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*Illustrated Catalogue*  
OF  
“MAGNETA”  
ELECTRIC CLOCKS



Recommended (for Government use as being the most perfect apparatus) in a Parliamentary paper in the House of Parliament, New Zealand, after an exhaustive enquiry and survey of equipment, including electric clocks, drawn up for the Rt. Hon. Sir J. G. Ward, P.C., K.C.M.G. (Postmaster General, New Zealand).



A REPRODUCTION OF THE LATE SIR WM. H. PREECE'S  
REPORT IS GIVEN IN FULL ON THE NEXT PAGE.



*Manufactured by*  
The MAGNETA TIME CO.  
LIMITED

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*Monomark :*  
BCM. MAGNETA.

# REPORT

OF THE LATE  
SIR WILLIAM H. PREECE,  
K.C.B., F.R.S.

ALL systems of Time Distribution by Electricity, with which I have had any practical experience, have been dependent on batteries, on intermittent currents, and on the maintenance of clean mechanical contacts. Batteries, however, become exhausted and contact points get dirty. Hence much personal supervision and expert aid are necessary to obtain correct working and secure true time.

The MAGNETA System removes these two weak points. The battery is replaced by an alternator, and the circuit is never broken. There are no sparks and no contact points to get dirty.

The alternator is worked by the mechanical energy of the falling weight of a Master Clock. Every minute this weight falls the fraction of an inch, and by doing so turns the armature of the alternator in a strong magnetic field and generates an electric current, which throbs through the whole circuit and propels simultaneously every minute hand of every secondary clock in the circuit to the next minute. There is no difficulty in doing this through 50 miles of line and working 500 clocks.

Synchronous time is thus provided if the propelling action in each clock is maintained in working order. This is a mere mechanical action which differs from that in existing use and is much simpler.

The system is trustworthy. There is little to maintain and nothing to renew. Occasional lubrication is of course desirable, as it is in common clocks, but the secondary clocks require no winding, setting, or repairs.

I have formed a very high opinion of its practical merits.

(Signed) W. H. PREECE.

*But dost thou love life?  
Then do not squander time,  
For that is the stuff life is made of."*  
Benjamin Franklin.

# ACCURACY

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How many of your clocks are <sup>CHAOTIC?</sup>  
<sup>CORRECT?</sup>

Chaos is merely the absence of order. The completely chaotic state would mean the utter futility of all things, and all things would cease to exist.

We are governed by laws—Newton's Law—Common Law—Conventional Law. It therefore behoves us to utilize these laws to our best advantage, and not to break them. To keep the common law, and to keep the conventional, so that we may refrain from emotional chaos, is in the long run the most profitable of all laws. It is foresight, and to be foresighted is to be systematic, and in being systematic there is profit.

In many a factory, in offices and houses, no two clocks agree

as to time; these clocks are breaking the law, perhaps only a little, but they are verging on the chaotic, and if left alone for as little as seven days, no two clocks would be found to agree.

As far as clocks are concerned, the governing law is inexorable. It is such and such a time and not one fraction of a second before or an infinitesimal part of a second after, and the "Magna" Clocks administer this law inevitably and permanently by having a Master Clock to control and actuate every clock, be it in your office, your house or factory, so that every clock will tell the time precisely always.

*"Time, O my friend, is money!"*

*Time wasted can never conduce to money well managed."*

*Bulwer Lytton, "On the Management of Money."*

Many new standards of excellence have been achieved during the lifetime of most of us. "Time," however, remains unchanged. The hour still contains but sixty minutes, and the minute no more than sixty most precious seconds. All achievement lies in the utilization of time, and it is the manner in which this most valuable of materials (and is it not also capital and labour?) is conserved and invested that brings its reward in dividends of money, in the increase of knowledge, and in the allocation of that rare commodity known as "Spare Time."

Most of us have known the costly consequence of inaccurate time, even when the appointment has been with that everyday and ordinary train—to say nothing of the confusion caused by incorrect Departmental Clocks, some of which are behind and some ahead of actual time.

Time is of vital importance in the undermentioned buildings:

General Post Office, London.  
Central Telegraph Station,  
London.

Avenue Telephone Exchange.  
Paddington District Post  
Office.

South Eastern District Post  
Office.

Northern District Post Office.  
Western District Post Office.  
Returned Letter Office.

Money Order Office.

Studd Street Postal Stores.  
Post Office Savings Bank.

General Post Office, Pretoria.

General Post Office, Auckland.

General Post Office,  
New Zealand.

Radio House (Marconigram  
Station).

Royal Mint

Metropolitan Railway (not  
District), (all London Stations).

**"Magna" is relied on exclusively for time-keeping in these and hundreds of other buildings.**

*"He who gains Time gains everything."*

*Disraeli.*



"Magneta" Master Clock (60 unit), Type "D," in oak or mahogany cabinet, with bevelled plate glass front, capable of actuating sixty 12in. Secondary Clocks, without resort to batteries or any outside source of current whatever.

The type "C" Clock, capable of actuating 35 12in. Clocks, is similar in appearance.

"Magneta" Master Clock (100 unit), Type "F," in oak or mahogany cabinet, with bevelled plate glass front, capable of actuating one hundred 12in. Secondary Clocks, without resort to batteries or any outside source of current whatever.

Clocks of any size can be operated by these Master Clocks, see page 13.

The pendulum of Invar Steel and a Graham Dead Beat Escapement embodied in this apparatus ensure absolutely accurate timekeeping.

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The pendulum of Invar Steel and a Graham Dead Beat Escapement embodied in this apparatus ensure absolutely accurate timekeeping.

*"A penny saved is twopence clear, a pin a day is a groat a year."*  
Benjamin Franklin.

"Magneta" Clock Cases of the modern type are as soundly made as the best constructed by the craftsmen of any period. This old Guild spirit is embodied in our trading policy. By putting forth their very best efforts, these Guilds became both famous and prosperous, and the quality of their productions was such that much of their handiwork is extant to-day.



A special Clock, having a dial consisting of silvered numeral ring with black Roman numerals and fleur-de-lys ornamentation. The centre is of hand pierced and chased metal finished in Dutch brass, with a soft olive green background.



A reproduction in the Louis XV style. The case is of red tortoiseshell with Ormolu enrichments.



An example of modern craftsmanship on Chippendale lines, in rich Spanish mahogany, exquisitely carved.



*An antique bracket clock of inlaid Buhl and hand modelled bronze, fitted with "Magneta" Secondary movement.*

The beauty of mellow age and delicate workmanship, which is the characteristic of many of the clock cases ornamenting fashionable mansions and adorning the rooms of ancient, venerable and famous business houses, banks and insurance companies, is appreciated by everyone in any way connected with this business, and when it is arranged for us to convert such clock cases to "Magneta" control, reverent care is bestowed upon them by skilled hands.



An example of a "Magneta" Master Clock Movement, fitted to an antique grandfather case. Neither the appearance of the case nor its value as a work of art is in any way affected in the process of conversion. Although allied with the product of science and modern progress, it remains a legacy of the past.



*A reproduction by us, copied at a client's request from the original, which is over 200 years old, and in his possession. Every detail is faithfully carried out by expert craftsmen.*



515 Plain

A style specially favoured for private offices and residences. Entirely of metal, plated gold, silver, etc., but most effective when white oxydised. The dial is silvered with black numerals, overall diameter 9½ in.



515 Ornamental

Similar to above, but rendered more ornate, though not extravagantly so, by the addition of modelled leaf enrichment.

We appreciate to the fullest extent the necessity of avoiding incongruous details in otherwise well-conceived schemes of decoration. "If a thing is worth doing, it is worth doing well," though hackneyed, is a verity. The point of this paragraph is that a clock should receive as much consideration as to its form as is necessary to ensure perfect harmony.



A beautiful dial for inserting into a case or panel. This dial consists of a silvered numeral ring with rich blue numerals of unusual yet pleasing form. The centre is of modelled silver with Griffin motif, the background and hands being of blue enamel. The bezel is of hand tooled bronze with head enrichment. Other combinations of colour can be supplied. Overall diameter is only 5 $\frac{3}{8}$  in.



A clock designed by us for a world-famous restaurant.

The figures are of hand cut bronze, gold plated and mounted on a silvered ring. The centre ornament consists of a sunray motif in modelled bronze, gold plated, the outline of which is accentuated by a rich blue enamel background. Hands are also of this colour. The dial is mounted on a delicately proportioned circular tablet which is gilt, the whole fitted in the centre of a large mirrored panel.



This design lends itself to various combinations of colour and finish. The dial of this clock is enamelled a soft rich blue, numerals and hands being of dull silver.

Noted decorators say that "every room should have a clock." It is essential of course that the clock should harmonize but a well chosen clock does more than that, it "vitalizes" a room and furthers the decorative beauty of any chosen scheme. We guarantee every "Period" Clock to be authentic in design, and to be a perfect replica, including the rich deep colour of the rare antique, and to tell the time precisely, always.



A suitable design for Restaurant. The case of white enamel (or coloured, if desired) metal beads and bezel and Louis knot can be gilt bronze, silver oxydized or other finish—the dial can be written Arabic or Roman numerals, and hands can be of an ornamental pattern.



An effective treatment for marble, stone faced or timber panelled walls. The skeleton dial, in hand tooled coinage bronze, is backed with a thin tablet of material similar to wall surface. In some cases these dials are fitted on painted walls and a zinc back plate is fitted to match. A variation is sometimes made by the use of a coloured plate in the centre, the surface behind the numerals being left to match the wall surface.



Standard L8A Wall Clock. A very neat clock for the small room or office. The overall diameter is  $9\frac{1}{2}$  in., and the dial diameter 7 in. The clock is fitted with a polished brass lacquered bezel with a bevelled domed glass, the movement is enclosed in dust-proof box, and terminal connections are easily accessible, but out of sight—a feature of all "Magneta" Clocks.

The standard of construction is of the very highest order. Our wooden cases are made from selected timber, thoroughly seasoned, all joints being tongued, mitred and glued. Every dial is written by hand, and white dials are stove enamelled. Movements are contained in dust-proof brass boxes of heavy gauge material, and all facings are screwed, terminals are so arranged that circuit wires can be connected direct to the clock without the necessity of unsightly spirals of wire, which render neatness impossible.

Our metal cased clocks are water-tight and damp proof, and constructed of heavy gauge zinc. A unique feature of these clocks is that the whole of the exposed portion is in one piece, and the cover glass is embedded in red lead, consequently there is no possibility of moisture penetrating.



Standard 12in. Clock in mahogany or oak case finished as required.

Supplied also with 10in. and 16in. dials. Silvered brass dials can be fitted in place of white enamelled dials, if desired.



Standard metal (zinc) Clock. It is water-tight and damp-proof.

Supplied with 8in., 12in., 16in., and 20in. White Enamelled dials.

It is not the object of this little book to give concrete instances of how Time escapes us, but to bring before you the scientific measurement of time by the means of "Magneta" Clocks.

In hospitals where noiseless working is desirable—works, where the apparatus has to withstand enormous vibration or the effects of corrosive fumes from acids; in streets, for public services, where the clocks are exposed to climatic changes; Central Telegraph Station and Postal Buildings, where extreme accuracy is made a condition of the contract; railways, ocean-going steamers, in fact, under any and all conditions, "Magneta" Clocks have given and give faithful service at a minimum maintenance cost.



L. 8a

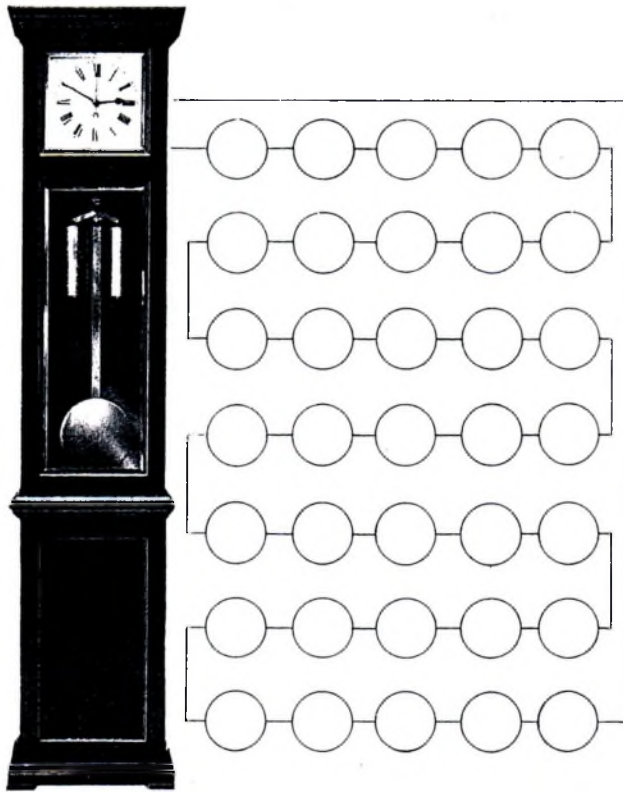
A Mantelpiece Clock for general use. In oak, walnut or mahogany.

Height  $12\frac{1}{2}$  in., width at base 10 in., dial diameter  $5\frac{1}{2}$  in.



L. 12

An exceptionally pleasing clock in natural or stained oak, particularly suited to Tudor decoration—if desired, the dial can be of ebony with inlaid figures of ivory. Dimensions 12 in. wide at base, 13 in. high, dial diameter,  $5\frac{3}{4}$  in.



This diagram shows the complete circuit arrangement for "Magneta" Master Clock (35 Units), Type "C," and 35 Secondary Clocks.

The whole system is entirely self-contained, and the simple series circuit is permanently closed.

The "Magneta" Master Clock, TYPE "C," is capable of actuating 35 UNITS.  
 The "Magneta" Master Clock, TYPE "D," is capable of actuating 60 UNITS.  
 The "Magneta" Master Clock, TYPE "F," is capable of actuating 100 UNITS.

12in. dial diameter Secondary Clocks have 1-UNIT movements.

Over 12in. up to 24in. dial diameter Secondary Clocks have 3-UNIT movements.

Larger dials are supplied fitted with heavier movements.

**There are no Relays, Batteries or other  
 Outside Source of Current or Contacts.**

A short technical description will be found in the following pages.

## The "MAGNETA" ELECTRIC CLOCK SYSTEM

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The "Magneta" Electric Time System differs fundamentally from all other systems, in that no battery or other outside source of current is resorted to, consequently **there are no maintenance expenses.**

The "Magneta" Master Clock is a particularly accurate time-keeper the full seconds pendulum being of Invar Steel and therefore not affected by changes in temperature, and the bob of elliptical form which reduces to a minimum the effects of variation in atmospheric density. The "Magneta" Master Clock incorporates a Graham dead beat escapement, and the pendulum is mechanically maintained by a remontoir spring which has sufficient power to maintain the pendulum for approximately 30 minutes. This spring, however, is re-wound each minute, which results in the arc of the pendulum being kept at a constant amplitude. The pendulum has no additional work such as the operation of count wheels or other devices for periodically making contact in the secondary clock circuit.

The current required to actuate the various Secondary Clocks is generated by the Master Clock itself, and transmitted precisely at the 60th second of each minute, these impulses are always of precisely equal strength and duration. The Master Clock and various Secondary Clocks are wired up in one series circuit, there being no contacts in any part of the whole system. This method has the following advantages, which are unobtainable with any other electric clock system:

There is no current in the circuit at any time between the impulses, consequently, should a short develop on the circuit, no possible damage through fire can occur, as the current generated by the "Magneta" Master Clock, while providing a margin of safety not less than 100 per cent., is so minute that it is impossible to produce a spark. With battery driven systems short circuits may result in the coils in the movements being burnt out and also the battery being entirely run down, involving considerable additional maintenance expenses.

The series wiring system has advantages over the parallel system, in that it is often less costly to instal. It is sometimes considered that the parallel system is preferable on account of the fact that circuit trouble does not affect the whole system. When it is remembered, however, that in the case of a short circuit the current only takes the path of least resistance, which results in none of the clocks responding, and that should a break develop in the circuit all clocks on that portion of the circuit beyond the fault will cease to function, such preference has no practical support. There is a further disadvantage that the amount of current in a parallel circuit as compared with that in a series circuit is in the ratio of the latter multiplied by as many clocks as may be working on the circuit.

The "Magneta" System is unique in that line resistance has no practical effect whatever upon the working of the clocks. There are "Magneta" installations involving circuits of 50 or 60 miles in length, and **no additional apparatus of any sort is used**, the whole system consisting merely of the "Magneta" Master Clock, wiring, and the "Magneta" Secondary Clocks. We have also for experimental purposes satisfactorily operated our clocks through an added resistance of 10,000 ohms in series. When it is realised that this is achieved without the aid of any outside source of current whatever, therefore eliminating losses due to line resistance, inevitable with all battery driven systems, it will be appreciated that the "Magneta" System, from a practical point of view, has merits which place it far in advance of anything else of the kind obtainable, and that it is from a financial point of view much more economical, the installation of the system being a question of first cost only.

The "Magneta" Secondary Clock Movements are not of the type commonly referred to as "click and ratchet." The propelling action consists of a rocking armature pivoted at the centre, which is alternately attracted to the cores according to their polarity at the moment of the electrical impulse. This armature is held in position between the impulses by a permanent magnet. The rocking armature actuates an escapement, the pallets of which engage in the main or minute wheel of the movement. This wheel has teeth machine cut of specially devised form to eliminate friction, and of considerable depth, which ensures extremely positive action.

# EFFICIENCY

## TO THE LAST DEGREE

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No apparatus leaves our factory unless it passes a test of an overload of not less than 100 per cent.

Only the highest grade materials and workmanship are employed in the manufacture of our apparatus.

The standard of construction is consistently of the highest order, resulting in unparalleled efficiency and long life.

"Magneta" Apparatus is of British Material and British Manufacture throughout.

The efficiency resulting from the combination of these points is such that we are able to unequivocally guarantee all apparatus supplied by us against any defects in workmanship and material for a period of **Two Years** from date of installation—such guarantee must be an adequate safeguard to the purchaser.

"Magneta" has in numerous instances superseded large installations of battery driven clocks.

## "MAGNETA"

Your ultimate desire—  
Why not anticipate it?