

ESTABLISHED 1857

FIFTY-FOURTH YEAR EDITION

1911

SURVEYING
AND OTHER
INSTRUMENTS
OF PRECISION



HEARN & HARRISON
OPTICIANS

10-12 NOTRE DAME ST. EAST, - MONTREAL, Canada.

SPECIAL NOTICE

TO OUR PATRONS

**This Edition of our Catalogue annuls all former editions.
The prices in this catalogue are net cash.**

IN ordering by this catalogue it is necessary to give the number, name and price of article, and in some cases the size.

Remittance can be made either by Express or Post Office Money Order, if cash is sent by mail, the letter should be registered.

For goods ordered to be sent by express, the bill to be collected on delivery (C.O.D.) a remittance to cover packing and expressage both ways, is required with the order. Express charges for collection will be added to the amount of the bill.

By sending full remittance with the order, buyers will save the charges for collecting the amount of the bill and will avoid delay in delivery.

Small articles can be sent per mail at the rate of one cent per ounce and five cents extra for registration and this postage must be added to the price of the goods. As we use every precaution in packing goods, no allowance can be made if goods are damaged in direct shipment or in enclosure through other houses.

We must decline to send goods on approval. Should any of our goods not prove satisfactory, we solicit prompt information. Any complaints shall have our careful attention, as we aim to satisfy our patrons in every respect, in order to maintain the good reputation we are now enjoying:

HEARN & HARRISON

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Catalogue and Price List

— OF —

*Drawing Instruments and Materials, Surveying,
Meteorological and Nautical Instruments.*

— OF —

Hearn Hearn & Harrison *Harrison*

— M. R. DE MESLÉ, Manager. —

OPTICIANS

MANUFACTURERS AND IMPORTERS OF

*Spectacles and Eye-glasses of every description. Magic
Lanterns and Views. Kodaks and Photographic accessories.
Microscopes, Telescopes and OPERA GLASSES. Hydro-
meters, Thermometers and Hygrometers, Surveying,
Meteorological and Nautical Instruments. :: :: ::*

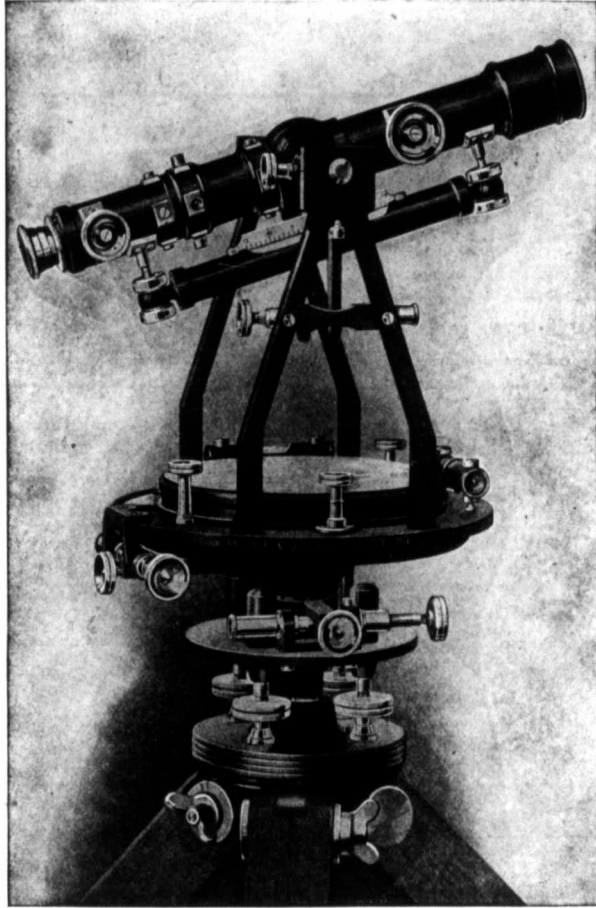
REPAIRS A SPECIALTY.

DRAWING INSTRUMENTS AND ACCESSORIES.

10 AND 12 NOTRE DAME STREET EAST,
MONTREAL, CANADA.

Telephone, 8 a.m. to 6 p.m.
Main 2904

Telephone, 6 p.m. to 8 a.m.
East 4077

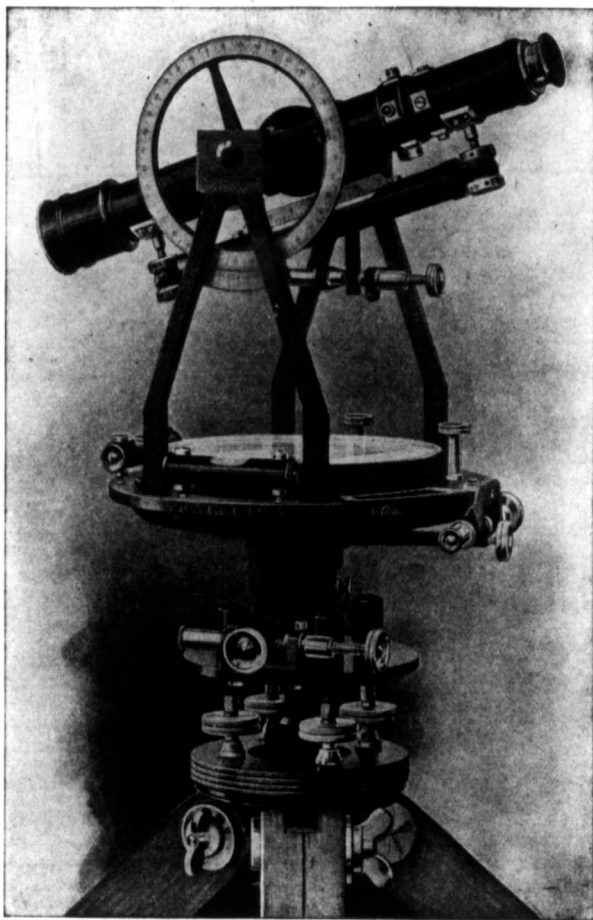
Transits

No. 1

No. 1.—Surveyor's Transit, one vernier to limb, 5-in. needle, with level on telescope and clamp and tangent to telescope axis. With tripod and case. \$166.50

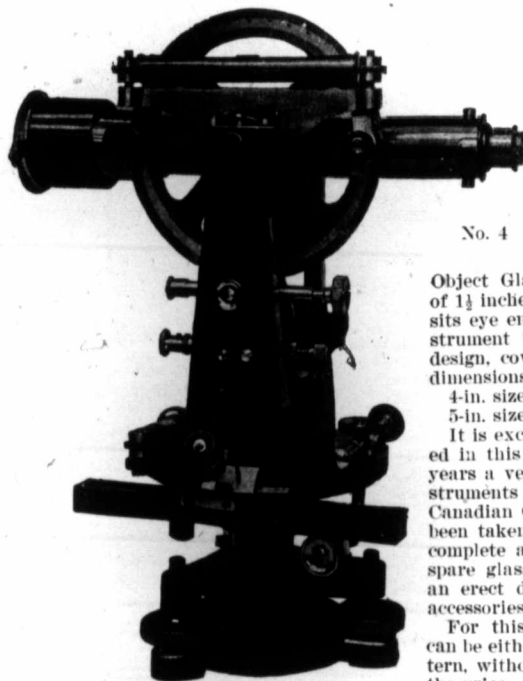
No. 2.—Surveyor's
level
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screw

No. 3.—Light
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No. 2

- No. 2.—Surveyor's Transit, two verniers to limb, 5-in. needle, with $4\frac{1}{2}$ -in. vertical circle, level on telescope and clamp and tangent to telescope axis. With tripod and case \$200.00
- No. 3.—Light Mountain or Mining Transit, $4\frac{1}{2}$ -in. vertical circle, with level on telescope and clamp and tangent to telescope axis. With tripod and case 225.00



Special Pattern Transit Theodolite

SPECIFICATIONS

Constructed in accordance with our Standard Specification, with the following additions and improvements:

No. 4 The telescope is considerably larger than our ordinary Standard pattern, the

Object Glass having a clear aperture of 1½ inches. 4-in. size instrument transmits eye end of telescope only. The instrument is packed in a case of new design, covered in leather, the outside dimensions being as follows:—

4-in. size . . . 18½-in. x 7½-in. x 6½-in.

5-in. size . . . 18½-in. x 8-in. x 7½-in.

It is exceedingly portable when packed in this way. During the past few years a very large number of these instruments have been supplied to the Canadian Government. Every care has been taken to make the instrument as complete as possible and to this end a spare glass diaphragm, spare bubbles, an erect diagonal eyepiece, and other accessories, are packed in each case.

For this special instrument, tripod can be either sliding, or open frame pattern, without making any difference in the price.

PRICES

No. 4.—4-in. reading to 1' \$175.00
No. 4a.—5-in. reading to 20" 200.00

Transit Theodolites

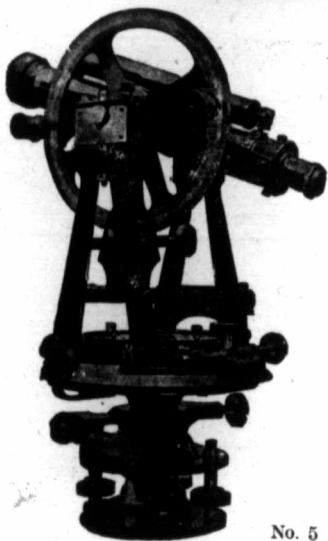
(ROUND COMPASS)

For many years this pattern has been made, and we find a large number of surveyors preferring a round compass Theodolite with four-screw parallel plate adjustment, and we are therefore continuing to supply it.

As this design costs less than Standard Specification to manufacture, we are able to list it at a lower price, although we wish it to be understood that the quality and workmanship is quite equal to the more expensive instruments.

These can also be supplied with a three-screw and locking plate levelling adjustment at the same prices.

No. 5.—5-in. Transit Theodolite reading
to 1' \$175.00



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No. 6

Transit Theodolites

Transit theodolites constructed of best material throughout. Bell metal centres.

The telescope, powerful achromatic, with erect and inverting eye pieces and sun glass, fitted with stadia lines.

The graduations are on sterling silver two verniers to each circle, microscope to each vernier, dividing of horizontal circle protected.

Round compass, improved pattern spring tangents, three levelling screws and locking plate, centering motion for accurately hanging the plummet over a given point without moving the tripod, open frame or sliding tripod supplied, polished mahogany case with lock and key, fitted with usual accessories.

No. 6.—5-in. transit theodolite as above description, reading to 1 minute... \$185.00

No. 7.—6-in. transit theodolite as above description, reading to 20 seconds... \$215.00

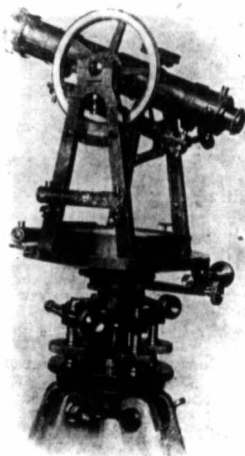
American Pattern Transit Theodolite

American Pattern transit theodolite. We have paid special attention to the construction of these instruments, which will compete successfully with those made in United States, with regard to both finish and accuracy. The telescope, powerful achromatic with erect and inverting eye-piece and sun glass, fitted with stadia lines, graduation figures are inclined the way they should be read, two rows of figures provided, two opposite verniers to horizontal plate with dust tight glass covers and reflectors, verniers at angle of 30° to line of sight; circular compass graduated to half degrees, improved design clamp and spring tangents, four screw parallel plates with centering motion for accurately bringing plummet over a given point without moving tripod, extension tripod, packed in upright mahogany case, with best rubber cushions, fitted with lock and key and usual accessories.

No. 8.—5-in. reading to 1 minute . . . each \$195.00

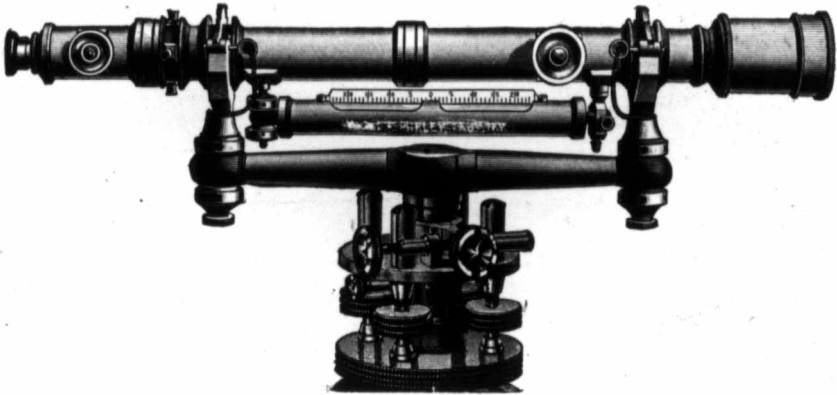
No. 9.—6-in. reading to 20 seconds . . . " \$225.00

Any American make of instrument imported to order. We taking all risks and guaranteeing delivery of instrument in perfect adjustment.



Engineers 18 Inch Wye-Level

(AMERICAN PATTERN)



No. 10

Specifications

No. 10.—EIGHTEEN-in. telescope; aperture of object glass $1\frac{1}{4}$ in; eye-piece provided with an arrangement for the accurate focussing of cross-wires; fixed stadia, field of view large and flat; telescope provided with an adjustable stop to readily set cross-wires horizontal and perpendicular. Line of collimation true on all distances; objects erect; protection of object slide; telescope balanced when focussed to a mean distance with sun-shade attached to it, to secure the highest accuracy attainable; the center is very stout, long and of the hardest bell metal; crossbar is cast hollow and provided with ribs; 8-in. sensitive spirit level; instrument does not detach from tripod above levelling screws; it packs whole and stands in the case erect; case provided with straps and hooks, contains sun-shade, wrench, screw-driver, a bottle of fine watch-oil, hair-brush and adjusting pin. . . . \$137.50

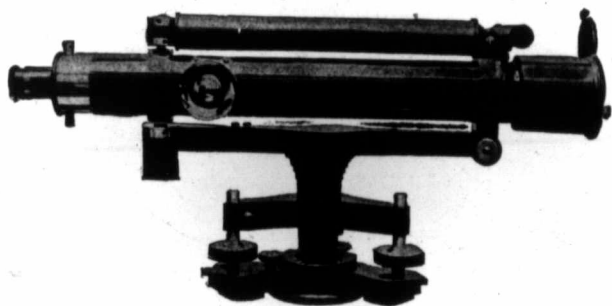
No. 11.—15-in. telescope. \$112.50

Improved
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TELESCO
LEVELLI
four-screw
TRIPOD.—
No. 12.—12-
No. 13.—14-
No. 14.—16-
No. 15.—18-

No. 16.—10-i
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No. 17.—Ditt
No. 18.—10-l
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Dumpy Levels

Standard Specifications



No. 12

Improved design. Axis and limb made in one casting of hard gun-metal, the axis having a very large bearing face.

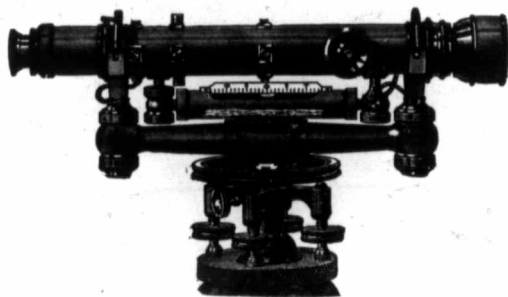
TELESCOPE.—Powerful achromatic, with two eyespieces.

LEVELLING ADJUSTMENT.—Three-screw, with locking plate; or if preferred with four-screw parallel plates.

TRIPOD.—Ordinary round pattern.

No. 12.—12-in. Dumpy Level as above.....	\$ 75.00
No. 13.—14-in. " " "	85.00
No. 14.—16-in. " " "	95.00
No. 15.—18-in. " " "	105.00

Architect's Level



No. 17

No. 16.—10-in. Architect's Level, American pattern, with graduated limb for reading horizontal angles to three minutes, special pattern, complete in case, with tripod, four screw parallel plates.....

\$70.00

No. 17.—Ditto, American make, reading to 5 minutes, in case, with tripod...

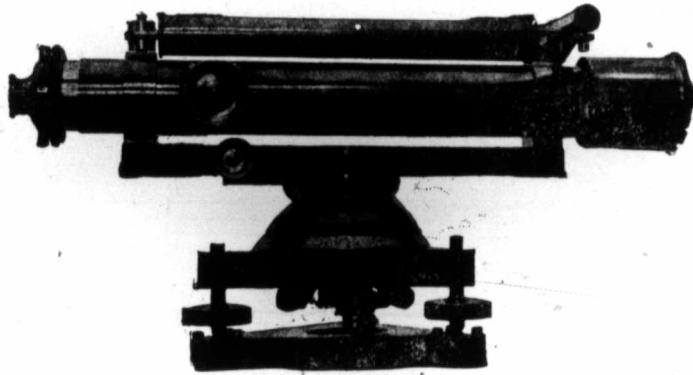
62.50

No. 18.—10-in. Builder's Dumpy Level, with four screw parallel plates, in case, with tripod.....

45.00

eye-piece
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wrench,
\$137.50
\$112.50

Railway Level

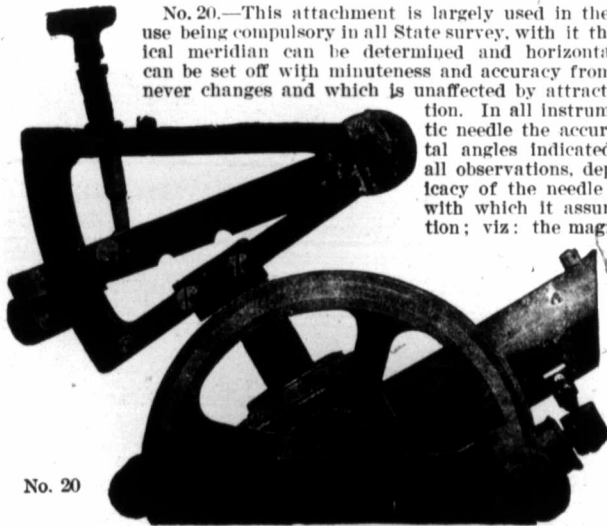


No. 19

This instrument has been designed for rapid levelling on very uneven ground, such as railway embankments, etc. In addition to our improved three-screw and locking plate levelling adjustment, it has a quick setting ball and socket arrangement. Clamp and slow-motion screw of new design is also provided. This instrument will be found exceedingly rigid and convenient.

No. 19.—Price, 14-in. \$125.00

Solar Attachment



No. 20

No. 20.—This attachment is largely used in the United States, its use being compulsory in all State survey, with it the true or astronomical meridian can be determined and horizontal angles therefore can be set off with minuteness and accuracy from a direction which never changes and which is unaffected by attraction of any description. In all instruments with a magnetic needle the accuracy of the horizontal angles indicated and therefore of all observations, depends upon the delicacy of the needle and the regularity with which it assumes a certain position; viz: the magnetic meridian. Error is very likely to occur through the first wearing, loss of magnetism in the needle, local attraction, etc., and the effect of the sun's rays. From all these influences the solar attachment is free. It can be fitted to any of our transit theodolites having vertical circle with clamp and tangent. \$65.00

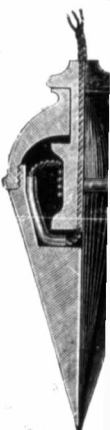
No. 20.—Price, 14-in. \$65.00

No. 21.—Or
No. 22.—Op
No. 23.—Sti

No. 24.—Pl

No. 25.—Gr

No. 26.—Gr

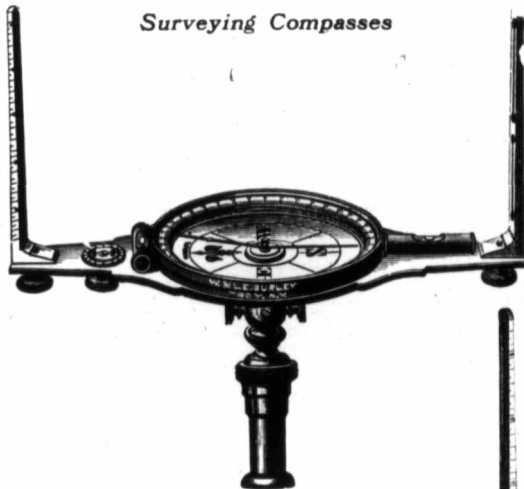


No. 35
No. 36.—Rec
No. 37.—Plu
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No. 63.—Surveyors' Compass, 5 inch needle, two straight Levels, Jacob staff mountings, brass cover, sights graduated for taking angles of elevation and depression in box, with lock and strap for carrying.

Price \$37.50

Surveying Compasses



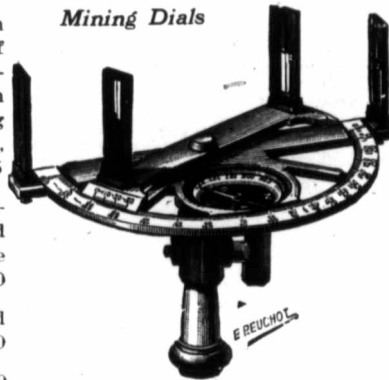
No. 63



No. 64

No. 61.—Surveyors' Compass, 5 inch needle, two straight Levels, Jacob staff mountings, brass cover, vernier, for adding or subtracting the magnetic variation of the needle, sights graduated for taking angles of elevation and depression, in box, with lock and strap for carrying.. \$43.75

Mining Dials



No. 68

No. 65.—Tripod with cherry legs, paral-
lled plates and levelling up screws and
clamp and tangent movement for above
compasses \$17.50

No. 66.—Tripod with Jacob staff head
light \$10.00

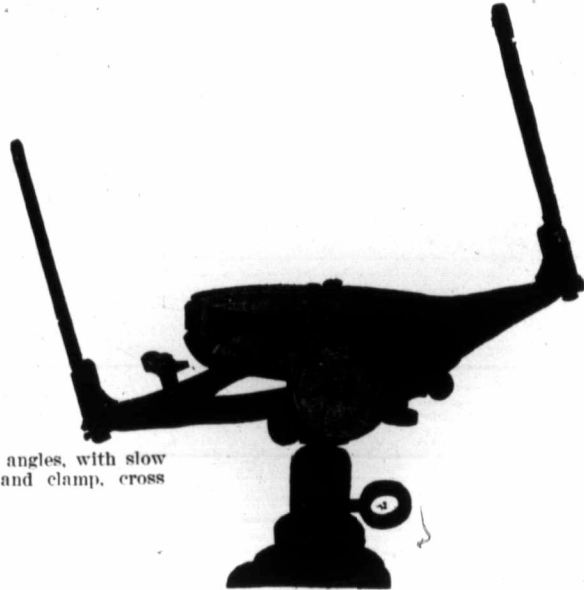
No. 67.—Jacob staff with iron shoe 1.50

No. 68.—Semi-Circumferentor, with double sights and compass, in case, each \$18.00

\$ 5.00
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18.00
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Mining Dials

No. 69. — Improved Hedley dial 5 in., this instrument is now constructed on greatly improved lines. The vernier is fixed outside the compass box and at an angle of 40 degrees to the line of sight, the edge of the horizontal circle is chamfered and so figured that the reading of the vernier checks the reading of the needle, the graduation of this circle is protected. A tangent screw is provided which always occupies the same relative position to the clamps. This instrument is fitted with an improved arc for reading the vertical angles, with slow motion tangent screw and clamp. cross



No. 69



No. 71

bubble, vertical arc with parallel plates, in case with improved sliding tripod \$125.00

Telescope and supports in addition to sights, extra \$40.00

No. 70.—Water Levels in brass, very strong, in three parts by connecting the two levels with rubber tubing, levels of machinery, etc., at different place can be taken, in case \$9.00

No. 71.—Vernier Pocket Compass, with folding sights, 3¼ in., bar needle, agate cap, 2 levels, nonius on side of compass for adding and subtracting magnetic variations, Jacob staff mountings, in case, each \$18.00

No. 72.—Ditto, 4¼ in. needle. \$20.00

No. 73.—Jacob Staff for above ironshoe \$1.50

No. 74.—Tripod, with Jacob staff mounting \$3.00

No. 75.—Light Tripod, with brass mounting to fit socket of compass, each \$12.00

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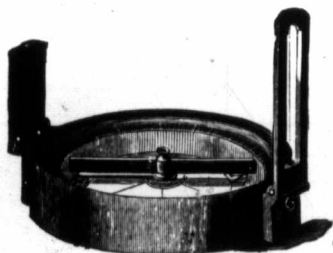
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Extras for Transits, Levels and Compasses

No. 76.—Sunshade	\$1.00
No. 77.—Cap for object glass	0.75
No. 78.—Cap for eye-piece	0.75
No. 79.—Steel adjusting pins	0.25
No. 80.—Screw-driver	0.25
No. 81.—Screw-driver and centre key	0.50
No. 82.—Fine oil for instruments, bottle	0.25
No. 83.—Dust guard to object glass slide	4.00
No. 84.—Waterproof cover for transit or level	1.00
No. 85.—Solar screen to fit eye-piece	6.00
No. 86.—Rack and pinion movement to eye-piece	5.00
No. 87.—Object glass from \$6.00 to	10.00
No. 88.—Eye-pieces, diagonal, erect, inverting, \$6.00 to	10.00
No. 89.—Leather case with shoulder strap for transit, level or compasses, \$8.00 to	12.00
No. 90.—Clamp with graduated screw to telescope	12.00
No. 91.—Clamp with graduated screw in place of tangent screw	6.00
No. 92.—Level and telescope, fine graduated bubble, in case, \$5.00 to	12.00
No. 93.—Striding and adjusting level	4.00
No. 94.—Reflector for illuminating, cross wires	4.00
No. 95.—Cross hairs, \$1.00 to	2.00
No. 96.—Fixed stadia hairs and diaphragm	5.00
No. 97.—Adjustable stadia hairs	6.00
No. 99.—Vernier reader	1.50
No. 100.—Mounted microscopes to verniers	5.00
No. 101.—Compass needle and centre pin	3.50
No. 102.—Cover glass for compass	0.25
No. 103.—Cover glass for compass, grounded edges, 50c to	1.00
No. 104.—Clamp screw for horizontal limb or centre	1.00
No. 105.—Tangent	2.50
No. 106.—Levelling screws	2.50
No. 107.—Tripod head with screw bolts	6.50
No. 108.—Wall tripod for transit and level	6.00
No. 109.—Compound tangent ball spindle for compass	8.50
No. 110.—Levelling adapter, small, \$6.50; large	8.50
No. 111.—Folding sights to telescope	10.00
No. 112.—Folding sights to telescope standards at right angle to telescope	10.00
No. 113.—Levelling head with parallel plates, levelling screws and clamp and tangent, fitted to transit	18.00
No. 114.—Plain table or trough compass, bronzed metal, with raised, divided ends, bar needle, agate cap, 6 in. long	10.00

Any repairs, alterations, etc., made with all possible despatch and at lowest rate, with due regard to workmanship.

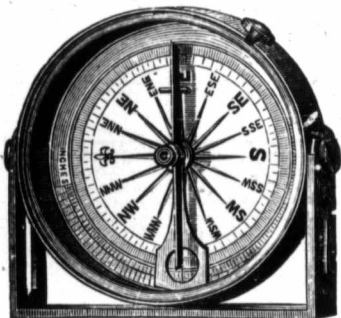


No. 115

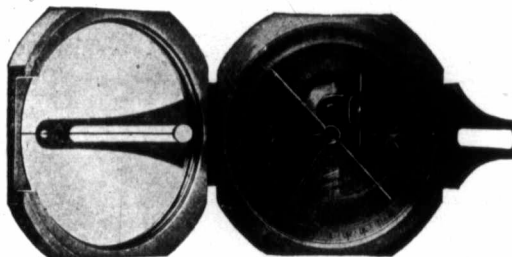


No. 118

- No. 115.—Sight Compass bar needle, agate cap with stop, folding sight, cover, 2 in.,each \$5.00
- No. 116.—Ditto, 2½ in. " 6.00
- No. 117.—Ditto, 3 in. " 7.50
- No. 118.—Square Mahogany Box Sight Compass, with slide in lid to cover sight line, bar needle and stop, 3 in. " 6.00
- No. 119.—Ditto, 4 in. " 7.50



No. 120



No. 123

- No. 120.—Improved Sight Compass and clinometer bar needle, agate cap, with stop and cover, 2½ in.each \$7.50
- No. 121.—Ditto, 3 in. " 9.00
- No. 122.—Ditto, 4 in. " 11.00

The Brunton Patent Pocket Transit

- No. 123.—This is a pocket instrument, which takes the place of a sighting compass, clinometer, prismatic compass, and Abney or Locke's level for surface or underground survey, case in aluminum, weight 8 ounces, in case,each \$31.50
- No. 124.—Service pattern clinometer for measuring angles of elevation and depression, round form, in case \$17.50

No. 125.—P

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No. 126.—D

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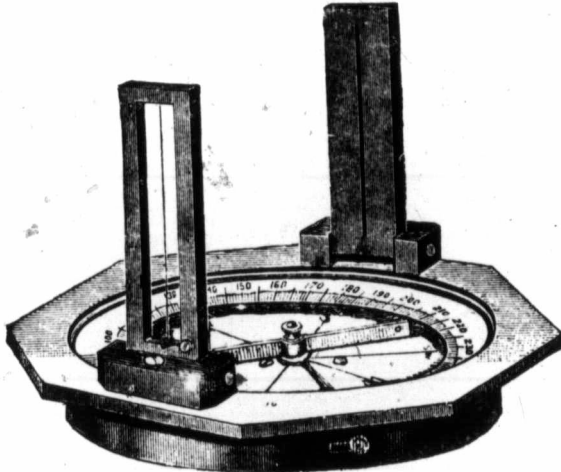
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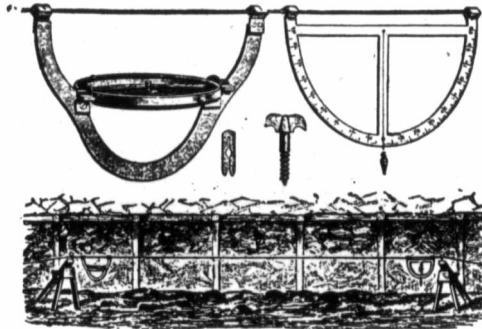
Pocket Surveying Compass



No. 125

- No. 125.—Pocket Surveying Compass, with folding sights, 2½ in., bar needle, agate cap, Jacob staff mounting, in case,each \$12.00.
 No. 126.—Ditto, 3½ in., needle, 2 levels 15.00

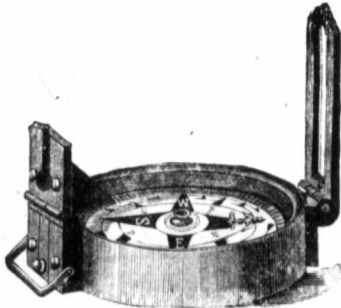
Mining Compass



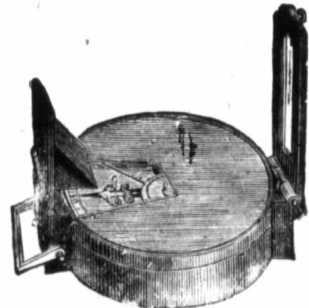
No. 127

- No. 127.—Mining Compass and Clinometer, 3¼ in. needle, with stop graduated to half degrees, suspended in a frame with hooks by a universal joint. (gimbal). Clinometer, 7 in. diameter, graduated to half degrees, with hooks and plumb bob, screws for cord and brass stop in lined leather sling case \$50.00
 No. 128.—Station Buck'sper pair 5.00
 No. 129.—Waterproof cord on reel, 80 ft. longper pair 4.50

Prismatic Compasses

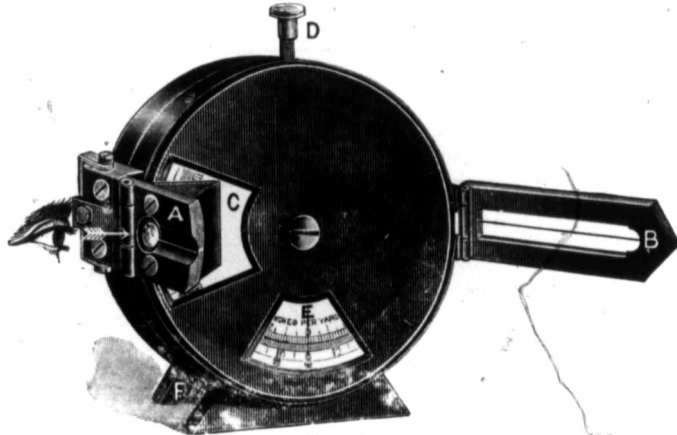


No. 130



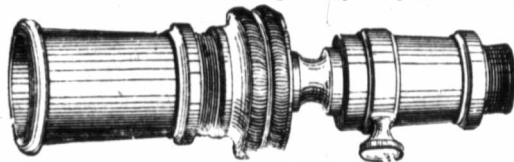
No. 135

- No. 130.—Prismatic compasses, best finished case, card dial, agate cap and stop, 2 in., in morocco case each \$10.00
- No. 131.—Ditto, 3 in., in leather sling case " 15.00
- No. 132.—Ditto, 4 in., in leather sling case " 17.50
- No. 133.—Ditto, with azimuth glasses, consisting of shades, mirror, 3 in., in sling leather case " 20.00
- No. 134.—Ditto, 4 in. " 22.50
- No. 135.—Ditto, improved Hutchinson pattern 3 in., in sling leather case. " 15.00
- No. 136.—Ditto, improved Hutchinson pattern 4 in., in sling leather case. " 17.50



No. 140

No. 140.—Combined Altitude Instrument clinometer and prismatic compass, Hutchinson's pattern, 3 in. box and 2½ in altitude disc, compass card, mounted on agate cap complete, in sling leather case . . each \$25.00



No. 141

No. 141.—Ball-socket for Jacob staff mounting fitted to above compasses. \$5.00

No. 142.—Light tripod with brass mounting to fit socket of compasses, sliding legs \$12.50

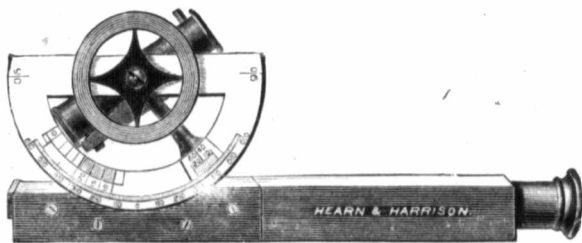
No. 144.—
No. 145.—



No. 146.—
No. 147.—

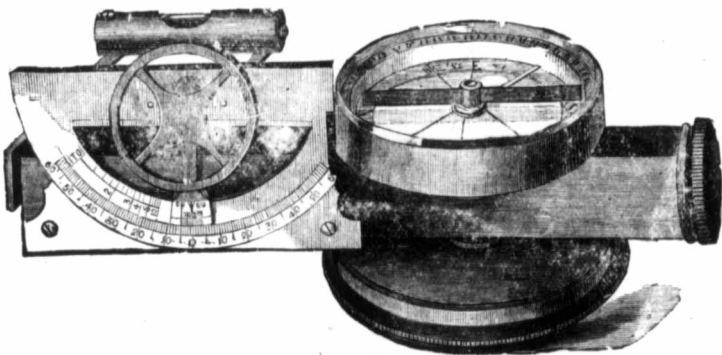
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No. 149.—

Abney's Reflecting Levels



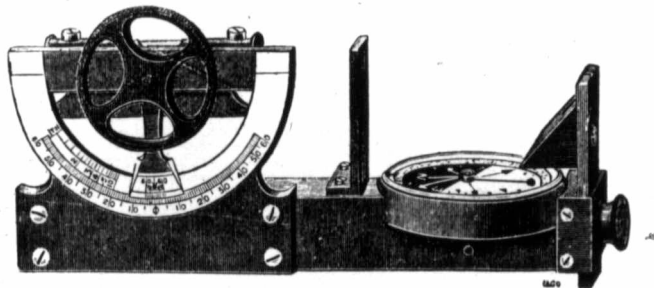
No. 144

- No. 144.—Abney's Reflecting Level or Pocket Altimeter, improved, divided to degrees, with vernier reading to 10", 5 in., in case \$12.75
 No. 145.—Ditto, 8 in., in case 20.00



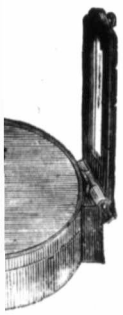
No. 146

- No. 146.—Abney's Reflecting Level or Pocket Altimeter, same as above but with bar needle compass, revolving base and socket for Jacob staff, 5 in., in case \$15.00
 No. 147.—Ditto, 7 in., in sling case 25.00



No. 148

- No. 148.—Abney's Reflecting Level or Pocket Altimeter, same as above but with prismatic compass and sights, in leather sling case . . . each \$18.50
 No. 149.—Ditto, 7 in. long and with draw telescope, vernier reading to 5", in leather sling case " 27.50

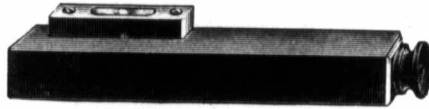


and
 each \$10.00
 " 15.00
 " 17.50
 " 20.00
 " 22.50
 " 15.00
 " 17.50



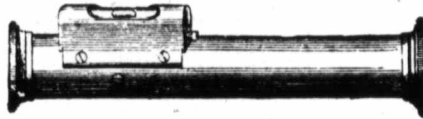
pass.
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 each \$25.00
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 . . . \$12.50

Locke's Hand Levels



No. 151

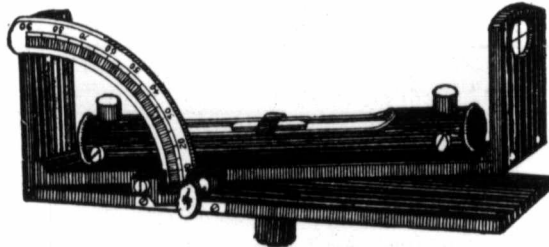
No. 151.—Plain Reflecting Level, 4 in., in case \$4.50



No. 152

No. 152.—Plain Reflecting Level, 5 in., in leather case \$6.00
 No. 153.—Best Reflecting Level, 6 in., in leather case 7.50

Pocket Clinometer and Drainage Level

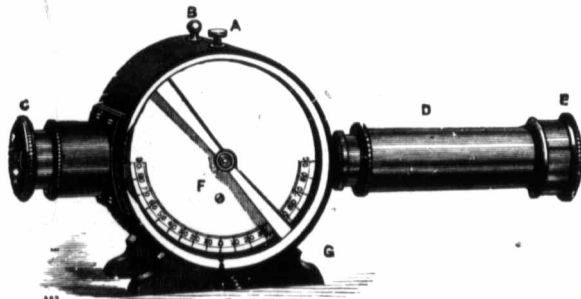


No. 154

No. 154.—Complete in morocco case \$10.00
 No. 155.—Complete but fitted with ball and socket to fit stand 13.50

Pocket Alt-Azimuth

No. 156. — Pocket Alt - Azimuth, for travellers and military surveyors. Altitudes azimuths, compass bearings, clinometer degrees and levels are all obtainable by this handy and accurate little instrument. By the addition of an excellent telescope it has been so much improved as to make it perfect for the various purposes to which it can be applied. Size of instrument, 6½ in. long, 2½ in. diameter, 1½ in. thick, weight 13 ounces, in morocco case \$40.00



No. 156

No. 156. — Pocket Alt - Azimuth, for travellers and military surveyors. Altitudes azimuths, compass bearings, clinometer degrees and levels are all obtainable by this handy and accurate little instrument. By the addition of an excellent telescope it has been so much improved as to make it perfect for the various purposes to which it can be applied. Size of instrument, 6½ in. long, 2½ in. diameter, 1½ in. thick, weight 13 ounces, in morocco case \$40.00

No. 157.—

No. 158.—

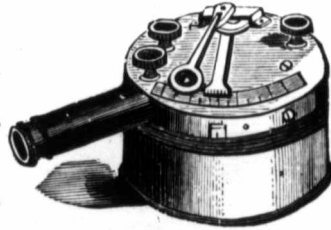
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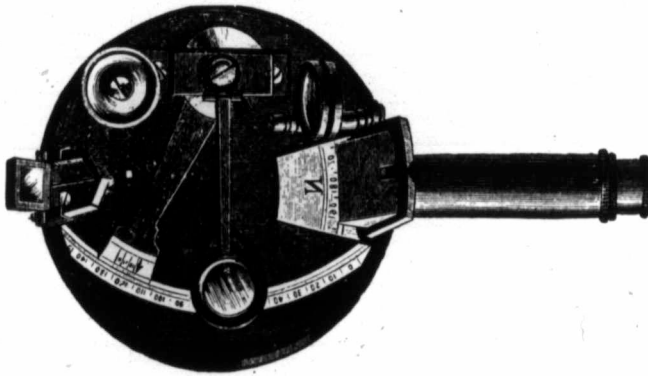
Pocket Sextants

No. 157.—Pocket Sextant, best quality, divided on silver with telescope, tangent adjusting screw, in sling leather case \$30.00



No. 157

No. 158.—Ditto, but with supplementary arc 40.00



No. 159

No. 159.—Pocket Sextant and prismatic compass combined, divided on silver, with telescope combined with prismatic compass, 3 in. diameter, in leather sling case \$50.00



No. 160.—Miner's safety mine lamp, improved style, double safety \$3.50

No. 161.—Blow pipe sets. Letcher set of Society of arts, containing blow pipe spirit lamp, grease lamp, hammer, anvil, pestle and guard platinum forceps, brass forceps, lamp tweezers, test tube holder, chisel, magnet, file, scissors, cupel striker, bone spatula, platinum wire, platinum foil, magnesium, pastille and cupel holder, pastilles, boiling dish, open tubes, closed tubes, glass rod, blue glass litmus paper, turner paper, Brazil wood paper, soda paper, carbonate of soda, microcosmic salt, borax, bone ash, fluor spar, assay lead, nitrate of cobalt, bisulphate of potash, oxide of copper, chloride of silver, potassic iodide and sulphur \$12.00

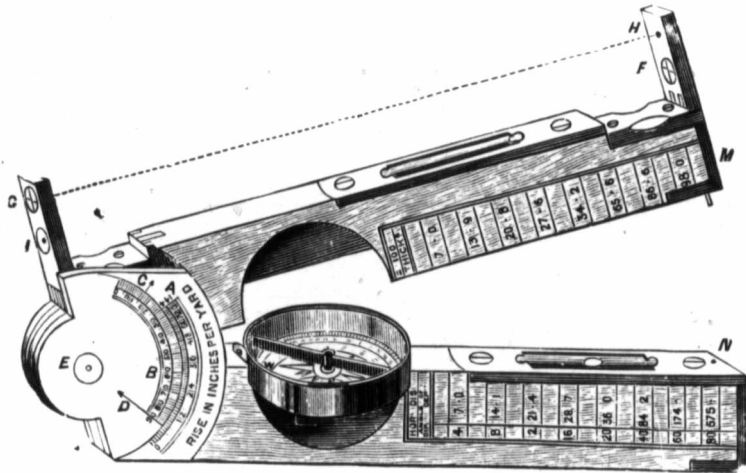
... \$4.50

... \$6.00
... 7.50

... \$10.00
... 13.50

1 1/2 in. thick,
... \$40.00

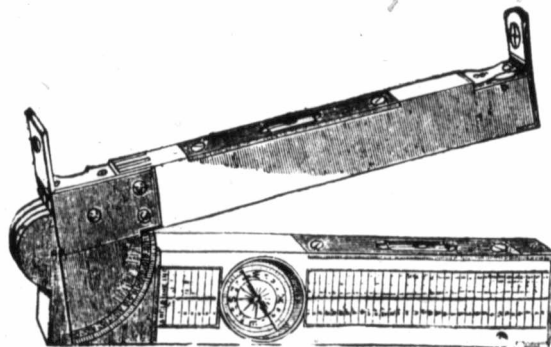
Clinometer Rules



No. 162

The Inclination Scale marked upon these Clinometers gives the value of any angle, as follows: The angle, having been ascertained from the divided arc upon the instrument, refers to that degree in the column marked "angle", and opposite, in another column, will be found the rise or fall in any given measured distance. For instance, say the degree shown on the divided arc is 18, opposite to this number on the scale is 3, this indicating one part fall or rise in three, or one mile in three one foot in three feet.

No. 162.—Clinometer rule, 2 levels, swing bar needle compass two sights, best flush vernier arc with rise in inches per yard, 12 in. long, folding 6 in. long, in case each \$15.00



No. 163

No. 163.—Clinometer rule, 2 levels, bar needle compass, two sights, best flush vernier arc with rise in inches per yard, 12 in. long, folding 6 in. long, in case, each \$12.50
 No. 164.—Clinometer rule same as above but without sights, in case 8.50

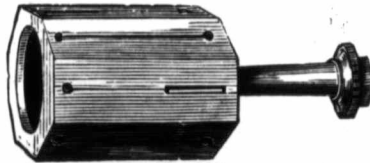
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 No. 166.—Cr
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No.

No. 177.—Life
 No. 178.—Wh
 No. 179.—Anc
 No. 180.—Anc

Cross Staff Head



No. 165

No. 165.—Cross Staff Head, brass, bright or bronzed, in case	2½ in.	3 in.
No. 166.—Cross Staff Head, brass, bright or bronzed, with compass, in case	\$2.50	\$3.00
No. 167.—Jacob Staff for above	4.00	5.00
No. 168.—Tripod with Jacob staff top	each	1.25
No. 169.—Best finished bronzed Optical Square, in morocco case, 2½ in.		3.00
No. 170.—Ditto, but with adjustment		7.50
No. 171.—Ditto, with adjustment, double reflecting, 90° both ways, 3 in. diameter, in solid leather case		10.00
No. 172.—Ditto, but without adjustment		18.00
No. 173.—Rectangular prism, for taking right angles, a convenient little instrument, 2½ x 1½ x 1½, in case		13.50
		5.00

Charm Compasses

Suitable to hang on watch chain warranted true



No. 174

No. 174.—Transparent compass, bar needle, pebble magnifier, reading and burning lenses, very useful for use with maps, plans, charts, etc., 1½ in. diameter. Silver mounting	\$ 6.00
Gold mounting, 10 kt.	10.00
No. 175.—Patent strap compass for use on horseback, in bracelet form which buckles round wrist, securely fixed in centre, is a best revolving stop day and night float dial, agate cap.	7.50
No. 176.—Nickel pocket watch shape liquid compass with painted skeleton dial, sapphire centre, compensating vacuum in solid leather case, 1½ in. dial, 2½ in. box, useful for yachting or on horseback.	10.00



No. 179



No. 180

No. 177.—Life buoy pebble charm compass, gold 15 ct.	each	\$12.00
No. 178.—Wheel pattern " " " 10 ct.	"	10.50
No. 179.—Anchor Wheel " " " 15 ct.	"	15.00
No. 180.—Anchor Life Buoy " " " 15 ct.	"	15.00

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flush
6 in.
each \$12.50
8.50

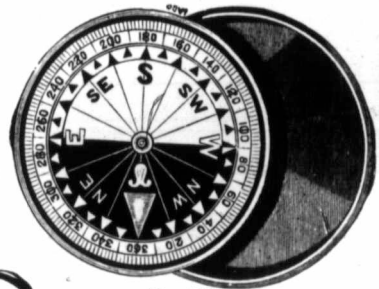
Pocket Magnetic Compasses



No. 184



No. 191



No. 188

- No. 181.—Pocket magnetic compass, watch pattern, 1½ in. diametereach \$0.50
 - No. 182.—Ditto, with stop to needle, 2 in. diametereach 0.75
 - No. 183.—Ditto, agate centre with stop to needle, 2 in. diameter, each 1.50
 - No. 184.—Pocket magnetic compass, stout brass box, pull off cover bar needle, jewelled cap and stop, diameter 1½ in. 1.50
 - No. 185.—Ditto, 2 in. 1.75
 - No. 186.— " 2½ in. 2.00
 - No. 187.— " 3 in. 2.50
 - No. 188.—Pocket magnetic compass, stout brass box, pull off cover, but with Mariner's floating card luminous N. and S. points, diameter 2 in. \$1.75
 - No. 189.—Ditto, 3 in. 2.00
 - No. 190.—Ditto, 4 in. 2.50
 - No. 191.—Nickel plated spring Hunter case compass, bar needle jewelled, cap and stop, 1½ in. \$2.25
 - No. 192.—Ditto, 1¾ in. 2.50
 - No. 193.—Ditto, 2 in. 3.00
 - No. 194.—Ditto, but with patent floating dial, 1½ in. \$2.00
 - No. 195.—Ditto, 1¾ in. 2.25
 - No. 196.—Ditto, 2 in. 2.75
- This compass is in every respect a serviceable article. All parts are well made, especially for rough wear, the joints being stout, pendant ring and pendant are screwed, and it is in all ways a reliable and durable Compass.
- No. 197.—Bronze Military Compass, with divided and engraved metal dial, bar needle, agate cap and stop, also glass with four cardinal points painted in red, diameter 1½ in.each \$6.00

Bronzed Military Compass



No. 197

No. 200.—M
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No. 201.—D
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When u
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Compasses

- Compass, in. diam. each \$0.50
- Needle, 2 each 0.75
- Compass with stop meter, each 1.50
- Compass, off cover and cap and 1.50
- Compass, 1.75
- Compass, 2.00
- Compass, 2.50

Patent-Collapsing Pocket Gimbal Compass



For boating or yachting this compass will be found very useful, or, as an ordinary Pocket Compass, it has the great advantage of being steadier and more easily kept in a level position while using than an ordinary Compass.

No. 199.—Pocket Gimbal Compass, with Singer's patent dial, automatic stop and jewelled cap, complete in best morocco snap case, diameter 2 in. . . . \$6.00

No. 199

Dipping Needles or Miner's Compasses



No. 200



No. 201

For Tracing Veins of Magnetic Iron Ore.

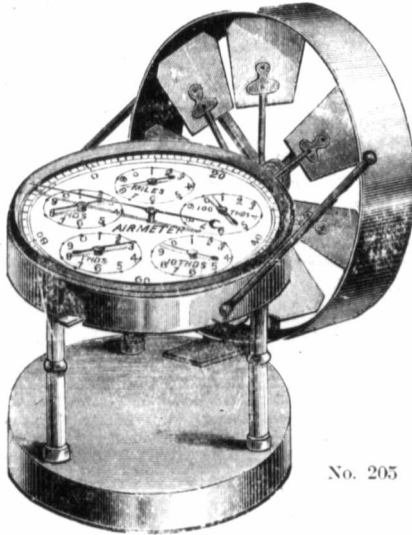
- No. 200.—Miner's Compass or Dipping Needle, for tracing iron ore, glass on both sides, 3½ in., each \$10.00
- No. 201.—Ditto, with Norwegian needle, glass on both sides, stop to needle, 3¾ in., each 14.00

When used for tracing ore the observer should hold the ring in his hand and keep the needle north and south standing with his face to the west. If held horizontal it serves, of course, as an ordinary pocket compass.

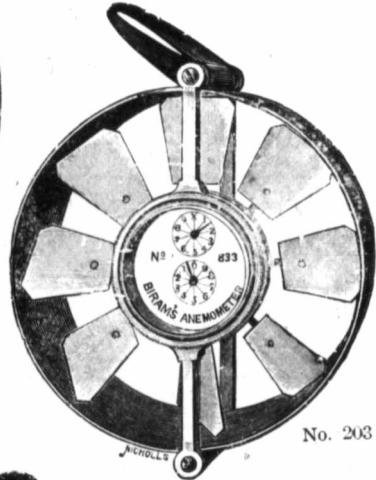


Military Compass

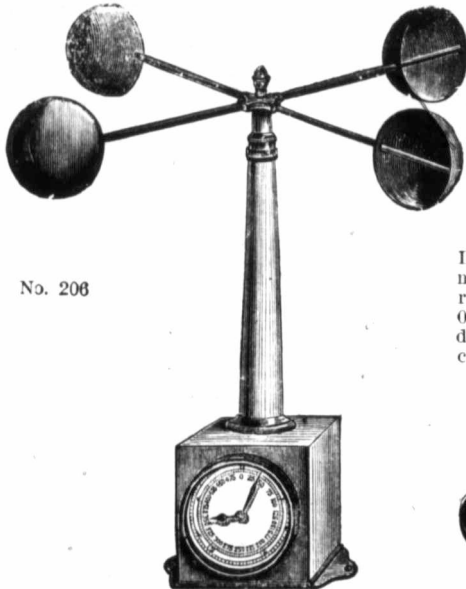
Anemometers or Wind Gauges
 For Measuring the amount and Velocity
 of Wind, draft in Mine, Hospitals, etc.



No. 205



No. 203



No. 206

No. 202.—Pocket size Anemometer watch form, 2 in. diameter, reading to 1,000 ft., in case \$25.00
 No. 203.—Bram's Anemometer, 4 in. diameter, reading to 1,000 ft., 2 dials, with disconnecter, in case \$15.00

No. 204. — Ditto, 6 in. diameter, 4 dials, reading to 100,000 ft., with disconnecter, in case . . . \$20.00

No. 202



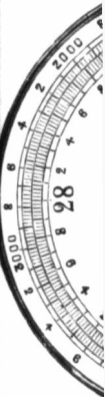
No. 205.—Anemometer reading to 10,000,000 ft., 1893 miles, 6 dials, in case.. \$22.50
 No. 206.—Robinson's improved and simplified Anemometer to fix to the roof of a building and register the force of wind, for experiments, comparisons, etc., with one dial reading to 500 miles, centre column, copper cups, hard enamel dial adjustable index 25.00

Directions and corrections tables, with each instrument, Anemometers repaired and adjusted carefully.

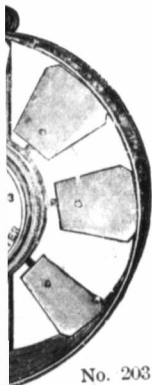
No. 207



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Wind Gauges
Amount and Velocity
Hospitals, etc.



No. 203

Small size Anemo-
 meter, 2 in. diameter,
 in case \$25.00
 Large Anemometer,
 reading to 1,000
 miles, in case
 \$15.00

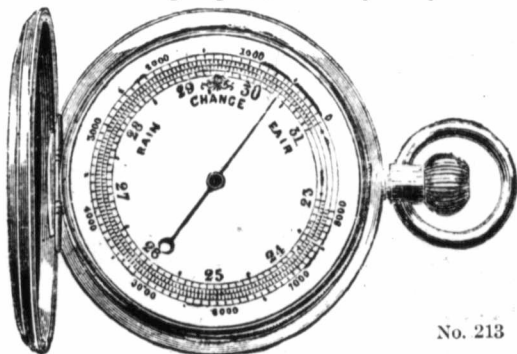


Case... \$22.50
 The roof
 is, com-
 column,
 ... 25.00
 meters

Pocket Aneroid Barometers

For measuring heights and Atmospheric pressure

No. 207



No. 213

- No. 207.—Pocket Mountain Aneroid, 1½ in. diameter, compensated for temperature with altitude scale to 8,000 ft., in case each \$13.50
- No. 208.—Ditto, with altitude scale to 10,000 ft., in case " 15.00
- No. 209.—Ditto, but with thermometer, 8,000 ft., in case " 17.50
- No. 210.—Ditto, but with small size Pear dial compass and thermometer on reverse side, in case " 20.00
- No. 211.—Ditto, nickel spring hunting case with altitude scale 8,000 ft., in case " 15.00
- No. 212.—Ditto, but with transparent pebble compass, in case " 20.00
- No. 213.—Ditto, but with Keyless action to altitude scale, no compass, in case " 18.00

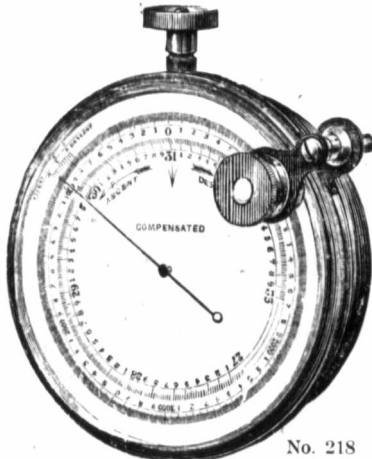
**Surveying and Mining
 Aneroids**



No. 214

- No. 214.—Pocket size, 2½ in. diameter, bronzed case, silvered metal dial, revolving altitude 10,000 feet, compensated for temperature, in morocco case, each \$16.00
- No. 215.—Ditto, raised ring, altitude 10,000 feet, and thermometer, each, \$20.00
- No. 216.—Geological Aneroid, compensated for temperature, silvered metal dial, with needle compass at back, 2½ in. diameter, in leather sling case, with altitude scale to 8,000 ft., each, \$25.00

Surveying and Mining Aneroids



No. 217.—Improved altitude scale Surveying Aneroid compensated with an extra broad altitude scale and four separate circles of divisions, figured with their respective value which greatly facilitates reading the altitude scale reading to 5,000 ft., 3 in. diameter, in case \$35.00

No. 218.—Surveying Aneroid $3\frac{1}{2}$ in. diameter, compensated for temperature, reading to 5 ft., with altitude scale to 6,000 ft., with magnifier, in case \$35.00

No. 219.—Ditto, 5 in. diameter, graduated to hundredths and reading by vernier to single feet, in case . . . \$40.00

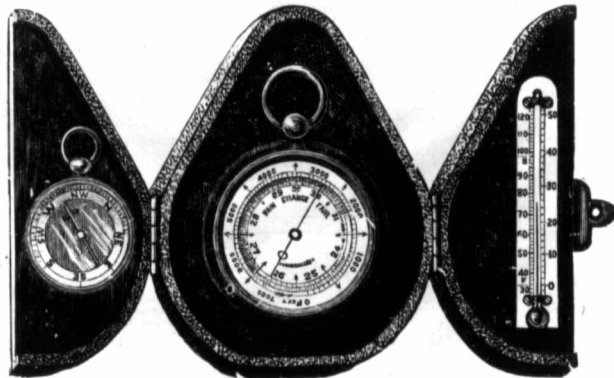
No. 220.—Ditto, but altitude scale to 10,000 ft., in case \$50.00

No. 218 No. 221.—Mining Aneroid, same as above, 5 in. diameter, but arranged to register 2,000 ft. below sea level to 4,000 ft. above, in case \$50.00

No. 222.—Leather Sling Case for Pocket Aneroid 2.50

The Surveying and Mining Aneroid is of very refined workmanship, and has a new and exact system of reading. It may be confidently relied upon for comparing depths and inclines of mines, altitudes of hills, etc., within a single yard or less, with good observation.

The Tourist Case



No. 223 (Two-Third Size)

This invaluable set when opened can be placed with safety in the room, and when folded take up but little more space than an ordinary Aneroid. Case contains best quality Aneroid Compass and Thermometer.

No. 223.—Best quality Aneroid Barometer, gilt, revolving altitude scale to 8,000 ft., compensated, with best double scale Ivory thermometer and double-action bar needle compass each \$25.00

Of the very



No. 224.—An
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ANEROID BAROMETERS

Of the very best made, have all been tested and their accuracy guaranteed



No. 226



No. 233

- No. 224.—Aneroide Barometer, 3 1/4 in. dial, in case \$5.00
- No. 225.—Aneroide Barometer, 5 in. dial, in case 6.00
- No. 226.—Aneroide Barometer, 5 in. dial, with thermometer, in case 7.50
- No. 227.—Aneroide Barometer, 5 in. silvered dial, in case 8.50
- No. 228.—Aneroide Barometer, 5 in. silvered dial, with thermometer, in case 9.50
- No. 229.—Aneroide Barometer, 5 in., in carved oak frame with thermometer, in case 7.50
- No. 230. Aneroide Barometer, 6 in. carved oak frame with thermometer, in case 9.00

- No. 231.—Aneroide Barometer, 8 in. carved oak frame with thermometer, in case. \$10.50
 - No. 232.—Aneroide Bar., 5 in. open face, in case \$9.00
 - No. 233.—Aneroide Bar., 5 in. open face, with thermometer, in case \$10.00
 - No. 234.—Universal aneroide barometer, 5 in. dial enamelled case, recommended for the use of mariners, agriculturist, etc., in case (see cut on outside cover) \$6.00
 - No. 235.—Aneroide barometer, 6 in. dial with thermometer on dial, metal frame, suitable for marine use, a first class instrument \$12.00
 - No. 236.—Ditto, 8 in. \$15.00
 - No. 237.—Clock to match the Universal Aneroide barometer, 8-day movement, 6 in. \$9.00
 - No. 238.—Clock to match Aneroide barometer, 8-day movement, 8 in. \$15.00
 - No. 239.—The "Aneroide Barometer, How to Buy and How to Use it", with altitude tables, each \$0.25
 - No. 240.—Yacht pattern Aneroide with separate clock to match, 1st quality movements, 3 1/2 in. diameter, the set of two \$25.00
- Aneroide and Mercurial Barometers
Repaired and Adjusted.



No. 235

scale Surveying
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reading the alti-
to 5,000 ft., 3 in.
... \$35.00

3 1/2 in. diameter.
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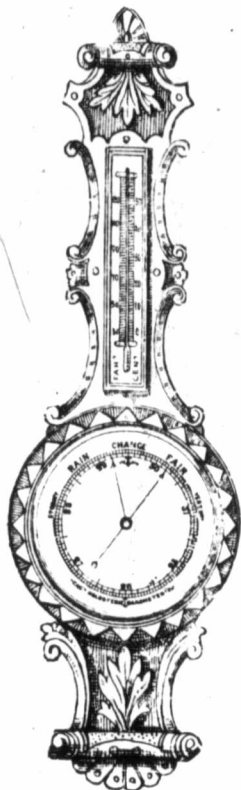
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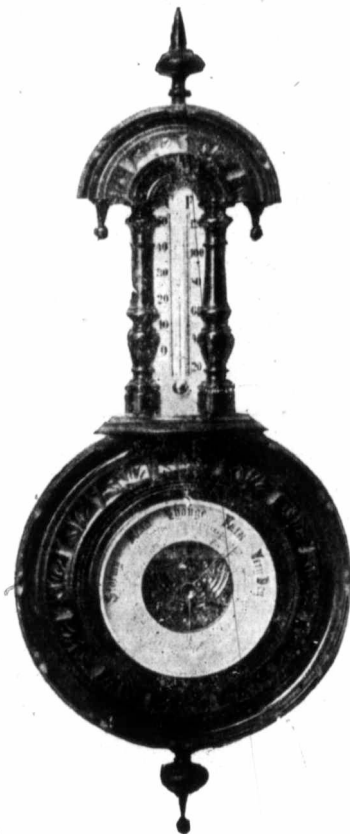
scale to
mometer
...each \$25.00

Pendant Aneroid and Mercurial Barometers

Pendant Aneroid Barometers



No. 243



No. 241



No. 249

- No. 241.—Household Barometer open face, Aneroid, 3¼ in. dial, with Thermometer, 16 in. long \$7.50
- No. 242.—Household Barometer, 5 in. Aneroid, plainly figured, with 8 in. Thermometer, in oak frame, total height 25 in., width 7 in. A very handsome Barometer 10.00
- No. 243.—Household Barometer, 8 in. Aneroid, in elegant carved oak frame, with 9 in. Thermometer above the Aneroid, total height 33 in. extreme width 10 in. 17.50
- No. 244.—Barometer, Clock and Thermometer, 5 in. Aneroid, and 8-day clock with Thermometer, 24 in. long 20.00

No. 255.—Be
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Mercurial Barometers

- No. 245.—Farmer's Mercurial Barometer, solid oak frame, opal glass scales, sliding vernier, with enamel tube, wet and dry bulb Hygrometer and Thermometer \$15.00
- No. 246.—School Mercurial Barometer, with Thermometer, Hygrometer, Magnet, Magnetic Compass, magnifier, bubble, metre and plumb bob complete \$12.50
- No. 247.—Fitzroy Mercurial Barometer, with Thermometer and weather glass complete, with two indicators \$7.50
- No. 248.—Ditto, but gothic frame, nicely finished \$12.50
- No. 249.—Model House Mercurial Barometer, walnut frame, opal scales, with sliding vernier, tube visible throughout, with attached Thermometer \$9.00
- No. 250.—Marine Mercurial Barometer, in solid rosewood frame, brass arm gimbals, and Thermometer attached, ivory scales, read by vernier to 100ths inch. \$20.00
- No. 251.—Board of trade Marine Barometer, bronzed metal frame, with Thermometer \$35.00
- No. 252.—Mountain Barometer, with portable tripod stand and Gimbals in leather sling case \$75.00
- No. 253.—Sympiesometers to use in conjunction with above Barometer each \$12.50
- No. 254.—Richard's Registering Barometer with 52 Weekly charter each \$35.00

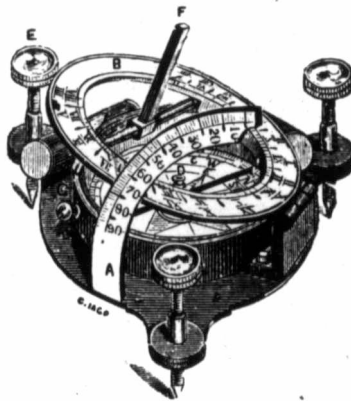
Magnetic Sun Dials and Compasses



No. 249



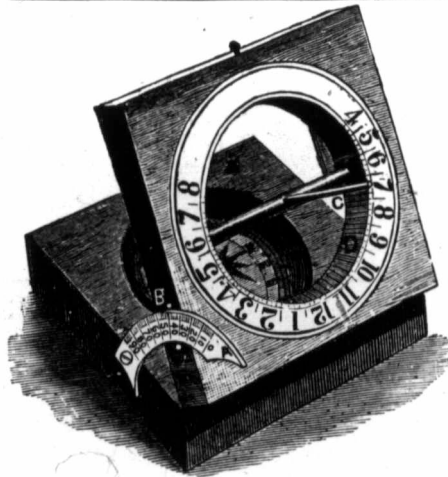
No. 250



No. 258

- No. 255.—Best Wood Bronzed Sun Dial, jewelled cap, with cover and stop, each \$2.50
- No. 256.—Nicked, watch pattern, hinged cover, agate centre, stop to needle, and Sun Dial, 2 in. diameter each 7.50
- No. 257.—Horizontal Sun Dial, engraved and divided to 10 minutes, with points of compass, suitable for placing on window sill diam. 2 1/4 in., each 5.00
- No. 258.—Universal Sun Dial for north and south latitudes, with Levels and adjusting screws, in case, 3 1/4 in. dial each 20.00

41
 ith Ther- \$7.50
 ith 8 in.
 . A very 10.00
 k frame,
 33 in. ex^t 17.50
 lay clock 20.00



No. 260

Universal Sun Dial

This Sun Dial will suit any latitudes

No. 260.—Polished Mahogany Case Sun Dial, with Silvered Dial plate and Polar Gnomon, engraved and divided Arc, Compass, with Stop, and directions for use,each \$5.00



No. 261

HORIZONTAL SUN DIALS

- No. 261.—Brass Circular Horizontal Sun Dial, divided to five minutes, with eight engraved compass points, stout brass plate and gnomon with foot, three studs at back to fit it on pedestal, with equation table, 10 in. \$25.00
 - No. 262.—Slate Circular Horizontal Sun Dial, divided to five minutes, four points of compass, engraved stout brass gnomon, 10 in. 10.00
- These Sun Dials can be altered to suit any latitude.

RAIN GAUGES

- No. 263.—Howard's Rain Gauge, consisting of glass bottle with japanned funnel, 5 in. diameter, graduated glass measure, divided to show .01 of an inch of rainfalleach 2.50
- No. 264.—Howard's Pedestal form Rain Gauge, consisting of a funnel with a receiving surface of 12 inches in diameter and a graduated tube in connection, divided to inches and tenths and hundredths, showing at a glance the amount of rainfall without the use of graduated measure, with tap for emptying, in solid coppereach 18.00
- No. 265.—Spare graduated tubes for the aboveeach 3.50



No. 268.—P
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...each \$5.00



No. 265

Chesterman's Pocket Spring Measures

(With one or two measurements, inches and 8ths on one side and centimetres and millimetres on the other, or inches and 16ths one side and feet and 100ths the other).

- No. 266.—Patent Spring Steel Tape, in German Silver case, with spring top... \$1.00 \$1.25 \$2.00 \$2.50
 No. 267.—Patent Spring Linen, ditto... 0.75 1.00 1.25 1.50

No. 268.—Patent Spring Measures, with Steel Tapes and Spring Stops, specially adapted for Architects and Engineers, in German Silver case... \$1.75

These Tapes are 6 feet or 2 metres long, and are marked with two measurements on one side, and on the other side with a dozen different 12 inches scales. Thus, for a Mechanical Draughtsman, it would have 72 English inch and 2 French metres on one side, and on the other side 12 fully divided 12 inches scales, ranging from 1-16th to 3 ins., or, for an Architect, 8 fully divided duodecimal scales and 4 chain scales, 10 to 40.

- No. 269.—Tailor's Tapes, 60 in. long, divided, both sides into 8ths of in., each \$0.10
 No. 270.—Shoemaker's Tapes, 24 in. long, divided into 8ths one side shoe sizes the other... each 0.10
 No. 271.—Chesterman's Pocket Spring Tapes for converting metrical weights and measurements into English and vice versa, 2 metres long divided on one side into inches and 10ths, metres and millimetres, and on the other side kilograms and pounds... each 2.00
 No. 272.—Patent Pocket Spring Measure, 12 feet long, marked English feet and inches on one side of the tape and hands on the other with cattle gauge attached for ascertaining the weights of cattle by measurements; linen tape, each \$2.50; steel tape... each 3.50

Patent "Constantia" Measuring Tapes, Flush Handles



No. 273



No. 274

Recently introduced by Messrs. Chesterman as more reliable than the Metallic or Wire Tape, we can confidently recommend as greatly superior in accuracy and durability to any woven tape hitherto manufactured.

- No. 273.—The Constantia, $\frac{3}{8}$ in. tape, in leather case, divisions, 10ths or 12ths, each... \$1.75 \$2.25 \$2.50 \$3.50 \$2.50
 No. 274.—Patent Metallic Tape, $\frac{3}{8}$ in. wide, in leather case, 10ths or 12ths, each... 1.75 2.25 2.50 3.50 2.50
 No. 275.—Patent Tape, without case, 10ths or 12ths, each... 0.90 1.25 1.50 2.25 1.50

The above Tapes are Marked on Both Sides. Tapes are ordinarily sent out with feet and inches on one side and links on the other, but are kept in stock with feet English on one side and French metres on the other. New tapes fitted to old boxes in a few minutes.

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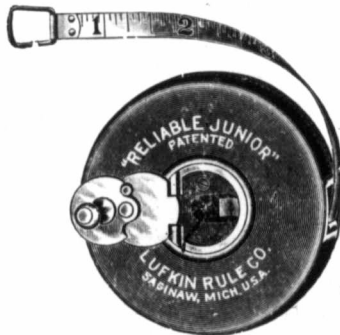
Chesterman's Patent Steel Tapes



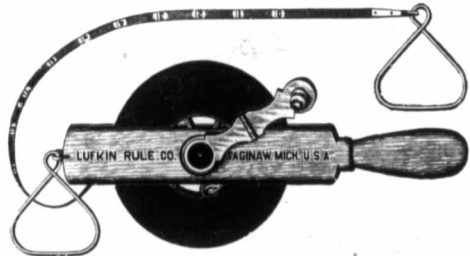
No. 276

These Tapes can be depended upon as standards, to be used not only for the measuring of important work, but also for the testing of Chains and Tapes for ordinary work.

- No. 276.—Chesterman's Steel Tape, in strong bent leather case, flush handle, divisions of 1-10ths or 1-12ths, on one side, links on the other, $\frac{1}{4}$ inch \$3.25 \$3.75 \$5.25 \$6.75 \$9.00 \$7.50
- No. 277.—Ditto, extra stout, $\frac{1}{2}$ inch 6.75 8.50 12.00 9.00
- No. 278.—Ditto, extra strong, $\frac{3}{4}$ inch 11.00 15.00 12.00
- No. 279.—Steel tapes for measuring diameters and circumferences, German silver case 6 feet. 9 feet. 12 feet. \$1.50 \$2.00 \$2.50



No. 280



No. 282

Steel Tapes

Reliable Junior Steel Tape with double folding flush handle, opened by pressing small pin or button on opposite side, in hard leather case, nickel plated trimming.

- No. 280.— $\frac{1}{4}$ in. Steel Tape marked feet, 10ths and 100ths, 25 feet each \$3.75
- No. 281.— $\frac{1}{4}$ in. Steel Tape marked feet, 10ths and 100ths, 50 feet each 4.50

Surveyor's chain tapes, nicely finished in hardwood with large metal folding handle and two large detachable handles, nickel plated trimmings, with reel.

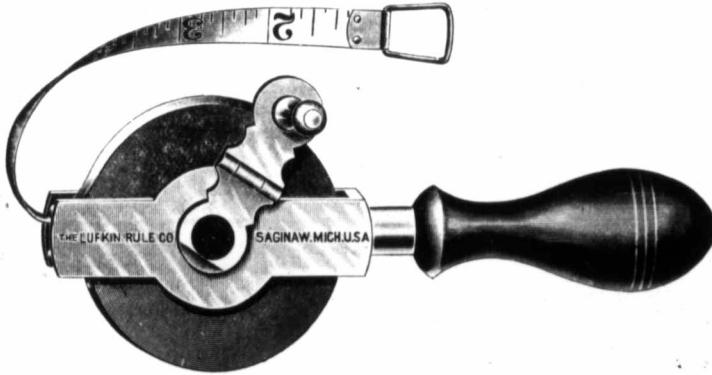
- No. 282.—Heavy $\frac{1}{4}$ in. steel tape graduated every foot the end feet, and 10ths, 100ft. long \$6.00
- No. 283.—Heavy $\frac{1}{4}$ in. steel tape graduated every foot the end feet, and 10ths, 200 ft. long 9.00
- No. 284.—Heavy $\frac{1}{4}$ in. steel tape graduated every links the end feet, and 10ths, 400 links 12.50

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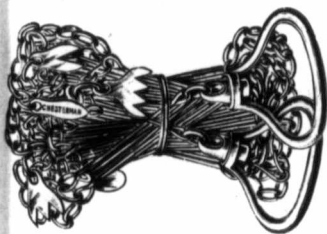


No. 285

Folding winding handle, nickel plated trimmings, very strong and serviceable.

- No. 285.— $\frac{1}{2}$ in. steel tape marked 10ths and 100ths of feet, 66 ft. \$6.25
- No. 286.— $\frac{1}{2}$ in. steel tape marked 10ths and 100ths of feet, 100 ft. 9.00
- No. 287.—Spring balances for Engineer's steel tape indicating tension to 20 lbs.
each 3.50
- No. 288.—Spring balances and level with handle and snap each 5.00

Chesterman's Surveyors' and Band Chains



No. 290



No. 294



No. 300

The 2 and 4 poles Chains are divided into links and tallied at every 10 links. The 50 and 100 feet Chains are divided into feet and tallied at every ten feet.

	33 or 50	50	66 100	100 feet links
No. 289.—Iron Chains, best 3 oval rings, No. 9 wire	\$1.50	\$1.75	\$2.50	\$3.00
No. 290.—Steel Chains, light tempered, No. 12 steel wire. 2.00	3.00	4.00	5.00	
No. 291.—Ditto, standard, with all the joints brazed	4.50	5.00	7.00	9.00
No. 292.—Arrows, set of 11, iron, 15 inches long, 50c; steel, 75c; heavy steel.				1.00
No. 293.—Arrows, 3-16 in. square, 14 in. long, nicely nickel plated, with red flag firmly sewn to the ring, set of 11				2.50

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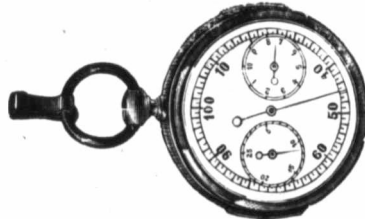
All Chains and Woven Measuring Tapes are liable to contraction or expansion but this article, being a strong Steel Band, is practically unalterable. When not in use it is coiled on a Steel t, but it can also be had fitted with Metal Case at an extra price.

	Width of band	50	66	100 feet.	
		50	20	30 metres	
No. 294.—Divided into links, and numbered at every 10 links	1/8 inch.	\$	\$6.00	\$	
No. 295.—Divided into feet and numbered at every 10 feet.	1/2 "	"	3.50		6.00
No. 296.—Divided into feet and numbered at every 10 feet.	3/8 "	"	5.00		7.00
No. 297.—Etched feet one side, and link the other.	1/2 "	"	5.00	6.50	8.00
No. 298.—Etched feet, inches and 8ths on one side, link on the other	3/8 "	"	7.50	9.00	12.50
No. 299.—Ditto, 10ths and 10ths on one side, link on the other	1/4 "	"	8.50	9.50	13.50
No. 300.—Metal Cases for above				each, extra	2.50
No. 301.—Metal Crosses for above				each	1.00

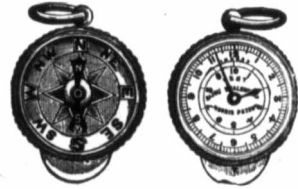
Tape and Chain Repairing a Specialty

- No. 302.—Tally register for Surveyor's and others, useful in chaining, counting trees, persons, cattle, etc., registers to 1000 and can be set at zero at will \$3.75
- No. 303.—Ditto, watch form, porcelain dial, nickel plated case, dials registering to 1000 with setting to zero by knob 5.00

Pedometers, Passometers, Combined Charm, Measuring Instrument and Compass



No. 306



No. 310

- No. 304.—Pedometer, for measuring distances by walking over them, in nickel case, watch form and size, complete with key and directions for use, each \$4.00
- No. 305.—Ditto, nickel case, showing yards and miles to 50 miles each 5.00
- No. 306.—Passometer, for counting the number of steps taken, nickel case, 1 to 25,000 steps. The Passometer is designed for the use of surveyors, civil and military engineers, and others to whom it is occasionally of importance to obtain an approximate idea of distances by pacing, each 6.00
- No. 307.—Improved Passometer with automatic setter and improved means of adjustment, 0 to 25,000 steps, with Cartometer and Compass each 9.00
- No. 308.—Wealemfna, for measuring distances by running a wheel over them. Useful for irregular lines on maps, etc. Nickel Case, small size, to hang on watch chain each 1.50
- No. 309.—Wealemfna in Nickel Case but with handle 2.00
- No. 310.—Wealemfna in Silver, with jewelled centre Compass at back, each 6.00



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Marine Instruments

Megaphone

Finely finished in hard fibre, two coats of spar varnish, mouth pieces and handles, nickel plated.



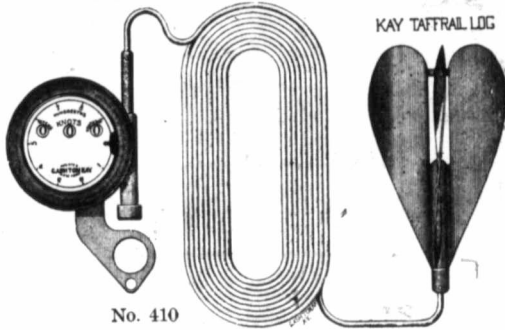
No. 400

- No. 400.—Megaphone, 15 inch... \$1.50
- No. 401.—Megaphone, 30 inch... 2.50
- No. 402.—Megaphone, 35 inch... 3.00
- No. 403.—Megaphone, 40 inch... 3.50
- No. 404.—Megaphone, 48 inch... 5.00
- No. 405.—Megaphone, 60 inch... 7.50

Megaphone fitted with mouth pieces only.

- No. 406.—Megaphone, 12 inch... 0.25
- No. 407.—Megaphone, 20 inch... 0.50
- No. 408.—Coxwain's Megaphone, arranged to be attached to the head... 1.50
- No. 409.—Stand for the larger size megaphones... 2.50

Kay Taffrail Log for yacht or small boat, it weights about six ounces so that the drag of the propeller is practically nothing and will register at any speed.

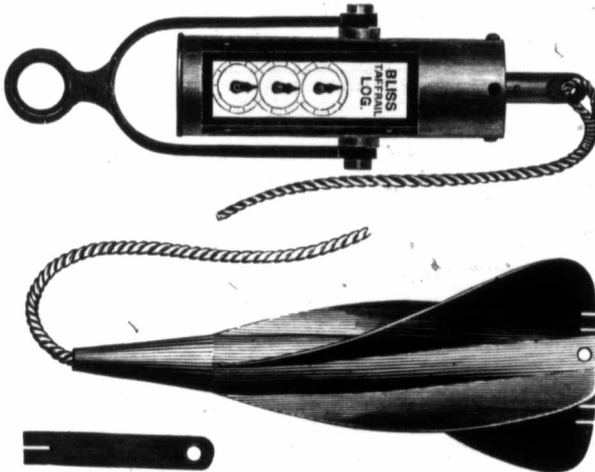


KAY TAFFRAIL LOG

No. 410

- No. 410. — Complete with register, line and propeller... \$7.50
- No. 411. — Extra propeller... 1.50
- No. 412. — Extra line 0.75

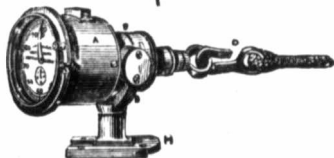
Bliss Taffrail Log



No. 413

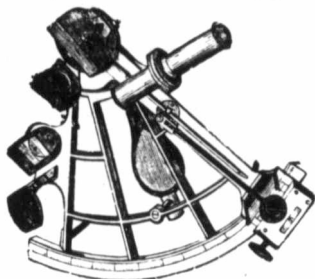
- No. 413.—Bliss Taffrail Log, with rotator and line, hook, wrench, iron form, as used in the United States and other navies... \$22.50
- No. 414.—Extra rotators for Bliss Log... 6.00
- No. 415.—Extra lines for Bliss Log... 2.50

Log



No. 414

- No. 414.—Cherub Log, the registering apparatus is fixed to the taffrail of the vessel, the Rotator being in the water and attached by a long tow-line, this is the most accurate and serviceable log, its construction is exceptionally strong, the working part being of hardened steel and phosphor bronze, complete with 2 rotators improved model, complete \$30.00
- No. 415.—Spare Rotator for above Log 6.00
- No. 416.—Walker's Excelsior yacht log, is adapted for very small yacht, Register Rotator and Line 15.00
- No. 417.—Spare Rotator for yacht Log 3.50
- No. 418.—Governor or fly-wheel to give steadiness to the revolutions of the spindle of the Register, this presenting the whatever and jerky action caused by the length of the tow-line, galvanized iron . . . each 2.50



No. 419

- No. 419.—Octant Plain Pattern, with silver arc divided to 15", reading to 115°, 6 shades and index reader, in mahogany case \$35.00
- No. 420.—Diamond and curve pattern, 7½ in., full edge bar sextant, 7 shades, inverting, prospect, and blank telescopes, divided to 10", on silver in mahogany case 50.00
- No. 421.—Cadet Pattern Sextant edge bar, divided to 70" on silver, 7 shades, three telescopes, in mahogany case 45.00

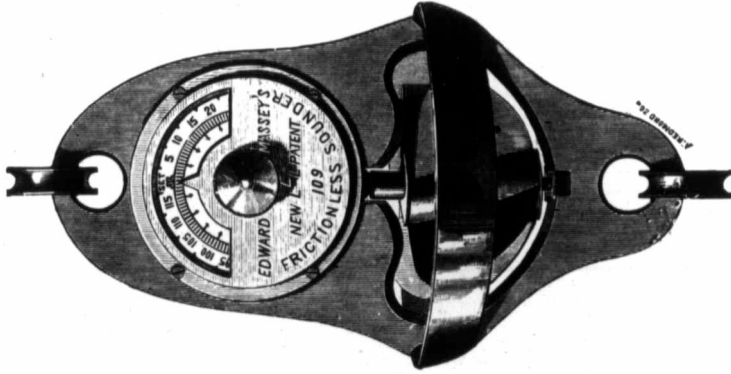
Artificial Horizons

- No. 422.—Black Glass Plane or Artificial Horizon, with 3 adjusting screws and ground spirit bubbles, in mahogany case \$17.00
- No. 423.—Artificial Horizon, with boxwood mercury trough, and wood mercury bottle, parallel glasses, fitted in bronze metal frame, in case . . . 25.00
- No. 424.—Ditto, but with iron mercury trough and iron mercury bottle, in mahogany case 27.50

No. 425.—the wheels which can ship's lead. fathoms . . .
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 No. 428.—spare tube i
 No. 429.—agate caps .
 No. 430.—bowl
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Massey's Improved Sounding Machine



No. 425

No. 425.—The best machine for ordinary use. All the wheels covered from injury, Index on one dial, which cannot corrode. Can be used with ordinary ship's lead. Easily read, and set instantly. 120 fathoms... each \$18.00

No. 426.—Lord Kelvin's (Sir William Thomson) sounding machine with 100 prepared glass tubes or with improved depth recorder and 30 glass tubes, 300 fathoms of galvanized wire, 3 sinkers, complete with accessories... \$135.00

No. 427.—Extra prepared tubes, per 100... \$35.00

No. 428.—Basnett's atmospheric sounder with spare tube in box... \$30.00

Boat Compasses

No. 429.—4 inch box, 2½ inch card oak cases, with agate caps... each \$2.50

No. 430.—5 inch box, 3 inch card, brass rings and bowl... each \$3.00

No. 431.—6 inch box, 4 inch card... 3.50



No. 432

No. 432.—8 in. box, 5 in. card, each \$4.00

No. 433.—10 in. box, 6½ in. card, each 5.00

Ritchie Compasses

The Ritchie Compass has established a reputation throughout the world as the most perfect compass made. There are now thousands of them in use.

No. 434.—16 in. box, 10 in. card, each \$50.00

No. 435.—12 in. box, 7½ in. card, each 35.00

No. 436.—11 in. box, 6½ in. card, each 32.00

No. 437.—9½ in. box, 5½ in. card, each 28.50

No. 438.—7½ in. box, 4½ in. card, each 22.50

No. 439.—5 in. box, 3 in. card, each 18.50

No. 440.—5½ in. box, 2½ in. card, each 13.50

No. 441.—4½ in. box, 2 in. card, each 10.00



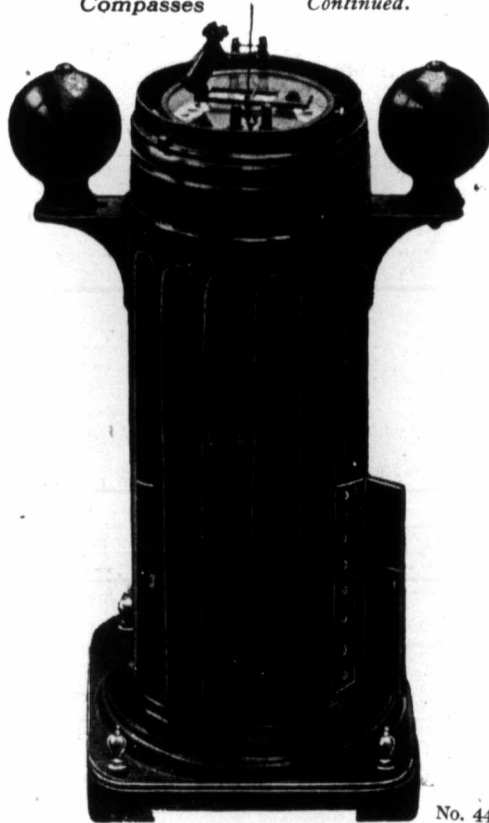
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27.50

Compasses *Continued.*



No. 442

No. 442.—Patent Standard Compass, with Binnacle, 10 in. card, teak stand all correctors, patent course indicator and azimuth mirror, height, 57 inches, complete. \$225.00

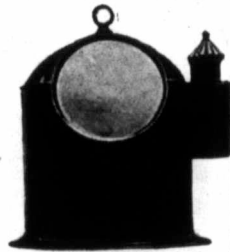
No. 443.—Brass Binnacle, 8 in. high, with lamp and spirit compass, 3½ in. dial, can be fitted on deck or on a small stand, each \$25.00

No. 444.—Ditto, but 4 in. dry card compass. 15.00

No. 445.—Pedestal Binnacle, 15 in. dome top, 2 revolving lamps, lacquered brass, dolphin pattern, will take a card or spirit compass, 10 in. dial 75.00

No. 446.—Steering Binnacle, Brass, heavily built and substantial, two lamps, total height 32 inches, it will take a 5½ in. compass card 75.00

No. 447.—Straight Bar Magnets for adjusting ship's compass, copper covered, and water tight, \$1.50



No. 443

15 x 1½ 18 x 1½ inches
\$2.25 \$3.00 each.

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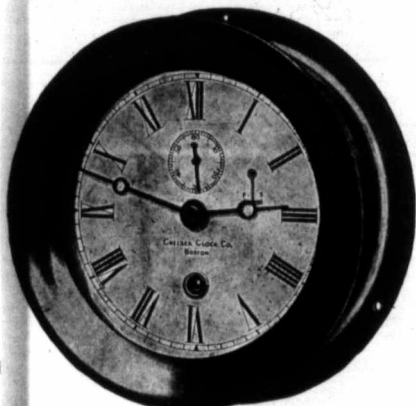
Floating Log or Current Meter.



No. 448

- No. 448.—Floating Log or Current Meter. This machine is constructed for the purpose of ascertaining the flow or velocity of streams; it may also be used in boat surveys, for measuring lakes; complete in mahogany case each \$45.00
- No. 449.—Current Meter, divided to feet, furlongs and miles, for use in small rivers and streams to show rate of flow of tide, or number of gallons flowing from any reservoir or supply each 35.00
- No. 450.—Current Meter, pocket size; two graduated wheels registering to 1000 revolutions. The registering wheels can be thrown into and held in gear by a string attached to a lever, or they can be released and stopped by means of a cam operated by two strings and attached to the frame. The instrument fits on a pole of $\frac{3}{4}$ inch diameter. It can be taken apart and stored compactly in a morocco case 9 x 4 x 1 $\frac{1}{2}$ in. each 50.00
- No. 451.—Price's acoustic current meter, with two lengths of nickel brass tubing, graduates feet and tenths up to four feet and with four feet rubber tubing, in wood case 62.50
- No. 452.—Electric current meter, with electric register and lead, complete. 212.50

Chronometers and Clocks



No. 456



No. 453

- No. 453.—Chronometer, best two day. each \$175.00
- No. 454.—Chronometer, best eight day. each 225.00
- No. 455.—Chronometer comparison forms, per doz. 0.15

Good second hand Chronometers on hand, for sale at reasonable prices. Chronometer carefully rated by telegraphic sounder direct from McGill University Observatory. Cleaning, repairing, and adjusting by experienced workmen and at reasonable rate.

No. 456.—Striking ship's bell clock (Chelsea), best in the world, 8 day, solid cast brass, screw bezel case, water proof:—

4 $\frac{1}{2}$ inch dial	6 inch dial	8 inch dial
\$45.00	\$50.00	\$56.50 each

No. 457.—Yacht or Marine clock, time only, (Chelsea), 8 day, solid cast brass cases:

4 $\frac{1}{2}$ inch dial	6 inch dial	8 $\frac{1}{2}$ inch dial
\$22.50	\$28.75	\$36.25 each

42
 oak stand
 r, height,
 \$225.00



No. 443
 18 x 1 $\frac{1}{2}$ inches
 \$3.00 each.



No. 458

- No. 458.—Salinometer, is an instrument to ascertain the density of water in marine steam boilers, the zero of the scale marked O represents the point to which the instrument sinks in pure water at a temperature of 200° Farenheit, in nickel plated metal, round bulb, flat stem, in case \$2.50
- No. 459.—Glass Salinometer, in case 1.00
- No. 460.—Board of Trade Marine thermometer 0° to 220° Farenheit, enamel tube divided on stem, porcelain scale copper case as used in the Royal Navy 4.50
- No. 461.—Deep Sea Sixe's maximum-minimum thermometer, enamel tube, metal scale in round copper case with door and ring at bottom for weight 20.00
- No. 462.—Deep Sea patent improved frame, standard thermometer for recording temperature at any depth 60.00

Log Glasses, Log Slates

- No. 463.—14 or 28 seconds, wood frame, log glasses each \$ 0.50
- No. 464.—14 or 28 seconds, brass frame, log glasses " 1.00
- No. 465.— $\frac{1}{2}$ hour, in ordinary wood frame, log glasses " 1.00
- No. 466.— $\frac{1}{2}$ hour, in ordinary wood frame, log glasses " 1.25
- No. 467.—1 hour, in ordinary wood frame, log glasses " 2.00
- No. 468.—Log slates in strong wood frame folding in two:

10 x 7	12 x 8	14 x 10 inches.
\$1.25	\$1.50	\$1.75 each

Log Books for Officers

- No. 469.— 3 months one day's work on a page, cloth back \$ 1.25
- No. 470.— 6 months one day's work on a page, cloth back 1.75
- No. 471.—12 months one day's work on a page, cloth back 3.00

Log Books for Engineers

- No. 472.— 3 months one day's work on a page, cloth back \$ 1.50
- No. 473.— 6 months one day's work on a page, cloth back 2.00
- No. 474.—12 months one day's work on a page, cloth back 3.50
- No. 475.—Bain and Ainsley ship's course corrector, complete in case 35.00
- No. 476.—Deviatometer to find out the deviation of the compass, in case. . . 50.00
- No. 477.—Ship's signal lights, blue, red and green, price on application.

We have constantly in hand all kind of charts and nautical Books. We stock the British admiralty charts, Imray's blue back charts, U. S. Coast and Geodetic survey charts, etc.

- No. 478.—Drawing blocks, 13 x 10, 38 sheets \$0.25
- No. 479.—Whistles, officer's calls 1.50

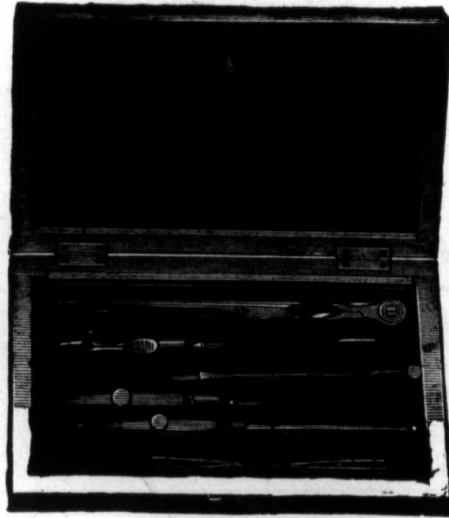
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We also Keep in Stock the Following Navigation Books, Etc.

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Fahrenheit, copper case 4.50	No. 480.—Ainsley's Nautical Almanach and tide tables	\$0.50
ter, enamel or and ring 20.00	No. 481.—Canadian Nautical Almanach	0.50
ermometer 60.00	No. 482.—English Nautical Almanach, ordinary edition	1.00
..... each \$ 0.50	No. 483.—Patterson's illustrated Nautical Encyclopedia	3.50
..... " 1.00	No. 484.—Norie's epitome of practical navigation	6.00
..... " 1.00	No. 485.—Leckie's wrinkles on navigation	6.50
..... " 1.25	No. 486.—Elementary seamanship, Barker	3.00
..... " 2.00	No. 487.—Navigation theoretical and practical	1.20
..... \$ 1.25	No. 488.—Latitude and Longitude. How to find them, White	1.25
..... 1.75	No. 489.—Burdwood Azimuth tables	1.25
..... 3.00	No. 490.—Aneroid barometer and how to use it	0.25
..... \$ 1.50	No. 491.—Lights and tides of the world and fog signals	2.50
..... 2.00	No. 492.—International code of signals, new edition	6.00
..... 3.50	No. 493.—Indicator's papers	per doz. 0.10
se 35.00	No. 494.—Elementary questions and answers, John Tod	2.00
n case. .. 50.00	No. 495.—Indicator diagrams, McGibbon	3.50
tion.	No. 496.—Verbal notes and sketches, Sothorn	3.50
ooks. We stock	No. 497.—Mechanical and marine engineering, Somerscales	6.00
ast and Geodetic	No. 498.—Lockies improved drawing scales	1.00
..... \$0.25	No. 499.—Signal manuals, Rugg	0.50
..... 1.50	No. 500.—Rugg's pocket deviascopes	1.00
	No. 501.—Tait's memory work	0.50
	No. 502.—Navigator's practical star book, Machattie	2.50
	No. 503.—Modern seamanship, Williamson	0.75
	No. 504.—Knots, ties and splices, Burgess	0.50
	No. 505.—Tempometer or horometrical charts	1.25
	No. 506.—Elementary navigation, Barker	1.75
	No. 507.—Revolving Orrery for every hour of the year	2.50
	No. 508.—The Stars, how to know and use them, Rosser	3.50
	No. 509.—Ships and boats, Bland	0.75
	No. 510.—Seaman's assistant to the use of mechanical tools, Reeds	1.00

French Instruments of Brass and German Silver—In Cases



No. 602

No. 600.—Mahogany Case, containing 6 pieces, Brass.

1 Pair Compasses, 4½ inch, with Pen and Pencil Points, 1 Crayon holder, 1 Key, 1 Rule, . . . each \$0.50

No. 601.—Mahogany Case, containing 8 pieces, Brass.

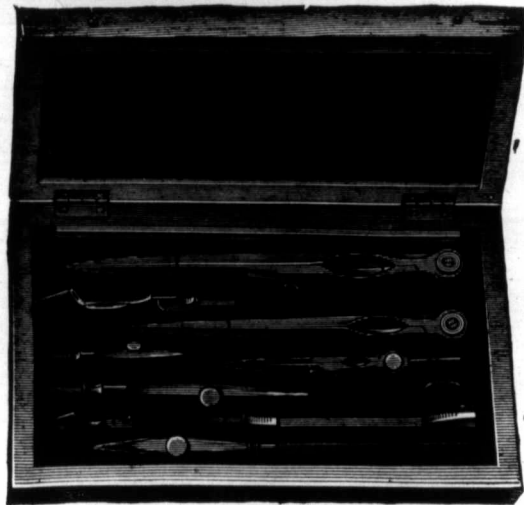
1 Pair Compasses, 4½ inch, with Pen, Pencil Points and Lengthening Bar, 1 Crayon-holder, 1 Protractor 1 Key, 1 Rule,each \$0.60

No. 602.—Mahogany Case, containing 9 pieces, Brass.

1 Pair Compasses, 4½ inch, with Pen, Pencil Points and Lengthening Bar, 1 Drawing Pen, 1 Crayon holder, 1 Protractor, 1 Key, 1 Rule each \$0.75

No. 603.—Mahogany Case, containing 10 pieces, Brass.

1 Pair Compasses, 4½ inch, with Pen, Pencil Points and Lengthening Bar, 1 Pair Dividers, 3½ inch, 1 Drawing Pen, 1 Protractor, 1 Crayon-holder, 1 Key, 1 Rule, each \$1.00



No. 604

No. 604.—Mahogany Case, containing 12 pieces, Brass.

1 Pair Compasses, 4½ inch, with Pen, Pencil Points and Lengthening Bar, 1 Pair Dividers, 3½ inch, 1 Bow Pen with Pencil Point, 1 Drawing Pen, 1 Protractor, 1 Key, 1 Ruleeach \$1.25

No. 605.—Mahogany Case, containing 12 pieces, Brass.

The same as 604, but Compasses 5½ and 4½ inches long.each 1.50

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No. 607.—R
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No. 611.—R
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No. 612.—R
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r-In Cases

any Case, contain
ss.
sses, 4 1/4 inch, with
Points, 1 Crayon
Rule, ... each \$0.5
any Case, contain
ss.
sses, 4 1/4 inch, with
s and Lengthening
older, 1 Protractor
... each \$0.0
any Case, contain
ss.
sses, 4 1/4 inch, with
ts and Lengthening
g Pen, 1 Crayon
tor, 1 Key, 1 Rule
... \$0.7
any Case, contain
ss.
sses, 4 1/4 inch, with
s and Lengthening
viders, 3 1/4 inch, 1
Protractor, 1 Cray
1 Rule, each \$1.0

French Instruments—(Continued)

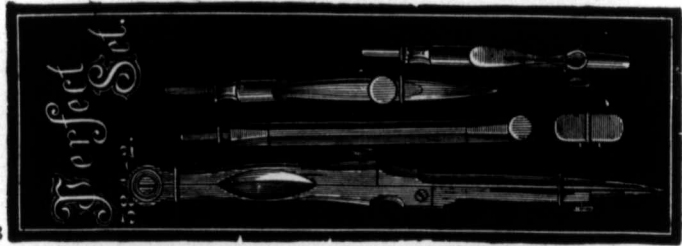


No. 610

- No. 606.—Rosewood Case, with Lock and Tray, containing 12 pieces, Brass.
The same as No. 605 each \$2.25
- No. 607.—Rosewood Case, with Lock and Tray, containing 12 pieces, Brass.
The same as No. 606, but Compasses 6 1/4 and 5 1/4 inches long. . . . each 2.50
- No. 608.—Rosewood Case, with Lock and Tray, containing 15 pieces, Brass.
1 Pair Needle Pointed Compasses, 6 1/4 inch, with Pen, Pencil Points
and Lengthening Bar, 1 Pair Compasses, 3 1/2 inch with Pen and Pencil
Points, 1 Pair Dividers, 4 1/2 inch, 1 Bow Pen with Pencil Point, 1
Drawing Pen, 2 Protractors, 1 Key, 1 Rule each 2.00
- No. 609.—Rosewood Case, with Lock and Tray, containing 15 pieces German
Silver.
The same as No. 608; the Compasses with Needle Points 5.50
- No. 610.—Rosewood Case, with Lock and Tray, containing 15 pieces, Brass.
1 Pair Compasses, with Needle Point, 6 1/4 inch, with Pen, Pencil Point
and Lengthening Bar, 1 Pair Compasses, with Needle Point, 4 1/2 inch,
with Pen and Pencil Points, 1 Pair Dividers, 4 1/2 inch, 1 Spring Bow
Pen, 1 Pair Proportional Dividers, 1 Drawing Pen, 1 Protractor,
1 Key each 6.00
- No. 611.—Rosewood Case, with Lock and Tray, containing 15 pieces, German
Silver.
The same as No. 610 each 7.50
- No. 612.—Rosewood Case, with Lock and Tray, containing 19 pieces.
The same as No. 611, but with Beam Compasses each 13.00

Lengthening
nt, 1 Draw-
... each \$1.25
... each 1.50

French Instruments



No. 613

- No. 613.—Brass. 1 Pair Compasses, 5½ inch, with fixed Needle Point, Pen, Pencil Point and Lengthening Bar, Key each \$0.75
 No. 614.—German Silver. 1 Pair Compasses, 5½ inch, the same as No. 613 " 1.25
 No. 615.—Brass. Ditto, but 6½ inch Compasses, same as No. 613 1.00
 No. 616.—German Silver. Ditto, but 6½ inch Compasses, same as No. 614 " 1.50

No. 617.—Pocket Case, covered with fine cloth, containing 9 pieces, Brass 1 Pair Compasses, with Needle Point, 5½ inch, with Pen, Pencil Point and Lengthening Bar, 1 Pair Dividers, 4½ inch, 1 Spring Bow Pen, 1 Drawing Pen, 1 Protractor, 1 Key, each \$3.00

No. 618.—Pocket Case, covered with fine cloth, containing 9 pieces, German Silver. The same as No. 617, each \$4.00



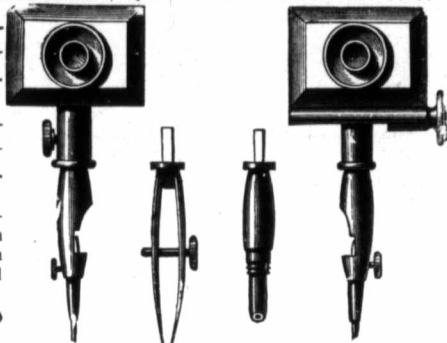
No. 618

- No. 622.—Plain Brass Divider, 5½ in. \$0.35
 No. 623.—Plain Brass Divider, 6½ in. 0.50

No. 624.—German Silver Divider, 5½ inch, 50c.

No. 625.—German Silver Divider, 6½ inch, 75c.

No. 626.—German Silver, Beam Compasses, with Pen and Pencil Points, in Case, each \$5.00



No. 626

Loose — Brass and German Silver

No. 619.—1 Pair Compasses with Handle, 3½ inch with fixed Needle Point, Pen and Pencil Points, Brass, each 75c

No. 620.—The same as No. 619 German Silver, each \$1.00

No. 621.—Ditto extra fine instruments. German Silver, each \$2.00

No. 627.—Brass Beam Compasses with Pen and Pencil Points, in case each \$4.50

No. 628.—Hard wood Bars for Beam Compasses.

- 24, 30, 36 inch.
 35, 40, 45 cents.
 42, 48, 60 inch.
 50, 60, 75 cents.

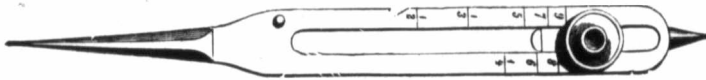
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 No. 632.—G
 No. 633.—G

No. 634.—G
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No. 640.—P
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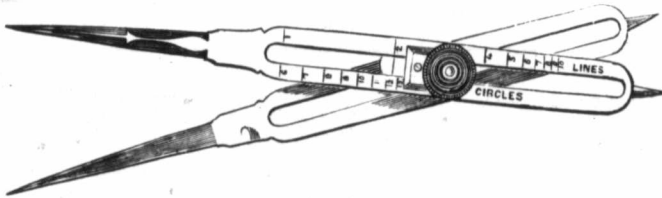
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 No. 645.—M
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Proportional Compasses



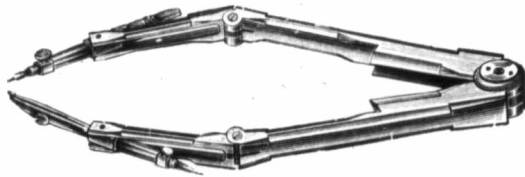
No. 630

- No. 630.—Brass. Proportional Dividers, 6½ inch, in case each \$1.75
- No. 631.—Brass. Proportional Dividers, 8 inch, in case " 3.50
- No. 632.—German Silver. Proportional Dividers, 6½ inch, in case " 2.25
- No. 633.—German Silver. Proportional Dividers, 8 inch, in case " 4.00



No. 634

- No. 634.—German Silver. Proportional Dividers, 6½ inch, divided for Lines, Circles, and Planes, in case each \$4.00
- No. 635.—German Silver. 8 inch ditto " 6.00
- No. 636.—German Silver. Proportional Dividers, 6½ inch, with Rack Movement, divided Lines, Circles Solids and Planes " 6.00
- No. 637.—German Silver. 8 inch ditto " 7.50
- No. 638.—German Silver. 9 inch ditto, fully divided, extra quality, not adjusting " 15.00
- No. 639.—German Silver. Proportional Dividers, 7 inch. Points bent rectangular, for Lines and Circles, in case " 5.50



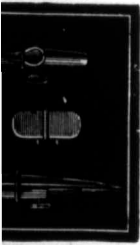
No. 640

- No. 640.—Pocket Dividers, with Folding Pen, Pencil and Needle Points, German Silver each \$4.50



No. 641

- No. 641.—Drawing Pen, Ebony Handle each \$0.15
- No. 642.—Drawing Pen, White Bone Handle, with Pin " 0.20
- No. 643.—Drawing Pen, with screw in middle. White Bone Handle, S. S. nut " 1.00
- No. 644.—Double R. R. Pen with screw in middle. White Bone Handle, S. S. nut " 2.00
- No. 645.—Music Pens for ruling Music Paper at one stroke of Pen, 6, 8, 11, 12 millimetres wide " 0.60



- Point, Pen, each \$0.75
- No. 613 " 1.25
- 1.00
- No. 614 " 1.50

Loose — Brass and German Silver

- No. 619.—1 Pair Compasses with Handle, 3½ inch with fixed Needle Point, Pen and Pencil Points Brass, each 75c
- No. 620.—The same as No. 619 German Silver, each \$1.00

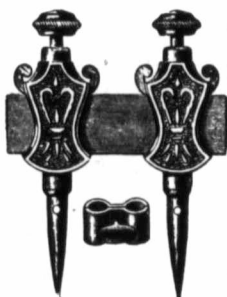
- No. 621.—Ditto extra fine instruments. German Silver, each \$2.00

- \$0.35
- 0.50

- No. 627.—Brass Beam Compasses with Pen and Pencil Points, in case each \$4.50

- No. 628.—Hard wood Bars for Beam Compasses.

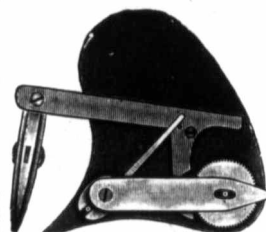
- 24, 30, 36 inch. 35, 40, 45 cents.
- 42, 48, 60 inch. 50, 60, 75 cents.



No. 646

No. 646. — Bronze Metal Trammel Points for Machinists, Carpenters, etc., to strike larger than those with an ordinary compass. Price, small size, \$1.25; medium, \$1.50; large \$2.00

Dotting Instrument



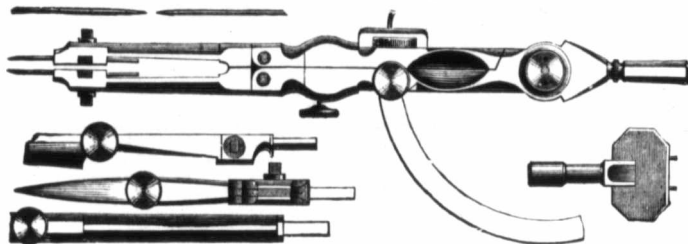
No. 647

No. 647. — Dotting Instrument of German Silver with 2 extra wheels, in case, \$3.75

This instrument answers the purpose of making dotted lines better than any other yet made. It consists of a small, conveniently shaped German

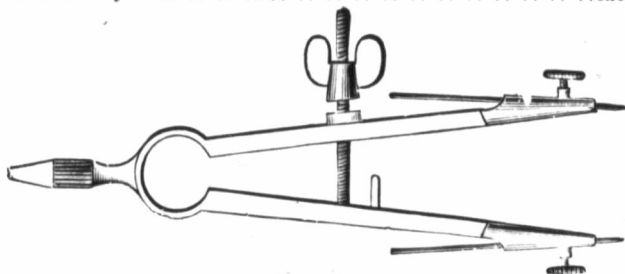
Silver plate, upon which is fastened a Pen connected by a small bar and a ratchet movement with a rolling wheel. The bar is kept in its place by a small spring.

Lithographic Compasses



No. 648

No. 648.—German Silver, very strong, with arc, set screw and micrometer adjustment, 8 inch. Pen, Pencil Points, Lenthening Bar and Wrench-Key each \$12.00



No. 649

No. 649.—Lithographic Spring Compass, with movable points, 6 in. long . . . \$3.00
 No. 650.—Lithographic Spring Compass, with movable points, 7 in. long . . . 4.00
 No. 651.—Ditto. German Silver, with movable points, 4½ in. long 6.00
 No. 652.—Ditto, German Silver, with movable points, 6½ in. long 7.50
 No. 653.—Lithographic Set of 2 Spring Bows, pen point and steel movable point, German Silver, bone handle, in case 6.00
 No. 654.—Engine Speed Indicators, with stop motion 1.50
 No. 655.—Registering Speed Indicators, with rubber tips for pointed and hollow centres 3.50

No. 656.—4
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No. 657.—D
No. 658.—4
R

No. 659.—5½
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No. 660.—D
No. 661.—D

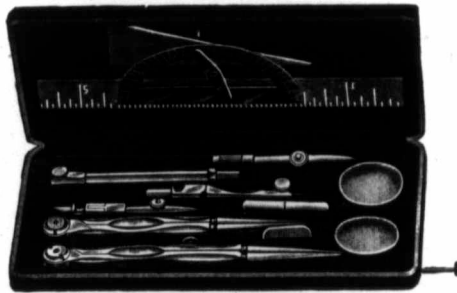
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Nickel Plated Instruments

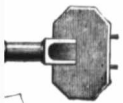


No. 647
bar and a ratchet
a small spring.

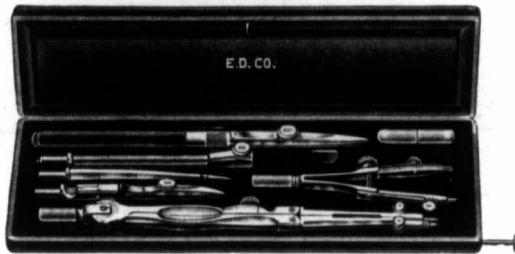


No. 657

- No. 656.—4½ in. Compass, Pen and Pencil Points, Ruling Pen, Box of Leads, Protractor, Ruler and Triangle in sliding bar lock case \$1.50
- No. 657.—Ditto, with Pair Divider, extra 2.00
- No. 658.—4½ in. Compass, Pen and Pencil Points, Lengthening Bar; Divider; Ruling Pen; Spring Bow Pen; Box of Leads and Key. 9 pieces. 3.00



micrometer
Bar and
each \$12.00

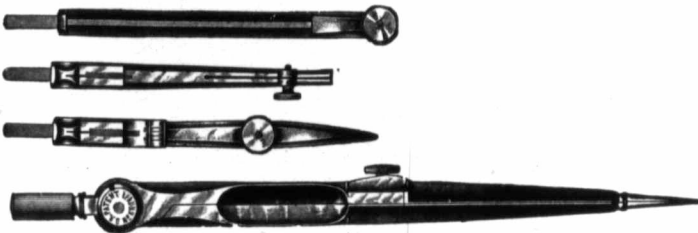


No. 659

- No. 659.—5½ in. Compass, Attached Needle Point, with Pencil and Pen Points, Lengthening Bar; Ruling Pen, Spring bow pen, Box of Leads and Key \$5.00
- No. 660.—Ditto, but with spring bow pencil 6.50
- No. 661.—Ditto, but with spring bow divider 7.50



n. long \$3.00
n. long 4.00
n. long 6.00
n. long 7.50
eel movable 6.00
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No. 662

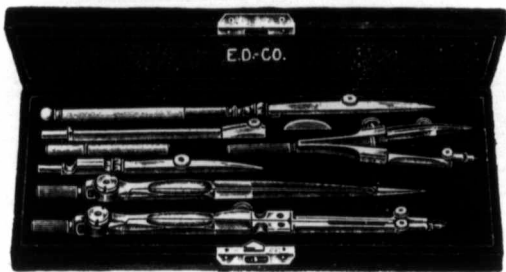
- No. 662.—Compasses, 6 in., with steel point, pen, pencil point and lengthening bar, each \$2.50
- No. 663.—Compasses, 6 in., with fixed needle point, pen, pencil point and lengthening bar, pivot joint, each 4.50

Fine German Silver Instruments



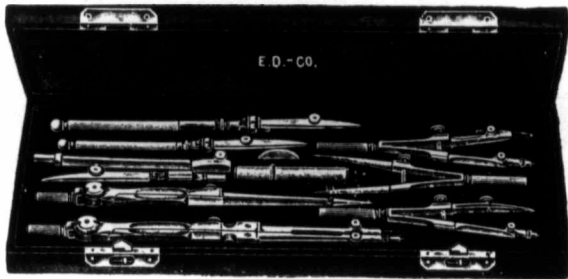
No. 664

No. 664.—3½ in. Compass, Needle Point, with Pencil and Pen Points, 4½ in. Spring back Ruling Pen, Box of Leads and Key \$5.00



No. 665

No. 665.—5½ in. Compass, Attached Needle Point, with Pencil and Pen Points, Lengthening Bar; Spring Bow Pen; 5 in. Spring-back Ruling Pen, Box of Leads and Key, 8 pieces \$7.50



No. 666

No. 666.—5½ in. Compass, Attached Needle Point, with Pencil and Pen Points, Lengthening Bar; 5 in. Divider with Hair-Line Spacing Attachment; Spring Bow Pencil, Spring Bow Pen, Spring Bow Divider; two Spring-back Ruling Pens, 4½ and 5 inches; Box of Leads and Key, 11 pieces \$10.00

No. 668. -
taining:
pen, 5 in.,
spring and
handle.

Detail Pe
with sprin
long lines.

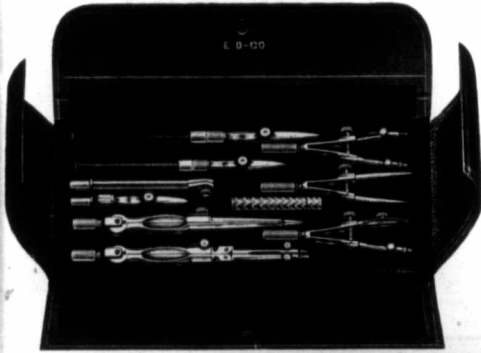
Steel Sprin
Dividers, 3
metal handl

Ditto, Pen
in.

Ditto, Pe
in.

Hairspring
ders, 6-in.,
joint.

Compasses
hairspring,
fixed needle
pen, pencil
and lengther



No. 667

No. 667.—Containing Ruling Pen, 4½ in., with spring and ebony handle.

Ditto, 5 in., ditto.

Steel Spring Bow Divider, 3 in., metal handle.

Ditto, Pencil, 3 in., ditto.

Ditto, Pen, 3 in., ditto.

Hairspring Divider, 4½ in., with pivot joint compass, 4½ in., with fixed needle point, pen and pencil points, and lengthening bar, pivot joint, box with lead and key, \$12.50

No. 668. — Containing: Ruling pen, 5 in., with spring and ebony handle.

Detail Pen, 6 in., with spring for long lines.

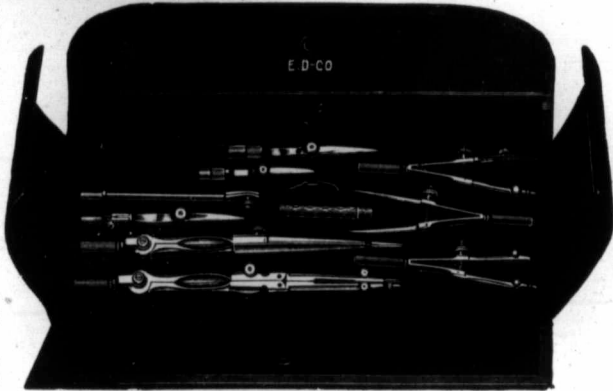
Steel Spring Bow Dividers, 3½ in., metal handle.

Ditto, Pencil, 3½ in.

Ditto, Pen, 3½ in.

Hairspring Dividers, 6 in., pivot joint.

Compasses, 6 in., hairspring, with fixed needle point, pen, pencil point and lengthening bar, pivot joint



No. 668

\$15.00

No. 669. — Containing: Ruling Pen, 4½ in., with spring and ebony handle.

Swedish Pen, 5 in.

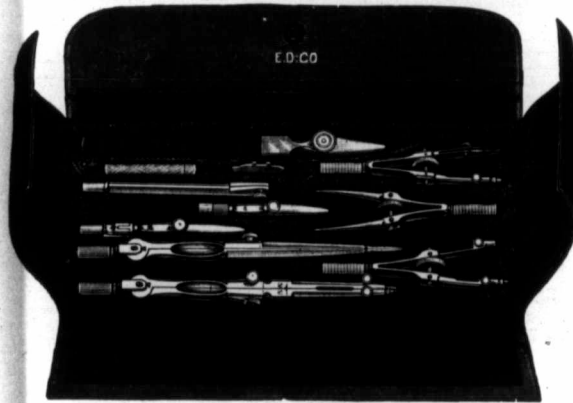
Steel Spring Bow Divider, 3½ in., metal handle.

Ditto, Pencil, 3½ in.

Ditto, Pen, 3½ in.

Hairspring Divider, 6 in., Union pivot joint and clamp.

Compasses, 6 in., with fixed needle point, pencil pen points and lengthening bar, Union pivot joint and clamp



No. 669

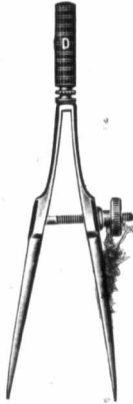
\$18.00

oints, 4½ in.
..... \$5.00

Pen Points,
Ruling Pen,
..... \$7.50

Pen Points,
tachment;
ider; two
and Key,
..... \$10.00

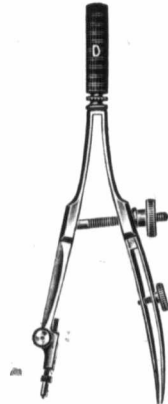
Spring Bows



No. 670



No. 671



No. 672

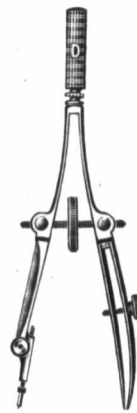
- No. 670.—Steel Spring Bow Divider, 3½ inch, Metal Handle \$1.00
- No. 671.—Steel Spring Bow Pencil, 3½ inch, Metal Handle 1.25
- No. 672.—Steel Spring Bow Pen, 3½ inch, Metal Handle 1.25
- No. 673.—The set of three Spring Bows in morocco case velvet lined 4.50



No. 674



No. 675



No. 676

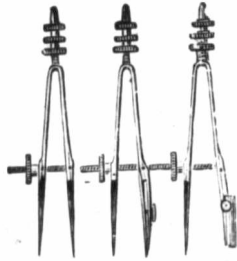
- No. 674.—Steel Spring Bow Divider, 3½ inch, Central Screw, Metal Handle . . . \$1.50
- No. 675.—Steel Spring Bow Pencil, 3½ inch, Central Screw, Metal Handle . . . 1.75
- No. 676.—Steel Spring Bow Pen, 3½ inch, Central Screw, Metal Handle 1.75
- No. 677.—The set of three Spring Bows in morocco velvet lined case 6.00

- No. 678.—S
- No. 679.—S
- No. 680.—S
- No. 681.—S
- No. 682.—S
- No. 683.—C

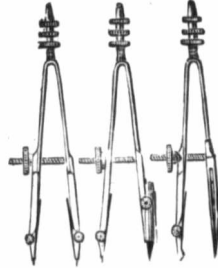


- No. 684.—Pl
- No. 685.—Pl
- No. 686.—D
- No. 687.—D
- No. 688.—D
- No. 689.—D
- No. 690.—D

English Spring Bows—Extra Quality



No. 678

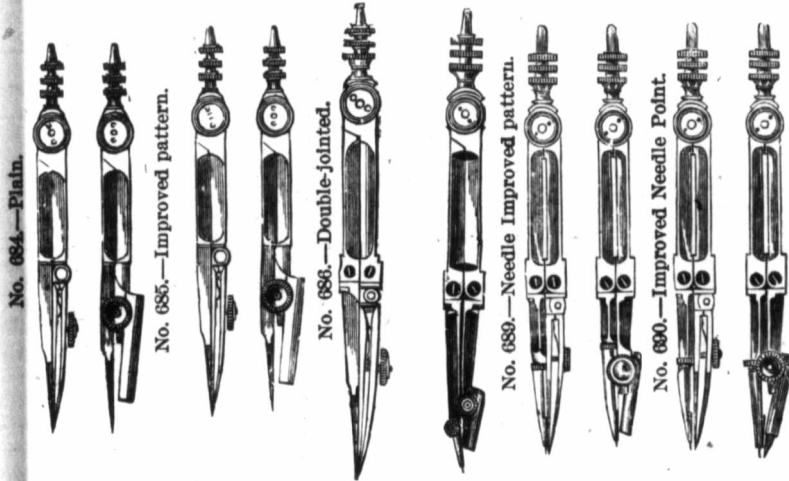


No. 679

Electrum.

- No. 678.—Spring Bows, set of three ink, pencil and divider, in case \$3.00
- No. 679.—Spring Bows, set of three, points to carry needles 4.00
- No. 680.—Spring Bows, set of three, new pattern, suitable for larger circles. 3.75
- No. 681.—Spring Bows, set of three, new pattern, points to carry needles. . . 5.50
- No. 682.—Spring Bows, set of three, with nut and bolt needle points 7.50
- No. 683.—Combination pen and pencil, spring bow 3.50

A single bow one third the price of set.



No. 684.—Plain.

No. 685.—Improved pattern.

No. 686.—Double-jointed.

No. 689.—Needle Improved pattern.

No. 690.—Improved Needle Point.

Electrum.

- No. 684.—Plain, ink or pencil each \$1.00
- No. 685.—Plain improved pattern 1.50
- No. 686.—Double-jointed plain points ink or pencil 2.00
- No. 687.—Double-jointed plain points improved pattern 2.50
- No. 688.—Double-jointed with points to hold needles, ink or pencil 2.50
- No. 689.—Double-jointed improved pattern 3.00
- No. 690.—Double-jointed with improved needle points 3.50

o. 672
 \$1.00
 1.25
 1.25
 ed 4.50

o. 676
 Handle . . . \$1.50
 Handle . . . 1.75
 dle 1.75
 se 6.00

English Instruments — (Continued)

POCKET CASES

No. 691. — Russia Leather Case, with Silver plate, containing the following extra quality Electrum instruments: 6 in. compass, with improved needle points, ink and pencil points, and two lengthening bars; improved hair divider, ink and pencil bows, with improved needle points, set of 3 needle spring bows, 2 drawing pens, pricker, ivory protractor, and architect's scale . . . \$35.00



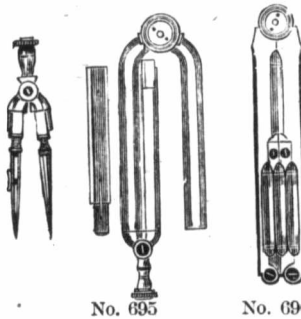
No. 691

No. 692. — Morocco Case, containing the following extra quality Electrum instruments: 6 in. double-jointed needle-pointed compass ink and pencil points and lengthening bar; ink and pencil double-jointed needle-pointed bows, set of three spring bows, hair divider, one drawing pen, one knife key. \$19.00

No. 693.—Morocco Case, containing the following extra quality Electrum instruments:—6 inch double-jointed needle-pointed compass, ink and pencil points, and lengthening bar; hair divider, ink and pencil double-jointed needle-pointed bows, one drawing pen, one pricker, one knife key \$15.00

No. 694.—Morocco Case, containing 6 inch sector-joint compass, ink and pencil points and lengthening bar; divider, ink and pencil bows, one drawing pen and pricker 7.50
With set of spring bows extra 3.00

POCKET COMPASSES



No. 695

No. 696

No. 695.—Pillar Compasses, forming set of instruments, ink and pencil points, drawout, in case, with lengthening bars. 12 in radius \$8.75

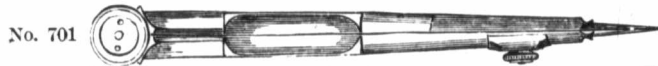
No. 696.—Napier Compass, ink and pencil points revolve, in case, with scale and box of leads 7.50

No. 697.—Napier Compass, Swiss Pattern in case 5.00

DIVIDERS



No. 699



No. 701

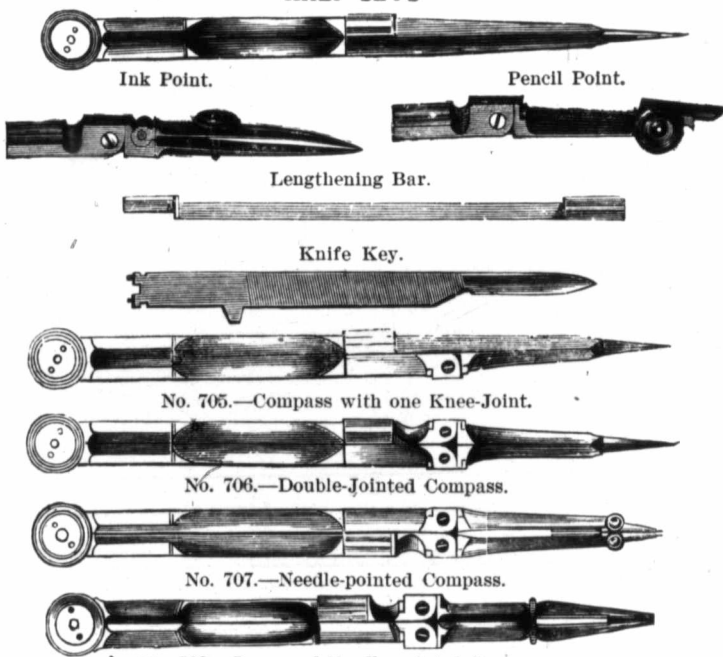
No. 698.—Steel-Joint, 4 and 6 in. \$1.00
No. 699.—Sector-Joint, 6 in. 1.50
No. 700.—Sector-Joint, with sheath to protect points, 4 in. \$1.25; 6 in. 2.50
No. 701.—Sector-Joint, with Hair Spring for fine adjustment 2.00
No. 702.—Sector-Joint, improved pattern 2.50

No. 704

No. 703.—St
No. 704.—Se
No. 705.—D
No. 706.—D
No. 707.—D
No. 708.—D
No. 709.—6
No. 710.—W
No. 711.—Le
No. 712.—Pe
No. 713.—Pe
No. 714.—Ne
No. 715.—Kn
No. 716.—Mo
No. 717.—W
No. 718.—Tr
Electrum
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No. 719.—El
No. 720.—Dr
cas

English Instruments — (Continued)

HALF SETS



No. 704

No. 692. — Morocco
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Electrum instru
ts: 6 in. double
ted needle-pointed
pass ink and pen
points and length
ag bar; ink and
cil double-jointed
dle-pointed bows
of three spring
rs, hair divider, on
wing pen, one knife
..... \$19.00
Electrum in-
ass, ink and
and pencil
one pricker,
..... \$15.00
nk and pencil
rs, one draw-
..... 7.5
..... extra 3.0

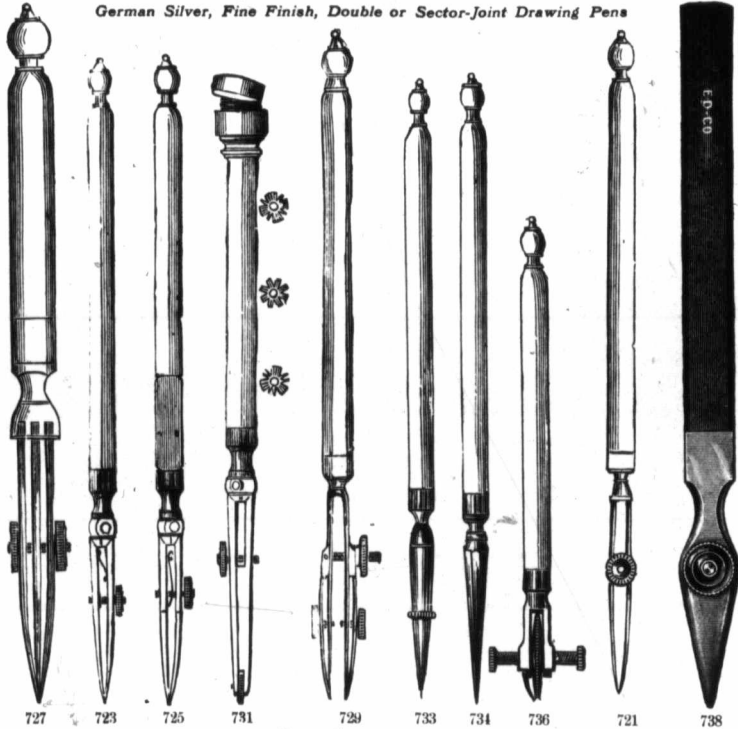
ASSES
Electrum
rming set of
pencil points,
lengthening
..... \$8.7
and pencil
e, with scale
..... 7.5
s Pattern in
..... 5.0
Electrum
..... \$1.0
..... 1.5
; 6 in. 2.5
..... 2.0
..... 2.5

- No. 705.—Compass with one Knee-Joint.
- No. 706.—Double-Jointed Compass.
- No. 707.—Needle-pointed Compass.
- No. 708.—Improved Needle-pointed Compass.
- No. 703.—Steel-joint Compass, ink and pencil, and lengthening bar \$2.50
- No. 704.—Sector-joint Compass, with ink and pencil points and lengthening bar 4.75
- No. 705.—Ditto, with one knee-joint to compass 5.50
- No. 706.—Ditto, with double-joints to compass 6.00
- No. 707.—Ditto, with points to hold needles 7.00
- No. 708.—Ditto, with improved needle points 9.00
- No. 709.—6 in. or 4½ in. Compass, with one needle point, ink and pencil point only 5.50
- No. 710.—Wheel point, with set of wheels fitted to above, extra 2.75
- No. 711.—Lengthening bar " " 1.25
- No. 712.—Pencil point " " 1.50
- No. 713.—Pen point " " 1.50
- No. 714.—Needle point " " 1.25
- No. 715.—Knife-key for above compasses 0.50
- No. 716.—Morocco cases for above half sets, extra 1.50
- No. 717.—Wholes and Halves or Bisecting compasses, 6½ in. long each 5.00
- No. 718.—Triangular compasses, 5 in. for taking off three points with move-
able bar, German Silver 4.50
- No. 719.—Ellipsograph compasses with pen and pencil points in case 2.50
- No. 720.—Drawing compasses with ¼ in. arc and rackwood German Silver, in
case 5.50

INSTRUMENTS CLEANED, REPAIRED AND COMPLETED

English Instruments — (Continued)

German Silver, Fine Finish, Double or Sector-Joint Drawing Pens



- No. 721.—Fine Steel, Ivory handle, $4\frac{1}{2}$ or 6 in. improved construction.. \$0.75
- No. 722.—Detail stout Ivory handle, .. \$1.25
- No. 723.—Turn up nib, ditto.. \$1.50
- No. 724.—Ditto, in square Ivory handle... \$1.75
- No. 725.—Ditto, with extra strong back nib and square ivory handle, \$2.00
- No. 726.—Red Ink, Ivory handle, all Elect .. \$1.00
- No. 727.—Bordering, ditto .. \$1.75
- No. 728.—Lithographic, ditto, improved, warranted hard for stone. . . \$1.50
- No. 729.—Double Railroad, Pen or Pencil, improved construction. . . \$2.50
- No. 730.—Plain dotting, one wheel, improved construction. \$1.50
- No. 731.—Dotting, with set of wheels in handle \$2.50
- No. 732.—Pricker or Needle Holder \$0.90
- No. 733.—Improved ditto \$1.00
- No. 734.—Steel Tracers, Ivory handle \$0.50
- No. 735.—Opsimeters, for measuring curved lines, roads on plans. . . \$1.50
- No. 736.—Ditto, divided into inches and tenths \$4.00
- No. 737.—Set of 3 fine Steel Drawing Pens, to fit one handle, in Morocco Case \$3.50
- No. 738.—Swedish detail pen, 6 in. ebony handle for long lines . . . \$1.75

All our Drawing Pens are made from best steel carefully tempered and accurately set for immediate use.

Drawing Pens Sharpened and Accurately Set at 15c. each

No. *725 is a new construction of Pen for Architectural and Mechanical Drawing the back nib is made very stiff, so that the nibs will not close by pressure; the upper nib is made of steel, with a tight joint to prevent lateral movement of the nibs a square on the handle indicates the true direction for holding the pen.

No. 739.—
No. 740
No. 741
No. 742
No. 743.—Be
No. 744.—Be
No. 745.—Be
No. 746.—Be
No. 747.—Ma
No. 748.—W
No. 749.—Do

Tubular Compasses

No. 739.—7 in. Tubular Compass, with improved solid bars, and keyed to prevent turning, with points to hold needles, in case. . . . Ex. quality \$12.50

No. 740  % size.



New improved Drawing Pen, without side screw. . . . each \$1.25

No. 741  % size.



New improved Curve Pen each \$1.25

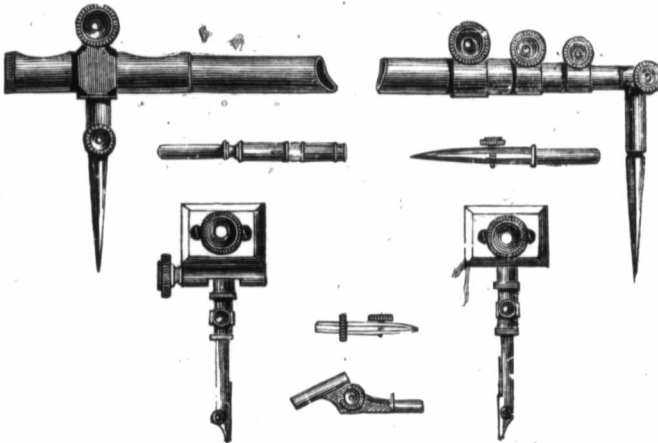
No. 742  % size.



New improved Railroad Pen each \$3.50

Beam Compasses

No. 746



No. 745

Electrum.

No. 743.—Beam Compasses, to fit any lathe, in case. \$4.00

No. 744.—Beam Compasses, with screw adjustment, in case 5.00

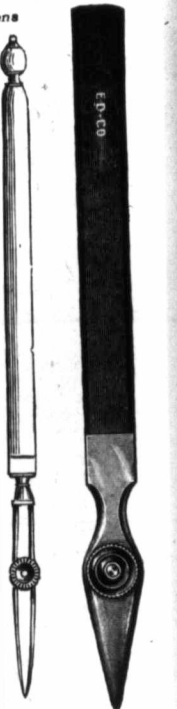
No. 745.—Beam Compasses, with points to hold needles, in case 6.50

No. 746.—Beam Compasses, Sliding Tubular, with ink and pencil points and screw adjustment 12.50

No. 747.—Mahogany Beam Compass lathe, 24 in., 35c; 36 in., 50c; 48 in. . . . 0.75

No. 748.—Wheel attachment for above Beam Compasses 2.25

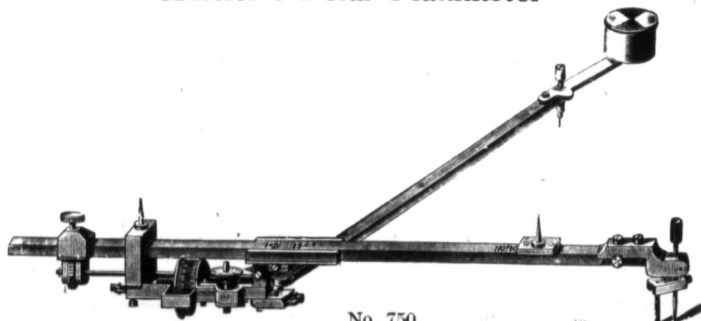
No. 749.—Double Road pens for above Beam Compasses 1.75



721
738
Ex. qual
g, with set of
... \$2.5
or Needle Holder
... \$0.6
ed ditto ... \$1.0
racers, Ivory handle
... \$0.5
sters, for measuring
on plans. . . \$1.5
divided into inches
... \$4.0
fine Steel Drawing
handle, in Morocco
... \$3.5
h detail pen, 6 in.
ng lines . . . \$1.5
ered and accurate

each
Mechanical Drawing
y pressure; the up
vement of the nib
he pen.

Amsler's Polar Planimeter



No. 750

- No. 750.—Amsler's Polar Planimeter each \$25.00
 No. 751.—Amsler's Polar Planimeter but with special arrangement for finding rapidly the mean height of indicator diagrams each 30.00
 The Planimeter is an instrument for calculating the contents of plans, maps or any other surface. It is most simple in its application, and gives the result with the greatest accuracy. Full directions accompany each instrument.



No. 752

- Metric Compendium Learner's set in box, 20 inches high, 16 inches wide, 8 inches deep \$15.00
 No. 752.—The above contains the following, 1 meter folding in 10 pieces, surveying chain, double decimeter, separating cube decimeter, Roberval balance $\frac{1}{2}$ kilo, also the following weights, 500, 200, 50 grammes weights, also following measures, $\frac{1}{2}$ litre, $\frac{1}{2}$ decilitre for wine measuring, $\frac{1}{2}$ litre, decilitre for milk measuring, double decilitre, centilitre, for oil measuring, litre, decilitre, wooden measure, also a box containing imitation of monies and a chart giving the weight, sizes and value of the pieces of monies. Very useful set for schools.
 No. 753.—Celestial and terrestrial globes, cosmographs, etc., imported to order. Prices quoted on application.
 No. 754.—Globe quadrants or meridian, $\frac{1}{4}$ inch brass for finding the latitude of any plan or any globe, brass with screw to fit on the meridian according to size, from \$2.00 to 3.00

No. 755.—F
 No. 756.—F
 No. 757.—S
 No. 758.—S
 No. 759.—G

No. 760.—P
 No. 761.—G

No. 762.—F
 No. 763.—H
 No. 764.—K
 No. 765.—P
 No. 766.—S
 No. 767.—G
 No. 768.—O
 No. 769.—O
 No. 770.—O
 No. 771.—O
 No. 772.—O
 No. 773.—S
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 reduced scale
 No. 774.—Rul
 No. 775.—Rul

- No. 755.—Patent Leads for Instruments, box containing 4 Leads .each \$0.15
- No. 756.—Needle Points, shoulder \$0.15 to 0.25
- No. 757.—Screw with German Silver head, for Dividers. " 0.20
- No. 758.—Screw with German Silver head, for Pens " 0.20
- No. 759.—German Silver nut for spring bows " 0.25

Compass Pencils



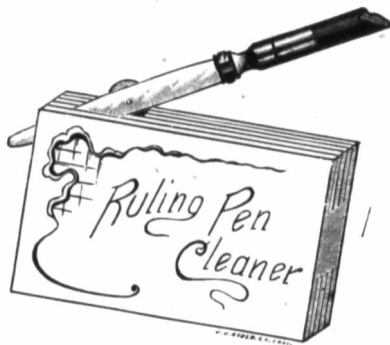
No. 763

- No. 760.—Plain Cedar, thin medium or thick for compassesper dozen \$0.50
- No. 761.—Graphite Compass, leads full length. Per box of 6 0.75

Drawing Pencils

- No. 762.—Faber's Pencils, all lettersper dozen \$0.50
- No. 763.—Hexagon Pencils, all letters, for Engineers and Architects. " 1.25
- No. 764.—Koni-Hoor pencils, all letters " 1.00
- No. 765.—Pencil improved sharpeners. 0.15
- No. 766.—Stylographic pens improved in box with filler 1.00
- No. 767.—Gilots mapping and Etching pen 0.25
- No. 768.—00170 Warranted box of 1½ doz. 0.15
- No. 769.—00303 Extra fine, box of 1 doz. 0.15
- No. 770.—00291 Mapping, card of 1 doz. and handle. 0.50
- No. 771.—00659 Crowquille, card of 1 doz. and handle 0.50
- No. 772.—001000 Superfine, drawing card of 1 doz. 1.00
- No. 773.—Soennecken's round writing for artistic printing or plans No. 1 broad to No. 6 fine, per box of 1½ doz. 0.15

Any other make of pens supplied



No. 774

The manner of using this Ruling Pen Cleaner is shown in the cut which is on a reduced scale.

- No. 774.—Ruling Pen Cleaners.each \$0.10
- No. 775.—Ruling Pen Cleanersper dozen 1.00

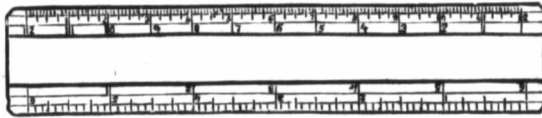
each \$25.00
 for finding
 each 30.00
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 50 grammes
 wine meas-
 cilitre, cen-
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 for schools.
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the latitude
 ae meridian
 3.00

**IVORY, BOXWOOD AND ENGINE-DIVIDED
Fully Divided Scales**

No. 776



Chain Scales

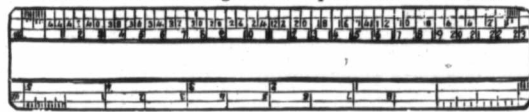
	Boxwood.	Ivory.	Ivory edged
No. 776.—6 in., fully divided, flat section, with any scales, 10 to 60 divisions to the inch, or crossed 30 and 60, 10 and 40, 20 and 50...	\$0.50	\$1.50	\$1.00
No. 777.—12 in. ditto	0.75	2.50	1.15
No. 778.—18 in. ditto	1.25		3.00
No. 779.—6 in. ditto, with from 70 to 100 divisions to the inch	0.75	2.00	
No. 780.—12 in. ditto, with from 70 to 100 divisions to the inch	1.00	3.00	
No. 781.—2 in. Offset Scale for 12 in. scale, 10 to 60.	0.20	0.60	0.50
No. 782.—2 in. Offset Scale for 12 in. scale, 70 to 100.	0.30	0.75	0.70

Architects' and Engineers' Fully Divided Scales

	Boxwood.	Ivory.	Ivory edged
No. 783.—12 in., flat section, with one or two scales only, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1 in., 1-16, 3-16, $\frac{3}{8}$, $\frac{1}{2}$ in., etc.	\$0.75	\$2.50	\$1.15
No. 784.—12 in. oval section, fully divided, containing $\frac{3}{8}$, $\frac{1}{2}$ and 3 in., or $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 in.	1.00	3.00	1.25
No. 785.—18 in. ditto	1.50	7.50	3.00

Architects' and Engineers' Open Divided Scales

No. 786



	Boxwood.	Ivory.	Ivory edged
No. 786.—12 in. open divided oval section, containing 4 scales, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ and 1 in., or $\frac{3}{8}$, $\frac{1}{2}$, $1\frac{1}{2}$ and 3 in.	\$0.75	\$3.50	\$1.15
No. 787.—18 in. ditto	1.50	5.00	3.00
No. 788.—6 in. open divided oval section, containing 8 scales, viz., $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, $\frac{3}{4}$, $1\frac{1}{2}$ and 3 in.	0.50	1.50	1.00
No. 789.—12 in. ditto	0.75	2.50	1.50
No. 790.—18 in. ditto	1.50	5.00	3.50

Universal Scales

No. 792



	Boxwood.	Ivory.	Ivory edged
No. 791.—6 in. Universal Builders' Scale, containing 16 scales...	\$0.50	\$1.50	
No. 792.—12 in. Universal Builders' Scale, containing 16 scales...	0.75	2.50	
No. 793.—6 in. Universal Architects' Scale, containing 17 scales..	0.50	2.50	
No. 794.—12 in. Universal Architects' Scale, containing 17 scales..	0.75	2.50	

	Metric Scales			
	10	20	30	50 cm. long
No. 795.—Flat Boxwood... each	\$0.40	\$0.75	\$1.00	\$1.50
No. 796.—Flat Ivory	2.00	3.00	4.00	

	Boxwood.	Ivory.	Ivory edged
No. 797.—12 in., with English Scale on one edge and French on the other, flat section	\$0.75	\$3.00	
No. 798.—2 in. Offset Scale for the above	0.30	1.00	

No. 799.—
No. 800.—
No. 801.—
No. 802.—
No. 803.—
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No. 866.—I
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No. 871.—O
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at
No. 873.—C
No. 874.—B
No. 875.—M
No. 876.—M
No. 877.—M
No. 878.—M
No. 879.—M
ed
No. 880.—M
ed
No. 881.—M
ed

Sets of Scales — in Cases

		Boxwood.	Ivory.
No. 799.—Sets of Scales for Architectural or Mechanical Drawing, consisting of eight 12 in. scales, in Mahogany case	\$9.50	\$15.00	
No. 800.—Set of Surveyors' Scales, six 12 in. scales, 10 to 60, with corresponding offsets, in Mahogany case	7.50	11.50	
No. 801.—Set of 6 metre Scales, 12 in., in Mahogany case, either metres and feet, or metres on both edges, and offsets.	7.50	11.50	
No. 802.—Case only, for 6 in. scales, \$1.00; for 12 in.	\$1.50		
No. 803.—Mahogany case, with lock, to hold six 12 in. scales, \$2.50, to hold ten, \$3.00			

Engine Divided Cardboard Scales

For Engineers, Architects, Draughtsmen, etc.

Every scale is ruled in the Dividing Engine, on a different slip of specially prepared Cardboard, 18 in. long, the figures and inscription having been previously printed dry. By this arrangement the confusion of crowded scales is entirely avoided, and any of them may be applied directly to the drawing, or compared with one another, without the employment of the compasses; and as from their thinness they pass under the T square, no offsets are required. The material of the scales, and of the drawing paper being identical, both are equally affected by climate or temperature, and expand or contract equally together.

Ordinary Drawing Scales

No. 864.—A series of 24 scales, consisting of the usual reductions of the foot, viz., 1-16, 1-12, $\frac{1}{4}$, 3-16, $\frac{1}{2}$, 5-16, $\frac{3}{8}$, $\frac{1}{8}$, $\frac{5}{16}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 1 $\frac{3}{4}$, 2, 2 $\frac{1}{2}$, 3, 4, 5, 6 inches to the foot, 3 lines of inches, divided into eighths, tenths and twelfths, and the English foot decimally divided. The set of 24 scales, in case	\$7.00
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Chain Scales

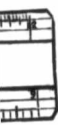
No. 865.—A series of 24 scales in Chains and Links, viz., 1, 1 $\frac{1}{2}$, 2, 2 $\frac{1}{2}$, 3, 4, 5, 6, 7, 8, 10, 12, 13-33, 15, 18, 20, 25, 30, 40, 50, 60, 70, 80, 100 chains to the inch. The set of 24 scales, in case	\$7.00
Single Scales of any of the above, and of many other varieties, kept in stock	each 0.30
No. 866.—Ivory Sector, 6 in., opens to 12 in.	2.00
No. 867.—Boxwood Sector, 6 in., opens to 12 in.	0.50
No. 868.—Ivory Plotting Scales, 6 in.	0.75
No. 869.—Boxwood Plotting Scales, 6 in.	0.15

Steel Draughting Scales 12 inch, Mechanical or Architectural

No. 870.—Flat Beveled Steel Scales, fully divided on four edges to $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 in. to the foot	\$1.75
No. 871.—Or divided to $\frac{3}{8}$, $\frac{1}{2}$, 1 $\frac{1}{2}$ and 3 in. to the foot	each 1.75
No. 872.—Same as above, but beveled on both sides, graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1, and $\frac{3}{8}$, $\frac{1}{2}$, 1 $\frac{1}{2}$ and 3 in. to the foot	1.75
No. 873.—Chesterman's Patent Steel Chain Scales, 12 in.—	
10	\$1.00
20	\$1.00
30	\$1.25
40	\$1.25
50	\$1.50
60 to the inch.	\$1.50

School Rules

No. 874.—Boxwood School Rule, 12 in., 1-16ths and $\frac{1}{8}$ ths	each \$0.15
No. 875.—Maple School Rule, 12 in., 1-16ths.	0.10
No. 876.—Maple School Rule, divided to eighths, 12 in., brass edge in laid	0.20
No. 877.—Maple School Rule, divided to eighths, 18 in., brass edge in laid	0.30
No. 878.—Maple School Rule, divided to eighths, 24 in., brass edge in laid	0.40
No. 879.—Maple School Rule, divided to millimeters, 30 cm. long, brass edge in laid	0.30
No. 880.—Maple School Rule, divided to millimeters, 40 cm. long, brass edge in laid	0.40
No. 881.—Maple School Rule, divided in millimeters, 50 cm. long, brass edge in laid	0.50



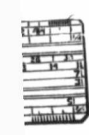
Ivory. Ivory edged
\$1.50 \$1.00
2.50 1.15
3.00

2.00
3.00
0.60 0.50
0.75 0.70

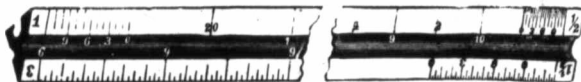
Ivory. Ivory edged
\$2.50 \$1.15
3.00 1.25
7.50 3.00



Ivory. Ivory edged
\$3.50 \$1.15
5.00 3.00
1.50 1.00
2.50 1.50
5.00 3.50



Boxwood. Ivory
... \$0.50 \$1.50
... 0.75 2.50
s... 0.50 2.50
s... 0.75 2.50
50 cm. long
00 \$1.50
00
Boxwood. Ivory
the \$0.75 \$3.00
... 0.30 1.00



No. 882 Boxwood. Ivory edge

- No. 882.—Architects' Triangular Scale, of Boxwood, 18 in. long, graduated 3-32, 3-16, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 3 in. and 16ths to the foot \$2.00
- No. 883.—Ditto, 12 in. long 1.00 \$2.25
- No. 884.—Ditto, 6 in. long 0.75 1.75
- No. 885.—Engineers' Triangular Scale, of Boxwood, 18 in. long, graduated 10, 20, 30, 40, 50 and 60 to the inch; or 20, 30, 40, 50, 60 and 80 to the inch 2.50
- No. 886.—Ditto, 12 in. 1.00 2.25
- No. 887.—Ditto, 6 in. graduated 0.75 1.75
- No. 888.—Triangular Scales, of Boxwood, for Offsets, 2 in. long, 10, 20, 30, 40, 50 and 60 parts 0.50 1.00
- No. 889.—Triangular Rubber Scale, divided 3-32, 3-16, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, 1, 1 $\frac{1}{2}$ and 3 in. to the foot, 1-16 in., 6 in., each 2.50
- No. 890.—Ditto, 12 in., " 4.00
- No. 891.—Triangular Rubber Chain Scale, divided 10, 20, 30, 40, 50, 60 parts per in., 6 in., each 2.50
- No. 892.—Ditto, 12 in., " 4.00

No. 902.—I
No. 903.—I
No. 904.—I
No. 905.—I
No. 906.—I
No. 907.—I
No. 908.—I
No. 909.—I
No. 910.—I
No. 911.—I
No. 912.—I
No. 913.—I

Metallic Triangular

- No. 893.—12 in., divided to scales of 3-16, 3-32, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, 1, 1 $\frac{1}{2}$ and 3 in. to the foot and 16ths of inches each \$3.00
- No. 894.—12 in., divided on one edge each to 10ths, 20ths, 30ths, 40ths, 50ths, 60ths and 80ths of inches 3.00

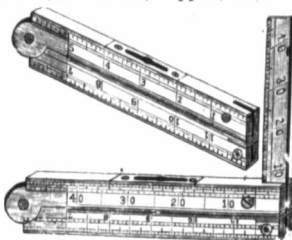


No. 895.—Triangular Scale Guard, nickel platedeach \$0.25



Glaziers' or Stationers' Rules

- No. 896.—36 in., capped, double rows of figures on each side. each \$1.00
- No. 897.—48 in., capped, inches to 8ths and 16ths on each side. " 1.00
- No. 898.—60 in., capped, inches to 8ths and 16ths on each side. " 1.00



No. 899 $\frac{1}{2}$ size.

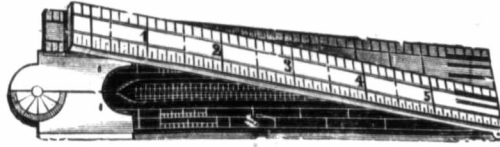
Combination Rules

No. 899. — This is the most convenient and useful Pocket Rule ever made; it combines in itself a Carpenter's Rule, Spirit Level, Square, Plum Bevel, Indicator, Brace, Draughting, Scale of equal parts, T Square Protractor, Rightangle, Triangles and with a Straight Edge can be used as a Parallel Rule, all the parts being in their separate applications perfectly reliable. Boxwood, 1 foot, 2 feet each \$2.00

No. 914.—1
No. 915.—2
No. 916.—3
No. 917.—4
No. 918.—In
No. 919.—In
No. 920.—In
No. 921.—Ch
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No. 922.—Bo
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- No. 900.—Tailors' Squares, hand graduated on short arm in 32nds, 8ths, 4ths and halves, long arm 24ths, 12ths, 6ths, 3rds and $\frac{1}{2}$; other side graduated inches and 8ths. \$1.00
- No. 901.—Tailors' Squares, hand graduated on short arm in 24ths, 12ths, 6ths, 3rds and $\frac{1}{2}$, long arm 32nds, 8ths, 4ths and halves; other side graduated inches and 8ths 2.00

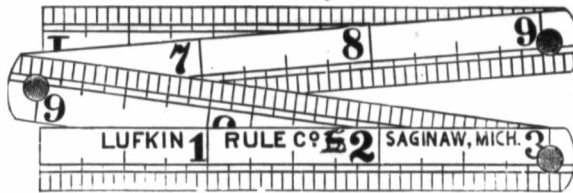
Pocket Scale Rules



No. 900

- No. 902.—Plain boxwood, 1 foot, four fold, 8th and 16th, $\frac{3}{8}$ in. wide.....each \$0.25
- No. 903.—Plain boxwood, 1 foot, four fold, bound, 8th and 16th, $\frac{3}{8}$ in. wide " 0.50
- No. 904.—Ivory, 1 foot, four fold, 8th, 10th, 12th and 16th, $\frac{1}{2}$ in. wide.... " 2.50
- No. 905.—Ivory, 1 foot, four fold, fully divided, $\frac{1}{2}$ in. wide..... " 3.50
- No. 906.—Plain boxwood, 2 feet, four fold, 8th, 10th, 12th, 16th and draughting scales, 1 in. wide..... " 0.50
- No. 907.—Best boxwood, 2 feet, four fold, fully divided, 1 in. wide..... " 1.50
- No. 908.—Ivory, 2 feet, four fold, 8th, 10th, 12th and 16th, $\frac{3}{8}$ in. wide.... " 4.50
- No. 909.—Ivory, 2 feet, four fold, fully divided, 1 in. wide..... " 7.00
- No. 910.—Boxwood, 2 feet, 6 fold, 8th, 10th, 12th and 16th, $\frac{3}{8}$ in. wide... " 0.75
- No. 911.—Ivory, 1 foot, four fold, caliper rule, $\frac{1}{2}$ in. wide..... " 4.50
- No. 912.—Boxwood, 2 feet, two fold, Routledge engineer's slide rule.... " 3.00
- No. 913.—Boxwood, 6 in., Isographs for giving angles, German Silver.... " 2.00

Folding Pocket Steel Rule



No. 914

$\frac{1}{2}$ and 3 in. to each \$3.00
40ths, 50ths, 3.00

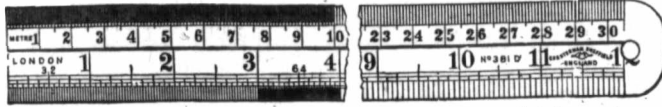


each \$1.00
" 1.00
" 1.00

Rules

- No. 914.—1 foot folding, $\frac{3}{8}$ in. wide, 4 fold, 3 in. joints.....each \$0.50
 - No. 915.—2 feet folding, $\frac{3}{8}$ in. wide, 8 fold, 3 in. joints..... " 1.00
 - No. 916.—3 feet folding, $\frac{3}{8}$ in. wide, 9 fold, 4 in. joints..... " 1.25
 - No. 917.—4 feet folding, $\frac{3}{8}$ in. wide, 12 fold, 4 in. joints..... " 1.50
- Chesterman's Patent Steel Folding Pocket Rules**
- | | | | |
|--------------------------------------|---------|---------|---------|
| | 1 foot. | 2 feet. | 3 feet. |
| No. 918.—In Joints of 3 inches..... | \$0.25 | \$0.40 | \$0.60 |
| No. 919.—In Joints of 6 inches..... | 0.40 | 0.75 | 1.00 |
| No. 920.—In Joints of 12 inches..... | | 0.75 | |
- No. 921.—Chesterman's Patent Machine-Divided Graduated Steel Rule and Square combined, with one stop joint, graduated on 3 edges, 16, 32, 64, 10, 20, 50, 100, 24, 48 and 96ths of an inch, and millimetres and halves on one edge,.....each 1.50 2.25
- No. 922.—Boxwood folding pocket rule, metric measurement, in 10 parts.....each 0.10

nds, 8ths, 4ths
%; other side
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24ths, 12ths,
res; other side
2

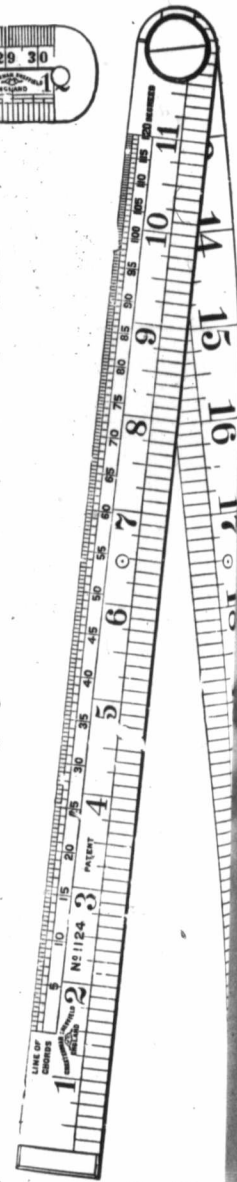


No. 933

**Chesterman's Improved Machine-Divided
Steel Rules—Nickel Plated**

These Rules are made of the best hardened and tempered steel, true and straight on the edges, and machine divided with great exactness; hole at one end, so that they can be hung up at the bench.

No.	Width and Thickness Marked, on two edges	$\frac{3}{8}$ in. x 21 W. G.		$1\frac{1}{2}$ in. x 19 W. G.	
		4	6	12 in.	30 cm.
923	Inches into 8ths, 16ths, 32nds, 64ths each	0 25	0 40	0 50	.....
924	Ditto, 8ths, 12ths, 24ths, 32nds, 48ths, 64ths "	0 25	0 40	0 50	.....
925	Ditto, 10ths and 16ths "	0 20	0 30	0 40	.....
926	Ditto, 8ths, 10ths, 20ths, 32nds, 50ths, 64ths "	0 25	0 40	0 50	.....
927	Ditto, 8ths, 10ths, 20ths, 32nds, 50ths, 64ths and 100ths . . . . . "	.....	0 40	.....	.....
928	Centimetres into millimetres . . . . . "	.....	.....	.....	0 50
929	Centimetres into millimetres and halves . . . . . "	.....	.....	.....	0 75
930	Centimetres into millimetres, inches into 16ths "	0 25	0 40	0 50	.....
931	Centimetres into millimetres, inches into 10ths . . . . . "	.....	.....	0 50	.....
932	Centimetres into millimetres, inches into 12ths . . . . . "	.....	.....	0 50	.....
933	Centimetres into millimetres and halves, inches into 16ths, 32nds and 64ths "	0 30	0 50	0 75	.....
<i>Marked, on four edges</i>					
934	Inches into 8ths, 16ths, 10ths and 12ths . . . . . "	.....	.....	0 60	.....
935	Ditto, 8ths, 10ths, 12ths, 16ths, 20ths, 24ths, 32nds, 48ths, 50ths and 64ths . . . . . "	.....	.....	0 75	.....
936	Ditto, 10ths, 12ths, 16ths, 20ths, 24ths, 32nds, 48ths, 50ths, 64ths, 96ths and 100ths . . . . . "	.....	.....	1 00	.....



No. 937

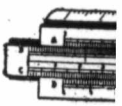
No. 937.—Chesterman's machine divided jointed rule, 2 ft. x $\frac{3}{8}$ x 19 M. G. and German Silver ends, inches on both sides into 8ths or 16ths. \$0.75

Depth G

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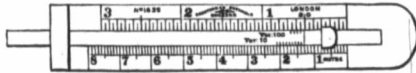
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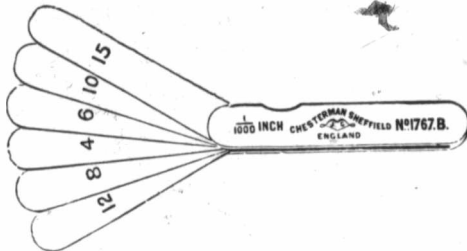
Depth Gauge for Engineers, etc., for Measuring Depths of Holes, Recesses, etc.



No. 938

No. 938.—4 inches long divided to read by vernier to inches and 100ths and to millimetres and tenths. The other side is for use as a rule and is marked into inches and 64ths and millimetres and halves . . . each \$1.75

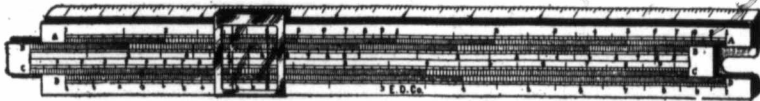
No. 939



Steel Feeler Gauges for Engineers, etc.

No. 939.—These gauges consist of sets of tempered steel blades of varying thickness for gauging purposes, one blade 3 x ½ in. of each, 4, 6, 8, 10, 12, 15-1000th of inch, and folding in case . . . each \$0.75

Faber's Improved Calculating Slide Rule



No. 943

The number and variety of problems that can be worked out with the aid of this calculating rule is almost endless.

No. 940.—A. W. Faber's slide rule covered with celluloid surface and instructions . . . \$3.50

No. 941.—A. W. Faber's Improved calculating slide rule, with slide spring and digit registering cursor Boxwood celluloid surface and book of instructions . . . 4.50

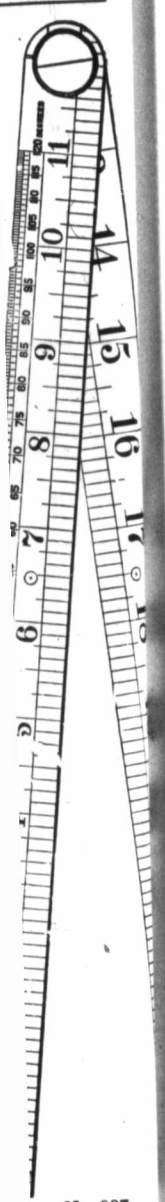
No. 942.—Extra cursor for Faber's slide rule . . . 0.75

No. 943.—Improved slide rule with spring for compensating wear and atmospheric changes, 10 in. Boxwood divisions on white ivory and glass indicator with printed instructions . . . 4.50

No. 944.—Boucher's Calculigraph, watch size, with book of instructions. . . 8.00

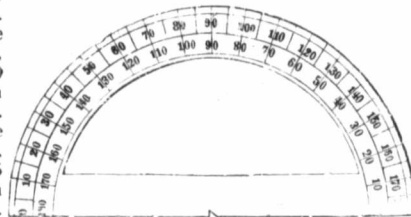
No. 937

G. and
... \$0.75



Protractors of Horn, Brass, German Silver and Vulcanite

- No. 945. — Horn Protractors, 4 in. diameter, whole circle, half degrees. \$1.00
- No. 946. — Horn Protractors, 5 in. diameter, whole circle, half degrees. \$1.25
- No. 947. — Horn Protractors, 6 in. diameter, whole circle half degrees. \$1.50



No. 945

- No. 948. — Horn Protractors, 4 in. diameter, half circle, whole degrees. \$0.25
- No. 949. — Horn Protractors, 5 in. diameter, half circle, half degrees. \$0.40
- No. 950. — Horn Protractors, 6 in. diameter, half circle, half degrees. \$0.50

- No. 951.—Horn Protractors, 7 in. diameter, half circle, half degrees. \$0.60
- No. 952.—Horn Protractors, 8 in. diameter, half circle, half degrees. 0.75
- No. 953.—Railroad Curve Protractor of Horn, 8 in. diameter, having laid off on it curves, from 1/2 degree to 8 degrees, with a radius of 400 feet to the inch 1.50
- No. 954.—Horn Rectangular Protractor, 6 in. long, 2 1/4 in. wide, divided around edge from 0 to 180 degrees in—degrees 0.60
- No. 955.—Horn Embankment Protractor 1.50
- No. 956.—Brass Protractor, 4 in. diameter, half circle, whole degrees 0.10
- No. 957.—Brass Protractor, 4 in. diameter, half circle, half degrees 0.25
- No. 958.—Brass Protractor, 5 in. diameter, half circle, half degrees 0.40
- No. 959.—Brass Protractor, 6 in. diameter, half circle, half degrees 0.50
- No. 960.—German Silver Protractor, 4 in. diameter, half circle, whole degrees. 0.50
- No. 961.—German Silver Protractor, 5 in. diameter, half circle, half degrees. 0.75
- No. 962.—German Silver Protractor, 6 in. diameter, half circle, half degrees. 1.00
- No. 963.—German Silver Protractor, 8 in. diameter, half circle, half degrees. 1.25
- No. 964.—German Silver Protractor, 5 in. diameter, half circle, beveled edge, 1/2 degree 1.25
- No. 965.—German Silver Protractor, 6 in. diameter, half circle, beveled edge, 1/2 degree 1.50
- No. 966.—German Silver Protractor, 8 in. diameter, half circle, beveled edge, 1/2 degree 2.00

Fine Circular Protractors — English

	6 in.	8 in.	10 in.
No. 967.—German Silver, divided to half degrees	\$6.00	\$7.50	\$10.00
No. 968.—Brass, divided to half degrees	4.00	6.00	8.00
No. 969.—Vulcanite, or white celluloid, divided to half degrees	2.00	3.00	4.00
No. 970.—Celluloid transparent, divided to half degrees.	1.50	2.00	2.75

Fine Semi-Circular Protractors — English

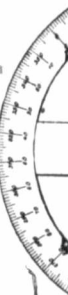
	6 in.	8 in.	10 in.
No. 971.—German Silver, divided to half degrees	\$2.50	\$3.50	\$5.00
No. 972.—Brass, divided to half degrees	1.75	2.50	4.00
No. 973.—Vulcanite, divided to half degrees	0.75	1.25	2.00
No. 974.—Celluloid transparent, divided to half degrees.	0.75	1.00	1.50

No. 975.

No. 976.—

No. 977.—

Extra E



No. 981.—D

No. 982.—C

No. 983.—D

No. 984.—D

No. 985.—C

No. 986.—D

No. 987.—C

No. 988.—D

No. 989.—C

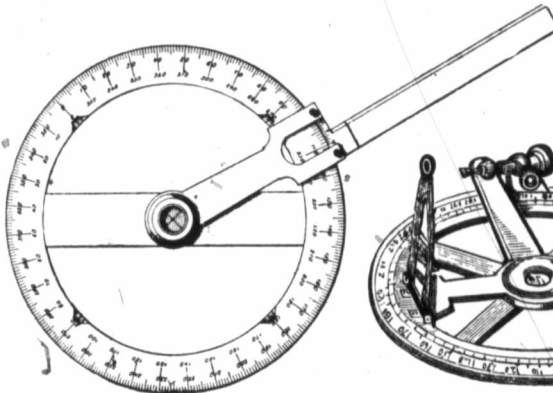
No. 990.—D

Boxwood and Ivory Protractors

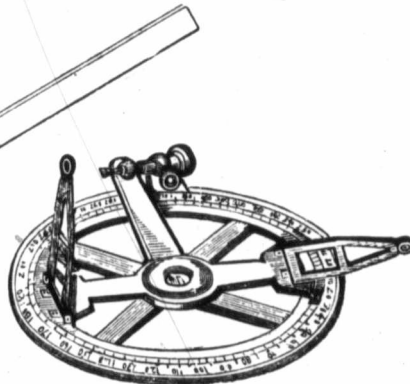
Boxwood. Ivory.

- No. 975.—Boxwood, rectangular, 6 in. long, 1½ in. wide, divided in whole degrees 0 to 180, scales of ½, ⅓, ¼, ⅕, ⅙, ⅑, ⅒ and 1 in. to foot; scale of chords, 30, 35, 40, 45, 50, 60 parts to in., and diagonal scale each \$0.75 \$2.00
- No. 976.—6 in. Ivory Parallel and Protractor combined " 3.00
- No. 977.—Ivory Protractor, rectangular, 12 in. long, 2½ in. wide, divided in ½ degrees, ⅓, ¼, ⅕, ⅙, ⅑, ⅒, 1, 1½, 1¾, 1⅞, 1⅚ in. scales; scale of chords, diagonal scale, scales of 10, 15, 20, 25, 30, 35, 40, 45, 50, 60 parts per in. 8.00

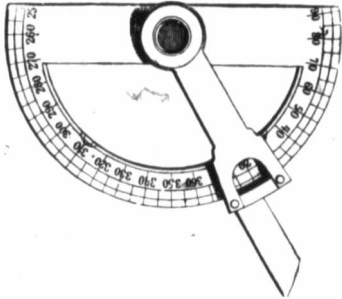
Extra Fine Protractors of German Silver, with Arms and Verniers



No. 982



No. 985



No. 978

- No. 978.—Semi-circular fine German Silver Protractor, with Horn centre, Vernier reading to 3 minutes, 6 in., ½ degrees, in case. each \$13.50
- No. 979.—Ditto, 8 in., ¼ degrees, " \$17.50
- No. 980.—Ditto, reading to 1 minute, 10 in., ¼ degree, . . . each \$21.00
- No. 980a.—Semi-circular Protractor, German Silver, with Horn centre, moveable arm, 6 in., ¼ degrees, each \$10.00

- No. 981.—Ditto, 7 in., ¼ degrees each 13.50
- No. 982.—Circular fine German Silver Protractor, with Horn centre, Vernier reading to 3 minutes, 6 in., ½ degrees, in case. each 17.50
- No. 983.—Ditto, 8 in., ¼ degrees each 21.00
- No. 984.—Ditto, Vernier reading to 1 minute, 10 in., ¼ degrees each 25.00
- No. 985.—Circular Brass Protractor, divided on Silver with clamp and tangent screw adjustment, folding arms, 2 Verniers reading to 1 minute, 6 in., in mahogany case. each 35.00
- No. 986.—Ditto, reading to 20 seconds, 8 in. each 50.00

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948. — Horn
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whole de-
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949. — Horn
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half degrees.
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950. — Horn
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8 in. 10 in.

\$7.50 \$10.00

6.00 8.00

3.00 4.00

2.00 2.75

8 in. 10 in.

\$3.50 \$5.00

2.50 4.00

1.25 2.00

1.00 1.50

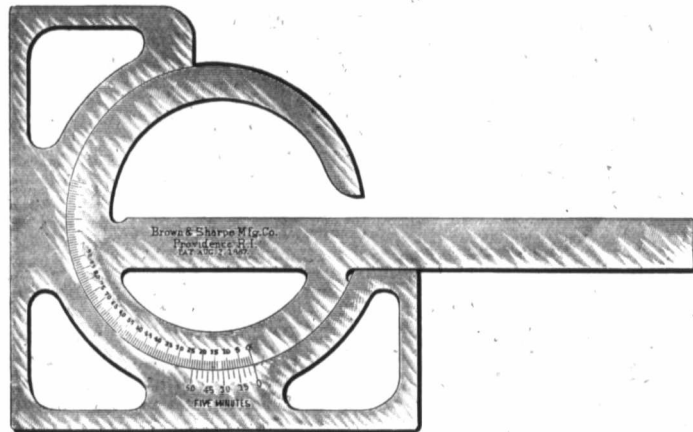
Paper Protractors

No. 987.—Half Circle Protractor, 5 in. diameter, $\frac{1}{2}$ degrees, on Bristol board, each	each	\$0.30
No. 988.—Whole Circle Protractor, 8 in. diameter, $\frac{1}{2}$ degrees, on Drawing paper, printed in Red or Black	each	0.40
No. 989.—Whole Circle Protractor, 14 in. diameter, $\frac{1}{2}$ degrees, on Drawing paper, printed in Red or Black	each	0.50
No. 990.—Same as No. 726, on Bristol Board	"	0.50
No. 991.—Same as No. 727, on Bristol Board	"	0.60
No. 992.—Same as No. 726, on Vegetable Tracing Paper	"	0.40

Engine Divided Circular Card Protractors Outside and Inside Edges Cut

No. 993.—Divided on the external diameter, 12 in., \$1.50; 15 in.	\$2.75
No. 994.—Divided on the internal diameter, 12 in., \$2.00; 15 in.	3.50

The Draughtsman Protractor



No. 995

No. 995.—This Protractor can be quickly set to any angle, it can be used either side up and on either of the two straight edges and it is of advantage in dividing a circle transferring angle without resetting on either side of a line, the vernier reads to five minutes, it forms a convenient extension to a Tee Square and frequently takes the place of 45° and 60° triangles, in morocco case \$9.50



less than same size beveled by thirteen n equivalent

No. 997.—me

No. 998.—me stor

This pa iper is sh measures eighths of inch. In r paper, car other yel

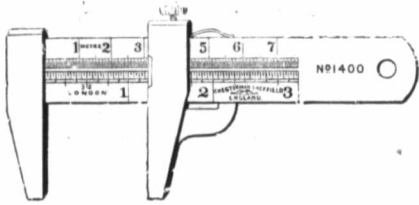


No. 999.—P

No. 1000.—

Any ot

Steel Caliper Gauges

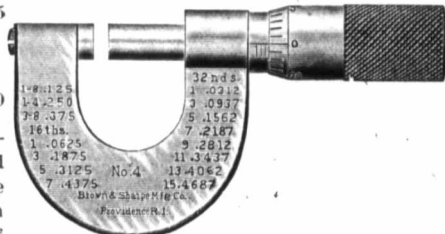


No. 996

No. 996.—This is a very handy instrument for machinist, engineers, etc., divided on one side inches into 32ds. and centimetres in millimetres and halves, each \$2.00

This caliper measures all sizes less than one half inch by thousands of an inch the outer end of the frame is the same size as the measuring spindle and the edges of the measuring surfaces are not beveled but are left square, this caliper is also made to measure all sizes less than thirteen millimetres by hundredths of a millimetre, when so made the table of equivalents is omitted.

No. 997.—English or metric measure in case, each \$6.25

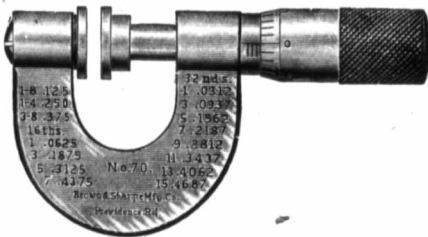


No. 997

No. 998.—English or metric measure with ratchet stop in case, . . . each 6.90

This paper gauge micrometer caliper is shown full size in cut and measures all sizes less than three eighths of an inch by thousand of an inch. In measuring the thickness of paper, cardboard, sheet rubber or other yielding substance it is ad-

vantageous to use micrometre calipers provided with dics or washers on the ends of the measuring spindle and adjusting screw, the comparatively large size have less tendency to compress the object measured and enable accurate measurement to be quickly obtained. This caliper is also made to measure all sizes less than nine millimetres by hundredth of a millimetre. When so made the table of equivalents is omitted.



No. 999

No. 999.—Paper gauge micrometre caliper, English or metric measure, in case. \$7.50

No. 1000.—Paper gauge micrometre caliper, English or metric measure, with ratchet stop 8.00

Any other calipers can be supplied to order.

board, each \$0.30

wing each 0.40

wing each 0.50

" 0.50

" 0.60

" 0.40

and

. . . \$2.75

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Wooden Blackboard Dividers, for Crayon or Lead Pencil



No. 1001

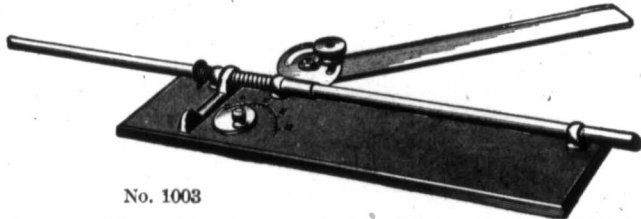
An excellent Tool for spacing and ruling lines, at regular distances apart. A most simple, and satisfactory device, it will bear rough handling without getting out of order. Will continue for years, to do accurate and beautiful work. The movements of the ruler are exact, and positive, and it can be set for any width or ruling.

No. 1001.—	12	15	18	24	inch.
	\$1.25	\$1.50	\$1.75	\$2.00	each.
No. 1002.—With Arc and Clamp.	12	15	18	24	inch.
	\$1.75	\$2.00	\$2.50	\$3.00	each.



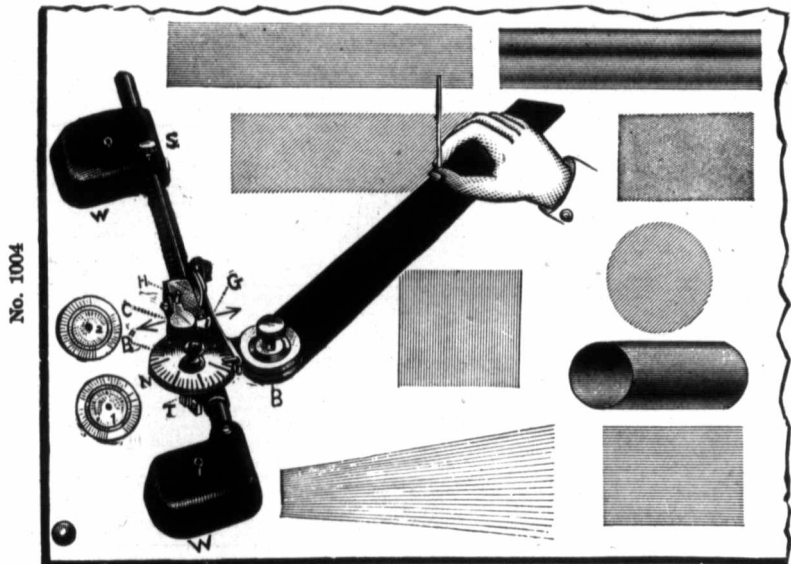
No. 1002

Section Liners



No. 1003

No. 1003.—Practical Section Liner, of Hardwood, with nickel-plated mountings, in caseeach \$2.00

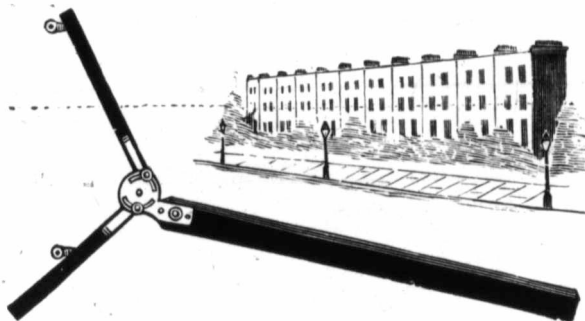


No. 1004

No. 1004.—Improved Section Liner, made 14 in. longeach \$8.50

No. 1005.—
No. 1006.—
No. 1007.—

No. 1008.—
No. 1009.—
No. 1010.—
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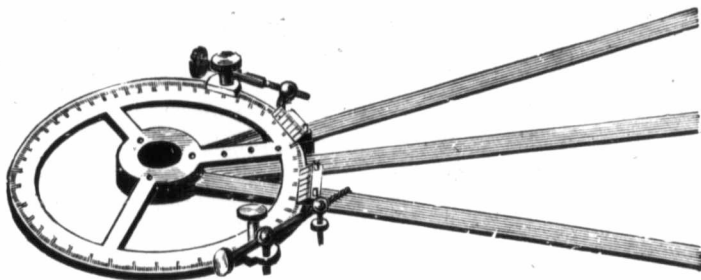


No. 1005

No. 1005.—Centrollneads, for drawing perspective, with ebony bars and brass mountings, complete with studs, superior quality each **\$7.00**

No. 1006.—Ditto, electrum mountings " **8.50**

No. 1007.—Eccentrollneads for drawing eccentric lines, Ivory and German Silver " **3.00**



No. 1008

No. 1008.—Station Pointers or three arm Protractor, 8 in. divided on silver, with lengthening bars extending to 36 in., with vernier reading to minute, clamp and tangent screw, in case **\$80.00**

No. 1009.—Ditto, 4½ in. divided on silver, with lengthening bars extending to 20 in., with vernier reading to minute clamp and tangent screw, in case **60.00**

No. 1010.—Plane table board, 13¼ x 11 in., with Levelling adjustment and clamp, trough compass, right rule and straight edge complete with tripod, in strong case **\$2.00**



No. 1002



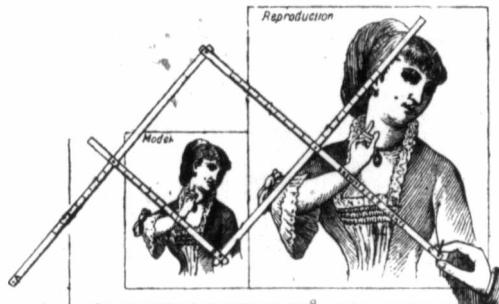
autiful work.
or any width

mount-
each \$2.00



each \$8.50

Pantographs



No. 1012

The improved Pantograph is an instrument for enlarging copying textually or reducing any design. It is used chiefly for the reproduction of Photographs, Architectural Plans, Landscapes, Academical Designs, Geographical Maps, Engravings, etc., etc. Whatever difficulties may be presented by a complicated design, the improved Pantograph can reproduce it very accurately in a few minutes. We beg to recommend it to Architects and all other Designers. Instructions for use are supplied with each instrument.

- No. 1011.—Pantograph of hard wood, for reducing and enlarging drawings, simple construction, 15 in. \$0.80 Wood.
- No. 1012.—Improved Pantograph, with brass mountings, arms 16 in. long. . . \$ 1.50
- No. 1013.—Improved Pantograph, with brass mountings, arms 20 in. long. . . 3.00
- No. 1014.—Improved Pantograph, with brass mountings, arms 24 in. long. . . 4.00
- No. 1015.—Improved Pantograph, with brass mountings, arms 30 in. long. . . 5.00
- No. 1016.—Pantograph of box wood, with brass joints and mountings, iron and lead weights and complete fittings, arms 18 in. long, in case. . . 15.00
- No. 1017.—Ditto, complete fittings, arms 24 in. long, in case. 18.00
- No. 1018.—Best 2 feet Brass Pantograph, for enlarging or reducing plans and drawings, complete with mahogany case each 37.50
- No. 1019.—3 feet ditto " 50.00
- No. 1020.—Best Eldograph, complete, with mahogany case, 36 in. " 75.00

This most useful instrument is, in many respects, superior to the Pantograph for copying, reducing or enlarging Plans, Drawings, etc. It is not liable to get out of adjustment, and, having but one support produces results more accurate than those obtained by the Pantograph; and, unlike that instrument, is unlimited in its proportions of enlargement or reduction.

Stencil Plates, etc. -

- | | 1/4 in. | 1/2 in. | 3/4 in. | 1 in. | 1 1/2 in. |
|--|---------|---------|---------|--------|-----------|
| No. 1021.—Alphabet, plain block | \$1.25 | \$1.25 | \$1.25 | \$1.50 | \$1.50 |
| No. 1022.—Alphabet, plain Roman | 1.25 | 1.25 | 1.50 | 1.50 | 1.50 |
| No. 1023.—Alphabet, ornamental | | 1.75 | 2.00 | 2.25 | 2.50 |
| No. 1024.—Set of Figures, 75c. to \$1.00 per set. | | | | | |
| No. 1025.—Corner Pieces and Borders, 75c. to \$1.25. | | | | | |
| No. 1026.—North Points, from 40c. to \$1.00. | | | | | |
| No. 1027.—Stencil Brushes, each, 10c. and 20c. | | | | | |
| No. 1028.—Stencil Ink, per box, 15c. and 25c. | | | | | |
| No. 1029.—Stencil Pads, each, 25c. | | | | | |

STENCIL PLATES TO ORDER.



No. 1030.

No. 1031.

No. 1031a

No. 1032.

No. 1033.

No. 1034.

Soli

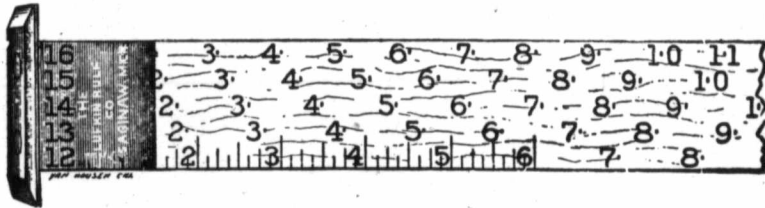
45 x 45°
No. 1036

No. 1035.—

No. 1036.—

No. 1037.—

No. 1038.—



No. 1030

No. 1030.—5 tier board rule, burnt figures, 1½ in. wide, brazed head, marked one side to measure 12, 13, 14, 15, 16 in., the other side, 7, 8, 9, 10, 11 in.each \$2.50

No. 1031.—Timber girthing tapes, with a ring at the beginning end, ¾ in. wide, girth on both sides. 6 8 12 feet. \$1.50 \$2.00 \$3.00 each.

No. 1031a.—Timber leather tapes with hook at end, divided in inches. . . .each \$2.50

No. 1032.—Dip rods for measuring specially when logs are lying in the water, made of brass with 1 in. hook, wooden handleeach 2.00

No. 1033.—Square head log rule, 48 inches, with 8 in. handle " 2.50

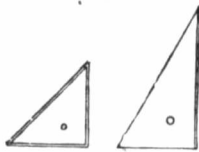
No. 1034.—Marking stick for lumber crayons 36 in. long " 1.00

Wooden Triangles

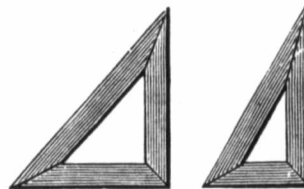
Solid Cherry

Jointed Cherry Angles

With Mortising Corner Joints



45 x 45° No. 1036
30 x 60° No. 1035



45 x 45° No. 1038
30 x 60° No. 1037

	4	6	8	10	12	14	15 inches.
No. 1035.—30° x 60°	\$0.05	\$0.08	\$0.12	\$0.15			each.
No. 1036.—45° x 45°	0.05	0.10	0.15	0.20			"
No. 1037.—30° x 60°	0.15	0.20	0.25	0.30	\$0.35	\$0.40	\$0.50 "
No. 1038.—45° x 45°	0.15	0.20	0.25	0.35	0.40	0.50	0.75 "

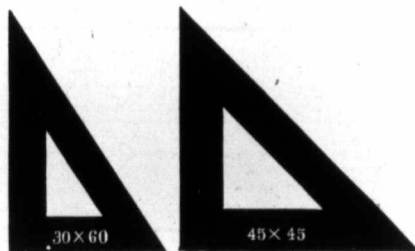
textually or
graphs, Archi-
Engravings,
sign, the im-
We beg to
use are sup-

rings,
... \$0.80
Wood.
ng.. \$ 1.50
ng.. 3.00
ng.. 4.00
ng.. 5.00
iron
case, 15.00
each 18.00
plans
each 37.50
" 50.00
" 75.00
or to
raw-
ving
ob-
un-

¼ in. \$1.50
½ in. \$1.50
¾ in. 1.50
1 in. 2.25

Rubber Triangles. Open or Solid Centre

1-16 of an inch.



No. 1039

No. 1040

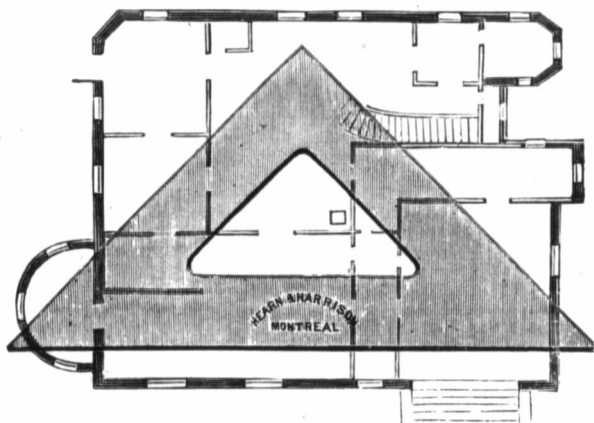
4 6 8 10 12 14 15 inches.

No. 1039.—30° x 60°..... \$0.15 \$0.25 \$0.35 \$0.50 \$0.60 \$0.80 \$1.00 each.

No. 1040.—45° x 45°..... 0.25 0.35 0.50 0.60 0.75 1.25 1.50 "

Transparent Amber Triangles

No. 1042



4 6 8 10 12 14 16 18 inches.

No. 1041.—30° x 60°..... \$0.25 \$0.45 \$0.60 \$0.75 \$1.10 \$1.50 \$2.00 \$2.50 each.

No. 1042.—45° x 45°..... 0.40 0.60 0.80 1.00 1.65 2.00 2.75 3.25 "

Transparent Amber Triangles with Finger Notches

4 6 8 10 12 14 16 18 inches.

No. 1043.—30° x 60°..... \$0.30 \$0.50 \$0.65 \$0.85 \$1.25 \$1.65 \$2.25 \$2.75 each.

No. 1044.—45° x 45°..... 0.50 0.65 0.90 1.15 1.75 2.25 3.00 3.50 "

No. 1045

No. 1046

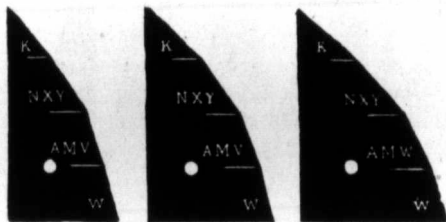
No. 1047

No. 1048.

No. 1049.

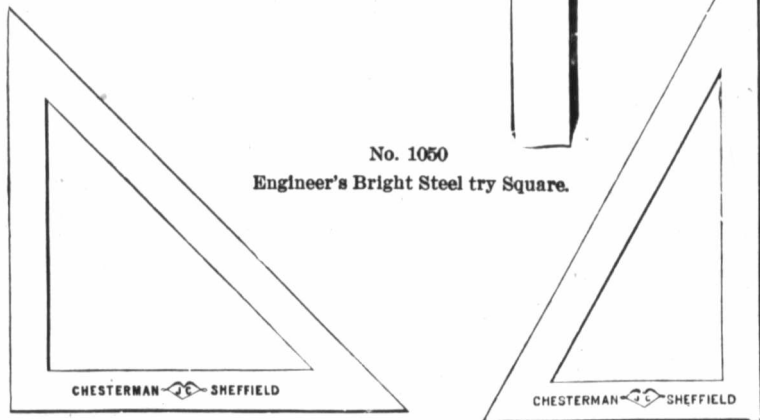
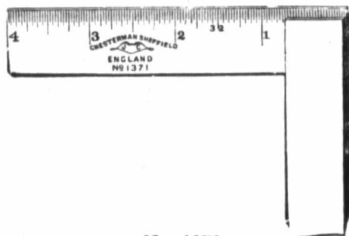
No. 1050.

Amber, Rubber and Steel Lettering Angles
 One Set of 3 Lettering Triangles, each $3\frac{1}{2}$ inches in size.



- No. 1045.—In Amber per Set \$2.00
- No. 1046.—In Rubber " 1.45
- No. 1047.—In N. P. Steel " 3.00

Open Steel Set Squares, Nickel-Plated



No. 1050
 Engineer's Bright Steel try Square.

No. 1049

No. 1048

No. 1048.—Open Steel Triangles Nickel-plated, 30 x 60 x 90 degrees.

7	8	10	12	15 inches.
\$1.50	\$1.75	\$2.00	\$2.50	\$3.25 each.

No. 1049.—Open Steel Triangles Nickel-plated, 45 x 45 x 90 degrees.

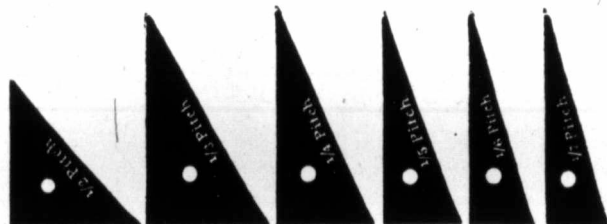
6	8	10	12 inches.
\$1.25	\$1.75	\$2.00	\$2.50 each.

Length in inches as above means the length of the longest side.

No. 1050.—Engineer's Light Steel try Squares, 4 in. divided into 32nds one side and 64ths of an inch on the other, each \$2.00

15 inches.
 \$1.00 each.
 1.50 "

18 inches.
) \$2.50 each.
 5 3.25 "
 hes
 18 inches.
 5 \$2.75 each.
 0 3.50 "



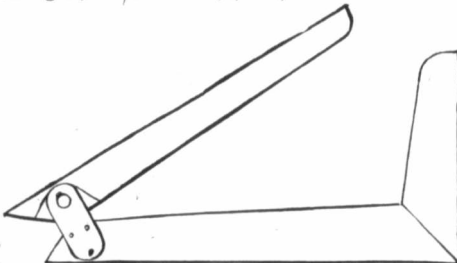
**Slopes
and
Batters**

Set of three forms of Batters and Slopes Triangles for walls and rocks, giving the following Slopes, 1 in. 4, 1 in. 5, 1 in. 6, 1 in. 8, 1 in. 10, 1 in. 12.

- No. 1051.—Hard Rubber, per set \$2.25
- No. 1052.—Transparent Amber, " 4.50
- No. 1053.—Cross section Triangles. Set of seven cross section triangles, made of hard rubber, as follows: $\frac{1}{4}$ to 1, $\frac{1}{2}$ to 1, $\frac{3}{4}$ to 1, 1 to 1, $1\frac{1}{4}$ to 1, $1\frac{1}{2}$ to 1, 2 to 1, per set 4.25
- No. 1054.—Single Triangles, each 0.75
- No. 1055.—One set of 6 Roof Pitch Triangles, Hard Rubber, \$4.00; Amber . . . 6.00

Patent Clinograph

No. 1056. — The Clinograph is a set-square with a swivelling blade, used, in conjunction with a tee-square for drawing lines parallel, perpendicular, or symmetrically inclined to any given line or direction. Pearwood each \$0.50



No. 1057. — Ditto, Mahogany, each \$0.90

No. 1056

Curve Rules

No. 1058 **ROUNDED EDGE**
SQUARE EDGE

	7	15	31
Double edge curve rule	\$0.50	\$1.00	\$2.00 each.

RUBBER
STEEL
LEAD
STEEL

No. 1059 **12** **24** Inch.

Single edge curve rule \$1.00 \$2.00 each.

No. 1060 **14 1/2** in. \$2.50 each.

No. 1061 **30** in. \$3.50 each.



No. 1062.
No. 1063.
No. 1064.

No. 1062.
No. 1063.
No. 1064.

No. 1062.
No. 1063.
No. 1064.

IRREGULAR CURVES

opes
and
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three forms
eters and
triangles for
nd rocks,
he follow-
es, 1 in. 4,
l in. 6, 1 in.
10, 1 in. 12.

er set \$2.25
" 4.50

made
to 1,
er set 4.25
each 0.75
er... 6.00



RUBBER
TEEL
EAD
TEEL

31 Inch.
\$2.00 each.



24 Inch.
\$2.00 each.



\$2.50 each.



\$3.50 each.

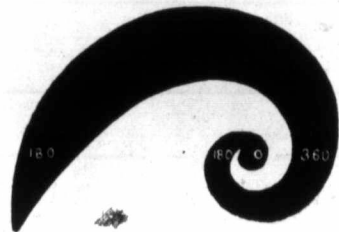


No. 1062.—In Wood .	1	2	3	4	5	6	7	8	9	
No. 1063.—In Rubber.	\$0.10	\$0.20	\$0.18	\$0.20	\$0.20	\$0.20	\$0.25	\$0.25	\$0.25	\$0.25 each.
No. 1064.—In Amber.	0.25	0.30	0.25	0.35	0.35	0.35	0.40	0.40	0.45	"
	0.35	0.35	0.40	0.40	0.40	0.40	0.45	0.45	0.50	"
No. 1062.—In Wood .	10	11	12	13	14	15	16	17		
No. 1063.—In Rubber.	\$0.30	\$0.25	\$0.20	\$0.25	\$0.25	\$0.35	\$0.30	\$0.30		each.
No. 1064.—In Amber.	0.45	0.50	0.30	0.45	0.50	0.50	0.50	0.60		"
	0.50	0.45	0.40	0.55	0.65	0.60	0.55	0.90		"
No. 1062.—In Wood .	18	19	20	21	22	23	24	25		
No. 1063.—In Rubber.	\$0.35	\$0.35	\$0.30	\$0.35	\$0.35	\$0.45	\$0.40	\$0.45		each.
No. 1064.—In Amber.	0.65	0.65	0.55	0.60	0.65	0.80	1.00	1.15		"
	0.90	0.90	0.90	0.85	1.00	1.00	1.10	1.50		"

Ellipsas, Hyperbolas and Parabolas

No. 1065.—Ellipsas, 10 in set, from 1½ to 6 in. long, varying ¼",	per set	Wood \$2.50	Rubber \$3.50	Amber \$ 5.00
No. 1066.—Ellipsas, 8 in set, from 1½ to 3 in. long, varying ¼",	per set	2.00	3.00	4.00
No. 1067.—Hyperbolas, 8 in set, from 2 to 5½ in. long, 8 double curves in set		2.50	3.50	4.00
No. 1068.—Parabolas, 8 in set, from 1½ to 5½ in. long, 8 double curves in set		2.25	3.50	4.00
No. 1069.—Parabolas, 8 in set, from 3½ to 14½ in. long, 16 double curves in set		4.50	6.00	10.00

Spiral Curve



No. 1074

No. 1070.—Hard Rubber Splines:—
 18 24 30 36 42 inch.
 \$0.30 \$0.40 \$0.50 \$0.55 \$0.60 each.

No. 1071.—Pearwood Splines:—
 18 24 30 36 42 inch.
 \$0.25 \$0.30 \$0.40 \$0.50 \$0.55 each.

No. 1072.—Lead Weights for Splines, with finger each \$1.25

No. 1073.—Lead Paper Weights, covered with leather. each \$1.00

No. 1074.—Hard Rubber Spiral Curve, each. \$1.25

No. 1075.—In Amber, each 2.00

Set of 10 Copenhagen Ship Curves for

Mechanical Engineers



No. 1076

No. 1076.—Wood,	per set	\$ 4.00
No. 1077.—Rubber,	"	6.00
No. 1078.—Amber,	"	10.00

Railroad Curves



No. 1079.—1 set of 10 curves, from 12" to 120" radius, varying 12 in., arc, finished only on the convex side, in case, per set:—
 Wood. Rubber. Amber. Cardboard.
 \$4.50 \$7.00 \$9.00 \$3.25

No. 1080.—1 set of 24 curves, from 1½" to 24" radius, varying ½" from 1½" to 10", varying 2" from 10" to 24", arc, finished only on the convex side.

Per set.	Wood. \$10.00	Rubber. \$17.00	Amber. \$21.50	Cardboard. \$8.00
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Scale, 100 feet to the inch.

No. 1081.—1 set of 12 curves, from 1° to 12° by every degree.
 Wood. Rubber. Amber. Cardboard.
 Per set. \$5.50 \$8.50 \$10.75 \$4.00

Set of and inch

0° .30'
 1°
 1° .15'
 1° .30'
 1° .45'
 2°
 2° .15'
 2° .45'
 3°
 3° .15'

No. 1082.—

No. 1083.—

No. 1084.—

No. 1085.—

No. 1086

Hardwood

No. 1087

Mahogany edges

No. 1088

Hard Rub

No. 1089.—

No. 1090.—

* Thi

100 Foot Scale

Set of 41 with Tangent, made in Rubber, Wood and Amber. Marked in degrees and inches.


Amber	5.00	0° .30' = 114.59 in.	3° .30' = 16.37 in.	6° .15' = 9.55 in.	8° .30' = 6.75 in.
	4.00	1° .00' = 57.30 in.	3° .45' = 15.28 in.	6° .15' = 9.17 in.	8° .45' = 6.55 in.
	4.00	1° .15' = 45.84 in.	4° .00' = 14.33 in.	6° .30' = 8.82 in.	9° .00' = 6.37 in.
	4.00	1° .30' = 38.20 in.	4° .15' = 13.48 in.	6° .45' = 8.49 in.	9° .15' = 6.20 in.
	10.00	1° .45' = 32.74 in.	4° .30' = 12.73 in.	7° .00' = 8.19 in.	9° .30' = 6.04 in.
		2° .00' = 28.65 in.	4° .45' = 12.07 in.	7° .15' = 7.91 in.	9° .45' = 5.88 in.
		2° .15' = 25.47 in.	5° .00' = 11.46 in.	7° .30' = 7.64 in.	10° .00' = 5.74 in.
		2° .30' = 22.92 in.	5° .15' = 10.92 in.	7° .45' = 7.40 in.	10° .30' = 5.48 in.
		2° .45' = 20.84 in.	5° .30' = 10.42 in.	8° .00' = 7.17 in.	11° .00' = 5.22 in.
		3° .00' = 19.10 in.	5° .45' = 9.97 in.	8° .15' = 6.95 in.	11° .30' = 4.99 in.
		3° .15' = 17.63 in.			

- No. 1082.—In Wooden Box. Rubber, per set \$37.50
- No. 1083.—In Wooden Box. Amber, " 50.00
- No. 1084.—In Wooden Box. Wood, " 30.00


Scale 400 Feet to the Inch

- No. 1085.—Set of 20 curves, from 30 minutes to 10 degrees, by every 30 minutes. Arc finished, only on convex side.
In wood, per set, \$9.50; in rubber \$14.00


Straight Edges

No. 1086 

Hardwood, beveled edge, thick 24 30 36 42 48 60 inch.
\$0.35 \$0.40 \$0.45 \$0.50 \$0.65 \$0.85 each.

No. 1087 

Mahogany, ebony lined, beveled edges, thick 24 30 36 42 48 60 inch.
\$0.60 \$0.70 \$0.80 \$1.00 \$1.20 \$1.70 each.

No. 1088 

Hard Rubber 24 30 36 42 inch.
\$1.15 \$1.45 \$1.70 \$2.20 each.

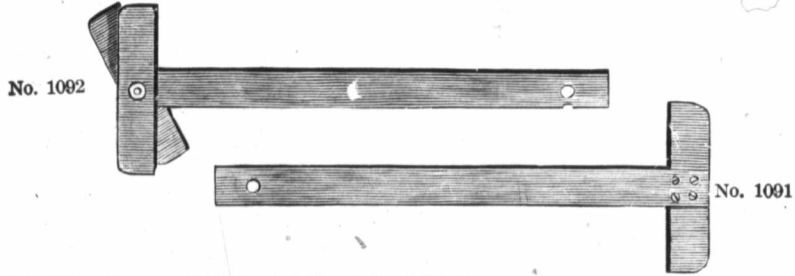
No. 1089.—Steel, one edge beveled, the other square, nickel-plated.
18 24 30 36 42 48 60 72 inch.
\$1.25 \$1.75 \$2.50 \$3.00 \$3.50 \$4.50 \$5.50 \$7.50 each.

No. 1090.—Ditto, machine divided on beveled edge into inches and 10ths.
24 30 36 *42 48 inch.
\$2.50 \$3.50 \$4.00 \$4.75 \$6.00 each.

* This size can be had in metre subdivided into centimetre, each \$4.75.

Amber \$ 5.00
4.00
4.00
4.00
10.00
42 inch.
\$0.60 each.
42 inch.
\$0.55 each.
Splines, with
each \$1.25
Edges, covered
each \$1.00
Spiral Curve,
\$1.25
each 2.00
per set \$ 4.00
" 6.00
" 10.00
Curves
curves, from
trying 12 in.,
convex side,
Cardboard.
\$3.25
1 1/2" to 10",
side.
Cardboard.
\$8.00
Cardboard.
\$4.00

T Squares



No. 1091.—Pearwood Blade and Head, fixed head.

18	21	24	30	36	42	48	54	60	inch.
\$0.20	\$0.35	\$0.40	\$0.45	\$0.50	\$0.60	\$0.70	\$0.80	\$1.00	each.

No. 1092.—Pearwood Blade and Head, shifting head.

18	24	30	36	42	48	54	inch.
\$0.70	\$0.85	\$0.95	\$1.05	\$1.25	\$1.30	\$1.50	each.

No. 1093.—Maple Blade, Black Walnut Head, fixed.

18	24	30	36	42	48	54	inch.
\$0.40	\$0.50	\$0.60	\$0.70	\$0.80	\$0.95	\$1.00	each.

No. 1094.—Ditto, shifting .. 0.90 1.15 1.25 1.35 1.50 1.70 1.90 each.

No. 1095.—Protractor T Square mahogany, ebony-lined, shifting head adjustment.

30	36	42	inch.
\$9.00	\$10.00	\$11.00	each.

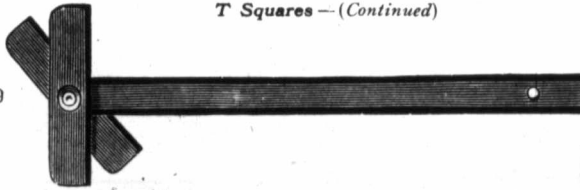


T Squares, Rubber Blades, Black Walnut Head 24 30 36 42 inch.

No. 1096.—Plain Heads	.....	.....	.....	.....	.....	.....	.....	.....	.....
									\$1.70 \$2.25 \$2.85 \$3.60 each.
No. 1097.—Double Heads	.....	.....	.....	.....	.....	.....	.....	.....	2.50 3.15 3.25 4.40 each.

T Squares -- (Continued)

No. 1099



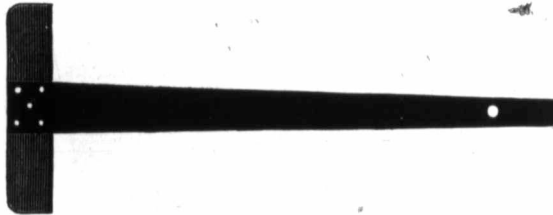
No. 1098



No. 1098.—Mahogany, Ebony lined Blade 24 30 36 42 48 54 inch.
and Head, Plain Head. . . . \$0.75 \$0.90 \$1.05 \$1.25 \$1.40 \$1.65 each.

No. 1099.—Double Head 1.20 1.40 1.60 1.75 2.00 2.20 each.

No. 1100



No. 1100.—Hardwood Blade, tapered 24 30 36 42 48 54 inch.
Black Walnut Head \$0.95 \$1.10 \$1.25 \$1.45 \$1.70 \$1.90 each.

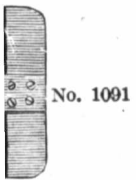
No. 1101.—Mahogany ebony lined, tapered
Black Walnut Head 1.15 1.35 1.50 1.75 2.00 2.25 each.

No. 1102.—Dean's patent swivel and adjustment, nickel fitting shifting head with ad-
justment, mahogany ebony lined... 30 36 42 48 60 inch.
\$3.00 \$3.25 \$3.50 \$3.75 \$4.75 each.

No. 1103



No. 1103.—Polished Hardwood Heads, Nickel-plated Steel Blades,
12 18 24 30 36 42 48 54 inch.
\$1.25 \$1.50 \$2.50 \$3.00 \$3.50 \$4.50 \$5.50 \$6.50 each.



No. 1091

60 inch.
\$1.00 each.

54 inch.
\$1.50 each.

54 inch.
\$1.00 each.

1.90 each.

adjustment.

42 inch.
\$11.00 each.



No. 1096

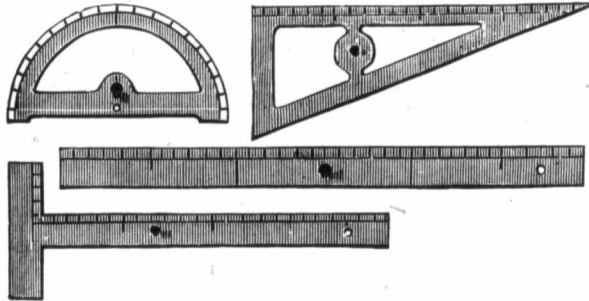
42 inch.

\$3.60 each.

4.40 each.

Engravers' T Squares

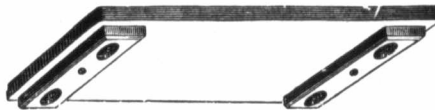
No. 1104.—Engravers' T Square, Steel Blade, Brass	4	6	8	Inch.
Head, fixed	\$1.25	\$1.50	\$1.75	each.
No. 1105.—Engravers' T Square, Steel Blade, Brass				
Head, shifting	1.50	1.75	2.00	each.



No. 1106

No. 1106.—Blackboard Set, of wood, containing Straight Edge, 36 inch; T Square, 24 inch; Triangle, 24 inch; Protractor, 15½ inch... set	\$5.00
No. 1107.—Ditto, but with metric measurements	3.50

Drawing Boards



No. 1113

No. 1108.—Drawing Board plain pinewood, clamped, 12 x 17 in.	\$0.75
No. 1109.—Drawing Board plain pinewood, clamped, 16 x 21 in.	1.00
No. 1110.—Drawing Board plain pinewood, clamped, 20 x 26 in.	1.50
No. 1111.—Drawing Board plain pinewood, clamped, 23 x 31 in.	1.75
No. 1112.—Drawing Board plain pinewood, clamped, 31 x 42 in.	2.50
Drawing Board, pinewood, hardwood ledges, screwed to the back, the screws run in slots to allow free contraction or expansion—	
No. 1113.—Demy size, 16 x 21 inches	1.50
No. 1114.—Royal size, 20 x 26 inches	2.00
No. 1115.—Imperial size, 23 x 31 inches	3.00
No. 1116.—Double Elephant, 31 x 42 inches	5.00
No. 1117.—Larger Drawing Boards made to order in any styles.	
No. 1118.—Trestles or Wood Horses for Drawing Boards, quoted on application. Packing Cases for Drawing Boards and Trestles, charged extra.	

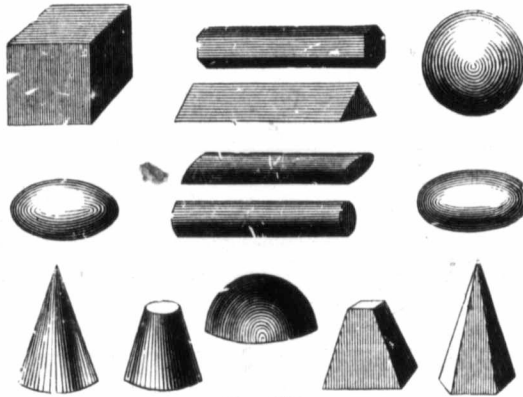
No. 1119.—2
a
No. 1120.—4
u

No. 1121.—F
No. 1122.—F
No. 1123.—C
No. 1124.—I

No. 1125.—C

No. 1126.—C
No. 1127.—K
in

Geometrical Models



No. 1119

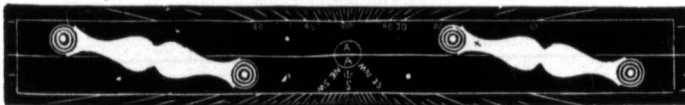
No. 1119.—24 Geometrical Models, solids, surfaces, angles. Put up in a box per set \$2.75
 No. 1120.—44 Geometrical Models, 24 solids, 17 surfaces, 3 angles. Put up in a box " 5.00

Shifting Parallel Rule



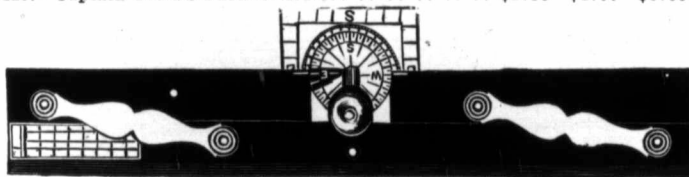
No. 1121

		6	9	12	15	18	24
No. 1121.—Ebony,	each	\$0.40	\$0.65	\$0.90	\$1.15	\$1.50	\$ 2.00
No. 1122.—Rubber,	"	0.50	1.15	1.75	2.25	2.75	3.50
No. 1123.—German Silver,	"	3.00	4.50	6.00	9.00	12.00	15.00
No. 1124.—Ivory G. S. Bars		1.50					



No. 1125

No. 1125.—Captain Field's Parallel Rule. 12 18 24 Inch.
 \$2.50 \$4.00 \$6.00 each.



No. 1126

No. 1126.—Captain Toynbee Parallel Rule each \$6.50
 No. 1127.—Kay's Patent Parallel, it is transparent, sound-ings, etc., can be seen through it. 15 18 Inch.
 \$5.50 \$6.50 each.

8 inch.
 \$1.75 each.
 2.00 each.

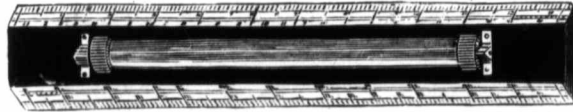
inch;
 . . . set \$5.00
 3.50

\$0.75
 1.00
 1.50
 1.75
 2.50

1.50
 2.00
 3.00
 5.00

in application.
 xtra.

Rolling Parallel Rules



No. 1129

	12"	15"	18"	24"	30"
No. 1128.—Plain Ebony Rolling Parallel best.	\$ 3.25	\$ 4.00	\$ 5.00	\$ 6.50	\$
No. 1129.—Ebony Rolling Parallel, graduated ivory edges	6.50	7.50	8.75	12.00	
No. 1130.—Solid Brass Rolling Parallel, in case	9.50	12.00	15.00	18.00	24.00
No. 1131.—Solid German Silver Rolling Parallel, in case.	12.00	15.00	18.00	20.00	30.00
No. 1132.—Hard Rubber Parallel Nickel Plated mountings.	4.50	5.50	6.50	10.00	

Parallel Ruling Attachments.

Our Attachments are of simple construction, neat in appearance, consisting of perfectly constructed brass wheels, mounted on plates, with best quality braided silk line or wire, and a perfect clamping device for clamping same to straight edge. They are easily attached to any drawing board having ledges beneath, or on any frame having an opening into which a drawing board can be placed.

We furnish the Attachments with or without Straight Edge.

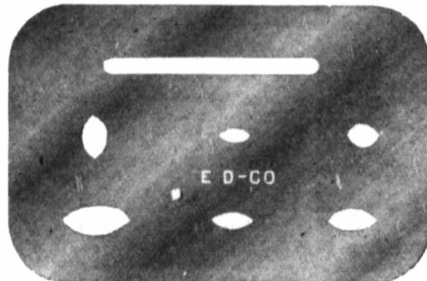
Attachments Only

	24	31	42	55	60 inch.
No. 1133.—Attachments	\$5.00	\$5.50	\$6.00	\$6.50	\$7.00 each.

Straight Edges and Attachments

No. 1134.—Attachments with Mahogany Ebony Lined Straight Edge	each	\$6.00	\$6.50	\$7.00	\$8.50	\$9.50
---	------	--------	--------	--------	--------	--------

In ordering Attachments, please state thickness of board and in ordering Straight Edges state exact length of board.



No. 1135

No. 1135.—Nickel-Plated Erasing Shield	each	\$0.25
No. 1136.—Transparent Amber Erasing Shield	"	0.20

No 1137.—I
No. 1138.—C
No. 1139.—S
No 1140.—I
No. 1141.—I
No. 1142.—C
No. 1143.—V
No. 1144.—I
No. 1145.—C
No. 1146.—S
T
No. 1147.—I
o
P

No.

Fine Quality Indian Ink



No. 1138



No. 1139



No. 1140

- No. 1137.—Lion top Indian ink, glazed, 2 sizeseach 15c. \$0.25
 - No. 1138.—Oblong blackeach 0.50
 - No. 1139.—Square black, glazed superfine " 0.75
 - No. 1140.—Hexagon black, glazed superfine " 1.25
 - No. 1141.—Hexagon black, glazed superfine, double dragoon " 2.00
 - No. 1142.—Oblong red, Indian ink, superfine " 1.00
 - No. 1143.—Windsor & Newton liquid Indian ink, small bottle, 20c; large. " 0.40
 - No. 1144.—Higgins Water proof ink, all colors, per bottle " 0.25
 - No. 1145.—Chin-Chin Water proof ink, all colors, superior bottle " 0.25
 - No. 1146.—Steebers Water proof ink, all colors " 0.25
- These can be used for all fine line work and washes and are waterproof when dry.
- No. 1147.—Liquor "Mervelleux" for taking off ink stains from paper, colors on hand, without any fear of injury or of spoiling paper, per bottle. " 0.50

- No. 1147a.—Slate ink slab, air tight glass cover 3½ x 3½ in.each \$0.35
- No. 1148.—Nest of Cabinet Saucers, 6 in set, according to size, per set, 40c; 50c; 60c and 0.75
- No. 1149.—Patent ink slab with cover 1½ x 4½each 0.50
- No. 1150.—Brushes of the very best quality and of different size such as sable and camel hair in the polished handles, from, each, 15c to 1.00



No. 1148

24" 30"

\$ 6.50 \$

12.00

18.00 24.00

20.00 30.00

10.00

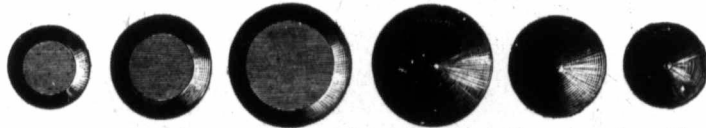
... consisting of
... ily braided silk
... ight edge. They
... r on any frame

55 60 inch.
\$ 6.50 \$7.00 each.

0 \$8.50 \$9.50
nd in ordering

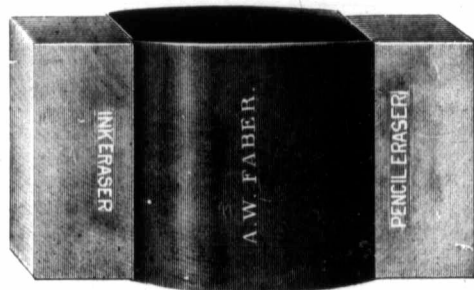
... each \$0.25
... " 0.20

Drawing Pins or Tacks



	Nos.	0	1	2	3	4	5	5½	
No. 1151.—Brass Tacks, points riveted.	Inches	¼	5-16	¾	7-16	½	9-16	¾	
	Dozen	\$0.10	\$0.15	\$0.20	\$0.25	\$0.30	\$0.35	\$0.40	\$0.50
No. 1152.—German Silver Tacks, points, riveted			0.25	0.30	0.35	0.40	0.50	0.60	0.75
No. 1153.—Best German Silver Tacks, steel points, screwed and riveted			0.50	0.60	0.70	0.80	0.90	1.00	
No. 1154.—Solid Steel Tacks.		0.25	0.30						
No. 1155.—Horn center, extra fine.	each								0.10
No. 1156.—Thumb tack extractor	"								0.25
No. 1157.—Pocket knife and tack extractor	"								1.00
No. 1158.—White Chalk for marking, per box of 100 sticks	"								1.50
No. 1159.—Industrial Red Chalk for marking, per doz. sticks	"								0.50
No. 1160.—Industrial Blue Chalk for marking, per doz. sticks	"								0.50
No. 1161.—Violet Chalk for Forestry use, for marking wet wood or lumber, per doz. sticks	"								0.80
No. 1162.—Marking sticks for lumber crayons, a convenient article adapted to all regular lumber crayons and made to hold them firmly in place, nicely finished and nickel plated, 36 in. hickory handle	"								1.00

Ink and Pencil Eraser



No. 1163

No. 1163.—The centre of red polished cedar wood into which pieces of best pencil rubber and ink eraser are inserted, small size, 15c. each; medium, 20c. each; large, 35c. each.

Oblong and Pencil Eraser



No. 1164

No. 1164.—The centre of red polished cedar wood, all three sizes are the same length as illustrated but the thickness of the rubber varies. Small size, 12c. each; medium, 15c. each; large, 20c. each.

No. 1165.—
No. 1166.—
No. 1167.—
No. 1168.—
Blac
No. 1169.—
No. 1170.—
No. 1171.—
No. 1172.—
No. 1173.—
Made of E
Cushion or I

Size

No. 1174.—18
No. 1175.—20
No. 1176.—24
No. 1177.—30
No. 1178.—36

Metal Bat

No. 1179.—18
No. 1180.—20
No. 1181.—24
No. 1182.—30
No. 1183.—36

Bl

No. 1184.—In

- No. 1165.—New bevel rubber for pencil marks erasing, only small, 10c. each; medium, 15c. each; large, 25c. each.
- No. 1166.—Circular rubber eraser. This eraser is of special compound and will readily erase both ink and pencil marks owing to its continuous narrow edge, the shape is found most convenient for typewriting purpose, 10c. each; 80c. per dozen.
- No. 1167.—Extra soft pencil rubber, specially made for rubbing out pencil marks for which the softer description of rubber is particularly well adapted, ordinary size, 15c. each; large size, 25c. each.

Sponge Rubbers

- No. 1168.—New sponge rubber, Nigroverline Lardeach \$0.15

Black Sponge Rubber for cleaning drawings, plans, etc.

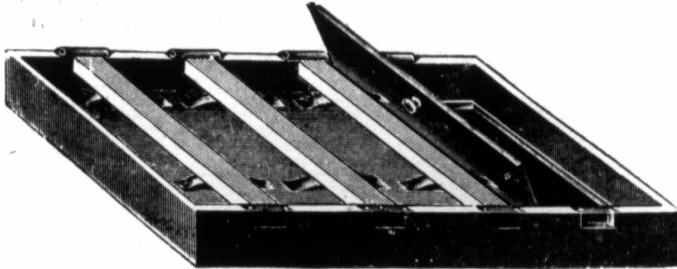
- No. 1169.—Small size, 1 x 1 x 1each \$0.15
 No. 1170.—Medium size, 1½ x 2 x 1 " 0.30
 No. 1171.—Large size, 4 x 2 x 1 " 0.75
 No. 1172.—Mammoth size, 6 x 4 x 1 " 1.75

White Sponge Rubber

- No. 1173.—Small size, 20c. each; Medium size, 35c. each; Large size, 50c. each.

Blue Print Frames

Made of Hard Wood, neatly finished, with Metal Mountings, with or without Felt Cushion or Polished Plate Glass.



No. 907

Size	Frame only	With Felt Cushion	With Pol. Plate Glass
No. 1174.—18 x 21	\$ 6.00	\$ 7.00	\$ 8.50 each.
No. 1175.—20 x 24	7.00	8.50	10.00 "
No. 1176.—24 x 30	8.00	10.00	15.00 "
No. 1177.—30 x 43	12.50	15.00	25.00 "
No. 1178.—36 x 60	20.00	22.50	40.00 "

Bath Trays for Blue Print Frames

- Metal Bath Trays with drain pipe, strong wired rim and hard wood braces.
- No. 1179.—18 x 22 in. \$ 4.00 each.
 No. 1180.—20 x 24 in. 4.50 "
 No. 1181.—24 x 30 in. 5.50 "
 No. 1182.—30 x 42 in. 7.00 "
 No. 1183.—36 x 60 in. 9.00 "

Blue Print Paper, Slow or Rapid or Extra Rapid

- No. 1184.—In rolls of 10 yards, best quality stock . . \$1.25 \$1.50 \$1.75 \$2.50 per roll.

5 5½
 9-16 ¼ 4
 \$0.35 \$0.40 \$0.50

0.50 0.60 0.75

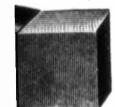
0.90 1.00

each 0.10
 " 0.25
 " 1.00
 " 1.50
 " 0.50
 " 0.50

umber, " 0.80

adapted firmly handle " 1.00

es of best pencil
 ch; medium, 20c.



e the same length
 ach.

"Vandyke" Solar Paper for Negative or Positive Prints

	Medium Thick.	Or thin for mailing
No. 1185.—"Vandyke" Solar Paper.	Width. 30 in.	36 in. 42 in.
Per roll of 10 yards, prepared	\$2.00	\$2.50 \$3.00

Imperial Tracing Cloth

	30	36	42	54 inches
No. 1186.—In rolls of 24 yards	\$7.50	\$9.00	\$10.50	\$15.00 per roll
	0.40	0.50	0.75	1.00 " yard

Tracing Paper

	30	40 inches
No. 1187.—In roll of 24 yards	\$3.00	\$4.00 per roll
	0.20	0.25 " yard

Profile Paper

No. 1188.—In rolls of 50 yards, Plate A, 4 x 20 to one in., 20 in. wide.	\$11.00 per roll
No. 1189.—In rolls of 50 yards, Plate B, 4 x 30 to one in., 20 in. wide.	11.00 " 0.25 " yard

Cross Section Paper

No. 1190.—In rolls of 50 yards, 10 x 10 to one in., 20 in. wide	\$11.00 per roll
No. 1191.—In sheets, 16 x 20 in., 10 x 10 to one in.	0.25 " sheet

Drawing papers in sheets or in rolls comprising detail buff color, fine cream paper, perfect white paper. Price on application.

Surveyor's Books, etc.

No. 1192.—Transit books, 4½ x 7½ in., with Keith and Hall tables	each \$0.
No. 1193.—Field books, 4½ x 7½ in., right hand, page 8 vertical line to the end with Keith and Hall tables	" 0.
No. 1194.—Level books, 4 x 6½ in., with Hall table for excavation and embankments	" 0.
No. 1195.—Cross section books, 5 x 7 in., dimension 10 x 10 to in.	" 0.
No. 1196.—Profile books, 5 x 7½ in., Plate A, 4 x 20 to one in., 50 leaves	" 2.
No. 1197.—Profile books, Plate B, 4 x 30 to one in., 50 leaves	" 2.

Bound in Flexible morocco Covers.

These books are folded like a map to replace the continuous rolls of profile paper, and the pages are mounted on muslin.

Each leaf, or two pages facing, contain six thousand feet—a "Section" as generally laid out for the construction of a road. The paper is smooth and is of extra fine quality.

No. 1198.—Plate A.	4 x 20 to one inch.	5½ x 8 inches.	Printed in green
	12	25	50
	Each, \$2.50	\$4.00	\$6.75
No. 1199.—Plate B.	4 x 30 to one inch.	4½ x 8 inches.	Printed in green
	12	25	50
	Each, \$2.50	\$4.00	\$6.75
No. 1200.—Blank note books			\$12.00



No. 1250

- No. 1250.—Si
- No. 1251.—Si
- No. 1252.—Si
- No. 1253.—Si
- No. 1254.—Si
- No. 1255.—Si
- No. 1256.—Dc
- No. 1257.—Dc
- No. 1258.—Tr
- No. 1259.—Tr
- No. 1260.—Tr



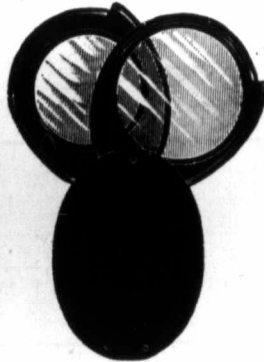
No. 126

- No. 1261.—Lin
- nicl
- No. 1262.—Lin
- No. 1263.—Lin
- No. 1264.—Wa
- No. 1265.—Tri
- lacc
- No. 1266.—Gor

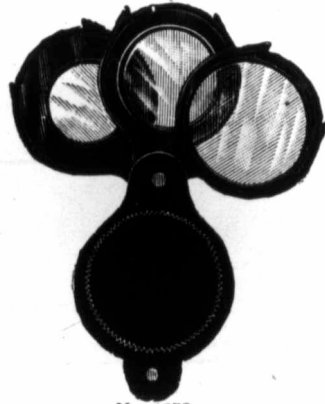
Pocket Magnifying Glasses



No. 1250

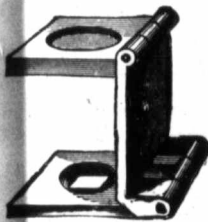


No. 1256

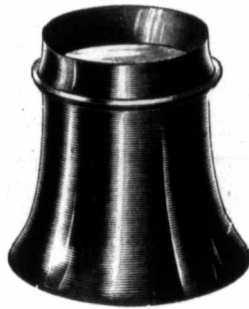


No. 1258

No. 1250.—Single Lens, $\frac{3}{4}$ in. diameter	each	\$0.35
No. 1251.—Single Lens, 1 in. diameter	"	0.50
No. 1252.—Single Lens, $1\frac{1}{4}$ in. diameter	"	0.60
No. 1253.—Single Lens, $1\frac{1}{2}$ in. diameter	"	0.75
No. 1254.—Single Lens, $1\frac{3}{4}$ in. diameter	"	1.00
No. 1255.—Single Lens, 2 in. diameter	"	1.25
No. 1256.—Double Lens, $1\frac{1}{8}$ x $1\frac{1}{4}$ in. diameter	"	1.25
No. 1257.—Double Lens, $1\frac{1}{4}$ x $1\frac{1}{2}$ in. diameter	"	1.50
No. 1258.—Triple Lens, size of glasses, $\frac{1}{2}$, $\frac{3}{8}$ and $\frac{3}{4}$ in. diameter	"	1.00
No. 1259.—Triple Lens, size of glasses, $\frac{3}{8}$, $\frac{2}{4}$ and $\frac{3}{4}$ in. diameter	"	1.25
No. 1260.—Triple Lens, size of glasses, $\frac{3}{8}$, $\frac{2}{4}$ and 1 in. diameter	"	1.50



No. 1261



No. 1264



No. 1265

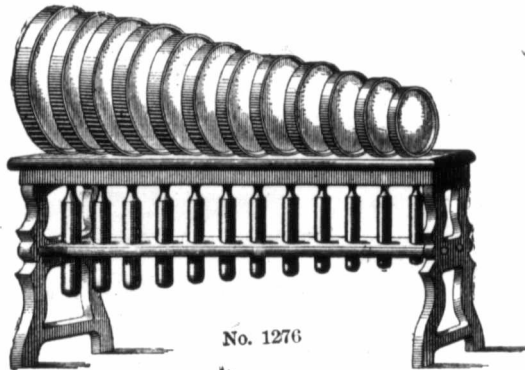
No. 1261.—Linen Provers, brass, $\frac{1}{4}$ x $\frac{1}{4}$, $\frac{1}{4}$ x $\frac{1}{2}$, $\frac{1}{2}$ x $\frac{1}{2}$ in. opening. Brass, 40c; nickel plated	each	\$0.75
No. 1262.—Linen Provers, brass, $\frac{1}{2}$ x $\frac{1}{2}$ in. opening, with larger lense	each	1.00
No. 1263.—Linen Provers, brass, large frame, 1 x 1 in. opening	"	2.00
No. 1264.—Watchmakers' Rubber Loupes assorted powers	each	35c and 0.50
No. 1265.—Tripod Microscope, used extensively for detecting counterfeit notes, lacquered brass	"	0.75
No. 1266.—Goniometers to measure the angle of crystals	"	3.75

Pocket Magnifying Glasses:—(Continued)

- No. 1267.—Seed Microscope, . . . each \$0.50
- No. 1268.—Engraver Glasses, with double plano-convex lenses, 1½ in. diameter, each \$2.50
- No. 1269.—Engraver Glasses, with double plano-convex lenses, 1½ in. diameter, each \$3.00
- No. 1270.—Engraver Glasses, with double plano-convex lenses, 2¼ in. diameter, each \$4.50
- No. 1271.—Engraver Glasses, with single double-convex lenses, 1½ in. diameter, each \$1.00
- No. 1272.—Engraver Glasses, with single double-convex lenses, 1½ in. diameter, each \$1.50
- No. 1273.—Engraver Glasses, with single double-convex lenses, 1½ in. diameter, each \$2.00



No. 1268



No. 1276

- No. 1274.—Eye-glass Stand for Watch makers and Engravers, each \$3.00

- No. 1275.—Magnifying mirrors, one side convex (Magnifier), the other plain, with handle and hook to hang by \$1.50 \$3.00 each

READING and PICTURE GLASSES

Superior Quality

Diameter in inches

No. 1276.—German silver rim, black handle:—

1½	1¾	2	2¼	2½	3	3¼	3½	3¾	4	4¼	4½	5	5½
0.50	0.60	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.50	5.00

No. 1277.—Rich gilt rim, pearl handle:—

2	2¼	2½	3	3¼	3½	3¾	4	4¼	4½	5	5½	6
2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00					

No. 1278.—German silver rim, black handle, with concave lens for reducing photos, etc., 3 in. diameter each \$2

Double

- No. 1279.—2
- No. 1280.—3
- No. 1281.—3
- No. 1282.—3

Do



No. 1292

- No. 1283.—Si
- No. 1284.—Si
- No. 1285.—Si
- No. 1286.—Si
- No. 1287.—Si
- No. 1288.—Si
- No. 1289.—Co
- No. 1290.—Di
- No. 1291.—Di
- No. 1292.—Ac

su

A Do
D Do

No. 1293.—Der
fori

Double Convex Lens Mounted in Square-cornered Nickel Plated Metal Frame, with Ebonized Wood Handle

No. 1279.—2½ in. long	\$1.25
No. 1280.—3 in. long	1.50
No. 1281.—3 3-16 in. long	1.75
No. 1282.—3½ in. long	2.00

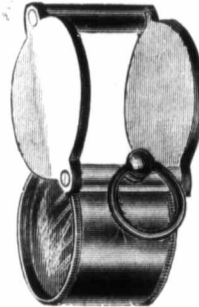
DOUBLE CYLINDRICAL READING GLASSES

Mounted in Round-cornered Oblong German Silver Frames, with Handles

These entirely new and very superior reading glasses are made of a double cylindrical lens with its axes crossing at right angles, giving an entirely flat field, free from chromatic or spherical aberration, to the extreme edge.



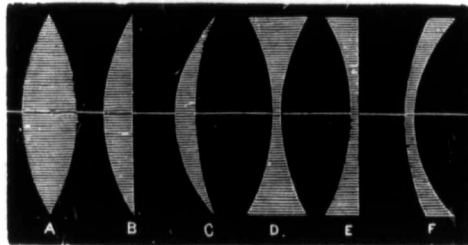
No. 1292



No. 1289

No. 1283.—Size, 2 x 3 in.	\$3.00
No. 1284.—Size, 2½ x 3¼ in.	3.75
No. 1285.—Size, 2¾ x 3½ in.	4.50
No. 1286.—Size, 2½ x 4 in.	5.50
No. 1287.—Size, 2¾ x 4¼ in.	6.00
No. 1288.—Size, 2¾ x 4½ in.	7.00
No. 1289.—Coddington lenses folding for pocket, nickel plated frame and cover, 1½ in. focus, high magnifying power, small size	1.50
No. 1290.—Ditto, medium size	1.75
No. 1291.—Ditto, large size	2.00
No. 1292.—Achromatic triplet, nickel plated frame and cover, ¾ in. focus, superior lenses, magnifying power 20 and clearest definition.	7.00

Demonstration Lenses



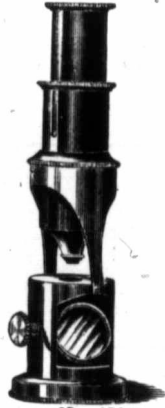
No. 1293

A Double Convex. B Plano Convex. C Periscopic Convex.
D Double Concave. E Plano Concave. F Periscopic Concave.

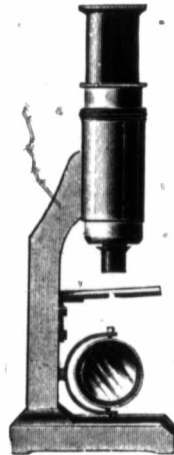
No. 1293.—Demonstration Lenses, set of six, 1½ in. diameter, showing the forms of the various kinds of lenses, as above	\$2.50
---	--------

... each \$2.00
 Eye-glass Stand for Watchmakers and Engravers, each \$3.00
 Magnifying mirrors, one side convex (Magnifying), the other plain, with handle and hook to hang by 4 6 in. diameter 1.50 \$3.00 each.
 Superior Quality
 1½ 5 5½
 .00 3.50 5.00 6.00
 5 5½ 6
 for reducing
 ... each \$2

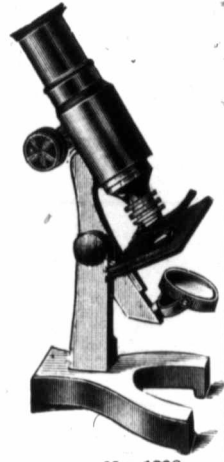
Compound Microscopes



No. 1294



No. 1295



No. 1298

No. 1294.—Compound Microscope, tubular body, six in. in height \$3.5

This instrument is a well made and substantial one, and well adapted to the study of objects requiring more power than can be conveniently obtained with a *simple* microscope. It will show satisfactorily the larger animalculæ in pond water, the scales from a butterfly's wing, and similar minute objects. The stand is of polished brass, handsomely lacquered, with one eye-piece and one object glass, magnifying about 40 diameters or 1,600 times. We supply with it two prepared objects, two glass slips and a pair of brass forceps, the whole packed in a neat polished wood case.

No. 1295.—Compound Microscope, six in. in height, lacquered brass body and focussing tube, bronzed stand, two objectives and one eye-piece giving powers of 30 and 50 diameters, including one prepared object, two glass slips and a pair of brass forceps, in polished wood case 5.5

No. 1296.—Compound Microscope, pocket, five and a half in. in height, lacquered brass body and focussing tube, bronzed stand, two objectives and one eye-piece magnifying about 60 diameters, ball and socket joint, affording any angle of inclination, clips on stage, in velvet-lined pocket case 7.5

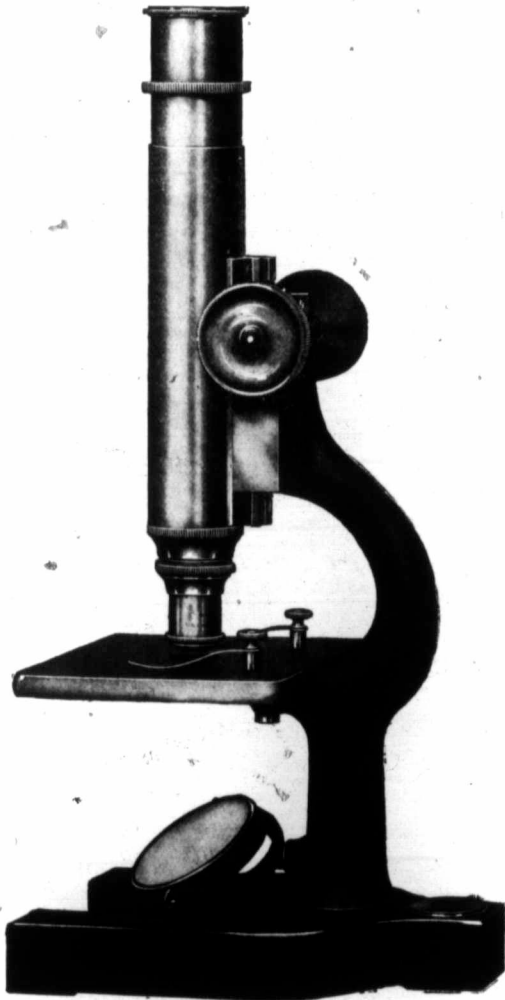
No. 1297.—Compound Microscope, six and a half in. in height, lacquered brass body and focussing tube, bronzed stand, affording any angle of inclination, spring clips on stage, with triplet objective and one eye-piece giving powers of 30, 50 and 80 diameters, with one prepared object, two glass slips and brass forceps, in polished wood case . . . 9.5

No. 1298.—Compound Microscope, similar to preceding, with rack motion . . . 12.5



No. 1298
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No. 1300

Continental Microscope

This stand meets the popular demand for an instrument of simple construction for individual use, which will serve for the examination of the multitude of objects requiring comparatively low magnification, such as starches, sugar, drugs, silks, and other fabrics and the fibers from which they are made, flesh suspected of containing trichinae and other parasites, cements, earths, paper and similar materials, paint and its components, grinding and polishing material, pond life, parts of insects, pollen, spores, and the coarser structure of plants and animals. This microscope for the household will be an endless source of education and amusement and can be placed in the hands of children, as its simplicity makes it easy to use with little danger of its being damaged.

Specifications

Base, Pillar and Arm of one solid piece of metal, giving rigidity and durability. Heavily japanned.

Mirror, plain and concave, on rotating fork.

Stage, extra large, very firm, nicked and with spring clips.

Focussing Adjustment, diagonal cut rack and pinion.

Main Tube; has society screw and draw tube carrying regular size eye-piece and objectives.

Catalog Number	Objectives	Eyepieces	Power	Nosepiece	Price
1300	1 Divisible—1½ and ½ in.	1 in.	70 to 220 dia.	.....	\$25 00
1301	1 Divisible—1½ and ½ in., and a 1/5 in. Special	2 in., 1 in.	35 to 500 dia.	.....	35 00
1302	1 Divisible—1½ and ½ in., and a 1/5 in. Special	2 in., 1 in.	35 to 600 dia.	Double	40 00

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 No. 1308.—M
 No. 1309.—G
 No. 1310.—C
 No. 1311.—E

Model University Microscope

The Model University Microscope has been designed and constructed with a view to meet the special requirements of the student, to whom a well-made microscope is such a necessity, and from our increased sales, we feel assured it has met with general approval. For an instrument of moderate cost it is certainly the most efficient in use, and is particularly adapted with the higher power for all general histological work. Having a standard size body it may be supplied at any time with supplementary substage apparatus and other valuable additions not necessary to the working student. The body is made in two forms; one with sliding coarse adjustment, and the other with a perfect rack and pinion motion. On both instruments the fine adjustment is given by the fine micrometer screw at the top of the stem, which is quite steady under the highest power, and constructed so as not to be liable to derangement.

The main tube has a cloth lining, in which the extension draw tube is fitted, and having the "society standard thread," the higher powers can be used, and the amplifier or analyzer of Polariscope. The stand is of brass, oxidized, very firm and solid, admitting of no vibration, while the axis is so arranged to allow inclination of the body to any angle, being sufficiently firm to permit of it being placed horizontally for use with the camera lucida. It has a circular glass stage, so that re-agents can be used, having a removable substage ring and revolving diaphragm attached. It is supplied with plane and concave mirrors, made adjustable on the bar to any required angle. The objectives supplied are of our second series, being well corrected, of great brilliancy and giving fine definition, the $\frac{1}{4}$ readily resolving *P. angulatum* in balsam.



- No. 1303.—Model University Microscope, 11 in. high, with two achromatic objectives, Nos. 1235 and 1237 (1 in. and $\frac{1}{4}$ in.) having "standard society screw" and one Huyghenian eye-piece, affording powers from about 60 to 375 diameters; including a condenser with universal motion to stand, brass pliers, glass slips and covers, concave slip for examination of fluids, and a drawer for the accessories, in a polished mahogany box with handle, lock and key \$45.00
- No. 1304.—Model University Microscope, as No. 1303, with two achromatic objectives, 1 in. and 1-6 in., having "standard society screw" and extra extension to draw tube, affording powers from about 50 to 600 diameters 60.00
 Spiral Rack and Pinion, coarse adjustment extra 7.50
 "Abbe" form of Condenser with Iris diaphragm " 10.00

Microscope Accessories

- No. 1305.—Stage micrometer divided in 100ths and 1000ths of an inch . . . each \$1.25
 No. 1306.—Live Box for securing living objects each \$1.50 to 2.25
 No. 1307.—Condenser on stand universal motion " 3.00 to 7.50
 No. 1308.—Microscope Lamp with adjustment for light each 6.00
 No. 1309.—Glass Slips, 3 x 1 in., from, per doz., 15c, 0.40
 No. 1310.—Cover Glasses square or circle, from, per ounce, \$1.50 to 3.00
 No. 1311.—Entomological pins packed in one ounce, from 75c to 1.25

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 \$25 00
 35 00
 le 40 00

Fine Achromatic Objectives

FIRST SERIES.

Of the very best construction and largest angular aperture for first class microscope stands.

Nos.	Equivalent Focal Length of Objectives	Angle of Aperture	Lineal Magnifying Power with the various Eye-pieces and Tube of Standard Length				Price \$
			A	B	C	D	
			2 inch	1½ inch	1 inch	¾ inch	
1312	3 inches...	12°	20	28	40	56	12.50
1313	2 " " "	16°	25	35	50	70	12.50
1314	1½ " " "	20°	35	50	70	98	12.50
1315	1 " " "	25°	50	70	100	140	15.00
1316	* ½ " " "	75°	110	155	220	310	17.50
1317	* ¼ " " "	100°	250	350	500	700	20.00
1318	* ⅓ " " "	130°	325	425	650	900	24.00
1319	* ⅔ " " "	150°	425	595	850	1100	27.50



No. 1319

Those marked * have screw collar adjustment to allow for difference in thickness of cover glass.

SECOND SERIES.

Of smaller angular aperture, giving fine definition, recommended as thoroughly useful powers for students of Physiology and Pathology.

Objective	Angle Aperture	Price	Objective	Angle Aperture	Price
No. 1320.—3 in.	9°	each \$7.50	¼ in.	75°	each \$12.50
No. 1321.—2 in.	10°	" 7.50	1-6 in.	100°	" 15.00
No. 1322.—1 in.	15°	" 7.50	½ in.	105°	" 20.00
No. 1323.—½ in.	40°	" 10.50			

Extra for Screw Collar Adjustments.

French Objectives

These objectives are triple combinations, excepting the first which is a double, dividing to give lower power when desired. They have all the French screw as used on French microscopes.

No. 1324.—French Objective, 1 in.	Each \$2.50	French Objective, 1-6 in.	Each \$4.00
No. 1325.—French Objective, ½ in.	3.00	French Objective, ¼ in.	5.00
No. 1326.—French Objective, ⅓ in.	3.50		

Huyghenian Eye-pieces for Microscopes

The following eye-pieces are of the very best construction, giving a clear flat field, and are made to fit any of the first-class microscopes, having the draw tubes of the same diameter.



No. 1327



No. 1331

No. 1327.—Eye-pieces, large size, A and B, engraved	each \$4.50
No. 1328.—Eye-pieces, large size, C, engraved	" 5.00
No. 1329.—Eye-pieces, large size, D, engraved	" 5.00
No. 1330.—Eye-pieces, large size, E, engraved	" 5.50
No. 1331.—Eye-pieces, large size, F, engraved	" 6.00
No. 1332.—Eye-pieces, small size, A and B	" 3.00
No. 1333.—Eye-pieces, Orthoscopic or large field, A and B	" 7.50
No. 1334.—* Erecting Glass to screw in draw tube	" 6.00

* This allows the compound microscope to be used as a dissecting instrument with considerable range of power (with same object glass) and increase of working distance.

11 lines equal to 1 inch.

Achromatic brass draw

No. 1350.—
No. 1351.—
No. 1352.—
No. 1353.—
No. 1354.—
No. 1355.—

For ex
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No. 1356.—3
No. 1357.—3

Achromatic spray shade.

No. 1358.—1
No. 1359.—1
No. 1360.—1

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16" lenses
No. 1362.—Bl
16 lenses
No. 1363.—Bl
16 lenses

Achromatic Portable Telescopes

11 lines
equal to
1 inch.



No. 1350

Achromatic Portable Telescope, black morocco covered body, highly burnished brass draw tubes according to size, as follows:—

Dimensions:		Diameter of object glass.	Magnifying Power.	each.
Open.	Closed.			
No. 1350.—13½ in.	5 in.	10 lines	10 times	\$ 3.50
No. 1351.—16 in.	6 in.	12 lines	15 times	5.00
No. 1352.—17 in.	6½ in.	14 lines	20 times	7.50
No. 1353.—23 in.	8 in.	16 lines	25 times	10.00
No. 1354.—30 in.	9¼ in.	19 lines	30 times	15.00
No. 1355.—34 in.	10¼ in.	22 lines	35 times	20.00

The Signal Service Sling Telescope

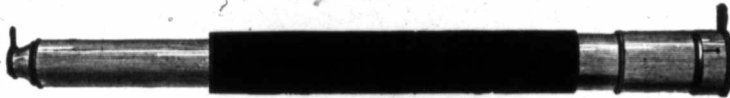
For extreme long distances the most powerful hand telescopes made, having panoramic eye-pieces, by which the power may be regulated to suit the varied conditions of the atmosphere.

Signal Service Telescope, of the very finest quality and workmanship, morocco covered body, sunshade, leather caps and sling, with four oxidized metal draw tubes:

Dimensions:		Diameter of object glass.	Magnifying Power.	each.
Open.	Closed.			
No. 1356.—36 in.	10¼ in.	24 lines	30 to 40 times	\$35.00
No. 1357.—36 in.	11 in.	27 lines	40 to 50 times	50.00

Achromatic Marine Telescopes

KNOWN IN THE MERCHANT SERVICE AS THE DAY OR NIGHT.



No. 1358

Achromatic Marine Telescope, leather covered, highly burnished tubes, with sun or spray shade.

	Closing to.	When open.	Dia. of ob- ject glass.	Magnify about.	each.
No. 1358.—1 draw	.21 in.	.36 in.	1¼ in.	12 times	\$12.00
No. 1359.—1 draw	.21 in.	.36 in.	2 in.	12 times	17.00
No. 1360.—1 draw	.24 in.	.40 in.	2¼ in.	16 times	20.00

Binocular Telescopes

Two Telescopes mounted side by side, fitted with adjustment to adapt to the exact width between centres of eyes.

These instruments have about 3 times the power of the best Binoculars of the ordinary construction, and are unsurpassed as a marine and yachting glass.

No.	Description	Dia. of object glass.	Power.	Field.	each.
No. 1361.—Binocular Telescope,	16 lenses, morocco covered,	25 mm	11 times	39	\$35.00
No. 1362.—Binocular Telescope,	16 lenses, morocco covered,	33.5 mm	16 times	28	45.00
No. 1363.—Binocular Telescope,	16 lenses, morocco covered,	38 mm	20 times	28	50.00



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each \$12.50
" 15.00
" 20.00

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Each
\$4.00
5.00

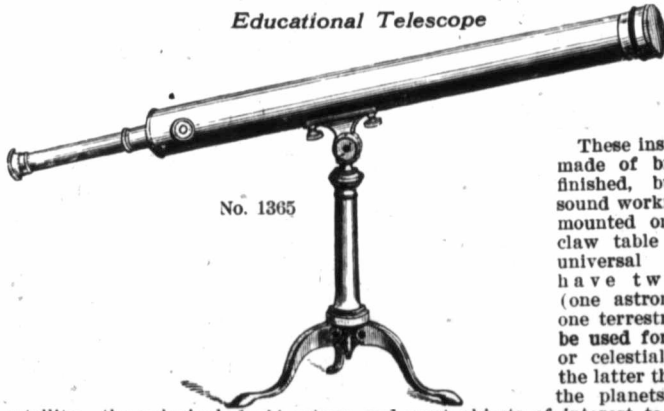


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each \$4.50
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Educational Telescope



No. 1365

These instruments are made of brass, plainly finished, but of good sound workmanship, are mounted on pillar and claw table stand with universal movements, have two eye-pieces (one astronomical and one terrestrial), so may be used for either land or celestial objects. Of the latter they will show the planets with their

satellites, the principal double stars, and most objects of interest to an amateur astronomer. As land telescope they are extremely good; they will show a flag-staff at 20 miles, the time by a church clock at 10 miles, the name on a vessel at 10 miles.

- No. 1364.—Educational Telescope, object glass $2\frac{1}{2}$ in. in diameter, in case, each \$50.00
- No. 1365.—Educational Telescope, object glass 3 in. in diameter, in case, " 60.00
- No. 1366.—Rackwork Steadying Rod, extra " 12.50
- No. 1367.—Adding Finder, extra " 7.50
- No. 1368.—Extra Astronomical Eye-pieces " 9.00
- No. 1369.—Extra Terrestrial Eye-pieces of any power, to order " 10.00
- No. 1370.—Mahogany tripod for garden use " 15.00

Combined Astronomical and Terrestrial Telescopes



No. 1371

With astronomical eye-piece and dark glass head for sun. brass table stand and clip, with jointed pillar and steel screw for screwing into a tree or field gate, etc., packed in a mahogany case, with lock and key.

- No. 1371.—Diameter of object glass . . . 2 , Magnify day . . . 25, Astro . . . 60 . . \$50.00
- No. 1372.—Diameter of object glass . . . 2 $\frac{1}{2}$, Magnify day . . . 25, Astro . . . 80 . . 60.00
- No. 1373.—Diameter of object glass . . . 2 $\frac{1}{2}$, Magnify day . . . 30, Astro . . . 90 . . 75.00

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No. 1374.—Rochon Micrometer Telescope, 24 in. long, in mahogany case, complete, with directions each \$75.00 and \$85.00

This Micrometer is a most useful instrument to Astronomers, Geographical Engineers, Military and Naval Officers, it being possible to determine the distance or height of any object, by means of a double prism, through which are reflected two images of the object in the field, and the angle is measured by their contact, as in taking the sun's diameter with a sextant.

For large size and more costly telescopes having equatorial mountings, we shall be please to quote prices on application.

Boys' Telescopes — Non-achromatic

No. 1375.—Boys' Telescope, wood covered body, brass draw tubes:—
Open, 6-12 in.; closed, 4 in.; object glass, 12 lines; draws 1 2 3
\$1.00 \$1.25 \$1.50

No. 1376.—Toy Telescope, colored Japan body, brass draw tubes:—
Open, 3½-5½ in.; closed, 2½ in.; object glass, 11 lines; draws 1 2 3
\$0.35 \$0.45 \$0.60

No. 1377.—Walking Stick Telescope, having Achromatic Telescope concealed in the end each 5.00

No. 1378.—Pocket Telescope, range of vision 6 to 8 miles, in leather case. . . . 3.00

Optical Telegraphy

No. 1379.—This apparatus for luminous projection in which the calculated curve of the lenses give the minimum of aberration. This instrument has been adopted by several continental power after several severe tests. On the side of each apparatus is placed a strong and powerful telescope permitting to seek and read the signals of the corresponding post of observation. All movements are obtained mechanically without friction or efforts, packed in strong case with all accessories, field instrument objective 10 centimetres, complete \$125.00

Tripod Stands for Telescopes, Etc.

No. 1380.—Hardwood with saddle for support of telescope affording altitude and azimuth movement. \$5.50

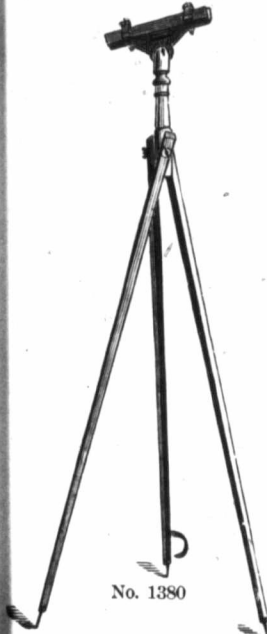
No. 1381.—Tripod similar to above, but with legs sliding up and down for raising or lowering telescope. each 7.00

No. 1382.—Clamp rests for telescopes with suitable hinged collar and gimlet screw for fastening to trees, posts or window frames, very convenient when prolonged observation is required, price according to size of collar, each \$2.00 to \$4.00

Object Glasses for Astronomical Telescopes

Mounted in brass cells, superior in definition to any ever produced at a moderate cost. Their illuminating power is perfect and they are practically free from any secondary color.

	Clear aperture.	Focus.	
No. 1383.—	. . . . . 2 inches	. . . . . 25 inches	\$ 15.00
No. 1384.—	. . . . . 2½ inches	. . . . . 30 inches	20.00
No. 1385.—	. . . . . 2¾ inches	. . . . . 36 inches	30.00
No. 1386.—	. . . . . 2¾ inches	. . . . . 40 inches	40.00
No. 1387.—	. . . . . 3 inches	. . . . . 45 inches	50.00
No. 1388.— 3¼ inches 46 inches	70.00
No. 1389.— 3¾ inches 54 inches	100.00
No. 1390.— 4 inches 60 inches	125.00



No. 1380

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...60... \$50
...80... 60
...90... 75

Best French Achromatic Object Glasses for Telescopes

No. 1391.—Achromatic Object Glass, 1½ in. diameter, 18 to 30 in. focus.....	\$2.00
No. 1392.—Achromatic Object Glass, 1½ in. diameter, 18 to 30 in. focus.....	2.50
No. 1393.—Achromatic Object Glass, 1½ in. diameter, 18 to 30 in. focus.....	4.50
No. 1394.—Achromatic Object Glass, 2 in. diameter, 18 to 30 in. focus.....	6.00
No. 1395.—Achromatic Object Glass, 2½ in. diameter, 18 to 30 in. focus.....	7.50
No. 1396.—French Achromatic Object Glasses for Portable Telescopes:—	
Sizes.....	10 12 14 16 19 22 lines.
Prices.....	\$.75 \$1.00 \$1.25 \$1.50 \$2.50 \$3.50

Eye-Pieces, Diagonals, Etc., Etc.

No. 1397.—Astronomical Eye-pieces of low magnifying power.....	each \$ 5.00
No. 1398.—Astronomical Eye-pieces of high powers.....	" 9.00
No. 1399.—Achromatic Eye-pieces.....	" 12.00
No. 1400.—Sliding Steadying Rod, from the base of pillar to the eye-piece end of telescope.....	" 10.00
No. 1401.—Rackwork Steadying Rod, from the base of pillar to the eye-piece end of telescope.....	" 15.00
No. 1402.—Barlow lens, adapted to any of the telescopes.....	" 7.50
No. 1403.—Sun Diagonal.....	" 9.00
No. 1404.—Star Diagonal.....	" 12.50
No. 1405.—Comet Eye-piece.....	" 6.00
No. 1406.—Screw Micrometer Eye-piece.....	" 15.00
No. 1407.—Transit Eye-piece.....	" 9.50
No. 1408.—Sunshades for Eye-pieces, any tint.....	" 2.00
No. 1409.—Best quality Pancratic Eye-piece.....	" 9.00
No. 1410.—Achromatic Finder.....	" 12.50

Scientific Societies and Institutions of learning, Colleges, Convent, etc., being entitled to import these instruments duty free, we are prepared to execute all such orders promptly, without charge other than actual import expenses.

Set of Lenses for Non-Achromatic Telescopes

No. 1411.—Set of Lenses for constructing Non-achromatic Telescope, consisting of:—	
Eye-piece Lens..... ½ in. diameter.... 1 in. focus.....	} Set. \$ 1.50
Field Lens..... 1 in. diameter.... 2 in. focus.....	
Object Lens..... 2 in. diameter.... 40 in. focus.....	

Triangular Prisms

No. 1412.—Solid Flint Glass Prisms, 2 in. long.....	each \$1.00
No. 1413.—Solid Flint Glass Prisms, 3 in. long.....	" 1.25
No. 1414.—Solid Flint Glass Prisms, 4 in. long.....	" 1.50
No. 1415.—Solid Flint Glass Prisms, 6 in. long.....	" 2.50

Rectangular Prisms—Crown Glass

No. 1416.—½ in. square, face 90°.....	\$ 2.00
No. 1417.—¾ in. square, face 90°.....	2.50
No. 1418.—1 in. square, face 90°.....	3.00
No. 1419.—1 in. square, face 90°.....	4.00
No. 1420.—Nicol Prisms.....	2.50
No. 1421.—1½ in. square, face 90°.....	5.00
No. 1422.—1½ in. square, face 90°.....	6.50
No. 1423.—1½ in. square, face 90°.....	8.50
No. 1424.—2 in. square, face 90°.....	11.00



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No. 1431.—
No. 1432.—
No. 1433.—
No. 1434.—
No. 1435.—
No. 1436.—
No. 1437.—
No. 1438.—

Achromatic Field or Marine Glasses



No. 1425



No. 1427

MANUFACTURED BY LEMAIRE, PARIS.

No. 1425. — Field or Marine Glasses, 12 lenses, superior, Coast Signal service sawn leather body, with sun shades, finely black japanned or oxidized draw tubes, cross bars, tops and trimmings; in sole leather sling case: 46 mm., \$18.50; 53, \$21.50; 57, \$24.00; 62, \$31.50

No. 1426.—Field or Marine Glasses, 12 lenses, black morocco body, with sun shades, black japanned or oxidized draw tubes, cross bars, tops and trimmings, in morocco sling case:—
42 mm., \$14.00; 46, \$16.00; 53, \$18.50; 57, \$22.50

No. 1427.—Three-power Glasses, 12 lenses, superior, changeable eye-pieces of different powers used respectively for Theatre, Field and Marine, black morocco body with sun shades, finely black japanned draw tubes, cross bars, tops and trimmings, in sole leather sling case:—
46 mm., \$23.00; 52, \$25.00; 57, \$27.50

No. 1428.—Field or Marine Glasses, 6 lenses, black morocco body, with sun shades, finely black japanned draw tubes, cross bars and tops, compact model, designed to afford large field, in morocco sling case:—
42 mm., \$11.00; 46, \$12.50; 53, \$13.50; 57, \$15.00

No. 1429.—Marine Glasses, 6 lenses, superior, strong sawn leather body, with sun shade, finely black japanned or oxidized draw tubes, cross bars, tops and trimmings, in solid leather case, power 9, field 39 objective, 57 mm. 35.00

No. 1430.—Ditto, power 7.1, field 27 objective, 57 mm. 25.00

No. 1431.—Ditto, power 6.5, field 28 objective, 56 mm. 21.50

No. 1432.—Field Glass, with cross wires (solving a problem long thought off) this field glass permits to fix rapidly the angular distance between two objects, objective 42.7 mm., power 5, field 43 metres, in case. 22.50

"Chevalier"

No. 1433.—Field or Marine Glasses, 6 lenses, black morocco body, with sun shades, black japanned draw tubes, cross bars, tops and trimmings, in sling case:—39 mm., \$5.00; 42, \$5.50; 46, \$6.00; 53, \$7.50; 57, 9.00

No. 1434.—Field or Marine Glasses, 6 lenses, superior, black morocco body, with sun shades, black oxidized draw tubes, cross bars, low tops and trimmings, in sling case:—
39 mm., \$7.00; 42, \$8.00; 46, \$9.00; 53, \$10.00; 57, 12.00

Sling Cases for Field or Marine Glasses

No. 1435.—Morocco case 39 mm., \$1.50; 42, \$1.75; 46, \$2.00; 53, \$2.25; 57, 2.50

No. 1436.—Sole leather case 39 mm., \$2.50; 42, \$2.75; 46, \$2.75; 53, \$3.00; 57, 3.00

No. 1437.—Strap, with Buckle 0.50

No. 1438.—Leather Cord, with Swivel 0.50

Binoculars of all kinds repaired and adjusted.

opes
\$2.00
2.50
4.50
6.00
7.50
22 lines.
50
each \$ 5.00
" 9.00
" 12.00
" 10.00
" 15.00
" 7.50
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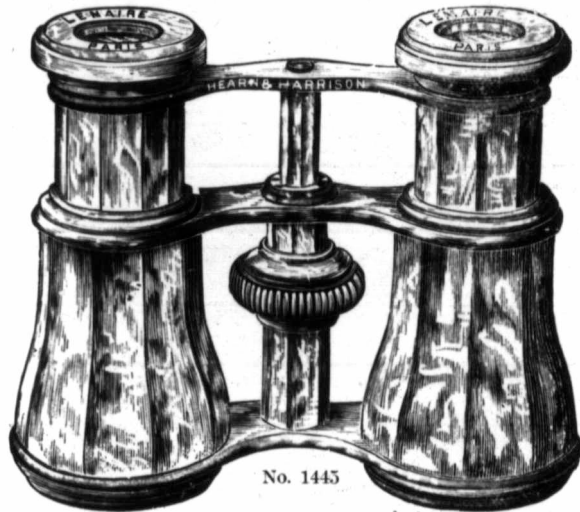
Bausch and Lomb-Zeiss Stereo Binoculars



Price List of the Bausch and Lomb-Zeiss Stereo Binoculars

Nos	Mag- nify- ing power	Diam. of field of view p. 1000 yards in feet	Wght of Glasses in ounces	Prices for Binoculars	Ditto Universal Binocular
1440	4	474	12	\$20 00	\$35 00
1441	6	315	12	25 00	40 00
1442	8	246	13	40 00	45 00
1443	10	174	27	45 00	50 00
1444	12	135	27	50 00	60 00

Price includes heavy hand-sewed Leather Carrying Case with Shoulder Strap and directions for the use and care of the glasses.



No. 1445

- No. 1445.—ALL PEARL—Opera Glasses, 12 superior lenses, with body, cross bars, tops, draw tubes, trimmings and adjusting bar, all of best selected white pearl:— 13 lines, \$23.00; 15, \$25.00; 17, \$30.00
- No. 1446.—PEARL AND GILT—Opera Glasses, 6 superior lenses, with white or iridescent pearl body and tops; richly gilt draw tubes, cross bars and trimmings:—11 lines, \$10.50; 13, \$11.00; 15, \$12.50; 17, 14.00
- No. 1447.—PEARL AND NICKEL—Opera Glasses, 6 superior lenses, with body of alternating sections of black and white pearl, finely nickelled draw tubes, tops and cross bars:—
10 lines, \$10.00; 11, \$10.50; 13, \$11.50; 15, \$12.50; 17, 14.50
- No. 1448.—Folding Opera Glass "Mars" for pocket, 14 lines object glass, in flat case 6 4.50



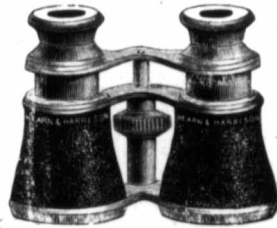
Achromatic Opera Glasses

No. 1449. — Opera Glasses, black morocco body; black japanned draw tubes, cross bars, tops and trimmings:—11 lines, \$2.00; 13, \$2.50; 15, \$3.00; 17, \$3.50; 19, \$4.00; 21, \$5.00

Manufactured by Lemaire, Paris.

No. 1450. — Opera Glasses, with dark brown kid body; richly gilt draw tubes, cross bars and trimmings; black tops:—13 lines, \$6.50; 15, \$7.50; 17, \$9.00; 19, \$10.50

No. 1451. — Opera Glasses, fine black morocco body; black japanned draw tubes, cross bars, tops and trimmings:—13 lines, \$5.00; 15, \$6.00; 19, \$7.00; 19, \$8.00



No. 1451

Pocket three-power Binocular

By a simple arrangement the eye-pieces are made changeable, giving three different powers, used respectively for the Field, Marine or Opera, strong metal bodies covered with morocco.

No. 1452.—Pocket three power Binoculars:—
15 lines, \$18.00; 17, \$20.00; 19, \$22.00

Vest Pocket Opera Glasses

No. 1453.—Opera Glasses, fine black morocco body, black japanned draw tubes, cross bars, tops and trimmings:—
7 lines, \$5.50; 10, \$6.00; 11, 7.00

Single or Monocular Glasses

These Monocular Glasses are most useful to any persons who, either from a defect of vision or loss of sight with one eye, are unable to use a Binocular.

No. 1454.—Single Opera Glass, morocco leather body:—
13 lines, \$3.50; 15, \$4.00; 19, \$5.00; 21, \$6.00

No. 1455.—Single Field Glass, morocco leather body, with sun shades:— 21 lines, \$5.50; 24, \$6.50; 26, 7.50

Cases for Opera Glasses

No. 1456.—Morocco case:—11 lines, \$0.75; 13, \$0.90; 15, \$1.00; 17, \$1.25; 19, \$1.50; 21, 1.75

No. 1457.—Silk Velvet, satin-lined case:—
11 lines, \$2.00; 13, \$2.25; 15, \$2.50; 17, 2.75

No. 1458.—Opera Glass, white pearl handle, gilt mounts, extension 7.50

No. 1459.—Opera Glass, handle oriental pearl, gilt mounts, extension 7.50

Any of the above pearl Opera Glass can be supplied with attached handles.

Bausch and Stereo

Prices for Binoculars	Ditto Universal Binocular
\$20 00	\$35 00
25 00	40 00
40 00	45 00
45 00	50 00
50 00	60 00

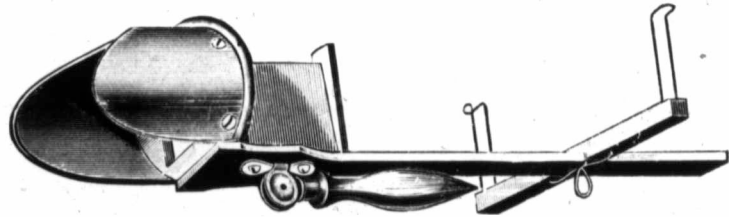
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No. 1458

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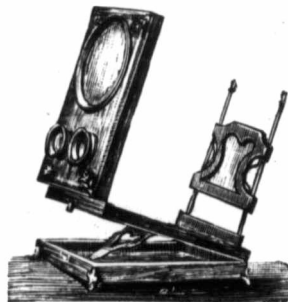
STEREOSCOPES and GRAPHOSCOPES
Both Elegant and Useful in the Drawing Room



No. 1460

- No. 1460.—Stereoscopes, cherry frame, small lenses, folding handle, imitation rosewood head each \$0.50
- No. 1461.—Ditto, medium size lenses " 0.75
- No. 1462.—Ditto, large size lenses, with aluminum hoods " 1.00
- No. 1463.—Ditto, all aluminum " 2.00

Stereoscopes
and
Graphoscopes



No. 1468

- No. 1461.—Polished stands for above stereoscope, each \$0.50

- No. 1465.—Graphoscope, mahogany, carte de visite size, 2½ in. lens, each \$1.50

- No. 1466.—Graphoscope, mahogany, cabinet size, 3 in. lens, each \$2.00



No. 1474

- No. 1467.—Graphoscope, ebonized wood 3½ in. lens. each \$3.00
- No. 1468.—Grapho-Stereoscope, rosewood polished 4 in. lens. " 5.00
- No. 1469.—Grapho-Stereoscope, ebonized and decorated. 4 in. lens. " 6.00
- No. 1470.—Grapho-Stereoscope, rosewood. 5½ in. lens. " 7.50
- No. 1471.—Grapho-Stereoscope, ebonized wood and mouldings. 5½ in. lens. " 9.00
- No. 1472.—Grapho-Stereoscope, ebonized wood and engraved. . 6 in. lens. " 11.00
- No. 1473.—Grapho-Stereoscope, olivewood, nickel trimmings. . 6 in. lens. " 12.00
- No. 1474.—Revolving Stereoscope, to hold 25 views 10.00
- No. 1475.—Revolving Stereoscope, to hold 50 views, 17 in. high, 10 in. square. 12.50
- No. 1476.—Card Stereoscopic views, groups and comic, plain. per dozen 0.75
- No. 1477.—Card Stereoscopic views, groups and comic, colored 2.50
- No. 1478.—Card Stereoscopic views, European scenes, common. 0.75
- No. 1479.—Card Stereoscopic views, European and American scenes. 0.75
- No. 1480.—Card Stereoscopic views, European and American scenes. 1.50
- No. 1481.—Transparent Stereoscopic Views, comic 2.00
- No. 1482.—Transparent Stereoscopic Views, infernal regions 2.50
- No. 1483.—Graphoscope Views, assorted. per dozen, \$1.50, \$3.00, 5.00
- No. 1484.—Graphoscope or cosmorama lenses:—

	2½	3	4	5	6	7	in. diameter
	\$0.75	\$1.00	\$2.00	\$2.50	\$3.00	\$4.00	

No. 1489

No. 1485.—

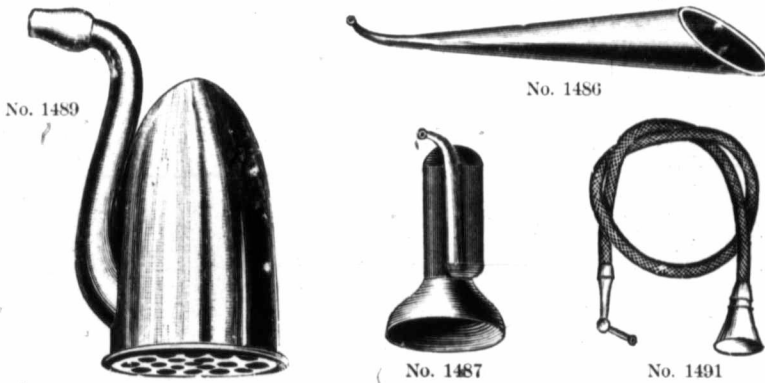
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Ear Cornets

No. 1485.—Ear Cornets, the smallest auricular instruments made:—

Per pair, rubber, \$1.50; zylonite, \$2.00; silver, \$3.00

When the tympanum or drum of the ear is inactive from the thickening of the membrane and obstruction of the conducting canal, the Ear Cornets will keep the canal open, and by admitting air to the tympanum sometimes start is dormant functions.

Ear Trumpets

No. 1486.—Ear Trumpets, bronzed, straight necks, various lengths, each \$2.00 to \$4.00

No. 1487.—Ear Trumpets, bronzed, curved necks, various forms, " 4.00 to 6.00

No. 1488.—Ear Trumpets, bronzed telescopic, closing for pocket, " 5.00

In cases of deafness with persons over forty years of age, having good health and no organic constitutional trouble, the hearing becomes worse as age increases and relief can only be obtained by the use of the Ear Trumpet, so named because of its similarity to the well known musical instrument. In principle, however, it is the reverse, as instead of producing and emitting sound, it absorbs, concentrates and conducts the air waves to the ear. These are made in various forms, of which we can recommend the above, as a conversation can be carried on with their aid in a natural tone of voice.

Dome Trumpets

No. 1489.—Dome Trumpets, bronzed, each \$5.00 and \$6.00

The Dome Trumpets are best adapted to hear public lectures, for church, etc., being less conspicuous, and have been found effectual for conversational use in most obstinate cases, where the ordinary forms have failed. The mouth piece is closed by a perforated metal plate, while the neck curving to the inside nearly reaches the top of the mouth piece. The air waves passing through the small apertures, when reaching the top are diverted back to a common centre by the neck of the instrument. All the waves forced into the channel and conducted to the ear, result in a great increase of power over the ordinary trumpets. These are also made of various forms and sizes.

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Auricles

No. 1490.—Auricles, bronzed per pair \$5.00 and \$6.00
 The Auricles consist of two ramshorn shaped trumpets, flattened on one side to fit close to the ears, and connected by a fine steel spring passing over the crown of the head. They are not conspicuous and are of great convenience to those persons who wish to hear general conversation without having to use a trumpet.

Conversation Tubes

No. 1491.—Conversation Tubes each \$5.00 and \$7.50
 The Conversation Tube has small mouth piece with neck about a yard long and perfectly flexible. Being of fine mohair, with india rubber lining no external sound is produced. It will convey the merest whispers and is most convenient in company, where a private conversation may be carried on without attracting the attention of others.

Audiphone

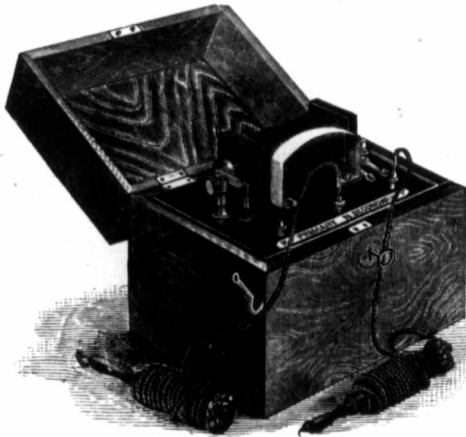
No. 1492.—Audiphone, of hard rubber, shaped like a fan, for application to the teeth, each 10.00
 No. 1493.—Artificial Tympanum, or Ear Drum. each 0.50
 No. 1494.—Ear Speculum, in sets of four, rubber. per set 1.50
 No. 1495.—Ear Syringe, rubber ball. each .075

Improved Faradic Batteries

Messrs. Hearn & Harrison take pleasure in calling attention to the improvements made in the following Batteries, which can be recommended as the most powerful and portable ever offered for sale. They are so simple in construction that any person reading the directions will have no trouble about operating them. Great care has been taken in their manufacture, so that any part can be furnished by us, and put in place without trouble. All the metal work is very finely finished, nickel plated and polished, and they are all put up in polished black walnut cases, very compact and strong, having lock, key and handle.

Family Battery

No. 1496.—Family Battery, designed for domestic use operated by dry cell, easily handled, always ready for use, complete with handles. \$7.50



FAMILY FARADIC BATTERY. No. 1497

The Family Faradic Battery

The Family Faradic Battery has been especially designed for domestic use. It is a good working instrument, made in a substantial manner, giving a smooth, even current, being made on the same principle as the large batteries. Although not intended to take the place of the Physician's Battery, it may safely be claimed to be the most perfect and complete ever offered at the price. The case is 7½ x 6 x 5 and weighs less than 5 lbs. It is furnished with electrodes and conducting wires.

No. 1497.—. \$12.50

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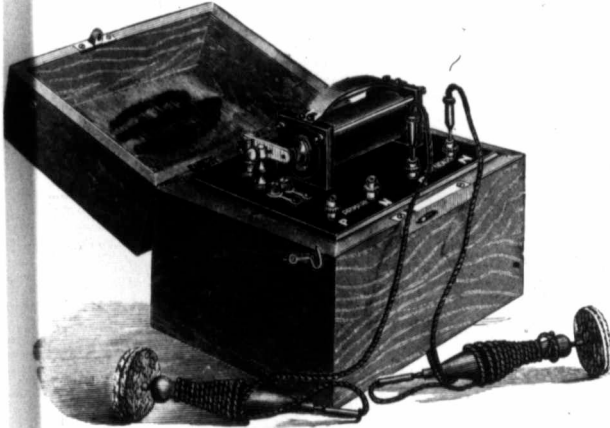
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The Physician's Portable Faradic Battery

The Physician's Portable Faradic Battery, weighing less than 8 lbs. when charged, will be found very convenient as a visiting battery or for family use, as it

gives sufficient strength to treat any case where the Faradic or induced current is needed. The induction coil has polished hard rubber ends and cover. The coil, binding posts and rheotome are placed on a hard rubber plate, having the under surface covered with soft rubber and holding the zinc and carbons. The connections of the coil with the zinc are permanent. The manner in which the hard rubber plate is securely clamped over the rubber cell and drip cup preventing any spilling of the solution while



PHYSICIAN'S PORTABLE FARADIC BATTERY. No. 1498.

carrying in the hand or in a buggy, will particularly recommend them to the medical profession. After use, the zincs and carbons should be removed from the cell containing solution, reversed and placed in the drip cup. By making the cell and drip cup in one piece they are more convenient to handle, and there is less chance of any liquid being split. The case is 8 x 7 x 7.

No. 1498. — Price, with Sponge Electrodes and Conducting Wires. . . \$21.00

The Household Battery

List of Attachments Furnished with Battery

No. 1499.—1 Pair Conducting Cords (two colors); 1 Pair Nickered Tubular Metal Handles; 1 Pair Wooden Handles (to hold Spongio Discs); 1 Pair Spongio Discs; 1 Nickered Foot Plate; 1 Pamphlet of Instructions \$7.50

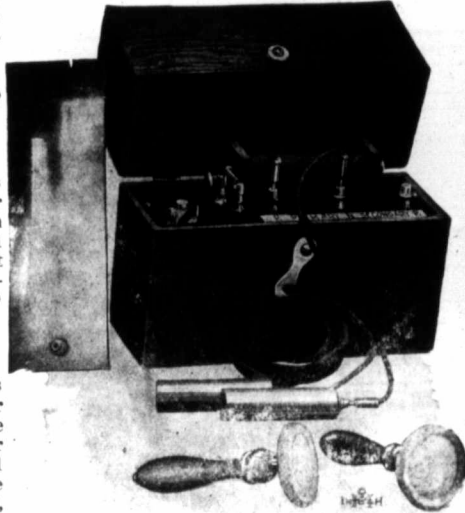
The Masseuse Battery

List of Attachments Furnished with Battery

No. 1500. — 1 Pair Conducting Cords (two colors); 1 Pair Nickered Tubular Metal Handles; 1 Wooden Handle with Spongio Disc; 1 Massage Roller Electrode; 1 Hair Brush Electrode; 1 Nickered Foot Plate; 1 Wrist Sponge Electrode; 1 Pamphlet of Instructions, \$10.00

No. 1501. — Magnet Electric Battery, with two handles, small size. . . . \$5.00

No. 1502. — Ditto, larger coil and magnet \$9.00



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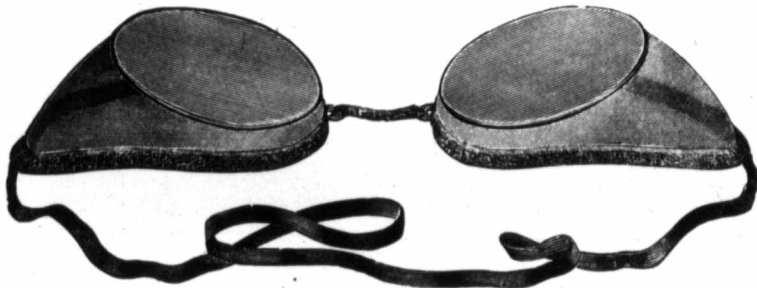
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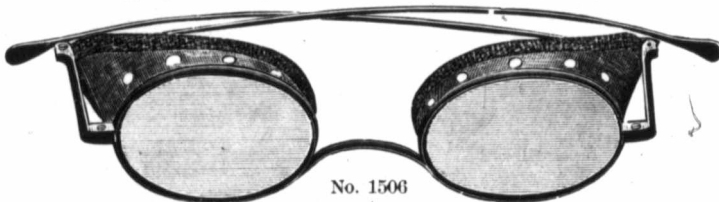
Eye Protectors, Flat Colored Glasses, White, Blue or Smoke



No. 1504

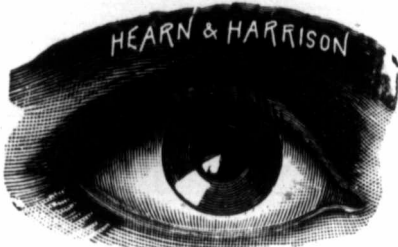
- No. 1503.—White Gauze Eye Protectors, ordinary, plain edgesper pair \$0.25
- No. 1504.—White Gauze Eye Protectors, best, velvet bound " 0.75
- No. 1505.—White Gauze Spectacles, best, velvet bound " 1.50

Driving Spectacles, Flat Glasses, White, Blue or Smoke



No. 1506

- No. 1506.—Wire Gauze Driving Spectacles, finest finish, light steel frames, velvet bound, with cups fitting the face exactly, recommended as the best dust protector for the eyes and also for snow and wind. . . \$2.50
- No. 1507.—Ditto, shell shaped glasses " 2.50
- No. 1508.—Wire Nickel Eye Protectors, riding temples and round plain white lenses, 3 in. diameterper pair 0.50



No. 1509

Artificial Human Eyes

In ordering an artificial eye, it will be necessary to answer the following questions:—

1. Is the eye wanted for right or left?
2. Has the party worn an artificial eye before?
3. Has the eye been operated, and if taken out in part or whole?
4. What time has elapsed since the operation?
5. What color is wanted?
6. Is the sclera or white of the eye yellow, red or blue tinted?

If the party has worn an artificial eye before, send it with the order, even if broken, and state how it suited in regard to color and size.

- No. 1509.—Artificial Human Eyes, best quality, shell style, selected,each \$5.00
- No. 1510.—Artificial Human Eyes, best quality, made to order 7.50
- No. 1511.—Artificial Human Eyes, best quality, reform full back 10.00



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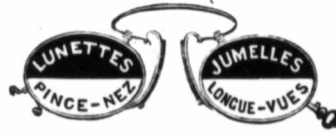
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- No. 1520.—
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SPECTACLES and EYEGLASSES

Eyes tested free of charge



Directions for Selection of Glasses

When any difficulty is experienced in reading, writing and sewing, or objects at a distance are not seen clearly, by carefully testing the sight of each eye separately on this "Test-types" and sending answers to the following questions, we shall in most cases be enabled to supply glasses adapted to the particular defect.

The trial can be made either by daylight or any good artificial light, care being taken to have the light fall on the page and avoid exposing the eyes to any direct glare.

1. What is the *extreme* distance in feet and inches at which you can read this type?
2. What is the *nearest* point in feet and inches at which you can read this type?
3. Have you used glasses before, and if so, give the *nearest* and *farthest* points at which you can read with them this type?
4. Are the glasses required for Reading or for Distance?
5. Are Spectacles or Eyeglasses preferred?
6. What is the distance from the centre of one pupil to the centre of the other? This can be measured by a tape or rule, or a piece of folded paper, if marked on the edge opposite the pupils when looking perfectly straight.
7. Is the bridge of the nose prominent?
8. Is it broad or thin?

In answering to the above it is not necessary to repeat the question, but simply put the number of it before the answer.

A register is kept in all cases where glasses are supplied, so that at a future time they can be duplicated without further trouble.

Spectacles and Eyeglasses can be supplied at following prices

No. 1512.—Steel nickel plated straight temples	per pair	\$0.50	\$1.00	\$1.50
No. 1513.—Steel nickel plated riding bow temples	"	1.00	1.50	2.00
No. 1514.—Steel nickel plated Eyeglasses (Lorgnons)	"	1.00	1.50	2.00
No. 1515.—Solid Silver spectacles, or eyeglasses (Lorgnons)	per pair		2.00	
No. 1516.—Gold filled spectacles warranted for 10 years, either straight or curl temples	"		3.00	
No. 1517.—Gold filled Eyeglasses (Lorgnons) warranted for 10 years.	"		3.00	
No. 1518.—Gold spectacles and eyeglasses (Lorgnons) 10 kt.	per pair	\$5.00	6.00	
No. 1519.—Gold spectacles and eyeglasses (Lorgnons) 14 kt.	"	7.50	9.00	

The above prices include the lenses.

Cylindrical, spherocylindrical or cataract lenses are extra.

Brass Bound Eyeshades

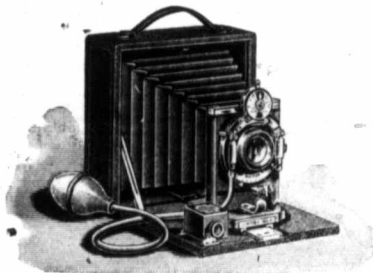
No. 1520.—Eyeshades made in linen	\$0.15
No. 1521.—Eyeshades made in transparent celluloid	0.20

Special quotation for quantities.



No. 1520

Kodaks and Photo Accessories



No. 1528.

For the use of Civil Engineers, Architects, Builders to photograph and keep for future references, Bridges or parts of Bridges, Tunnels, Railway work, Buildings, etc.

	Picture.		Films, per roll of 12 exposures.
No. 1522.—Pocket Folding Kodak Picture,	1½ x 2½.....	\$ 6.00	\$0.25
No. 1523.—Pocket Folding Kodak Picture,	2¼ x 3¼.....	10.00	0.40
No. 1524.—Pocket Folding Kodak Picture,	2½ x 4¼.....	12.00	0.50
No. 1525.—Pocket Folding Kodak Picture,	3½ x 3½.....	15.00	0.60
No. 1526.—Pocket Folding Kodak Picture,	3¼ x 4¼.....	17.50	0.70
No. 1527.—Pocket Folding Kodak Picture,	3½ x 5½.....	20.00	0.80
No. 1528.—Pocket Folding Kodak Picture,	4 x 5.....	20.00	0.90
No. 1529.—Developing outfit for above up to	5 x 4.....	1.50	
No. 1530.—Enlarging outfit for above up to	4 x 5.....	4.00	

Films can be sent to us by mail and we will develop, print and mount them on card at the following prices:

Size 1½ x 2½	per dozen	\$0.65
Size 2¼ x 3¼	"	0.90
Size 2½ x 4¼	"	1.00
Size 3½ x 3½	"	1.00
Size 3¼ x 4¼	"	1.00
Size 5 x 4	"	1.10
Size 7 x 5	"	2.00

We have also the panorama Kodak for scenery picture taking only.

	Kodak.	Film, per roll.	Develop	Print.
No. 1531.—No. 1, Picture 2¼ x 7.	\$10.00	of 6 exposures.	\$.00	per doz. \$1.25
No. 1532.—No. 4, Picture 3½ x 12.	20.00	of 6 exposures.	0.90	per doz. 2.50
No. 1533.—Round brass tube tripod to fit any of the above Kodaks, open to 4½ ft. long, closed to 15 in.				\$2.50 to 3.50
No. 1534.—Feather wood tripod folding in 4 sections				3.00
No. 1535.—Distantia, an apparatus for automatically indicating the correct distance between the objective of a Camera and object to be Photographed, the distantia is in brass, nickered and in leather case, each				2.00
No. 1536.—Bottle Ruby Lamp for candle use				0.75
No. 1537.—Portable Ruby Lamp				1.00



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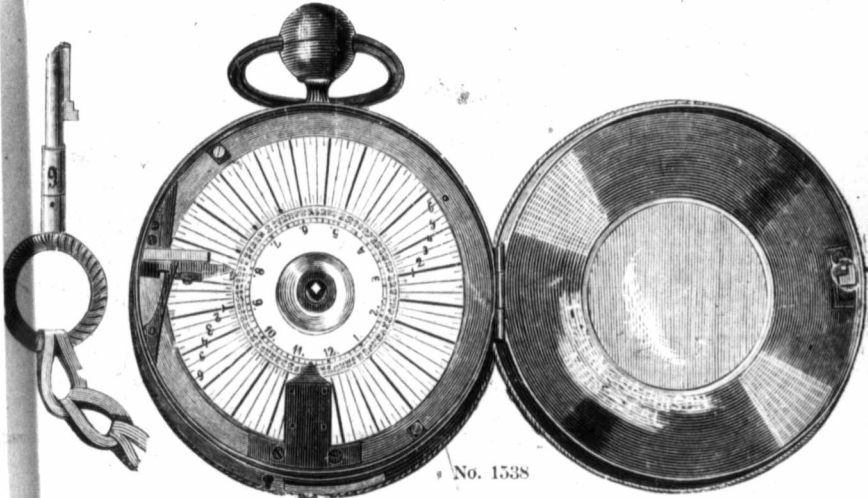
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*Improved Time Detector or Watchman's Clock
With Safety Lock*



No. 1538

*This instrument is supplied with six different keys for six different stations
Extra keys can be had if required*

The Special Improvement

The Special Improvement in this Detector is that the keys are stamped Nos. 1 to 6, and when used the number punched on the dial is the same as that on the key. Those clocks which are arranged to prick holes in the dials are not as distinct, consequently more confusing and unreliable.

The Safety Lock

The Safety Lock is a most important addition as a means of detecting dishonest watchmen who may attempt to open the clock with a false key and mark the dial without making their rounds. This is accomplished by a small pall, which marks on the dial at the time that the key is turned in the lock.

The Keys

The Keys Nos. 1 to 6 are placed at the different stations of the watchman's beat. In the evening before the clock is given to the watchman, a new card dial should be placed in position, the clock wound up, set as near as possible to the correct time and the case locked. When the watchman is making his rounds, on arriving at a station he must insert the key and turn only once to the right; upon so doing a figure is punched on the dial corresponding to that on the key, indicating on the card the time that it is punched. At each station this is repeated, so that in the morning it can be seen how often the rounds were made during the night and if every station had been visited as instructed.

This Time Detector is invaluable to all those who employ watchmen, as it is the only check which can be relied on.

The cases are nicked and made perfectly dustproof, and the movements are as reliable as the best lever watch. Any good watchmaker can clean and repair them.

No. 1538.—Improved Time Detector, one winding key, one key for safety lock and six station keys, with leather pouch and sling, and box of dial for one year each \$35.00

No. 1539.—Improved Time Detector or Watchman clock, with one winding key, one key for safety lock and 12 station keys with leather sling case and box of dials for one year each 50.00

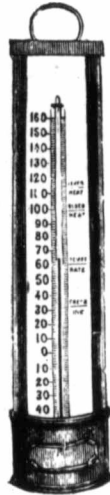
No. 1540.—Extra keys fitted to above clock " 0.75

All kinds of clock repaired, rated and adjusted promptly and carefully.

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THERMOMETERS



No. 1600

- No. 1600.—Tin Case Thermometers, scale divided from 40° below zero to over 120° above; each mark representing 2 degrees, 7 in. \$0.25
 " " " " " " " " " " " " 8 in. 0.40
 " " " " " " " " " " " " 10 in. 0.50
 " " " " " " " " " " " " 12 in. 0.75
- No. 1601.—Tin Case Thermometers, scale divided from 20° below zero to over 212° above; each mark representing 2 degrees, 8 in. 0.50
 " " " " " " " " " " " " 10 in. 0.75
 " " " " " " " " " " " " 12 in. 1.00
- No. 1602.—Tin Case Thermometers with two scales, Fahrenheit and Reaumur, or Fahrenheit and Centigrade. . . 8 in. 0.50
 " " " " " " " " " " " " 10 in. 0.75
 " " " " " " " " " " " " 12 in. 1.00
 " " " " " " " " " " " " 14 in. 1.50
- No. 1603.—Tin Case Thermometers, with seasoned tubes, tested and graduated with special care as to accuracy. Scale tube and case extra heavy, mounted with bright metal clasps, 8 in. 0.75
 " " " " " " " " " " " " 10 in. 1.00
 " " " " " " " " " " " " 12 in. 1.50
 " " " " " " " " " " " " 14 in. 2.00

Dairy Thermometers

- No. 1604.—Flange Dairy Thermometers, marked for churning, cheese and scalding 7 in. 0.25
- No. 1605.—All Glass Floating Dairy Thermometers, marked freezing, cheesing, churning and scalding, 8 in. \$0.25
 " " " " " " " " " " " " 10 in. 0.50



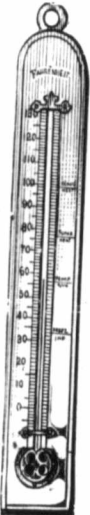
No. 1604



No. 1606

Bath Thermometers

- No. 1606.—In square wooden frame with turned handle, thermometer 7 in. long, frame 12 in. long 0.75
- No. 1607.—In square wooden frame with turned handle, thermometer 12 in. long, frame 18 in. long 1.00
- No. 1608.—Bath Thermometers, porcelain scale, transferred, enamel tube, in black japanned case, 8 in. 1.25
- No. 1609.—" " " " " " " " " " " " 8 in. 1.50
- No. 1610.—" " " " " " " " " " " " 8 in. 2.00
- No. 1611.—Porcelain "Sick-room" Thermometers, enamel tube, legible, 8 in. 1.25



No. 1612

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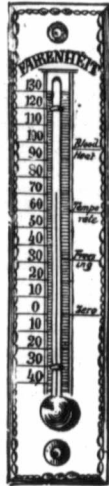
No. 1623

Porcelain Thermometers

No. 1624.—Porcelain Thermometers, enamel tube, metal guards, bold figures, Fahrenheit and Centigrade scales. 10 in. long, ordinary \$1.50

“	“	“	“	10	“	best.	3.00
“	“	“	“	12	“	best.	4.00
“	“	“	“	16	“	best.	6.00
“	“	“	“	20	“	best.	9.00

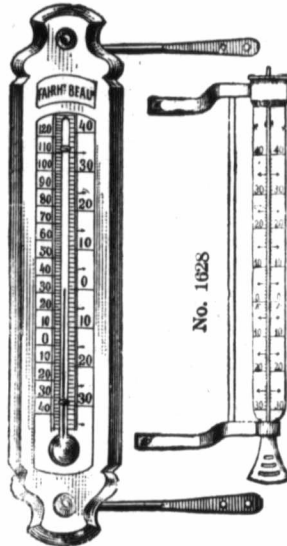
Window Thermometers



- No. 1625.—Window Thermometers, all glass, heavy plate, divided in clear bold figures from 40° below zero to 130° above, with brass arms to fasten outside of window, 8 in., \$1.00; 10 in., \$1.50; 12 in. 2.00
- No. 1626.—Window Thermometers, all glass, heavy plate, divided in clear bold figures from 40° below zero to 120° above; ornamental bevelled edge, with brass arms, 8 in., \$2.00; 10 in. 2.50
- No. 1627.—Window Thermometers, all glass, heavy plate, divided in clear bold figures indelible from 40° below zero to 120° above; large column of mercury, with polished bevelled edges, with brass arms, 10 in., \$3.00; 12 in. 4.00
- No. 1628.—Window Thermometers, 15 in. long, glass cylinder with porcelain scale 1½ in. wide, heavy brass cap, with brass holders 4.00
- No. 1629.—Window Thermometers, walnut frame, angle back, for right or left hand, 8 in., \$0.75; 12 in. 2.00
- No. 1630.—Window Thermometers, ivory scale, enamel tube, in glass cylinder and mahogany frame, with copper roof, each 6.00

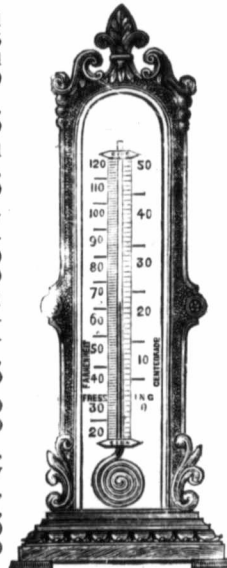
No. 1626

Fedestal Thermometers



No. 1627

- No. 1631. — Pedestal Thermometers, cut glass, 5 in. high, Fahrenheit and Reaumur scale . . . \$0.50
- No. 1632.—Do, 6 in. high, \$1.00
- No. 1633. — Do, bronzed iron, light or dark verde, 8 in. \$1.50
- No. 1634. — Do, fancy wood stands, different patterns, . . 7 in. \$1.50, \$2.00
Do, . . . 9 in. 2.00, 2.50
- No. 1635. — Do, in real bronze, reproducing Trajan's column, Column Vendome and Obelisk of Luxor, 7 in. \$7.50
- Do do . . 8 in. 9.00
Do do . . 10 in. 12.00
- No. 1636.—Do, opal scale, spiral tube on elegantly carved back and stand, Fahrenheit and Centigrade, 12 in. \$8.00
- Do do 14 in. 10.00



No. 1633



No.

No. 16

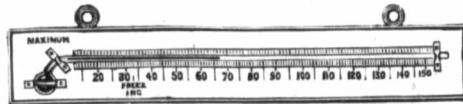
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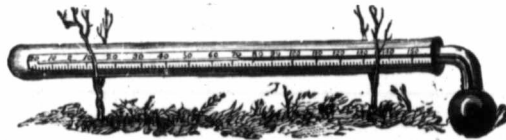
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No. 1641

Self-Registering Thermometers for Cold



No. 1643



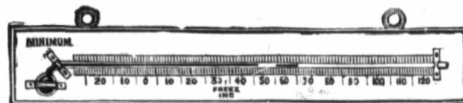
No. 1647

- No. 1642.—Garden Minimum Thermometer, boxwood scale, enamel tube, double degrees, graduated from 50° below zero to 120° above 10 in. 12 in.
\$1.00 \$1.50
- No. 1643.—Minimum Thermometers, Rutherford's principle, spirit column, round bulb, graduated from 50° below zero to 130° above, enamel tube on boxwood scale 1.50 2.50
- No. 1644.—" " " in white japanned roof case. 2.25 3.50
- No. 1645.—Standard Minimum Thermometers, Rutherford's principle, divided on stem and figured on raised scale, oak back, graduated from 50° below zero to 130° above. 12 in. 14 in.
4.50 6.50
- No. 1646.—" " " with Kew verification. 7.00 9.00
- No. 1647.—Terrestrial Radiation Minimum Thermometer, for temperature of the surface of the earth 7.50

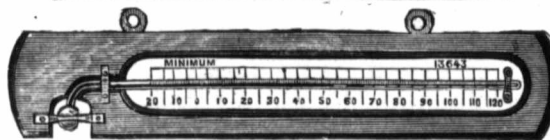
Directions for using Minimum Thermometers, for the Determination of the Minimum Temperature of the Air

The Thermometers are filled with colourless alcohol in which floats a black glass index. Having caused the black index to flow to the end of spirit column by slightly tilting the Thermometer, suspend the instrument in such a manner that the bulb is about half an inch lower than the other end; on a decrease of temperature the spirit will carry the index towards the bulb; on an increase of temperature the spirit will ascend again, leaving the end of index furthest from the bulb indicating the extreme of cold. (Should the spirit column become separated, it can be easily joined by swinging the Thermometer backwards and forwards with a pendulous motion, keeping the bulb end down. When joined allow it to stand upright for one hour before suspending for observation).

Self-Registering Thermometers for Heat



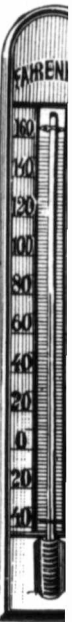
No. 1648



No. 1650

- No. 1648.—Maximum Thermometers, enamel tube on boxwood scale. 10 in. 12 in. 14 in.
\$2.00 \$3.00
- No. 1649.—" " " in white japanned roof case 2.75 4.00
- No. 1650.—Standard Maximum Thermometer, enamel tube, divided on stem, opal scale, in solid mahogany frame. 6.00 \$7.50
- No. 1651.—" " " with Kew verification 7.50 9.00
- No. 1652.—Solar Radiation Thermometer, registering maximum in vacuo 10.00

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No. 1668



No. 1671

The importance of temperature in disease is now universally recognized by the medical profession, and their observations have clearly established the fact that each disease which runs a definite course (*e. g. scarlet fever, measles, small-pox, typhus fever, rheumatism, acute phthisis, and the like*) has a characteristic and distinctive range of temperature.

The normal temperature of the human body, at completely sheltered parts of its surface, amounts to 98.4° Fahrenheit, or a few tenths more or less; and a rising above 99.5° Fahrenheit, or a depression below 97.3° Fahrenheit, are sure signs of some kind of disease, if such increase or depression is persistent.

The average temperature of the trunk of the body in the Tropics is nearly one degree higher than in temperate regions.

The increase of temperature above 99° Fahrenheit, as measured by the Thermometer, is the best index of the amount of fever present in any disease.

Directions for use of Clinical Thermometer

Its index must be set before commencing to take an observation. To set the Clinical hold it firmly in the hand bulb downwards, and swing the Thermometer backwards and forwards with a pendulum motion. The column will then be brought below the graduations.

All the tubes used in these Clinicals are stocked some months before being graduated, thereby avoiding any possibility of alteration in the column through contraction, and great care is exercised in the selection of tubes of uniform bore throughout their entire length by the most accurate calibration, which though it may be briefly described as dividing a tube into parts of equal volume, involves no small amount of experience and delicacy of manipulation.

- No. 1667.—Clinical Thermometer, self-registering, constricted tube in case, 2 minutes \$1.00
- No. 1668.—Clinical Thermometer, self-registering, broad bore, with patent constricted tube, preventing the union of index and mercury, 4 in., in german silver or ebony case, 1 minute 1.50
- No. 1669.—Clinical Thermometer, self-registering, with patent lens face by which register is magnified, indestructible index, 4 in., in german silver or ebony case, ½ minute 2.50
- No. 1670.—Clinical Thermometer, self-registering, with flat front, which is a substitute for the lens front, in german silver case 2.00
- No. 1671.—Clinical Thermometer, curved tube on ivory scale, very convenient for placing into the arm pit 3.00
- No. 1672.—Veterinary Clinical Self-registering Thermometer, open scale and protecting, german silver shield, arranged for treatment of cattle, (can be used without removing protector), 8 inches. 4.00

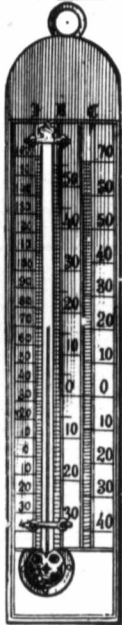
Clinical Thermometers with Centigrade Scales at the same prices as above list. That physicians at a distance may be enabled to procure Clinical Thermometers upon which they can thoroughly rely, we will pack and send by mail at 25c. additional charge.



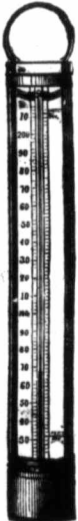
No. 1681



No. 1691



No. 1693



No. 1706



No. 1713

Thermometers for Special Purposes

- No. 1693.—Comparative Thermometer, 10 in. long, having the three scales—Centigrade, Reaumur and Fahrenheit \$1.50
- No. 1694.—Coal Pit Thermometers, porcelain scales \$2.00 to 5.00
- No. 1695.—Patent Self-registering Maximum Thermometer, for recording the temperature of mines, thermal or boiling springs, atmospheric and earth temperature, etc., mounted in round copper case, with ring to suspend 12.50
- No. 1696.—Disinfecting Thermometers, for hospitals and mortuary use 6.00
- No. 1697.—Hypsometrical Thermometer and Apparatus, complete, in leather case 30.00
- No. 1698.—Leslie's Differential Thermometer, on stand 4.00
- No. 1699.—Leslie's Differential Thermometer, with scales on both arms, on mahogany stand, complete 7.50
- No. 1700.—Hydrometer Thermometer, ivory scale, enamel tube, 7 in. 9 in. 10 in. 2.75 3.50 2.25
- No. 1701.—Saccharometer " brass scale, enamel tube . . . 10 in. 2.25
- No. 1702.—Salinometer " brass scale, enamel tube . . . 7 in. 1.50

Pyrometers

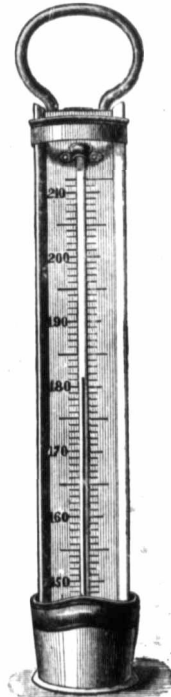
- No. 1703.—Richard's Registering Thermometer, one week's temperature on one chart 35.00
 - No. 1704.—Pyrometer for testing temperature in oven, furnace, etc., from 0° to 1000° 4 ft. stem, 5-in. dial 20.00
 - No. 1705.—Ditto, registering from 200° to 650°, for Baker's oven . . . 16.00
- Pyrometers made to higher temperature to order.

Thermometers for Manufacturing Purposes

Brewers' and Distillers' Instruments

- No. 1706.—Brewers' Tin Case Thermometers, extra heavy scale and tube . . 10 in. \$1.50
- " " " " " 12 in. 1.75
- " " " " " 14 in. 2.00
- No. 1707.—" graduated from 0° to 120° for cellar use 12 in. 1.75
- No. 1708.—" " copper case, extra heavy scale and tube 10 in. 2.00
- No. 1709.—" " " " " 12 in. 2.25
- No. 1710.—Brewers' Thermometer, heavy copper cup case, riveted, 30° to 220°, or for fermenting tuns 50° to 90° and 30° to 110°, best flat top, enamel tube, 12 in. 14 in. 4.00 5.00
- No. 1711.—Blind Scale Brewers' Thermometer, for private use, with pocket scale by which the secret of the heat employed may be kept; in heavy riveted copper case, with enamel tube, sliding brass index, graduated to 220° Fahrenheit, 14 in. 5.50
- No. 1712.—Porcelain Fermenting Tun Thermometer, bold large figures, broad column of mercury easily seen, strongly recommended, in copper case, . . . 10 in. 4.00
- " " " " " 14 in. 5.00

The Scale of this Thermometer will not corrode, and the figures will not come out, thereby being a useful Thermometer in the Fermenting Room, and is most easily read, having a broad column of mercury, recommended by brewers and others who have them in use.



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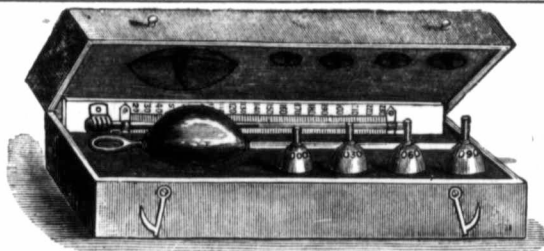
No. 1731.

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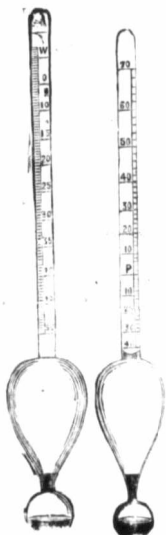
- No. 1735.—Bates' Saccharometer. (used by the Inland Revenue for ascertaining the specific gravity of Worts, as per the new Beer Act), 4 poises, best double gilt, metal scale Thermometer in mahogany box, with book of directions, etc. \$25.00
 - No. 1736.—Bates' Saccharometer, for distillers' use, 5 poises, shewing specific gravity 970° to 1120°, best double gilt, with metal Thermometer, in mahogany box, book of tables giving the expansion of heat at different temperatures 27.50
 - No. 1737.—Allan's Saccharometer, shewing specific gravity 1000° to 1130°, weights used on top of stem, best double gilt with metal Thermometer, in mahogany box, complete 25.00
 - No. 1738.—Small Pocket Saccharometer, metal gilt in case, for ascertaining the gravity of Worts in process of fermentation 25.00
 - No. 1739.—Improved one-weight Saccharometer, soldered with silver, shewing from water to 52 lbs. per barrel, best double gilt, with stout metal Thermometer, enamelled tube, adjusted to Kew standard with rule, in best bedded mahogany box, lock and key, book of directions and specific gravity tables, complete 21.00
 - No. 1740.—Kaiser Copper Saccharometer, in tin case, or any other scale 12.50
- Hydrometers and Saccharometers Repaired and Adjusted to the Government Standard.

Hydrometers and Saccharometers — Glass

- No. 1741.—Saccharometer for Brewers, shewing water to 50 lbs. per barrel, ivory scale, with directions, in tin case each \$ 1.50
- No. 1742.—" " paper scale, wood box 1.00
- No. 1743.—" " specific gravity scale, 0° to 100°, in tin case each 1.50
- No. 1744.—Saccharometer, specific gravity, standard with cylinder bulb, 0° to 100°, with Thermometer, in mahogany case and directions 7.50
- No. 1745.—Saccharometer, lbs. per barrel, best standard with cylinder bulb, 0° to 50°, graduated on stem, shewing correctly to 1-5th of a pound, in mahogany case 5.00
- No. 1746.—Saccharometer shewing on one instrument lbs. per barrel and specific gravity, with Thermometer, in mahogany case 6.00
- No. 1747.—Kayser's Saccharometer and Thermometer combined 2.00
- No. 1748.—Balling's Saccharometer and Thermometer combined 2.00
- No. 1749.—Copper Saccharometer Can, with Thermometer. 5.00
- No. 1750.—Pocket Saccharometer, without Thermometer. 1.00
- No. 1751.—Copper Mash Sampler 5.00

Hydrometers

- No. 1752.—Syke's Hydrometer, for proof spirit, from 40° under to 70° over proof, ivory scale, with directions. 1.50
- No. 1753.—" " " " paper scale 0.75
- No. 1754.—" Pocket size, with trial jar, in case 2.00
- No. 1755.—" with trial jar and Ivory Thermometer, in case 5.00



No. 1741

No. 1752

BEAUME'S HYDROMETERS.—Continued.

For Liquids Heavier than Water

No. 1787.—Beaumé Scale, especially accurate, 20° to 30°, divided into $\frac{1}{4}$	\$1.50
No. 1788.—Beaumé Scale, especially accurate, 40° to 50°, divided into $\frac{1}{4}$	1.50
No. 1789.—Beaumé Scale, especially accurate, 50° to 60°, divided into $\frac{1}{4}$	1.50
No. 1790.—Beaumé Scale, especially accurate, 60° to 70°, divided into $\frac{1}{4}$	1.50
No. 1791.—Beaumé Scale, 0° to 5°, divided into 1-20ths.	2.00
No. 1792.—Beaumé's Hydrometer for Acid	0.75
No. 1793.—Beaumé's Hydrometer for Ammonia	0.75
No. 1794.—Beaumé's Hydrometer for Alkali	0.75
No. 1795.—Beaumé's Hydrometer for Aquarium	0.75
No. 1796.—Beaumé's Hydrometer for Bark	0.75
No. 1797.—Beaumé's Hydrometer for Beer	0.75
No. 1798.—Beaumé's Hydrometer for Chlorine	0.75
No. 1799.—Beaumé's Hydrometer for Cider	0.75
No. 1800.—Beaumé's Hydrometer for Coal Oil	0.75
No. 1801.—Beaumé's Hydrometer for Glycerine	0.75
No. 1802.—Beaumé's Hydrometer for Lye	0.75
No. 1803.—Beaumé's Hydrometer for Salt or Pickle	0.75
No. 1804.—Beaumé's Hydrometer for Sperm Oil	0.75
No. 1805.—Beaumé's Hydrometer for Sugar and Syrup	0.75
No. 1806.—Beaumé's Hydrometer for Shellac	0.75
No. 1807.—Beaumé's Hydrometer for Vinegar	0.75
No. 1808.—Oeschlé's Hydrometer for Wine Must	0.75
No. 1809.—Argentometer, for silver solution, (photographer's use)	1.25
No. 1810.—Argentometer, for silver solution, with trial jar.	1.50

Hydrometers made to order to any scale or subdivisions

URINOMETERS

The Urinometer indicates the departure of urine from its healthy, normal standard. One side of the scale is marked with degrees, and the reverse side with the following letters: W, showing the point at which the instrument rests when immersed in pure water; H, the point for healthy, normal urine; S, indicating an increase of strength, or specific gravity, but a diminution of health; the last division showing the point at which the disorder known as "Diabetes" has set in, its progress is indicated by the instrument floating at lower divisions of the scale.

No. 1811.—Urinometer, specific gravity scale, from 1000° to 1060°, in case	\$1.00
No. 1812.—Urinometer, from 1000° to 1060°, with graduated jar, in pull-off morocco case	1.75
No. 1813.—Urinary Cabinet, containing Urinometer, Thermometer, spirit lamp, two small bottles, test-tubes, pipette, graduated trial-glass and test-papers	7.50
No. 1814.—Gilt Urinometer, in leather case	4.00

SALINOMETERS

The Salinometer is a modification of the Hydrometer, with a special scale, adapting it to ascertain the density of water in marine steam boilers. The zero of the scale marked 0 represents the point to which the instrument sinks in pure water, at a temperature of 200° Fahrenheit.

No. 1815.—Salinometer, glass, in case	each \$ 1.00
No. 1816.—Salinometer, best electro gilt, round bulb, flat stem, mahogany case	4.00
No. 1817.—Salinometer, German Silver with Thermometer, in velvet-lined mahogany case.	6.00
No. 1818.—Salinometer, Thermometer	1.50
No. 1819.—Salinometer, Testing Pot, stout copper	2.00
No. 1820.—Nicholson's Gravimeter, for ascertaining specific gravity of metals and other solids, japanned tin	5.00
No. 1821.—Nicholson's Gravimeter, brass, in mahogany case, with divisions.	15.00
No. 1822.—Babington's Atmidometer, for measuring the rate of evaporation from water, ice or suow	21.00



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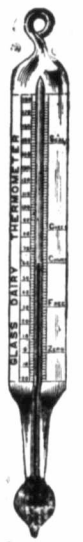
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LACTOMETERS and DAIRYMEN'S INSTRUMENTS.

Description of Lactometer for Testing the Quality of Milk.

Milk being so universally used as an article of food, it becomes a matter of great importance to ascertain whether the milk obtained is pure or not. The above-named instrument was invented for this purpose, for fixing the standard weight of milk as it is produced in the best grazing districts in the country, and for detecting the fraud of adulterating milk with water, so frequently practiced by dealers.

The method of using it is as follows:

Fill the jar with milk to be tested, allow it to cool to the temperature of 60 degrees, then immerse the Lactometer, and notice the mark on the scale that is level with the surface of the milk, which will show the quality.

- The mark P. being pure milk.
- " " three parts milk and one part water.
- " " two parts milk and two parts water.
- " " one part milk and three parts water.
- " " all water.

Any intermediate value can be determined by the decimal scale on the opposite side, zero being water, and 100 pure milk.

To farmers this instrument has proved to be very valuable as a ready means of testing the relative quality of his cows by inspecting their milk; and also showing the effects produced by a change of the animal's food, as its quality will change the density of the milk.

- No. 1823 No. 1820
- No. 1823.—Lactometer for testing the quality of milk, paper scale, in wood box \$0.75
- No. 1824.—Lactometer for testing the quality of milk and specific gravity scale, in case 1.00
- No. 1825.—Lactometer (pocket) for testing the quality of milk and specific gravity scale with divided cream jar, in case 1.50
- No. 1826.—Lactometer and Thermometer combined, Board of Health, in box 2.00
- No. 1827.—Combination Lactometer and Cream Gauge in round wooden box 1.50
- No. 1828.—Standard Lactometer, white metal, round bulb, flat stem, mahogany case 4.00
- No. 1829.—Lactoscope, for determining the amount of butter in milk, in polish wood case with pipette 5.00

Directions for Lactoscope.

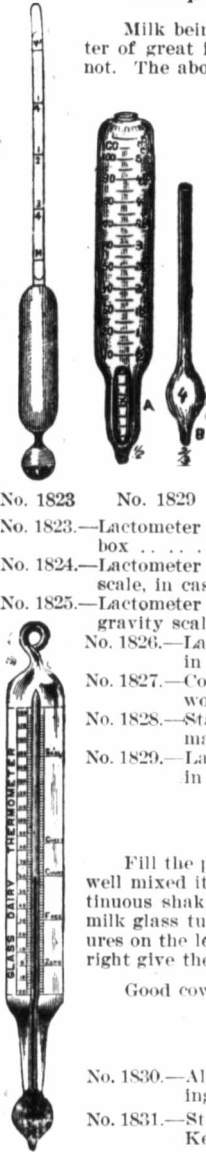
Fill the pipette to the mark with the milk to be tested, and after having well mixed it, pour into the graduated cylinder. Add gradually under continuous shaking, as much water as is necessary to make the lines on the milk glass tube in the cylinder just visible enough to be counted. The figures on the left give the cubic centimeters of water added, and those on the right give the percentage or fat (cream) or butter contained in the milk.

Good cow's milk should contain not less than three per cent. of fat.

Dairy Thermometers.— Superior Quality.

- No. 1830.—All Glass Floating Dairy Thermometers, marked for freezing, cheesing, churning and scalding, 8 in. \$0.25
- No. 1831.—Standard Dairy Thermometers, graduated on stem with Kew certificate, with handle, 10 in. 5.00

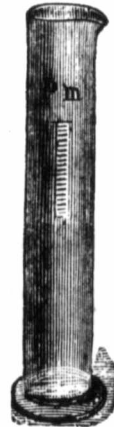
No. 1830 No. 1832.—Gauging Rods for Milk Cans, each 1.00



Dairymen's Instruments — (Continued)



No. 1833



No. 1834

- No. 1833.—Per cent. Glasses, graduated, 0 to 100, on foot, 10 x 2 \$1.00
- No. 1834.—Cream Testers or Gauges, graduated, 0 to 30, on foot, 12 x 2½ 1.00
- No. 1835.—Cream Testers or Gauges, graduated, 0 to 30, on foot, 10 x 2 0.75
- No. 1836.—Cream Testers or Gauges, graduated, 0 to 30, on foot, 8 x 1½ 0.60
- No. 1837.—Cream Testers or Gauges, graduated, 0 to 30, on foot, 6 x 1½ 0.50
- No. 1838.—Dairy Sets, consisting of one Lactometer, one Cream Jar, 10 in.,
divided from 0 to 100; two Cream Jars, 12 in., graduated from 0
to 30; one floating Dairy Thermometer, put up in a wooden box,
complete, per set 3.50
- No. 1839.—Set of four Cream Gauges, for comparison, on stand; these tubes
are divided into 100 parts, though graduated only in the upper por-
tion from 0 to 20, complete, each set 2.00
- Single tubes for do 0.25
- No. 1840.—Test Glasses, extra heavy, with flat bottom, 5 x 1½ in., . . .dozen 1.00
- No. 1841.—Test Tubes, 6 x ¼ in., " 0.50

Directions for Using Cream Gauges

Every sample of milk to be tested by the Lactometer *must* be brought to the same degree or temperature, as every variation of temperature will cause a variation in its specific gravity by the Lactometer. Those Lactometers, which are graduated for milk at 80° Fahrenheit, are the most convenient for use at butter and cheese factories.

Whenever milk shows by the Lactometer a less specific gravity than pure milk, one of two things may be suspected: either that the milk contains an unusual amount of cream, which can be easily determined by comparing it with an equal quantity of pure milk set in two equal cream gauges a sufficient length of time for the cream to rise, and if the suspected milk has more cream than the pure milk all right; but if less cream, the second suspicion ought to be that the milk has been watered and perhaps skimmed. Then to ascertain how much water has been added, take a sample of milk known to be pure, and from the mixed milk of several cows, and put it in a per cent. jar, filling it up to gauge mark ten; then fill another per cent. jar to the same mark with the suspected milk, and one with water to 0, or zero. Place all three jars side by side, so that they will be of the same temperature, and subjected to the same atmospheric influences until the cream has time to raise.

Note the percentage of cream on each sample of milk before removing or disturbing it. Then, after removing the cream from both jars, insert the Lactometer in the suspected milk, and note the point to which it sinks. Then place the Lactometer in the pure milk, and from the per cent. jar turn in water until the Lactometer sinks to the same point at which it stood in the watered milk. Place the jar

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No. 1842.—

No. 1843.—

No. 1844.—

No. 1845.—

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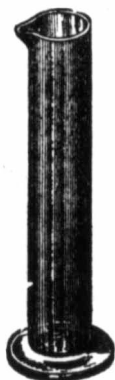
No. 1860.—

No. 1861.—

of water where it will stand level, and as soon as it comes to a rest, read from it the percentage of water added. The value of the cream taken from the milk can be estimated from the amount left, by comparing it with the same amount furnished by the sample of pure milk. In all tests of milk, which may affect the reputation of the man or woman delivering it, sufficient care ought to be used to make it reliable.

N. B.—The jar graduated from 0 to 100 is for water, and holds one-half the quantity of the large jars, or two degrees of the small being equal to one degree of the large jar. To prevent getting the large jars confused, one is marked M. and the other P. M.

Instruments for the Inspection of Coal and its Products



No. 1858

No. 1849

- No. 1842.—Coal Oil Hydrometer, with Thermometer combined, from 10° to 100° Beaumé, and specific gravity scale, (regular size), without jar, each \$ 3.00
- No. 1843.—Do for 4 oz. sample bottles, with Thermometer combined. " 2.50
- No. 1844.—Do plain, without Thermometer " 1.00
- No. 1845.—Standard Hydrometer Set, consisting of four Hydrometers and one Glass Jar in morocco case, complete, each set 12.50
- No. 1846.—Standard Hydrometer, absolutely correct, for acid, 64° to 66°, and specific gravity 1835, divided in 10ths, in walnut case. each 5.00
- No. 1847.—Glass Thieves, 24 in. " 1.50
- No. 1848.—Sample Bottles, 4 oz., " 0.40
- No. 1849.—Copper Coal Oil Fire Testers, with Thermometer, " 6.00
- No. 1850.—Copper Fire Testers, high grade for heavy oils " 7.50
- No. 1851.—Standard Coal Oil Pyrometer; this apparatus is intended to test the explosiveness and combustibility of coal oil and its products. It being the only instrument by means of which the vaporizing point (the real dangerous point) can be ascertained, each 12.50
- No. 1852.—Fusil Oil Testers, engraved, " 4.00
- No. 1853.—Improved Standard Lubricating Oil Freezer 25.00
- No. 1854.—Flush test apparatus for Petroleum to ascertain the temperature at which it will give inflammable vapor 45.00

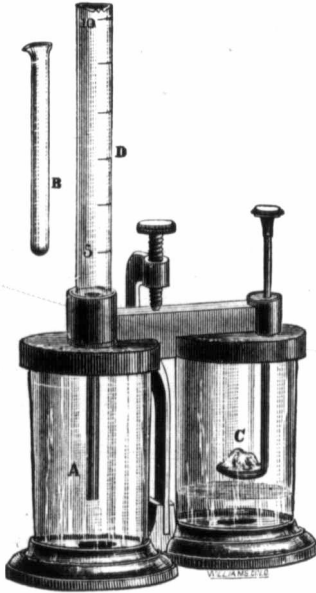
Glass Hydrometer Jars

- No. 1855.— 5 in. high 0.30
- No. 1856.— 6 in. high, 1 in. diameter, on foot, with lip 0.40
- No. 1857.— 8 in. high, 1½ in. diameter, on foot, with lip 0.50
- No. 1858.—10 in. high, 2 in. diameter, on foot, with lip 0.60
- No. 1859.—12 in. high, 2 in. diameter, on foot, with lip 0.75
- No. 1860.—15 in. high, 2 in. diameter, on foot, with lip 1.00
- No. 1861.—18 in. high, 2 in. diameter, on foot, with lip 1.50

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Twitchell's Acidometer

The want of an instrument to determine the strength of vinegar has been felt by vinegar dealers ever since this condiment has been obtained from other processes than the natural or artificial souring of wines or cider, the strength of which could be easily ascertained by the use of the Hydrometer. Since the introduction, however, of wood chips, sulphuric and other acids as factors of vinegar, a test based on specific gravity has become as absolute as genuine vinegar.



No. 1862

No. 1862.—Twitchell's Acidometer being applicable to all kinds of vinegar, supplies this want, and being easily handled and correct, fully deserves the popularity it is acquiring daily with vinegar dealers, each \$17.50

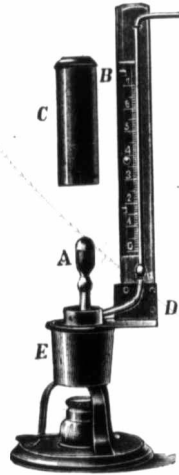
Full directions how to use the Acidometer accompany every instrument.

No. 1863.—Acidometer for the gauging of the acidity of vinegar, complete with acidometer tube, pipette, and one bottle of acidometer liquor, with instructions 3.50

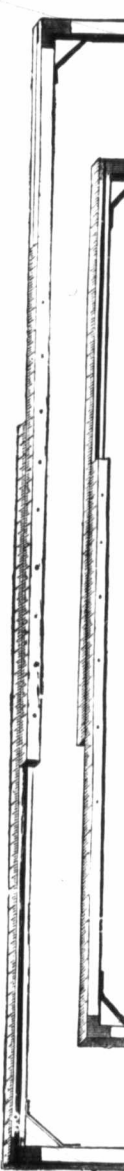
Patent Still

This apparatus is of great value to manufacturers and dealers of wines and liquors to accurately determine the percentage of alcohol contained in wine, cider, beer, etc., full instructions with each apparatus.

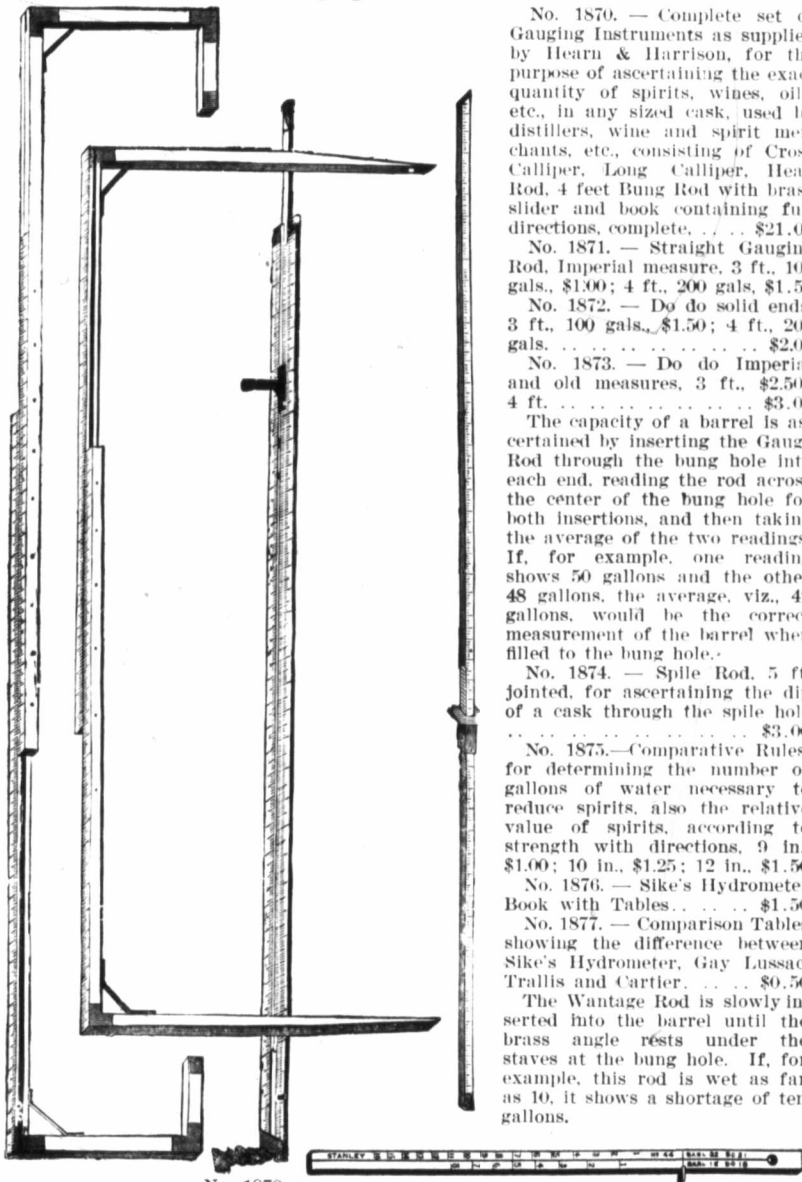
- No. 1864.—No. 1, with 2 alcoholmeters, complete \$ 9.50
- No. 1865.—No. 2, with 2 alcoholmeters, large size, complete 12.50
- No. 1866.—Ebulliometer for the rapid analysis of alcohol in wines, complete with scale and instructions. 20.00
- No. 1867.—Vapormeter, with thermometer for testing promptly and accurately the alcohol contained in vinegar, complete with instructions 7.50
- No. 1868.—Scale and tube with mercury bottle for above. 5.00
- No. 1869.—Scale and tube with 6 mercury bottles, for above 7.50



No. 1867



No. 1878.—

Gauging Rules and Rods

No. 1870

No. 1878.—Wantage Rod.

No. 1878.—Wantage Rod, to ascertain the number of gallons missing in a barrel, with full directions how to use it, 12 lines of graduations, . . . \$0.75

No. 1870. — Complete set of Gauging Instruments as supplied by Hearn & Harrison, for the purpose of ascertaining the exact quantity of spirits, wines, oils, etc., in any sized cask, used by distillers, wine and spirit merchants, etc., consisting of Cross Calliper, Long Calliper, Head Rod, 4 feet Bung Rod with brass slider and book containing full directions, complete, . . . \$21.00

No. 1871. — Straight Gauging Rod, Imperial measure, 3 ft., 100 gals., \$1.00; 4 ft., 200 gals., \$1.50

No. 1872. — Do do solid ends, 3 ft., 100 gals., \$1.50; 4 ft., 200 gals., . . . \$2.00

No. 1873. — Do do Imperial and old measures, 3 ft., \$2.50; 4 ft., . . . \$3.00

The capacity of a barrel is ascertained by inserting the Gauge Rod through the bung hole into each end, reading the rod across the center of the bung hole for both insertions, and then taking the average of the two readings. If, for example, one reading shows 50 gallons and the other 48 gallons, the average, viz., 49 gallons, would be the correct measurement of the barrel when filled to the bung hole.

No. 1874. — Spile Rod, 5 ft. jointed, for ascertaining the dip of a cask through the spile hole . . . \$3.00

No. 1875.—Comparative Rules, for determining the number of gallons of water necessary to reduce spirits, also the relative value of spirits, according to strength with directions, 9 in., \$1.00; 10 in., \$1.25; 12 in., \$1.50

No. 1876. — Sike's Hydrometer Book with Tables, . . . \$1.50

No. 1877. — Comparison Tables showing the difference between Sike's Hydrometer, Gay Lussac, Trallis and Cartier, . . . \$0.50

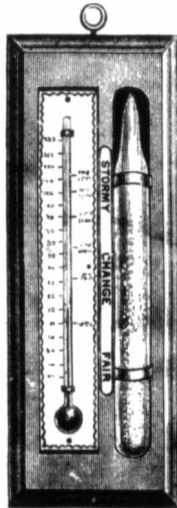
The Wantage Rod is slowly inserted into the barrel until the brass angle rests under the staves at the bung hole. If, for example, this rod is wet as far as 10, it shows a shortage of ten gallons.

Hygrometers

These instruments are employed for estimating the amount of moisture in the air. The atmosphere is never completely dry, nor completely saturated with moisture, and the amount of aqueous vapor held in suspension is very variable. This fact has important bearings on many branches of industry, as also on the hygienic qualities of the atmosphere. The consideration that a certain amount of moisture is necessary to the continuance of health will suggest the importance of maintaining that due proportion in the atmosphere of sick rooms, where the artificial heat, so injudiciously used, often disturbs the healthful hygrometric condition of the air. The Board of Health and the medical profession should enforce, as far as lies in their power, the use of these simple and effective instruments, which give indications so important to the comfort of the patient.



No. 1879



No. 1888

- No. 1879.—Mason's Hygrometer on wood scale, two thermometers \$ 4.50
- No. 1880.—Ditto, on oak frame, scales raised from frame by insulated straps (wet and dry bulb) 7.50
- No. 1881.—Ditto, latest pattern consisting of two thermometers, bulbs extending below plates, mounted on oak finished back, certificate furnished, with each thermometer 10.00
- No. 1882.—Hygrometer (wet and dry bulb), sling style, this form of Hygrometer is for the purpose of determining the degree of humidity quicker than is possible, with the ordinary wet and dry bulb, Hygrometer graduated 0° to 100° in 1° space improved form 7.50
- No. 1883.—Ditto, but graduated in 1/5 degree space from 10° to 70° 10.00
- No. 1884.—Lambecht's Polymeter for testing instantly the humidity or dryness of the atmosphere in rooms, hospitals, factories, etc., made of brass with thermometer, complete with instructions 9.00
- No. 1885.—Richard's Automatic Registering Hygrometer, each 50.00
- No. 1886.—Damp Detector, watch form, by which the dampness of a room is instantly shown 2.50 and 5.00

Storm Glasses

The Storm Glass has been known for more than a century, and although the name of its inventor is unknown, tradition attributes the honor to an Italian sailor. It is simply a glass vial containing a properly proportioned mixture of camphor, nitre, sal ammoniac, alcohol and water; and when due care is exercised in the preparation of the solution, it is very useful with the Thermometer and Barometer, as an assistant in forecasting the weather. In fair weather, the solution appears clear, with a sediment at the bottom; in stormy weather, the solution is disturbed and rendered cloudy. The more singular changes in the character of the mixture vary with the direction of the wind.

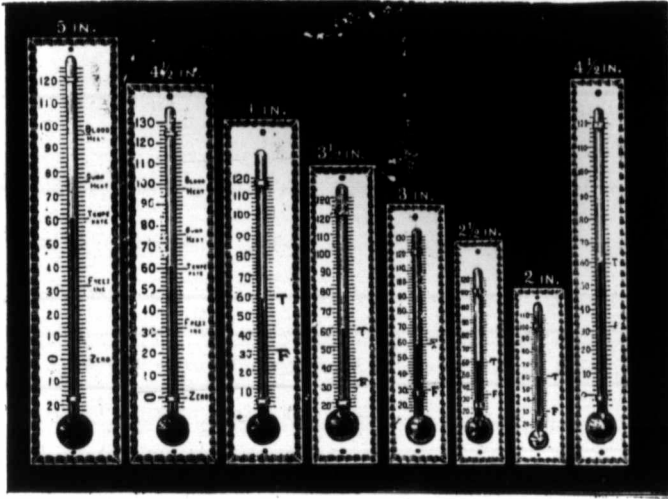
- No. 1887.—Storm Glass, 10 in., with Thermometer, mounted on polished boxwood back, highly finished, best make, with directions \$2.00
- No. 1888.—Do with Thermometer, mounted on polished walnut back 0.75

There are as ac
No. 1889.
No. 1890.



No.

Thermometers for Decorative Art and Fancy Work



No. 1889

Thermometers for this purpose are all graduated from three test points, and are as accurate as it is possible to make them.

No. 1889.—Any size from 2 to 5 inches, per dozen \$2.00

No. 1890.—Ditto, ditto, or ivory scales, " 5.00

The Improved Weather Houses

These indicate the changes in the weather in a unique, simple and pleasing manner. They are made of wood, handsomely decorated in different colors, provided with a reliable thermometer, and two miniature figures arranged in such a manner that the man will come out just before the storm, whereas the lady steps out to enjoy fair weather.



No. 1891

No. 1891.—Improved Weather House, assorted patterns \$1.00, \$1.25, \$1.50, \$2.00

SPECIAL NOTICE

In addition to this catalogue, priced and illustrated catalogue of the following goods will be mailed on application.

1. *Sciopticons, stereopticons and toy magic lanterns and accessories.*
2. *Photographic Kodaks and Cameras, lenses, paper, plates and accessories.*

If in these catalogues you do not find the article you require in the line of Scientific Instruments either optical, mathematical, philosophical, meteorological and marine, we will be glad to answer any correspondence on the subject.

Institutions of Education and Scientific Societies being allowed to import foreign instruments for their own use free of duty, we are prepared to execute promptly any orders entrusted to us.

HEARN & HARRISON,

M. R. de MESLÉ, Manager

10-12 Notre Dame St. East,

Montreal,

Canada.

P. S.—Since putting this catalogue in the printer's hands, on account of the continued rise of prices of brass and glass, we reserved the right to increase the prices of any articles of brass or glass manufacture without further notice.

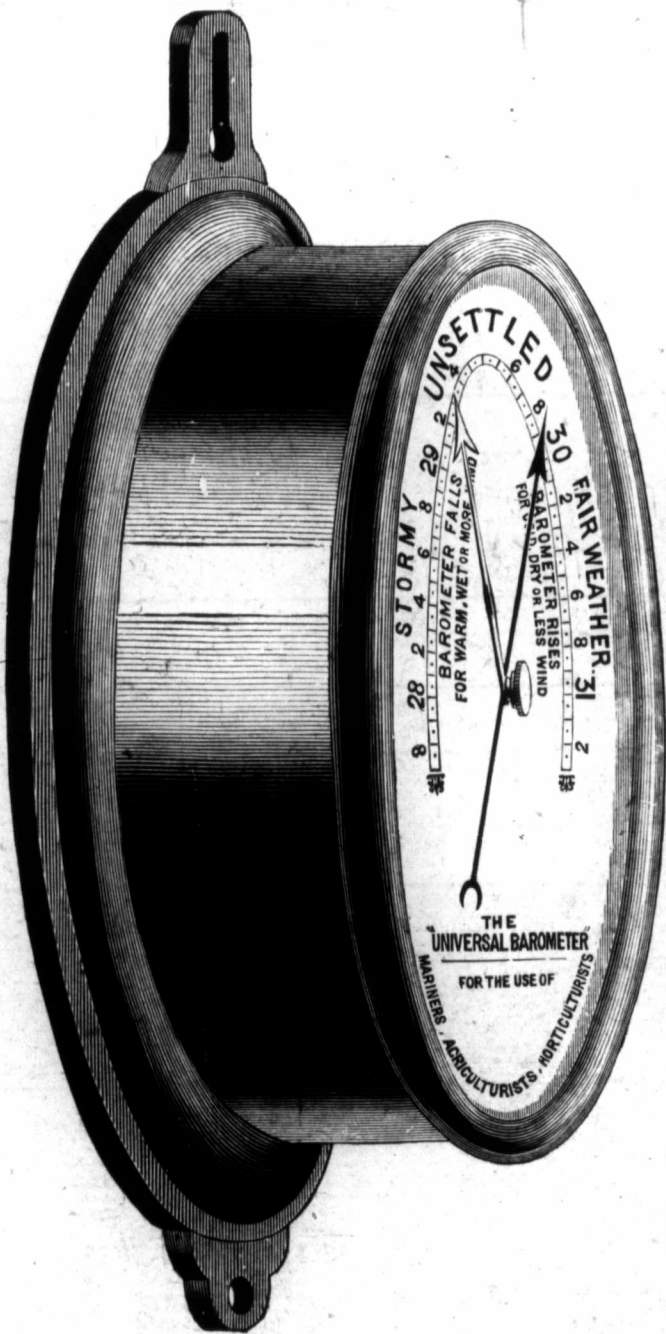
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HEARN & HARRISON

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M. R. DE MESLE,

MANAGER