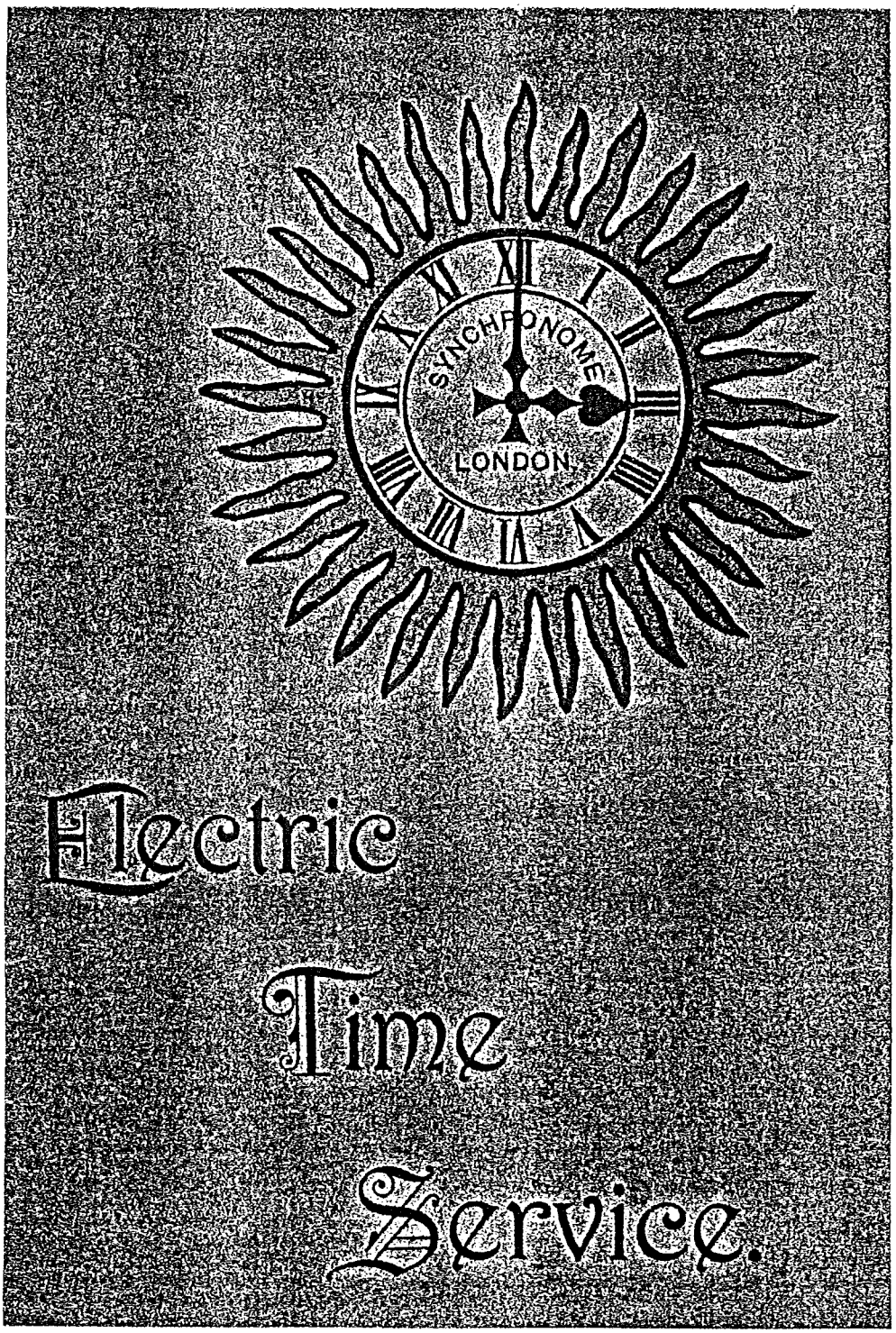
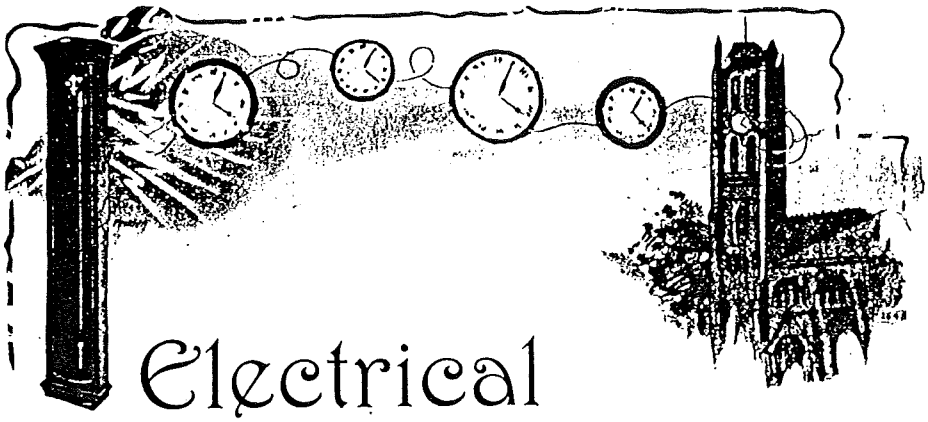

SYNCHRONOME
LONDON
Electric
Time
Service.



Electrical

Time

Service.

THE SYNCHRONOME COMPANY,

32 & 34, CLERKENWELL ROAD,

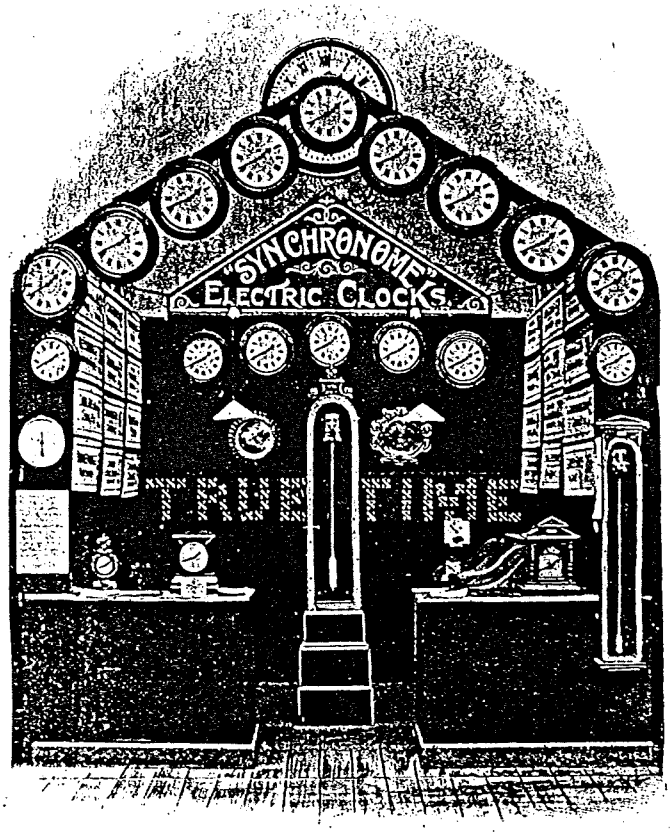
LONDON, E.C.

CONTENTS.

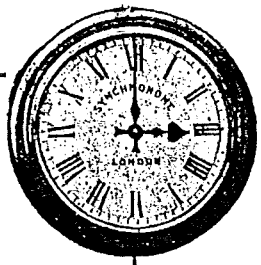
The word "Synchronome" is registered as a Trade Mark, and the system known by that name is protected by numerous patents in most countries of the world, granted to F. Hope-Jones, G. B. Bowell, & others.

EARL'S COURT, 1903.

Silver Medal Awarded.



A time-circuit of a mile in length, comprising a dozen large Dials throughout the **International Fire Exhibition,** was operated by the pendulum in the centre of the Stall.



THE

"SYNCHRONOME"

SYSTEM.

What it is;-

An electrically-driven pendulum, which is used to control any number of Dials.

The pendulum is operated by two wheels only, and each dial by one.

This simple mechanism suffices to secure uniform and accurate time-keeping, by all dials, without winding up or any other attention.

How it Works;-

. . THE PENDULUM.

The pendulum is at once **a clock** and **a switch**—the best possible clock for accuracy of time-keeping, and the best possible switch for operating secondary dials.

The weighted lever (A) as it falls turns the wheels (B & C) and keeps the pendulum (D) swinging. When it reaches the armature (E) the circuit of the battery (F) is closed, and the electro-magnet (G) replaces the weight by throwing it up on to the next tooth of the ratchet (B).

This electrical contact, occurring at each half-minute precisely, is **the only contact in the system**, and it is a very perfect one; a severe rubbing and thrusting action of the surfaces being obtained at every operation.

It is so designed that at each operation it transmits to all the dials 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.

In all previous electric clocks, the contacts required for winding up the controlling clock and for sending out impulses to indicator dials, engage some moving part of the wheelwork. That is to say, their safety depends mainly upon the extent to which they rob the pendulum driving mechanism of the power which properly belongs to it. In the Synchronome System it will be noticed that the energy devoted to the purpose of making a reliable contact is considerable, but that it is not derived from the wheelwork; on the other hand it is obtained from the electro-magnet in its act of imparting power to the clock.

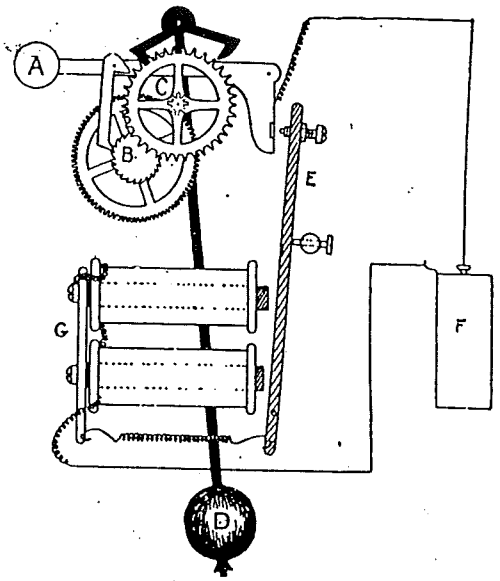
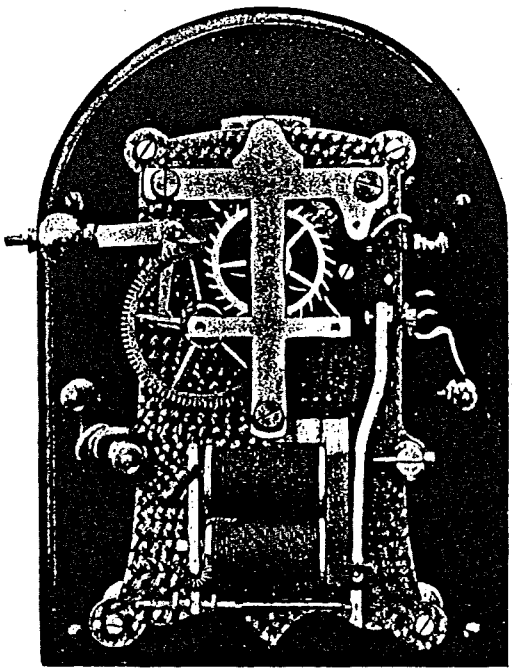


Diagram of Automatic Timed Switch.

(PATENTED.)



Photograph of Automatic Timed Switch.

How it Works;-

. . THE DIALS.

The mechanism behind the "indicator dials" or "receiver" clocks is a step by step movement which propels the hands half a minute at a time.

A is a wheel having 120 rectangular teeth, and is rigidly connected with the minute hand. B is an electro magnet with armature C centred at D and carrying a pawl E at its end. F is a spring, G a backstop click, and H I are fixed stops.

The impulses from the controlling clock pass through the electro magnet each half minute, causing it to attract the armature and allow the driving click to pick up another tooth. The spring then carries it forward, the wheel remaining rigidly locked.

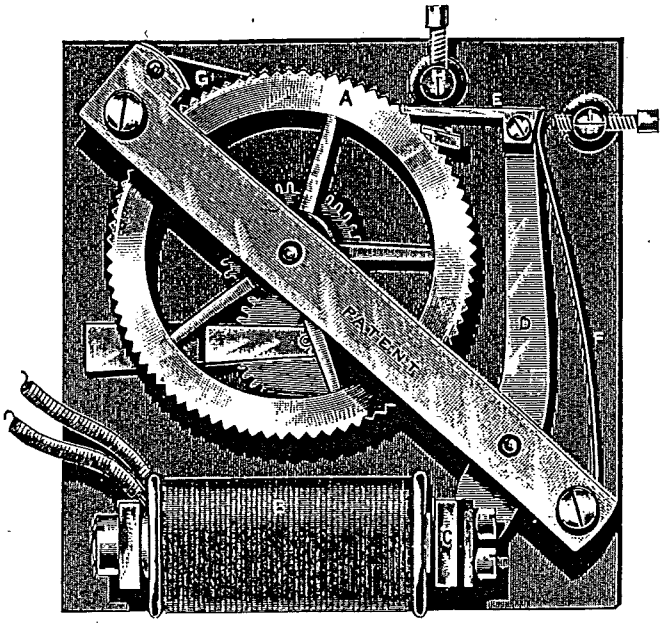
This instrument is very sensitive, and will operate with a contact having a duration of only one hundredth part of a second. It can never take up more than one tooth, whether the contact is long or short.

It is thus practically impossible for the dials to be out of synchronization.

The dials are almost noiseless in action, and a perfectly silent movement can be put in whenever required.

THE WIRING.—A single line of ordinary bell-wire of not less than 18 gauge, to connect each dial with its nearest neighbour in simple series circuit, as shown in diagram.

THE BATTERY.—Any form of good dry cell, two being required for every three 12" dials in circuit.



Step-by-Step Dial Movement.

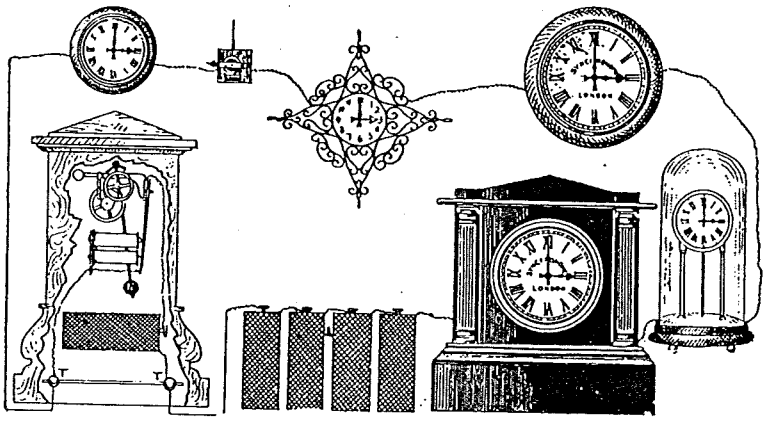


Diagram of Electrical Time Circuit.

THE DURATION OF THE CONTACT is exactly what the dials require, and is actually dictated by the self-induction of their magnets. It varies from a 50th to a 60th part of a second, whereas in other systems a whole second is frequently allowed.

THE CONSUMPTION OF CURRENT is therefore very small, the total period of closed circuit being less than 6 hours per annum. At a current rate of ·3 amp. this means that each dial consumes only 1·7 amp. hours per annum. As a good dry cell is capable of yielding from 200 to 300 amp. hours, it is obvious that the life of the battery depends upon how long it will keep fresh rather than upon the amount of electrical energy taken from it. If kept in a cool but dry place, it should last from two to four years.

Advantages.

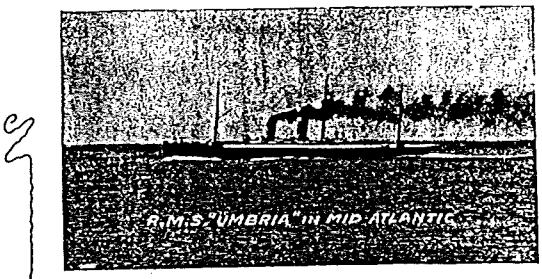
One pendulum only is required, and that, owing to its simplicity, is a better time-keeper than the best key-wound clock.

Every dial on the time-circuit indicates the time kept by the pendulum.

Any number of dials may be worked from one pendulum.

Existing clock cases can be readily fitted with dial movements. The dials are **unaffected by vibration.** They are sealed up to exclude dust, and cannot be tampered with.

The system is economical since no winding or other attention is required, and the amount of electricity used is considerably less than that necessary for ordinary electric bells.



CONTROLLING CLOCKS operated on this principle can be supplied in **any other form,** and the self-winding action is as readily applicable to a balance wheel as to a pendulum.

For passenger Steamers, particularly for **large Ocean Liners,** the system is peculiarly well adapted. For this purpose the switch is applied to a Marine Chronometer, which thus becomes a self-wound controlling clock capable of operating dials wherever required throughout the ship.

The daily alterations necessitated by change of longitude at sea is affected in all the dials simultaneously by attention to one of them only in the following manner:—

To set forward all the clocks in the ship when sailing Eastwards, a press button is provided which will advance them half a minute at every touch.

To set them back when sailing Westwards, a "Pilot" dial is previously provided with a switch normally open, but so arranged that when the minute hand is pushed back any desired distance the switch short-circuits the rest of the dials, which will then wait until the hands of the Pilot dial have returned to the position they previously occupied.

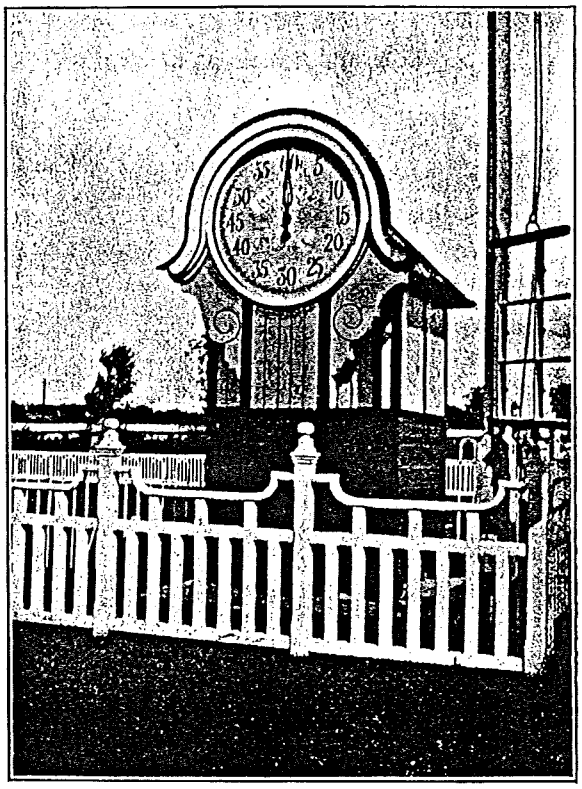
RACING TIME RECORDER.

FOR RACECOURSES,
MOTOR TRACKS,
ATHLETIC CLUBS, &c.

A Turret Clock showing fifths of seconds, electrically started and stopped.

The dial is 4 ft. in diameter, and the figures represent seconds and minutes, no hour hand being required. The seconds hand is 2 ft. in length and progresses in fifths of seconds, the dial being so large that every division is clearly visible to the Public.

The starting, stopping, and fly-back motions are accomplished by merely pressing a button at any desired point. The clock illustrated is incorporated with the Judge's box and faces the Grand Stand. The starting gates are used to set it in motion by means of a simple electrical contact applied to the lever operated by the starter, whilst each race is timed by pressing the button at the winning post. The clock then reveals to some thousands of the Public the exact time of the Winner, accurate to the fifth part of a second. After a suitable interval has elapsed, the button is again pressed, and the hands fly back to zero, ready for the next race.



Electrical Racing Time Recorder.

PRICE LIST.

CONTROLLING PENDULUMS.

(Automatic Timed Switches.)

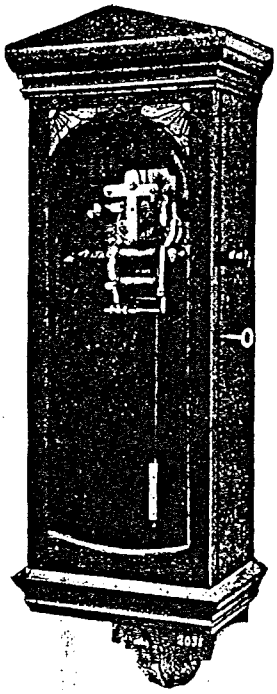
With steel rods and lead bobs. In polished oak or walnut cases, with glass fronts.

	£	s.	d.
Half Seconds (9·78 long, 120 beat)	4	0	0
Three-quarter Seconds (19·56 long, 90 beat) ...	6	10	0
Seconds (39·24 long, 60 beat) with superior movement, as shown ~~in No. 2 on page 4~~ ...	9	10	0
Or the same but with "Invar" (nickel-steel) or steel and mercury compensation, optional ...	15	15	0

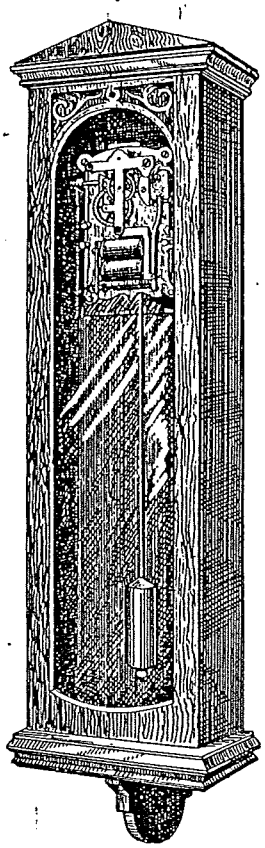
The seconds pendulum is strongly recommended, and in cases where a number of dials are required, the cost of a really good one will not be grudged.

Supplied also without case, suitable for fixing in the body of a Grandfather clock:

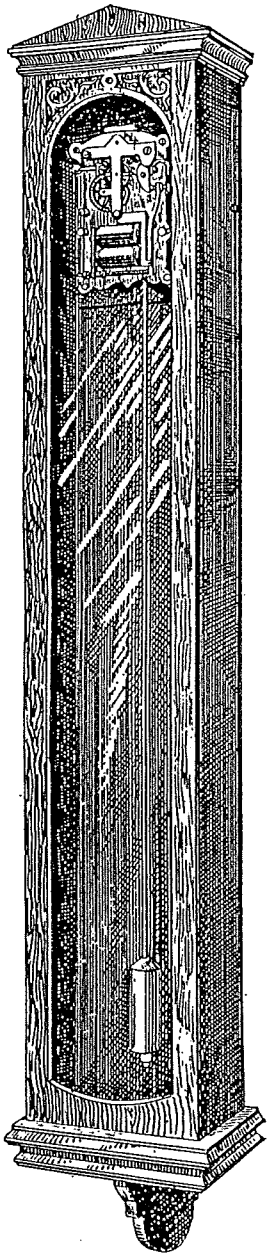
	£	s.	d.
With steel and lead pendulum (Seconds) ...	7	5	0
With steel and mercury pendulum (Seconds) ...	13	15	0



Half Seconds.



Three-quarter Seconds.



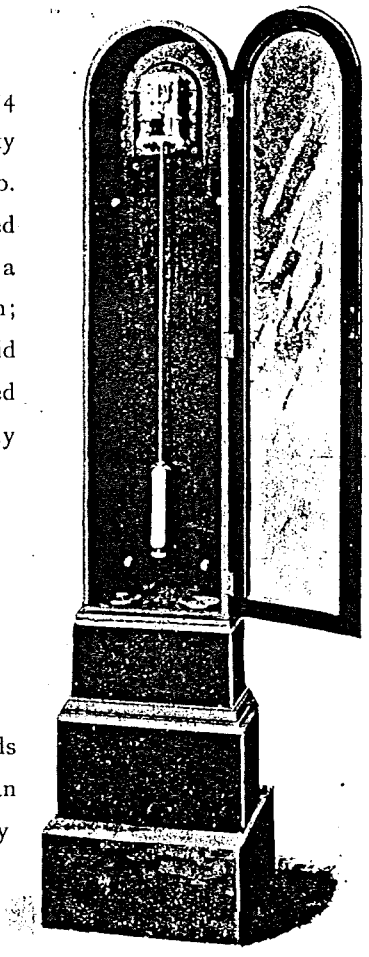
Seconds.

Price List (continued).

SUPERIOR REGULATOR

AS MADE FOR THE

NATIONAL PHYSICAL LABORATORY,
Bushy House, Teddington, Middlesex.



With seconds pendulum (39·14 long, 60 beat) of best quality "Invar" (nickel-steel), with 9½ lb. cylindrical brass bob supported at its centre of gravity on a small brass tube for compensation; superior movement with solid cut steel pinions and jewelled escapement, all in solid mahogany case.

Price ... £31 10 0.

To any pendulum of seconds beat, a silvered engraved dial can be added to indicate seconds only price 15s. extra.

Price List (continued).

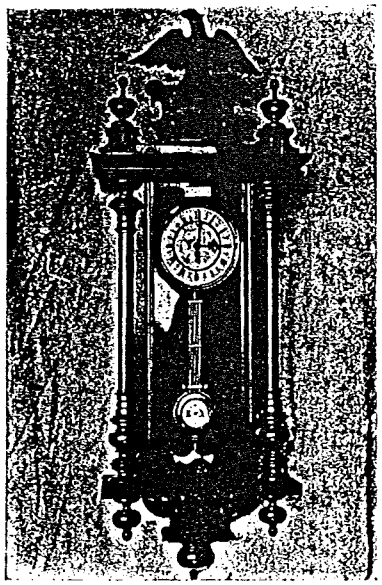
POPULAR SELF-WOUND CLOCKS.

A concession to the "Man in the Street."

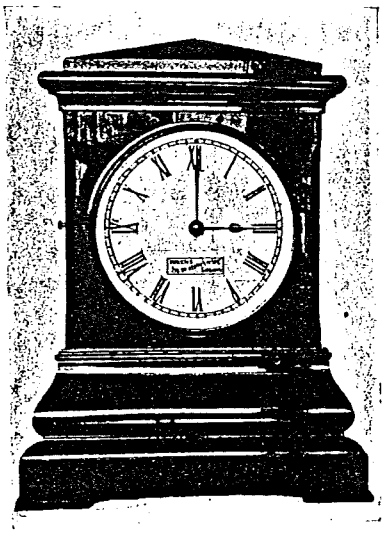
Controlling pendulums provided with clock faces of their own. They will operate other dials, but do not pretend to the accuracy of the instruments described on the previous pages. Recommended for small domestic installations.

Between the terminals on each clock will be found the following instructions:

> "This Self-wound Electrical Clock may be used to operate any number of 'Synchronome' One-wheel Dials connected between these terminals by a single line in series circuit; two dry cells being added for every three Dials in circuit."



Wall Clock, £4 4 0.



Bracket Clock, £4 16 0.

Price List (continued).

PLAIN DIALS,

Complete with movements and hands.

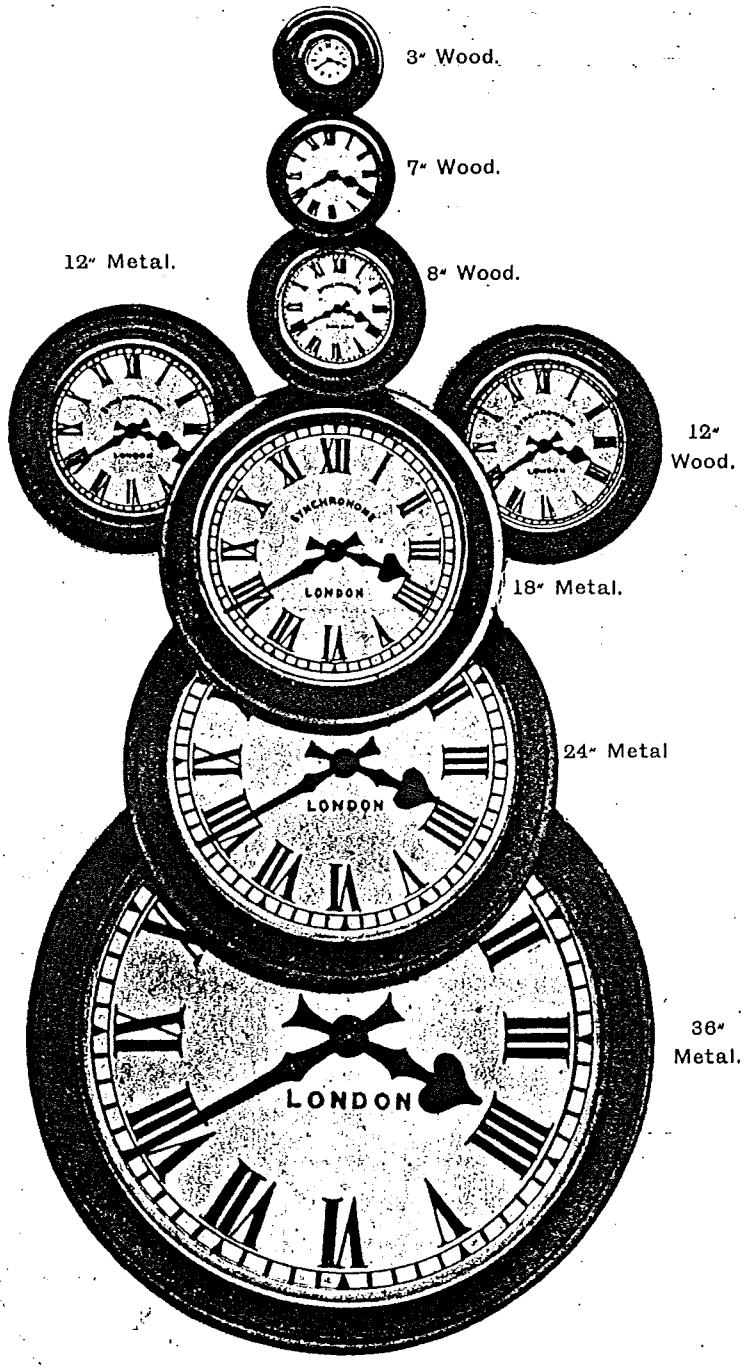
		£	s.	d.
3″	diameter in ebonized pine case	1	10	0
7″	,, in stained ,, ,, ...	1	12	6
8″	,, in solid turned white-wood, stained and polished to any colour	1	17	6
12″	,, in stamped metal case, high finished to imitate hardwood	2	0	0
12″	,, in solid turned whitewood, stained and polished to any colour	2	5	0
16″	,, in polished mahogany, walnut, or oak case	4	0	0
18″	,, Do. do.	4	7	6
24″	,, Do. do.	5	18	0
18″	,, in rolled metal dust and weather proof case, japanned black with gilt bands ...	3	15	0
24″	,, Do. do.	5	2	6
30″	,, Do. do.	8	12	6
36″	,, Do. do.	12	10	0
42″	,, Do. do.	16	0	0
48″	,, Do. do.	19	10	0

These dials, having no "clock-works" inside, lie flat against the wall. They are hung on single nails like pictures. They cannot be tampered with, for it being unnecessary to get at the hands, the glasses are permanently fixed.

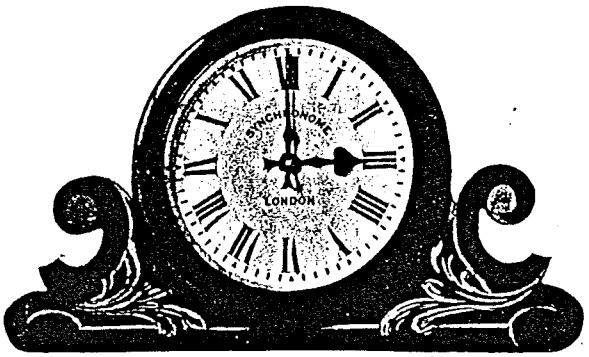
TURRET CLOCKS.

Electro-magnetic release for applying to the escapement of an ordinary turret clock in place of its pendulum £4 17 6

The clock will require to be wound up as usual, but will then keep uniform time with all other dials on the circuit.


3" Wood.
7" Wood.
12" Metal.
8" Wood.
12"
Wood.
SYNCHRONOME
LONDON
18" Metal.
24" Metal
LONDON
36"
Metal.
LONDON

Price List (continued).



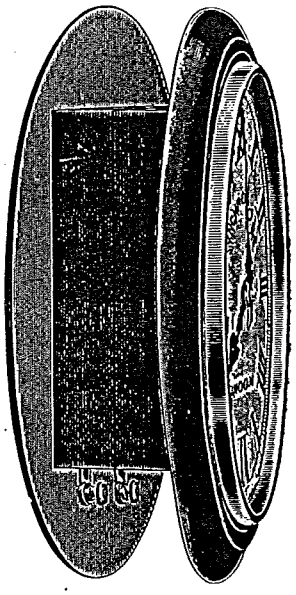
CARVED SUPPORTS.

In hardwood, suitable for single dials from 12″ to 18″ diameter, at £1 to £1 10s. according to design.

DOUBLE-FACE DIALS

Consist of two ordinary complete dials placed back to back with a box in between to provide for fixing, as shown in illustration.

Ornamental cast-iron bracket suitable for supporting them in pairs will be supplied and fitted at 5s. up to 18″ diameter, and 10s. above that size. Special wrought-iron supports of any desired design at suitable prices.



Price List (continued).

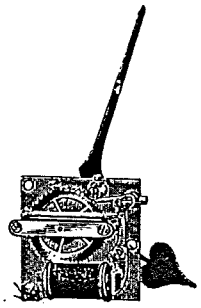
OPAL DIALS FOR ILLUMINATION

Are provided with circular movements attached to their centres by means of screw collar and rubber washers. These movements are so small that no shadow is thrown by them.

Prices of opal dials complete with movements and hands erected in glazed openings provided by customer:—

18" £4 2 6; 24" £5 8 6; 30" £8 18 6; 36" £12 16 0.

DIAL MOVEMENTS ONLY.



Movement suitable for operating the hands of any dial from 3" to 18" diameter, £1 5 0

Fitted to dials forwarded to us carriage paid, including balanced aluminium hands, £1 10 0

DIAL MOVEMENTS FOR SPECIAL PURPOSES.

With wheel of 100 teeth, for use as an electro-magnetic counter for such purposes as Billiard Marking, &c. ... £1 10 0

Fitted with "fly-back" motion, so that the pointer may be set to zero at any time by pressing a lever £3 2 6

Note. Our dial movement is the only one on the market to which this "fly-back" motion can be applied.

CENTRE-SECONDS DIALS.

For Observatories, Laboratories, &c., to respond to electrical impulses transmitted every second from a precision clock.

With painted iron dial of 12" diameter in polished hardwood case £4 12 6

Prices of other sizes and qualities on application.

Price List (continued).

FANCY DIALS,

Complete with movements and hands.

Ordinary clock cases consist essentially of "boxes to cover clockworks," but the absence of mechanism in this system enables them to be treated artistically and suggests their combination with drawing-room art work in painting, repousse copper and brass and wood carving.

"Cupid and Butterfly," 12" dial. A water-colour sketch on card. Florentine openwork gilt frame and glazed as a picture ... £4 8 0

"Father Time," 12" dial. A water-colour sketch on card, in polished mahogany frame, glazed as a picture £3 18 6

Hand Hammered copper with 10" diameter brass ring dial £5 10 0

Mantle-shelf clock, as illustrated on page 17 .. £3 7 6

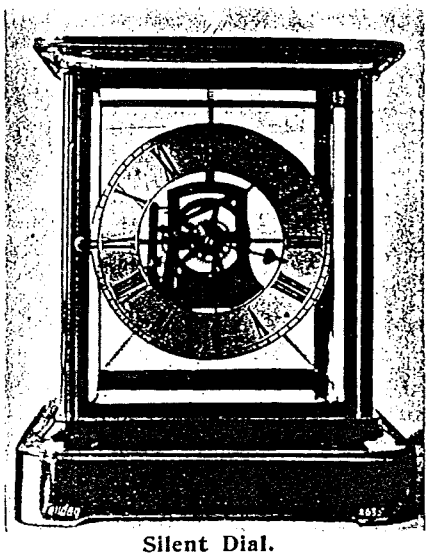
OTHER PATTERNS IN PREPARATION.

SILENT DIALS.

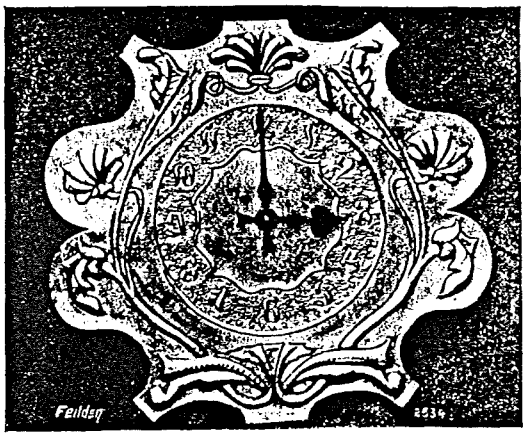
The dials above described are so silent in action that the half-minute movement is hardly audible in an ordinary sitting-room. In bedrooms, however, it is necessary that they should be absolutely silent. In the illustration at the head of the opposite page the dial and movement is suspended on springs in a handsome cast brass case, with panels of bevelled plate glass.

Price £7 10 0

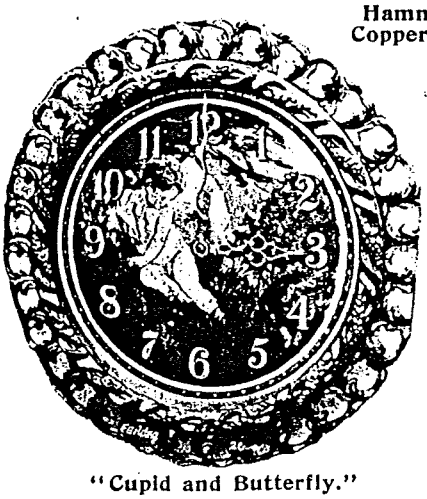
Another pattern under glass shade,
Price £3 15 6



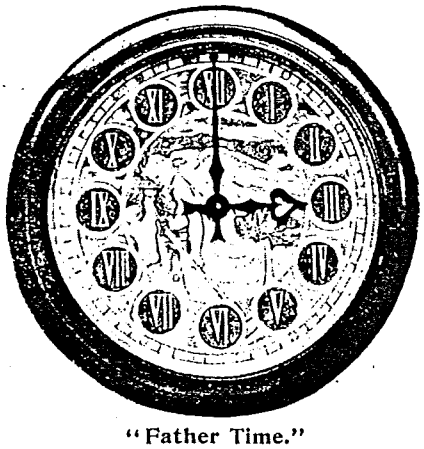
Silent Dial.



Hammered
Copper Dial.



"Cupid and Butterfly."



"Father Time."

Price List (continued).

BELL CONTROLLER.

For ringing a circuit of ordinary electric bells automatically at pre-arranged times. This instrument, shown on opposite page, may be placed in any time-circuit wherever desired as an ordinary dial. In its simplest form it consists of a one-wheel dial movement provided with a disc of vulcanite carrying copper segments in its periphery, to make contact with a spring at one or more half-minutes in every hour. A wheel revolving once in twenty-four hours is shown above it, and by means of pins set in its periphery, it selects the required hours in which the bells are to ring.

It is obvious that whatever half-minute calls are made in any one hour, will be repeated in any other hour at which a pin is placed on the wheel. If different half-minute calls are required in different hours, one or more extra discs are provided controlled by longer pins set in the slowly revolving wheel.

PRICES:

With simple programme ...	£7 15 0
With double programme ...	9 15 0

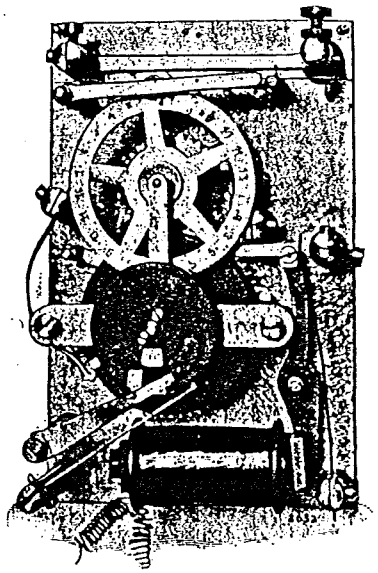
EMPLOYEES' TIME RECORDERS can now be electrically propelled by substituting our dial movement for the heavily driven clock usually supplied in these machines.

This has already been accomplished successfully in many large works such as

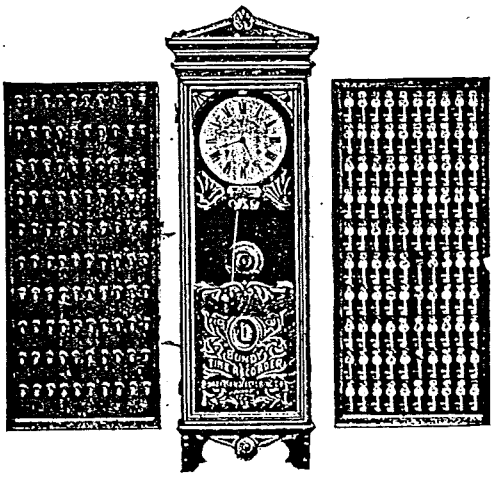
John Broadwood & Sons, Ltd., Old Ford, E. ... (4)
Debenham & Freebody, Wigmore Street, W. ... (8)
Stapley & Smith, Hackney, N.E. ... . (9)
Newcastle Corporation Electric Tramways, &c., &c.

Price of large movement, including fitting in place of ordinary clock-works £3 10 0

All other instruments previously driven by independent clock-works can be electrically propelled by our dial movement.



Bell Controller.



Workman's Time Register.

SOME RECENT UNSOLICITED TESTIMONY

AS TO THE

RELIABILITY and ACCURACY of . . .

. . . ELECTRIC TIME CIRCUITS.

WHETLEY MILLS, BRADFORD.

"About twelve months ago we put in an installation of your electric clocks. We have found it very reliable and much simpler to attend to than ordinary clocks. The whole installation has kept time to half a minute in the last three months, and we have no doubt it is capable of more exact regulation."

(*Signed*) DANL. ILLINGWORTH & SONS.

POULTON-CUM-SEACOMBE SCHOOL BOARD,
SEACOMBE, CHESHIRE.

"Mr. F. Hope Jones' method of recording the time is proving an unqualified success. The clocks are most regular, they do not vary one from another, and are no trouble; they are proving a real boon."

(*Signed*) W. C. S. JONES, *Head Master.*

ROYAL COLLEGE OF SCIENCE, DUBLIN.

"I hear nothing but praise of your clocks on all sides, and after careful enquiry I have written a long report to the City of Dublin Technical Schools to the effect that I strongly recommend your system to be installed in all the Class Rooms as soon as possible. Meanwhile please send an approximate estimate for the central standard pendulum and for say 20 12" dials."

(*Signed*) W. F. BARRETT, F.R.S., &c.

45, WELL STREET, BRADFORD.

"Our installation of clocks has now been in operation for twelve months, and we desire to take this opportunity of expressing our entire satisfaction with them; they are perfect time keepers, and require no regulating, two considerations which in the long run make them the cheapest clock in the market."

THE YORKSHIRE WOOLCOMBERS' ASSOCIATION, LTD.

(*Signed*) THOMAS PATON, *Secretary.*

STAR IRON WORKS, WEXFORD.

"We need scarcely say that we are very pleased with the system. It is the admiration of all our friends, and there is no time-keeping in the town equal to it."

THE WEXFORD ENGINEERING CO., LTD.

(*Signed*) THOS. MAXWELL, *Director.*

"BRADFORD DAILY ARGUS," BRADFORD.

"The clocks have gone to absolute perfection since the first day they were put in; they have not even required any regulation to talk about. As far as I know there is not a failure in any dial, and altogether we are very proud of the installation."

(*Signed*) JASPER PATTERSON, *General Manager.*

76, CHEAPSIDE, E.C.

"I am glad to be able to report to you that the five "Synchronome" dials which I have had in my offices for nearly three years, have proved a great convenience, as I am supplied with accurate and uniform time, and I am not inconvenienced by people coming in to wind up the clocks every week."

(*Signed*) F. E. D. ACLAND, M.INST.C.E., &c.

PALMERSTON BUILDINGS, E.C.

"We are glad to state that the clocks fixed by you in our offices are working quite satisfactorily, and there being no necessity for winding or other attention, is, we find, a great convenience."

(*Signed*) DAVIDSON, UNWIN, & CO.

REPORT OF

PROF. SYLVANUS P. THOMPSON,

D.Sc., F.R.S., ETC., ON THE

SYNCHRONOME SYSTEM OF ELECTRIC CLOCKS.

For some two years I have been conversant with the "Synchronome" method of operating clocks by electricity, and for more than twelve months I have had an installation under my eyes daily. This method of controlling and driving clocks by electric currents has, in my opinion, several distinct advantages over all methods hitherto suggested for electric clocks or for the electric distribution of time.

I have for years been acquainted with the various proposals of English and Continental Electricians, and do not hesitate to say that in respect both of the electrical arrangements, the mechanical devices, and the general simplicity of the system, the Synchronome method of electric horology is ahead of anything hitherto devised.

Amongst the technical advantages possessed by the system are the following features;

(1) In the controlling self-driven pendulum the excellent method of procuring the regular periodic electric contact without robbing any mechanical power by friction or otherwise from the driving mechanism of the clock; thereby ensuring absolutely uniform impulses independent of the strength of the electric current.

(2) In the controlled dials the propulsion of the hands in perfect synchronism, by mechanism which is at once simple and secure.

I have recently inspected several of the electric-time services that have been installed in London by the Synchronome Company, including those at the Institution of Mechanical Engineers, at the Surveyors' Institute, and at Palmerston Buildings, Bishopsgate Street. In each case I found that the dials distributed about the buildings in different rooms were in absolute agreement with one another. In no case was there as much as one half-minute's difference between any of the dials; and in each case the controller appeared to be running with absolute uniformity. Such is also the case in the smaller installation in the buildings of the City and Guilds Technical College, Finsbury, where the dials in the Lecture Theatres are operated from a controller with perfect satisfaction.

I know of no system of electric clocks, nor indeed of clocks of any kind, that could with equal simplicity and certainty of action be applied for the municipal distribution of time, or for the provision of time-services throughout large industrial establishments.

(*Signed*) SILVANUS P. THOMPSON.

Testimonals

Are seldom read, and even if they are, they sometimes fail to convince, but

REPEAT ORDERS

speak for themselves.

Messrs. Nettlefolds, the great screw makers of Birmingham, installed the system throughout the Heath Street Works in 1898. In 1900 they extended the circuit throughout their St. George's Works, one of even greater extent.

The National Telephone Co., Ltd., began in 1900 with 18 dials in their Head Offices, and now have 45 dials.

The Prudential Assurance Co,, Ltd., at Holborn Bars, began with 7 dials, and now have 31 dials.

The Selwood Printing Works, of Frome, although disheartened by the failure of another system, installed 35 clocks in 1900. After 2½ years' experience of their perfect running, they added 5 more.

Messrs. John Broadwood & Sons, the Pianoforte Makers, began with a dozen dials in their new works at Old Ford, London, E., since when they have extended the circuit on three separate occasions to operate additional dials and their workmen's time-registers.

A list of all the important installations of Electrical Time Service we have erected would be too bulky to include in this pamphlet, but a selection from it comprising over 1,000 dials in operation will be forwarded if desired.

OUR prices include a visit of inspection to make sure that all the clocks are properly erected and in good order and adjustment. We then accept full responsibility for their safe-going and time-keeping, but we ask you to put them in charge of a capable Assistant, handing him the following

Instructions for Management.

Regulation. Turn the rating nut below the "bob" slightly upwards, to shorten or accelerate the pendulum if slow, or downwards to lengthen or retard the pendulum if fast. In an ordinary seconds pendulum one complete revolution of the rating nut will make a difference of about one minute in 24 hours.

For accurate regulation wait until a definite gaining or losing rate has been proved by two or three observations, then turn the nut very slightly.

To obtain the very highest degree of accuracy prove a slight losing rate and then work the rating nut upwards by very small degrees, and at ever lengthening intervals. This ensures the "bob" following the nut.

To Set all the Dials Forward if Slow. In the case of ordinary seconds pendulums, stop the pendulum, and grasping the rod lightly close to the movement, vibrate it from side to side so as to allow the scape wheel to turn quickly and to send out additional impulses. In other instruments a press button is provided. When this is used, care should be taken to send out definite and precise impulses.

To Set all the Dials Back if Fast. Stop the pendulum for as long as may be necessary.

In the event of any irregularity or break-down you are **earnestly requested** to communicate at once with us as the installation is guaranteed. In the meantime, if it is desired to ascertain the cause, see next page.

Instructions (continued).

In the event of the Pendulum having stopped, see whether the weighted lever is touching the armature (circuit closed) or whether there is a space between them (circuit open).

If the former, **closed,** either the battery is insufficient to throw up the weighted lever, or the circuit is broken. Look at the nearest dial, and if its magnet is holding the armature the circuit is not broken, but the current is insufficient. **Open the circuit immediately** at any point, otherwise the battery will remain on closed circuit and will rapidly run down.

If the latter, **open,** then the electro-magnet has not been called upon to do its self-winding and switching operation, and there is no reason to suppose that the electrical arrangements are at fault. On the other hand, the fault is a "clock-making" one, being confined to the wheel-work and escapement which the weighted lever is apparently insufficient to drive. See that the pendulum is in even beat. Look for evidence of some undue friction such as dust, &c., and oil the pivots with a little fine typewriter oil.

In the event of any one Dial stopping or dropping behind time, take it out of circuit, twist the wires together quickly and send a postcard to us for another one.

In the meantime, if it is desired to ascertain and correct the fault, open the back and turn the dial on its head (XII) downwards, so that the backstop click falls out. Hold the driving click out of engagement with the wheel, and spin the wheel to find undue friction. If the wheel and hands revolve quite freely, there is only one thing more to look at, viz.: the flat steel spring, which must be just strong enough to propel the hands, but not too strong for the electro-magnet to pull it over. It may be easily adjusted by pressing it near the pillar on which it is mounted.

In the event of it being necessary to touch any individual dial to turn the hands to time, never touch the hands themselves, but open the back and pressing the armature lightly with one finger, spin the wheel with the thumb.

F. HOPE-JONES,

Associate Institution of Electrical Engineers,
Member of the British Horological Institution,
&c., &c.

Proprietor of

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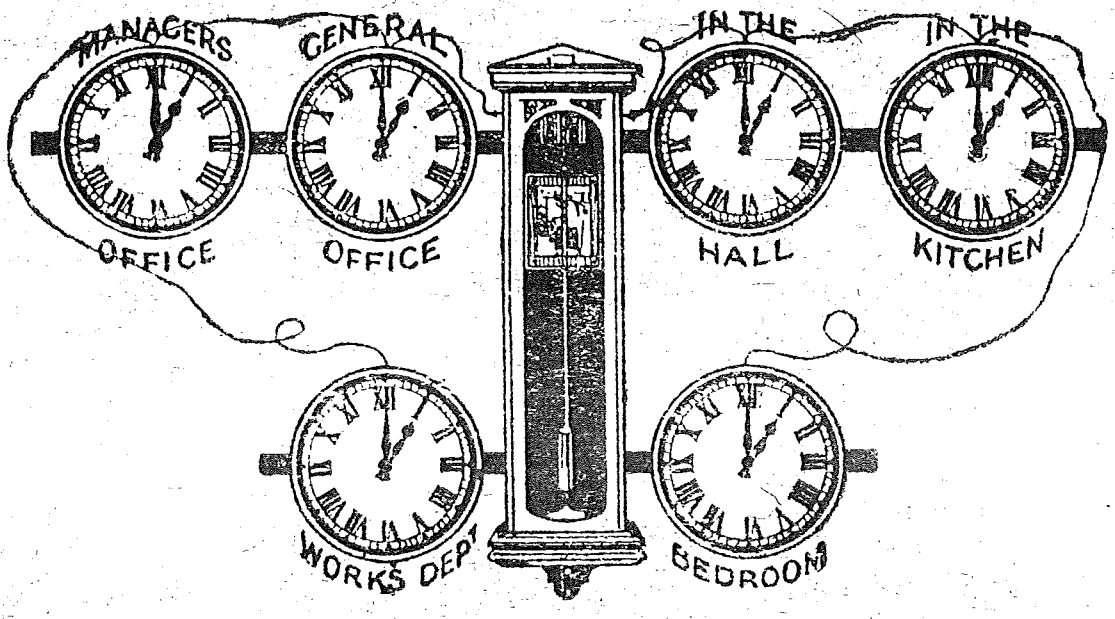
MANAGERS
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IN THE
KITCHEN
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