

***CURLEY***

*Civil  
Engineering  
Instruments*

CATALOGUE  
OF  
**GURLEY INSTRUMENTS**  
FOR  
CIVIL, MINING AND  
HYDRAULIC ENGINEERS  
AND LAND SURVEYORS

MANUFACTURED BY  
**W. & L. E. GURLEY**  
ENGINEERING INSTRUMENT MAKERS SINCE 1845  
TROY, N. Y., U. S. A.

BRANCH FACTORY, MARITIME BUILDING, SEATTLE, WASHINGTON



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W. & L. E. GURLEY  
TROY, N. Y., U. S. A.

REGAL ART PRESS, TROY, N. Y.

## INTRODUCTION

### EXTENT OF OUR BUSINESS

The manufacture of surveying instruments has been conducted by us since 1845, and for many years our facilities have been far superior to those of any other similar establishment in the world. They are being constantly increased by the introduction of new machinery and tools.

We now make under our own roof the lenses for the telescopes of our instruments, the platinum filament for the crosswires and stadia wires, the glass vials for the level tubes, the wooden boxes in which the instruments are packed, and the leather cases and straps for these boxes, as well as all the metal parts of the instruments themselves.

Thousands of our instruments have been distributed to all parts of the United States, Canada, Mexico, Central America, Cuba, South America, China, Japan, Australia, Africa, India and other foreign countries.

### GUARANTEE

**All instruments of our own make** are examined and tested before being shipped, and are sent to the purchaser adjusted, ready for immediate use. When purchased directly of us, they are warranted correct in all their parts—we agreeing in the event of any original defect appearing after reasonable use, to repair or replace with new and perfect instruments, promptly at our own cost, express charges included; or we will refund the money and the express charges paid by the purchaser.

It sometimes happens, in a business as large and widely extended as ours, that instruments reach our customers in bad condition, owing to careless transportation or to defects escaping the closest scrutiny of the maker. We consider the retention of such instruments by the purchaser an injury very much greater to us than to himself.

### TRIAL OF INSTRUMENTS

If requested to do so, we will ship to the express station nearest the person giving the order and will instruct the express agent to collect the amount of our bill and hold the money three days. This will give the purchaser an opportunity to test the instrument in the field and if it is not found as represented, he may return it to the express agent who will refund the full amount paid, including transportation charges.

This privilege of trial applies only to our large instruments such as Transits, Levels, Compasses, etc., is not given unless requested, and is allowed only in the United States. Privilege of trial is not allowed by the Great Northern or Southern Express Companies. All express companies, however, will allow examination of instruments at their offices, if the shipper requests it for the purchaser.



## INFORMATION TO PURCHASERS

### ORDERING

In ordering, **always give the Catalogue Number.**

If full particulars concerning each item accompany the order, delay will often be avoided, as it will probably be unnecessary for us to write you.

If no shipping directions are given, we will always ship by the quickest and safest method.

When any articles can be sent safely by mail, we have printed the approximate cost of postage so that, by remitting with the order the cost of the article and the postage, the goods can be sent at small expense.

### PACKING AND DELIVERY

Each of our Transits, Levels and Surveyors Compasses is packed in a well finished mahogany case, furnished with lock and key, and leather strap for convenience in carrying.

When sent to the purchaser the mahogany cases are carefully enclosed in outside packing boxes of pine, made a little larger on all sides to receive elastic packing material.

**We make no charge for packing boxes or packing,** and our instruments are delivered F. O. B. Troy, N. Y., to the express company or freight house.

**Charges for transportation are in all cases to be paid by the purchaser,** we guaranteeing the safe arrival of our goods at the destination indicated at the time of shipment.

### TERMS OF PAYMENT

Terms of payment are **uniformly cash,** and we have but one price, whether ordered in person or by mail. Our prices are as low as instruments of first quality can be made.

**Remittances** may be made by a cashier's bank draft, payable to our order, or by Express Company or Post Office money order payable at Troy, N. Y. These may be sent by mail with the order for the instrument, and, if lost or stolen on the route, can be replaced by a duplicate, obtained as before, and without additional cost.

The customer may also send the money in advance by registered mail, or by the express agent, or, may pay the agent on receipt of the instrument in funds current in New York. Goods ordered for shipment to foreign countries must be paid for in advance of shipment.

Customers ordering instruments and desiring **changes in construction** from our regular patterns, must make a payment in advance **when ordering** of fifty per cent. of the price.

The cost of returning the money on bills of amounts under \$20, collected by express, will be charged to the customer.



## INSTRUMENTS FOR FOREIGN COUNTRIES

Instruments packed for foreign shipment which are to have ocean passage are wrapped in waterproof material and enclosed in heavy packing boxes.

**The cash for all orders for foreign shipments by steamship must, in every case, accompany the order;** and if it is desired that we attend to the shipment of the instruments, the remittance must be made ten per cent. more than the catalogue price of the instruments if the order amounts to \$250 or less, or eight per cent. more than catalogue price if the order amounts to from \$300 to \$500, or six per cent. more than catalogue price if the order amounts to from \$600 to \$1,000.

This extra remittance is to cover cost of shipping charges, freight and insurance, which must always be paid in advance on all shipments except those to Canada and some parts of Mexico.

If the amount remitted is more than enough to cover these expenses, any balance will be returned to the purchaser with the receipted bill and bill of lading, unless we are directed to hold it to his credit.

Remittances must be made by bank draft on London, England, or on New York City, and such drafts can be purchased in any of the large cities of the different countries.

## REPAIR OF INSTRUMENTS

Each year we receive hundreds of instruments of our own and other makes sent to us for refitting and repairs.

We advise our customers who have instruments in need of repairs, to send them directly to us, as our facilities enable us to do the work economically and promptly.

They should always be placed in their own boxes, and then enclosed in an outside packing case, an inch larger in all its dimensions, and the space between the two filled with paper wadding, hay or shavings.

**The owner's name and address should always appear on the package and a note specifying the repairs needed should accompany the instrument** and a letter should also be sent by mail to us, giving not only directions as to the repairs, but also stating when the return of the instrument is required, and the precise location to which it should be forwarded. It should also be remembered that **each instrument is made to fit its own spindle**, and no other; and therefore the leveling head complete should always be sent with it.

The tripod legs and brass head in which they are inserted need never be sent unless in need of repairs.

When requested to do so, we will furnish an estimate of the cost of the repairs on any instrument sent us, before beginning the work.

## SELECTION OF INSTRUMENTS

The Vernier Compass or Vernier Transit Compass is required where the variation of the needle is to be allowed, as in retracing the lines of an old survey, etc.

When, in addition to the variation of the needle, local attraction must be taken into account and the angles taken independently of the needle, an instrument with a graduated limb must be used, and for this purpose the Railroad Compass will be sufficient.



For a mixed practice of general surveying, including farm and city work, the establishment of the grades of roads, the running of levels, etc., such an instrument as the Surveyors Transit, with its various attachments, is sufficient.

The various forms of the Engineers Transit, the Mountain Transit and the Y Leveling Instruments, are designed for engineering of the highest class.

In the United States Public Land Surveys, an instrument with the Solar Attachment is required, and the Solar Transit and Solar Compass with telescope attached are usually selected.

In surveys of mining claims, especially in the high elevations of Colorado, and for the surveys of mines in general, the Mountain Transit, with the Solar Attachment and with other extras, has proved a universal favorite.

The various Plane Table Outfits have a recognized utility for topographical and map drawing.

The Current Meters are almost indispensable in measuring the velocity of the flow of water in harbors, rivers, small streams and irrigation ditches.

The Drainage Level is the simplest instrument designed for laying out drains and similar work.

The Architects Level and the Builders Transit are employed in laying out buildings, determining the level of their floors, sills, windows, and the general work of the builder and contractor.

The Explorers Transit, the Reconnaissance Transit and the various forms of Pocket Compasses, with or without telescope attachment, are desirable for the class of work where extreme lightness and portability are desirable.

When iron ores are to be traced, the Miners Dip Compass, the Dial Compass and the Pocket Solar Compass are used.

We do not pretend to make any instrument by which veins of gold and silver can be traced, or the presence of those metals detected.

## INSTRUMENTS MADE OF ALUMINUM

Since 1876 we have made Civil Engineers and Surveyors Instruments of aluminum, to order only.

The principal advantage which instruments of aluminum have over those of the ordinary metals is their light weight; but as all the bearing parts must be made of bronze, the total weight can be reduced only about fifty per cent.

We finish aluminum instruments in the natural color, and the result is more satisfactory from an artistic standpoint than when an artificial coloring is used although it entails extra expense.

We will quote price on application for any of our instruments of regular pattern, made of aluminum.

## SPECIAL INFORMATION ON INSTRUMENTS

A Transit with "plain" telescope is one without any attachments or extras, such as the clamp and tangent, vertical circle and level.

The telescopes of all our Transits, Nos. 1 to 17, 25 to 90, and 110 to 117, are now furnished with rack and pinion movements to both eye piece and object glass slides without extra charge.

In Transits Nos. 20 to 23, 100, 102 and 105, the object glass is focused by a rack and pinion and the eyepiece by a spiral movement.



To enable the observer to see objects near the instrument, we have recently introduced an important modification of the telescopes used on Transits Nos. 1 to 117, so that they can be focused on an object at a distance of about four and one half feet from the instrument.

All of our Transits, Nos. 1 to 105, are furnished with shifting center to the leveling head, and with a tripod and leveling screws and clamp and tangent to spindle. Transits Nos. 20 to 23, 25 to 31, 100 and 102 have tripods with extension legs. For prices of plain, split leg and extension tripods, see page 84.

The limbs of all our Transits, Nos. 1 to 102, are graduated on sterling silver. The graduation is to half degrees, and is read by vernier to single minutes. A finer gradation is furnished, if desired, at an extra price. See page 40.

The vertical circles and vertical arcs are also graduated on sterling silver. The circle of  $3\frac{1}{2}$  inch diameter is graduated to whole degrees and is read by vernier to 5 minutes. The circles of 4,  $4\frac{1}{2}$  and 5 inches diameter and the arcs of 2 and  $2\frac{1}{2}$  inches radii are graduated to half degrees and are read by vernier to 1 minute. The arc of 3 inch radius is graduated to 20 minutes and is read by vernier to 30 seconds.

A variation arc furnished with any new Engineers Transit, Nos. 1 to 10, costs \$4.00 extra. See No. 130, page 39.

All of our Transits, Nos. 17 to 102, and 110 to 117, have a variation arc for setting off the variation of the needle.

Stadia wires are furnished without extra charge if requested when ordering a new Transit, Nos. 1 to 117. When desired, we arrange the stadia wires to disappear, or be out of focus, when the plain cross wires only are in use. See page 42.

A dust guard to the object glass slide is furnished without charge with Transits Nos. 1 to 90 and 110 to 117; but, if furnished with a new Transit, Nos. 100, 102 or 105, the extra cost is \$4.00. See No. 154, page 47.

Reflectors to the limb verniers are furnished without charge, if requested, with new Transits, Nos. 1 to 90; but, if furnished with a new Transit, Nos. 100 or 102, the extra cost is \$1.50.

Each Transit is packed in a mahogany case, with lock and leather strap, and has a plummet, reading glass, adjusting pins, etc. The wooden box for the Explorers Transit is leather covered. The wooden box for the Mountain Transit has an outside sole leather case with shoulder straps.

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**BRANCH FACTORY AT SEATTLE, WASHINGTON**  
**MARITIME BUILDING**  
**CORNER WESTERN AVENUE AND MADISON STREET**

In 1908 we established a Branch Factory at Seattle, Washington.

A large stock of finished instruments and supplies is kept on hand and customers in the western part of the United States and Canada will be able to have orders filled without the delay and expense of shipment from Troy.

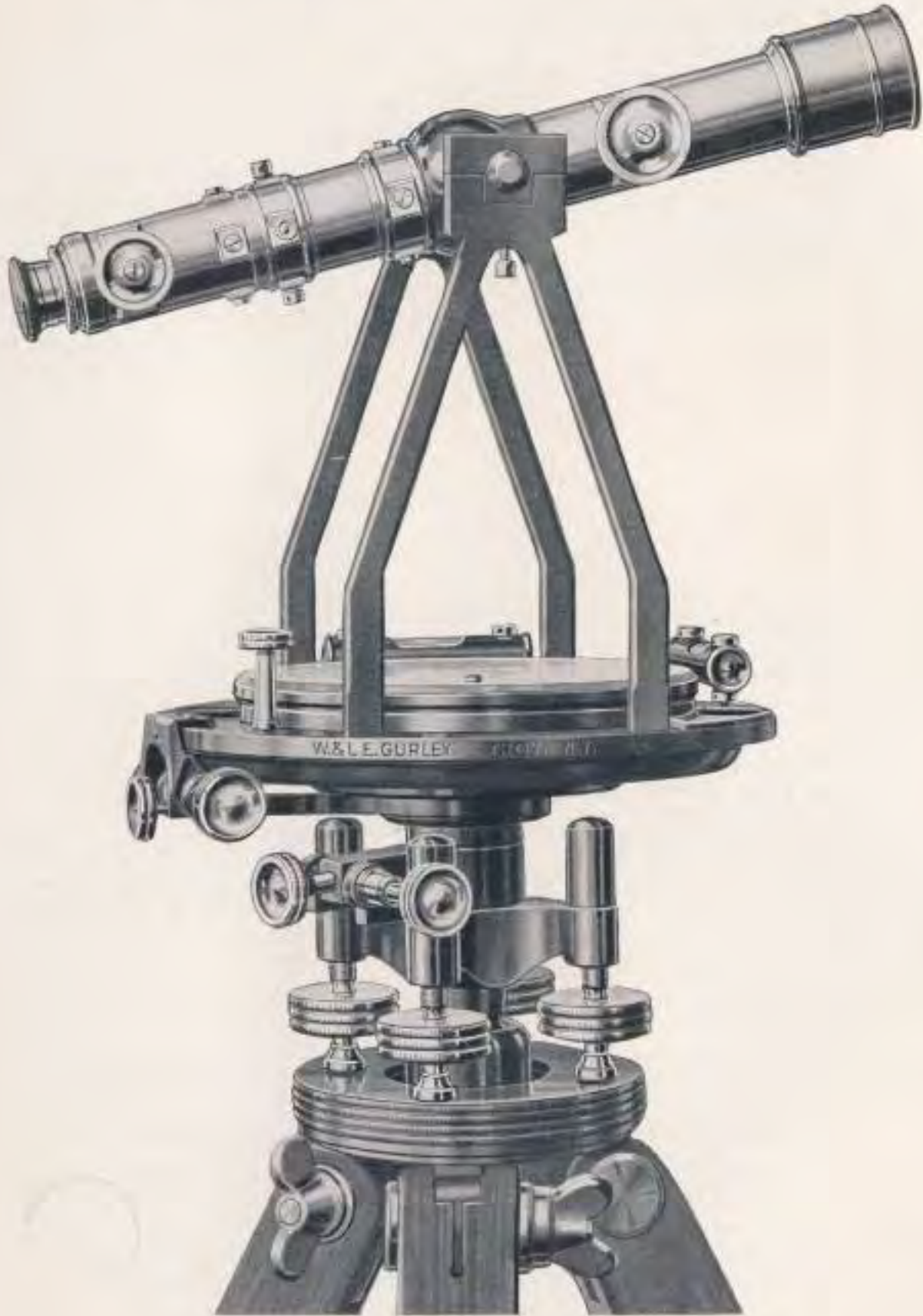
Special attention is given to the repairing and adjustment of Engineers and Surveyors Instruments. With a complete equipment and competent workmen, under the immediate supervision of a manager who has had over twenty-five years of experience, we guarantee our work to be of the highest quality.

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## ENGINEERS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB

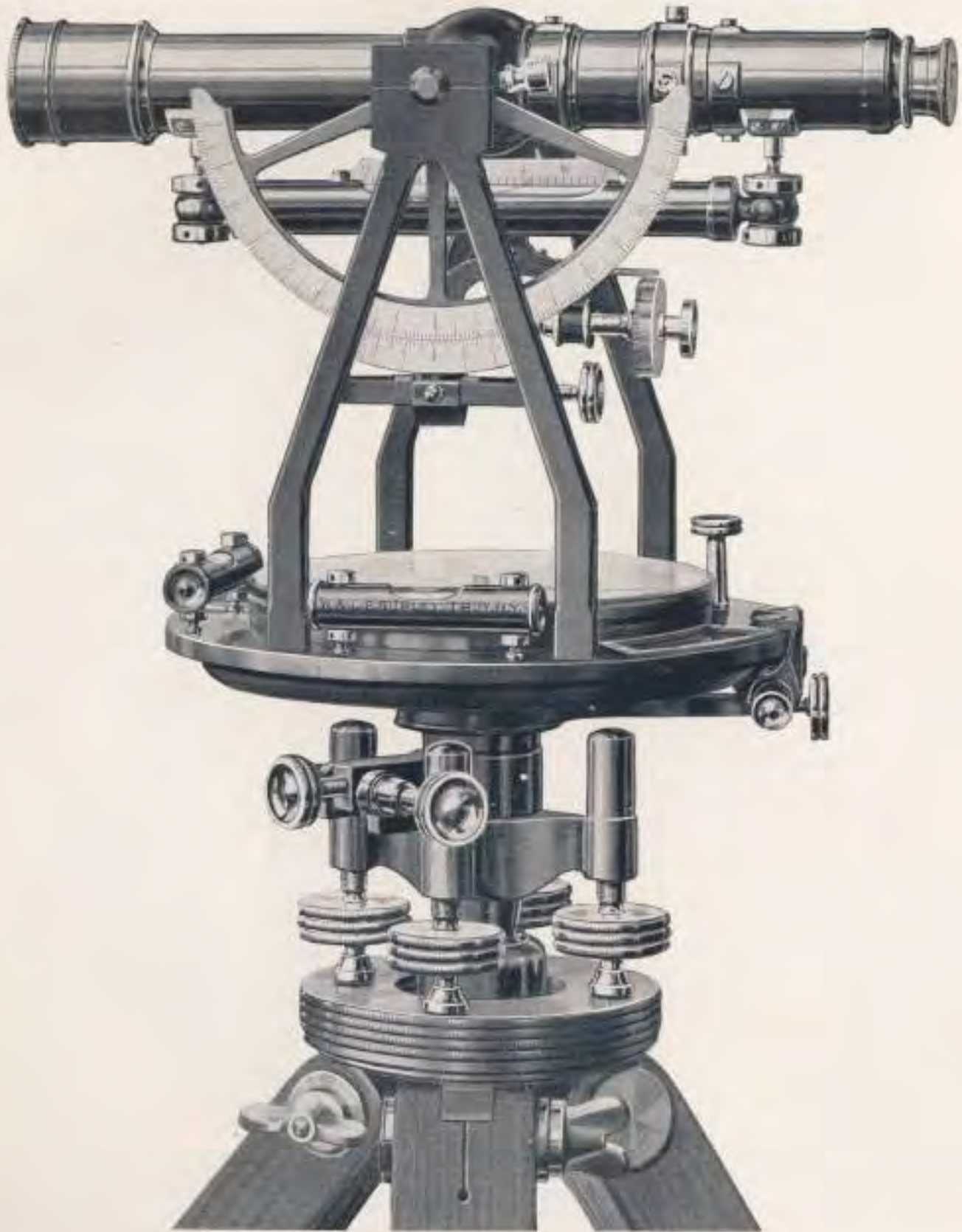


Engineers Transit

No. 1	5.65" limb, 4" needle, 10" telescope, weighs 13 lbs.	-----	\$145.00
No. 6	6.25" limb, 4½" needle, 11" telescope, weighs 14 lbs.	-----	150.00
No. 12	6.70" limb, 5" needle, 11" telescope, weighs 15½ lbs.	-----	150.00

## ENGINEERS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB



Engineers Transit

No. 5	5.65" limb, 4" needle, 10" telescope, weighs 14½ lbs.	----	\$193.00
No. 10	6.15" limb, 4½" needle, 11" telescope, weighs 15½ lbs.	----	198.00
No. 16	6.70" limb, 5" needle, 11" telescope, weighs 17½ lbs.	----	198.00



## ENGINEERS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB

## Specifications of Transits Nos. 1 to 17

**CENTERS:** Compound; long spindle and socket insuring accuracy and stability, leveling head of ribbed construction combining light weight with rigidity, four leveling screws with dust caps, clamp and tangent to spindle, shifting center.

**HORIZONTAL LIMB:** Of ribbed construction, graduations on sterling silver to half degrees and figured 0 to 90 each way inner row, and 0 to 360 outer row (see Limb No. I, page 36) reading by two opposite double verniers to one minute; verniers placed at 30 degrees to line of sight and covered with selected plate glass, waterproof. Clamp and tangent movement.

**PLATE:** With needle 4, 4½ or 5 inches long, circle graduated on upper face to half degrees and figured 0 to 90 each way; also graduated on inner edge to whole degrees. Graduations are clear and distinct on a silvered surface. Compass is covered with beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.

**TELESCOPE:** Best quality with good light, flat field and clear definition; erecting eyepiece, cross wires of *platinum*, rack and pinion movements to eye piece and object slides, dust guard to object slide, detachable sun shade, and cap. Aperture of object glass 1<sup>2</sup>/<sub>10</sub> inches.

**FINISH:** Bronze, except screws and small parts which are bright.

**EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Accessories of reading glass, 10 oz. plain plummet, screw driver, adjusting pins, and wrench for center pin.

**TRIPOD:** Plain legs, catalogue No. 400, bolts with wing nuts which can be tightened by hand, protecting cap for head.

	Transits Nos. 1 to 5	Transits Nos. 6 to 10	Transits Nos. 12 to 17
Diameter of Horizontal Limb:	5.65 inches	6.25 inches	6.70 inches
Length of needle:	4 inches	4½ inches	5 inches
Shape of needle:	Vertical	Horizontal	Horizontal
Length of telescope:	10 inches	11 inches	11 inches
Power of telescope:	24 diameters	26 diameters	26 diameters
Weight of instrument:	12 to 14½ lbs.	14 to 15½ lbs.	15½ to 18 lbs.
Weight of instrument including box and accessories:	20 to 22 lbs.	22 to 24 lbs.	24 to 26 lbs.
Weight of tripod:	10 lbs.	10 lbs.	10 lbs.
Shipping weight, instrument and tripod, packed in 2 boxes for domestic shipment; about	70 lbs.	75 lbs.	75 lbs.
Shipping weight for export: about	100 lbs.	100 lbs.	110 lbs.



**ENGINEERS TRANSITS**

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB

Transits with level on telescope have sensitive ground vial with graduations on a metal scale.

Vertical circles are graduated on sterling silver and read by fixed double vernier to one minute.

Vertical arcs are graduated on sterling silver and read by vernier to 30 seconds, the vernier movable by tangent screw.

Stadia wires of *platinum* will be supplied without extra charge; and horizontal limb will be figured 0 to 360 two rows, inclined, reading in opposite directions (see Limb No. IV., page 37) without increase in cost, if specified in the order.

Variation Arc for setting off magnetic declination, Transits Nos. 1 to 16, when ordered with the instrument, \$4.00 extra.

For other attachments, see pages 38 to 48.

**Prices of Transits Nos. 1 to 17**

No.		Price.
1	Engineers Transit, two verniers to limb, 4 inch needle, plain telescope and plain tripod, as shown on page 8	\$145.00
2	Engineers Transit, 4 inch needle, with level on telescope and clamp and tangent to telescope axis	163.00
3	Engineers Transit, 4 inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis.	175.00
4	Engineers Transit, 4 inch needle, with vertical arc of 3 inches radius, and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis	181.00
5	Engineers Transit, 4 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope, and gradienter combined with clamp and tangent to telescope axis, as shown on page 9	193.00
6	Engineers Transit, two verniers to limb, 4½ inch needle, plain telescope and plain tripod, as shown on page 8	150.00
7	Engineers Transit, 4½ inch needle, level on telescope and clamp and tangent to telescope axis	168.00
8	Engineers Transit, 4½ inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis	180.00
9	Engineers Transit, 4½ inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis	186.00
10	Engineers Transit, 4½ inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and gradienter combined with clamp and tangent to telescope axis, as shown on page 9	198.00
12	Engineers Transit, two verniers to limb, 5 inch needle, plain telescope and plain tripod, as shown on page 8	150.00
13	Engineers Transit, 5 inch needle, with level on telescope and clamp and tangent to telescope axis	168.00
14	Engineers Transit, 5 inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis.	180.00
15	Engineers Transit, 5 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis	186.00
16	Engineers Transit, 5 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and gradienter combined with clamp and tangent, as shown on page 9	198.00
17	Engineers Transit, 5 inch needle, with variation arc, stadia, Solar Attachment, latitude level, vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope, and clamp and tangent to telescope axis, as shown on page 12	250.00

Engineers Transits Nos. 1 to 17 are regularly supplied with plain tripods No. 400 as shown on page 82. Split leg tripod No. 405 will be substituted, if preferred, for \$2.00 extra, or extension leg tripod No. 410 for \$5.00 extra. See pages 83 and 84.



## ENGINEERS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB



Engineers Transit with Burt Solar Attachment

No. 17 6.70" limb, 5" needle, 11" telescope, weighs 18 lbs. \_\_\_\_\_ \$250.00

The solar attachment as shown in this illustration can also be furnished with Engineers Transits Nos. 4, 5, 9, 10 and 16, and including the extra cost of variation are for setting off magnetic declination, increases the prices of those instruments, \$64.00.

For description of Burt Solar Attachment, see page 48.

## LIGHT MOUNTAIN TRANSITS

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB



Light Mountain Transit

No. 27 5.65" limb, 4" needle, 8" telescope, weighs 10 $\frac{1}{4}$  lbs. ----- \$180.00

NOTE: See pages 16 to 21.



**EXPLORERS TRANSITS**

MADE IN ONE SIZE. WITH TWO VERNIERS TO LIMB



Explorers Transit

No. 20 4" limb, 2 $\frac{3}{4}$ " needle, 6 $\frac{1}{2}$ " telescope, weighs 5 lbs. \_\_\_\_\_ \$165.00

This instrument is designed to meet the demand for a transit of greatest accuracy with the least possible weight. Similar to our Light Mountain Transit in construction, the instrument itself weighs only about five pounds, and when placed in its leather covered case can be readily packed and carried in a twenty-four inch dress suit case, together with its special tripod. See page 49.



## EXPLORERS TRANSITS

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB

*The smallest and lightest Engineers Transit*

### Specifications of No. 20.

- CENTERS:** Compound; long spindle and socket insuring accuracy and stability, leveling head of ribbed construction combining light weight with rigidity, four leveling screws with dust caps, clamp and tangent to spindle, shifting center.
- HORIZONTAL LIMB:** 4 inches diameter, of ribbed construction, graduations on sterling silver to half degrees and figured 0 to 180 each way (see Limb No. II., page 36) or special figuring if preferred. Reading by two opposite double verniers to one minute; verniers placed at angle of 30 degrees to line of sight and covered with selected plate glass, waterproof. Clamp and tangent movement.
- PLATE:** With needle  $2\frac{3}{4}$  inches long, circle graduated on upper face to whole degrees and figured 0 to 90 each way. Variation arc for setting off magnetic declination, graduated to degrees and reading by vernier to five minutes; with rack and pinion movement. Graduations are clear and distinct on a silvered surface. Compass is covered with beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.
- TELESCOPE:**  $6\frac{1}{2}$  inches long, erecting eyepiece, power 16 diameters, cross wires and stadia wires of *platinum*, rack and pinion movement to object slide, spiral movement to eyepiece, detachable sunshade, and cap. Aperture of object glass,  $\frac{1}{8}$  inch.
- VERTICAL LIMB:** Full circle, 4 inches diameter, graduated on sterling silver to half degrees and reading by fixed double vernier to one minute, circle figured 0 to 90 each way.
- LEVEL ON TELESCOPE:** With sensitive ground vial, graduations on the glass.
- CLAMP AND TANGENT:** To telescope axis.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Light mahogany box, leather covered, with hinged cover, lock and shoulder strap. Dimensions of box about  $5\frac{1}{2}$  inches by 7 inches by  $10\frac{1}{4}$  inches. Accessories of reading glass, 6 oz. plain plummet, adjusting pins, and wrench for center pin.
- TRIPOD:** Jointed extension legs with canvas case for carrying. This tripod and the transit can be packed together in an ordinary 24 inch dress suit case as shown on page 49.
- WEIGHT:** Of Transit, about 5 lbs.; Transit, including box and accessories, about 9 lbs.; Tripod about 5 lbs. Shipping weight Transit and tripod packed in one box for domestic shipment, about 50 lbs.; for export shipment about 75 lbs.

No.		Price.
20	Explorers Transit, complete as specified	\$165.00
21	Explorers Transit, same as No. 20 but with vertical arc 2 inches radius graduated on silver, reading by vernier to one minute, the vernier moved by tangent screw (instead of with vertical circle)	171.00
22	Explorers Transit, same as No. 21 but with gradienter combined with clamp and tangent to telescope axis	183.00
23	Explorers Transit, same as No. 21 and with Solar Attachment complete	231.00
	Beaman Stadia Arc fitted to any new Explorers Transit	15.00
	Leather Dress Suit Case, 24 inches long, to contain Explorers Transit and jointed extension tripod in canvas case. See page 49.	8.00

Regular extension tripods, without joints or canvas case, will be furnished, if desired, with Explorers Transits for \$5.00 less than the prices quoted above, but owing to their length, 38 inches when closed, they cannot be packed in a suit case.



**LIGHT MOUNTAIN TRANSITS**

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB



Light Mountain Transit

No. 28 5.65" limb, 4" needle, 8" telescope, weighs 10 $\frac{1}{4}$  lbs. \_\_\_\_\_ \$186.00

This Transit was introduced by us in 1876 and was designed for mine and mountain use. As now constructed it embodies many improvements over the original pattern and on account of its accuracy and portability, it has become largely used by City Engineers, Highway Engineers, Railroad Engineers, Mining Engineers and others, in preference to larger and heavier instruments.



## LIGHT MOUNTAIN TRANSITS

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB

### Specifications of No. 28.

**CENTERS:** Compound; long spindle and socket insuring accuracy and stability, leveling head of ribbed construction combining light weight with rigidity, four leveling screws with dust caps, clamp and tangent to spindle, shifting center.

**HORIZONTAL LIMB:** 5.65 inches diameter, of ribbed construction, graduations on sterling silver to half degrees, figured 0 to 90 each way inner row, and 0 to 360 outer row (see Limb No. I., page 36) reading by two opposite double verniers to one minute; verniers placed at an angle of 30 degrees to line of sight and covered with selected plate glass, waterproof. Clamp and tangent movement.

**PLATE:** With needle 4 inches long, circle graduated on upper face to half degrees and figured 0 to 90 each way; also graduated on inner edge to whole degrees. Variation arc for setting off magnetic declination, graduated to half degrees and reading by vernier to single minutes; with rack and pinion movement. Graduations are clear and distinct on a silvered surface. Compass is covered with a beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.

**TELESCOPE:** 8 inches long, object glass clear aperture 1 inch, power 20 diameters, erecting. Rack and pinion movements to both eyepiece and object slides. Dust guard to object slide. *Platinum* cross wires and stadia wires. Detachable sunshade and dust cap for object glass.

**VERTICAL ARC:** 2½ inches radius, graduated on sterling silver, reading by one double vernier to single minutes. Vernier movable by tangent screw.

**LEVEL ON TELESCOPE:** With sensitive ground vial and graduations on metal scale.

**CLAMP AND TANGENT:** To telescope axis.

**FINISH:** Bronze, except screws and small parts which are bright.

**EQUIPMENT:** Transit is securely packed in a light mahogany box having lock and rubber tips. Box is enclosed in a Sole Leather Case (outside dimensions 10 inches by 9½ inches by 14½ inches), having handle and shoulder straps. Accessories of reading glass, 10 oz. adjustable plummet, screw driver, adjusting pins and center pin wrench.

**TRIPOD:** Extension legs, closing to 36 inches, catalogue No. 410; bolts with wing nuts which can be tightened by hand; wooden cap and carrying strap.

**WEIGHT:** Of Transit only, about 10¾ lbs.; Transit, including box, leather case and accessories, about 20 lbs.; Extension Tripod, about 10 lbs. Shipping weight, Transit and Tripod packed in 2 boxes for domestic shipment, about 65 lbs. Packed for export, about 90 lbs.

No.	Price.
28 Light Mountain Transit, complete as specified_____	\$186.00

*A special 32-page illustrated booklet entitled, "Gurley Light Mountain Transit," contains detailed specifications and prices of the different models and their attachments, and will be sent on request. Transit No. 28 is illustrated in its natural colors.*



## LIGHT MOUNTAIN TRANSITS

MADE IN ONE SIZE. WITH TWO VERNIERS TO LIMB

### Prices of Nos. 25 to 32

No.		Price.
25	Light Mountain Transit, with plain telescope, that is, omitting vertical circle or arc, omitting level on telescope, and omitting clamp and tangent to telescope axis; but otherwise as specified under No. 28	\$150.00
26	Light Mountain Transit, with level on telescope and clamp and tangent to telescope axis, but without vertical circle or arc	168.00
27	Light Mountain Transit, same as No. 26, but with addition of $4\frac{1}{2}$ inch vertical circle. See page 13	180.00
28	Light Mountain Transit, with vertical arc of $2\frac{1}{2}$ inch radius; as specified on page 17	186.00
29	Light Mountain Transit, same as No. 28, but with addition of gradienter, combined with clamp and tangent to telescope axis	198.00
30	Light Mountain Transit, same as No. 28, but with addition of Burt Solar Attachment and latitude level. See page 19	245.00
32	Light Mountain Transit, same as No. 28, but with addition of Telescopic Solar Attachment. See pages 20 and 21	296.00



If one of the above transits is desired with the mahogany box only (omitting the sole leather case) — Deduct \$6.00

If with split leg tripod No. 405, instead of extension tripod No. 410, — Deduct 3.00

If with solid round leg tripod No. 400, instead of extension tripod No. 410,

Deduct 5.00

[For illustrations of Tripods, see pages 82 and 83.]

Sole Leather Carrying Case with shoulder straps, enclosing the light mahogany transit box. Regularly furnished with Light Mountain Transits Nos. 25 to 32.



**LIGHT MOUNTAIN TRANSITS**

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB



Light Mountain Transit with Burt Solar Attachment

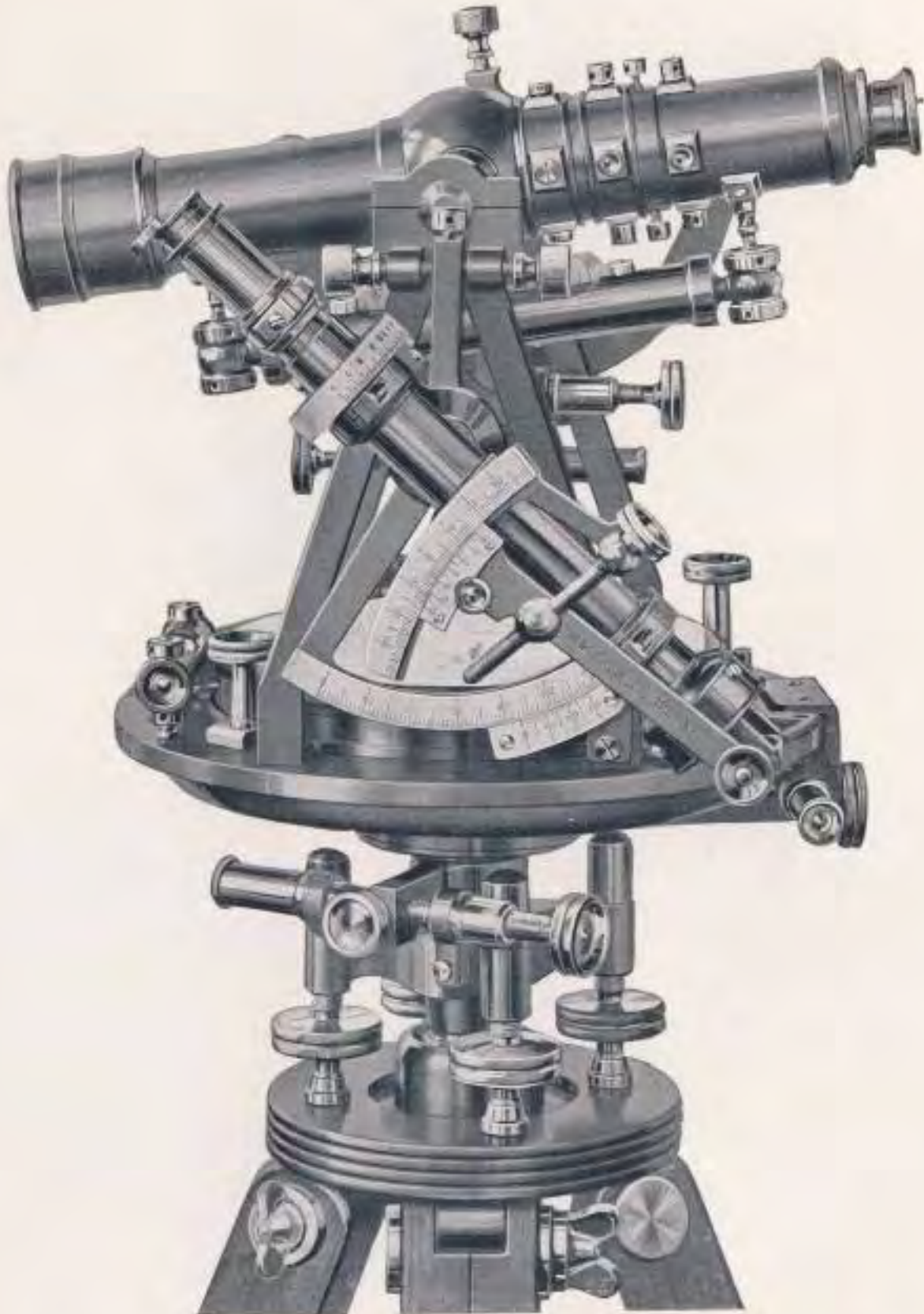
No. 30 5.65" limb, 4" needle, 8" telescope, weighs 12¼ lbs. ----- \$245.00

(For description of Burt Solar Attachment, see page 48.)



## LIGHT MOUNTAIN TRANSITS

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB



Light Mountain Transit with Telescopic Solar Attachment

No. 32 5.65" limb, 4" needle, 8" telescope, weighs 12½ lbs. ----- \$296.00



## LIGHT MOUNTAIN TRANSIT

WITH TELESCOPIC SOLAR ATTACHMENT

When a continued series of solar observations are to be made, it is sometimes important that, when taken, these need not be referred to the main telescope of the transit.

We have recently introduced a telescopic solar to meet such requirements; the solar attachment once being adjusted, the main telescope of the transit may be used independently and solar observations taken with no other adjustment than for the hourly change of declination.

The new telescopic solar, as shown in the illustration, consists of an attachment whereby the sun is viewed through a telescope giving a magnified image. This telescope has a movement about itself which constitutes the polar axis and follows the apparent movement of the sun in time. The angle of the reflector is adjustable in declination and the whole movable about a latitude axis.

The attachment is mounted on the side of the transit standard and is so arranged that the several parts are independently adjustable and in their relation with each other occupy the least possible space.

- 32 Light Mountain Transit, with Telescopic Solar Attachment, vertical arc of  $2\frac{1}{2}$  inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis, stadia, and extension tripod shortening to half length. The instrument packed in a mahogany box, covered with a light sole leather case, with straps for packing. As shown on page 20 \_\_\_\_\_ \$296.00



## SURVEYORS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB



Surveyors Transit

No. 37	5.65" limb, 4" needle, 10" telescope, weighs 15	lbs.	-----	\$155.00
No. 47	6.70" limb, 5" needle, 11" telescope, weighs 17½	lbs.	-----	160.00
No. 57	7.20" limb, 5" needle, 11" telescope, weighs 19	lbs.	-----	160.00



## SURVEYORS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB

## Specifications of Transits Nos. 35 to 60.

- CENTERS:** Special construction, accurately fitted, leveling head ribbed, combining minimum weight with rigidity, four leveling screws with dust caps, clamp and tangent to spindle, shifting center.
- HORIZONTAL LIMB:** Of ribbed construction, graduations on sterling silver to half degrees and figured 0 to 90 each way inner row, and 0 to 360 outer row (see Limb No. I., page 36) reading by two opposite double verniers to one minute; verniers placed at 30 degrees to line of sight and covered with selected plate glass, waterproof.
- PLATE:** With needle 4 inches, 5 inches or 5½ inches long, circle graduated on upper face to half degrees and figured 0 to 90 each way; also graduated on inner edge to whole degrees. Variation arc for setting off magnetic declination, graduated to half degrees and reading by vernier to one minute; with rack and pinion movement. Graduations are clear and distinct on a silvered surface. Compass is covered with a beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.
- TELESCOPE:** Best quality with good light, flat field and clear definition; erecting eyepiece, cross wires of *platinum*, rack and pinion movements to eyepiece and object slides, dust guard to object slide, detachable sun shade, and cap. Aperture of object glass, 1<sup>2</sup>/<sub>3</sub> inches.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Accessories of reading glass, 10 oz. plain plummet, screw driver, adjusting pins, and wrench for center pin.
- TRIPOD:** Plain legs, catalogue No. 400; bolts with wing nuts which can be tightened by hand; protecting cap for head.

	Transits Nos. 35 to 40	Transits Nos. 45 to 50 and No. 60	Transits Nos. 55 to 58
Diameter of Horizontal Limb:	5.65 inches	6.70 inches	7.20 inches
Length of needle:	4 inches	5 inches	5½ inches
Shape of needle:	Vertical	Horizontal	Horizontal
Length of telescope:	10 inches	11 inches	11 inches
Power of telescope:	24 diameters	26 diameters	26 diameters
Weight of instrument:	13½ to 15½ lbs.	16½ to 18 lbs.	17½ to 19 lbs.
Weight of instrument including box and accessories:	21 to 23 lbs.	24 to 26 lbs.	26 to 28 lbs.
Weight of tripod:	10 lbs.	10 lbs.	10 lbs.
Shipping weight, instrument and tripod, packed in 2 boxes for domestic shipment; about	70 lbs.	75 lbs.	75 lbs.
Shipping weight for export; about	100 lbs.	100 lbs.	110 lbs.

Transits with level on telescope have sensitive ground vial with graduations on metal scale.

Vertical circles are graduated on sterling silver and read by fixed double vernier to one minute.

Vertical arcs are graduated on sterling silver and read by vernier to 30 seconds, the vernier movable by tangent screw.

Stadia wires of *platinum* will be supplied without extra charge, and the horizontal limb will be figured 0 to 360 two rows, inclined, reading in opposite directions (see Limb No. IV., page 37) without extra increase in cost, if specified in the order.

For other attachments, see pages 38 to 48.



## SURVEYORS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB

## Prices of Transits Nos. 35 to 58

No.		Price.
35	Surveyors Transit, two verniers to limb, 4 inch needle, plain telescope and plain tripod.....	\$125.00
36	Surveyors Transit, two verniers to limb, 4 inch needle, with level on telescope and clamp and tangent to telescope axis.....	143.00
37	Surveyors Transit, two verniers to limb, 4 inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis, as shown on page 22.....	155.00
38	Surveyors Transit, two verniers to limb, 4 inch needle, with 4½ inch vertical circle, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	167.00
39	Surveyors Transit, two verniers to limb, 4 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis.....	161.00
40	Surveyors Transit, two verniers to limb, 4 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	173.00
45	Surveyors Transit, two verniers to limb, 5 inch needle, plain telescope and plain tripod.....	130.00
46	Surveyors Transit, two verniers to limb, 5 inch needle, with level on telescope and clamp and tangent to telescope axis.....	148.00
47	Surveyors Transit, two verniers to limb, 5 inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis, as shown on page 22.....	160.00
48	Surveyors Transit, two verniers to limb, 5 inch needle, with 4½ inch vertical circle, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	172.00
49	Surveyors Transit, two verniers to limb, 5 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis.....	166.00
50	Surveyors Transit, two verniers to limb, 5 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	178.00
55	Surveyors Transit, same as No. 45, but with 5½ inch needle.	130.00
56	Surveyors Transit, same as No. 46, but with 5½ inch needle.	148.00
57	Surveyors Transit, same as No. 47, but with 5½ inch needle.	160.00
58	Surveyors Transit, same as No. 48, but with 5½ inch needle.	172.00

Surveyors Transits Nos. 35 to 58 are regularly equipped with plain tripods. Split leg tripod may be substituted for \$2.00 extra, or extension leg tripod for \$5.00 extra. See pages 82 to 84.

Plain cross wires only are furnished with Transits Nos. 35 to 58. Stadia wires will be supplied without extra charge, if requested.



**SURVEYORS TRANSITS**

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB



Surveyors Transit, with Burt Solar Attachment

No. 60 6.70" limb, 5" needle, 11" telescope, weighs 18 lbs. \_\_\_\_\_ \$226.00

(For description of Burt Solar Attachment, see page 48.)



## SURVEYORS TRANSITS

WITH BURT SOLAR ATTACHMENT

The illustration represents our Surveyors Transit, with 5 inch needle, to which is adapted the Burt Solar Attachment with latitude level, vertical arc of 3 inches radius, level on telescope and clamp and tangent to telescope axis; both the vertical and declination arcs being graduated on silver and reading to thirty seconds. The instrument has shifting center to leveling head and is furnished either with one vernier to limb, or with two verniers to limb, as may be desired.

The horizontal limb is graduated on sterling silver and reads to single minutes. The telescope is fitted with stadia wires.

No.	Price.
60 Surveyors Transit, two verniers to limb, 5 inch needle, with Burt Solar Attachment, latitude level, stadia, vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis, as shown on page 25 -----	\$226.00
90 Surveyors Transit, one vernier to limb, leveling head same as furnished with Transit No. 76 as shown on page 27. 5 inch needle, with Burt Solar Attachment, latitude level, stadia, vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis -----	211.00

Surveyors Transits Nos. 60 and 90 are regularly equipped with plain tripods. Split leg tripod may be substituted for \$2.00 extra, or extension leg tripod for \$5.00 extra. See pages 82 to 84.



## SURVEYORS TRANSITS

MADE IN THREE SIZES, WITH TWO VERNIERS TO LIMB



Surveyors Transits

No. 66	5.65" limb, 4" needle, 10" telescope, weighs 14 lbs.	-----	\$128.00
No. 76	6.70" limb, 5" needle, 11" telescope, weighs 16½ lbs.	-----	133.00
No. 86	7.20" limb, 5½" needle, 11" telescope, weighs 17¼ lbs.	-----	133.00



## SURVEYORS TRANSITS

MADE IN THREE SIZES, WITH ONE VERNIER TO LIMB

## Specifications of Transits Nos. 65 to 90.

- CENTERS:** Special construction, accurately fitted, leveling head ribbed, combining minimum weight with rigidity, four leveling screws with dust caps, clamp and tangent to spindle, shifting center.
- HORIZONTAL LIMB:** Of ribbed construction, graduations on sterling silver to half degrees and figured 0 to 90 each way inner row, and 0 to 360 outer row (see Limb No. 1., page 36) reading by one vernier to one minute; vernier placed at 30 degrees to line of sight and covered with selected plate glass, waterproof.
- PLATE:** With needle 4 inches, 5 inches, or 5½ inches long, circle graduated on upper face to half degrees and figured 0 to 90 each way; also graduated on inner edge to whole degrees. Variation arc for setting off magnetic declination, graduated to half degrees and reading by vernier to one minute; with rack and pinion movement. Graduations are clear and distinct on a silvered surface. Compass is covered with a beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.
- TELESCOPE:** Best quality with good light, flat field and clear definition; erecting eyepiece, cross wires of *platinum*, rack and pinion movements to eyepiece and object slides, dust guard to object slide, detachable sun shade, and cap. Aperture of object glass, 1⅜ inches.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Accessories of reading glass, 10 oz. plain plummet, screw driver, adjusting pins, and wrench for center pin.
- TRIPOD:** Plain legs, catalogue No. 400, bolts with wing nuts which can be tightened by hand, protecting cap for head.

	Transits Nos. 65 to 70	Transits Nos. 75 to 80 and No. 90.	Transits Nos. 85 to 88
Diameter of Horizontal Limb:	5.65 inches	6.70 inches	7.20 inches
Length of needle:	4 inches	5 inches	5½ inches
Shape of needle:	Vertical	Horizontal	Horizontal
Length of telescope:	10 inches	11 inches	11 inches
Power of telescope:	24 diameters	26 diameters	26 diameters
Weight of instrument:	13 to 14½ lbs.	16 to 17 lbs.	17 to 18 lbs.
Weight of instrument including box and accessories:	21 to 23 lbs.	24 to 26 lbs.	26 to 28 lbs.
Weight of tripod:	10 lbs.	10 lbs.	10 lbs.
Shipping weight, instrument and tripod, packed in 2 boxes for domestic shipment; about	70 lbs.	75 lbs.	75 lbs.
Shipping weight for export; about	100 lbs.	100 lbs.	110 lbs.



## SURVEYORS TRANSITS

MADE IN THREE SIZES, WITH ONE VERNIER TO LIMB

Transits with level on telescope have sensitive ground vial with graduations on metal scale.

Vertical circles are graduated on sterling silver and read by fixed double vernier to one minute.

Vertical arcs are graduated on sterling silver and read by vernier to 30 seconds, the vernier movable by tangent screw.

Stadia wires of *platinum* will be supplied without extra charge, and the horizontal limb will be figured 0 to 360 two rows, inclined, reading in opposite directions (see Limb No. IV., page 37) without increase in cost, if specified in the order.

For other attachments, see pages 38 to 48.

### Prices of Transits Nos. 65 to 88

No.		Price.
65	Surveyors Transit, one vernier to limb, 4 inch needle, plain telescope and plain tripod.....	\$110.00
66	Surveyors Transit, one vernier to limb, 4 inch needle, with level on telescope and clamp and tangent to telescope axis.....	128.00
67	Surveyors Transit, one vernier to limb, 4 inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis.....	140.00
68	Surveyors Transit, one vernier to limb, 4 inch needle, with 4½ inch vertical circle, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	152.00
69	Surveyors Transit, one vernier to limb, 4 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis.....	146.00
70	Surveyors Transit, one vernier to limb, 4 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	158.00
75	Surveyors Transit, one vernier to limb, 5 inch needle, plain telescope and plain tripod.....	115.00
76	Surveyors Transit, one vernier to limb, 5 inch needle, with level on telescope and clamp and tangent to telescope axis, as shown on page 27.....	133.00
77	Surveyors Transit, one vernier to limb, 5 inch needle, with 4½ inch vertical circle, level on telescope and clamp and tangent to telescope axis.....	145.00
78	Surveyors Transit, one vernier to limb, 5 inch needle, with 4½ inch vertical circle, level on telescope and gradienter combined with clamp and tangent to telescope axis.....	157.00
79	Surveyors Transit, one vernier to limb, 5 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and clamp and tangent to telescope axis.....	151.00
80	Surveyors Transit, one vernier to limb, 5 inch needle, with vertical arc of 3 inches radius and vernier moved by tangent screw, level on telescope and gradienter combined with clamp and tangent, to telescope axis.....	163.00
85	Surveyors Transit, same as No. 75, but with 5½ inch needle.....	115.00
86	Surveyors Transit, same as No. 76, but with 5½ inch needle.....	133.00
87	Surveyors Transit, same as No. 77, but with 5½ inch needle.....	145.00
88	Surveyors Transit, same as No. 78, but with 5½ inch needle.....	157.00

Surveyors Transits Nos. 65 to 88 are regularly equipped with plain tripods. Split leg tripod may be substituted for \$2.00 extra, or extension leg tripod for \$5.00 extra. See pages 82 to 84.

Plain cross wires only are furnished with Transits Nos. 65 to 88. Stadia wires will be supplied without extra charge, if requested.



## RECONNOISSANCE TRANSITS

MADE IN ONE SIZE, WITH TWO VERNIERS TO LIMB



Reconnaissance Transit

No. 100 4.96" limb, 3½" needle, 9" telescope, weighs 7¾ lbs. ----- \$115.00

In response to a demand for a very light transit for rapid work, where extreme accuracy is not required, we introduced in 1887 the Reconnaissance Transit, No. 100. This instrument is finished with the same care as our larger and more expensive transits, and we recommend it as reliable for a great variety of work. Its quality, together with its portability, have made it very popular.



## RECONNOISSANCE TRANSITS

MADE IN ONE SIZE, WITH ONE VERNIER TO LIMB

### Specifications of No. 100.

- CENTERS:** Special construction, accurately fitted, Surveyors Transit pattern, Leveling head ribbed, combining light weight with rigidity, four leveling screws, clamp and tangent to spindle, shifting center.
- HORIZONTAL LIMB:** Of ribbed construction, 4.96 inches diameter, graduated on sterling silver to half degrees and figured 0 to 180 each way (see Limb No. II, page 36), or special figuring if desired, reading by one double vernier to one minute; vernier placed at 30 degrees to line of sight and covered with selected plate glass, waterproof.
- PLATE:** With needle  $3\frac{1}{2}$  inches long, circle graduated on upper face to half degrees and figured 0 to 90 each way. Variation arc for setting off magnetic declination, graduated to half degrees and reading by vernier to one minute; with rack and pinion movement. Graduations are clear and distinct on a silvered surface. Compass is covered with a beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.
- TELESCOPE:** 9 inches long, erecting eyepiece, object glass  $\frac{1\frac{1}{4}}$  inch aperture, power 18 to 20 diameters, rack and pinion to object slide, spiral movement to eyepiece, *platinum* cross wires and stadia wires. Detachable sunshade, and cap.
- VERTICAL LIMB:** Full circle,  $3\frac{1}{2}$  inches diameter, graduated on sterling silver to whole degrees and reading by fixed double vernier to five minutes. Circle figured 0 to 90 each way.
- LEVEL ON TELESCOPE:** With sensitive ground vial, graduations on the glass.
- CLAMP AND TANGENT:** To telescope axis.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Accessories of reading glass, 6 oz. plain plummet, screw driver, adjusting pins, etc.
- TRIPOD:** Extension legs, catalogue No. 411, with protecting cap, and strap for carrying. Bolts have wing nuts which can be tightened by hand.
- WEIGHT:** Of Transit, about  $7\frac{3}{4}$  lbs.; including box and accessories about  $12\frac{1}{2}$  lbs.; weight of tripod about 8 lbs. Shipping weight, 2 boxes, packed for domestic shipment, about 50 lbs.; packed for export, about 75 lbs.

No.	Price.
100 Reconnoissance Transit, complete as specified, -----	\$115.00
102 Reconnoissance Transit, same as No. 100 but equipped with full vertical circle, $4\frac{1}{2}$ inches diameter, graduated on sterling silver to half degrees and reading by fixed double vernier to one minute.-----	122.00
103 Reconnoissance Transit, same as No. 100 but equipped with vertical arc, $2\frac{1}{2}$ inches radius, graduated on sterling silver to half degrees and reading by double vernier to one minute, the vernier movable by tangent screw.-----	128.00

Horizontal limbs of Reconnoissance Transits will be figured as per Limb I. or IV. without extra charge, if specified in the order. For attachments, see pages 38 to 48.



**BUILDERS TRANSITS**

MADE IN ONE SIZE



Builders Transit

No. 105 4.96" limb, 9" telescope, weighs 6½ lbs. \_\_\_\_\_ \$80.00

This instrument is designed for the use of architects and builders in the construction of buildings, where it is necessary not only to furnish levels, but to determine points in a vertical plane above or below the level line, or on either side and in line with the center of the instrument, more conveniently than can be done with the Architects Level, described on pages 77 and 78.



## BUILDERS TRANSITS

MADE IN ONE SIZE

## Specifications of No. 105

- CENTERS:** Special construction, accurately fitted, Reconnaissance Transit pattern. Leveling head ribbed, combining light weight and rigidity, four leveling screws, clamp and tangent to spindle, shifting center.
- HORIZONTAL LIMB:** Of ribbed construction, 4.96 inches diameter, graduated to degrees and figured 0 to 180 (see Limb No. II., page 36), reading by index mark placed at an angle of 30 degrees to line of sight, covered with selected plate glass, waterproof. Clamp and tangent movement.
- PLATE:** With two levels having ground and graduated vials.
- TELESCOPE:** 9 inches long, erecting eyepiece, object glass  $\frac{1\frac{1}{2}}{10}$  inch aperture, power 18 to 20 diameters, rack and pinion to object slide, spiral movement to eyepiece, cross wires of *platinum*, detachable sunshade, and cap.
- LEVEL ON TELESCOPE:** With sensitive ground vial, graduations on the glass.
- CLAMP AND TANGENT:** To telescope axis.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Accessories of trivet plate, plummet, screw driver, and adjusting pins.
- TRIPOD:** Plain legs, catalogue No. 400, with protecting cap. Bolts have wing nuts which can be tightened by hand.
- WEIGHT:** Of instrument, about 7 lbs; with box and accessories about 12 lbs; tripod about 7 lbs. Shipping weight, 2 boxes, about 50 lbs. Packed for export, about 75 lbs.

No.	Price.
105 Builders Transit, complete as specified.....	\$80.00

## Attachments and Modifications

<b>STADIA WIRES:</b> Of <i>platinum</i>	No extra charge.
<b>COMPASS:</b> Full circle with needle $3\frac{1}{2}$ inches long, graduated on upper face to half degrees and figured 0 to 90 each way. Variation arc for setting off magnetic declination, graduated to half degrees and reading by vernier to one minute; with rack and pinion movement. Graduations clear and distinct on a silvered surface. Compass covered with a beveled edge plate glass which extends above the bezel ring and is waterproof.....	\$10.00
<b>HORIZONTAL LIMB:</b> With graduations on sterling silver to half degrees, figured 0 to 180 (see Limb No. II., page 36), reading by one double vernier to one minute.....	10.00
<b>VERTICAL LIMB:</b> Full circle, $3\frac{1}{2}$ inches diameter, graduated on sterling silver to whole degrees, figured 0 to 90 each way, reading by fixed double vernier to five minutes.....	8.00
<b>VERTICAL LIMB:</b> Like the above, but $4\frac{1}{2}$ inches diameter, reading by vernier to one minute.....	12.00
<b>SPLIT TRIPOD LEGS</b> instead of plain legs, like catalogue No. 405.....	5.00
<b>EXTENSION TRIPOD LEGS</b> instead of plain legs, like catalogue No. 410.....	7.00

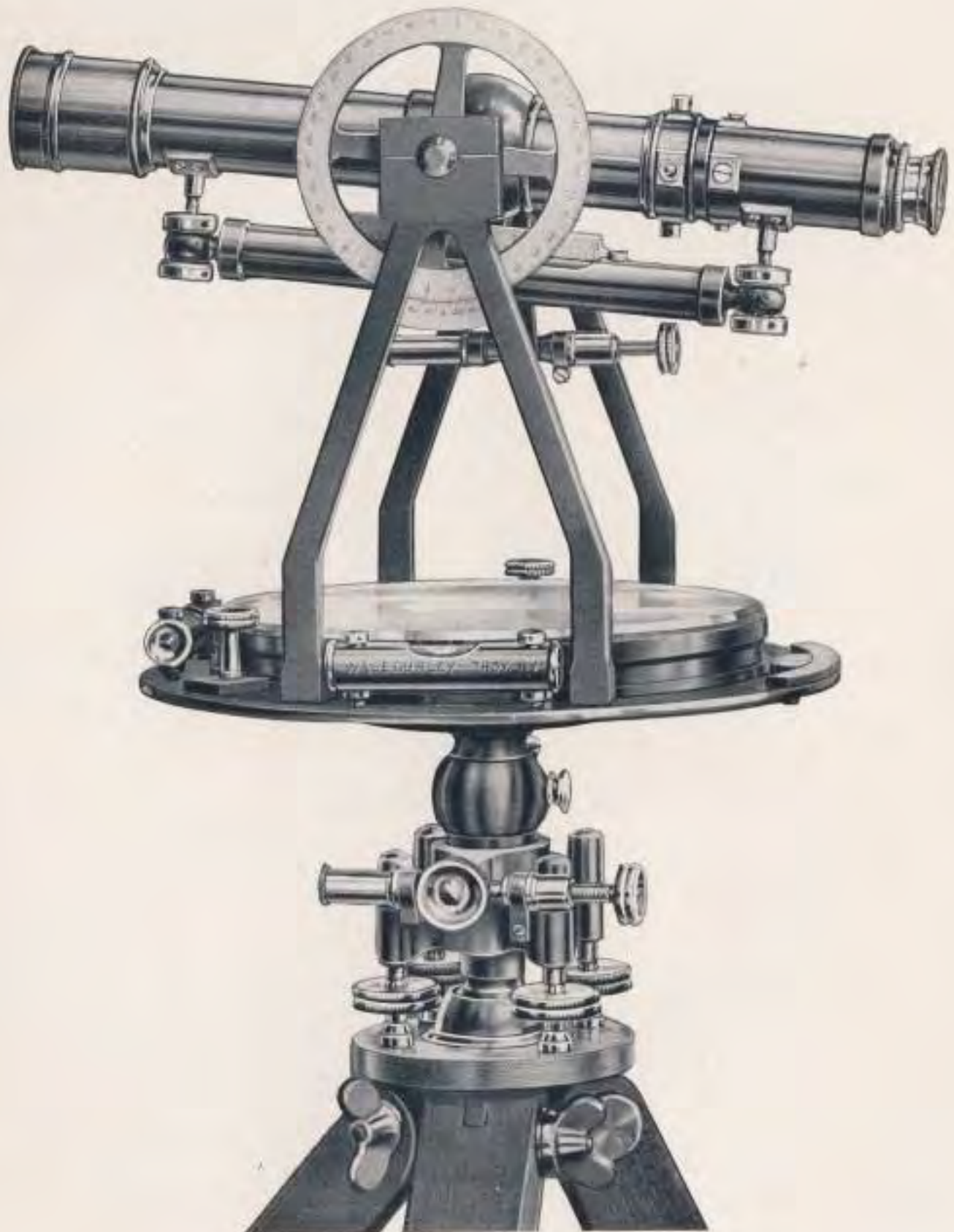
We will send on request a booklet illustrating and describing the use and adjustment of our Builders Transit and Architects Levels.



## VERNIER TRANSITS

OTHERWISE KNOWN AS SURVEYORS TELESCOPE COMPASSES.

MADE IN TWO SIZES



Vernier Transit

No. 118 6" needle, 11" telescope, weighs 15½ lbs. ----- \$121.00



## VERNIER TRANSITS

OTHERWISE KNOWN AS SURVEYORS TELESCOPE COMPASSES.

MADE IN TWO SIZES

These instruments are Surveyors Compasses without sights but with telescope mounted on standards as supplied with Engineers and Surveyors Transits. They have no horizontal limbs like the instruments described in the preceding pages and therefore angles can only be measured by the needle. The illustration shows the instrument with 6 inch needle; in the smaller size, the vernier of the compass circle is in the box under the glass, as with that of the Surveyors Transits. The needle lifting screw is underneath the plate, but is concealed in the picture.

### Specifications of Nos. 110 to 118

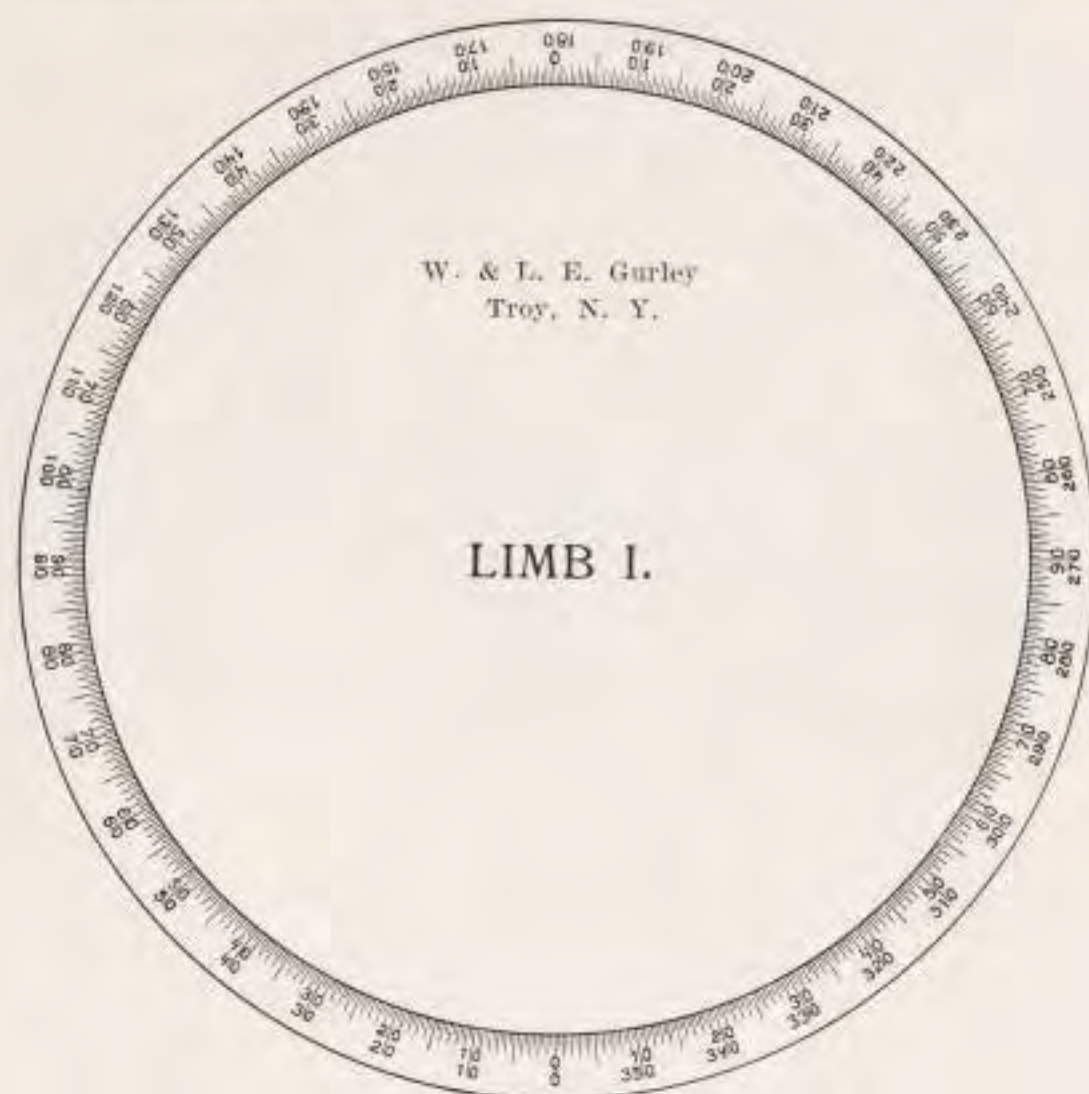
- PLATE:** With needle 5 inches or 6 inches long, circle graduated on upper face to half degrees and figured 0 to 90 each way; also graduated on inner edge to whole degrees. Variation arc for setting off magnetic declination, graduated to half degrees and reading by vernier to one minute; with rack and pinion movement. Graduations are clear and distinct on a silvered surface. Compass is covered with a beveled edge plate glass which extends above the bezel ring and is waterproof. Two levels with ground and graduated vials.
- TELESCOPE:** As supplied with Engineers and Surveyors Transits, 11 inches long, erecting eye piece, object glass  $1\frac{3}{16}$  inch aperture, power 26 diameters, rack and pinion movements to eyepiece and object slides, *platinum* cross wires, dust guard to object slide, detachable sunshade, and cap.
- LEVELING HEAD:** With four leveling screws having dust caps, and clamp and tangent to spindle.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Accessories of 10 oz. plain plummet, adjusting pins, etc.
- TRIPOD:** Plain legs, catalogue No. 400, with protecting cap. Bolts have wing nuts which can be tightened by hand.
- WEIGHT:** Of instruments  $12\frac{1}{2}$  lbs. to  $15\frac{1}{2}$  lbs.; including box and accessories 20 to 25 lbs.; tripod about 8 lbs. Shipping weight, 2 boxes, packed for domestic shipment, about 75 lbs.; packed for export, about 100 lbs.

No.		Price.
110	Vernier Transit, 5 inch needle, plain telescope, leveling head and plain tripod	\$90.00
111	Vernier Transit, 5 inch needle, with level on telescope and clamp and tangent to telescope axis, leveling head and plain tripod	108.00
113	Vernier Transit, 5 inch needle, with $3\frac{1}{2}$ inch vertical circle, reading by vernier to five minutes, level on telescope and clamp and tangent to telescope axis, leveling head and plain tripod	116.00
115	Vernier Transit, 6 inch needle, plain telescope, leveling head and plain tripod	95.00
116	Vernier Transit, 6 inch needle, with level on telescope and clamp and tangent to telescope axis, leveling head and plain tripod	113.00
118	Vernier Transit, 6 inch needle, with $3\frac{1}{2}$ inch vertical circle, reading by vernier to five minutes, level on telescope and clamp and tangent to telescope axis, leveling head and plain tripod. See page 34	121.00

#### Extras

Stadia wires of <i>platinum</i>	No extra charge,	
Split tripod legs instead of plain legs	\$3.00	
Extension tripod legs instead of plain legs	5.00	



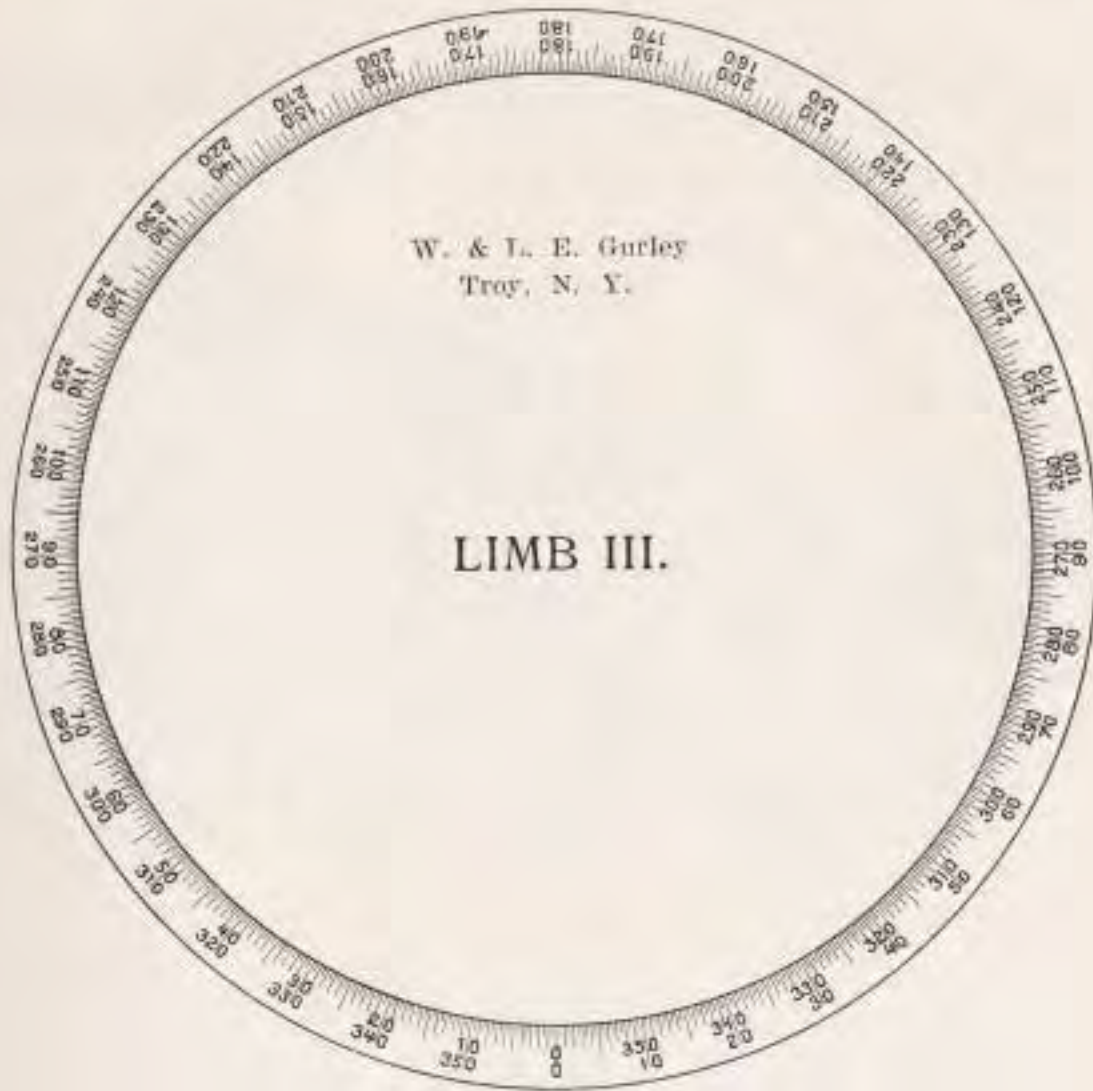


LIMB I—The figures are in two rows, the outer from 0 to 360, and the inner in quadrants from 0 to 90. This is the customary form.

LIMB II—The figures are in one row, reading from 0 each way to 180. This is the usual figuring on the limbs of Transits Nos. 20, 100, 102 and 105.







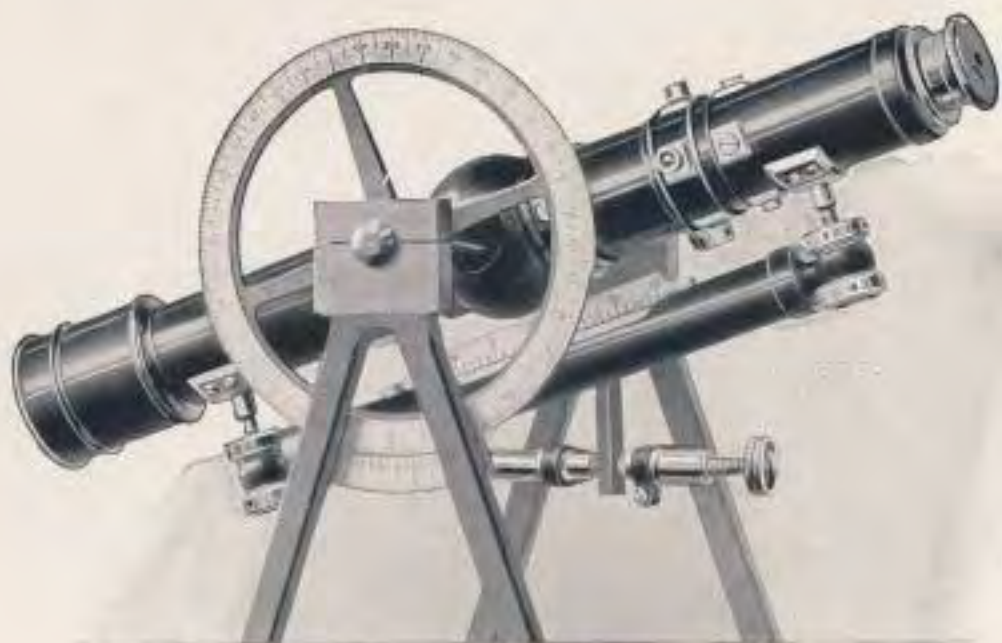
LIMB III—The figures are in two rows, each row from 0 to 360, but reading in opposite directions.

LIMB IV—The numbering is identical with that used in III, except that the figures are inclined in the direction in which they increase.



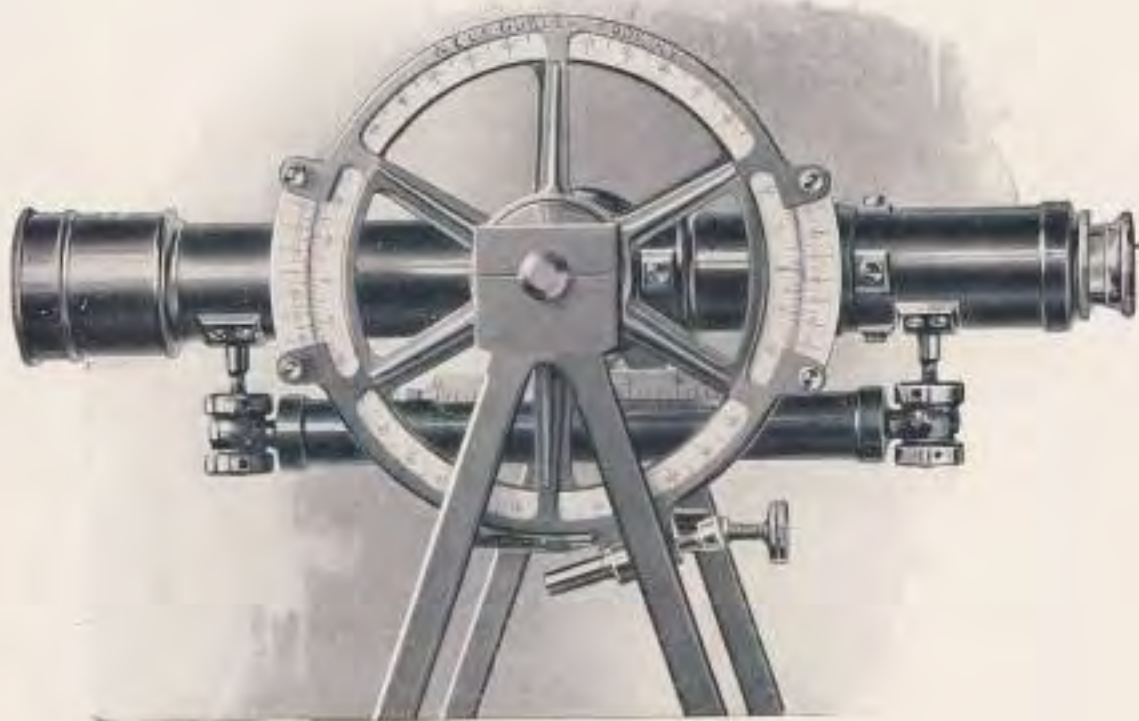


ATTACHMENTS AND EXTRAS FOR TRANSITS



Nos. 136, 145 and 148

Vertical Circle, Level, Clamp and Tangent.



No. 138

Vertical Circle, with two opposite double verniers.



## ATTACHMENTS AND EXTRAS FOR TRANSITS

The following prices are for attachments only when furnished with a new instrument.

When fitted to a completed instrument, the cost of alterations must be added to the price of the new parts.

No.		Price.	Postage.
130	Variation Arc added to a new Engineers Transit, Nos. 1 to 16, if ordered with the Transit	\$4.00	
131	Variation Arc added to Transits when sent for repairs	15.00	
135A	Vertical Circle, 3½ inches diameter, with vernier to 5 minutes	8.00	\$0.17
135B	Vertical Circle, 4 inches diameter, with vernier to 1 minute	12.00	.20
136	Vertical Circle, 4½ inches diameter, with vernier to 1 minute. See page 38	12.00	.20
137	Vertical Circle, 5 inches diameter, with vernier to 1 minute	15.00	.20
138	Vertical Circle, 5 inches diameter, with two opposite double verniers to 1 minute. See page 38	35.00	.35
139A	Vertical Arc, 2 inches radius, with vernier to 1 minute, moved by tangent screw	18.00	.20
139B	Vertical Arc, 2½ inches radius, with vernier to 1 minute, moved by tangent screw	18.00	.20
140	Vertical Arc, 3 inches radius, with vernier to 30 seconds, moved by tangent screw. See page 41	18.00	.20
141	Aluminum Guard for Vertical Circle. See page 41	6.00	
145	Level on Telescope with ground vial and scale. See p. 38	12.00	.25
146	Level on Telescope with reversion vial	17.00	.35
148	Clamp and Tangent to Telescope Axis. See page 38	6.00	.15
149	Beaman Stadia Arc attached to new Transit. See page 43	15.00	
150	Gradiometer combined with clamp and tangent. See page 44	18.00	.25
151	Platinum Stadia Wires, adjustable, and diaphragm	5.00	.17
152	Platinum Stadia Wires, fixed, and diaphragm	7.00	.17
154	Dust Guard to objective slide. See page 47	4.00	
155	Rack and Pinion movement to eyepiece	5.00	
157	Sights on Telescope with folding joints	8.00	
158	Sights on Standards at right angles with telescope	8.00	



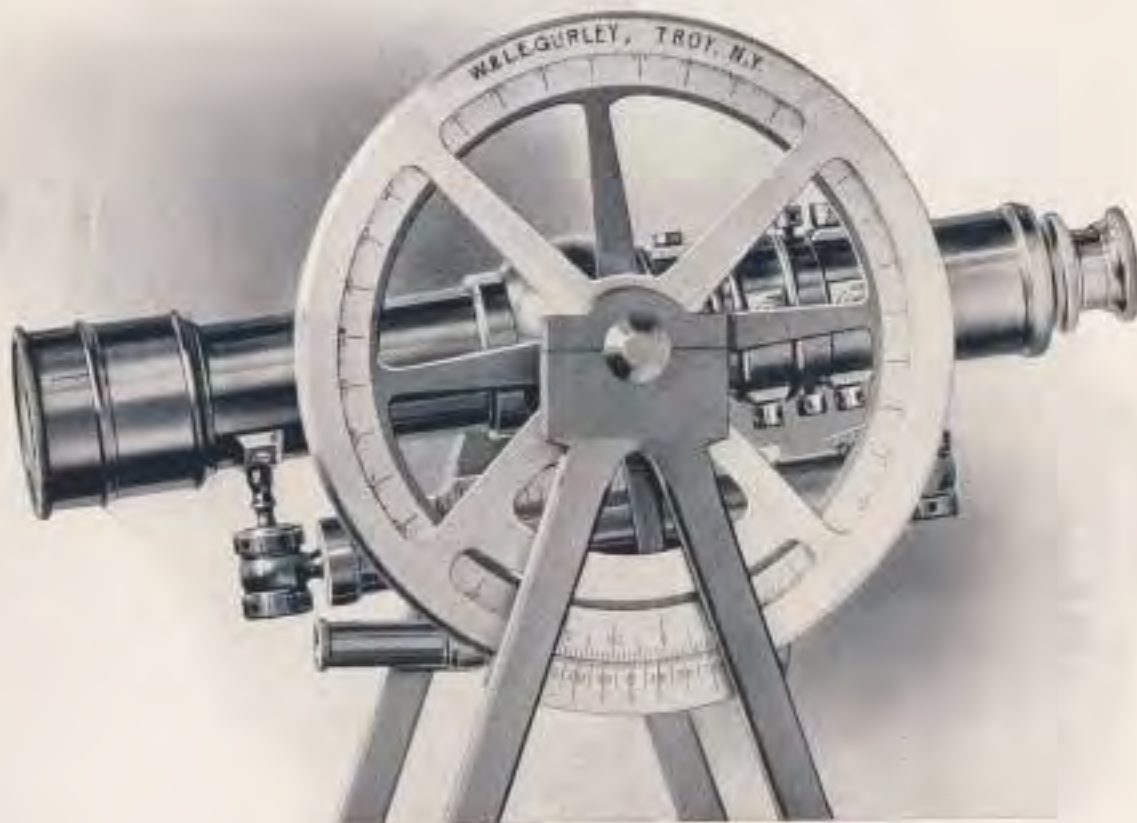
## ATTACHMENTS AND EXTRAS FOR TRANSITS

No.		Price.	Postage.
160	Detachable Side Telescope and Counterpoise for vertical sighting. See page 45.....	\$25.00	\$0.50
161	Detachable Riding Telescope, for vertical sighting. See page 45 .....	25.00	.50
165	Reflector for illuminating cross wires. See page 46.....	4.00	.16
166	Reflector for illuminating cross wires of large Y Level.	5.00	.16
168	Diagonal Prism for eyepiece of telescope. See page 46	8.00	.16
170	Plummet Lamp for Mine Surveying. See page 46.....	10.00	.35
176	Leveling Head, ribbed construction, leveling screws and clamp and tangent, for Vernier Transits and Surveyors Compasses. See page 47 .....	18.00	
180	Attached Magnifier with three universal joints, to read verniers .....	5.00	
185	Graduation of limb to read to 20 or 30 seconds, extra...	10.00	
186	Graduation of limb to read to 10 seconds, extra.....	30.00	
187	Graduation of 4½ or 5 inch vertical circle to read to 20 or 30 seconds, extra .....	5.00	
188	Graduation of No. 138 Vertical Circle to read to 20 or 30 seconds, extra .....	10.00	
190	Burt Solar Attachment with declination arc, hour circle and polar axis. See page 48.....	60.00	.30
192	Solar Screen to fit eyepiece of telescope. See page 46	5.00	.14
193	Patent Latitude Level, for use with Solar Transit.....	6.00	.17
196	Striding or Adjusting Level .....	3.00	.17
197	Adjusting Bar for Solar Attachment of Transit .....	1.50	.15

For Tripods, see pages 82 to 85. For Leather Cases, see pages 85 and 86.

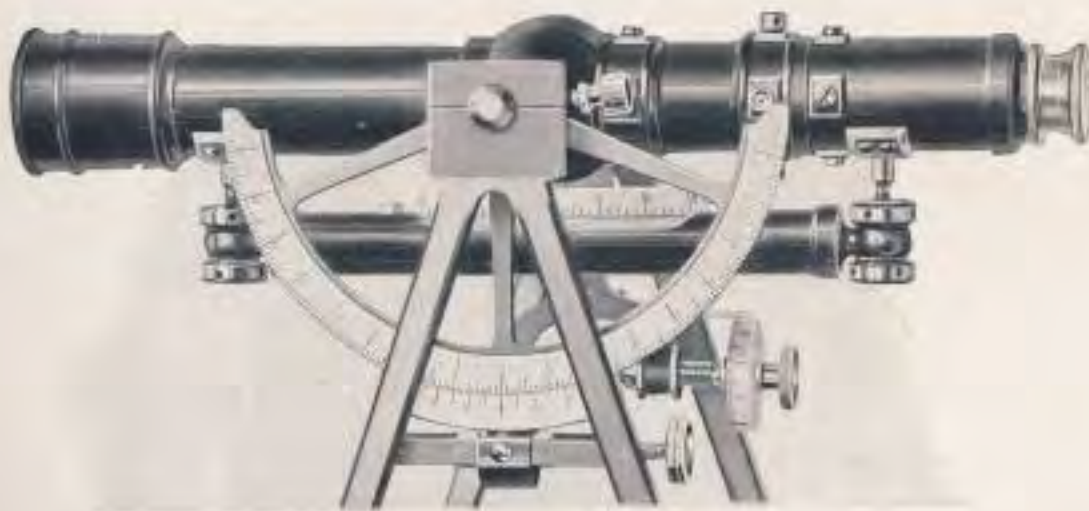


## ATTACHMENTS AND EXTRAS FOR TRANSITS



No. 141

The illustration, No. 141, shows an aluminum guard applied to the vertical circle to protect the graduations from injury. The extra cost of this attachment is \$6.00.

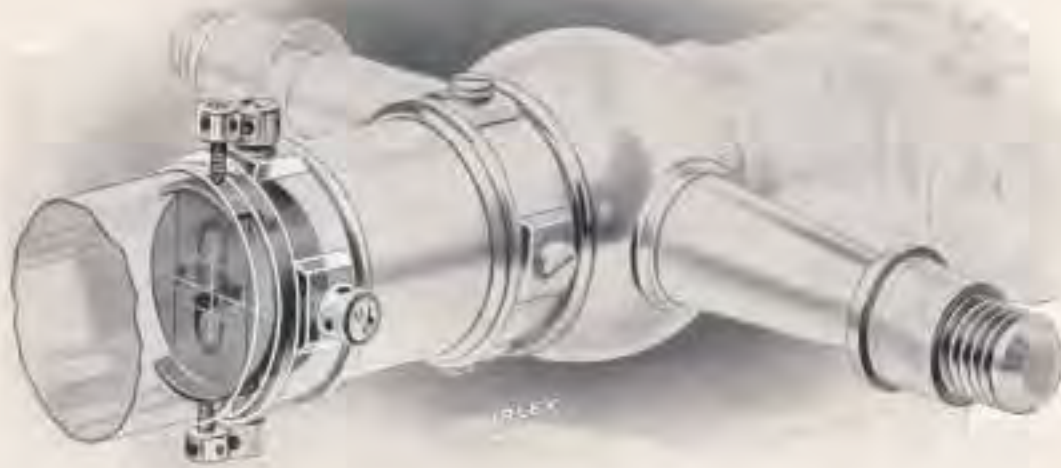


Nos. 140, 145 and 150

The illustration shows the vertical arc with tangent screw, level on telescope with ground glass vial and graduated scale, and the gradienter combined with clamp and tangent. An enlarged view of the gradienter, with description, will be found on page 44.



## ATTACHMENTS AND EXTRAS FOR TRANSITS



## STADIA WIRES

The Stadia, or Micrometer, is a compound cross wire ring or diaphragm, as shown, having three horizontal wires, of which the middle one is cemented to the ring as usual, while the others are fastened to slides, held apart by springs and actuated by independent screws, by which the distance between the two movable wires can be adjusted to include a given space, as one foot on a rod one hundred feet distant.

These wires will, in the same manner, include two feet on a rod two hundred feet distant, or half a foot at a distance of fifty feet, and so on in the same proportion, thus furnishing a means of measuring distances, especially over broken ground, more easily and even more accurately than with a tape or chain.

We furnish stadia wires in our Transit and Y Level telescopes without extra charge, if requested when the instrument is ordered. The stadia wires are fixed permanently on the same ring with the cross wires, when desired, or they may be placed so that they are out of focus when the cross wires are visible, or vice versa. (See also page 7).

We are successfully drawing platinum wires from one eight thousandths to one fifty thousandths of an inch in diameter, and are using them in all the telescopes of our instruments. They are opaque, unaffected by moisture, and universally preferred to spider web.

The Cox Stadia Computer is a circular slide rule of about 15 inches effective length, for the reduction of stadia readings, in convenient form for field use.

Printed on heavy cardboard, cloth bound, size  $6\frac{3}{4} \times 6\frac{3}{4}$ ", suitable for carrying in coat pocket.

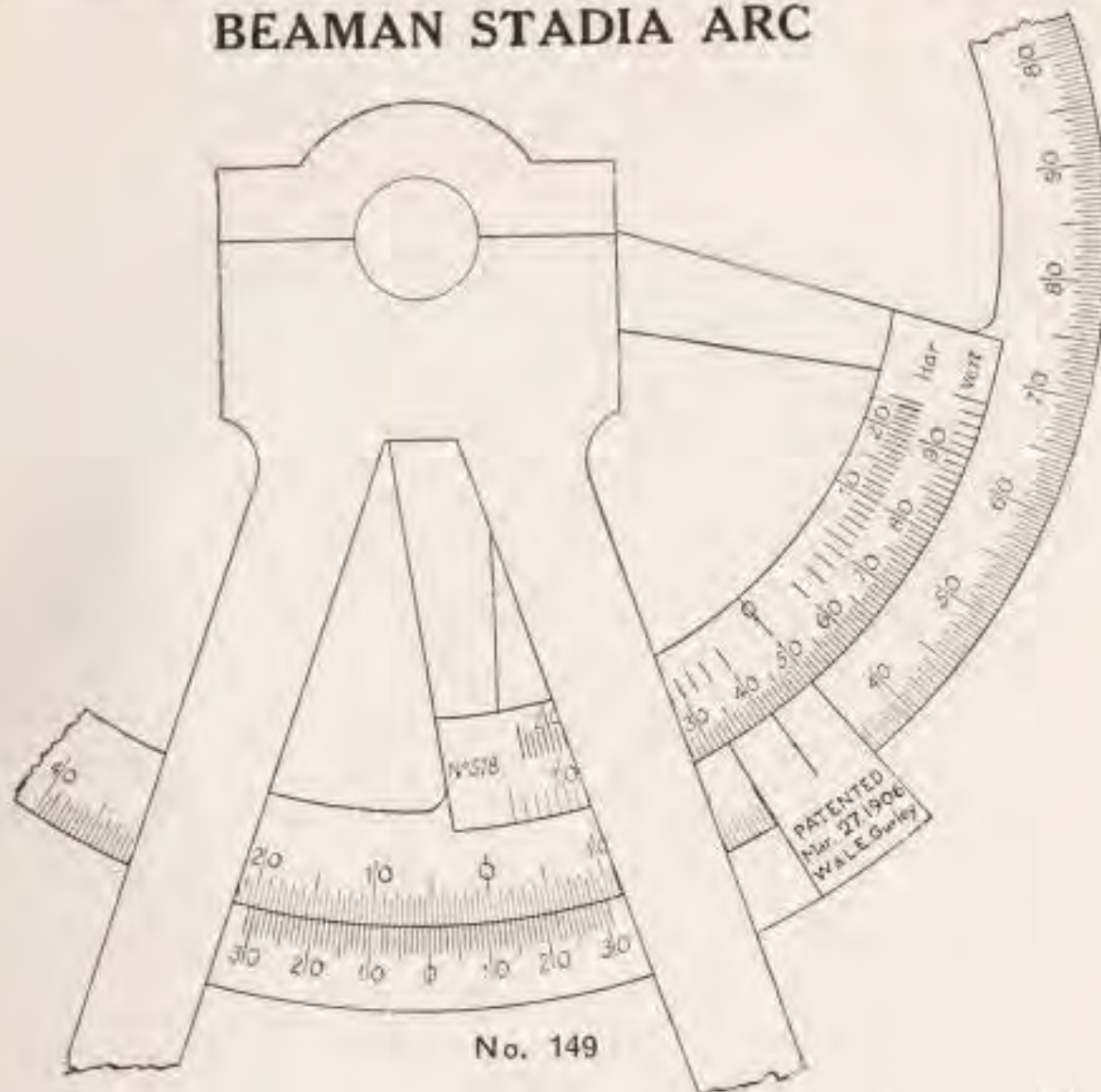
Complete description and explanation sent on request.

Price

80.75



## BEAMAN STADIA ARC



This specially graduated vertical arc was devised and patented by W. M. Beaman, a topographer in the U. S. Geological Survey, and is now extensively used by that bureau in its topographical surveys. In 1906 we introduced it on our transits and alidades, and because this arc furnishes engineers with a rapid and exact mechanical solution of the stadia problem, the use of the stadia in surveying has been popularized to an appreciable extent.

By the use of this arc precise differences in elevation, and reduced horizontal distances, can be determined with great rapidity, and without the intricate calculation heretofore necessary.

The arc is attached to the vertical limb of the transit or alidade, and carries two scales having coincident zero points, marked 0 and 50 respectively, either scale being read by an index common to both. The scale graduations are so spaced and figured as to give simple multiples of the rod interval.

The outer scale, marked "Vert.," indicates multiples of the rod interval, for determining differences in elevation between instrument and rod. The zero point of this scale is marked 50, so that a direct scale reading will indicate whether the telescope is elevated or depressed.

The inner scale, marked "Hor.," gives at the same pointing a direct reading of the percentage of correction (always subtractive) necessary to reduce the observed stadia reading (in feet subtended) to the true horizontal distance.

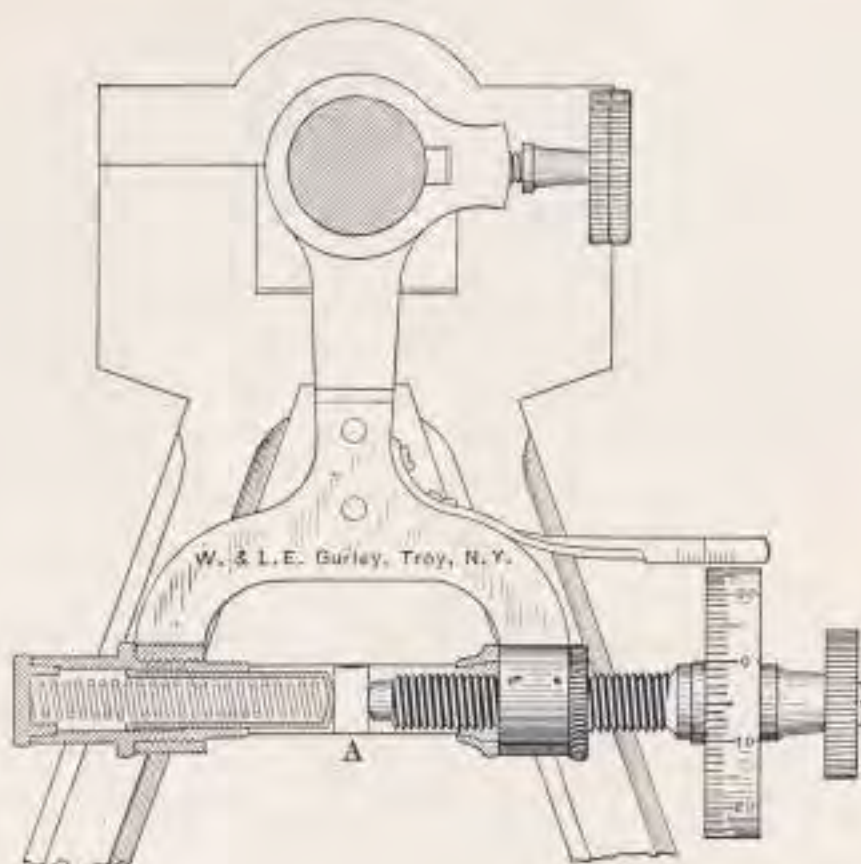
A more detailed description of this instrument is contained in a special circular, which we will send on request.

The Beaman Stadia Arc can be supplied with any new transit of our manufacture, (or Telescopic Alidades, Nos. 582 and 583), having a vertical circle or vertical arc four inches diameter or larger, for fifteen dollars (\$15) extra, if ordered with the instrument. It can also be furnished with Telescopic Alidades, Nos. 584-A and 584-B, for thirty dollars (\$30) extra.

This attachment can also be fitted to an old transit (or Alidades, Nos. 582, 583, 584-A or 584-B), but the additional cost of alterations and readjusting can only be determined upon examination of the instrument, which must be in our hands for this purpose.



## ATTACHMENTS AND EXTRAS FOR TRANSITS



No. 150

Gradienter, \$18.00.

This attachment consists of a screw attached to the semi-circular expanded arm of the ordinary clamp of the telescope axis; the screw is accurately cut to a given number of threads, and passing through a nut in one side of the arm presses against a little stud, *A*, fixed to the inside surface of the right hand standard.

As the value of the screw thread is such that a complete revolution will move the horizontal cross wire of the telescope over a space of one foot on a rod at a distance of one hundred feet, it is clear that when the screw is turned through fifty spaces on the graduated head, the wire will pass over fifty one-hundredths, or one-half a foot on the rod, and so on in the same proportion.

In this way the Gradienter can be used in the measurement of distances.

Grades can also be established, with great facility, as follows: 1st, level the instrument; bring the telescope level to its center by the clamp of the gradienter screw; move the graduated head until its zero is brought to the edge of the scale; and then turn off as many spaces on the head as there are hundredths of feet to the hundred in the grade to be established.



ATTACHMENTS AND EXTRAS FOR TRANSITS



No. 160.

No. 161.

EXTRA TELESCOPES FOR VERTICAL SIGHTING  
IN MINE SURVEYING



ATTACHMENTS AND EXTRAS FOR TRANSITS



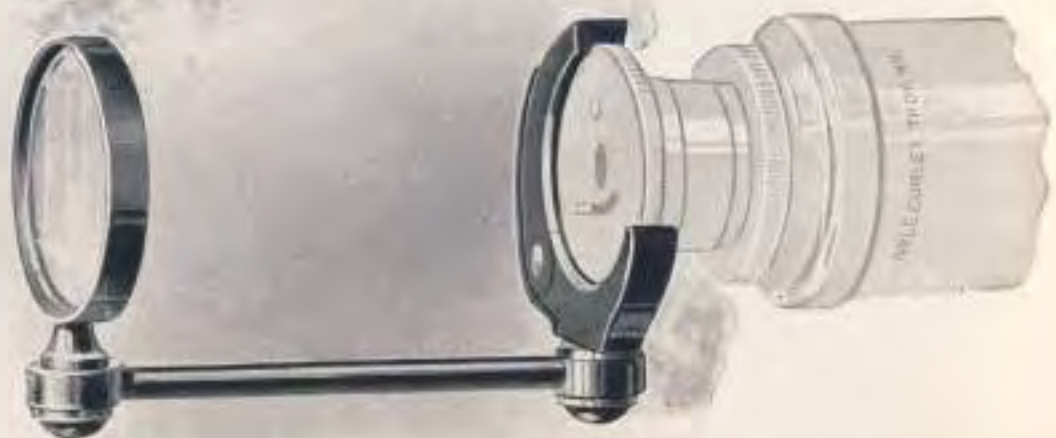
Nos. 165 and 166  
REFLECTOR, \$4.00 and \$5.00



No. 168  
DIAGONAL PRISM, \$8.00



No. 170  
PLUMMET LAMP,  
\$10.00



No. 192  
SOLAR SCREEN, \$5.00

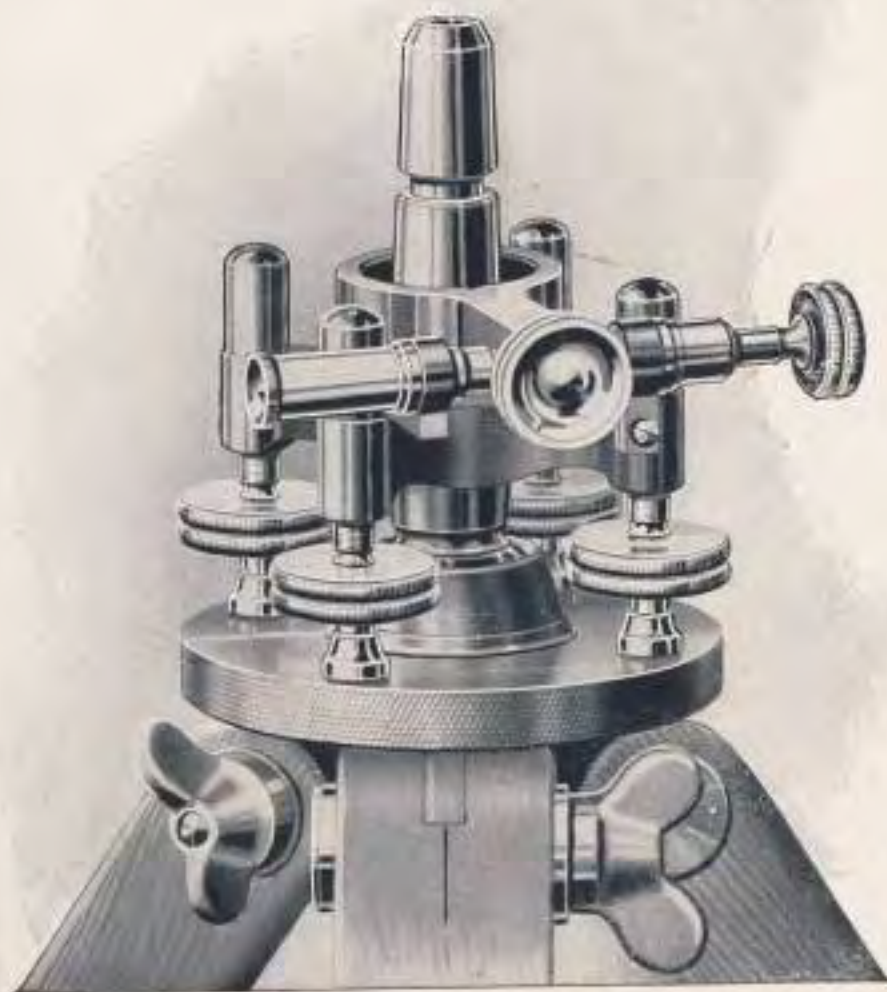


ATTACHMENTS AND EXTRAS FOR TRANSITS



No. 154

DUST GUARD, \$4.00



Nos. 176 and 242

LEVELING HEAD, \$18.00



## ATTACHMENTS AND EXTRAS FOR TRANSITS



No. 190

BURT SOLAR ATTACHMENT AS APPLIED TO TRANSITS, \$60.00

The Solar Attachment is essentially the solar apparatus of Burt placed upon the cross bar of the ordinary Transit, the polar axis being directed above instead of below, as in the Solar Compass. A little disk one and one half inches in diameter, having a short round pivot projecting above its upper surface, is first securely screwed to the telescope axis. Upon this pivot rests the enlarged base of the polar axis, which is also firmly connected with the disk by four capstan head screws.

The Hour Circle surrounding the base of the polar axis is easily movable about it, and can be fastened at any point desired by two flat head screws above. It is graduated to five minutes of time, is figured from I to XII, and is read by an index fixed to the declination arc and moving with it. The Declination Arc is graduated to quarter degrees. On the Mountain Transit it reads by its vernier to single minutes of arc, and on the larger Transits to half minutes of arc, the graduations of both vernier and limb being in the same plane.

The Latitude is set off by means of a large vertical limb figured from the center each way in two rows, from  $0^{\circ}$  to  $80^{\circ}$  and from  $90^{\circ}$  to  $10^{\circ}$ , the first series being intended for reading vertical angles and the latter series for setting off the latitude.



SHOWING AN EXPLORERS TRANSIT WITH ITS SPECIAL  
TRIPOD, PACKED IN A DRESS SUIT CASE.



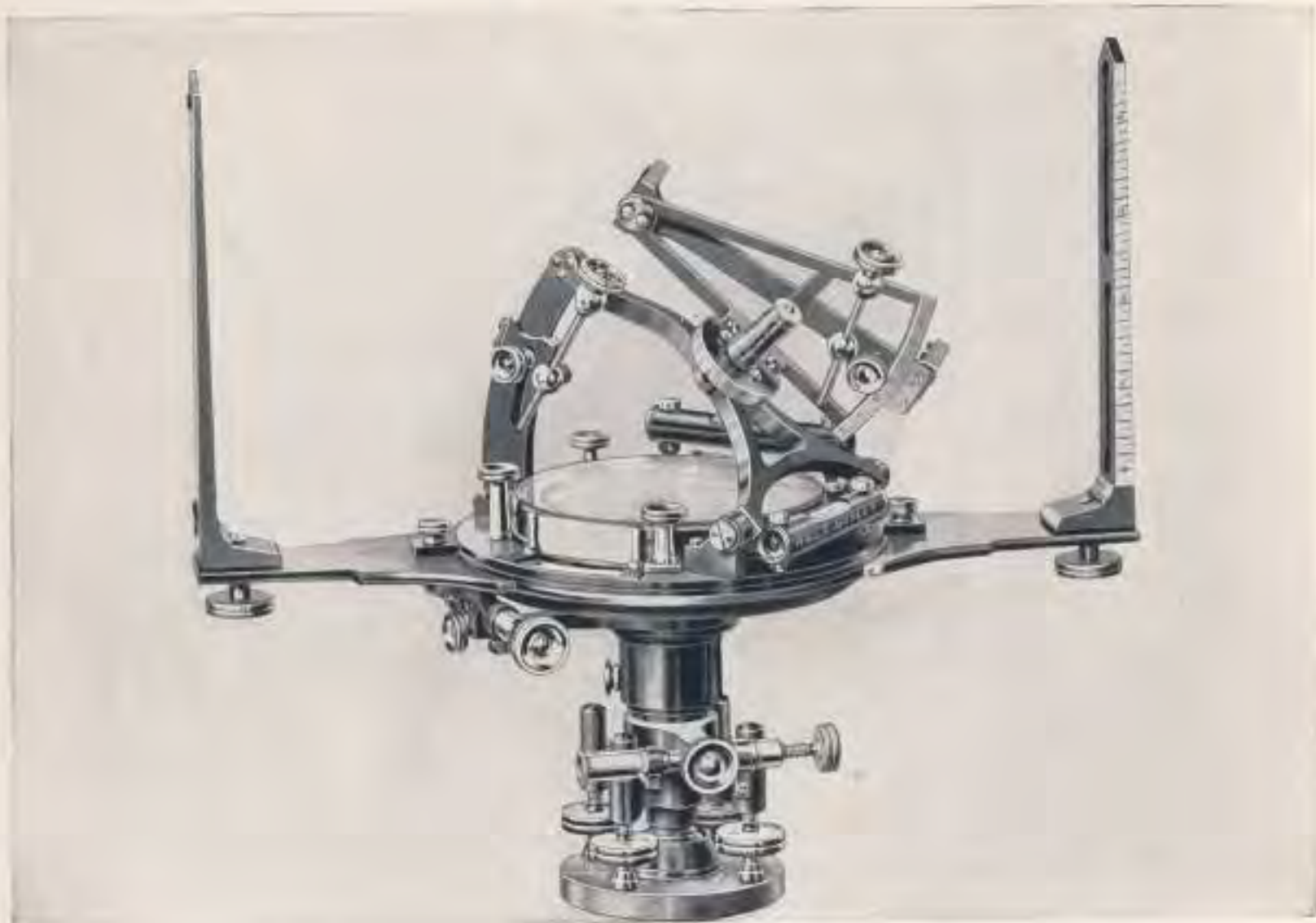
Leather Dress Suit Case, \$8.00.

	Price.
Leather dress suit case, 24 inches long, to contain Explorers Transit and jointed extension tripod in canvas case -----	\$8.00

See pages 14 and 15.



## SOLAR COMPASS



No. 210

Solar Compass, \$210.00.

The Solar Compass, so ingeniously contrived for readily determining a true meridian, or north and south line, came into general use in the surveys of United States Public Lands, the principal lines of which are required to be run with reference to the true meridian.

The arrangement of its sockets and plates is similar to that of the Surveyors Transit, except that the sight vanes are attached to the under plate or limb, and this revolves around the upper or vernier plate on which the solar apparatus is placed.

It has a full compass circle, with a four inch needle.

The limb is graduated to half degrees, is figured in two rows from 0 to 360 and 0 to 90 each way, and reads by the two opposite verniers to single minutes.

The graduations of the limb and all other arcs of the Solar Compass are made upon sterling silver.

The Burt Solar Apparatus is seen on the upper plate with the needle, and in fact operates as its substitute in the field.

It consists mainly of three arcs of circles, by which can be set off the latitude of a place, the declination of the sun, and the hour of the day.

Note.—For several years past the U. S. Land Office has required the principal lines of its surveys to be run with a Solar Telescope Instrument, and for this purpose our Solar Compass, No. 210, with No. 262 Telescope, and our Solar Transits Nos. 17, 23, 30, 60 and 90 have been generally adopted.



**VERNIER COMPASSES**



No. 227  
Vernier Compass, \$40.00

No.		Price.
225	Vernier Compass, 4 inch needle, brass cover, outkeeper, and staff mountings -----	\$30.00
226	Vernier Compass, 5 inch needle, brass cover, outkeeper and staff mountings -----	35.00
227	Vernier Compass, 6 inch needle, brass cover, outkeeper and staff mountings -----	40.00

**PLAIN COMPASSES**



No. 232  
Plain Compass, \$35.00.



## PLAIN COMPASSES

No.		Price.
230	Plain Compass, 4 inch needle, brass cover, outkeeper, and staff mountings . . . . .	\$25.00
231	Plain Compass, 5 inch needle, brass cover, outkeeper and staff mountings . . . . .	30.00
232	Plain Compass, 6 inch needle, brass cover, outkeeper and staff mountings. See page 51. . . . .	35.00

Compasses Nos. 225 to 232 are packed in mahogany case, with lock and leather strap. Compass Tripod (our No. 415) will be furnished at an extra cost of \$7.00; and if the staff mountings are omitted we deduct \$2.00.

## ATTACHMENTS AND EXTRAS FOR COMPASSES



Compound Tangent Ball Spindle, with Leveling Adopter

No. 240 Compound Tangent Ball Spindle can be furnished only with Compasses Nos. 226, 227, 231 and 232.

No. 241 Leveling Adopter can be furnished with Compasses Nos. 225 to 232 inclusive.

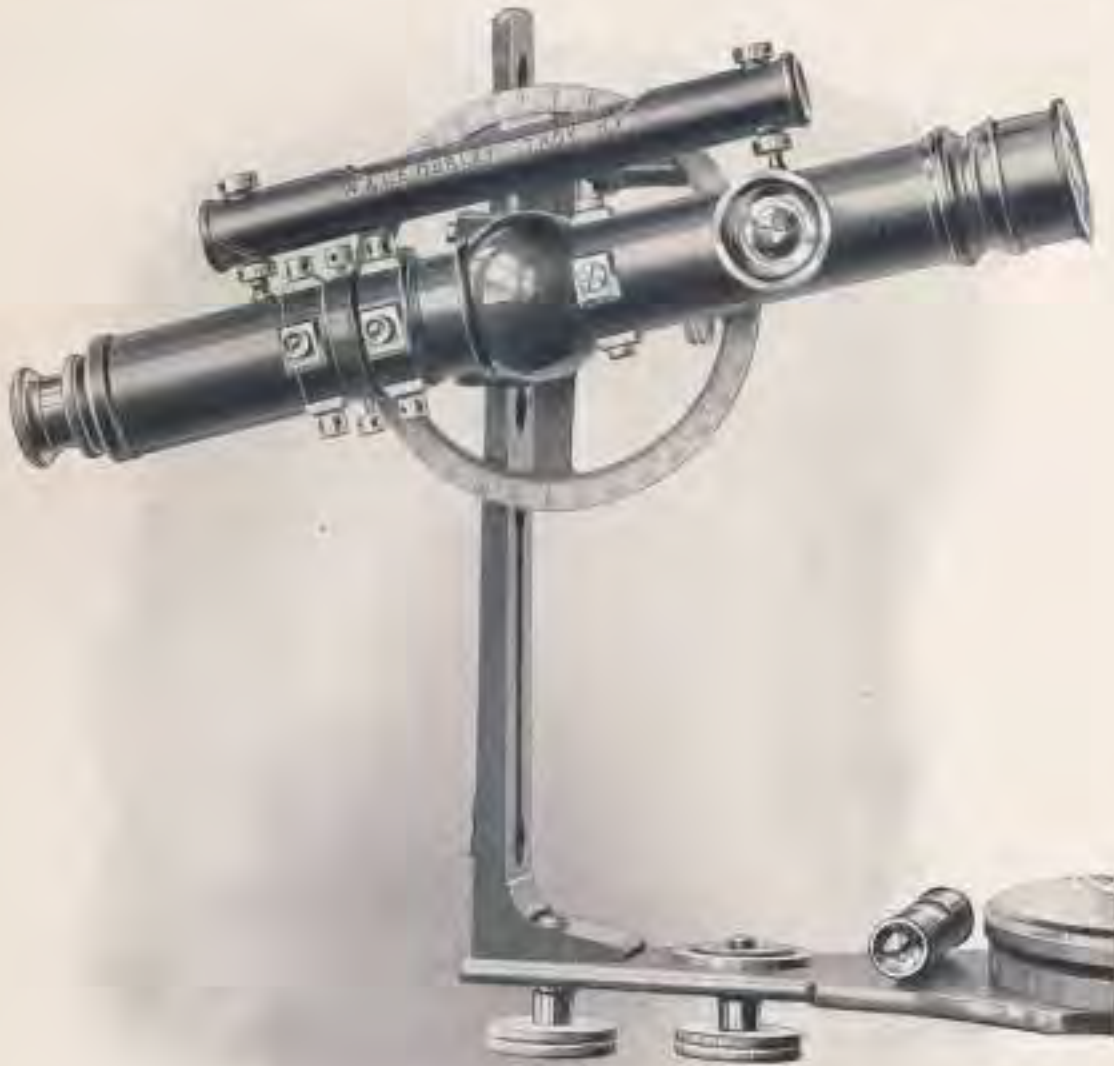
The price of the leveling adopter, without tripod or ball spindle, is \$7.00; with tripod and compound tangent ball, as shown, \$23.00.

No.		Price.	Postage.
240	Compound Tangent Ball Spindle . . . . .	\$9.00	\$0.30
241	Leveling Adopter, large size . . . . .	7.00	.40
242	Leveling Head, ribbed construction, leveling screws and clamp and tangent, fitted to use with tripods Nos. 401, 406, 411, 415, 420, and 425 . . . . .	18.00	
245	Compass Tripod Mountings, without the legs . . . . .	5.00	.60

For Tripods, see pages 82 and 84. For Leather Cases, see pages 85 and 86.



## ATTACHMENTS AND EXTRAS FOR COMPASSES



No. 262

## Telescopic Sight. Attachable to Compass Sight.

This valuable attachment for the Surveyors Compass consists of a telescope furnished with the usual cross wires, etc., and attached to a movable band, which, as shown in the illustration, can be slipped over the sight of a Compass, clamped at any point desired, and put in adjustment by any person who has a screw driver and a steel adjusting pin.

To put this attachment in place, slip the band over the south sight of the Compass, having (as shown in the illustration) the telescope at the right hand and the front clamp screw on the outer surface of the sight; and place the band as low as will allow the telescope to revolve in either direction without striking the Compass. This place should be marked by a line across the sight, or still better, a screw or pin on the inner surface of the sight, that the band may be set at the same point in subsequent use.

To fasten the band to the sight, first bring up the clamp screw in front with a pressure just sufficient to hold the band to its place, then tighten the screw on the left until the band is brought up against the right edge of the sight, and finally tighten the front clamp screw again, when the fastening will be complete.

To focus the telescope, turn the end of the eyepiece back or forth by the thumb and forefinger until by the spiral motion of the tube the cross wires are brought into distinct view; the object glass is then moved in either direction by the pinion on the side of the telescope until the object is clearly seen.



## ATTACHMENTS AND EXTRAS FOR COMPASSES

No.		Price.	Postage.
261	Achromatic Telescope, 9 inch, power about 20 diameters.....	\$18.00	\$0.45
262	Achromatic Telescope, 9 inch, same as No. 261, and with stadia wires .....	20.00	.50
	We add to the Telescopic Sight the following extras:		
265	Vertical Circle, with vernier to 5 minutes.....	5.00	
266	Level on Telescope, with ground and graduated vial.....	5.00	
267	Clamp and Tangent to telescope axis.....	5.00	
268	Offset Standard with Counterpoise, to bring the telescope over the line of zeros.....	7.50	.50

**PRICES FOR PARTS OF INSTRUMENTS  
LIABLE TO LOSS OR INJURY**

## FOR TRANSITS.

Needle with jeweled center and center pin .....	3.00	.12	
Center pin only .....	.50	.01	
Ground glass level vial, for plate or standard, each .....	.45	.02	
Ground glass level vial, brass mounted complete, for plate or standard, each .....	2.00	.14	
Ground glass level vial for telescope, each .....	1.25	.14	
Cap for eyepiece or object glass, each .....	.75	.03	
Shade for object glass .....	.75	.03	
Clamp screws for horizontal limb, each .....	.75	.02	
Tangent screw for leveling head .....	.75c to	1.50	.13
Clamp screw for leveling head .....	.75	.03	
Leveling screw for leveling head, each .....	\$1.00 to	1.50	.14
Eyepiece complete .....	6.00	.14	
Object glass complete .....	6.00	.14	
Platinum cross wires and diaphragm .....	5.00	.15	
Platinum stadia wires, adjustable, and diaphragm .....	5.00	.15	
Platinum stadia wires, fixed, and diaphragm .....	7.00	.15	
Mahogany box with lock and strap, and fitted inside, according to size .....	\$5.00 to	6.00	

## FOR SURVEYORS COMPASSES.

Needle with jeweled center and center pin .....	3.00	.12
Center pin only .....	.50	.01
Ground glass level vials, each .....	.45	.02
Ground glass level vials, brass mounted complete, each .....	2.00	.14
Brass cover for compass of our make .....	1.00	.25
Outkeeper .....	1.00	.13
Glass circle, unmounted, for compass face .....	.25	.15
Wrench for center pin .....	.10	.01
Staff mountings, brass head, without spindle .....	2.00	.25
Staff mountings, steel point .....	.50	.18
Ball spindle fitted to old socket .....	3.00	.30
Compass sight vanes only, each .....	2.50	.20
Clamp screw for spindle or sight vane .....	.50	.03
Staff mountings complete for Pocket Compass, small .....	2.50	.15
Staff mountings complete for Pocket Compass, large .....	3.50	.20
Mahogany box with lock and strap, and fitted inside, according to size .....	\$4.00 to	6.00



PRICES FOR PARTS OF INSTRUMENTS  
LIABLE TO LOSS OR INJURY

FOR Y LEVELS.

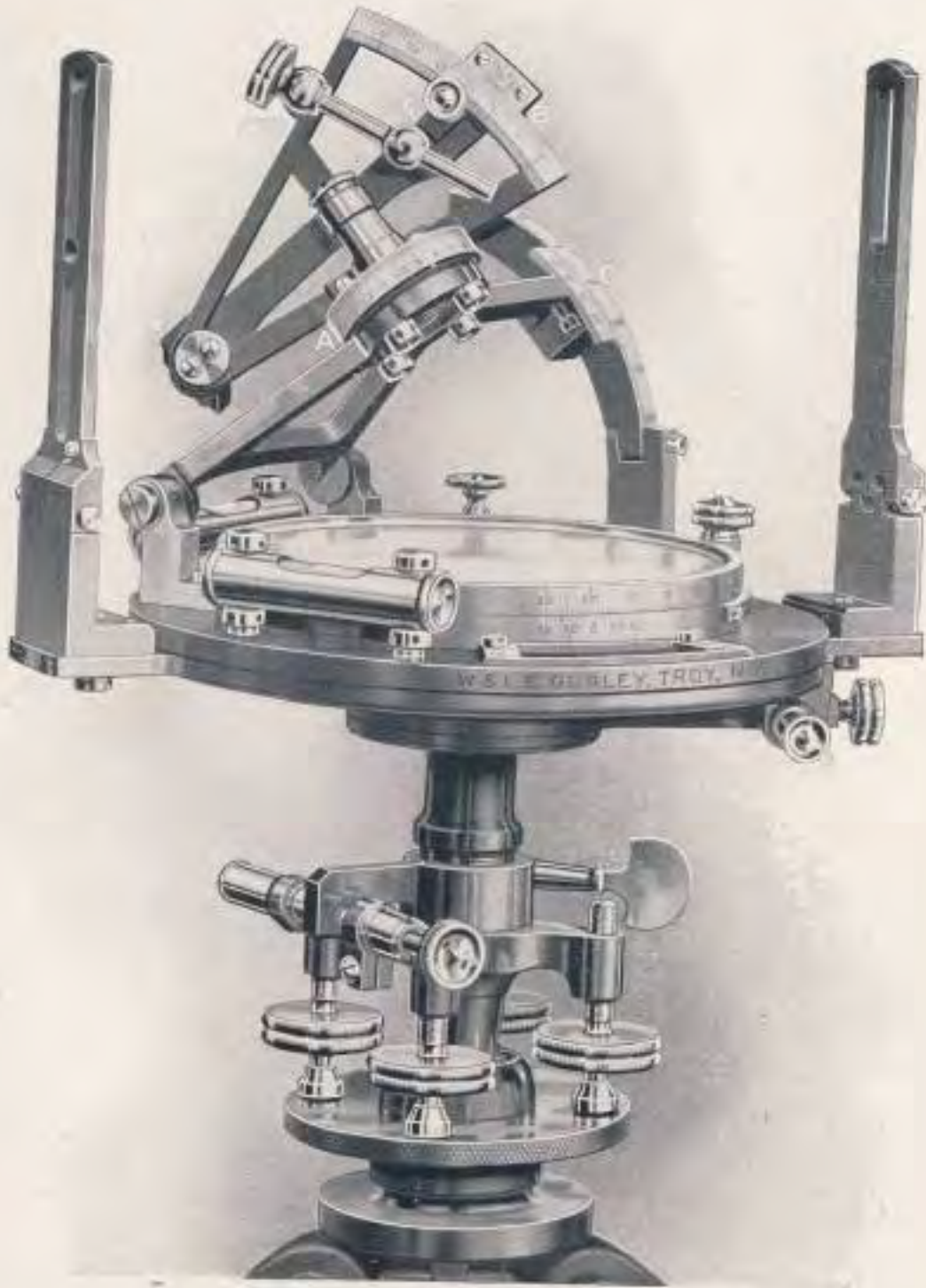
	Price.	Postage.
Ground glass level vial, unmounted, for 22 inch Y Level.....	\$1.85	\$0.25
Ground glass level vial, unmounted, for 15-20 inch Y Level....	1.65	.20
Ground glass level vial, extra sensitive (ten seconds in one tenth of one inch), unmounted, for 18, 20 or 22 inch Y Level .....	4.00	.25
Ground glass level vial, unmounted, for Architects Level.....	.90	.05
Cap for eyepiece or object glass, each.....	.75	.03
Clamp screw for leveling head.....	.75	.03
Tangent screw for leveling head.....	1.50	.13
Leveling screw for leveling head, each.....	1.50	.14
Eye-piece complete .....	6.00	.14
Object glass complete.....	7.00	.14
Platinum cross wires and diaphragm.....	3.00	.15
Platinum stadia wires, adjustable, and diaphragm.....	5.00	.15
Platinum stadia wires, fixed, and diaphragm.....	7.00	.15
Mahogany box with lock and strap, and fitted inside, according to size .....	6.00	

MISCELLANEOUS.

Plain tripod legs only, for Engineers Transit or Level, per set.	5.00	
Split tripod legs only, for Engineers Transit or Level, per set....	7.00	
Extension tripod legs only, for Engineers Transit or Level, per set .....	10.00	
Clamp screw and band for extension leg, each.....	.85	.05
Tripod head only, with bolts and nuts, for Engineers Transit or Level .....	5.00	.50
Wooden cap with brass screw plate, to fit tripod head, each.....	.75	.12
Brass bolt and nut to fit tripod head, each.....	.75	.05
Metal point or shoe for tripod leg, each.....	.50	.05
Shawl strap (superior) for extension tripod.....	.50	.10
Steel screw driver with wooden handle, each.....	.25	.05
Steel adjusting pins, each.....	.05	.01
Rubber tips, for bottom of instrument box, per set.....	.40	.08
Leather strap and buckle for instrument box.....	.50	.10
Reading glass, for Transit, each .....	.75	.02
Brass Plummet with screw cap, for Transit or Level, each.....	1.50	.20
Waterproof hood, for Transit or Level, each.....	1.00	.06
Chamois skin, large size, best quality, each.....	.65	.05
Clamp with clamp screw, for New York rod.....	2.50	.15
Clamp with scale and clamp screw, for Philadelphia rod.....	3.00	.15
Target with clamp screw and spring, for New York or Phila- delphia rod .....	4.50	.35
Chain handle, with staple and nuts, each.....	.75	.08
Chain tallies, per set of 9.....	.50	.06



POCKET SOLAR COMPASSES



No. 278

Pocket Solar Compass, with leveling head and extension tripod, \$120.00.



## POCKET SOLAR COMPASSES

The Pocket Solar Compass has a needle three inches long and a limb four and one half inches in diameter, graduated to half degrees, figured one row 0 to 180 each way, and reading by one double vernier to single minutes.

The arrangement of the plates is similar to that of the large Solar Compass, the lower plate carrying the sights revolving around the upper or compass plate, to which are attached the solar parts, levels, etc. There is a clamp and tangent movement to the horizontal limb and another to the whole instrument about its spindle, both now made with an opposing spring.

The sights are about four and one half inches high, the distance between them being nearly seven inches. They have a slit and hair in half their height, and are hinged to fold down in packing.

The compass circle is arranged with a pinion and is movable, so as to set off the magnetic declination to five minutes. The needle has a lifting lever by which it is raised against the glass.

The solar apparatus is attached to the upper plate, and consists of the usual hour, latitude, and declination arcs, marked respectively A, C, and B in the illustration on page 55, with an arm, FF, to the declination arc, carrying the solar lenses and lines.

The latitude arc is graduated to half degrees, and reads by its vernier to one minute.

The declination arc is graduated to quarter degrees, and reads by its vernier to single minutes.

The hour arc is graduated on its edge into hours and twelfths, or spaces of five minutes of time, the index on the declination arc above easily enabling one to read single minutes of time.

The solar lenses and lines are placed as in the larger instruments, the declination arc being also reversible as the sun changes from north to south of the equator.

When packed in the case, the declination arc with its arm is detached from the hour arc, and this, together with the latitude arc, folds close to the compass box.

The Pocket Solar Compass is used either upon a ball spindle with staff mountings, or as shown, upon a light tripod like the other pocket compasses, and often with a small leveling head with clamp and tangent screws.

Sometimes a side telescope with counterpoise is used in addition to the sight vanes.

No.		Price.
275	Pocket Solar Compass, one vernier to limb, limb reading to 1 minute, 3 inch needle, with two levels, folding sights and staff mountings -----	\$100.00
276	Pocket Solar Compass, with light tripod -----	105.00
277	Pocket Solar Compass, with light extension tripod -----	110.00
278	Pocket Solar Compass, with light extension tripod, and leveling head with clamp and tangent -----	120.00
280	Side Telescope and Counterpoise fitted to new Pocket Solar Compass -----	25.00



POCKET RAILROAD COMPASSES



Pocket Railroad Compass

No. 285 5" limb, 3 1/2" needle, folding sights, weighs 4 lbs. ----- \$50.00



## POCKET RAILROAD COMPASSES

The instrument shown is a one vernier Railroad Compass in miniature. The limb is five inches in diameter, graduated to half degrees, figured one row 0 to 180 each way, and reads by vernier to single minutes. The needle is three and one half inches long, and the magnetic declination can be set off to single minutes.

This instrument has the improved spring tangent, and the vernier is placed at an angle of thirty degrees with the line of sights. The sights fold down closely for convenience in packing, and are each made half slit and half hair, so that fore and back sights may be taken without turning the instrument.

The Pocket Railroad Compass can be used for a great variety of work, and, with light extension tripod, is especially adapted for surveys of mines, where angles must be taken independently of the needle.

The price of this instrument, with staff mountings, only, is \$45.00; with light tripod, as shown in the illustration, \$50.00; and with extension tripod, \$55.00.

No. 285 Pocket Railroad Compass cannot be fitted with Telescopic Sight No. 261 or No. 262.

No.		Price.
285	Pocket Railroad Compass, one vernier to limb, limb 5 inches diameter reading to 1 minute, and with clamp and tangent, 3½ inch needle, folding sights, two levels, staff mountings, and tripod. See page 57	\$50.00

Another form of the Pocket Railroad Compass is our No. 288, in which the plates are circular, the sights being screwed to the lower one, the compass circle above, and turning around the lower plate to set off the variation of the needle.

The limb is underneath the compass face, and reads by one double vernier under the glass to single minutes. There is also a clamp and tangent to the limb.

A clamp and tangent to the spindle is added whenever desired at an additional cost of \$5.00.

The sights are made to fold down closely to the glass for convenience in packing; they are each made half slit and half hair, so as to take fore and back sights without turning the instrument.

No.		Price.
288	Pocket Railroad Compass, one vernier to limb with clamp and tangent, limb inside the compass circle and reading to 1 minute, 4½ inch needle, folding sights, two levels, staff mountings and tripod	\$39.00



POCKET RAILROAD COMPASSES

WITH TELESCOPE



Pocket Railroad Compass

No. 293 4" limb, 4½" needle, 9" telescope, weighs 7¾ lbs. ----- \$84.00



## POCKET RAILROAD COMPASSES

WITH TELESCOPE

In the illustration of No. 293 is shown a form of the Pocket Railroad Compass with telescopic sight.

The plates are circular and the sights are made half slit and half hair, and are hinged to fold down close to the glass.

The needle is four and one half inches long, and there is an arc with vernier, on the outside of the compass plate, for setting off the magnetic declination.

The instrument has a limb four inches in diameter, placed inside the compass circle, and reading by a vernier to single minutes. The spindle has a clamp and tangent movement.

The sights being inclined to each other, as shown, a short standard is secured by two milled head screws to the tops of the sights, and a telescope is thus placed in position, making the instrument in effect a very light Surveyors Transit.

The attachments of vertical circle, level, and clamp and tangent, as shown in the figure, may also be added, furnishing the means for taking grades and running levels with accuracy sufficient for the common practice of the surveyor.

The sights are placed at one side of the line of zeros, and the telescope is thus brought into that line and over the center of the instrument. The short standard can be detached with the telescope and placed in the case, or easily replaced without deranging the adjustments.

The Pocket Railroad Compass may be used either on a staff or with small tripod, and, if desired, with leveling adopter, as shown.

No.	Price.
291 Pocket Railroad Compass, 4½ inch needle, clamp and tangent to limb, limb reading to 1 minute, clamp and tangent to spindle, and fitted with Telescopic Sight No. 261, with extras of level, vertical circle to 5 minutes, clamp and tangent to telescope axis, and tripod.....	\$77.00
292 Pocket Railroad Compass, same as No. 291, but with Telescope No. 262 .....	79.00
293 Pocket Railroad Compass, same as No. 292, and with Leveling Adopter, complete as shown on page 59 .....	84.00



## POCKET VERNIER COMPASSES



No. 300	Pocket Vernier Compass, 3½ inch needle,	-----	\$16.00
No. 305	Pocket Vernier Compass, 4½ inch needle,	-----	18.00

The Pocket Vernier Compass is an excellent and portable instrument for preliminary work, having a fine needle and a vernier and clamping nut, by which the sights can be placed at an angle with the line of zeros, so as to set off the magnetic declination as with the Vernier Compass.

The instrument has folding sights, two levels and staff mountings, and is packed in a mahogany case.

We make two sizes of the Pocket Vernier Compass, having needles respectively three and one half and four and one half inches long. In the smaller instrument the sights have a slit in the south vane and a hair in the north vane, for readily finding an object; but in the larger size the sights are made half slit and half hair. Both sizes have the compass circle graduated to half degrees. In the smaller size the vernier of the variation are reads to five minutes, and in the larger size to single minutes. The instrument may be used, if desired, upon tripods Nos. 416, 421 or 426. See page 65.

When ordered, a rack movement with pinion is added, by which the magnetic declination may be set off more readily, at an extra cost of \$4.00.

The compass with three and one half inch needle weighs about one and three quarters pounds; that with four and one half inch needle about two and three quarters pounds.

No.		Price.	Postage.
300	Pocket Vernier Compass, 3½ inch needle, folding sights, two levels and staff mountings-----	\$16.00	\$0.70
305	Pocket Vernier Compass, 4½ inch needle, folding sights, two levels and staff mountings-----	18.00	1.10



POCKET VERNIER COMPASSES

WITH TELESCOPE



No. 312

Pocket Vernier Compass, \$64.00.



## POCKET VERNIER COMPASSES

WITH TELESCOPE

As shown in illustration, a telescope with attached vertical circle, level, and clamp and tangent may be added to the sights of the four and one half inch Pocket Vernier Compass, making this little instrument practically a transit compass for land surveying and reconnoissance, capable of running levels and grades with accuracy sufficient for ordinary practice. The sights in this instrument are placed at one side, so that the telescope is in line with the zeros of the needle circle. The instrument has a clamp and tangent movement to the spindle, as shown in the figure. When packed for transportation, the telescope and support are detached from the sights and packed separately in the case. Staff mountings and a light tripod with plain legs, are furnished.

The weight of compass No. 312, without tripod, is about four and one-half pounds, and the tripod weighs about four pounds.

No.	Price.
311 Pocket Vernier Compass, 4½ inch needle, clamp and tangent to spindle, and fitted with Telescopic Sight No. 261, with extras of level, vertical circle to 5 minutes, clamp and tangent to telescope axis and tripod	\$62.00
312 Pocket Vernier Compass, same as No. 311, but with Telescope No. 262. See page 62	64.00

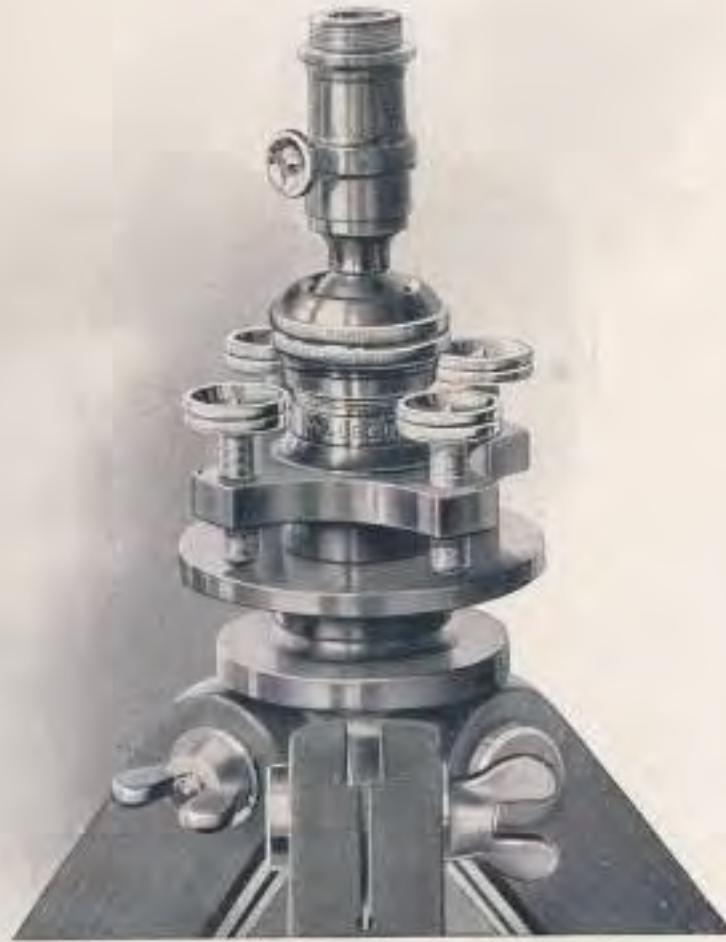
## POCKET PLAIN COMPASSES



No. 316	Pocket Plain Compass, 2½ inch needle,	\$10.00
No. 318	Pocket Plain Compass, 3½ inch needle,	12.50
No.		Price. Postage.
315	Pocket Plain Compass, 2½ inch needle, and folding sights	\$8.00 \$0.25
316	Pocket Plain Compass, 2½ inch needle, folding sights and staff mountings	10.00 .35
317	Pocket Plain Compass, 3½ inch needle and folding sights	10.00 .40
318	Pocket Plain Compass, 3½ inch needle, folding sights, and staff mountings	12.50 .50
319	Pocket Plain Compass, 3½ inch needle, folding sights, two levels and staff mountings	14.00 .50



## EXTRAS FOR POCKET COMPASSES



No. 327

Leveling Adopter, \$5.00.

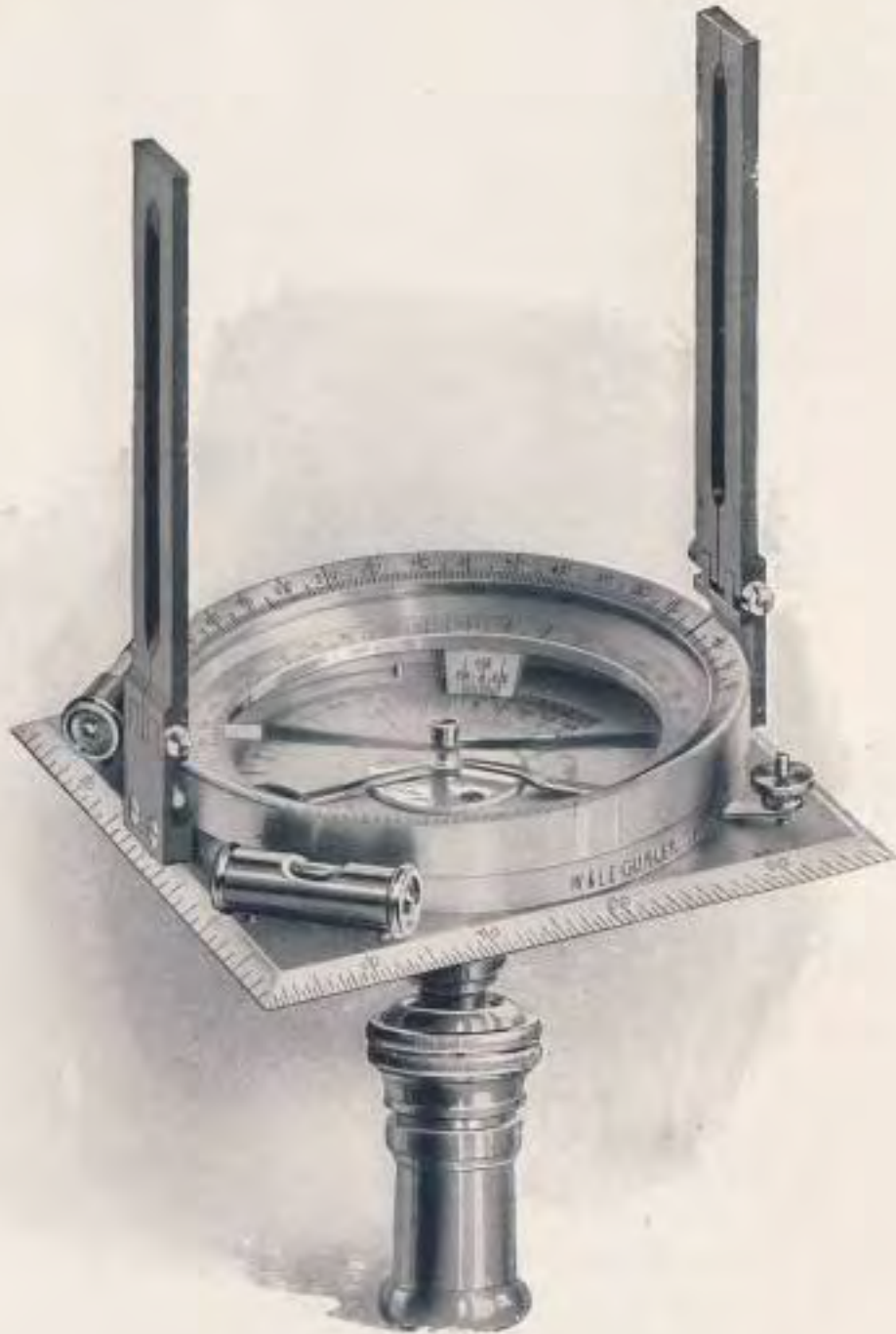
No.		Price.	Postage.
325	Clamp and Tangent fitted to ball spindle of Compasses Nos. 285, 288, 300, 305, and 315 to 319	\$5.00	
326	Rack and Pinion to variation arc of Compasses Nos. 288 to 312	4.00	
327	Leveling Adopter, small size	5.00	\$0.25
328	Leveling Head with 4 leveling screws and clamp and tan- gent to spindle	10.00	

For Tripods, see pages 82 and 84. For Leather Cases, see pages 85 and 86.



## GEOLOGISTS COMPASS

U. S. FOREST SERVICE STANDARD.



No. 335

Geologists Compass, \$24.00.



## GEOLOGISTS COMPASS

U. S. FOREST SERVICE STANDARD

This instrument has proved admirably adapted for topographical work, and has been adopted by the U. S. Forest Service for the use of field men in making forest surveys and maps.

It is made of aluminum to secure lightness in weight and has a needle two and five eighths inches long enclosed with its compass circle in a circular box set on a plate four inches square.

The edges of this base are beveled and graduated two for a tangent scale and two to inch scales. One of these latter is graduated to eighths, each of which represents ten chains, and the other is decimal. The compass circle is made movable, and by a vernier attached to it on the inside the magnetic declination may be set off to five minutes.

On the under side of the plate is a township plat.

On the south side of the compass face is an arc of 180 degrees figured on each side of the 0 line from 0 to 90. A weighted pendulum hung from the center pin indicates, by its pointer on this arc, the angle of slope, when the compass is placed so that it rests on its south edge. On the outside of the box containing the compass circle is a movable circle, beveled and graduated on its upper edge and figured from 0 to 90, and having at each quadrant a slit for sighting.

Two tall folding sights are attached to the edge of the circular box, and two small levels are placed at right angles with each other upon the base.

The compass is supported on a simple ball spindle and socket, with staff mountings, and is usually carried in a leather pouch with shoulder and belt straps. Such a pouch can be supplied for \$2.00 extra.

Tripods Nos. 416, 421 and 426 are suitable for use with this compass.

No.	Price.	Postage.
335 Geologists Compass (of aluminum), U. S. Forest Service pattern, graduated movable sighting circle, graduated base, variation arc, folding sights, two levels, clinometer and staff mountings. See cover page.....	\$24.00	\$0.35
416 Plain Tripod for No. 335 Compass.....	6.00	
421 Split Leg Tripod for No. 335 Compass.....	8.00	
426 Extension Tripod for No. 335 Compass.....	10.00	
<i>"Treatise on Practical Field Geology,"</i> by J. H. Farrell, E. M. and A. J. Moses, E. M. ....	2.50	
<i>"Instructions for Making Forest Surveys and Maps,"</i> issued by the Forest Service of the U. S. Department of Agriculture, contains suggestions for using these compasses. Pocket size, 85 pages, illustrated and with tables, etc.,		.25



## CLINOMETER COMPASS



No. 338

Clinometer Compass, \$16.00.

Another form of Pocket Compass is shown above. It is made of brass and is known as the Clinometer Compass.

It has a needle  $3\frac{1}{2}$  inches long enclosed with its compass circle in a circular box set upon a base  $4\frac{1}{2}$  inches square.

On one edge of this base is placed the rectangular side upon which the Compass may be set in determining grades; the small pendulum swinging from the center pin designating by its index the degree of slope upon the graduated arc on the compass face.

Two folding sights are attached to the circular box and two small levels are placed at right angles with each other upon the base.

The Compass is supported upon a simple ball spindle and socket with staff mountings and the instrument is packed in a mahogany box.

Tripods Nos. 416, 421 and 426 are suitable for use with this Compass.

See page 67.

No.	Price.	Postage.
338 Clinometer Compass (of brass), $3\frac{1}{2}$ inch needle, folding sights, square base, two levels, clinometer and staff mountings	\$16.00	\$0.50
Sole leather pouch, with belt loops and shoulder strap		2.50



## MINERS OR DIP COMPASSES



Nos. 340 and 341  
\$16.00.

Nos. 344 and 345  
\$16.00 and \$20.00.

The Miners Compasses, two forms of which are shown on this page, consist essentially of a magnetic needle so suspended as to move readily in a vertical direction, the angle of inclination, or "dip," being measured upon the graduated rim of the compass circle.

When in use, the ring or bail is held by the hand, and the compass box by its own weight assumes a vertical position. *It must be held in the plane of the magnetic meridian.*

In this position the needle, when brought over any mass of magnetic iron ore, dips, and thus detects the presence of such ore.

If the Miners Compass, Nos. 340 or 341, is held horizontal, it serves as an ordinary pocket compass, and indicates the magnetic meridian, in the plane of which it should be held when used to ascertain the dip.



## MINERS DIP COMPASSES

The Norwegian Compass, Nos. 344 and 345, is a modification of an instrument used in northern Europe.

It has a needle either three or four inches long, resting upon a single vertical pivot so as to move freely in a horizontal direction. At the same time, being attached to the needle cap by two delicate pivots, one on each side, it is free to dip like the needle of the ordinary Miners Compass.

*In use carefully note the following:*

The needle of our Miners or Dip Needle Compass is adjusted to read 0 at Troy, N. Y., when held in the plane of the magnetic meridian, but it may read differently in another place.

The readings of these compass needles are always relative and not absolute; therefore, if a needle is held in the plane of the meridian, in a place where it is known that there is no magnetic attraction, and the reading is carefully noted; and the needle is then held in the plane of the meridian where magnetic attraction is suspected, a different reading will show the presence of some magnetic body, whether the needle is, in the first case, perfectly horizontal (reads to zero) or not.

A level cannot be supplied with Miners Dip Compasses  
Nos. 344 or 345.

When in use, the needle should always be held so that it will swing freely in the plane of the meridian, the stops being drawn entirely out of the way.

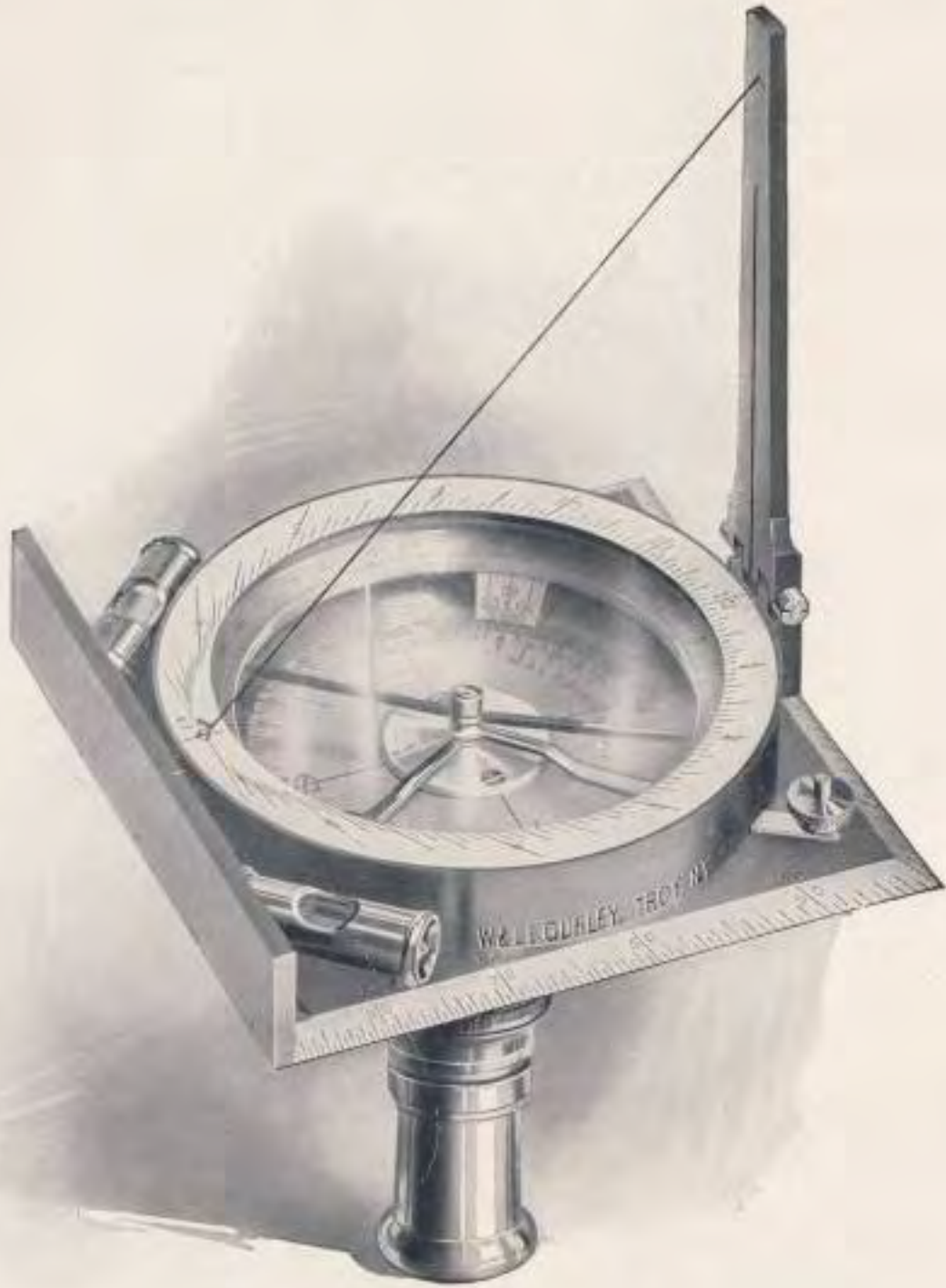
When not in use, the stops must be pushed entirely in, so that the delicate bearings will not be injured.

There is no instrument made which will indicate the presence of gold or silver.

No.		Price.	Postage.
340	Miners Dip Compass, 3 inch needle with stop, glass on both sides, in wood case.....	\$16.00	\$0.25
340A	Miners Dip Compass, 3 inch needle with stop, glass on both sides, in a wood case, and with level attached.....	18.00	
341	Miners Dip Compass, 3 inch needle with stop, glass on both sides, with brass covers.....	16.00	.35
341A	Miners Dip Compass, 3 inch needle with stop, glass on both sides, brass covers, and with level attached.....	18.00	
344	Miners Dip Compass, 3 inch Norwegian needle with stop, glass on both sides, with brass covers.....	16.00	.35
345	Miners Dip Compass, 4 inch Norwegian needle with stop, glass on both sides, with brass covers.....	20.00	.50
	Sole leather pouch, with belt loop, for Nos. 340 to 344.....	2.00	
	Sole leather pouch, with belt loop, for No. 345.....	2.50	
	<i>"Location and Examination of Magnetic Oil Deposits by Magnometric Measurements,"</i> by Eugene Haanel, Ph. D., Superintendent of Mines, Canada.....	1.00	
	<i>"Treatise on Mine Surveying,"</i> by B. H. Brough.....	2.50	
	<i>"Practical Geology,"</i> by J. H. Farrel, E. M. and A. J. Moses, E. M.	2.50	



DIAL COMPASSES



No. 349

Dial Compass, with staff mountings, \$20.50.



## DIAL COMPASSES

This instrument has a needle two and five eighths inches long, and with its compass circle is enclosed in a circular box set upon a base four inches square, three edges of which are chamfered and graduated, the one on the W side of the compass into inches and tenths and the two others into degrees and half degrees, and figured from a center on the southwest corner of the base.

The compass circle is movable, in order to set off the magnetic declination, and has a vernier attached to it on the inside, by which a graduated arc on the face of the compass is read to five minutes.

There is also on the south side of the face an arc of one hundred and eighty degrees, figured from 0 to 90 on each side of the south or zero line of the face.

A pendulum with index point hung from the center pin reads this arc when the compass is set up vertical on the raised south edge, thus making it a clinometer or slope measurer.

The sight is hinged to fold in packing, but when erect it makes taut a silk thread, attached at one end to the sight and at the other to an hour circle above the compass glass, at an angle with the plane of the hour circle equal to that of the latitude of the place where the compass is used. The hour circle is graduated for any required latitude, as a sun dial, the thread serving as a gnomon to give apparent time with the sun.

The Dial Compass is extensively used in this country in regions where there is local attraction, and it is desirable to have a simple means of determining the meridian independently of the needle.

This can be easily and quickly done by turning the compass, with dial graduated for the latitude of the place, until the shadow of the thread when the compass is held level indicates local time on the dial. The line of zeros will then be in the meridian. The needle may be set to the meridian by laying off the magnetic declination and any deflection of the needle from the true meridian will indicate the presence of veins of magnetic iron ore.

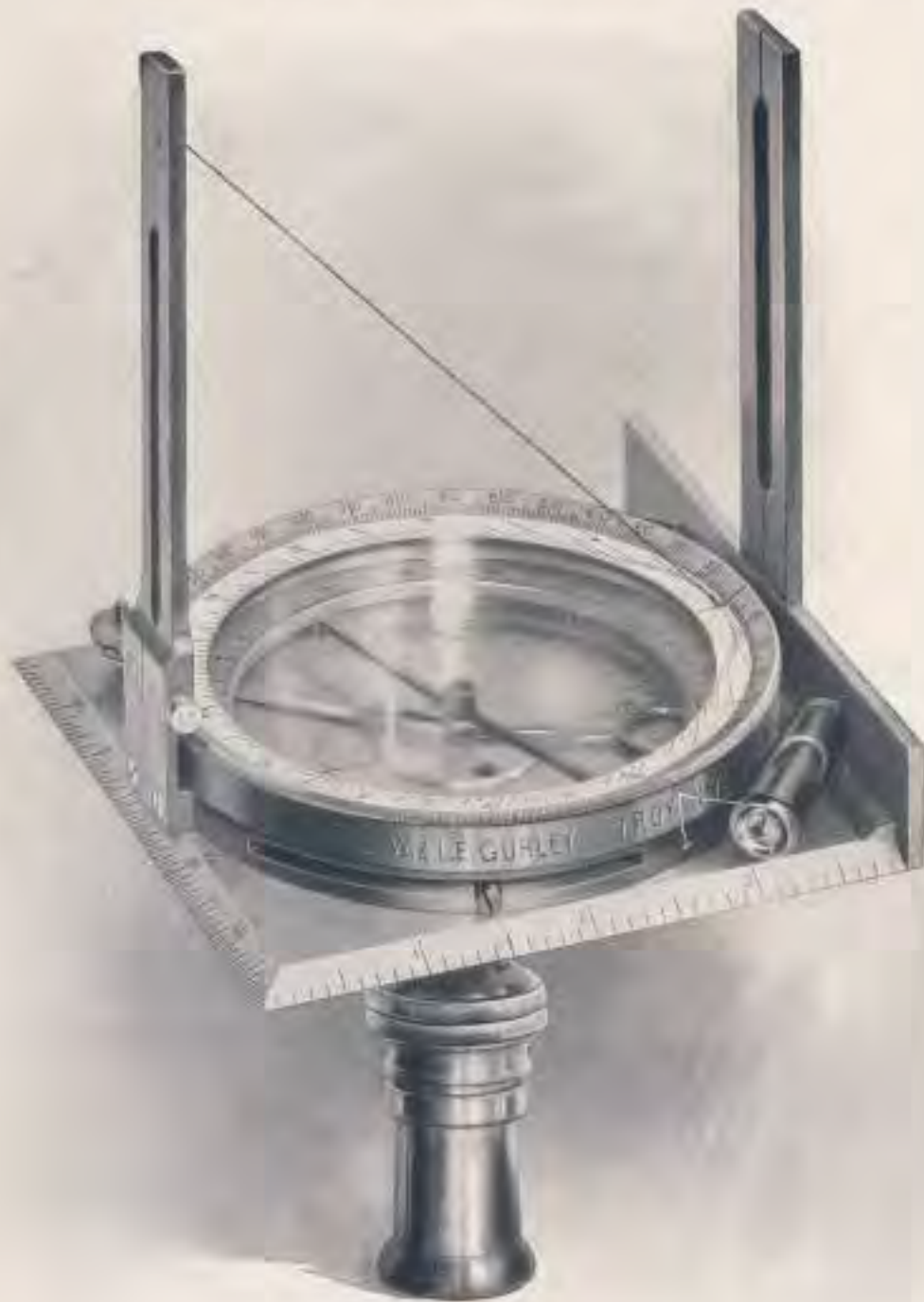
Extra hour circles, graduated for any latitude and to fit the same compass, can be furnished, and we also supply staff mountings, including ball spindle and socket, when desired.

No.		Price.	Postage.
348	Brass Dial Compass, with hour circle graduated for any latitude as ordered, variation arc, graduated base, one folding sight, two levels and clinometer	\$18.00	\$0.40
349	Dial Compass, same as No. 348, and with staff mountings complete. See page 71	20.50	.50
	Extra Hour Circles, graduated for any latitude as ordered, to fit either of these Dial Compasses, each	5.00	.12
	A light tripod for Dial Compass No. 349 costs \$6.00 extra.		
	Sole leather pouch, with belt loops and shoulder strap, for No. 348 or No. 349 Dial Compass	2.00	



## ALUMINUM DIAL COMPASSES

U. S. GEOLOGICAL SURVEY PATTERN



No. 350

Aluminum Dial Compass, \$30.00.

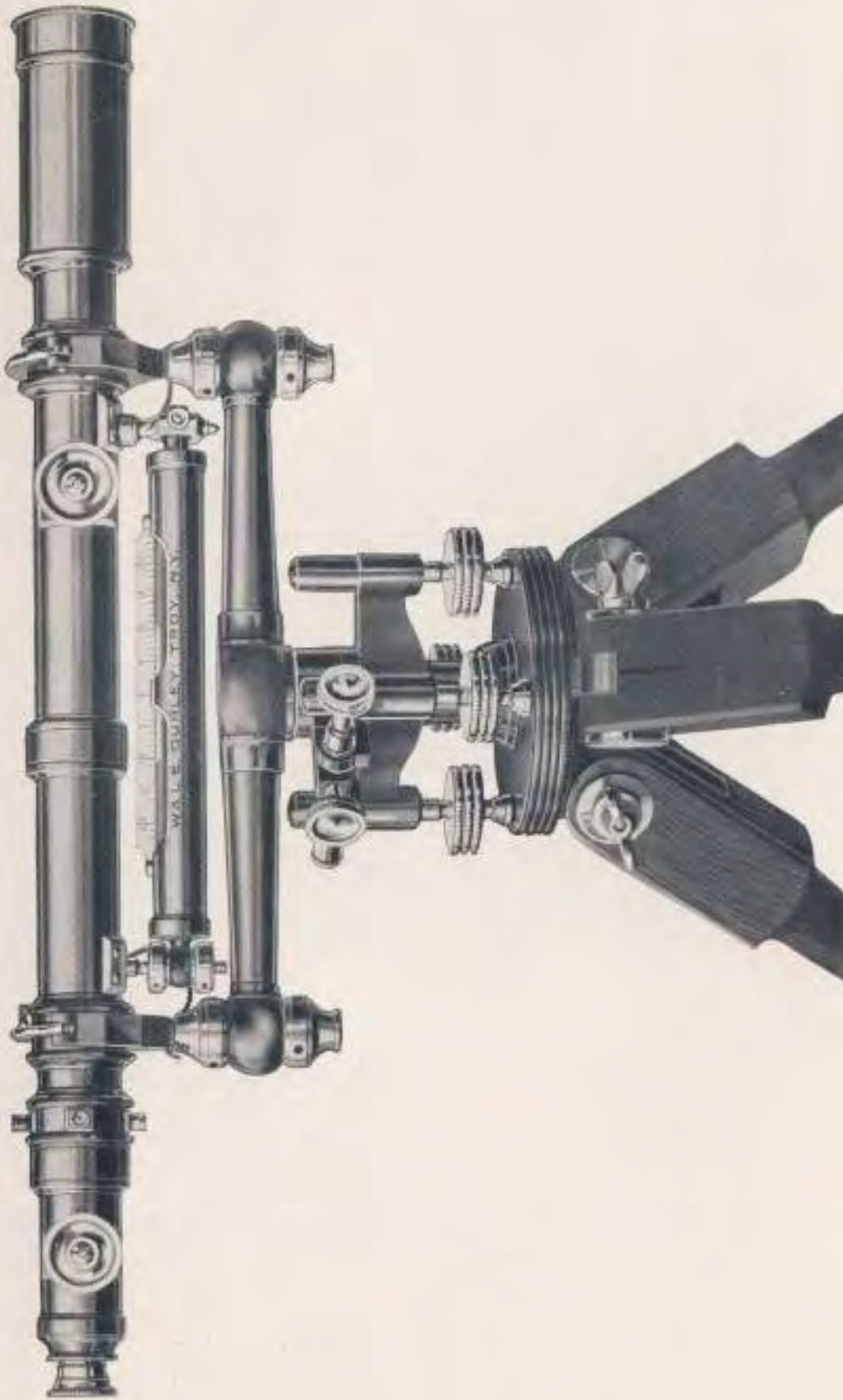
The illustration shows an improved form of the Dial Compass, made of aluminum, and differing from our No. 348 in several respects. This instrument is of the same size and has the same parts as the Dial Compass shown on page 71, and has in addition a movable circle graduated on its beveled edge from 0 to 90 degrees. At each quadrant there is a slit cut for sighting, and an open sight is furnished with the compass, to be placed upon the clinometer base when desired, and used in connection with the regular sight. The instrument is mounted upon a small ball spindle and socket, with staff mountings, and is packed in a mahogany box.

No.		Price.	Postage.
350	Aluminum Dial Compass, with hour circle graduated for any latitude as ordered, graduated base, graduated movable sighting circle, variation arc, one folding sight, one removable sight, two levels, clinometer and staff mountings	\$30.00	\$0.45
	Extra Hour Circles, graduated for any latitude as ordered, to fit Dial Compass, each	5.00	.14
	A light Tripod for Dial Compass No. 350 costs \$6.00 extra.		
	Sole leather pouch, with belt loops and shoulder strap	2.00	



# ENGINEERS Y LEVELS

FOUR SIZES



Engineers Y Level

No. 375	22 inch telescope,	-----	\$115.00
No. 376	20 inch telescope,	-----	110.00
No. 377	18 inch telescope,	-----	110.00



## ENGINEERS Y LEVELS

MADE IN FOUR SIZES

Of the different models of precise leveling instruments, the Y Level is universally preferred by American engineers, on account of its accuracy and ease of adjustment. Gurley Levels are standard, and are noted for their accuracy, durability, ease and permanence of adjustment.

### Specifications of Nos. 375, 376 and 377

**CENTERS AND HEAD:** Long steel spindle with bronze socket, leveling head of ribbed construction combining light weight with rigidity, four leveling screws with dust caps, clamp and tangent to spindle.

**BAR AND WYES:** Bar of bell metal, special design, shaped for greatest strength in the parts most subject to strain. Wyes, large and strong, with adjustable nuts; one of the wye clips fitted with stop which maintains cross wires in a true horizontal and perpendicular position.

**TELESCOPE:** Best quality with good light, flat field and clear definition; erecting eyepiece, objective 1 $\frac{1}{8}$  inches aperture; cross wires of *platinum*; rack and pinion to eyepiece and object slides; dust guard to object slide; detachable sunshade, and cap for object glass.

**LEVEL:** With sensitive ground vial, graduations on metal scale; level is adjustable horizontally and vertically.

**FINISH:** Bronze, except screws and small parts which are bright.

**EQUIPMENT:** Mahogany box with hinged cover, lock, strap and rubber bumpers. Instrument is packed upright with leveling head attached. Accessories of 10 oz. plain plummet, screw driver and adjusting pins.

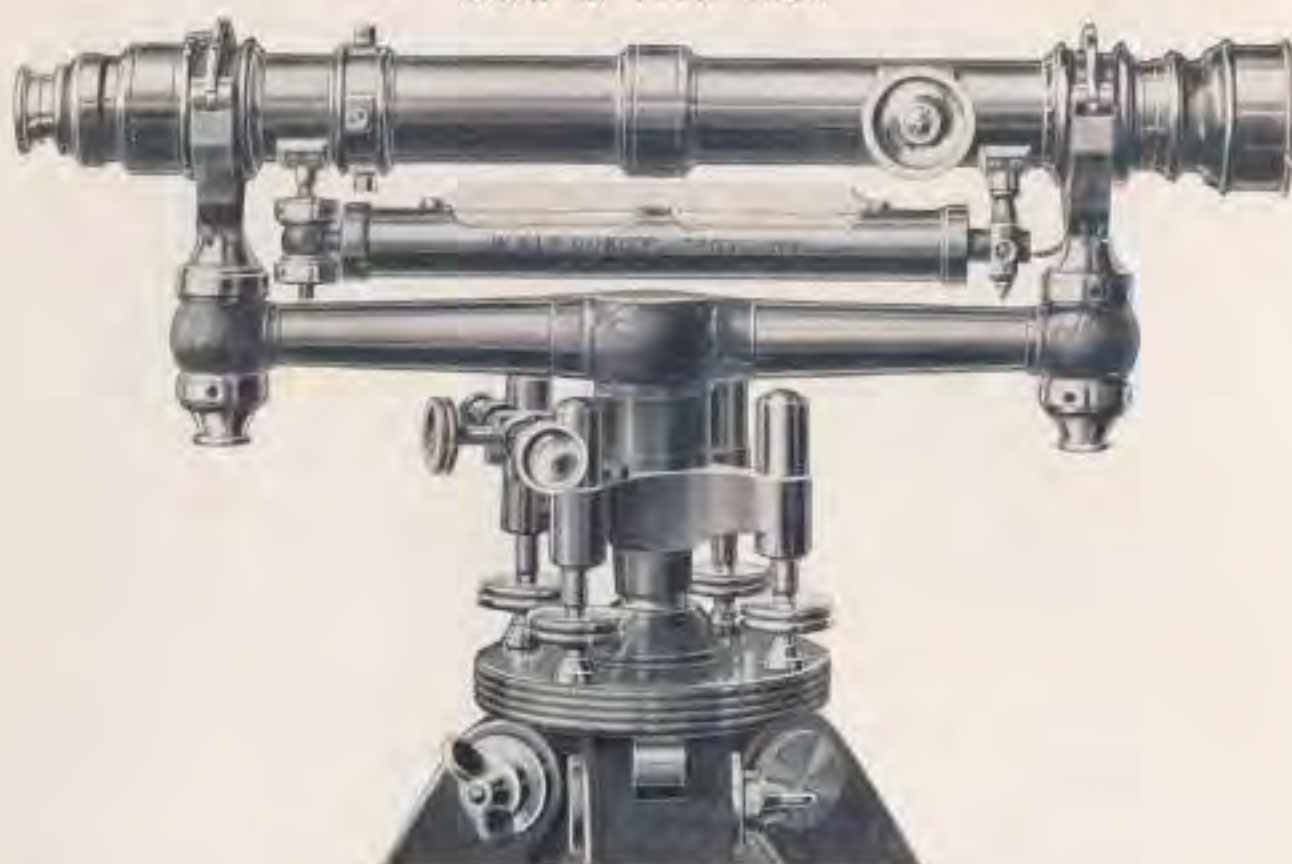
**TRIPOD:** Plain legs, catalogue No. 430; bolts have wing nuts which can be tightened by hand; protecting cap for head.

	No. 375	No. 376	No. 377
Length of telescope -----	22 inches	20 inches	18 inches
Power of telescope -----	42 diameters	37 diameters	32 diameters
Least focussing distance of telescope, from center of instrument -----	12 feet	11 feet	8 $\frac{3}{4}$ feet
Weight of instrument only --	14 $\frac{1}{4}$ lbs.	13 $\frac{1}{2}$ lbs.	13 $\frac{3}{4}$ lbs.
Weight of instrument includ- ing box and accessories --	26 lbs.	24 lbs.	22 lbs.
Weight of tripod -----	10 lbs.	10 lbs.	10 lbs.
Weight of instrument and tripod, packed in 2 boxes, for domestic shipment --	75 lbs.	65 lbs.	65 lbs.
For export shipment ----	110 lbs.	100 lbs.	100 lbs.
<b>PRICE</b> -----	\$115.00	\$110.00	\$110.00



## ENGINEERS Y LEVELS

MADE IN FOUR SIZES



No. 378

Engineers 15 inch Y Level, \$90.00.

This instrument is of the same pattern and construction as Nos. 375, 376 and 377 and the specifications are alike, except as follows:

Telescope is 15 inches long.

Power of telescope is 20 diameters.

Telescope can be focussed upon an object  $8\frac{1}{2}$  feet from center of instrument.

Eyepiece has spiral movement instead of rack and pinion.

Object slide has no dust guard.

Weight of instrument is about  $11\frac{1}{2}$  lbs.; including box and accessories, about 19 lbs.

Weight of tripod is about 10 lbs.

Weight of instrument and tripod, packed in two boxes, for domestic shipment, 60 lbs.; for export shipment, 90 lbs.

No.	Price.
378 Engineers 15 inch Y Level, -----	\$90.00

**Attachments and Modifications for Engineers Y Levels Nos. 375, 376, 377 and 378, when ordered with the instruments, can be supplied as follows:**

Stadia wires of <i>platinum</i> , adjustable, disappearing or fixed, -----	No extra charge.
Level Vial with graduations and figures directly on the glass (omitting metal scale) -----	No extra charge.
Cloth finish on telescope and level tube, -----	No extra charge.
Level Vial, extra sensitive, value ten seconds to one tenth of an inch (instead of regular vial), extra, -----	\$2.00
Rack and pinion movement for eyepiece, for No. 378, -----	5.00
Dust guard to object slide, for No. 378, -----	5.00
Horizontal Circle, $3\frac{1}{2}$ inches diameter, graduated to degrees, reading by vernier to five minutes -----	15.00
Compass with full needle circle graduated to whole degrees, needle 3 inches long, with stop. Attached on top of telescope and secured with two clamp screws -----	15.00
Mirror for observing level bubble from eyepiece end of instrument. --	10.00
Waterproof hood -----	1.00
Split leg tripod instead of plain tripod -----	2.00
Extension leg tripod instead of plain tripod -----	5.00
Sole leather case for mahogany box -----	10.00
Sole leather case for extension tripod -----	10.00
Canvas Case with leather mountings, for extension tripod -----	7.50
Special outside packing box with hinged cover and lock, lined inside with rubber cushions, for convenience in reshipping -----	6.00



## ARCHITECTS LEVELS

MADE IN ONE SIZE



No. 380

Architects Level, \$50.00.

The Architects Level, introduced by us in 1874, is extensively used by intelligent and enterprising architects, builders and millwrights on construction and building work, as well as by engineers and surveyors in the grading of streets, sewers, irrigation ditches and drains. A constantly growing demand for this instrument has been created by its extremely low price, simplicity and excellence.

## Specifications of No. 380

- CENTERS AND HEAD:** Long bronze spindle; leveling head of ribbed construction combining light weight with rigidity; four leveling screws; clamp screw to spindle.
- BAR AND WYES:** Like those of our Engineers Y Levels Nos. 375 to 378 and adjusted in the same manner. One of the wye clips fitted with stop which maintains cross wires in a true horizontal and perpendicular position.
- TELESCOPE:** 12 inches long, power 19 diameters, objective  $1\frac{3}{16}$  inch aperture, erecting eyepiece, cross wires of *platinum*, rack and pinion movement to object slide, spiral movement to eyepiece, sunshade and cap for objective. Telescope will focus on an object  $6\frac{1}{2}$  feet from the center of the instrument.
- LEVEL:** With sensitive ground vial, graduations on metal scale; level is adjustable horizontally and vertically.
- CIRCLE:** 3 inch diameter, graduated to degrees, figured 0 to 90 each way and reading by vernier to five minutes.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box with hinged cover, lock and strap. Trivet plate which enables instrument to be set upon the walls or girders of a building where it is impossible to use a tripod. Accessories of 6 oz. plain plummet, screw driver and adjusting pins.
- TRIPOD:** Plain legs; bolts have wing nuts which can be tightened by hand; protecting cap for head.
- WEIGHT:** Of instrument only,  $6\frac{1}{2}$  lbs.; with box and accessories,  $11\frac{3}{4}$  lbs.; weight of tripod,  $7\frac{1}{2}$  lbs.; shipping weight, 2 boxes packed for domestic shipment, about 45 lbs.; for export, about 65 lbs.

No.	380 Architects Level, complete as specified,	Price. \$50.00
-----	--	-------------------



## ARCHITECTS LEVELS

MADE IN ONE SIZE



No. 381

Architects Level, \$65.00.

This instrument, in pattern and construction, is like No. 380, and the specifications are the same, except that the leveling head is equipped with clamp and tangent to spindle. Instrument weighs about 7 lbs. and the other weights correspond with those specified under No. 380.

No.	Price.
381 Architects Level, complete, .....	\$65.00

**Attachments and Modifications for Nos. 380 and 381 Architects Levels  
can be supplied, when ordered with the instruments, as follows:**

Stadia wires of <i>platinum</i> , adjustable, disappearing or fixed...No extra charge.	
Rack and pinion movement to eyepiece .....	\$5.00
Dust guard to object slide .....	5.00
Compass with full needle circle graduated to whole degrees, figured 0 to 90 each way, needle 3 inches long with stop. Attached on top of telescope and secured with two clamp screws ...	10.00
Waterproof Hood .....	1.00
Split leg tripod instead of plain tripod .....	5.00
Extension leg tripod instead of plain tripod .....	7.00
Jointed extension tripod instead of plain tripod, with canvas case; 24 inches long when closed .....	12.50



## EXPLORERS LEVELS

MADE IN ONE SIZE



No. 383

Explorers Level, \$50.00.

A new model, small and light, designed to meet the requirements of Engineers for a compact and serviceable Level for running preliminary lines in exploration work where it is not convenient to operate a large instrument. A companion instrument to our Explorers Transit, and can be packed with it in a 24 inch suit case, tripod included.

## Specifications of No. 383

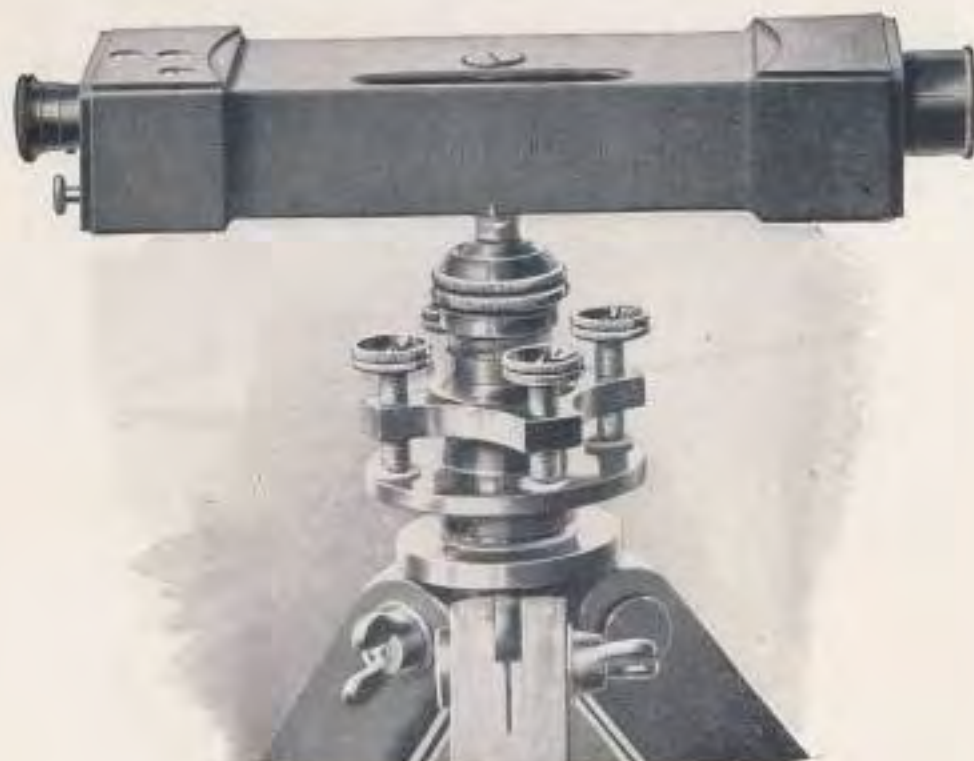
- CENTERS AND HEAD:** Long spindle and socket, leveling head of ribbed construction, combining light weight with rigidity; four leveling screws with dust caps; clamp and tangent to spindle.
- TELESCOPE:**  $6\frac{1}{2}$  inches long, of best quality with good light, flat field and clear definition; erecting eyepiece, power 16 diameters, objective  $\frac{1}{4}$  inch aperture; cross wires of *platinum*; rack and pinion movement to object slide, spiral movement to eyepiece; detachable sunshade, and cap for object glass.
- LEVEL:** With sensitive ground vial, graduations on the glass.
- FINISH:** Bronze, except screws and small parts which are bright.
- EQUIPMENT:** Mahogany box  $7\frac{1}{4}$  inches x 6 inches x 4 inches, with lock and shoulder strap; leather covered when ordered. Accessories of 6 oz. plain plummet, adjusting pins, and screw driver.
- TRIPOD:** With plain or extension legs, or jointed extension legs which can be closed to 24 inches in length.
- WEIGHT:** Instrument,  $2\frac{3}{4}$  lbs.; with box and accessories 5 lbs.; weight of tripod 4 to 6 lbs. Shipping weight Level and tripod, packed for domestic shipment about 40 lbs.; for export shipment about 65 lbs.

No.		Price.
383	Explorers Level, with mahogany box, accessories and plain tripod	\$50.00
	Stadia wires of <i>platinum</i> , extra	2.50
	Extension tripod legs instead of plain legs, extra	5.00
	Jointed extension tripod legs instead of plain legs, extra	10.00
	Canvas case for jointed extension tripod, extra	2.50
	Leather covering for box, permanently attached to the wood, extra	5.00
384	Explorers Level complete, with stadia wires, leather covered box, jointed extension tripod in canvas case	70.00



## DRAINAGE LEVELS

MADE IN ONE SIZE



No. 388

Drainage Level, with Compass attached, \$30.00.



No. 387

Drainage Level, \$25.00.



## DRAINAGE LEVELS

MADE IN ONE SIZE

No. 387 represents a level combining great simplicity and compactness with real efficiency, at a very moderate cost. The telescope is about nine inches long and is made especially for this instrument, being achromatic, of low but sufficient power, and having good light and definition. The cross hairs are fixed in the eyepiece, so that they are not easily disturbed. The level, telescope and socket are enclosed in a strong outside case of brass, about seven and one half inches long, two and one quarter inches wide, and one and one half inches high.

The ends of the case are thickened and made parallel each to each, on the upper and under sides.

A ball attachment, by which the instrument is made approximately level, screws into a spindle which is within the case. The precise leveling is done by the leveling screws, as shown. When desired, the leveling head can be dispensed with, and the instrument leveled by the ball alone.

The advantages of this level in the work of the farmer, manufacturer, and builder will be apparent. Drains can be located and leveled, the height of springs ascertained, and the accurate level of lines of shafting, floor timbers, and sills be determined.

The Architects Leveling Rod is intended for use with this instrument, when desired. See Nos. 510 and 511, pages 88 and 90.

A compass with three inch needle is added to the Drainage Level, when desired. This is fitted to the upper surface of the case and can be removed at pleasure, and while it does not interfere in any way with the reading of the level vial, it furnishes a ready means of determining the bearing of lines or of measuring angles by the needle.

No.	Price.
385 Drainage Level, with staff mountings-----	\$15.00
386 Drainage Level, with staff mountings and tripod-----	20.00
387 Drainage Level, with staff mountings, leveling screws and tripod. See page 80 -----	25.00
388 Drainage Level, same as No. 387, and with compass attached. See page 80 -----	30.00

Stadia hairs will be inserted in Drainage Levels, if required, for \$5.00 extra.

Drainage Levels Nos. 387 and 388 are regularly supplied with plain tripods. A split leg tripod may be substituted for \$3.00 extra, or an extension leg tripod for \$5.00 extra.

Levels, Nos. 385 to 388, are packed in mahogany case with lock, and strap or handle. For Level Tripods, see pages 82 to 85. For Leather Cases, see pages 85 and 86.



## TRIPODS



Nos. 415 and 416  
Plain Leg Tripods.

Nos. 400 and 430  
Plain Leg Tripods.

In the tripods of all our instruments, the upper part of the leg is flattened and slotted to fit closely on each side of a tenon projecting from the under side of the tripod head, to which it is firmly held by a brass bolt, with large head and thumb nut on opposite sides of the leg. The tripod head is of the best bell metal, the tenons and upper part being cast in one piece and firmly braced together. The legs are round, and taper in each direction toward the head and point. The point or shoe is a tapering brass ferrule, having an iron end. It is cemented and firmly riveted to the wood.



## TRIPODS



Nos. 405 and 435  
Split Leg Tripods.

Nos. 410 and 440  
Extension Leg Tripods.

The legs of all our tripods are made of straight grained hardwood, and are about four feet eight inches long from head to point.

We make four sizes of tripods with solid legs as follows:

The heavy tripod, No. 400, has a metal head four and one quarter inches in diameter, with legs one and three eighths inches in diameter at the top, one and three quarters at the swell, and one and one eighth near the point. This is used with the Engineers Transits and with the larger Y Levels.

The medium sized tripod has a head the same diameter as the former.



## TRIPODS

and five eighths at the swell, and one and one sixteenth near the point. This tripod is used with the Surveyors Transit, the light Engineers Transit, and the fifteen inch Level.

The compass tripod, No. 415, has a head about three inches in diameter, and legs which are about one inch in diameter at the top, one and three eighths at the swell, and seven eighths near the point. This tripod is used with the various compasses and with the Vernier Transit Compass.

## PLAIN TRIPODS.

The pocket compass tripod is the same pattern as No. 415, but has smaller head and legs. The legs are nearly three quarters of an inch in diameter at the top and bottom, and one and one eighth at the swell.

## SPLIT LEG TRIPODS.

The improved split leg tripods, Nos. 405 and 435, are shown in the illustration. The form is shown in section at A B.

The legs are of straight grained hardwood, combining stiffness and strength with reduced weight, and allowing greater ease in carrying. We make several sizes of this tripod, for use with transits, levels, and compasses.

## EXTENSION TRIPODS.

In No. 410 is shown an improvement on the pattern of extension tripod, which has proved so popular. The new tripod is lighter, stronger and more rigid than the old pattern. The form is shown in section at A B.

This tripod can be carried more easily than the old one, and the shape of the side pieces allows the middle piece to be clamped firmly with the two bands and screws, while slight changes in length can be made by twisting the middle piece up or down. The legs are clamped to the tripod head with thumb nuts.

We make several sizes of these tripods. The large size is used with the large transits and levels, and the medium size with the Mountain Transit. A smaller size is used with the smaller transits, architects levels, and large compasses, and the smallest size is used with the pocket compasses.

## TRANSIT TRIPODS.

No.		Price.
400	Plain Tripod for Transits Nos. 1 to 90.....	\$10.00
401	Plain Tripod for Transits Nos. 100 to 117.....	7.00
405	Split Leg Tripod for Transits Nos. 1 to 90.....	12.00
406	Split Leg Tripod for Transits Nos. 100 to 117.....	10.00
410	Extension Tripod for Transits Nos. 1 to 90.....	15.00
411	Extension Tripod for Transits Nos. 100 to 117.....	12.00

## COMPASS TRIPODS.

415	Plain Tripod for Compasses Nos. 210 to 232.....	7.00
416	Plain Tripod for Pocket Compasses Nos 275 to 319.....	6.00
420	Split Leg Tripod for Compasses Nos. 210 to 232.....	10.00
421	Split Leg Tripod for Pocket Compasses Nos. 275 to 319.....	8.00
425	Extension Tripod for Compasses Nos. 210 to 232.....	12.00
426	Extension Tripod for Pocket Compasses Nos. 275 to 319.....	10.00

## LEVEL TRIPODS.

430	Plain Tripod for Levels Nos. 375 to 378.....	10.00
431	Plain Tripod for Levels Nos. 380 and 381.....	7.00
432	Plain Tripod for Levels Nos. 385 to 388.....	6.00
435	Split Leg Tripod for Levels Nos. 375 to 378.....	12.00



### TRIPODS

No.		Price.
436	Split Leg Tripod for Levels Nos. 380 and 381	\$10.00
437	Split Leg Tripod for Levels Nos. 385 to 388	8.00
440	Extension Tripod for Levels Nos. 375 to 378	15.00
441	Extension Tripod for Levels Nos. 380 and 381	12.00
442	Extension Tripod for Levels Nos. 385 to 388	10.00

When ordering a separate tripod, the customer should always specify for what instrument it is wanted.

### BRASS PLUMMETS—Plain



No. 465  
Adjustable  
Plummet, \$2.50.

No.		Price.	Postage.
450	Plummet, screw head, steel point, 6 oz.	\$1.00	\$0.15
452	Plummet, screw head, steel point, 10 oz.	1.50	.20
454	Plummet, screw head, steel point, 16 oz.	2.00	.25
456	Plummet, screw head, steel point, 24 oz.	2.75	.35
458	Plummet, screw head, steel point, 32 oz.	3.50	.45
460	Plummet, screw head, steel point, long neck, 12 oz.	2.00	.25

### BRASS PLUMMETS—Adjustable

These Plummetts have a concealed reel, R, around which the string is wound by turning the milled head, K, on top. The friction upon the reel will hold the Plummett at any desired point of the line.

No.		Price.	Postage.
465	Adjustable Plummet, 10 oz.,	\$2.50	\$0.20
469	Adjustable Plummet, 30 oz.,	5.00	.45
471	Iron Spads, for suspending plummetts in mines, per 100	1.50	.15
472	Stake Tacks, galvanized, 2 oz. box	.10	.04
473	Stake Tacks, galvanized, 1 lb. box	.50	.20
474	Plummet Cord, braided linen, per 25 yards	.38	.04

### LEATHER CASES AND POUCHES

We have in our establishment the best facilities for making all kinds of leather work to order, and can promptly furnish anything in the line of cases or pouches for surveying instruments.

The small pouch as shown in the illustration furnishes a very convenient method for carrying small Pocket Compasses without telescopes, as Nos. 288-350.

These pouches are strongly made, furnished with adjustable sling strap, and are so arranged as to hold the Compass and its mountings firmly and protect them from any injury in transportation. The wooden box in which the small Compasses are packed is omitted when the leather *pouch* is used. The leather *cases*, however, are fitted to hold the wooden box containing the instrument, and are used with any transit, level or compass.



## SOLE LEATHER CASES, WITH SHOULDER STRAPS

TO FIT OUTSIDE THE WOODEN BOX.

No.		Price.	
475	For Engineers or Surveyors Transits. Price according to size -----	\$8.00 to \$10.00	
476	For Mountain, Reconnoissance or Builders Transits.....	8.00	
477	For Large Solar Compass -----	10.00	
478	For Surveyors Compasses, Nos. 215 to 232. Price according to size.....	6.00 to 9.00	
479	For Engineers Y Levels. Price according to size.....	8.00 to 10.00	
480	For Architects Levels.....	6.00	
481	For Drainage Levels -----	4.00	
			Postage.
485	For Compasses Nos. 315, 316, 335, 340 to 344, 348 to 350	2.50	\$0.22
486	For Compasses Nos. 300, 317 to 319, 338, 345.....	3.00	.32
487	For Compasses Nos. 275, 285, 288, 305.....	4.00	.50
488	For Compasses Nos. 291 to 293, 311, 312.....	6.00	



Nos. 490 to 492

Leather Pouch with Shoulder Strap.

FITTED TO RECEIVE POCKET COMPASSES WITHOUT THE WOODEN BOX

No.		Price.	Postage.
490	For Compasses Nos. 315, 316, 335, 340 to 344, 348 to 350	2.00	\$0.18
491	For Compasses Nos. 300, 317 to 319, 338, 345.....	2.50	.28
492	For Compasses Nos. 288, 305.....	3.00	.38

### TRIPOD CASES

	Price.
494 Leather Case, with cap and carrying handle, for extension tripod -----	\$10.00
497 Canvas Case, with leather trimmings, for extension tripod.....	7.50

### ENGINEERS FIELD BAG

	Price.	Postage.
498 Engineers Field Bag, made of heavy sole leather with two extra pockets and with shoulder strap. Inside measure: 9 inches long, 7 inches high, 2½ inches wide -----	\$4.00	\$0.35

We make to order Leather Cases and Pouches of any style and size that may be desired.



LEVELING RODS



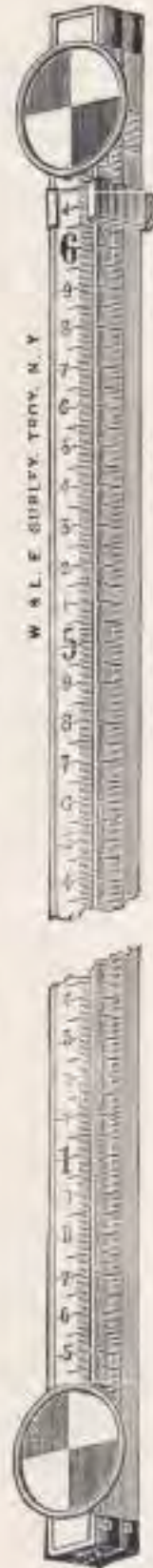
No. 500 Philadelphia Rod, in 2 parts, \$14.00.



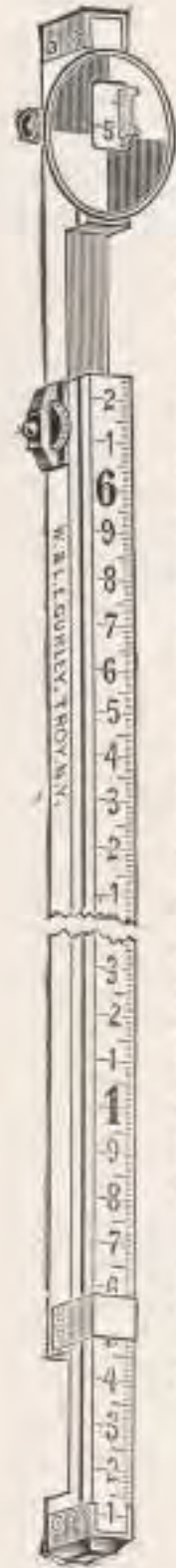
No. 501 Philadelphia Rod, in 3 parts, \$18.00.



No. 503 Boston Rod, \$14.00.



No. 504 Troy Rod, \$10.00.



No. 505 New York Rod, in 2 parts (improved pattern), \$14.00.

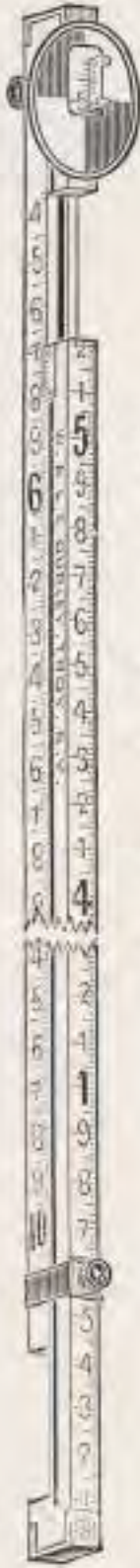
No.	Description	Price.
500	Philadelphia Rod, 2 ply, 7 3-10 feet closed, sliding to 13 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	\$14.00
500B	Philadelphia Rod, 2 ply, 7 3-10 feet closed, sliding to 13 feet, graduated to feet and 10ths, with both target and rod reading by natural scales to half hundredths	14.00
501	Philadelphia Rod, 3 ply, 5 3-10 feet closed, sliding to 13 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	18.00



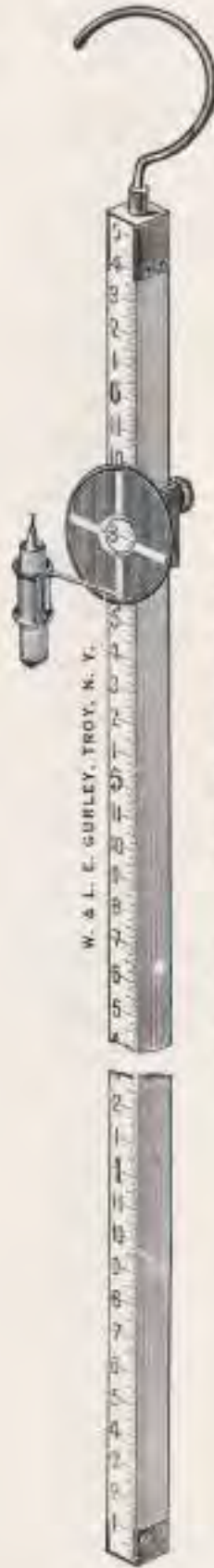
LEVELING RODS



No. 507 New York Rod, in 3 parts, \$18.00.



No. 511 Architects Rod, \$6.00.



No. 512 Machinists Rod, \$5.00.



No. 513 Telemeter or Stadia Rod, \$12.00.



No. 515 Telescope Rod, \$22.00.

No.	Description	Price.
501B	Special Self-reading Rod, 3 ply, 7 6-10 feet closed, sliding to 20 feet, graduated on four faces to feet and 10ths, and on back of the front section to feet, 10ths and 100ths; also reading by two scales to half hundredths. With aluminum target and canvas case	\$20.00
502A	Philadelphia Mining Rod, 2 ply, 3 3-10 feet closed, sliding to 5 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	12.00



LEVELING RODS



No. 516 Cross Section Rod, \$10.00.



No. 518A Plain Leveling Rod, \$6.00.



Hinge Joint for Plain Rods.



No. 524A Plain Leveling Rod, in 4 parts, \$12.00.



Nos. 525B to 528 Flexible or Pocket Leveling Rod.

No.	Description	Price.
503	Boston Rod, 2 ply, 6 feet closed, sliding to 11 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	\$14.00
504	Troy Rod, 2 ply, 6½ feet closed, sliding to 12 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	10.00
505	New York Rod, 2 ply, 6 8-10 feet closed, sliding to 12 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	14.00
507	New York Rod, 3 ply, 5 feet closed, sliding to 12½ feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	18.00



## LEVELING RODS

No.		Price.
509	New York Mining Rod, 2 ply, 3 3-10 feet closed, sliding to 5 3-10 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	\$12.00
510	Architects Rod, 2 ply, 5½ feet closed, sliding to 10 feet, graduated to feet, inches and 16ths	6.00
511	Architects Rod, 2 ply, 5½ feet closed, sliding to 10 feet, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths	6.00
512	Machinists Rod, one piece, 6½ feet long, for leveling shafting, graduated to feet, inches and 16ths	5.00
513	Telemeter or Stadia Rod without target, hinge joint, 6 feet folded, unfolding to 12 feet, graduated to feet, 10ths and 100ths	12.00
514	Telemeter or Stadia Rod, without target, hinge joint, 7 feet folded, unfolding to 14 feet, graduated to feet, 10ths and 100ths	13.00
515	Telescopic Rod, 3 ply, without target, 5 feet closed, sliding to 14 feet, graduated to feet, 10ths and 100ths	22.00
516	Cross Section Rod, one piece, without target, 10 feet long, with level vial at each end, graduated to feet, 10ths and 100ths	10.00
518A	Plain Rod, one piece, without target, 10 feet long, graduated to feet, 10ths and 100ths	6.00
518B	Plain Rod, without target, with hinge joint, 5 feet folded, unfolding to 10 feet, graduated to feet, 10th and 100ths	8.00
519A	Plain Rod, one piece, without target, 12 feet long, graduated to feet, 10ths and 100ths	7.00
519B	Plain Rod, without target, with hinge joint, 6 feet folded, unfolding to 12 feet, graduated to feet, 10ths and 100ths	9.00
520A	Plain Rod, one piece, without target, 14 feet long, graduated to feet, 10th and 100ths	8.00
520B	Plain Rod, without target, with hinge joint, 7 feet folded, unfolding to 14 feet, graduated to feet, 10ths and 100ths	10.00
521B	Plain Rod, without target, with hinge joint, 8 feet folded, unfolding to 16 feet, graduated to feet, 10ths and 100ths	11.00
522A	Plain Rod, 2 ply, without target, 5 3-10 feet long, sliding to 10 feet, graduated to feet, 10ths and 100ths	8.00
522B	Plain Rod, 2 ply, without target, 6 3-10 feet long, sliding to 12 feet, graduated to feet, 10ths and 100ths	9.00
522C	Plain Rod, 2 ply, without target, 7 3-10 feet long, sliding to 14 feet, graduated to feet, 10ths and 100ths	10.00
524A	Plain Rod, 4 ply, without target, 3 3-10 feet long, sliding to 11 2-10 feet, graduated to feet, 10ths and 100ths	12.00

**Any of our Leveling Rods made with metric graduations without extra charge.**

Canvas Case for regular pattern Philadelphia or New York Rod, \$3.00; other sizes and styles made to order.

*A beautifully illustrated booklet in four colors, entitled "A Reading on the Rod," describes the processes and the unusual care used in the making of our Leveling Rods. A copy will be mailed you on request.*

## FLEXIBLE OR POCKET LEVELING RODS

Made of canvas, can be coiled up and carried in pocket, in use fastened to a board with thumb tacks.

No.		Price.	Postage.
525B	Pocket Rod, 10 feet long, graduated to feet, 10ths and 100ths	\$3.25	\$0.25
526A	Pocket Rod, 12 feet long, graduated to feet, 10ths and 100ths	4.00	.28



LEVELING RODS, FLAGSTAFFS, ETC.



No.530 No.534 No.539

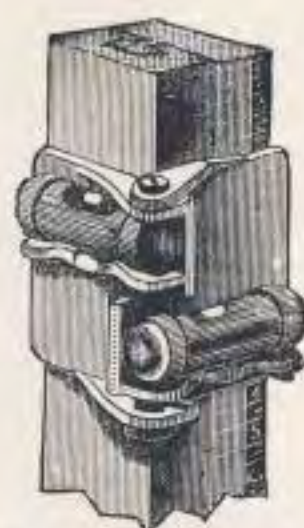


Nos. 537A to 538B



No. 545

Rod Level, \$3.00.



No. 545 Rod Level,  
as applied to a rod.



No. 547 \$6.00

No.		Price.	Postage.
526B	Pocket Rod, 12 feet long, graduated to feet, inches and 8ths	\$4.00	\$0.28
527	Pocket Rod, 14 feet long, graduated to feet, 10ths and 100ths	4.50	.30
528	Pocket Rod, 3½ meters long, graduated to centimeters—	4.00	.30

COMBINED LEVELING POLE AND FLAGSTAFF

No.		Price.
530	Wood Leveling Pole and Staff, 7 feet long	\$5.00
531	Wood Leveling Pole and Staff, 9 feet long	6.00



## WOOD FLAGSTAFFS

These staffs are divided into feet, which are painted alternately red and white, and are fitted with a metal shoe.

No.		Price.
534	Wood Staff, octagonal, 6 feet long	\$2.00
535	Wood Staff, octagonal, 8 feet long	2.25
536	Wood Staff, octagonal, 10 feet long	2.50

The following Wood Staffs are made in sections of equal length, and are firmly joined together by protected metal screw joints. They are especially adapted for carrying in trains, trolley cars, carriages and automobiles.

537-A	Wood Staff, round, 6 feet long, in 2 sections	\$4.50
537-B	Wood Staff, round, 6 feet long, in 2 sections and with canvas case	7.00
537-C	Wood Staff, round, 6 feet long, in 3 sections	7.00
537-D	Wood Staff, round, 6 feet long, in 3 sections and with canvas case	9.50
538-A	Wood Staff, round, 9 feet long, in 3 sections	7.50
538-B	Wood Staff, round, 9 feet long, in 3 sections, and with canvas case	10.50

## IRON AND STEEL RANGING POLES

539	Aligning or Ranging Pole, 6 feet long, hung in gimbals	\$4.00
	The aligning pole consists of an iron tube, 11-16 of an inch in diameter, 6 feet long, and being hung in gimbals always assumes a vertical position.	
540A	Steel Ranging Pole, solid, hexagonal, 6 feet long, $\frac{1}{2}$ inch diameter	2.75
540B	Steel Ranging Pole, solid, hexagonal, 8 feet long, $\frac{1}{2}$ inch diameter	3.00
541	Iron Tubular Ranging Pole, 6 feet long, 13-16 inch diameter	2.75
543	Iron Tubular Ranging Pole, 8 feet long, 13-16 inch diameter	3.00
544	Iron Tubular Ranging Pole, 10 feet long, 13-16 inch diameter	3.50

Any of the above staffs and poles with metric graduations (five to a meter) at the same price.

## ROD LEVELS

	Price.	Postage.
545	Rod Level, for plumbing a Rod or Staff	\$3.00 \$0.15
546	Circular Rod Level, with folding joint	6.00 .15
547	Circular Rod Level for Precise Rods	8.00 .35
548	Circular Rod Level, aluminum frame, with clamp for Rods Nos. 500 to 509	8.00

NOTE—Nos. 546, 547, and 548 Rod Levels have one piece hermetically sealed vials which, unless broken, will not leak. This feature overcomes a serious defect in the old style circular level made of two pieces of glass and which could not be guaranteed against leakage or evaporation.



## PLANE TABLES

The recognized utility of the Plane Table for topographical and map drawing is bringing it into use in this country, and to meet the demand for instruments of moderate cost and real efficiency, we have introduced several patterns.

The Plane Table consists mainly of a drawing board mounted upon a firm tripod, as shown in No. 549, having upon its upper surface a movable straight edge or alidade, arranged either with sight vanes or a telescope, by which it may be directed to any point, a line being then drawn on the paper along the edge of the alidade.



No. 549

Plane Table Outfit, with Garley Movement, Leveling Screws, Clamp and Tangent, and No. 583 Alidade, \$170.00.

The illustration shows a modification of the simple plane table, there being added a tangent movement in azimuth and three screws for leveling.

In detail, the socket and leveling screws and tangent movement, are shown in the illustration at the side. By these a more delicate orienting may be obtained than by the method before described.

The tripod is set up firmly, and the board with the upper half of the spherical socket attached is placed upon the lower half of the socket fastened to the tripod, the wing clamping nut being screwed up until the table is secure upon the tripod. The board is moved by the pressure of the hand, or by the leveling screws, until the level bubbles upon the compass plate will remain in the middle upon any part of the surface. The wing nut is then screwed up and the board made firm upon the tripod.

Any place on the drawing board may be assumed as a starting point, its position over a given point on the ground being determined by the plumbing arm and plummet. From the given point on the paper, sights can be taken to different corners of the field, and lines drawn on the paper along the edge of the alidade. Thus a miniature of the tract can be traced on the paper, the bearing of any line being ascertained by applying the side of the compass plate to the edge of the alidade placed on that line. The table can be oriented, either by hand, on releasing the milled head screw which clamps the flange, or by the tangent screw as before described.



## PLANE TABLES



No. 553

Plane Table Outfit, with Gurley Movement, and No. 582 Alidade, \$130.00.

The measurement of distances by the stadia wires of the telescope, and of vertical angles by the circle, is effected as already described in our account of the transit.

A square brass plate, to which is attached a compass with three inch needle and two spirit levels, is also shown, and serves both to level the table and, when applied by the edges parallel to the zero lines of the compass circle, to determine the magnetic bearing of the lines drawn on the paper, or the direction of the table itself.

The table is of wood arranged in sections to prevent warping, and has an adjustable wooden roller at each end, by which the paper is brought down snugly to the board, or upon which a long sheet can be rolled and unrolled. Sometimes in place of the rollers, and often in connection with them, a number of brass clamps are used, as shown, to hold the paper firmly.

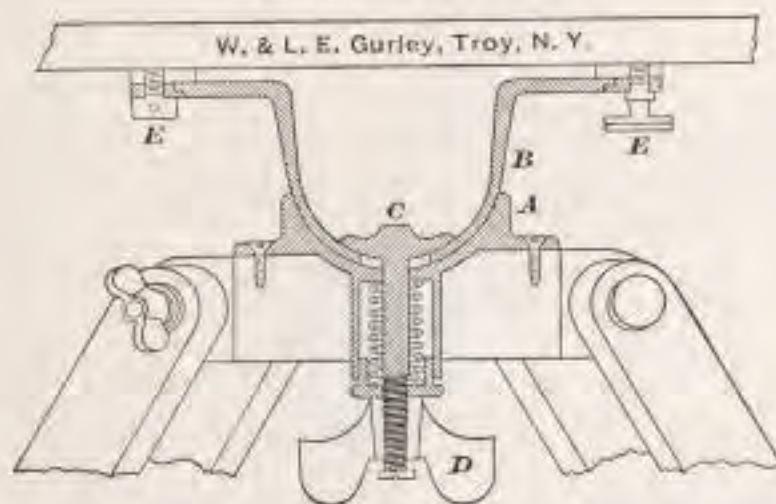
Another method of fastening the paper to the board is by small brass screws passing through the paper and into brass sockets let into and slightly below the surface of the board. This method allows the alidade to move over the surface without interference.

The plumbing arm, shown in the figure, has its end brought to a point, that it may be set at any given place upon the paper, the plummet hanging from the under arm determining the corresponding point on the ground. The lower arm moves upon a hinge, an index on the side showing when the ends of the two arms are plumb with each other as applied to the table.

The construction of the socket and tripod head is shown in the sectional view on page 95, A representing the hemispherical concave metal cup fastened by six screws to the wooden top of the tripod, B the upper or convex part fitting into the cup and clamped to it by the clamping piece, C and nut, D. A strong spiral spring in the hollow cylinder between C and D serves to hold the two spherical surfaces of the socket together, and allows the easy movement of one within the other in the leveling of the table.



PLANE TABLES



Sectional View of Gurley Movement.

The flange of the socket B supports the table, and is connected with it by three segments of brass, two of which are shown at E E. The table can be oriented at will, and clamped by a milled head screw passing through one of these segments.

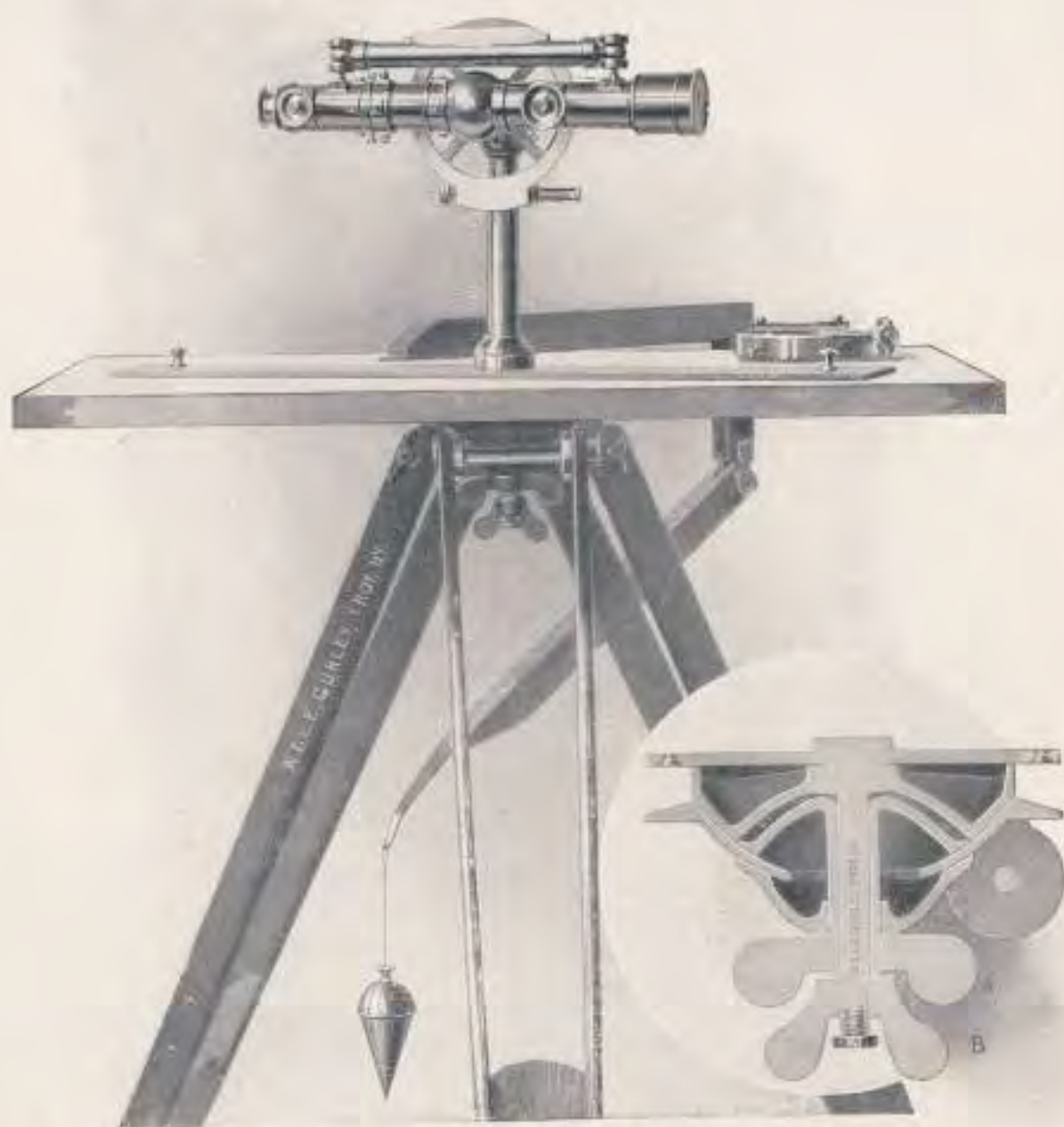
PLANE TABLE OUTFITS

No.	Price.
549 Plane Table with board 30 x 24 inches, mounted on large tripod with leveling socket and clamp, and with plumbing arm, plummet and clamps for paper.....	\$45.00
Set of three leveling screws, No. 563.....	10.00
Clamp and tangent, for orienting, No. 564.....	10.00
Combined Compass with levels and square base.....	15.00
Allidade with telescope 11 inches long, with stadia, 4½ inch vertical circle to 1 minute, level on telescope and clamp and tangent, on column, power of telescope 24 diameters. See page 90, No. 583.....	90.00
Total, as shown on page 93.....	\$170.00
550 Plane Table, with board, tripod, etc., as in No. 549.....	\$45.00
Combined Compass with levels and square base.....	15.00
Allidade with telescope 11 inches long, with stadia, 4½ inch vertical circle to 1 minute, level on telescope and clamp and tangent on column, power of telescope 24 diameters. See page 99, No. 583.....	90.00
Total.....	\$150.00
553 Plane Table, with board, tripod, etc., as in No. 549.....	\$45.00
Combined Compass with levels and square base.....	15.00
Allidade with telescope 9 inches long, power 20 diameters, with stadia, vertical circle to 1 minute, level on telescope and clamp and tangent, on column. See page 94, No. 582.....	70.00
Total, as shown on page 94.....	\$130.00
556 Plane Table, with board, tripod, etc., as in No. 549.....	\$45.00
Combined Compass with levels and square base.....	15.00
Allidade with telescopic sight No. 262, with stadia, vertical circle to 5 minutes, level and clamp and tangent. See page 99 No. 581.....	50.00
Total.....	\$110.00



## PLANE TABLES

559	Plane Table, with board, tripod, etc., as in No. 549	\$45.00
	Combined Compass with levels and square base	15.00
	Alidade with sight vanes. See page 98, No. 580	15.00
	Total	<u>\$75.00</u>
560	Plane Table, with board, tripod, etc., as in No. 549, and omitting Compass and Alidade	\$45.00
563	Set of three leveling screws for Plane Tables Nos. 550 to 560, extra	10.00
564	Clamp and tangent, for orienting, for Plane Tables Nos. 550 to 560, extra	10.00



No. 576

Plane Table Outfit, with Johnson Movement, and No. 583 Alidade, \$149.00.



## PLANE TABLES

The side illustration in No. 576, on page 96, shows the construction of the Johnson Movement alone. It has been largely used by the topographers of the U. S. Geological Survey.

As shown, this movement supplies an arrangement whereby the table can be easily made horizontal and then secured by the large wing nut, A. To orient the board, the wing nut, B, is loosened, leaving the hemispherical surface, bearing the board secured to the flange, free to turn, and it can be clamped by screwing up the same nut. This movement as modified in recent years supplies an extremely efficient and portable plane table.

The movement with legs complete weighs about nine pounds. The legs are of straight grained second growth hickory, and the construction of the whole tripod insures strength and accuracy, and it is capable of standing rough usage without getting out of order.

Any of the alidades, as described on pages 98-102, can be used with the Johnson Plane Table.

## JOHNSON PLANE TABLE AND EXTRAS

## Prices for Separate Parts.

No.		Price.
570	Johnson Plane Table Movement and split leg tripod.....	\$35.00
	If tripod has extension legs, the extra cost is \$10.00.	
573	Drawing Board, 31 x 24 inches, with brass screw plate fitted, and with eight clamp screws and sockets for paper.....	5.00
	Canvas covered wooden case for No. 573.....	6.00
	Flexible canvas case for No. 573.....	2.00
	Eggshell Drawing Paper, single mounted, 31 x 24 inches, per sheet.....	.75
	*Eggshell Drawing Paper, double mounted (muslin between), 31 x 24 inches, per sheet.....	1.50
573A	Drawing Board, 18 x 24 inches, with brass screw plate fitted, and with eight clamp screws and sockets for paper.....	4.50
	Canvas covered wooden case for No. 573A.....	5.00
	Flexible canvas case for No. 573A.....	1.50
	Eggshell drawing paper, single mounted, 18 x 24 inches, per sheet.....	.60
	*Eggshell drawing paper, double mounted (muslin between), 18 x 24 inches, per sheet.....	1.20
574	Plumbing arm and plummet.....	4.00
575	Combined Compass with levels and square base.....	15.00

## JOHNSON PLANE TABLE OUTFITS

576	Johnson Plane Table Movement and tripod, with drawing board, 31 x 24 inches, with brass screw plate fitted, and with eight clamp screws and sockets for paper.....	\$40.00
	Plumbing arm and plummet.....	4.00
	Combined Compass with levels and square base.....	15.00
	Allidade with telescope 11 inches long, with stadia, 4½ inch verti- cal circle to 1 minute, level on telescope and clamp and tan- gent, on column, power of telescope 24 diameters. See page 96, No. 583.....	90.00
	Total, as shown on page 96.....	\$149.00

\* Drawings can be made on both sides of double mounted paper.



## PLANE TABLES

577	Plane Table, with tripod, board, etc., as in No. 576.....	\$40.00
	Plumbing arm and plummet.....	4.00
	Combined Compass with levels and square base.....	15.00
	Alidade with telescope 9 inches long, power 20 diameters, with stadia, vertical circle to 1 minute, level on telescope and clamp and tangent, on column, No. 582.....	70.00
	Total .....	<u>\$129.00</u>
578	Plane Table, with tripod, board, etc., as in No. 576.....	\$40.00
	Plumbing arm and plummet.....	4.00
	Combined Compass with levels and square base.....	15.00
	Alidade with telescopic sight No. 262, with stadia, vertical circle to 5 minutes, level and clamp and tangent. See page 99 No. 581.....	50.00
	Total .....	<u>\$109.00</u>
579	Plane Table, with tripod, board, etc., as in No. 576.....	\$40.00
	Plumbing arm and plummet.....	4.00
	Combined Compass with levels and square base.....	15.00
	Alidade with sight vanes. No. 580.....	15.00
	Total .....	<u>\$74.00</u>

## ALIDADES



No. 580

Alidade, with Compass Sights, \$20.00.

The simplest alidade is shown above, and consists of a brass ruler or straight edge, twenty inches long and about three inches wide, at the ends of which sight vanes are mounted, like those of the compass. The edge of the ruler is chamfered and in line with the slots of the vanes.

The illustration No. 581 shows the alidade to which is fitted the telescopic sight, having a level, clamp and tangent, and vertical circle reading to five minutes attached to the telescope, which has also stadia wires. The telescope is placed in line with the fiducial edge of the ruler.



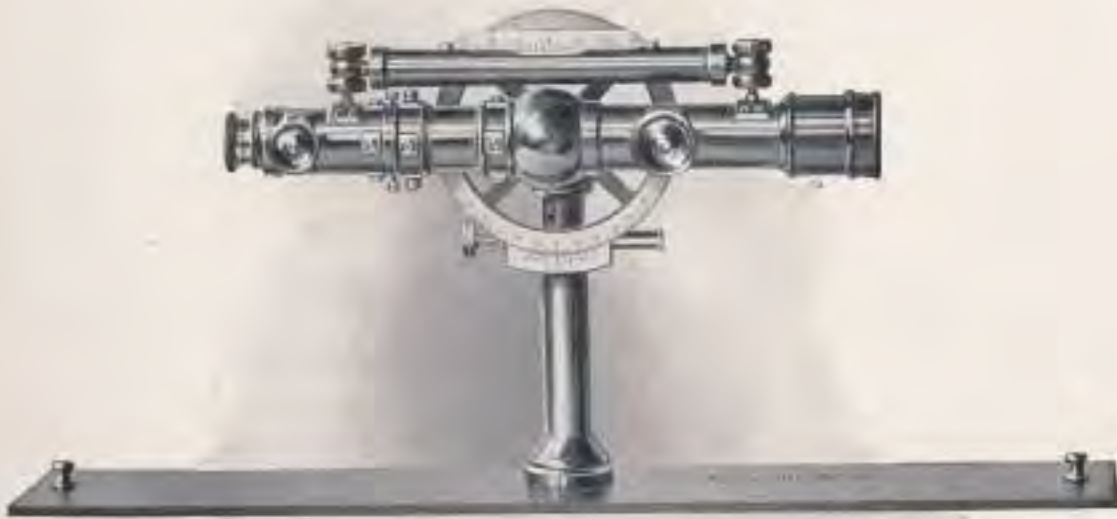
## ALIDADES



No. 581

Alidade, with Telescopic Sight, \$50.00.

Another pattern of alidade, No. 582, is shown in the illustration of the plane table on page 94, the brass ruler being three inches wide. The column supports the telescope with its attachments. The vertical circle is graduated on silver and reads to one minute. The telescope is nine inches long with a power of twenty diameters, and is provided with stadia wires and adjusted like the telescope of the transit.



No. 583

Alidade, with Level on Telescope, \$90.00.

In the alidade shown in No. 583 the telescope is the same as that used in our engineers transits, having level, clamp and tangent, vertical circle graduated on silver and reading to one minute, and stadia wires for measuring distances.

It is placed on a brass ruler four inches wide, and is adjusted and used in the same manner as the one just described.



## ALIDADES

No.		Price.
580	Alidade with Compass sights. See page 98	\$20.00
581	Alidade with telescopic sight No. 262, with stadia, vertical circle to 5 minutes, level and clamp and tangent. See page 99	50.00
582	Alidade with telescope 9 inches long, power 20 diameters, with stadia, vertical circle to 1 minute, level on telescope and clamp and tangent, on column	70.00
583	Alidade with telescope 11 inches long, with stadia, $4\frac{1}{2}$ inch vertical circle to 1 minute, level on telescope and clamp and tangent, on column, power of telescope 24 diameters. See page 99	90.00



No. 584A

Alidade, with Special Arc, and Detachable Level, \$118.00.

U. S. G. S. PATTERN

In alidade No. 584A, shown in the illustration, the blade is eighteen inches long and three inches wide, and carries a circular spirit level, the glass body of which is made in one piece hermetically sealed, and a telescope eleven inches long with stadia wires, detachable striding level, vertical arc and axis tangent, mounted on a column. For easy adjustment of the line of collimation the telescope can be turned on its axis through 180 degrees. The vertical arc reads by vernier to one minute, and as the zero is at one end all the angles read are positive. Vertical arc is graduated on its edge.

The telescope is made either inverting or erecting, as desired, and is fitted with a diagonal prism, as shown. A rectangular box compass, with four inch needle, and attached to the alidade, is also furnished when desired.

No.		Price.
584A	Alidade with telescope 11 inches long, with inverting eyepiece, stadia, vertical arc to 1 minute, detachable striding level, axis tangent, diagonal prism for eyepiece. The telescope has a power of 16 diameters, and is mounted on column	\$118.00
584B	Alidade same as No. 584A, but with erecting eyepiece	118.00
584C	Alidade same as 584A, but with enlarged objective	118.00
585	Box Compass, rectangular metal case, 4 inch needle, fitted to Alidades Nos. 584A and 584B	10.00
	Beaman Stadia Arc fitted to Alidades Nos. 582 and 583	15.00
	Beaman Stadia Arc No. 149, fitted to Alidades Nos. 584A and 584B	30.00

Note—Beaman Stadia Arc cannot be fitted to Alidade No. 581.

The Alidades as above described can be used with any of our Plane Tables Nos. 549 to 579, and will be sold separately at the prices named.



## TRAVERSE PLANE TABLE

U. S. G. S. PATTERN



No. 586

Traverse Plane Table, \$30.00.

The illustration, No. 586, represents a simple form of plane table and alidade, first made by us for the U. S. Geological Survey, and in its present improved form used extensively for traverse work. The board is fifteen inches square, and has on its under side a strong brass flange with spring, in which the plunger clamp of the tripod head engages, allowing the board to be clamped or oriented as desired. Small clamp screws with sockets for holding the paper are placed at the corners of the board.

The alidade consists of a brass ruler ten inches long, graduated on the beveled edge to a scale of forty parts to the inch, and having at each end hinged sights which fold close to the surface of the ruler. The alidade is furnished with a leather pouch. Inserted in one edge of the board is a small box compass with needle about four inches long.

The tripod legs are attached to a head which has a clamping screw passing through its center, compressing a concealed spring and holding the board to the tripod head when oriented to position.

The whole, while not capable of as accurate work as the larger plane tables, constitutes a light and portable instrument for topography.

No.		Price.
586	Improved Traverse Plane Table Board, 15 x 15 inches, with Box Compass let into one edge, 4 clamp screws and sockets for paper, Ruler Alidade with graduated edge, folding sights and leather pouch, tripod with plunger clamp and spring board plate, complete as shown.....	\$30.00
	If tripod with extension legs is required the extra cost is \$5.00.	
	Flexible waterproof case for board, extra.....	1.00
	Eggshell drawing paper, single mounted, 15 x 15 inches, per sheet.....	.40
	Eggshell drawing paper, double mounted (muslin between), drawings can be made on both sides, 15 x 15 inches, per sheet.....	.75
	When desired, we furnish separate parts of Plane Table No. 586, at the following prices:	
587	Drawing Board with improved spring board, plate, tripod head, four clamp screws and sockets for paper, and plain legs.....	12.00
588	Box Compass, rectangular metal case, 4 inch needle.....	8.00
589	Ruler Alidade, 10 inches long, with graduated edge, folding sights and with leather pouch.....	12.00



## POCKET ALIDADES

A pocket alidade, of a pattern like the one shown with the Traverse Plane Table, is made six inches long and has hinged sights which fold close to the ruler. The beveled edge is graduated to a scale of one forty five thousandth and one ninety thousandth, each graduation representing respectively one twentieth or one fiftieth of a mile.

Another form of the pocket alidade is made seven inches long, with a peep hole for the near sight, and for the other a folding sight graduated for a vertical scale representing a rise of twenty five feet to the mile. The beveled edge is graduated the same as the six inch alidade described above. The ruler carries an adjustable level with knurled head leveling screw.

No.	Price.
590A Pocket Alidade, 6 inches long, with graduated edge and folding sights, and with leather case with pencil pockets.....	\$7.50
590B Extra folding sights for Alidade No. 590A, per pair.....	3.25
591 Pocket Alidade, 7 inches long, with graduated edge, one peep sight and one folding sight, and with leather case with pencil pockets .....	12.00

## ARMY SKETCHING CASE

Designed and patented by Glenn S. Smith, Topographer  
U. S. Geological Survey.

This instrument for topographic map making was originally designed for the use of Army Engineers, but since its introduction has been found of great service for a similar class of work by foresters, geologists, timber cruisers and civil engineers.

In addition to the simplicity and strength of construction fitting it for general use, it possesses a unique feature in that the board does not require to be oriented in taking observations.

The Army Sketching Case consists of a plane table board, six by twelve inches — to the lower right hand side of which is attached a compass box with floating dial, three inches in diameter, beveled on the edge and graduated to three hundred and sixty degrees.

A protected opening in the compass box permits the graduated dial to be read either from above or when the board is held level with the eye of the observer.

In line with the center of the compass and parallel with the edge of the board are placed rifle sights, which are used as an alidade in taking bearings.

On the upper side of the board is mounted a circular plate, six inches in diameter, and pivoted at the center. This plate is attached to an L shaped base at the upper end of which is a cylinder through which passes a rod parallel with and secured to the top of the board.

A metal strip let into a slot in the middle of the board guides the lower edge of the L shaped base.

Upon the guides as described, the base carrying the circular plate can be moved from side to side over the upper surface of the board and clamped at will by a set screw in the cylinder at the top.

A clamp with index line is so attached to the base that the circular plate mounted upon it may be set at any desired position.

To the surface of the circular plate is attached a card of aluminum having printed upon it a combined protractor and scale.

The protractor is graduated to three hundred and sixty degrees and the scale consists of a series of equally spaced concentric circles.



ARMY SKETCHING CASE



No. 594

Army Sketching Case, \$22.50.

Different protractor cards are furnished for the various scales used in map making.

Rollers with friction brakes at the top and bottom of the board receive the paper and hold it snugly against the surface of the protractor which travels underneath it and an aluminum shield protects the paper and prevents soiling when carrying the case.

To the underside of the board is attached a strap by which the case is carried, and there is also a socket by which a tripod may be attached for use with the board if desired. A simple clinometer for taking slopes is also provided.

As far as possible the metal parts are made of aluminum, thus reducing the weight of the case to two pounds.

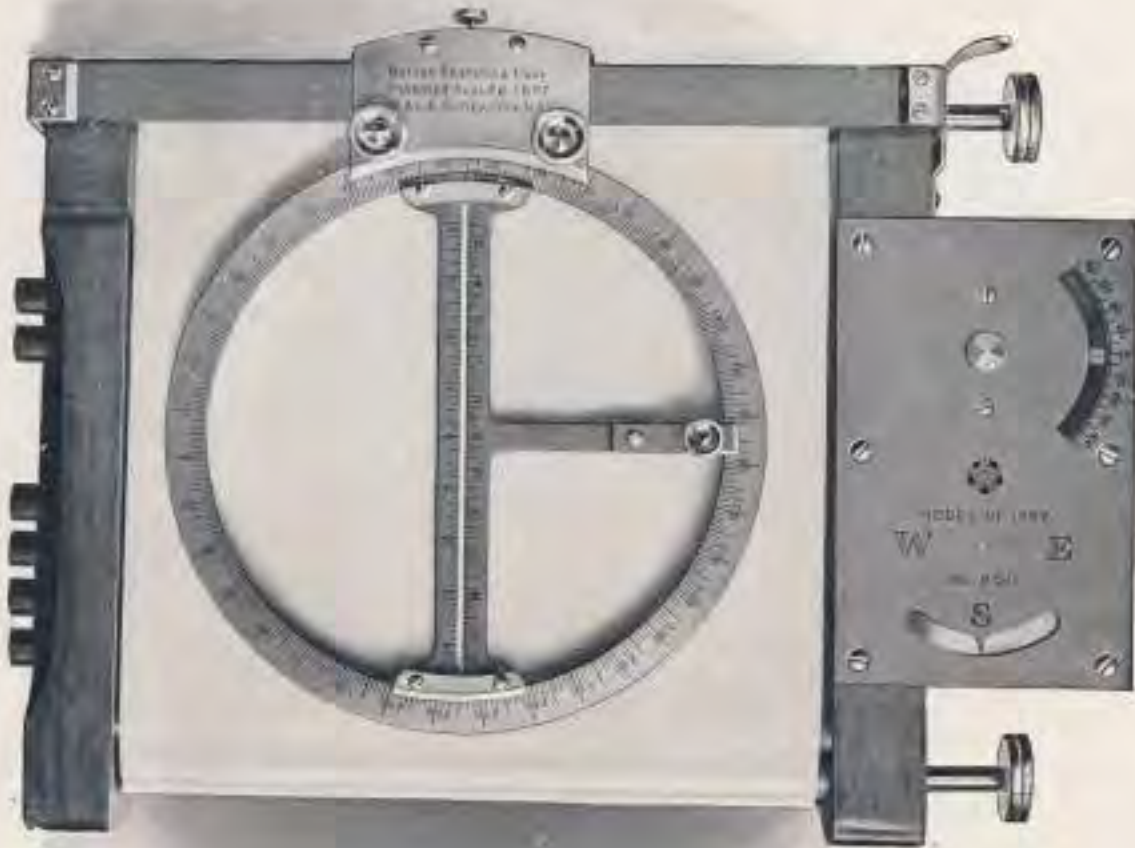
Care in the selection of a proper material for use on the case in recording observations is essential to successful operation and tracing cloth should be avoided as too smooth for the use of a pencil. Vellum tracing paper which has a slightly roughened surface, little affected by moisture and on which the pencil works well, is recommended. This paper we are prepared to supply.

Directions for the use of the Army Sketching Case will be furnished on application.

No.	Description	Price.
594	Army Sketching Case, Glenn S. Smith patent, as illustrated, with one protractor card as selected, and clinometer.....	\$22.50
	Tripod .....	3.50
	Extra Protractor Cards, 1 inch to 1 mile, 2 inches to 1 mile, 3 inches to 1 mile, 1 1 1 1	
	----- and -----, ----- metric, ----- metric.	
	24000 48000 50000 100000	
	Each .....	1.00
	Canvas Pouch with leather carrying strap.....	2.00
	Sole leather pouch with shoulder strap.....	5.00
	Staff, 2 feet long, with metal shoe.....	1.00
	Vellum Tracing Paper, in rolls 8 in. by 36 in. Each.....	.10
	Translucent Celluloid for Smith Case, 50"x8 1/8". This material is more durable than paper and not affected by moisture.....	.35



## BATSON SKETCHING CASE



No. 595

Batson Sketching Case, \$30.00.

The illustration shows the Batson Sketching Case, designed for the use of civil and military engineers and surveyors in reconnoissance and topographical surveys. It was given an extensive and successful trial, in 1898 and 1899, in Cuba and the Philippines, as well as in the United States.

This instrument is a small drawing board, having upon its upper surface a movable graduated circle, carrying a small alidade with scales. At one end of the board are a compass and a clinometer.

The drawing board is of wood and is provided with rollers which carry the paper for recording observations. Friction brakes hold the rollers, so that the paper is held down snugly to the board and prevented from uncoiling. Six holes at the end of the board opposite the compass afford receptacles for the pencils used in topographical sketching.

The protractor is held in position by a carrier which slides upon a bar attached to the wooden end pieces, as shown. The construction of the carrier allows the protractor to be turned, or to be clamped by means of two set screws, if desired. The protractor can also be lifted to an upright position, by pulling back the spring catch at the end of the carrier bar. The alidade turns within the graduated circle, and with it forms the protractor.

The paper for use with this instrument is six inches wide, and from thirty to forty inches is found to be a convenient length.



The sketching case is fitted with a strap for carrying on the forearm, and, if desired, is provided with a short, light staff or a tripod, for use in taking bearings on reference points and on objects which it is desirable to locate more accurately than is possible when holding the instrument in the hand.

A sole leather case, having a pocket for the instrument and another for sketches and extra paper, and fitted with lock and shoulder strap, is provided with each instrument.

A special circular giving full instructions for the use of the Batson Sketching Case will be supplied on application.

No.		Price.
595	Batson Sketching case, with leather case.....	\$30.00
	Wood Staff, about 2 feet long, with steel pointed shoe, extra.....	1.00
	Plain Tripod, about 3½ feet long, extra.....	3.50
	Opaque Celluloid for Batson Case, 50" x 5¾". This material is more durable than paper and is not affected by moisture.....	.25



## HOOK GAGE

A NEW AND IMPROVED TYPE — MADE ENTIRELY OF METAL

This Hook Gage is made entirely of metal and is nickel plated throughout. The tube is regularly made to read to 2.2 ft., but may be made longer if desired. It is graduated to feet, tenths and hundredths, and is read to thousandths by a vernier, which is capable of fine adjustment by a means of a slow motion screw. Elongated holes in the base furnish means for bolting the Gage to the side of the flume. The hook is adjustable within the tube and allows for a movement of 12 inches independent of the Gage, thus permitting it to be set accurately to the exact surface of the water.

The entire arrangement is such that the readings can be taken by the observer with the greatest possible convenience and at some distance from the surface of the stream or ditch being measured, and which is often a decided advantage. This is especially so in the East, where many of the streams are contaminated by dye stuffs and other undesirable material, rendering it unpleasant for the observer to get too close to the water.

No.		Price.
628	Hook Gage, .....	\$20.00

*We make several types of Automatic Water Stage Registers, making Printed or Graphic records, Flow Meters, and Turbine Flow Recorders, which are described in special booklets which will be sent on request. We are prepared to make to order, from designs furnished, special water registers, tide gages and similar instruments.*



## CURRENT METERS FOR STREAM GAGING



No. 615. Acoustic Current Meter, with ear piece and tube.

No. 623. Electric Current Meter, showing Covert pattern yoke and one section of wading rod.

We make six different patterns of Price Current Meters, only two of which are illustrated. An illustrated booklet describing the construction and uses of each pattern and containing Rating Tables, will be mailed on request.

No.		Price.
600	Electric Current Meter, largest size, for Harbors and Rivers, recording each revolution by Electric Register No. 609, or indicating each revolution by Telephone Sounder No. 615. Meter only	\$80.00
ACCESSORIES FOR NO. 600 CURRENT METER.		
604	Brass Tubing, graduated to feet and tenths, and jointed in 4-foot lengths, ----- per length	5.00
606	Lead weight, 60 pounds, with connections -----	15.00
609	Electric Register -----	50.00
612	Dry Cell or Wet Cell Battery of three cells, in box with lock and strap -----	7.00
614	Insulated Copper Wire for battery ----- per foot	.03
615	Telephone Sounder with dry cell battery and 40 feet of cable -----	11.00
619	Time Recorder, open face, nickel case, stem winder, with fly-back attachment for starting and stopping. Registering minutes, seconds and fifths of seconds -----	8.00
616	Acoustic Current Meter, indicating each tenth revolution, including two lengths of graduated brass tube, to measure 4 feet from the plane of the bucket wheel, wooden box with lock and strap, and accessories of oil can, wrench, screw driver and extra pivot bearing -----	50.00
	Extra Graduated Brass Tube ----- per 2-foot length	2.50
	Canvas Case for two, three or four lengths of tube -----	2.50
	Time Recorder, No. 619 -----	8.00



## CURRENT METERS

No.		Price.
617	Electric Current Meter indicating each revolution, including telephone sounder with dry battery, twenty feet of cable and 6½-pound torpedo shaped lead weight. All packed in wooden box with lock, hooks and strap, and including accessories of oil can, wrench, screw driver, extra pivot bearing, binding screws and nipple.....	\$63.50
	Extra Cable.....per foot	.05
	Extra Lead Weight, 6½ pounds.....	3.50
	Extra Lead Weight, 15 pounds.....	5.00
	Time Recorder, No. 619.....	8.00
	Wading Rods.....per 1½-foot length	2.50
	Base for Rod.....	1.25
	Hanger for Rod.....	3.00
	Leather Case for rod and accessories.....	3.50
618	Electric Current Meter, indicating each revolution, with base, for shallow streams, omitting vane and weight, including telephone sounder with dry battery, twenty feet of cable and two lengths of graduated brass tube, to measure 4 feet from the plane of the bucket wheel. Meter, sounder and cable, packed in wooden box with lock and strap, and including accessories of oil can, wrench, screw driver and extra pivot bearing.....	<del>62.00</del> 62.00
	Extra Cable.....per foot	.03
	Extra graduated Brass Tube.....per 2-foot length	2.50
	Canvas Case for two, three or four lengths of tube.....	2.50
	Time Recorder, No. 619.....	8.00
621	Electric Current Meter, indicating every fifth revolution, including telephone sounder, with dry battery, twenty feet of cable, and 6½-pound torpedo shaped lead weight. All packed in wooden box with lock, hooks and strap and including accessories of oil can, wrench, screw driver, extra pivot bearing, binding screws and nipple.....	63.50
	Extra Cable.....per foot	.05
	Extra Lead Weight, 6½ pounds.....	3.50
	Extra Lead Weight, 15 pounds.....	5.00
	Time Recorder, No. 619.....	8.00
	Wading Rods.....per 1½-foot length	2.50
	Base for rod.....	1.25
	Hanger for rod.....	3.00
	Leather Case for rod and accessories.....	3.50
623	Electric Current Meter with two interchangeable commutator boxes, one indicating each revolution and the other each fifth revolution of bucket wheel. Covert pattern yoke, telephone sounder, dry battery, twenty feet of cable and 6½-pound torpedo shaped lead weight. All packed in wooden box with lock, hooks and strap and including accessories of oil can, wrench, screw driver, extra pivot bearing, binding screws and nipple.....	78.50
	Extra Cable.....per foot	.05
	Graduated Brass Tube, 4 sections at \$2.50.....	10.00
	Leather Case for brass tube.....	3.50
	Extra Lead Weight, 6½ pounds.....	3.50
	Extra Lead Weight, 10 pounds.....	4.00
	Extra Lead Weight, 15 pounds.....	5.00
	Special Carrying Case of fibre, for Current Meters Nos. 617, 621, 622 or 623, having two compartments, the upper one for meter, and the lower one for lead weight, cable, sounder, etc. ....	\$12.00
	If the above special fibre case is furnished, instead of the regular wooden box, the extra cost is only.....	\$7.00



HAND LEVELS



No. 640

No. 641

No.		Price.	Postage.
640	Monocular Hand Level, in case.....	\$12.00	\$0.20
641	Binocular Hand Level, in case.....	15 00	.35



No. 643

643	Locke Hand Level, nickel plated, in case.....	8.00	.20
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NOTE: Nos. 640 to 646 are our own make. Nos. 648 and 649 are of foreign make.



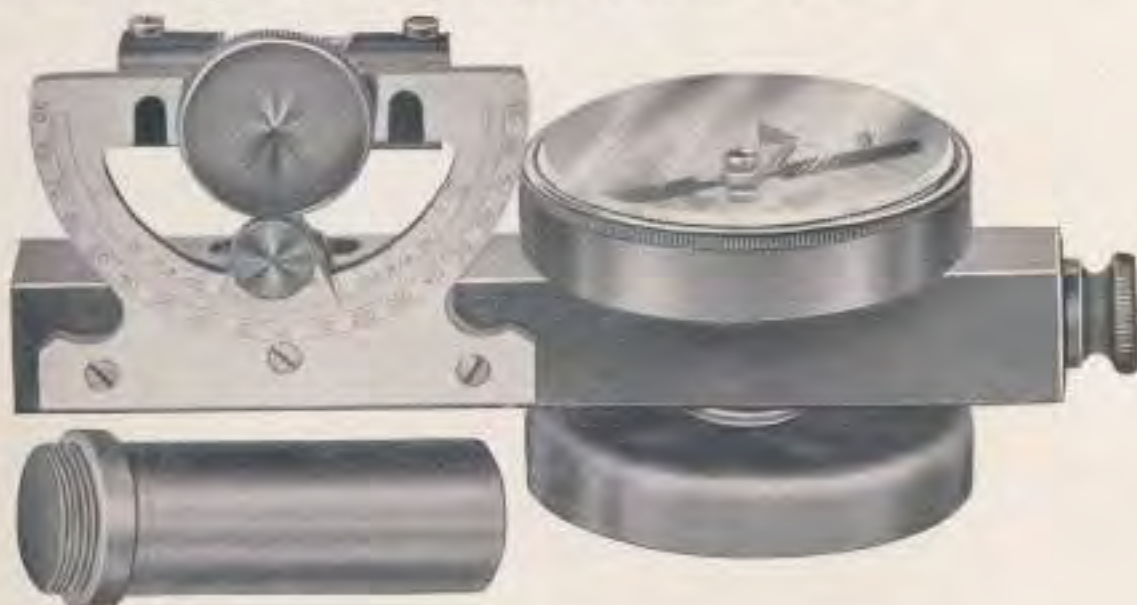
HAND LEVELS



No. 646

No.		Price.	Postage.
646	Abney Level, an improved Locke Hand Level, giving angles of elevation graduated for slopes, as 1 to 1, 2 to 1, etc., in mahogany case -----	<del>\$13.50</del> \$13.00	\$0.25
646A	Abney Level No. 646, but with sole leather pouch and shoulder strap, instead of mahogany box -----	\$14.50	

Graduated to give per cent. of grade, at same price.



No. 648

648	Abney Level, an improved Locke Hand Level, similar to No. 646, and with compass, revolving circular base by means of which horizontal angles can be measured and plain staff socket, complete, in morocco case -----	18.00	.30
648A	Abney Level No. 648, but with sole leather pouch and shoulder strap, instead of morocco case -----	20.00	



No. 649

649	Stadia Hand Level Telescope, 10 in., with object glass 1 in., adjustable eyepiece, stadia hairs reading 1:100, with ball joint and socket. Useful for preliminary surveys, etc.; weight about 1½ lbs., in leather sling case -----	18.00	.40
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## CHAINS AND TAPES

## CHAINS

No.		Price.	Postage.
650	33 feet, 50 links, oval rings, No. 10 refined iron wire.....	\$2.25	\$0.65
651	33 feet, 50 links, oval rings, No. 8 refined iron wire.....	2.50	.85
652	66 feet, 100 links, oval rings, No. 10 refined iron wire.....	3.50	1.15
653	66 feet, 100 links, oval rings, No. 8 refined iron wire.....	4.00	1.75
656	33 feet, 50 links, oval rings, No. 10 best steel wire.....	4.00	.65
658	50 feet, 50 links, oval rings, No. 10 best steel wire.....	4.75	.80
660	66 feet, 100 links, oval rings, No. 10 best steel wire.....	7.00	1.15
662	100 feet, 100 links, oval rings, No. 10 best steel wire.....	8.50	1.50

## BRAZED STEEL CHAINS

No.		Price.	Postage.
670	33 feet, 50 links, No. 12 tempered steel wire, brazed links and rings.....	5.00	\$0.45
671	50 feet, 50 links, No. 12 tempered steel wire, brazed links and rings.....	6.00	.55
672	66 feet, 100 links, No. 12 tempered steel wire, brazed links and rings.....	9.00	.70
673	100 feet, 100 links, No. 12 tempered steel wire, brazed links and rings.....	10.00	1.00

Our brazed steel chains displace the ordinary chains wherever they are tried, on account of superior lightness and strength. They are practically the only chains now used in railroad construction.

Chains of two and four poles with 40 and 80 links, same price as chains of 50 and 100 links.

Steel snaps to make full chains into half chains, without extra charge, if ordered with the chain.

## GRUMMAN PATENT STEEL CHAINS

No.		Price.	Postage.
680	33 feet, 50 links, No. 15 tempered steel wire, weight 1 lb.---	\$5.00	\$0.28
681	50 feet, 100 links, No. 15 tempered steel wire, weight 1¼ lbs.	6.00	.30
682	66 feet, 100 links, No. 15 tempered steel wire, weight 1½ lbs.	9.00	.35
683	100 feet, 200 links, No. 15 tempered steel wire, weight 2¼ lbs.-----	11.00	.50
685	50 feet, 100 links, No. 18 tempered steel wire, with spring balance, level and thermometer, for very accurate measurements, weight 14½ oz.-----	15.00	.30
688	Spring balance for 6 lbs. strain, with handle and steel snap, to use with chains Nos. 680 to 683.....	2.50	.17

## VARA CHAINS

No.		Price.	Postage.
690	10 varas, 50 links, oval rings, No. 10 refined iron wire.....	\$2.25	\$0.55
691	10 varas, 50 links, oval rings, No. 8 refined iron wire.....	2.50	.75
694	20 varas, 100 links, oval rings, No. 10 refined iron wire.....	3.50	1.00
695	20 varas, 100 links, oval rings, No. 8 refined iron wire.....	4.00	1.65
700	10 varas, 50 links, oval rings, No. 10 best steel wire.....	4.00	.55
704	20 varas, 100 links, oval rings, No. 10 best steel wire.....	7.00	1.00
708	10 varas, 50 links, oval rings, No. 12 tempered steel wire, brazed links and rings.....	5.00	.35
710	20 varas, 100 links, oval rings, No. 12 tempered steel wire, brazed links and rings.....	9.00	.65



## METER CHAINS

No.		Price.	Postage.
715	10 meters, 50 links, oval rings, No. 10 refined iron wire	\$2.25	\$0.65
716	10 meters, 50 links, oval rings, No. 8 refined iron wire	2.50	.85
719	20 meters, 100 links, oval rings, No. 10 refined iron wire	3.50	1.15
720	20 meters, 100 links, oval rings, No. 8 refined iron wire	4.00	1.75
723	10 meters, 50 links, oval rings, No. 10 best steel wire	4.00	.65
727	20 meters, 100 links, oval rings, No. 10 best steel wire	7.00	1.15
730	10 meters, 50 links, oval rings, No. 12 tempered steel wire, brazed links and rings	5.00	.45
732	20 meters, 100 links, oval rings, No. 12 tempered steel wire, brazed links and rings	9.00	.70

## MARKING PINS

NICKEL PLATED.

No.		Price.	Postage.
740	Set of 11 Pins, No. 4 iron wire, 14 inches long	\$1.25	\$0.50
742	Set of 11 Pins, No. 6 steel wire, 14 inches long	1.50	.40
744	Set of 11 Pins, No. 6 steel wire weighted, 14 inches long	2.50	1.25
746	Set of 11 Pins, No. 10 steel wire, 9 inches long, in leather pouch	2.00	.25
748	Set of 11 Pins, No. 4 brass wire, 14 inches long	2.50	.50
749	Spring Steel Carrying Ring for marking pins	.15	

## TIMBER SCRIBE



No. 750

No.		Price.	Postage.
750	Timber Scribe, for marking trees, posts or boards	\$1.25	\$0.17

## STEEL RIBBON BRIDGE TAPES

One fourth inch wide, about one one hundredth inch thick, with handles and extra fine reels.



No. 770



## STEEL RIBBON BRIDGE TAPES

No.		Price.
770	Steel Ribbon, 300 feet, graduated each 5 feet.....	\$13.00
771	Steel Ribbon, 400 feet, graduated each 5 feet.....	15.00
772	Steel Ribbon, 500 feet, graduated each 5 feet.....	17.00

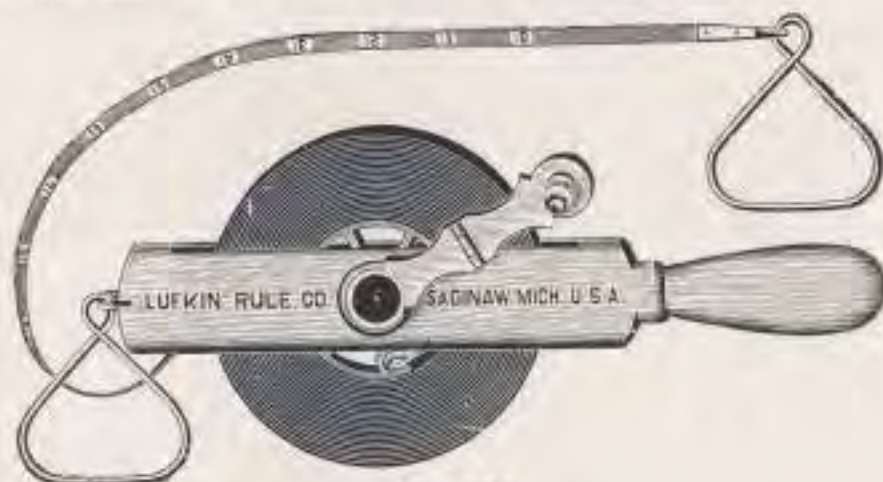
Our Bridge Tapes are mounted on substantial wooden reels with aluminum and brass mountings and swivel handle.

These tapes have the first and last 5 feet graduated each foot.

Tapes, Nos. 760 to 772, have etched graduations.

## STEEL RIBBON CHAIN TAPES (Superior)

One fourth inch wide, heavy steel ribbon, deeply etched graduations, large detachable handles and a fine reel with nickel trimmings.



No. 776

No.		Price.	Postage.
774	Steel Ribbon, 66 feet, graduated to 100 links.....	\$5.00	\$0.40
775	Steel Ribbon, 132 feet, graduated to 200 links.....	7.00	.60
776	Steel Ribbon, 100 feet, graduated each foot.....	6.00	.50
777	Steel Ribbon, 200 feet, graduated each foot.....	9.00	
778	Steel Ribbon, 300 feet, graduated each foot.....	12.50	
779	Steel Ribbon, 500 feet, graduated each foot.....	21.50	

The 66 and 132 feet tapes have the first and last link in 10ths.

The 100, 200, 300, and 500 feet tapes have the first and last foot in 10ths.

## STEEL RIBBON CHAIN TAPES

METRIC MEASURE ONLY.

One fourth inch wide, heavy steel ribbon, deeply etched graduations, detachable handles and fine reel with nickeled trimmings.

No.		Price.	Postage.
M-20	Steel Ribbon, 20 meters, graduated to decimeters.....	\$5.00	\$0.40
M-25	Steel Ribbon, 25 meters, graduated to decimeters.....	5.75	.45
M-30	Steel Ribbon, 30 meters, graduated to decimeters.....	6.50	.50
M-50	Steel Ribbon, 50 meters, graduated to decimeters.....	9.50	.80
M-100	Steel Ribbon, 100 meters, graduated to decimeters.....	17.00	

These tapes have the first meter in centimeters with the first decimeter in millimeters.

## STEEL RIBBON CHAIN TAPES

VARA MEASURE ONLY.

One quarter inch wide, heavy steel ribbon, deeply etched graduations, detachable handles and fine reel with nickeled trimmings.

No.		Price.	Postage.
V-20	Steel Ribbon, 20 varas, graduated to tenths of a vara.....	\$5.00	\$0.40
V-30	Steel Ribbon, 30 varas, graduated to tenths of a vara.....	6.00	.45
V-50	Steel Ribbon, 50 varas, graduated to tenths of a vara.....	8.50	.60
V-100	Steel Ribbon, 100 varas, graduated to tenths of a vara.....	15.00	



## METALLIC TAPES

Made of linen thread, interwoven with fine brass wire. They are  $\frac{5}{8}$  inch wide, and in leather cases. The graduations are in 10ths or 12ths of a foot, as desired, on one side, and in links on the reverse side.



No. 782

No.		Price.	Postage.
780	Metallic Tape, 33 feet, in 10ths or 12ths, and links.....	\$2.10	\$0.18
782	Metallic Tape, 50 feet, in 10ths or 12ths, and links.....	2.60	.20
783	Metallic Tape, 66 feet, in 10ths or 12ths, and links.....	3.00	.25
786	Metallic Tape, 100 feet, in 10ths or 12ths, and links.....	4.20	.30

We can furnish metallic tapes, Nos. 780 to 794, with metric or vara measure on reverse side, instead of links at an extra cost of one cent per foot.

## METALLIC TAPES WITHOUT CASES

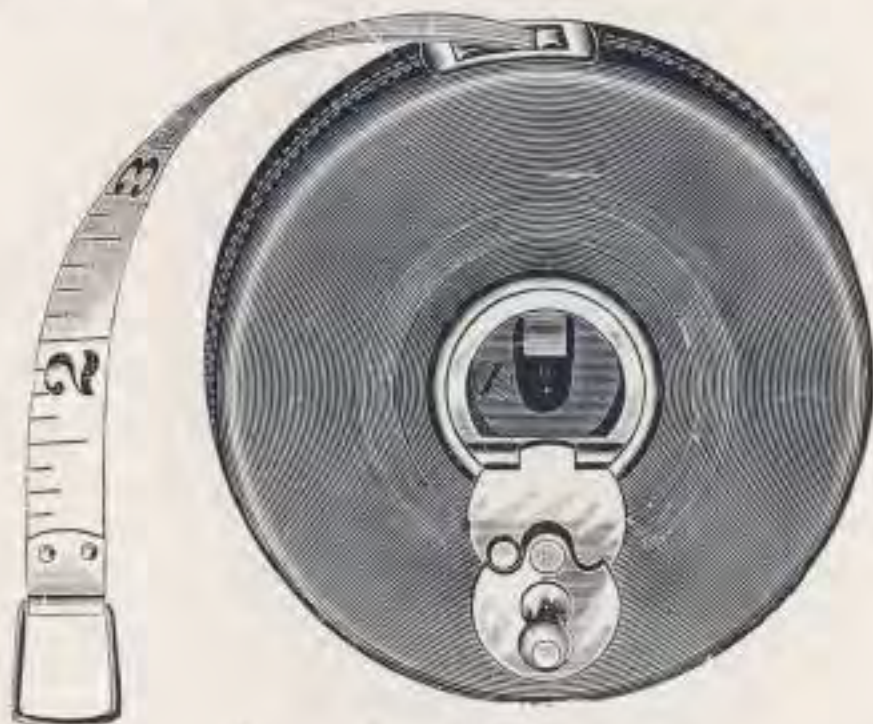
These tapes can be put into the leather cases when the original tape line is worn out.

No.		Price.	Postage.
790	Metallic Tape, 33 feet, in 10ths or 12ths, and links.....	\$1.10	\$0.14
791	Metallic Tape, 50 feet, in 10ths or 12ths, and links.....	1.50	.16
792	Metallic Tape, 66 feet, in 10ths or 12ths, and links.....	1.80	.18
794	Metallic Tape, 100 feet, in 10ths or 12ths, and links.....	2.90	.20



STANDARD AMERICAN STEEL TAPES (Superior)

Three eighths inch wide, etched graduations, in leather cases with nickeled trimmings and double folding flush handle.



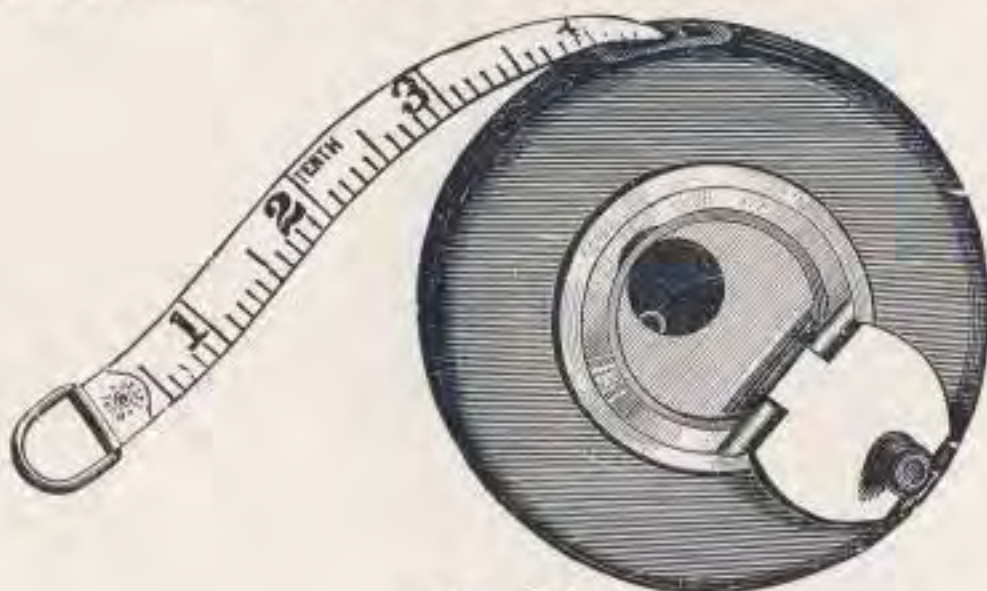
No. 796

No.		Price.	Postage.
795	Steel Tape, 33 feet, in 10ths or 12ths, and links	\$5.20	\$0.18
796	Steel Tape, 50 feet, in 10ths or 12ths, and links	7.20	.20
797	Steel Tape, 66 feet, in 10ths or 12ths, and links	9.20	.23
798	Steel Tape, 100 feet, in 10ths or 12ths, and links	12.80	.30
799	Steel Tape, 200 feet, in 10ths or 12ths, and links	24.00	.55

STANDARD AMERICAN STEEL TAPES

Three eighths inch wide, in leather cases with nickeled trimmings and single folding handle.

No.		Price.	Postage.
800	Steel Tape, 25 feet, in 10ths or 12ths, and links	\$4.00	\$0.16
801	Steel Tape, 33 feet, in 10ths or 12ths, and links	4.40	.18
802	Steel Tape, 50 feet, in 10ths or 12ths, and links	6.40	.20
803	Steel Tape, 66 feet, in 10ths or 12ths, and links	8.00	.23
804	Steel Tape, 75 feet, in 10ths or 12ths, and links	9.60	.25
805	Steel Tape, 100 feet, in 10ths or 12ths, and links	12.00	.30



No. 802



## THE "STAR" STEEL TAPES

Three eighths inch wide, in nickeled brass cases.



No. 810

No.		Price.	Postage.
808	Steel Tape, 25 feet, in 10ths or 12ths, and links	\$3.00	\$0.16
809	Steel Tape, 33 feet, in 10ths or 12ths, and links	3.20	.18
810	Steel Tape, 50 feet, in 10ths or 12ths, and links	3.60	.20
811	Steel Tape, 66 feet, in 10ths or 12ths, and links	4.40	.25
812	Steel Tape, 75 feet, in 10ths or 12ths, and links	4.80	.30
813	Steel Tape, 100 feet, in 10ths or 12ths, and links	6.40	.35

Steel Tapes, Nos. 800 to 879, have etched graduations.

## CHESTERMANS ENGLISH STEEL TAPES

Three eighths inch wide, in leather cases, folding handle.

No.		Price.	Postage.
815	Steel Tape, 33 feet, in 10ths or 12ths, and links	\$5.20	\$0.18
816	Steel Tape, 50 feet, in 10ths or 12ths, and links	7.20	.20
817	Steel Tape, 66 feet, in 10ths or 12ths, and links	9.20	.23
819	Steel Tape, 100 feet, in 10ths or 12ths, and links	12.80	.30

## AMERICAN STEEL TAPES (Paines Pattern)

One fourth inch wide, in leather cases, folding handles.



No. 820



AMERICAN STEEL TAPES (Paines Pattern)

No.		Price.	Postage.
820	Steel Tape, 33 feet, in 10ths or 12ths, and links.....	\$4.40	\$0.18
821	Steel Tape, 50 feet, in 10th or 12ths, and links.....	6.40	.23
822	Steel Tape, 66 feet, in 10ths or 12ths, and links.....	8.00	.28
823	Steel Tape, 75 feet, in 10ths or 12ths, and links.....	9.60	.30
824	Steel Tape, 100 feet, in 10ths or 12ths, and links.....	12.00	.35



No. 830

IN METAL CASES.

830	Steel Tape, 25 feet, in 10ths or 12ths, and links.....	2.80	.16
831	Steel Tape, 33 feet, in 10ths or 12ths, and links.....	3.60	.18
832	Steel Tape, 50 feet, in 10ths or 12ths, and links.....	4.80	.23
833	Steel Tape, 66 feet, in 10ths or 12ths, and links.....	6.40	.28
834	Steel Tape, 75 feet, in 10ths or 12ths, and links.....	8.00	.30
835	Steel Tape, 100 feet, in 10ths or 12ths, and links.....	9.60	.35

Tapes Nos. 821 to 824, and 832 to 835 (50 to 100 feet), are detachable from their cases and furnished with an extra handle, No. 841, and can be used as a chain tape.

Tapes Nos. 795 to 835 are graduated to feet, 10ths and 100ths of feet, or to feet, inches and 8ths of inches, as desired, on one side, and in links on the reverse side.

Tapes Nos. 820 to 835, with metric or vara measure on reverse side instead of links, at an extra cost of two and one half cents per foot.

EXTRAS FOR PAINES STEEL TAPES

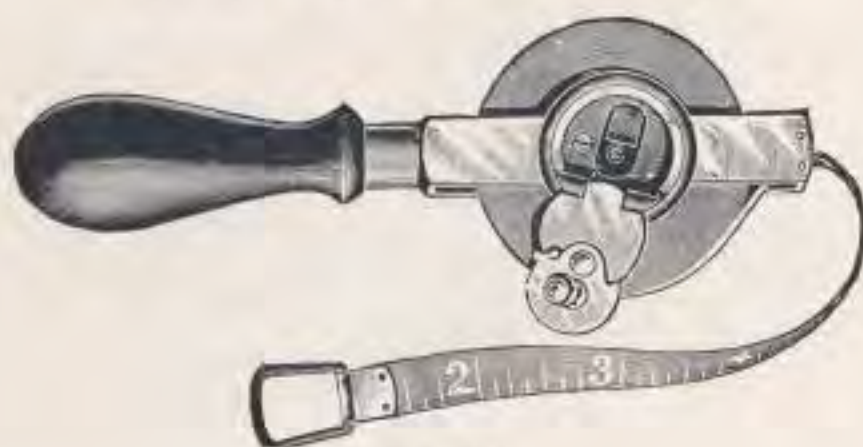
No.		Price.	Postage.
840	Compensating Handles, detachable, with graduated scale, per pair.....	\$2.00	\$0.14
841	Plain Finger Ring Handles, detachable, each.....	.40	.02
843	Pocket Thermometers, each.....	.85	.15
844	Spring Balance (for tension 0 to 10 lbs., or 0 to 20 lbs., as ordered), with handle and snap.....	2.50	.15
845	Spring Balance and Level, with handle and snap.....	4.00	.17



No. 844



## GERMANIA STEEL TAPES



No. 851

One half inch wide, on nickeled brass frame with folding handle.

No.		Price.	Postage.
850	Steel Tape, 33 feet, in 10ths or 12ths, and links	\$5.00	\$0.20
851	Steel Tape, 50 feet, in 10ths or 12ths, and links	6.00	.25
852	Steel Tape, 66 feet, in 10ths or 12ths, and links	7.00	.30
853	Steel Tape, 100 feet, in 10ths or 12ths, and links	10.00	.40
854A	Steel Tape, 150 feet, in 10ths or 12ths, and links	15.00	.60
854B	Steel Tape, 200 feet, in 10ths or 12ths, and links	20.00	
855	Steel Tape, 50 feet, in 10ths or 12ths, and meters	6.50	.25
858	Steel Tape, 100 feet, in 10ths or 12ths, and meters	12.00	.40
859A	Steel Tape, 150 feet, in 10ths or 12ths, and meters	17.00	.60
859B	Steel Tape, 200 feet, in 10ths or 12ths, and meters	22.00	

Tapes Nos. 850 to 854B are graduated to feet, 10ths and 100ths of feet, or to feet, inches and 8ths of inches, as desired, on one side and in links on the reverse side.

Tapes Nos. 855 to 859B have metric measure on the reverse side instead of links.

## NICKEL PLATED TAPES

When desired, we will nickel plate our steel tapes, Nos. 795 to 835 and 850 to 859B, to protect from rust, at the following prices:

Feet	25	33	50	66	75	100	150	200
Each	\$0.90	\$1.00	\$1.50	\$1.75	\$1.75	\$2.00	\$2.50	\$3.00

## POCKET STEEL TAPES

In German silver cases, with spring and stop.

No.		Price.	Postage.
860	Pocket Steel Tape, 3 feet, in 10ths or 12ths	\$0.80	\$0.13
863	Pocket Steel Tape, 6 feet, in 10ths or 12ths	1.00	.14
866	Pocket Steel Tape, 12 feet, in 10ths or 12ths	2.40	.16
870	Pocket Steel Tape, 6 feet, in 10ths one side and 12ths reverse side	1.25	.14
873	Pocket Steel Tape, 12 feet, in 10ths one side and 12ths reverse side	2.75	.16
875	Pocket Steel Tape, 3 feet, in 10ths or 12ths, and meters	.85	.13
877	Pocket Steel Tape, 6 feet, in 10ths or 12ths, and meters	1.25	.14
879	Pocket Steel Tape, 12 feet, in 10ths or 12ths, and meters	2.50	.16



PUNCH AND RIVETER FOR REPAIRING TAPE LINES



No. 885

This punch cuts a clean hole in steel tapes of the usual thickness, and the eyelet is then inserted and quickly and neatly riveted. The punch is  $7\frac{1}{4}$  inches long.

No.		Price.	Postage.
885	Punch and Riveter, with eyelets-----	\$4.00	\$0.30
886	Extra eyelets, two lengths, two packages of 500 each length	1.25	.05



## DRAWING INSTRUMENTS

### INFORMATION TO PURCHASERS

**This Price List supersedes all previous editions, and has been carefully revised and enlarged.**

**When ordering goods always state the edition and the number in the Price List.**

Many of our smaller instruments, such as drawing instruments, pocket compasses, chains, tapes, small packages of paper and parts of large instruments, can be sent by parcel post securely packed.

**In all cases where goods are to be sent by mail, the cash for postage as well as for the goods must accompany the order.**

**The approximate postage required is mentioned in the second column of the Price List. Should the amount sent exceed the actual postage, the balance will be returned.**

All articles can be insured at an extra cost which varies according to the value of the package. For details see Parcel Post Regulations.

**We guarantee safe delivery to our customers.**

For the convenience of our customers, we will furnish any articles which are not on our list, but described in the catalogue of any American maker or dealer in mathematical instruments, at catalogue prices.

To guide the engineer and surveyor in the selection of Drawing Instruments, we give here a detailed description of the sets and separate instruments of different kinds in general use, with illustrations and prices.

**Alteneders** instruments are listed first. They are of the finest quality and finish, and are the best of American manufacture.

The **Swiss** instruments are also of the finest quality and finish, and are made of the best German silver and English steel.

The **German** instruments, made of German silver, are the best of their kind in the several grades.

The cheaper German silver and nickle plated instruments are for schools in Elementary practice.

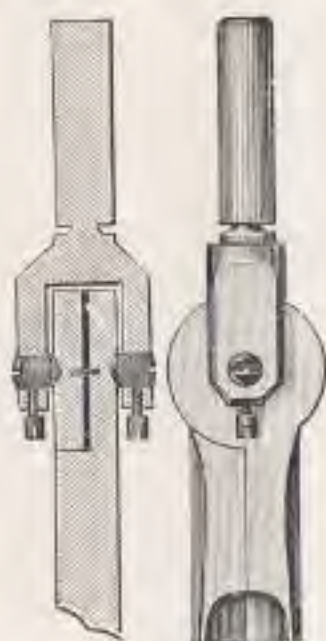
Special morocco or mahogany cases will be made to order to suit the separate pieces selected, at an additional cost of from \$2 to \$10, according to the size and quality of the case.



## DRAWING INSTRUMENTS

ALTENEDERS PATENT JOINT GERMAN SILVER AND  
STEEL DRAWING INSTRUMENTS

WARRANTED GENUINE.



Alteneders Patent Joint



Knuccle Joints



Clamp Holders



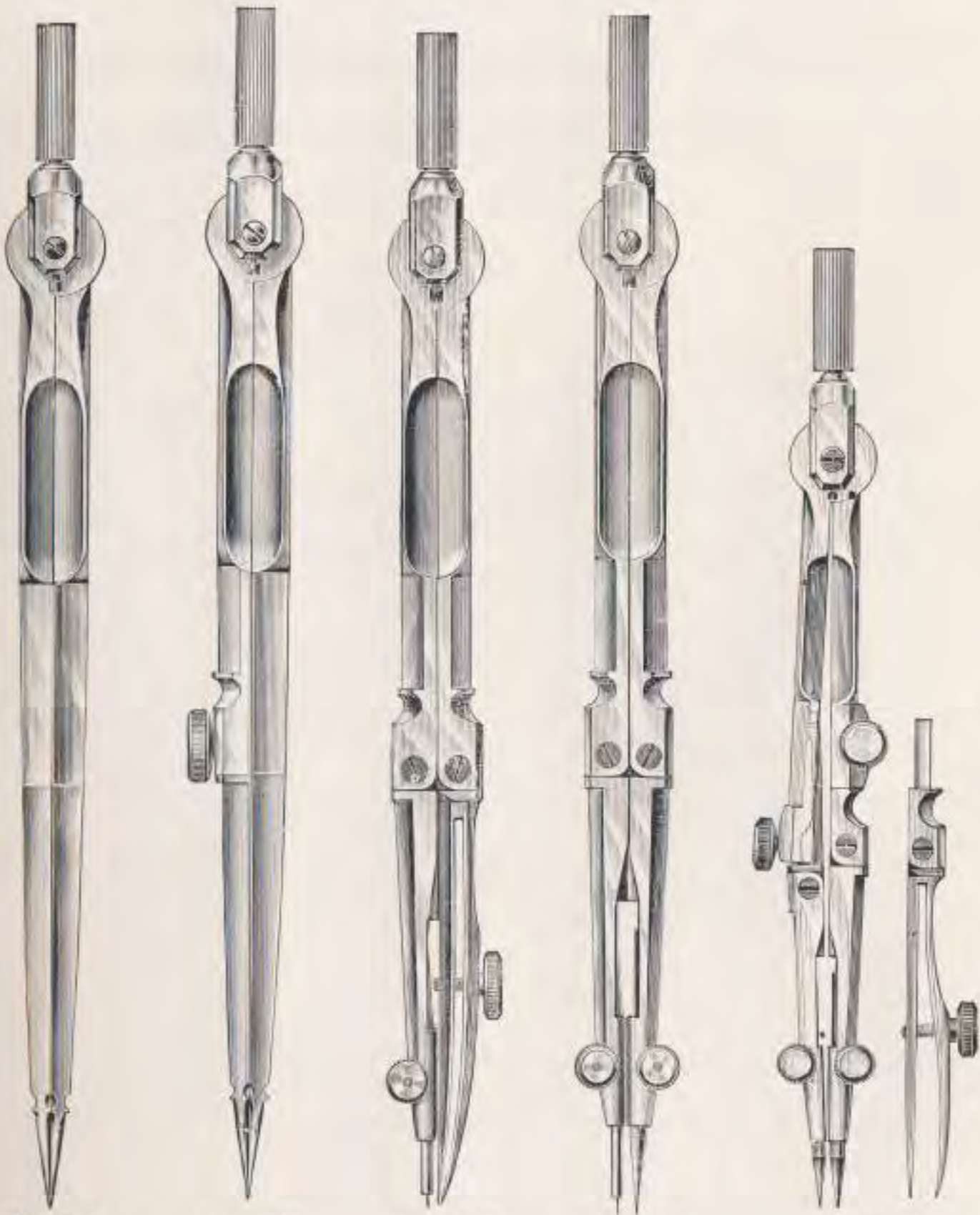
Clamp Sockets

The excellence of these instruments consists in the joints of the dividers being so constructed as to prevent any irregular motion when the legs are opened or closed, also in the general care with which the instruments are finished. All the pens are well made and pointed.

No.		Price.	Postage
1000	Plain Dividers, 3½ inch	\$2.25	\$0.12
1001	Plain Dividers, 4½ inch	2.50	.14
1002	Plain Dividers, 5 inch	2.50	.14
1006	Hairspring Dividers, 3½ inch	3.50	.12
1007	Hairspring Dividers, 4½ inch	3.75	.14
1008	Hairspring Dividers, 5 inch	4.00	.14
1015	Compasses, 3½ inch, with fixed needle and pen points	4.00	.14
1016	Compasses, 3½ inch, with fixed needle and pencil points	4.00	.14
1017	Compasses, 4½ inch, with fixed needle and pen points	4.50	.15
1018	Compasses, 4½ inch, with fixed needle and pencil points	4.50	.15
1019	Compasses, 5½ inch, with fixed needle and pen points	5.00	.15
1020	Compasses, 5½ inch, with fixed needle and pencil points	5.00	.15
1021	Compasses, 3½ inch, with fixed needle point, and pen and pencil points	6.00	.14
1022	Compasses, 3½ inch, with fixed needle point, with hairspring, and pen and pencil points	7.50	.14
1023	Compasses, 4½ inch, with fixed needle point, and pen and pencil points and lengthening bar	7.25	.15
1024	Compasses, 4½ inch, with fixed needle point, with hairspring, and pen and pencil points and lengthening bar	8.75	.15
1025	Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar	7.50	.16
1026	Compasses, 5½ inch, with fixed needle point, with hairspring, pen and pencil points and lengthening bar	9.00	.16



ALTENEDERS PATENT JOINT GERMAN SILVER AND  
STEEL DRAWING INSTRUMENTS



No. 1001

No. 1007

No. 1017

No. 1018

No. 1022

No.		Price.	Postage.
1035	Steelspring Bow Spacer, metal handle, 3¼ inch	\$1.75	\$0.12
1036	Steelspring Bow Spacer, needle points, metal handle, 3¼ inch	2.50	.12
1037	Steelspring Bow Pen, needle point, metal handle, 3¼ inch	2.50	.12
1038	Steelspring Bow Pencil, needle point, metal handle, 3¼ inch	2.50	.12
1039	4 inch Self-adjusting Needle point Bow Pen	4.00	.12
1040	4 inch Self-adjusting Needle point Bow Pen and Pencil	5.00	.12



ALTENEDERS PATENT JOINT GERMAN SILVER AND  
STEEL DRAWING INSTRUMENTS



No. 1050



No. 1035



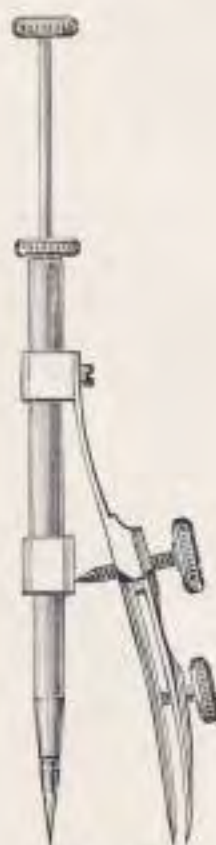
No. 1036



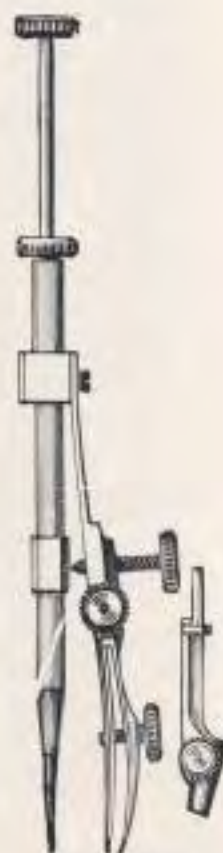
No. 1037



No. 1038



No. 1039



No. 1040



## ALTENEDERS PATENT JOINT GERMAN SILVER AND STEEL DRAWING INSTRUMENTS

No.		Price.	Postage.
1050	Drawing Pen, with spring blade, ebony handle, 4¼ inch...	\$1.40	\$0.13
1051	Drawing Pen, with spring blade, ebony handle, 5 inch.....	1.65	.13
1052	Drawing Pen, with spring blade, ebony handle, 5½ inch...	1.90	.13
1053	Drawing Pen, 4¼ inch, with patent spring hinge, ebony handle -----	2.90	.13
1054	Drawing Pen, 5 inch, with patent spring hinge, ebony handle -----	2.90	.13
1055	Drawing Pen, 5½ inch, with patent spring hinge, ebony handle -----	2.90	.13
1060	Railroad Pen, ebony handle, 5 inch -----	3.50	.13
1062	Swivel Curve Pen, spring blade, hollow metal handle.....	2.00	.13
1064	Pricker, with removable needle point, ebony handle.....	1.00	.12
1066	Tubular nickel plated case, for leads.....	.15	.02



No. 1079

## ALTENEDERS PATENT JOINT® DRAWING INSTRUMENTS IN MOROCCO CASE

1075	Morocco Case, containing: Compasses, No. 1025; Bow Pen, No. 1037; Drawing Pen, No. 1051; Box of Leads.....	13.25	.20
1077	Morocco Case, containing: Compasses, No. 1025; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pen, No. 1051; Box of Leads.....	15.75	.22
1079	Morocco Case, containing: Hairspring Dividers, No. 1008; Compasses, No. 1025; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads -----	23.50	.25



No.		Price.	Postage.
1081	Morocco Case, containing: Hairspring Dividers, No. 1008; Compasses, No. 1026; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pen- cil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads -----	\$25.00	\$0.25
1083	Morocco Case, containing: Hairspring Dividers, No. 1008; Compasses, Nos. 1021 and 1024; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads -----	30.00	.30



No. 1085

1085	Folding Pocket Case, with flexible flaps, and containing same instruments as in set No. 1079 -----	24.75	0.25
1087	Folding Pocket Case, flexible flaps, containing Hairspring Dividers, No. 1008; Compasses, No. 1026; Bow Spacer, No. 1035; Bow Pen, No. 1037; Bow Pencil, No. 1038; Drawing Pens, Nos. 1050 and 1051; Box of Leads ----	26.25	.25

### EMPTY CASES FOR ALTENEDERS INSTRUMENTS

1090	Empty Folding Pocket Case, with flexible flaps, and fitted to receive from five to twelve pieces of drawing instru- ments; price, according to size of case --	\$3.00 to \$4.00	.15 to .30
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Folding Pocket Cases furnished, instead of the usual Morocco Cases, with sets Nos. 1075 to 1081, at an extra cost of \$1.25, and with set No. 1083 at \$1.50 extra.



SUPERIOR SWISS DRAWING INSTRUMENTS



No. 1102

No. 1104

No. 1106

No. 1112

No. 1118

No.		Price.	Postage.
1100	3½ inch Plain Divider	2.00	\$0.14
1102	5 inch Plain Divider	2.50	.14
1104	5 inch Hair Spring Divider	3.25	.14
1106	3½ inch Compasses with fixed needle point, pen and pencil point	4.75	.14
1108	5 inch Compasses with fixed needle point, pen and pencil point and lengthening bar	6.50	.16
1110	4 inch Drawing Pen with ebony handle	1.10	.13
1112	5 inch Drawing Pen with ebony handle	1.20	.13
1114	6 inch Drawing Pen with ebony handle	1.35	.13
1116	5 inch Swedish Pen, ebony handle	1.50	.13
1118	6 inch Swedish Pen, ebony handle	1.60	.14
1120	Border Pen for extra broad lines	2.50	.14
1122	Curve Pen	1.50	.14
1124	Railroad Pen	3.50	.14
1126	Rivet Pen for small circles	3.00	.12
1128	Rivet Pen with pen and pencil point	4.00	.12
1130	Pricker	1.00	.12



SUPERIOR SWISS DRAWING INSTRUMENTS



No. 1120



No. 1122



No. 1124



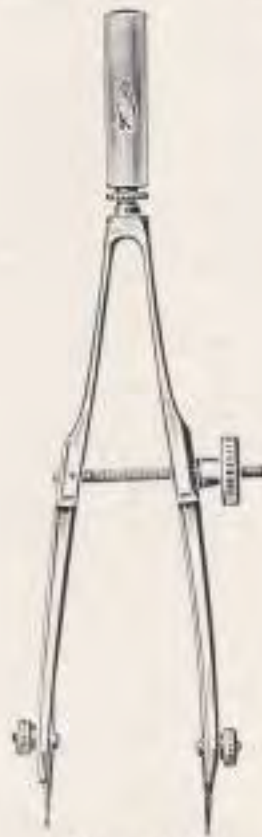
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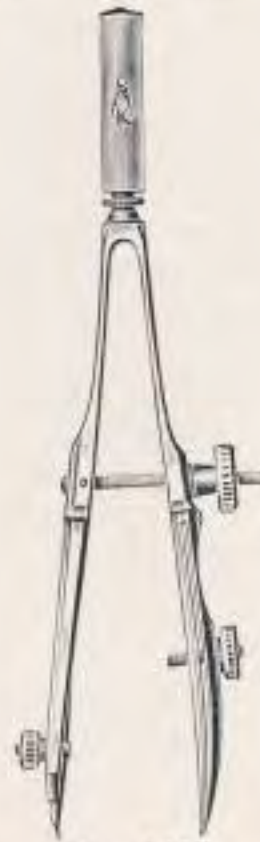
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No. 1135



No. 1136



No. 1137



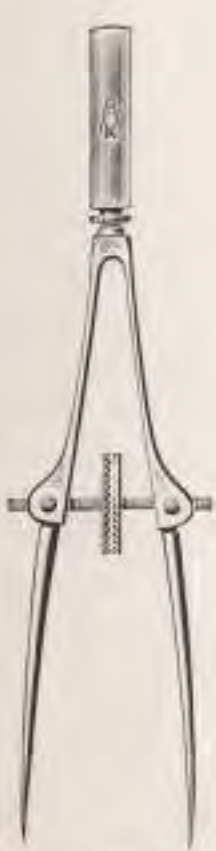
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SUPERIOR SWISS DRAWING INSTRUMENTS

STEELSPRING BOWS WITH NUT AND BOLT MOVEMENT

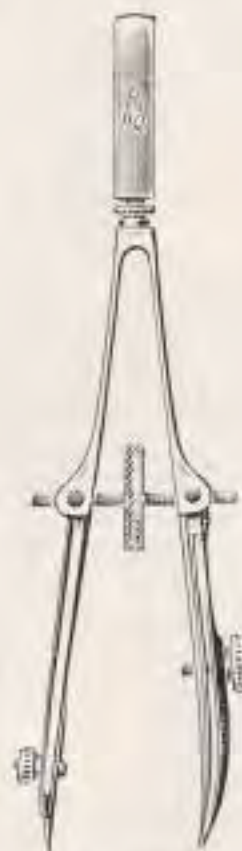
No.		Price.	Postage.
1135	Steelspring Bow Divider with plain points.....	\$1.50	\$0.12
1136	Steelspring Bow Divider with needle points.....	2.00	.12
1137	Steelspring Bow Pen with needle point.....	2.25	.12
1138	Steelspring Bow Pencil with needle point.....	2.25	.12



No. 1140



No. 1141



No. 1142



No. 1143

STEELSPRING BOWS WITH CENTER WHEEL ADJUSTMENT

1140	Steelspring Bow Dividers with plain points.....	1.75	.12
1141	Steelspring Bow Dividers with needle points.....	2.25	.12
1142	Steelspring Bow Pen with needle point.....	2.50	.12
1143	Steelspring Bow Pencil with needle point.....	2.50	.12



No. 1150

1150	Set of instruments containing two pens, spring bow divider, spring bow pencil, spring bow pen, hair spring divider, compasses and box of leads, all in morocco case.....	20.00	.25
1152	Same as above but contained in pocket folding case.....	21.75	.25



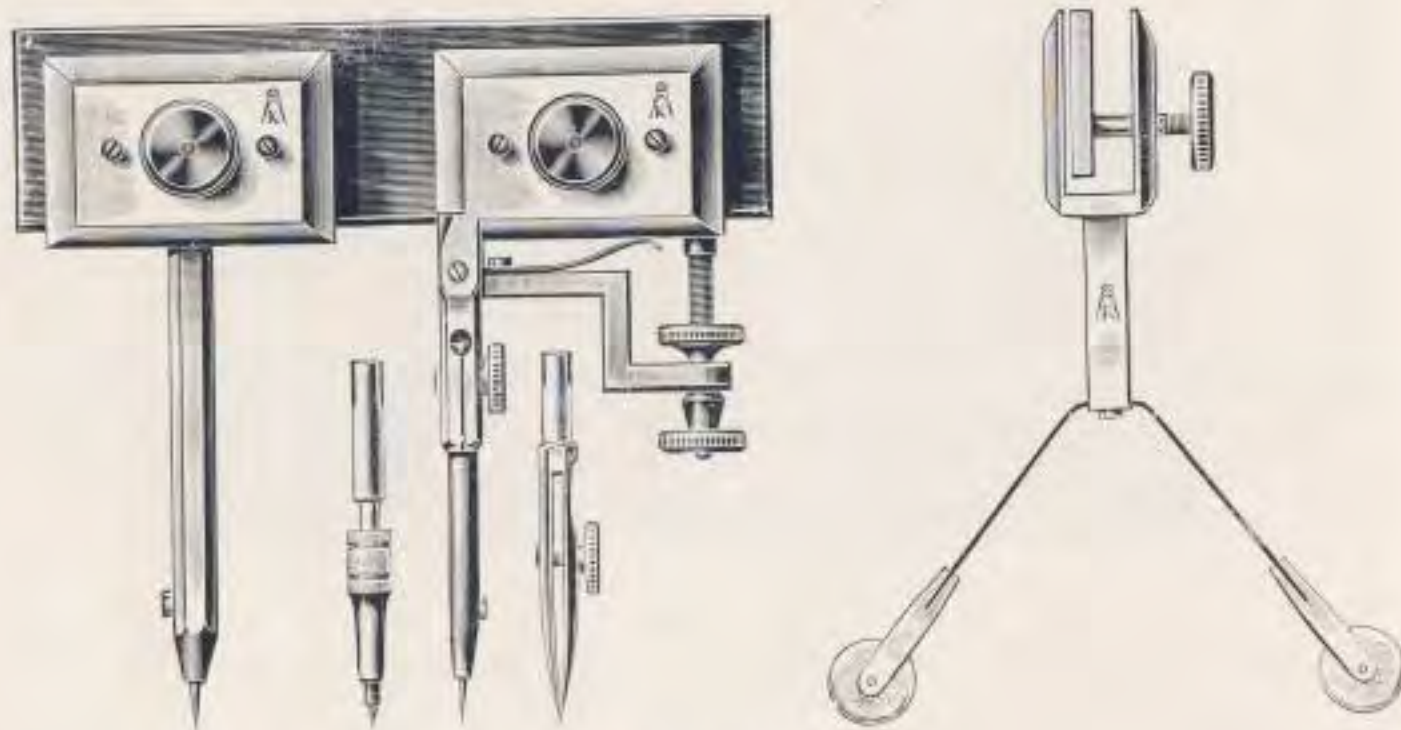
SUPERIOR SWISS DRAWING INSTRUMENTS

BEAM COMPASSES

No.		Price.	Postage.
1160	Beam Compasses with horizontal adjustment, pen and pencil points	\$8.00	\$0.20
1162	Beam Compasses with vertical adjustment, pen and pencil points and wheel attachment for standing alone	13.00	.30
1164	Hardwood Bars for No. 1162 Beam Compasses		
	24 30 36 48 inches long		
	.30 .35 .40 .55 each		
	.10 .12 .15 .20 postage		



No. 1160



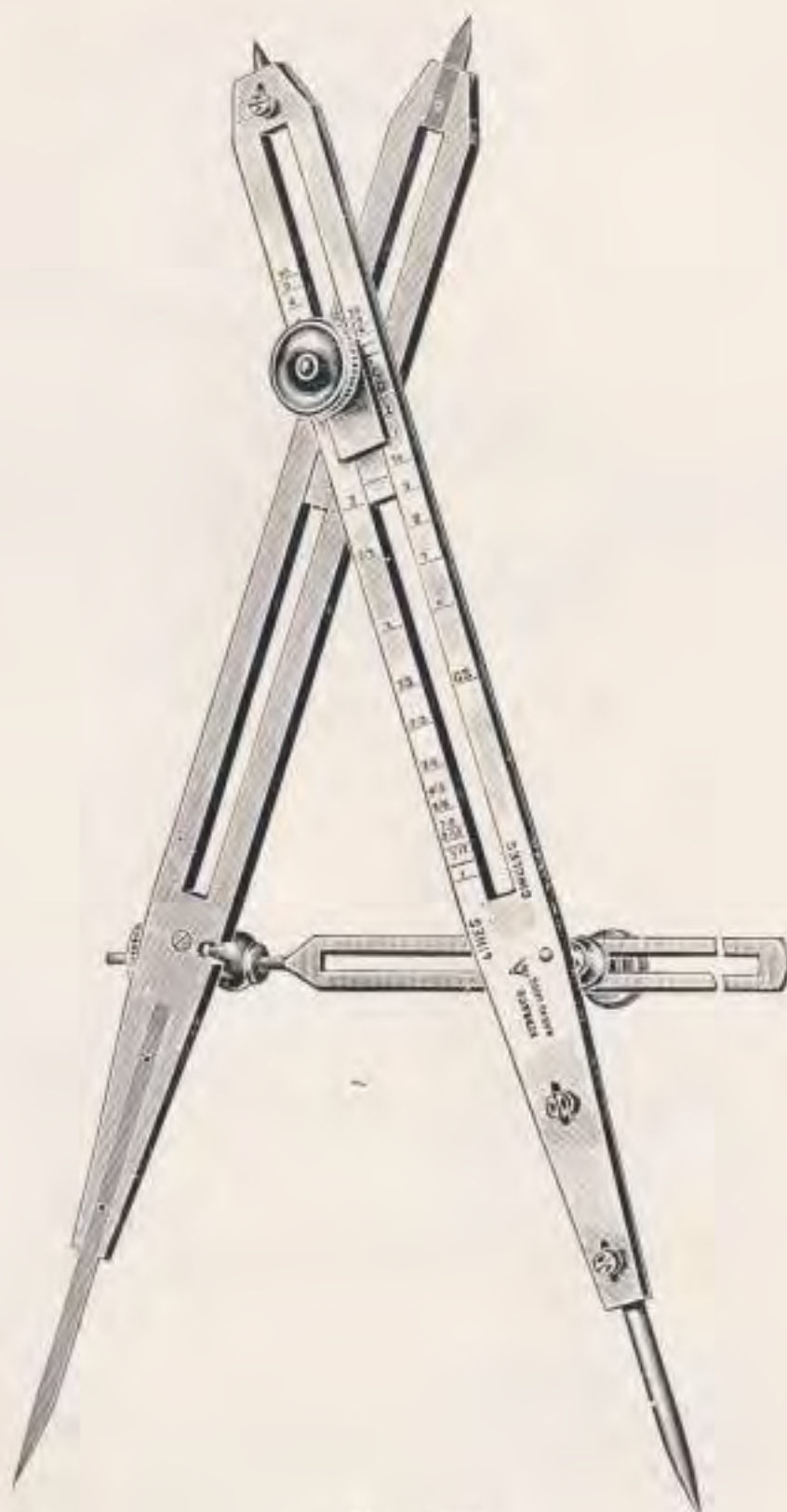
No. 1162



SUPERIOR SWISS DRAWING INSTRUMENTS  
 PROPORTIONAL DIVIDERS



No. 1172



No. 1176

No.	Description	Price.	Postage.
1170	5½ inch Proportional Dividers for lines	\$8.00	\$0.17
1172	8 inch Proportional Dividers for lines and circles	10.00	.17
1174	8 inch Proportional Dividers for lines and circles, with rack movement	12.50	.20
1176	8 inch Proportional Dividers for lines and circles, with micrometer adjustment	15.00	.20
1178	8 inch Proportional Dividers for lines, circles, planes and solids, with micrometer adjustment	16.50	.20

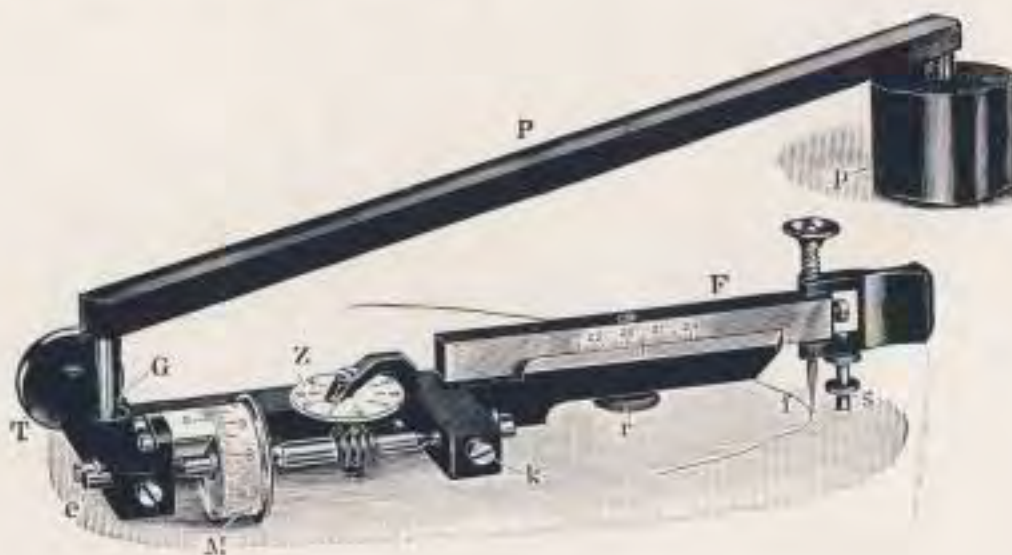
MOROCCO CASES FOR PROPORTIONAL DIVIDERS

To fit Dividers Nos. 1170, 1172	1.00	.14
To fit Dividers No. 1174	1.25	.14
To fit Dividers Nos. 1176, 1178	1.50	.16

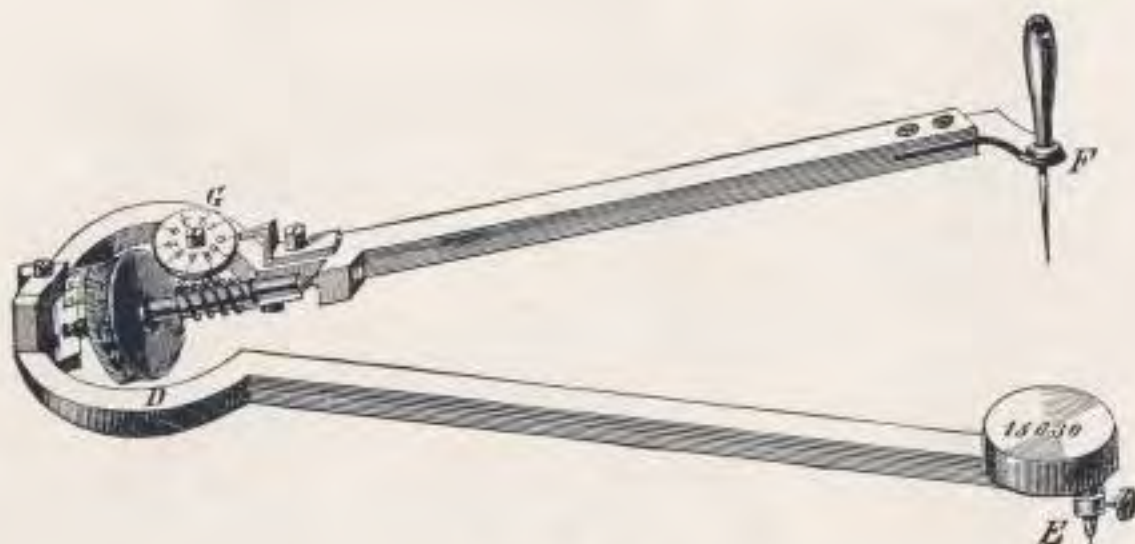


## POLAR PLANIMETERS

By means of the Polar Planimeter a person can ascertain the area of any planimetric figure more accurately and in less time than the most experienced mathematician could calculate it.



No. 1092

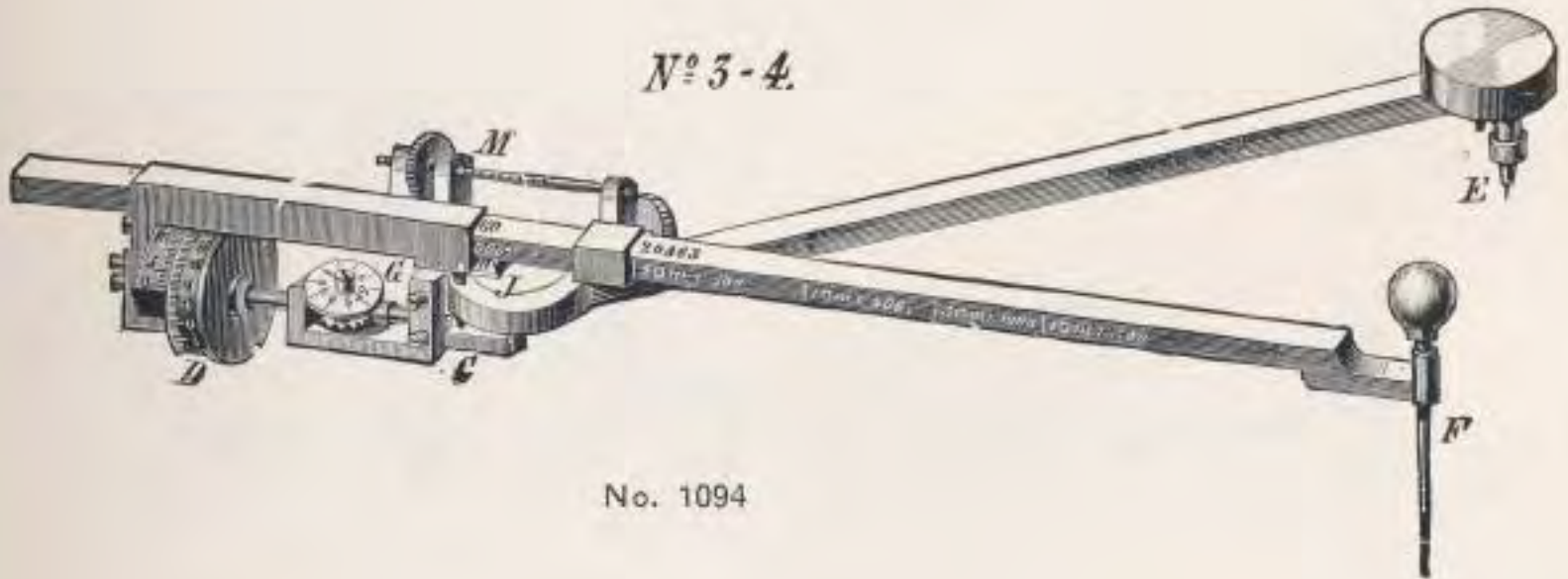


No. 1093

No.	Description	Price.	Postage.
1092	Polar Planimeter, German silver, best quality, measuring up to 100 square inches, in case, with printed directions	\$16.50	\$0.25
1093	Polar Planimeter, German silver, best quality, measuring up to 100 square inches. Swiss make. In morocco case, with printed directions	19.00	.25

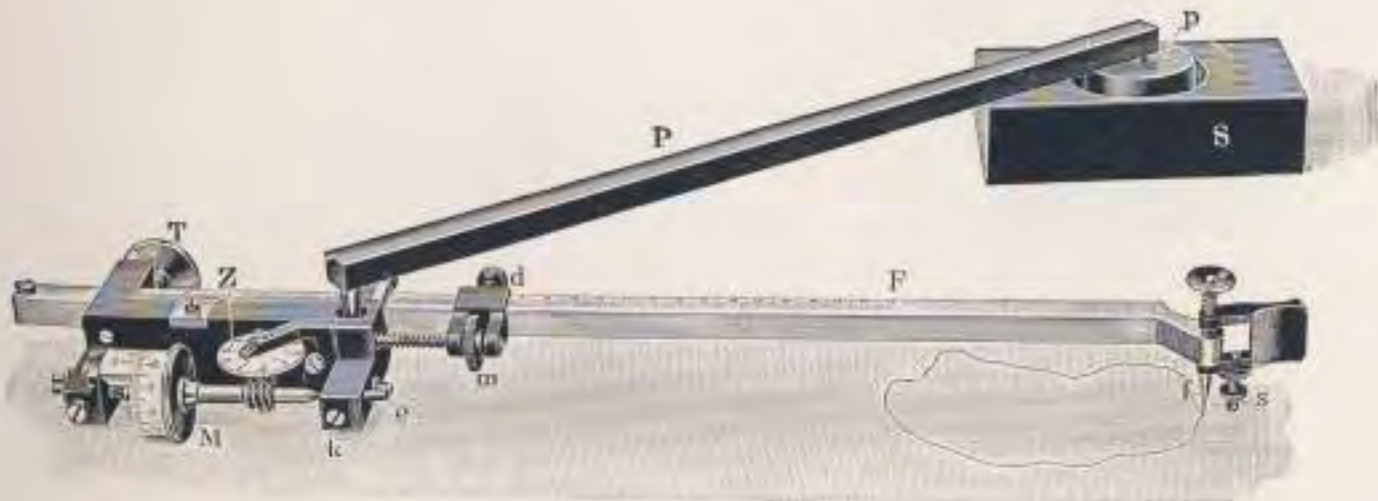


POLAR PLANIMETERS



No. 1094

No.		Price.	Postage.
1094	Polar Planimeter, German silver, best quality, measuring up to 450 square inches, also indicates square feet and square centimeters. Swiss make. In morocco case, with printed directions.....	\$28.00	\$0.35
1095	Compensating Planimeter, German silver and brass; adjustable tracer arm fully graduated, improved pole weight. German make, with directions, in case.....	35.00	.35



No. 1095

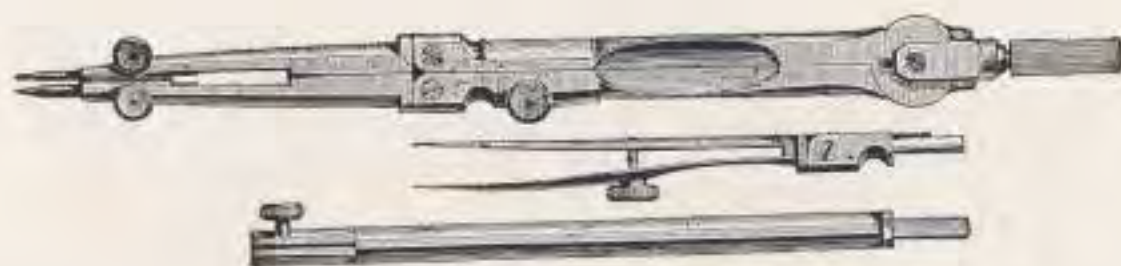


## FINE GERMAN DRAWING INSTRUMENTS

No.		Price.	Postage.
1200	Plain Dividers, 3½ inch, with handle.....	\$0.70	\$0.02
1202	Plain Dividers, 6 inch, with handle.....	1.00	.14
1203	Plain Dividers, 6 inch, pivot joint handle (Superior).....	1.25	.14
1206	Hairspring Dividers, 4¼ inch, with handle.....	1.20	.12
1208	Hairspring Dividers, 6 inch, with handle.....	1.75	.14
1209	Hairspring Dividers, 6 inch, pivot joint handle (Superior).....	2.00	.14
1212	Pocket Dividers, 5 inch, with sheath.....	1.50	.14
1213	Three Legged Dividers, 5 inch, for taking off three points.....	2.75	.15



No. 1209



No. 1218

1215	Compasses, 4¼ inch, with two steel points, pen, pencil and needle point.....	2.50	.14
1216	Compasses, 4¼ inch, with pivot joint handle, pen, pencil and fixed needle point (Superior).....	3.00	.14
1217	Compasses, 6 inch, with two steel points, pen, pencil and needle points and lengthening bar.....	3.00	.17
1218	Compasses, 6 inch, with pivot joint handle, pen, pencil fixed needle point and lengthening bar (Superior).....	4.00	.17
1220	Pocket Compasses, with folding points.....	5.00	.14
1225	Proportional Dividers, 6½ inch, divided for lines.....	2.50	.16
1226	Proportional Dividers, 7 inch, for lines and circles.....	3.25	.17
1227	Proportional Dividers, 7½ inch, with rack movement and divided for lines and circles.....	5.20	.17



BEAM COMPASSES

No.		Price.	Postage.
1240	Beam Compass Furniture, with pen, pencil, fixed needle point and tangent adjustment, in case-----	\$5.50	\$0.17
1241	Beam Compass Furniture, with pen, pencil, two needle points and micrometer adjustment, in case-----	6.00	.17
1248	Map Measurer, registers inches to miles and centimeters to kilometers -----	2.00	.14



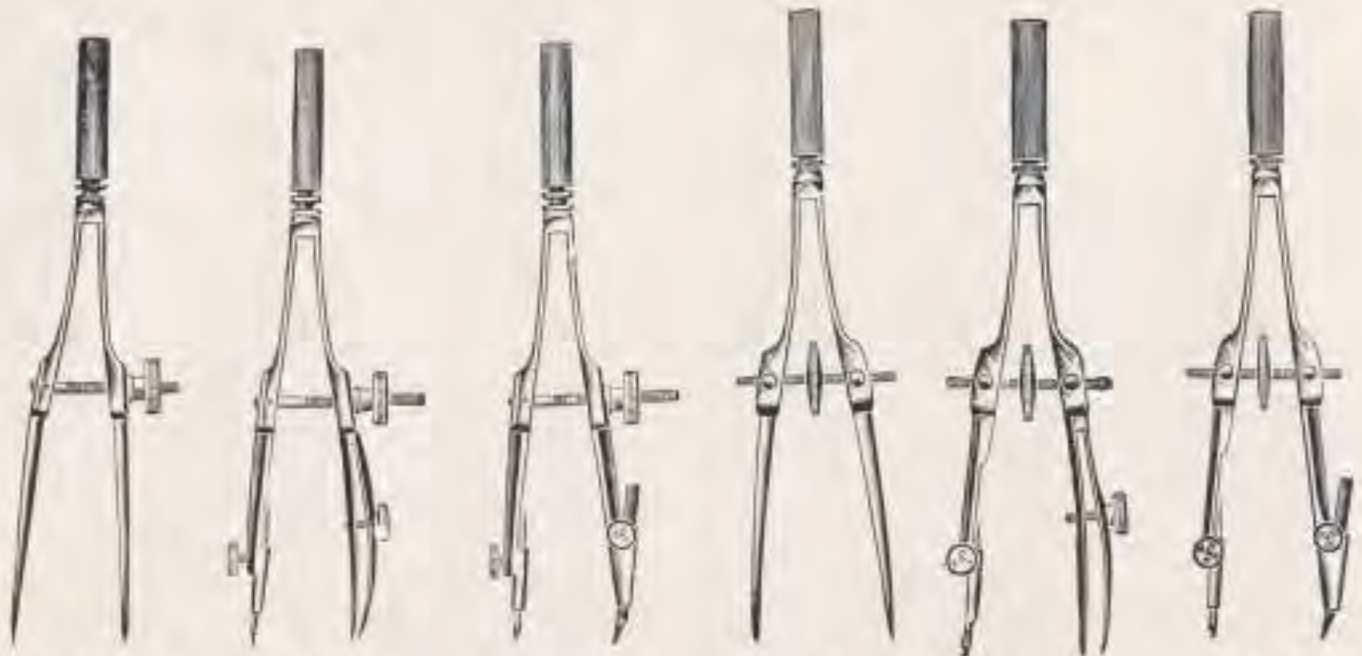
No. 1241



No. 1248



FINE DRAWING INSTRUMENTS



No. 1250      No. 1251      No. 1252      No. 1260      No. 1261      No. 1262

No.	Description	Price.	Postage.
1250	Steelspring Bow Spacer, metal handle, 3½ inch	\$1.00	\$.12
1251	Steelspring Bow Pen, metal handle, 3½ inch	1.35	.12
1252	Steelspring Bow Pencil, metal handle, 3½ inch	1.35	.12
1255	Set of three Steel Bows, Nos. 1250, 1251 and 1252, in morocco case	4.50	.16
1260	Bow Spacer, with wheel adjustment, metal handle, 3½ inch	1.65	.12
1261	Bow Pen, with wheel adjustment, metal handle, 3½ inch	1.95	.12
1262	Bow Pencil, with wheel adjustment, metal handle, 3½ inch	1.95	.12
1265	Set of three Steel Bows, Nos. 1260, 1261 and 1262, in morocco case	6.40	.17
1268	Spring Bow Pen, with adjustable needle point for small circles	2.00	.12
1270	Spring Bow Pen, with pencil leg, and adjustable needle point for small circles	3.00	.13
1275	Drawing Pen, without joint, ivory handle, 4½ inch	.40	.02
1277	Drawing Pen, without joint, ivory handle, 5½ inch	.45	.03
1280	Drawing Pen, with fine joint, ivory handle, 4½ inch	.60	.02
1281	Drawing Pen, with fine joint, ivory handle, 5 inch	.70	.03
1282	Drawing Pen, with fine joint, ivory handle, 5½ inch	.80	.03
1285	Drawing Pen, with fine joint and pin, ivory handle, 4½ inch	.70	.02



No. 1263



No. 1280



FINE DRAWING INSTRUMENTS



No. 1300



No. 1303



No. 1308

No.		Price.	Postage.
1287	Drawing Pen, with fine joint and pin, ivory handle, 5 inch	\$0.80	\$0.03
1289	Drawing Pen, with fine joint and pin, ivory handle, 5½-6 inch	.90	.03
1300	Drawing Pen, without set screw, hollow metal handle, 5½ inch	1.45	.12
1303	Drawing Pen, Swedish pattern, ebony handle, 5 inch	.75	.03
1304	Drawing Pen, Swedish pattern, ebony handle, 6 inch	.85	.03
1306	Drawing Pen, with German silver blades, for red ink, 5 inch	.70	.03
1308	Curve Pen, swivel blade, hollow metal handle, 5 inch	1.50	.12
1310	Drawing Pen, for heavy border lines, ivory handle, 5½ inch	2.00	.12



No. 1314



No. 1318



No. 1322

1314	Railroad Pen, with joints, ivory handle, 5½ inch	2.25	.13
1318	Detail Pen, with broad blades, for heavy border lines, ebony handle, 6¼ inch	1.00	.13
1321	Railroad Pen and Border Pen to draw two parallel lines of same or different width or one broad line	3.50	.14
1322	Dotting Pen, one wheel, ivory handle, 5 inch	1.00	.12

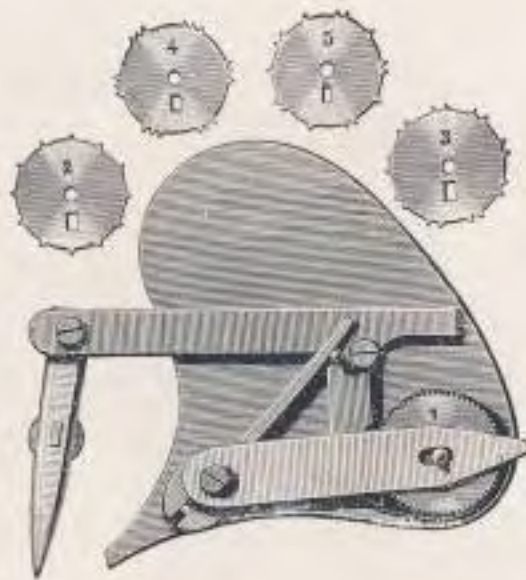


## FINE DRAWING INSTRUMENTS

No.		Price.	Postage.
1323	Dotting Pen, with six wheels, extra fine, in morocco case -----	\$3.75	\$0.15
	The outer wheel is rolled on the edge of a ruler and turns the ratchet wheel, which causes the pen to move up and down. The flat point near the pen must slide on the paper.		
1325	Railroad Curve Pen, swivel blades, hollow metal handle, 5¼ inch -----	4.25	.13
1329	Tracer, ivory handle -----	.85	.02



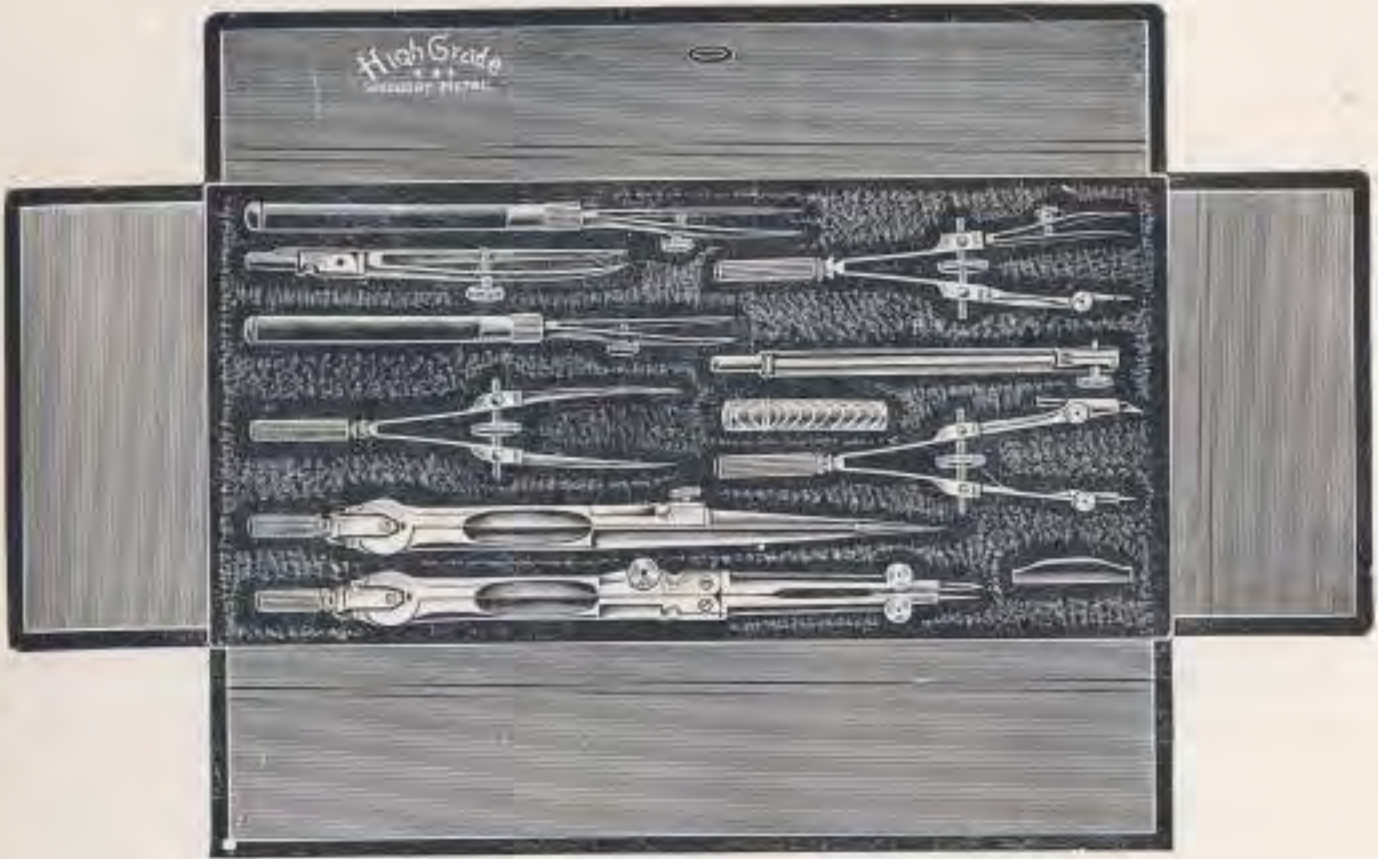
No. 1325



No. 1323



CASES OF SUPERIOR QUALITY PIVOT JOINT  
INSTRUMENTS OF BEST GERMAN MAKE



No. 1353



No. 1354



## CASES OF SUPERIOR QUALITY PIVOT JOINT INSTRUMENTS OF BEST GERMAN MAKE

No.		Price.	Postage.
1350	Morocco Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Pen; Bow Pencil; Drawing Pen; Box of Leads -----	\$12.00	\$0.20
1351	Morocco Case, containing: Hairspring Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Spacer; Bow Pen; Bow Pencil; two Drawing Pens; Box of Leads -----	14.50	.24
1352	Folding Pocket Case, flexible flaps, containing: Hairspring Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Spacer; Bow Pen; Bow Pencil; two Drawing Pens; Box of Leads -----	15.00	.24
1353	Folding Pocket Case, flexible flaps, containing: Hairspring Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Spacer, Bow Pen and Bow Pencil, each with central screw; two Drawing Pens; Box of Leads -----	17.00	.25
1354	Morocco Case, containing: Hairspring Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Compasses, 3½ inch, with fixed needle and pen point; Compasses, 3½ inch, with fixed needle and pencil point; Bow Spacer; Bow Pen; Bow Pencil; three Drawing Pens; Box of Leads ..	20.00	.28
1355	Folding Pocket Case, flexible flaps containing Hairspring Dividers, 5 inch; Compasses, 5½ inch; equipped with Micrometer Attachment, Pen, Pencil and Lengthening Bar; Bow Pen and Pencil and Bow Spacer, each with circular spring and center screw. The Bow Pen and Pencil also having our special Micrometer Attachment. Two Drawing Pens and box of Leads -----	23.00	.25
1356	Set complete as above but without Micrometer Attachment and with regular spring bows instead of spring bows with circular spring -----	22.00	.25

Sets Nos. 1355 and 1356 are of the same quality as our No. 1350 series but have several improvements such as micrometer adjustment, patented cross joints to pens, to facilitate cleaning, and improved pivot joint to heads of compasses and dividers.



CASES OF SPECIAL QUALITY GERMAN INSTRUMENTS



No. 1360



No. 1361

No.		Price.	Postage.
1360	Morocco Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Drawing Pen, 5 inch; Box of Leads	\$5.00	\$0.17
1361	Morocco Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Pen; Drawing Pen, 5 inch; Box of Leads	6.00	.18
1362	Morocco Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Pen; Bow Pencil; Drawing Pen, 5 inch; Box of Leads	7.00	.20
1363	Morocco Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Spacer; Bow Pen; Bow Pencil; Drawing Pen; 5 inch; Box of Leads	8.00	.22



CASES OF SPECIAL QUALITY GERMAN INSTRUMENTS



No. 1364

No.		Price.	Postage.
1364	Morocco Case, containing: Hairspring Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Spacer; Bow Pen; Bow Pencil; Drawing Pens, 4½ and 5 inches; Box of Leads	\$9.00	\$0.24
1365	Morocco Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Compasses, 3½ inch, with two steel points, needle point, pen and pencil; Bow Spacer; Bow Pen; Bow Pencil; Drawing Pens, 4½ and 5 inches; Box of Leads	12.00	.26

CASES OF GERMAN SILVER INSTRUMENTS FOR SCHOOL USE



No. 1370

1370	Leather Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar; Drawing Pen; Box of Leads	3.40	.16
1371	Leather Case, containing: Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar; Bow Pen; Drawing Pen; Box of Leads	3.75	.16



CASES OF GERMAN SILVER INSTRUMENTS FOR SCHOOL USE



No. 1372

No.		Price.	Postage.
1372	Leather Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar; Bow Pen; Drawing Pen; Box of Leads	\$4.25	\$0.17
1373	Leather Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar; Bow Pen; Bow Pencil; Drawing Pen; Box of Leads	5.00	.18
1374	Leather Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen, pencil and lengthening bar; Bow Spacer; Bow Pen; Bow Pencil; Drawing Pen; Box of Leads	5.75	.20



No. 1375



## CASES OF GERMAN SILVER INSTRUMENTS FOR SCHOOL USE

No.		Price.	Postage
1375	Leather Case, containing: Hairspring Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar; Bow Spacer; Bow Pen; Bow Pencil; two Drawing Pens; Box of Leads-----	\$6.75	\$0.20
1376	Leather Case, containing: Plain Dividers, 5 inch; Compasses, 5½ inch, with fixed needle point, pen and pencil points and lengthening bar; Compasses, 3½ inch, and two steel points, needle point, pen and pencil points; Bow Spacer; Bow Pen; Bow Pencil; two Drawing Pens; Box of Leads-----	8.50	.24

## CASES OF NICKEL PLATED DRAWING INSTRUMENTS LEATHERETTE CASES

FOR BEGINNERS



No. 1392

1390	Case, containing: Compasses, 4½ inch, with pen and pencil points; Drawing Pen; Box of Leads; Protractor, Ruler and Triangle-----	1.40	.15
1391	Case, containing: Plain Dividers, 4 inch; Compasses, 4½ inch, with pen and pencil points; Drawing Pen; Box of Leads; Protractor, Ruler and Triangle-----	1.65	.17
1392	Case, containing: Plain Dividers, 4 inch; Compasses, 4½ inch, with pen and pencil points and lengthening bar; Spring Bow Pen; Drawing Pen; Box of Leads; Protractor, Ruler and Triangle-----	2.25	.20

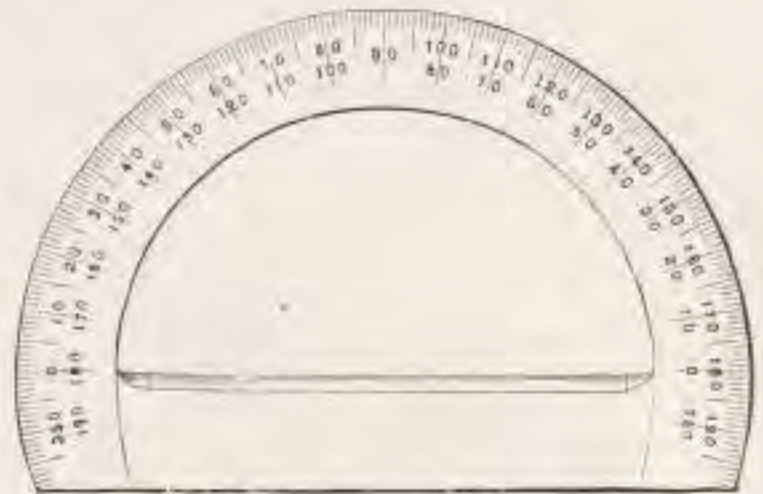


# PROTRACTORS

EXTRA FINE GERMAN SILVER PROTRACTORS OF BEST GERMAN MAKE



No. 1442

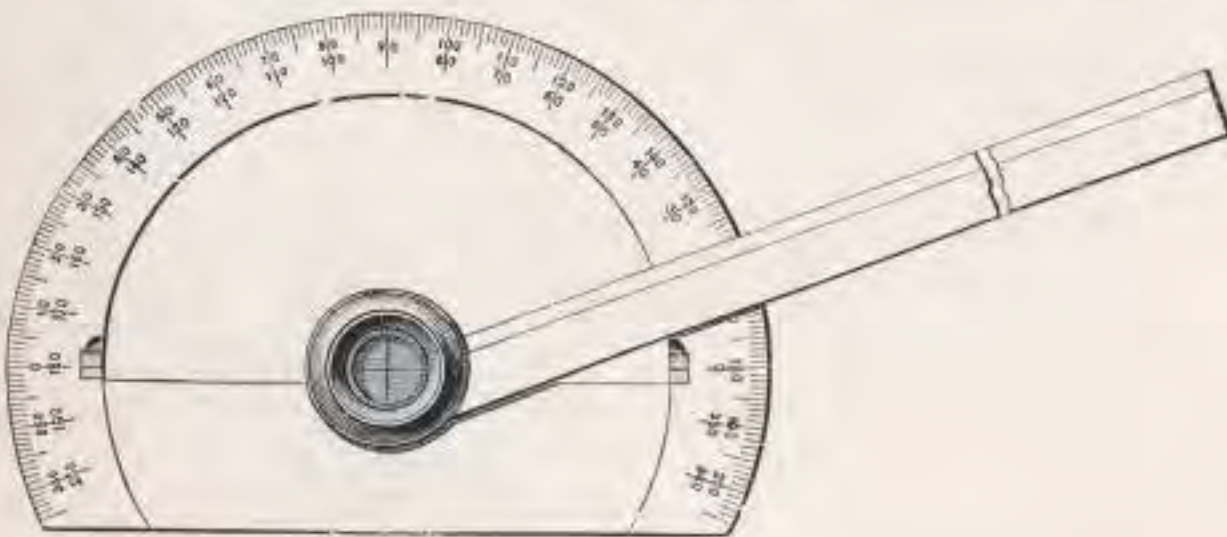


No. 1446

No.		Price.	Postage.
1440	Protractor, half circle, 4 inch beveled edge, center on outer edge, divided to 1 degree	\$1.00	\$0.14
1441	Protractor, half circle, 5 inch, divided to $\frac{1}{2}$ degrees	1.50	.14
1442	Protractor, half circle, 6 inch, divided to $\frac{1}{2}$ degrees	2.10	.16
1443	Protractor, half circle, 6 inch, divided to $\frac{1}{4}$ degrees	2.60	.16
1444	Protractor, half circle, 7 inch, divided to $\frac{1}{2}$ degrees	3.00	.16
1445	Protractor, half circle, 5 inch, beveled edge, center on inner edge, divided to $\frac{1}{2}$ degrees	1.75	.14
1446	Protractor, half circle, 6 inch, divided to $\frac{1}{2}$ degrees	2.40	.16
1447	Protractor, half circle, 6 inch, divided to $\frac{1}{4}$ degrees	2.90	.16
1450	Protractor, whole circle, 5 inch, divided to $\frac{1}{2}$ degrees	3.50	.18

## EXTRA FINE GERMAN SILVER PROTRACTORS WITH ARM AND WITHOUT VERNIER

1454	Protractor, half circle, 6 inch, with horn center and 6 inch movable arm, divided to $\frac{1}{2}$ degrees	8.50	.20
1455	Protractor, half circle, 7 inch, with horn center and $6\frac{1}{2}$ inch movable arm, divided to $\frac{1}{2}$ degrees	10.00	.22

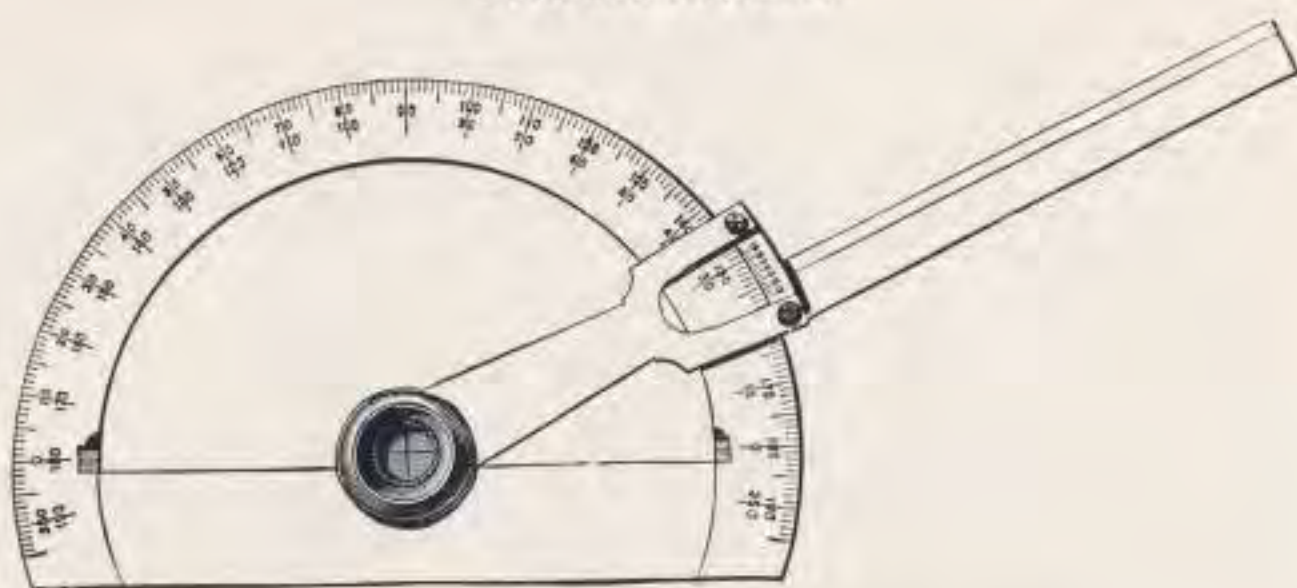


No. 1455

Length of arms extending over the outer edge of Protractors.  
 For No. 1454, 6 inch.  
 For No. 1455,  $6\frac{1}{2}$  inch.



PROTRACTORS



No. 1461

Length of arms extending over the outer edge of Protractors.  
 For Nos. 1460 and 1465, 5½ inch.  
 For Nos. 1461, 1466, 1470, 6 inch.  
 For Nos. 1462, 1467, 1473, 6½ inch.

EXTRA FINE GERMAN SILVER PROTRACTORS WITH ARM AND VERNIER

No.		Price.	Postage.
1460	Protractor, half circle, 5½ inch, with horn center and movable arm, divided to ½ degrees, vernier reading to 3 minutes	\$10.00	\$0.20
1461	Protractor, half circle, 8 inch, divided to ¼ degrees, vernier to 1 minute	14.00	.25
1462	Protractor, half circle, 10 inch, divided to ¼ degrees, vernier to 1 minute	17.00	.35
1465	Protractor, whole circle, 5½ inch, with horn center and movable arm, divided to ½ degrees, vernier reading to 3 minutes	14.00	.25
1466	Protractor, whole circle, 8 inch, divided to ¼ degrees, vernier to 1 minute	16.00	.35
1467	Protractor, whole circle, 10 inch, divided to ¼ degrees, vernier to 1 minute	20.00	.50
1470	Protractor, whole circle, 8 inch, with horn center and movable arm, divided to ¼ degrees, vernier to 1 minute, with clamp and tangent to arm	20.00	.25
1473	Protractor, whole circle, 8 inch, with horn center and movable arm, divided to ¼ degrees, vernier to 1 minute, with clamp and tangent to arm and magnifying lens	23.50	.40

MAHOGANY CASES FOR PROTRACTORS

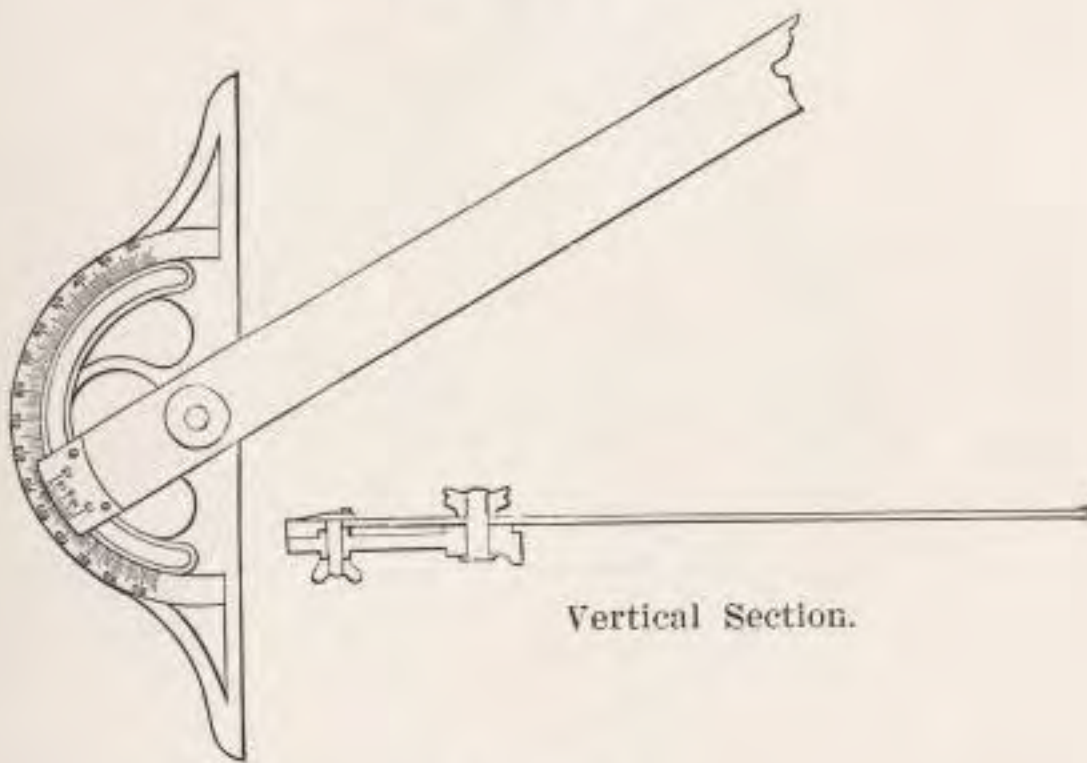
1476	Case for Protractors Nos. 1454, 1455, 1460	1.75	.25
1477	Case for Protractors Nos. 1461, 1462, 1465, 1470	2.00	.35
1478	Case for Protractors Nos. 1466, 1467, 1473	2.50	.45



### PROTRACTORS

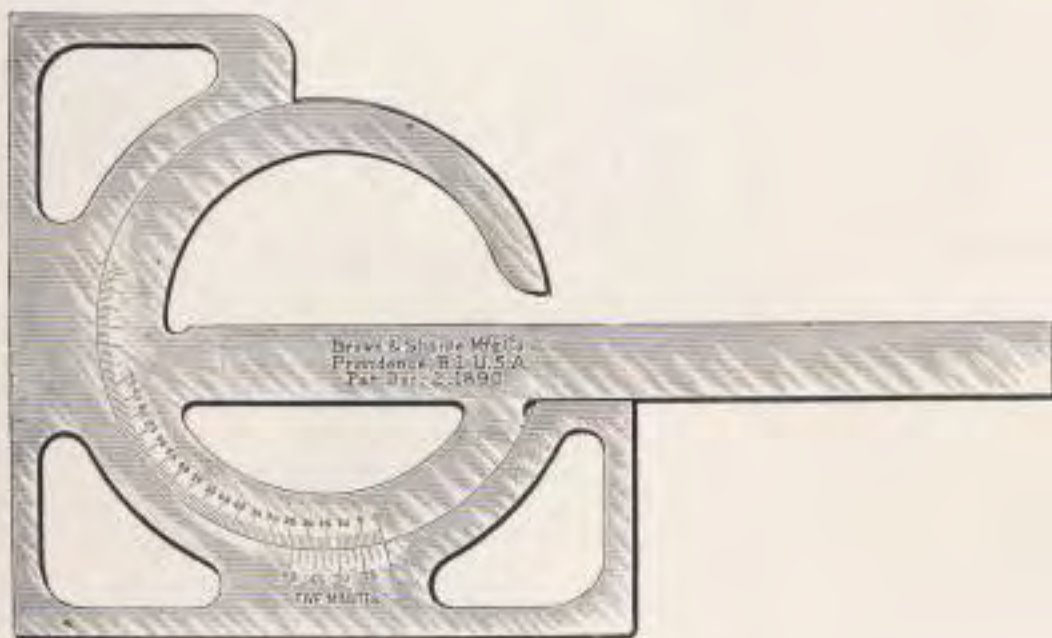
BRONZE HEAD, STEEL BLADE, VERNIER TO ONE MINUTE

MADE BY W. & L. E. GURLEY



No. 1480

### DRAFTSMANS PROTRACTORS

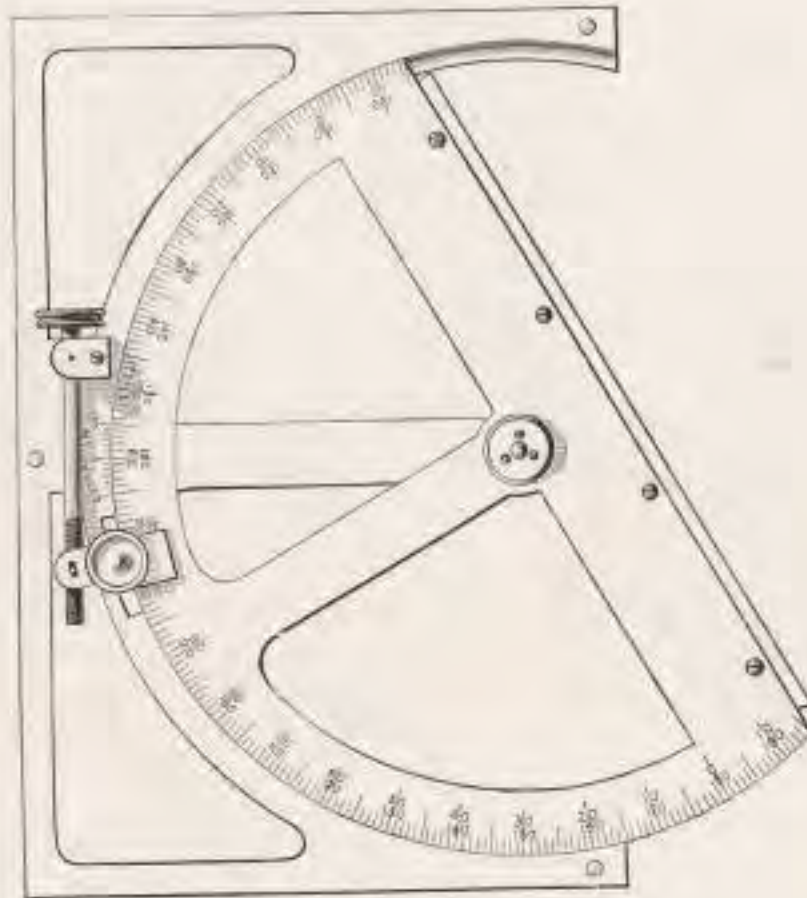


No. 1486



### CROZET PROTRACTOR

MADE BY W. & L. E. GURLEY



No. 1488

### PROTRACTORS

BRONZE HEAD, STEEL BLADE, NICKEL PLATED, VERNIER TO ONE MINUTE

MADE BY W. & L. E. GURLEY

No.		Price.	Postage.
1480	Protractor, with blade 24 inch	\$8.00	
1481	Protractor, with blade 30 inch	8.75	
1482	Protractor, with blade 36 inch	9.50	
1483	Protractor, with blade 42 inch	10.25	
1484	Protractor, with blade 48 inch	11.50	

### DRAFTSMANS PROTRACTORS

1486	Steel Protractor, divided to 1 degree, vernier to 5 minutes, 8½ inch blade. It is used with the T rule or straight edge. Very convenient in dividing circles, transferring angles, laying off angles each side of a line without resetting. In morocco case.	7.75	\$0.35
1488	Crozet Protractor, German Silver, 8 inch, half circle, half degrees, vernier to 1 minute. In mahogany case	40.00	

The Crozet Protractor we can recommend as the best among the high grade Protractors.

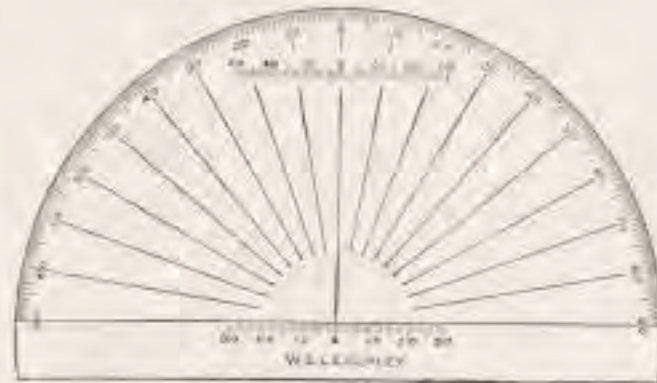
It is used with the T rule or straight edge. The feather edge is set to the starting point and lines produced without puncturing the paper.



## DUFFIELD PROTRACTORS

MADE BY W. & L. E. GURLEY

Made of transparent celluloid, with two parallel scales of twenty parts to the inch, so that the zero line can be set parallel to meridian lines drawn on the paper.



No. 1490

No.		Price.	Postage.
1490	Protractor, half circle, 6 inch, divided to $\frac{1}{2}$ degrees	\$3.00	\$0.14
1492	Protractor, half circle, 9 inch, divided to $\frac{1}{2}$ degrees	3.50	.17
1494	Protractor, half circle, 12 inch, divided to $\frac{1}{4}$ degrees	4.00	.20

### GERMAN SILVER PROTRACTORS, Flat Edge

1500	Protractor, 4 inch, half circle, half degrees	.40	.03
1502	Protractor, 5 inch, half circle, half degrees	.60	.04
1503	Protractor, 6 inch, half circle, half degrees	.80	.06

### BRASS PROTRACTORS, Flat Edge

1515	Protractor, $3\frac{1}{2}$ inch, half circle, whole degrees	.10	.02
1516	Protractor, $4\frac{1}{4}$ inch, half circle, whole degrees	.25	.03
1517	Protractor, 4 inch, half circle, half degrees	.35	.03
1518	Protractor, 5 inch, half circle, half degrees	.50	.04
1519	Protractor, 6 inch, half circle, half degrees	.65	.06

### OPAQUE WHITE CELLULOID PROTRACTORS

#### Center at Inner Edge

1525W	Protractor, 6 in., half circle, beveled edge, $\frac{1}{2}$ degrees	2.75	.16
1526W	Protractor, 8 in., half circle, beveled edge, $\frac{1}{2}$ degrees	3.50	.18
1527W	Protractor, 6 in., whole circle, beveled edge, $\frac{1}{2}$ degrees	3.50	.20
1528W	Protractor, 8 in., whole circle, beveled edge, $\frac{1}{2}$ degrees	4.50	.22

### TRANSPARENT CELLULOID PROTRACTORS

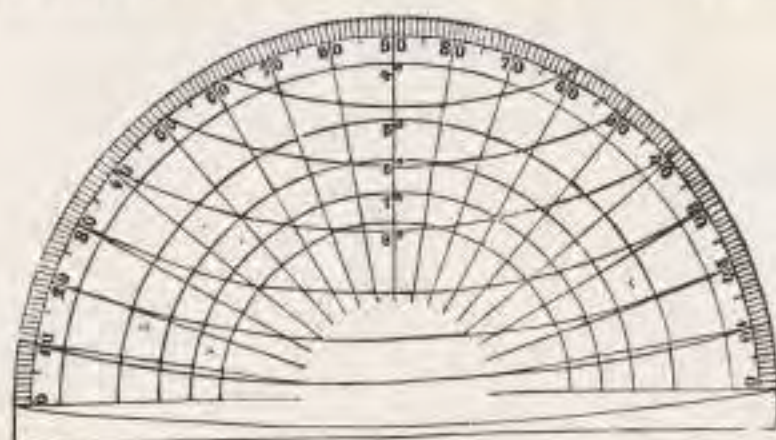
1532	Protractor, 6 in., half circle, beveled edge, $\frac{1}{2}$ degrees	2.75	.16
1533	Protractor, 8 in., half circle, beveled edge, $\frac{1}{2}$ degrees	3.50	.18
1535	Protractor, 6 in., whole circle, beveled edge, $\frac{1}{2}$ degrees	3.50	.20
1536	Protractor, 8 in., whole circle, beveled edge, $\frac{1}{2}$ degrees	4.50	.22



TRANSPARENT CELLULOID PROTRACTORS, Flat

No.		Price.	Postage.
1541C	Protractor, 5 inch, half circle, half degrees	\$0.45	\$0.03
1542C	Protractor, 6 inch, half circle, half degrees	.60	.04
1543C	Protractor, 7 inch, half circle, half degrees	.75	.05
1544C	Protractor, 8 inch, half circle, half degrees	1.20	.16
1548C	Protractor, 6 inch, whole circle, half degrees	1.50	.16
1549C	Protractor, 8 inch, whole circle, half degrees	2.25	.18

RAILROAD CURVE PROTRACTORS



No. 1551A.

1551A	Railroad Curve Protractor, of transparent celluloid, 8 inch, half circle, half degrees, with circular curves from $\frac{1}{2}$ degree to 8 degrees, to a scale of 400 feet to the inch	2.75	.16
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RAILROAD CURVE PROTRACTORS

1551B	Railroad Curve Protractor, of transparent celluloid, 10 inch, half circle, half degrees, with circular curves $1^\circ$ , $1\frac{1}{2}^\circ$ , $2^\circ$ , $2\frac{1}{2}^\circ$ , $3^\circ$ , $3\frac{1}{2}^\circ$ , $4^\circ$ , $5^\circ$ , $6^\circ$ , $7^\circ$ , $8^\circ$ , $10^\circ$ , $12^\circ$ , $14^\circ$ , $16^\circ$ , $18^\circ$ , $20^\circ$ , to a scale of 100 ft. to the inch	3.25	.20
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PAPER PROTRACTORS

1552	Protractor, on Bristol Board, 5 inch, half circle, half degrees	.10	.02
1553	Protractor, on Bristol Board, 6 inch, half circle, half degrees	.15	.02
1554	Protractor, on Bristol Board, 5 inch, half circle, half degrees, and diagonal scale to inches and 100ths and millimeters	.15	.02
1555	Protractor, on Bristol Board, 8 inch, whole circle, half degrees	.20	.04
1556	Protractor, on Bristol Board, 13 inch, whole circle, quarter degrees	.40	.07
1558	Protractor, on Drawing Paper, 13 inch, whole circle, quarter degrees	.30	.06
1559	Protractor, on Tracing Paper, 13 inch, whole circle, quarter degrees	.25	.06



# SCALES

## IVORY PROTRACTOR SCALES



Front View.

No. 1560

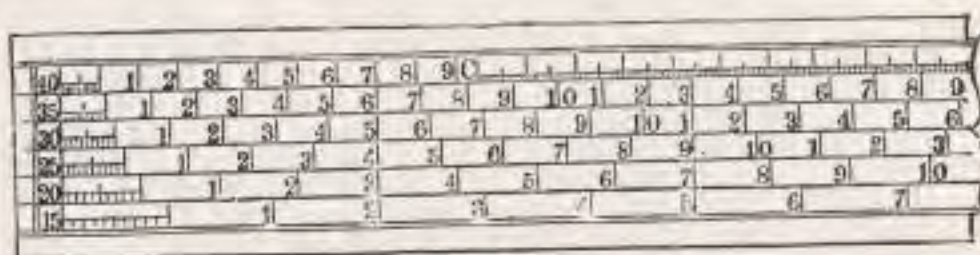
No.	Description	Price.	Postage.
1560	Ivory Rectangular Protractor, 6 inches long, 1 3/4 inches wide, with scales as follows: Front sides divided around edges from 0 to 180 degrees in single degrees, scales of 1/4, 1/2, 3/4 and 1 inch to the foot, and scale of chords. Reverse side scales of 30, 35, 40, 45, 50 and 60 parts to the inch, scale of chords and diagonal scale of inches and 100ths	\$1.75	\$0.14
1561	Ivory Rectangular Protractor, 6 inches long by 1 3/4 inches wide, with scales as follows: Front side, the edge divided into single degrees from 0 to 180 degrees, scales of 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, and 1 inch to the foot, and scale of chords. On the reverse side, scales of 30, 35, 40, 45, 50 and 60 parts to the inch, scale of chords and diagonal scale of 100ths	2.00	.14
1563	Ivory Rectangular Protractor, 6 inches long by 2 inches wide, with scales as follows: Front side, the edge divided in whole degrees from 0 to 180 degrees, scales of 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2 inches to the foot, scale of chords, and line of 40 parts on lower edge. On the reverse side, scales of 30, 35, 40, 45, 50 and 60 parts to the inch, and diagonal scale of 100ths	4.35	.15
1564	Ivory Rectangular Protractor, 6 inches long by 2 1/2 inches wide, with scales as follows: Front side and edge divided in 1/2 degrees from 0 to 180 degrees, scales of 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2 inches to the foot, scale of chords, and scale of 40 parts on the lower edge. Reverse side, scales of 10, 15, 20, 25, 30, 35, 40, 45, 50 and 60 parts to the inch, and diagonal scale of 100ths	5.50	.15

## FLAT BOXWOOD AND IVORY SCALES

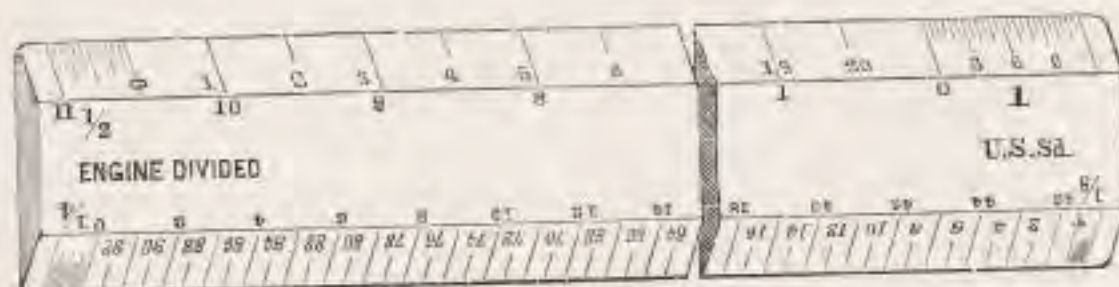
1570	Boxwood Protractor, 6 inches long, 1 3/4 inches wide, divided to whole degrees, with scales 1/4, 1/2, 3/4, 1 inch, diagonal scale and scale of chords	.35	.03
1572	Boxwood scale, 6 inch, diagonal and chain scales	.15	.02



FLAT BOXWOOD AND IVORY SCALES



No.	No. 1573	Price.	Postage.
1573	Ivory scale, 6 inch, with diagonal and chain scales	\$0.85	\$0.03
1575	Boxwood Sector Scale, 6 inch, opens to 12 inch	1.00	.14
1576	Ivory Sector Scale, 6 inch, opens to 12 inch	2.25	.14
1577	Boxwood Scale, 6 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , 1 inch to the foot	.50	.03



No.	No. 1578	Price.	Postage.
1578	Boxwood Scale, 12 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , 1 inch to the foot	.75	.06
1579	Boxwood Scale, 18 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , 1 inch to the foot	1.50	.18
1580	Boxwood Scale, 24 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , 1 inch to the foot	2.00	.22
1583	Boxwood Scale, 6 inch, divided $\frac{3}{8}$ , $\frac{3}{4}$ , $1\frac{1}{2}$ , 3 inches to the foot	.50	.03
1584	Boxwood Scale, 12 inch, divided $\frac{3}{8}$ , $\frac{3}{4}$ , $1\frac{1}{2}$ , 3 inches to the foot	.75	.06
1585	Boxwood Scale, 18 inch, divided $\frac{3}{8}$ , $\frac{3}{4}$ , $1\frac{1}{2}$ , 3 inches to the foot	1.50	.18
1586	Boxwood Scale, 24 inch, divided $\frac{3}{8}$ , $\frac{3}{4}$ , $1\frac{1}{2}$ , 3 inches to the foot	2.00	.22
1590	Boxwood White Edge Scale, 6 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , 1 inch to the foot	.75	.03
1592	Boxwood White Edge Scale, 12 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , 1 inch to the foot	1.25	.16
1594	Boxwood White Edge Scale, 6 inch, divided $\frac{3}{8}$ , $\frac{3}{4}$ , $1\frac{1}{2}$ , 3 inches to the foot	.75	.03
1595	Boxwood White Edge Scale, 12 inch, divided $\frac{3}{8}$ , $\frac{3}{4}$ , $1\frac{1}{2}$ , 3 inches to the foot	1.25	.16
1604	Boxwood Scale, 12 inch, with the following scales, the graduations of which are all brought to the edge: $\frac{1}{16}$ , $\frac{1}{8}$ , $\frac{3}{16}$ , $\frac{1}{4}$ , $\frac{5}{16}$ , $\frac{1}{2}$ , $\frac{3}{8}$ , $\frac{7}{16}$ , $\frac{1}{2}$ , $1\frac{1}{4}$ , $1\frac{1}{2}$ , $1\frac{3}{4}$ , 2, $2\frac{1}{2}$ , and 3 inches to the foot, the first division of each scale subdivided into 12 parts	.90	.06
1610	Boxwood School Rule, 12 inch, divided $\frac{1}{16}$ and $\frac{1}{8}$ of an inch	.15	.03
1611	Boxwood School Rule, 18 inch, divided $\frac{1}{8}$ of an inch, and with inlaid brass edges	.35	.10
1612	School Rule, 12 inch, beveled edges, divided $\frac{1}{16}$ of an inch and millimeters	.25	.05
1613	School Rule, 18 inch, beveled edges, divided $\frac{1}{16}$ of an inch and millimeters	.25	.10



## FLAT BOXWOOD CHAIN SCALES



No. 1618

No.	Description	Price.	Postage.
1615	Boxwood Scale, 6 inch, divided 10 and 50 parts to the inch	\$0.50	\$0.03
1616	Boxwood Scale, 6 inch, divided 20 and 40 parts to the inch	.50	.03
1617	Boxwood Scale, 6 inch, divided 30 and 60 parts to the inch	.50	.03
1618	Boxwood Scale, 12 inch, divided 10 and 50 parts to the inch	.75	.06
1619	Boxwood Scale, 12 inch, divided 20 and 40 parts to the inch	.75	.06
1620	Boxwood Scale, 12 inch, divided 30 and 60 parts to the inch	.75	.06
1627	Boxwood Offset Scales, 2 inch, divided like Nos. 1615 to 1617, each	.40	.02
1629	Boxwood White Edge Scale, 6 inch, divided 10 and 50 parts to the inch	.75	.03
1630	Boxwood White Edge Scale, 6 inch, divided 20 and 40 parts to the inch	.75	.03
1631	Boxwood White Edge Scale, 6 inch, divided 30 and 60 parts to the inch	.75	.03
1632	Boxwood White Edge Scale, 12 inch, divided 10 and 50 parts to the inch	1.25	.16
1633	Boxwood White Edge Scale, 12 inch, divided 20 and 40 parts to the inch	1.25	.16
1634	Boxwood White Edge Scale, 12 inch, divided 30 and 60 parts to the inch	1.25	.16
1641	White Edge Offset Scales, 2 inch, divided like Nos. 1632 to 1634, each	.70	.02

## FLAT METALLIC CHAIN SCALES

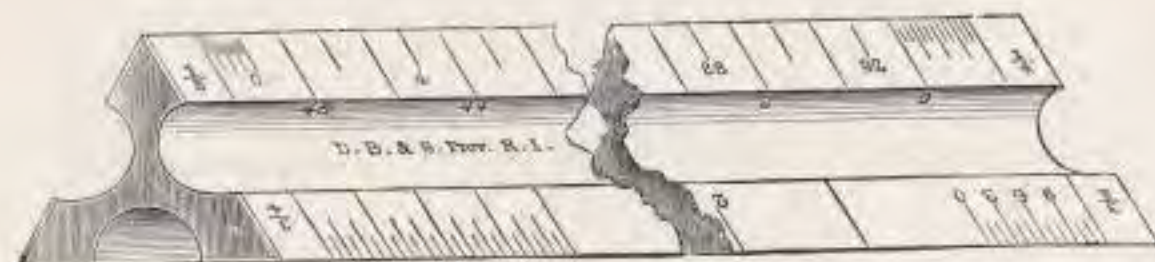
A superior article, our own make, made of brass, and nickel plated.  
Divided on beveled edges.

1645	Flat Metal Scale, 12 inch, divided 10 and 50 parts to the inch	3.00	.16
1646	Flat Metal Scale, 12 inch, divided 20 and 40 parts to the inch	3.00	.16
1647	Flat Metal Scale, 12 inch, divided 30 and 60 parts to the inch	3.75	.16
1648	Flat Metal Scale, 12 inch, divided 80 and 100 parts to the inch	5.00	.16
1649	Flat Metal Scale, 12 inch, divided 100 and 500 parts to the foot	3.00	.16
1650	Flat Metal Scale, 30 centimeters, divided to millimeters and half millimeters	3.75	.16



## TRIANGULAR BOXWOOD SCALES

OF BEST QUALITY, FOR ARCHITECTS

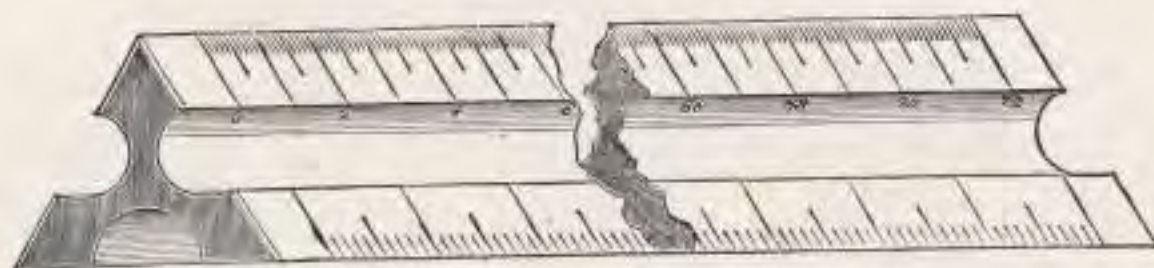


No. 1656

No.		Price.	Postage.
1655	Triangular Boxwood Scale, 6 inch, divided $\frac{2}{32}$ , $\frac{2}{10}$ , $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1, $1\frac{1}{2}$ and 3 inches to the foot, and one edge inches and 16ths	\$0.60	\$0.04
1656	Triangular Boxwood Scale, 12 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1, $1\frac{1}{2}$ , 2, 3, and 4 inches to the foot, and one edge inches and 16th	.75	.16
1657	Triangular Boxwood Scale, 18 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1, $1\frac{1}{2}$ , 2, 3 and 4 inches to the foot, and one edge inches and 16ths	2.50	.20
1658	Triangular Boxwood Scale, 24 inch, divided $\frac{1}{8}$ , $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1, $1\frac{1}{2}$ , 2, 3 and 4 inches to the foot, and one edge inches and 16ths	4.25	.25

## TRIANGULAR BOXWOOD CHAIN SCALES

OF BEST QUALITY, FOR ENGINEERS



No. 1661

1660	Triangular Boxwood Scale, 6 inch, divided 10, 20, 30, 40, 50 and 60 parts to the inch	.60	.04
1661	Triangular Boxwood Scale, 12 inch, divided 10, 20, 30, 40, 50 and 60 parts to the inch	.75	.16
1662	Triangular Boxwood Scale, 18 inch, divided 10, 20, 30, 40, 50 and 60 parts to the inch	2.50	.20
1663	Triangular Boxwood Scale, 24 inch, divided 10, 20, 30, 40, 50 and 60 parts to the inch	4.25	.25
1665	Triangular Boxwood Scale, 12 inch, divided 20, 30, 40, 50, 60 and 80 parts to the inch	.75	.16
1668	Triangular Offset Scale, divided 2 inch, same as No. 1660	.60	.02
1670	Triangular Boxwood Scale, 12 inch, divided 100, 200, 300, 400, 500 and 600 parts to the foot	1.50	.16



## TRIANGULAR BOXWOOD SCALES—With White Edges

No.		Price.	Postage.
1674	White Edge Scale, 6 inch, divided same as No. 1655	\$1.50	\$0.14
1675	White Edge Scale, 12 inch, divided same as No. 1656	2.50	.16
1678	White Edge Scale, 6 inch, divided same as No. 1660	1.50	.14
1679	White Edge Scale, 12 inch, divided same as No. 1660	2.50	.16
1682	White Edge Scale, 12 inch, divided same as No. 1665	2.50	.16
1684	White Edge Scale, 12 inch, divided same as No. 1670	2.50	.16

## METALLIC TRIANGULAR SCALES

The Metallic Triangular Scales are made of brass tubing with the ends closed, nickered with a dull finish, and weigh about three and one half ounces.

The liability of the wood scales to crack, warp or twist, the chipping of their edges, and their variation from standard measurement are well known to all who have used them. These objections have been overcome in the metallic scale.

1690	Metallic Triangular Scale, 12 inch, divided same as No. 1656	2.50	.16
1692	Metallic Triangular Scale, 12 inch, divided same as No. 1660	2.50	.16
1694	Metallic Triangular Scale, 12 inch, divided same as No. 1665	2.50	.16
1698	Metal Guard for Triangular Scale (preventing errors)	.20	.02

## METRIC SCALES AND RULES

1700	Flat Boxwood Scale, 20 centimeters, divided to millimeters and $\frac{1}{2}$ millimeters	.60	.04
1701	Flat Boxwood Scale, 30 centimeters, divided to millimeters and $\frac{1}{2}$ millimeters	.75	.06
1702	Flat Boxwood Scale, 50 centimeters, divided to millimeters and $\frac{1}{2}$ millimeters	1.50	.18
1703	Flat White Edge Scale, 20 centimeters, divided to millimeters and $\frac{1}{2}$ millimeters	1.00	.14
1704	Flat White Edge Scale, 30 centimeters, divided to millimeters and $\frac{1}{2}$ millimeters	1.25	.16
1706	Triangular Boxwood Scale, 20 centimeters, divided .01, .02, .03, .05, .025, .0125	.75	.05
1707	Triangular Boxwood Scale, 30 centimeters, divided to .01, .02, .03, .05, .025, .0125	1.00	.16
1710	Triangular Boxwood Scale, 30 centimeters, divided to millimeters and $\frac{1}{2}$ millimeters, also to 10ths, 12ths, and 16ths of inches, and 100ths of a foot	2.00	.16
1712	Triangular White Edge Scale, 30 centimeters, divided same as No. 1707	2.50	.16
1714	Triangular White Edge Scale, 30 centimeters, divided same as No. 1710	3.00	.16
1718	Flexible Wood Rule, four feet, eight fold, divided to millimeters and 16ths of inches, spring joints	.35	.05
1719	Flexible Wood Rule, same as No. 1718, and with white enamel finish	.50	.05



## PAPER SCALES

Paper Scale, printed on Bristol Board, 18 inches long,  
for architects and engineers, as follows:

No.		Price.	Postage.
1727	Series A contains 6 scales, one each divided to $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1, $1\frac{1}{2}$ , and 3 inches to the foot, each scale-----	.20	.04
1728	Series B contains 6 scales, one each divided $\frac{3}{32}$ , $\frac{1}{8}$ , $\frac{1}{16}$ , $\frac{3}{16}$ , $\frac{3}{8}$ , and $\frac{7}{8}$ inch to the foot, each scale--	.20	.04
1729	Series C contains 6 scales, each one divided to 10, 20, 30, 40, 50 and 60 parts to the inch, each scale-----	.20	.04

## THACHERS CALCULATING INSTRUMENTS

1730	Thachers Calculating Instrument, with cylinder 18 inches long. Performs a great variety of useful calculations with rapidity and accuracy. In mahogany box and with instruction book-----	35.00	
1731	Thachers Calculating Instrument, same as No. 1730, and with 3 inch reading glass sliding on brass bar, adjustable to any part of the instrument and for focus -----	45.00	

## RULES

## CIRCULAR SLIDE RULES

For Computing Earthworks, Excavations and Embankments.

1732	Crockett Slide Rule. Applicable to any width of roadbed, any center height, any length, any side slope ratio, and to sections determined by any number of levels, without requiring the plotting of the end sections. $16\frac{1}{2}$ inches diameter, on heavy cardboard -----	4.00	.35
1734	Rudiger Slide Rule. Applicable to use with center height, and the surface slope measured in degrees, $16\frac{1}{2}$ inches diameter, on heavy cardboard-----	4.00	.35

Descriptive circular of the Crockett and Rudiger Slide Rules mailed on application.

## BOXWOOD AND IVORY RULES



No. 1749

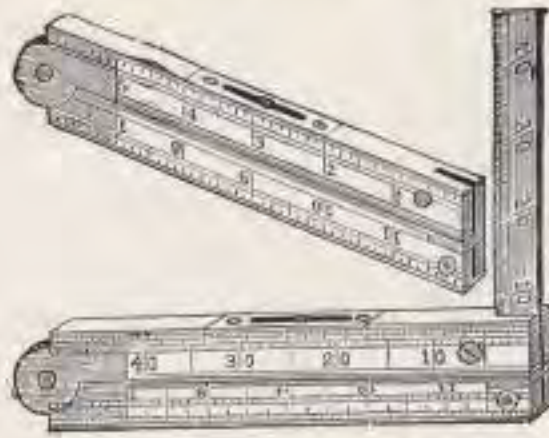


## BOXWOOD AND IVORY RULES

No.		Price.	Postage.
1735	Boxwood Rule, one foot, four fold, 8ths and 16ths of inches	\$0.10	\$0.03
1736	Boxwood Rule, one foot, four fold, edge plates, 8ths and 16ths of inches	.15	.03
1737	Boxwood Rule, one foot, four fold, brass edges, bound, 8ths and 16ths of inches	.30	.04
1740	Boxwood Rule, two feet, four fold, 8ths and 16ths of inches	.15	.05
1741	Boxwood Rule, two feet, four fold, edge plates, 8ths, 10ths, 12ths and 16ths of inches, and drafting scales	.25	.05
1742	Boxwood Rule, two feet, four fold, brass edges, bound, 8ths, 10ths, 12ths and 16ths of inches, and drafting scales	.50	.06
1743	Boxwood Rule, two feet, four fold, edge plates, 8ths, 10ths, 12ths and 16ths of inches, and drafting scales, and inside beveled edges	.50	.05
1745	Boxwood Caliper Rule, one foot, four fold, edge plates, 8ths, 10ths, 12ths and 16ths of inches	.50	.04
1747	Ivory Rule, one foot, four fold, edge plates, 8ths, 10ths, 12ths and 16ths of inches	1.75	.14
1748	Ivory Rule, one foot, four fold, edge plates, 8ths, 10ths, 12ths and 16ths of inches and 100ths of a foot	2.15	.14
1749	Ivory Rule, one foot, four fold, German silver edges, bound, divided like No. 1747	2.50	.15
1750	Ivory Caliper Rule, one foot, four fold, edge plates, divided like No. 1747	2.70	.15
1751	Ivory Caliper Rule, one foot, four fold, German silver edges, bound, divided like No. 1747	3.30	.15
1753	Ivory Rule, two feet, four fold, edge plates, 8ths, 10ths, 12ths and 16ths of inches, and 100ths of a foot	4.50	.17
1754	Ivory Rule, two feet, four fold, German silver edges, bound, 8ths, 10ths, 12ths and 16ths of inches, and drafting scales	5.65	.18
1755A	Flexible Wood Rule, yellow finish, four feet, eight fold, divided to 16ths of an inch and 100ths of a foot, with spring joints	.35	.05
1755B	Flexible Wood Rule, same as No. 1755A, and with white enamel finish	.50	.05
1755C	Flexible Wood Rule, yellow finish, six feet, twelve fold, divided same as No. 1755A	.50	.08
1755D	Flexible Wood Rule, same as No. 1755C, and with white enamel finish	.75	.08
1756A	Flexible Wood Rule, yellow finish, four feet, eight fold, divided alike on both sides to 16ths of inches, and with spring joints	.35	.05
1756B	Flexible Wood Rule, same as No. 1756A, and with white enamel finish	.50	.05
1758	Boxwood Shrink Rule, divided to 8ths, 10ths, 12ths and 16ths of inches. Either $24\frac{2}{10}$ , $24\frac{1}{4}$ , $24\frac{3}{8}$ , or $24\frac{1}{2} = 24$ inches. Each style	1.20	.18



BOXWOOD RULES



No. 1760

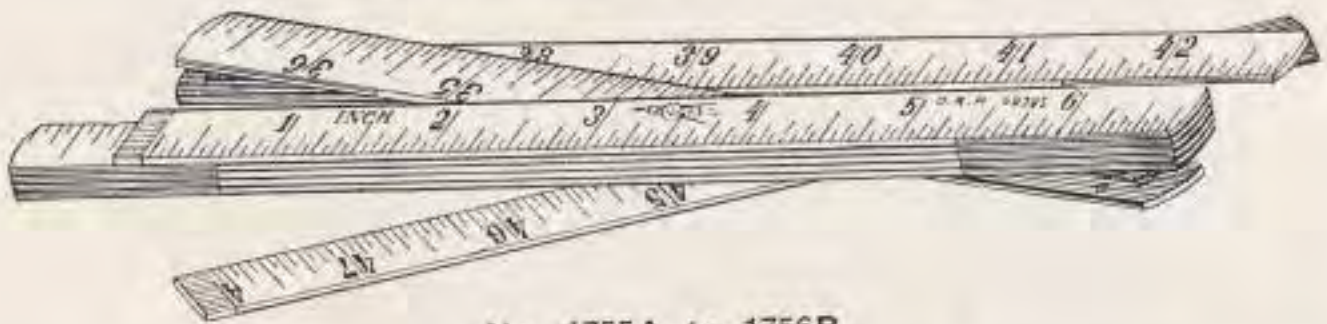
No.

1760 Boxwood Combination Rule, one foot, two fold. It combines in itself a Carpenters Rule, Spirit Level, Square, Plumb, Level, Indicator, Brace, Scale, Drafting Scale of equal parts, T Square, Protractor, Right Angle Triangle, etc.

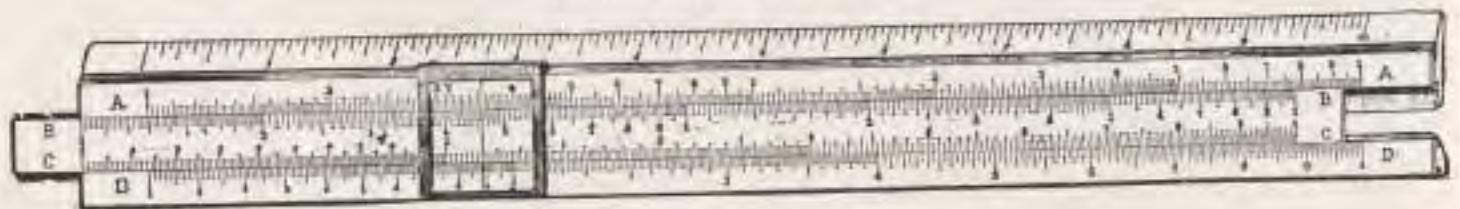
Price. Postage.

\$2.00 \$0.17

BOXWOOD SLIDE RULES



No. 1755A to 1756B



No. 1764B

1761	Mannheim Slide Rule, not adjustable, 10 inch, divided on white facings, with glass indicator and directions	3.00	.15
1762	Fabers Slide Rule and Calculating Scale, 10½ inch, with glass indicator and directions	3.75	.20
1763	Students Slide Rule, for beginners, 10 inch, with indicator and directions	1.00	.15
1764	Engineers Adjustable Mannheim Slide Rule, 5 inch, divided on white facings, with glass indicator and directions	4.50	.10
1764A	Engineers Adjustable Mannheim Slide Rule, 8 inch, divided on white facings, with glass indicator and directions	4.50	.15
1764B	Engineers Adjustable Mannheim Slide Rule, 10 inch, divided on white facings, with glass indicator and directions	4.50	.15



BOXWOOD SLIDE RULES

No.		Price.	Postage.
1764C	Engineers Adjustable Mannheim Slide Rule, 16 inch, divided on white facings, with glass indicator and directions	\$10.00	\$0.30
1764D	Engineers Adjustable Mannheim Slide Rule, 20 inch, divided on white facings, with glass indicator and directions	12.50	.35
1764E	Magnifier, in metal frame, fitted for 8 and 10 inch Mannheim and Duplex Slide Rules	2.00	.14
1764F	Magnifier, in metal frame, fitted for 16 and 20 inch Mannheim Slide Rules	2.50	.15
1765	Duplex Slide Rule, 10 inch, divided on white facings, with glass indicator, Arithmetical slide and directions	5.00	.15
1767	Duplex Slide Rule, 10 inch, divided on white facings, with glass indicator and both Arithmetical and Trigonometrical slides and directions	6.50	.20
1767A	Log Log Duplex Rule, Adjustable, 10 inch, divided on white facings, glass Indicator and Directions	8.00	.20
1767B	Mannheim Polyphase Slide Rule, Adjustable, 10 inch, divided on white facings, glass Indicator and Directions	5.00	.15
1768	Stadia Slide Rule, 20 inch, divided on white facings. This rule is designed to solve the equations generally used in stadia measurements	12.50	.35

STANDARD STEEL RULES

No.		Price.	Postage.	No.		Price.	Postage.
1770	3 inch	\$0.35	\$0.02	1775	18 inch	\$2.00	\$0.20
1772	6 inch	.65	.04	1776	24 inch	2.50	.25
1774	12 inch	1.25	.16	1777	36 inch	5.00	.50

These rules are divided on four edges in parts of inches as follows: 10, 20, 50, 100; 12, 24, 48; 16, 32, 64; 8.

STANDARD METRIC STEEL RULES

1780	1-10 meter	.45	.03	1783	½ meter	2.00	.22
1781	1-5 meter	.85	.04	1784	1 meter	8.00	.55
1782	3-10 meter	1.25	.16				

These rules are divided to millimeters and half millimeters.

TRIANGULAR STEEL RULES

1785	3 inch	.50	.02	1787	6 inch	1.00	.14
1786	4 inch	.70	.03	1788	12 inch	2.00	.16

These rules are divided on three edges in parts of inches as follows: 20, 50, 100; 12, 24, 48; 16, 32, 64.

SQUARE STEEL RULES

1790	3 inch	.45	.02	1792	6 inch	.90	.04
1791	4 inch	.60	.03				

These rules are divided on four edges in parts of inches as follows: 16, 32, 64, 100.



## STRAIGHT EDGES

### STEEL STRAIGHT EDGES, SQUARE EDGES

No.		Plain	Nickel Plated	Postage	No.		Plain	Nickel Plated	Postage
1800	15 inch	\$0.90	\$1.10	\$0.17	1804	36 inch	\$3.00	\$3.50	\$0.45
1801	18 inch	1.00	1.25	.20	1805	42 inch	4.00	4.50	.50
1802	24 inch	1.50	1.90	.25	1806	48 inch	6.00	6.60	.60
1803	30 inch	2.25	2.75	.30	1807	60 inch	8.00	8.75	

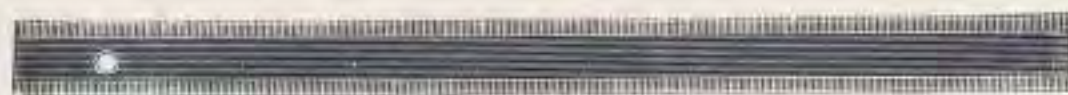
### STEEL STRAIGHT EDGES, NICKEL PLATED

#### ONE EDGE BEVELED

1810	18 inch		2.00	.20	1813	36 inch		5.00	.45
1811	24 inch		3.00	.25	1814	42 inch		6.50	.50
1812	30 inch		4.00	.30	1815	48 inch		8.00	.60

### MAHOGANY STRAIGHT EDGES, AMBER LINED

#### SQUARE EDGES



#### No. 1820

1820	18 inch		.90	.06	1823	36 inch		1.90	.25
1821	24 inch		1.10	.18	1824	42 inch		2.50	.30
1822	30 inch		1.25	.20	1825	48 inch		3.00	.35

### MAHOGANY STRAIGHT EDGES, EBONY LINED

#### SQUARE EDGES

1830	24 inch		.50	.08	1833	42 inch		1.00	.30
1831	30 inch		.60	.10	1834	48 inch		1.35	.35
1832	36 inch		.80	.15	1835	60 inch		2.00	

### HARDWOOD STRAIGHT EDGES

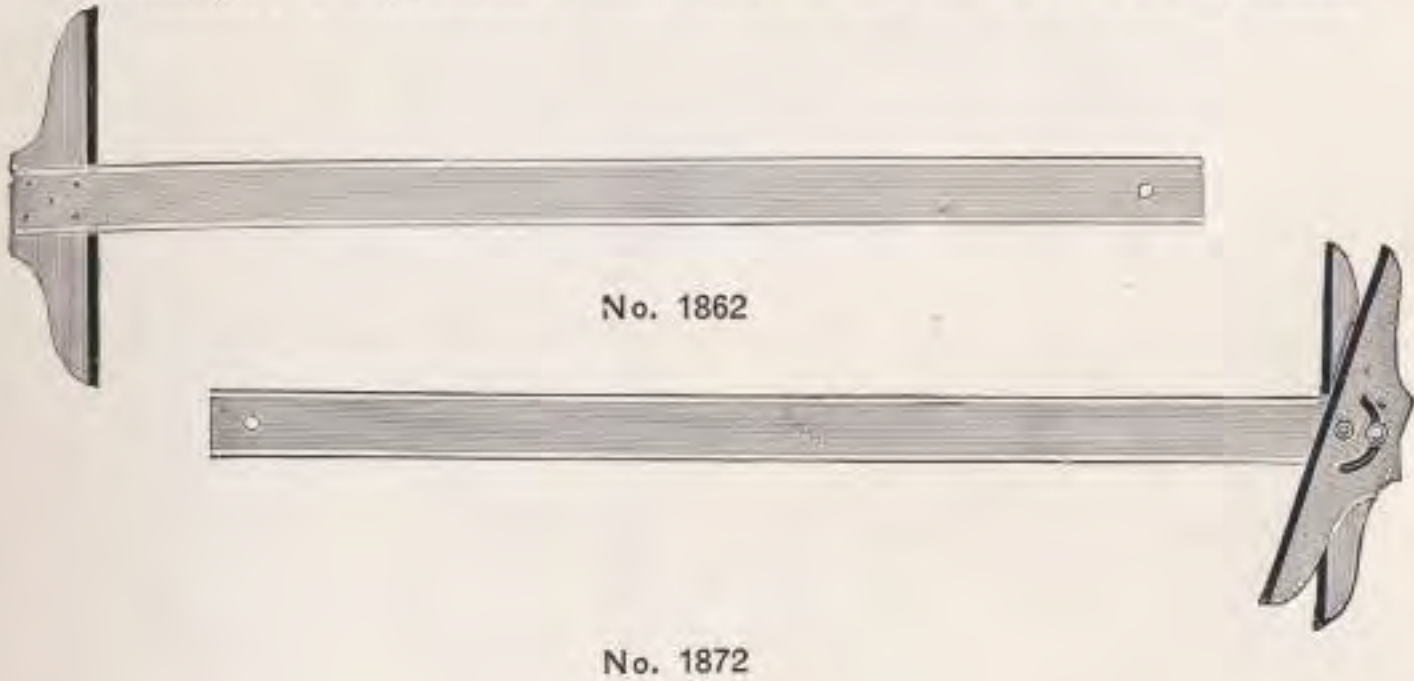
#### ONE EDGE BEVELED

1850	18 inch		.20	.06	1854	42 inch		.50	.20
1851	24 inch		.25	.08	1855	48 inch		.65	.25
1852	30 inch		.30	.10	1856	60 inch		1.00	
1853	36 inch		.40	.15	1857	72 inch		1.25	



# T SQUARES

## MAHOGANY T SQUARES WITH AMBER EDGES AND FIXED HEAD



No.		Price.	Postage.	No.		Price.	Postage.
1860	18 inch -----	\$1.10	\$0.25	1863	36 inch -----	\$2.15	
1861	24 inch -----	1.50	.35	1864	42 inch -----	2.50	
1862	30 inch -----	1.85	.45	1865	48 inch -----	3.00	

## MAHOGANY T SQUARES WITH AMBER EDGES AND SHIFTING HEAD

1870	18 inch -----	1.90	.30	1873	36 inch -----	3.20	
1871	24 inch -----	2.45	.40	1874	42 inch -----	3.60	
1872	30 inch -----	2.80	.50	1875	48 inch -----	4.20	

## STEEL BLADE T SQUARES, NICKEL PLATED WITH FIXED JAPANNED IRON HEAD

1896	18 inch -----	3.00	.35	1898	30 inch -----	4.50	.45
1897	24 inch -----	3.50	.40	1899	36 inch -----	5.50	

## STEEL BLADE T SQUARES, NICKLE PLATED WITH SHIFTING JAPANNED IRON HEAD

1902	18 inch -----	4.25	.45	1904	30 inch -----	5.75	.55
1903	24 inch -----	5.00	.50	1905	36 inch -----	6.75	



HARDWOOD T SQUARES, FIXED HEAD

No.		Price.	Postage.	No.		Price.	Postage.
1908	15 inch -----	\$0.25	\$0.15	1911	30 inch -----	\$0.45	\$0.45
1909	20 inch -----	.30	.25	1912	40 inch -----	.65	
1910	25 inch -----	.35	.35	1913	50 inch -----	1.00	

HARDWOOD T SQUARES, SHIFTING HEAD

1916	15 inch -----	.60	.20	1919	30 inch -----	.80	.50
1917	20 inch -----	.65	.30	1920	40 inch -----	1.00	
1918	25 inch -----	.70	.40	1921	50 inch -----	1.50	

MAHOGANY T SQUARES, WITH EBONY EDGES AND FIXED HEAD

1922	24 inch -----	1.00	.35	1924	36 inch -----	1.40	
1923	30 inch -----	1.20	.45	1925	42 inch -----	1.60	

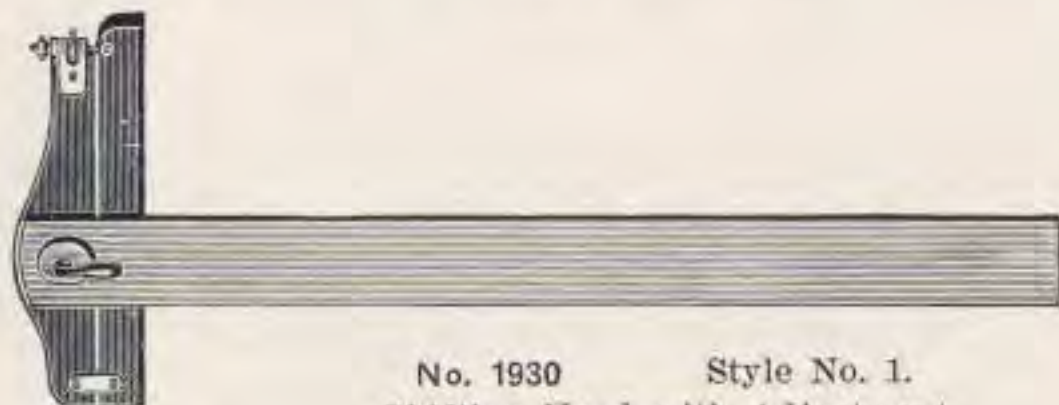
MAHOGANY T SQUARES, WITH EBONY EDGES AND SHIFTING HEAD

1926	24 inch -----	1.75	.40	1928	36 inch -----	2.25	
1927	30 inch -----	2.00	.50	1929	42 inch -----	2.50	

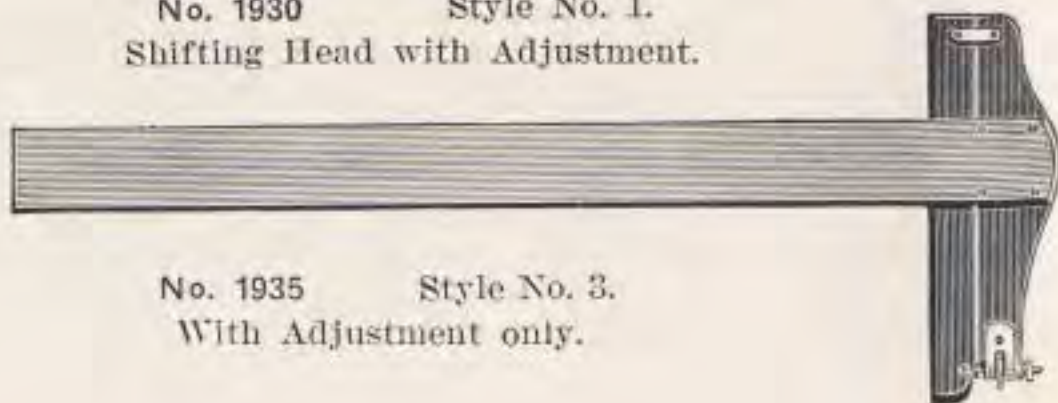
T SQUARES, WITH DEANES PATENT SWIVEL AND ADJUSTMENT  
MAHOGANY BLADES WITH AMBER EDGES

1930	24 inch, Style No. 1	-----	3.25	.40
1931	30 inch, Style No. 1	-----	3.65	.45
1932	36 inch, Style No. 1	-----	4.25	
1935	24 inch, Style No. 3	-----	2.75	.38
1936	30 inch, Style No. 3	-----	3.25	.43
1937	36 inch, Style No. 3	-----	3.75	

T SQUARE WITH DEANES PATENT SWIVEL  
ADJUSTMENTS



No. 1930 Style No. 1.  
Shifting Head with Adjustment.



No. 1935 Style No. 3.  
With Adjustment only.



## DRAWING TABLES



No. 1947

## DRAWING TABLES

No.		Price.
1945	Drawing Table, hardwood top, 24 x 22 inches-----	\$8.75
1946	Drawing Table, hardwood top, 24 x 22 inches, and with instrument shelf, 24 x 7 inches-----	10.00
1947	Drawing Table, hardwood top, 26 x 22 inches, instrument shelf, 26 x 7 inches, two instrument drawers, ornamented stand-----	13.25
1949	Drawing Table, hardwood top, 26 x 22 inches, with instrument shelf and two drawers, and with folding arm and plain shelf, ornamented stand-----	17.00

These tables are adjustable for horizontal and angular motion and for heights about 30 to 44 inches. The shelves and drawers remain level when the top is inclined. They are mounted on an iron stand with casters.



## THE WORCESTER DRAWING TABLE



No. 1950

No.		Price.
1950	Drawing Table, with white pine drawing board, 42 x 31 inches, and substantial iron stand, adjustable.....	\$25.00
1951	Drawing Table, with white pine drawing board, 55 x 33 inches, and substantial iron stand, adjustable.....	26.50
1952	Drawing Table, with white pine drawing board, 60 x 36 inches, with substantial iron stand, adjustable.....	28.00

These tables are adjustable for horizontal, angular, and vertical movements.

## DRAWING BOARDS AND TRESTLES

1960	Drawing Board, pinewood, 14 x 10 inches .....	.75
1962	Drawing Boards, pinewood, 20 x 15 inches, tongue and groove ends .....	1.25
1964	Drawing Board, pinewood, 28 x 20 inches, tongue and groove ends .....	1.50
1966	Drawing Board, pinewood, 40 x 28 inches, tongue and groove ends .....	2.50
1967	Drawing Board, best white pine, 55 x 33 inches, expansion cleats .....	8.00
1970	Drawing Board, with mahogany frame, and removable pine-wood center, 18 x 13 inches.....	3.00
1972	Drawing Board, with mahogany frame, and removable pine-wood center, 25 x 17 inches.....	4.00
	Drawing Boards and Trestles of any size made to order.	
1975	Pinewood Horses, 37 inches high, 35 inches long, with removable sloping ledges. Per pair.....	5.00
1977	Folding Trestle, hardwood, 37 inches high, 33 inches long, 26 inches wide .....	10.00



DRAWING BOARDS AND TRESTLES



No. 1978

No.		Price.
1978	Folding Trestle, hardwood, 37 inches high, combined with adjustable Drawing Board of pinewood, 42 x 31 inches, and hinged to the Trestle. All folding compactly.....	\$14.00
1979	Folding Trestle and Drawing Board, same as No. 1978, but with the Drawing Board 55 x 33 inches.....	16.50

TRIANGLES

OPEN STEEL TRIANGLES, NICKEL PLATED

30° x 60° x 90°.

No.		Price.	Postage.	No.		Price.	Postage.
1982	6 inch -----	\$3.20	\$0.15	1986	10½ inch ----	\$4.25	\$0.25
1984	8 inch -----	3.85	.20	1989	15 inch -----	6.50	.40

OPEN STEEL TRIANGLES, NICKEL PLATED

45° x 45° x 90°.

1992	6½ inch -----	3.50	.18	1996	10 inch -----	5.50	.35
1994	8 inch -----	4.25	.25	1998	12 inch -----	6.50	.45

OPEN GERMAN SILVER TRIANGLES

30° x 60° x 90°.

2002	5½ inch -----	2.50	.15	2006	10 inch -----	4.00	.25
2004	8 inch -----	3.00	.20	2008	12 inch -----	5.00	.30

45° x 45° x 90°.

2012	6 inch -----	2.75	.18	2016	10 inch -----	5.00	.35
2014	8 inch -----	4.00	.25	2018	12 inch -----	6.50	.45







HARDWOOD TRIANGLES, PLAIN

30° x 60° x 90°.

No.		Price.	Postage.	No.		Price.	Postage.
2120	4 inch -----	\$0.05	\$0.03	2124	8 inch -----	\$0.12	\$0.06
2122	6 inch -----	.08	.04	2126	10 inch -----	.15	.08

45° x 45° x 90°.

2130	4 inch -----	.06	.04	2132	6 inch -----	.10	.05
2131	5 inch -----	.08	.05	2134	8 inch -----	.13	.08

HARD RUBBER LETTERING TRIANGLES



No. 2140

2140	Lettering Triangles for Block Letters, 3½ inch, three in a set. Per set -----	1.35	.15
------	---	------	-----



No. 2145

2145	Lettering Triangles for Shaded Letters, 3½ inch, three in a set. Per set -----	1.20	.15
------	--	------	-----



No. 2147

2147	Transparent Amber Lettering Templets, three in a set. Per set -----	2.00	.17
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### SECTION LINERS

No.		Price.	Postage.
2168	Marions Section Liner with 7 inch triangle and 10 inch ruler -----	\$2.00	\$0.20
2170	Standard Section Liner. Especially adapted for school use and mechanical sectional drawing-----	1.50	.20

### IRREGULAR CURVES OF HARD RUBBER, AMBER AND WOOD



Nos. 2180, 2182 and 2184



## IRREGULAR CURVES OF HARD RUBBER, AMBER AND WOOD

No.		Price.	Postage.
2180	Hard Rubber Curves, Nos. 1, 2, 5, 14, 15, 16, 17, 18, 22, 23, 25 and 26. Each-----	\$0.35	\$0.03
	Hard Rubber Curves, Nos. 13, 19, 20 and 21. Each-----	.45	.03
	Hard Rubber Curves, Nos. 3, 4 and 24. Each-----	.50	.05
	Hard Rubber Curve, No. 27-----	.75	.08
	Hard Rubber Curve, No. 28-----	2.00	.18
	Hard Rubber Curve, Logarithmic Spiral, No. 29-----	1.25	.15
2182	Transparent Amber Curves, Nos. 1, 2, 5, 16, 22, 25 and 26. Each-----	.45	.03
	Transparent Amber Curves, Nos. 3, 4, 13, 19 and 20. Each-----	.60	.05
	Transparent Amber Curve, No. 24-----	.75	.05
	Transparent Amber Curve, No. 27-----	.90	.08

## IRREGULAR CURVES

No.		Price.	Postage.
2184	Wood Curves, No. 1, 5, 21, 25 and 26. Each-----	\$0.25	\$0.03
	Wood Curves, Nos. 3, 4, 13, 19, 20 and 24. Each-----	.30	.05
	Wood Curve, No. 27-----	.35	.08

## ADJUSTABLE CURVE RULER



No. 2186

2186	Adjustable Curve Ruler, 14½ inches long-----	2.25	.16
2187	Adjustable Curve Ruler, 30 inches long-----	3.30	.35

These rulers can be instantly adjusted and retained to any form of curve. This tool is recommended by architects and draftsmen, and meets a long felt want. It is well made, neatly finished and nickel plated.



## ELLIPSES, HYPERBOLAS AND PARABOLAS

No.		Price.	Postage.
2190	Hard Rubber Ellipses, 6 in a set, 2 to 4½ inch. Per set	\$1.50	\$0.14
2191	Hard Rubber Ellipses, 10 in a set, 1½ to 6 inch. Per set	2.50	.16
2194	Wood Ellipses, 6 in a set, 2 to 4½ inch. Per set	1.25	.14
2195	Wood Ellipses, 10 in a set, 1½ to 6 inch. Per set	2.00	.16
2200	Wood Hyperbolas, 8 in a set, 2 to 5½ inch. Per set	1.50	.15
2204	Wood Parabolas, 8 in a set, 1¼ to 5¾ inch. Per set	1.50	.15

## RAILROAD CURVES

Set of 10 Curves, cut to a scale of inches, from 12 to 120 inches radius, varying every 12 inches.

2210	Rubber Curves, in wood box	6.50	.30
2211	Wood Curves, in wood box Set of 24 Curves, cut to a scale of inches, from 1½ to 24 inches radius, varying every ½ inch up to 10 inches, and then every 2 inches up to 24 inches.	3.50	.30
2214	Rubber Curves, in wood box	15.00	.40
2215	Wood Curves, in wood box Set of 10 Curves, cut to a scale of 40 feet to the inch, from 1° to 10°, varying every degree.	9.00	.40
2218	Rubber Curves, in wood box	6.50	.30
2219	Wood Curves, in wood box Set of 20 Curves, cut to a scale of 40 feet to the inch, from 1° to 20°, varying every degree.	3.50	.30
2222	Rubber Curves, in wood box	12.50	.35
2223	Wood Curves, in wood box Set of 12 Curves, cut to a scale of 100 feet to the inch, from 1° to 12°, varying every degree.	7.50	.35
2226	Rubber Curves, in wood box	8.00	.30
2227	Wood Curves, in wood box Set of 20 Curves, cut to a scale of 400 feet to the inch, from 30' to 10°, varying every 30 minutes.	5.00	.30
2238	Rubber Curves, in wood box	12.50	.35
2239	Wood Curves, in wood box	7.50	.35



## PARALLEL RULES



No. 2250

### EBONY PARALLEL RULES

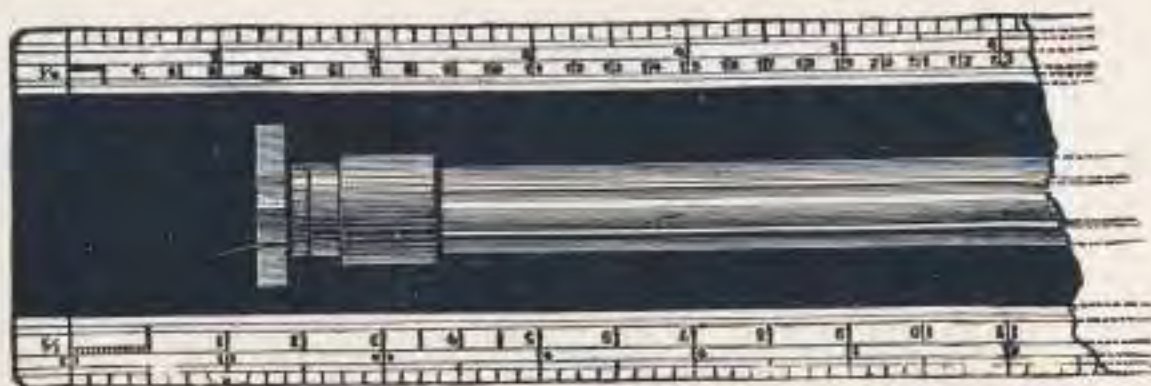
No.		Price.	Postage.	No.		Price.	Postage.
2250	6 inch	\$0.35	\$0.04	2253	15 inch	\$1.00	\$0.20
2251	9 inch	.55	.06	2254	18 inch	1.25	.22
2252	12 inch	.75	.08	2255	24 inch	1.75	.25

### BLACK AMBER PARALLEL RULES

2260	6 inch	.75	.04	2262	12 inch	1.25	.18
2261	9 inch	1.00	.06	2263	15 inch	1.50	.20

### EBONY PARALLEL RULES ON ROLLERS

2270	9 inch	2.75	.20	2272	15 inch	4.00	.30
2271	12 inch	3.25	.25	2273	18 inch	5.00	.35



No. 2280

### HARD RUBBER PARALLEL RULES ON ROLLERS

2275	9 inch	3.50	.20	2277	15 inch	5.00	.30
2276	12 inch	4.25	.25	2278	18 inch	6.00	.35

### EBONY PARALLEL RULES ON ROLLERS

WITH WHITE EDGES, DIVIDED  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ , 1 INCH TO THE FOOT

2280	12 inch	5.00	.25	2282	18 inch	7.50	.35
2281	15 inch	6.50	.30				

### BRASS PARALLEL RULES ON ROLLERS

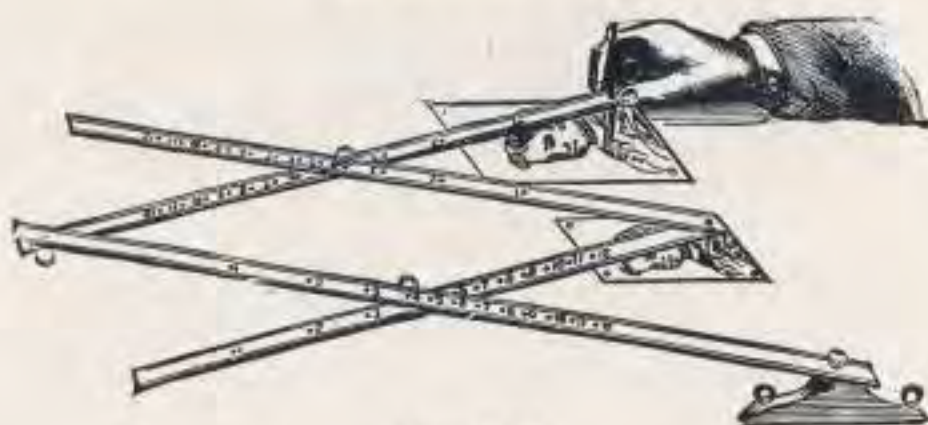
2285	9 inch	7.25	.30	2287	15 inch	10.00	.50
2286	12 inch	8.50	.40	2288	18 inch	12.00	

### GERMAN SILVER PARALLEL RULES ON ROLLERS

2292	9 inch	8.50	.30	2294	15 inch	12.00	.50
2293	12 inch	10.00	.40	2295	18 inch	15.00	



## PANTOGRAPHS FOR ENLARGING OR REDUCING DRAWINGS



No. 2300

No.		Price.	Postage.
2300	Pantograph, hardwood, brass mountings, with arms 21 inches long	\$1.50	\$0.30
2302	Pantograph, hardwood, nickel plated mountings, with arms 21 inches long	2.50	.30
2304	Pantograph, hardwood, brass mountings, with arms 22½ inches long, adapted for 15 ratios	3.50	
2306	Pantograph, hardwood, brass mountings, with arms 41 inches long and joints formed by bolts and thumbnuts. Adapted for 34 ratios	5.00	

## DRAWING PAPER

NOTE—Small quantities of paper must be put on a wooden roller when sent by mail. Several yards can be put on a single roller, with but little extra for postage. The pound price for papers No. 2389 to 2434 applies only to full rolls.

### ARCHITECTS PAPER FOR PLANS

WHITE, STRONG, SMOOTH SURFACE

2350	Medium, 23 x 18 inches, per sheet, 6 cents; per quire	1.25	.48
2352	Super Royal, 28 x 20 inches, per sheet, 8 cents; per quire	1.75	.60
2355	30 inches wide, per roll of 10 yards	1.25	.40
2356	36 inches wide, per roll of 10 yards	1.50	.50
2357	42 inches wide, per roll of 10 yards	1.75	.60

### WHATMANS DRAWING PAPER

SELECTED, BEST QUALITY, GRAINED SURFACE

2360	Demy, 20 x 15 inches, per sheet, 5 cents; per quire	.95	.28
2361	Medium, 22 x 17 inches, per sheet, 7 cents; per quire	1.40	.40
2362	Royal, 24 x 19 inches, per sheet, 9 cents; per quire	1.80	.50
2363	Super Royal, 27 x 19 inches, per sheet, 10 cents; per quire	2.10	.55
2365	Imperial, 30 x 22 inches, per sheet, 17 cents; per quire	3.00	.68
2368	Double Elephant, 40 x 26 inches, per sheet, 25 cents; per quire	5.75	1.38



## WHATMANS DRAWING PAPER

MOUNTED ON MUSLIN

2370	Royal, 24 x 19 inches, per sheet	\$0.30	\$0.10
2372	Imperial, 30 x 22 inches, per sheet	.50	.13
2374	Double Elephant, 40 x 27 inches, per sheet	.90	.18

## BRISTOL BOARD DRAWING PAPER

No.		Price.	Postage.
2380	Patent Office Bristol Board, 15 x 10 inches, per sheet, 6 cents; per dozen	.60	.20
2381	Bristol Board, 20 x 15 inches, per sheet, 12 cents; per dozen	1.20	.50
2385	Patent Office Bristol Board, printed with border, etc., 15 x 10 inches, per sheet, 8 cents; per dozen	.75	.20

## DETAIL DRAWING PAPER, CREAM BUFF TINT

SUPERIOR QUALITY IN ROLLS OF 35 TO 40 POUNDS

2389	30 inches wide, per pound, 29 cents; per yard	.13	.10
2390	36 inches wide, per pound, 29 cents; per yard	.15	.12
2391	42 inches wide, per pound, 29 cents; per yard	.20	.20

## BLEACHED MANILA PAPER

FOR WORKSHOP DRAWINGS, BEST AMERICAN MAKE, IN ROLLS  
OF ABOUT 50 POUNDS

2395	36 inches wide, medium, per pound, 12 cents; per yard	.08	.12
2396	42 inches wide, medium, per pound, 12 cents; per yard	.10	.14
2397	48 inches wide, medium, per pound, 12 cents; per yard	.12	
2398	54 inches wide, medium, per pound, 12 cents; per yard	.15	

## AMERICAN WHITE ROLL DRAWING PAPER

VERY STRONG AND OF EXCELLENT QUALITY. IN ROLLS OF ABOUT 40 POUNDS

2410	36 inches wide, smooth surface, per pound, 45 cents; per yard	.25	.12
2411	42 inches wide, smooth surface, per pound, 45 cents; per yard	.30	.14
2413	62 inches wide, smooth surface, per pound, 45 cents; per yard	.50	
2414	72 inches wide, smooth surface, per pound, 50 cents; per yard	.70	

## EXCELSIOR WHITE ROLL DRAWING PAPER

IN ROLLS OF ABOUT 40 POUNDS

2420	36 inches wide, grained surface, per pound, 36 cents; per yard	.20	.12
2421	42 inches wide, grained surface, per pound, 36 cents; per yard	.24	.14

## BEST EGGSHELL DRAWING PAPER

IN ROLLS OF ABOUT 40 POUNDS

2430	36 inches wide, pebbled surface, per pound, 50 cents; per yard	.33	.13
2431	42 inches wide, pebbled surface, per pound, 50 cents; per yard	.38	.15
2434	58 inches wide, pebbled surface, per pound, 50 cents; per yard	.50	
2435	58 inches wide, thick, pebbled surface, per pound, 50 cents; per yard	.65	



## MOUNTED DRAWING PAPER

WHITE, MOUNTED ON MUSLIN. IN ROLLS OF 10 YARDS

No.		Price.	Postage.
2450	American, 36 inches wide, smooth surface, per roll, \$6.65; per yard -----	\$0.80	\$0.25
2451	American, 42 inches wide, smooth surface, per roll, \$8.45; per yard -----	1.00	.30
2453	American, 62 inches wide, smooth surface, per roll, \$13.60; per yard -----	1.60	
2454	American, 72 inches wide, smooth surface, per roll, \$18.00; per yard -----	2.25	
2460	Eggshell, 36 inches wide, pebbled surface, per roll, \$7.50; per yard -----	.90	.25
2461	Eggshell, 42 inches wide, pebbled surface, per roll, \$9.30; per yard -----	1.10	.30
2463	Eggshell, 58 inches wide, medium thick, pebbled sur- face, per roll, \$12.50; per yard -----	1.45	
2464	Eggshell, 58 inches wide, thick, pebbled surface, per roll, \$13.75; per yard -----	1.60	
2467	Paper Cloth, 38 inches wide, smooth surface, per yard	.42	.20

Large pieces, for City, County, or State Maps, mounted  
to order.

## TRACING PAPER

2470	Pellucid, common, 21 inches wide, per yard, 5 cents; per roll of 20 yards -----	.75	.18
2471	Pellucid, common, 42 inches wide, per yard, 10 cents; per roll of 20 yards -----	1.50	.40
2472	Vegetable, 30 inches wide, per yard, 10 cents; per roll of 20 yards -----	1.50	.40
2474	Bank Note, 36 inches wide, per yard, 10 cents; per roll of 20 yards -----	1.62	.40
2475	Bank Note, 42 inches wide, per yard, 13 cents; per roll of 20 yards -----	2.00	.45
2476	Parchment, 39 inches wide, per yard, 22 cents; per roll of 20 yards -----	3.50	.60
2477A	Vellum, 36 inches wide, per yard, 25 cents; per roll of 20 yards -----	4.00	.55
2477B	Vellum, 42 inches wide, per yard, 32 cents; per roll of 20 yards -----	5.00	.65
2479	Manila, common, 48 inches wide, per yard, 7 cents; per roll of 20 yards -----	1.00	.50
2484	Bond, 21 x 16 inches, per sheet, 6 cents; per quire ----	1.00	.20
2486	Bond, 30 x 19 inches, per sheet, 8 cents, per quire ----	1.40	.30



## IMPERIAL TRACING CLOTH

In rolls of 24 yards. Face glazed and back dull.

No.		Price.	Postage.
2495	30 inches wide, per yard, 35 cents; per roll	\$7.55	\$0.70
2496	36 inches wide, per yard, 40 cents; per roll	8.40	
2497	42 inches wide, per yard, 55 cents; per roll	11.30	
2498	48 inches wide, per yard, 75 cents; per roll	14.95	
2499	54 inches wide, per yard, 80 cents; per roll	15.90	
2500	Pounce Powder, in tin shaker, for Tracing Paper or Tracing Cloth, each	.15	.07

## PREPARED BLUE PRINT PAPER

Best quality; ready for immediate use.

2506	Sensitized Paper, 24 inches wide, per yard, 15 cents; per roll of 10 yards	1.20	.40
2508	Sensitized Paper, 30 inches wide, per yard, 18 cents; per roll of 10 yards	1.50	.50
2510	Sensitized Paper, 36 inches wide, per yard, 20 cents; per roll of 10 yards	1.65	.60
2512	Sensitized Paper, 42 inches wide, per yard, 22 cents; per roll of 10 yards	1.80	.70
2515W	White Ink, for altering Blue Prints, per bottle	.20	.06
2515R	Red Ink, for altering Blue Prints, per bottle	.20	.06
2515Y	Yellow Ink, for altering Blue Prints, per bottle	.20	.06

## PREPARED BLUE PRINT PAPER

Second Grade, Medium thickness.

	24"	30"	36"	42"
10 yd. rolls	.85	.95	1.05	1.20
25 yd. rolls	2.00	2.25	2.55	2.90
50 yd. rolls	3.50	4.00	4.65	5.30

## PREPARED BLUE PRINT PAPER

Second Grade, thin stock, for blue prints that are to be mailed.

	24"	30"	36"	42"
10 yd. rolls	.70	.80	.90	1.05
25 yd. rolls	1.65	1.95	2.20	2.55
50 yd. rolls	3.00	3.35	4.00	4.60

## THE BLUE PROCESS OF COPYING TRACINGS

Special attention is directed to this easy process of copying tracings, and its great value to all engineers, architects and mechanical draftsmen is fully recognized.

If not convenient to procure a Print Frame, blue prints can be made readily by following these directions:

1. Provide a flat board as large as the tracing which is to be copied.
2. Lay on this board a cushion of blanket or felt about  $\frac{1}{4}$  inch thick, to give a slightly yielding backing for the paper.
3. Lay on the blanket the prepared paper with the sensitive side uppermost.
4. Lay on this paper the tracing, making it as smooth as possible, so as to insure a perfect contact with the paper.



5. Lay on the tracing a plate of clear glass, which should be heavy enough to press the tracing close down upon the paper. Ordinary plate glass, one quarter of an inch in thickness, is sufficient.

6. Expose the whole to a clear sunlight by pushing it out on a shelf from a window, or in any other convenient way, from four to six minutes (in winter, six to ten minutes). If a clear sky only can be had, the exposure must be continued from twenty to thirty minutes; and under a cloudy sky from sixty to ninety minutes may be needed, the shade depending on the time.

7. Remove the prepared paper and wash it freely for one or two minutes in clear water, and hang it by one corner to dry.

Too light a blue means under exposure, and too dark a blue is over exposure.

## PRINT FRAMES AND BATH TRAYS



No. 2534

No.		Price.
2534	Print Frame, complete with Plate Glass and Cushion, 24 x 20 inches, clear exposure -----	\$9.00
2536	Print Frame, complete with Plate Glass and Cushion, 30 x 24 inches, clear exposure -----	13.50
2538	Print Frame, complete with Plate Glass and Cushion, 42 x 30 inches, clear exposure -----	22.50
	Felt, $\frac{1}{4}$ inch thick, for Print Frames, per square foot---	.25

## ZINC BATH TRAYS WITH WOODEN FRAMES

FOR WASHING BLUE PRINTS IN WATER BATH

2540	Zinc Bath Tray, for washing copies, 24 x 20 inches-----	3.75
2542	Zinc Bath Tray, for washing copies, 30 x 24 inches-----	4.50
2544	Zinc Bath Tray, for washing copies, 42 x 30 inches-----	6.00

## TIN TUBES WITH SCREW TOPS

FOR HOLDING PREPARED PAPER, TRACINGS, DRAWINGS, ETC.

			Postage.
2546	Plain Tin Tube, screw top, 24 x 2 $\frac{1}{4}$ inches -----	\$0.80	\$0.30
2547	Plain Tin Tube, screw top, 30 x 2 $\frac{1}{4}$ inches -----	.95	.35
2548	Plain Tin Tube, screw top, 36 x 2 $\frac{1}{4}$ inches -----	1.00	.40
2549	Plain Tin Tube, screw top 42 x 2 $\frac{1}{4}$ inches -----	1.10	.45



## TOWNSHIP PLOTTING PAPER

2550	Township Plotting paper, Rulings 6 x 6 inches, blocks 1 inch square, per quire	1.00	.18
2552	Township Plotting paper, Rulings 12 x 12 inches, blocks 2 inches square, per quire	2.00	.35
2553	Township Plotting paper, Rulings 18 x 15 inches, per quire	3.00	.45

## CROSS SECTION SKETCH BLOCKS

24 SHEETS

2554	Sketch Block, 7 x 5 inches, ruled 1-10 of an inch	.75	.06
2555	Sketch Block, 10 x 7 inches, ruled 1-10 of an inch	1.25	.12
2557	Sketch Block, 20 x 12½ cm., metric ruling	.75	.06
2558	Sketch Block, 25 x 20 cm., metric ruling	1.25	.12

## PLAIN SKETCH BLOCKS

EACH BLOCK CONSISTS OF 32 SHEETS OF BEST QUALITY WHATMANS  
DRAWING PAPER

No.		Price.	Postage.
2560	Sketch Block, 7 x 5 inches, unbound	\$0.50	\$0.08
2561	Sketch Block, 10 x 7 inches, unbound	.90	.16
2563	Sketch Block, 14 x 10 inches, unbound	1.60	.16
2565	Sketch Block, 20 x 14 inches, unbound	3.00	.70
2570	Sketch Block, 7 x 5 inches, bound	1.00	.12
2571	Sketch Block, 10 x 7 inches, bound	1.50	.32
2573	Sketch Block, 14 x 10 inches, bound	2.50	.50
2575	Sketch Block, 20 x 14 inches, bound	4.50	

The unbound blocks have a stiff pasteboard backing.

The bound blocks have cloth sides and leather back, with a portfolio and loop for pencil inside. The portfolio will last for a number of blocks.

## PORTFOLIOS

CLOTH SIDES, LEATHER BACK AND CORNERS

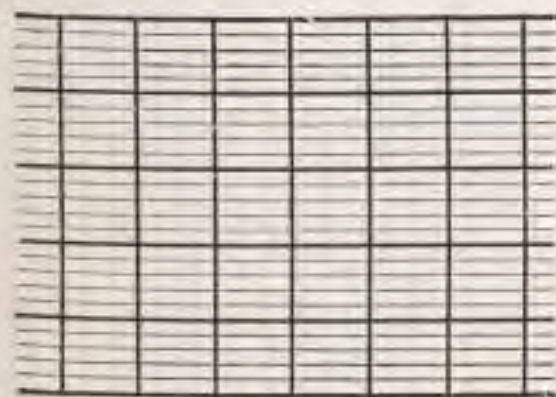
2576	Portfolio, 14 x 18 inches	1.50
2577	Portfolio, 17 x 22 inches	1.75
2578	Portfolio, 20 x 26 inches	2.25
2579	Portfolio, 23 x 31 inches	3.00

## PROFILE PAPERS

Sheets: Lines printed in green.

Continuous: Lines printed in green or orange.

Continuous on tracing paper or tracing cloth: Lines printed in orange.



No. 2584. Plate A.  
Rulings 4 x 20 to one inch.



No. 2600. Plate B.  
Rulings 4 x 30 to one inch.

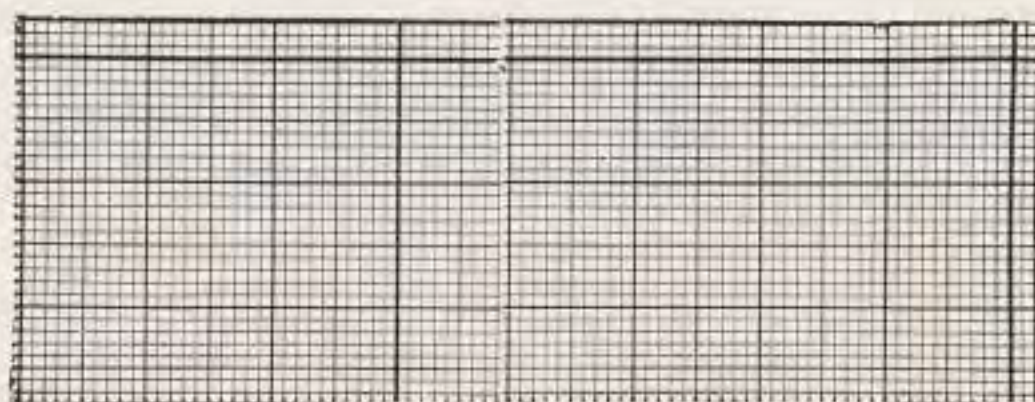


No.		Price.	Postage.
2580	Plate A, sheet 42 x 15 inches, per quire	\$8.50	\$0.75
2581	Plate A, sheet 42 x 15 inches, per sheet	.40	.05
2584	Plate A, continuous, 20 inches wide, 50 yards in roll, per yard	.20	.05
2586	Plate A, continuous, 20 inches wide, mounted on muslin, 20 yards in roll, per yard	.60	.08
2588	Plate A, continuous, 20 inches wide, on tracing paper, 50 yards in roll, per yard	.20	.05
2589	Plate A, continuous, 20 inches wide, on tracing cloth, 20 yards in roll, per yard	.75	.08

## PROFILE PAPERS

2595	Plate B, sheet 42 x 13½ inches, per quire	8.50	.75
2596	Plate B, sheet 42 x 13½ inches, per sheet	.40	.05
2600	Plate B, continuous, 20 inches wide, 50 yards in roll, per yard	.20	.05
2602	Plate B, continuous, 20 inches wide, mounted on muslin, 20 yards in roll, per yard	.60	.08
2604	Plate B, continuous, 20 inches wide, on tracing paper, 50 yards in roll, per yard	.20	.05
2605	Plate B, continuous, 20 inches wide, on tracing cloth, 20 yards in roll, per yard	.75	.08

## METRIC PAPERS



No. 2610

2610	Millimeter. Sheet 50 x 40 centimeters, rulings every millimeter, per sheet, 20 cents; per quire	3.50	.40
2611	Millimeter, Continuous, 50 centimeters wide, ruling in millimeters, in 50 yard rolls, per yard	.20	.05
2612	Millimeter. Continuous, mounted on muslin, 50 centimeters wide, ruling in millimeters, in 50 yard rolls, per yard	.60	.10
2613	Millimeter. Continuous, on tracing paper, 50 centimeters wide, ruling in millimeters, in 50 yard rolls, per yard	.20	.05
2614	Millimeter, Continuous, mounted on tracing cloth, 50 centimeters wide, ruling in millimeters, in 20 yard rolls, per yard	.75	.05

## CROSS SECTION PAPERS

Sheets: Lines printed in green.

Continuous: Lines printed in green.

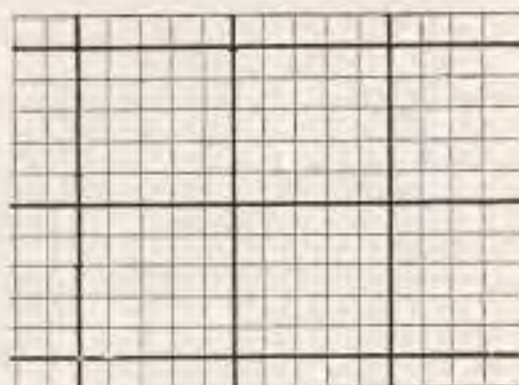
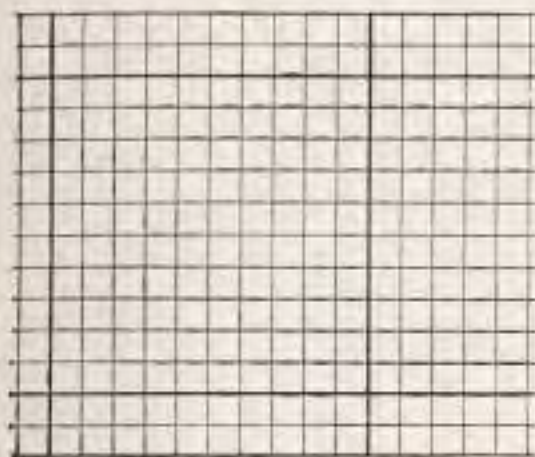
Continuous on tracing paper or tracing cloth: Lines printed in orange.

2620	Cross Section Paper, rulings 20 x 16 inches, 8 feet to inch, per sheet, 20 cents; per quire	3.50	.40
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No.		Price.	Postage.
2621	Cross Section Paper, rulings 20 x 16 inches, 10 feet to inch, per sheet, 20 cents; per quire.....	\$3.50	\$0.40
2622	Continuous Cross Section Paper, 20 inches wide, in rolls of 50 yards, per yard.....	.20	.05
2623A	Continuous Cross Section Paper, 20 inches wide, ruled 10 feet to inch on tracing paper, in rolls of 50 yards, per yard.....	.20	.05
2623B	Continuous Cross Section Tracing Cloth, 20 inches wide, ruled 10 feet to inch, in rolls of 20 yards, per yard.....	.75	.08

CROSS SECTION PAPERS



No. 2621

10 x 10 to the inch

No. 2624

5 x 5 to the half inch.

2624	Cross Section Paper, rulings 20 x 16 inches, 10 feet to inch, every fifth line heavy, per sheet, 20 cents; per quire.....	3.50	.40
2625	Cross Section Paper, rulings 20 x 16 inches, ruled 10 feet to inch on tracing paper, per sheet, 20 cents; per quire.....	3.50	.25
2626	Cross Section Paper, rulings 20 x 16 inches, 16 feet to inch, per sheet, 20 cents; per quire.....	3.50	.40
2627	Continuous Cross Section Paper, 20 inches wide, ruled 16 feet to inch, in rolls of 50 yards, per yard.....	.20	.05

The following Cross Section Papers, being ruled, are much cheaper than those printed from copper plates:

2635	Ruled Cross Section Paper, 4 spaces to inch, 21 x 16 inches, per quire.....	1.00	.35
2636	Ruled Cross Section Paper, 8 spaces to inch, 21 x 16 inches, per quire.....	1.00	.35
2637	Ruled Cross Section Paper, 10 spaces to inch, 21 x 16 inches, per quire.....	1.00	.35
2638	Ruled Cross Section Paper, 12 spaces to inch, 21 x 16 inches, per quire.....	1.50	.35
2645	Crowells Adhesive Tape, either brown or white, 3/4 inch wide, for binding and mending drawings, per box of 50 feet.....	.25	.05

THUMB TACKS AND HORN CENTERS

2680	Brass Thumb Tacks, round head, 1/4 inch diam., per doz. ....	.10	.02
2681	Brass Thumb Tacks, round head, 3/8 inch diam., per doz. ....	.15	.02

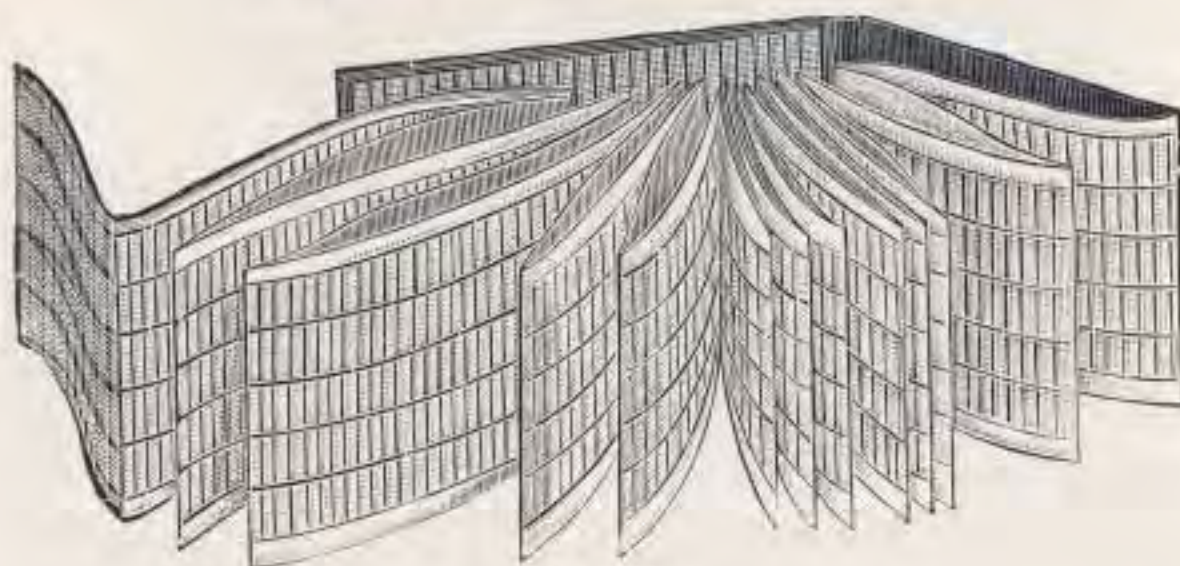


2682	Brass Thumb Tacks, round head $\frac{1}{2}$ inch diam., per doz.	.25	.02
2684	German Silver Thumb Tacks, round head, $\frac{3}{8}$ inch diam., per doz.	.25	.02
2685	German Silver Thumb Tacks, round head, $\frac{1}{2}$ inch diam., per doz.	.30	.02
2686	German Silver Thumb Tacks, round head, $\frac{5}{8}$ inch diam., per doz.	.45	.03
2689	German Silver Thumb Tacks, round head, superior $\frac{1}{2}$ inch diam., per doz.	.70	.02
2690	German Silver Thumb Tacks, round head, superior $\frac{5}{8}$ inch diam., per doz.	.90	.03

### THUMB TACKS AND HORN CENTERS

No.		Price.	Postage.
2692	Silvered Steel Thumb Tacks, common, $\frac{3}{8}$ inch diam., per doz.	\$0.08	\$0.02
2693	Silvered Steel Thumb Tacks, common, $\frac{3}{8}$ inch diam., per box of 100	.55	.05
2694	Silvered Steel Thumb Tacks, common, 9-16 inch diam., per doz.	.12	.02
2695	Silvered Steel Thumb Tacks, common, 9-16 inch diam., per box of 100	.80	.06
2700	Thumb Tack Lifter and Paper Knife, nickel plated.	.20	.02
2703	Brass Paper Fasteners, round heads, prongs $\frac{1}{2}$ inch, per doz.	1.05	.02
2705	Brass Paper Fasteners, round heads, prongs $\frac{1}{2}$ inch, in box, per 100	.25	.06
2707	Horn Center, plain	.10	.01
2708	Horn Center with German silver rim	.50	.01
2710	Handy Paper Cutter, brass mounted, for cutting drawings from the board	.35	.03

### CONTINUOUS PROFILE BOOKS



No. 2715

These books are for field or office purposes, being printed on a tough thick paper, mounted upon a continuous piece of muslin and bound in book form with flexible morocco covers, convenient for the pocket. Each page will contain a profile of three thousand feet in length, so that each two pages facing will contain an average section of six thousand feet for a road as usually laid out for construction. Railroad and other engineers will find them very useful. The rulings correspond to our large profile plates A and B.



2715	Plate A, about 8½ x 6 inches, profile 12 miles	2.00	.16
2716	Plate A, about 8½ x 6 inches, profile 25 miles	3.25	.18
2717	Plate A, about 8½ x 6 inches, profile 50 miles	5.25	.22
2718	Plate A, about 8½ x 6 inches, profile 100 miles	9.50	.28
2720	Plate B, about 8 x 5¼ inches, profile 12 miles	2.00	.15
2721	Plate B, about 8 x 5¼ inches, profile 25 miles	3.25	.17
2722	Plate B, about 8 x 5¼ inches, profile 50 miles	5.25	.20
2723	Plate B, about 8 x 5¼ inches, profile 100 miles	9.50	.25

**PLAT AND PROFILE BOOK**

This book is 9½ x 4¼ inches, oblong, with flexible morocco cover, containing 36 profile pages, plate B, and the opposite pages are blank for plats, etc. The book has also valuable tables.

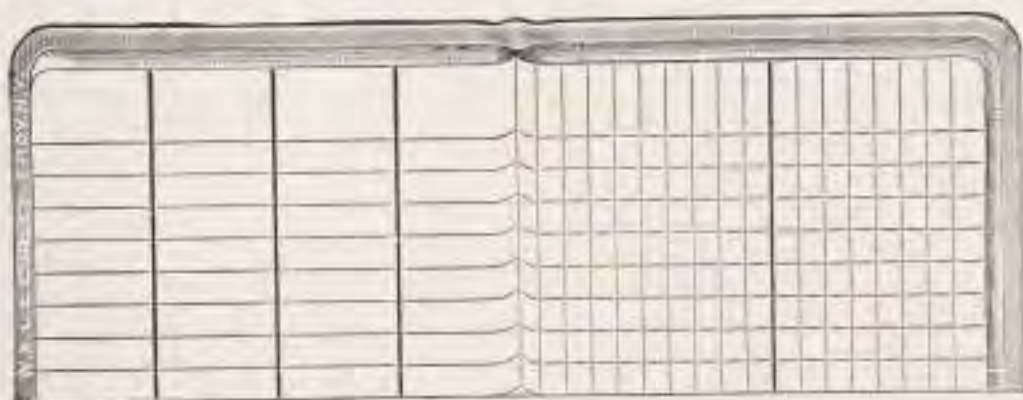
2724A	Dunhams Plat and Profile Book	1.30	.15
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**ENGINEERS BLANK FIELD BOOKS**

Leather Binding and Rounded Corners,



No.		Price.	Postage.
2725	Level Books, 4¼ x 6¾ inches, 60 leaves, per dozen, \$5.00; or single	\$0.50	\$0.05



2728	Transit Books, 4¼ x 6¾ inches, 60 leaves, per dozen, \$5.00; or single	.50	.05
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2731	Record Books, 4¼ x 6¾ inches, 60 leaves, per dozen, \$5.00; or single	.50	.05
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No.		Price.	Postage.
2736	Cross Section Books, $4\frac{1}{4}$ x $6\frac{3}{4}$ inches, 60 leaves, ruled 5 spaces per inch, per doz., \$5.00; or single-----	\$0.50	\$0.05
2738	Cross Section Books, $4\frac{1}{4}$ x $6\frac{3}{4}$ inches, 60 leaves, ruled 10 spaces per inch, per doz., \$5.00; or single----	.50	.05
2742	Cross Section Books, $6\frac{1}{2}$ x $8\frac{1}{2}$ inches, 80 leaves, ruled 10 spaces per inch, per doz., \$9.00; or single-----	.85	.08
2744	Earthworks Books, 5 x $7\frac{3}{4}$ inches, 80 leaves, with printed headings and tables for R. R. Engineers, per dozen, \$10.00; or single-----	1.00	.18

## LEAD PENCILS

2750	Fabers Siberian, Hexagon, fine Drawing, Nos. 2 B to 8 H, per dozen-----	1.25	0.14
2751	Fabers best Castell, Hexagon, Nos. 2 B to 8 H. The highest grade Drawing Pencil, per dozen-----	1.25	.14
2752	Hexagon, Drawing, Nos. 1 to 5, per dozen-----	.75	.04
2754	Round, Drawing, Nos. 1 to 4, per dozen-----	.50	.04
2758	Office Pencil, Nos. 2, 3, and 4, with rubber tip, per dozen-----	.50	.04
2765	Fabers Artists Pencils, with movable lead, H to 6H each.-----	.25	.02
2768	Fabers Leads, H to 6 H, for Artists Pencil, 6 in box. These leads fit the pencil legs of modern Drawing Compasses, per box-----	.60	.04
2778	Hardtmuths Koh-i-noor Pencils, Hexagon, Superfine, 2 B to 8 H, per dozen-----	1.25	.14
2780	Hardtmuths Mephisto, Copying, Round, No. 73 B, Violet, per dozen-----	.75	.04
2781	Hardtmuths Mephisto, Copying, Round, Red Tip, No. 77, Violet, per dozen-----	.85	.04
2784	Pencil Point Protector with rubber tip-----	.05	.01

## COLORED PENCILS AND CRAYONS

2785	Round, Red, Blue, Green and Yellow Pencils, per dozen-----	.75	.05
2790	Round, Wax Crayon Pencils, 6 in box, assorted colors, per box-----	.75	.05
2791	Round, Wax Crayon Pencils, 12 in box, assorted colors, per box-----	1.50	.18



## LUMBER CRAYONS

For marking stakes and boards.

No.		Price.	Postage.
2795	Lumber Crayons, dark red, per dozen	\$0.60	\$0.15
2796	Lumber Crayons, dark blue, per dozen	.60	.15
2797	Lumber Crayons, waterproof, best quality, red, blue or black and yellow, per dozen	1.20	.15

These crayons are superior quality and do not soil the hands.

## STEEL LETTERING AND WRITING PENS

2800	Gillotts Mapping Pens, per dozen	.60	.03
2801	Gillotts Lithographic Pens, per dozen	.60	.03
2802	Gillotts Crow Quill Pens, per dozen	.60	.03
2803	French Crow Quill Pens, per dozen, on card	.35	.03
2806	Gillotts Mapping and writing Pens, No. 170, per dozen, 10 cents; per gross	1.00	.13
2807	Gillotts Mapping and Writing Pens, No. 303, per dozen, 15 cents; per gross	1.50	.14
2808	Gillotts Mapping and Writing Pens, No. 404, per dozen, 10 cents, per gross	1.00	.14
2810	Falcon Writing Pens, No. 048, per dozen, 10 cents; per gross	.75	.14
2812	Office Writing Pens, fine quality, per dozen, 15 cents; per gross	1.50	.14
2814	Commercial Writing Pens, per dozen, 10 cents; per gross	.75	.14
2816	Penholders, black swell handle, metal tip, for office use, per dozen	.50	.05

## ROUND WRITING PENS FOR ORNAMENTAL WRITING

2820	Pens, single pointed, Nos. 1 to 6, assorted, per dozen	.12	.02
2822	Pens, single pointed, Nos. 1 to 6, assorted, per gross	1.00	.15
2824	Pens, double pointed, Nos. 10, 20 and 30, assorted, per dozen	.35	.03
2826	Sample assortment of 25 Pens, per box	.35	.03
2827	Inkholder, for single pointed round writing pens, per box of 6	.30	.03
2828	Penholders for round writing pens, each	.10	.02
2830	Textbook to round writing, with full instructions	.65	.05
2831	Copybook for round writing practice	.35	.05

STEEL ERASING KNIVES, ERASING SHIELDS,  
PENCIL SHARPENERS AND FILES

2835	Steel Blade Eraser, Cocoa handle	.35	.03
2836	Steel Blade Eraser, Bone handle	.50	.03
2838	Steel Eraser, long knife blade, Cocoa handle	.45	.03
2839A	Metal Erasing Shield, nickel plated, 3¼ x 2¾ in.	.20	.02
2839B	Zylonite Erasing Shield, 4½ x 2½ inches	.20	.02
2840	Fabers Pencil Sharpener	.25	.03
2843	Fine Steel Pencil File, with sheath	.25	.03
2844	Fine Steel Pencil File, with Tack lifter at end	.25	.03
2846	Pencil Pointer (a pad of flint paper), 1¼ x 4 in.	.10	.02



ERASING RUBBERS

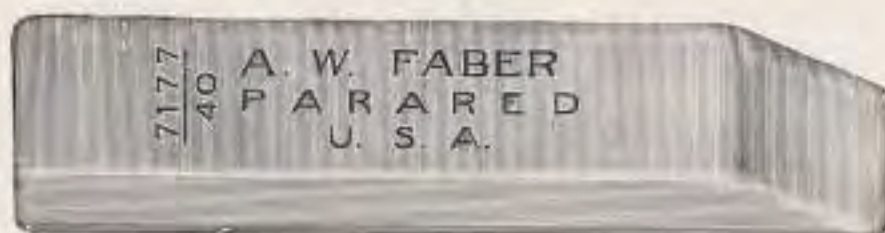


No. 2850



No. 2862

No.		Price.	Postage.
2850	Pliable Artists Rubber, No. 40	\$0.06	\$0.01
2852	Pliable Artists Rubber, No. 24	.10	.02
2854	Pliable Artists Rubber, No. 16	.15	.03
2856	Pliable Artists Rubber, No. 12	.20	.03
2858	Kneaded Rubber, 1 1/4 x 13-16 inch	.05	.01
2859	Kneaded Rubber, 1 5/8 x 1 1/4 inches	.10	.02
2861	Circular Ink eraser	.05	.01
2862	Ink Eraser, 1 1/2 x 1 inch	.05	.01
2864	Ink Eraser, 1 7/8 x 1 1/2 inches	.20	.03
2866	Combined Ink and Pencil-eraser, 2 1/4 x 1 inch	.15	.02
2867	Combined Ink and Pencil eraser, 2 1/2 x 1 3/4 in.	.25	.03
2868	Typewriters Rubber, 3 3/4 x 5/8 inch	.10	.02
2872	Gum, for cleaning drawings, 2 1/4 x 1 3/8 inch	.07	.02
2873	Gum, for cleaning drawings, 2 7/8 x 2 inches	.15	.03



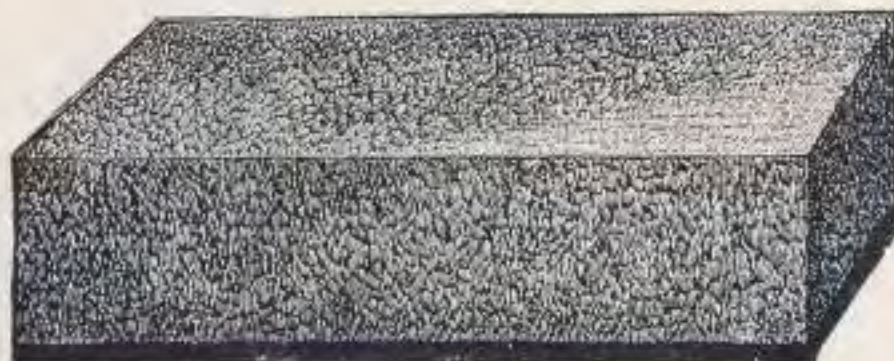
Nos. 2880 to 2885

2880	Bevel Rubber, green, oblong, No. 48	.06	.01
2881	Bevel Rubber, red, oblong, No. 48	.06	.01
2882	Bevel Rubber, green, oblong, No. 24	.12	.02
2883	Bevel Rubber, red, oblong, No. 24	.12	.02
2884	Bevel Rubber, green, oblong, No. 12	.20	.03
2885	Bevel Rubber, red, oblong, No. 12	.20	.03



## SPONGE RUBBERS

FOR CLEANING DRAWINGS



No. 2896

No.		Price.	Postage.
2895	Sponge Rubber, $2\frac{1}{2}$ x $1\frac{3}{4}$ x $\frac{5}{8}$ inch.....	.30	.02
2896	Sponge Rubber, 2 x 2 x 1 inch.....	.30	.02
2898	Sponge Rubber, 4 x 2 x 1 inch.....	.60	.04

## RUBBER BANDS

2900	Rubber Bands, No. 8, $\frac{7}{8}$ x $\frac{1}{16}$ inch, per gross.....	.15	.02
2901	Rubber Bands, No. 10, $1\frac{1}{4}$ x $\frac{1}{16}$ inch, per gross.....	.18	.02
2902	Rubber Bands, No. 29, $1\frac{1}{2}$ x $\frac{1}{8}$ inch, per gross.....	.65	.04
2903	Rubber Bands, No. 31, $2\frac{1}{2}$ x $\frac{1}{8}$ inch, per gross.....	.80	.05
2904	Rubber Bands, No. 61, 2 x $\frac{3}{4}$ inch, per gross.....	1.00	.17
2905	Rubber Bands, No. 63, 3 x $\frac{1}{4}$ inch, per gross.....	1.50	.20
2907	Rubber Bands, No. 200, 11 sizes assorted, $1\frac{1}{8}$ to 3 inches, per box.....	1.25	.18

## HIGGINS DRAWING BOARD MUCILAGE

2915	Drawing board Mucilage, fine quality, 3 ounce jar....	.15	.13
2916	Drawing board Mucilage, fine quality, 6 ounce jar.....	.25	.20
2918	Taurine Mucilage, fine quality, 2 ounce bottle, with brush.....	.10	.10
2919	Taurine Mucilage, fine quality, 4 ounce bottle, with brush.....	.20	.15
2920	Taurine Mucilage, fine quality, pint bottle, without brush.....	.50	.30

The Drawing Board Mucilage is a semi-fluid paste of great strength.  
The Taurine Mucilage is a powerful liquid adhesive.



## DRAWING INKS

## HIGGINS AMERICAN LIQUID DRAWING INKS

No.		Price.	No.		Price.
2925	Waterproof Black Ink, small bottle				\$0.25
2926	Waterproof Black Ink, 8 oz. bottle				2.00
2928	General Black Ink (not waterproof), small bottle				.25
2929	General Black Ink (not waterproof), 8 oz. bottle				2.00
		Price.			
2930	Waterproof Carmine	\$0.25	2936	Waterproof Green	.25
2931	Waterproof Scarlet	.25	2937	Waterproof Yellow	.25
2932	Waterproof Vermillion	.25	2938	Waterproof Brown	.25
2933	Waterproof Blue	.25	2939	Waterproof Orange	.25
2934	Waterproof Indigo	.25	2940	Waterproof Brick Red	.25
2935	Waterproof Violet	.25	2941	Waterproof White	.25
2942	Waterproof Ink, any of the above colors, per 8 oz. bottle				2.00
2943A	Higgins Eternal Black Writing Ink, small bottle				.10
	Postage on the above inks, 7 cents each small bottle, and 30 cents each 8 oz. bottle.				
2944	Metal Ink Bottle Stand with spring clutch, fitted to hold three small bottles of Higgins Inks. If mailed, add 10 cents for postage				.35

## WINSOR AND NEWTONS WATER COLOR LIQUIDS

	Price.	No.		Price.	
2945	India Ink, Black	\$0.30	2950	Silver Ink	.30
2946	Chinese White	.30	2951	Gold Ink	.30
2947	Carmine	.30	2952	Indelible Brown	.30
2948	Sepia	.30	2953	Prouts Brown	.30
2949	Prussian Blue	.30	2954	Extract of Ox Gall	.30

Postage on the above inks, 7 cents each bottle.

## MISCELLANEOUS LIQUID DRAWING INKS

	Price.	Postage.
2955	Devoes White Ink, per bottle	\$0.25 \$0.08
2956	Bourgeois Black India Ink, per bottle	.25 .06
2958	Box of Indelible Drawing Inks, 6 bottles (Blue, Brown, Carmine, Green, Scarlet, Yellow), per box	1.50 .35
2959	Winsor & Newtons Waterproof Drawing Inks (Black, Brown, Carmine, Emerald Green, Indigo, Vermillion, Yellow), per bottle	.25 .06

## CHINESE INDIA INK FOR GENERAL DRAWING

2960	Round, Black, Lion Head, 2½ inches, per cake	.15	.02
2962	Oval, Black, Lion Head, 3¼ inches, per cake	.25	.02
2963	Round, Black, Lion Head, 4¼ inches, per cake	.50	.04
2967	Square, Black, Super Super, 3 x ½ inch, per cake	.50	.03
2968	Square, Black, Super Super, 3¾ x ¾ inch, per cake	1.00	.14
2970	Oblong, Black, Double Dragon, fine, 3¾ x ¾ inch, per cake	2.00	.14
2971	Oblong, Dead Black, for Photo Drawing, 3½ x ¾ inch, per cake	1.00	.14
2972	Oblong, Red Ink, fine, 2¾ inches, per cake	.50	.03
2973	Oblong, Blue Ink, fine, 2¾ inches, per cake	.50	.03
2974	Oblong, Yellow Ink, fine, 2¾ inches, per cake	.50	.03



## JAPANESE INDIA INK

FOR DRAWINGS IN WHICH THE INK LINES ARE WASHED IN APPLYING COLORS

No.		Price.	Postage.
2980	Oblong, Black, fine quality, small cake -----	\$1.00	\$0.14
2982	Oblong, Black, fine quality, medium cake -----	2.00	.14
2984	Oblong, Black, fine quality, large cake -----	3.00	.15

## WINSOR AND NEWTONS WATER COLORS

MOIST IN CHINA PANS



Whole Pan.



Half Pan.

No.

2990 Whole, each 25 cts.; Half, each, 15 cts.

1	Antwerp Blue	20	India Red	33	Prussian Blue
6	Brown Ochre	21	Indigo	34	Prussian Green
8	Burnt Sienna	22	Italian Pink	35	Raw Sienna
9	Burnt Umber	23	Ivory Black	36	Raw Umber
10	Chinese White	26	Light Red	40	Vandyke Brown
11	Chrome Yellow	27	Naples Yellow	41	Venetian Red
13	Deep Chrome	28	Neutral Tint	42	Vermilion
15	Emerald Green	29	New Blue	43	Yellow Lake
17	Gamboge	30	Olive Green	44	Yellow Ochre
18	Hookers Green No. 1	31	Orange Chrome		
19	Hookers Green No. 2	32	Paynes Gray		

2992 Whole, each, 45 cts.; Half, each, 25 cts.

46	Brown Madder	51	Neutral Orange	56	Scarlet Vermilion
47	Cerulean Blue	62	Orange Vermilion	57	Sepia
49	Crimson Lake	52	Purple Lake	58	Warm Sepia
60	Indian Yellow	55	Scarlet Lake		

2994 Whole, each 65 cts.; Half, each, 35 cts.

59	Cobalt Blue	79	Pure Scarlet
61	Lemon Yellow	97	Cobalt Green
63	Violet Carmine		

2996 Whole, each, 90 cts.; Half, each, 45 cts.

70	Carmine	81	Madder Carmine
78	Pink Madder	82	Purple Madder
80	Rose Madder	90	Scarlet Madder

Postage on Water Colors, 1 cent each.



## WINSOR AND NEWTONS WATER COLORS

In Polished Mahogany Box, with Lock and Key, and Drawer, Paint Stone, Water Glass, India Ink, Brushes and Colors.

No.		Price.	Postage.
3000	Complete Box, with 12 colors, whole cakes	\$9.00	\$1.00
3002	Complete Box, with 18 colors, whole cakes	13.50	1.15
3004	Complete Box, with 12 colors, half cakes	6.00	.50
3006	Complete Box, with 18 colors, half cakes	7.75	.65



No. 3000



No. 3010

The following colors are generally used by Architects and Civil and Mechanical Engineers :

- Burnt Umber to represent earth.
- Burnt Sienna to represent wood.
- Light Red to represent brick.
- Sepia and Yellow Ochre to represent stone.
- Prussian Blue to represent wrought iron.
- Paynes Gray to represent cast iron.
- Gamboge to represent brass.
- Gamboge and Carmine to represent copper.
- Prussian Blue and Carmine to represent steel.

In Topography the following colors are generally used :

- Hookers Green No. 2 to represent grass.
- Burnt Sienna to represent cultivated ground.
- Burnt Sienna and Hookers Green to represent uncultivated ground.
- Indigo and Hookers Green to represent swamp.
- Gamboge and Hookers Green to represent trees.
- Yellow Ochre to represent roads and streets.
- Indigo to represent water.
- Carmine to represent buildings, bridges and masonry.
- Sepia to represent hills.
- Sepia to represent shade lines and shadows.



EMPTY JAPANED TIN COLOR BOXES

No.		Price.	Postage.
3010	Japanned Box, to hold 6 whole or 12 half pans.....	\$0.80	\$0.06
3011	Japanned Box, to hold 10 whole or 20 half pans.....	1.00	.17
3012	Japanned Box, to hold 12 whole or 24 half pans.....	1.15	.18
3013	Japanned Box, to hold 16 whole or 32 half pans.....	1.30	.20
3014	Japanned Box, to hold 18 whole or 36 half pans.....	1.40	.22

WATER COLOR BRUSHES



Nos. 3020 and 3025

										Postage.
3020	Camel Hair in Quills:									
No.	1	2	3	4	5	6	7	8		
Each,	\$0.05	.05	.06	.06	.08	.08	.10	.10		.01
3025	Red Sable in quills:									
No.	1	2	3	4	5	6	7	8		
Each	\$0.12	.15	.20	.25	.30	.35	.50	.60		.01
3030	Camel Hair in Tin, with handle:									
No.	1	2	3	4	5	6				
Each	\$0.06	.08	.08	.10	.10	.12				.02
3035	Red Sable, in Albata, with handle:									
No.	1	2	3	4	5	6	7	13	14	
Each,	\$0.20	.25	.35	.45	.55	.65	.75	1.00	1.30	.02 to .12



No. 3040

						Postage.
3040	Camel Hair Sky or Wash Brush, in Tin, with handle:					
No.	0	1	2	3	4	
Each,	\$0.18	.20	.25	.35	.45	.02
3045	Camel Hair Wash Brushes in Tin, with two points:					
No.	0	1	2	3		
Each,	\$0.35	.40	.50	.60		.02

WATER GLASSES, INK AND COLOR SLABS

	Price.	Postage.
3050	Artists Water Glass, 2 $\frac{3}{8}$ inches.....	\$0.12 \$0.08
3051	Artists Water Glass, 2 $\frac{3}{4}$ inches.....	.20 .10
3052	Artists Water Glass, 3 $\frac{1}{4}$ inches.....	.25 .10
3054	Ink or Color Slab, 2 $\frac{3}{4}$ x 1 $\frac{1}{2}$ inches.....	.10 .04
3055	Ink or Color Slab, 3 $\frac{3}{8}$ x 2 $\frac{3}{8}$ inches.....	.15 .06
3056	Ink or Color Slab, 4 x 2 $\frac{1}{2}$ inches.....	.25 .10
3057	Ink or Color Slab, 4 $\frac{1}{2}$ x 2 $\frac{3}{4}$ inches.....	.30 .15
3065	Slate Ink Slab, 3 $\frac{1}{2}$ x 3 $\frac{1}{2}$ inches, with glass cover.....	.35 .15
3067	Opal Glass Ink Saucer, with cover, 3 $\frac{1}{4}$ inches.....	.50 .15



PATENT INK SLAB

No.		Price.	Postage.
3070	Patent Ink Slab, China, with cover, 4½ x 1¾ inches---	\$0.35	\$0.10
3071	Patent Ink Slab, China, with cover, 5¼ x 2¼ inches---	.40	.15

COLOR SAUCERS



No. 3075

3075	Nest of 5 Saucers and a cover, 2¾ inches, per nest----	.45	.15
3076	Nest of 5 Saucers and a cover, 2⅝ inches, per nest----	.55	.20
3077	Nest of 5 Saucers and a cover, 3¼ inches, per nest----	.65	.28
3078	Nest of 5 Saucers and a cover, 3¾ inches, per nest----	.75	.35

BRASS STENCILS, ALPHABETS AND FIGURES

Height of Letters		¼ in.	⅜ in.	½ in.	⅝ in.	¾ in.	1 in.
3100	Stencil Alphabet -----	\$1.50	\$1.75	\$2.00	\$2.30	\$2.65	\$3.00
3101	Stencil Alphabet -----	2.75	3.00	3.25	3.50	3.75	4.15
3102	Stencil Alphabet -----	6.00	6.25	6.65	6.90	7.25	7.50
3103	Stencil Alphabet -----	2.75	3.00	3.25	3.50	3.75	4.15

A set of Figures to match any of these Alphabets will cost one third the price of the same style and size of Alphabet.

Postage on Alphabets -----	.14 to	.17
Postage on each set of figures, Nos. 3100, 3101, 3102, and 3103		.04



STENCIL ALPHABETS, FIGURES AND PLATES

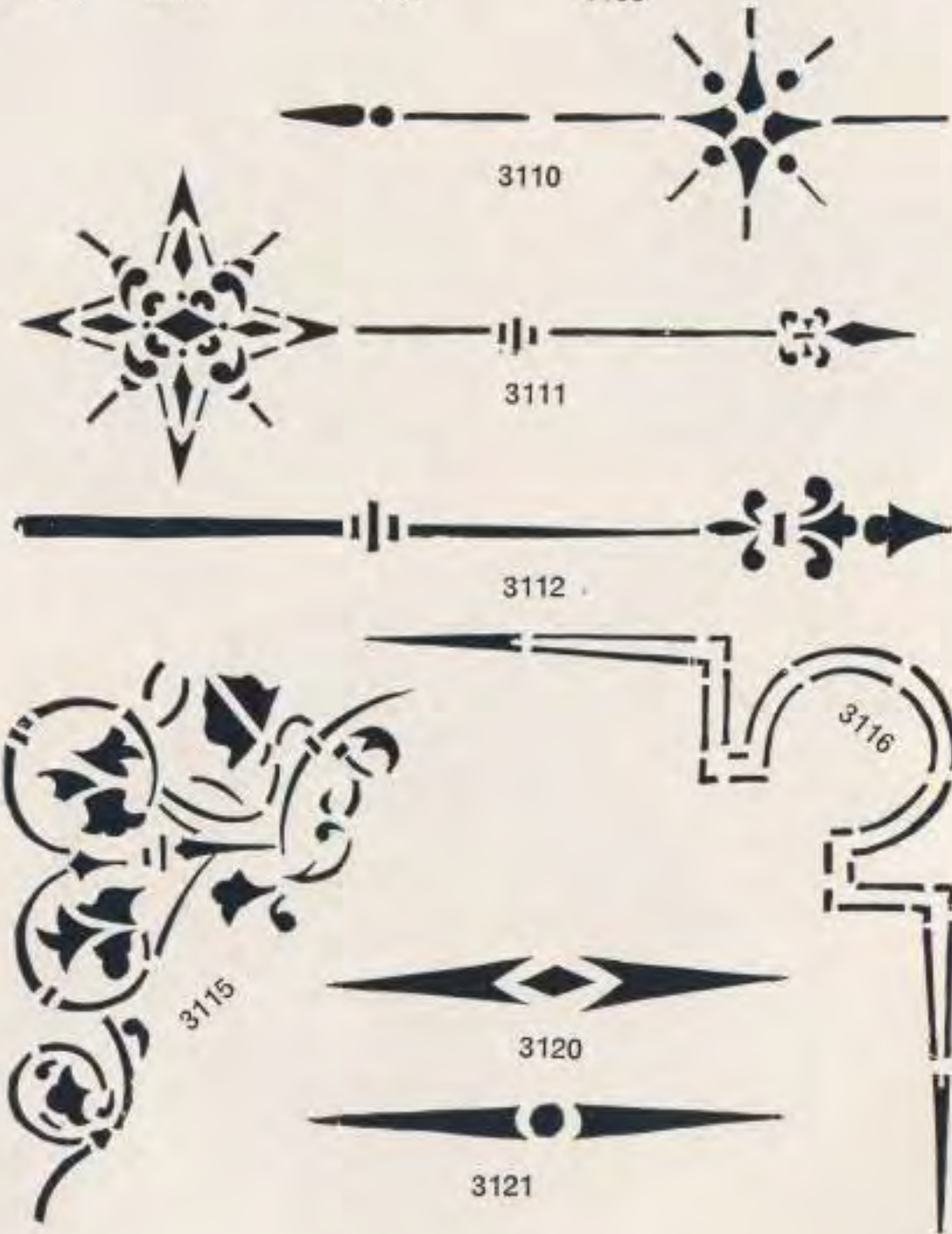
**EMMA A43**

3100

3101

3102

3103



No.		Price.	Postage.
3110	North Point, full size	\$0.65	\$0.02
3111	North Point, full size	.95	.02
3112	North Point, full size	.75	.02
3115	Ornamental Corner, full size	1.25	.12
3116	Ornamental Corner, full size	.95	.03
3120	Dasher, full size	.30	.02
3121	Dasher, full size	.30	.02

A Stencil Brush is furnished without extra charge.  
Use thick India ink for marking.



## POCKET MAGNETIC COMPASSES

No.		Price.	Postage.
3153	Pocket Compass, mahogany case, 3" square, needle circle graduated on raised ring to whole degrees and figured 0 to 90 each way. Needle 2" long, with jeweled center and automatic stop; piano hinged cover with clasp. Weight 4 ounces, Gurley, maker	\$4.00	\$0.15
3154	Pocket Compass, like No. 3153 but with needle circle figured 0 to 360, Gurley, maker	4.00	.15
3155	Compass like No. 3154, but with raised ring 0° to 90° each way, 3¾ inches square, and 2½ inch needle, Gurley, maker	5.00	.18
	Township Diagram on inside of cover of Nos. 3153 3154, or 3155	1.00	
3160	Brass, round, watch pattern, stop, agate center, 1½ inches diameter	.85	.04
3161	Brass, round, watch pattern, stop, agate center, 2 inches diameter	1.00	.14
3164	Brass, round, stop, agate center, 1½ inches diameter, with cover	1.10	.14
3165	Brass, round, stop, agate center, 2 inches diameter, with cover	1.25	.14
3166	Brass, round, automatic stop, agate center, 2½ inches diameter, with reversible cover (superior)	2.50	.15



No. 3154

3168	Brass, round, watch pattern, stop, agate center, 1½ inches diameter, with hinged cover	1.25	.14
3170	Brass, round, watch pattern, stop, agate center, 2 inches diameter, with hinged cover	1.50	.14
3175	Pocket Compass, 1¾ inches diameter, hunting case, spring catch, stop to needle in joint of cover, and bar needle with agate center	3.20	.14
3176	Pocket Compass, 2 inches diameter, hunting case, spring catch, stop to needle in joint of cover, and bar needle with agate center	4.00	.15



POCKET MAGNETIC COMPASSES



No. 3160



No. 3166



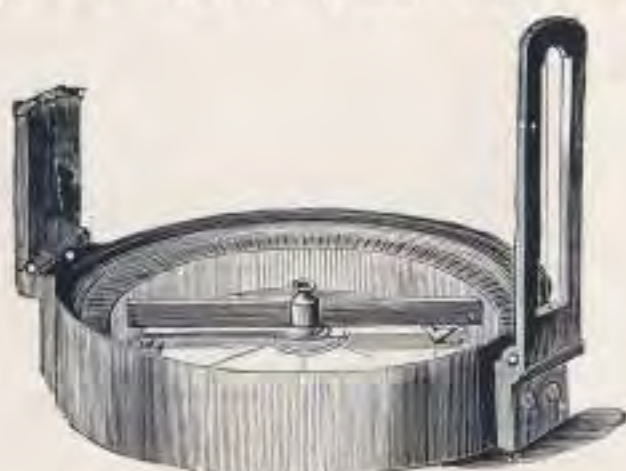
No. 3168



No. 3175



POCKET MAGNETIC COMPASSES



No. 3183

No.		Price.	Postage.
3182	Pocket Compass, 2½ inches diameter, with cover, folding sights, raised ring, bar needle, with agate center, and stop to needle -----	\$6.00	\$0.15
3183	Pocket Compass, 3 inches diameter, with cover, folding sights, raised ring, bar needle with agate center, and stop to needle -----	7.50	.10



No. 3186. As Clinometer

3186	Clinometer Compass, 2½ inches diameter, graduated to one degree, bar needle with agate center and stop, pivoted sights to swing over compass face, and morocco case -----	7.25	.16
3187	Clinometer Compass, 3 inches diameter, graduated to one degree, bar needle with agate center and stop, pivoted sights, and morocco case -----	8.75	.18
3188	Pocket Compass, 3¾ inches diameter, heavy brass case and cover, raised ring, 2½ inch needle with agate center and stop, superior, Gurley, maker -----	6.00	.20
3192	Pocket Compass, 1¾ inches diameter, watch pattern, stem stop, Singers patent pearl dial -----	3.85	.14



## POCKET MAGNETIC COMPASSES

No.		Price.	Postage.
3194	Geological Compass, $2\frac{3}{4}$ inches diameter, with pendulum, for ascertaining the angle of dip in rocks	\$4.25	\$0.15
3200	Pocket Compass, watch pattern, $2\frac{1}{2}$ inches diameter, hunting case, raised ring, agate center, stop to needle, folding sights	5.50	.16

## BRUNTON POCKET TRANSIT



No. 3215

3215	Brunton Pocket Transit. Designed for civil and mining engineers, mine managers and geologists. Can be used as a prismatic compass, sighting compass, clinometer and Abney Level. Aluminum case. Size $2\frac{3}{4}$ x $2\frac{3}{4}$ x 1 inch. Weight 8 ounces	22.50	.25
	Ball and socket tripod head	5.00	
	Tubular extension tripod	5.00	
	Plain leather case for instrument only	1.50	
	Leather case with belt loop for instrument only	1.75	
	Leather case with sling strap for instrument only	2.00	
	Leather case for instrument, tripod head, and tripod with sling strap	4.00	

## POCKET ALT AZIMUTH

3220	Pocket Alt Azimuth, with Telescope, for travelers and military surveyors. Altitudes, azimuths, compass bearings, clinometer degrees and levels are all obtained by this instrument. Size $6\frac{1}{2}$ x $2\frac{1}{2}$ x $1\frac{1}{8}$ inches, in case	50.00	.40
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## PRISMATIC COMPASSES

3225	Prismatic Compass, $2\frac{1}{8}$ inches diameter, hunting case; can be used as an ordinary compass without opening the cover, and a prismatic compass by raising the cover; glazed with a stout glass, on which is etched a line for the sight. With folding prism and floating card dial with stop	15.00	.16
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PRISMATIC COMPASSES



No. 3225

No.		Price.	Postage.
3226	Prismatic Compass, 3 inches diameter, with floating metal ring, jewelled center, azimuth glasses, folding prism and folding sight with hinged mirror, in leather sling case.....	\$28.00	\$0.25
3227	Prismatic Compass, 3 inches diameter, with floating card dial, jewelled center, folding prism and folding sight, in leather sling case.....	16.00	.20



No. 3226

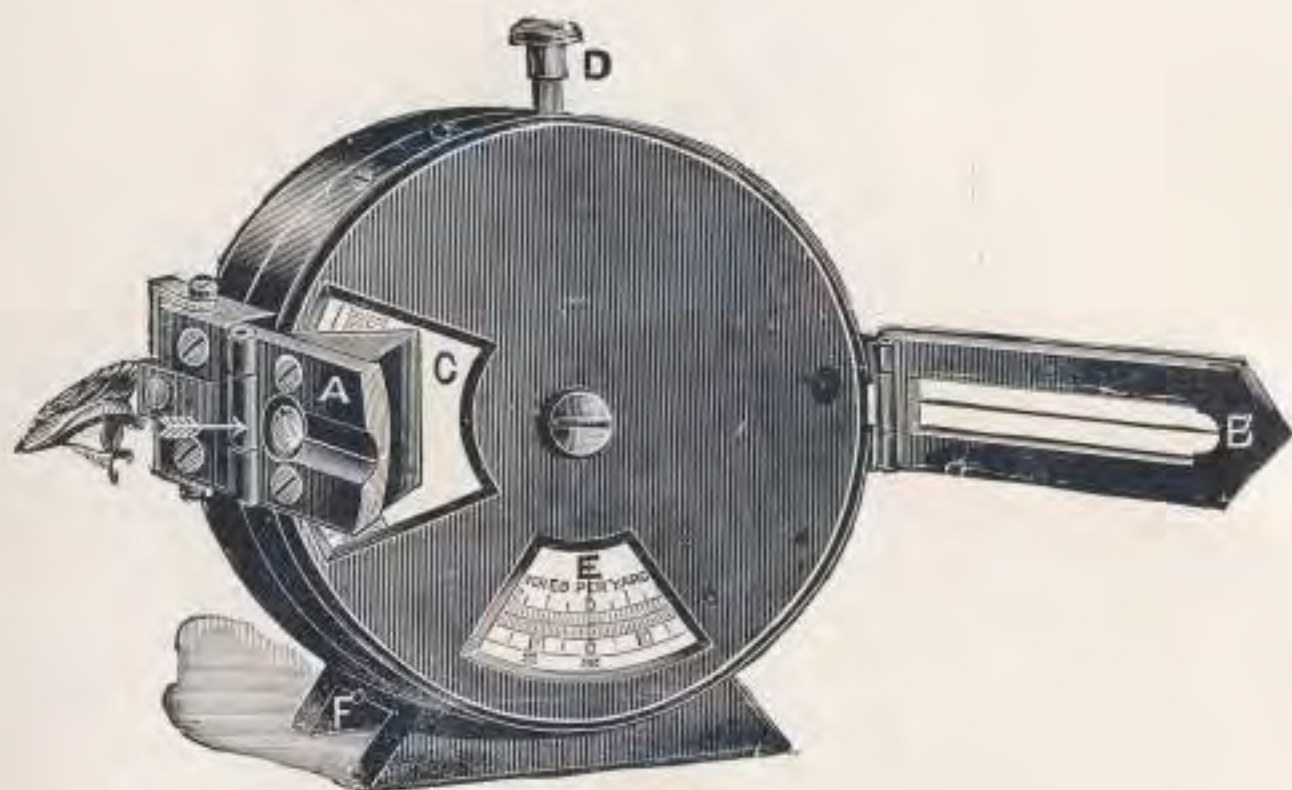


No. 3228

3228	Prismatic Compass, 3 inches diameter, with floating metal ring, jewelled center, folding prism, and folding sight, in leather sling case.....	21.00	.20
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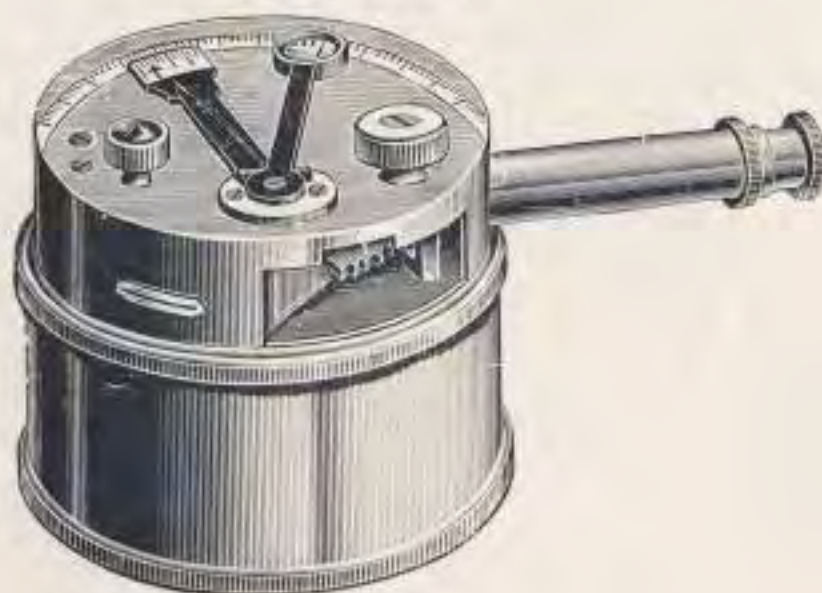
PRISMATIC COMPASSES



No. 3230

No.	Description	Price.	Postage.
3230	Prismatic Compass, Barkers Patent, 2 3/4 inch floating dial, agate center with stop, mounted beneath 2 3/4 inch pendulum dial, graduated for altitudes 0° to 180°, also graduated 0° to 90° both ways as clinometer and with scale of rise or fall in inches per yard; folding prism and hair sight, metal case, and in leather sling case	\$27.00	\$0.25
3232	Prismatic Compass, 3 inches in diameter, with metal dial graduated to 1/2 degrees, agate center with stop, folding prism, azimuth glasses, folding sight with hinged and sliding mirror, metal cover, in leather sling case	25.00	

SEXTANTS



No. 3240



SEXTANTS



No. 3245

No.		Price.
3240	Pocket Sextant, graduated to $\frac{1}{2}$ degrees, with vernier to 1 minute, telescope, two neutral glasses, magnifier, tangent screw, etc. In metal box 3 inches diameter, and in leather sling case -----	\$40.00
3245	Sextant of gun metal, $4\frac{1}{2}$ inches radius, arc of $150^\circ$ graduated on silver to 15 minutes with vernier to 15 seconds, clamp and tangent and magnifier, one terrestrial telescope, one celestial telescope, one sight tube, six neutral glasses, two mirrors in mahogany box -----	50.00
3247	Sextant of gun metal, $6\frac{1}{2}$ inches radius, arc of $150^\circ$ graduated on silver to 10 minutes with vernier to 10 seconds, clamp and tangent and magnifier, two celestial telescopes, one terrestrial telescope, one sight tube, seven neutral glasses, two mirrors, in mahogany box -----	80.00
3248	Sextant of gun metal, superior, 7 inch radius, arc of $150^\circ$ graduated on silver to 10 minutes with vernier to 10 seconds, clamp and tangent and magnifier, two celestial telescopes, one terrestrial telescope, one sight tube, seven neutral glasses, two mirrors, in mahogany box -----	100.00

ARTIFICIAL HORIZONS

Made by W. & L. E. Gurley.

	Price.	Postage.
3250 Artificial Horizon, with black glass plane mounted in brass frame, with three leveling screws, and sensitive level vial. All in mahogany box -----	\$16.00	\$0.30
3252 Mercurial Horizon, iron trough, iron bottle with screw stopper and funnel cap, glazed metal roof. All in mahogany box -----	30.00	

ANGLE MIRRORS, PRISMS AND RANGE FINDERS



No. 3256



No. 3260



## ANGLE MIRRORS, PRISMS AND RANGE FINDERS

No.		Price.	Postage.
3255	Angle Mirror, with small plummet, for angles of $90^\circ$ . The handle can be detached and stored in frame of instrument, in morocco case -----	\$7.50	\$0.15
3256	Angle Mirror, plain, for angles of $90^\circ$ , in morocco case -----	5.00	.15
3260	Rectangular Prism, for angles of $90^\circ$ , in morocco case -----	5.00	.12
3262	Double Prism, to take angles of $90^\circ$ and $45^\circ$ , in morocco case -----	10.00	.12
3264	Penta Prism Range Finder brass mounted, in leather case, with directions. Distance up to two miles easily determined -----	10.00	.25

## SURVEYORS CROSS STAFF HEADS

3265	Surveyors Cross Staff Head, for $45^\circ$ and $90^\circ$ angles. Octagonal, $2\frac{1}{2}$ inches long. With staff sockets-----	2.75	.30
3266	Surveyors Cross Staff Head, for $45^\circ$ and $90^\circ$ angles. Octagonal, 3 inches long. With magnetic compass, $1\frac{3}{4}$ inch needle, and with staff socket-----	4.75	.35
3267	Surveyors Cross Staff Head, for $45^\circ$ and $90^\circ$ angles. Round, $3\frac{3}{4}$ inches long. With vertical axis graduated to $1^\circ$ and vernier to 2 minutes. With magnetic compass, $2\frac{1}{8}$ inch needle, and with staff socket-----	11.50	.40

## PEDOMETERS, PASSOMETERS AND TALLY REGISTERS



No. 3276



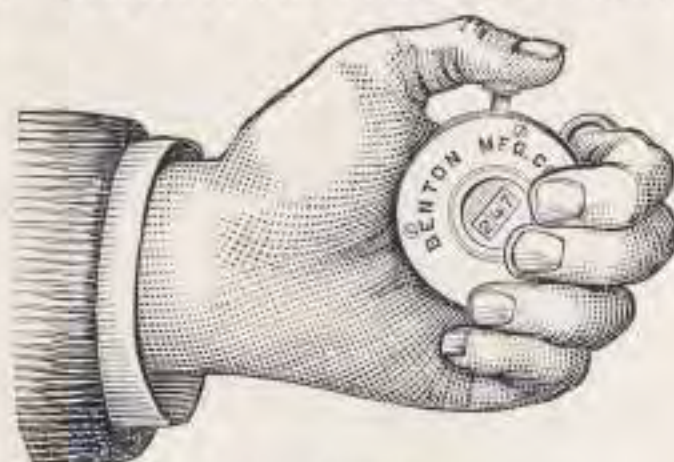
No. 3281



No.		Price.	Postage.
3270	Pedometer, watch form, with automatic stem attachment to set the pointers to zero. Two dials register distance walked up to 100 miles by each $\frac{3}{4}$ mile.	\$4.50	\$0.14
3272	Pedometer, watch form, with automatic stem attachment to set the pointers to zero. Three dials register distance walked up to 100 miles by each 80 yards	5.25	.14
3276	Passometer, watch form, with automatic stem attachment to set the pointers to zero. Three dials register each step up to 25,000 steps	6.00	.14
3277	Passometer, watch form, with automatic stem attachment to set the pointers to zero. Three dials register each step up to 100,000 steps	6.50	.14

With the Passometers, the distance walked is computed by multiplying the number of steps registered by the average length of stride.

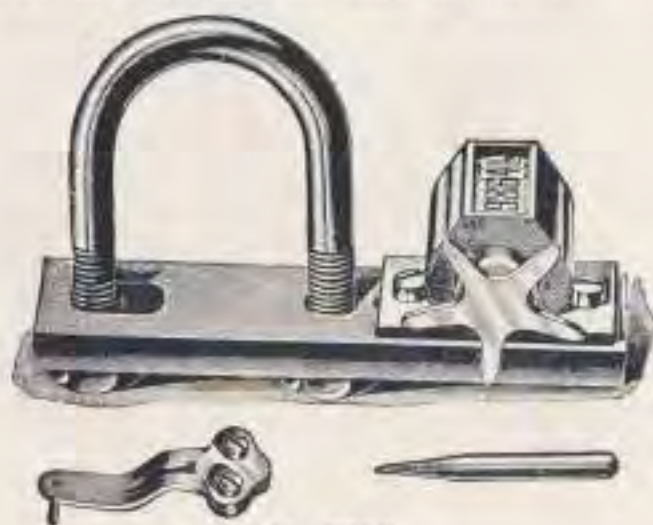
### TALLY REGISTERS AND ODOMETERS



No. 3280

3280	Tally Register, for surveyors and others; useful in chaining, for counting persons, cattle, coal, wheat, etc. Registers to 999 and can be set to zero at will.	2.50	.16
3281	Tally Register, with 4 dials. Registers to 10,000, and can be set to zero at will.	5.50	.16
3282	Veeder Odometer, or Revolution Counter, with fixtures for attaching	3.50	.18

This Odometer is like the cut of No. 3283 in appearance, but registers on the dial only every fifth revolution of the carriage wheel. To ascertain the distance traveled, multiply the registered number of revolutions by five and that product by the circumference of the wheel. This Odometer can be used with carriage wheels of any diameter.

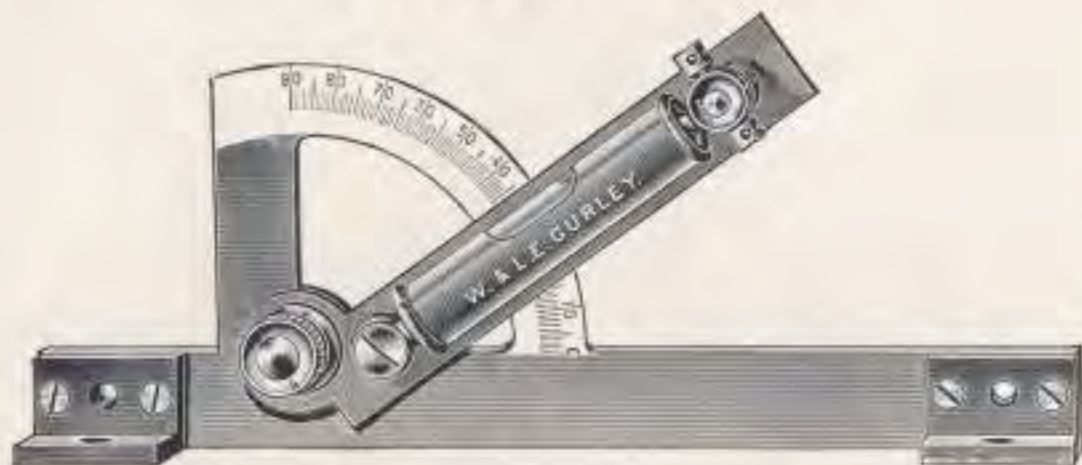


No. 3283



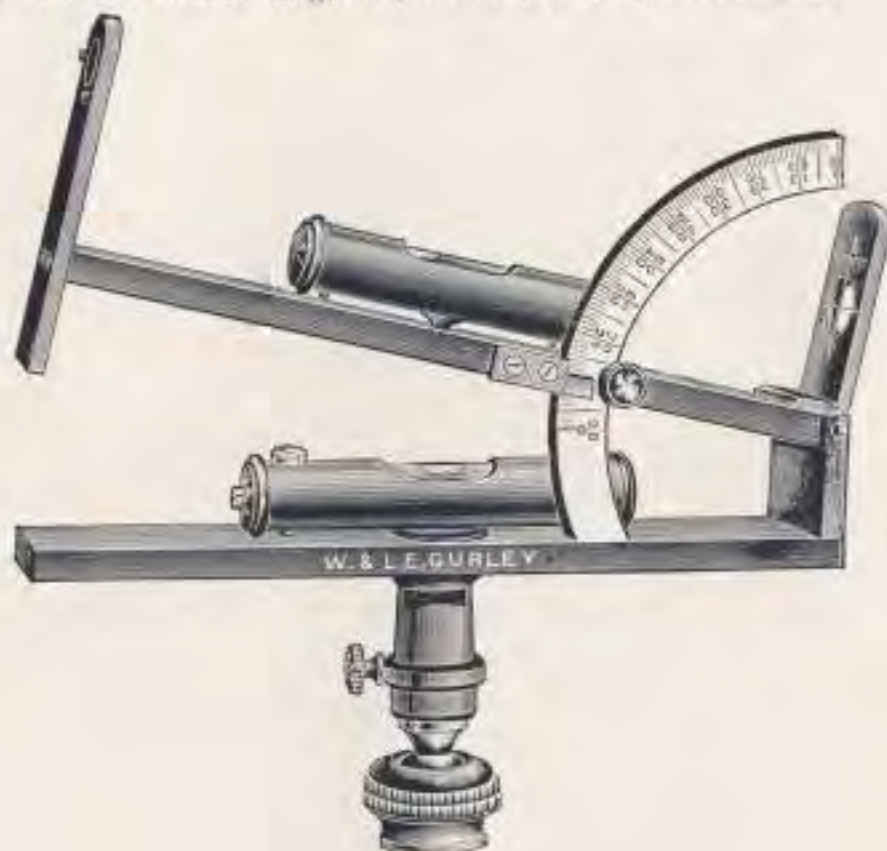
- | No.  |  | Price. | Postage. |
|------|--|--------|----------|
| 3283 | Veeder Regular Odometer, with fixtures for attaching. This Odometer registers the distance traveled in miles and fractions of a mile, and is designed for attaching to left front or left rear axles. Mention the wheel size of your vehicle when ordering No. 3283. | \$3.50 | \$0.18   |

### CLINOMETERS



No. 3284

- |      |   |      |     |
|------|---|------|-----|
| 3284 | Clinometer or Slope Level, Gurley, maker, 7 inches long, arc to whole degrees, in wood case | 8.00 | .30 |
|------|---|------|-----|



No. 3288

- |      |   |       |     |
|------|---|-------|-----|
| 3288 | Clinometer or Slope Level, Gurley, maker, 6 inches long, arc to whole degrees, two levels, sights and staff mountings, in wood case | 16.00 | .50 |
| 3290 | Boxwood Clinometer, 12 inch, folding to 6 inch, with two levels, compass, inclination scale, and sights, in leather case            | 12.00 | .20 |

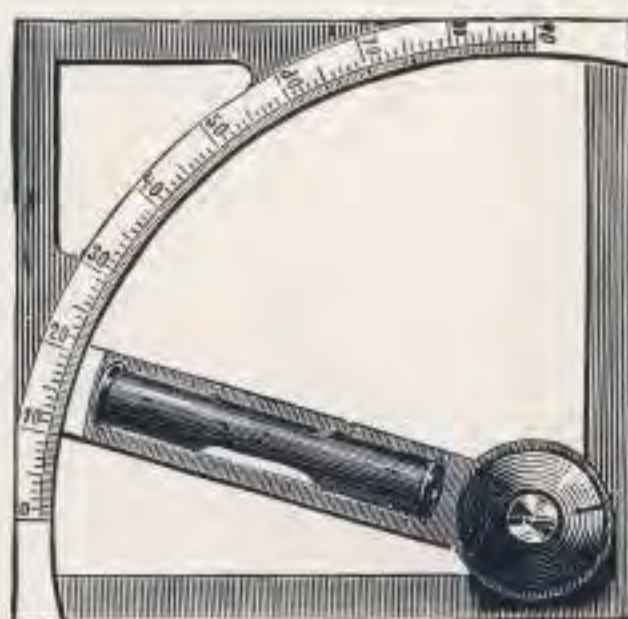
The inclination scale gives the value of any angle. The angle, ascertained from the graduated arc, refers to that degree in the column marked "angle," and another column gives the rise or fall in any given distance.



## CLINOMETERS



No. 3290



No. 3292

No.		Price.	Postage.
3292	Clinometer or Slope Level, brass frame, 4 inches square, arc to whole degrees and vernier to 5 minutes. The design renders the measurement of the inclination of the under side of a plane available, as any of the four edges may be used; in 12,000 feet, by each 50 feet-----	\$10.00	\$0.40

## ANEROID BAROMETERS

Mountain Aneroid Barometers, compensated for temperature, with gilt cases and silvered dials, in morocco cases.

With the exception of Nos. 3336, 3338 and 3340, all the Barometers mentioned are furnished with a rating card, showing the result of tests in comparison with our standard mercurial barometer.

A Treatise on the Aneroid Barometer; its construction and use. Illustrated. 50 cents.

3300	Pocket Aneroid, 1¾ inches diameter, altitude scale to 3,000 feet, by each 10 feet-----	19.00	.20
3301	Pocket Aneroid, 1¾ inches diameter, altitude scale to 5,000 feet, by each 20 feet-----	18.00	.20
3302	Pocket Aneroid, 1¾ inches diameter, altitude scale to 10,000 feet, by each 100 feet-----	19.00	.20
3303	Pocket Aneroid, 1¾ inches diameter, altitude scale to 16,000 feet, by each 100 feet-----	20.00	.20
3304	Pocket Aneroid, 2 inches diameter (nickel hunting case and omitting morocco case), altitude scale to 8,000 feet, by each 50 feet-----	22.00	.20



ANEROID BAROMETERS



No. 3316

No.		Price.	Postage.
3310	Pocket Aneroid, 2½ inches diameter, altitude scale to 3,000 feet, by each 10 feet.....	\$20.00	\$0.25
3312	Pocket Aneroid, 2½ inches diameter, altitude scale to 5,000 feet, by each 20 feet.....	19.00	.25
3314	Pocket Aneroid, 2½ inches diameter, altitude scale to 10,000 feet, by each 100 feet.....	20.00	.25
3315	Pocket Aneroid, 2½ inches diameter, altitude scale to 12,000 feet, by each 50 feet.....	21.00	.25
3316	Pocket Aneroid, 2½ inches diameter, altitude scale to 16,000 feet, by each 100 feet.....	22.00	.25
3318	Pocket Aneroid, 2½ inches diameter, altitude scale to 20,000 feet, by each 100 feet.....	23.00	.25
3322	Pocket Aneroid, 2½ inches diameter, altitude scale to 10,000 feet, by each 50 feet, and thermometer.....	23.00	.25
3324	Pocket Aneroid, 2½ inches diameter, altitude scale to 16,000 feet, by each 50 feet, and thermometer.....	25.00	.25
3329	Pocket Metric Aneroid, 2½ inches diameter, altitude scale to 1,500 meters, reading to 5 meters, and pressure scale reading to ½ millimeter.....	21.00	.25
3330	Pocket Metric Aneroid, 2½ inches diameter, altitude scale to 3,000 meters, reading to 10 meters, and pressure scale reading to 1 millimeter.....	22.00	.25
3332	Pocket Metric Aneroid, 2½ inches diameter, altitude scale to 5,000 meters, reading to 20 meters, and pressure scale reading to 2 millimeters.....	24.00	.25



## ANEROID BAROMETERS

No.		Price.	Postage.
3336	Plain Aneroid, no altitude scale, 5 inches diameter, with thermometer and open face to show mechanism, for parlor use.....	\$16.00	
3338	Plain Aneroid, no altitude scale, 6½ inches diameter, and with one thermometer reading to scale of Fahrenheit and Reaumer, and open face to show mechanism for parlor use.....	20.00	
3340	Self-recording Aneroid Barometer (Barograph), with a series of five vacuum chambers. Atmospheric pressure from 28 to 30.5 inches are registered for one week. With charts for one year and bottle of ink. In mahogany case, hinged cover with handle, and glass front.....	45.00	

The graduated spaces on the altitude scales of Barometers No. 3300 to 3332 can be subdivided by the eye or by using a magnifier, and thus a closer reading obtained.

A leather sling case for Barometers Nos. 3306 to 3332, and omitting the morocco case, costs extra, \$1.50.

## SURVEYING AND MINING ANEROIDS

BRONZED CASES, SILVERED DIALS, WITH REVOLVING MAGNIFIER, COMPENSATED FOR TEMPERATURE, IN LEATHER SLING CASES.

## THREE INCH ANEROIDS.

3350	Surveying Aneroid, altitude scale to 6,000 feet, by each 20 feet, and by vernier to 2 feet.....	45.00	.40
3352	Surveying Aneroid, with altitude scale to 10,000 feet, by each 50 feet, and by vernier to 5 feet.....	48.00	.40
3354	Surveying Aneroid, with altitude scale to 16,000 feet, by each 50 feet, and by vernier to 5 feet.....	50.00	.40
3355	Mining Aneroid, arranged to register 2,000 feet below sea level to 4,000 feet above, by each 20 feet, and by vernier to 2 feet.....	45.00	.40

## FIVE INCH ANEROIDS

3360	Surveying Aneroid, with altitude scale to 5,000 feet, by each 10 feet, and by vernier to 1 foot.....	50.00	
3362	Surveying Aneroid, with altitude scale to 10,000 feet, by each 20 feet, and by vernier to 2 feet.....	53.00	
3364	Surveying Aneroid, with altitude scale to 16,000 feet, by each 20 feet, and by vernier to 2 feet.....	55.00	
3366	Surveying Aneroid, with altitude scale to 20,000 feet, by each 50 feet, and by vernier to 5 feet.....	60.00	

The Surveying and Mining Aneroid has been constructed especially for the use of surveyors and engineers, for ascertaining slight variations in gradients, levels, etc., and from its extreme sensitiveness will be found of considerable utility in Mining and Surveying Work generally.

The Vernier Scale is moved by rack and pinion, and the magnifier which rotates on the outer circumference of the instrument facilitates the reading of the vernier.



SURVEYING AND MINING ANEROIDS



No. 3360

TO USE THE ANEROID WITH ALTITUDE SCALE

Find the height in feet at first station and subtract this from the height in feet at second station. If the mean temperature is greater or less than 50° F., apply correction for temperature as hereafter given.

Example:

Aneroid at Station A, 1,800 feet. Thermometer, 50°.

Aneroid at Station B, 800 feet. Thermometer, 70°.

The approximate height is 1,000 feet. The sum of the temperature is 120. A correction of - 20 is therefore applied. This is 20 feet.

The difference of elevation is therefore 1,000 + 20 = 1,020 feet.

TO FIND THE RELATIVE HEIGHT OF TWO GIVEN PLACES

Take a reading of the Aneroid at first station; subtract from this the reading at second station. The product multiplied by 9 will give the difference of altitude in feet, thus:

First Station, 30.20; Second Station, 29.99; 30.20 — 29.99 = .21; .21 × 900 (or 21 × 9) = 189 feet = difference of altitude.

This under ordinary pressures and with a temperature of about 50° F. will give good results. If the temperature is over 70° F. multiply by 10.

The table prepared by Mr. Symons is more strictly accurate:

Mean Temperature	30°	40°	50°	60°	70°	80°
Mean pressures, 27 in. -----	9.7	9.9	10.1	10.3	10.5	10.8
Mean pressures, 28 in. -----	9.3	9.5	9.8	10.0	10.2	10.4
Mean pressures, 29 in. -----	9.0	9.2	9.4	9.6	9.8	10.0
Mean pressures, 30 in. -----	8.7	8.9	9.1	9.3	9.5	9.7

Roughly speaking, the barometer falls one inch for every 900 feet of ascent; or at mean atmospheric pressure in this latitude,

Above sea level 917 feet, the barometer falls -----	1 inch.
Above sea level 1,860 feet, the barometer falls -----	2 inches.
Above sea level 2,830 feet, the barometer falls -----	3 inches.
Above sea level 3,830 feet, the barometer falls -----	4 inches.
Above sea level 4,861 feet, the barometer falls -----	5 inches.



## ANEMOMETERS

FOR MEASURING THE PRESSURE AND VELOCITY OF CURRENTS OF AIR IN COAL MINES AND VENTILATORS, FLUES, ETC., OF PUBLIC BUILDINGS

"Birams."—For registering the velocity of currents of air in mines, tunnels, etc., by means of a light fan, the revolutions of which are recorded on a dial in the center of the instrument.

This instrument placed in the passage of a mine registers automatically the rate at which the air is traveling through it, and a simple observation will detect any slackening of the current arising from obstruction of the ways or want of attention at the ventilating furnace, or fan wheel.

We furnish a rating card with each Anemometer, showing the friction constant to be added in every computation, which is ascertained by us by actual experiment.



No. 3383

No.		Price.	Postage.
3380	Birams Anemometer, 3 in. diameter, reading to 1,000 feet, with disconnecter, in case.....	\$20.00	\$0.30
3383	Birams Anemometer, 4 in. diameter, reading to 100,000 feet, with disconnecter, in case.....	23.00	.40
3386	Birams Anemometer, 6 in. diameter, reading to 100,000 feet, with disconnecter, in case.....	28.00	.60
3390	Birams Anemometer, watch pattern, hunting case, very sensitive, reading to 1,000 feet.....	30.00	.18

Pocket size, 2 inches diameter.—Is made in the form of a watch. The top and bottom of the case, when opened, form a base for the instrument, and a check spring passing through the pendant acts as a stop to the movement, on being pressed by the finger at the expiration of the time necessary to make the observation. The movement is jeweled at four points. The outer circle of divisions on the dial records by single feet up to one hundred; the smaller dial continues the enumeration up to one thousand feet.



## THE USE OF THE ANEMOMETER

The Anemometer consists of a series of vanes, which revolve with the action of the air current, the number of revolutions, or numbers proportioned to the revolutions, being registered by a pointer on the face of a dial, forming part of the instrument itself. An observer has only to record the position of the several indices at the first observation, by writing the lower of the two figures on the respective circles, between which the index points, in their proper order, and deduct the amount from their position at the second observation, to ascertain the velocity of the air which has passed in the interval. This, multiplied by the area in feet of the passage where the instrument is placed, will show the number of cubic feet which has passed during the same period.

Thus, suppose the observation of one minute gives:

Second reading -----	525
First reading -----	225
	<hr/>
	300
Add correction, say -----	30
	<hr/>
	330

Size of passage in feet,  $10 \times 5 \times 330 = 16,500$  cubic feet per minute.

The correction added above is the value of the constant of friction, which must be found for each machine by actual experiment.

### To Find the Velocity of the Air in the Passage

Proceed thus: Suppose the Anemometer indicates 330 feet per minute,  $330 \div 88 = 3.75$ , or  $3\frac{3}{4}$  miles per hour, 88 being 1-60 of a mile.

To ascertain the force of the air current, multiply the square of the velocity of the air in feet per second by .0023.

## AIR METERS



No. 3395



## AIR METERS

No.		Price.	Postage.
3395	Portable Air Meter, with fan wheel $2\frac{3}{4}$ inches diameter, four dials, recording to 100,000 feet, and disconnecter. The pointer can be set to zero at will by a zero setting attachment and key-----	\$25.00	\$0.35
3397	Portable Air Meter, with fan wheel $2\frac{3}{4}$ inches diameter, six dials recording to 10,000,000 feet, and disconnecter, but without setting attachment-----	25.00	.35

The Portable Air Meter is for the measurement of currents of air through mines, tunnels, sewers and the ventilators of hospitals, public buildings, etc. The indications are obtained by means of a delicately poised fan wheel, the recordings being commenced by the long hand, which traverses the extreme outer circumference of the main dial for the passage of one hundred feet of air. The enumeration is continued by a series of smaller dials as shown in the illustration. A Disconnecter, projecting from the band of the instrument, opposite the fan wheel, serves to throw the mechanism out of gear, and arrest its action, when required. The instrument is packed, with universal jointed socket, in a box about four inches square.

## FIELD GLASSES

The Field Glasses here described are of the best quality and especially adapted for tourists, engineers, military service, or general field use. They are achromatic, and are metal body covered with morocco, and have a case with strap. Some are designated by the diameter of the objectives, in French lines, eleven lines being equal to one inch.



No. 3437



## LEMAIRE FIELD GLASS

No.		Price.	Postage.
3436	Field Glass; objectives, 21 lines.....	\$13.00	\$0.35
3437	Field Glass; objectives, 24 lines.....	15.00	.40
3439	Field Glass; objectives, 26 lines.....	17.00	.45

## COLMONT FIELD GLASS, LOW TOPS

FOR MARINE USE

3440	Field Glasses; objectives, 24 lines.....	12.00	.40
3441	Field Glass; objectives, 26 lines.....	13.00	.45
3444	Field Glass, jointed cross bars, for pupillary distance; objectives, 21 lines.....	14.50	.35

## RANCHMANS FIELD GLASS, HIGH TOPS

3445	Field Glass; objectives, 26 lines.....	12.00	.50
------	--	-------	-----

## COLMONT FIELD GLASS, HIGH TOPS

3450	Field Glass; objectives, 24 lines.....	12.00	.45
3451	Field Glass; objectives, 26 lines.....	13.00	.50

## BUSCH JENA FIELD GLASS, LOW TOPS

3453	Field Glass; objectives, 24 lines.....	16.00	.40
3454	Field Glass; objectives, 26 lines.....	18.00	.45
3455	Field Glass, jointed cross bars, for pupillary distance; objectives, 21 lines.....	18.00	.35
3456	Field Glass, jointed cross bars, for pupillary distance; objectives, 24 lines.....	19.50	.40



## PRISM BINOCULARS

The Prism Binocular, in design and construction, is simple, compact, of light weight and fine finish. It combines large field of view with great magnifying power and clear definition. One eye piece cap is graduated and can be adjusted for normal, near sighted and far sighted eyes. The metal body is covered with fine black morocco and each Binocular has a leather case with strap.

## LEFILS PRISM BINOCULARS

A popular low price prism glass of new design, combining lightness with power.

No.		Magnifying Power	Field of View at 1000 yds.	Price.	Postage.
3457	Prism Binocular	8	87 yds.	\$20.00	\$0.45



No. 3459

## BUSCH STEREO ULTRALUX

A high grade glass for traveling and general use.

		Magnifying Power	Field of View at 1000 yds.	Price.	Postage.
3458	Prism Binocular	6	130 yds.	\$40.00	\$0.40
3459	Prism Binocular	8	115 yds.	40.00	.45

## BUSCH STEREO SULLOX

A superior glass for hunting, and in the lower powers for marine purposes as a "Night Glass." On account of the large size of the objectives, this glass is one of the best models for all-around use.

		Magnifying Power	Field of View at 1000 yds.	Price.	Postage.
3461	Prism Binocular	6	150 yds.	\$60.00	\$0.40
3462	Prism Binocular	8	125 yds.	60.00	.45
3463	Prism Binocular	10	90 yds.	65.00	.50
3463A	Prism Binocular	12	80 yds.	70.00	.55



## ACHROMATIC TELESCOPES

MOROCCO COVERED BODY AND BURNISHED DRAW TUBES



No. 3475

No.		Price.	Postage.
3475	Telescope, with 3 draws, 17 $\frac{1}{4}$ inches drawn out, 6 $\frac{1}{2}$ inches shut, objective 1 $\frac{1}{8}$ inches in diameter, power 12 times	\$2.50	\$0.20
3476	Telescope, with 3 draws, 18 $\frac{3}{4}$ inches drawn out, 7 inches shut, objective 1 $\frac{1}{4}$ inches in diameter, power 16 times	3.50	.25
3477	Telescope, with 3 draws, 23 $\frac{3}{4}$ inches drawn out, 8 $\frac{1}{2}$ inches shut, objective 1 $\frac{1}{2}$ inches in diameter, power 20 times	5.00	.30
3478	Telescope, with 3 draws, 31 inches drawn out, 10 $\frac{3}{4}$ inches shut, objective 1 $\frac{5}{8}$ inches in diameter, power 25 times	7.00	.40
3479	Telescope, with 4 draws, 37 inches drawn out, 11 inches shut, objective 2 inches in diameter, power 30 times	10.00	.65
3480	Telescope, with 4 draws, 42 inches drawn out, 12 $\frac{1}{2}$ inches shut, objective 2 $\frac{1}{8}$ inches in diameter, power 40 times	17.00	
3481	Telescope, with 4 draws, 48 inches drawn out, 13 $\frac{1}{2}$ inches shut, objective 2 $\frac{3}{8}$ inches in diameter, power 50 times	30.00	

## TOURISTS ACHROMATIC TELESCOPES



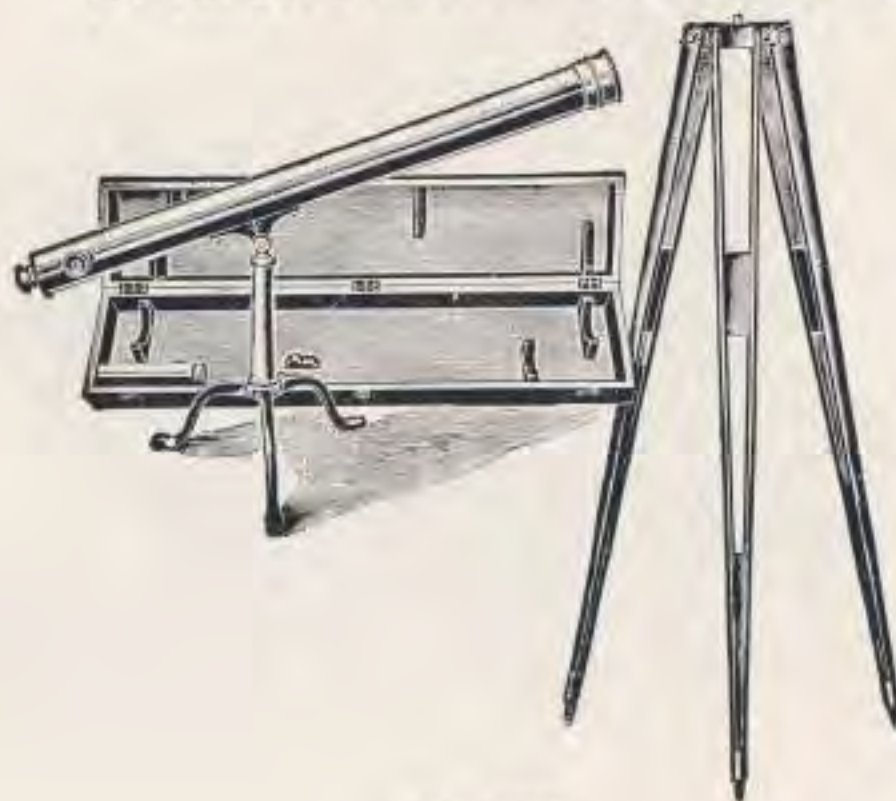
No. 3488



## TOURISTS ACHROMATIC TELESCOPES

No.		Price.	Postage.
3485	Telescope, with oxidized draw tubes and brass body covered with morocco; three draws, 17 inches drawn out, 6 inches shut; objective $1\frac{1}{4}$ inches in diameter; sun shade; leather caps to cover eye-piece and objective, and shoulder strap. Power 20 times -----	\$8.00	\$0.20
3486	Telescope, same as No. 3485, but is 21 inches drawn out, 7 inches shut; objective $1\frac{5}{8}$ inches diameter. Power 25 times -----	11.00	.30
3487	Telescope, same as No. 3485, but is 24 inches drawn out, 9 inches shut; objective $1\frac{3}{4}$ inches diameter. Power 30 times -----	13.00	.40
3488	Telescope, same as No. 3485, but has four draws, 36 inches drawn out, 10 inches shut; objective 2 inches in diameter. Power 35 times -----	22.00	.60
3492	Rifle Spy Glass, $10\frac{1}{4}$ inches drawn out; body covered with morocco; objective $\frac{1}{2}$ inch in diameter. Power 10 times -----	2.50	.17
3494	Wooden Tripod, with vertical and horizontal motion, upon which to place a telescope. A useful article, as a telescope of much power cannot be held in the hand with sufficient steadiness -----	5.00	
3495	Wooden Tripod, similar to No. 3494, but with more rigid legs and arranged to raise and lower the telescope -----	7.50	
3496	Improved Nickel Plated Clamp with Gimlet Screw to fasten telescope to a post or tree. Adjustable to fit telescopes from $\frac{3}{4}$ to 2 inches diameter -----	2.50	.15

## ASTRONOMICAL TELESCOPE



No. 3508



No.		Price.
3508	Astronomical Telescope, polished brass body, about 39 inches long, rack and pinion for focusing, achromatic objective about 3 inches in diameter, terrestrial eyepiece, power 45 times, two celestial eyepieces, powers 50 and 114 times. This telescope is equipped with one large hardwood tripod and one brass table tripod. In box with lock	\$95.00

POCKET MAGNIFIERS



No. 3520



No. 3526

RUBBER CASE, OVAL FORM, 1 DOUBLE CONVEX LENS

No.		Price.	Postage.	No.		Price.	Postage.
3520	1 inch	\$0.35	\$0.02	3522	1½ inch	\$0.55	\$0.03
3521	1¼ inch	.45	.02	3523	2 inch	.85	.04

RUBBER CASE, OVAL FORM, 2 DOUBLE CONVEX LENSES

3526	¾ and 1 inch	.60	.03	3528	1¼ and 1½ in.	1.00	.14
------	--------------	-----	-----	------	---------------	------	-----

RUBBER CASE, BELLOWS FORM, 1 DOUBLE CONVEX LENS

3530	¾ inch	.35	.02	3532	1 inch	.45	.02
------	--------	-----	-----	------	--------	-----	-----

RUBBER CASE, BELLOWS FORM, 2 DOUBLE CONVEX LENSES

3534	¾ and ¾ inch	.50	.03	3536	¾ and 1 inch	.65	.03
------	--------------	-----	-----	------	--------------	-----	-----

RUBBER CASE, BELLOWS FORM, 3 DOUBLE CONVEX LENSES

3538	½, ¾ and ¾ in.	.70	.04	3539	¾, ¾ and 1 in.	.95	.04
------	----------------	-----	-----	------	----------------	-----	-----

3542	White Celluloid Case, oval form, one ¾ inch double convex lens					.80	.02
3543	White Celluloid Case, oval form, one 1¼ inch double convex lens					1.00	.12
3550	German Silver Case, oval form, one 1 inch double convex lens					.75	.04



No. 3555



No. 3560



POCKET MAGNIFIERS

No.		Price.	Postage.
3555	Microscope, brass mounted, on three legs, adjustable.....	\$0.55	\$0.05
3560	Linen Prover, for counting threads in linen fabrics, brass mounted, $\frac{1}{4}$ inch square open space.....	.50	.02
3561	Linen Prover, for counting threads in linen fabrics, brass mounted, 18-100 inch round open space.....	.50	.02
3562	Linen Prover, for counting threads in linen fabrics, brass mounted, 18-100 inch round and $\frac{1}{4}$ inch square open spaces.....	.60	.02
3565	Linen Prover, for counting threads in linen fabrics, brass mounted, 1 inch square open space.....	2.00	.15



No. 3566

3566	Coddington Lens, brass mounted, small.....	1.00	.14
3567	Coddington Lens, brass mounted, medium.....	1.25	.14
3568	Coddington Lens, brass mounted, large.....	1.50	.15
3569	Aplanatic Magnifier, high power, and flat field.....	1.00	.14



No. 3570

3570	Coddington Lens, nickeled frame and cover, $\frac{1}{2}$ inch diameter.....	1.25	.14
3571	Coddington Lens, nickeled frame and cover, $\frac{3}{4}$ inch diameter.....	1.50	.14
3572	Coddington Lens, nickeled frame and cover, 1 inch diameter.....	1.75	.15
3575	Aplanatic Triplet, nickeled frame and cover, superior quality, giving perfect definition and flat field, $\frac{1}{2}$ inch focus, power 20 times.....	5.00	.14
3577	Aplanatic Triplet, nickeled frame and cover, superior quality, giving perfect definition and flat field, 1 inch focus, power 10 times.....	5.00	.14

Lenses Nos. 3566 to 3577 have extra power and definition for examining minerals, ore, rock, flowers, etc.

READING AND PICTURE GLASSES



No. 3585



## READING AND PICTURE GLASSES

Reading Glass, Metal Frame, Double Convex Lens.

No.		Price.	Postage.	No.		Price.	Postage.
3585	2 in. diam.----	\$0.75	\$0.05	3589	4 in. diam.----	\$2.35	\$0.19
3586	2½ in. diam.---	.95	.06	3591	5 in. diam.----	3.75	.35
3587	3 in. diam.----	1.30	.17	3593	6 in. diam.----	5.00	.40

READING GLASS, METAL FRAME, TWO PLANO CONVEX LENSES

3595	2 in. diam.---	1.20	.16	3597	3 in. diam.---	2.00	.20
3596	2½ in. diam.--	1.60	.17	3598	3½ in. diam.--	2.80	.22

READING GLASS, OBLONG METAL FRAME, DOUBLE CONVEX LENS

3600	2¾ x 1½ in.--	1.35	.15	3602	3¼ x 1½ in.---	1.80	.18
3601	3 x 1½ in.----	1.60	.17	3603	3½ x 1¾ in.---	2.25	.20

## ADJUSTABLE POCKET LEVELS

Plain vials mounted in nickel plated tubes on Japanned bases. Bases have a longitudinal groove for use in leveling shafting, cylindrical work, etc.

No.		Price.	No.	Price.	
3650	4 inches -----	\$1.00	3652	8 inches -----	\$1.50
3651	6 inches -----	1.25	3653	12 inches -----	2.00

## POCKET SPIRIT LEVELS

A superior article. Our own make, with ground and graduated vial, mounted in brass and adjustable, and in wood case.



No. 3660

	Price.	Postage.	No.	Price.	Postage.		
3660	6 inches-----	\$3.50	\$0.18	3664	10 inches-----	\$4.50	\$0.25

## LEVEL VIALS, UNMOUNTED

Our Own Make, and Every One Tested.



No. 3675



## LEVEL VIALS, UNMOUNTED

No.

3675 Ground and Graduated Level Vials, unmounted:

1½ in. -----	\$0.45	2 in. -----	\$0.50	2½ in. -----	\$0.60
3 in. -----	.75	3½ in. -----	.90	4 in. -----	1.05
4½ in. -----	1.20	5 in. -----	1.45	5½ in. -----	1.65
6 in. -----	1.80	6½ in. -----	2.00	7 in. -----	2.25

3690 Ground Level Vials, not graduated, unmounted:\*

1 to 1½ in. -----	\$0.35	2 in. -----	\$0.40	2½ in. -----	\$0.50
3 in. -----	.60	3½ in. -----	.75	4 in. -----	.90
4½ in. -----	1.00	5 in. -----	1.25	5½ in. -----	1.40
6 in. -----	1.50	6½ in. -----	1.65	7 in. -----	1.85

We cannot furnish vials smaller than ⅜ inch diameter.

If sent by mail, the postage on unmounted level vials, 1½ to 7 inches, will be 3 cents to 18 cents, according to size.

\* When ordering, mention the extreme length and diameter required.

## CARPENTERS AND MASONS SPIRIT LEVELS

No.		Price.
3726	Cherry Body, 26 inches long, with level and plumb vials -----	\$0.75
3730	Cherry Body, 26 inches long, brass ends, both vials adjustable -----	1.25
3734	"Handy" Plumb and Level, cherry body, 26 inches long, brass ends, adjustable vials -----	1.50
3740	Iron Frame, 22 inches long, adjustable vials. The plumb vial is set in a graduated brass circle and can be used as a slope level -----	3.50

## OIL STONES

	Price.	Postage.
3765 Oilstone, fine quality, about 2½ x ¾ inch, for drawing pens, pen knives and needle points -----	\$0.25	\$0.03
3767 Oilstone, fine quality, 3½ inch, in vulcanized rubber case -----	1.00	.16

## TRAMMEL POINTS

3780	Trammel Points, small, No. 1 -----	1.00	.15
3781	Trammel Points, medium, No. 2 -----	1.25	.18
3782	Trammel Points, large, No. 3 -----	1.65	.20
3800	Machinists Tools, Lathe and Drill Chucks and Drills, Steel Squares and Gauges, Brass Tubing and Wire, Sheet Brass and German Silver, Stubs Steel Wire, etc., etc., at manufacturers prices.		

## STEEL MAGNETS

	Price.	Postage.		Price.	Postage.
3850 2 inches -----	\$0.12	\$0.03	3856 5 inches -----	.50	.10
3852 3 inches -----	.20	.04	3858 6 inches -----	.75	.13
3854 4 inches -----	.35	.06	3860 7 inches -----	1.10	.20

## BRASS BLOW PIPES

	Plain		With Bulb	
3865 8 inches -----	.15	.05	3875 8 inches -----	.30 .05
3867 10 inches -----	.20	.06	3877 10 inches -----	.35 .06
3869 12 inches -----	.25	.07	3879 12 inches -----	.40 .07



# THERMOMETERS

## JAPANNED TIN CASE, "OPEN AIR" RANGE.

Light Tin Case.				Heavy Tin Case.			
No.		Price.	Postage.	No.		Price.	Postage.
3890	6 in., Mercury	\$0.45	\$0.06	3900	7 in., Mercury	\$0.65	\$0.10
3892	8 in., Mercury	.50	.08	3901	8 in., Mercury	.75	.15
3894	10 in., Mercury	.65	.10	3903	10 in., Mercury	1.00	.20

## HEAVY JAPANNED TIN CASE, "WATERBOIL" RANGE.

3910	8 in., Mercury	.85	.10	3912	10 in., Mercury	1.10	.20
------	----------------	-----	-----	------	-----------------	------	-----

## COPPER CASE, "OPEN AIR" RANGE

3914	6 in., Mercury	.65	.08	3916	8 in., Mercury	.75	.10
------	----------------	-----	-----	------	----------------	-----	-----

## POLISHED WOOD BACK, "OPEN AIR" RANGE.

Oak, Walnut, Mahogany, Cherry or Satinwood.

3918	6 in., Mercury	1.00	.18	3922	10 in., Mercury	1.50	.22
3920	8 in., Mercury	1.25	.20	3924	12 in., Mercury	2.00	.25

## PORTABLE OR POCKET CASE, "OPEN AIR" RANGE.

Polished Mahogany or Oak Case, with Reversible Cover.

3935	4 in., Mercury	1.70	.14	3936	6 in., Mercury	2.00	.16
------	----------------	------	-----	------	----------------	------	-----

**The "Wilder" Thermometers listed above are manufactured by Charles Wilder Company, Troy, N. Y., and are guaranteed by us.**

3938	Pocket Thermometer, in 5 inch nickel plated metal tube		.85	.06
3940	Window Thermometer, 8 inch, plate glass, with brackets, 30° below zero		1.25	.25
3941	Window Thermometer, same as No. 3940, but 50° below zero		1.50	.25
3950	Chemical Thermometer, all glass, 14 inch, to 300° F.		2.00	.25
3952	Chemical Thermometer, all glass, 14 inch, to 400° F.		2.25	.25
3954	Chemical Thermometer, all glass, 14 inch, to 500° F.		2.50	.25
3956	Asphalt or Tar Testing Thermometer, for Highway Engineers and Road Builders, in nickel plated case		4.00	.10
	Extra tube fitted to case		2.00	.10

## SELF-REGISTERING THERMOMETERS

3960	Maximum Thermometer, 10 inch, wood back		2.75	.20
3962	Maximum Thermometer, U. S. Weather Bureau pattern, 12 inch, aluminum scale		5.00	.20
3965	Minimum Thermometer, 10 inch, wood back		2.25	.20
3967	Minimum Thermometer, U. S. Weather Bureau pattern, 12 inch aluminum scale		4.25	.20



No. 3970

3970	U. S. Weather Bureau set of Maximum and Minimum Thermometers, same as Nos. 3962 and 3967, but mounted together on one wood back		9.50	.50
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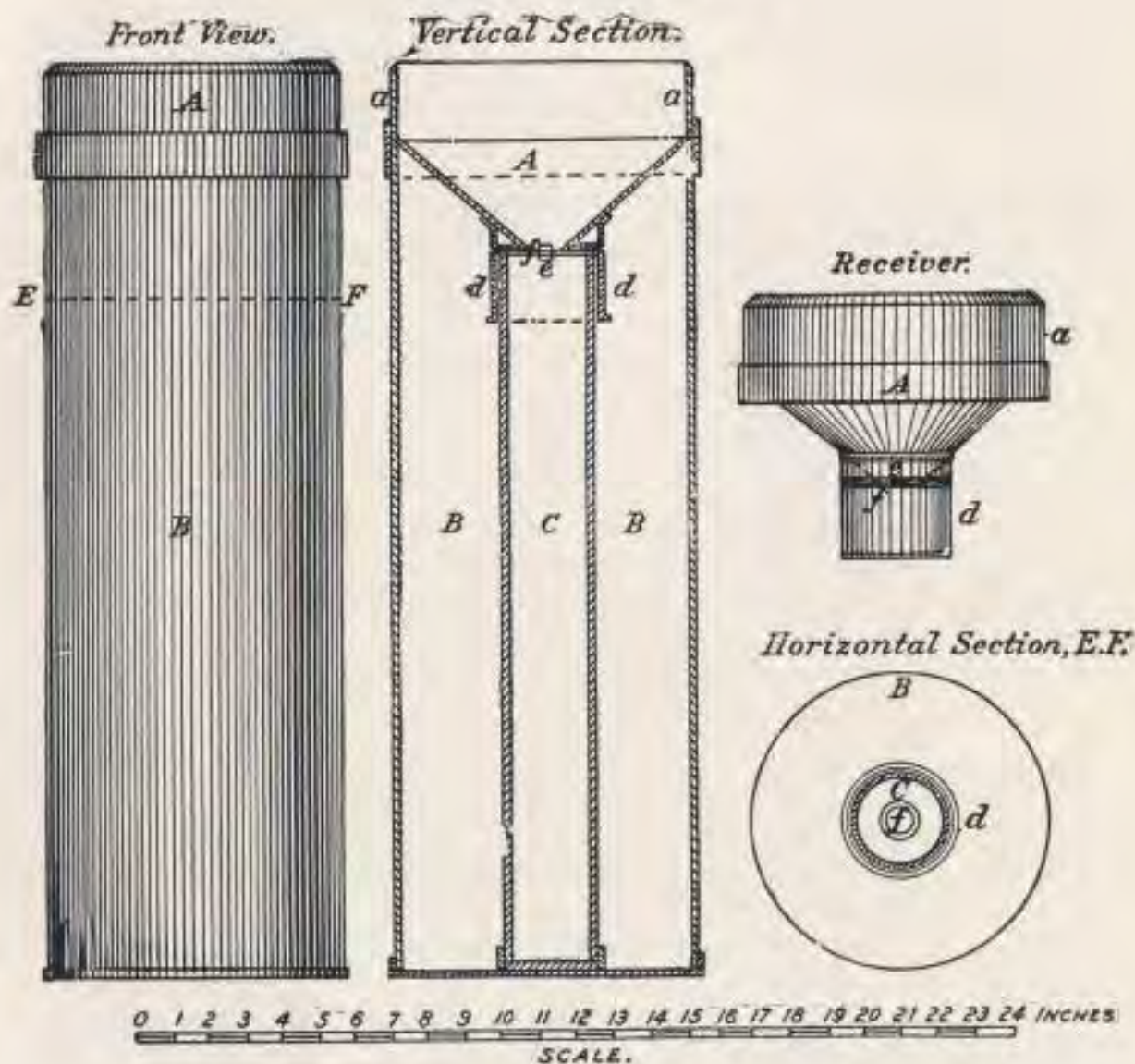


## HYGROMETERS

No.		Price.	Postage.
3975	Masons Hygrometer, consisting of dry and wet bulb thermometers mounted on one wood back.-----	\$2.25	\$0.25
3976	Masons Hygrometer, consisting of dry and wet bulb thermometers mounted on a polished boxwood back with beveled edges. Lines are drawn on the scales for convenience in obtaining a humidity of 50° at the normal temperature of the living room.---	4.50	.30

All of these Thermometers, Nos. 3960 to 3976, have the Fahrenheit scale, and are fine quality.

## RAIN GAGES



No. 3981

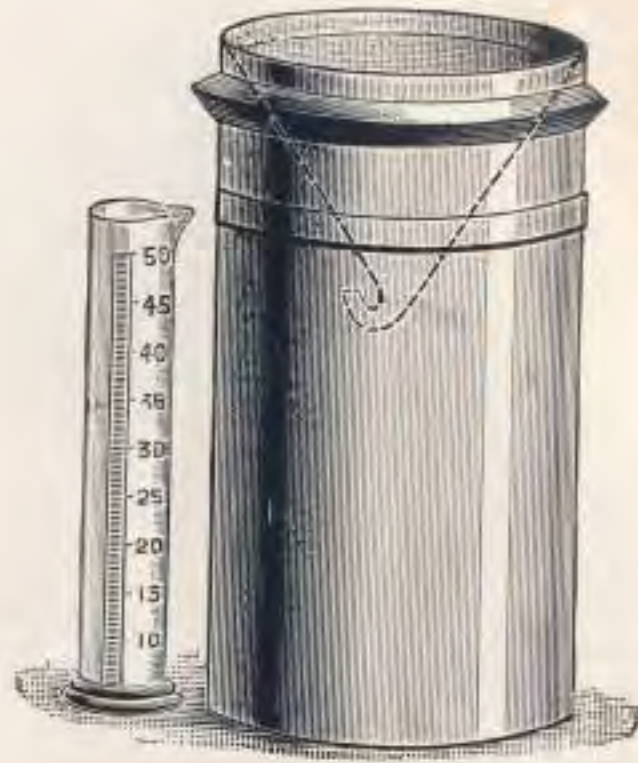
No.		Price.
3981	U. S. Weather Bureau Standard Rain and Snow Gage of galvanized iron, 8 inch diameter, 25½ inches high, with measuring stick. The receiver has a capacity of 2 inches of rainfall, and in connection with the overflow the possible capacity is 20 inches of rainfall. The Gage is so adjusted that the reading is magnified 10 times and 1 inch of rainfall actually measures 10 inches on the stick -----	\$6.00



## RAIN GAGES



No. 3982



No. 3983

No.		Price.
3982	Howards Rain Gage, consisting of a vertical glass bottle, through the neck of which the terminal tube of a galvanized iron funnel, 5 inches in diameter, is inserted. A glass graduate, measuring to 100ths of an inch, is furnished with the instrument.	4.00
3983	Glaishers Rain Gage, consisting of a galvanized iron cylinder, with a receiving funnel 8 inches in diameter terminating in a curved tube which prevents evaporation. A glass graduate, measuring to 100ths of an inch, is furnished with the instrument.	7.00
3984	Smithsonian Rain Gage, of capacity for 1 inch rainfall. This gage is made of brass and is the most simple in its construction of any now in use. It has a measuring stick which reads to 10ths and 100ths of inches; also a wooden cylinder to insert in the ground for the protection and ready adjustment of the instrument.	5.00



MINERS COPPER LAMP



No. 3987

No.	Price.	Postage.
3987 Miners Copper Lamp, with hook, size No. 2 -----	\$0.30	\$0.10

MINERS BRASS SAFETY LAMP

No.	Price.
3988C Miners Brass Safety Lamp (Clanny) -----	\$3.00
3988D Miners Brass Safety Lamp (Davy) -----	2.50

For Aneroid Barometers, Anemometers and Air Meters for Miners use, see pages 200 to 206.



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