

PHYSICAL *and* CHEMICAL
APPARATUS

MANUFACTURED AND IMPORTED BY

CENTRAL SCIENTIFIC CO.,

14 to 28 MICHIGAN STREET.

CHICAGO

U. S. A.

MAY, 1909

Established
1889

A. H. McCONNELL, Pres.
H. C. ARMS, Vice-Pres.
J. M. ROBERTS, Secy.
A. H. STANDISH, Treas.

Incorporated
1900

CATALOGUE M

METEOROLOGICAL INSTRUMENTS.

- 1151. **Barometer Tubing**, heavy large bore, per meter \$ 20
- 1153. **Barometer Tube**, large bore, thick walled, one end sealed, 80 c. m. long 33
- 1155. **Barometer Tube**, cup and pipette, complete 55
- 1157. **Barometer Tube**, with bend and bulb..... 45
- 1161. **Barometer Tube**, same as No. 1153, graduated in millimeters. 2 00
- 1162. **Mercury Well**, iron.. 33



No. 1153.



No. 1157.



No. 1161.

1165. IMPROVED MERCURIAL BAROMETER. FORTIN PRINCIPLE. Patented Nov. 28, 1905.

A **Barometer** without provision for the adjustment of the mercury level (zero point) is of no practical value in scientific work. For this reason we have ceased to carry the "old line" instruments.

This **New Barometer** embodies all of the important features and operates on the same principle as the U. S. Weather Bureau Standard Barometer.

The **glass tube** is straight and of heavy wall and uniform bore. This is much stronger than the bent or "U" shaped tubes commonly used.

The **mercury cistern** (C) is constructed of glass, sealed to the tube. A flexible and air-tight piece of leather forms the lower part of the cistern, and by means of the adjustment screw (B) the mercury level can be raised or lowered to coincide with the zero point. This zero point consists of a piece of colored glass (A) drawn to a sharp point, and extending from the outer wall of the tube. The zero level of the mercury is readily obtained, and with no error due to parallax. This form is far superior to the "line" zero used on most low cost barometers.

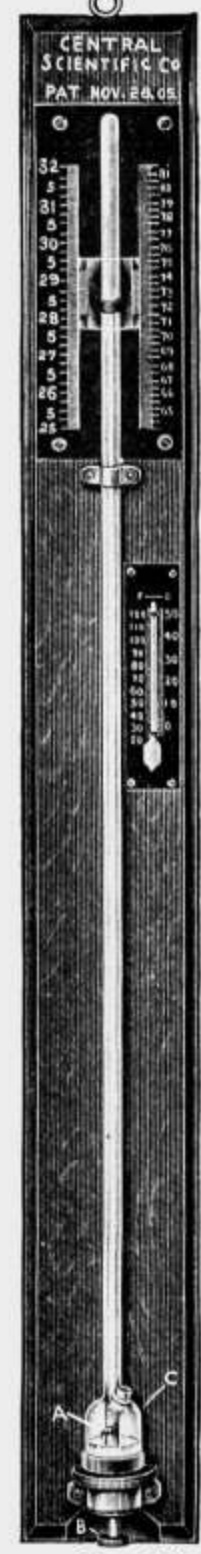
The **height of the mercury column** is observed by means of a special device attached to the vernier, which overcomes any error of parallax.

The **Barometer Scale** is fixed to the board and the distance between the scale divisions and zero is absolute and constant. This is superior to other forms constructed with a metal rod connecting the movable scale and zero, as this rod contracts or expands with changes in temperature, which destroys the accuracy of the graduations on the scale.

The **Barometer Scale** is graduated in Metric and English readings by means of a vernier to $\frac{1}{10}$ m. m. and 1-200 inch. The vernier slides in an accurately cut slot and moves freely and independently of the glass tube. The graduations are placed on a beveled surface, bringing them close to the scale. A lens front thermometer with Centigrade and Fahrenheit scale is attached to the mounting. \$16 65

- 1165A. **Improved Mercurial Barometer**, same as No. 1165, with a scale reading down to 20 inches for use in high altitudes \$ 19 00

- 1166. **Improved Mercurial Barometer**. Same as No. 1165, with addition of rack and pinion adjustment for the vernier and a certificate of error..... 22 25



No. 1165.

1169. **Standard Barometer, United States Weather Bureau Type, Fortin Principle.** This barometer is of the highest type of excellence, indorsed by the United States Weather Bureau and fully warranted by the manufacturer. The mercury tube is inclosed in a bronze-brass body, having at its upper end two vertical openings, in which the vernier works, the latter operated by a rack and pinion movement. The readings are taken through these openings, aided by light reflected from a white opaque glass reflector attached to the mahogany board behind. The scale is divided on one side into inches and 10ths, and on the other centimeters and millimeters, the vernier enabling a reading to be taken, in each case respectively, of 1-100th of an inch and 1-10th of a millimeter. The attached thermometer consists of a well seasoned tube with both Centigrade and Fahrenheit scales, with the figures etched on the stem. It is so mounted that it can be easily removed for testing, etc. Corrections for the thermometer accompany each instrument. No correction for capillary action or instrumental error is given with these barometers, as the scale has been adjusted until readings are identical with the standard compared with that of the Kew Observatory, England. The barometer may be used without the board by suspending it by the ring at the top, but the board (No. 1171), as shown in the illustration, possesses many advantages. Without board..... \$ 45 00
1171. **Mahogany Back** for above, to which is attached a brass bracket to receive the ring in the top of the barometer, a ring with steadying screws to clamp about the cistern, and white opaque glass reflectors forming a translucent background for reading the instrument..... 5 50

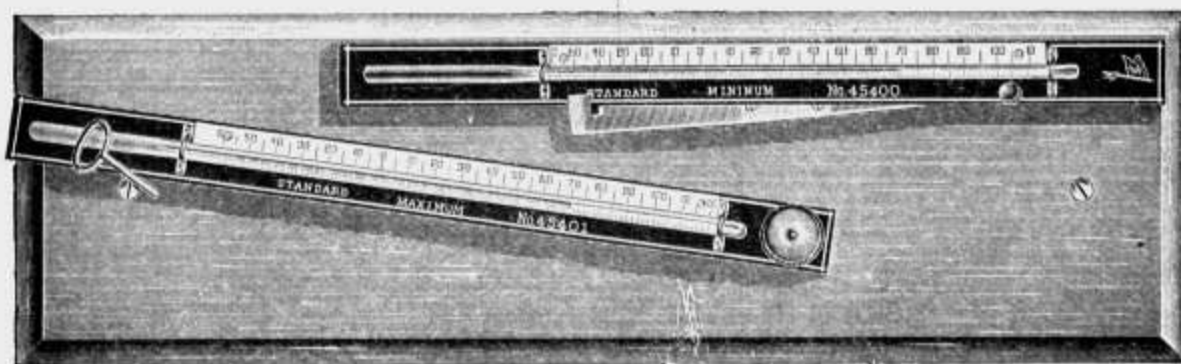


No. 1169-71.



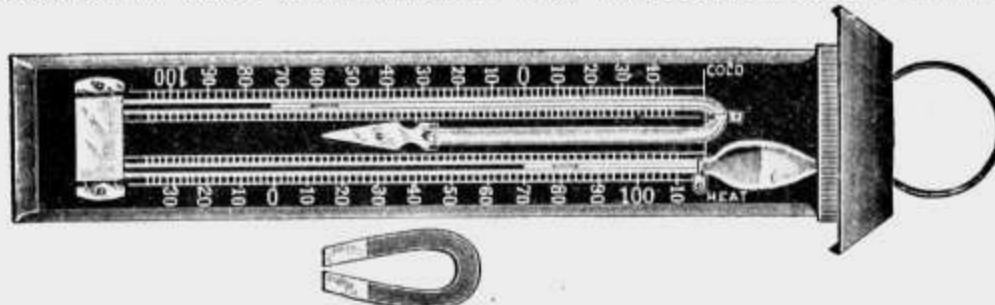
No. 1185.

- 1181. **Standard Thermometer**, 12 inch, latest Weather Bureau pattern, cylindrical bulb, graduation etched on tube, with raised metal strip at side of the tube on which are marked the figures and every fifth line of the scale. Furnished with support and binding screws. Certificate with each thermometer..... \$ 5 50
- 1183. **Standard Minimum Registering Thermometer**, same pattern and description as No. 1181. Certified..... 6 00
- 1185. **Standard Maximum Registering Thermometer**, same pattern and description as No. 1181. Certified..... 6 50



No. 1189.

- 1189. **U. S. Weather Bureau Set of Maximum and Minimum Registering Thermometers**, latest pattern, consisting of Nos. 1183 and 1185 Thermometers mounted on polished oil finished back. Furnished with certificates for each thermometer. Per set..... 12 00



No. 1190.

- 1190. **Six's Self-Registering Maximum and Minimum Thermometer**. Eight inch black japanned tin case, silvered metal scale with magnet..... 3 65

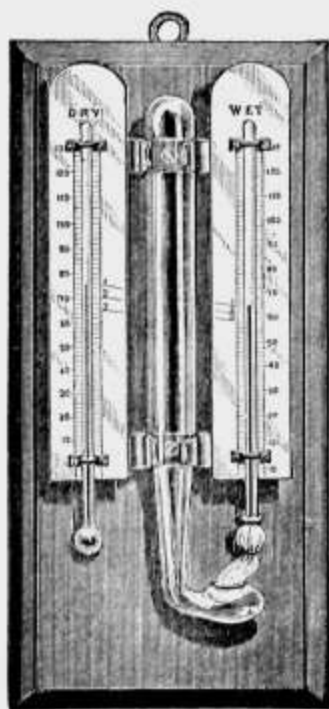


No. 1191.

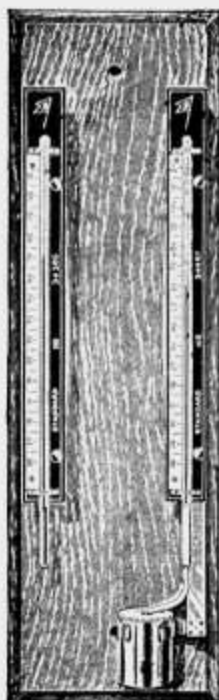
- 1191. **Soil Thermometer**, for work in physical geography. Ten inches in length, paper scale, in cylindrical tube with brass point..... 1 25
- 1194. **Spiral Hygrometer**, scale denoting the humidity of the air without reference to tables. In spun brass nickel plated case, 3 inch dial.... 2 20



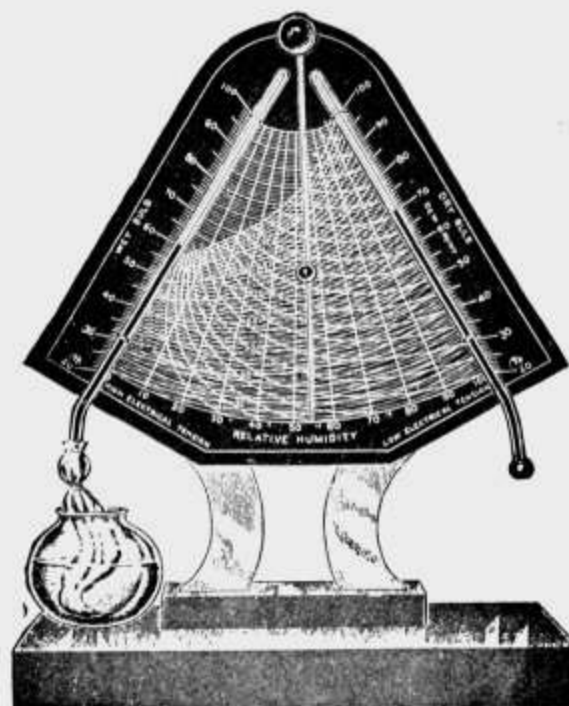
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No. 1195.

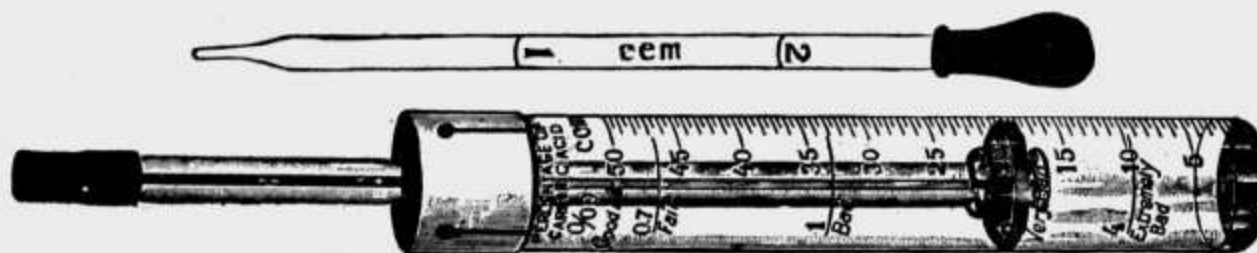


No. 1199.



No. 1203.

- 1195. **Mason's Hygrometer**, with lines drawn on the scale for convenience of maintaining a humidity of 50 degrees at normal temperatures, mounted on polished hardwood frame, 10½ x 4¾ inches, scale raised from frame by insulating strips, complete with glass cistern and tables for determining dew point and humidity..... \$ 5 00
- 1197. **Mason's Hygrometer**, cheaper form, thermometers not raised, mounted on polished hardwood frame..... 2 50
- 1199. **U. S. Weather Bureau Hygrometer**, consisting of two standard thermometers, No. 1181, extending below the finely polished hardwood back, metal cistern with wick, and certificate for each thermometer 12 00
- 1203. **Hygrodeik**, an improved form of the Mason's Hygrometer. Consists of two thermometers, wet and dry bulbs, mounted upon the outer edge of a chart which has been plotted from new and corrected tables prepared under the direction of the U. S. Weather Bureau. This chart, while complicated in appearance, is very simple and obviates entirely the use of tables for temperatures between 20 and 100 degrees Fahrenheit. Full directions furnished with each instrument..... 10 00
- 1205. **"Sling" Psychrometer or Hygrometer**, designed for the purpose of obtaining quick and more accurate results than are possible with the stationary wet and dry bulb instrument. Two paper-scale thermometers, No. 1525, carefully selected, mounted upon an oxydized brass plate with wooden handle and swivel, student form..... 2 50



No. 1209.

- 1209. **Wolpert's Air Tester (Carbacidometer)**, for obtaining the amount of carbonic acid gas in a room by direct readings from the graduations etched on the glass, thus doing away with all computations and tables as in the old forms. Another advantage of this form is that the air of a room may be secretly tested, if desired. Directions and full set of test solutions furnished with each instrument..... 3 75



No. 1210.

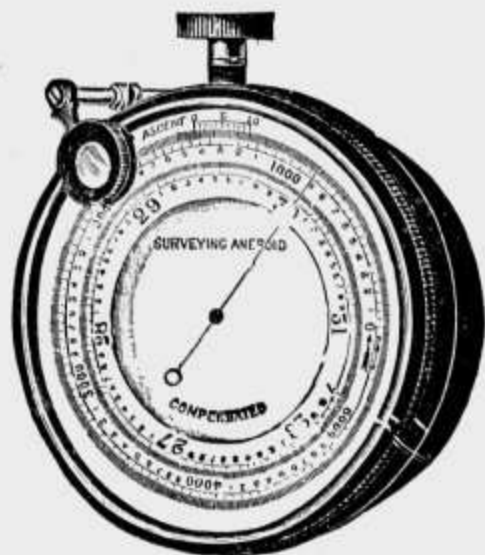


No. 1212.

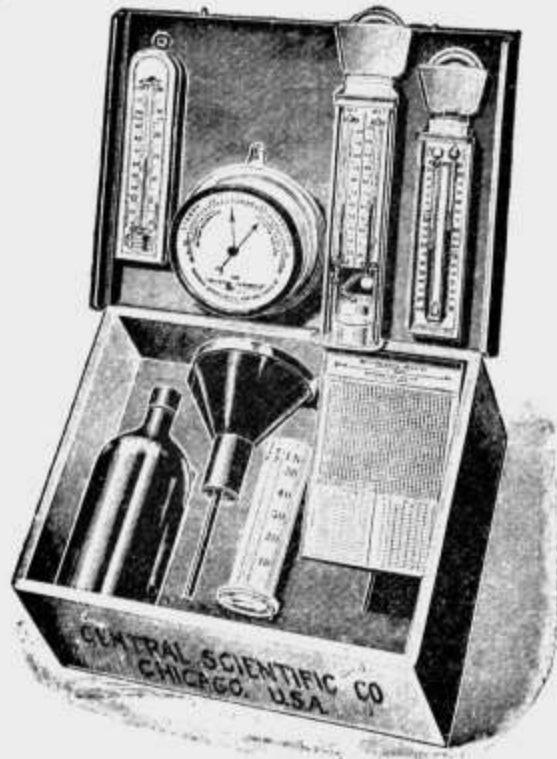


No. 1217.

1210. **Aneroid Barometer, Demonstration Form.** This is a very desirable and useful instrument that should be in every laboratory. By simply blowing in or drawing out the air by means of a rubber tube the effect of the atmospheric pressure upon a barometer is clearly demonstrated. This barometer is handsomely mounted and finished and makes a very accurate instrument to hang up in the schoolroom for daily barometric observations..... \$ 13 35
1212. **Aneroid Barometer, 5 inch brass case, with closed porcelain dial.** A most valuable instrument. As an improvement over all other types of Aneroids, a patent adjustable altitude hand is provided, which shows without computations at any latitude (1) the U. S. government sea level reading; (2) fair, rainy and stormy weather indications; and (3) high or low atmospheric pressure..... 8 00
- 1212A. **Aneroid Barometer, same as No. 1212, but with scale reading down to 22 inches.** Weather indications arranged for an approximate altitude of 6,400 feet. With patent adjustable altitude hand..... 9 50
1213. **Aneroid Barometer, 4 inches in diameter.** The mechanism is mounted in a highly polished copper case and is in full view. The graduations read in both English and Metric systems..... 7 50
1214. **Aneroid Barometer, 4 inch card dial, open face, nickel plated case.** Graduations in both English and Metric systems..... 4 00
- N. B.—None of the above aneroids, with the exception of No. 1212A, are suitable for altitudes over 3,000 feet.
1215. **Aneroid Barometer, pocket mountain type, watch case form, 1 3/4 inches in diameter, first quality, compensated for temperature, silvered metal dial, revolving altitude scale, 3,000 feet, in gilt case. Inclosed in neat morocco case.....** 16 75
1217. **Aneroid Barometer, same as No. 1215, reading to 10,000 feet.....** 16 50
1218. **Aneroid Barometer, same as No. 1215, reading to 16,000 feet.....** 19 50
1219. **Surveying Aneroid, especially designed and constructed for the purpose of readily ascertaining slight variations in gradients, levels, etc.** Besides extreme sensitiveness, the specialty claimed for this instrument is an arrangement of the scale of altitudes which admits of subdivisions by a vernier. Compensated for temperature changes and reads to single feet of altitude scale. 3 inch bronze metal case, silvered metal dial, with vernier scale moved by rackwork motion, reading lens arranged to traverse the entire circle, altitude scale 6,000 feet, in solid leather sling case.Duty free 40 00



No. 1219.

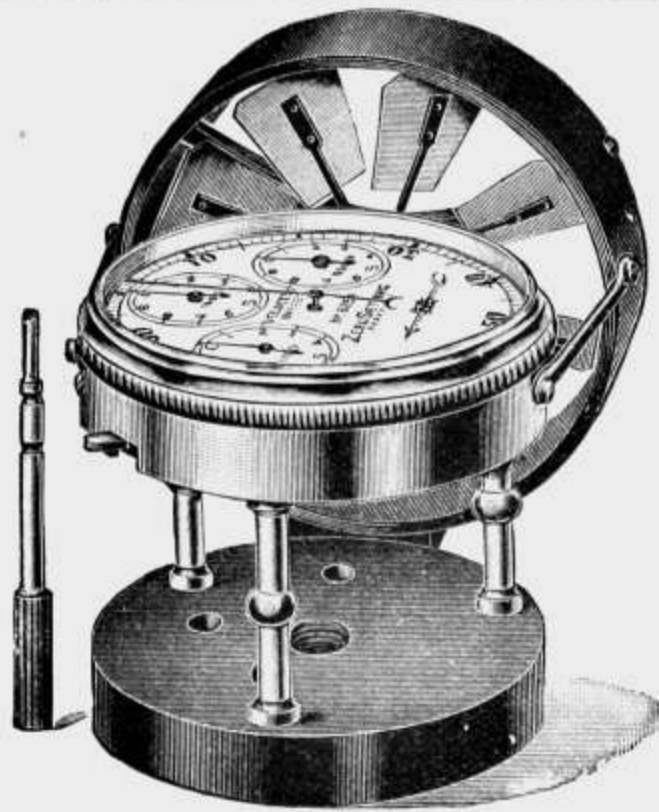


No. 1220.

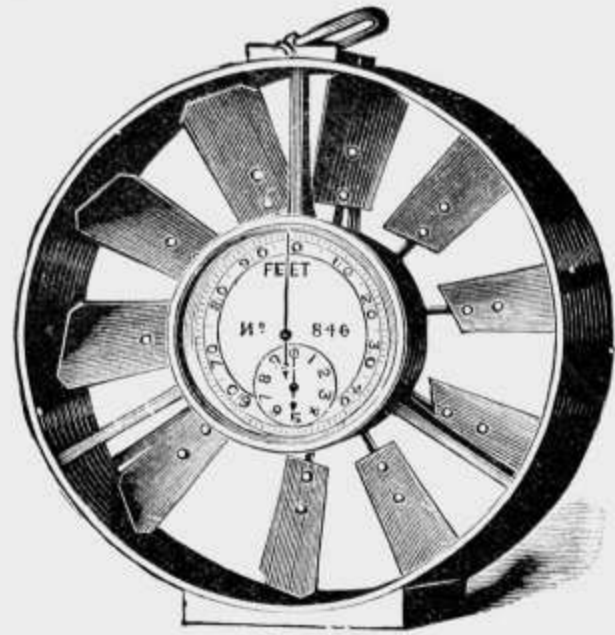


No. 1222.

1220. **Universal Meteorological Set**, a complete set of meteorological instruments suitable for a beginner, and of such a quality as to give entire satisfaction. The set comprises a 5 inch metal case aneroid barometer, 8 inch boxwood thermometer with F. and C. scales, 8 inch maximum and minimum (Six's) thermometer with boxwood scale and magnet, 8 inch Mason's wet and dry bulb hygrometer with boxwood scale, 5 inch Howard rain gauge, and a calendar for keeping a record of the instruments in the set. Packed in neatly stained box.... \$ 16 65
1221. **Weather Forecast Chart, or Key to Barometer Reading, and Chart for Aneroid Barometer**, by J. Benj. F. Rawson, late of the Weather Bureau. This chart is intended as an aid in the intelligent interpretation of barometer readings and in forecasting weather for twenty-four hours. By a comparison of outside air temperature and the direction of the wind at 30 inch readings, with temperature and wind reference given on the chart, one can know the nature of a coming change of weather, also the general location of centers of areas of high and low pressure and the rapidity with which the pressure areas travel, which will be indicated by the rate of change of the barometer. High pressure areas read above, while low pressures read below, 30 inches. This chart will be found quite accurate and most useful in any science laboratory. Full directions on each chart. Each 50
- 1221A. **"Weather and Weather Instruments."** Many teachers have written us for information regarding the management and use of weather instruments. This book contains the most complete information of any book or books of which we have knowledge. It describes the mechanism of the many instruments and in addition gives in concrete and simplified form the practical uses of the different instruments. The tables of classified data recommend it particularly to teachers. Pasteboard covers..... 50
- 1221B. **"Weather and Weather Instruments,"** same as above, cloth covers... 1 00
1222. **Rain Gauge**, United States Weather Bureau type, 3 inches in diameter, with overflow and measuring stick..... 2 75



No. 1223.



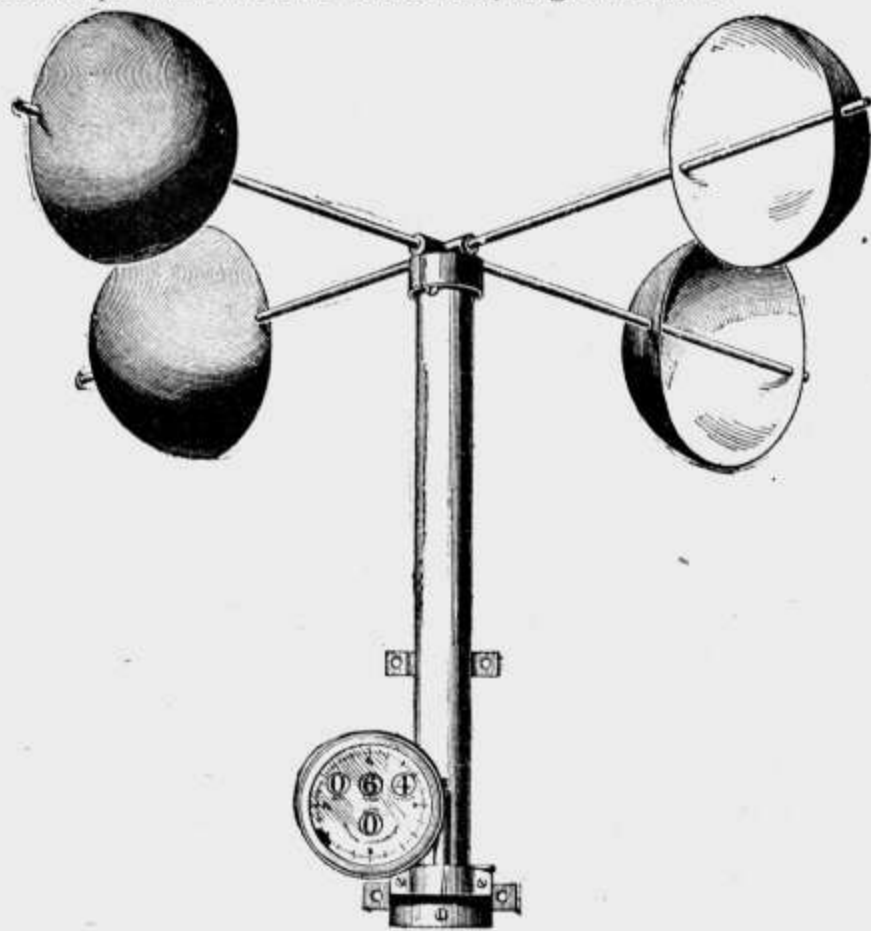
No. 1225.

1223. **Anemometer**, portable form, for measuring velocities of air currents in buildings, etc. Indications are obtained by means of a delicately poised fan wheel 2 $\frac{3}{4}$ inches in diameter. The long hand indicates on the outer circumference of the main dial the passage of 100 feet or less of air. The readings are continued up to 100,100 feet by a series of smaller dials, as shown in the illustration. Complete with jointed socket holder, zero setting device and disconnecter, in mahogany case \$ 22 50
1225. **Anemometer**, Biran's, 4 inches in diameter, four dials reading to 100, 100 feet, complete with zero setting device and disconnecter, in mahogany case 21 50

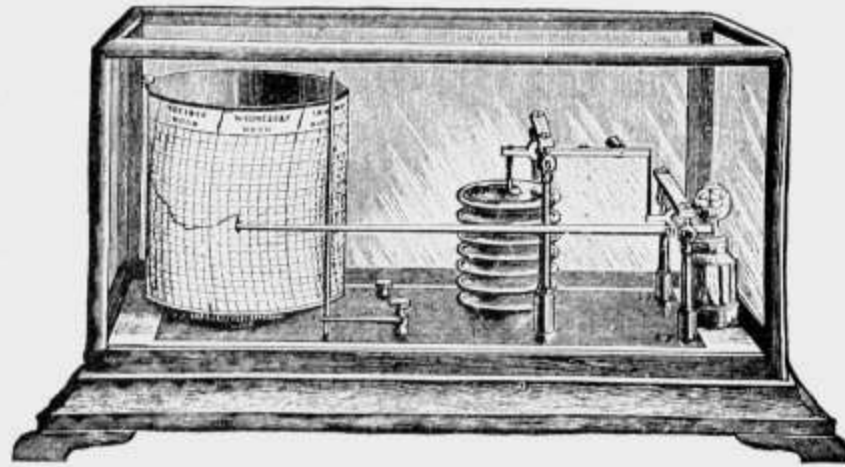
1227. **Wind Gauge or Anemometer**. This simple device for indicating the velocity of the wind in miles consists of a vertical shaft, to the upper end of which are fastened four arms, each carrying a Robinson hemispherical copper cup. These cups turn in one direction, regardless of the direction of the wind, and at a ratio determined by experiment. To the lower end of the shaft is rigidly fastened a plate carrying two small roller bearings, which, as the shaft revolves, actuate a wheel, which in turn meshes into a series of other wheels; thus the miles are indicated on the registering dial. The dial is so divided as to show velocities from one hundredth of a mile to 10,000 miles, and then it repeats, commencing at zero.

This instrument is carefully made and requires no care or attention, save a little oiling, say once a month. All parts are interchangeable.

Each instrument is standardized and fully warranted; weight, 3 $\frac{1}{2}$ lbs. \$ 22 00



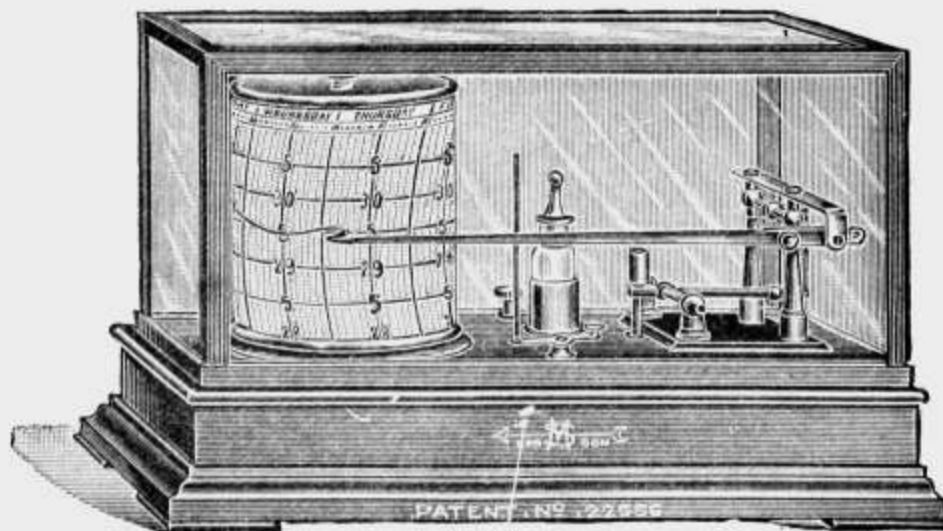
No. 1227.



No. 1229.

1229. **Barograph (Recording Barometer)**, a most interesting instrument to those who take note of atmospheric variations, as a complete record is given by a pen upon a printed chart for an entire week, and, by its form, the exact barometric reading can be seen at any moment, as well as the varying line traced by the pen for the time preceding. The charts, which are changed at the beginning of each week, can be retained as a record for the entire year. The mechanism consists of a series of vacuum chambers, eight in number, joined to each other. The movement of pen is magnified by a series of levers. Chart reading 28 to 31 inches is held on a drum driven by eight day clock movement. Mahogany frame with glass case. Complete with full directions for use, charts for a year, pen and ink.....Duty free \$ 30 00

1229A. **Barograph**, same as No. 1229, but in copper case, glass front and end, with handle. Cover hinged at end. Complete with directions for use, charts for a year, pen and ink.....Duty free 34 50



No. 1230.

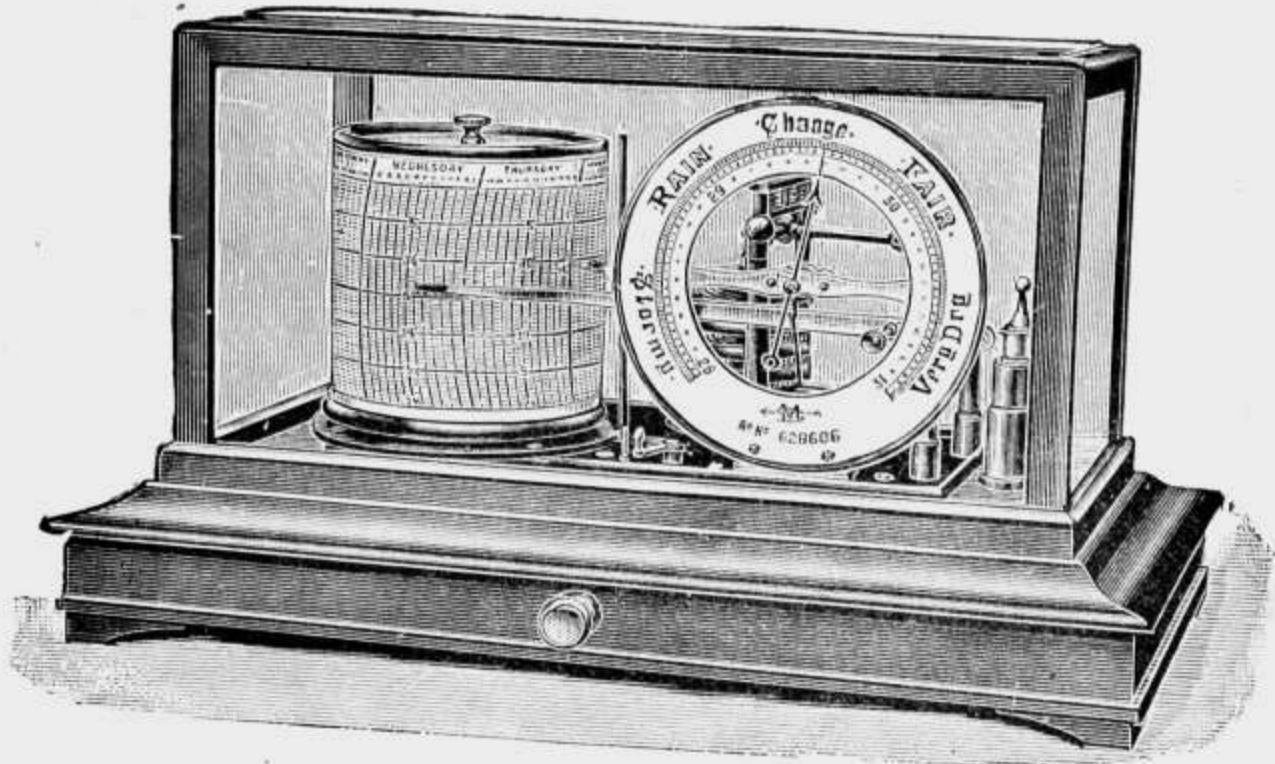
1230. **Barograph**, same as No. 1229, but of new design. The movement is concealed in the base of the instrument and is worked by a large vacuum pan. In fumed oak case, glass top and sides. Complete with full directions for use, charts for a year, pen and ink. Duty free 25 00

N. B.—**High Altitude Barographs.** Barographs Nos. 1229 and 1229 A may be so modified as to read to altitudes of 6,000 feet. A special high drum is substituted, with special charts marked in feet. Extra chargeDuty free 13 60

Certificate from Kew Observatory, extra..... 10 00

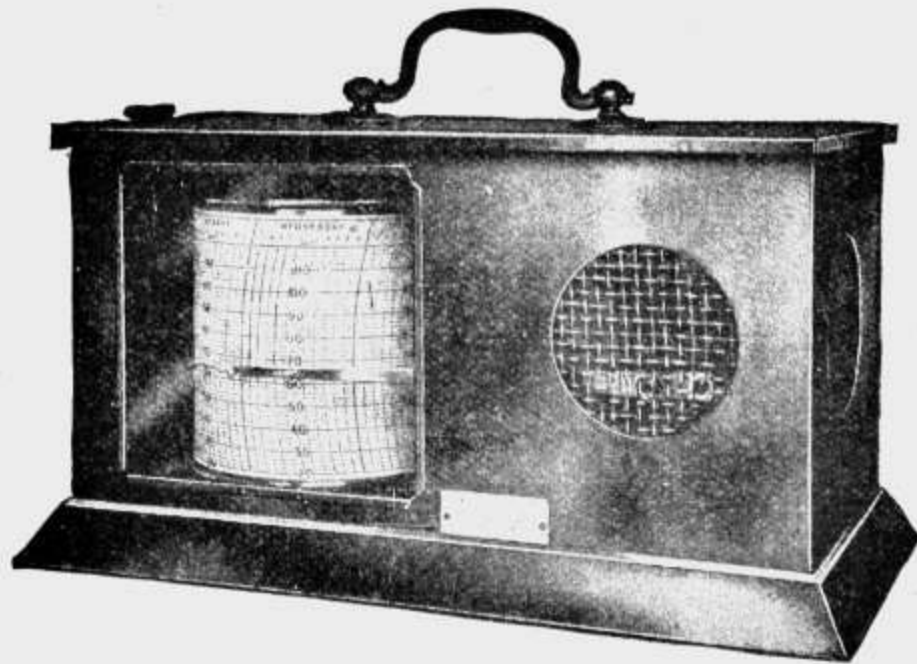
1230A. **Barograph Charts**, for barographs reading 28 to 31 inches. Per box containing one year's supply..... 2 00

1230B. **Barograph Charts**, for use with barographs with "special high drums." Per box containing one year's supply..... 2 50



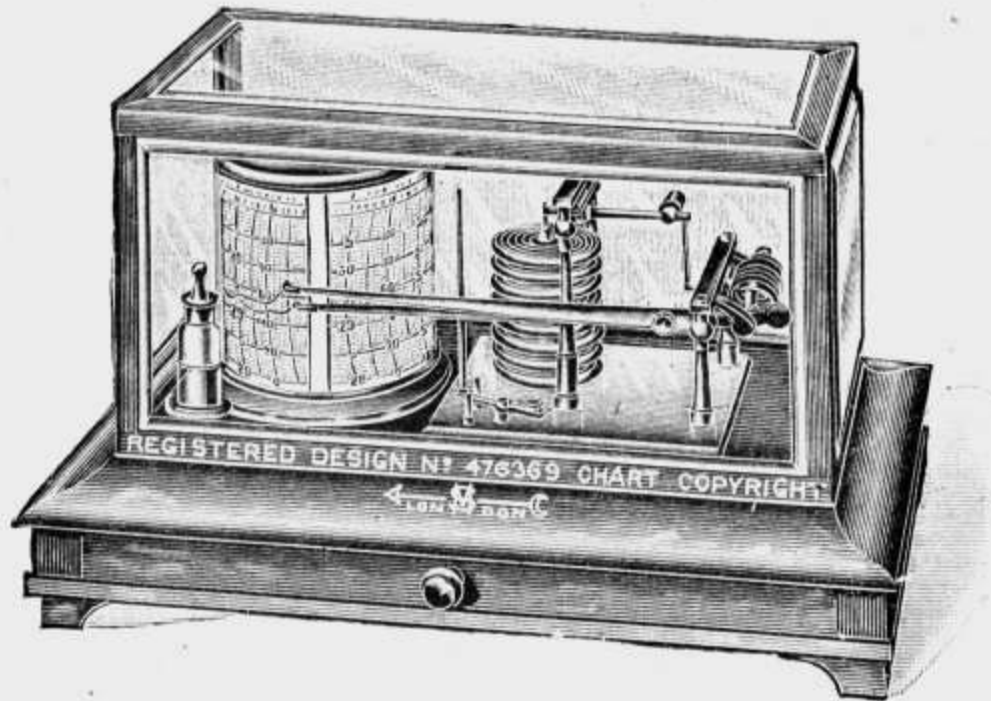
No. 1231.

1231. **Barograph.** The illustrated instrument shows No. 1229 Barograph (with drawer) with metal dial aneroid attachment. For range and description of movement see No. 1229.....Duty free \$ 37 50



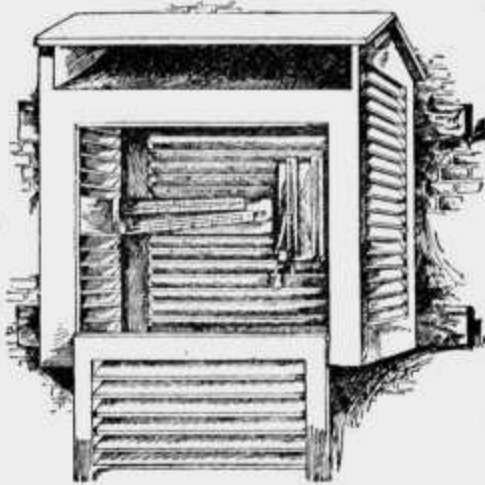
No. 1232.

1232. **Thermograph (Recording Thermometer).** A most accurate thermometer which will not vary its standard for years. A complete record is given by a pen upon a printed chart for an entire week, and by its form an exact thermometric reading can be seen at any moment, as well as the varying line traced by the pen for the time preceding. The charts are changed at the beginning of each week and can be retained as a record for the entire year. Mechanism consists of a spiral lamina of non-rusting material, which is exposed to the atmosphere at the end of the case. It is extremely sensitive and, having no levers in its construction, is very rigid. In copper case, with glass front and screened openings on three sides about the lamina. With handle. Ranges —50 to 120 degrees F. Complete with full directions for use, charts for one year, pen and ink.....Duty free 30 00
 Certificate from Kew Observatory, extra..... 10 00
 1232A. **Thermograph Charts,** for use with No. 1232, per box containing a year's supply 2 50



No. 1234.

1234. **Baro-Thermograph (Recording Barometer and Thermometer Combined)**, a recent improvement whereby both barometric and thermometric tracings are made on the same chart, records being made by two pens in different colored inks (blue for the barograph and green for the thermograph). Range of the barograph is from 28 to 31 inches, while the thermograph shows a range of 0 to 120 degrees F. in 2 degree lines. In copper case, glass front and end, with handle. Cover hinged at end.....Duty free \$ 50 00
- 1234A. **Baro-Thermograph Charts**, for use with No. 1234, per box containing one year's supply..... 2 50



No. 1235.



No. 1236.

1235. **Shelter.** The latest pattern Weather Bureau Instrument Shelter. Sufficiently large to hold Barograph or Thermograph and the two instruments shown in the cut. Made of best quality white pine wood, painted three coats lead paint, swing door provided with lock and key. Complete with screws for mounting..... 20 00
1236. **Sunshine Recorder.** This instrument records the duration and intensity of sunshine for twenty-four hours on a specially prepared photographic chart, which merely requires washing in cold water to become permanent. The chart being divided into hours, an exact record is thus obtained with the minimum of trouble. Complete with divided arc for adjustment of instrument to any latitude, with 100 charts and directions for use..... 16 65
- 1236A. **Extra Charts for Above**, per 100..... 3 30