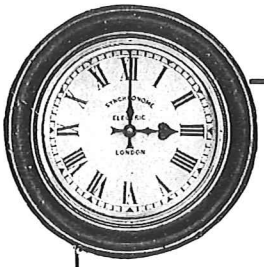
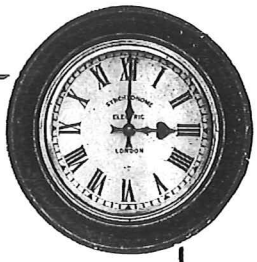
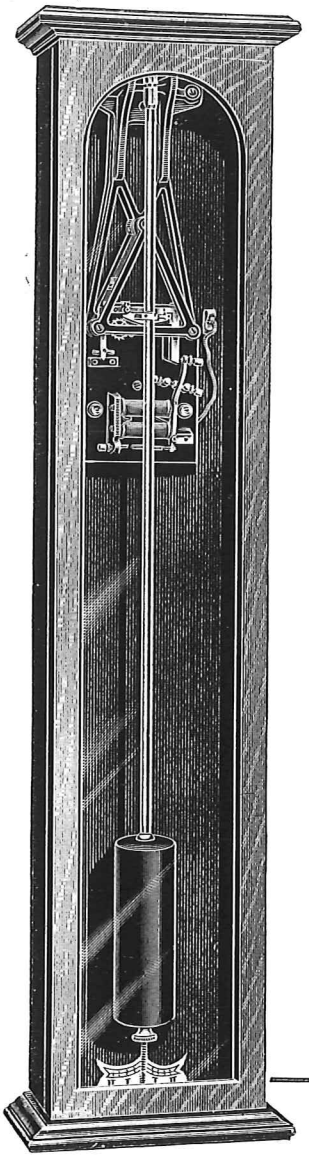

SYNCHRONOME

ELECTRIC CLOCKS.

DESCRIPTIVE CATALOGUE and PRICE LIST







THE

"SYNCHRONOME"

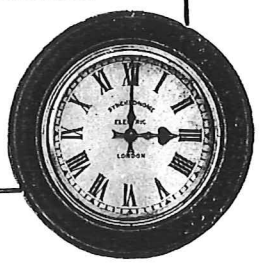
System of Electrical Impulse Clocks

consists of

An Electrically-Driven Pendulum which operates *any number of Dials.*

The Pendulum is combined with a simple switch, so that both the time-keeping and switching functions are performed automatically and in an ideally perfect manner.

Each dial has only a "one-wheel" movement behind it, yet this simple mechanism secures *uniform and accurate time-keeping* without winding up or any other attention.



The History of the "Synchronome" System

is the history of the science of modern electrical time service.

The first of a long series of Patents was taken out in 1895, and the Synchronome Company was then established by Mr. F. Hope-Jones, who read a Paper in description of the new system before the British Horological Institution in that year. The literature of the subject is mainly from his pen, and he has since read many Papers before scientific societies, notably the Royal Astronomical Society and the Institution of Electrical Engineers, in 1899 and in 1910. In the discussion following the latter, Mr. H. R. Kempe, Electrician to the Post Office, said—"I have mentioned Mr. Ritchie as being a pioneer, but I must assert, and I think with authority, that by no man living or dead, have electric clocks been brought to such perfection as they have been by Mr. Hope-Jones."

The "Synchronome" system was alone in England from 1895 to 1905, and in that ten years it succeeded in breaking down the prejudice previously aroused by the many failures of other systems.

Progressive improvements have produced a system ideal in its simplicity yet possessing the following advantages:

Completely automatic action, **not even the master clock requiring to be wound up.**

Absolute synchronism of **any number of dials.**

Small consumption of current, which may be derived from **any source of supply.**

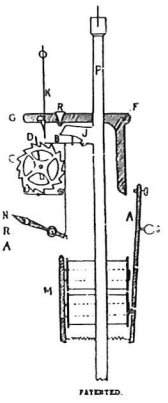
Automatic battery warning, audible or visible.

Impossibility of stopping in closed contact.

Great accuracy of time keeping, which is **unaffected** by variation of battery.

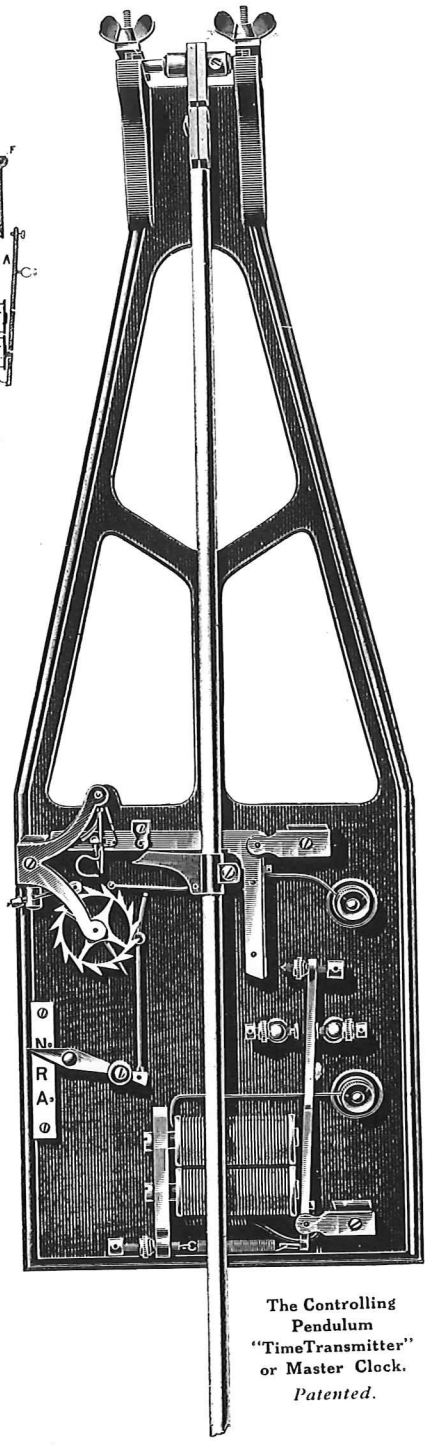
Facility for **automatic synchronization** by official time signals.

The switch consists of two moving-parts : (1) the right angled lever **G** centred at **F** and normally supported on spring catch **K**. Once every half-minute the lever is let down, in the act of giving an impulse to the pendulum **P**, upon (2) the armature **A**. Current from any available source then passes through the series circuit of dials and the magnet **M**, which attracts the armature **A** and throws up the lever **G** on to its catch again.



If the current is insufficient, the pendulum assists the magnet **M** to replace the gravity lever **G**, thereby giving **warning** of impending failure of battery by lighting a lamp or ringing a bell.

The pendulum releases the switch by means of the fifteen toothed wheel **C**, which carries a vane **D**, engaging with the catch **K** at each revolution. The hook **B** pivoted upon the pendulum **P** turns this wheel once every thirty seconds. At

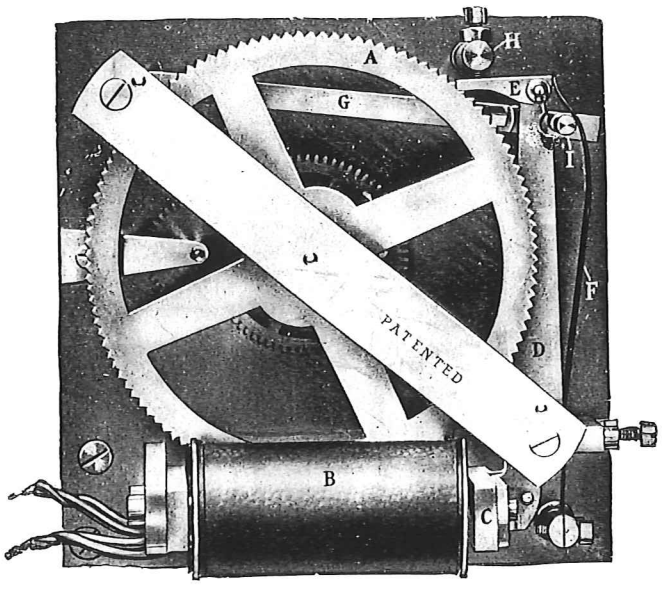


The Controlling Pendulum "TimeTransmitter" or Master Clock.
Patented.

the moment of its release, the little roller **R** on the gravity arm **G** is just above the curved end of the pallet **J**, down which it runs, giving an impulse to the pendulum **at the moment when it passes through its zero or central position.** Thus the pendulum is free at all times except in the middle of its swing ; not only is the escapement detached, but it operates at zero, thus realising the ideal which horologists have been aiming at for centuries.

The shape of the impulse surface of the pallet **J** is mathematically produced to yield an impulse, beginning with extreme gentleness, increasing to a maximum at zero, and diminishing in identical ratio.

The dials can be readily **set to time** by merely moving the lever from normal to retard or accelerate. In the type illustrated on page 2 this action has been greatly improved. A crutch is provided to engage the pendulum which can be easily hung in position ; this design facilitates erection, many adjustments being dispensed with.



Dial Movement (Patented).

The electrical contact, occurring at each half-minute precisely, is the only contact in the system, and it is a very perfect one ; **the whole of the energy required to keep the pendulum swinging being transmitted through the contact surfaces.**

Thanks to its perfection, dial movements of ideal simplicity can be used with confidence that they will keep in step. The motion is here illustrated, and it will be understood that the electro-magnet **B** receives an impulse every half-minute which attracts the armature **C** and by means of the lever **D** enables the click **E** to engage another tooth of the wheel **A.** The spring **F** then propels the wheel **A** and the minute hand attached to it one half-minute. The stops **H** and **I** are so arranged that the wheel is locked at every point in the cycle of operations, yet capable of being freed at any moment by merely lifting the backstop lever **G.**

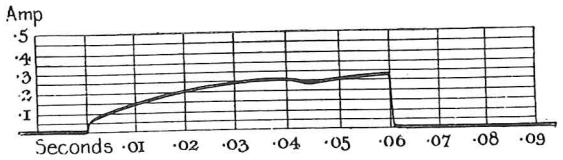
They are invariably arranged in series as shewn diagramatically in the border of page 2.

There is no theoretical limit to number of dials. For instance, the London Hospital has more than 250 dials all in series circuit operated from one controlling pendulum.

Suitable apparatus can be supplied to meet the objections raised by the timid against too large a series circuit, and the consequent increase of risk of line disconnection involved.

It is obvious that where several adjacent buildings are concerned, separate controlling pendulums may be installed in each. One of these, the best timekeeper, may transmit hourly impulses by means of overhead lines to synchronise the others, which are called sub-controllers. But such precautions are rarely, if ever, necessary if our **AUTOMATIC CUT OUT** is used. This device is installed at the neck of each loop of a time circuit which it is desired to specially protect. In the event of a disconnection occurring in that loop the next half-minute impulse immediately substitutes an equivalent resistance and the stoppage is confined to the clocks beyond the cut-out.

The great virtue of the pendulum switch is that it transmits to all dials in the time-circuit sufficient current to propel them. By an entirely novel application of the phenomenon of self-induction, it becomes impossible for the switch to operate without doing so. This was perfectly demonstrated by Mr. Hope-Jones in his 1910 Paper before the Institution of Electrical Engineers by means of a series of oscillographs, one of which is here reproduced.

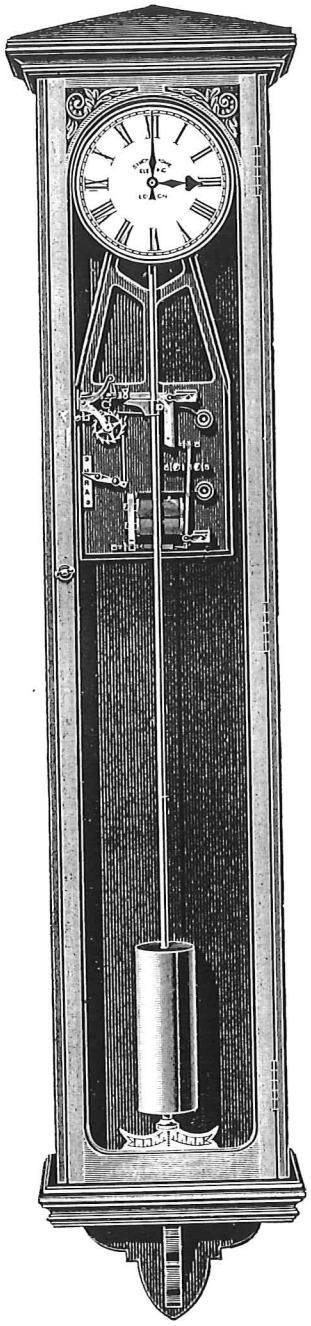


It may be described as a photograph of the electric impulse which passes through the "Synchronome" time-circuit every half-minute. The vertical divisions represent hundredth parts of a second, and the horizontal lines are twentieth parts of an ampére. The small depression in the curve between ·04 and ·05 sec. represents the operation of the dials. It will be observed that the dials operate at ·25 ampéres with an impulse whose duration is less than a twentieth part of a second. The total duration of the impulse is ·06, or one-seventeenth of a second. The area enclosed by the curve represents the consumption of current, which, in this case, is ·012 coulombs per impulse= 3·5 ampére hours per annum, or an average of 5 watt hours per annum per dial, many of which were large ones.

The voltage might drop 30 per cent. before the electro-magnet would call upon the pendulum to assist it to raise the gravity arm, and even then the circuit would continue to work perfectly.

The above compensatory effect is of the greatest practical value, and is not to be found in any other system.

The Oscillograph test, which is the **severest known to electrical science,** reveals the slightest intermittency or "raggedness" of impulse. It demonstrates the perfect cleanliness and precision of the make and break—the cardinal virtues of the "Synchronome" switch—which are **unobtainable by any other means.**



Controlling Pendulums or Master Clocks

In Polished Oak, Walnut, or Mahogany cases with Glass Fronts.

	£ s. d.
Pendulum of seconds length, 60 beat (39.14 inches long), with "INVAR" rod and cast iron bob, as illustrated on page 2	16 5 0

Or with 16 pdr. shell as bob **£1 0s. 0d.** extra.

The same, but of superior finish, with "INVAR" rod certificated by the National Physical Laboratory, and cylindrical steel bob..	**19 15 0**

Or with 16 pdr. shell **10/-** extra.

Either of the above instruments can be supplied and fitted into customers' own "Grandfather" or other cases of special design at **£12 7s. 6d.** and **£15 17s. 6d.** respectively.

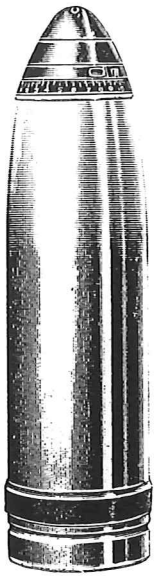
Extra for dial of 7ins. diameter to either of the above, as illustrated ..	2 5 0

Any of the above controlling pendulums can be "Synchronised" i.e., automatically corrected by an hourly or daily time-signal if such a service is available.

The necessary apparatus consists of "Selector" contacts applied to the movement of the dial, at the head of the master clock, and a "Rocker" synchronizer at the middle of the pendulum. Price **£5 5s. 0d.**

A 16 Pounder Shell as Pendulum Bob

A PERMANENT SOUVENIR OF THE GREAT WAR



Height 11½ in.; diameter 3 in.; complete with copper band and brass fuse cap, polished, nickelled and lacquered; bored for "Invar" rods of our standard diameter (5/16 in.).

Price - £1 5s. 0d.

If in place of cast iron bob **£1 0s. 0d.** extra.

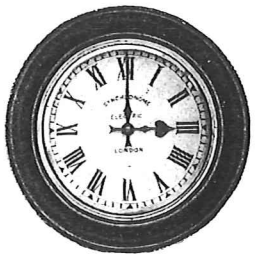
If in place of plain steel bob, **10s.** extra.

Battery Warning Lamp

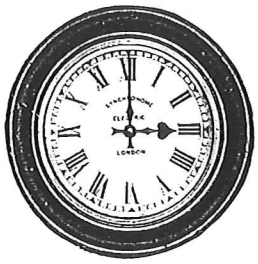
A Perfect Indicator of impending failure of current.

Dimensions 5in. by 3in. in polished walnut case. The lamp is concealed behind a ruby glass panel, but flashes brightly every half minute when the battery requires attention.

Price - £1 1s. 0d.



STANDARD Electrical Impulse DIALS



With movements totally enclosed in metal boxes.

Wood Frames.

Built up of 4 pieces with grain set at right angles to prevent shrinkage or warping. They lie flat against the wall on concealed hanging plates.

Metal Frames.

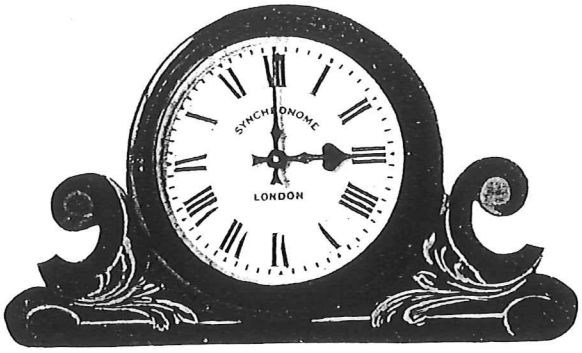
Watertight, dust, weather and steam proof. Strongly recommended for factories and outdoor use.

DIMENSIONS.				A	B	C
NOMINAL SIZE, *i.e.* actual dimension of dial plates		EXTERNAL DIAMETER		American White wood, stained and polished, painted dials, spun bezels	Hardwood (Oak, Walnut or Mahogany) hand engraved and silvered brass dials & cast bezels	Stamped sheet steel, dial and frame all in one piece, high temperatured enamelled.
Inches	Centimetres	Inches	Centimetres	£ s. d.	£ s. d.	£ s. d.
7"	17.78	9½	24.13	**2 17 6**	**4 6 6**	
8"	20.32	10½	26.67	**3 0 0**	**4 10 6**	
10"	25.40	13	33.02	3 8 6	5 2 6	
12"	30.48	15	38.10	**3 12 6**	**5 12 6**	**3 6 0** External Dia. 17¾"
14"	35.56	17	43.18	4 10 6		
16"	40.64	19½	49.93	5 10 0		
18"	45.72	22	55.88	**6 5 0**		**5 15 0** External Dia. 23"
20"	50.80	24	60.96	7 7 6		
24"	60.96	28	71.12	**9 2 6**		**8 0 0** External Dia. 32"

Prices for larger sizes on application.

"A" type dials can be supplied in hardwood frames at 10% extra.

STOCK SIZES IN HEAVY TYPE.

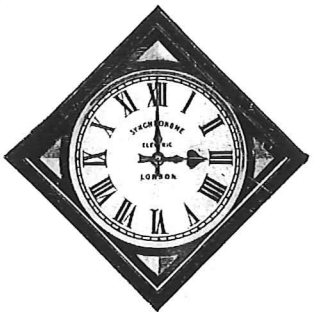


Carved Wood Saddles

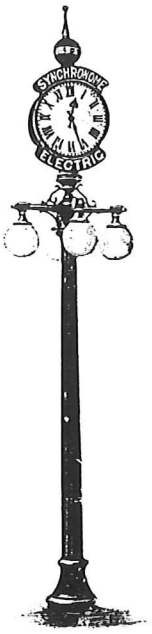
Or Suspension Supports
in a variety of designs
For 12 dia. (as illustrated) £2 15s. 0d.

Diamond Shaped Wood Frames

Originally designed for Shell Filling Factories to suppress the use of external metal, it is specially suitable for Chemical Laboratories and corrosive atmospheres, whilst its handsome appearance often recommends it for Offices.



12" nominal 14" square	£4	2 6
18" " "	7	5 0



Municipal Time Service

The SYNCHRONOME System is now being extensively used for public street clocks.

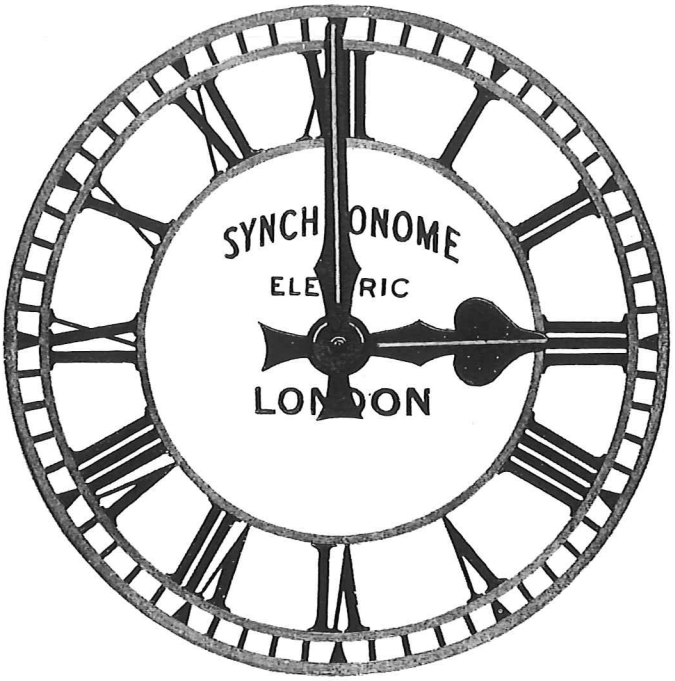
STREET CLOCKS
(Illuminated).

For such purposes the series of high temperature enamelled dials listed overleaf are ideal, and may be fixed upon arc lamp standards as at Marble Arch, or upon tramway trolley posts as at Southport, Lancashire, where the County Borough have seven miles of underground wiring devoted to the purpose.

They are also suitable for **outside bracket clocks,** two being hung back to back supported by any simple wrought iron scroll work.

If illumination is desired, a drum construction is necessary to carry opal dials, as listed on next page.

TURRET CLOCKS.



Opal Dials FOR Illumination.

Complete with shadowless movements and hands, suitable for erection in glazed openings provided by customers.

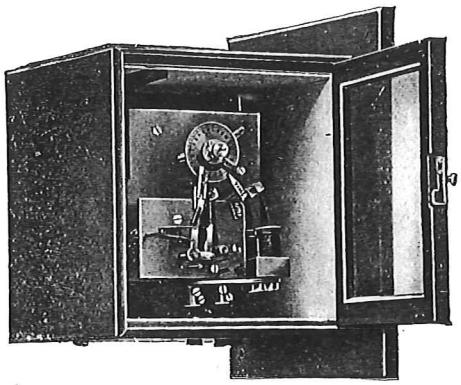
For groups of dials in one turret special terms on application.

Diameter.		£ s. d.
18″	single sheet, set in iron rim, figures kilned	6 5 0
24″	,,	8 12 6
30″	,,	13 5 0
36″	,,	18 15 0
36″	cast skeleton iron dial panelled with opal	18 15 0
42″	,,	23 0 0
48″	,,	27 10 0
54″	,,	30 0 0
5′ 0″	,,	33 10 0
5′ 6″	,,	35 5 0
6′ 0″	,,	37 0 0

EXISTING TURRET CLOCKS may also be controlled by the substitution of an electro-magnetic release for the pendulum and escapement. Most turret clocks lend themselves to this treatment, and the Release can be supplied and fitted for the sum of **£9 8 6**

Automatic Time Switches.

These instruments may be included anywhere in a time-circuit as ordinary dials. They deal quite automatically with gas or electric light, turning it off and on as may be desired at any pre-arranged times.



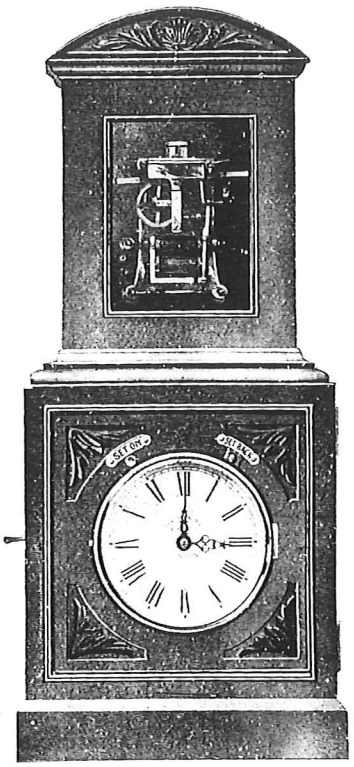
	£	s	d.
Simplest form to switch off only	5	12	6
To switch on and off ..	7	10	0
To switch on and off twice in 24 hours	9	0	0
To switch on and off with Calendar motion which automatically alters its time of operation to accord with sunset and sunrise ..	14	16	0

Employees' Time Recorders.

These can be electrically propelled by substituting our dial movement for the heavily driven clock usually supplied in these machines.

Price of large movement, including fitting in place of ordinary clock works (for which an allowance is made) £6 15 0

Certain recent types of Time Recorders are incapable of direct electrical propulsion by impulse dial movements. These can, however, be electrically released every half-minute by the method described on the previous page in connection with existing turret clocks. Price £3 15 0



Marine Installations for Ocean Liners.

The Master Clock has a balance wheel instead of a pendulum. It is usually placed in the Chart Room and is combined with a "Pilot" dial in a teak case, as illustrated. Price **£33 10 0**

The daily alterations necessitated by change of longitude are very simply effected, in the following manner: To set all the dials in the ship forward, a press button is provided on the Master Clock which, when pressed, advances all the dials one half-minute at every touch. To set them back, push back the hands of the Pilot dial any desired distance, the rest of the dials will then wait until the Pilot dial catches them up. The action is entirely automatic.

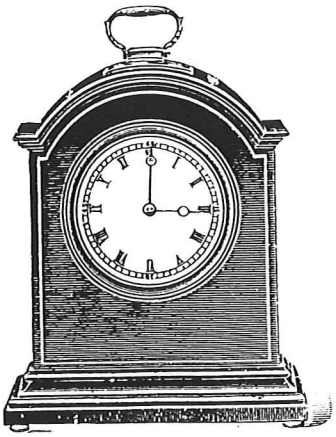
Among other vessels equipped are the latest new steamers of the Cunard and Booth Steamship Cos.

Private House and Hotel Installations.

For large private houses, hotels, etc., special dial movements are used which render the "Synchronome" system ideal owing to their silent working. Alone of all other systems it survived the drastic tests of the Midland Railway Co. when selecting a system for the Liverpool Adelphi Hotel, where 150 of the 200 dials are in bedrooms.

EXISTING KEY-WOUND CLOCKS may be converted by the substitution of the one-wheel dial movement for their ordinary clock works @ **50/-** each.

Prices and illustrations of superior bracket clocks will be sent on application.



In Polished Mahogany with 5-in. dial.

Price : £5 18s. 6d.

Other Sections of Our Catalogue.

BELL CONTROLLERS for operating circuits, of electric bells and other sound producing Devices, at pre-arranged times automatically in exact synchronization with the time circuit.

THE "HOROPHONE," a wireless set for receiving Time Signals with full details of the International Code of signals transmitted from the Eiffel Tower.

ASTRONOMICAL REGULATORS and Observatory Time Services.

Special illustrated leaflets are also published or are in course of preparation on

MUNICIPAL TIME SERVICE.
TIME BALLS and all apparatus for receiving Greenwich Mean Time signals.
HISTORY AND BIBLIOGRAPHY OF ELECTRIC CLOCKS.
LISTS OF THE MORE IMPORTANT "SYNCHRONOME" INSTALLATIONS
INSTRUCTIONS FOR WIRING, ERECTION AND MANAGEMENT.
"THE HOUSE THAT JACK BUILT." Domestic applications of the System.

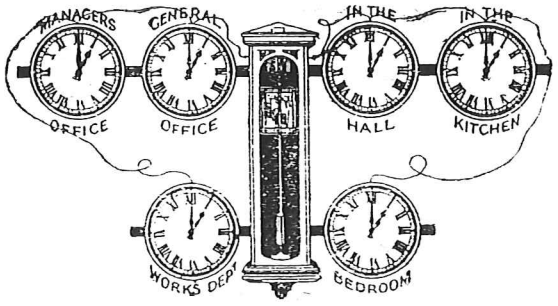
In the last 25 years the "Synchronome" system has been accorded all the honours which the scientific world has had to bestow, and it would be difficult to name any invention which has received more spontaneous and enthusiastic testimony.

Owing to their large number and the difficulty of selection we have ceased to print such letters. In any case it is doubtful whether they would be read, but

REPEAT ORDERS

speak for themselves. Almost all of the many thousands of installations erected by the Synchronome Company since 1895 have been increased by the addition of extra dials from time to time.

—— FIRST IN 1895 ——
AND FOREMOST EVER SINCE


MANAGERS
OFFICE
GENERAL
OFFICE
IN THE
HALL
IN THE
KITCHEN
WORKS DEP
BEDROOM