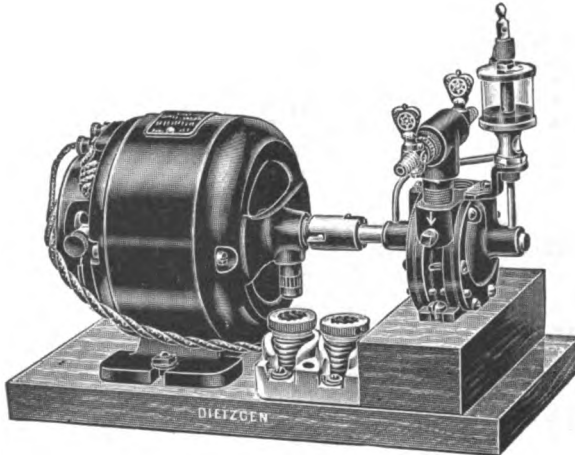
Vacuum Exhaust Outfits

For use with Vacuum Solar Printing Frames

No. 4290. Vacuum Exhaust Outfit, consists of $\frac{1}{15}$ H. P., 110 volt D. C. motor, and a direct connected rotary pump. This outfit is very simple,

efficient and durable. It requires but one square foot of floor space, and can be operated by attaching to an incandescent lamp socket.

Each, . . . \$



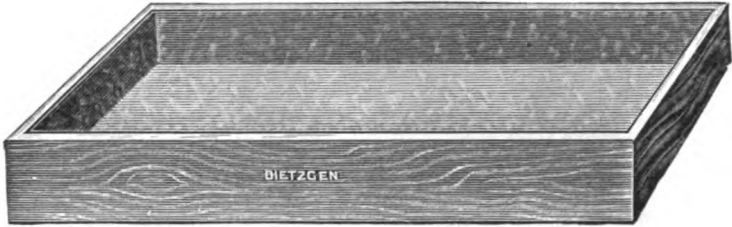
No. 4290.

No. 4291. Like No. 4290 but with $\frac{1}{15}$ H. P., 110 volt A. C. motor, driving pump by belt.

Each, . . . \$

See Price List in back of Catalog.

Galvanized Iron Bath Trays



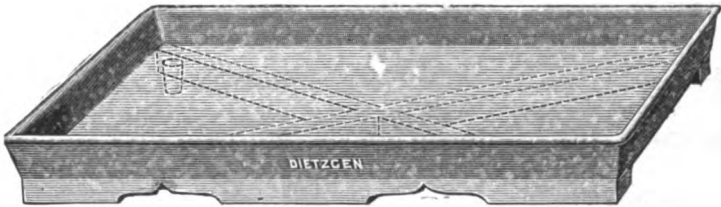
No. 4300.

The Frames of these trays are made of carefully selected, thoroughly seasoned hardwood, and are lined with heavy galvanized iron, painted with asphaltum paint.

Each tray is provided with a drain pipe.

	Each.	Approx. Ship'g Wgt.
No. 4300. Bath Tray, 36 × 60 × 8 inches, . . .	\$	115 lbs.
4301. " " 42 × 60 × 8 " . . .		135 "
4302. " " 45 × 75 × 10 " . . .		180 "
4303. " " 56 × 98 × 10 " . . .		250 "

Other sizes made to order.



No. 4308.

These Trays, of galvanized iron and equipped with a drain pipe, are exceptionally well made. They have a strong wired-rim, and are rigidly braced by wooden cross-bars.

	Each.	Approx. Ship'g Wgt.
No. 4306. Bath Tray, 20 × 24 × 6 inches, . . .	\$	25 lbs.
4307. " " 24 × 30 × 6 " . . .		40 "
4308. " " 30 × 42 × 6 " . . .		60 "

Other sizes made to order.

See Price List in back of Catalog.

Wheel Carriages



No. 4318 with No. 4269.

These Wheel Carriages, made of iron and practical in design, have four fixed wheels. If preferred, they will be furnished with two swivel wheels on one end, at the same prices.

Either our regular type Solar Printing Frames, Nos. 4266-4271, or our Vacuum type Solar Printing Frames, described on page 180, may be mounted on them, and, when mounted, can be revolved in the uprights of the carriage so as to receive the direct rays of the sun.

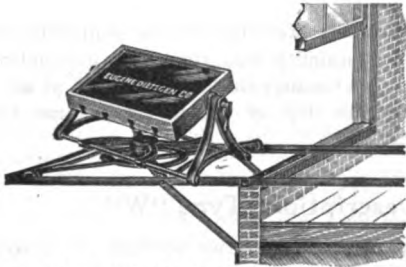
	Each.	Approx. Ship'g Wgt.
No. 4315. Carriage only, for frames with printing surface 24 × 36 in.,	\$	115 lbs.
4316. Carriage only, for frames with printing surface 30 × 42 in.,		120 "
4317. Carriage only, for frames with printing surface 36 × 48 in.,		130 "
4318. Carriage only, for frames with printing surface 36 × 60 in.,		140 "
4319. Carriage only, for frames with printing surface 42 × 60 in.,		150 "
4320. Carriage only, for frames with printing surface 42 × 72 in.,		160 "

Other sizes made to order.

Turntable Carriages listed under Nos. 4322-4325. Angle Iron Tracks with Supports described on page 183.

See Price List in back of Catalog.

Turntable Carriages



Our Turntable Carriages, consisting of an iron carriage mounted on an iron turntable, are adapted for exposing Solar Printing Frames outside of a window, when used with tracks as described below.

Either our regular type Solar Printing Frames, Nos. 4266-4271, or our Vacuum type Solar Printing Frames, described on page 180, may be mounted on them, and, when mounted, can be revolved and tilted so as to meet the direct rays of the sun.

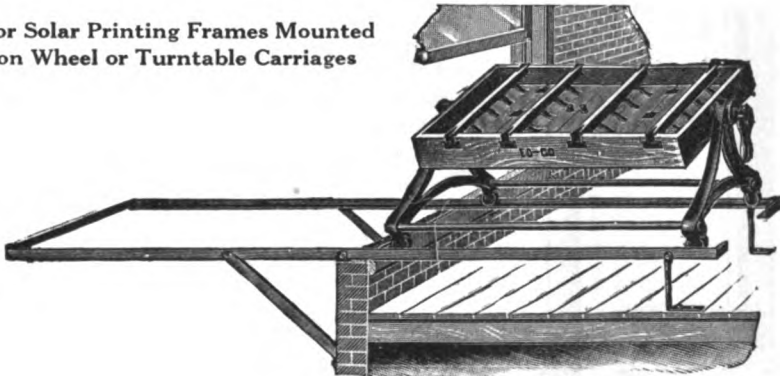
No. 4324 with No. 4269 and Iron Tracks and Supports.

	Each.	Approx. Ship'g Wgt.
No. 4322. Turntable Carriage only, for frames with printing surface 30 X 42 in.,	\$	140 lb.
4323. Turntable Carriage only, for frames with printing surface 36 X 48 in.,		155 "
4324. Turntable Carriage only, for frames with printing surface 36 X 60 in.,		170 "
4325. Turntable Carriage only, for frames with printing surface 42 X 72 in.,		195 "

Other sizes made to order.

Angle Iron Tracks with Supports

For Solar Printing Frames Mounted on Wheel or Turntable Carriages



Iron Tracks and Supports with Wheel Carriage and Frame.

Our Angle Iron Tracks with Supports, used for carrying Solar Printing Frames through and outside of a window, are simple in design, well made and practical.

They are specially adapted for use with either our regular type Solar Printing Frames, Nos. 4266-4271, or our Vacuum type Solar Printing Frames, described on page 180, when these frames are mounted on our Wheel Carriages Nos. 4315-4320 or on our Turntable Carriages Nos. 4322-4325.

Prices for Tracks and Supports quoted on request.

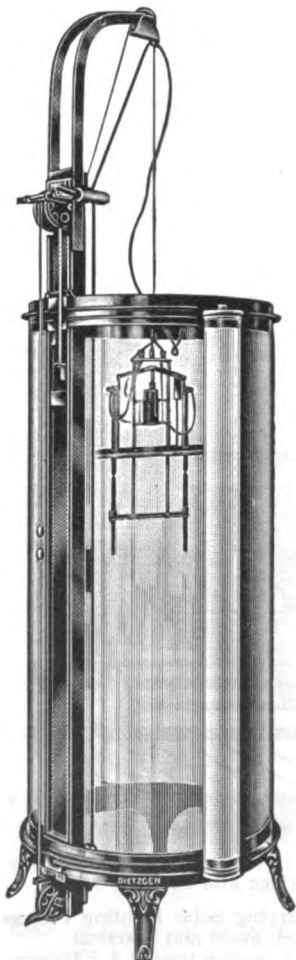
When requesting prices, always give the following information:

- | | |
|--------------------------------------|---|
| 1. Width and height of open window. | 4. Thickness of wall. |
| 2. Width of window sill. | 5. Width of Printing Frame. |
| 3. Height of window sill from floor. | 6. Length of Carriage over all. |
| | 7. Width of Carriage outside of wheels. |

See Price List in back of Catalog.

Cylindrical Electric Printing Machines

The Type "W" and Type "X" Electric Printing Machines are, for simplicity of construction, ease and economy in operation, durability and efficiency, unequaled by any other make. With their aid, drawings and tracings can be reproduced at any time during the day or night, independent of weather conditions.



No. 4336 Type "W."

Description (Type "W")

This style consists of two sections of curved plate glass joined to form a cylinder. An arc lamp descends axially through this cylinder, thereby giving equal light radiation on the interior surface of same, and hence a uniform exposure of the sensitized paper.

Roller Curtain

The tracings and sensitized paper are held in place by roller curtains which are unsurpassed for convenience and efficiency. The rollers are usually moved by pushing them with the knee, thus leaving both hands of the operator free to adjust the tracings and paper. The contact of the curtains and the glass is so perfect that at any time the curtains can be partly rolled back and the prints examined without in any way disturbing the position of the tracings with respect to the prints. This is an advantage when printing new, old, and soiled tracings at the same time, as it permits regulating the exposure according to the transparency of the different tracings.

Speed Regulator

The Speed Regulator, noiseless in operation and of an original pattern, insures an absolutely uniform speed in the descent of the arc lamp. It provides a wide range of speed regulation, and can be adjusted to every possible requirement.

Arc Lamp

The Arc Lamp is designed specially for rapidity in printing, giving the greatest actinic effect and a strong, uniform, and steady light. It is illustrated and fully described on page 185A-1 under No. 4349 Style "A."

See Price List in back of Catalog.



Cylindrical Electric Printing Machines

Automatic Cut-off

The electric current is automatically cut off at any desired point by means of a tripping device, which is easily adjusted to any height on the cylinder. When the lamp is started downward by the operator, no more attention is needed, as when the printing is completed, the light is automatically extinguished. As the paper is well protected from outside light, there is no necessity for immediately removing it from the machine. This feature is advantageous in offices where a regular blue printer is not employed, as any member of the office force can load the machine, start the lamp on its downward course, and then pursue other duties, without fear of finding the prints over-exposed upon his return.

Description (Type "X")

This type of machine consists of one curved plate glass section, semi-circular, with open back, the frame being strongly braced at the back by two rods which cross each other and extend from the top to the bottom of the sides of the frame. This style is designed particularly for use in offices where the reproduction work is more or less limited.

Floor Space and Height

The Type "W" and Type "X" Machines occupy a floor space only three feet square, and as the mechanism is not dependent upon side wall or ceiling fixtures of any kind, the machines can be placed wherever desired. They are furnished complete, and are ready to operate when connected with the feed wire. The height overall of the 42 × 44 in. machines is 8 ft. 2 in.; of the 42 × 60 in., 9 ft. 6 in.; of the 42 × 72 in., 10 ft. 6 in. If desired, we can reduce these heights 8 inches by shortening the extension arm.

Prices

No.	Description	Size	Price	Approx. Ship'g Wgt
4335.	Type "W," capacity two prints, each	42 × 44 in.	Each, \$	550 lbs.
4336.	Type "W," " " " "	42 × 60 " "	" "	600 "
4337.	Type "W," " " " "	42 × 72 " "	" "	750 "
4338.	Type "X," " one print,	42 × 44 " "	" "	500 "
4339.	Type "X," " " " "	42 × 60 " "	" "	550 "
4340.	Type "X," " " " "	42 × 72 " "	" "	650 "

Prices are for machines furnished with Standard Arc Lamps: 110 volts, 15 amperes, D. C., 110 volts, 15 amperes, A. C., 60 cycles; 220 volts, 7½ amperes, D. C., 220 volts, 7½ amperes, A. C., 60 cycles. An additional charge for special lamps.

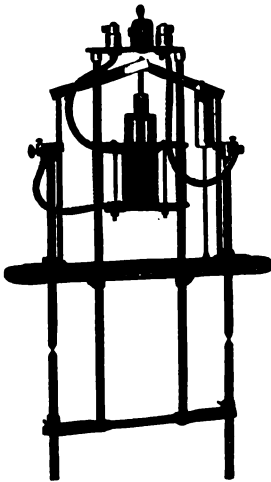
When ordering, state voltage and whether current is direct or alternating.

Globes and Carbons

No. 4342.	Globes, clear Thermo glass, 2¾ in. at top, 1¼ in. at bottom, 7 in. high; for A. C. lamps of A. B. type only,	Each, \$
4343.	Globes, clear Thermo glass, 3½ in. at top, 1⅝ in. at bottom, 8¼ in. high; for D. C. lamps of A. B. type, or for A. C. or D. C. enclosed single-arc lamps, No. 4349 Style B,	"
4344.	Globes, clear Thermo glass, 7¾ in. at top, 9⅝ in. high; for A. C. or D. C. lamps of Paragon Blue Printing Machines, described on pages 186-187,	"
4345.	Carbons, cored, highest quality, ½ × 12 in., for A. C. lamps,	"
4346.	" solid, " " ½ × 12 " " A. C. and D.	"
	C. lamps,	"
4347.	White Flame Carbons, cored, chemically treated, ½ × 12 in., for A. C. and D. C. Hi-Power Twin Arc lamps,	"

See Price List in back of Catalog.

Arc Lamps for Electric Blue Printing Machines



No. 4349 Style "A."
Hi-Power Twin Arc Lamp



4349 Style "B."
Enclosed Single Arc Lamp

The No. 4349 Style "A" Hi-Power Twin Arc Lamp is now furnished with our Type "W" and Type "X" Electric Blue Printing Machines described on pages 184 and 185. It prints at two to three times the speed of an enclosed single-arc lamp, and as it produces two distinct arcs of high intensity, a better light distribution, with more uniform exposure, is obtained. Additional advantages are that it has no complicated parts to get out of order and no globes to break; new upper carbons can be inserted without disturbing the lower carbons, or vice versa; and it can be operated and trimmed by an inexperienced boy.

It is built to operate on 110 or 220 volts A. C., 60 cycle; also 110 or 220 volts Direct Current. Rheostats are built with a variation of 10 volts. They are not interchangeable, but furnished according to the current used. On higher voltages than listed, a special Hi-Power Lamp and Rheostat can be furnished at extra charge. We can furnish Hi-Power Lamps for A. C. current on 60 cycle only. Therefore A. C. Lamps with cycle other than 60 will be of the enclosed single arc type No. 4349 Style "B."

The No. 4349 Style "B" Enclosed Single Arc Lamp is adapted for use in both Vertical and Continuous Electric Blue Printing Machines. The working parts are few, and as the lamp is substantially constructed, it will give long life with minimum repairs. It has a maximum efficiency with an unusual low current consumption. Built to operate on 110 or 220 volts A. C., 60 cycle; also 110 or 220 volts Direct Current.

No. 4349. Style "A" Hi-Power Twin Arc Lamp, for 60 cycle Alternating current or for Direct current; complete with Rheostat, . . . Each, \$

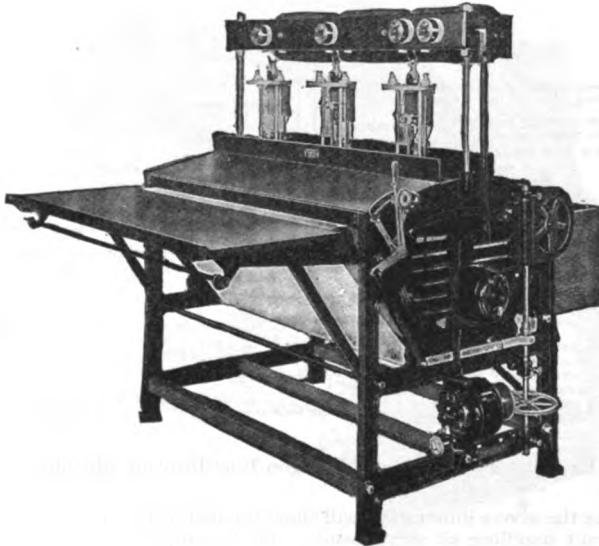
4349. Style "B" Enclosed Single Arc Lamp, for Alternating or for Direct current; complete with Rheostat, Each, \$

When ordering, state voltage and whether current is direct or alternating.

Paragon Electric Blue Printing Machine

The Paragon Electric Blue Printing Machine, requiring approximately 22 feet of floor space, embodies speed and a range of efficiency that makes it second to none for low consumption of current on a given amount of work and for convenience in operation.

By using the Paragon Blue Printing Machine together with the Paragon Print Drying Machine (described on pages 188-189), it is possible, in four minutes at a maximum, to print, wash, and dry perfectly flat.



Construction

The printing bed is constructed of polished plate glass $37\frac{1}{4}$ inches across (the length depending upon the size of the machine in which it is to be used) bent to a radius of 12 inches, thus making a complete half cylinder. This is of a depth which will accommodate the special Blue Print arc lamps so as to obtain all of their light direct without the use of reflectors and at the same time permit the lamps to be placed at such distance from the printing surface that the light equalizes perfectly, producing an absolute uniformly lighted printing surface. All of these points are important, as reflected light would result in wasted energy as well as unnecessary expense, while uneven exposure would result in poor prints.

Three special Blue Print arc lamps are furnished with the 42 inch machine and four with the 54 inch machine. Snap switches are provided for each lamp, so that one or more lamps can be readily used; one lamp will properly expose prints up to 12 inches wide; two lamps up to 24 inches, etc.

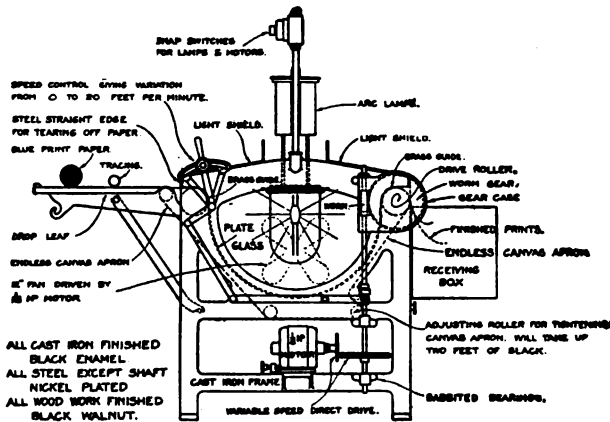
The semi-cylinder is supported by cast iron enameled frames, these frames carrying the journals of the rollers which are necessary to drive the apron that conveys the tracings and the sensitized paper.

See Price List in back of Catalog.

Paragon Electric Blue Printing Machine

The apron is 2 inches wider than the rated capacity of the machine, thus permitting full width prints to be made conveniently. It is driven from the rear of the semi-circular glass, giving an action similar in many respects to a band brake, pressing all of the air from between the tracings and the sensitized paper. Perfect contact—for which the Paragon is noted—is obtained by this method of driving the apron, no spring nor other makeahift apparatus being necessary.

Convenience



Explanatory Drawing of Paragon Blue Printing Machine.

A glance at the above illustration will show the leaf or feeding table, which is large enough to permit handling all work easily. The tracings are fed in from the front, right side up, and in the standard machines are discharged at the rear. If preferred, the machines will be equipped so that both tracings and prints will return to the front when desired, but this construction is not recommended.

The range of speed is ample for all classes of work, and a reliable constant speed motor of $\frac{1}{8}$ H. P. is used. All changes in the speed of the machine are instantly made by means of a noiseless drive giving any speed from six lineal inches to twenty lineal feet per minute. This arrangement is especially valuable for making black line, brown line, and blue line prints. The drive mechanism is self-contained, a part of the machine, enclosed and guarded so as to comply with the strictest factory regulations.

No.	Capacity	Each.	Approx. Ship'g Wgt.
No. 4350.	Capacity 42 in., complete, for Direct Current,	\$	1,100 lbs.
4351.	" 42 " " " Alternating "		1,100 "
4352.	" 54 " " " Direct "		1,200 "
4353.	" 54 " " " Alternating "		1,200 "

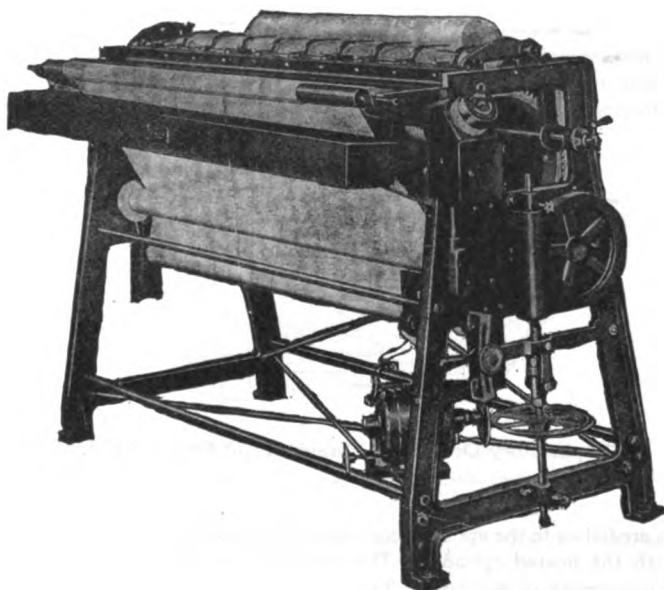
When ordering, state voltage and whether current is direct or alternating; if alternating, advise number of cycles.

For Globes and Carbons, see page 185.

See Price List in back of Catalog.

Paragon Print Drying Machine

The Paragon Print Drying Machine fully meets the demand for a satisfactory and an efficient means of drying, within a limited space, various sized prints in separate sheets of any length. It requires approximately eight square feet of floor space, and when used with the Paragon Electric Blue Print Machine (described on pages 186-187) an unequaled equipment is possessed. The use of this machine also permits prints to be washed for any desired length of time without interrupting either the printing or the washing process.



Construction

It consists of a smooth steel cylinder, supported on ball bearing journals, and is driven by means of a variable speed device, directly connected to an electric motor, which allows any desired speed from between 0 and 10 feet per minute. No belts or chains are used.

The cylinder may be heated by gas, electricity, or steam, and the proper construction, based upon the source of heat desired, is made at the factory.

The machine is so constructed that perfect combustion is obtained in the gas heated dryer without the use of a blower.

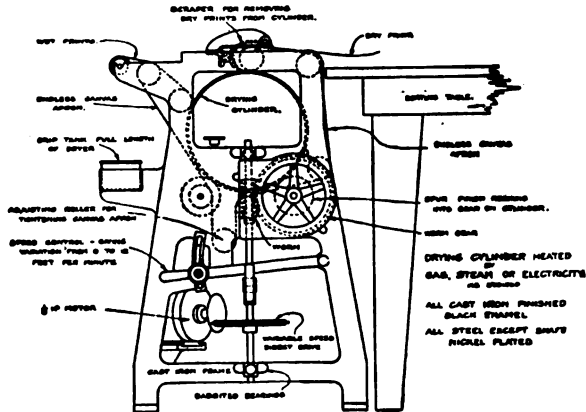
The canvas apron is carried upon a series of steel rollers so arranged as to bring the apron in tight contact with the surface of the steel drying cylinder. This apron is kept taut by a steel roller, the weight of which gives a uniform tension regardless of the variation in heat and dampness.

See Price List in back of Catalog.

Paragon Print Drying Machine

Convenience

A device is provided for transferring the prints from the bath trays to the dryer. Small prints or prints of any length and of any width up to the rated capacity of the machine can be handled with equal ease.



Explanatory Drawing of Paragon Print Drying Machine.

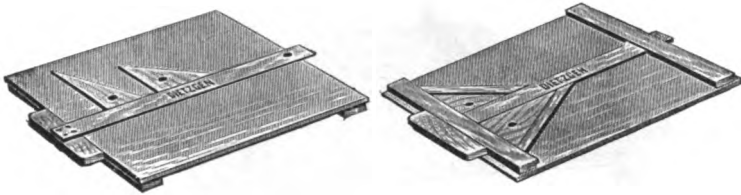
Prints are fed on to the apron at one side of the machine and are carried by it into contact with the heated cylinder. They are fed from the wash trays to the dryer without the necessity of wringing. The apron holds the paper in direct contact with the heated cylinder until the prints are exhausted perfectly dry on the opposite side of the machine. Stripper fingers are provided for automatically running the prints from the heated cylinder and depositing them upon a sorting table which should be provided at the rear of the machine to receive them.

In use, the Paragon Print Drying Machine works to the best advantage if the front edge of the machine is placed about two feet from the wash trays and the back of the machine is placed against the receiving or sorting table.

				Each.	Approx. Ship'g Wgt.
No. 4354.	Capacity 42 in., complete,	Gas Heated,	. . \$		700 lbs.
4355.	" 42 "	" Electric Heated,	. .		700 "
4356.	" 54 "	" Gas Heated,	. .		800 "
4357.	" 54 "	" Electric Heated,	. .		800 "

See Price List in back of Catalog.

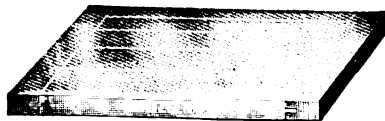
Drawing Boards



No. 4400.

These Drawing Outfits consist of a well-made Board, T Square, and two Triangles; the board is so constructed that when the T Square and Triangles are not in use they are held firmly to the under side of the board. They are compact, inexpensive and durable, and are excellent for school, home, or traveling use.

No. 4400.	Drawing Outfit, 10 × 12 in.,	. . .	Doz., \$	.	Each, \$
4401.	" " 13 × 19 "	. . .	"	"	"
4402.	" " 17 × 22 "	. . .	"	"	"



No. 4406.

No. 4406. Drawing Board, selected basswood, with two drawing surfaces and side ledges.

Size,	. 12×17	16×22	20×24½	20×26	23×31	31×43 in.
Doz.,	\$					
Each,	.					



No. 4410.

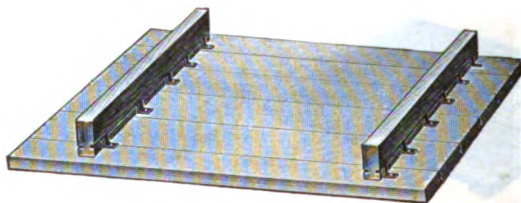
No. 4410. Drawing Board, narrow strips of selected white pinewood, joined by tongue and groove, with two drawing surfaces and side ledges.

Size,	. 12×17	16×22	20×24½	20×26	23×31	31×43 in.
Doz.,	\$					
Each,	.					

Larger Drawing Boards of any size made to order.

See Price List in back of Catalog.

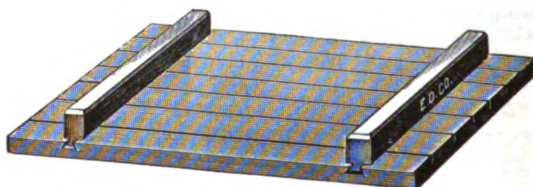
Drawing Boards



No. 4414.

No. 4414. Drawing Board, selected white pinewood, with hardwood ledges attached by adjustable special metal clamps to allow contraction and expansion.

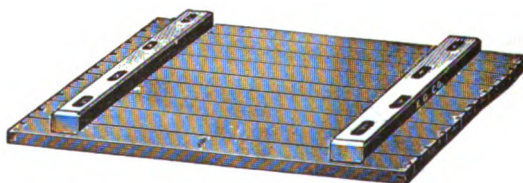
Size,	23×31	31×43	37×49	37×55	43×61	49×73 in.
Each,	\$					
Ship'g Wgt.,	20	55	65	70	100	120 lbs.



No. 4418.

No. 4418. Drawing Board, selected white pinewood, with hardwood ledges dovetailed into the board to allow contraction and expansion, and grooves sunk in $\frac{1}{4}$ the thickness of the board, thus allowing the narrow wooden strips to be still more effectually controlled by the hardwood ledges.

Size,	31×43	37×55	43×61	49×73	49×85 in.
Each,	\$				
Ship'g Wgt.,	55	85	105	125	150 lbs.



No. 4420.

No. 4420. Drawing Board, like No. 4418, but of extra fine quality, with screws passing through the ledges in oblong slots with metal bushings, which allow the screws to move when drawn by the contraction of the board. To make working edge perfectly smooth, a strip of hardwood is let into edge of board, allowing an easy movement of the T Square.

Size,	23×31	31×43	37×55	43×61	49×73	49×85 in.
Each,	\$					
Ship'g Wgt.,	25	60	85	105	125	150 lbs.

Larger Drawing Boards of any size made to order.

See Price List in back of Catalog.

Horses for Drawing Boards

Best Workmanship



No. 4425.



4426.

	Pair.	Approx. Ship'g Wgt.
No. 4424. Wooden Horses, 37 in. high, 35 in. long, light construction,	\$	30 lbs.
4425. Like No. 4424, but heavy construction; fine quality,		35 "
4426. Wooden Horses, 37 in. high, 35 in. long, heavy construction, sloping top ledges; fine quality,		50 "



No. 4428.

	Pair.	Approx. Ship'g Wgt.
No. 4428. Adjustable Wooden Horses, 35 in. long, adjustable to different slopes or can be used level. Heavy construction. Height adjustments range from 37 to 47 inches. Rigidity is assured at all heights because of the special clamps which connect the fixed and movable parts. Fine quality,	\$	50 lbs.

To reduce transportation charges, all wooden horses are shipped "knocked-down." The assembling is very simple.

See Price List in back of Catalog.

Drawing Stands and Tables

Simplicity Folding Stand



No. 4432.

The Simplicity Folding Stand is well adapted for use in Manual Training Schools, Apprentice Schools, Homes, small Offices, Studios, and wherever space is limited. Its range of adjustment and compactness when folded, makes it very serviceable for those who desire a substantial, convenient stand at a moderate price.

Durably made of hardwood and nicely finished.

		Each.	Approx. Ship'g Wgt.
No. 4432.	Simplicity Stand,	\$	30 lbs.
4432A.	“ “ with board No. 4410, 20 × 24½ in.,		36 “
4432B.	“ “ “ “ “ 4410, 23 × 31 “		40 “

Drawing Boards No. 4410 listed on page 190.

See Price List in back of Catalog.

Peerless Adjustable Folding Stand



No. 4436. Peerless Stand. Substantially made of hardwood, nicely finished, with stationary drawer. 38 inches wide, durable, perfectly rigid and firm in any position. When folded, occupies but little space. Can be quickly adjusted to a convenient sitting or standing height. The frame on which the drawing board rests can be tilted to different angles, as shown in illustrations. Each, \$

No. 4436C. Stand No. 4436, with board No. 4410, 31 × 43 in., . . . Each,

No. 4436E. Stand No. 4436, with board No. 4418, 37 × 55 in., . . . Each,

No. 4436F. Stand No. 4436, with board No. 4418, 43 × 61 in., . . . Each,



No. 4436. Three positions.

The approximate shipping weight of No. 4436 is 125 lbs.; No. 4436C, 175 lbs.; No. 4436E, 195 lbs.; No. 4436F, 225 lbs.

Drawing Boards Nos. 4410 and 4418 listed on pages 190-191.

See Price List in back of Catalog.

Ideal Drawing Tables



No. 4440C.

The Ideal Drawing Tables are strong, durable and rigid. They are made of hardwood, with well-seasoned pinewood Drawing Board tops, and are especially adapted for use in schools. The height adjustment is from 32 to 42 inches.

By means of a metal slide arrangement, the top can be tilted from a horizontal to a vertical position, and securely fastened by a thumb nut which locks both of the tilting irons at the same time. A locking wheel at the right of the cross bar also permits of making the entire table very rigid.

	Each.	Approx. Ship'g Wgt.
No. 4440C. Ideal Table, board 32 × 42 in.,	\$	85 lbs.
4440E. " " " 37 × 60 "		125 "

See Price List in back of Catalog.

Economy Folding Tables



No. 4444C.

The Economy Folding Tables, practical in design and of firm construction, have an exceptional range of adjustment. They can be adjusted from 31 to 41 inches for height and from horizontal to 45 degrees for slant of top.

On account of their unique design, they occupy but very little space when folded, and for this reason they are specially well adapted for general use in small offices and homes, or wherever space is limited.

They are made of well-seasoned hardwood, with fine quality pinewood Drawing Board tops, which are provided with hardwood ledges, attached so as to allow contraction and expansion.

		Each.	Approx. Ship'g Wgt.
No. 4444C.	Economy Table, board 31 × 43 in., . . .	\$	75 lbs.
4444E.	“ “ “ 37 × 55 “ . . .		90 “

See Price List in back of Catalog.

Madison Drawing Tables



No. 4450.

4448.

The Madison Drawing Tables are designed to meet all the requirements of an efficient and durable table for the class room. They are of solid iron construction, with hardwood top, neatly finished, and are so arranged that they may be used alternately by two students; each table having two drawers with locks, for storing tools, and a shelf for holding drawing boards. When the tables are not used for school work, the top can be reversed from position as shown in illustration, thus enabling the drawing board shelf to be used as a foot rest, with ample knee room when the draftsman is sitting on a stool.

The hardwood top is permanently fixed at a convenient slant, but is adjustable to heights of 37, 39 and 41 inches by means of strong bolts which insure perfect rigidity at any height.

	Each.	Approx. Ship'g Wgt.
No. 4448. Madison Table (Stand only),	\$	65 lbs.
4450. " " hardwood top 25×32 in., shelf and two drawers with locks,		120 "
4450B. Madison Table, like No. 4450, but with board No. 4410, 23 × 31 in.,		130 "

The Plain Table (Stand only), No. 4448, can be utilized to advantage with Drawing Boards from 23 × 31 in. to 37 × 49 in. in size.

Drawing Board No. 4410 listed on page 190.

See Price List in back of Catalog.

Eureka Adjustable Drawing Tables



No. 4454C-4456A-4456B.

The Eureka Adjustable Drawing Tables consist of a thoroughly seasoned hardwood frame, iron legs, and a fine quality pinewood Drawing Board top, which is provided with hardwood ledges, attached so as to allow contraction and expansion.

The height adjustment is from 32 to 40 inches, and by means of a unique arrangement the top can be tilted to any desired angle and rigidly locked by turning a small wheel. The standards are slotted to receive the ends of the cross bar, through which there is a metal rod that joins the legs, so that the entire table can be made exceptionally rigid by simply tightening a small handwheel.

	Each.	Approx. Ship'g Wgt.
No. 4454C. Eureka Table, board 31 × 43 in.,	\$	120 lbs.
4454E. " " " 37 × 55 "		145 "
4454F. " " " 43 × 61 "		170 "

Accessories

No. 4456A. Hardwood Box, for holding roll papers, etc.,	Each,	\$
4456B. Folding-Arm, with plain shelf,		"

When ordering Hardwood Box, No. 4456A, always specify catalog number of table with which it is to be used.

See Price List in back of Catalog.

Shamrock Adjustable Drawing Tables



No. 4460D.

The Shamrock Adjustable Drawing Tables, substantially constructed of hardwood, are well designed. The top consists of a fine quality pinewood Drawing Board, which is provided with hardwood ledges, attached so as to allow contraction and expansion. It can be tilted to any desired angle and securely clamped.

By spreading or closing the legs, height adjustments from 32 to 42 inches can be obtained, and any adjustment held firmly by means of clamp bolts.

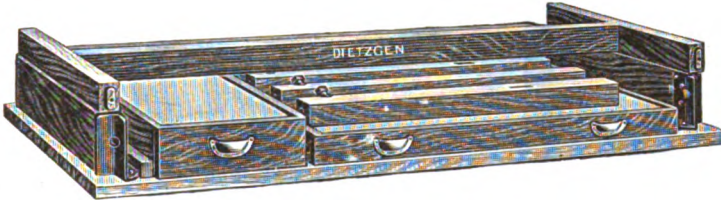
These tables fold compactly, and occupy a comparatively small space when closed. Each table furnished with drawer, lock and key.

	Each.	Approx. Ship'g Wgt.
No. 4460D. Shamrock Table, board 37 × 49 in., . . .	\$	140 lbs.
4460F. " " " 43 × 61 " . . .		170 "
4460G. " " " 49 × 73 " . . .		190 "

See Price List in back of Catalog.

Sturdy Drawing Tables

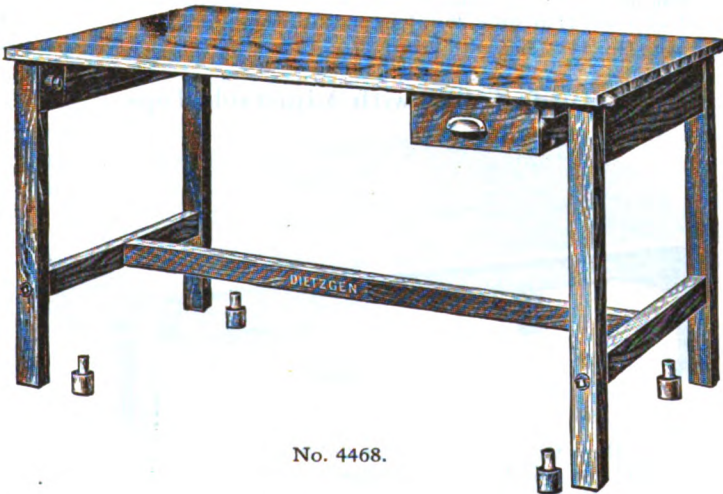
The Sturdy Drawing Tables are sturdily built, and, in addition to being suitable for all the customary uses of drawing tables, can be quickly set up, taken down, or compactly crated for transporting at a reduced rate, as they are of "knock-down" construction.



Sturdy Table "knocked-down" for shipment.

Each leg is fastened to the upper frame by a long heavy bolt that passes through a steel corner plate of special design. A bracing frame, to which each leg is tongued and also screw-bolted, is a noteworthy feature, insuring, with the steel corner plates, absolute rigidity.

The upper frame, the bracing or lower frame, the legs, and the fronts of the drawers are made of thoroughly seasoned hardwood, highly finished. The top, 33 × 63 × 1½ inches, is a soft white pine Drawing Board, of selected stock. The height, 34 inches, can be increased to 35, 36 and 37 inches by means of 1, 2 and 3 inch raising blocks. Unless otherwise specified, the 2 inch raising blocks are furnished.

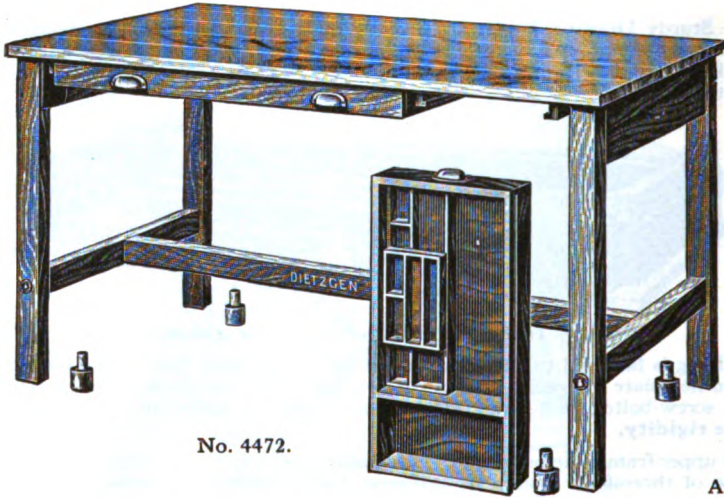


No. 4468.

No.	Description	Each.	Approx. Ship'g Wgt.
4464.	Sturdy Table, with 1, 2 or 3 in. raising blocks, board 33 × 63 in., without drawer,	\$	160 lbs.
4465.	Like No. 4464, but with board 39 × 75 in.,		180 "
4468.	Sturdy Table, with 1, 2 or 3 in. raising blocks, board 33 × 63 in.; one drawer, 12 in. wide, 24½ in. long and 4 in. deep, inside, containing partitioned tool tray,		165 "
4469.	Like No. 4468, but with board 39 × 75 in.,		185 "

See Price List in back of Catalog.

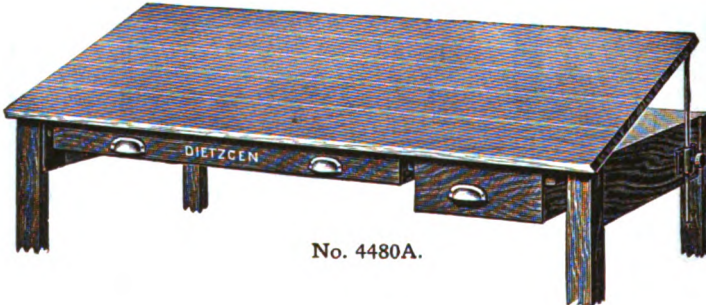
Sturdy Drawing Tables



No. 4472.

- | | |
|---|--|
| <p>No. 4472. Sturdy Table, with 1, 2 or 3 in. raising blocks, board 33 × 63 in., with two drawers: one 12 in. wide, 24 ½ in. long and 4 in. deep, inside, containing partitioned tool tray; other 37 in. wide, 26 in. long and 2 in. deep, inside, \$</p> <p>4473. Like No. 4472, but with board 39 × 75 in., . . .</p> | <p>Approx.
Ship'g Wgt</p> <p>170 lbs.</p> <p>190 "</p> |
|---|--|

Sturdy Tables with Adjustable Tops



No. 4480A.

The Tops of these tables are hinged at the front and can be adjusted to different angles by means of two adjustable metal supports, one of which is shown in illustration. They are rigid at any angle, and when they are raised the contents of the drawers are protected by a second top.

- | | |
|--|-----------------|
| No. 4476A. Like No. 4464, but adjustable top instead of flat top, . . . | Each, \$ |
| 4476B. " " 4465, " " " " " " " " " " " " " " " " | . . . " |
| 4478A. " " 4468, " " " " " " " " " " " " " " " " | . . . " |
| 4478B. " " 4469, " " " " " " " " " " " " " " " " | . . . " |
| 4480A. " " 4472, " " " " " " " " " " " " " " " " | . . . " |
| 4480B. " " 4473, " " " " " " " " " " " " " " " " | . . . " |

See Price List in back of Catalog.

National Adjustable Drawing Tables



No. 4484F.

The National Adjustable Drawing Tables, substantially constructed of cast iron, can be easily adjusted and are neatly finished. The top consists of a fine quality pinewood Drawing Board, which is provided with hardwood ledges, attached so as to allow contraction and expansion. It can be clamped at any angle, and is raised and lowered by rack and pinion.

	Each.	Approx. Ship'g Wgt.
No. 4484C. National Table: Stand No. 4486A; board 31 × 43 in., \$		155 lbs.
4484E. " " " " 4486B; " 37 × 55 "		205 "
4484F. " " " " 4486C; " 43 × 61 "		250 "
4484G. " " " " 4486C; " 49 × 73 "		270 "
4486A. National Stand (without board), distance between centers of brackets 26½ in.,		100 "
4486B. National Stand (without board), distance between centers of brackets, 38½ in.,		120 "
4486C. National Stand (without board), distance between centers of brackets, 50½ in.,		145 "

Parallel Attachments and Straight Edges for use with Drawing Tables listed under Nos. 2043-2047.

See Price List in back of Catalog.

Columbia Adjustable Drawing Tables



No. 4490F-4492B-4492D.

The Columbia Adjustable Drawing Tables, rigid and durable in construction, are made of cast iron, and are nicely japanned. The top is raised and lowered by rack and pinion, can be tilted to any desired angle and securely clamped. It consists of a fine quality pinewood Drawing Board, which is provided with hardwood ledges, attached so as to allow contraction and expansion.

	Each.	Approx. Ship'g Wgt.
No. 4490C. Columbia Table, board 31 × 43 in.,	\$	195 lbs.
4490E. " " " 37 × 55 "		225 "
4490F. " " " 43 × 61 "		280 "
4490G. " " " 49 × 73 "		300 "

Accessories

No. 4492A. Hardwood Footrest,	Each, \$
4492B. Folding-Arm with plain shelf,	"
4492C. " " " large " and drawer with lock,	"
4492D. Bracket with cabinet having two drawers with locks,	"

See Price List in back of Catalog.

Draftsmens Stools



No. 4500A.



4502A.

	Each.	Ship'g Wgt.
No. 4500A. Draftsmens Stool, golden elm, wood seat, height 34 in., \$		20 lbs.
4500C. Like No. 4500A, but cane seat,		20 "
4502A. Draftsmens Stool, golden elm, wood seat, height adjustable from 26 to 30 inches,		30 "
4502C. Like No. 4502A, but cane seat,		30 "



No. 4504A.



4506A.

	Each.	Ship'g Wgt.
No. 4504A. Draftsmens Stool, golden elm, wood seat, height adjustable from 31 to 35 inches, \$		32 lbs.
4504C. Like No. 4504A, but cane seat,		32 "
4506A. Draftsmens Stool, oak, wood seat, height adjustable from 31 to 35 inches,		32 "
4506C. Like No. 4506A, but cane seat,		32 "

See Price List in back of Catalog.

Draftsmens Indestructo Steel Stools



No. 4508A.

4509A.

4509D with 4509F.

These Stools, made of angle steel and finished in olive green baked enamel, are light, rigid, durable, comfortable and attractive.

They are securely braced, and specially reinforced with extra cross-supports. The seats are hardwood, varnished; and the feet are rounded and smooth.

		Each.	Ship'g Wgt.
No. 4508A.	Draftsmens Indestructo Steel Stool, 28 in. high, . . . \$		45 lbs.
4508B.	Like No. 4508A, but 30 in. high,		45 "
4508E.	" " 4508A, " 32 " "		47 "
4509A.	Draftsmens Indestructo Steel Stool, height adjustable from 30 to 35 inches,		50 "
4509D.	Like No. 4509A, but with adjustable back,		50 "
4509F.	Adjustable Foot Rest,		10 "

See Price List in back of Catalog.

Multum Drawing Tables



The Multum Drawing Tables are substantially constructed, rigid, easily adjusted, and neatly finished. They are adjustable to heights from 30 to 46 inches, and the board can be tilted to any angle and revolved to any position.

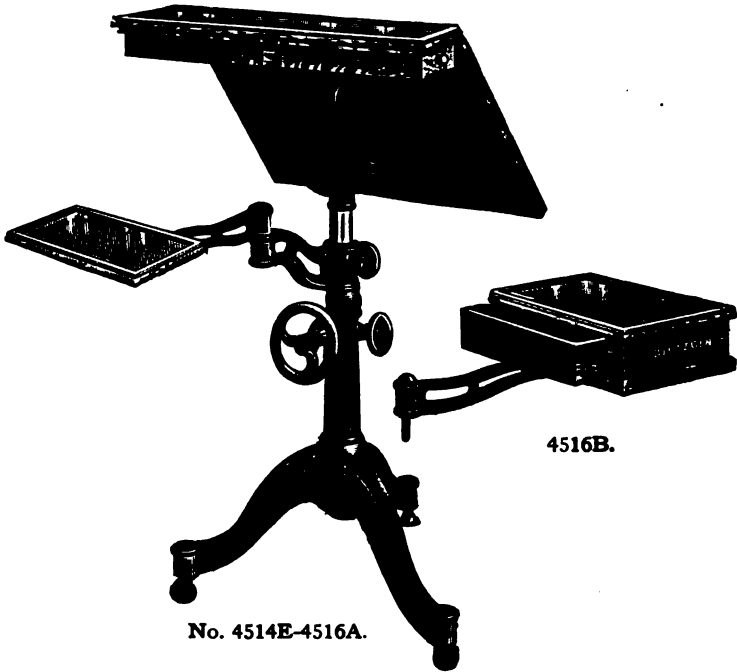
These Tables have an advantage of permitting several drawing boards to be used interchangeably on the same stand. This is accomplished by attaching the special ring as shown in illustration to each board, it then being a simple matter to quickly remove the board on the stand and replace with one of the other boards.

	Each.	Approx. Ship'g Wgt.
No. 4510. Multum Table (Stand only),	\$	40 lbs.
4510A. " " with board No. 4410, 20 × 24½ in.,		50 "
4510B. " " " " " 4414, 23 × 31 "		55 "
4510R. Attaching Rings for boards,		

Drawing Boards Nos. 4410 and 4414 listed on pages 190-191.

See Price List in back of Catalog.

Matchless Drawing Tables



No. 4514E-4516A.

4516B.

The Matchless Drawing Tables can be used in a sitting or a standing position, as they are adjustable for heights between 33 and 45 inches. The top is attached to a substantial spindle, the upper part of which consists of a locking mechanism having a large corrugated bearing surface, thus facilitating a quick and firm clamping of the top at any desired angle. A rack and pinion of special design permits raising and lowering the table top with but little effort. The shelf, furnished with Nos. 4514B, 4514D and 4514E Tables, is always horizontal, and is very convenient for drawing instruments, water-cups, ink stands, etc.

Cast iron is used for the tripod, standard and spindle, all working parts are easily operated and the clamping screws accessible. These Tables are exceptionally ornamental, rigid and compact, and because of their meritable features have met with general favor for use in Colleges, Manual Training Schools, and Studios, as well as in drafting rooms.

	Each.	Approx. Ship'g Wgt
No. 4514A. Matchless Table, Oak Top 22 × 24 in., plain,	\$	95 lbs.
4514B. " " " " 22 × 24 " with shelf,		100 "
4514C. " " " " 22 × 26 " plain,		105 "
4514D. " " " " 22 × 26 " with shelf,		110 "
4514E. " " " " 22 × 26 " " "		135 "

and two drawers,

Accessories

No. 4516A. Folding Arm, with plain shelf,	Each, \$
4516B. " " " large " drawer and lock,	

See Price List in back of Catalog.

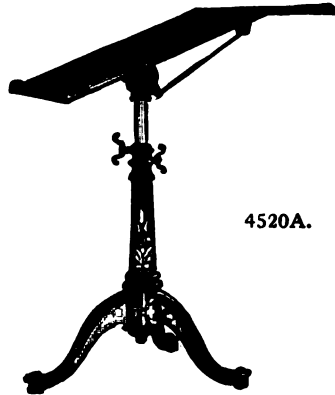
Standard Drawing Tables

These Tables can be adjusted to any height between 30 and 44 inches, thus being adapted either for sitting or for standing use. By loosening the screw at the right, the top can be rotated and either side brought to the front. The shelf or ledge is attached to the reverse side of the table, and is always level, regardless of the inclination of the table top. This is very convenient for pencils, ink bottles, etc. When the table top is in a nearly vertical position it forms a perfect easel, and the table occupies but little space.

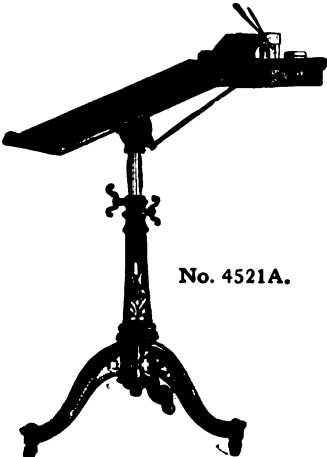
The tripod, hollow standard and sliding spindle, neatly painted and bronzed, are made of cast iron. The working parts are well finished and very easily operated. The stand is sufficiently firm to hold a large drawing board. Simplicity of design and rigidity of construction result in these tables being exceptionally well adapted for the use of students in class rooms of Schools and Colleges; also for general use in offices and homes.



No. 4520.



4520A.



No. 4521A.

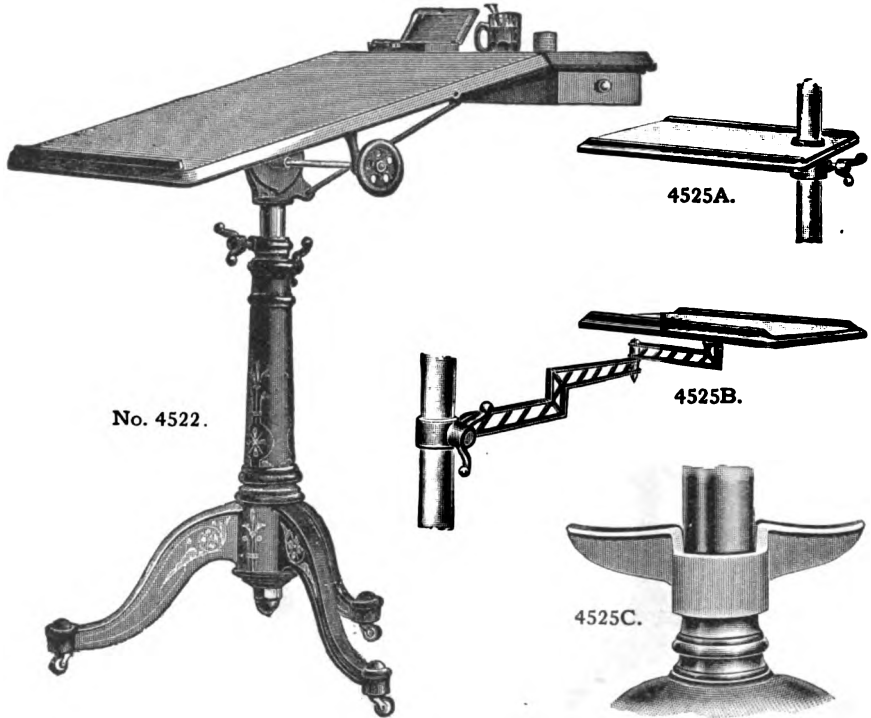


4523.

For Dimensions of Tops, see page 208.

See Price List in back of Catalog.

Standard Drawing Tables



			Each.	Approx. Ship'g Wgt.
No. 4520.	Ash Top,	22 × 24 in.,	\$	65 lbs.
4520A.	" "	22 × 24 " ; top shelf,		65 "
4521.	Quar. Oak Top,	22 × 26 " ; " "		65 "
4521A.	" " "	22 × 26 " ; top shelf with two drawers; on casters,		70 "
4521B.	Mahogany Top; otherwise like 4521A,			70 "
4522.	Quar. Oak Top, 22 × 26 in.; top shelf with two drawers; long set screw; on casters,			70 "
4522A.	Mahogany Top; otherwise like 4522,			70 "
4523.	Clay Modeling Stand, Ash Top, 22 × 24 in.; with cups,			65 "

Accessories

No. 4525A.	Adjustable Shelf, plain,	Each, \$
4525B.	Swinging Arm with Shelf,	"
4525C.	Foot Rest,	"
4525D.	Casters, to fit any of above Tables,	"

For Illustrations of Nos. 4520, 4520A, 4521A and 4523, see page 207.

See Price List in back of Catalog.

Combination Drawing Tables and Filing Cases



No. 4530A.

Made of well-seasoned oak, golden oak rubbed finish. Consist of two No. 4536A; one No. 4536S; and a swinging arm with tray and drawer. Top is a fine basswood Drawing Board, with a sketch box 3 inches deep; board is arranged so it can be extended from 6 to 8 inches beyond front edge of cabinet, raised or lowered 10 inches on the level, and tilted to any angle. All parts are securely fastened together, making a very rigid outfit.

	Each.	Approx. Ship'g Wgt.
No. 4530A. Comb. Table Filing Case, adjustable top, 37×54 in., \$		400 lbs.
4530B. " " " " " 37×60 "		475 "
4530C. " " " " " 40×72 "		550 "
4532A. " " " flat top, 37×54 "		390 "
4532B. " " " " " 37×60 "		465 "
4532C. " " " " " 40×72 "		540 "

Nos. 4532A-4532C have a flat Drawing Board top, as shown in illustration below.

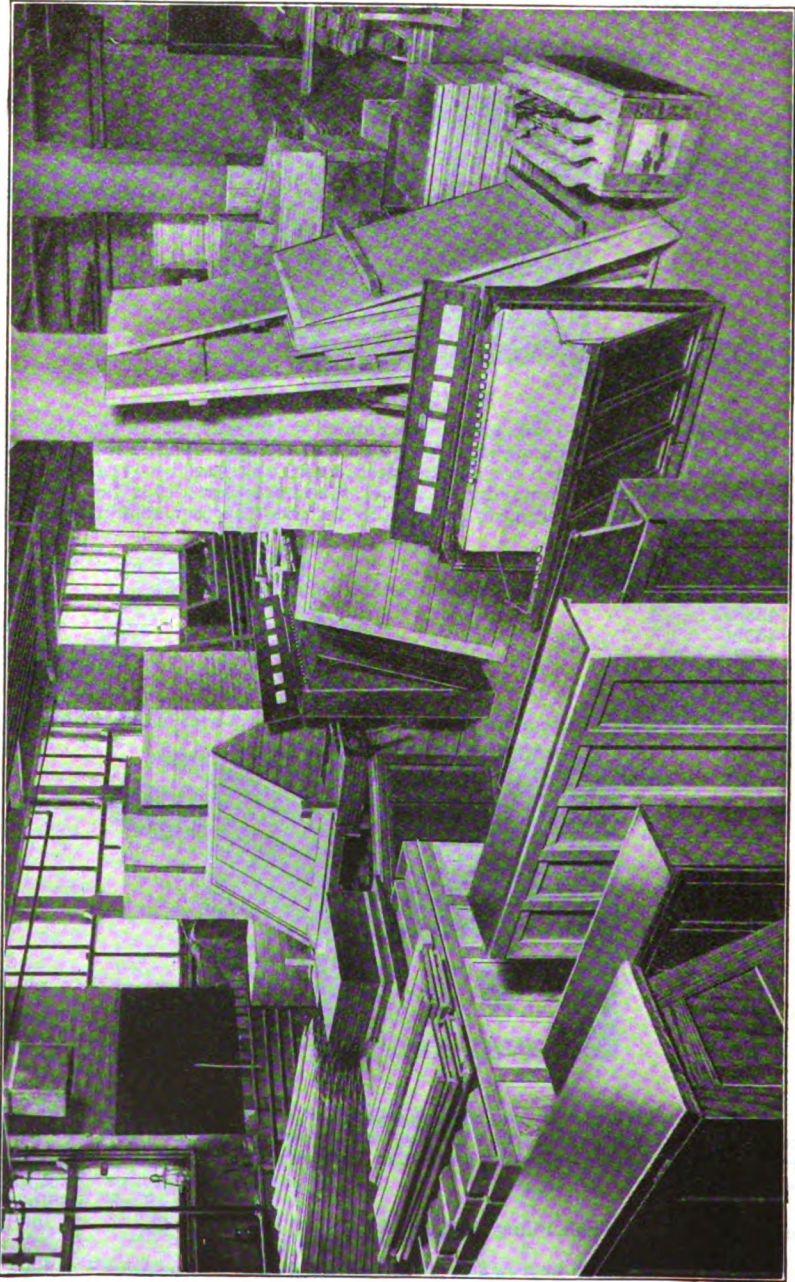


No. 4534A.

Made of well-seasoned oak, golden oak finish. Consist of one No. 4536A; one No. 4536T; and a swinging arm with tray and drawer. Top, flat, is a fine basswood Drawing Board, put on with slides so it can be drawn forward. A neat, durable, and practical outfit.

	Each.	Approx. Ship'g Wgt.
No. 4534A. Comb. Table Filing Case, flat top, 37 × 54 in., . \$		300 lbs.
4534B. " " " " " 37 × 60 "		325 "
4534C. " " " " " 40 × 72 "		400 "

See Price List in back of Catalog.



Section of Cabinet Department—Factory

Oak Sectional Filing Cases



For
Filing
Drawings
Flat.

Showing
three
Sections
No. 4536A,
Top
No. 4536K,
and
Base with
drawer
No. 4536R.

Our Cabinets are made on the plan of the well-known sectional bookcases. They will be found uniform in size, and always the same, so that any number of sections bought at different times will fit perfectly.

Sections—The Sections are made in three styles, as follows:

	OUTSIDE DIMENSIONS OF SECTION.			INSIDE DIMENSIONS OF DRAWERS.		
	Length.	Width.	Height.	Length.	Width.	Depth.
Section of 5 drawers,	45 1/2 in.	34 1/2 in.	14 1/2 in.	42 1/2 in.	32 in.	2 in.
“ “ 3 “	45 1/2 “	34 1/2 “	14 1/2 “	42 1/2 “	32 “	3 3/8 “
“ “ 1 “	45 1/2 “	34 1/2 “	9 1/4 “	42 1/2 “	32 “	7 “

The Drawers slide in grooves. All joints are dovetailed and well glued, the glue blocks being used at frequent intervals, thus making the cases firm and durable. The back of each drawer is covered for a space of 6 inches with a thin strip to prevent drawings from curling up, and finger holes are in the bottom of each drawer to facilitate removing contents. When desired, drawers can be made to order subdivided into two or four compartments, as shown in illustrations on page 212.

Top—The Top is made in one style only, is closed at top and fits any Section; 45 1/2 in. long, 34 1/2 in. wide, 3 in. high.

Bases—The Bases are made in four styles, fitting any Section, as follows:

	OUTSIDE DIMENSIONS.		
	Length.	Width.	Height.
Base, plain,	45 1/2 in. long,	34 1/2 in. wide,	4 in. high.
“ with drawer 6 1/4 in. deep,	45 1/2 “ “	34 1/2 “ “	9 1/4 “ “
“ low Sanitary,	45 1/2 “ “	34 1/2 “ “	5 3/4 “ “
“ high Sanitary,	45 1/2 “ “	34 1/2 “ “	22 3/4 “ “

Material—The Sections, Top and Bases are made of well-seasoned and thoroughly kiln-dried oak.

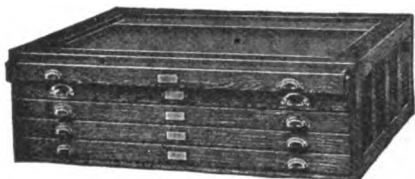
Finish and Trimmings—Golden oak stain and filler; three coats of varnish, rubbed and finished in a uniform color; oxidized drawer pulls and label holders.

Sections, Top and Bases illustrated on pages 212-213. Steel Sectional Filing Cases listed on pages 214-215.

See Price List in back of Catalog.

Oak Sectional Filing Cases

Sections



No. 4536A.



4536F.



No. 4536G.

	Each.	Approx. Ship'g Wgt.
No. 4536A. Section of 5 drawers, height 14½ in., drawers 2 in. deep,	\$	150 lbs.
4536B. Like No. 4536A, but with an Oak Top attached,		150 "
4536F. Section of 3 drawers, height 14½ in., drawers 3⅝ in. deep,		145 "
4536G. Section of 1 drawer, height 9¼ in., drawer 7 in. deep,		75 "
<p>A Locking Device, by means of which all drawers of a section can be locked as a unit, will be furnished to order on new sections. Price quoted on request.</p>		

Style "B" Drawer



Style "C" Drawer



Subdivided Drawers, as per illustrations, will be furnished to order on new sections. Prices quoted on request.

See Price List in back of Catalog.

**Oak Sectional Filing Cases
Hold Down Irons**



No. 4536H.

No. 4536H. Hold Down Irons, for securely holding down the contents of drawers, Each, \$

Top



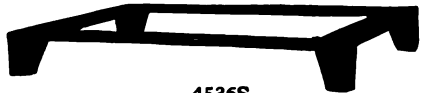
No. 4536K.

No. 4536K. Top, height 3 in.,	Each.	Approx. Ship'g Wgt. 70 lbs.
	\$	

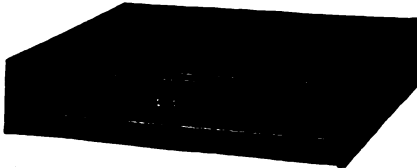
Bases



No. 4536P.



4536S.



No. 4536R.



4536T.

No. 4536P. Base, plain, height 4 in.,	Each.	Approx. Ship'g Wgt. 40 lbs.
4536R. Base, with drawer, height 9¼ in., drawer 6¼ in. deep,		80 "
4536S. Base, low Sanitary, height 5¼ in.,		30 "
4536T. Base, high Sanitary, height 22¼ in.,		75 "

Sections, Top and Bases fully described on page 211.

See Price List in back of Catalog.

Steel Sectional Filing Cases



The Steel Sectional Filing Cases listed by us are made of cold rolled furniture steel, and have welded corners which eliminate joints.

As they are built entirely of steel, they are practically indestructible and are a protection against destruction by fire. The angle runs insure ease of operation regardless of the weight of the contents, or of changes due to atmospheric conditions.

The color is olive green, and the surface is hard and smooth with a rich dull effect, which is produced after applying successive coats of baked enamel.

Sections—The Sections are made in three styles, as follows:

	OUTSIDE DIMENSIONS OF SECTION.			INSIDE DIMENSIONS OF DRAWERS.		
	Length.	Width.	Height.	Length.	Width.	Depth.
Section of 5 drawers,	46 ¹³ / ₁₆ in.	35 ¹ / ₂ in.	15 ³ / ₈ in.	43 in.	32 in.	2 in.
“ “ 3 “	46 ¹³ / ₁₆ “	35 ¹ / ₂ “	15 ³ / ₈ “	43 “	32 “	3 ¹³ / ₁₆ “
“ “ 1 “	46 ¹³ / ₁₆ “	35 ¹ / ₂ “	9 ⁷ / ₈ “	43 “	32 “	7 ¹ / ₂ “

Top—The Top is made in one style only, and fits any Section; 46¹³/₁₆ in. long, 36¹/₄ in. wide, ¹³/₁₆ in. high.

Base—The Base is of the low Sanitary style; 46¹³/₁₆ in. long, 35¹/₂ in. wide, 5¹¹/₁₆ in. high.

Material—The Sections, Top and Base are made entirely of cold rolled furniture steel.

Finish and Trimmings—Hard and smooth surface. Drawer Pulls and Label-holders are stamped brass, satin finish.

Sections, Top and Base illustrated on next page.

Oak Sectional Filing Cases listed on pages 211-213.

See Price List in back of Catalog.

Steel Sectional Filing Cases

Sections



No. 4540A.



4540F.



No. 4540G.

	Each.	Approx. Ship'g Wgt.
No. 4540A. Section of 5 drawers, height 15 $\frac{3}{8}$ in., drawers 2 in. deep,	\$	375 lbs.
4540F. Section of 3 drawers, height 15 $\frac{3}{8}$ in., drawers 3 $\frac{13}{16}$ in. deep,		325 "
4540G. Section of 1 drawer, height 9 $\frac{1}{8}$ in., drawer 7 $\frac{1}{2}$ in. deep,		200 "

Hold Down Irons, for securely holding down the contents of the drawers, are furnished with each drawer.

A Locking Device, by means of which all drawers of a section can be locked as a unit, and Subdivided Drawers, Styles "B" and "C," as illustrated on page 212, will be furnished to order on new sections. Prices quoted on request.

Top



No. 4540K.

Base



4540S.

	Each.	Approx. Ship'g Wgt.
No. 4540K. Top, height 1 $\frac{13}{16}$ in.,	\$	60 lbs.
4540S. Base, low Sanitary, height 5 $\frac{11}{16}$ in.,		75 "

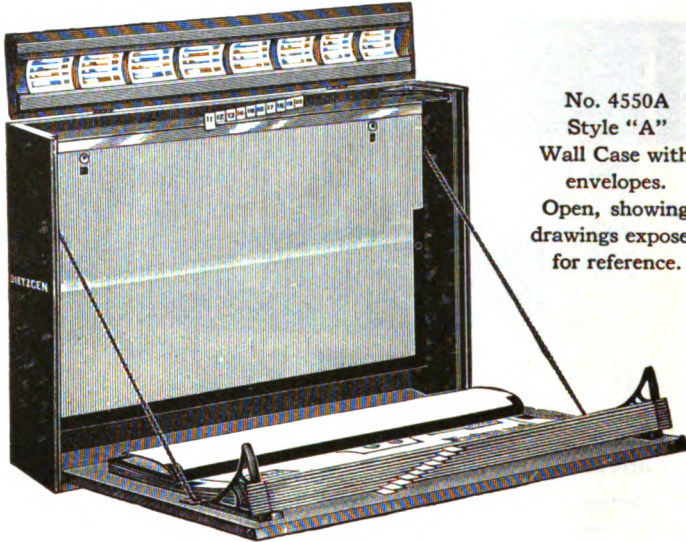
Sections, Top and Base fully described on opposite page.

See Price List in back of Catalog.

Beck Vertical Files

(Patented)

For Drawings, Tracings, Blue Prints, Etc.



No. 4550A
 Style "A"
 Wall Case with
 envelopes.
 Open, showing
 drawings exposed
 for reference.

Practical Advantages

Files drawings flat, vertically, saving floor and wall space.
Keeps drawings clean and protected from injury and wear.
Prevents drawings from slipping down and crumpling.
Files drawings of different sizes systematically in one case.
Exposes drawings instantly for inspection.
Unequaled for use in vaults and filing rooms.
Economical in cost.

The Beck Vertical Files are designed both for wall and for floor use. The Wall Cases are vertical cases having an inside depth of about six inches, and a carrying capacity of either 20 envelopes or 15 file rods, each envelope and file rod being equipped with a numbered index tab. The top is hinged, and has grooves on the inside to hold a series of cards for a classified index of the contents. The front, hinged at the bottom, can be dropped to form a horizontal reference desk for inspecting the drawings, etc. The Floor Cases, fully described on pages 221 to 223, are built on the same principle as the Wall Cases, embody all of their excellent features and are entirely self-contained.

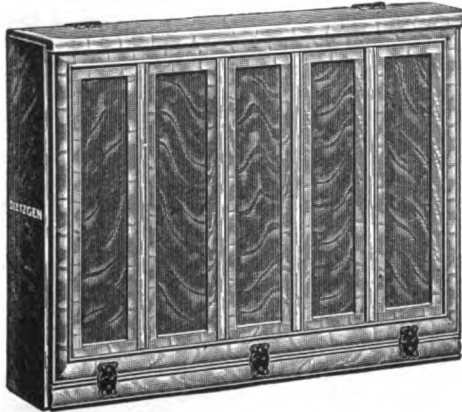
The envelopes are made of a heavy, tough and durable paper, the lower section being bound at the edges with cloth, forming a pocket that absolutely prevents the drawings, etc., from slipping down and crumpling. The upper section is a flap which opens for the insertion and extraction of drawings, and when closed is fastened to the back by means of clamps, making the envelopes practically dust proof. The file rods are steel bars, each one, according to its length, being equipped with two to four sliding clamps for holding the drawings.

Our illustrated pamphlet containing full description and price list of the various styles of Beck Files sent to any address on request.

See Price List in back of Catalog.

Beck Vertical Files

Style "A" Wall Cases



No. 4550A, Style "A" Wall Case, closed.

The Style "A" Wall Cases are designed for fastening to the wall or for attaching to Sanitary Bases as illustrated and described under Nos. 4554A-4554E.

For wall use, two wooden strips are supplied. These are fastened to the wall and the back of the case secured to them. When cases are attached to the wall, the index tabs should be about level with the eyes, as this height is suitable to form a reference desk of the front when it is dropped to a horizontal position.

These cases can also be "built-up" on the well-known plan of sectional book-cases by using the "Unit" Standards as illustrated and described on page 219.

The capacity of each Style "A" Wall Case, when equipped with envelopes or with file rods, is approximately five hundred drawings or tracings. Each case is furnished with twenty envelopes or with fifteen file rods, as desired. All cases are of uniform depth, about six inches inside and eight inches outside. The outside size is approximately five inches higher and six inches wider than the size of the envelope or the file rod, i. e., if the envelopes or the file rods are for drawings 30 × 42 inches, the outside dimensions of the case are 35 × 48 × 8 inches. They are made of Quartered Oak with golden oak, antique, or natural finish; Plain Oak with dark or light finish; and Ash with dark finish.

Prices for Style "A" Wall Cases made of other woods or with different finishes quoted on request.

Style "A" Wall Cases, equipped with 20 Envelopes.

No.	For Drawings.		Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4550A.	22 × 30 in.,	. . .	Each, \$			100 lbs.
4550B.	24 × 36 "	. . .	"			125 "
4550C.	30 × 42 "	. . .	"			160 "
4550D.	36 × 42 "	. . .	"			185 "
4550E.	36 × 48 "	. . .	"			200 "

When ordering, specify wood and finish desired.

Style "A" Wall Cases equipped with File Rods listed on next page.

See Price List in back of Catalog.

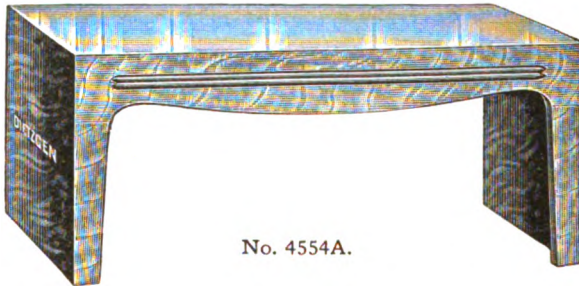
Beck Vertical Files

Style "A" Wall Cases, equipped with 15 File Rods

No.	For Drawings.	Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4552A.	22 × 30 in.,	Each, \$			100 lbs.
4552B.	24 × 36 "	"			125 "
4552C.	30 × 42 "	"			160 "
4552D.	36 × 42 "	"			185 "
4552E.	36 × 48 "	"			200 "

When ordering, specify wood and finish desired.

Bases for Style "A" Wall Cases



No. 4554A.

These Bases are of the Sanitary type and can be fastened either to wall or to floor. Their height is based upon the size of the filing case to be used. The prices below include the hardware necessary for attaching the filing case to the base and the base to the wall or the floor.

They are substantially made, and are furnished in the same woods and finishes as the Style "A" Wall Cases, to which they can be attached easily and quickly.

Prices for Bases made of other woods or with different finishes quoted on request.

No.	Height.	For Cases.	Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4554A.	Base, 26 in.	22 × 30 in.,	Each, \$			75 lbs.
4554B.	" 26 "	24 × 36 "	"			75 "
4554C.	" 26 "	30 × 42 "	"			75 "
4554D.	" 22 "	36 × 42 "	"			75 "
4554E.	" 22 "	36 × 48 "	"			75 "

When ordering, specify wood and finish desired.

Our illustrated pamphlet containing full description and price list of the various styles of Beck Files sent to any address on request.

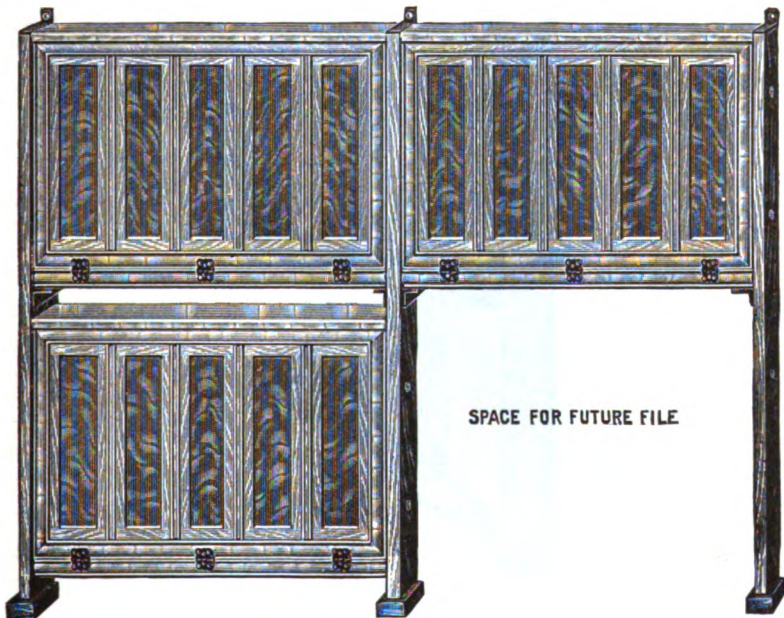
See Price List in back of Catalog.

Beck Vertical Files

"Unit" Standards for Style "A" Wall Cases

Each single filing case, while complete in itself, is also a unit of the entire system. Therefore, filing cases sufficient for only your present requirement need be installed, and other units added to the system as the drawings increase in number.

To facilitate the adding of units, we can furnish "Unit" Standards, by means of which two or more filing cases can be joined in a very simple manner. These Standards are furnished in the same woods and finishes as the Style "A" Wall Cases, and can be easily attached to the wall. Prices shown below are for one Standard: two Standards are required for the first filing case; only one Standard for each additional filing case. Filing cases for drawings 24 X 36 inches or smaller are usually built up two in height, while filing cases for larger drawings are used one in height, placed at a convenient distance from the floor.



No.	Height.	For Cases.	Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4556A.	"Unit" Standards, 70 in.	22 X 30 in.,	Ea., \$			25 lbs.
4556B.	"	74 " 24 X 36 "	"			25 "

"Unit" Standards Nos. 4558A-4558C, as listed below, are for use with filing cases larger than 24 X 36 inches, the cases being built up only one in height and placed at a convenient distance from the floor.

No.	Height.	For Cases.	Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4558A.	"Unit" Standards, 66 in.	30 X 42 in.,	Ea., \$			25 lbs.
4558B.	"	66 " 36 X 42 "	"			25 "
4558C.	"	66 " 36 X 48 "	"			25 "

When ordering, specify wood and finish desired.

See Price List in back of Catalog.

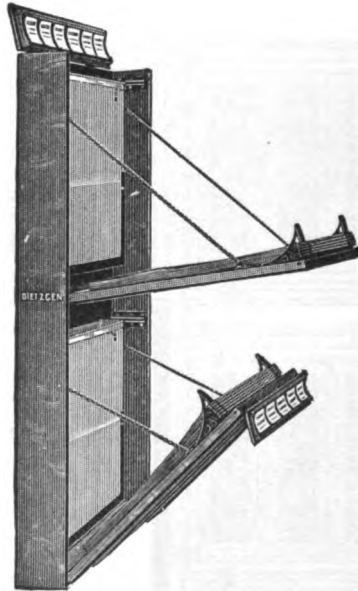
Beck Vertical Files

Style "B" Double-Deck Cases

The Style "B" Double-Deck Cases have double the capacity of the Style "A" Wall Cases, or about 1,000 drawings or tracings, without requiring any additional floor space.

They are usually attached to the wall with the base resting on the floor, thus making both cases easily accessible. One of the cases can, if desired, be used for filing drawings, etc., that are for occasional reference, and the other for data that is in constant use. They are substantially made, and are furnished in the same woods and finishes as the Style "A" Wall Cases.

Prices for Style "B" Double-Deck Cases made of other woods or with different finishes quoted on request.



No. 4560A.

Style "B" Double-Deck Cases, equipped with 40 Envelopes.

No.	For Drawings.		Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4560A.	22 × 30 in., . .	Each, \$				200 lbs.
4560B.	24 × 36 " . . .	"				250 "

Style "B" Double-Deck Cases, equipped with 30 File Rods.

No.	For Drawings.		Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4562A.	22 × 30 in., . .	Each, \$				200 lbs.
4562B.	24 × 36 " . . .	"				250 "

When ordering, specify wood and finish desired.

Our illustrated pamphlet containing full description and price list of the various styles of Beck Files sent to any address on request.

See Price List in back of Catalog.

Beck Vertical Files

Style "E" Floor Cases

The Style "E" Floor Cases have double the capacity of the Style "A" Wall Cases or about 1,000 drawings or tracings, and occupy but very little floor space.

They consist of two Style "A" Wall Cases securely fastened to each other, back to back, and rigidly attached to metal bases equipped with rollers. The length of each metal base is about twenty-two inches from roller to roller. These Floor Cases can be easily moved from place to place in the drafting room or the office and rolled into the vault for protection. They are furnished in the same woods and finishes as the Style "A" Wall Cases.

Prices for Style "E" Floor Cases made of other woods or with different finishes quoted on request.



No. 4564A.

Style "E" Floor Cases, equipped with 40 Envelopes.

No.	For Drawings.	Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt
4564A.	22 X 30 in., . . .	Each, \$			215 lbs.
4564B.	24 X 36 " . . .	"			265 "

Style "E" Floor Cases, equipped with 30 File Rods.

No.	For Drawings.	Quartered Oak.	Plain Oak.	Ash.	Approx. Ship'g Wgt.
4566A.	22 X 30 in., . . .	Each, \$			215 lbs.
4566B.	24 X 36 " . . .				265 "

When ordering, specify wood and finish desired.

Our illustrated pamphlet containing full description and price list of the various styles of Beck Files sent to any address on request.

See Price List in back of Catalog.



Beck Vertical Files

Style "G" Floor Cases

The Style "G" Floor Cases are designed for use in buildings where, due to lease agreements, temporary attachments cannot be fastened to the walls or the floors.

These Cases, built on the principle of the Style "A" Wall Cases and embodying all of their excellent features, are entirely self-contained, each case having a filing capacity of approximately five hundred drawings or tracings. The front can be used as a reference desk without the aid of an attachment—a convenience embodied in only these floor cases. It takes but a moment to bring it to a horizontal position—the action is quick and positive—absolute rigidity is secured—it cannot fall as it is self-suspending. Another advantage is, that any envelope or file rod is mechanically placed in a horizontal position—it is not necessary to lift these containers from the case to the reference desk.

All sizes are of uniform height and depth. The height is about forty-two inches inside and forty-seven inches over all outside. The depth at the top is about eight inches inside and ten inches over all outside; at the bottom, nineteen inches inside and twenty-three inches over all outside.

They are made of Plain Oak, with golden oak, antique, dark, light or natural finish. Prices for cases made of other woods or with different finishes quoted on request.

The 36 × 42 and 36 × 48 inch cases are equipped with a lifting wheel, as shown in illustration on opposite page. This is simply a mechanical aid for quickly bringing the front to a horizontal position when all envelopes or file rods are filled to their full capacity.

Style "G" Floor Cases, equipped with 20 Envelopes.

No.	For Drawings.	Plain Oak.	Approx. Ship'g Wgt.
4568B.	24 × 36 in.,	Each, \$	175 lbs.
4568C.	30 × 42 "	"	200 "
4568D.	36 × 42 "	"	240 "
4568E.	36 × 48 "	"	260 "

Style "G" Floor Cases, equipped with 15 File Rods.

No.	For Drawings.	Plain Oak.	Approx. Ship'g Wgt.
4570B.	24 × 36 in.,	Each, \$	175 lbs.
4570C.	30 × 42 "	"	200 "
4570D.	36 × 42 "	"	240 "
4570E.	36 × 48 "	"	260 "

When ordering, specify finish desired.

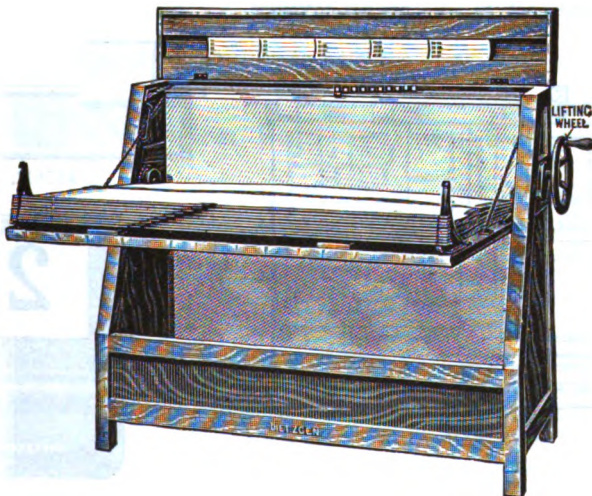
Our illustrated pamphlet containing full description and price list of the various styles of Beck Files sent to any address on request.

See Price List in back of Catalog.

**Beck Vertical Files
Style "G" Floor Cases**



Style "G" Floor Case showing position of front that enables contents of any envelope or file rod to be examined with a facility equal to that of any other floor case.

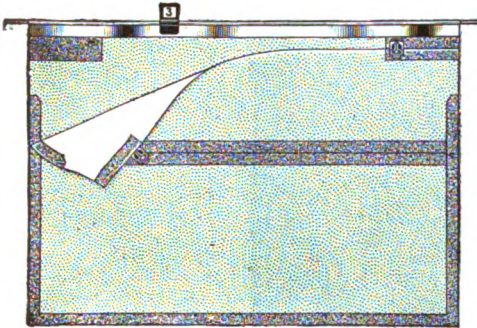


Style "G" Floor Case showing position of front when used as a self-suspended horizontal reference desk—a convenience embodied in only this type of floor case. Illustration also shows the lifting wheel with which the 36 × 42 inch and 36 × 48 inch cases are equipped.

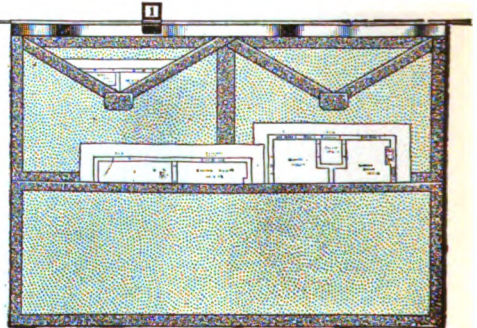
See Price List in back of Catalog.

Beck Vertical Files

Extra Envelopes, File Rods, Clamps and Index Tabs



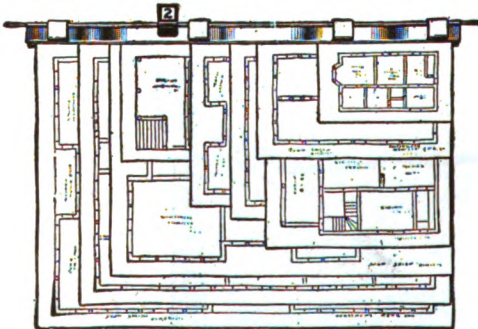
No. 4572A.



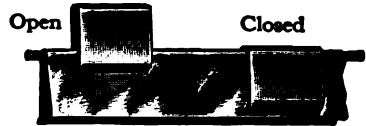
Subdivided Envelope.

No.	For Drawings.	Each, \$
4572A.	Envelope, with Index Tab, 22 × 30 in.,	.
4572B.	“ “ “ “ 24 × 36 “	.
4572C.	“ “ “ “ 30 × 42 “	.
4572D.	“ “ “ “ 36 × 42 “	.
4572E.	“ “ “ “ 36 × 48 “	.

Subdivided envelopes, as per illustration, will be furnished at the following additional charges to the list prices of the regular envelopes Nos. 4572A-4572E: with two pockets, — cents per envelope; with three or four pockets, — cents per envelope; with five to eight pockets, — cents per envelope.



No. 4574C.



4576R.

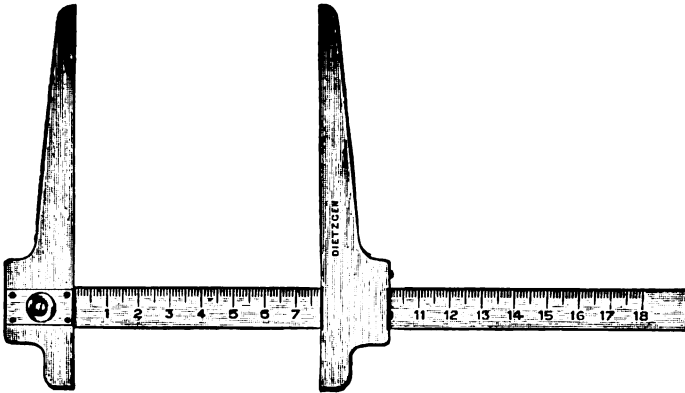


4578T.

No.	For Drawings.	Each, \$
4574A.	File Rod, 30 in., with Index Tab and 3 Clamps,	.
4574B.	“ “ 36 “ “ “ “ “ 3 “	.
4574C.	“ “ 42 “ “ “ “ “ 4 “	.
4574E.	“ “ 48 “ “ “ “ “ 4 “	.
4576R.	Clamps, for File Rods,	.
4578T.	Index Tabs, for Envelopes or File Rods, .	.

See Price List in back of Catalog.

Foresters Tree Calipers



No. 4846.

These Calipers, of best workmanship, are made of thoroughly seasoned hardwood. The beam is graduated to 10ths inches and plainly numbered. The stationary arm is held by brass clamp nuts with lock nut, and the eye of the sliding arm is brass-lined all around. Both arms are removable for convenience in transportation.

No. 4846.	Tree Caliper, fine Hardwood,	18 in.,	1 clamp nut,	. . .	Each, \$
4847.	" " " "	24 "	2 " "	. . .	"
4848.	" " " "	30 "	2 " "	. . .	"
4849.	" " " "	50 "	2 " "	. . .	"

Combination Folding Pocket Rules



No. 4854.

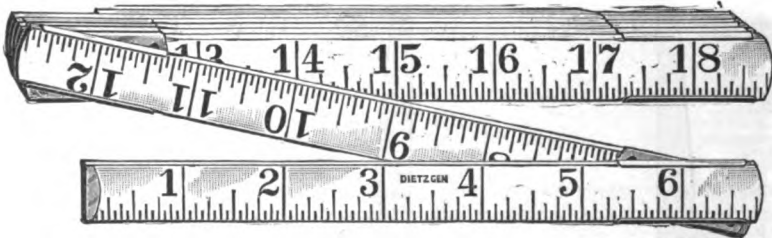
The Combination Folding Pocket Rules can be used as a Caliper Gauge, Protractor, Triangle, or Try Square. They are made of spring Nickel silver, accurately and distinctly graduated, are adjustable to any angle, and the construction of the center joint is such that the arms will not move except when pressed. The upper edge and the caliper arm are graduated to 32nds, and the lower edge to 16ths. The Protractor is graduated to five degrees and the vernier reads to half-degrees.

No. 4854.	Combination Folding Pocket Rule,	6 inch,	2 fold,	. . .	Each, \$
4855.	" " " "	12 "	2 " "	. . .	"
4856.	Chamois Sheath for No. 4854,	. . . . .	. . . . .	. . . . .	"
4857.	" " " "	4855,	. . . . .	. . . . .	"

See Price List in back of Catalog.

Folding Pocket Rules: Yellow Enamel Finish

Outside Measurement



No. 4864.

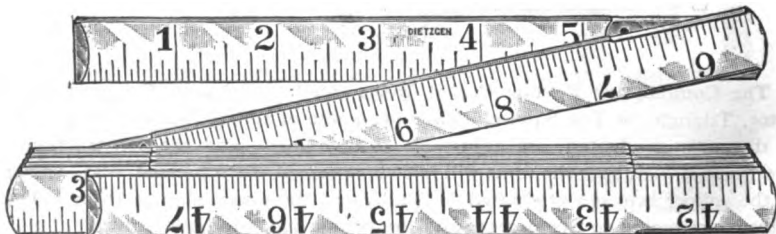
These Folding Rules are accurate, have no rivets on the surface to interfere with the reading, and the ends are protected by metal tips. The black graduations and figures are clear and sharp.

The construction of the friction joints is such that practically no wood is cut away from the rule to attach the joints. This feature, combined with the fact that the joints are made of heavy rust-proof metal and firmly anchored at four points, gives an exceptional durability.

Joints will not slip nor pull from the rule, and even when the rule is opened full length hold it firmly in position.

No.	Pocket Rule,	2 feet,	4 fold,	div.	$\frac{1}{8} \times \frac{1}{8}$ in.	Doz., \$	; Each, \$
4863.	"	3	6	"	$\frac{1}{16} \times \frac{1}{8}$ "	"	"
4864.	"	4	8	"	$\frac{1}{16} \times \frac{1}{8}$ "	"	"
4865.	"	5	10	"	$\frac{1}{16} \times \frac{1}{8}$ "	"	"
4866.	"	6	12	"	$\frac{1}{16} \times \frac{1}{8}$ "	"	"
4868.	"	8	16	"	$\frac{1}{8} \times \frac{1}{8}$ "	"	"
4864M.	Pocket Rule,	4 feet,	8 fold,	div.	$\frac{1}{8} \times$ mm.,	"	"
4864T.	Pocket Rule,	4 feet,	8 fold,	div.	$\frac{1}{8} \times \frac{1}{100}$ ft.,	"	"
4866T.	"	6	12	"	$\frac{1}{8} \times \frac{1}{100}$ "	"	"

Inside Measurement



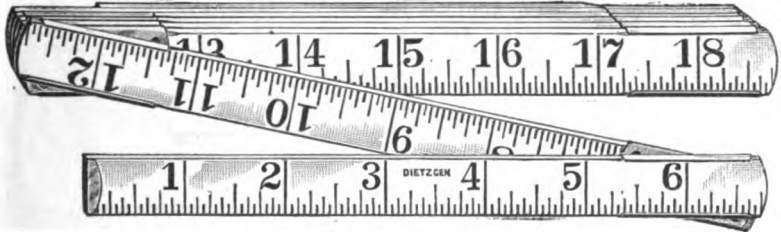
No. 4874.

No. 4874.	Pocket Rule,	4 feet,	8 fold,	div.	$\frac{1}{8} \times \frac{1}{8}$ in.	Doz., \$	; Each, \$
4876.	"	6	12	"	$\frac{1}{8} \times \frac{1}{8}$ "	"	"

See Price List in back of Catalog.

Folding Pocket Rules: White Enamel Finish

Outside Measurement



No. 4904.

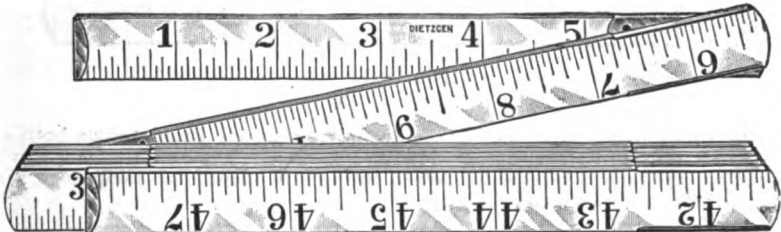
These Folding Rules, while similar in workmanship and construction to those listed under Nos. 4862 to 4866T, have a white coating that is very durable, resists heat and moisture, and can be cleaned with water, oil or alcohol, thus enabling their neat appearance to be always maintained.

They are accurate, have no rivets on the surface to interfere with the reading, and the ends are protected by metal tips. The black graduations and figures, clear and distinct, are exceptionally legible against the white background.

Joints will not slip nor pull from the rule, and even when the rule is opened full length hold it firmly in position.

No. 4902.	Pocket Rule, 2 feet,	4 fold,	div. $\frac{1}{8} \times \frac{1}{8}$ in.	Doz., \$	; Each, \$
4903.	" " 3 "	6 "	" " $\frac{1}{8} \times \frac{1}{8}$ "	"	"
4904.	" " 4 "	8 "	" " $\frac{1}{8} \times \frac{1}{8}$ "	"	"
4905.	" " 5 "	10 "	" " $\frac{1}{8} \times \frac{1}{8}$ "	"	"
4906.	" " 6 "	12 "	" " $\frac{1}{8} \times \frac{1}{8}$ "	"	"
4908.	" " 8 "	16 "	" " $\frac{1}{8} \times \frac{1}{8}$ "	"	"
4904M.	Pocket Rule, 4 feet,	8 fold,	div. $\frac{1}{8} \times$ mm.,	"	"
4904T.	Pocket Rule, 4 feet,	8 fold,	div. $\frac{1}{8} \times \frac{1}{100}$ ft.,	"	"
4906T.	" " 6 "	12 "	" " $\frac{1}{8} \times \frac{1}{100}$ "	"	"

Inside Measurement



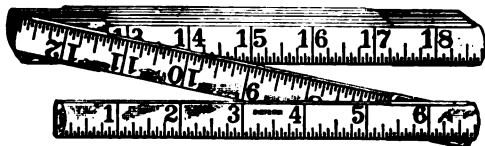
No. 4914.

No. 4914.	Pocket Rule, 4 feet,	8 fold,	div. $\frac{1}{8} \times \frac{1}{8}$ in.,	Doz., \$	; Each, \$
4916.	" " 6 "	12 "	" " $\frac{1}{8} \times \frac{1}{8}$ "	"	"

See Price List in back of Catalog.

Folding Pocket Rules

Vest Pocket Size: Outside Measurement



No. 4942.

Yellow Enamel Finish

- | | | | |
|-----------|--|---------|------------|
| No. 4942. | Pocket Rule, 2 feet, 6 fold, $\frac{1}{8} \times \frac{1}{8}$ in., | Doz. \$ | ; Each, \$ |
| 4943. | " " 3 " 9 " $\frac{1}{8} \times \frac{1}{8}$ " | " | " |

White Enamel Finish

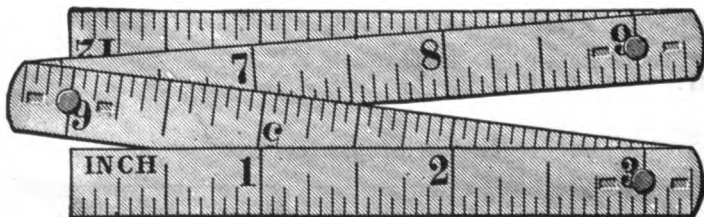
- | | | | |
|-----------|--|---------|------------|
| No. 4962. | Pocket Rule, 2 feet, 6 fold, $\frac{1}{8} \times \frac{1}{8}$ in., | Doz. \$ | ; Each, \$ |
| 4963. | " " 3 " 9 " $\frac{1}{8} \times \frac{1}{8}$ " | " | " |

Rules Nos. 4942-4963 are only $\frac{1}{2}$ inch wide. When closed they measure but $\frac{1}{2} \times \frac{5}{8} \times 5\frac{1}{4}$ inches. Very convenient for the pocket.

Steel Folding Pocket Rules

Spring Joints

In Leather Sheaths

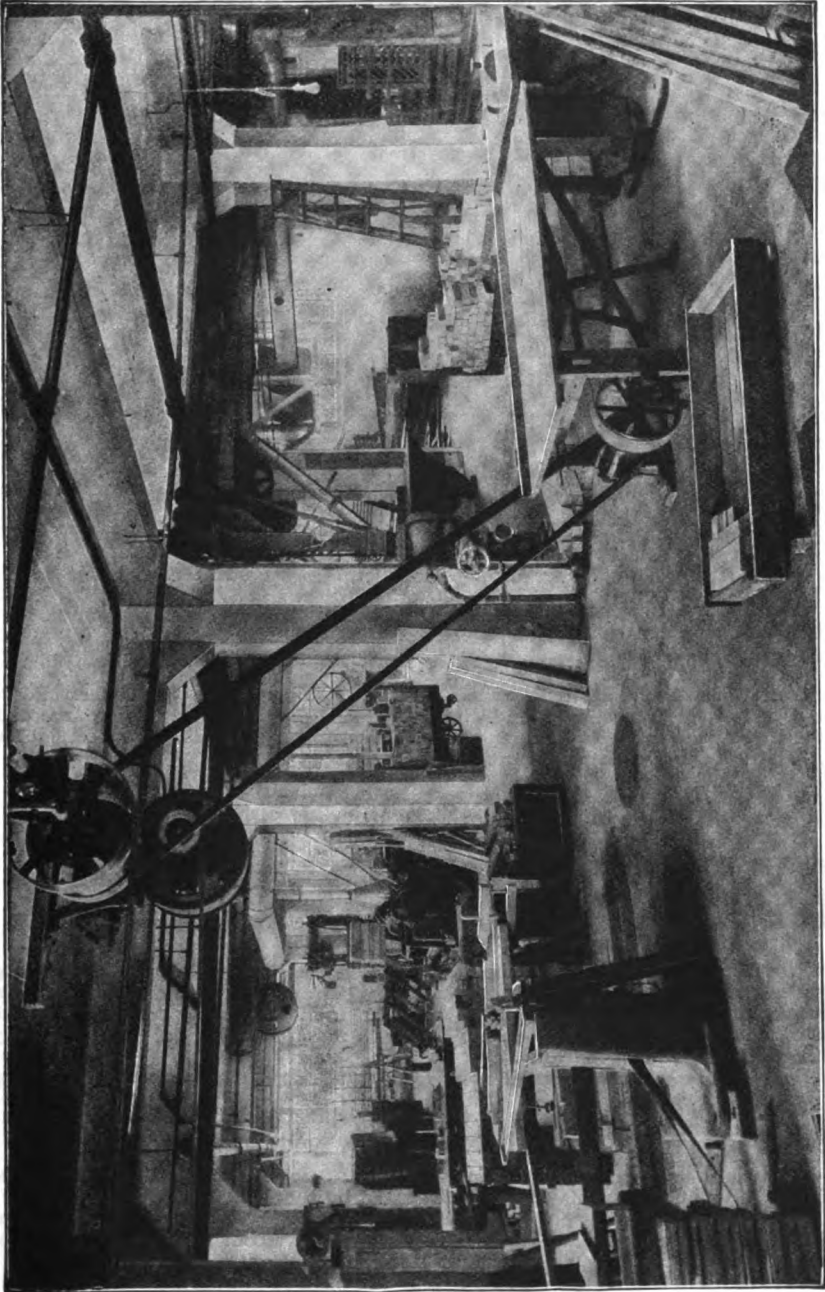


No. 4981.

These Rules, furnished in leather sheaths, are accurately graduated on both sides, and the divisions and numbering are clear and distinct. They are made of carefully tempered spring steel, $\frac{3}{8}$ inch wide. When the rule is opened the joints lock firmly, holding the rule in a rigid straight line.

- | | | | |
|-----------|---|---------|------------|
| No. 4981. | Steel Pocket Rule, 1 foot, 4 fold, div. $\frac{1}{8} \times \frac{1}{8}$ in., | Doz. \$ | ; Each, \$ |
| 4982. | " " " 2 " 8 " " $\frac{1}{8} \times \frac{1}{8}$ " | " | " |
| 4983. | " " " 3 " 12 " " $\frac{1}{8} \times \frac{1}{8}$ " | " | " |

See Price List in back of Catalog.



Section of Woodworking Department—Factory



Dietzgen Measuring Tapes



Accuracy

All Steel Measuring Tapes of our manufacture are graduated according to the U. S. Standard of the National Bureau of Standards at Washington, D. C.

Tension and Temperature

Steel Tapes are graduated under a tension of 10 pounds up to 100 feet and 20 pounds if longer. When supported their entire length, they are accurate according to the U. S. Standard—62° Fahrenheit for the customary English units (feet, inches, etc.), and 20° Centigrade for Metric units.

Numbering—Simplified-Reading



From above illustration the simplicity and advantage of our **Simplified-Reading** is evident. At each foot the figures are not only **large** but are placed at a slant most convenient for quick reading, while at each inch the foot marks are repeated with smaller figures having the same slant. The inch marks are vertical, and thus easily distinguished from the foot marks.

By this improved arrangement, total reading is seen at a glance without referring backward or forward.

Finish

A special black finish is applied to all of our Steel Tape ribbons having etched divisions and numbers. This finish is designated by the word **Black**.

The **Black Finish** not only increases the legibility of the bright etched divisions and numbers, but also is a safeguard against rusting, overcomes the necessity of protecting the ribbon by oiling, and greatly aids in maintaining its appearance.

See Price List in back of Catalog.



Subdivisions

English and Metric

Steel Tapes in 10ths have the foot divided to 10 parts and each $\frac{1}{10}$ again to 10 parts, making the unit division $\frac{1}{100}$ foot.

Steel Tapes in 12ths have the foot divided to inches ($\frac{1}{12}$ foot) and each inch to eighths, making the unit division $\frac{1}{96}$ inch, except the Major Junior, Reliance Junior and Admiral Junior which are divided to $\frac{1}{64}$ inch.

Steel Tapes in Metric are divided to half-centimeters, the first decimeter to millimeters.

Spring Winding Pocket Tapes in 10ths have the foot divided to 10 parts and each $\frac{1}{10}$ again to 10 parts, making the unit division $\frac{1}{100}$ foot.

Spring Winding Pocket Tapes in 12ths have the foot divided to inches in 16ths, the entire length of ribbon.

Spring Winding Pocket Tapes in Metric are divided to millimeters, the entire length of ribbon.

On all Steel Measuring Tapes in Metric except the Monarch, Argus, Chancellor and Monitor, the divisions begin—"on the line."

Certificate of Comparison

We can furnish any of the Dietzgen Steel Tapes, the graduations of which begin on the line, with Certificate of Comparison of the National Bureau of Standards at Washington. The fees of the Bureau of Standards for comparisons are given below; to this must be added the transportation charges to and from Washington, D. C.

For total length not greater than 100 feet or 50 meters, either supported throughout or at intervals,	\$0 75
For each additional 100 foot or 50 meter interval,	50
For comparing total length both supported throughout and at intervals for length of 100 feet or 50 meters,	1 25
For each additional 100 foot or 50 meter interval,	1 00
For each subdivision compared,	10
For determination of length at an additional tension, for each 100 foot or 50 meter interval,	25
For determining the tension to the nearest 0.5 pound or 0.25 kilogram at which the Tape is most nearly correct at the standard temperature, there will be an additional charge for each 100 foot or 50 meter interval,	50
For Tapes not sent on a reel there will be an additional charge for each 100 foot or 50 meter length or fraction thereof,	25

Tapes with graduations beginning at outside end of ring and those having the terminal mark on a tension handle will be accepted for test, and a Certificate will be given showing their errors, but will not be marked with a Bureau of Standards identification number.

The Bureau of Standards Certificate states the temperature at which the comparison was made, method of support, the tension used in making comparison, and the length corrected for the standard temperature.

See Price List in back of Catalog.

Numeral and Letter Suffixes

In connection with the catalog numbers of certain Tapes, we use numeral and letter suffixes, explanation of which is given below:

When numbers end with numeral "0" ribbons are divided one side only, 10ths of feet.

"	"	"	"	"	"2"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	"5"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	"7"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	letter	"A"	"	"	"	25 feet in length.	"	"	"	"	"	"	"	"
"	"	"	"	"	"B"	"	"	"	33	"	"	"	"	"	"	"	"
"	"	"	"	"	"C"	"	"	"	50	"	"	"	"	"	"	"	"
"	"	"	"	"	"D"	"	"	"	66	"	"	"	"	"	"	"	"
"	"	"	"	"	"E"	"	"	"	75	"	"	"	"	"	"	"	"
"	"	"	"	"	"F"	"	"	"	100	"	"	"	"	"	"	"	"
"	"	"	"	"	"G"	"	"	"	150	"	"	"	"	"	"	"	"
"	"	"	"	"	"H"	"	"	"	200	"	"	"	"	"	"	"	"
"	"	"	"	"	"R"	"	"	"	10 meters	"	"	"	"	"	"	"	"
"	"	"	"	"	"S"	"	"	"	15	"	"	"	"	"	"	"	"
"	"	"	"	"	"T"	"	"	"	20	"	"	"	"	"	"	"	"
"	"	"	"	"	"W"	"	"	"	25	"	"	"	"	"	"	"	"
"	"	"	"	"	"X"	"	"	"	30	"	"	"	"	"	"	"	"
"	"	"	"	"	"Y"	"	"	"	50	"	"	"	"	"	"	"	"

Nickel-Plating Steel Ribbons

We are prepared to furnish our Steel Tape ribbons nickel-plated (for protection against rust) at the following extra charge:

Steel Measuring Tapes							
Length in feet, . . .	25	33	50	66	75	100	
Extra charge, . . .	\$						
Steel Chain Tapes							
Length in feet,				100	200	300	500
Extra charge,					\$		
Steel Pocket Tapes							
Length in feet,				3	5	6	8
Extra charge,					\$		

Repairs

At our establishments in Chicago, New York, San Francisco, New Orleans and Pittsburgh, we have the best facilities for making repairs of any nature on Steel Measuring Tapes.

This work is given careful and prompt attention and the charges will be found moderate consistent with high-class workmanship.

See Price List in back of Catalog.

Monarch Steel Tapes

Leather Cases

Ribbons $\frac{1}{4}$ inch



No. 5000C.

Ribbon—Heavy steel, black finish, $\frac{1}{4}$ inch wide, simplified-reading, easily removed from case, two detachable handles.

Divisions—Begin at end of line.

Case—Strong leather, hand sewed, steel lining.

Handles—Flush folding, long leverage, opened by pressing handle pin from opposite side of case.

Mountings—Nickel-plated.

10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5000B.	No. 5002B.	33 Feet.	\$
5000C.	5002C.	50 "	
5000D.	5002D.	66 "	
5000E.	5002E.	75 "	
5000F.	5002F.	100 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5005S.	15 Meters.	\$	No. 5007S.	15 Meters.	\$
5005W.	25 "		5007W.	25 "	
5005X.	30 "		5007X.	30 "	

Detachable Handles for Steel Tapes listed under Nos. 5597A-5597B.

Tapes of other widths, lengths or divisions made to order.

See Price List in back of Catalog.

Merrimac Steel Tapes

Leather Cases

Ribbons 1/2 inch



No. 5022C.

Ribbon—Steel, black finish, 1/2 inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed, steel lining.

Handle—Flush double folding, long leverage, opened by pressing handle pin from opposite side of case.

Mountings—Nickel plated.

10ths of Feet. No. 5020C. 5020F.	12ths of Feet. No. 5022C. 5022F.	Length. 50 Feet. 100 "	Each. \$
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Metric, one side only. No. 5025S. 5025X.	Length. 15 Meters. 30 "	Each. \$	Metric and 12ths of Feet. No. 5027S. 5027X.	Length. 15 Meters. 30 "	Each. \$
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For Nickel-Plating Steel Tape Ribbons, see page 228.

See Price List in back of Catalog.

Major Steel Tapes

Leather Cases

Ribbons $\frac{3}{8}$ inch



No. 5032C.

Ribbon—Steel, black finish, $\frac{3}{8}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed, steel lining.

Handle—Flush double folding, long leverage, opened by pressing handle pin from opposite side of case.

Mountings—Nickel-plated.

10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5030A.	No. 5032A.	25 Feet.	\$
5030C.	5032C.	50 "	
5030E.	5032E.	75 "	
5030F.	5032F.	100 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5035R.	10 Meters.	\$	No. 5037R.	10 Meters.	\$
5035S.	15 "		5037S.	15 "	
5035T.	20 "		5037T.	20 "	
5035W.	25 "		5037W.	25 "	
5035X.	30 "		5037X.	30 "	

**Repairs on Steel Tapes promptly attended to at moderate charges,
see page 228.**

See Price List in back of Catalog.

Major Junior Steel Tapes

Leather Cases

Ribbons $\frac{1}{4}$ inch



No. 5062C.

Ribbon—Steel, black finish, $\frac{1}{4}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed, steel lining.

Handle—Flush double folding, long leverage, opened by pressing handle pin from opposite side of case.

Mountings—Nickel-plated.

10ths of Feet.	12ths of Feet, inches in 16ths.	Length.	Dimensions.	Weight.	Each.
No. 5060A.	No. 5062A.	25 Feet.	$2\frac{1}{4} \times \frac{1}{2}$ in.	$4\frac{1}{2}$ oz.	\$
5060C.	5062C.	50 "	$2\frac{3}{4} \times \frac{1}{2}$ "	$7\frac{1}{2}$ "	
5060E.	5062E.	75 "	$3\frac{1}{4} \times \frac{1}{2}$ "	$9\frac{1}{2}$ "	
5060F.	5062F.	100 "	$3\frac{3}{4} \times \frac{1}{2}$ "	$12\frac{1}{2}$ "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet, inches in 16ths.	Length.	Each.
No. 5065R.	10 Meters.	\$	No. 5067R.	10 Meters.	\$
5065S.	15 "		5067S.	15 "	
5065T.	20 "		5067T.	20 "	
5065W.	25 "		5067W.	25 "	
5065X.	30 "		5067X.	30 "	

The Major Junior Tapes are duplicates of the well-known Major, with the exception of size. Although small and light, their general construction and the weight of the ribbon insures durability and accuracy.

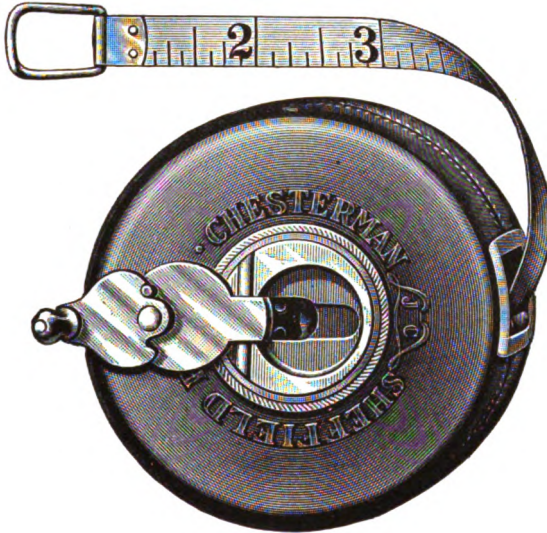
Tape of other widths, lengths or divisions made to order.

See Price List in back of Catalog.

Chesterman Steel Tapes

Leather Cases

Ribbons $\frac{3}{8}$ inch



No. 5092C.

Ribbon—Steel, light finish, $\frac{3}{8}$ inch wide, without simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed.

Handle—Flush double folding, long leverage, opened by pressing knob on hinge end of handle.

Mountings—Nickel-plated.

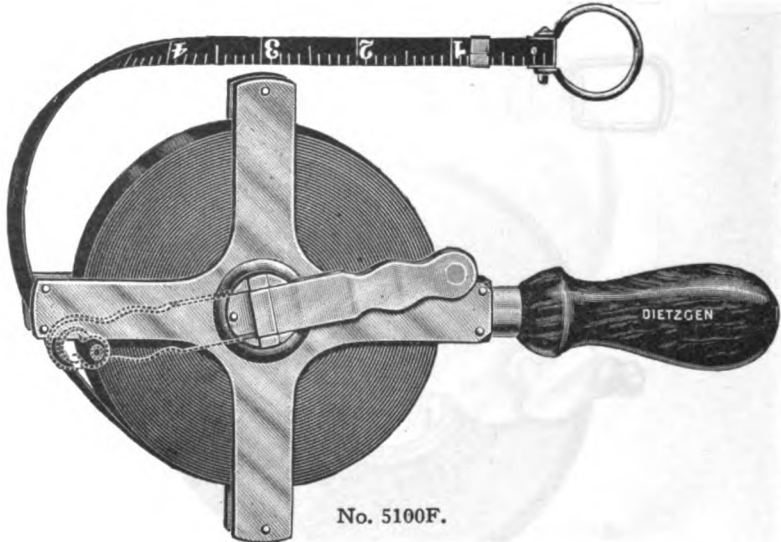
10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5090A.	No. 5092A.	25 Feet.	\$
5090B.	5092B.	33 "	
5090C.	5092C.	50 "	
5090D.	5092D.	66 "	
5090E.	5092E.	75 "	
5090F.	5092F.	100 "	

**Repairs on Steel Tapes promptly attended to at moderate charges,
see page 228.**

See Price List in back of Catalog.

Argus Steel Tapes

Lock Handle Steel Frames Ribbons 1/4 inch



Ribbon—Heavy steel, black finish, 1/4 inch wide, simplified-reading, easily removed from frame, two detachable handles.

Divisions—Begin at end of line.

Frame (Reel)—Steel, four arms, with polished hardwood handle.

Handle—Folding, extra long leverage.

Mountings and Frame—Nickel-plated.

10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5100C.	No. 5102C.	50 Feet.	\$
5100F.	5102F.	100 "	
5100G.	5102G.	150 "	
5100H.	5102H.	200 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5105S.	15 Meters.	\$	No. 5107S.	15 Meters.	\$
5105X.	30 "		5107X.	30 "	
5105Y.	50 "		5107Y.	50 "	

A two arm (instead of four arm) frame is furnished with the Argus Tapes when ribbons are less than 100 feet or 30 meters in length.

The Lock Handle form of frame has in place of the usual handle one of unique design by means of which the Tape can be locked at any desired length. This special handle gives, on account of its length, powerful winding leverage with resultant ease in winding the Tape rapidly.

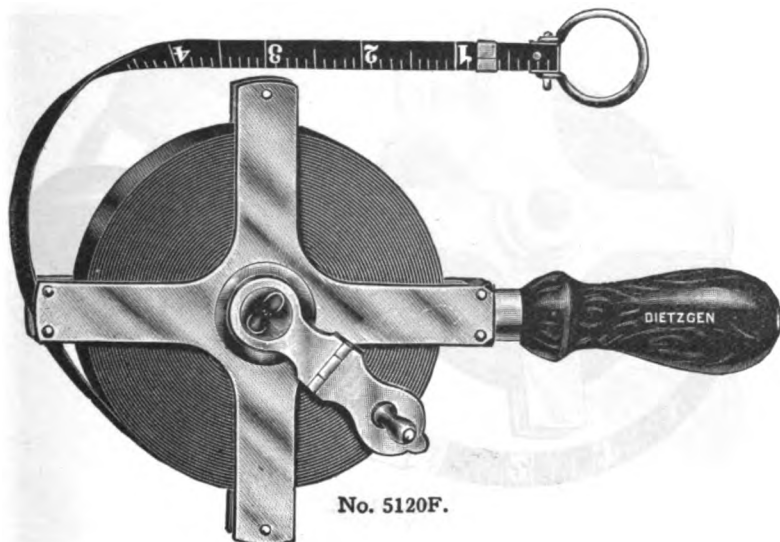
The Lock Handle frame will be furnished with Chancellor, Majestic or Regal Tapes in place of the regular form, without extra charge.

See Price List in back of Catalog.

Chancellor Steel Tapes

Steel Frames

Ribbons $\frac{1}{4}$ inch



No. 5120F.

Ribbon—Heavy steel, black finish, $\frac{1}{4}$ inch wide, simplified-reading, easily removed from frame, two detachable handles.

Divisions—Begin at end of line.

Frame (Reel)—Steel, four arms, with polished hardwood handle.

Handle—Folding, extra long leverage.

Mountings and Frame—Nickel-plated.

10ths of Feet.		12ths of Feet.		Length.	Each.
No. 5120C.		No. 5122C.		50 Feet.	\$
5120F.		5122F.		100 "	
5120G.		5122G.		150 "	
5120H.		5122H.		200 "	

Metric, one side only.	Length.	Each.		Metric and 12ths of Feet.	Length.	Each.
No. 5125S.	15 Meters.	\$		No. 5127S.	15 Meters	\$
5125X.	30 "			5127X.	30 "	
5125Y.	50 "			5127Y.	50 "	

A two arm (instead of four arm) frame is furnished with Chancellor Tapes when ribbons are less than 100 feet or 30 meters in length.

"Lock Handle" Frames described on page 234.

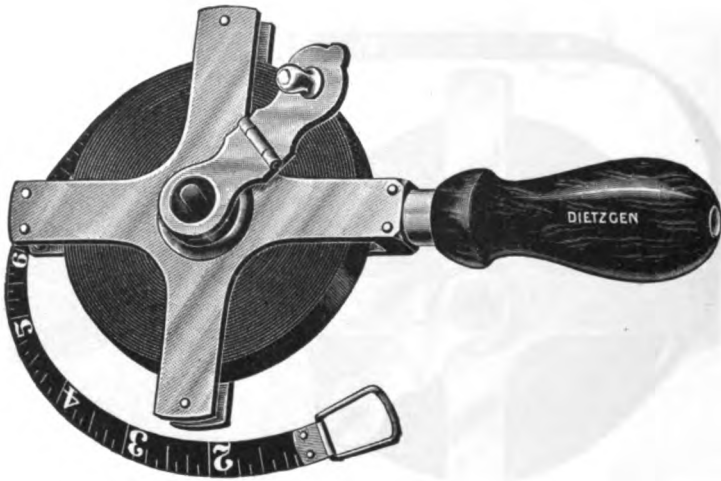
Detachable Handles for Steel Tapes listed under Nos. 5597A-5597B.

See Price List in back of Catalog.

Majestic Steel Tapes

Steel Frames

Ribbons $\frac{1}{2}$ inch



No. 5142F.

Ribbon—Steel, black finish, $\frac{1}{2}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Frame (Reel)—Steel, four arms, with polished hardwood handle.

Handle—Folding, extra long leverage.

Mountings and Frame—Nickel-plated.

10ths of Feet. No. 5140C. 5140F.	12ths of Feet. No. 5142C. 5142F.	Length. 50 Feet. 100 "	Each. \$
Metric, one side only. No. 5145S. 5145X.	Length. 15 Meters. 30 "	Each. \$	Metric and 12ths of Feet. No. 5147S. 5147X.
		Length. 15 Meters. 30 "	Each. \$

A two arm (instead of four arm) frame is furnished with Majestic Tapes when ribbons are less than 100 feet or 30 meters in length.

"Lock-Handle" Frames described on page 234.

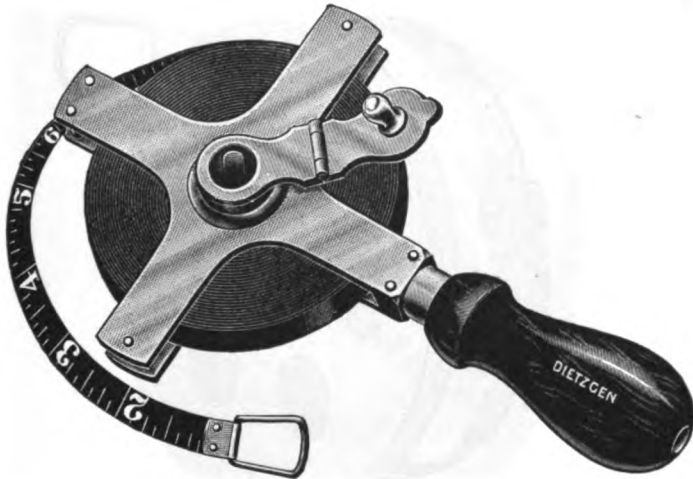
For Nickel-Plating Steel Tape Ribbons, see page 228.

See Price List in back of Catalog.

Regal Steel Tapes

Steel Frames

Ribbons $\frac{3}{8}$ inch



No. 5152F.

Ribbon—Steel, black finish, $\frac{3}{8}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Frame (Reel)—Steel, four arms, with polished hardwood handle.

Handle—Folding, extra long leverage.

Mountings and Frame—Nickel-plated.

<p>10ths of Feet.</p> <p>No. 5150C. 5150F. 5150G. 5150H.</p>	<p>12ths of Feet.</p> <p>No. 5152C. 5152F. 5152G. 5152H.</p>	<p>Length.</p> <p>50 Feet. 100 " 150 " 200 "</p>	<p>Each.</p> <p>\$</p>
<p>Metric, one side only.</p> <p>No. 5155S. 5155X. 5155Y.</p>	<p>Length.</p> <p>15 Meters. 30 " 50 "</p>	<p>Each.</p> <p>\$</p>	<p>Metric and 12ths of Feet.</p> <p>No. 5157S. 5157X. 5157Y.</p>
<p>Length.</p> <p>15 Meters. 30 " 50 "</p>	<p>Each.</p> <p>\$</p>	<p>Length.</p> <p>15 Meters. 30 " 50 "</p>	<p>Each.</p> <p>\$</p>

A two arm (instead of four arm) frame is furnished with Regal Tapes when ribbons are less than 100 feet or 30 meters in length.

"Lock-Handle" Frames described on page 234.

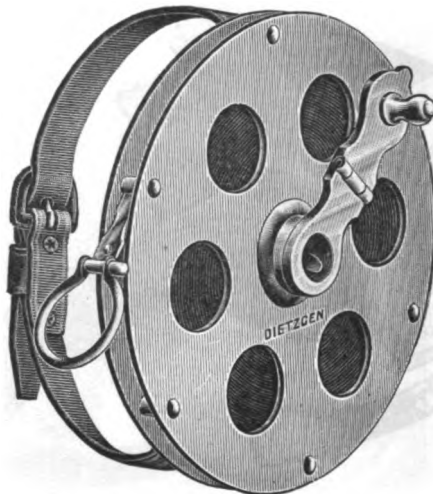
Tapes of other widths, lengths or divisions made to order.

See Price List in back of Catalog.

Monitor Steel Tapes

Steel Reels

Ribbons 1/4 inch



No. 5180C.

Ribbon—Heavy steel, black finish, 1/4 inch wide, simplified-reading, easily removed from reel, two detachable handles.

Divisions—Begin at end of line.

Reel—Steel, with adjustable leather strap for holding firmly while winding.

Handle—Folding, long leverage.

Mountings and Reel—Nickel-plated.

10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5180C.	No. 5182C.	50 Feet.	\$
5180F.	5182F.	100 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5185S.	15 Meters.	\$	No. 5187S.	15 Meters.	\$
5185X.	30 "		5187X.	30 "	

Detachable Handles for Steel Tapes listed under Nos. 5597A-5597B.

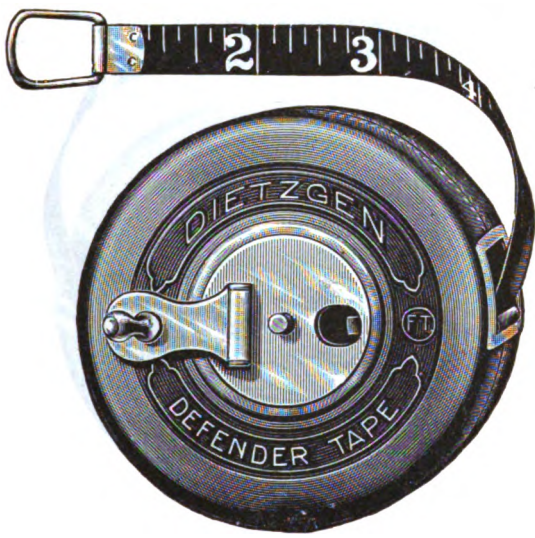
Tapes of other widths, lengths or divisions made to order.

See Price List in back of Catalog.

Defender Steel Tapes

Leather Cases

Ribbons 1/2 inch



No. 5192C.

Ribbon—Steel, black finish, 1/2 inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed, steel lining.

Handle—Folding, long leverage, opened by pressing button which acts direct on handle from opposite side of case.

Mountings—Nickel-plated.

10ths of Feet. No. 5190C. 5190F.	12ths of Feet. No. 5192C. 5192F.	Length. 50 Feet. 100 "	Each. \$
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Metric, one side only. No. 5195S. 5195X.	Length. 15 Meters. 30 "	Each. \$	Metric and 12ths of Feet. No. 5197S. 5197X.	Length. 15 Meters. 30 "	Each. \$
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For Nickel-Plating Steel Tape Ribbons, see page 228.

Tapes of other widths, lengths or divisions made to order.

See Price List in back of Catalog.

Reliance Steel Tapes

Leather Cases

Ribbons $\frac{3}{8}$ inch



No. 5202C.

Ribbon—Steel, black finish, $\frac{3}{8}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed, steel lining.

Handle—Folding, long leverage, opened by pressing button which acts direct or handle from opposite side of case.

Mountings—Nickel-plated.

10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5200A.	No. 5202A.	25 Feet.	\$
5200C.	5202C.	50 "	
5200E.	5202E.	75 "	
5200F.	5202F.	100 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5205R.	10 Meters.	\$	No. 5207R.	10 Meters.	\$
5205S.	15 "		5207S.	15 "	
5205T.	20 "		5207T.	20 "	
5205W.	25 "		5207W.	25 "	
5205X.	30 "		5207X.	30 "	

**Repairs on Steel Tapes promptly attended to at moderate charges,
see page 228.**

See Price List in back of Catalog.

Reliance Junior Steel Tapes

Leather Cases

Ribbons $\frac{1}{4}$ inch



No. 5222C.

Ribbon—Steel, black finish, $\frac{1}{4}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand-sewed, steel lining.

Handle—Folding, long leverage, opened by pressing button which acts direct on handle from opposite side of case.

Mountings—Nickel-plated.

10ths of Feet.	12ths of Feet, inches in 16ths.	Length.	Dimensions.	Weight.	Each.
No. 5220A.	No. 5222A.	25 Feet.	$2\frac{1}{4} \times \frac{1}{2}$ in.	$4\frac{1}{2}$ oz.	\$
5220C.	5222C.	50 "	$2\frac{3}{4} \times \frac{1}{2}$ "	$7\frac{1}{2}$ "	
5220E.	5222E.	75 "	$3\frac{1}{4} \times \frac{1}{2}$ "	$9\frac{1}{2}$ "	
5220F.	5222F.	100 "	$3\frac{3}{4} \times \frac{1}{2}$ "	$12\frac{1}{2}$ "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet, inches in 16ths.	Length.	Each.
No. 5225R.	10 Meters.	\$	No. 5227R.	10 Meters.	\$
5225S.	15 "		5227S.	15 "	
5225T.	20 "		5227T.	20 "	
5225W.	25 "		5227W.	25 "	
5225X.	30 "		5227X.	30 "	

The Reliance Junior Tapes, while of the same excellent workmanship, are about one-half the weight and size of the popular Reliances, and are, therefore, very convenient for carrying in the pocket. Although not designed for heavy work, they are absolutely dependable and will give satisfaction in all respects.

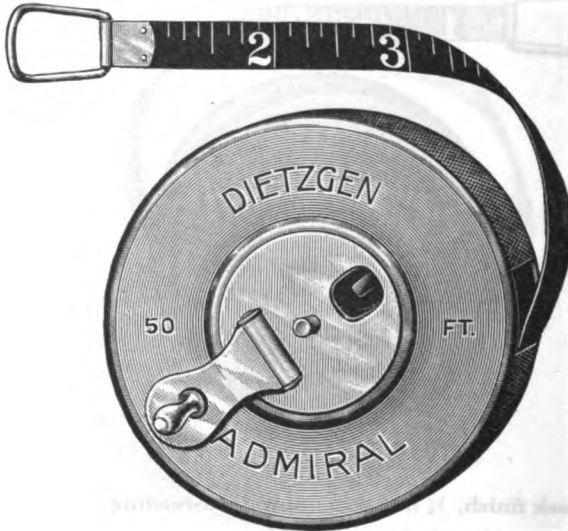
For Nickel-Plating Steel Tape Ribbons, see page 228.

See Price List in back of Catalog.

Admiral Steel Tapes

Steel Cases

Ribbons $\frac{3}{8}$ inch



No. 5242C.

Ribbon—Steel, black finish, $\frac{3}{8}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Heavy steel, with knurled band which insures firm grip while winding the tape.

Handle—Folding, long leverage, opened by pressing button which acts direct on handle from opposite side of case.

Mountings and Case—Nickel-plated.

10ths of Feet.	12ths of Feet.	Length.	Each.
No. 5240A.	No. 5242A.	25 Feet.	\$
5240C.	5242C.	50 "	
5240E.	5242E.	75 "	
5240F.	5242F.	100 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5245R.	10 Meters.	\$	No. 5247R.	10 Meters.	\$
5245S.	15 "		5247S.	15 "	
5245T.	20 "		5247T.	20 "	
5245W.	25 "		5247W.	25 "	
5245X.	30 "		5247X.	30 "	

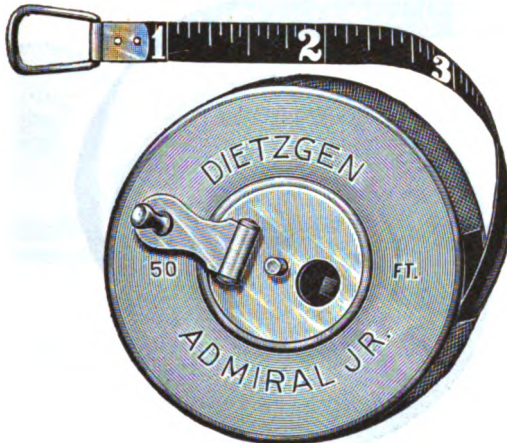
Tapes of other widths, lengths or divisions made to order.

See Price List in back of Catalog.

Admiral Junior Steel Tapes

Steel Cases

Ribbons $\frac{1}{4}$ inch



No. 5262C.

Ribbon—Steel, black finish, $\frac{1}{4}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Heavy steel, with knurled band which insures firm grip while winding the tape.

Handle—Folding, long leverage, opened by pressing button which acts direct on handle from opposite side of case.

Mountings and Case—Nickel-plated.

10ths of Feet.	12ths of Feet, inches in 16ths.	Length.	Dimensions.	Weight.	Each.
No. 5260A.	No. 5262A.	25 Feet.	$2\frac{1}{4} \times \frac{1}{2}$ in.	$4\frac{1}{2}$ oz.	\$
5260C.	5262C.	50 "	$2\frac{3}{4} \times \frac{1}{2}$ "	$7\frac{1}{2}$ "	
5260E.	5262E.	75 "	$3\frac{1}{4} \times \frac{1}{2}$ "	$9\frac{1}{2}$ "	
5260F.	5262F.	100 "	$3\frac{3}{4} \times \frac{1}{2}$ "	$12\frac{1}{2}$ "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet, inches in 16ths.	Length.	Each.
No. 5265R.	10 Meters.	\$	No. 5267R.	10 Meters.	\$
5265S.	15 "		5267S.	15 "	
5265T.	20 "		5267T.	20 "	
5265W.	25 "		5267W.	25 "	
5265X.	30 "		5267X.	30 "	

The Admiral Junior Tapes, while of the same excellent workmanship, are about one-half of the weight and size of the Admiral, embodying, in addition to the meritable features of the latter, lightness and compactness. With proper care, they will last as long as any ordinary Tape, for they are very durable.

See Price List in back of Catalog.

Wonder Steel Tapes

Steel Cases

Ribbons $\frac{3}{8}$ inch



No. 5272C.

Ribbon—Steel, black finish, $\frac{3}{8}$ inch wide, simplified-reading.

Divisions—Begin at outside end of ring.

Case—Steel, with black leathery finish.

Handle—Folding, long leverage, opened by pressing button which acts direct on handle from opposite side of case.

Mountings—Nickel-plated.

12ths of Feet.	Length.	Each.
No. 5272A.	25 Feet.	\$
5272C.	50 "	
5272E.	75 "	
5272F.	100 "	

Metric, one side only.	Length.	Each.	Metric and 12ths of Feet.	Length.	Each.
No. 5275R.	10 Meters.	\$	No. 5277R.	10 Meters.	\$
5275S.	15 "		5277S.	15 "	
5275T.	20 "		5277T.	20 "	
5275W.	25 "		5277W.	25 "	
5275X.	30 "		5277X.	30 "	

The Wonder Steel Tapes are manufactured by us to meet the demand for low-priced, light and compact Steel Tapes with $\frac{3}{8}$ inch ribbons. They are more accurate than Metallic Tapes and in many instances will prove an economical substitute for them.

See Price List in back of Catalog.

Ideal Steel Pocket Tapes
Nickel-Plated Cases Ribbons 1/4 inch
Spring Winding



Nos. 5290-3 to 5297-5.

Ideal Steel Pocket Tapes, black finish ribbons 1/4 in. wide, nickel-plated brass cases, spring winding, with stop at center.

No. 5290-3.	Divided inches to 16ths (one side), 36 in. long.	Each, \$
5290-5.	" " " 16ths " " 60 " " "	"
5290-6.	" " " 16ths " " 72 " " "	"
5290-8.	" " " 16ths " " 96 " " "	"
No. 5291-8.	Divided feet, inches and 16ths (one side), 8 ft. long.	Each,
No. 5292-3.	Divided feet to 100ths (one side), 3 feet long.	Each,
5292-5.	" " " 100ths " " 5 " " "	"
5292-6.	" " " 100ths " " 6 " " "	"
5292-8.	" " " 100ths " " 8 " " "	"
No. 5293-3.	Divided feet, inches, 16ths, other side ft. to 100ths, 3 ft. long.	Each,
5293-5.	" " " 16ths, " " " " 100ths, 5 " " "	"
5293-6.	" " " 16ths, " " " " 100ths, 6 " " "	"
5293-8.	" " " 16ths, " " " " 100ths, 8 " " "	"
No. 5294A.	Divided inches to 16ths, other side millimeters, 1 meter long.	Each,
5294B.	" " " 16ths, " " " " 1 1/2 " " "	"
5294C.	" " " 16ths, " " " " 2 " " "	"
5294D.	" " " 16ths, " " " " 2 1/2 " " "	"
No. 5295-5.	Divided inches to 16ths, other side Scale 1/4 in. to the foot, 60 inches long.	Each,
5296-5.	Divided inches to 16ths, other side Scale 1/8 in. to the foot, 60 inches long.	"
5297-5.	Divided Scale 1/4 in. to the foot, other side Scale 1/8 in. to the foot, 60 inches long.	"

The Nos. 5291-8, 5292-3 to 8 and 5293-3 to 8 have simplified-reading.

Nos. 5295-5, 5296-5 and 5297-5 Tapes will be found especially convenient for Architects' and Contractors' use. Distances on large drawings made to 1/4 in. or 1/8 in. scales can be laid off or measured in one operation, thus saving time and avoiding errors, which may result from the shifting of the ordinary short scales. These Tapes are subdivided their entire length on both sides.

The Ideal Pocket Tapes, while moderate in price, are both reliable and durable. Extreme accuracy and fine construction is guaranteed. In workmanship they present a nicely finished appearance.

See Price List in back of Catalog.

Tape Display Tray



This Tray, $13\frac{3}{4} \times 17\frac{1}{4} \times 1$ in., of golden oak finish and well constructed, contains a practical assortment of our best selling Tapes. It can be used either inside or outside the show case, and for the latter use a suitable frame with polished plate glass is provided for protection. Under each Tape there is a celluloid strip imprinted with the name and lengths of the tape and having a blank space for the dealer to mark his selling prices. The Tray is very attractive and will act as a silent salesman for the dealer. It contains one each of the following Tapes:

No. 5202C.	50 ft. Reliance	}	.	.	.	.	.	.	Described on page 240.
5202F.	100 " "		.	.	.	.	.	.	" " " 241.
5222A.	25 " Reliance		.	.	.	.	.	.	" " " 242.
5222C.	50 " "		.	.	.	.	.	.	" " " 243.
5242C.	50 " Admiral		.	.	.	.	.	.	" " " 245.
5242F.	100 " "		.	.	.	.	.	.
5262A.	25 " Admiral Jr.		.	.	.	.	.	.
5262C.	50 " " "		.	.	.	.	.	.
5290-3.	36 in. Ideal Pocket		.	.	.	.	.	.
5290-5.	60 " " "		.	.	.	.	.	.
5290-6.	72 " " "	.	.	.	.	.	.
5290-8.	96 " " "	.	.	.	.	.	.
5295-5.	60 " " "	.	.	.	.	.	.
5296-5.	60 " " "	.	.	.	.	.	.

No. 5299. Tape Display Tray, complete with Tapes, Each, \$

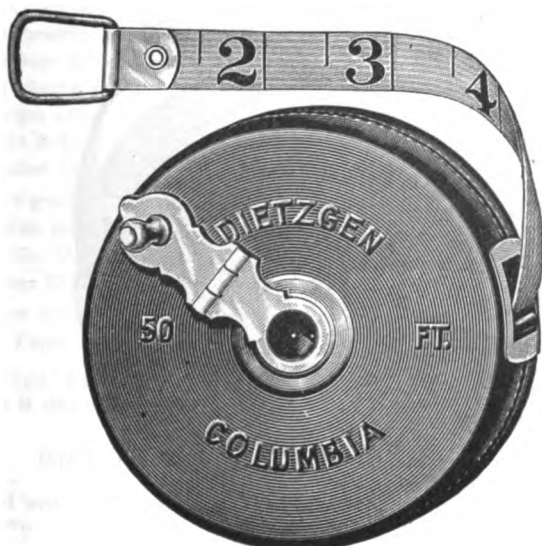
The above price is the total of the list prices of the Tapes contained in the tray. The tray is simply loaned to the dealer for displaying Dietzgen Tapes.

See Price List in back of Catalog.

Columbia Metallic Tapes

Leather Cases

Ribbons $\frac{5}{8}$ inch



No. 5362C.

Ribbon—Linen, interwoven with metal, $\frac{5}{8}$ inch wide, leather re-enforce 1 end.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed.

Handle—Folding, long leverage.

Mountings—Brass.

10ths of Feet and Links.	12ths of Feet and Links.	Length.	Each.
No. 5360A.	No. 5362A.	25 Feet.	\$
5360C.	5362C.	50 "	
5360E.	5362E.	75 "	
5360F.	5362F.	100 "	

Columbia Metallic Tapes, without Case

10ths of Feet and Links.	12ths of Feet and Links.	Length.	Each.
No. 5370A.	No. 5372A.	25 Feet.	\$
5370C.	5372C.	50 "	
5370E.	5372E.	75 "	
5370F.	5372F.	100 "	

See Price List in back of Catalog.

Chesterman Metallic Tapes

Leather Cases

Ribbons $\frac{5}{8}$ inch



No. 5382C.

Ribbon—Linen, interwoven with metal, $\frac{5}{8}$ inch wide, leather re-enforced end.

Divisions—Begin at outside end of ring.

Case—Strong leather, hand sewed.

Handle—Folding, long leverage.

Mountings—Brass.

10ths of Feet and Links.	12ths of Feet and Links.	Length.	Each.
No. 5380A.	No. 5382A.	25 Feet.	\$
5380B.	5382B.	33 "	
5380C.	5382C.	50 "	
5380D.	5382D.	66 "	
5380E.	5382E.	75 "	
5380F.	5382F.	100 "	

Chesterman Metallic Tapes, without Case

10ths of Feet and Links.	12ths of Feet and Links.	Length.	Each.
No. 5390A.	No. 5392A.	25 Feet.	\$
5390B.	5392B.	33 "	
5390C.	5392C.	50 "	
5390D.	5392D.	66 "	
5390E.	5392E.	75 "	
5390F.	5392F.	100 "	

See Price List in back of Catalog.



Dietzgen Flat Steel Wire Tapes

For City, Bridge, Mine and Railroad Engineering

These Tapes are $\frac{1}{8}$ inch wide, manufactured from the finest quality of flexible steel ribbon, heavily plated with white metal to resist rust, and carefully tempered to prevent kinking or breaking. The ends of the bands are beveled to prevent their catching on obstructions, or on each other when winding or unwinding the ribbon. Divisions begin about 6 inches from ends of ribbon. Made regularly from 100 feet up to 500 feet in length, but can be furnished up to 1000 feet if desired. Also made to order graduated in Links, Varas, or other measures.

They are graduated according to the U. S. Standard, and are correct at 62° Fahrenheit for English units (feet, inches, etc.) and 20° Centigrade for Metric units. A certificate from the U. S. Bureau of Standards for verification can be supplied upon request (see page 227).

Reels are listed separately (see Nos. 5594A-5596), and are not included in the prices of the Tapes.

Each Tape is provided with two No. 5524 Detachable Handles, brass, nickel-plated, but if desired a pair of No. 5526 Rawhide Handles will be furnished.

Ribbons $\frac{1}{8}$ Inch Wide, with Brass Bands

Divided and numbered on brass bands (sleeves) which are securely clamped to the ribbon.



Divided and numbered every foot, each end foot divided by short bands to 10ths of a foot.

No. 5402A.	100 feet, Flat Steel Wire Tape, without reel,	. . .	Each, \$
5402C.	200 " " " " " " " "	. . .	"
5402E.	300 " " " " " " " "	. . .	"
5402G.	500 " " " " " " " "	. . .	"

Divided every foot by short bands, divided and numbered every 5 feet, each end foot divided by short bands to 10ths of a foot.

No. 5403A.	100 feet, Flat Steel Wire Tape, without reel,	. . .	Each, \$
5403C.	200 " " " " " " " "	. . .	"
5403E.	300 " " " " " " " "	. . .	"
5403G.	500 " " " " " " " "	. . .	"

Divided and numbered every 5 feet, first and last 5 feet divided and numbered every foot, each end foot divided by short bands to 10ths of a foot.

No. 5408A.	100 feet, Flat Steel Wire Tape, without reel,	. . .	Each, \$
5408C.	200 " " " " " " " "	. . .	"
5408E.	300 " " " " " " " "	. . .	"
5408G.	500 " " " " " " " "	. . .	"

Divided and numbered every 10 feet, first and last 10 feet divided and numbered every foot, each end foot divided by short bands to 10ths of a foot.

No. 5409A.	100 feet, Flat Steel Wire Tape, without reel,	. . .	Each, \$
5409C.	200 " " " " " " " "	. . .	"
5409E.	300 " " " " " " " "	. . .	"
5409G.	500 " " " " " " " "	. . .	"

See Price List in back of Catalog.



Flat Steel Wire Tapes

Ribbons $\frac{1}{8}$ Inch Wide, with Brass Bands

Divided and numbered every meter, each end meter divided by short bands to decimeters.

No. 5414A.	25 meters,	Flat Steel Wire Tape, without reel, . . .	Each, \$
5414C.	50	" " " " " " " " . . .	"
5414E.	100	" " " " " " " " . . .	"

Ribbons $\frac{1}{8}$ Inch Wide, with Nickel Silver Bands

Divided and numbered on hard Nickel silver bands (sleeves) which are securely clamped and soldered, thus preventing corrosion, as moisture cannot enter between the bands and the ribbon.



Divided and numbered every foot, each end foot divided by short bands to 10ths of a foot.

No. 5432A.	100 feet,	Flat Steel Wire Tape, without reel, . . .	Each, \$
5432C.	200	" " " " " " " " . . .	"
5432E.	300	" " " " " " " " . . .	"
5432G.	500	" " " " " " " " . . .	"

Divided every foot by short bands, divided and numbered every 5 feet, each end foot divided by short bands to 10ths of a foot.

No. 5433A.	100 feet,	Flat Steel Wire Tape, without reel, . . .	Each, \$
5433C.	200	" " " " " " " " . . .	"
5433E.	300	" " " " " " " " . . .	"
5433G.	500	" " " " " " " " . . .	"

Divided and numbered every 5 feet, first and last 5 feet divided and numbered every foot, each end foot divided by short bands to 10ths of a foot.

No. 5438A.	100 feet,	Flat Steel Wire Tape, without reel, . . .	Each, \$
5438C.	200	" " " " " " " " . . .	"
5438E.	300	" " " " " " " " . . .	"
5438G.	500	" " " " " " " " . . .	"

Divided and numbered every 10 feet, first and last 10 feet divided and numbered every foot, each end foot divided by short bands to 10ths of a foot.

No. 5439A.	100 feet,	Flat Steel Wire Tape, without reel, . . .	Each, \$
5439C.	200	" " " " " " " " . . .	"
5439E.	300	" " " " " " " " . . .	"
5439G.	500	" " " " " " " " . . .	"

Divided and numbered every meter, each end meter divided by short bands to decimeters.

No. 5444A.	25 meters,	Flat Steel Wire Tape, without reel, . . .	Each, \$
5444C.	50	" " " " " " " " . . .	"
5444E.	100	" " " " " " " " . . .	"

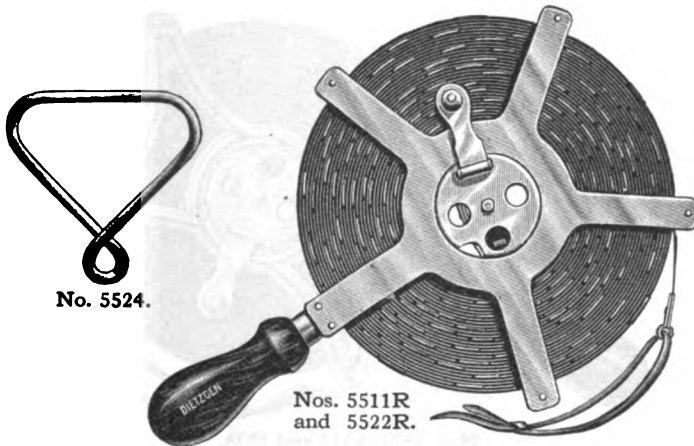
Flat Steel Wire Tapes furnished to order, without extra charge, with one extra subdivided foot before zero.

Reels for above Tapes listed under Nos. 5594A-5596.

Flat Steel Wire Tapes of other lengths or divisions furnished to order.

See Price List in back of Catalog.

Premier Steel Chain Tapes
Ribbons $\frac{1}{4}$ inch

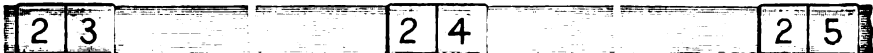


No. 5524.

Nos. 5511R
and 5522R.

Premier Steel Chain Tapes, steel ribbon $\frac{1}{4}$ inch wide heavily plated with white metal to resist rust. Divided and numbered on hard Nickel silver bands (sleeves) which are securely clamped and soldered, thus preventing corrosion, as moisture cannot enter between the bands and ribbon. The ends of the bands are beveled to prevent their catching on under-brush, etc., or on each other when winding or unwinding the ribbon. Divisions begin about 6 inches from ends of ribbon. Each Tape is provided with a pair of No. 5526 Rawhide Handles, but if desired two No. 5524 Detachable Handles, brass, nickel-plated, will be furnished.

Reel No. 5528 is of steel, nickel-plated, with polished hardwood handle. Large center with long folding handle, opened by pressing button acting direct on handle from opposite side of reel.



Divisions and numbers on Nickel silver bands.

Divided every foot by brass rivets, divided and numbered every 5 feet on Nickel silver bands, each end foot divided by brass rivets to 10ths of a foot.

No. 5511N.	100 feet long, without reel,	Each, \$
5511R.	100 " " with reel No. 5528, as shown in illustration,	"
5517N.	200 " " without reel,	"
5517R.	200 " " with folding metal reel No. 5588G,	"
5519N.	300 " " without reel,	"
5519R.	300 " " with folding metal reel No. 5588H,	"

Nos. 5511N to 5519R will be furnished to order with ribbons divided and numbered every foot on Nickel silver bands, each end foot divided by brass rivets to 10ths of a foot. Prices quoted on request.

Divided every 20 centimeters by brass rivets, every meter divided and numbered on Nickel silver bands, each end meter divided by brass rivets to decimeters.

No. 5522N.	30 meters long, without reel,	Each, \$
5522R.	30 " " with reel No. 5528, as shown in illustration,	"
5523N.	50 " " without reel,	"
5523R.	50 " " with folding metal reel No. 5588G,	"
5524.	Detachable Handles, brass, nickel-plated,	Pair,
5526.	Rawhide Handles,	"
5528.	Reel only, for 100 foot or 30 meter tapes,	Each,

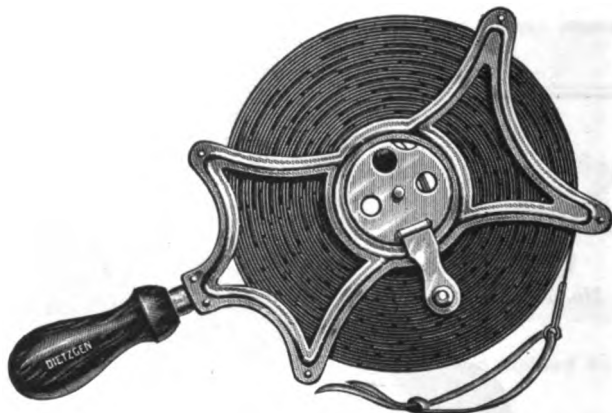
Above Tapes furnished to order, without extra charge, with one extra subdivided foot before zero.

Reels only, Nos. 5588G-5588H, described on page 256.

See Price List in back of Catalog.

Indestructible Steel Chain Tapes

Ribbons $\frac{5}{16}$ inch

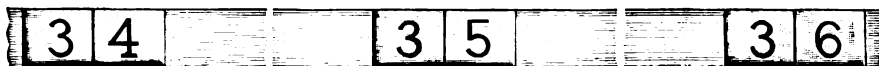


Nos. 5531, 5533 and 5538.

Indestructible Steel Chain Tapes, steel ribbon $\frac{5}{16}$ inch wide heavily plated with white metal to resist rust. Divided and numbered every foot on Babbitt metal, each end foot divided to 10ths of a foot. In Metric, they are divided every 20 centimeters, divided and numbered every meter, each end meter divided to decimeters. Divisions begin about 6 inches from ends of ribbon. Each Tape is provided with a pair of No. 5526 Rawhide Handles, but if desired two No. 5524 Detachable Handles, brass, nickel-plated, will be furnished.

The ribbon is somewhat heavier than the ordinary Chain Tape, and being exceptionally tough and strong, will withstand the most severe usage. The divisions and numbers are less liable to injury than rivets or plates.

Reels Nos. 5543 and 5544 are made of steel, nickel-plated, with polished hardwood handle, the No. 5544 being of same design but of heavier construction than the No. 5543. Ribbed construction insures lightness and strength. Large center with long folding handle which is opened by pressing button acting direct on handle from opposite side of reel. The No. 5543 Reel can be conveniently carried in the pocket.



Divisions and numbers on Babbitt metal.

No.	Length	Description	Each, \$
No. 5530.	100 feet long,	without reel,	
5531.	100 "	" with reel No. 5543, as shown in illustration,	"
5532.	200 "	" without reel,	"
5533.	200 "	" with reel No. 5544, as shown in illustration,	"
5534.	300 "	" without reel,	"
5535.	300 "	" with folding metal reel No. 5588M,	"
5537.	30 meters long,	without reel,	"
5538.	30 "	" with reel No. 5543, as shown in illustration,	"
5539.	50 "	" without reel,	"
5540.	50 "	" with folding metal reel No. 5588K,	"
5543.	Reel only, for 100 foot or 30 meter tapes,		"
5544.	" " 200 " tape,		"

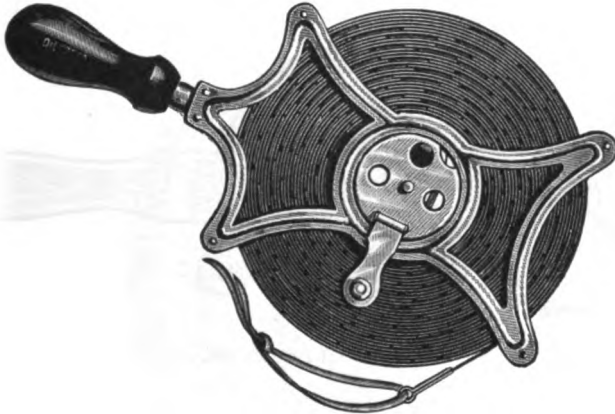
Indestructible Steel Chain Tapes will be furnished to order, with divisions beginning at end of ribbon, with one extra subdivided foot before zero or with metal shoulder at zero point, without extra charge.

Reels only, Nos. 5588K-5588M, described on page 256.

See Price List in back of Catalog.

Indestructible Steel Chain Tapes

Ribbons $\frac{3}{16}$ inch



Nos. 5531A, 5533A and 5538A.

Indestructible Steel Chain Tapes, steel ribbon $\frac{3}{16}$ inch wide heavily plated with white metal to resist rust. Divided and numbered every foot on Babbitt metal, each end foot divided to 10ths of a foot. In Metric, they are divided every 20 centimeters, divided and numbered every meter, each end meter divided to decimeters. Divisions begin about 6 inches from ends of ribbon. Each Tape is provided with a pair of No. 5526 Rawhide Handles, but if desired two No. 5524 Detachable Handles, brass, nickel-plated, will be furnished.

The ribbon is somewhat heavier than the ordinary Chain Tape, and being exceptionally tough and strong, will withstand the most severe usage. The divisions and numbers are less liable to injury than rivets or plates.

Reels Nos. 5543A and 5544A are made of steel, nickel-plated, with polished hardwood handle, the No. 5544A being of same design but of heavier construction than the No. 5543A. Ribbed construction insures lightness and strength. Large center with long folding handle which is opened by pressing button acting direct on handle from opposite side of reel. The No. 5543A Reel can be conveniently carried in the pocket.



Divisions and numbers on Babbitt metal.

No.	Length	Description	Each, \$
5530A.	100 feet	long, without reel,	.
5531A.	100 "	with reel No. 5543A, as shown in illustration,	"
5532A.	200 "	without reel,	"
5533A.	200 "	with reel No. 5544A, as shown in illustration,	"
5534A.	300 "	without reel,	"
5535A.	300 "	with folding metal reel No. 5588P,	"
5537A.	30 meters	long, without reel,	"
5538A.	30 "	with reel No. 5543A, as shown in illustration,	"
5539A.	50 "	without reel,	"
5540A.	50 "	with folding metal reel No. 5588N,	"
5543A.	Reel only,	for 100 foot or 30 meter tapes,	"
5544A.	" " "	200 " tape,	"

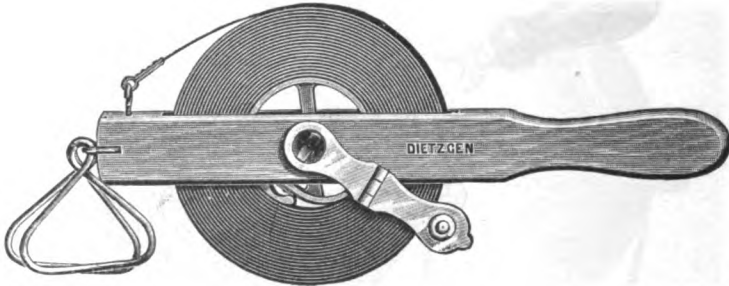
Indestructible Steel Chain Tapes will be furnished to order, with divisions beginning at end of ribbon, with one extra sub-divided foot before zero or with metal shoulder at zero point, without extra charge.

Reels only, Nos. 5588N-5588P, described on page 256.

See Price List in back of Catalog.

Empire Steel Chain Tapes

Ribbons $\frac{1}{4}$ inch



Nos. 5561 and 5564.

Empire Steel Chain Tapes, steel ribbon $\frac{1}{4}$ inch wide, black finish with etched divisions and numbers. Wherever divided and numbered the ribbon has a bright raised surface, which greatly increases the legibility of the black divisions and numbers. Divided and numbered every foot, each end foot divided to 100ths of a foot and numbered to 10ths of a foot. Divisions begin about 6 inches from ends of ribbon. Each Tape is provided with two No. 5524 Detachable Handles, brass, nickel-plated.

Reels Nos. 5574 and 5575 are made of hardwood with steel nickel-plated mountings. Large center with extra-long folding handle for winding ribbon.



Divisions and numbers etched on ribbon.

No.	Length	Description	Each, \$
5560.	100 feet	long, without reel,	"
5561.	100 "	" with reel No. 5574, as shown in illustration,	"
5562.	100 "	" " folding metal reel No. 5588A,	"
5563.	200 "	" without reel,	"
5564.	200 "	" with reel No. 5575, as shown in illustration,	"
5565.	200 "	" " folding metal reel No. 5588B,	"
5566.	300 "	" without reel,	"
5567.	300 "	" with folding metal reel No. 5588C,	"
5568.	500 "	" without reel,	"
5574.	Reel only,	for 100 foot tape,	"
5575.	" " "	200 " "	"

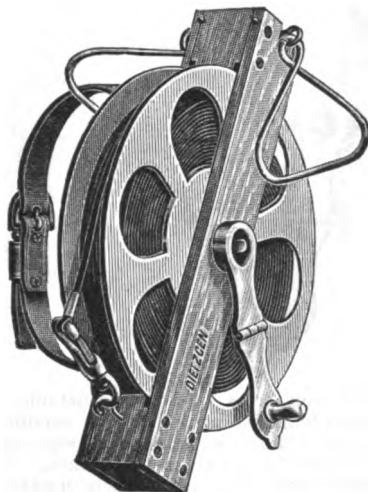
Reels only, Nos. 5588A-5588C, described on page 256.

Tape Grip and Clamping Handle listed under Nos. 5598-5599.

See Price List in back of Catalog.

Dominion Steel Chain Tapes

Ribbons $\frac{1}{8}$ inch



No. 5580B.

Dominion Steel Chain Tapes, steel ribbon $\frac{1}{8}$ inch wide, black finish with etched divisions and numbers. Wherever divided and numbered the ribbon has a bright raised surface, which greatly increases the legibility of the black divisions and numbers. Divided and numbered every foot, each end foot divided to 100ths of a foot and numbered to 10ths of a foot. Divisions begin about 6 inches from ends of ribbon. Each Tape is provided with two No. 5524 Detachable Handles, brass, nickel-plated.



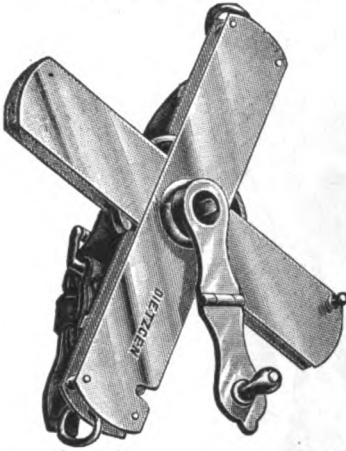
Divisions and numbers etched on ribbon.

No.	Length	Description	Each, \$
5580A.	100 feet long,	without reel,	"
5580B.	100 "	" with reel No. 5594A,	"
5581A.	200 "	" without reel,	"
5581B.	200 "	" with reel No. 5594A,	"
5582A.	300 "	" without reel,	"
5582B.	300 "	" with reel No. 5594A,	"
5583A.	500 "	" without reel,	"
5583B.	500 "	" with reel No. 5594C,	"
5583C.	650 "	" without reel,	"
5583D.	650 "	" with reel No. 5594C,	"
5583E.	660 "	" without reel,	"
5583F.	660 "	" with reel No. 5594C,	"

Reels only, Nos. 5594A-5594C, described on page 257.

See Price List in back of Catalog.

Reels for Flat Wire and Chain Tapes



(Open)

No. 5588A.



(Closed)

Steel Reel, nickel-plated, four arms. Strong adjustable leather loop for holding reel. Large center and extra-long folding handle for winding ribbon. When ribbon is in use and removed from reel, the cross arms of the reel can be folded, so that even the large sizes may be conveniently carried in the pocket. This Reel is made in nine sizes, for different styles and lengths of $\frac{5}{16}$, $\frac{1}{4}$ and $\frac{3}{16}$ inch ribbons.

No. 5588A.	For Empire Chain Tapes,	100 ft. long,	Each, \$
5588B.	" " " "	200 " "	"
5588C.	" " " "	300 " "	"
5588F.	Premier " " "	100 " "	"
5588G.	" " " "	200 " or 50 meters long,	"
5588H.	" " " "	300 " long,	"
5588K.	Indestructible Chain Tapes,	$\frac{5}{16}$ in. wide, 200 ft. or 50 meters long,	"
5588M.	Indestructible Chain Tapes,	$\frac{3}{4}$ in. wide, 300 ft. long,	"
5588N.	" " " "	$\frac{3}{8}$ " " 200 ft. or 50 meters long,	"
5588P.	Indestructible Chain Tapes,	$\frac{3}{4}$ in. wide, 300 ft. long,	"

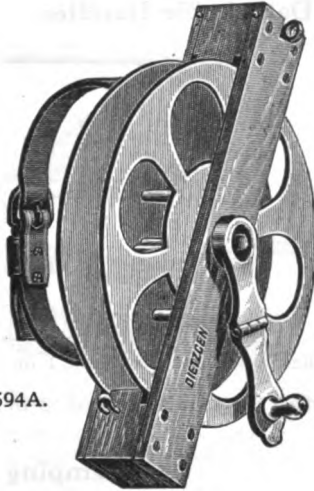
No. 5590.



No. 5590. Metal Reel, for $\frac{1}{4}$ in. Chain Tapes, 300 to 500 ft. long, . . . Each, \$
Substantially built, and as it is exceptionally strong, is very serviceable for long Tapes and for hard usage. The arrangement of the eight metal arms permits winding of the ribbon without kinking and allows free circulation of air for rapid drying and cleaning.

See Price List in back of Catalog.

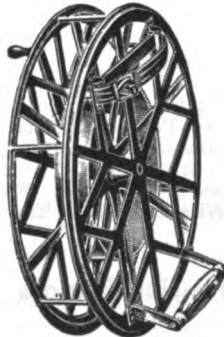
Reels for Flat Wire and Chain Tapes



No. 5594A.

Steel Reel, nickel-plated, open style, with hardwood frame. Strong, adjustable leather loop attached to one side of frame for holding. Large center and extra-long folding handle for winding ribbon. Made in two sizes, for different styles and lengths of $\frac{1}{8}$ inch ribbons.

- No. 5594A. For Dominion Chain Tapes, 100, 200 or 300 ft. long; also Flat Wire Tapes, 100 or 200 ft., and 25 or 50 meters long, . . . Each, \$
- 5594C. For Dominion Chain Tapes, 500, 650 or 660 ft. long; also Flat Wire Tapes, 300, 400 or 500 ft., or 100 meters long, . . . Each,



No. 5596.

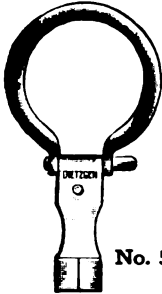
- No. 5596. Aluminum Reel, for $\frac{1}{8}$ inch Flat Wire and Chain Tapes, 300 to 500 ft. long, Each, \$

This Reel is exceedingly strong and will withstand very rough usage. It has a large grip handle and a leather strap to fit around arm of chainman. Friction brake and stop to hold Tape at any point. Large center and long handle gives powerful winding leverage.

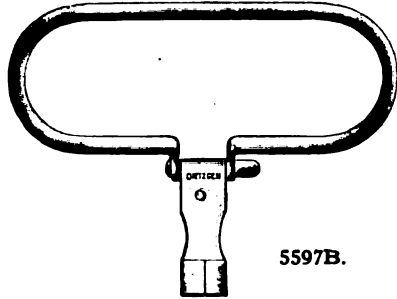
See Price List in back of Catalog.

Handles for Steel Tapes

Detachable Handles



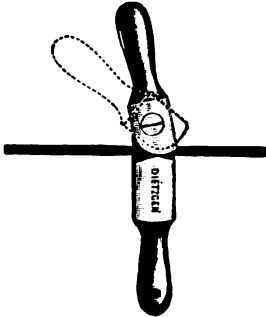
No. 5597A.



5597B.

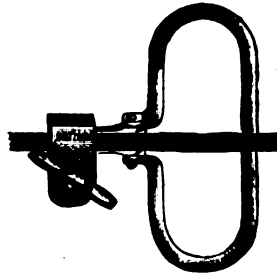
- No. 5597A. Detachable Handles, brass, nickel-plated, 1 in., round, for $\frac{1}{4}$ in. Tapes, Pair, \$
- 5597B. Detachable Handles, brass, nickel-plated, 3 in., oval, for $\frac{1}{4}$ in. Tapes, Pair, \$

Tape Grip



No. 5598.

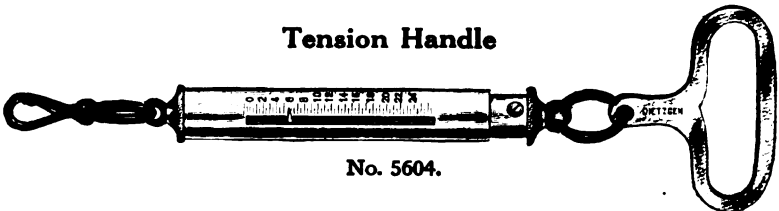
Clamping Handle



5599.

- No. 5598. Tape Grip, brass, nickel-plated. For use with Steel Tapes, especially Flat Steel Wire and Chain Tapes. Construction is very substantial and the design enables instant and positive grip to any part of ribbon, regardless of width or thickness, Each, \$
5599. Clamping Handle, brass, nickel-plated. For use with Steel Tapes, especially Flat Steel Wire and Chain Tapes. Easily clamped to any part of ribbon, Each, \$

Tension Handle

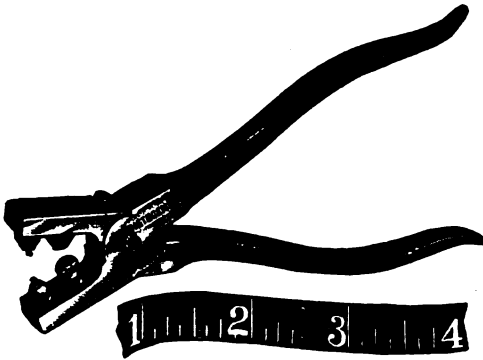


No. 5604.

- No. 5604. Tension Handle, brass, nickel-plated, for use with Steel Tapes, indicating tension up to 25 pounds, reading to half pounds, Each, \$

See Price List in back of Catalog.

Tape Repair Outfits



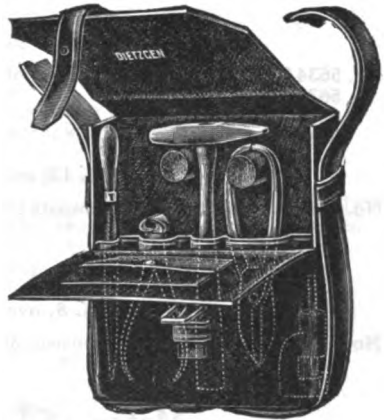
No. 5605.



5606.

- | | |
|---|--|
| <p>No. 5605. Punch and Riveter Outfit, with eyelets,</p> <p>5605A. Extra Eyelets, short, 500 in package,</p> <p>5605B. " " long, 500 " "</p> <p>5606. Tape Repair Outfit, consists of block and punch, rivets, and piece of steel ribbon,</p> | <p>Each, \$</p> <p>Package,</p> <p>Each,</p> |
|---|--|

5607. Tape Repair Outfit, consists of block and punch, hammer, cutting nippers, taper file, shears, and piece of steel ribbon. In sewed leather case which has shoulder strap and pocket containing rivets and metal sleeves for Flat Wire Tapes, Each,



No. 5607.



No. 5614.



5615.

- | | |
|---|-----------------|
| <p>No. 5614. Little Giant Tape Splice, for $\frac{1}{10}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ in. Tapes,</p> | <p>Each, \$</p> |
|---|-----------------|

To repair breaks, insert broken ends; adjust by sight hole and turn down screws. Will not catch on obstructions and will withstand the strongest pull. When ordering, specify width desired.

- | | |
|--|-------------------------|
| <p>No. 5615. Eureka Tape Splice, for various size tapes,</p> | <p>Doz. sleeves, \$</p> |
|--|-------------------------|

This Splice consists of thin sheet metal folded in the shape of a sleeve and coated with a combination of solder and flux so sensitive that the heat from a lighted match will make a perfect adhesion between sleeve and tape. Furnished one dozen in wooden box, with directions for use.

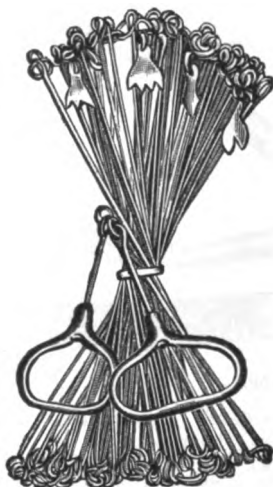
When ordering, specify width of Tape and whether it is heavy or light.

See Price List in back of Catalog.

Measuring Chains

Steel and Iron

U. S. Standard



No. 5634D.

W. G. 12, brazed links and rings, brass handles.

						Each.
No. 5634A.	Steel,	33 feet;	consists of	50 surveyors' links,	. . . . .	\$
5634B.	"	50 "	"	"	50 units of one foot each,	. . . . .
5634C.	"	66 "	"	"	100 surveyors' links,	. . . . .
5634D.	"	100 "	"	"	100 units of one foot each,	. . . . .

W. G. 12, oval rings, brass handles.

No. 5644A.	Steel,	33 feet;	consists of	50 surveyors' links,	. . . . .
5644B.	"	50 "	"	"	50 units of one foot each,	. . . . .
5644C.	"	66 "	"	"	100 surveyors' links,	. . . . .
5644D.	"	100 "	"	"	100 units of one foot each,	. . . . .

W. G. 8, oval rings, brass handles.

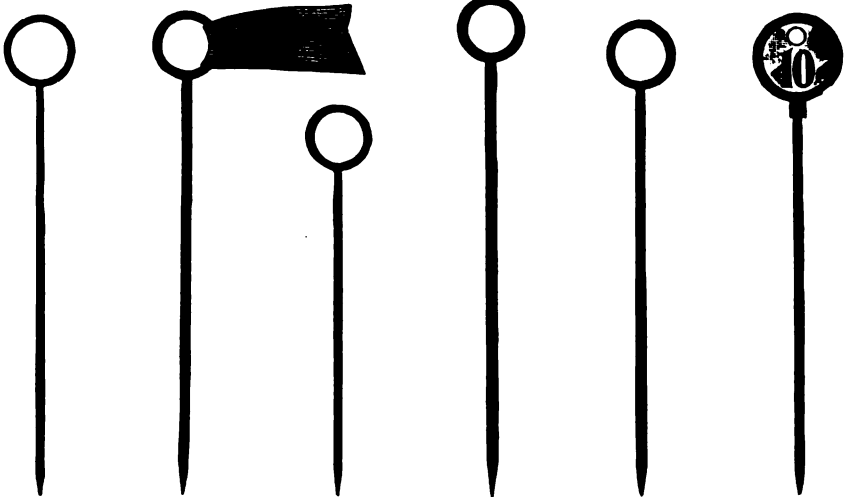
No. 5648B.	Iron,	50 feet;	consists of	50 units of one foot each,	. . . . .
5648D.	"	100 "	"	"	100 " " " " " "	. . . . .

Meter and Vara Steel Chains

						Each.
No. 5652A.	10 meter,	W. G. 12,	brazed links and rings,	brass handles,	. . . . .	\$
5652B.	15 "	"	12, " " " " " "	" " " " " "	. . . . .
5652C.	20 "	"	12, " " " " " "	" " " " " "	. . . . .
5652D.	25 "	"	12, " " " " " "	" " " " " "	. . . . .
5654A.	10 "	"	12, oval rings, brass handles,	. . . . .	. . . . .
5654B.	15 "	"	12, " " " " " "	" " " " " "	. . . . .
5654C.	20 "	"	12, " " " " " "	" " " " " "	. . . . .
5656A.	10 varas,	"	12, brazed links and rings, brass handles,	. . . . .	. . . . .
5656B.	20 "	"	12, " " " " " "	" " " " " "	. . . . .
5658A.	10 "	"	12, oval rings, brass handles,	. . . . .	. . . . .
5658B.	20 "	"	12, " " " " " "	" " " " " "	. . . . .

See Price List in back of Catalog.

Arrows or Marking Pins

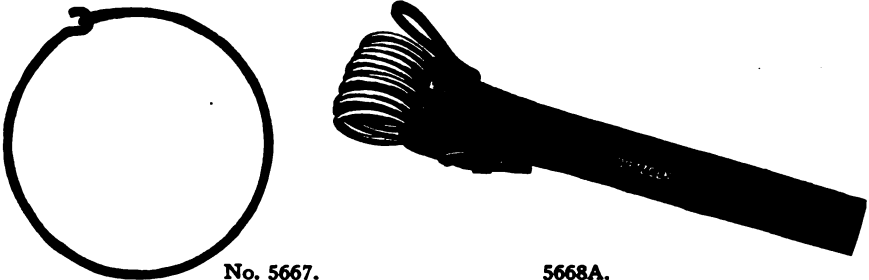


No. 5661. 5662. 5660. 5663. 5664. 5666.

- | | | |
|-----------|--|---------|
| No. 5660. | Steel Arrows, nickel-plated, 11 in set, 10 in. long, W. G. 6, | Set, \$ |
| 5661. | “ “ “ “ 11 “ 14 “ “ “ “ 6, | “ |
| 5662. | “ “ “ “ 11 “ 14 “ “ “ “ 6, | “ |
| | with red cloth flag attached to ring, | “ |
| 5663. | Steel Arrows, extra heavy, red enameled, 11 in set, 15 in. long, | “ |
| 5664. | Iron “ red enameled, 11 in set, 14 in. long, W. G. 10, | “ |
| 5666. | Steel “ nickel-plated, 11 “ 14 “ “ “ “ 6, | “ |
| | white enameled disc, 2½ in. diameter, with red figures 1 to 11, | “ |

Arrows No. 5663 are made of high-grade tempered tool steel and are especially adapted for use in rocky or hard ground. They are also valuable for scratching purposes.

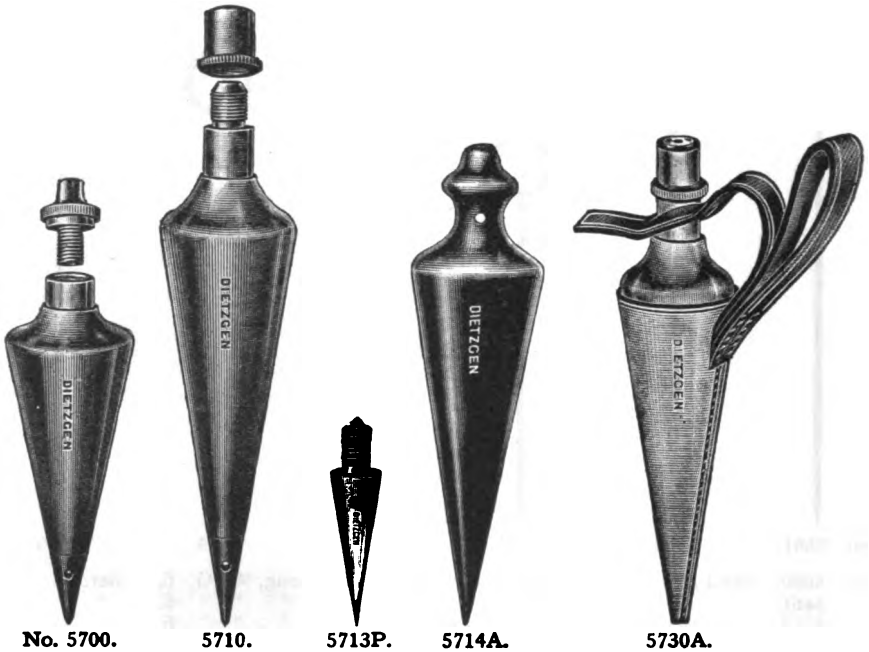
Carrying Ring and Quiver for Arrows



- | | | |
|-----------|--|----------|
| No. 5667. | Spring Steel Carrying Ring, 6 in. diameter, | Each, \$ |
| 5668A. | Sewed Leather Quiver, with adjustable strap and belt loop, | “ |
| | for set of 11 arrows, | “ |
| 5668B. | Canvas Carrying Case, with shoulder strap, for set of | “ |
| | arrows No. 5666, | “ |

See Price List in back of Catalog.

Plumb Bobs



Brass Plumb Bobs			
No. 5700.	Brass Plumb Bob, screw cap, steel point, about	6 oz.,	Each, \$
5701.	" " " " " " " " " "	8 "	"
5701A.	" " " " " " " " " "	10 "	"
5702.	" " " " " " " " " "	12 "	"
5703.	" " " " " " " " " "	14 "	"
5707.	Brass Plumb Bob, screw cap, steel point, about	6 oz., long neck,	"
5708.	" " " " " " " " " "	8 "	"
5709.	" " " " " " " " " "	10 "	"
5709A.	" " " " " " " " " "	12 "	"
5710.	" " " " " " " " " "	14 "	"
5710A.	" " " " " " " " " "	16 "	"
5710B.	" " " " " " " " " "	18 "	"
5711.	" " " " " " " " " "	24 "	"
5712.	" " " " " " " " " "	32 "	"

Steel Points for Brass Plumb Bobs

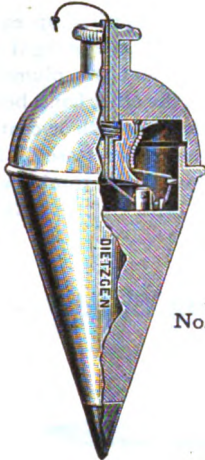
No. 5713P. Extra Steel Points, for Brass Plumb Bobs Nos. 5700 to 5712, Each, \$
 When ordering, give catalog number of Plumb Bob for which the steel point is to be used.

Iron Plumb Bobs			
No. 5714A.	Iron Plumb Bob, black enameled, about	7 ounces,	Each, \$
5714B.	" " " " " " " " " "	10 "	"
5714C.	" " " " " " " " " "	14 "	"

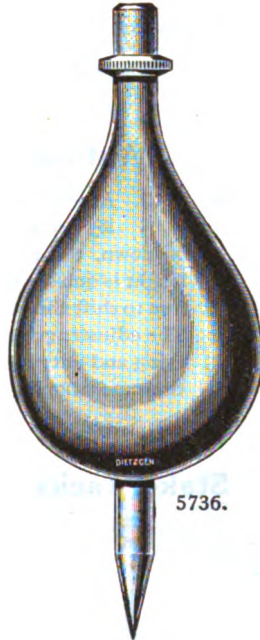
Sheaths for Plumb Bobs, Sewed Leather, with Belt Loop			
No. 5730A.	Sewed Leather Sheath, for Plumb Bobs weighing	6 to 8 oz.,	Each, \$
5730B.	" " " " " " " " " "	10 " 12 "	"
5730C.	" " " " " " " " " "	14 " 16 "	"

See Price List in back of Catalog.

Plumb Bobs



No. 5735.



5736.

- No. 5735. "Adjustable" Brass Plumb Bob, weight about 10 oz.: concealed reel on which line is wound and held by friction at any point of its length, Each, \$
5736. "Shaft" Brass Plumb Bob, steel point, weight about 44 oz., "

Plumb Bob Attachments

For Steel Tapes

These attachments are for obtaining quick and accurate measurement of the depth of oil in tanks, etc., and can be furnished for any of our Steel Tapes. Their length is included in the measurement of the tapes supplied. A snap permits detaching from the tape when not in use.



No. 5737.



5739.

- No. 5737. Attachment only, 13 oz., Each, \$
5739. " " " 6 " " "

See Price List in back of Catalog.

Plumb Bob Cord

No. 5740A.	Plumb Bob Cord, best linen, thin,	Yard, \$
5740B.	" " " " " medium,	"
5740C.	" " " " " thick,	"
5741.	" " " " best braided silk,	"



Autoset Plummet Adjuster

No. 5743. Autoset Plummet Adjuster. Makes setting up easy.
 By pressing the sides of the adjuster and moving it up or down, the proper length of the string and the plummet height is quickly secured with one hand, the other hand being free to shift the transit head to position over the tack or center. The adjuster grips instantly when the pressure is released. No tying and untying of knotted strings. Saves time, trouble and tiresome stooping. Each, \$

No. 5743.

Stake Tacks

Surveying Spads



No. 5745.

5748.

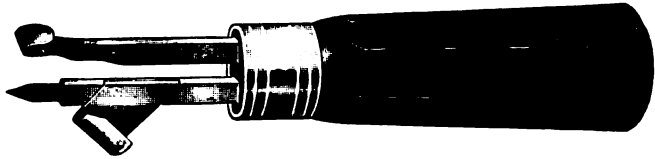
No. 5745.	Stake Tacks, galvanized, $\frac{3}{4}$ in. long, in flat tin box,	4 oz. box, \$
5746.	" "	Pound, "
5747.	" "	bulk, 5 lbs. or over, Pound,

These Stake Tacks have an indentation on the head. They are very convenient for obtaining a quick and accurate setting of a Plumb Bob.

No. 5748.	Surveying Spads, steel, $2\frac{1}{4}$ in. long, in flat tin box,	Box of 50, \$
5749.	" "	Lot of 1000,

The Surveying Spads Nos. 5748 and 5749 are made of high-grade steel, heavily galvanized to prevent rusting. They are used for suspending Plumb Bobs from timbers in mines, tunnels, etc.

Timber Scribe



No. 5754.

No. 5754.	Timber Scribe, or Tree Marker, $6\frac{1}{2}$ in. long,	Each, \$
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See Price List in back of Catalog.

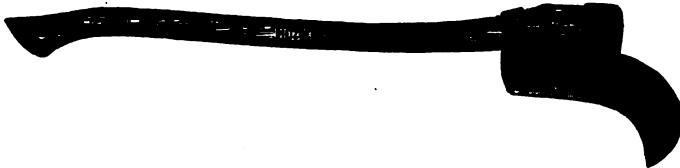
Surveyors Stake Hatchet



No. 5760.

No. 5760. Surveyors Stake Hatchet, weight about 2 lbs., blade 5 in. long, strong wooden handle 12 in. long from blade, . . . Each, \$

Surveyors Bush Hook



No. 5762.

No. 5762. Surveyors Bush Hook, weight about 3½ lbs., blade about 11 in. long, strong wooden handle about 30 in. long from blade, . . . Each, \$

Surveyors Bush Knife



No. 5764.

No. 5764. Surveyors Bush Knife or Machete, weight about 1¼ lbs., blade 17 in. long, strong horn handle 5 in. long, . . . Each, \$

5764S. Sewed Leather Sheath, 17 in. long, with belt loop, for blade of No 5764, Each,

See Price List in back of Catalog.

Surveyors Handy Bags



No. 5770.

No. 5770. Surveyors Handy Bag, 17 in. long, 7 in. wide, 8 in. high. Made of solid russet leather, carefully sewed. Very durable. Equipped with adjustable leather shoulder strap, Each, \$

5772. Like No. 5770, but 21½ in. long, 9 in. wide, 9½ in. high, "

These Surveyors Handy Bags are very convenient for carrying field utensils, such as Measuring Tapes, Plumb Bobs, Field Books, Etc., and for storing these articles when they are not in use.

Surveyors Field Book Bag

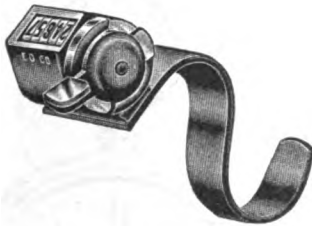


No. 5774.

No. 5774. Surveyors Field Book Bag, 14 in. long, 3 in. wide, 10 in. high. Made of selected pebble leather, carefully sewed. Equipped with an adjustable shoulder strap, fastened to a nicked ring which is riveted to a double strap extending the full height of the bag on the inside, thus preventing the strap from pulling out. Consists of one large and one small pocket, and is adapted for carrying small field accessories as well as field books, Each, \$

See Price List in back of Catalog.

Tallying Machines



No. 5780.



5782.

No. 5780. Tallying Machine, nickel-plated, registers to 99,999, Each, \$
 The lower part of this machine is designed to fit the fingers of the left hand, and the thumb is pressed on the lever in keeping count.

No. 5782. Tallying Machine, nickel-plated, for keeping count by pressing on a lever; registers to 999, Each, \$

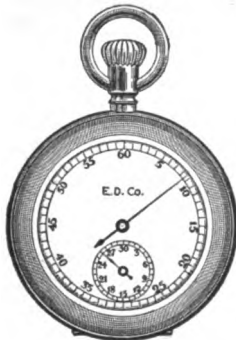


No. 5784.

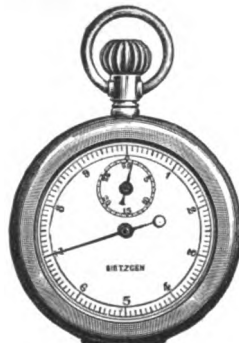
No. 5784. Set Back Hand Tally Counter, nickel-plated, registers to 9,999 Each, \$

This Counter can be quickly set to zero by one turn of the knob, and the finger ring is so located that the counter can be used with either hand.

Stop Watches



No. 5786.



5790.

No. 5786. Stop Watch, stem-winder, nickel-plated case, porcelain dial, registering to 30 minutes by $\frac{1}{5}$ seconds; fly-back, engaging and disengaging mechanism, Each, \$

5787. Like No. 5786, but with a side lever by means of which it is possible to cause the hand to fly back to zero and to start automatically and instantaneously, Each,

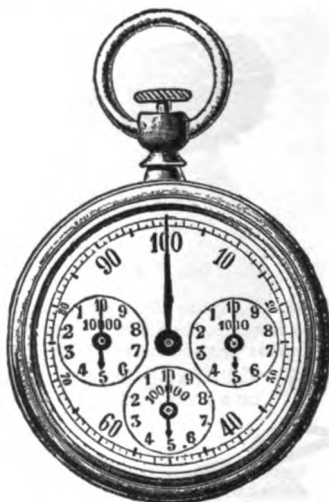
5790. Decimal Stop Watch, stem winder, nickel-plated case, porcelain dial, registering to 30 minutes by hundredths of minutes; fly-back, with anchor escapement. Especially valuable for cost calculations, Each,

See Price List in back of Catalog.

Pedometers and Odometers

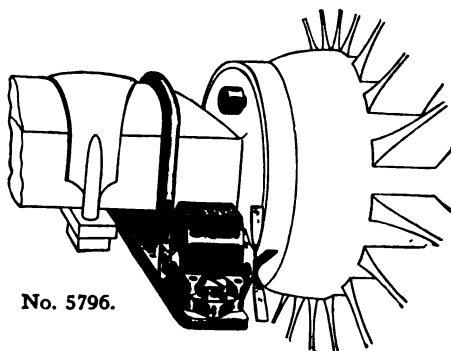


No. 5792B.



5794B.

- No. 5792A. Pedometer, watch pattern, nickel case, registering distance walked to 10 miles, Each, \$
- 5792B. Pedometer, watch pattern, nickel case, registering distance walked to 100 miles, Each,
- 5794A. Passometer, watch pattern, nickel case, with 3 hands, registering 25,000 steps, Each,
- 5794B. Passometer, watch pattern, nickel case, with 4 hands, registering 100,000 steps, Each,



No. 5796.

- No. 5796. Odometer, with straight-axle attachment, Each, \$
- 5797. " " axle attachment which may be bent to fit any curved axle, Each,

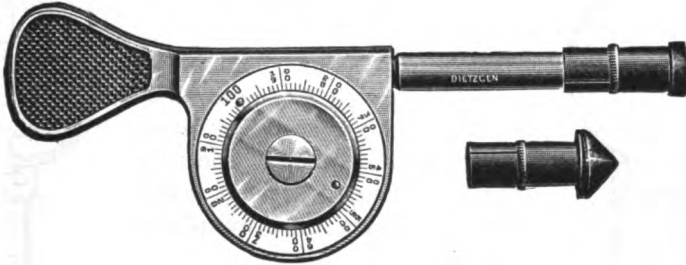
These Odometers can be furnished to record the revolutions of the wheel or to record miles. If desired for miles, always specify the exact outside diameter of the wheel.

They are for use with horse drawn vehicles, are very durable, and the mechanism is protected from mud, dust and rain by a nickel-finish case.

See Price List in back of Catalog.

Speed Counters

For finding the revolutions per minute made by a shaft, fly wheel, or any other revolving part.

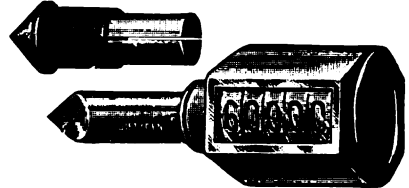


No. 5800.

No. 5800. High Speed Counter, nickel-plated, 5 in. long, working parts encased, dial plate has two rows of figures, reading right or left, as the shaft may run; with directions, and two rubber tips, for pointed and hollow centers, Each, \$

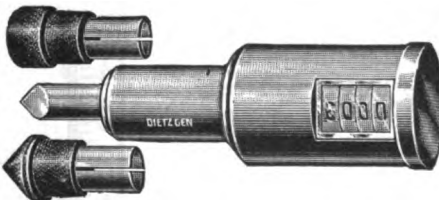
This Speed Counter is especially suitable for high speed, as it is constructed with a frictionless bearing. It can be quickly set to zero by turning the center dial until the two raised knobs are in line.

No. 5802. Direct Speed Counter, nickel-plated, 1 7/8 in. long, working parts encased; with directions, and one pointed rubber tip, . . . Each, \$



No. 5802.

The No. 5802 Speed Counter records each revolution up to 10,000, and therefore it is not necessary to count the revolutions of any dial. After noting the reading of the instrument at the start and deducting this figure from the final reading, the exact number of revolutions, within a given time, of any shaft, etc., can be readily determined.



No. 5804.

No. 5804. Direct Speed Counter with Clutch, nickel-plated, 3 in. long, working parts encased; with directions, and two rubber tips, for pointed and hollow centers, Each, \$

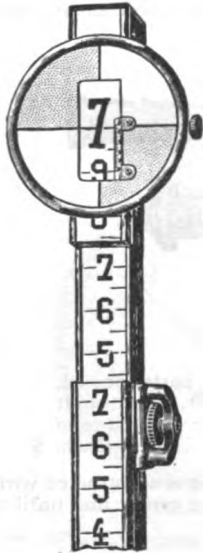
The No. 5804 Speed Counter is one of the best instruments manufactured for the intended purpose. Speeds as high as 5,000 R. P. M. can be safely measured.

Very accurate results are obtainable, as the tip of the counter will, when resting against the center of the shaft or against the fly wheel, run idle until pressure is brought against it, when immediately the counting mechanism becomes engaged and at the instant the pressure is released stops its operation.

See Price List in back of Catalog.

Dietzgen

Leveling Rods



No. 5901.



5905.

Our Leveling Rods are made of thoroughly seasoned straight grained hardwood, specially treated so as to prevent warping or binding by atmospheric changes.

The figures are bold and clear and the division lines well defined. Both the figures and division lines are sunk into the wood by a special process which insures permanence.

Durably constructed, with all unnecessary weight eliminated, and the corners rounded wherever possible, our rods are exceptionally agreeable to handle.

The workmanship and finish, to which careful attention is given, are unsurpassed.

Special Rods, differing in design from those listed, will be made to order provided a sketch and all essential details are submitted.

For description of Nos. 5901 and 5905, see next page.



Leveling Rods

Philadelphia

- | | Each.
\$ |
|---|-------------|
| No. 5901. Philadelphia Rod (heavy). Hardwood, | |
| Length — 7 feet extending to 13 feet. | |
| Divided — Feet, 10ths and half 10ths; scales reading to 200ths of a foot. | |
| *Target — Round with screw clamp. | |
| 5901A. Like No. 5901, but oval target with screw clamp,* | |
| 5901R. “ “ 5901, “ rolling angle target with screw clamp, | |
|
5902. Light Philadelphia Rod. Hardwood, | |
| Length — 6½ feet extending to 12 feet. | |
| Divided — Feet, 10ths and half 10ths; scales reading to 200ths of a foot. | |
| *Target — Round with screw clamp. | |
| 5902A. Like No. 5902, but oval target with screw clamp,* | |
| 5902R. “ “ 5902, “ rolling angle target with screw clamp, | |
|
5904. Philadelphia Rod (heavy). Hardwood, | |
| Length — 7 feet extending to 13 feet. | |
| Divided — Feet 10ths and 100ths; verniers reading to 1000ths of a foot. | |
| *Target — Round with screw clamp. | |
| 5904A. Like No. 5904, but oval target with screw clamp,* | |
| 5904R. “ “ 5904, “ rolling angle target with screw clamp, | |
| 5904W. “ “ 5904, “ without target, | |
|
5905. Light Philadelphia Rod. Hardwood, | |
| Length — 6½ feet extending to 12 feet. | |
| Divided — Feet, 10ths and 100ths; verniers reading to 1000ths of a foot. | |
| *Target — Round with screw clamp. | |
| 5905A. Like No. 5905, but oval target with screw clamp,* | |
| 5905R. “ “ 5905, “ rolling angle target with screw clamp, | |
| 5905W. “ “ 5905, “ without target, | |
|
5907. Interurban Philadelphia Rod. Hardwood, | |
| Length — 5.8 feet extending to 10.6 feet. | |
| Divided — Feet, 10ths and 100ths; verniers reading to 1000ths of a foot. | |
| *Target — Round with screw clamp. | |

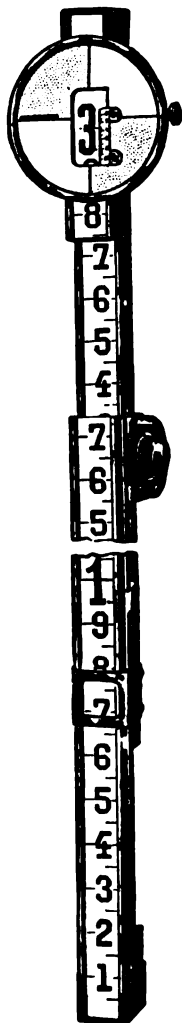
The No. 5907 Rod is of a length that complies with the laws of certain States prohibiting any article over 6 feet long being carried in trolley cars.

*Furnished with Dietzgen Improved “Cam Clamp” Targets (see Nos. 5986A-5992A), if preferred, at same price.

Oval and Rolling Angle Targets illustrated on page 280. Canvas Cases for Leveling Rods listed under Nos. 5996A-5996B.

See Price List in back of Catalog.

Leveling Rods



No 5909.

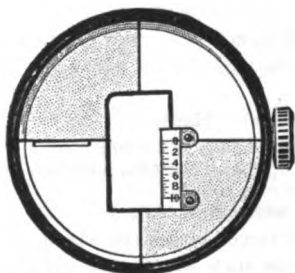


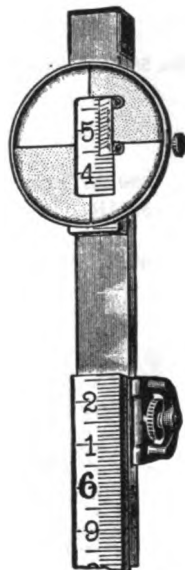
Illustration of

Mining Rod Target

showing slit which permits a light that is held behind the target to be seen readily.



5918.



5914.



For description, see next page



Leveling Rods

Mining

- | | | Each. |
|-----------|---|-------|
| No. 5909. | Mining Rod (Philadelphia pattern). Hardwood, . . . \$
Length — 3 feet extending to 5 feet.
Divided — Feet, 10ths and half 10ths; scales reading to 200ths of a foot.
*Target — Round with slit and screw clamp. | |
| 5910. | Mining Rod (Philadelphia Pattern). Hardwood, . . .
Length — 5 feet extending to 9 feet.
Divided — Feet, 10ths and half 10ths; scales reading to 200ths of a foot.
*Target — Round with slit and screw clamp. | |
| 5912. | Mining Rod (Philadelphia pattern). Hardwood, . . .
Length — 3 feet extending to 5 feet.
Divided — Feet, 10ths and 100ths; verniers reading to 1000ths of a foot.
*Target — Round with slit and screw clamp. | |
| 5913. | Mining Rod (Philadelphia pattern). Hardwood, . . .
Length — 5 feet extending to 9 feet.
Divided — Feet, 10ths and 100ths; verniers reading to 1000ths of a foot.
*Target — Round with slit and screw clamp. | |

Chicago

- | | | Each. |
|-------|---|-------|
| 5914. | Chicago Rod, sectional. Hardwood, \$
Length — 12½ feet; in three sections joined with telescopic rigid metal joints.
Divided — Feet, 10ths and 100ths. | |
| 5915. | Like No. 5914, but 16½ feet, in four sections, . . . | |

The Chicago Rods, of the same excellent workmanship and finish as our Philadelphia Rods, are very convenient for carrying in railroad coaches, trolley cars, or wherever space is limited, as each section is but 4½ feet in length. The sections when joined form a rod that is rigid and easy to handle. Furnished with heavy cloth carrying case.

These Rods are generally used without a target, but as a target may be desired for certain work we list one separately under No. 5973D.

New York

- | | | Each. |
|-----------|--|-------|
| No. 5918. | New York Rod. Hardwood, \$
Length — 6½ feet extending to 12 feet.
Divided — Feet, 10ths and 100ths; verniers reading to 1000ths of a foot.
*Target — Round with screw clamp. | |
| 5918A. | Like No. 5918, but oval target with screw clamp,* . . . | |
| 5918R. | “ “ 5918, “ rolling angle target with screw clamp, . . | |

*Furnished with Dietzgen Improved “Cam Clamp” Targets (see Nos. 5986A-5992A), if preferred, at same price.

See Price List in back of Catalog.

Leveling Rods



No. 5920.



5924.



5925.



5927.

For description, see next page.



Leveling Rods

Stadia

The increasing demand for Rods specially adapted for stadia measurements has received our careful attention, and the rods which we make for this purpose are both efficient and satisfactory. While any of our self-reading rods can be used for work of this kind, the following Stadia Rods are designed specially for reading at a farther distance than usual, without the aid of targets.

Appreciating the importance of stadia measurements in modern engineering practice, we fully recommend any of the rods here described as possessing the features which experience has proved to be essential for obtaining rapid and accurate results.

- | | | Each. |
|-----------|--|-------|
| No. 5920. | Stadia Rod. Pinewood, | \$ |
| | Length — 6 feet closed opening to 12 feet; two fold, with strong metal hinge locking rigidly; brace on back. | |
| | Divided — Feet, 10ths and 100ths; self-reading. | |
| 5921. | Like No. 5920, but 4 feet closed opening to 12 feet; three fold, | |
| 5924. | Stadia Rod. Pinewood, | |
| | Length — 12 feet, in one piece; brace on back. | |
| | Divided — Feet, 10ths and 100ths; self-reading. | |
| 5925. | Florida Rod. Hardwood, | |
| | Length — 10 feet, in one piece; brace on back, with hand-grip at the middle. | |
| | Divided — Feet, 10ths and 100ths; self-reading. | |
| 5926. | Like No. 5925, but 12 feet, | |

The unique color arrangement of the Florida Rods is a distinct advantage for rapid reading at long distances.

- | | | |
|-----------|--|-------|
| | | Each. |
| No. 5927. | Illinois Rod. Hardwood, | \$ |
| | Length — 10 feet, in one piece; front and one side graduated; corner of graduated sides faces line of sight. | |
| | Divided — Feet, 10ths and 100ths; self-reading. | |
| 5928. | Like No. 5927, but 12 feet, | |

The design of the Illinois Rods is such that they are exceptionally rigid when used in the wind, and the color scheme enables readings to be taken rapidly at long distances.

Rod Level listed under No. 5994.

See Price List in back of Catalog.

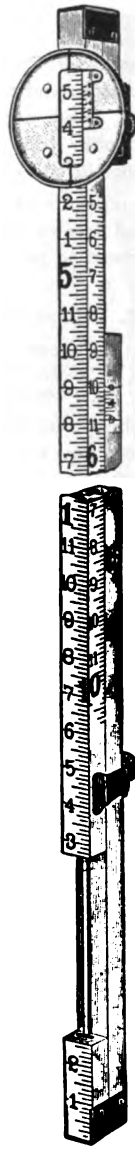
Leveling Rods



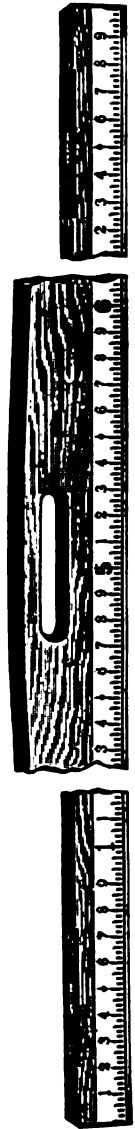
No. 5932.



5935.



5937.



5947.

For description, see next page.

Leveling Rods

Metric

- | | Each.
\$ |
|---|-------------|
| No. 5932. Metric Rod (Philadelphia pattern). Hardwood, | |
| Length — 2.2 meters extending to 4 meters. | |
| Divided — Meters, decimeters and centimeters; verniers reading to millimeters. | |
| *Target — Round with screw clamp. | |
| 5932A. Like No. 5932, but oval target with screw clamp,* | |
| 5932R. “ “ 5932, “ rolling angle target with screw clamp, | |
| 5934. Metric Rod (Philadelphia pattern). Hardwood, | |
| Length — 1.2 meters extending to 2.1 meters. | |
| Divided — Meters, decimeters and centimeters; verniers reading to millimeters. | |
| *Target — Round with screw clamp. | |
| 5934A. Like No. 5934, but oval target with screw clamp,* | |
| 5934R. “ “ 5934, “ rolling angle target with screw clamp, | |
| 5935. Metric Rod (Chicago pattern), sectional. Hardwood, | |
| Length — 4 meters; in three sections joined with telescopic rigid metal joints. | |
| Divided — Meters, decimeters and centimeters. | |

The No. 5935 Metric Rod (Chicago pattern) is generally used without a target, but as a target may be desired for certain work we list one separately under No. 5974B.

Architects

Our Architects Rods are designed for the use of Architects, Contractors, Builders, etc. They are of light but rigid construction, with metal shoes at top and bottom, rounded corners and secure clamps. The graduations are machine-divided, insuring accuracy.

- | | Each.
\$ |
|--|-------------|
| No. 5937. Architects Rod. Hardwood, | |
| Length — 5½ feet extending to 10 feet. | |
| Divided — Feet, inches and ⅛ inches; verniers reading to ¼ of an inch. | |
| Target — Round with screw clamp. | |
| 5943. Architects Rod. Hardwood, | |
| Length — 5½ feet extending to 10 feet. | |
| Divided — Feet, 10ths and 100ths; verniers reading to 1000ths of a foot. | |
| Target — Round with screw clamp. | |

Cross Section

- | | Each.
\$ |
|---|-------------|
| 5947. Cross Section Rod. Hardwood, | |
| Length — 10 feet, in one piece; adjustable spirit level at each end and open hand-grip at the middle. | |
| Divided — Feet, 10ths and 100ths; self-reading. | |

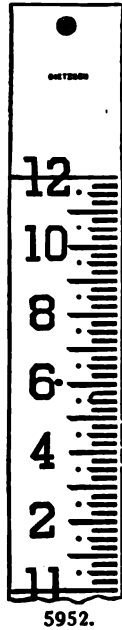
*Furnished with Dietzgen Improved “Cam Clamp” Targets (see Nos. 5986A - 5992A), if preferred, at same price. Oval and Rolling Angle Targets illustrated on page 280.

See Price List in back of Catalog.

Leveling Rods and Ranging Poles



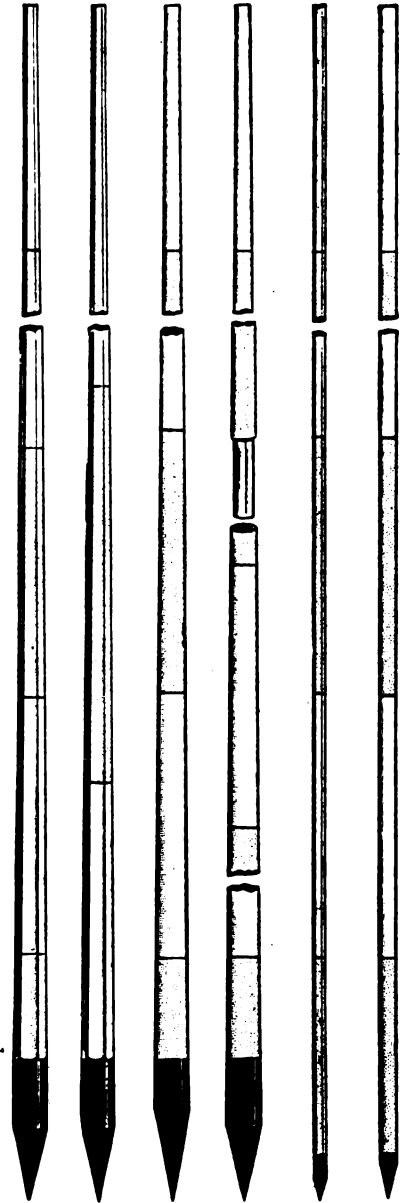
No. 5950.



5952.



5953.



5961.

5962.

5964.

5966.

5967.

5968.

For description, see next page.



Leveling Rods

Flexible

Our Flexible Pocket Leveling Rods, divided like self-reading rods, can be rolled compactly and readily carried in the pocket. They are used by fastening to a board by means of thumb tacks. Nos. 5950 to 5953 are made of pliable, strong rubber canvas; Nos. 5954 to 5956, of durable glazed fabric.

- No. 5950. Flexible Pocket Rod, 10 feet long, 3 in. wide, divided into feet, 10ths and 100ths; in neat tin box, Each, \$
- 5951. Like No. 5950, but 12 feet long; in neat tin box, " "
- 5952. Flexible Pocket Rod, 12 feet long, 3 in. wide, divided into feet, inches and $\frac{1}{8}$ inches; in neat tin box, Each,
- 5953. Flexible Pocket Rod, $3\frac{1}{2}$ meters long, 3 in. wide, divided into centimeters; in neat tin box, Each,
- 5954. Flexible Pocket Rod, 10 feet long, $1\frac{1}{2}$ in. wide, divided into feet, 10ths and 100ths; in heavy pasteboard box, Each,
- 5955. Like No. 5954, but 12 feet long; in heavy pasteboard box, " "
- 5956. Flexible Pocket Rod, 12 feet long, $1\frac{1}{2}$ in. wide, divided into feet, inches and $\frac{1}{8}$ inches; in heavy pasteboard box, Each,

Ranging Poles

Wooden

- No. 5961. Ranging Poles, octagonal, tapered, best seasoned wood, red and white alternately every foot.
 Length, 6 8 10 feet.
 Each, \$
- 5962. Ranging Poles, octagonal, metric, tapered, best seasoned wood, red and white alternately every half-meter.
 Length, 2 $2\frac{1}{2}$ 3 meters.
 Each, \$
- 5964. Ranging Poles, round, tapered, best seasoned wood, red and white alternately every foot.
 Length, 6 8 10 feet.
 Each, \$
- 5966. Ranging Poles, round, sectional, in two sections, best seasoned wood, red and white alternately every foot.
 Length, 8 10 feet.
 Each, \$

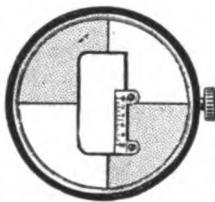
Steel and Iron

- No. 5967. Ranging Poles, octagonal, steel, solid, $\frac{1}{2}$ in. diameter, turned and hardened points, red and white alternately every foot.
 Length, 6 8 feet.
 Each, \$
- 5968. Ranging Poles, round, iron, tubular, $\frac{1}{8}$ in. diameter, red and white alternately every foot.
 Length, 6 8 10 feet.
 Each, \$

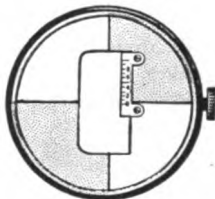
Canvas Cases for Ranging Poles listed under Nos. 5997A-5997C.

See Price List in back of Catalog.

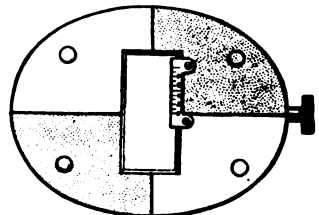
Dietzgen "Screw Clamp" Targets



No. 5972A.



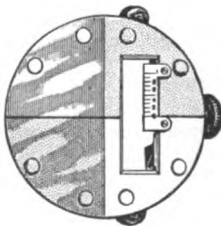
5973A.



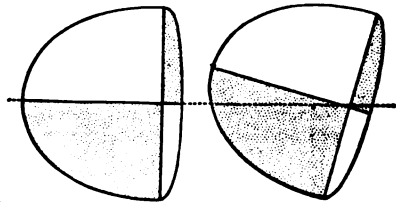
5979A.

				Each.
No. 5972A.	Round,	scale to	200ths, for Rod 5901,	\$
5972B.	"	"	200ths, " " 5902,	. . . . .
5972C.	"	"	200ths, " " 5909 and 5910,	. . . . .
5973A.	"	vernier	1000ths, " " 5904,	. . . . .
5973B.	"	"	1000ths, " " 5905 and 5907,	. . . . .
5973C.	"	"	1000ths, " " 5912 " 5913,	. . . . .
5973D.	"	"	1000ths, " " 5914 " 5915,	. . . . .
5973E.	"	"	1000ths, " " 5918,	. . . . .
5973F.	"	"	1000ths, " " 5943,	. . . . .
5974A.	"	"	m. m., " " 5932 and 5934,	. . . . .
5974B.	"	"	m. m., " " 5935,	. . . . .
5975A.	"	"	¼ in., " " 5937,	. . . . .
5978A.	Oval,	scale to	200ths, for Rod 5901A,	. . . . .
5978B.	"	"	200ths, " " 5902A,	. . . . .
5979A.	"	vernier	1000.ths, " " 5904A,	. . . . .
5979B.	"	"	1000.hs, " " 5905A,	. . . . .
5979C.	"	"	1000ths, " " 5918A,	. . . . .
5980A.	"	"	m. m., " " 5932A and 5934A,	. . . . .

Targets Nos. 5972C and 5973C illustrated on page 272. Targets Nos. 5973D, 5973F, 5974B and 5975A differ somewhat in construction from the targets illustrated under No. 5972A and 5973A.



No. 5982A.



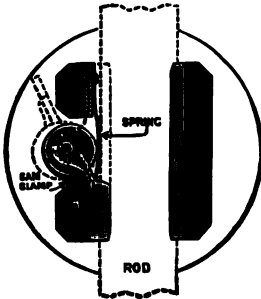
				Each.
No. 5981A.	Rolling Angle,	scale to	200ths, for Rod 5901R,	\$
5981B.	"	"	200ths, " " 5902R,	. . . . .
5982A.	"	vernier	1000ths, " " 5904R,	. . . . .
5982B.	"	"	1000ths, " " 5905R,	. . . . .
5982C.	"	"	1000ths, " " 5918R,	. . . . .
5984A.	"	"	m. m., " " 5932R and 5934R,	. . . . .

The Rolling Angle Targets are designed so that the horizontal dividing line of the target is carried over two surfaces placed at right angles to each other, thus showing a continuous horizontal line only when the rod is held perpendicular to the observer's line of sight. The target springs are provided with rollers which bear against the rod and permit of a very accurate setting of the target to any desired position.

See Price List in back of Catalog.

Dietzgen Improved "Cam Clamp" Targets

Patented



The Improved "Cam Clamp" Targets, made in round and oval forms, are an improvement over the "Screw Clamp" Targets, as they permit of a quick and rigid clamping of the target to the rod by simply pressing the lever of an eccentric.

The clamping arrangement is fully protected by the target, and the breaking off or bending of clamp screws, frequent with the "Screw Clamp" Targets, is eliminated.

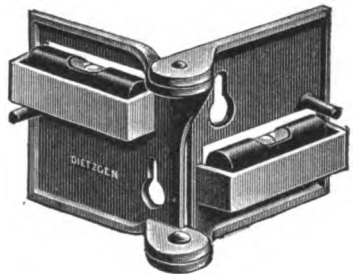
						Each.
No. 5986A.	Round,	scale	to	200ths, for Rod 5901,		\$
5986B.	"	"	"	200ths, " " 5902,		
5986C.	"	"	"	200ths, " " 5909 and 5910,		
5987A.	"	vernier	"	1000ths, " " 5904,		
5987B.	"	"	"	1000ths, " " 5905 and 5907,		
5987C.	"	"	"	1000ths, " " 5912 " 5913,		
5987D.	"	"	"	1000ths, " " 5918,		
5988A.	"	"	"	m. m., " " 5932 and 5934,		
5990A.	Oval,	scale	to	200ths, for Rod 5901A,		
5990B.	"	"	"	200ths, " " 5902A,		
5991A.	"	vernier	"	1000ths, " " 5904A,		
5991B.	"	"	"	1000ths, " " 5905A,		
5991C.	"	"	"	1000ths, " " 5918A,		
5992A.	"	"	"	m. m., " " 5932A and 5934A,		

Rod Level

No. 5994. Rod Level, Brass, two level vials, Each, \$

An excellent Rod Level for the more accurate plumbing of leveling rods and ranging poles. It can be secured to the rod or pole, or held in the hand, as desired.

When not in use, it can be folded, with the level vials protected, and easily carried in the vest pocket.



No. 5994.

Canvas Cases for Rods and Poles

These Cases are made of heavy canvas, carefully sewed, and are reinforced at the lower end. The upper end is closed by means of a drawstring.

						Each.
No. 5996A.	Canvas Case for Rods Nos.	5901-5907,	5918-5918R,			\$
5996B.	" " " "	" " 5909-5913,				
5997A.	" " " "	6 foot Ranging Poles,				
5997B.	" " " "	8 " " "				
5997C.	" " " "	10 " " "				

When ordering, always specify catalog number of Leveling Rod or Ranging Pole with which the case is to be used.

See Price List in back of Catalog.



Dietzgen

Engineering and Surveying Instruments

The Transits and Levels that are illustrated and described on the following pages embody all the latest improvements. The materials employed in their manufacture are the best obtainable, and the workmanship is of the highest order. The increased demand for our instruments is very gratifying to us, signifying, as it does, that our ideas of design and construction have met with the approval of the engineering profession.

The illustrations show the design of our regular stock instruments, but we are prepared to make such alterations, as far as practicable, which the experience of our professional friends may demand.

Following will be found a general description of the most essential parts; and complete specifications, fully explaining the details, are given after each instrument, thus aiding our patrons in a selection best suited for their purposes.

Telescopes

The optical and mechanical parts of our telescopes represent a thorough study, covering many years of experience; and, as it is necessary, in each particular instrument, that these parts be in perfect harmony with all other factors, great care is taken in adapting the proper combination of lenses and in securing the most perfect mechanical construction.

To obtain the highest degree of perfection the achromatic object glass is of extra large diameter and of increased focal length. The lenses for the terrestrial eye-piece are ground to special formulae by the most eminent opticians. With these features, we gain for our telescopes a high magnifying power, increased illumination and a large, flat and well-defined field. The lenses are mounted in the best possible manner, accurately centered and need no further adjustment with regard to the axis of the telescope.

The telescope slide is skillfully fitted directly into the main tube by an improved method, thus obtaining a perfectly true and smooth working slide, which is absolutely necessary to make the line of collimation true for all distances and to obtain permanent alignment. To further preserve this accuracy all of our telescopes are provided with dust and rain protectors. The motion of the slide for precise focusing is controlled by a rack and pinion, and the eye-piece is focused by simply turning the cap covering the eye-end to right or left, about one-sixth of a revolution, thus obtaining a true and even motion.

The telescopes are all balanced when focused for infinity, are reversible at both ends and provided with a center point for overhead centering.

To insure uniformity in quality, every telescope is tested, compared with and must conform to, a standard of excellent properties.

Magnifying Power

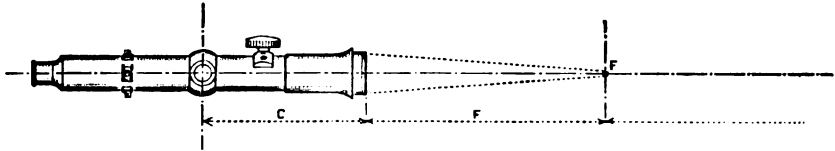
The power selected for each of the many styles of telescopes is the one where the slightest motion of vernier or levels can be easily observed in the field of view. A higher power is needless and would only proportionately decrease the illumination. To obtain the best results, the magnifying power of a telescope should not be greater than its intended purposes demand in order to maintain a large, flat field with ample light and good defining qualities.

While telescopes may vary in the construction of the eye-piece, they are all subject to the same fundamental rules of optics with regard to magnifying power, field and light. Therefore, a set of lenses can be at its maximum efficiency only at one point.

In the terrestrial (erecting) telescopes of our Transits the power ranges from 16 to 26 diameters; and in the telescopes of our Y Levels, with increased focal length and larger object glasses, a power of 26 to 42 diameters is attained. These same ratios are adhered to with telescopes having astronomical or inverting eye-pieces.

See Price List in back of Catalog.

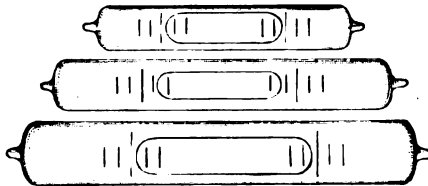
Stadia



The Stadia is a device for measuring distances, and consists essentially of two extra parallel hairs in addition to the ordinary cross hairs of the telescope of a transit or a level. The stadia hairs may be adjustable or they may be fixed permanently on the diaphragm.

In our Transit and Level telescopes the fixed stadia hairs are so set that they will intercept one foot on a rod at a distance of 100 feet. Since the image of the cross hairs is projected to a point beyond the telescope objective equal to its focal length, the rays of light converge at that point and measurements must begin from there; therefore, a constant is to be added to all stadia readings equal to the focal length of the object glass plus the distance from the face of objective to the center of the instrument. This constant is termed " $F + C$ ", and for transit telescopes is equal to about one foot. The stadia hairs are superior to any other appliances for measuring distances. As the telescopes furnished with our instruments possess all of the best optical and mechanical qualities that can be produced, we feel justified in warranting good results.

Spirit Levels



Our level vials are all accurately ground to a true curve by special automatic machinery; thereby securing more uniform and reliable results than generally obtained. They are absolutely symmetrical, and are tested and selected as to their sensibility in accordance with the use of the instrument for which they are intended. Their sensitiveness is such that any slight change of adjustment is quickly indicated, thus insuring accurate and reliable work. For this reason they are far superior to bubbles that are sluggish in action, and which, being unresponsive, seemingly indicate perfect adjustment quicker; but with results that are uncertain and unreliable. Great care is exercised to avoid all strain when mounting them in their respective tubes. They are graduated on the glass, as this affords the best and most satisfactory means of centering and reading the bubble.

The liquid with which they are filled is a compound that has the smallest degree of expansion and contraction. It is quick-acting and adaptable to all climates.

In addition to our regular grades we can also furnish, for Precise Levels and Astronomical Instruments, vials which have a sensitiveness of one second or finer.

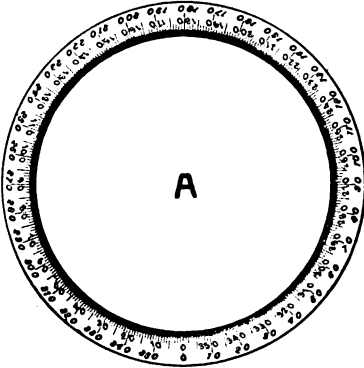
Graduations

This very important feature of Transits and Triangulation Instruments receives, on our make, minute attention. With the aid of modern automatic dividing machines of the highest quality, we are able to produce graduations which, for all practical purposes, are perfect.

See Price List in back of Catalog.

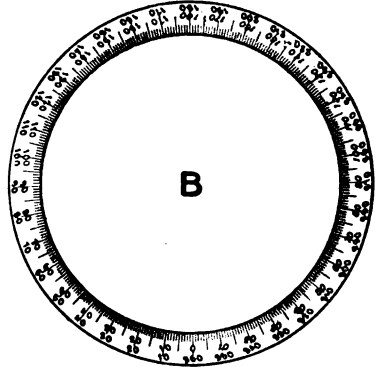
Numbering of Circles and Compass Rings

The lines of our graduations are exceptionally legible, absolutely straight, smooth, uniform in thickness and thoroughly black throughout their entire length. All numbers are machine engraved, and inclined in the direction they are to be read.



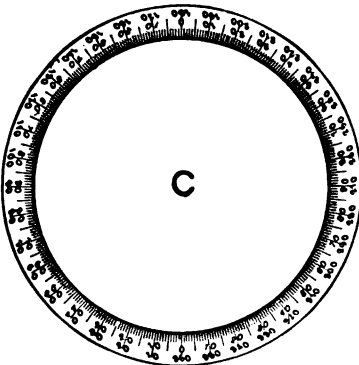
A

Horizontal Circle, numbered
0-360 and 360-0.



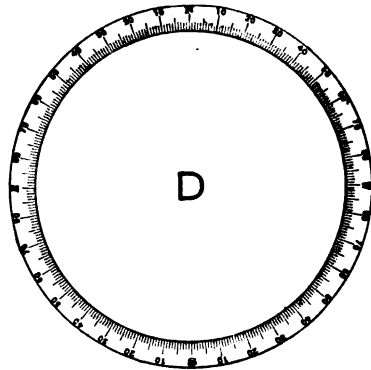
B

Horizontal Circle, numbered
0-180 and 0-360.



C

Horizontal Circle, numbered
in quadrants and 0-360.



D

Compass Ring, number in
quadrants.

The usual methods of numbering the graduations of the horizontal circles, as well as of the compass rings, are shown in the above illustrations.

All of our Transits are furnished with the horizontal circle numbered from 0 to 360 and 360 to 0, like figure A; the compass ring numbered in quadrants, like figure D; and the vertical circle numbered in quadrants. Other styles made to order.

The graduations of the verniers and of the horizontal and vertical circles are made on sterling silver, the surface of which is specially adapted for fine graduations. These parts are fitted so accurately and true that no space is visible between them; and, as the surfaces are exactly on the same plane, parallax is avoided.

See Price List in back of Catalog.

Verniers

The verniers of our various styles of Transits are made to read to single minutes, 30 seconds, 20 seconds or 10 seconds, as shown in the accompanying illustrations.

In the following formulae: M = the number of spaces of vernier which correspond to the spaces of the circle; a = value of one division of the circle; a' = value of one division of vernier; $a - a'$ = the least count of vernier, or the smallest reading of the circle.

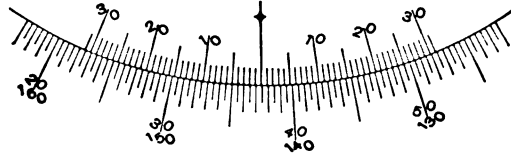


Fig. 1.

Fig. 1. Circle divided to half-degrees, vernier reading to single minutes.

$$M = \frac{a}{a - a'} \text{ then } M = \frac{30' \cdot 30 \times 60''}{1' \cdot 60''} = 30$$

therefore 30 spaces of the vernier must equal 29 spaces ($M-1$) of the circle.

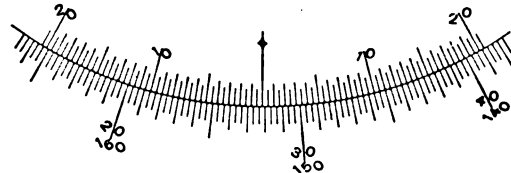


Fig. 2.

Fig. 2. Circle divided to 20 minute spaces, vernier reading to 30".

$$M = \frac{20 \times 60''}{30''} = 40$$

therefore 40 spaces of the vernier must equal 39 spaces ($M-1$) of the circle.



Fig. 3.

Fig. 3. Circle divided to 20 minute spaces, vernier reading to 20".

$$M = \frac{20 \times 60''}{20''} = 60$$

therefore 60 spaces of the vernier must equal 59 spaces ($M-1$) of the circle.

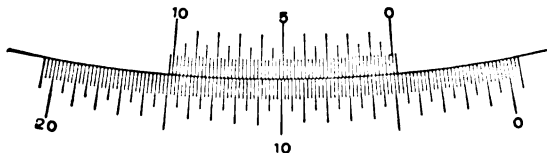


Fig. 4.

Fig. 4. Circle divided to 10 minute spaces, vernier reading to 10".

$$M = \frac{10 \times 60''}{10''} = 60$$

therefore 60 spaces of the vernier must equal 59 spaces ($M-1$) of the circle.

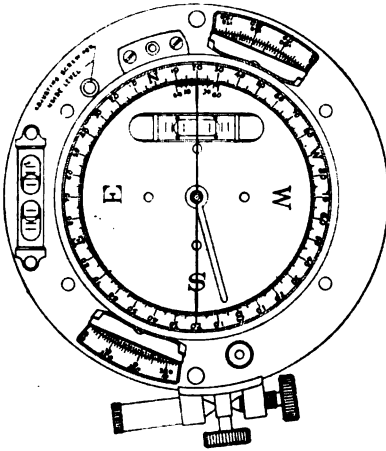
The above described verniers are the ones commonly furnished with our instruments; but we are prepared to make to order any other style specified.

See Price List in back of Catalog.

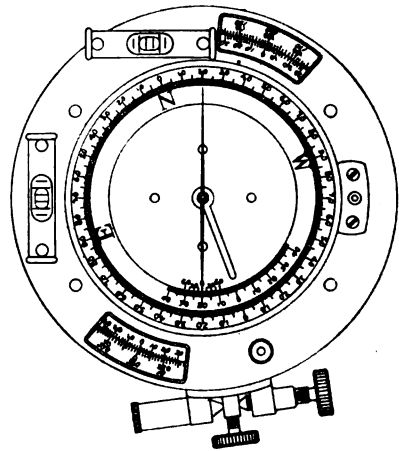
Compass

Our compass circles are numbered in quadrants and graduated to half-degrees. The magnetic needles have the greatest area in the vertical direction and taper from the center outward to a thin edge, as long experience has proved this form to be the best.

Great care is used in the selection of the steel of which they are made and in being certain that the arms of the needle bars are in line with their structural grain. The center of each needle is a highly polished and correctly formed jeweled bearing, resting on a hardened steel pin. The South end of each needle, in the Northern hemisphere, is provided with a coil of fine wire which can be shifted to equalize the difference of attraction.



**Compass Box and Variation Plate
Engineering Transit.**



**Compass Box and Variation Plate
Surveying Transit.**

Variation Plate— The compass boxes of our Transits are provided with a variation plate so that the magnetic declination may be set off accurately; and the cardinal points shift with the graduated circle. This latter feature eliminates the possibility of an error in reading when the magnetic declination is set off and the needle is at rest between the astronomical North and the magnetic North.

Standards

The standards of our Transits have been designed with the same care as all of the other parts, with the object of manufacturing instruments that are harmonious in all details. They are cast of hard bronze and are strongly ribbed, thus combining lightness with the greatest lateral strength. Enlarged bases and well-fitted screws secure them firmly to the horizontal plate.

The bearings for the telescope axis are conical in form and carefully fitted. One of the standards has an adjusting device near the top, consisting of a small box, which, by means of a screw underneath, can be raised or lowered and the telescope axis thus brought in a truly horizontal position.

See Price List in back of Catalog.

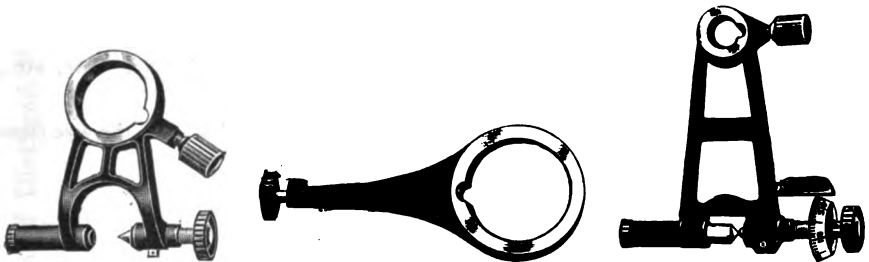
U-Shaped Standards

The Transits illustrated and described on pages 302 to 311 have U-Shaped Standards which are cast in one piece. They are of compact, graceful design, embodying the greatest lateral strength and rigidity.

Clamp and Tangent Screws

As our clamp and tangent screws act entirely on the centers, both plates are free from any strain and can be clamped without affecting the levels. This construction permits the plates to be fitted so close that dust or grit cannot enter between them.

The tangent screw consists of a single screw made of hard bronze or of Nickel silver, with an opposing spiral spring to take up the counter motion. The motion produced by the action of the tangent screw is perfectly smooth and will not be destroyed even if the screw should become injured.



Both the clamp and tangent screws are accessible and well protected. The tangent screw on our Levels is attached to the cross bar, and the clamp revolves with it and is always in the same relative position.

Centers

The centers are of great importance, as accurate working and final results are dependent upon them. Consequently, their manufacture demands the selection of suitable metals, the use of special machinery, and the workmanship of skilled men.

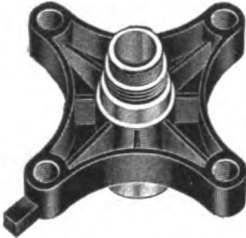
Hardest bell metal is used by us for the inner center, and gun metal and hard bronze for the outer centers. The form of the centers is that which our experience has proved to be the most serviceable; and they are extra large, perfectly tapered, and fitted to obtain great accuracy. They are made in one piece, with strong, substantial flanges.

As we use only the most improved machinery, we are confident that our centers are truly spherical and accurately fitted throughout their entire length.

All of our Transits and Theodolites, both with three and four leveling screws, have a shifting head, or shifting center, by means of which they can be precisely centered over a given point after they have been set approximately by the tripod legs. The range of shift varies from seven-sixteenths to seven-eighths inches, according to the size of the instrument.

See Price List in back of Catalog.

Leveling Base



This part, to which the leveling screws are fitted, is of ribbed design, strongly braced, and of extra height, thus giving a long bearing surface for the leveling screws.

The leveling screws, subject to constant wear, are cut in a special way that insures deep threads and a uniformity of pitch, with a resultant smooth motion and great durability.

They are made of hard bronze or of Nickel silver, the lower ends being spherical in form and provided with suitable cups. The milled finger heads of the screws are large and can be manipulated easily.

Y and Dumpy Levels

The preceding general description covering optics, centers, leveling base, etc., applies equally to both our Y and Dumpy Levels.

On all of our Levels the cross bars are long and heavily ribbed, and the wye clips are provided with an improved and efficient locking device.

Finish

Our Instruments are generally finished dark in color, the finish being exceedingly durable and not affected by spirits, acids, or atmospheric conditions. All smaller parts are finished bright, and the appearance of both our Transits and Levels is exceptionally pleasing.

Tripods

For use with our instruments, we have adopted a split-leg type of tripod, made of carefully selected and thoroughly seasoned hardwood, of a grade which experience has proved to give the best results in field service.

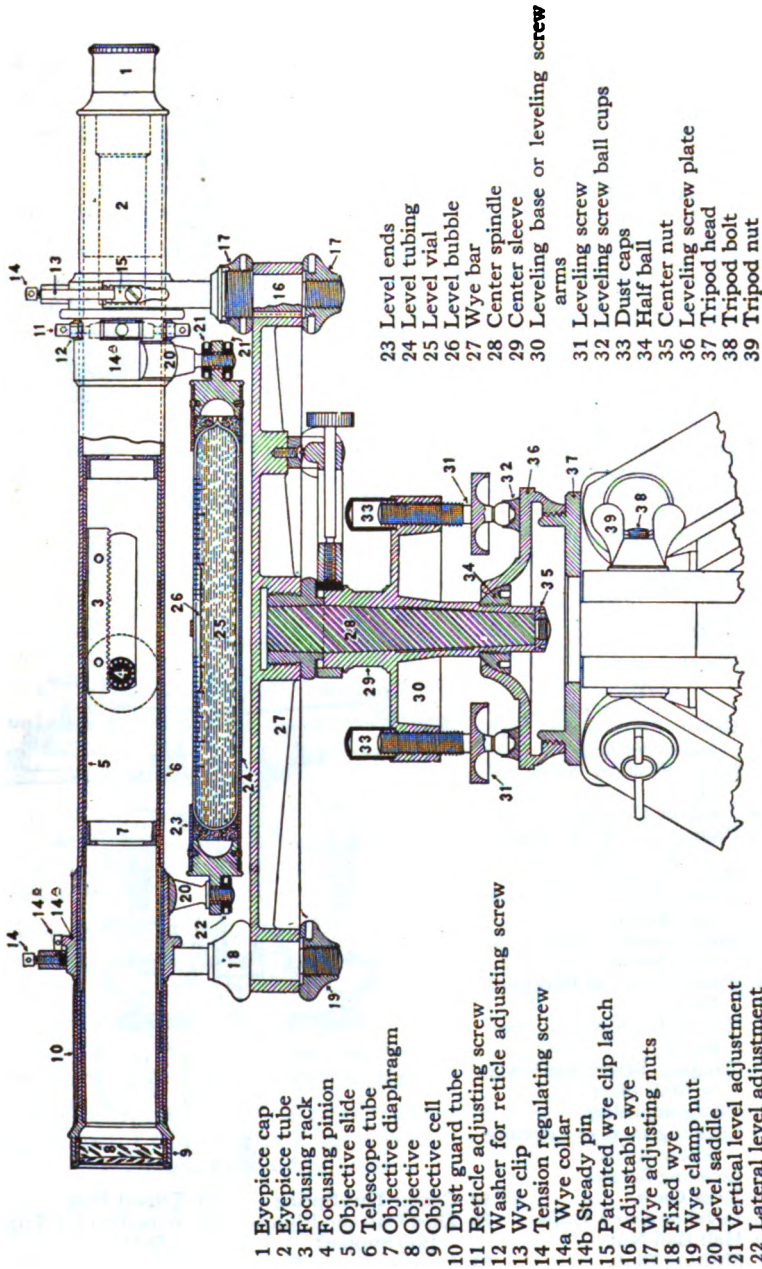
The shoe is made of iron, and has a long taper to insure a permanent and rigid fastening. At the top and on the outside a suitable spur is provided, to permit, by foot pressure, of giving the tripod a firm bearing and setting it securely into the ground.

The metal head, which receives the instrument and to which the tripod legs are attached, is made of bronze. The lugs are cast hollow and a long bearing is provided for the bolts which fasten the legs. The thread portion of the head is protected by a metal cap.

All metal parts have a durable black finish, and the parts made of wood are filled and varnished, thus making them impervious to moisture.

See Price List in back of Catalog.

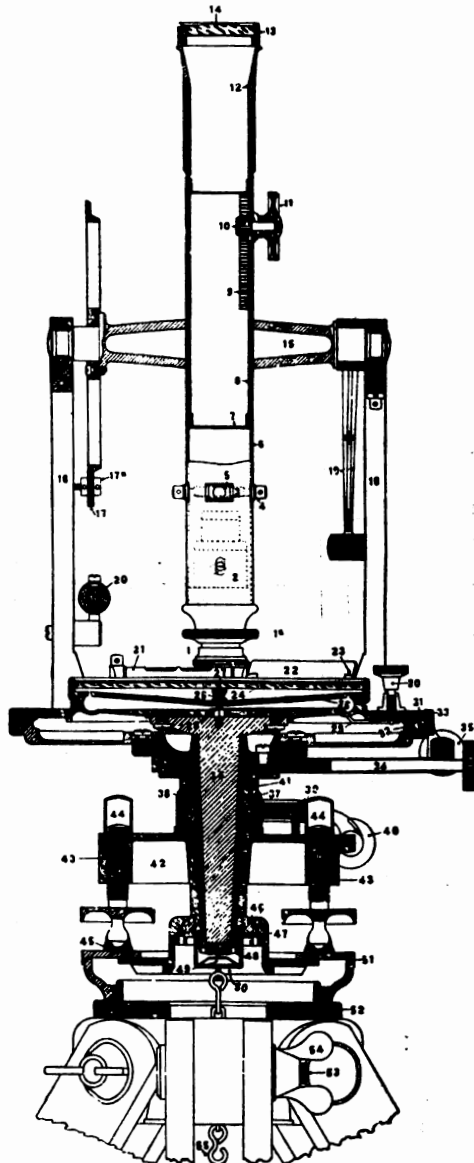
Cross Section of Dietzgen Wye Level



- 1 Eyepiece cap
- 2 Eyepiece tube
- 3 Focusing rack
- 4 Focusing pinion
- 5 Objective slide
- 6 Telescope tube
- 7 Objective diaphragm
- 8 Objective
- 9 Objective cell
- 10 Dust guard tube
- 11 Reticle adjusting screw
- 12 Washer for reticle adjusting screw
- 13 Wye clip
- 14 Tension regulating screw
- 14a Wye collar
- 14b Steady pin
- 15 Patented wye clip latch
- 16 Adjustable wye
- 17 Wye adjusting nuts
- 18 Fixed wye
- 19 Wye clamp nut
- 20 Level saddle
- 21 Vertical level adjustment
- 22 Lateral level adjustment
- 23 Level ends
- 24 Level tubing
- 25 Level vial
- 26 Level bubble
- 27 Wye bar
- 28 Center spindle
- 29 Center sleeve
- 30 Leveling base or leveling screw arms
- 31 Leveling screw
- 32 Leveling screw ball cups
- 33 Dust caps
- 34 Half ball
- 35 Center nut
- 36 Leveling screw plate
- 37 Tripod head
- 38 Tripod bolt
- 39 Tripod nut

Cross Section of Dietzgen Transit

- 1 Eyepiece cap
- 2 " tube
- 3 Cross hair reticle
- 4 Reticle adjusting screw
- 5 Washer for reticle adjusting screw
- 6 Telescope main tube
- 7 Diaphragm for objective tube
- 8 Objective slide
- 9 Focusing rack
- 10 " pinion
- 11 " nut
- 12 Objective head
- 13 " cell
- 14 Objective
- 15 Telescope axis
- 16 Vertical Circle
- 17 " Vernier
- 18 Standards
- 19 Telescope axis clamp
- 20 Standard level
- 21 Plate level
- 22 Vernier shade glass
- 23 " " " frame
- 24 Compass glass cover
- 25 " needle
- 26 Needle center
- 27 Center jewel
- 28 Needle pivot
- 29 " lifter
- 30 " " screw
- 31 Upper Plate with horizontal vernier
- 32 Lower Plate or horizontal limb
- 33 Tangent Hanger
- 34 Clamp Screw for upper vernier plate
- 35 Plate Tangent screw
- 36 Inner center of hardest Bell Metal
- 37 Intermediate center of Gun Metal
- 38 Outer Center of Phosphor Bronze
- 39 Clamp for lower or limb plate
- 40 Tangent Screw for lower or limb plate
- 41 Clamping collar
- 42 Leveling Base or Leveling Screw Arms
- 43 Leveling Screws
- 44 Dust Caps
- 45 Leveling Screw Cups
- 46 Half Ball Nut
- 47 Shifting Plate
- 48 Center Nut



- 49 Center Nut Spring
- 53 Tripod Bolt
- 50 Dust Cap and Plumb Bob Support
- 54 Wing Nut for Tripod Bolt
- 51 Leveling Screw Plate
- 55 Plumb Bob Chain and Hook
- 52 Tripod Head



General Construction

In conclusion, we wish to call attention to our method of construction, by means of which, while attaining great rigidity, we are able to eliminate all unnecessary weight in the various parts of the instrument.

By referring to the cross-sectional cuts of our Transit and our Y Level, shown on pages 289 and 290, it will be seen that all we claim for our instruments has been accomplished in a perfected mechanical manner, and that the protection and accessibility of all the vital parts is a particular feature.

We use selected and exceptionally hard bell metal for the centers, Y Level telescope bearings and telescope axis; hard bronze for the outer center; and hard composition metal for the leveling base. By the use of these metals, expansion and contraction is reduced to a minimum, and the liability of injury and fretting of the moving parts — which constantly exists when softer metals are used — is practically overcome, thus enabling more reliable and permanent adjustments to be made.

Aluminum alloys in the manufacture of our instruments are, owing to their inferior wearing properties, used only for those parts that are not subject to friction and wear. The injudicious use of aluminum in surveying instruments would, while obtaining lightness, sacrifice strength and stability.

Care of Instruments

With proper care the usefulness of an instrument can be preserved for many years, and we feel that it would not be amiss to mention, for the benefit of our friends and patrons, a few points regarding the care of instruments.

The lenses of the telescope, particularly the object glass, should not be removed, as this will disturb the adjustment. If necessary to clean them, great care should be taken and only soft, clean linen should be used.

To retain the sensibility of the compass needle, the delicate point on which it swings must be carefully guarded, and the instrument should not be carried without the needle being locked. When the needle is lowered it should be brought gently upon the center pin.

The object slide seldom needs to be removed; but when removing is necessary, the slide should be carefully protected from dust. Do not grease or oil the slide too freely, as only a thin film is necessary. Any surplus of oil should be removed with a clean wiper.

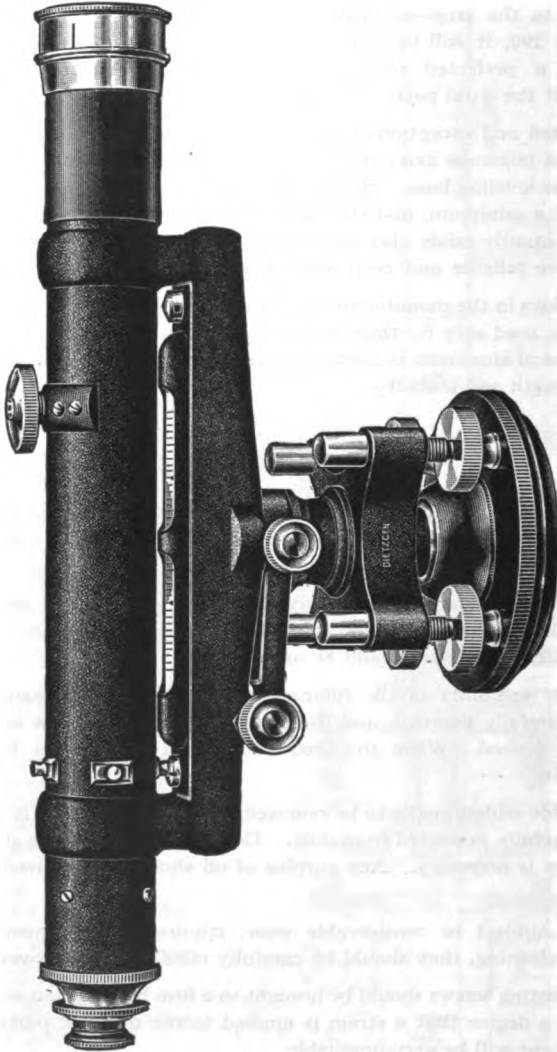
The centers, subject to considerable wear, require more frequent lubrication. After thoroughly cleaning, they should be carefully oiled with a fine watch oil.

All of the adjusting screws should be brought to a firm bearing; but should never be tightened to such a degree that a strain is applied to the different parts, as, if this is done, the adjustment will be very unreliable.

When the instrument is carried on the tripod all clamps should be tightened to prevent unnecessary wear on the centers.

See Price List in back of Catalog.

Engineering Dumpy Levels



No. 6000-6002.

For complete specifications, see next page.



Engineering Dumpy Levels

Specifications of No. 6000

Telescope — Length, 15 inches; magnifying power, 26 to 28 diameters; achromatic terrestrial, powerful and of best definition.

Object Glass — Diameter, $1\frac{5}{8}$ inches, used to full value.

Eye-Piece — Improved style, giving a large, flat field; provided with a screw-like arrangement for precise focusing of cross hairs.

Cross-Bar — Length, $9\frac{1}{4}$ inches; composition metal; designed to combine lightness with strength; provided with clamp and tangent screw.

Level to Cross Bar — Length, $7\frac{3}{4}$ inches; 20 seconds sensibility; $\frac{1}{10}$ inch division; well protected.

Center — Bell metal; extends from cross bar to bottom of leveling base, giving accuracy, strength and stability.

Leveling Base — Extra large diameter, enabling the use of a more sensitive bubble than is generally found.

Leveling Screws — Four, nickel silver, with accurately cut threads, dust caps and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 9 lbs., 14 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6000. Engineering Dumpy Level; complete, Each, \$

Specifications of No. 6002

Telescope — Length, 18 inches; magnifying power, 30 to 32 diameters; achromatic terrestrial, powerful and of best definition.

Object Glass — Diameter, $1\frac{3}{4}$ inches, used to full value.

Eye-Piece — Improved style, giving a large, flat field; provided with a screw-like arrangement for precise focusing of cross hairs.

Cross Bar — Length, $10\frac{1}{2}$ inches; composition metal; designed to combine lightness with strength; provided with clamp and tangent screw.

Level to Cross Bar — Length, $7\frac{3}{4}$ inches; 20 seconds sensibility; $\frac{1}{10}$ inch division; well protected.

Center — Bell metal; extends from cross bar to bottom of leveling base, giving accuracy, strength and stability.

Leveling Base — Extra large diameter, enabling the use of a more sensitive bubble than is generally found.

Leveling Screws — Four, nickel silver, with accurately cut threads, dust caps and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 10 lbs., 8 oz.; tripod, about 10 lbs.

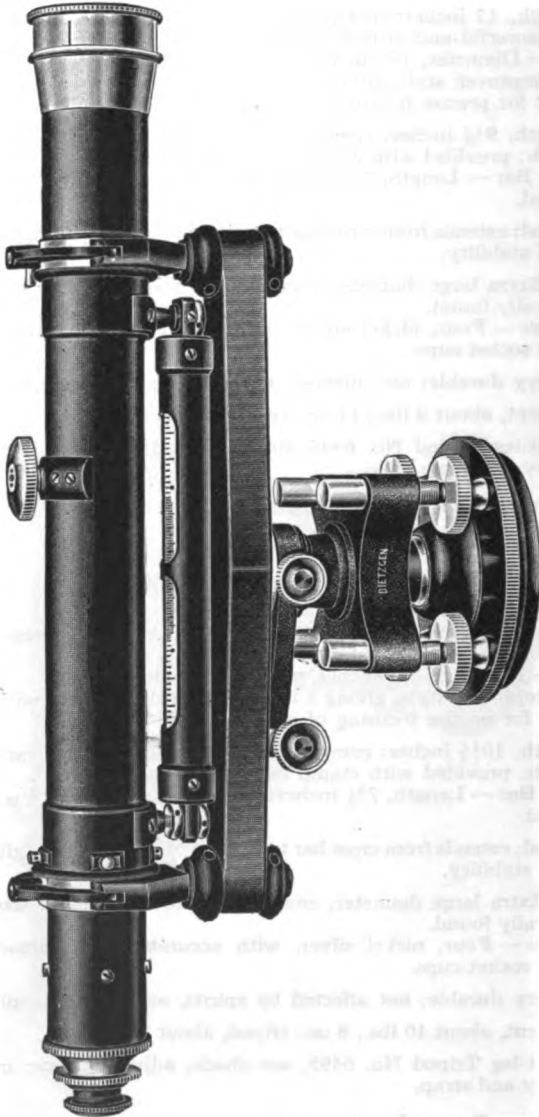
Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6002. Engineering Dumpy Level; complete, Each, \$

Surveying Dumpy Level listed under No. 6305.

See Price List in back of Catalog.

Engineering Y Levels



Nos. 6008, 6016, 6018.

For complete specifications, see next page.



Engineering Y Levels

Specifications of No. 6008

- Telescope:** Length, 18 inches; magnifying power, 30 to 32 diameters; objective 1 1/4 inches, used to full value; erecting eye-piece.
- Telescope Level:** Length, 7 3/4 inches; 20 seconds sensibility; 1/10 inch division.
- Cross Bar:** Length, 11 1/2 inches; composition metal; efficient locking device for wyes.
- Center:** Bell metal; extends from cross bar to bottom of leveling base, giving accuracy, strength and stability.
- Leveling Base:** Extra large diameter; four leveling screws, nickel silver, with accurately cut threads, dust caps and ball and socket cups.
- Finish:** Dark; very durable; not affected by spirits, acids or atmospheric changes.
- Weight:** Instrument, about 11 lbs., 8 oz.; tripod, about 10 lbs.
- Accessories:** Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6008. Engineering Y Level; complete, Each, \$

Specifications of No. 6016

- Telescope:** Length, 20 inches; magnifying power, 35 to 37 diameters; objective 1 3/4 inches, used to full value; erecting eye-piece.
- Telescope Level:** Length, 9 1/4 inches; 20 seconds sensibility; 1/10 inch division.
- Cross Bar:** Length, 13 inches; composition metal; efficient locking device for wyes.
- Center:** Bell metal; extends from cross bar to bottom of leveling base, giving accuracy, strength and stability.
- Leveling Base:** Extra large diameter; four leveling screws, nickel silver, with accurately cut threads, dust caps and ball and socket cups.
- Finish:** Dark; very durable; not affected by spirits, acids or atmospheric changes.
- Weight:** Instrument, about 12 lbs., 9 oz.; tripod, about 10 lbs.
- Accessories:** Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6016. Engineering Y Level; complete, Each, \$

Specifications of No. 6018

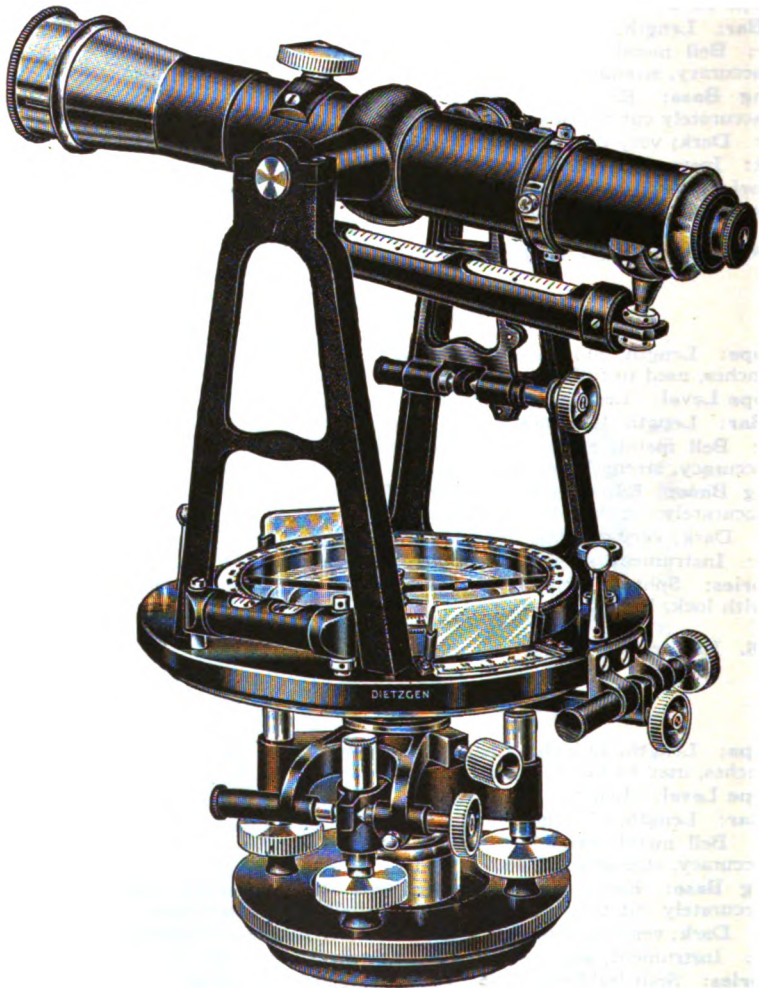
- Telescope:** Length, 22 inches; magnifying power, 40 to 42 diameters; objective 1 3/4 inches, used to full value; erecting eye-piece.
- Telescope Level:** Length, 9 3/4 inches; 20 seconds sensibility; 1/10 inch division.
- Cross Bar:** Length, 13 inches; composition metal; efficient locking device for wyes.
- Center:** Bell metal; extends from cross bar to bottom of leveling base, giving accuracy, strength and stability.
- Leveling Base:** Extra large diameter, four leveling screws, nickel silver, with accurately cut threads, dust caps and ball and socket cups.
- Finish:** Dark; very durable; not affected by spirits, acids or atmospheric changes.
- Weight:** Instrument, about 12 lbs., 12 oz.; tripod, about 10 lbs.
- Accessories:** Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6018. Engineering Y Level; complete, Each, \$

Surveying Y Levels listed under Nos. 6310-6316.

See Price List in back of Catalog.

Engineering Transits



Nos. 6022A-6022C.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6022A

Horizontal Circle—Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to 30 seconds; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels—Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope—Length, 11 inches; magnifying power, 24 to 26 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level—Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.

Compass—Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $4\frac{1}{2}$ inches; cardinal points shift with the graduated circle.

Centers—Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center—Range, $\frac{7}{8}$ inch.

Finish—Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight—Instrument, about 15 lbs., 14 oz.; tripod, about 10 lbs.

Accessories—Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6022A. Engineering Transit; complete, Each, \$

Specifications of No. 6022C

Horizontal Circle—Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to one minute; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels—Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope—Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level—Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Compass—Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers—Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center—Range, $\frac{5}{8}$ inch.

Finish—Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight—Instrument, about 11 lbs., 11 oz.; tripod, about 8 lbs.

Accessories—Split Leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

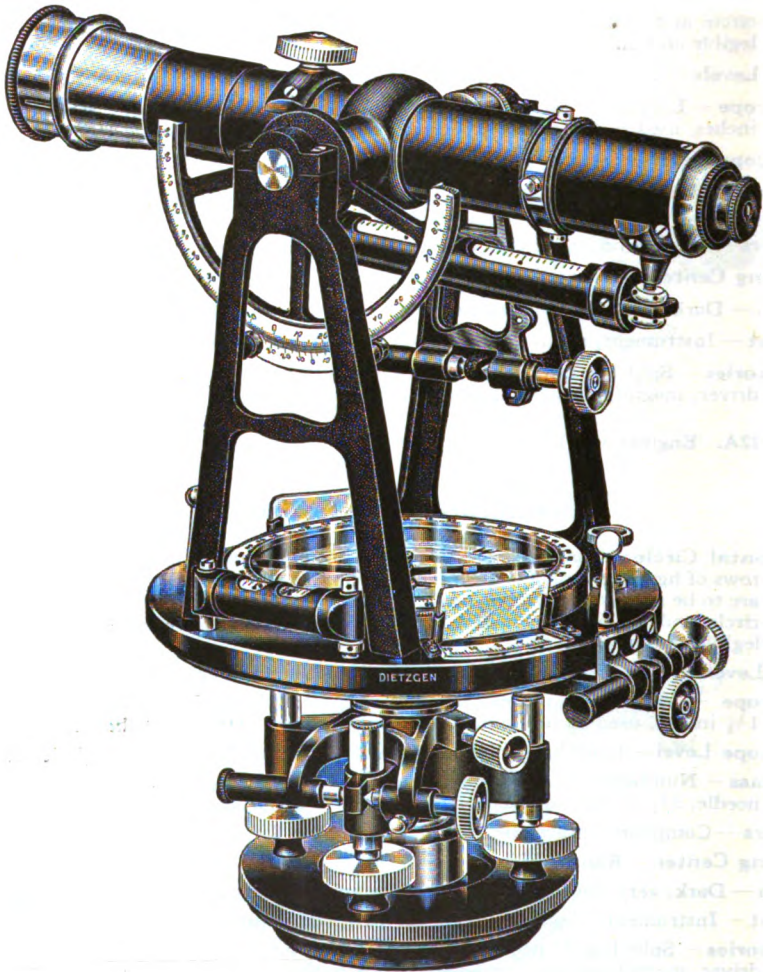
No. 6022C. Engineering Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

Surveying Transits listed under Nos. 6322A-6324A.

See Price List in back of Catalog.

Engineering Transits



Nos. 6023A-6023C.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6023A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to read; two verniers, double and exactly opposite, reading to 30 seconds; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; objective $1\frac{7}{16}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Arc — Diameter, 5 inches; vernier to 1 minute; graduated on sterling silver.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $4\frac{1}{2}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{7}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 16 lbs., 2 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screwdriver, magnifying glass, mahogany box with lock, key and strap.

No. 6023A. Engineering Transit; complete, Each, \$

Specifications of No. 6023C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to one minute; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Arc — Diameter, 5 inches; vernier to 1 minute; graduated on sterling silver.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 15 oz.; tripod, about 8 lbs.

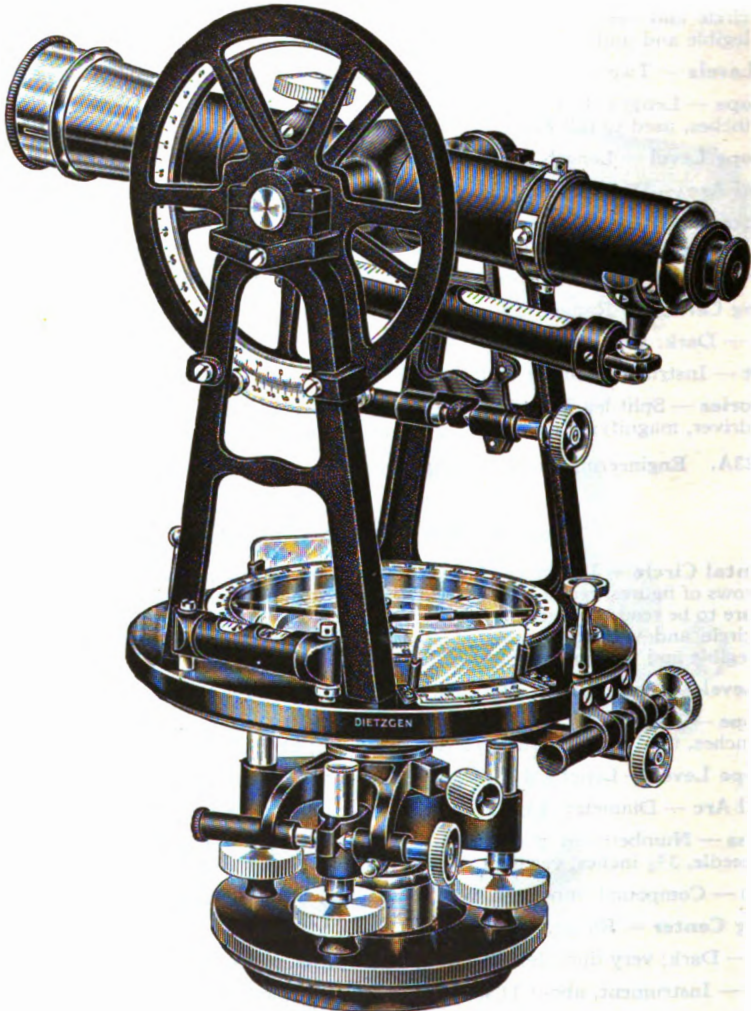
Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screwdriver, magnifying glass, mahogany box with lock, key and strap.

No. 6023C. Engineering Transit; complete, Each, \$

Surveying Transits listed under Nos. 6322A-6324A.

See Price List in back of Catalog.

Engineering Transits



Nos. 6024A-6024C-6024E.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6024A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches; numbered 0 to 360 both ways; two opposite verniers to 30 seconds; circle and verniers graduated on sterling silver.
Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.
Telescope — Length, 11 in.; power, 24 to 26 diam.; erecting eye-piece; fixed stadia hairs.
Telescope Level — Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.
Vertical Circle — Diam., 5 in.; vernier to 1 minute; graduated on sterling silver.
Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $4\frac{1}{2}$ inches; cardinal points shift with the graduated circle.
Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.
Shifting Center — Range, $\frac{1}{8}$ inch.
Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.
Weight — Instrument, about 16 lbs., 6 oz.; tripod, about 10 lbs.
Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6024A. Engineering Transit; complete, Each, \$

Specifications of No. 6024C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches; numbered 0 to 360 both ways; two opposite verniers to 1 minute; circle and verniers graduated on sterling silver.
Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.
Telescope — Length, 9 in.; power, 18 to 20 diam.; erecting eye-piece; fixed stadia hairs.
Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.
Vertical Circle — Diam., 5 in.; vernier to 1 minute; graduated on sterling silver.
Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{1}{4}$ inches; cardinal points shift with the graduated circle.
Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.
Shifting Center — Range, $\frac{5}{8}$ inch.
Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.
Weight — Instrument, about 12 lbs., 7 oz.; tripod, about 8 lbs.
Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6024C. Engineering Transit; complete, Each, \$

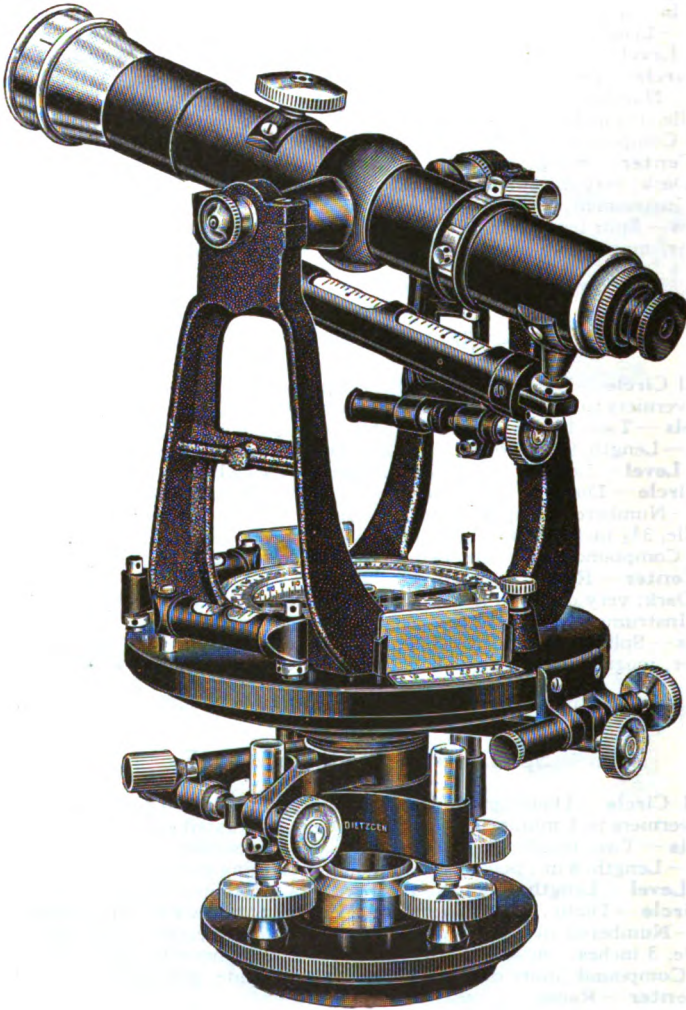
Specifications of No. 6024E

Horizontal Circle — Diameter, $4\frac{1}{2}$ inches; numbered 0 to 360 both ways; two opposite verniers to 1 minute; circle and verniers graduated on sterling silver.
Plate Levels — Two; length, $1\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.
Telescope — Length, 8 in.; power, 16 to 18 diam.; erecting eye-piece; fixed stadia hairs.
Telescope Level — Length, $3\frac{1}{2}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.
Vertical Circle — Diam., $4\frac{1}{2}$ in.; vernier to 1 minute; graduated on sterling silver.
Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 inches; cardinal points shift with the graduated circle.
Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.
Shifting Center — Range, $\frac{7}{16}$ inch.
Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.
Weight — Instrument, about 7 lbs., 8 oz.; tripod, about 8 lbs.,
Accessories — Extension Tripod No. 6496, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6024E. Engineering Transit; complete, Each, \$

See Price List in back of Catalog.

Engineering Transits



Nos. 6042A-6042C.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6042A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to 30 seconds; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.

Standards — U-Shaped; cast in one piece; compact and graceful.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{7}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 15 lbs., 14 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6042A. Engineering Transit; complete, Each, \$

Specifications of No. 6042C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to one minute; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Standards — U-Shaped; cast in one piece; compact and graceful.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 15 oz.; tripod, about 8 lbs.

Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

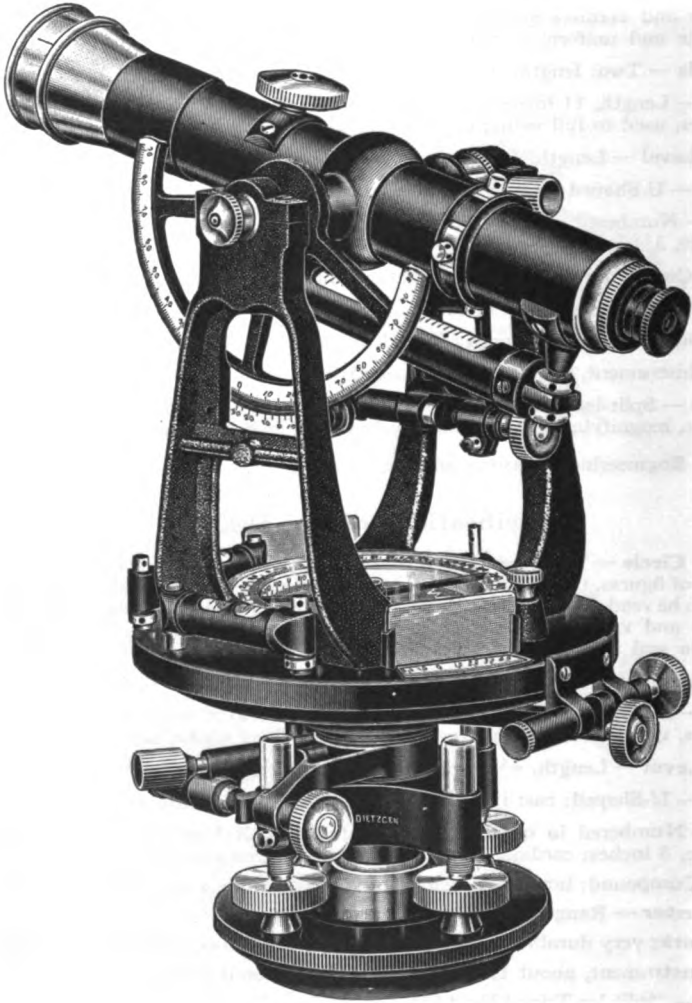
No. 6042C. Engineering Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

Surveying Transits listed under Nos. 6322A-6324A.

See Price List in back of Catalog.

Engineering Transits



Nos. 6043A-6043C.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6043A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to 30 seconds; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Arc — Diameter, 5 inches; vernier to 1 minute; graduated on sterling silver.

Standards — U-Shaped; cast in one piece; compact and graceful.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{7}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 16 lbs., 2 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6043A. Engineering Transit; complete, Each, \$

Specifications of No. 6043C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to one minute; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Arc — Diameter, 5 inches; vernier to 1 minute; graduated on sterling silver.

Standards — U-Shaped; cast in one piece; compact and graceful.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

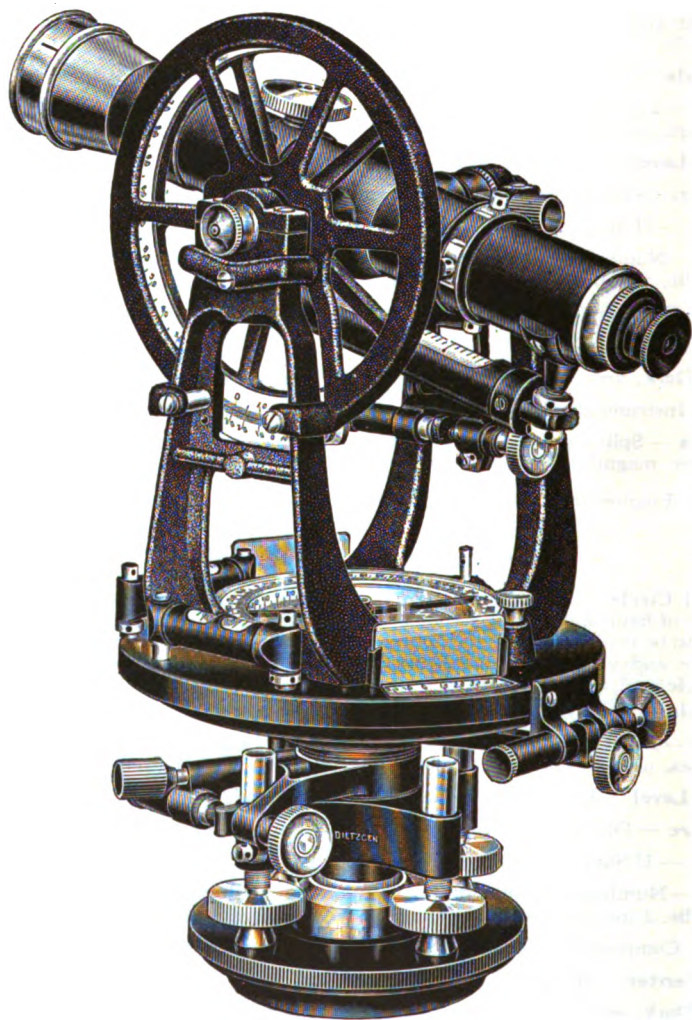
Weight — Instrument, about 11 lbs., 12 oz.; tripod, about 8 lbs.

Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6043C. Engineering Transit; complete, Each, \$

See Price List in back of Catalog.

Engineering Transits



Nos. 6054A, 6054C, 6054E.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6054A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches; numbered 0 to 360 both ways; two opposite verniers to 30 seconds; circle and verniers graduated on sterling silver.
Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.
Telescope — Length, 11 in.; power, 24 to 26 diam.; erecting eye-piece; fixed stadia hairs.
Telescope Level — Length, 5 inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.
Vertical Circle — Diam., 5 in.; vernier to 1 minute; graduated on sterling silver.
Standards — U-Shaped; cast in one piece; compact and graceful.
Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.
Centers — Compound; inner one, bell metal; intermediate, gun metal; outer, bronze.
Shifting Center — Range, $\frac{7}{8}$ inch.
Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.
Weight — Instrument, about 16 lbs., 6 oz.; tripod, about 10 lbs.
Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6054A. Engineering Transit; complete, Each, \$

Specifications of No. 6054C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches; numbered 0 to 360 both ways; two opposite verniers to 1 minute; circle and verniers graduated on sterling silver.
Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.
Telescope — Length, $9\frac{1}{2}$ in.; power, 18 to 20 diam.; erecting eye-piece; fixed stadia hairs.
Telescope Level — Length, $4\frac{1}{4}$ in.; 30 seconds sensibility; $\frac{1}{10}$ inch division.
Vertical Circle — Diam., 5 in.; vernier to 1 minute; graduated on sterling silver.
Standards — U-Shaped; cast in one piece; compact and graceful.
Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 inches; cardinal points shift with the graduated circle.
Centers — Compound; inner one, bell metal; intermediate, gun metal; outer, bronze.
Shifting Center — Range, $\frac{5}{8}$ inch.
Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.
Weight — Instrument, about 12 lbs., 7 oz.; tripod, about 8 lbs.
Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6054C. Engineering Transit; complete, Each, \$

Specifications of No. 6054E

Horizontal Circle — Diameter, $4\frac{1}{2}$ inches; numbered 0 to 360 both ways; two opposite verniers to 1 minute; circle and verniers graduated on sterling silver.
Plate Levels — Two; length, $1\frac{1}{2}$ in.; 60 seconds sensibility; $\frac{1}{10}$ inch division.
Telescope — Length, 8 in.; power, 16 to 18 diam.; erecting eye-piece; fixed stadia hairs.
Telescope Level — Length, $3\frac{1}{2}$ in.; 30 seconds sensibility; $\frac{1}{10}$ inch division.
Vertical Circle — Diam., $4\frac{1}{2}$ in.; vernier to 1 minute; graduated on sterling silver.
Standards — U-Shaped; cast in one piece; compact and graceful.
Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 inches; cardinal points shift with the graduated circle.
Centers — Compound; inner one, bell metal; intermediate, gun metal; outer, bronze.
Shifting Center — Range, $\frac{7}{8}$ inch.
Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.
Weight — Instrument, about 7 lbs., 8 oz.; tripod, about 8 lbs.
Accessories — Extension Tripod No. 6496, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6054E. Engineering Transit; complete, Each, \$

See Price List in back of Catalog.

Engineering Transits



Nos. 6062A-6062C.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6062A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to 30 seconds; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.

Standards — U-Shaped; cast in one piece; compact and graceful.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{1}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 15 lbs., 14 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6062A. Engineering Transit; complete, Each, \$

Specifications of No. 6062C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to one minute; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Standards — U-Shaped; cast in one piece; compact and graceful.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 10 oz.; tripod, about 8 lbs.

Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

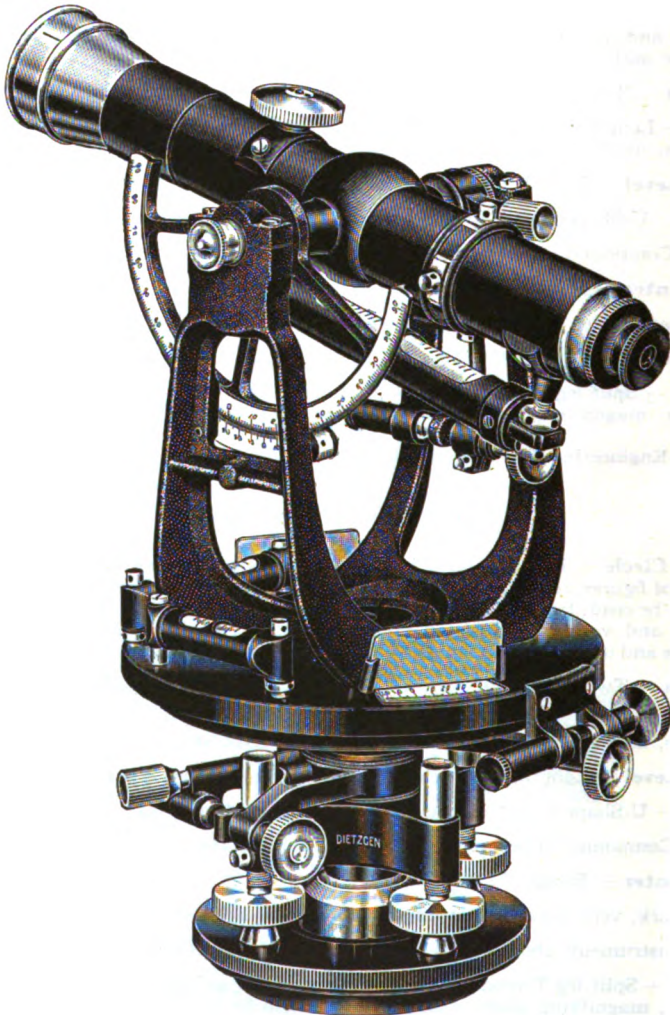
No. 6062C. Engineering Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

Surveying Transits listed under Nos. 6322A-6324A.

See Price List in back of Catalog.

Engineering Transits



Nos. 6063A-6063C.

For complete specifications, see next page.



Engineering Transits

Specifications of No. 6063A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to read; two verniers, double and exactly opposite, reading to 30 seconds; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, 5 inches; 20 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Arc — Diameter, 5 inches; vernier to 1 minute; graduated on sterling silver.

Standards — U-Shaped; cast in one piece; compact and graceful.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{7}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 16 lbs., 2 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6063A. Engineering Transit; complete, Each, \$

Specifications of No. 6063C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; two verniers, double and exactly opposite, reading to one minute; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs.

Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Arc — Diameter, 5 inches; vernier to 1 minute; graduated on sterling silver.

Standards — U-Shaped; cast in one piece; compact and graceful.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 14 oz.; tripod, about 8 lbs.

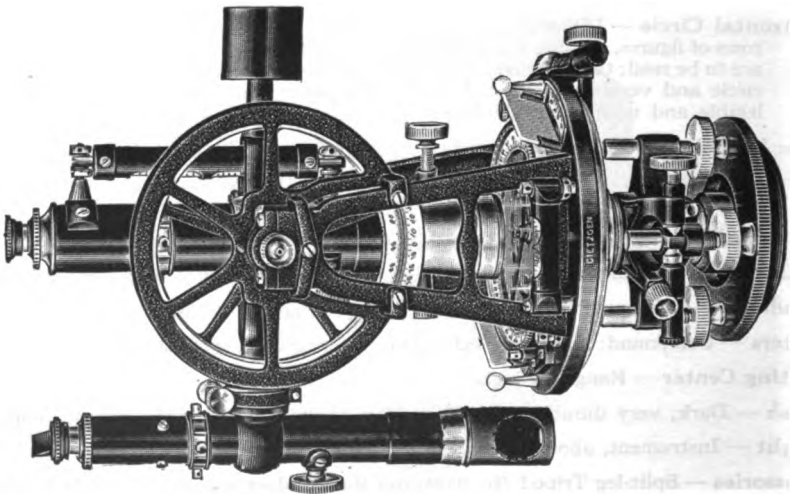
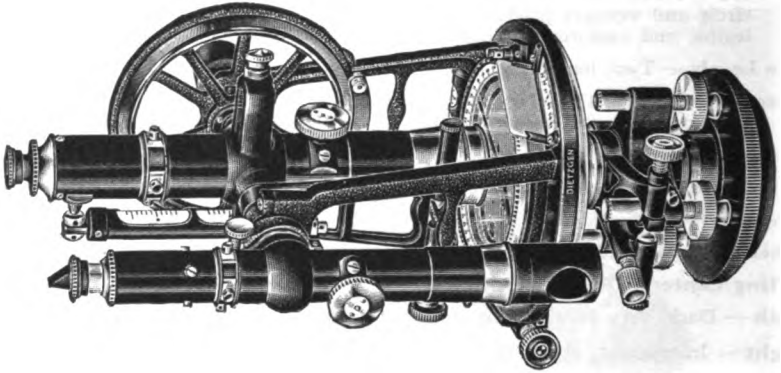
Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6063C. Engineering Transit; complete, Each, \$

Surveying Transits listed under Nos. 6322A-6324A.

See Price List in back of Catalog.

Mining Transits



Nos. 6074C-6074E.

For complete specifications, see next page.



Mining Transits

Specifications of No. 6074C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduations; marked with two rows of figures, reading 0 to 360 both ways; two verniers, double and exactly opposite, reading to 1 minute; circle and verniers graduated on sterling silver.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{4}$ inches, used to full value; erecting eye-piece; fixed stadia hairs; reflector.

Auxiliary Telescope (after Berger) — Attachable to either top of main telescope or end of axis of same; with counterpoise, plain prism with colored glass, and reflector.

Telescope Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, 5 in.; vernier to 1 minute; graduated on sterling silver.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 12 lbs., 7 oz.; tripod, about 8 lbs.

Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6074C. Mining Transit; complete, Each, \$

Specifications of No. 6074E

Horizontal Circle — Diameter, $4\frac{1}{2}$ inches to edge of graduations; marked with two rows of figures, reading 0 to 360 both ways; two verniers, double and exactly opposite, reading to 1 minute; circle and verniers graduated on sterling silver.

Plate Levels — Two; length, $1\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 8 inches; magnifying power, 16 to 18 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece; fixed stadia hairs; reflector.

Auxiliary Telescope (after Berger) — Attachable to either top of main telescope or end of axis of same; with counterpoise, plain prism with colored glass, and reflector.

Telescope Level — Length, $3\frac{1}{2}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, 5 in.; vernier to 1 minute; graduated on sterling silver.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 10 lbs., 7 oz.; tripod, about 8 lbs.

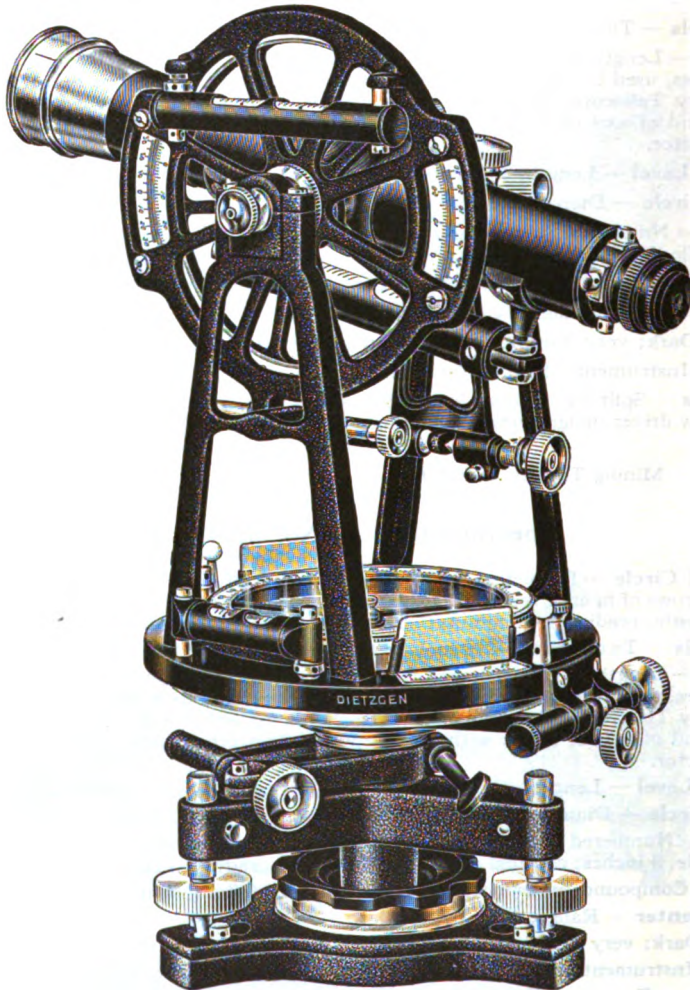
Accessories — Extension Tripod No. 6496, sun shade, adjusting pins, plumb bob, screw-driver, magnifying glass, mahogany box with lock, key and strap.

No. 6074E. Mining Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

See Price List in back of Catalog.

Stadia Topography Transit



No. 6084C.

For complete specifications, see next page.



Stadia Topography Transit

Specifications of No. 6084C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduations; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to read; circle and verniers graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Verniers — Two, double and exactly opposite, reading to 1 minute.

Plate Levels — Two; length, $2\frac{1}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $10\frac{1}{4}$ inches; magnifying power, 22 to 24 diameters; fixed stadia hairs.

Object Glass — Diameter, $1\frac{1}{16}$ inches, used to full value.

Eye-Piece — Inverting; improved style, giving greatly increased illumination with a large, flat field.

Level — Length, $4\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, 5 inches; verniers, two, double and exactly opposite, reading to 1 minute; graduated on sterling silver; provided with tangent screw and fine spirit level of 60 seconds sensibility and $\frac{1}{10}$ inch division.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch; of improved design, simple and practical

Leveling Base — Extra large diameter; three leveling screws, nickel silver, with accurately cut threads.

Tangent Screws — Nickel silver; improved form, with opposing spiral spring; accessible and well protected.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 12 lbs.; tripod, about 8 lbs., 7 oz.

Accessories — Special Split-leg Tripod, sun shade, adjusting pins, plumb bob, screw driver, magnifying glass, mahogany box with lock, key and strap.

No. 6084C. Stadia Topography Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

See Price List in back of Catalog.

Improved Solar Attachment (After Saegmuller)



No. 6098.

The above illustration represents the improved Solar Attachment as now made. It consists essentially of a small telescope and level, the telescope being mounted in standards, in which it can be elevated or depressed. The standard revolves around an axis, called the polar axis, which is fastened to the telescope axis of the transit instrument. The telescope called the "Solar Telescope" can thus be moved in altitude and azimuth. Two pointers attached to the telescope to approximately set the instrument are so adjusted that when the shadow of the one is thrown on the other the sun will appear in the field of view.

Adjustment

1. The Transit must be in perfect adjustment, especially the levels on the telescope and the plates; the cross axis of the telescope should be exactly horizontal, and the index error of the vertical circle carefully determined.

2. The polar axis must be at right angles to the line of collimation and horizontal axis of main telescope.

To effect this, level the instrument carefully and bring the bubble of each telescope level to the middle of its scale. Revolve the Solar around its polar axis, and if the bubble remains central the adjustment is complete. If not, correct half the movement by the adjusting screws at the base of the polar axis, and the other half by moving the solar telescope on its horizontal axis.

3. The line of collimation of the solar telescope and the axis of its level must be parallel.

To effect this, bring both telescopes in the same vertical plane and both bubbles to the middle of their scales. Observe a mark through the transit telescope, and note whether the solar telescope points to a mark above this, equal to the distance between the horizontal axes of the two telescopes. If it does not bisect this mark, move the cross wires by means of the screws until it does. Generally the small level has no adjustments and the parallelism is effected only by moving the cross hairs.

The adjustments of the Transit and the Solar should be frequently examined, and kept as nearly perfect as possible.

Directions for Using

First. Take the declination of the sun as given in the Nautical Almanac for the given day, and correct it for refraction and hourly change. Incline the transit telescope until this amount is indicated by its vertical arc. If the declination of the sun is north, depress it; if south, elevate it. Without disturbing the position of the transit telescope, bring the solar telescope into the vertical plane of the large telescope and to a horizontal position by means of its level. The two telescopes will then form an angle which equals the amount of the declination, and the inclination of the solar telescope to its polar axis will be equal to the polar distance of the sun.

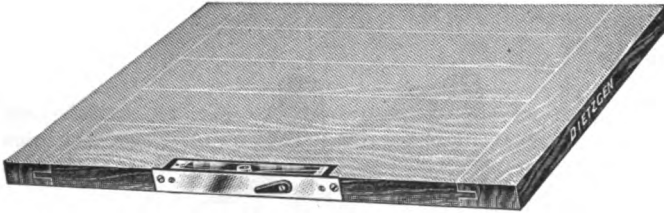
Second. Without disturbing the relative positions of the two telescopes, incline them and set the vernier to the co-latitude of the place.

By moving the transit and the "Solar Attachment" around their respective vertical axes, the image of the sun will be brought into the field of the solar telescope, and after accurately bisecting it the transit telescope must be in the meridian, and the compass-needle indicates its deviation at that place. The vertical axis of the "Solar Attachment" will then point to the pole, the apparatus being, in fact, a small equatorial.

No. 6098. Improved Solar Attachment, Each, \$

See Price List in back of Catalog.

Traverse Plane Table



Drawing Board and Compass



Solid Leg Tripod



Alidade

No. 6102.

Specifications of No. 6102

Alidade — Length, 10 inches; brass, durable black finish, with beveled edge graduated to 40 parts to the inch unless otherwise ordered; in leather case.

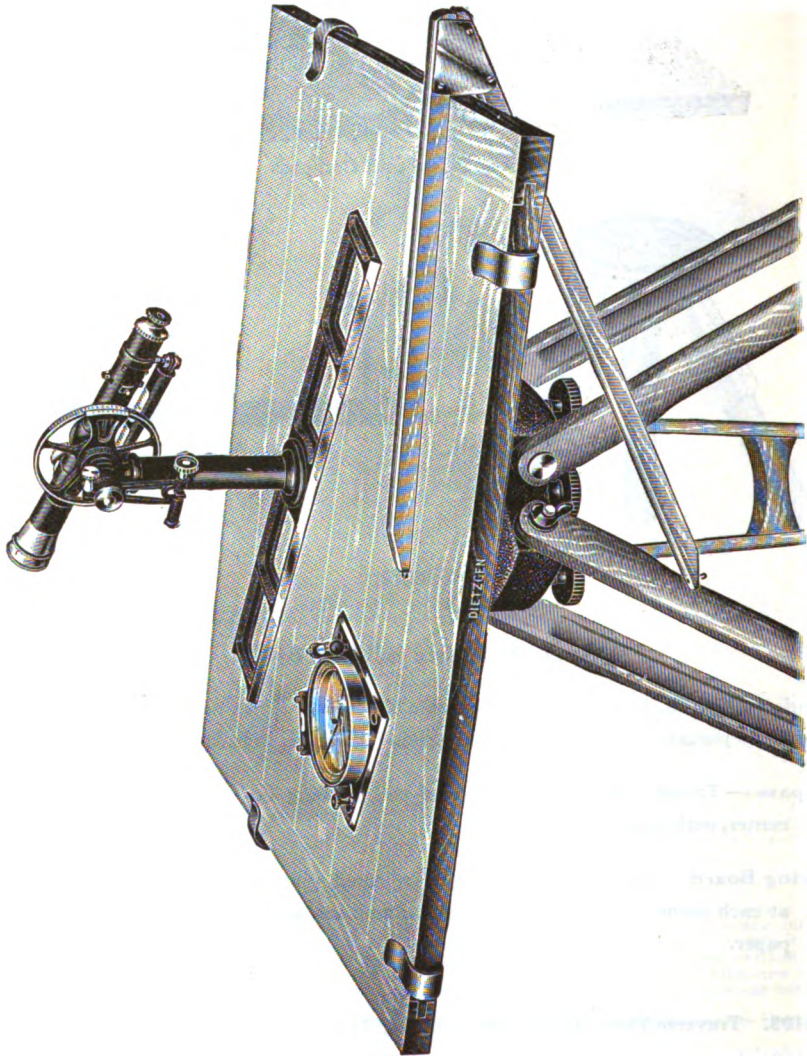
Compass — Trough; set into one edge of the drawing board; 3 inch needle, jewel center, with stop.

Drawing Board — Square; 15×15 inches; selected pinewood, thoroughly seasoned; at each corner of the board are small clamp screws with sockets for holding the paper.

No. 6102.	Traverse Plane Table; with solid-leg Tripod,	. . .	Each, \$
6103.	Like No. 6102, but with extension Tripod,	. . .	“
6104.	Alidade only, as described above,	. . .	“

See Price List in back of Catalog.

Plane Tables



No. 6108.

For complete specifications, see next page.



Plane Tables

Specifications of No. 6108

Alidade:

Telescope — Length, 11 inches; achromatic terrestrial (erecting); dust cap and sunshade; magnifying power, 24 diameters; objective, $1\frac{1}{4}$ inches; eyepiece with spiral focusing arrangement; fixed stadia hairs, ratio 1:100.

Telescope Level — Length, 5 inches; graduated on the glass; 30 seconds sensibility.

Vertical Circle — Diameter, $4\frac{1}{2}$ inches; double direct vernier, reading to 1 minute.

Straight Edge — Length, $21\frac{3}{4}$ inches; width, $3\frac{1}{4}$ inches.

Compass: Square; base, 4×4 inches; graduated on raised ring to half-degrees; $3\frac{1}{2}$ inch needle, with stop; equipped with two fine spirit levels graduated on the glass.

Drawing Board: 24×31 inches; selected pinewood, thoroughly seasoned.

Leveling Head and Tripod: No. 6140, illustrated and described on page 322.

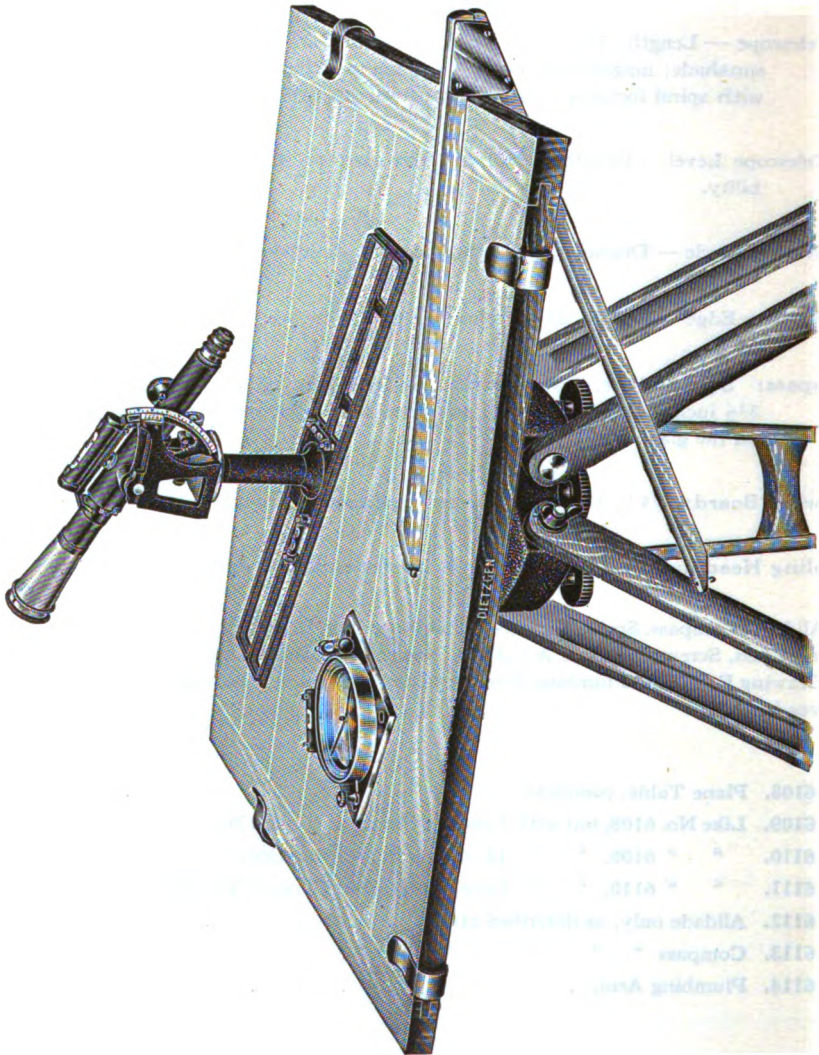
Alidade, Compass, Spring Clamps for holding paper, Plumb Bob, Magnifying Glass, Screwdriver and Adjusting Pins contained in a hardwood box; Drawing Board and Plumbing Arm contained in a separate canvas-covered wooden box.

No. 6108.	Plane Table, complete,	. . . . .	Each, \$
6109.	Like No. 6108, but with Leveling Head and Tripod No. 6142,		"
6110.	" " 6108, " " 18 \times 24 inch Drawing Board,	. . . . .	"
6111.	" " 6110, " " Leveling Head and Tripod No. 6142,		"
6112.	Alidade only, as described above,	. . . . .	"
6113.	Compass " " " "		"
6114.	Plumbing Arm,		"

Leveling Head and Tripod No. 6142 illustrated and described on page 323.

See Price List in back of Catalog.

Plane Tables



For complete specifications, see next page.



Plane Tables

Specifications of No. 6118

Alidade:

Telescope — Length, 16 inches; achromatic astronomical (inverting); dust cap and sunshade; magnifying power, 40 diameters; objective, $1\frac{1}{2}$ inches; eye-piece with spiral focusing arrangement; fixed stadia hairs, ratio 1:100; telescope is mounted in a sleeve and can be turned about its horizontal axis to bring the cross hairs into their optical axis.

Telescope Level — Length, $4\frac{1}{2}$ inches; graduated on the glass; 30 seconds sensibility.

Vertical Arc — Diameter, 6 inches; double direct vernier, reading to 1 minute.

Straight Edge — Length, 22 inches; width, $3\frac{1}{2}$ inches.

Straight Edge Levels — Two; length, 2 inches; graduated on the glass; 60 seconds sensibility.

Compass: Square; base, 4×4 inches; graduated on raised ring to half-degrees; $3\frac{1}{2}$ inch needle, with stop; equipped with two fine spirit levels graduated on the glass.

Drawing Board: 24×31 inches; selected pinewood, thoroughly seasoned.

Leveling Head and Tripod: No. 6140, illustrated and described on page 322.

Alidade, Compass, Spring Clamps for holding paper, Plumb Bob, Magnifying Glass, Screwdriver and Adjusting Pins contained in a hardwood box; Drawing Board and Plumbing Arm contained in a separate canvas-covered wooden box.

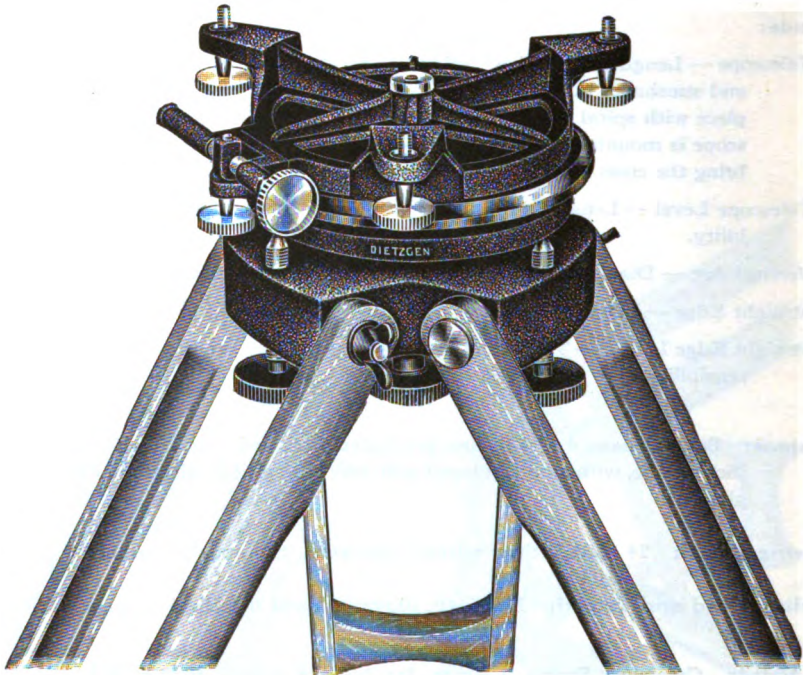
No. 6118.	Plane Table; complete,	. . . . .	Each, \$
6119.	Like No. 6118, but with Leveling Head and Tripod No. 6142,	. . . . .	"
6120.	" " 6118, " " 18 \times 24 inch Drawing Board,	. . . . .	"
6121.	" " 6120, " " Leveling Head and Tripod No. 6142,	. . . . .	"
6122.	Alidade only, as described above,	. . . . .	"
6123.	Compass " " " " . . . . .	. . . . .	"
6124.	Plumbing Arm, . . . . .	. . . . .	"

Leveling Head and Tripod No. 6142 illustrated and described on page 323.

See Price List in back of Catalog.

Leveling Head and Tripod

(Dietzgen Design)



No. 6140.

The Leveling Head and Tripod (Dietzgen design), illustrated above, is very light and rigid, and is adapted for use with the Plane Tables described on pages 318 to 321.

It has three leveling screws, widely separated so as to hold the drawing board firmly. The part that carries the drawing board revolves in a metal socket having a broad, substantial bearing surface, and is provided with a clamp and tangent screw.

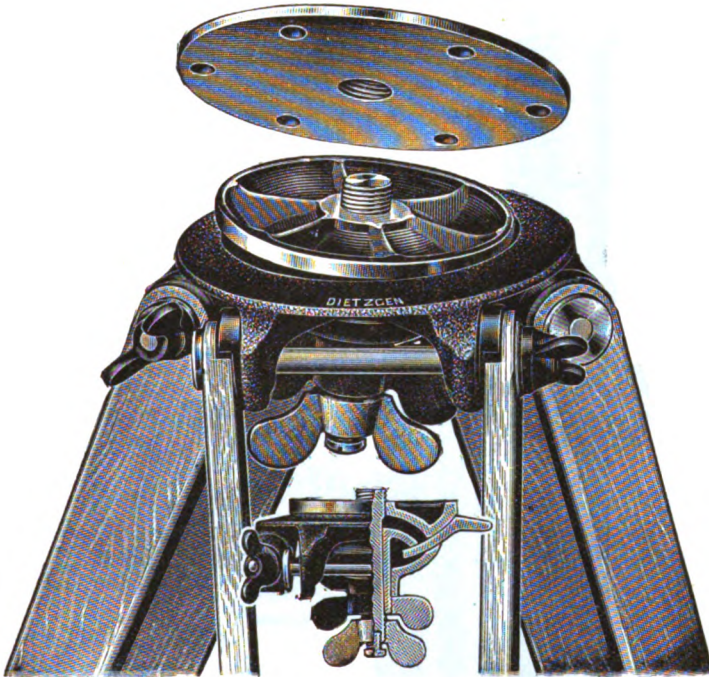
All metal parts, with the exception of the leveling screws, are made of aluminum. The complete weight is about 15 pounds, and the general design permits of very accurate and secure adjustments being made.

No. 6140. Leveling Head and Tripod; complete, Each, \$

See Price List in back of Catalog.

Leveling Head and Tripod

(Johnson Design)



No. 6142.

The Leveling Head and Tripod (Johnson design), illustrated above, is adapted for use with our Plane Tables as described on pages 318 to 321. It is simple to operate, light in weight, and exceptionally rigid.

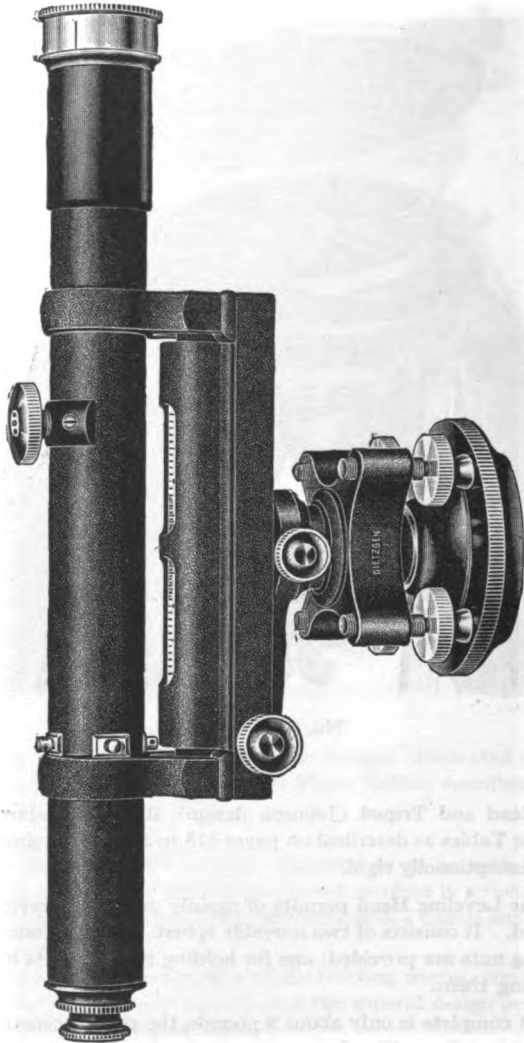
The design of the Leveling Head permits of rapidly orienting, leveling and clamping the drawing board. It consists of two movable sphere-segments, one placed within the other. Two wing nuts are provided: one for holding the segments in position, and the other for clamping them.

While the weight complete is only about 9 pounds, the general construction insures accuracy and the withstanding of hard usage.

No. 6142. Leveling Head and Tripod; complete, Each, \$

See Price List in back of Catalog.

Surveying Dumpy Level



No. 6305.

For complete specifications, see next page.



Surveying Dumpy Level

The No. 6305 Surveying Dumpy Level has been designed to meet the demand for a Dumpy Level which, while low in price, will give excellent and satisfactory service.

This Instrument possesses a reliable telescope and a long, sensitive level vial. While the construction of the less essential parts is somewhat different than on our higher priced Engineering Dumpy Levels, thus enabling a reduction in cost of manufacture, we have been able to maintain all of those features that are necessary to obtain accurate and dependable results.

The telescope of a Dumpy Level cannot be reversed as it is permanently fixed to the collars of the cross bar; on account of this construction the method of adjustment is different than that of a Y Level, the telescope of which is reversible in the wyes.

Specifications of No. 6305

Telescope — Length, 15 inches; magnifying power, 24 to 26 diameters; achromatic terrestrial, powerful and of good definition.

Object Glass — Diameter, $1\frac{3}{8}$ inches, used to full value.

Eye-Piece — Improved style, giving a large, flat field; provided with a screw-like arrangement for precise focusing of cross hairs.

Cross Bar — Length, $7\frac{1}{2}$ inches; gun metal; designed to combine lightness with strength; provided with clamp and tangent screw.

Level to Cross Bar — Length, 6 inches; 40 seconds sensibility; $\frac{1}{10}$ inch division; well protected.

Center — Bell metal; extends from cross bar to bottom of leveling base, giving accuracy, strength and stability.

Leveling Base — Strong and compact in design.

Leveling Screws — Four; nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 7 lbs., 7 oz.; tripod, about $7\frac{1}{2}$ lbs.

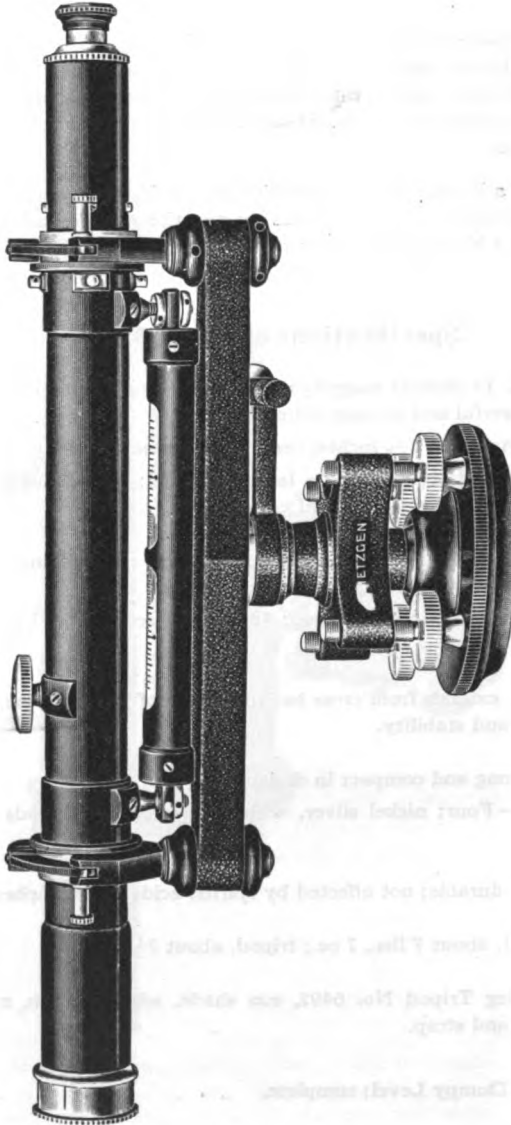
Accessories — Solid-leg Tripod No. 6492, sun shade, adjusting pin, mahogany box with lock, key and strap.

No. 6305. Surveying Dumpy Level; complete, Each, \$

Engineering Dumpy Levels listed under Nos. 6000-6002.

See Price List in back of Catalog.

Surveying Y Levels



Nos. 6310, 6314, 6316.

For complete specifications, see next page.



Surveying Y Levels

Specifications of No. 6310

Telescope — Length, 18 inches; magnifying power, 28 to 30 diameters; objective $1\frac{3}{8}$ inches, used to full value; erecting eye-piece.

Telescope Level — Length, $7\frac{3}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Cross Bar — Length, $11\frac{1}{2}$ inches; bell metal; efficient locking device for wyes.

Center — Bell metal; of a design in harmony with the general construction and quality of the instrument.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 10 lbs., 14 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6310. Surveying Y Level; complete, Each, \$

Specifications of No. 6314

Telescope — Length, 20 inches; magnifying power, 35 to 37 diameters; objective $1\frac{1}{2}$ inches, used to full value; erecting eye-piece.

Telescope Level — Length, $9\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Cross Bar — Length, 13 inches; bell metal; efficient locking device for wyes.

Center — Bell metal; of a design in harmony with the general construction and quality of the instrument.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 2 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6314. Surveying Y Level; complete, Each, \$

Specifications of No. 6316

Telescope — Length, 22 inches; magnifying power, 40 to 42 diameters; objective $1\frac{1}{2}$ inches, used to full value; erecting eye-piece.

Telescope Level — Length, $9\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Cross Bar — Length, 13 inches; bell metal; efficient locking device for wyes.

Center — Bell metal; of a design in harmony with the general construction and quality of the instrument.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 4 oz.; tripod, about 10 lbs.

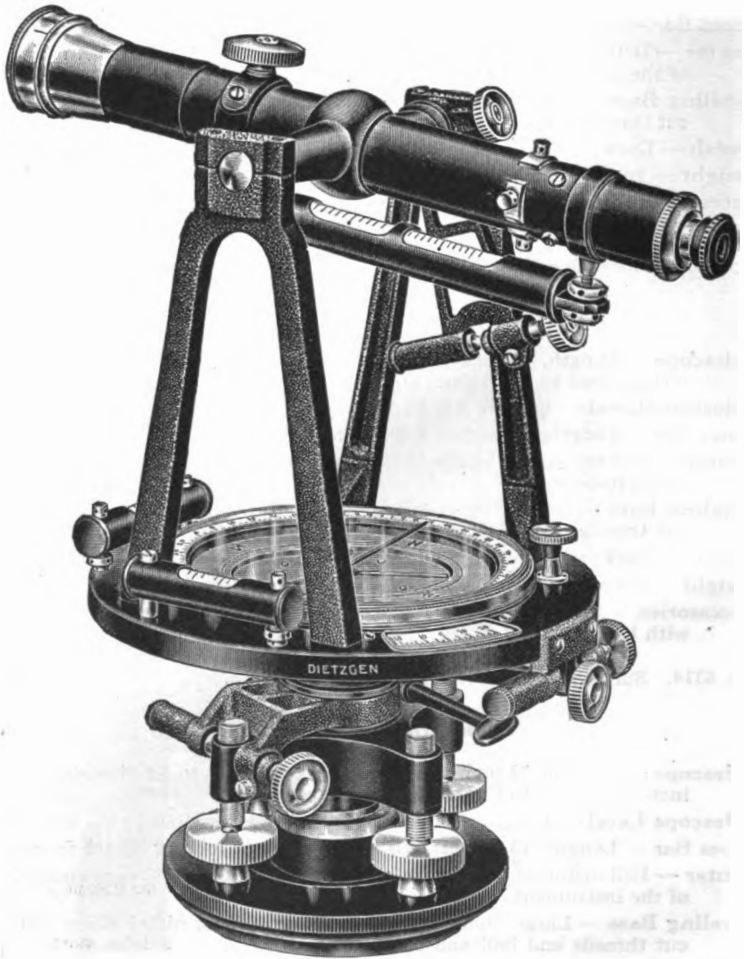
Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, mahogany box with lock, key and strap.

No. 6316. Surveying Y Level; complete, Each, \$

Engineering Y Levels listed under Nos. 6008-6018.

See Price List in back of Catalog.

Surveying Transit



No. 6322A.

For complete specifications, see next page.



Surveying Transit

Specifications of No. 6322A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; circle and verniers graduated on composition metal, the lines being very legible and uniform in thickness.

Verniers — Two, double and exactly opposite, reading to 1 minute.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; fixed stadia hairs.

Object Glass — Diameter, $1\frac{1}{4}$ inches, used to full value.

Eye-Piece — Erecting; improved style, giving a large, flat field.

Level — Length, 5 inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $4\frac{1}{2}$ inches; cardinal points shift with the graduated circle.

Centers — Accurate and substantial; of a design in harmony with the general construction and quality of the instrument.

Shifting Center — Range, $\frac{7}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Tangent Screws — Nickel silver; improved form, with opposing spiral spring; accessible and well protected.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 14 lbs., 9 oz.; tripod, about 10 lbs.

Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, magnifying glass, mahogany box with lock, key and strap.

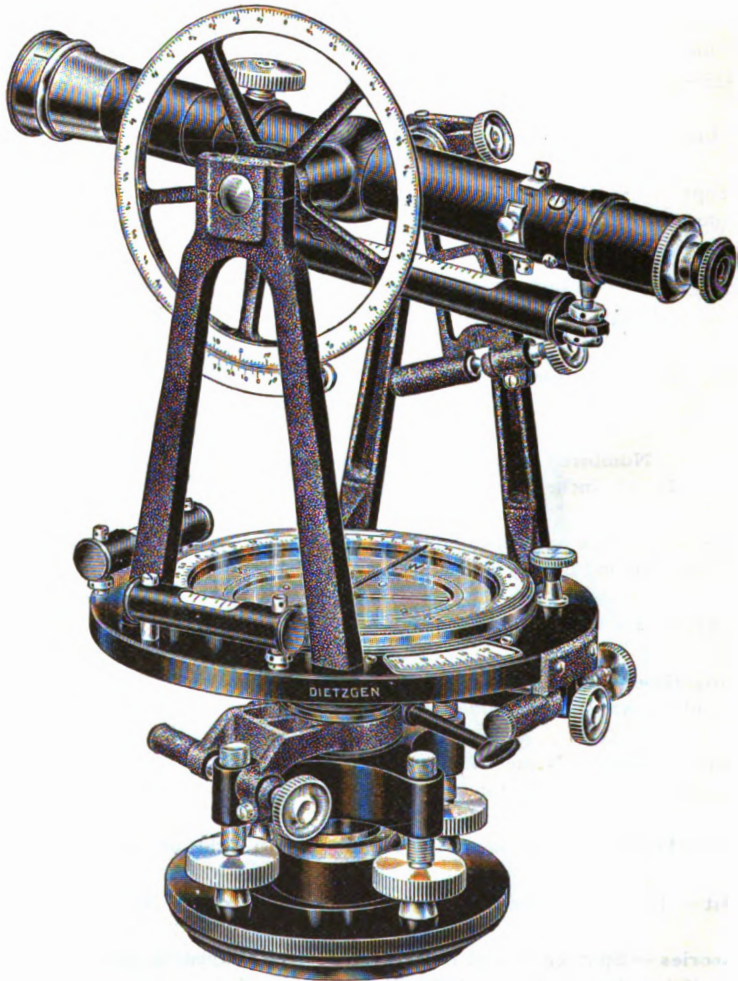
No. 6322A. Surveying Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

Engineering Transits listed under Nos. 6022A-6084C.

See Price List in back of Catalog.

Surveying Transit



No. 6324A.

For complete specifications, see next page.



Surveying Transit

Specifications of No. 6324A

Horizontal Circle — Diameter, $6\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; circle and verniers graduated on composition metal, the lines being very legible and uniform in thickness.

Verniers — Two, double and exactly opposite, reading to 1 minute.

Plate Levels — Two; length, $2\frac{1}{2}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, 11 inches; magnifying power, 24 to 26 diameters; fixed stadia hairs.

Object Glass — Diameter, $1\frac{1}{4}$ inches, used to full value.

Eye-Piece — Erecting; improved style, giving a large, flat field.

Level — Length, 5 inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, 5 inches; vernier to 1 minute; graduated on composition metal.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $4\frac{1}{2}$ inches; cardinal points shift with the graduated circle.

Centers — Accurate and substantial; of a design in harmony with the general construction and quality of the instrument.

Shifting Center — Range, $\frac{7}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Tangent Screws — Nickel silver; improved form, with opposing spiral spring; accessible and well protected.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 15 lbs.; tripod, about 10 lbs.

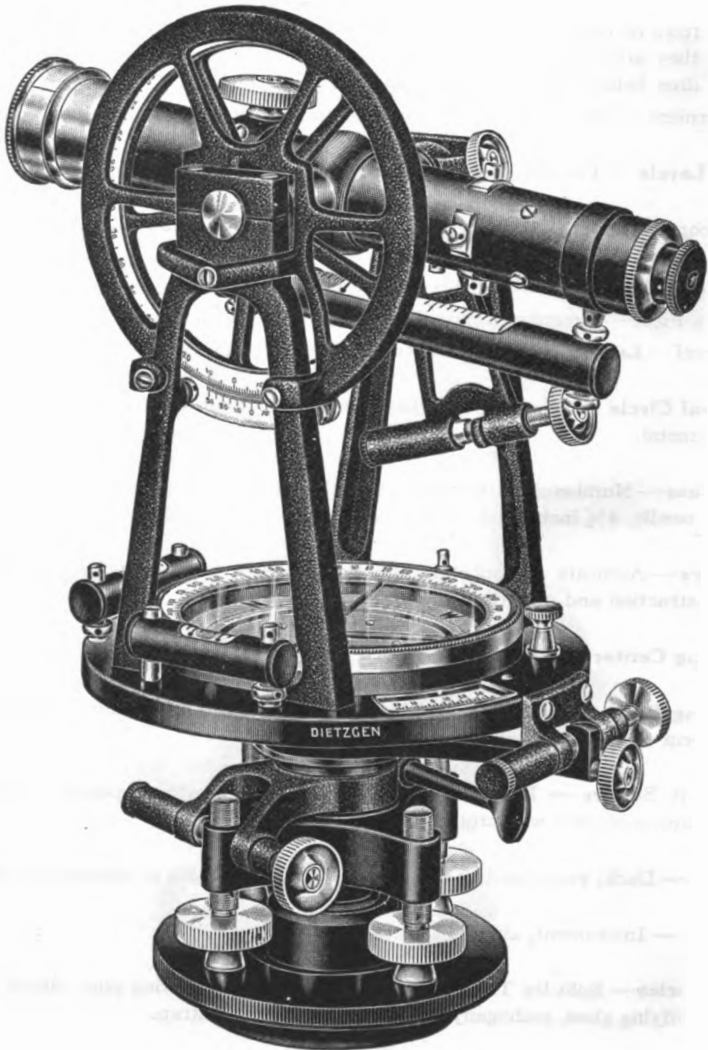
Accessories — Split-leg Tripod No. 6495, sun shade, adjusting pins, plumb bob, magnifying glass, mahogany box with lock, key and strap.

No. 6324A. Surveying Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

See Price List in back of Catalog.

Highway Transit



No. 6334C.

For complete specifications, see next page.



Highway Transit

Specifications of No. 6334C

Horizontal Circle — Diameter, $5\frac{1}{4}$ inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; circle and vernier graduated on sterling silver, the lines being exceptionally legible and uniform in thickness.

Verniers — Two; double and exactly opposite, reading to 1 minute.

Plate Levels — Two; length, 2 inches; 90 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; fixed stadia hairs.

Object Glass — Diameter, $1\frac{1}{4}$ inches, used to full value.

Eye-Piece — Erecting; improved style, giving a large, flat field.

Level — Length, $5\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, $4\frac{1}{2}$ inches; vernier to 1 minute; graduated on sterling silver; protected by guard.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{4}$ inches; cardinal points shift with the graduated circle.

Centers — Compound: inner one, bell metal; intermediate, gun metal; outer, bronze.

Shifting Center — Range, $\frac{5}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Tangent Screws — Nickel silver; improved form, with opposing spiral spring; accessible and well protected.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 11 lbs., 15 oz.; tripod, about 8 lbs.

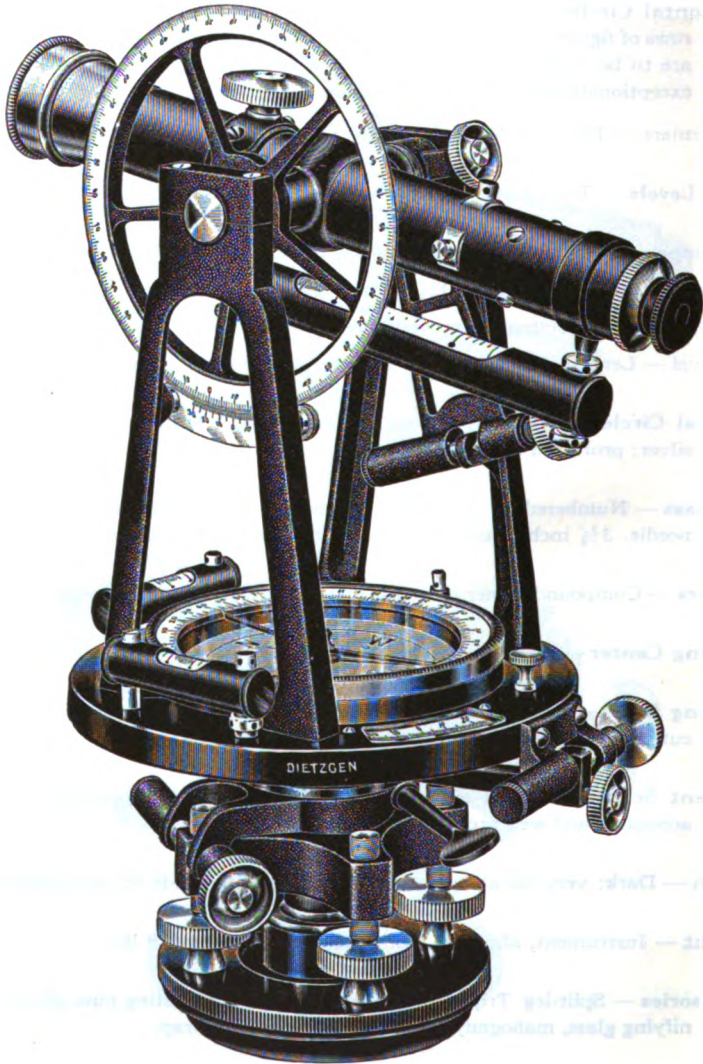
Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, magnifying glass, mahogany box with lock, key and strap.

No. 6334C. Highway Transit; complete, Each, \$

Accessories, Etc. listed on pages 347-349.

See Price List in back of Catalog.

Reconnaissance Transit



No. 6344C.

For complete specifications, see next page.



Reconnaissance Transit

Specifications of No. 6344C

Horizontal Circle — Diameter, 5 inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; circle and vernier graduated on composition metal, the lines being very legible and uniform in thickness.

Vernier — One, reading to 1 minute.

Plate Levels — Two; length, 2 inches; 90 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope—Length, $9\frac{1}{2}$ inches; magnifying power, 18 to 20 diameters; fixed stadia hairs.

Object Glass — Diameter, $1\frac{1}{8}$ inches, used to full value.

Eye-Piece — Erecting; improved style, giving a large, flat field.

Level — Length, $5\frac{1}{4}$ inches; 30 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, $4\frac{1}{2}$ inches; vernier to 1 minute; graduated on composition metal.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{8}$ inches; cardinal points shift with the graduated circle.

Centers — Accurate and substantial; of a design in harmony with the general construction and quality of the instrument.

Shifting Center — Range, $\frac{1}{2}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Tangent Screws — Nickel silver; improved form, with opposing spiral spring; accessible and well protected.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 10 lbs., 3 oz.; tripod, about 8 lbs.

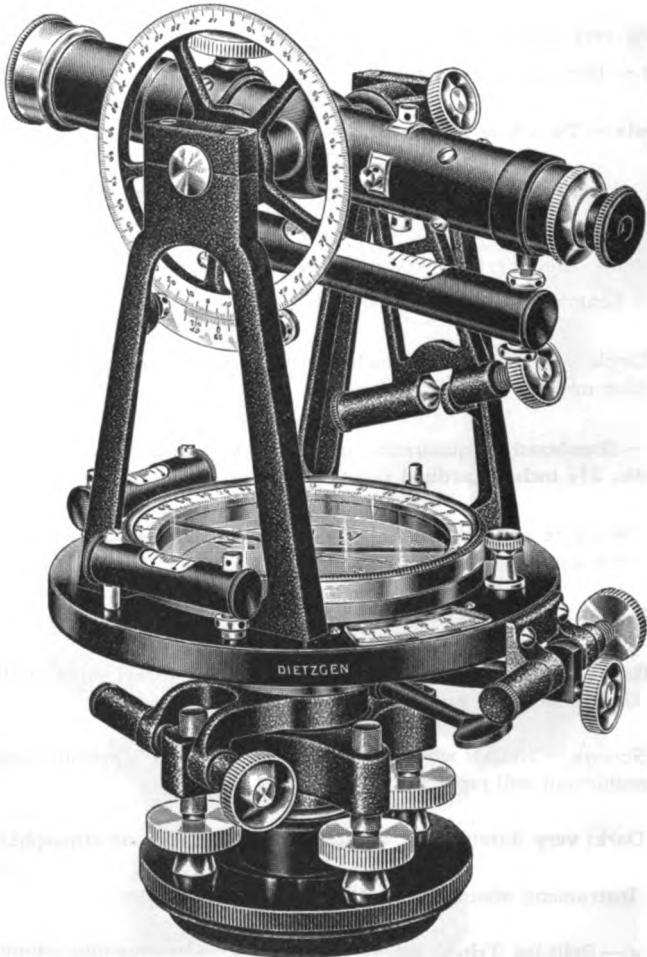
Accessories — Split-leg Tripod No. 6494, sun shade, adjusting pins, plumb bob, magnifying glass, mahogany box with lock, key and strap.

No. 6344C. Reconnaissance Transit; complete, Each, \$

Higher Grade Transit of about the same dimensions listed under No. 6334C.

See Price List in back of Catalog.

Light Reconnaissance Transit



No. 6354C.

For complete specifications, see next page.



Light Reconnaissance Transit

Specifications of No. 6354C

Horizontal Circle — Diameter, 5 inches to edge of graduation; marked with two rows of figures, reading 0 to 360 both ways; figures inclined in the direction they are to be read; circle and vernier graduated on composition metal, the lines being very legible and uniform in thickness.

Vernier — One, reading to 1 minute.

Plate Levels — Two; length, 2 inches; 90 seconds sensibility; $\frac{1}{10}$ inch division.

Telescope — Length, $8\frac{1}{4}$ inches; magnifying power, 16 to 18 diameters; fixed stadia hairs.

Object Glass — Diameter, 1 inch, used to full value.

Eye-Piece — Erecting; improved style, giving a large, flat field.

Level — Length, $4\frac{3}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Vertical Circle — Diameter, $3\frac{1}{2}$ inches; vernier to 2 minutes; graduated on composition metal.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, $3\frac{3}{8}$ inches; cardinal points shift with the graduated circle.

Centers — Accurate and substantial; of a design in harmony with the general construction and quality of the instrument.

Shifting Center — Range, $\frac{1}{2}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Tangent Screws — Nickel silver; improved form, with opposing spiral spring; accessible and well protected.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 9 lbs., 3 oz.; tripod, about 8 lbs.

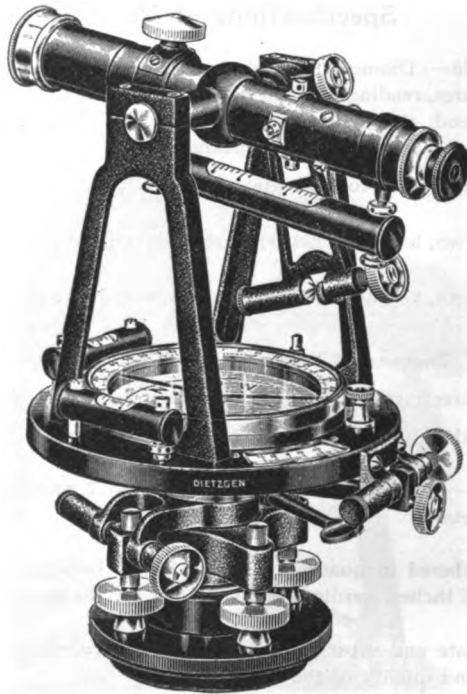
Accessories — Solid-leg Tripod No. 6492, sun shade, adjusting pins, plumb bob, magnifying glass, mahogany box with lock, key and strap.

No. 6354C. Light Reconnaissance Transit; complete, Each, \$

Reconnaissance Transit with more powerful telescope and of larger dimensions listed under No. 6344C.

See Price List in back of Catalog.

Builders Transit



No. 6362C.

This Builders Transit has been designed to meet the demand for a low-priced and reliable instrument that can be used by builders as either a Transit or a Level.

Specifications of No. 6362C.

Horizontal Circle — Diameter, 5 inches; marked with two rows of figures reading 0 to 360 both ways; graduated on composition metal; vernier reading to 1 minute.

Telescope — Length, 8 $\frac{1}{4}$ inches; magnifying power, 16 to 18 diameters; objective, 1 inch; erecting eyepiece; fixed stadia hairs.

Telescope Level — Length, 4 $\frac{3}{4}$ inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Compass — Numbered in quadrants; graduated to half-degrees; silvered; magnetic needle, 3 $\frac{3}{8}$ inches.

Centers — Accurate and substantial; range of shifting center, $\frac{1}{2}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 8 lbs.; tripod, about 8 lbs.

Accessories — Solid-leg Tripod No. 6492, sun-shade, adjusting pins, plumb bob, magnifying glass, mahogany box with lock, key and strap.

No. 6362C. Builders Transit; complete, Each, \$

See Price List in back of Catalog.

Builders Dumpy Level



Metal Trivet.

No. 6370.

This Instrument, while low in price, is exceptionally well made and very reliable. It meets all the requirements of the Builder, Contractor, Architect and Millwright, is simple to operate, does not get out of adjustment easily, and requires less careful handling than a Y Level.

The telescope of a Dumpy Level cannot be reversed as it is permanently fixed to the collars of the cross bar; on account of this construction the method of adjustment is different than that of a Y Level, the telescope of which is reversible in the wyes.

Specifications of No. 6370

Telescope — Length, 12 inches; magnifying power, 18 to 20 diameters; objective, $1\frac{1}{8}$ inches, used to full value; erecting eye-piece.

Cross Bar — Length, 8 inches; bell metal; designed to increase stability and decrease weight.

Level to Cross Bar — Length, 5 inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Horizontal Circle — Diameter, $3\frac{1}{4}$ inches; silvered; graduated every degree, numbered every 10 degrees, in quadrants; vernier reading to 5 minutes.

Center — Bell metal; center and cross bar cast in one piece.

Shifting Center — Range, $\frac{3}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

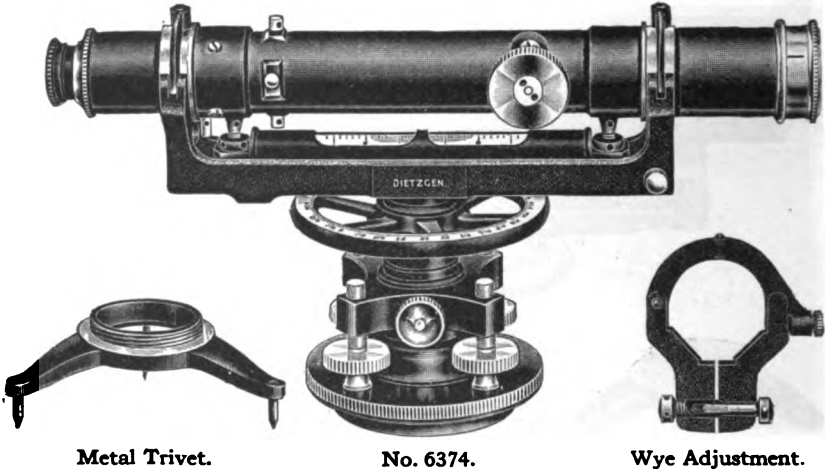
Weight — Instrument, about 5 lbs.; tripod, about $7\frac{1}{2}$ lbs.

Accessories — Solid-leg Tripod No. 6491, sun shade, plumb bob, adjusting pin, metal trivet (for setting Level where use of tripod is difficult), mahogany box with lock, key and strap.

No. 6370. Builders Dumpy Level; complete, Each, \$

See Price List in back of Catalog.

Builders Y Levels



Metal Trivet.

No. 6374.

Wye Adjustment.

These Instruments, of excellent quality and accurate workmanship, are adapted for reading angles; for laying out buildings; for leveling walls, foundations, floors, streets, curbing and bases of machinery, shafting, etc.; and for ditching and draining.

They are very simple to operate, easy to adjust, and of great value to Builders, Contractors, Architects, Landscape Gardeners, Etc.

Specifications of No. 6374

Telescope — Length, 12 inches; magnifying power, 18 to 20 diameters; objective, $1\frac{1}{8}$ inches; used to full value; erecting eye-piece.

Telescope Level — Length, 5 inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Cross Bar — Length, $7\frac{1}{2}$ inches; bell metal; simple wye adjustment and effective wye locking device.

Horizontal Circle — Diameter, $3\frac{1}{4}$ inches; silvered; graduated every degree, numbered every 10 degrees, in quadrants; vernier reading to 5 minutes.

Center — Bell metal; center, cross bar and wyes cast in one piece.

Shifting Center — Range, $\frac{3}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 5 lbs., 15 oz.; tripod, about $7\frac{1}{2}$ lbs.

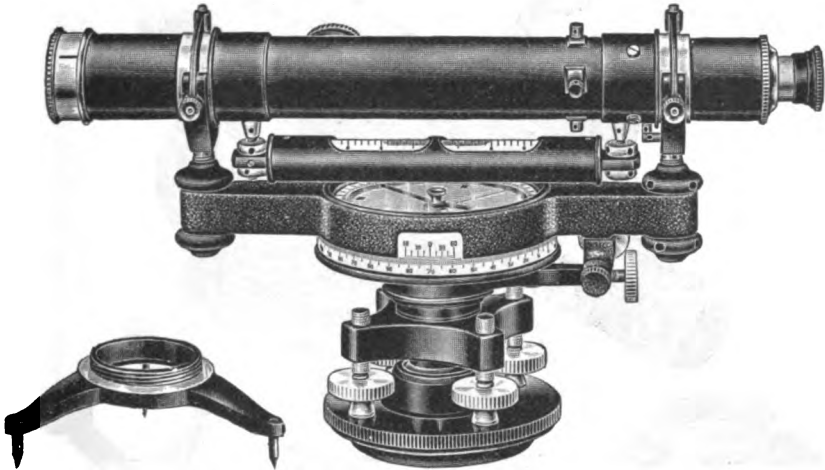
Accessories — Solid-leg Tripod No. 6491, sun shade, plumb bob, adjusting pins, metal trivet (for setting Level where use of tripod is difficult), mahogany box with lock, key and strap.

									Each.
No. 6374.	Builders Y Level;	complete,							\$
6376.	"	"	like No. 6374, but with Tangent Screw;	complete,					

See Price List in back of Catalog.

Builders Y Level

With Compass



Metal Trivet.

No. 6378.

This Instrument, of the same accurate workmanship as our No. 6374 Builders Level, is fitted with a compass which, while increasing the weight and size of the instrument but very little, affords a ready means of determining the bearing of lines and of measuring angles by the needle.

Specifications of No. 6378

Telescope — Length, 12 inches; magnifying power, 18 to 20 diameters; objective $1\frac{1}{8}$ inches, used to full value; erecting eye-piece.

Telescope Level — Length, 5 inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Cross Bar — Length, $7\frac{1}{2}$ inches; bell metal; effective wye locking device.

Compass — Numbered in quadrants; graduated to one degree; silvered; magnetic needle, 3 inches.

Horizontal Circle — Diameter, $3\frac{1}{4}$ inches; silvered; graduated every degree, numbered every 10 degrees, in quadrants; vernier reading to 5 minutes.

Center — Bell metal; center and cross bar cast in one piece.

Shifting Center — Range, $\frac{1}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

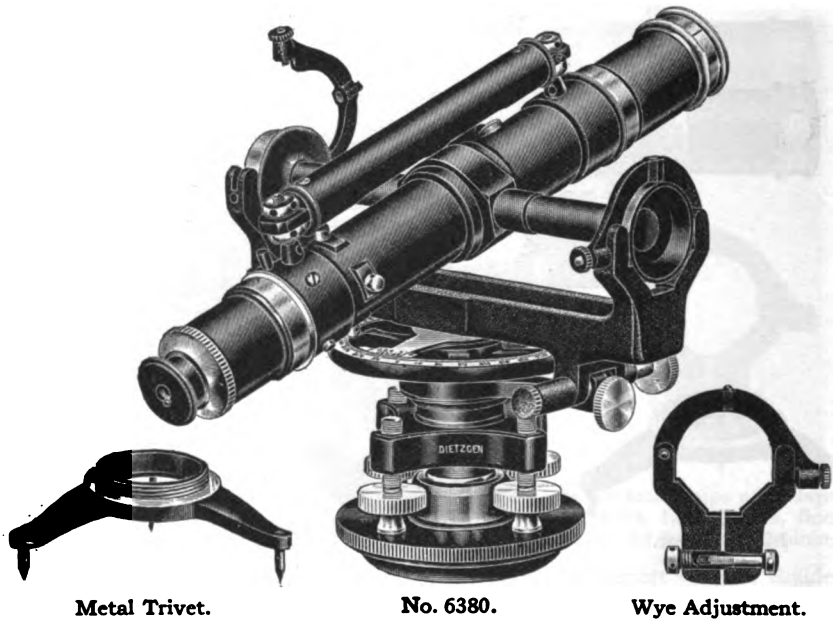
Weight — Instrument, about 6 lbs., 4 oz.; tripod, about $7\frac{1}{2}$ lbs.

Accessories — Solid-leg Tripod No. 6491, sun shade, plumb bob, adjusting pins, metal trivet (for setting Level where use of tripod is difficult), mahogany box with lock, key and strap.

No. 6378. Builders Y Level, with Compass and Tangent Screw; complete, Each, \$

See Price List in back of Catalog.

Builders Convertible Y Level



This Instrument, due to its convertible feature, can be used for obtaining vertical lines and for sighting objects above or below a horizontal plane. The illustration shows position when sighting a vertical line. To use as a Level, that is, for sighting a horizontal line, the trunnions—shown in illustration as screwed in the bearing piece at the middle of the telescope—are removed, and the telescope placed in the wyes.

Specifications of No. 6380

- Telescope** — Length, 12 inches; magnifying power, 18 to 20 diameters; objective, $1\frac{1}{8}$ inches, used to full value; erecting eye-piece.
- Telescope Level** — Length, 5 inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.
- Cross Bar** — Length, $7\frac{1}{2}$ inches; bell metal; simple wye adjustment and effective wye locking device.
- Horizontal Circle** — Diameter, $3\frac{1}{4}$ inches; silvered; graduated every degree, numbered every 10 degrees, in quadrants; vernier reading to 5 minutes.
- Center** — Bell metal; center, cross bar and wyes cast in one piece.
- Shifting Center** — Range, $\frac{1}{16}$ inch.
- Leveling Base** — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.
- Finish** — Dark; very durable; not affected by spirits, acids or atmospheric changes.
- Weight** — Instrument, about 6 lbs., 13 oz.; tripod, about $7\frac{1}{2}$ lbs.
- Accessories** — Solid-leg Tripod No. 6491, sun shade, plumb bob, adjusting pins, metal trivet (for setting Level where use of tripod is difficult), mahogany box with lock, key and strap.

No. 6380. Builders Convertible Y Level, with Tangent Screw; complete, Each, \$

See Price List in back of Catalog.

Builders Convertible Y Level With Compass



Metal Trivet.

No. 6382.

This Instrument, of the same accurate workmanship as our No. 6380 Builders Convertible Level, is fitted with a compass which, while increasing the weight and size of the instrument but very little, affords a ready means of determining the bearing of lines and of measuring angles by the needle.

Specifications of No. 6382

Telescope — Length, 12 inches; magnifying power, 18 to 20 diameters; objective, $1\frac{1}{8}$ inches, used to full value; erecting eye-piece.

Telescope Level — Length, 5 inches; 60 seconds sensibility; $\frac{1}{10}$ inch division.

Cross Bar — Length, $7\frac{1}{2}$ inches; bell metal; effective wye locking device.

Compass — Numbered in quadrants; graduated to one degree; silvered; magnetic needle, 3 inches.

Horizontal Circle — Diameter, $3\frac{1}{4}$ inches; silvered; graduated every degree, numbered every 10 degrees, in quadrants; vernier reading to 5 minutes.

Center — Bell metal; center and cross bar cast in one piece.

Shifting Center — Range, $\frac{1}{8}$ inch.

Leveling Base — Large diameter; four leveling screws, nickel silver, with accurately cut threads and ball and socket cups.

Finish — Dark; very durable; not affected by spirits, acids or atmospheric changes.

Weight — Instrument, about 6 lbs., 13 oz.; tripod, about $7\frac{1}{2}$ lbs.

Accessories — Solid-leg Tripod No. 6491, sun shade, plumb bob, adjusting pins, metal trivet (for setting Level where use of tripod is difficult), mahogany box with lock, key and strap.

No. 6382. Builders Convertible Y Level, with Compass and Tangent Screw; complete, Each, \$

See Price List in back of Catalog.

Bostrom Builders Levels

For Builders, Carpenters and Stone Masons



No. 6396.

The Bostrom Builders Levels are specially adapted for the use of Builders, Carpenters and Stone Masons. They can be used for any kind of foundation work and for obtaining angles, are simple in construction, easily understood, and can be operated by any one. They are made of brass, oxidized, and have a silvered circle graduated to degrees, an achromatic telescope of serviceable power, and a sensitive ground level vial. A plumb bob, a tripod, and a graduated rod, 5 feet extending to 9½ feet, are furnished with each instrument, the rod being equipped with a target.

No. 6396. Bostrom Builders Level, with plumb bob, tripod and graduated rod with target, Each, \$

6397. Like No. 6396, but more powerful telescope with rack and pinion to eye-piece; plumb bob, tripod and graduated rod with target, Each,

Bostrom Farm Level

Particularly adapted for Farm use

This Instrument is valuable for terracing, ditching, irrigation and drainage work. It has a circle graduated to degrees, and possesses all improvements that are essential for obtaining satisfactory results. Strongly and accurately made of iron, black enameled, with sliding telescope and spirit level tubes made of lacquered brass, polished.

No. 6398. Bostrom Farm Level, with plumb bob, tripod and graduated rod with target, Each, \$

See Price List in back of Catalog.



Accessories and Parts

The following prices apply only to Accessories and Parts for Instruments of our manufacture. Prices for Accessories and Parts to Instruments of other makes quoted on request.

No.		Each, \$
6400.	Adjusting Pins, steel,	"
6401.	Cap for object glass,	"
6402.	" " eyepiece,	"
6403.	Case, leather, with shoulder strap, for Transits,	"
6404.	" " " " " " Levels,	"
6405.	" " " " " " Builders Transits,	"
6406.	" " " " " " Builders Levels,	"
6407.	" " " for Surveyors Compasses,	"
6408.	Glass Cover for compass box, ground beveled edge,	"
6409.	" " " " " plain edge,	"
6410.	" colored, dark, to eyepiece,	"
6411.	" light, " "	"
6412.	" objective,	"
6413.	Prism with colored glass, to eyepiece,	"
6414.	Screws, clamp, to upper plate of Transit,	"
6415.	" " " lower " " "	"
6416.	" leveling, for Transit or Level,	"
6417.	" tangent, to telescope of Transit,	"
6418.	" " " upper or lower plate of Transit,	"
6419.	" " " telescope of Builders Transit,	"
6420.	" " " upper or lower plate of Builders Transit,	"
6421.	" " " Level,	"
6422.	" " " Builders Level,	"
6423.	Sunshade, plain,	"
6424.	" improved, with reflector for illuminating cross and stadia hairs,	"

The improved Sunshade, No. 6424, consists of a reflecting mirror rigidly mounted on a short tube. This tube is placed within the tube that forms the sunshade, and is held in position by a stop. If desired, the sunshade can be used without the reflector by taking out the short tube to which the mirror is attached and turning the sunshade so as to bring the opening away from the sun.

No. 6425.	Waterproof Cover for Transits with 11 inch telescope,	Each, \$
6426.	" " " " " 9½ " "	"
6427.	" " " " " 8 " "	"
6428.	Waterproof Cover for Levels with 22 inch telescope,	"
6429.	" " " " " 20-18 " "	"
6430.	" " " " " 15-12 " "	"

When ordering Accessories and Parts, always specify the serial or the catalog number of the Instrument.

See Price List in back of Catalog.



Attachments and Modifications

The following prices apply only to Attachments and Modifications for new Instruments of our manufacture. Prices of Attachments and Modifications for completed Instruments of our manufacture or for Instruments of other makes will be quoted on request.

- | | | |
|-----------|---|-----------|
| No. 6436. | Folding Sights to telescope, | Extra, \$ |
| 6437. | " " " standards (at right angle to telescope), " | " |
| 6438. | Guard to vertical circle, | " |
| 6439. | Vertical Circle with opposite verniers and guard; in place of regular vertical circle, | " |
| 6440. | Vertical Circle and vernier graduated on the edge or rim, with guard; in place of regular vertical circle, | " |
| 6441. | Vertical Circle and opposite verniers graduated on the edge or rim, with guard; in place of regular vertical circle, | " |
| 6442. | Vertical Circle completely encased by metal covering, with glass covered vernier and ground glass reflector; in place of regular vertical circle, | " |

For Solar Attachment, see No. 6098.

Graduations

- | | | |
|-------|--|----|
| 6449. | Graduating horizontal circle to read by vernier to single minutes, | \$ |
| 6450. | " " " " " " " " " 30 seconds, | " |
| 6451. | " " " " " " " " " 20 " | " |
| 6452. | " " " " " " " " " 10 " | " |
| 6453. | Graduating vertical circle to read by vernier to single minutes, | " |
| 6454. | " " " " " " " " " 30 seconds, | " |
| 6455. | " " " " " " " " " 20 " | " |
| 6456. | " " " " " " " " " 10 " | " |

Cross and Stadia Hairs

The following prices apply only for furnishing the Cross and Stadia Hairs separately from the Instrument. If the Instrument is sent to us and we are requested to adjust as well as supply the Cross and Stadia Hairs there will be an additional charge for labor.

- | | | |
|-----------|---|----|
| No. 6462. | Disappearing stadia hairs and diaphragm, | \$ |
| 6463. | Fixed stadia and cross hairs and diaphragm, | " |
| 6464. | Plain cross hairs and diaphragm, | " |
| 6465. | Replacing cross hairs on diaphragm, | " |
| 6466. | " stadia and cross hairs on diaphragm, | " |

See Price List in back of Catalog.



Separate Parts for Tripods

No. 6472.	Bolts, complete, for tripod head,	Each, \$
6473.	Tripod Head, without bolts,	"
6474.	Metal Cap,	"
6475.	Legs for Tripod No. 6491,	Set of 3, \$; "
6476.	" " " No. 6492,	" " 3, ; "
6477.	" " " No. 6493,	" " 3, ; "
6478.	" " " No. 6494,	" " 3, ; "
6479.	" " " No. 6495,	" " 3, ; "
6480.	" " " No. 6496,	" " 3, ; "
6481.	" " " No. 6497,	" " 3, ; "
6482.	" " " No. 6498,	" " 3, ; "

Level Vials

As the cost of Level Vials depends upon the length, diameter and sensibility, it is impossible to list standardized prices for all of the different kinds of vials used with our Instruments. Therefore, prices will be quoted on request.

When requesting prices, always mention the serial or the catalog number of the Instrument if it is of our manufacture and also specify whether the desired vial is for the plates or the telescope. If the Instrument is of other manufacture, either send us the spirit level tube or give the length, diameter and sensibility of the vial desired.

Repairs

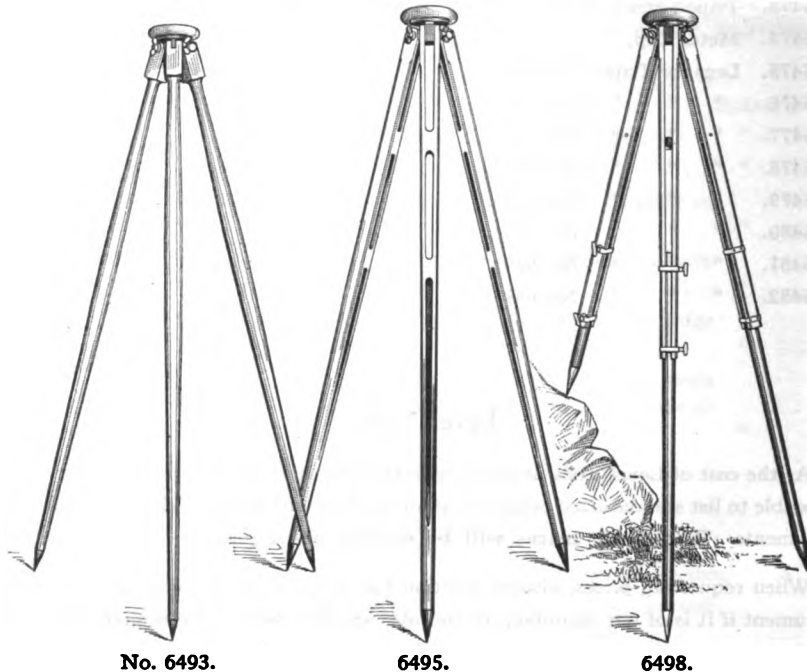
Our Surveying Instrument repair departments in Chicago, New York, San Francisco, New Orleans and Pittsburgh are thoroughly modern and fully equipped to handle all standard makes of Instruments. We have the best facilities for promptly making repairs of any nature, and the prices charged are the lowest consistent with perfect workmanship. All Instruments after repair are subjected to an exact adjustment test and our work will be found of unsurpassed excellence.

When forwarding Instruments for repair they should be carefully packed to eliminate the possibility of damage while in transit.

Estimates given on request.

See Price List in back of Catalog.

Tripods For Levels and Transits



- No. 6491. Solid Leg Tripod, hardwood, weight about 7½ lbs.; for Instruments Nos. 6370-6382, Each
6492. Solid Leg Tripod, hardwood, weight about 7½ lbs.; for Instruments Nos. 6305, 6354C and 6362C, Each
6493. Solid Leg Tripod, hardwood, weight about 10 lbs.; for Instruments Nos. 6000-6022A, 6023A, 6024A, 6042A, 6043A, 6054A, 6062A, 6063A and 6310-6324A, Each
6494. Split Leg Tripod, hardwood, weight about 8 lbs.; for Instruments Nos. 6022C, 6023C, 6024C, 6042C, 6043C, 6054C, 6062C, 6063C, 6074C, 6334C and 6344C, Each
6495. Split Leg Tripod, hardwood, weight about 10 lbs.; for Instruments Nos. 6000-6022A, 6023A, 6024A, 6042A, 6043A, 6054A, 6062A, 6063A and 6310-6324A, Each
6496. Extension Tripod, hardwood, weight about 8 lbs.; for Instruments Nos. 6024E, 6054E and 6074E, Each
6497. Extension Tripod, hardwood, weight about 8½ lbs.; for Instruments Nos. 6022C, 6023C, 6024C, 6042C, 6043C, 6054C, 6062C, 6063C, 6074C, 6334C and 6344C, Each
6498. Extension Tripod, hardwood, weight about 9½ lbs.; for Instruments Nos. 6000-6022A, 6023A, 6024A, 6042A, 6043A, 6054A, 6062A, 6063A and 6310-6324A, Each

For Separate Parts of Tripods, see page 349.

See Price List in back of Catalog.

Underground Trivet

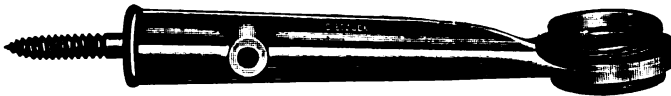


No. 6503.

This Underground Trivet, cast of bronze, is very substantial and well made, and can be used with our Transits (with or without a Compass) and Levels in underground and mining work. It is designed so that a small Plumb Bob can be used with it.

No. 6503. Underground Trivet, Each, \$

Timber Bracket



No. 6508.

This Bracket is designed for the support of Transits and Levels under conditions where the use of the tripod is impossible. It is made of bronze, is very strong and rigid, and will permit the centering of an instrument above or below a given point. The instrument is screwed upon it in the same manner as on a regular tripod. It is especially valuable for mining work. An auger and a bracket lever are furnished with each Bracket.

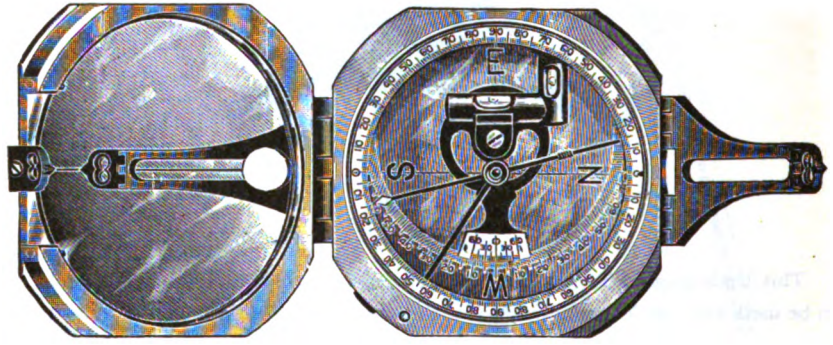
No. 6508. Bracket, with auger and bracket lever, Each, \$

When ordering the Underground Trivet or the Timber Bracket, always specify the catalog number or the serial number of our Instrument with which the Trivet or the Bracket is to be used.

See Price List in back of Catalog.

Dietzgen Pocket Transits

(Brunton Design)



No. 6618.

The Dietzgen Pocket Transits, Brunton design, are complete, accurate and reliable instruments of improved form for taking preliminary and topographic surveys of every description.

They are exceptionally well adapted for obtaining courses, horizontal angles and vertical angles, and can also be used as a Plumb, Hand Level, Clinometer and Prismatic Compass. Each Instrument, while strongly made, weighs but 8 ounces, and is completely enclosed in a nicely finished aluminum alloy case measuring $2\frac{3}{4} \times 2\frac{3}{4} \times 1\frac{1}{2}$ inches, thus being easily carried in the vest pocket.

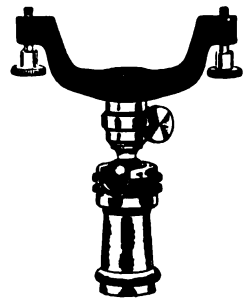
- No. 6618. Dietzgen Pocket Transit, compass ring divided every degree, numbered every 10 degrees, in quadrants, Each, \$
- 6619. Like No. 6618, but compass ring 0 to 360 degrees, clockwise, "
- 6620. " " 6618, " " 0 to 360 " counterclockwise, Each,
- 6621. Sewed Leather Sling Case with Sling Strap, for Nos. 6618, 6619 and 6620, Each,

Yoke with Ball Joint and Socket

For use with Dietzgen Pocket Transits

This Yoke with Ball Joint and Socket enables the Dietzgen Pocket Transits to be used with a tripod or a staff, an advantage when the work requires greater accuracy than it is possible to obtain by holding the instrument in the hand.

- No. 6622. Yoke with Ball Joint and Socket, for use with Pocket Transits Nos. 6618, 6619 and 6620, Each, \$

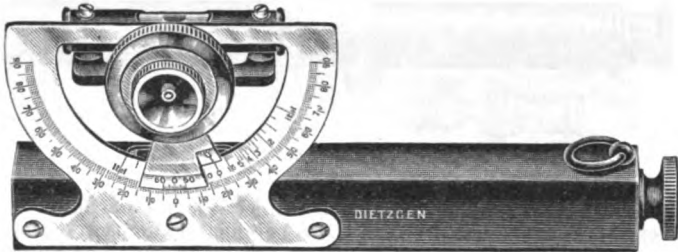


No. 6622.

For Jacob Staff and Tripods, see page 359.

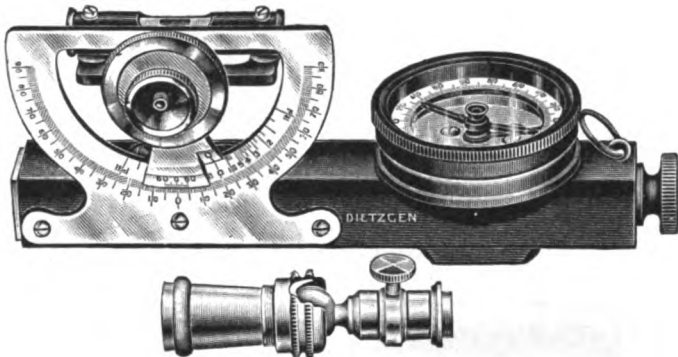
See Price List in Back of Catalog.

Abney Reflecting Levels



No. 6644.

No. 6644. Abney Reflecting Level or Pocket Altimeter, 5 in., Brass, durable black finish, square sighting tube, Nickel Silver arc, divided every degree, numbered every 10 degrees to 90° each side of zero, vernier reading to 5 minutes, gradients 1:1 to 1:10 in both directions, in sewed leather case, Each, \$



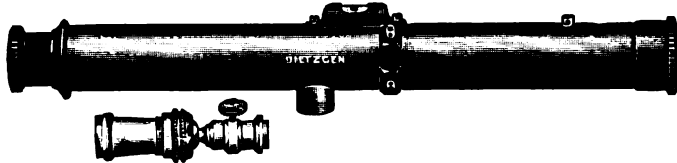
No. 6646.

No. 6646. Abney Reflecting Level or Pocket Altimeter, 5 in., Brass, durable black finish, square sighting tube, Nickel Silver arc, divided every degree, numbered every 10 degrees to 90° each side of zero, vernier reading to 5 minutes, gradients 1:1 to 1:10 in both directions, compass 1½ in., divided every 2 degrees, numbered every 20 degrees, in quadrants, 1 inch needle with jeweled center and stop, ball joint and socket, in sewed leather sling case with carrying strap, . . . Each, \$

For Jacob Staff and Tripods, see page 359.

See Price List in back of Catalog.

Stadia Hand Level



No. 6652.

No. 6652. Stadia Hand Level, telescope 10 in., object glass 1 in., adjustable eye-piece, stadia hairs reading 1:100, ball joint and socket, in sewed leather sling case with carrying strap, Each, \$

This instrument will be found very useful for preliminary surveys, etc. Weighs about 1½ lbs., and is easily carried.

For Jacob Staff and Tripods, see page 359.

Leveling Attachment



No. 6654.

No. 6654. Leveling Attachment for use with Abney Levels, Etc., bronzed metal, in sewed leather case, Each, \$

Locke Hand Levels



No. 6656.

No. 6656. Locke Hand Level, 5 in., Nickel Silver, with draw eye-piece and magnifying lens at end of draw for bubble, in sewed leather pouch, Each, \$

6658. Like No. 6656, but Brass, durable black finish, in sewed leather pouch, Each,

6660. Locke Hand Level, 5 in., Brass, durable black finish, draw eye-piece without magnifier, in sewed leather pouch, Each,

See Price List in back of Catalog.

Dietzgen Hand Level

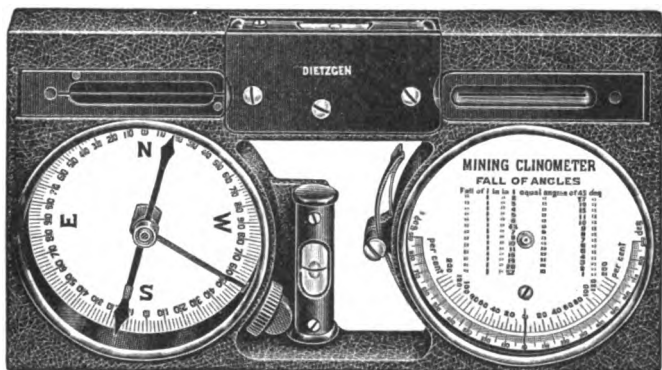


No. 6662.

No. 6662. Dietzgen Hand Level, 5 in., Brass, durable black finish, in leather covered case, Each, \$

Lower surface of sighting tube is flat and parallel with the bubble, thus enabling this instrument to be used also as a contact level.

Dietzgen Pocket Omnimeter



No. 6666.

No. 6666. Dietzgen Pocket Omnimeter, with folding sights, in sewed leather case, Each, \$

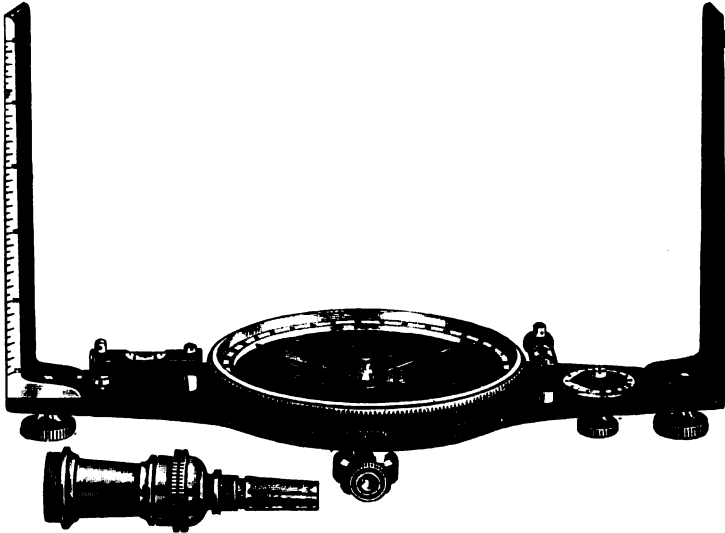
The Dietzgen Pocket Omnimeter combines a Compass, Clinometer, Hand Level, Plumb, Alidade and Contact Level. It will indicate magnetic bearings, azimuth angles, altitudes, levels and slopes; is also provided with folding sights for indicating azimuth angles of objects not in a horizontal plane.

Frame, aluminum alloy, is rectangular, $5\frac{3}{8} \times 3 \times \frac{5}{8}$ inches, and serves as a fiducial edge. Compass is 2 inches in diameter, divided every 2 degrees, numbered every 10 degrees, in quadrants, $1\frac{1}{8}$ inch needle with jeweled center and stop. Gravity Clinometer is 2 inches in diameter, divided every degree and numbered every 10 degrees to 90° each side of zero and to slopes in feet per 100 feet horizontal or centimeters per meter. Spirit level is as sensitive as is permissible in a hand level. Weight about 6 ounces.

See Price List in back of Catalog.

Surveying Compasses

Fine Quality



No. 6676.

Specifications of No. 6676

- Circle** — Silvered; divided every half-degree, numbered every 10 degrees, in quadrants variation arc with vernier reading to single minutes; made water-tight by beveled plate glass cover.
- Needle** — Improved pattern; jeweled center with stop controlled by screw under the main plate.
- Levels** — Two; mounted on the arms at right angles to each other, thus enabling the plate to be leveled while in any position.
- Outkeeper** — A small dial used for keeping record when chaining; numbered from 1 to 16; the index is turned by a milled head screw under the plate.
- Sights** — Two; detachable; each sight is made with a fine slit extending one-half its length, the slit having circular openings at top and bottom to facilitate finding the object sighted.
- Angle Scale** — The North sight is graduated to half-degrees on left and right edges so that angles of elevation and depression can be obtained by sighting through a peep hole in the South sight.
- Ball Joint and Socket** — A ball joint and socket is provided to facilitate leveling the compass.

No. 6676.	Surveying Compass, 4 in. needle, complete, in mahogany box, Each, \$	
6678.	Like No. 6676, but 5 in. needle,	"
6680.	" " 6676, " 6 " "	"
6682.	Tripod, solid leg, hardwood, for use with Nos. 6676-6680,	"
6683.	" extension, " " " " " 6676-6680,	"

See Price List in back of Catalog.

Surveying Compasses

Fine Quality



No. 6684.

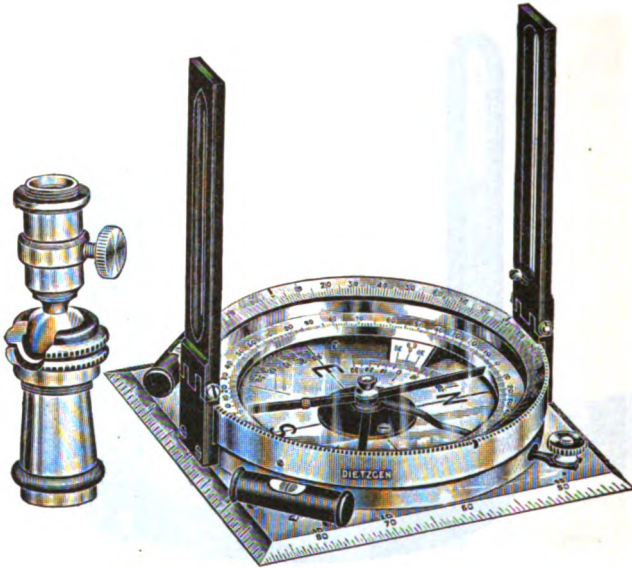
These Surveying Compasses are substantially made, and are specially adapted for reconnoissance and preliminary surveying. The magnetic variation is set by means of a capstan-head pinion, readily accessible to either hand.

- No. 6684. Surveying Compass, 3½ in. needle with jeweled center and stop, divided every half-degree on raised ring, numbered every 10 degrees, in quadrants, variation ring reads to 5 minutes, silvered, made water-tight by beveled plate glass cover, folding fore and back sights, two levels, ball joint and socket, in mahogany case, Each, \$
- 6685. Like No. 6684, but in sewed leather case, “
- 6686. Surveying Compass, 4½ in. needle with jeweled center and stop, divided every half-degree on raised ring, numbered every 10 degrees, in quadrants, variation ring reads to 5 minutes, silvered, made water-tight by beveled plate glass cover, folding fore and back sights, two levels, ball joint and socket, in mahogany case, Each,
- 6687. Like No. 6686, but in sewed leather case, “

For Jacob Staff and Tripods, see page 359.

See Price List in back of Catalog.

Geologists Compass and Clinometer



No. 6710.

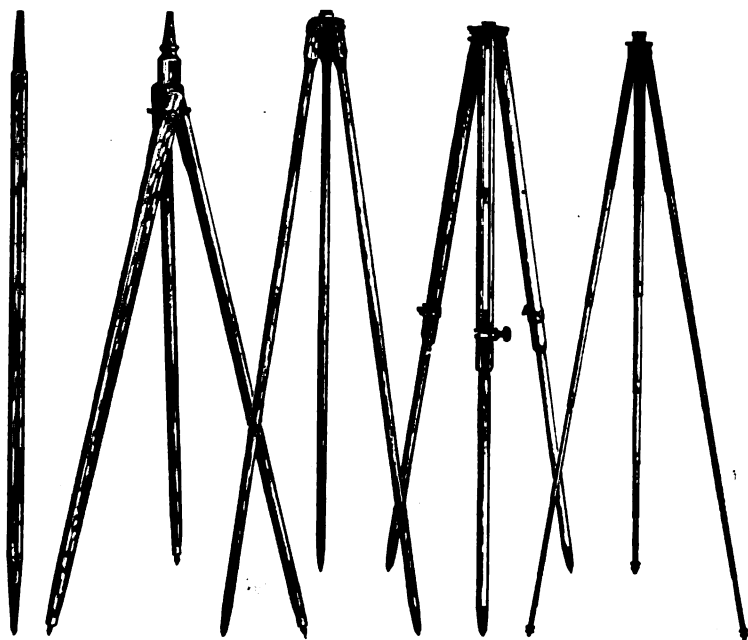
This Instrument is specially adapted for topographical work, as it is very light and portable. The edges of the base are beveled and graduated: two like a protractor; one inches to eighths, which represents 1 in. to 1 mile; and the other inches to tenths. The top ring of the compass box is beveled, divided to degrees and numbered in quadrants. It has a sighting mark at each quadrant, and its edge is knurled to facilitate turning. This arrangement will be found useful in laying off right angles, or in sighting vertical angles by setting the edge of the base on a level surface. The raised compass ring is graduated to degrees and numbered from 0 to 90° on each side of North and South, the cardinal points being engraved. The variation of the compass needle is set by means of a knurled-head screw extending from the revoluble compass ring through the wall of the compass box. This screw also serves for clamping the compass ring in its position. On the west side of the compass face is a graduated arc of 180°, reading to degrees and numbered from 0 to 90° on each side of the zero line. The clinometer consists of a weighted pendulum which hangs from the center pivot of the needle and carries at its lower end an index for reading the graduated arc. To use the clinometer, set the instrument on its west edge, view the object through the sights, and read inclination on the graduated arc. On the under surface of the base is a diagram showing arrangement of township numbering.

No. 6710. Geologists Compass and Clinometer, $2\frac{1}{8}$ in. needle, jeweled center with stop, two levels to base, folding sights, raised compass ring divided every degree, variation arc reading by vernier to 5 minutes, movable sighting circle and graduated base, ball joint and socket, in sewed leather case with shoulder strap, Each, \$

For Jacob Staff and Tripods, see next page.

See Price List in back of Catalog.

Jacob Staff and Tripods



No. 6712. 6714. 6716. 6718. 6720.

- No. 6712. Jacob Staff, hardwood, tapered head, metal shoe, weight about 1¾ lbs., Each, \$
- 6714. Tripod, hardwood, tapered head, metal shoes, weight about 4¾ lbs., Each,
- 6716. Tripod, hardwood, metal staff head, metal shoes, weight about 3¾ lbs., Each,
- 6718. Tripod, extension, hardwood, metal staff head, metal shoes, weight about 5 lbs., Each,
- 6720. Tripod, telescoping, metal, metal staff head, weight about 2½ lbs., Each,

The above Jacob Staff and Tripods are for use with any of the following Instruments: Nos. 6618-6620 (when equipped with No. 6622), 6646, 6652, 6654, 6684-6687, and 6710.

When ordering, always specify catalog number of the Instrument with which the Staff or the Tripod is to be used.

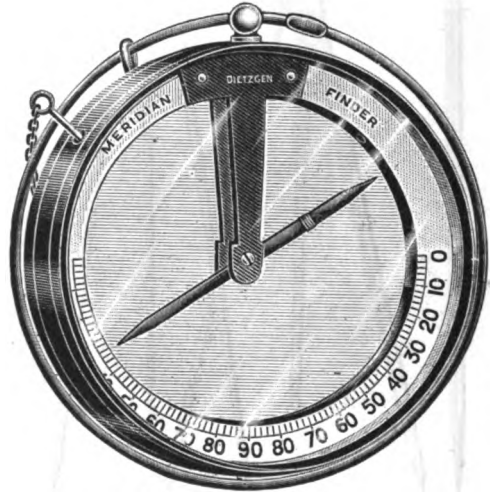
See Price List in back of Catalog.

Miners

Lamps and Compasses



No. 6730.

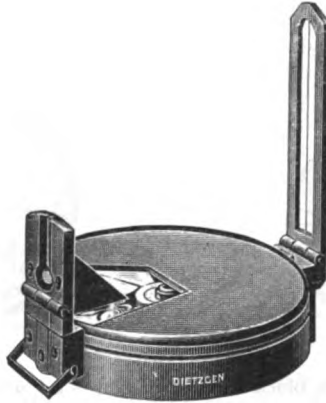


6735.

- No. 6730.** One Plummet Lamp, metal, steel point, weight about 20 oz., in mahogany box with carrying strap, Each, \$
- 6731.** Two Plummet Lamps, like No. 6730, both in a mahogany box with carrying strap, Each,
- 6735.** Miners Compass, or Dip Needle, for tracing iron ore, 3 in. needle, mounted on a metal ring graduated 0 to 90° in each direction and numbered every 10 degrees, glass and metal covers on both sides, in case, Each,
- 6736.** Miners Compass, or Dip Needle, 3 in. Norwegian needle, jeweled bearings, suspended in gimbals. Needle has a motion in azimuth as well as in altitude, and thus finds its true meridian. The method of suspension permits it to turn easily without its revolution being impeded in any way, an advantage as a perfect test can be made by reversing it. In case, Each,

See Price List in back of Catalog.

Prismatic Compass

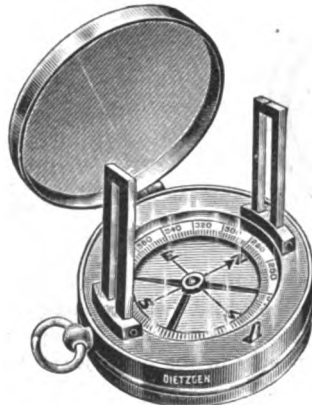


No. 6742.

This useful Instrument, valuable for taking the bearings of objects nearly in the same horizontal plane, contains a magnetic needle attached to a floating dial which revolves on a fixed center point. On one end of the case is a hinged sight having a fine metal thread, while directly opposite to this sight and in line with the center of the magnetic needle, is a hinged slit-sight, below which is a rectangular prism, used for reading the compass bearings when a distance object is being sighted.

No. 6742. Hutchinson Prismatic Compass, bronzed, improved pattern, with opening in top, floating dial, 2 in., in morocco case, Each, \$

Pocket Sight Compasses

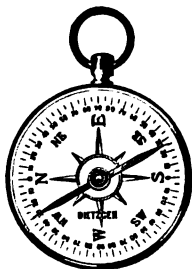


No. 6764A.

- No. 6764A. Pocket Sight Compass, nickel-plated, 2 in., folding sights, stop to needle, Each, \$
- 6764B. Like No. 6764A, but $2\frac{3}{8}$ in., "
- 6764C. " " 6764A, " $2\frac{3}{4}$ " "

See Price List in back of Catalog.

Magnetic Pocket Compasses

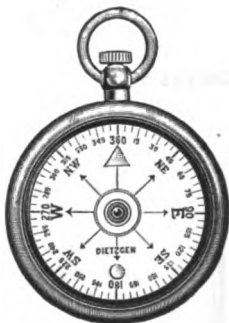


No. 6784.

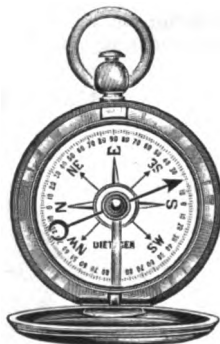


6785.

- No. 6784.** Pocket Compass, black bronzed case, $1\frac{3}{8}$ in., watch pattern, heavy enameled card fixed dial, divided every 5 degrees, numbered every 10 degrees, in quadrants, agate center, Each, \$
- 6785.** Pocket Compass, white metal case, $1\frac{3}{4}$ in., watch pattern, silvered metal fixed dial, divided every two degrees, numbered every 10 degrees, in quadrants, jeweled center, stop to needle, Each,



No. 6786.

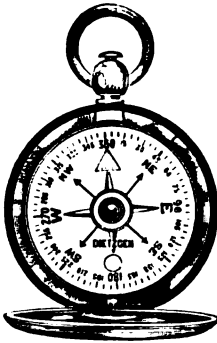


6787.

- No. 6786.** Pocket Compass, white metal case, $1\frac{3}{4}$ in., watch pattern, silvered metal floating dial, divided every 5 degrees, numbered every 15 degrees, 0 to 360°, North and South points permanently luminous and can be seen plainly in the dark, jeweled center with stop to jewel and point, Each, \$
- 6787.** Pocket Compass, white metal Hunter case strongly hinged, $1\frac{3}{4}$ in., watch pattern, silvered metal fixed dial, divided every 2 degrees, numbered every 10 degrees, in quadrants, jeweled center, self-acting stop to needle, Each,

See Price List in back of Catalog.

Magnetic Pocket Compasses



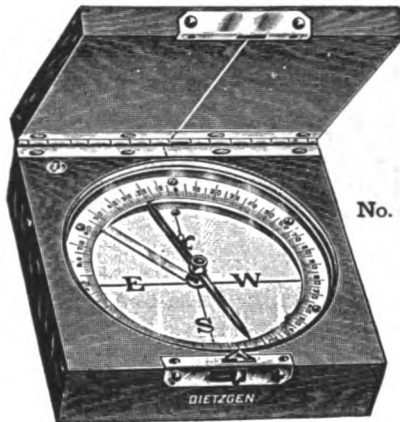
No. 6788.



6789.

- No. 6788. Pocket Compass, white metal Hunter case strongly hinged, $1\frac{1}{4}$ in., watch pattern, silvered metal floating dial, divided every 5 degrees, numbered every 15 degrees, 0 to 360°, North and South points permanently luminous and can be seen plainly in the dark, jeweled center with self-acting stop to jewel and point, Each, \$
6789. Like No. 6788, but silvered metal fixed dial, divided every 2 degrees, numbered every 10 degrees, in quadrants, each cardinal point and each end of the needle is permanently luminous and can be seen plainly in the dark, self-acting stop to needle, Each,

Military Compasses

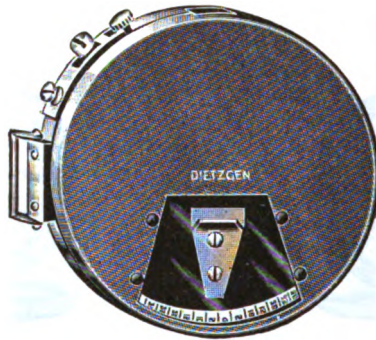


No. 6813.

- No. 6812. Military Compass, 3 X 3 in., silvered metal dial, divided every degree on raised silvered metal ring, numbered every 10 degrees, 0 to 360°, 2 inch bar needle with jeweled center and automatic stop, in mahogany box, sighting line on lid, Each, \$
6813. Like No. 6812, but in quadrants, " " " "
6814. " " 6812, " $3\frac{1}{4}$ X $3\frac{1}{4}$ in., 0 to 360°, $2\frac{1}{2}$ inch needle, " " " "
6815. " " 6814, " in quadrants, " " " "

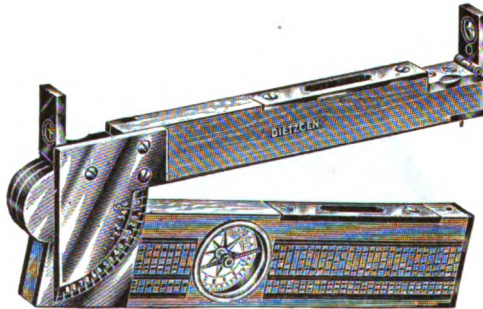
See Price List in back of Catalog.

Clinometers



No. 6825.

No. 6825. Military Clinometer, for measuring angles of elevation or depression, bronzed case 3 in. diam., arc scale is held clamped and is released to swing freely by pressing on a knob. Scale of arc is graduated from 0 to 45° in each direction; the red scale denotes elevation, the black scale depression. In leather sling case, Each, \$



No. 6832.

No. 6830. Boxwood Clinometer, 12 in. folding to 6 in., with one spirit level, compass, and inclination scale, metal mountings, in leather case, Each, \$

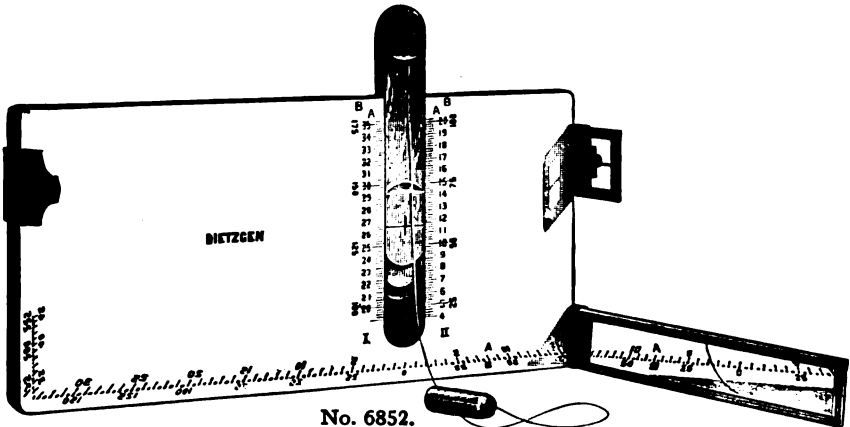
6832. Like No. 6830, but two spirit levels and with folding sights, in leather case, Each,

The Inclination Scale is used for obtaining the value of any angle, as follows: Having ascertained the angle from the divided arc which is on the instrument, refer to that degree in the column marked "Angle" and opposite in another column will be found the rise or fall in any given measured distance; for instance, if the degree shown on the divided arc is 18, opposite to this number will be found 3 on the scale, indicating one part rise or fall in three, or one inch in three inches or one foot in three feet.

See Price List in back of Catalog.

Hypsometers

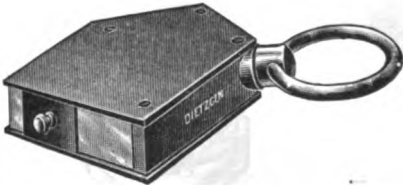
For Measuring Heights of Trees, Buildings, Etc.



No. 6852.

- No. 6852.** Mirror Reading Hypsometer (after Faustmann), $7 \times 3\frac{1}{4}$ in., Hardwood, improved construction, graduations on white composition with protective coating, folding sights and hinged mirror, scale of heights on base of instrument and scales of distances on either side of groove in which the slide moves; slide to which the plumb bob cord is fastened is provided with two reading lines to correspond with the two scales of distances; in pocket with cover flap, with directions, Each, \$
- 6853.** Like No. 6852, but of Brass, graduations on silvered surface, folding sights and hinged mirror, in pocket with cover flap, with directions, Each, \$

Penta-Prism Range Finder



No. 6862.

- No. 6862.** Penta-Prism Range Finder, bronzed metal frame, in leather case with directions, Each, \$

The Penta-Prism Range Finder is invaluable for surveyors and military officers for measuring distances and determining right angles. Distances up to two miles can be quickly measured, without the aid of any other instrument or with reference to tables.

As it consists of but one prism, it has an advantage over other makes consisting of several prisms, the view being more brilliant and the accuracy greater. Its use is easily understood, and the obtainable results are sufficiently accurate to meet all general requirements.

The distance is obtained by measuring the base line (see Base Line Measuring Tape listed below) as determined by the prism and multiplying by 50.

Base Line Measuring Tape

- No. 6863.** Base Line Measuring Tape, Steel, length 20 yds., graduated on a scale of 1:50 reading directly up to 1000 yards by single yards, Each, \$

See Price List in back of Catalog.

Angle Mirrors



No. 6864.



6865.

- No. 6864. Angle Mirror, for right angles, with small plumb bob, size when packed, $2\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$ in., in velvet-lined morocco case, Each, \$
6865. Like No. 6864, but without plumb bob, " "

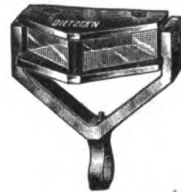
Angle Prisms



No. 6870.



6872.



6874.

- No. 6870. Rectangular Prism, for angles of 90 degrees, with plumb bob hook, size $1\frac{3}{8} \times \frac{7}{8} \times \frac{3}{8}$ in., in velvet-lined morocco case, Each, \$
6872. Double Prism, for angles of 90 and 45 degrees, in velvet-lined morocco case, Each,
6874. Angle Prism, for angles of 90 degrees, with cover folding back to act as handle, size $1\frac{3}{8} \times 1\frac{1}{2} \times 1\frac{1}{4}$ in., in velvet-lined morocco case, Each,

See Price List in back of Catalog.

Aneroid Barometers

For Measuring Heights and Atmospheric Pressure



No. 6896.



6898.



6900.

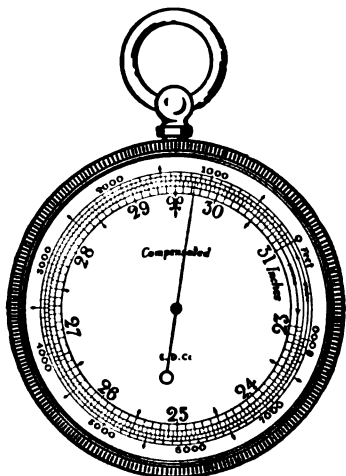
In selecting an Aneroid Barometer it should be considered that as the normal Barometric Pressure at (50° F.) Sea Level is 29.92, and as the Altitude scale is graduated in relation to the Pressure scale so that 31 and 0 coincide and 29.92 and 950 coincide, the maximum altitude which the Barometer will indicate is decreased by 950 feet: thus, an Altitude scale graduated to read altitudes to 8,000 feet, will, under normal conditions, serve only where the altitude of the station does not exceed 7,050 feet.

- No. 6896. Watch pattern, 1 3/4 in. diam., gold plated case and silvered metal dial with fixed altitude scale of 8,000 feet in 100 feet divisions, with revolving rim and pointer, in morocco case, Each, \$
- 6896D. Like No. 6896, but altitude scale 10,000 feet, " "
- 6898. Watch pattern, 1 3/4 in. diam., gold plated case and silvered metal dial with fixed altitude scale of 8,000 feet in 100 feet divisions, with revolving rim and pointer, compensated for temperature, in morocco case, Each,
- 6898D. Like No. 6898, but altitude scale 10,000 feet, " "
- 6898F. " " 6898, but altitude scale 16,000 feet, " "
- 6900. Watch pattern, 1 3/4 in. diam., gold plated case with highest grade movement and hand silvered dial, movement so arranged that it will not become strained if taken beyond the altitude as engraved on the dial. Fixed altitude scale of 8,000 feet in 50 feet divisions, with revolving rim and pointer, compensated for temperature, in morocco case, Each,
- 6900B. Like No. 6900, but altitude scale 3,000 feet in 10 feet divisions, Each,
- 6900C. Like No. 6900, but altitude scale 5,000 feet in 20 feet divisions, Each,
- 6900E. Like No. 6900, but altitude scale 12,000 feet in 100 feet divisions, Each,
- 6900F. Like No. 6900, but altitude scale 16,000 feet in 100 feet divisions, Each,

See Price List in back of Catalog.

Aneroid Barometers

For Measuring Heights and Atmospheric Pressure



No. 6906.



6909.

- No. 6906.** Watch pattern, $2\frac{1}{2}$ in. diam., gold plated case with highest grade movement and hand silvered dial. Movement so arranged that it will not become strained if taken beyond the altitude as engraved on the dial. Fixed altitude scale of 8,000 feet in 50 feet divisions, with revolving rim and pointer, compensated for temperature, in morocco case, Each, \$
- 6906B.** Like No. 6906, but altitude scale 3,000 feet in 10 feet divisions, Each,
- 6906C.** Like No. 6906, but altitude scale 5,000 feet in 20 feet divisions, Each,
- 6906E.** Like No. 6906, but altitude scale 12,000 feet in 50 feet divisions, Each,
- 6906F.** Like No. 6906, but altitude scale 16,000 feet in 100 feet divisions, Each,
- 6909.** Like No. 6906, but altitude scale of 5,000 feet in single 5 feet divisions in a repeating circle of divisions. The outer scale is divided to 10 feet while the scale directly beneath it subdivides it to 5 feet divisions. No vernier or magnifier required. In pigskin flap belt case, Each,

Livingston Set

- No. 6914.** Livingston Set. Consists of the following: Aneroid Barometer, best quality, watch pattern, $1\frac{3}{4}$ in., fixed altitude scale of 8,000 feet in 50 feet divisions, revolving rim and pointer, compensated for temperature; Pocket Compass, gilt case, open face pattern, $1\frac{3}{4}$ in., with floating aluminum dial; Ivory Scale Thermometer, $2\frac{1}{2}$ in., with Fahrenheit and Centigrade scales; in morocco folding pocket case, Set, \$

See Price List in back of Catalog.

Altitude Aneroid Barometers

For use of Engineers, Tourists, Travellers and Motorists



No. 6911C.

The Altitude Aneroid Barometer enables anyone to readily determine the altitude of hills or mountains over which he may travel, and will prove an interesting and instructive companion.

It possesses a distinct and valuable advantage over other forms, as the altitude scale, instead of being graduated in unequal divisions as on other barometers, is divided equally and revolves around the barometer pressure dial. This means that the zero on the altitude scale can always be set to the point of the hand, without error, so that in travelling the hand will always point to the true elevation of the instrument from its starting point, without any deduction or addition.

Of American manufacture throughout, with a duplication of the altitude and barometer scales as designed by our Government and having a very thorough mechanical compensation for temperature, these instruments will be found accurate, sensitive and dependable.

No. 6911C. Watch pattern, $2\frac{1}{4}$ in. diam. and about $1\frac{1}{4}$ in. deep, grained aluminum case and silvered metal dial with equal altitude scale of revolving type reading to 5,000 feet in 20 feet divisions, in leather, stitched, sling carrying case, Each, \$

6911D. Like No. 6911C, but altitude scale 10,000 feet in 50 feet divisions, Each,

See Price List in back of Catalog.

Aneroid Barometers

For Measuring Heights and Atmospheric Pressure



No. 6916D.

- No. 6916. Surveying Barometer, bronzed case, 3 in. diam., best engraved silvered dial, graduated on raised ring, fixed altitude scale 6,000 feet, vernier scale, reading to 2 feet, moved by rackwork motion, compensated for temperature, adjustable reading lens, in leather sling case, Each, \$

- 6916D. Like No. 6916, but altitude scale 10,000 feet, with vernier scale reading to 2 feet, Each,

- 6916F. Like No. 6916, but altitude scale 16,000 feet, with vernier scale reading to 2 feet, Each,

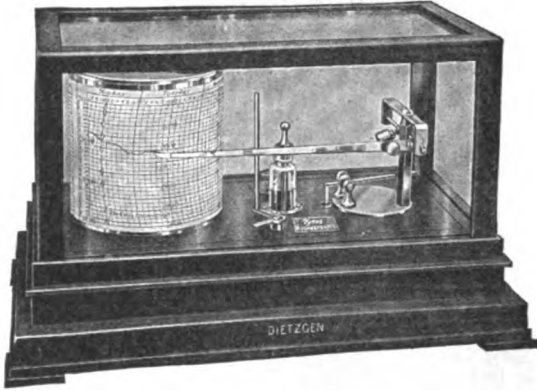
- 6920. Surveying Barometer, bronzed case, 5 in. diam., best engraved silvered dial, graduated on raised ring, fixed altitude scale 6,000 feet, vernier scale, reading to 1 foot, moved by rackwork motion, compensated for temperature, adjustable reading lens, in leather sling case, Each,

- 6920D. Like No. 6920, but altitude scale 10,000 feet, with vernier scale reading to 2 feet, Each,

- 6920F. Like No. 6920, but altitude scale 16,000 feet, with vernier scale reading to 2 feet, Each,

See Price List in back of Catalog.

Barograph



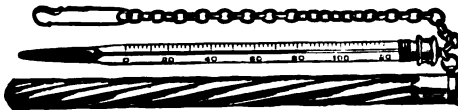
No. 6934.

This Instrument is constructed to record upon a chart changes in atmospheric pressure for a period of one week, as the clock revolves once in that time. As the top of the chart is divided into seven spaces, and subdivided into spaces representing two hours each, it is possible to tell at what time of day atmospheric conditions undergo a change. Charts universally used show a pressure from 28 in. to 31 in., the value of each division being .05 inches.

When ordering, the town or the altitude of the station where the instrument is to be used should be given.

No. 6934. Barograph. Simplified Form. The movement of the recording pen is controlled by a large vacuum chamber concealed in the base of the instrument. Clock and charts are identical to those of higher priced instruments. Complete with ink and a year's supply of charts, in case having mahogany frame-work, . . . Each, \$

Pocket Thermometer



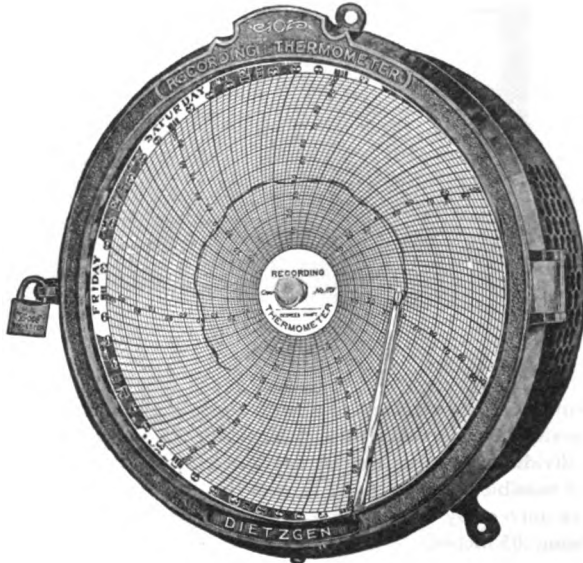
No. 6956.

No. 6956. Pocket Thermometer, 5 in., in aluminum case with chain. Approximate range of scale, minus 30° to plus 120° Fahrenheit, in 2° graduations, Each, \$

See Price List in back of Catalog.

Recording Thermometer

Self Contained



No. 6960.

This Self Contained Recording Thermometer, very sensitive and durably constructed, is especially adapted for industrial purposes and for recording temperatures in public buildings, homes, greenhouses, sun parlors, gardens, etc.

The case, 12 inches overall and equipped with lock and key, is finished in a weather-resisting instrument black which, contrasting with the polished bronze front, gives an exceptionally attractive appearance.

No. 6960. Recording Thermometer, self contained, with bottle of Recorder ink and 100 of any one of the charts described below, . Each, \$

Charts.	Range.	Divisions.	Timing
No. 6962A.	10° to 120° F.	2°	1 day
6962B.	0° " 100° F.	2°	1 "
6962C.	0° " 100° F.	2°	7 "
6962D.	10° " 120° F.	2°	7 "
6962E.	0° " 130° F.	2°	7 "
6962F.	-20° " 50° C.	1°	7 "

The above charts and temperature ranges are specially adapted for use with this Recording Thermometer. When ordering, always specify catalog number of the chart desired.

Prices for additional charts in quantities of 100 or 500 quoted on request.

See Price List in back of Catalog.

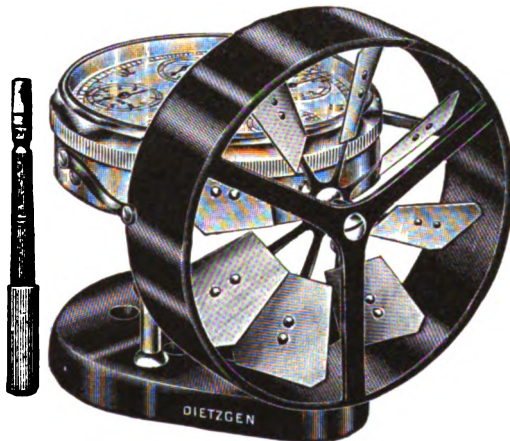
Airmeters

These Instruments are for the measurement of air currents through mines, tunnels and sewers; and for the ventilation of hospitals, public buildings, etc.

Velocities of air currents are obtained by means of a delicately poised fan wheel, the recording being commenced by the long hand, which traverses the extreme outer circumference of the main dial for the passage of 100 feet of air. The enumeration is continued by a series of smaller dials. Our Airmeters and Anemometers have a **zero setting arrangement**, by which all of the hands can be set back to zero, or starting point; the sum of the reading, for any single observation, thus being instantly seen without regard to previous tests. A **disconnecter** throws the mechanism out of gear and arrests its action when required. All Instruments have jeweled movements, insuring accuracy, and each one is carefully tested and furnished with a table of corrections.

Two Dial Instruments will stand a pressure of 1,000 ft. per minute.

Four Dial Instruments will stand a pressure of 3,000 ft. per minute.



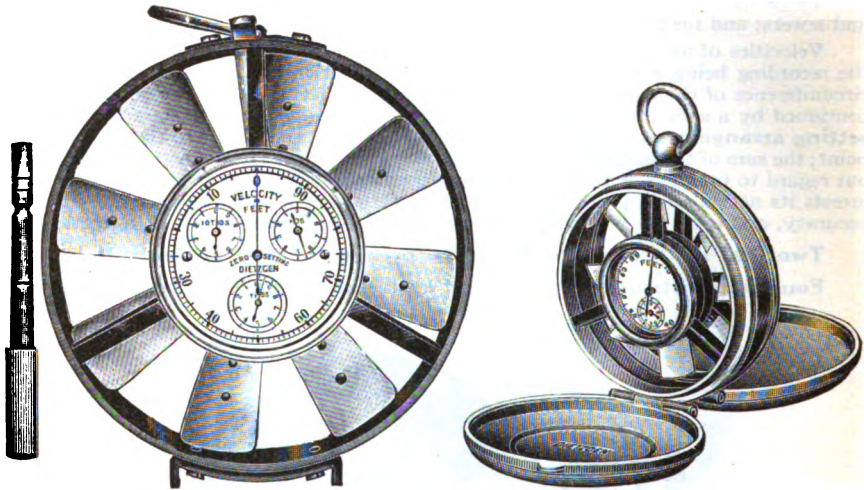
No. 6980.

- No. 6980.** Portable Airmeter, with disconnecter and zero setting arrangement, diameter of fan wheel $2\frac{3}{4}$ in., one large dial and 5 small dials recording up to 10,000,000 ft., or 1893 miles, in leather case, Each, \$
- 6982.** Like No. 6980, but with sand glass timer, "
- 6984.** Portable Airmeter, with disconnecter and zero setting arrangement, diameter of fan wheel $2\frac{3}{4}$ in., one large dial and 3 small dials, recording up to 100,000 ft., in leather case, Each,
- 6986.** Like No. 6984, but with sand glass timer, "

**We have the best facilities for testing and repairing
Airmeters and Anemometers.**

See Price List in back of Catalog.

Anemometers



No. 6994.

7000.

- No. 6993.** Biram Anemometer, with disconnecter and zero setting arrangement, 3 in. diameter, 2 dials reading to 1,000 ft., in leather case, Each, \$
- 6994.** Biram Anemometer, with disconnecter and zero setting arrangement, 4 in. diameter, 4 dials reading to 100,000 ft., in leather case, Each,
- 6996.** Biram Anemometer, with disconnecter and zero setting arrangement, 6 in. diameter, 4 dials reading to 100,000 ft., in leather case, Each,
- 6998.** Biram Anemometer, High Speed, with disconnecter and zero setting arrangement, 3½ in. diameter, 3 dials reading to 200,000 ft., capable of registering strong blast currents up to 8,000 feet per minute, in leather case, Each,
- 7000.** Pocket Anemometer, 2 in. diameter, ¾ in. thick, weight 5½ oz., watch pattern, bronze case with hinged lids which form a base for the instrument when it is open, 2 dials registering to 1,000 ft., Each,

For general description of Airmeters and Anemometers, see opposite page.

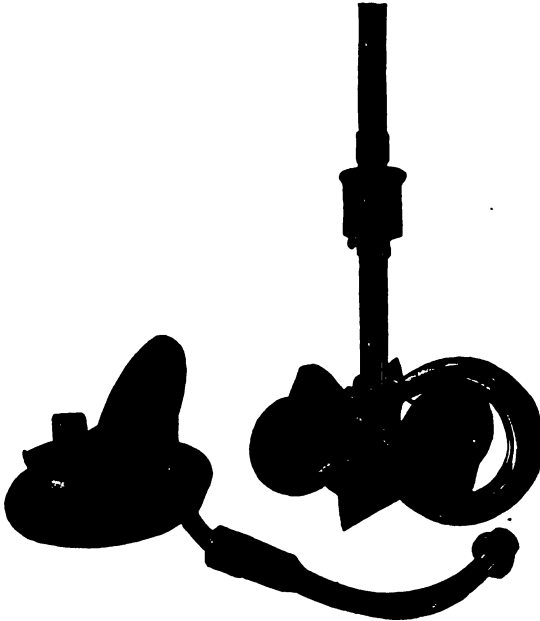
**We have the best facilities for testing and repairing
Airmeters and Anemometers.**

See Price List in back of Catalog.

Current Meter

The increased demand for a high grade Current Meter, especially designed for use in irrigation work to measure the speed of flowing water, has led us to list the following Acoustic Meter, which is superior to other makes on account of its accuracy and simplicity of construction. It is very compact and portable, and possesses the desirable advantages of having no exposed mechanism; no delicate parts to get out of order; continuous reliability in action; and rigidity combined with lightness.

The revolutions of the bucket wheel are indicated by the sound of a hammer striking against a diaphragm, one blow for every 10 revolutions. The indicating mechanism is enclosed and is absolutely protected from injury. The meter is held by a jointed rod which screws into the frame and, in connection with a rubber tube that has an ear piece attached, forms a passage through which the sound of the hammer stroke is transmitted to the ear of the observer, thus enabling him to count the number of revolutions of the wheel in any given space of time, and then by means of the reduction table to ascertain the velocity of flow. As the ear piece attachment is fastened to the observer's head, both hands are free for manipulating the meter.

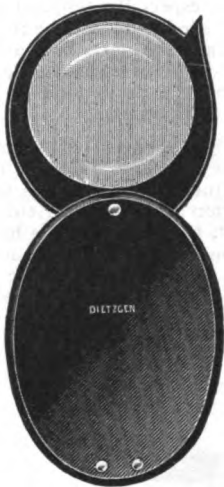


No. 7050.

- No. 7050. Acoustic Current Meter, including two lengths of graduated brass tube to measure four feet from plane of bucket wheel, tool accessories and extra pivot bearing, in wooden box with lock and strap, Each, \$
7051. Extra Graduated Brass Tube, 2 feet long, "
7052. Canvas Case, for 2, 3 or 4 lengths of tube, "

See Price List in back of Catalog.

Pocket Magnifying Glasses

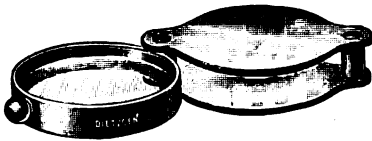


No. 7150.



7152.

No. 7150.	Mounted in rubber,	1 lens,	1 in. diameter,	. . . . .	Each, \$
7151.	"	"	1 " 1½ "	. . . . .	"
7152.	"	"	2 " 1 " "	. . . . .	"
7153.	"	"	2 " 1½ "	. . . . .	"



No. 7170.



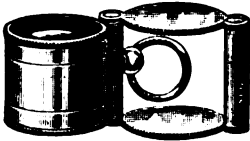
7172.

No. 7170.	Mounted in metal, nickel plated,	1 lens,	1 in. diameter,	. . . . .	Each, \$
7171.	"	"	2 " 1 " "	. . . . .	"
7172.	"	"	3 " 1 " "	. . . . .	"

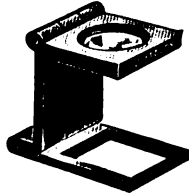
Nos. 7170-7172 have a very good magnifying power, and are specially adapted for reading graduations on surveying instruments. Their metal mounting insures great durability.

See Price List in back of Catalog.

Magnifying Glasses



No. 7230.



7251.



7261.

- | | | |
|-----------|--|----------|
| No. 7230. | Coddington Lens, metal folding frame, nickel-plated, 1/2 in. diameter, | Each, \$ |
| 7232. | Like No. 7230, but 1 in. diameter, | " |
| 7234. | " " 7230, " 1 3/8 " " | " |
| 7250. | Thread Counter, metal folding frame, 1/4 in. field, | " |
| 7251. | Like No. 7250, but 1/2 in. field, | " |
| 7252. | " " 7250, " 1 " " | " |
| 7261. | Magnifier, on 3 legs, brass, screw adjustment, 1 in. diameter, | " |

Reading and Reducing Glasses

Best Quality Nickel-Plated Frames Polished Wooden Handles



No. 7280.

- | | | | | | | | | |
|-----------|-------------------|----|-------|---|-------|---|-------|-------|
| No. 7280. | Reading Glasses. | | | | | | | |
| | Size, | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 in. |
| | Each, | \$ | | | | | | |
| 7285. | Reducing Glasses. | | | | | | | |
| | Size, | | | | | | 2 | 3 in. |
| | Each, | | | | | | \$ | |

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The prices of the books listed apply to latest editions now on the market and will change with the publishers' rates.

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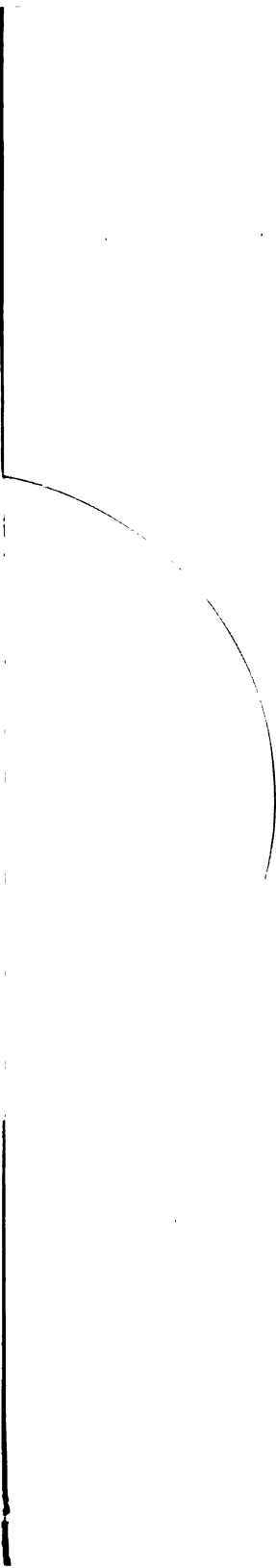
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