

SILENT ELECTRIC CLOCKS



THE SILENT ELECTRIC CLOCK COMPANY, LTD.,
192, GOSWELL ROAD, LONDON, E.C.1.

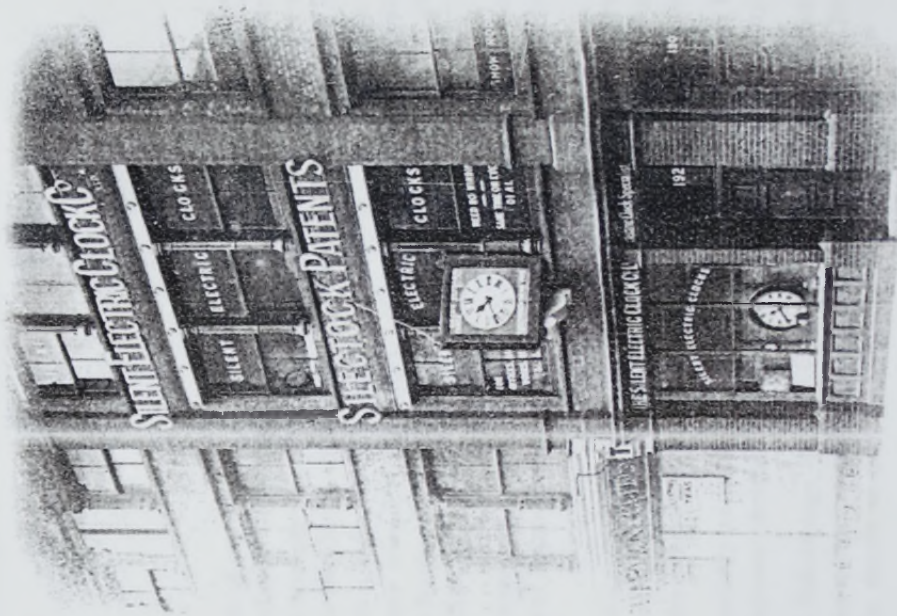
CHAIRMAN-SIR JAMES PATON, J.P.

SECRETARY H. T. W. BOWELL.

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VIEW OF
HEAD OFFICE
AND
FACTORY.



192,
GOSWELL ROAD,
LONDON,
E.C. 1.

PREFACE.



THE last edition of our Catalogue was published in 1912, and in 1914 we were about to bring out a new edition, when the great European War broke out. During the continuance of this gigantic struggle the Silent Electric Clock Company, realising that as far as possible manufactures should be confined to articles directly assisting our country in the conflict, carried on on a reduced scale, and we are proud to say that every man of military age in the service of the Company joined H.M. Forces. Nevertheless, even with a minimum staff, we exported clocks, during the war, to South Africa, India, Argentina, Siam, etc., etc., and carried out contracts for the Admiralty and Post Office.

Now that the war is over, we have come back to ordinary routine and manufacture, and accordingly take this opportunity of bringing out a catalogue which otherwise would have appeared in September, 1914.

Our Clocks are manufactured throughout by ourselves. We do *not* import ready-made parts and merely assemble them, but we know the quality of the workmanship that we put into every detail of our work, and can give the fullest guarantee as to the excellence of the standard of manufacture.

We have made a speciality of really high-class clock cases and dials, and have a large number of original and historically accurate designs for different periods, suitable for country houses, etc.

For the Factory, the Schoolroom and the Office, we make a substantial but quite simple pattern of clock, and we extend a hearty invitation to all who are interested in Electric Clocks to pay a visit to our workshops and inspect the details of our manufactures.

SEPTEMBER, 1919.

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GENERAL DESCRIPTION OF ELECTRIC CLOCK SYSTEMS.

(With special diagrams illustrating older types of Electric Clocks.)

TH**E**RE is no establishment, whether it be a factory, an office, hotel, public building, or private house, where **P**ER**F**E**C**T **U**N**I**F**O**R**M**ITY **O**F **T**I**M**E **O**N **E**V**E**R**Y** **C**L**O**C**K** in the place would not be an immense boon. This uniformity of time can never be attained by the use of separate independent mechanical clocks. The only method of providing uniformity of time is an electric clock system in which one "Master" clock controls all the clock faces of the establishment.

which are merely indicators of the time kept by the "Master" clock. An Electric Clock System consists, therefore, of one "Master" clock and as many subordinate "Receiving" clocks as are required in the establishment.

The advantages of this system of ABSOLUTELY UNIFORM TIME INDICATING are particularly apparent for large Works, Railways, Hotels, Schools, &c., &c.

In an electrical clock system each dial has an electric

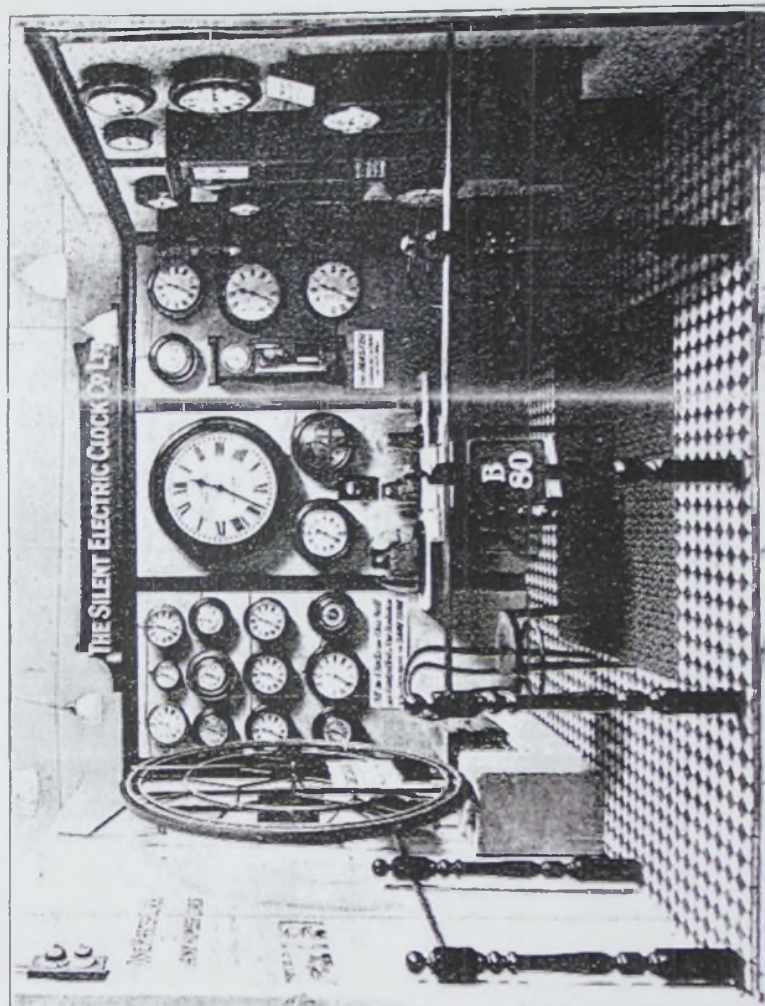
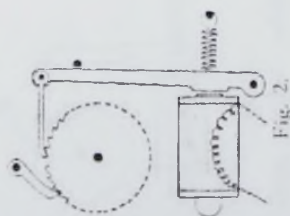


Fig. 1. Our Stand at the British Industries Fair of 1915, held at the Agricultural Hall.

General Description of Electric Clock Systems (continued).

action, which moves forward the hands at intervals sufficiently frequent—generally half-minutes. These electric dials are connected momentarily by a "Master" clock to a battery, and thus THE ONE "MASTER" CLOCK SHOWS ITS TIME ON AN UNLIMITED

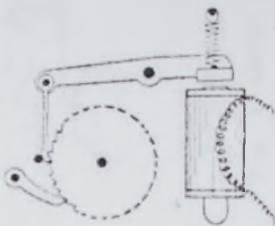


NUMBER OF SECONDARY DIALS, and winding and individual regulation are abolished.

About fifty years ago the first such system was attempted. In those days progress was handicapped by

lack of a suitable battery, but, quite apart from this, the earlier forms of electro-magnetic mechanisms were too crude—in fact, were fundamentally unworthy to supersede the steady-going clock.

The following brief summary describes various older designs of 'receiving



mechanisms, now superseded by the "Silectock" system.

Fig. 2 might almost be taken for an allegorical electric clock, but it is, nevertheless, a faithful representation of a style of dial movement that was seriously attempted

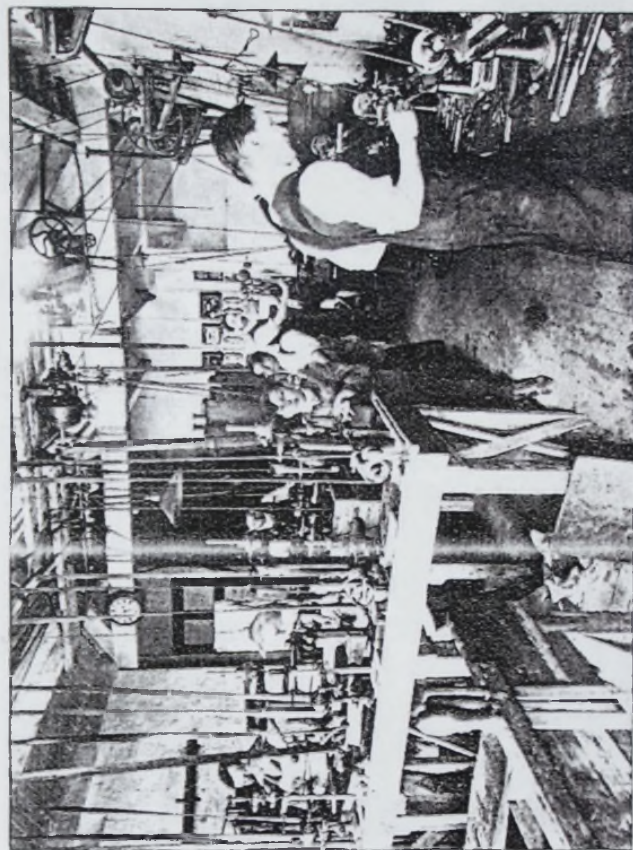


Fig. 4. View of a Machine-shop at our Works.

General Description of Electric Clock Systems (continued).

by quite a large number of designers, and was patented very many times over. The ratchet wheel is intended to be progressed one tooth at a time when ever the electro-magnet is energised. Some forms had a spring added over the retaining click, while others had a fixed

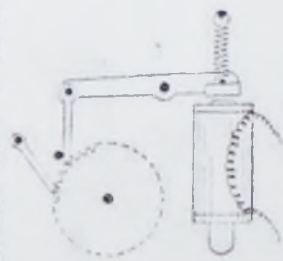


Fig. 5.

stop, under which the nose of the driving click came to rest at the end of its feeding travel.

Now, one admirable feature of the ordinary "old-fashioned clock" is that its parts are free from *violent blows*. The fall of the 'scape wheel teeth upon the

pallets is the worst offence, but the gentleness of these blows is very marked when compared with those delivered by the parts of a ratchet-actuated electric dial movement. Such parts should not exist. They have to hammer against themselves over a million times a year!

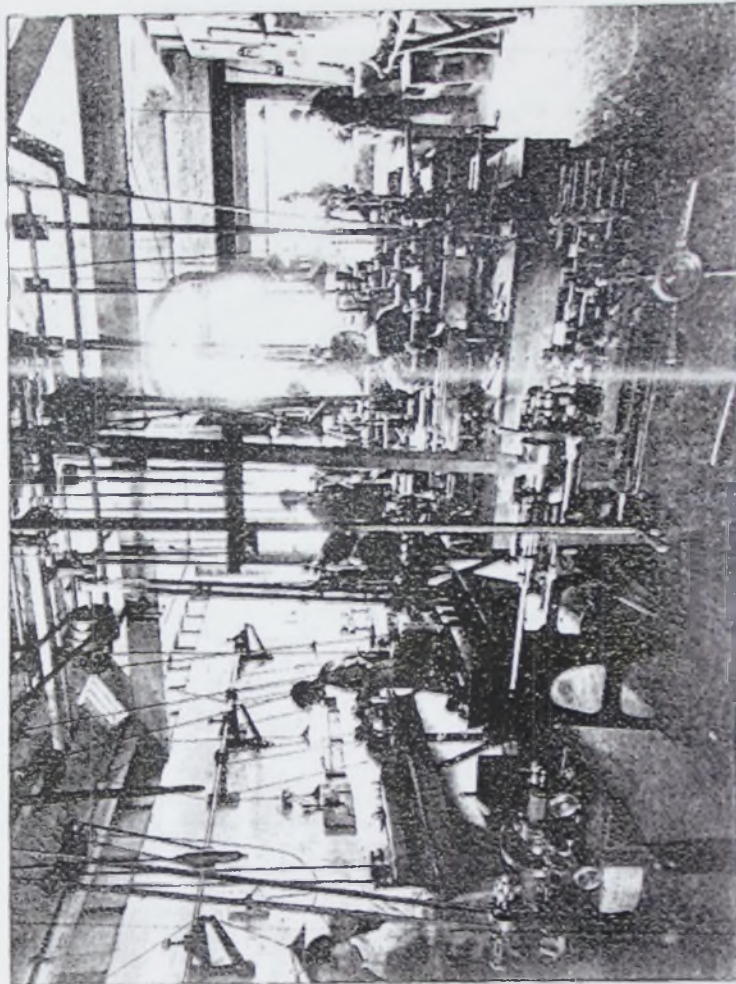


Fig. 7. Another View of a Machine-shop at our Works.

spring drives the hands. In this form it will be noticed that normally the wheel is locked.



Fig. 6.

Fig. 3 shows a form of later date. In this the severity of the blow is lessened because the magnet withdraws the driving click, and upon release the

General Description of Electric Clock Systems (continued).

Fig. 5 is similar, but has the click driving at about 45 deg. to the circumference of the wheel, thus allowing of a slightly easier action in unlocking.

Fig. 6 illustrates another class in which the wheel is fed forward by pallets acting on the inclined surfaces of

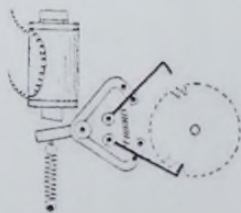


Fig. 8.

the teeth. This has the advantage that "over-shooting" is not possible; but unless means are also added to prevent recoil, it is possible for progression sometimes to be omitted because the one pallet leaves the wheel before

the other can enter. Fig. 8 shows a modification in which this is avoided, at, however, the expense of simplicity.

Another style is shown by Fig. 9. Here the magnet's pull performs the work of moving the hands, the motion for turning the wheel being derived from

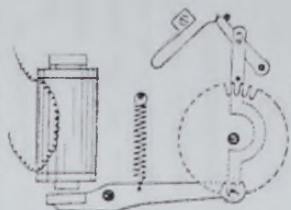


Fig. 9.

the radius rod; and the pallets do not both leave the wheel at once.

The foregoing six are very fairly representative of the great number of electric dial movements, which may well be termed "pick-up-one-tooth-at-a-time" mechanisms.

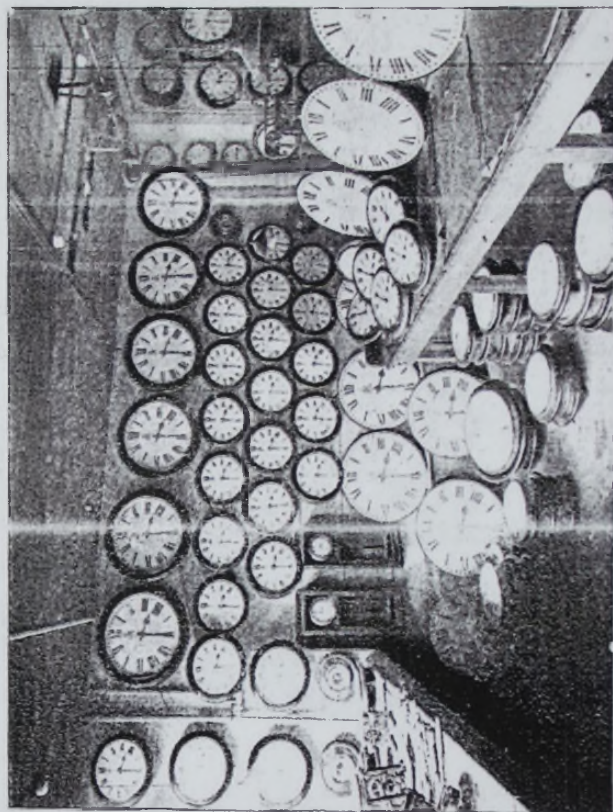


Fig. 10. A View of G. P. O. Clocks in our Testing Room.

number of electric dial movements, which may well be termed "pick-up-one-tooth-at-a-time" mechanisms.

General Description of Electric Clock Systems (continued).

Fig. 11 shows another action upon quite different lines. The magnet imparts a sharp blow to an unevenly balanced flywheel, which consequently proceeds forward about three-quarters of a turn, and when the armature is released the other quarter-turn is produced by reason of the out-of-balance nature of the flywheel. Pins placed in the side of the wheel act in

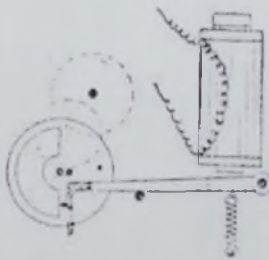


Fig. 11.

combination with the formation of the end of the armature lever as an escapement to prevent more than one turn of the wheel on each occasion, the weakest point of the movement being that the wheel has most of its journey to accomplish on momentum only.

All these dial movements are necessarily very noisy, and whilst quite admitting that there are many places where clocks must be, and where noise *per se* is not an evil, yet the fact remains that the noise merely signifies that the vital parts of the mechanisms are suffering by being sharply knocked against each other. Silent action, therefore, is a desideratum, and has been sought by some designers by the mere addition of pads of soft and perishable material to the working parts.

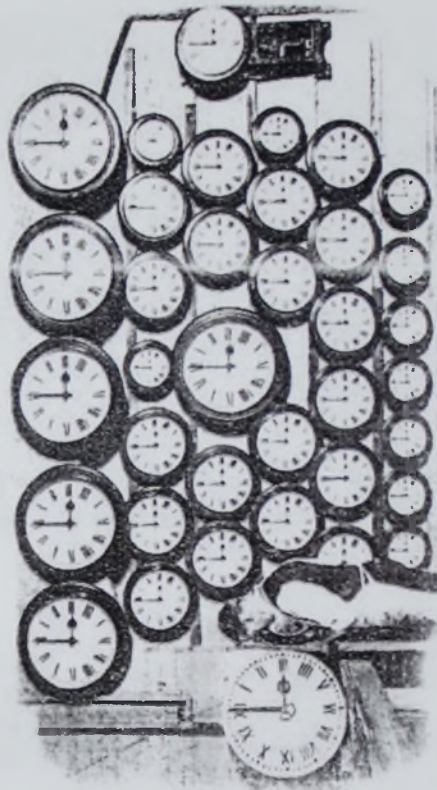


Fig. 12.
Clocks for H.M. Home Office being tested in our Works.

The invention of the "SILECTOCK" silent "Receiving" mechanism (Patents by G. B. Bowell of 1905, 1909 and 1911) marks, therefore, a very real advance in the history of Electric Clocks. Full descriptions and illustrations of the "SILECTOCK" mechanisms now follow.

SPECIAL DESCRIPTION OF THE "SILECTOCK" SYSTEM.

WHILE all electric clock systems claim the advantage of uniform time over an equipment of independent mechanical clocks, it is highly important to bear in mind that the success of an electric clock system depends upon the SOUNDNESS of the MECHANISMS and their freedom from possible failure in action.

The "Silectock" System of Electric Clocks is in many essential points very different to any other system offered to the public. The principal difference is in the patented mechanisms (Patents by G. B. Bowell, of 1905, 1909 and 1911) that actuate the hands of each subordinate "Receiving" Clock.

Our "rotary armature" principle is an enormous advance on any previous method, and as an electric clock only moves its hands *at each half minute*, it is most important that this movement should be *quiet in action*.

The "Silectock" "rotary armature" method has solved this problem in an ingenious but exceedingly simple manner, a full description of which is given on page 15.

Apart from the design of clock mechanisms, a very important point is the method of their manufacture. The "Silectock" Electric Clock Mechanisms are manufactured entirely in this country at our own works, and every

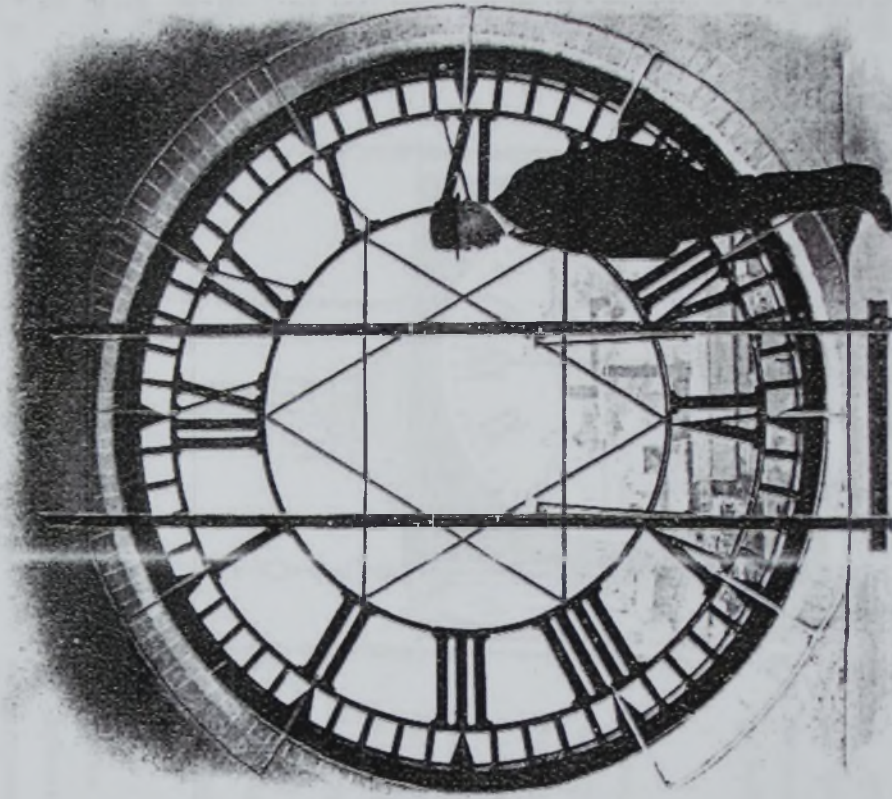


Fig. 13.
View through one of the 10-ft. Dials of the Hovis Clock.

Special Description of the "Silectock" System (*continued*).

part has been most carefully standardised to the smallest detail. This has not only brought their price to a very moderate level but has vastly improved their efficiency.

We have at various times exhibited our system at large and important exhibitions. In 1913, a year before the War, we exhibited the system at the Ghent International Exhibition, where we were awarded a gold medal, and Fig. 14 illustrates the handsome four-faced hanging clock which occupied the centre of the British Post Office stand at the Ghent Exhibition, and which was controlled as one of the clocks in our circuit.

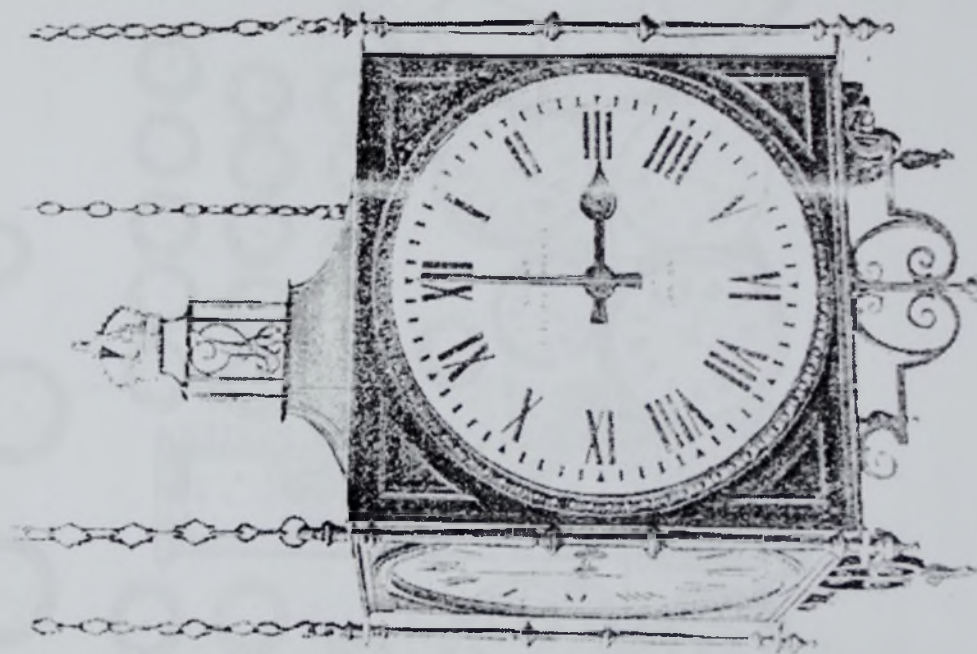


Fig. 14.

remaining clocks are of various standard patterns for ordinary indoor use. In this installation, the circuit of "Receiving" clocks was divided into two parallel circuits, in each of which was placed a special sliding resistance and milliamperemeter (seen on the left hand of the illustration) in order to balance equally the resistance of each circuit.

For export, our mechanisms stand univalled—this because of the soundness of the invention combined with the care taken in their manufacture.

At all times we welcome visits to our Workshops, and are proud to show every detail of manufacture to those who appreciate sound engineering construction. An hour spent in personal observation is better than unlimited description.

Fig. 15 is a typical example of an Overseas order. In this illustration will be seen the Control Clock, a 5-ft. outside tower clock, built of wrought iron and glazed opal, and fitted with one of our heavy worm-driven turret mechanisms. The

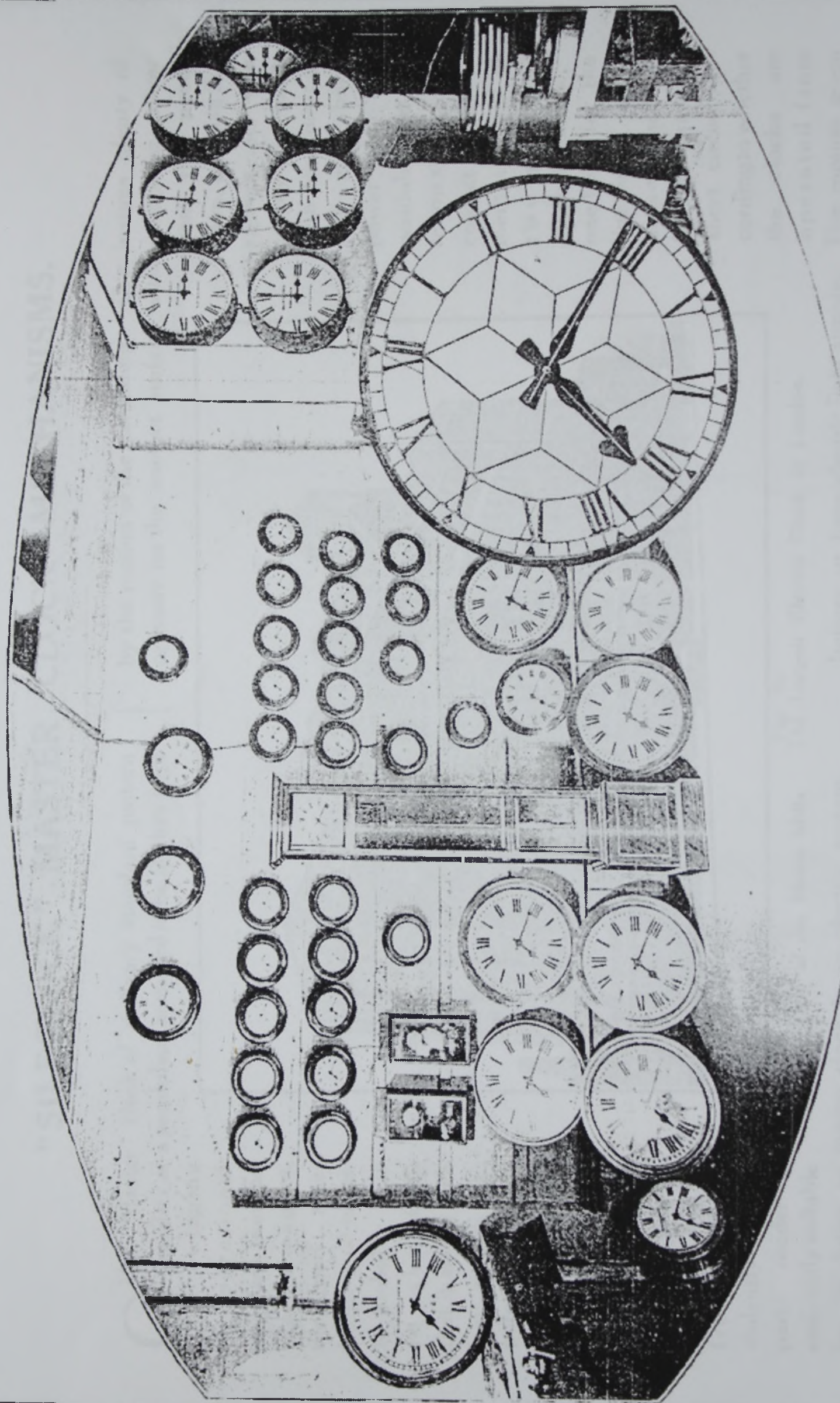


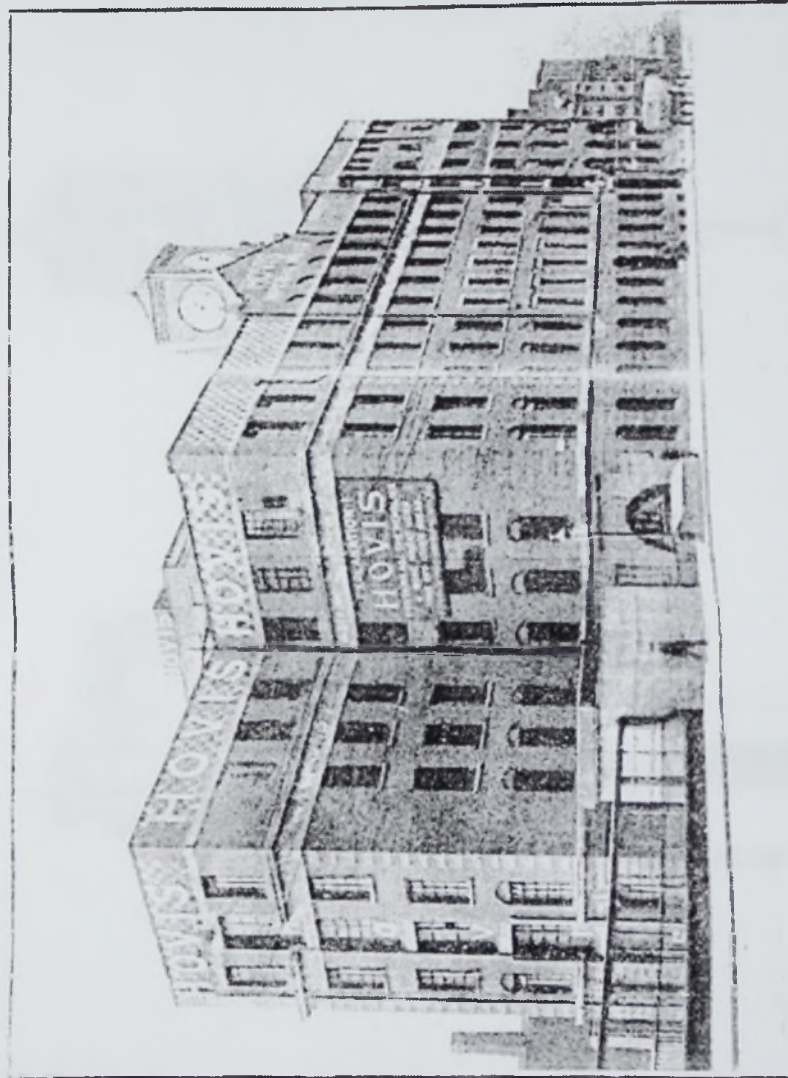
Fig 15
Installation supplied to the Central Argentine Railway, on test at our Works.

"SILECTOCK" MASTER CLOCK MECHANISMS.

OUR "Master" clock of ordinary standard pattern consists of a pendulum arranged to be always kept swinging by occasional impulses from an electro magnet, the good time-keeping of which is probably due to the fact that it works with just enough impulse to maintain a predetermined arc, while its practical immunity against stoppage, its perfect simplicity, and its freedom from violently-moved parts render it eminently suitable for its duties as master clock in an electric system.

The pendulum rotates a count-wheel which at each half-minute allows a set of contact springs to be deflected

by the motion of the pendulum. This insures plenty of pressure on the contact surface without robbing power from the pendulum, because the springs act like gravity arms (only with less inertia) and give back power to the pendulum on the return swing. The contact arrangement consists of two pairs of platinum points—one being for the line circuit to the dials and the other for the shunt or short circuit, according to whether the clocks are operated from battery or from electric light supply. The motion given to the contact springs in conjunction with this method of cutting out the shunt, except for the instant prior to



View of the Hovis Mills

Fig. 16.
The Largest Electric Clock in London.

by the motion of the pendulum. This insures plenty of pressure on the contact surface without robbing power from the pendulum, because the springs act like gravity arms (only with less inertia) and give back power to the pendulum on the return swing. The contact arrangement consists of two pairs of platinum points—one being for the line circuit to the dials and the other for the shunt or short circuit, according to whether the clocks are operated from battery or from electric light supply. The motion given to the contact springs in conjunction with this method of cutting out the shunt, except for the instant prior to

"Silectock" Master Clock Mechanisms (continued).

breaking the circuit, results in sparkless action.

We manufacture two separate designs of standard

"Master" clock mechanisms, one being fitted with a short pendulum beating exactly half a second, and thus usually termed a "half-seconds 'Master' clock," and the other with a long pendulum beating exactly full seconds and termed a "seconds 'Master' clock."

Fig. 17 shows the complete pendulum and count-wheel action for a half-seconds "Master" clock. It is built with an accurately machined cast-iron base to which the various parts are secured. Jewelled pivots are provided and all steel parts are hardened and polished. The pendulum bob is a handsomely polished

brass cylinder filled with lead and the rod is made of steel in tubular form. The time-keeping of these small

half-seconds "Master" clocks is marvellously accurate, and their mechanism is so simple as to render them easily erected by those who have never handled electric clocks before. The pendulum rod can, of course, be supplied in special steel with negligible coefficient of expansion if required.

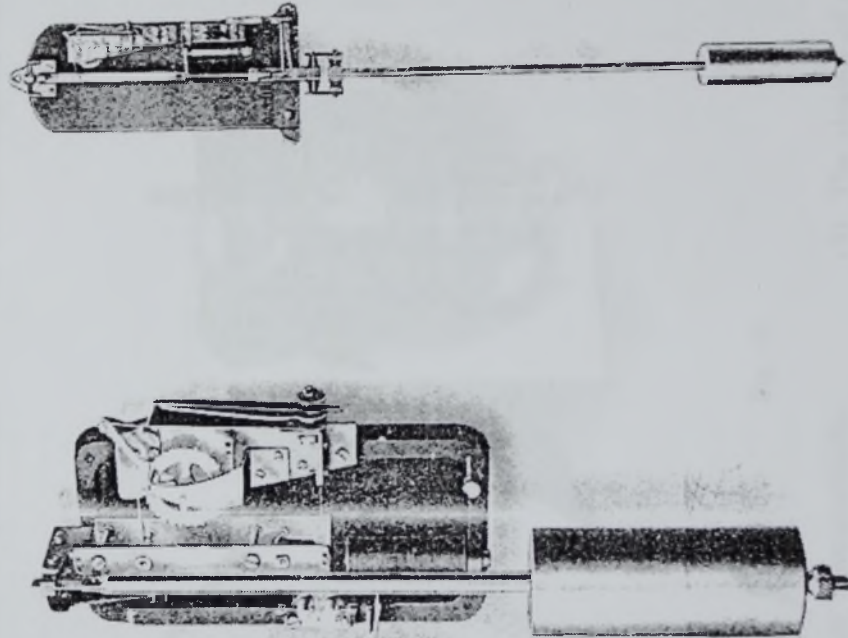


Fig. 17.

Fig. 18.

Fig. 18 illustrates the longer pendulum of the full-seconds clock. In this instance, also, the mechanism is built on an accurately machined cast-iron base, and the finish of the workmanship is of the very finest quality throughout.

“SILECTOCK” RECEIVING CLOCK MECHANISMS.

HITHERTO, the electro-magnetic mechanism behind each “Receiving” clock of an electric clock system has consisted briefly of a “ratchet wheel” operated by steel claws moved at each half-minute by an electro-magnet; but our system—the outcome of many years careful study of the subject—is based upon an entirely different plan. The steel claws and other oscillating parts are abolished, and in their place reign (1) a simple train of wheels whose sole function is to transmit the proper advance to the hour and minute hands, and (2) the “rotary armature” and its appertaining electro-magnetic parts.

Fig. 19 shows a general view of our No. 1 Standard Silent “Receiving” mechanism. The armature is mounted so as to rotate freely inside a circle of four pole pieces. Two of these are magnetically connected to a permanent magnet, whilst the other

two are similarly connected to an electro-magnet. At each half-minute, when the current is sent through the electro-magnet, the armature takes a new position—a quarter of a turn forward—and directly the current ceases, is pulled forward another quarter of a turn and is held there securely locked by the permanent magnet.

The simplicity of this action, and the consequent *trustworthiness of the complete dial mechanism*, will be clearly shown by the following facts:—

(1) Either magnet can impart a positive forward motion for over a third of a revolution, though neither, under any circumstances, is called upon to do so for more than a quarter of a revolution.

(2) In all its positions, the armature is securely locked magnetically.

(3) The design of even the smallest detail, and the quality of the finished article throughout, are such as to

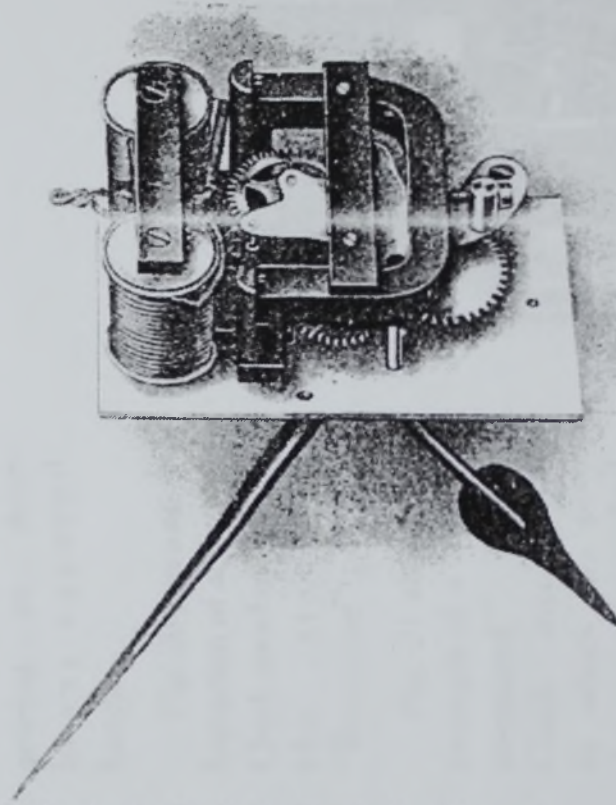


Fig. 19.

"Silectock" Receiving Clock Mechanisms (continued).

ensure the perfect performance of every movement we turn out.

We make *five different standard sizes* of "Receiving" mechanisms, and for large outside clocks the mechanisms are constructed with special worm gearing to drive heavy exposed hands.

Fig. 20 gives an illustration of a Tower Clock mechanism, of the standard "Receiving" pattern.

Fig. 21 shows an example of a "Self-contained" Tower Clock mechanism, in which the pendulum is attached to the dial. For Small Tower Clocks with accessible clock chambers, this is frequently a convenience.

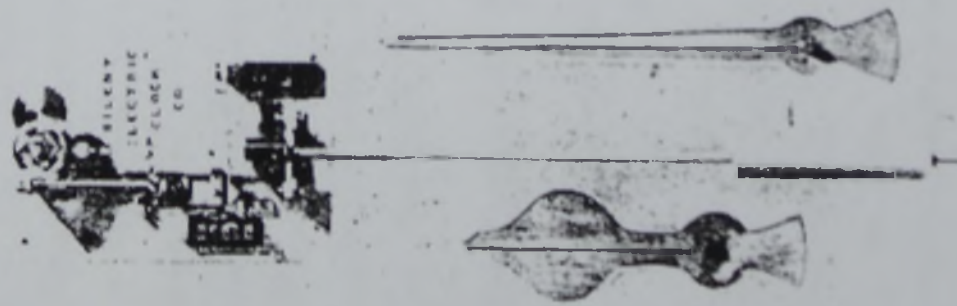


Fig. 21.

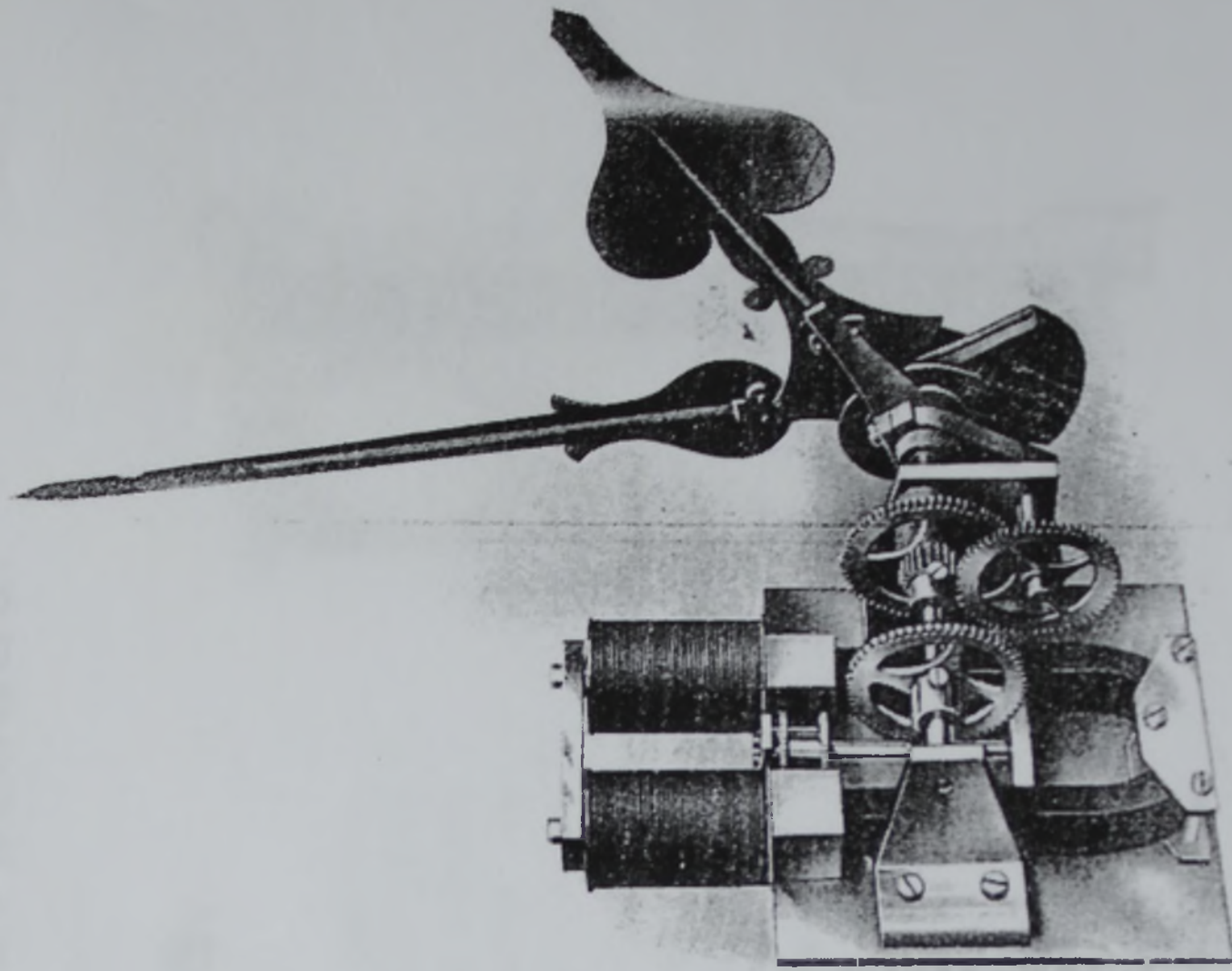


Fig. 20.

DESCRIPTIVE CATALOGUE.

MASTER CLOCKS.

ONLY one "Master" clock is required to control an installation. The pendulum mechanism, as already described on pages 13 and 14, is made in two standards, (a) the "short" pendulum, swinging half seconds, and (b) the "long" pendulum, swinging full seconds. As our "Master" clocks are *quiet in action*, they are a pleasing adjunct to a private office in the factory, or in a living room at home. Consequently we have always made a speciality of *high-class case work*, worthy of containing the substantial and accurately built "Master" clock mechanism.

Standard Half-Seconds Pendulums.

The neatest and most compact electric "Master" clock ever manufactured. The outside dimensions of the cases are 2 ft. 6 in. in length, by 12 in. wide, and 6 in deep. The dial fitted is about 5 in. diameter, and the general appearance is as shown by Fig. 22. This style "Master" can be thoroughly recommended as an excellent time keeper, and has been used in large numbers by H.M. Post Office for controlling large and important installations in Postal Buildings. Easily set up and simple in action, this pattern is specially recommended for export use.

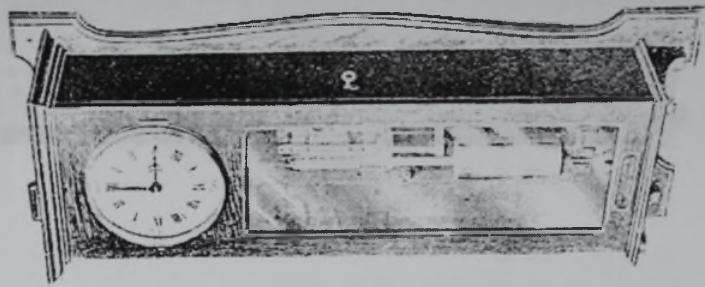


Fig. 22.

Master Clocks (continued).

- CODE H.2. Standard Half-seconds "Master," in oak case, with 4½ in. dial, solid bezel.
- H.3. Ditto, in mahogany case, with 6 in. dial, plate glass, hinged bezel.
- H.4. Ditto, in oak case, but fitted with ornamental Old English design ("The Gale") dial.
- H.5. Ditto, in mahogany case.

The above styles are similar to Fig. 22, though we can fit our standard "Half-seconds 'Master' Mechanism" into any pattern casework to suit architectural surroundings, and will always be pleased to submit special designs and estimates for same. Special pendulum rods of steel of negligible coefficient of expansion can be fitted if desired.

[Code "NC" added to any of above Code Numbers.]

Standard Full-Seconds Pendulums.

Our Full-seconds "Master" clocks are perfectly finished, and handsome additions to the furnishing of either the Board Room of a business house or the Hall of a country mansion. The dimensions of the "standard" pattern case are 5 ft. high by 1 ft. 4 in. wide by 9 in. deep. The pendulum mechanism is beautifully finished, mounted on heavy cast-iron base. Special pendulum rods of steel of negligible coefficient of expansion can be fitted if desired.

[Code "NC" added to any Code Numbers.]

- CODE F.1. Standard Full-seconds "Master" clock, with enamelled dial, in oak case.
- F.2. Ditto, in mahogany case.

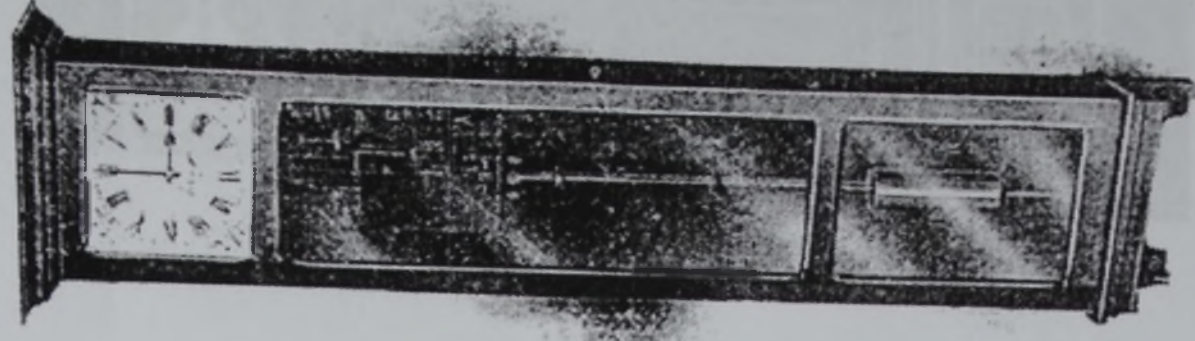


Fig. 23.
The "Standard" Full seconds
"Master" case.

Master Clocks (continued).



Fig. 24.

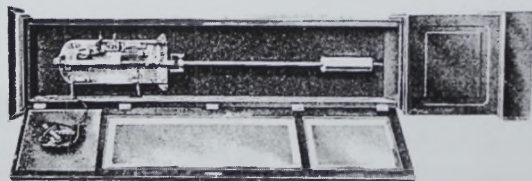


Fig. 25.

The "Standard Pedestal" case in either oak or mahogany.

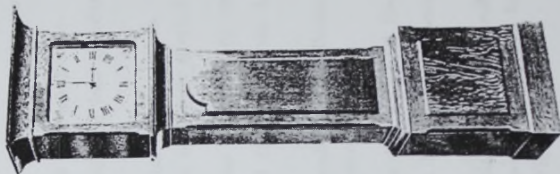


Fig. 26.

A "Standard Grandfather" case in oak.



Fig. 27.

Special design Mahogany Grandfather

Master Clocks (continued).

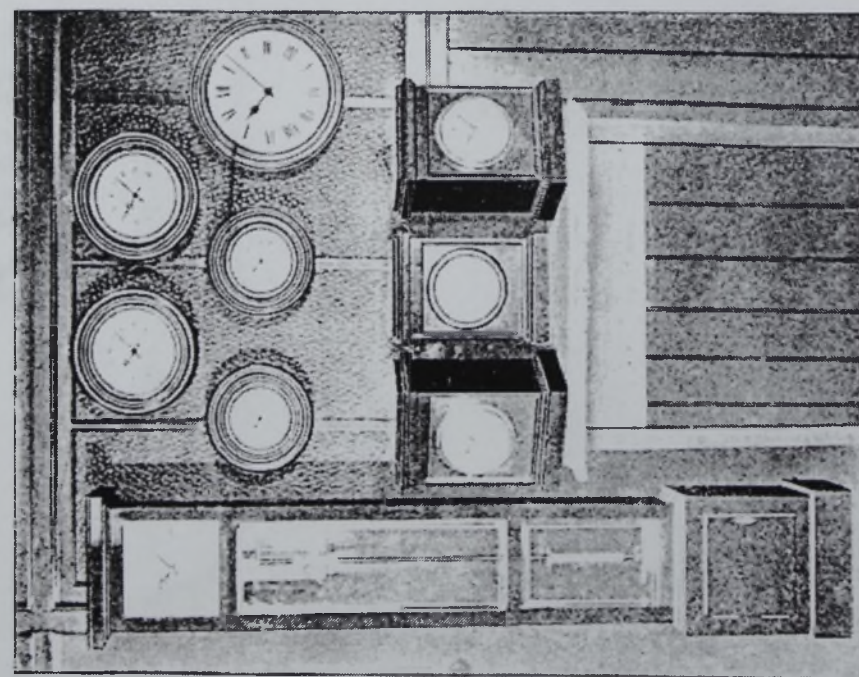


Fig. 28.
"Pedestal" Mahogany Full seconds "Master," with
special dials made for the Hong-Kong
and Shanghai Bank.

CODE F.3. Standard Full-seconds "Master" clock, in oak case,
but with silvered engraved dial.

F.4. Ditto, in mahogany case.

The preceding four standard cases are as Fig. 23.

F.5. "Pedestal" Full-seconds "Master" clock, in oak
case, and with silvered engraved dial.

F.6. Ditto, but in mahogany case.

Figs. 24 and 25 illustrate the above "Pedestal" pattern.

CODE F.G.7. "Standard Grandfather," case in oak, with
enamelled dial.

F.G.8. Ditto, but with Old English style brass dial.

Fig. 26 illustrates the above "Standard Grandfather,"
F.G.9. Special Design "Grandfather," case in mahogany,
with Old English brass dial, as illustrated by
Fig. 27.

As well as above standard pattern cases, we can supply
special designs to any requirements.

RECEIVING CLOCKS.

ANY NUMBER of "Receiving" clocks can be actuated by ONE "Master" clock, and we manufacture a series of "receiving" mechanisms on the "Rotary Armature" patent, for use according to the size of the subordinate clock, whether the latter be a 6 in. mantelpiece clock or a 6 ft. outdoor tower clock.

The dials (or faces) of our clocks comprise an exceptional selection of artistic designs, while the standard Roman figure style as used in our plain clocks is clear and easily read. The "standard" plain dials are enamelled by special process, accurate in every particular, of perfect finish, and will stand any climatic conditions.

Where sizes are given, the figures represent the dial exact diameter *without* the surrounding casework. If the average case be included the sizes are approximately:—

Diameter of Dial, 8 in. 10 in. 12 in. 18 in. 24 in.
Outside Diameter of Case, 11 in. 13 in. 15 in. 23 in. 31 in.

Fig. 29 shows three methods of plain casework. "A" is our "Drum" pattern clock, "B" is the "Standard Backbox" pattern, and "C" is a method of construction with metal backbox, where the clock mechanism is to be let into the wall and the case to lie flat.



Fig. 29.
"B"

Pattern "B" is the simplest and most generally used, and with pattern "A" is always in stock in standard sizes.

"Standard"

Back-box Pattern Clocks

in round cases, either oak or mahogany, fitted bezel and glass and back-boxes, as illustrated by Fig. 30.



Fig. 30

CODE

D.S.1.	Standard 6 in. clock in oak
D.S.1a.	.. 6 in. do. in mahogany
D.S.2.	.. 8 in. do. in oak
D.S.2a.	.. 8 in. do. in mahogany
D.S.3.	.. 10 in. do. in oak
D.S.3a.	.. 10 in. do. in mahogany
D.S.4.	.. 12 in. do. in oak
D.S.4a.	.. 12 in. do. in mahogany
D.S.5.	.. 18 in. do. in oak
D.S.5a.	.. 18 in. do. in mahogany
D.S.6.	.. 24 in. do. in oak
D.S.6a.	.. 24 in. do. in mahogany
D.S.7.	.. 30 in. do. in oak
D.S.7a.	.. 30 in. do. in mahogany

Drum Pattern Clocks

in solid built up drum cases in either oak or mahogany, fitted with bezel and glass and with dial either in minute divisions same as the Standard clock or, if preferred, with dots as shown by illustration (Fig. 31).

CODE

D.D.12.	8 in. Drum in oak
D.D.12a.	8 in. .. mahogany
D.D.13.	10 in. .. oak
D.D.13a.	10 in. .. mahogany
D.D.14.	12 in. .. oak
D.D.14a.	12 in. .. mahogany
D.D.15.	18 in. .. oak
D.D.15a.	18 in. .. mahogany



Fig. 31

Plain Factory Clock

in metal case, fitted with metal removable back-box covering mechanism.

D.F. 24. Fitted with 12 in. dial.

Receiving Clocks (*continued*). SPECIAL DESIGNS.



Fig. 32.
CODE D.31. The "Piccadilly" Dial; a neat little 5 in. dial, with a screwed-on solid brass bezel; similar design to that in use throughout the Piccadilly Hotel, London, where some three hundred dials are installed. "Roman" figures usually preferred.



Fig. 33.
CODE D.32. The "Gale" Dial; a 6 in. convex cream tinted Old English style dial in handsome oak case; the design of the dial taken from an XVIIIth Century watch.

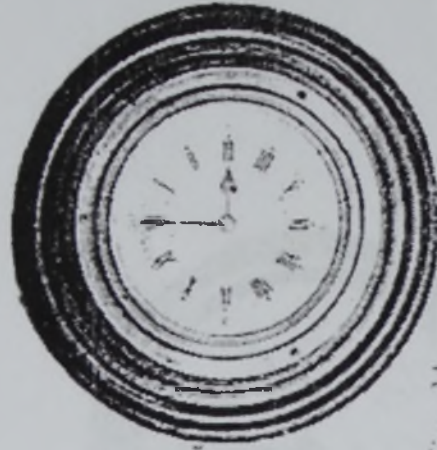


Fig. 34.
CODE D.33. "The Bank" dial; silvered 6 in. dial with screw-on bezel and in substantial oak case. Bezel, heavy oxydised bronze effect.



Fig. 35.
CODE D.34. Special Design; 10 in. dial, "Gale" pattern. Old English style, convex dial and glass. As supplied for use by H.M. Post Office.

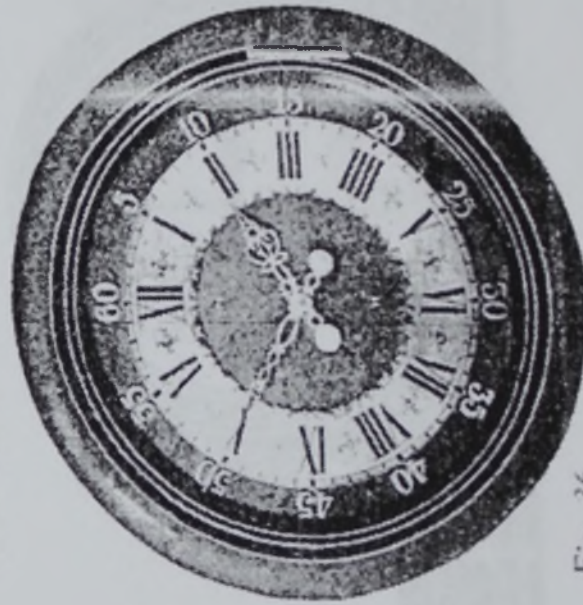


Fig. 36.
CODE D.35. Special French design, silvered engraved centre upon gilt background and raised minute figures with 12 in. face.



Fig. 37.
CODE D.36. Special Design; 6 in. "Gale" dial with satinwood case, hand-painted floral decorations, convex cream-tinted dial and convex glass.

Receiving Clocks. Special Designs (continued).

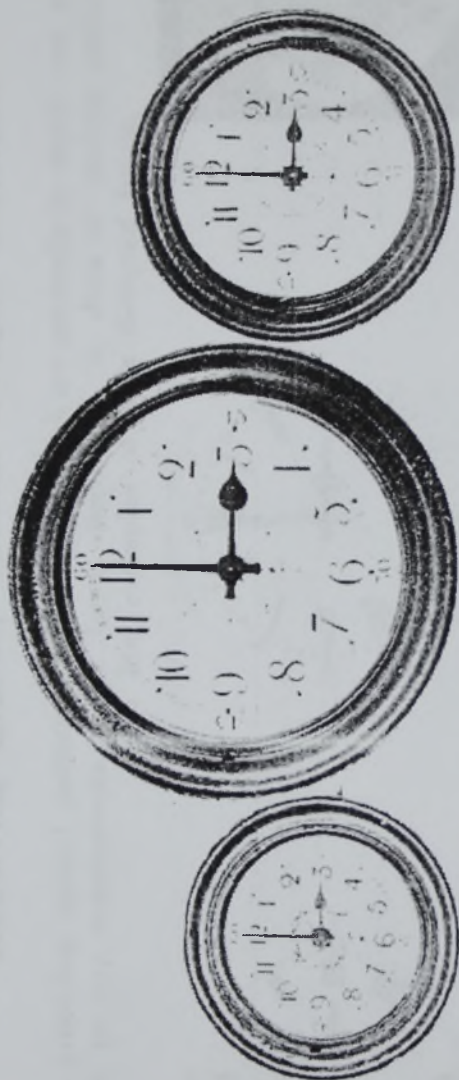


Fig. 38

CODE D.37. Special silvered engraved arabic figure 8 in. dial in oak case
D.38. Ditto, with 10 in. dial. D.39. Ditto, with 14 in. dial.

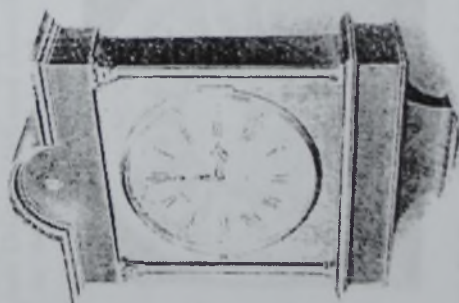


Fig. 39.

CODE D.40. Design similar to D.35, 12 in. dial mounted in hand-dome pedestal mahogany case.

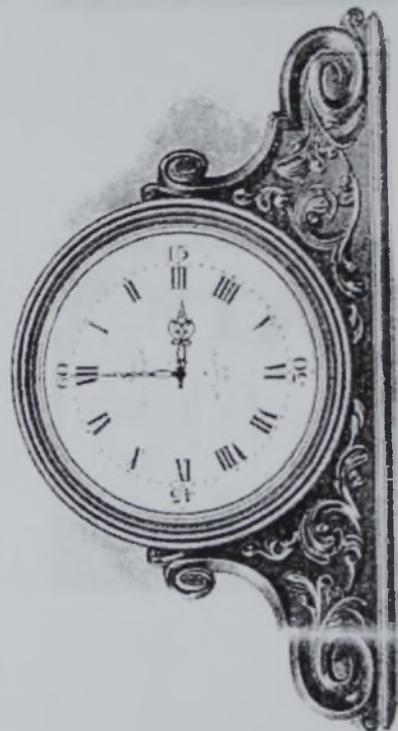


Fig. 41.

CODE D.41. Special design large overmantel clock with 18 in. dial and with solid mahogany pedestal.

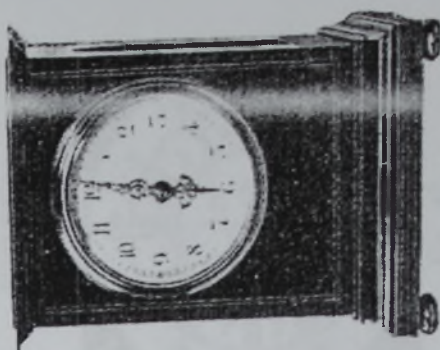


Fig. 42.

CODE D.42. Special small Sheraton mantel clock with 4 in. dial, arabic figures, in oak (D.42) or mahogany (D.42a) hand design.

Receiving Clocks, Special Designs (continued).

In addition to the preceding special patterns—examples of which are generally in stock—we can submit designs of dials and case-work to any requirements. We have specialised in dials of various periods and the following are a few examples of dials designed by us.



Fig. 42.
CODE D.43. As designed for an Old English Dining Hall and should be mounted in dark bronzed bezel.



Fig. 43.
CODE D.44. Special Louis XVI style, and should be surrounded by gold bezel.



Fig. 44.
CODE D.45. Jacobean dial in antique brass style.



Fig. 45.
CODE D.46. Georgian dial in gold finish.

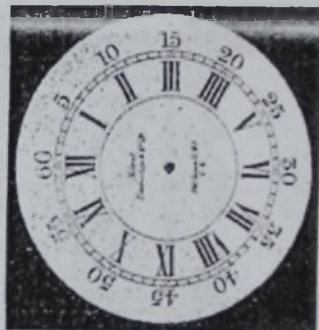


Fig. 46.
CODE D.47. Queen Anne dial, cream enameled face



Fig. 47.
CODE D.48. William and Mary dial, metal with silver finish.

We have a variety of additional special Louis XVI and Old English designs.

ADAPTATION OF EXISTING VALUABLE CLOCK CASES.

OLD and valuable clock cases, with their own old dials and hands, can be fitted with our "Receiving" mechanisms, and thus without in any way impairing their value as works of art they become perfect timekeepers, showing the same time as throughout the rest of the house installation.

A point worthy of special attention is that our "Receiving" mechanisms are actuated *solely* by *electric impulses*, and do NOT contain any fictitious aids (such as back-stops, the action of which depends upon the upright position of the clock)—and consequently a clock fitted with our "SILENCE-TOCK" mechanism will continue

to record its time perfectly even if laid on its side, or even upside down. For mantel clocks this is an important feature.

An old grandfather clock, for instance, can be converted into a combined clock and cigar cabinet—by attaching one of our "Receiving" mechanisms to the dial, and utilising the remainder of the case as a cupboard.

Unless, however, a clock is intrinsically valuable, or possesses personal recollections, it is no economy to utilise its case and dial, since our standard plain pattern clocks are available at moderate cost.

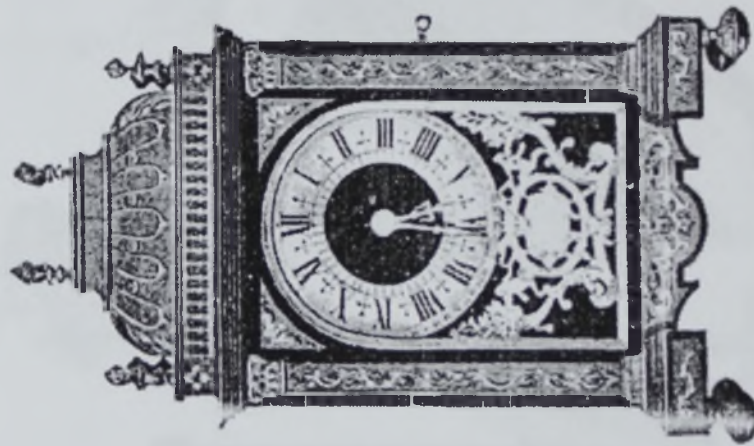


Fig. 48.

Example of fine old inlaid tortoiseshell French Mantel Clock fitted with our "Receiving" mechanism.

Receiving Clocks (*continued*).

TURRET AND OUTDOOR BRACKET CLOCKS.

IT is unnecessary to dilate upon the advantages offered by a large OUTDOOR TOWER CLOCK but its usefulness, whether in a busy Factory, or School, or in the grounds of a country house, is more than doubled when it indicates the SAME TIME as the other clocks installed throughout the premises.

PUNCTUALITY can only be reasonably enforced when the clocks on the premises give UNIFORM TIME.

For ordinary sized outdoor clocks we manufacture three standard patterns of mechanisms.

Our No. 3 is designed for use in clocks with light hands and glass protection over face.

For more substantial clocks, we make two standard sizes of worm-driven heavy Turret mechanisms (similar to illustration on page 16), which are used to drive heavy hands. Glass protection against dirt (or abroad, against sand storms, etc.) may of course be added, but it is not necessary in most instances.

Fig. 50 is an example of a commercial advertising outdoor two-faced bracket clock, glass protection and constructed to a simple bracket design.

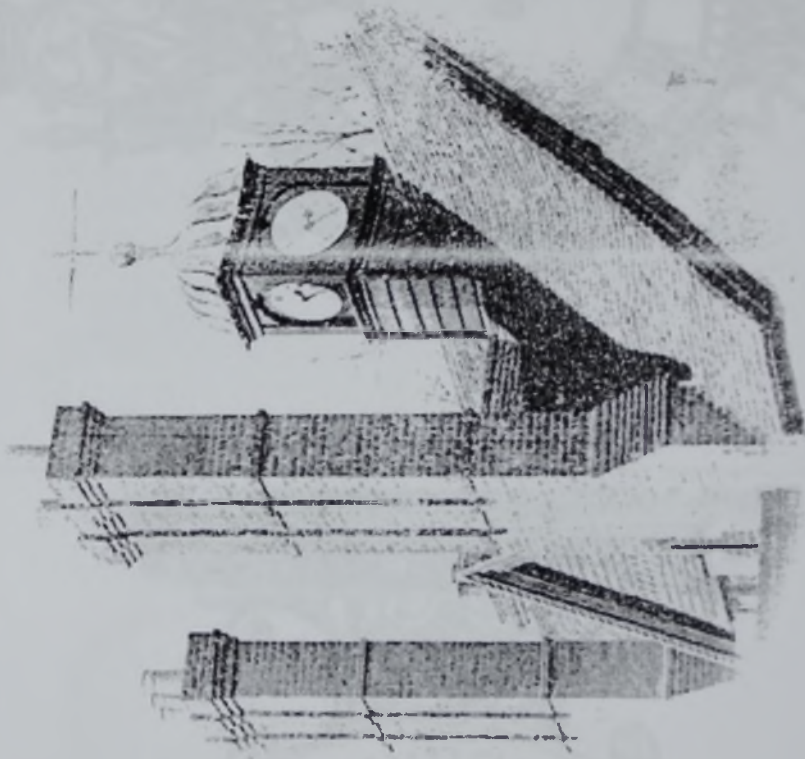


Fig. 49.
An example of a four-faced STABLE CLOCK with light mechanisms and glass protection over the hands.

Receiving Clocks, Turret and Outdoor Bracket Clocks (continued).

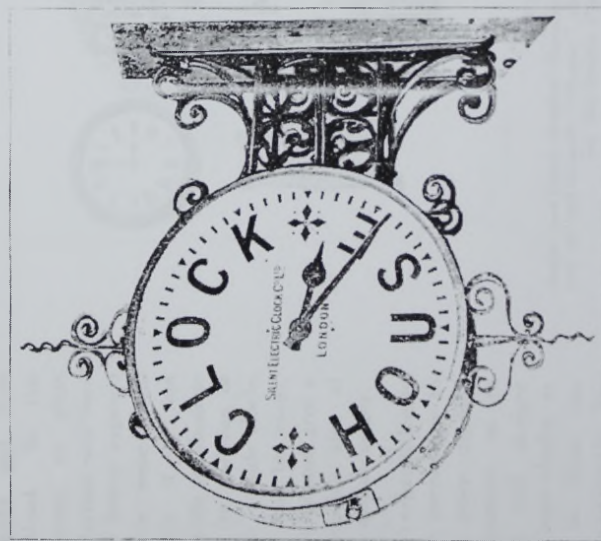


Fig. 50.

Two-faced Clock, 2 ft. 6 in. diameter, Standard Bracket Design.
CODE T.D.13.

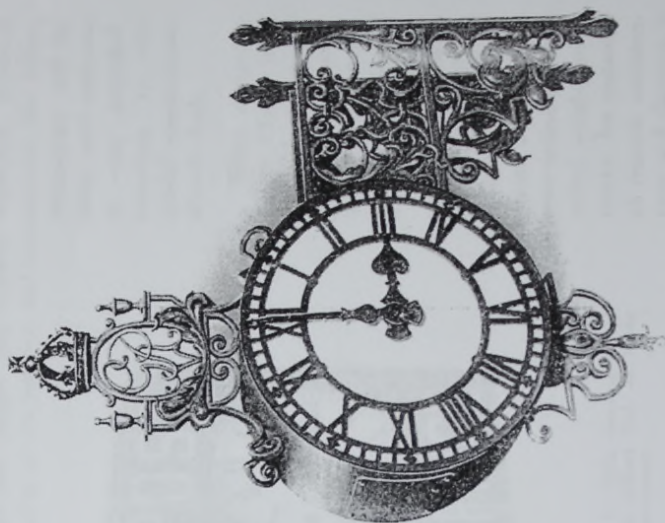


Fig. 51.

Two-faced Clock, 3 ft. diameter, Special Bracket Design.
CODE T.D.14.

Receiving Clocks, Turret and Outdoor Bracket Clocks (continued).

Fig. 51 is a two-faced bracket clock of more elaborate design, as supplied by us to Government Buildings both in Canada and New Zealand. In this instance, no glass protection was used and heavy exposed hands were used. While it is not possible to illustrate all the varieties of large outside clocks that can be made, these photos give a reasonable idea of the various designs.

A separate leaflet is in preparation to give more detailed information as to sizes and designs of large clocks, as far as these can conveniently be standardised. As, however, in practically every instance, the Tower Clock of a building forms part of the special

architectural design, and requires individual attention according to its position and arrangement, the fullest information will be given, and estimate of cost provided, according to the special requirements of each clock.

When designing Tower Clocks it is essential to provide convenient access to the clock mechanisms. While the "SILENTOCK" receiving mechanisms in a Tower Clock possess immense points of advantage over ordinary mechanical weight-driven clocks, for instance, as regards maintenance and cleaning, it

is, nevertheless, necessary to provide for the occasional "brush up" without which no substantial mech-

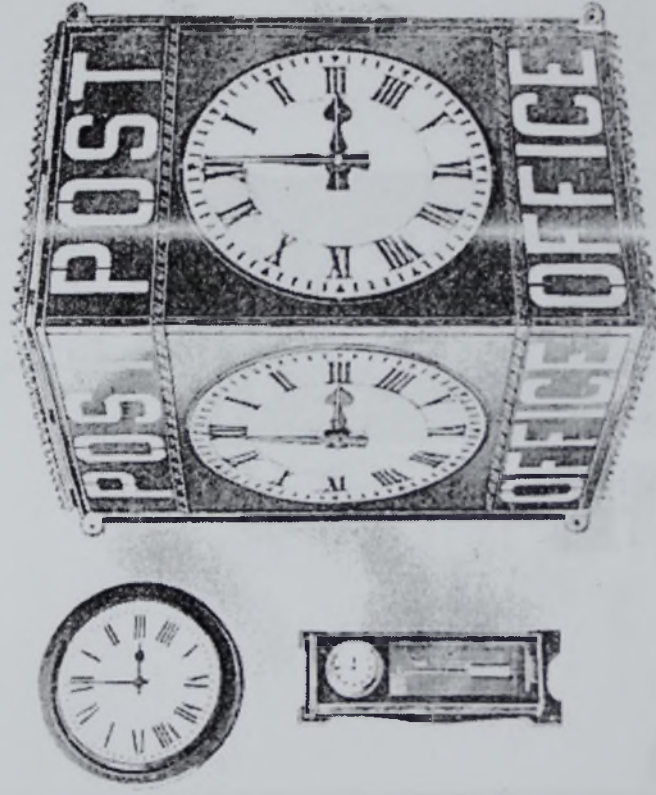


Fig. 52.

Angle two-faced Bracket illuminated Clock, 3 ft. dials, showing actual size of half-seconds "Master" clock and 24 in. indoor dial, as made for the Indian Post Office Department.

Receiving Clocks, Turret and Outdoor Bracket Clocks (continued).

anism can be expected to do its work honestly.

In an Angle-clock, such as is illustrated by Fig. 52 (or as is shown in the Frontispiece, outside our Head Office), it is easy to provide ample access behind the clock.

Fig. 53 illustrates the largest electric clock in London, which, with its four 10 ft. dials, was built by us in 1912, to the special design of Mr. G. B. Bowell.

The dial "Receiving" mechanisms in this big clock are specially designed to automatically synchronise themselves at each hour, while the actual time-keeping is kept by a

"Master" clock several floors below, in a private office.

In every case, our Turret clock mechanisms are so designed that they can be actuated by any of our standard "Master" clocks and in conjunction with any number of smaller indoor clocks. In this manner the big outside clock is no more trouble than the smallest indoor clock. Similarly the Time Recording Clocks in a factory, the Programme Ringer of a school, the striking gear of a public clock, may all be added and can be controlled by the

ONE "MASTER"

CLOCK.

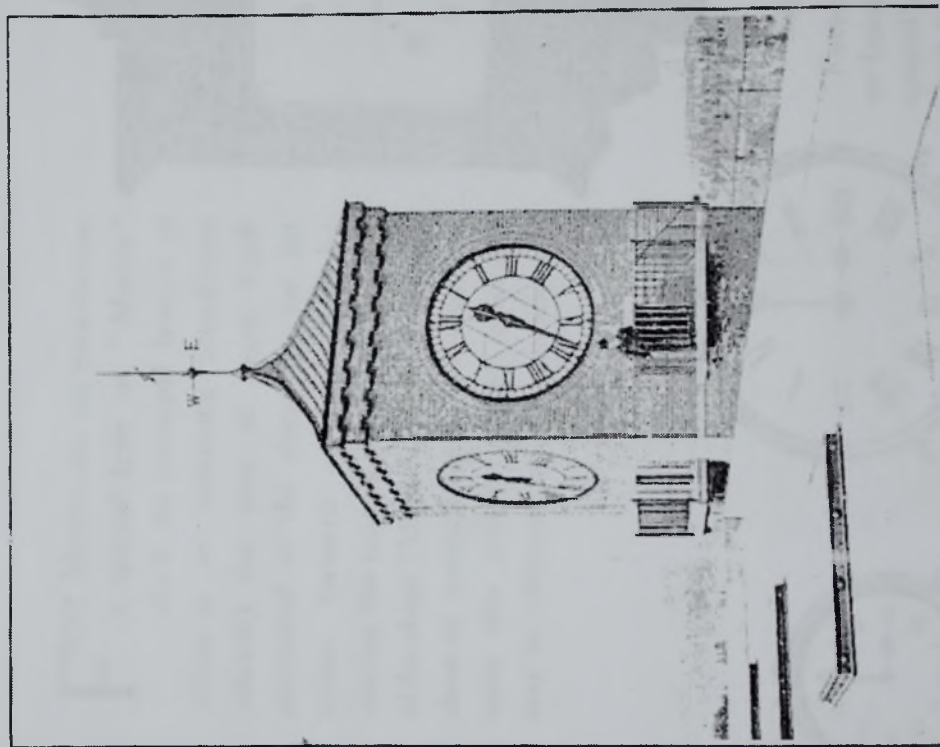


Fig. 53.

SHIPS' MASTER CLOCKS.

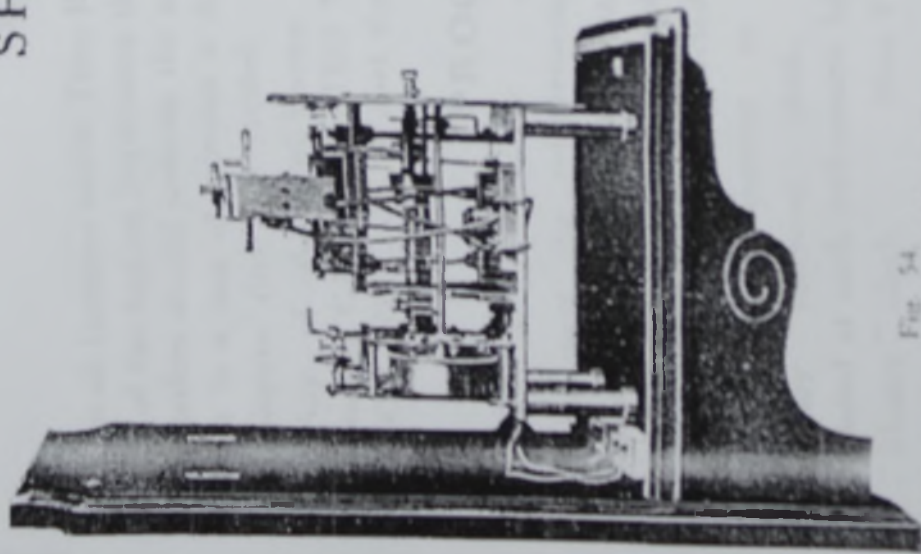


Fig. 54.
Mechanism of Ships' "Master."

As has been already pointed out, our "standard receiving" mechanism is ideally suited for marine use, because the movement of the vessel has no effect upon its action. Hence, any of our

FOR Marine use, we manufacture a special type of "Master" clock, the principal feature of which is an automatic attachment whereby the time of every clock controlled in the ship can be set either forward or backward by altering the time shown by the hands of the ships' "Master" clock. A special sheet of instructions and information upon this patent speciality may be obtained upon application.

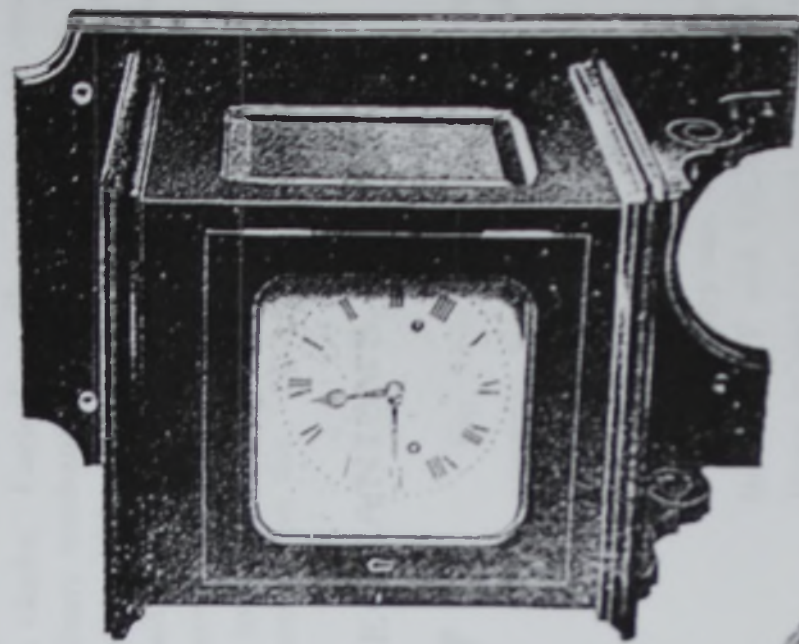


Fig. 55.
Ships' "Master" in case.

"Receiving" clocks can be used on board ship, but we also make a special brass-cased ships' "Receiving" clock in various sizes, of the usual ships' pattern, for attachment to bulkheads.



Fig. 56



WORKMEN'S TIME RECORDERS.

In all factories where Time Recorders are in use, it is of the highest importance that the various Time Recorders should indicate the same time, otherwise there is a loss of minutes a day per head of the employees' time as recorded.

Any of the well-known patterns of Time Recorders CAN BE FITTED WITH OUR ELECTRICAL RELEASE so that the time indicated will

be controlled on the same circuit as the ordinary electric clocks. Each Time Recorder would remain an ordinary mechanical hand-wound apparatus, but its time would be strictly electrically synchronised to agree with that kept by the Electric "Master" clock, thus ensuring a PERFECT UNIFORMITY OF TIME on all cards stamped by any Recorder thus synchronised on the "SILECTOCK" system.

PROGRAMME RINGING MECHANISMS.

To meet the requirements of Schools we manufacture a Programme Ringing Apparatus, which is placed in the circuit and connected up in the same manner as any ordinary receiving clock, and actuated at each half-minute by the "Master" clock. [CON. P.R.1.]

The Programme Ringing Apparatus controls a separate circuit of bells which can be set to ring at pre-determined fixed times throughout the day, and can be altered to suit the differing requirements of different Terms.

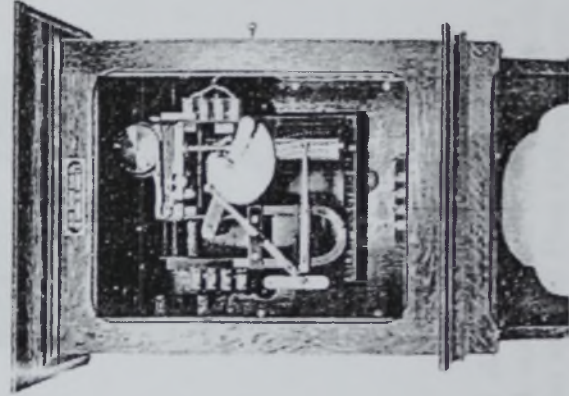


Fig. 57.

Fig. 57 is an example of a special apparatus of this description which was specially designed for an important building abroad.

For Factory use, where the signals (to START and CEASE work) are fewer in number and do not vary, we manufacture a simpler design in which the pre-determined fixed times for the signals remain constant daily—with, as an addition, a cut out for week-ends and holidays.

[CON. P.R.2.]

SPECIAL DESIGNS.

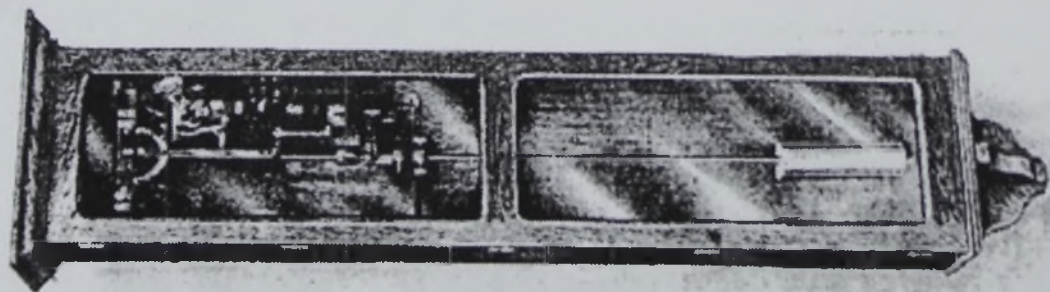


Fig. 58.

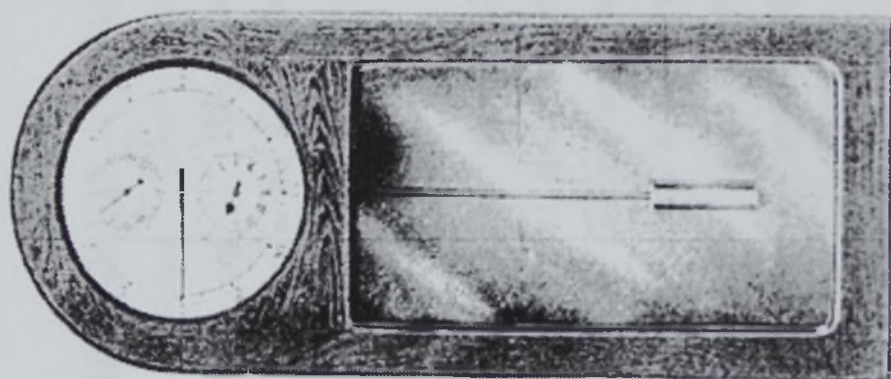


Fig. 59.

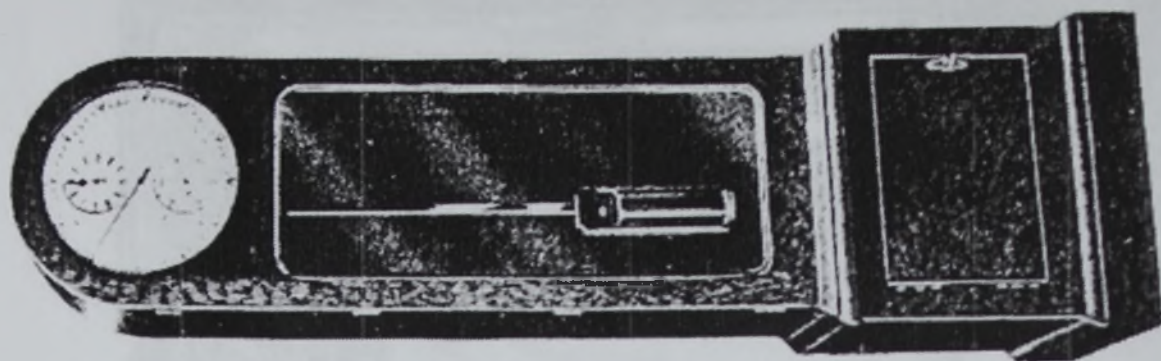


Fig. 60.

We have carried out a large number of special design CLOCKS, among these being the CHRONOPHER CLOCK of the Post Office, which, at St. Martins-le-Grand, controls the entire Greenwich Time Service in this country, and which was built by us in 1912. Fig. 58 illustrates another special Post Office design, a seconds beating clock arranged to record the time upon Trunk Telephone calls. Figs. 59 and 60 are Regulator faced Clocks, the former built for the Aberdeen Town Council to control the big striking clock, and itself synchronised to Greenwich Mean Time. Fig. 60 is an example of Steel and Mercury Pendulum Regulator Clock as made by us for several private houses, where exceptionally accurate time was a study.

SYNCHRONISED MASTER CLOCKS.

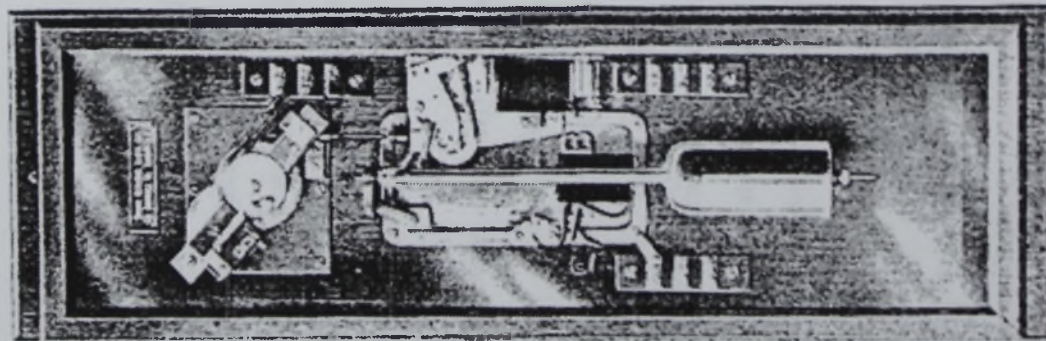


Fig. 61.
The Post Office "Chronophier Control" Clock,
as manufactured by us.

A SYNCHRONISED "Master" clock enables the entire installation of "Receiving" clocks to be kept exactly to Greenwich Mean Time (or summer time), by means of a daily automatic operation.

The Post Office Daily Time Signal is utilised, and the signal thus obtained from the General Post Office acts upon an electro-magnet whose armature is arranged to zero-ise the count-wheel of the "Master" clock by means of a cam action.

The mechanism is carefully designed so that if the "Master" clock be absolutely "on time" at the second when the signal comes through, the latter will not affect the count-wheel at all. Further, to prevent stray signals coming in at

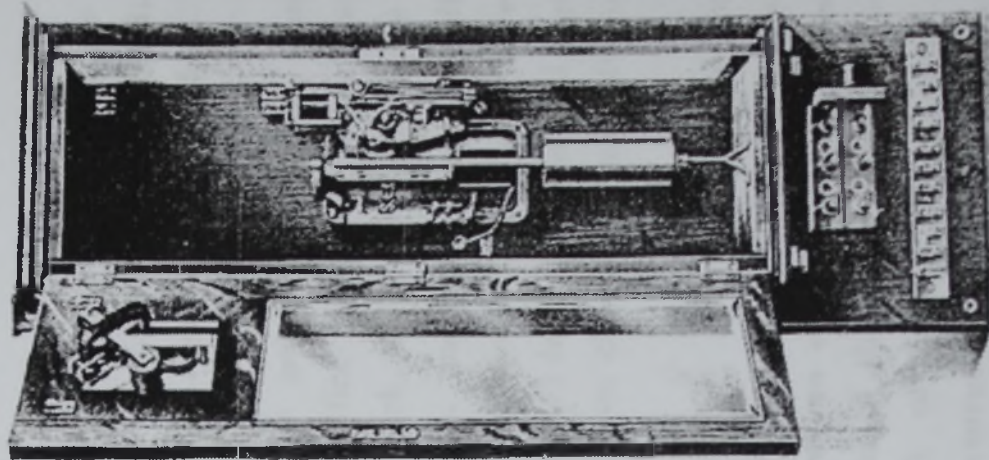


Fig. 62.
Special "Master" Clock, Half-seconds Beat, fitted
with automatic synchronising attachment.

Synchronised Master Clocks (*continued*).

wrong times, a further mechanism can be added, by which the "Master" clock is automatically cut off from receiving the signal except within a space of a minute and a half, during which time the Post Office line is cleared and the signal should appear.

Visitors to our Head Office can see one of these Automatically Synchronised "Master" clocks at work. The clock (illustrated by Fig. 63) controls all our indoor "Receiving" clocks as well as the two large illuminated outside clocks which now for years have been well-known "truthful" public clocks. A truly synchronised "Master" clock means not only UNIFORM but also TRUE TIME throughout the installation.

By a slight modification of the design, a similar "Master" clock can be supplied

suitable for reception of an Hourly signal—such, for instance, as that supplied by the Standard Time Co. in London.

Of other patterns, Fig. 61 illustrates the Post Office Standard Sub-chronometer Control Clock, all of which have been made by us, and which are installed in various provincial Post Offices to receive the daily signal from London and distribute it to their own circuit of local offices.

Fig. 62 is an example of another method of synchronisation, in which the armature of an electro-magnet arrests the progression of the count-wheel for exactly the length of time it has gained since previous correction. In this instance, the clock must be given a "gaining rate," and our standard pattern (Fig. 63) has the advantage in that it synchronises whether the clock be slow or fast.

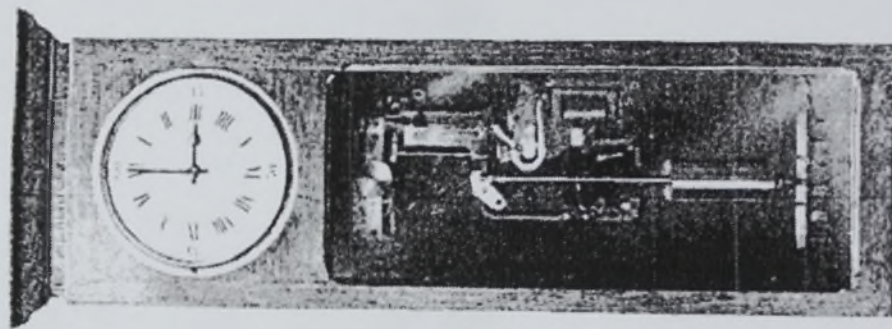


Fig. 63.

Standard Synchronising
Half-seconds "Master"
Clock as used at our Head
Office. CODE H.S. 6

BATTERY WARNING INDICATORS.

ONE of the simplest, and therefore most efficient, forms of Battery Warning devices is as supplied by us in the form of a small milliamperemeter and switch key. This is fitted in the dial circuit to enable a reading to be taken at any half-minute a red line indicating the proper Battery strength (250 milliamps).

CODE B.W.1.

Another standard pattern with *audible* warning, mounted neatly in oak case, complete with bell, is generally preferred. The Indicator is fitted in circuit with the "Receiving" clocks and is arranged so that as soon as the current falls below proper strength, the bell gives a single stroke of warning at each half-minute.

CODE B.W.2.

STRIKING MECHANISMS.

WE have frequently supplied substantial Striking Mechanisms, motor driven but controlled as to time by the "Master" clock of the installation.

Fig. 64 is an example of motor-driven mechanism, arranged for striking the Hours and Ting-Tang Quarters upon large bells, and was supplied to the order of D. Hanbury, Esq.

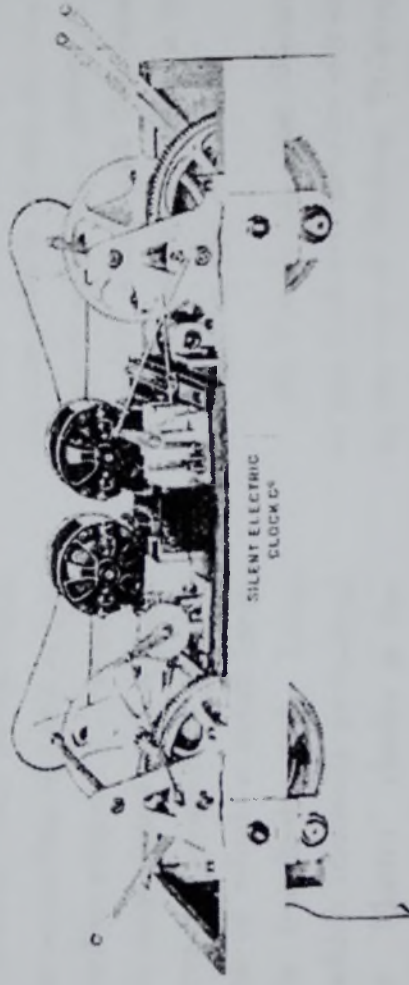


Fig. 64.

For house systems where only an "Hour strike" is required we can make special "Receiving" mech-

anism to control the number of strokes on a gong for each hour. A tubular gong hung in the Hall and controlled by one of these mechanisms will strike the hours, but can be switched off at night if desired.

MUNICIPAL TIME SERVICE.

IN addition to manufacturing apparatus for the simpler classes of Electric Clock installations, we also manufacture and can supply apparatus suitable for use in connection with Public Time Services upon an extensive scale. Such apparatus varies according to local conditions, but we are always pleased to prepare a scheme to suit any conditions when made acquainted with requirements. In general, arrangements are made for a number of distributing centres, at each of which a small (half-seconds) "Master" clock is installed, such being controlled by a main clock, which transmits periodical Synchronising Currents to the "Master" clocks at the distributing centres. This scheme enables the circuits to be so divided as to guard effectually against any risk of breakdown.

The distribution lines are of course metallic circuits, and suitable testing apparatus—together with convenient test boxes located where necessary—facilitate the localisation of line faults. All these accessories are of

Standard pattern and ensure the utmost simplicity of the whole plant.

Apart from the foregoing arrangement of the electrical circuits, which affords the most durable results, it is well to emphasise two points in particular in which our "Master" clock and dial mechanisms are specially suitable for use in connection with a Public Time Service installation, viz. :—

(1) The simple, but effective, magnetic lock and drive in our dial mechanism obviates any risk of failure due to the use of Sliding, Striking, or Spring actuated parts which, in exposed positions where rusting (even to a slight extent) may occur, cannot be considered to be entirely reliable.

(2) Our "Master" clocks, although inexpensive, are provided with contact mechanism which may justly be claimed as far superior to that in any other type of Electric Clock.

The following List gives the names of a number of purchasers of **SILENT ELECTRIC CLOCKS**. It is, however, very incomplete, because a large number of our clocks are sold through well-established Agents. Buyers need only see that the words "**SILENCE PATENT**" are on the face of each clock :

Aberdeen Town House	Chancellor & Son	East Bros.
Adams, William & Co.	Cobb, Munro	Eastman Kodak Co., U.S.A.
Alexandria Post Office, Egypt	Colonio Observatory, Ceylon	Egyptian States Railways, Alexandria Station, &c.
Appleby, E. G., Esq.	Cornish, C. H.	Egyptian Postal Administration
Admiralty	Cox, C. W., Esq.	Electro-Technische Industrie, Holland
Armstrong, Thos. & Bro., Ltd.	Crosswell, H. B., Esq.	
Archer, A. B., Esq.	Crown Agents for the Colonies	
Australian Post Office	Cummed, Laird & Co.	
Agent-General for South Australia	Cox, W., Esq.	Pertier, G. W., Esq.
	Cox & Walkers, Ltd.	Frodsham, Chas. & Co.
	Cash, H. J.	Fullerton, J. (Latour)
Battersea Telephone Exchange	Ceylon Railways	
Baker, A. F., Esq.	Cottingham, R. T.	Germiston Station, South Africa
Bell, Joseph	Cumberland County Council	Gallie, Major
Bexhill Golf Club	Christ's Hospital	Gilbey, W. & A.
Bexley Heath U.D.C.	Claughton, C.	Gilbey, Sir Walter, Bart.
Birmingham Fire Brigade	Cla & Co. (R.A.F. Bank)	Gledhill-Brook Time Recorders, Ltd.
Blackburn, Starling & Co., Ltd.	Carter, Lea, Ltd.	Guld, Sir Charles
Blythe, Mrs.	Clarke, John	Gold, Sir A. G.
Boldero, Mrs.	Chester Asylum	Gowring, G. H., M.A.
Bolton, Thos.		Grant, Sir J. Macpherson
Briscoe & Co. (Agents for Australia)	Dawson's, Ltd.	Great Northern Railway
British Nylon Co.	Davies, E.	Green, Thos. & Co.
Buckmaster, R., Esq.	Davies, F. H. & Co.	Guy's Hospital
Braamfontein Station, South Africa	Davies, Hubert & Co., Ltd. (Agents for South Africa)	Grafton, A., Esq.
Bockett, G. F. & Co.	Deacon & Sons	Gorton Shops, Perez (C.A.R.)
Bogler, C. & Co.	Denny, Wm. & Bro.	
Benton, Thos. & Co.	Dewar, M. B., Esq.	Haberdashers' School
Burrell & Co.	Edzell High School	Harrison, Messrs.
Birmingham Metal & Munitions Co.	E.L. Motor Co., Ltd.	Habury, D., Esq.
Barnes, G. & Co.	Dublin Post Office	Haycock, William
		Headling, L. J. & Co. (Agents for Japan)
Cairo Post Office, Egypt		Heart Hospital
Central Argentine Railway	Earl Grey Schools, Sask., Canada	

Purchasers of Silent Electric Clocks (continued).

Healy & Gresham (Agents for India)
 Helbert, L., Esq., M.A.
 H.M. Prison Commissioners
 H.M. Post Office.—Since 1910 we have supplied several thousands of clocks to this important Department, including The Chronophor Clock (controlling the entire G.M.T. service throughout the country), and all the Sub-Chronophor Clocks distributing official Post Office time.

Holmes, J. H. & Co.
 Hospital for Gentlewomen
 Hong-Kong and Shanghai Bank
 Hois, Ltd.
 Hayward, A. M., Esq.
 H.M.S. "Vernon."
 Harrison & Robinson, Ltd.
 Hawkins, G. T., Ltd.
 Hawkes, O. C., Ltd.

Imperial Japanese Railways
 Indian Telegraph Department

Johannesburg Town Hall, South Africa
 Javeri & Co.
 Jeffries, A. H.
 Jell, G. R., Esq.
 Johns, E. F., Esq., M.A.
 Joyce, J. B. & Co.
 Jackson, J., Ltd.

Kear, Thos., Esq.
 Kobe Club, Japan
 Kilpatrick, J. & Son
 Lambourne, Messrs.
 Lancashire and Yorkshire Railway

Larne Council Schools
 London & South-Western Railway
 Love, A. H., Esq.
 Lewis, Dr. C.
 Leopoldina Railway Co., Brazil
 Leeds P.O.
 Liverpool (Central and Exchange) Telephone Exchanges
 Leach, G., Esq., M.A.
 Leeming Bros.

Macnamara, J. B., Cairo
 Mackenzie, J. W., Esq.
 McNeil, A., Melbourne, Australia
 Manchester Ship Canal
 Manifold Printing Co., Ltd.
 Melville, Dundas & Whitson
 Miller Hospital
 MacHardy, the late Prof. M.
 Moose Jaw Schools, Sask., Canada
 Municipal Power Station, Johannesburg
 Morrison, Messrs. (Valparaiso)
 Muirhead, H. J.

Margate College
 Margate Ladies' College
 Max Minck
 Mackersie, J. & Co.
 Manchester P.O.
 Museum Telephone Exchange
 Mayfair Telephone Exchange

Nicole Neilson
 Newfoundland Post Office
 New Zealand Public Works Department
 National Provident Institution
 National Hospital for Heart
 National Institution for Blind
 National Projectile Factory, Nottingham

Newcastle G.P.O. (Australia)
 New Cordoba Station, C.A.R.
 Orchard, P.
 Oldham P.O.
 Osaka Electric Club, Japan
 Office of Public Works, Dublin
 Parliament Buildings, Regina, Canada
 Peare, W. F., Ltd.
 Piccadilly Hotel (over 300 dials)
 Price, Rev. W. G., M.A.
 Prior, A. V., Esq.
 Parsell, H. V., Esq. (New York)
 Ponders End Munition Works
 Park Royal Munition Works
 Parsons, A. E.
 Paton, Calvert & Co.
 Park Telephone Exchange

Queen's Highcliffe Hotel, Margate
 Queen Alexandra's Hospital for Officers

Rampton Asylum, Notts
 Rashleigh, Dr.
 Regina Schools, Canada
 Ranchi P.O., India
 Rusnoid, Ltd.
 Retiro Terminus, Argentine
 Richards, J. & Co.

Robertson, C. J. ~~✗~~
 Robinson, Captain
 Rimmer's Motor Works
 R.N. Barracks, Portsmouth

Salomons, Sir David, Bart.
 Salmon, A., Esq.
 Siam State Railway