SUPPLEMENTARY PRICE LIST.

NEGRETTI & ZAMBRA,

Opticians and Scientific Instrument Makers

TO HER MAJESTY THE QUEEN & H.M. GOVERNMENT DEPARTMENTS.

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Photographers at the Crystal Palace, Sydenham.

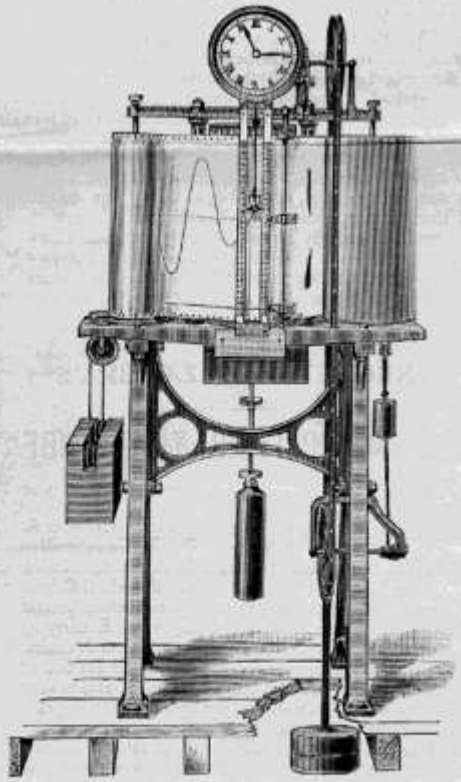

FIG. 1.

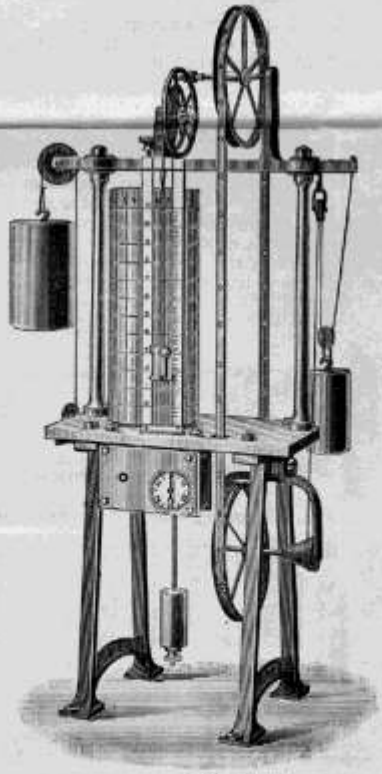

FIG. 2.

SIR WILLIAM THOMSON'S IMPROVED PATTERN TIDE GAUGES.

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SIR WILLIAM THOMSON'S IMPROVED PATTERN TIDE GAUGE (FIG. 1).

The Instrument consists of an Astronomical Clock, three Drums, Float Wheel and Gear Work for reducing the scale, the whole being mounted on a suitable plate and supporting standards, and requiring no further fixing.

The Clock is fitted with a modern escapement and compensated pendulum, and serves to show the time, and also to drive the centre or main drum of the Instrument.

The float wheel is flanged and provided with pins two inches apart, upon which the copper band coils itself during the rising tide.

The right hand drum receives the reel of paper, which is fitted to the Instrument without further fixing. The haul-off drum receives the paper records after it has passed round the main drum. The paper may be left to accumulate almost without limit on the haul-off drum, or can be removed at any time. The datum line on the record paper is traced by a fixed pencil, which can be adjusted to any level. Any number of horizontal lines can be ruled in this manner if desired.

The time is marked on the paper by means of pins placed at the top and bottom of the centre drum; these perforate the paper at hourly intervals, noon being distinguished by three such perforations, which facilitates the subsequent noting of times and dates upon the record.

The copper band is counterbalanced by means of a fusee and weight, by which great accuracy of recording is obtained. The employment of a continuous roll of paper obviates the necessity of continually applying fresh paper to the recording drum, and the tide-gauge can thus be left untended, except for the purpose of winding the clock, for an indefinite period. The system also of ruling the paper by fixed pencils and marking the hourly times by the clock constitutes a marked improvement, no error can thus occur from the wrong setting of the paper.

Price Complete, as Fig. 1, with Roll of Paper, £100 0 0.

SIR WILLIAM THOMSON'S IMPROVED PATTERN TIDE GAUGE (FIG. 2).

This Instrument is constructed on a smaller scale and is specially adapted for use upon canals, reservoirs, etc., and as a lock-keeper's tell-tale. It consists of a japanned iron frame, carrying a drum, which is driven by clockwork from beneath, and to which the recording chart is attached. The float wheel upon which the copper band connecting the float is coiled, is fitted with reducing gear, according to the scale required. The diagram curve is traced by means of a pencil working freely in a vertical direction between two brass guides, upon which are engraved the number of feet or inches constituting the range of the Instrument. A fine chain from the pencil-holder passes over one of the pulleys of the reducing gear, and the rise and fall of the float upon the surface of the water is indicated by a continuous line traced upon the slowly revolving chart. The charts supplied consist of plain sheets of suitable paper, with the hours printed at the top, the datum lines being traced by stationary pencils, adjustable at will to any desired height. The curve can be easily read at any moment by the aid of the graduated rule supplied with each Instrument. If preferred, ruled charts can be supplied but when accuracy is desired, we strongly advocate the use of plain charts and datum pencils, so as to avoid error from the wrong setting of the paper. The clock runs for eight days, is of best make throughout, and furnished with a setting dial. Additional facility for working is afforded by an extra drum, upon which the chart can be placed at leisure, and then substituted in the place of the one bearing the diagram when required. Price Complete as Fig. 2, with 200 Charts and extra drum, £56 10 0.

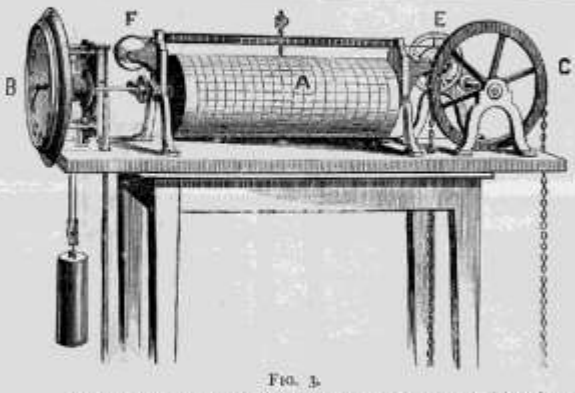

FIG. 3.

NEGRETTI & ZAMBRA'S

IMPROVED

NEWMAN PATTERN TIDE GAUGE

This consists of a horizontal brass Cylinder **A**, which, by means of the Clock **B**, is made to revolve once in every twenty-four hours. A Chain, to which is attached the Float, passes over the wheel **C**, and on the axis of this is a small toothed wheel placed so as to be in contact with a larger one **E**, carrying a grooved pulley, over which passes a small chain.

This Chain passes along the upper surface of the Cylinder, round a second pulley **F**, and is kept in a constant state of tension by means of a spring or weight at the end.

In the middle of this Chain is a small tube working in a slide and carrying a pencil, which moves laterally, according to the rise and fall of the Tide. This traces a line showing continuously the state of the Tide without any further attention than is necessary to change the Chart once every day.

The Charts are ruled with lines to correspond with the hours and crossed by others divided either into feet or metres as may be required. Price Complete as Fig. 3, with 200 Charts, £50 0 0

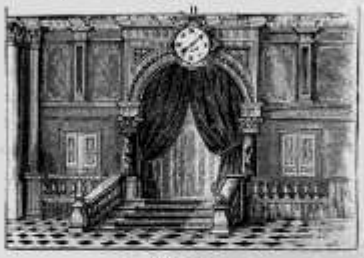

FIG. 4.

NEGRETTI & ZAMBRA'S

Dial Wind Indicators

AND

Sun Dials.

The Wind Vanes are arranged to show the varying direction of the wind upon a dial fixed in any part of the interior of the house.

The cost of erecting such Indicators, or Sun Dials, depends so much on the form and height of the building that no positive prices can be quoted, but estimates will be given upon particulars being sent of what is desired.

WIND VANES, for indicating the Direction of the Wind.

FIG. 5.

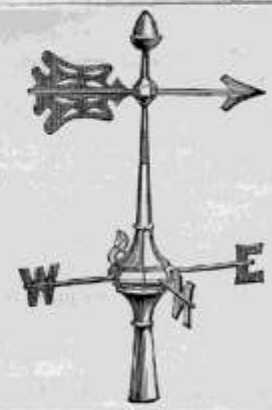

FIG. 6.

FIG. 7.

These Vanes are constructed of various dimensions and designs to suit the positions in which they are to be placed, the cost varying with the amount of work and ornament upon them. Subjoined are a few prices for the more ordinary forms of Vanes; these prices do not include fixing, for which estimates will be furnished if required.

As Fig. 5, 2 feet 3 inches high £1 5 0	As Fig. 6, 4 feet high ... £3 3 0	As Fig. 7, 3 feet high ... £2 5 0
5 feet 3 12 6	5 " " ... 4 12 6	6 " " ... 5 5 0

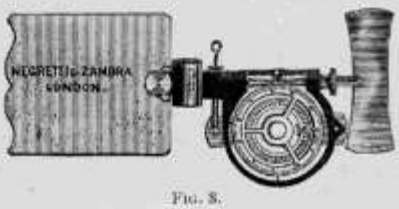

FIG. 8.

NEGRETTI & ZAMBRA'S

CURRENT METERS.

Current Meter, for ascertaining the tidal rate or flow of streams or rivers, in Miles, Furlongs, and Feet; or in Metres.
Price in mahogany box (Fig. 8) £6 6 0

NEGRETTI & ZAMBRA'S
IMPROVED TROCHEAMETER,

For measuring distances by the revolutions of a Carriage Wheel.

FIG. 9.

The Instrument is fitted into a metal case, covered with leather, provided with straps for fixing to the axle box of the left side wheel and central with it. In this position the case revolves with the wheel, but the instrument inside remains pendent.

The recording portion of the Trocheameter consists of two graduated circular Dials. Each division upon the outer dial represents one revolution of the carriage wheel, the entire circle being equal to 100 revolutions. The inner dial records the revolutions of the outer one, each division representing 100 revolutions of the carriage wheel. Hence it will be seen that when the outer dial has made a complete revolution, the index pointing on the inner dial will have moved one division. The total number of divisions on the inner dial will therefore indicate 9,900 revolutions of the carriage wheel.

Price in Case (Fig. 9) £3 10 0

TO SET THE TROCHEAMETER FOR USE.

Put the Dials out of gear by turning the milled head at the back. Bring the zero or O on both dials together, and in front of the fixed index pointer. Turn back the milled head until the dials are in gear, and the instrument is ready for use.

To ascertain the distance travelled multiply the number of revolutions indicated on the dials by the circumference of the carriage wheel.

EXAMPLES.—The Carriage Wheel being twelve feet in *Circumference*.

55 revolutions give 220 yards, or 1 furlong.
110 „ „ 440 „ ¼ mile.
440 „ „ 1760 „ 1 mile.
7040 „ „ 16 miles.

Another method of determining the distance travelled is to drive the carriage over a measured mile and note the number of revolutions recorded, using this number as the divisor in all future measurements.

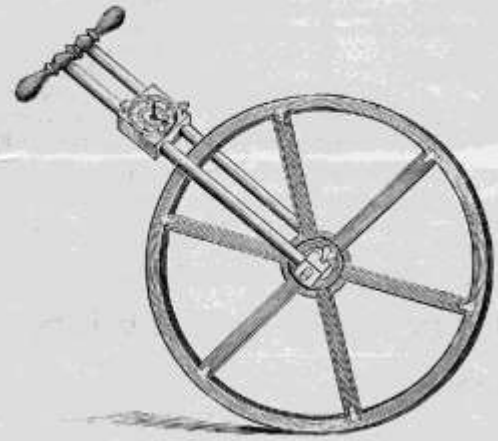

FIG. 10.

NEGRETTI & ZAMBRA'S
IMPROVED ROAD MEASURER.

Perambulator, for measuring the length of roads, streets, &c., consists of an accurately framed Mahogany Wheel, Brass Clamped, the circumference of which is carefully ascertained; the axis of this Wheel is connected by a series of toothed wheels and pinions to a dial, upon which the number of revolutions of the Wheel are recorded. The divisions upon the dial are English Measures; but any Foreign scale can be substituted to order. Best mounted and finished (Fig 10). £16 16 0

NEGRETTI & ZAMBRA'S

PORTABLE AIR METERS.

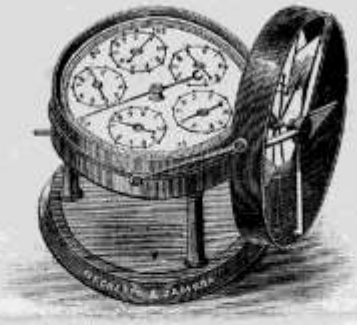

Fig. 11.

Improved Portable Air Meter, for measuring the velocity of currents of Air in Ventilating Shafts, Sewers, Coal Mines, Hospital or Prison Wards, Flues, &c., &c., in case. (Fig 11) £4 4 0

This Air Meter is the most sensitive yet constructed; by it the most feeble current may be measured with precision. It measures the current of air in feet, and records from one foot to 10,000,000 or 1,938 miles.

The long hand marks up to 100 feet. Each division on the large circle represents one foot traversed by the current of air.

In noting down the reading of the index hands, the long hand takes the units and tens place, and the five small hands follow respectively.

Fig. 12.

Patent Colliery Air Meter, for use in Mines, &c., &c.

The form and external aspect of this Instrument is that of Biram's Anemometer. The improvements consist of—1st, a large clear Dial; 2nd, the Fan is constructed of a light and anti-corrosive material; 3rd, the Indicating parts are perfectly protected from dust and smoke; and, 4th, a Lever is placed in a convenient position, to enable the observer to throw the Indicating Wheels in or out of gear from the Fan, for the purpose of taking short observations with accuracy. 6-inch Air Meter (Fig. 12) £4 10 0

This Anemometer will be found extremely useful in large Gun or Rifle practice.

Biram's Anemometers, for registering the velocity of currents of air in Mines, &c., by means of a light vane, the revolutions of which are recorded upon a dial in the centre of the instrument.

12-in., £5 0 0; 6-in., £4 0 0; 4-in., £3 0 0; 2¼-in., £2 10 0

To ascertain the rate at which the air is moving, proceed thus—suppose 100 revolutions = 200 feet per minute.

88] 200 [2·27.

Say 2¼ miles per hour—88 being 1-60th of a mile.

PETROLEUM TESTING APPARATUS.

Fig. 13.

Apparatus for testing the Flashing Point of Illuminating Oils. Sir Frederick Abel's Government Pattern, as supplied to the Government Inspectors, under the Petroleum Act, 1879 (Fig. 13).

Complete in Box, for use with Oil or Gas only £6 10 0

Do. do., arranged for use with either Oil or Gas 7 10 0

Including Verification at Standards Department.

Petroleum Act of 1879, giving description of the above Apparatus and instructions for using it, price 6d.

THOMPSON'S CALORIMETER, OR FUEL TESTER.

This Apparatus is now used by all the principal Railway Companies, Gas Works, and other Coal Consumers for ascertaining the heating power of various kinds of coals, &c.

Price, with accessories complete, in polished mahogany case, with instructions for use £7 10 0

NEGRETTI & ZAMBRA'S PYROMETER.

(Patent.)

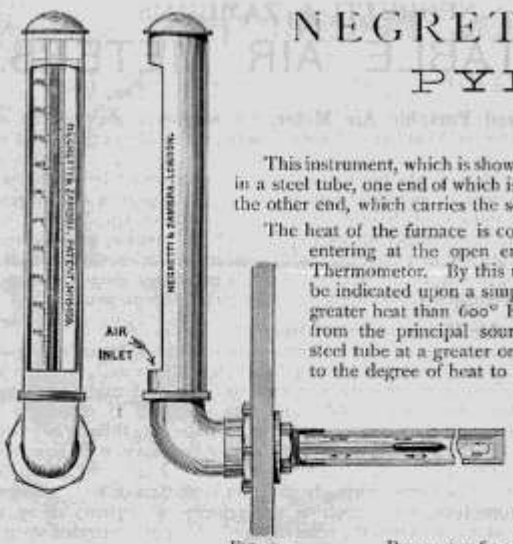

FIG. 14.

This instrument, which is shown in Fig. 14, consists of a high range Thermometer mounted in a steel tube, one end of which is closed and passes through the wall into the oven or furnace; the other end, which carries the scale, is open to the air and remains outside the furnace.

The heat of the furnace is conducted through the steel tube where it mixes with the air entering at the open end and becomes cooled before it reaches the bulb of the Thermometer. By this means a temperature up to **4000° Fahr.** in the furnace can be indicated upon a simple Thermometer, which in the usual way would not stand a greater heat than 600° Fahr. As the temperature decreases in geometrical ratio from the principal source of heat the bulb of the Thermometer is fitted into the steel tube at a greater or lesser distance from the interior of the furnace according to the degree of heat to be indicated.

PRICES.

Pyrometer for Bakers Ovens, &c., graduated for temperatures from 200° to 1200° Fahr. for inserting in walls up to 12 inches in thickness	£3 3 0
Ditto for walls over 12 inches in thickness ..	£3 10 0
Pyrometer for Flues, Chimneys, Ovens, &c., made to special sizes and graduated from 300° to 1200° Fahr.	£4 4 0
Ditto, with plumbago sheath for Furnaces ranging in temperature from 1200° to 4000° Fahr.	£6 6 0

SIEMENS' WATER PYROMETER.

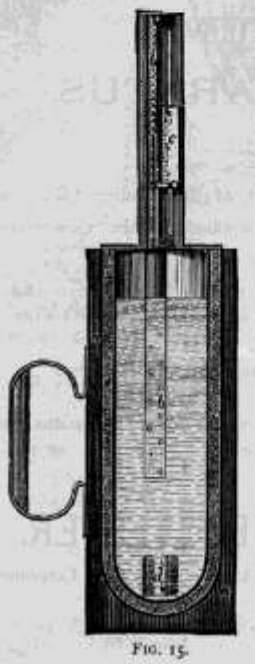

FIG. 15.

This Pyrometer, which is shown in Fig 15, consists of two cylindrical copper vessels having an air space *a*, between them. The inner vessel is constructed, with a view to prevent radiation, of a double casing of copper with an intermediate packing of felt, and is of sufficient size to hold rather more than a pint of water.

A mercurial thermometer, *b*, is fixed against one side of the inner vessel and protected by a perforated tube. The upper half of the Thermometer projects above the copper vessel, and is graduated in the ordinary degrees, Fahrenheit or Centigrade, while by the side of it is a small brass sliding scale, *c*, graduated and figured with degrees of the same denomination as the thermometer.

Cylinders of copper or platinum are provided with each Pyrometer, their size being accurately adjusted so that the capacity for absorbing heat between 0° and 100° C. is equal to one fiftieth of that of a pint of water; as however this capacity (specific heat) increases with the temperature, the divisions on the sliding scale expand with rise in temperature and in a different ratio for the two metals specified, thus necessitating a special sliding scale for each metal of which the cylinders are composed.

The temperature of a furnace, &c., is ascertained in the following manner :—

A pint (0·568 litre or 34·66 cubic inches) of clean water is placed in the Pyrometer vessel, and, after this has stood for a few minutes, the zero point of the sliding scale is set at the temperature indicated by the thermometer.

One of the metal cylinders is then exposed from two to ten minutes to the heat to be measured and allowed to remain in it until it has acquired its temperature. It is then quickly withdrawn and dropped into the water, the temperature of which rises gradually until a maximum is reached. This rise of temperature, as indicated by the sliding scale, added to the temperature of the water at the end of the experiment, gives that of the furnace, &c.

The range of the Pyrometer with copper cylinders extends to 1000° C. or 1800° F., but with platinum cylinders to 1500° C., or 2700° F.

PRICE—Water Pyrometer with Thermometer, and 6 copper cylinders, complete (Fig. 15) £4 4 0

The price of platinum cylinder varies with the market price of the metal, but quotation will be given on application.

METALLIC PYROMETERS.

FIG. 16.

This Instrument is constructed of metal bars expanding in a different ratio upon the application of heat, by which can be ascertained temperatures above the range of the mercurial thermometer. Its form is that of a long tube, surmounted by a dial with an index or pointer to indicate to 1500 Fahr., for furnaces, ovens, &c. (Fig. 16) £4 10 0

Pyrometer, smaller form, with 5 inch dial, graduated to 1000° or 1500° Fahr., and 30 inch metal stem £3 15 0

Ditto, with 3 inch dial graduated to 700° Fahr., for baker's ovens ... £2 15 0

HARDING'S PATENT SPEED INDICATOR.

IMPORTANT TO ELECTRICIANS.

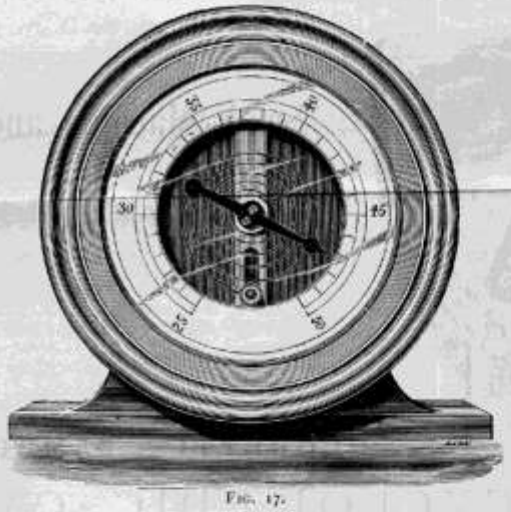

FIG. 17.

This Instrument has been designed for showing at a glance, without counting or the use of a watch, by the position of a needle on a dial, the actual speed at which an Engine or Machine is at any moment revolving.

The want of a really practical Instrument of this kind has long been felt, and the present one will at once commend itself by its simplicity, accuracy, sensitiveness, and moderate price.

The Indicator is very easily fixed, and the iron bracket that carries it can be attached either below the Instrument, as shown in Fig. 17, or above it, or at either side—screw holes being provided for these various positions.

IMPORTANT NOTE.—In ordering, please to give:—

(1) The working speed of the Engine or Machine to be indicated.

(2) The diameter and correct speed of the shaft from which the Indicator is to be driven.

PRICE £5 10 0

HARDING'S IMPROVED COUNTERS,

WITH PATENT ENAMELLED NUMBER WHEELS.

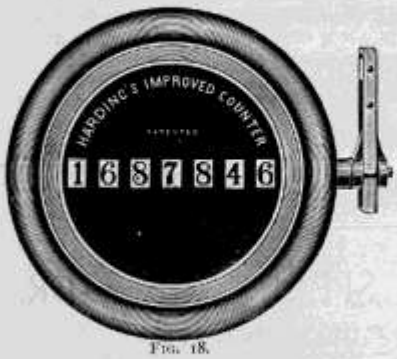

Fig. 18.

The No. 1 Size, with $\frac{3}{8}$-in. Figures, is the one always used for Engines of all kinds. Thousands of Harding's No. 1 Counters are at work on Stationary, Marine Engines, Mill and Pumping Engines, Newspaper Printing Machines, and for many other purposes.

For Engines the reciprocating motion is almost always selected, on account of the ease with which the counter lever is connected with some part of the valve gear.

For machines where the Counter is required to work at high speed, the rotary action is the most suitable. The Counter in these cases can be connected by a driving band or by wheels, the latter being, of course, more reliable.

Price, with 7 figures, as shown in Fig. 18 ... ... £5 10 0.

Fig. 19.

Small Machine and Pocket Counters.

This size, which is the smallest and cheapest of **Harding's Counters**, has met with numerous applications. Fig. 19 is a Woodcut (half size) of the Speedometer or Pocket Counter, now so generally and favourably known.

Price, with 4 figures and Steel Friction Bits, in Case ... ... £2 2 0.

NEGRETTI & ZAMBRA'S

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OF MATHEMATICAL, PHILOSOPHICAL, OPTICAL, PHOTOGRAPHIC, AND STANDARD

METEOROLOGICAL INSTRUMENTS,

Containing very numerous Comparative Tables of Reference, and Illustrated by upwards of TWELVE HUNDRED ENGRAVINGS,

Royal 8vo., cloth, gilt lettered Price 5s. 6d.

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