Book 5
Section 1*f*

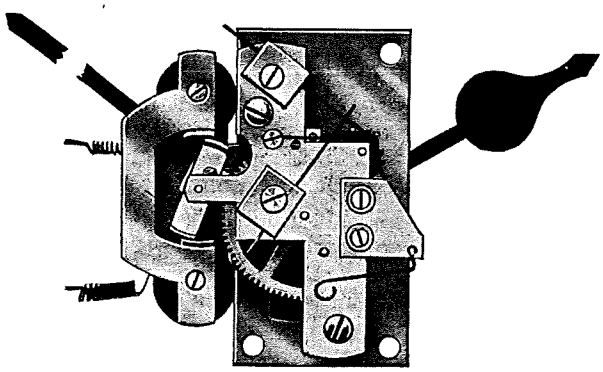
THE

"PUL-SYN-ETIC" System

OF

ELECTRIC IMPULSE CLOCKS and TIME DISCIPLINE APPARATUS

FOR INDICATING UNIFORM and ACCURATE TIME
IN OFFICE, INSTITUTE and INDUSTRY.



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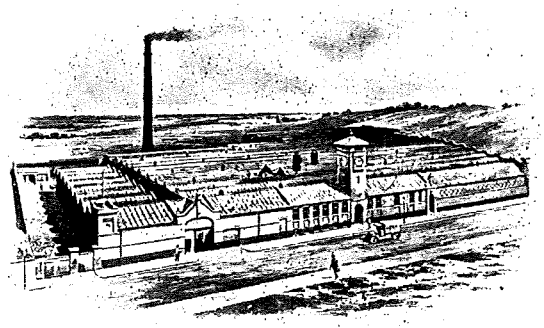

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THE ILLUSTRATIONS show generally the appearance of the respective articles ; but instruments may vary from the illustrations as improvements and alterations occur.

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Book 5
Section 1*f*

THE

"PUL-SYN-ETIC" System

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ELECTRIC IMPULSE CLOCKS and TIME DISCIPLINE APPARATUS

FOR INDICATING UNIFORM and ACCURATE TIME
IN OFFICE, INSTITUTE and INDUSTRY

INDEX.

SECTIONS OF "BOOK 5."

TELEGRAPHIC CODES.

WE USE THE FOLLOWING :—
OWN PRIVATE. ABC (5th and 6th). MARCONI (Vol. 1).
BENTLEY'S ("Complete Phrase," *also* "Second Phrase.")

"PUL-SYN-ETIC" SYSTEM.

The "Home" Impulse Transmitter.

The "Pul-syn-etic" Time Transmitter which gave the lead in Modern Time Transmitter construction is———
Imitated but not Excelled.
We were first in 1904 *to employ the roller on incline plane for giving the half-minute constant gravity impulse to Pendulum. Up to our introducing this feature, if for any reason the pendulum failed, due to a weakening current, the battery run down through the contacts.*

SPECIFICATION.

CASE.—Of designs illustrated, in sound well-seasoned hardwood, properly finished and polished. Full length front glazed panel forming door with strong hinges, auxiliary bolts and lock and key.

MOVEMENT.—Formed of rigid cast-iron bedplate, with correctly proportioned electro-magnet, improved quick-break sparkless half-minute automatic adjusting impulse contact, with heavy hard gold-alloy surfaces, escapement and repeating mechanism robustly constructed on Standard Clock Makers' principles. Inclined plane gravity impulse mechanism giving constant drive independent of battery strength and variation of circuit. Hardened steel arbors working in suitable bearings. Seconds Pendulum Fully Compensated. Rod of "Si-ne-var" non-expanding alloy. Heavy steel cylindrical bob and toothed rating nut, each tooth representing approximately one second per day adjustment and Platform for Regulating Weights. All guaranteed capable of being regulated to keep time within one second per day. *Half this small error is often obtained by careful regulation.*

ADVANCE.—An advance lever with cord is fitted to the movement, by which all impulse clocks in the circuit can be advanced one impulse every two seconds when required, as for instance in Daylight Saving change.

FITTINGS.—Substantial terminals, and fixing plates for four fixing screws are provided.

DIMENSIONS.—Size overall, 53-in. × 13-in. × 8-in.; weight, without time dial, approx. 44 lbs. Fig. C37 slightly exceeds these dimensions and weight.

Note.—The three Transmitters shown opposite at Figs. C6, C7 and C37 are identical except that the latter two have a time dial with its impulse movement fitted on the door of the case. The Transmitter mechanism is fully visible on opening the door.

For positions where a time dial separate from the Transmitter is desired, the Fig. C6 type is recommended. The absence of the time dial allows a free vision of the Transmitter action through the glass panel and often allows the Transmitter to be fixed in positions where the tick of the half-minute contact is unnoticed, and where wall space is less valuable.

NUMBER OF CLOCKS IN CIRCUIT.—A "Pul-syn-etic" Transmitter will impulse any reasonable number of Impulse Clocks.

We have installations where over 100 are on one Circuit controlled by one Transmitter. It should be remembered that the Voltage of such a Circuit is high, and it is this Voltage and the responsibility of having so many Clocks in one Circuit in case Wires are carelessly cut, that is the controlling factor. See pages 24 and 25.

For full details of "See-Saw" and Observatory Control, see Book 5, Section 4.

"PUL-SYN-ETIC" SYSTEM.

The "Home" Impulse Transmitter.

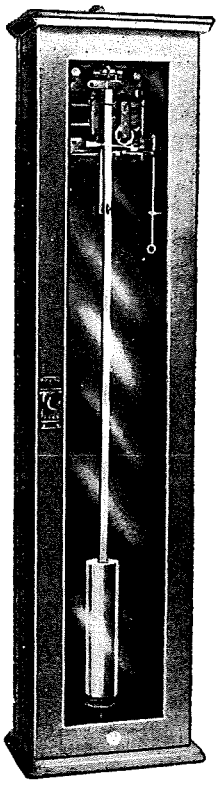


FIG. C6.

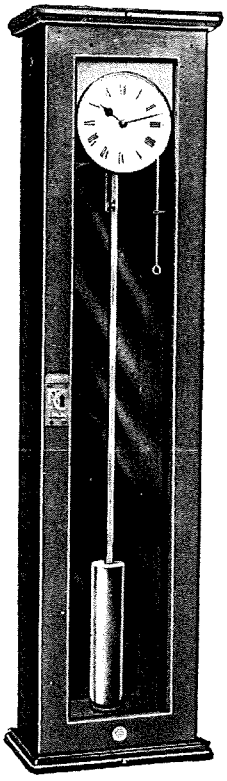


FIG. C7.

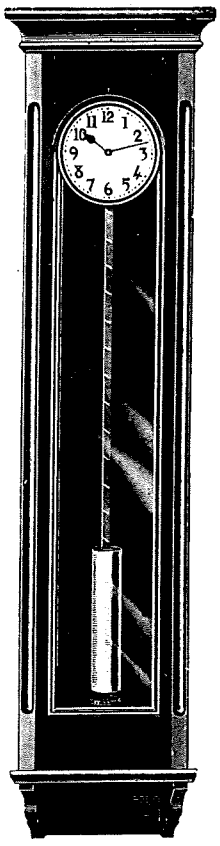


FIG. C37.

(E)

FIG. C6. TRANSMITTER. In polished Teakwood case with glass front panel, door secured with substantial hinges, auxiliary bolts, lock and key, giving access to movement and pendulum. Substantial fixing plates and alignment studs to enable case to be fixed in a vertical position. PRICE, each ... ... **£15 0 0.** Code word : **zilik**

FIG. C7. TRANSMITTER. Generally as Fig. C6 above, but with 7-in. time dial ... ... **£18 10 0.** Code word : **zilje**

Fig. C37. TRANSMITTER. Generally as Fig. C6 and C7 but in Ornamental solid hardwood case, highly finished.

Without Time Dial, each ... ... **£27 10 0.** Code word : **zillo**

With Silvered Time Dial, as illustrated, each ... ... **£31 0 0.** Code word : **zilny**

Figs. C6 and C7 can be supplied in framed case, if desired, at a cost of **£2 4 0** extra. Special cases can be made to architect's designs, or to match existing furniture, at extra cost.

"See-Saw Observatory Control," fitted to any Standard Home Transmitter with Impulse Dial (such as Fig. C7) *add* **£5 0 0.** Code word : **zojno**

Relay fixed in Clock Case and wound to 200 ohms for receiving observatory current (if required) ... *add* **£1 5 0.** Code word : **zojon**

These Transmitters automatically give indication of insufficient or failing current.

For Sub-Control Transmitting Systems, see pages 24 and 25.

For full details of such Observatory Control, see Book 5, Section 4.

"PUL-SYN-ETIC" SYSTEM.

Impulse Clock Movements.

"PUL-SYN-ETIC" IMPULSE MOVEMENTS, as Fig. C9, are manufactured and standardised in three distinct sizes, viz. :—

"S" TYPE. Simple standard locked Movement, built up on brass base for Clocks having glazed (protected) dials for all sizes up to approximately 18-in. diameter.

"B" TYPE. Double locked standard Movement, built up on brass base, and of more robust construction than "S" Type, for glazed (protected) dials, up to approximately 36-ins. diameter.

"W" TYPE. Powerful double locked Movement, built up on metal base, suitable for large Turret Dials, which are arranged behind glass or, for large Clocks with exposed hands fixed under cover, but not exposed to the weather. An example of such a clock is the Concourse Clock at a Railway Station.

The "S" Type Movement is the size which we fit with Contacts for ringing bells, or operating Hooters at pre-arranged times, and contacts for other purposes. (See illustration below, Fig. C9 with contacts, and further, see on page 20).

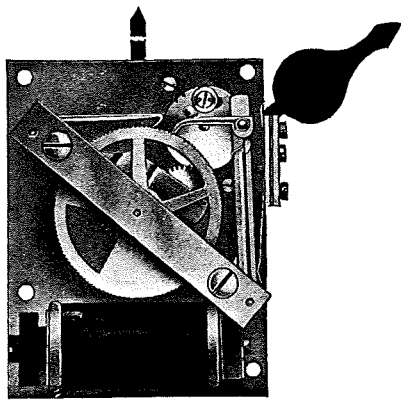


FIG. C9. "S" Type. Simple Locked Movement.
Code word ... **zoemp**

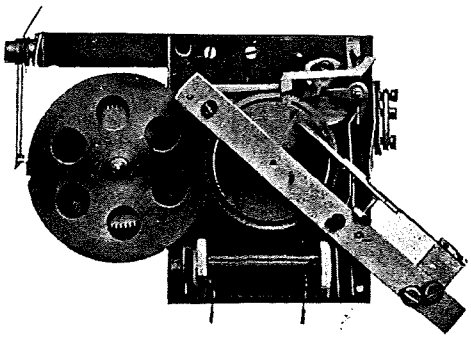


FIG. C9. With Contacts. "S" Type movement fitted with 24-hour wheel and contacts, for bell-ringing, etc..

See page 20.

Each Movement of Types "S" and "B" consists of heavy wrought brass plate, machined, finished and lacquered ; accurate machine-cut ratchet wheel with 120 teeth ; pawls of steel, hardened and tempered ; balanced aluminium hands running on bridged motion work ; highly efficient electro-magnet. All the moving parts are designed to resist wear, the driving and backstop pawls being of stainless steel to avoid rust. The design of the pawls and stops is such that it is absolutely impossible for them to advance the ratchet wheel more than one tooth at each impulse. The armature of the impelling magnet is designed to operate with a contact of exceptionally short duration, and with a very weak current, one cell only being required for every two 12-in. dials in a circuit.

In the "B" Type Movement, the motion work is constructed to carry larger but light hands.

For large Clocks with hands exposed to the weather, there is nothing equal to a "Waiting-Train" Movement. (See Book 5, Section 2).

Where silence is required, see next page.

"PUL-SYN-ETIC" SYSTEM.

Patent Triangle Inaudible Movement.

An Impulse Clock that cannot be heard by the occupants of a Bedroom, Small Library or Lounge, in the silence of midnight is now available, and at a reasonable price, so that it can be adopted generally where desirable.

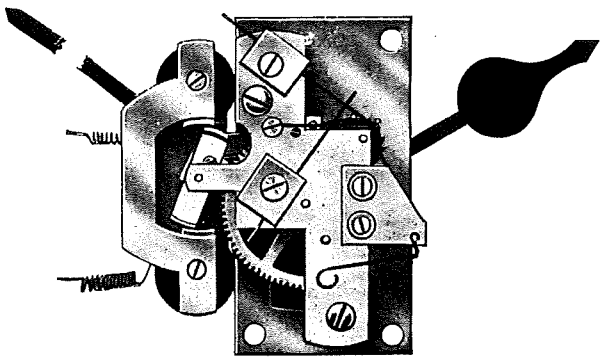


FIG. C107. SILENT MOVEMENT.

The **"PUL-SYN-ETIC" Triangle Movement** does not depend upon a spring suspension or padded case. The special action is such that the usual percussion or knock is absent, and therefore, does not have to be absorbed or masked. The Movement need not be nursed into position or humoured into keeping in step with its fellows, it takes practically the same energy to operate it, and is as permanently reliable as an ordinary Impulse Movement.

The **"PUL-SYN-ETIC" Triangle Movement** is manufactured in quantities and fitted into all ordinary cases, Wall, or Mantel, or Bracket Pattern, up to 12-in. in diameter, and the cost permits its general use.

It is recommended for Bedrooms, Boudoirs, etc., and all those situations where the audibility of the ordinary Impulse Movement is regarded as undesirable.

Hotel Bedrooms can be fitted with the Triangle Impulse Clock, giving the Guests the advantage of true time without fear or annoyance to the most nervous occupants, many such objecting to even the tick of a watch.

A Mechanism so inaudible has never been available in quantity until the introduction of this "PUL-SYN-ETIC" Triangle Movement, and it commands special consideration.

Weak Battery Warning Bell. (E)

By fitting this Warning Bell in the circuit of a system of Electric Impulse Clocks, all anxiety regarding the condition of the battery is removed, and no other testing apparatus or any periodical inspection is necessary. Immediately the battery begins to weaken, the gong is struck at each half-minute impulse until the battery has been given the necessary attention.

The Warning Bell requires no special battery to operate it, and can be fitted in any suitable position, being connected in the circuit exactly as an Impulse Clock.

Such Warning Bells are not required when accumulators are employed.

FIG. C8. WEAK BATTERY WARNING BELL. Consisting of impulse bell movement with balanced hammer operating on 2¼-in. gong. In polished wood case with glass front, the warning being visible as well as audible.

Overall size (approximately), 12-in. × 8-in. × 4-in.

PRICE, each ... **£2 0 0.** Code word : **ziymp**

FIG. C8. Warning Bell.

PUL-SYN-ETIC ELECTRIC CLOCK SYSTEMS

"PUL-SYN-ETIC" SYSTEM.

IMPULSE CLOCKS GENERALLY.

On this and the following pages we illustrate a selection of Impulse Clocks for a variety of positions and situations. Wall, Mantel, Hermetic, all-metal Drum type, etc.

These Clocks when operated by any of the Transmitters shown on page 5, indicate uniform and accurate time throughout the system. Requiring no winding or periodical attention, they may be fixed in positions most easily discernible without regard to accessibility.

For Wiring Diagrams, see page 32.

Impulse Wall Clocks (Wooden Cases). For Interior Use.

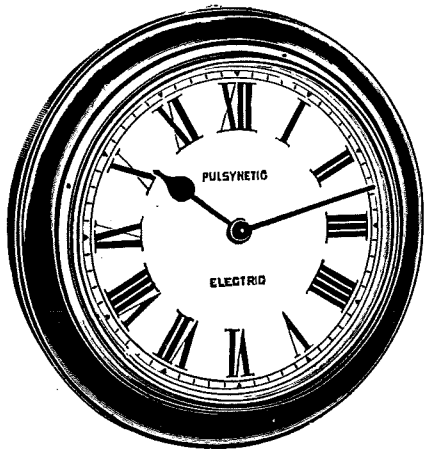


FIG. C10. IMPULSE WALL CLOCK. Solid Hardwood Front.

FIG. C10. IMPULSE WALL CLOCK, in polished case. Airtight and dust-proof. Strong glazed bezel and enamelled metal dial. "PUL-SYN-ETIC" simple locked standard movement, or patent Triangle movement described on page 7 as may be desired. Substantial terminals available without opening case. Complete with fixing plate. (E)

Diameter of Face ...	6-in.	9-in.	12-in.	16-in.	18-in.	20-in.	24-in.
Overall diameter (approx.)	9-in.	12-in.	15¼-in.	20½-in.	23½-in.	26¼-in.	30¼-in.
PRICE, with Standard Movement, each	£3 14	£3 16	£3 18	£7 5	£8 14	£10 4	£13 10
Code word	zilol	zilum	zilyn	zimaj	zimek	zimil	zimja
PRICE, if with Inaudible Movement, available up to 12-in. diam. only, each	£4 4	£4 6	£4 8				
Code word	zobif	zobjy	zobog				

This pattern of Impulse Clock being in Wooden Case is eminently suitable for having a fixed contact device added thereto—*see pages* 20, 21 *and* 22, *and diagrams on page* 32

"PUL-SYN-ETIC" SYSTEM.

Impulse Wall Clocks. Metal Cases, Incombustible.

For Interior Use.

If the " PUL-SYN-ETIC " system is to be driven off Supply Mains, Incombustible Impulse Clocks in Metal Cases are to be recommended.

ALL-METAL
IMPULSE WALL CLOCK FOR INTERIOR USE.

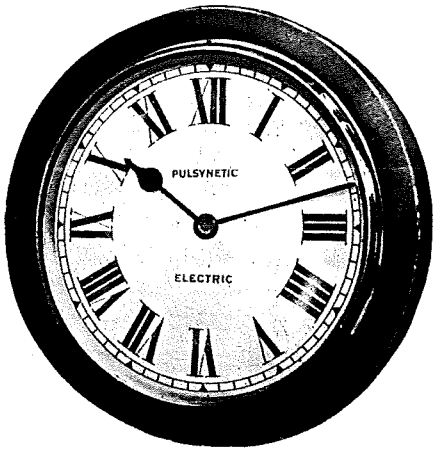


FIG. C15. IMPULSE WALL CLOCK. Wrought-metal Case.

FIG. C15. METAL IMPULSE WALL CLOCK. In enamelled case, incombustible, air-tight and dust-proof. Strong glazed bezel and enamelled face. " PUL-SYN-ETIC " simple locked standard movement or inaudible triangle movement as may be desired. Terminals available without opening case, complete with fixing plate. See page 10 for small clocks.

The 12-in. is generally as illustrated. Above this 12-in. size, the construction of the case forms a suitable moulding to the wall. (E)

Diameter of face ...	12-in.	16-in.	18-in.	24-in.	30-in.	36-in.
Diameter overall (approx).	15¼-in.	21½-in.	23½-in.	30½-in.	37-in.	43½-in.
PRICE, with Standard Movement, each	**£3 5**	**£5 16**	**£6 5**	**£8 18**	**£12 16**	**£20 0**
Code word	**zimke**	**zofko**	**zofmy**	**zofok**	**zoful**	**zogah**

To special order, these Clocks can be made and are practical and serviceable up to 60-in. diameter, and are often used for Railway platforms.

"PUL-SYN-ETIC" SYSTEM.

Bakelite Impulse Wall Clocks.

For Interior Use. Damp Situations. High Voltage.

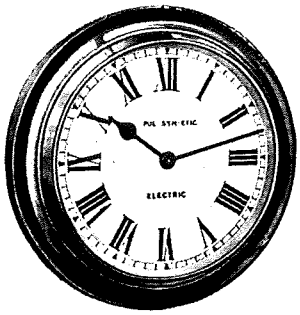


FIG. C36.
IMPULSE WALL CLOCK—all in Bakelite Case.

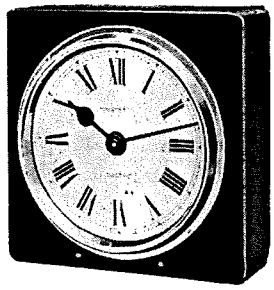


FIG. C109.
Square Bakelite Case.

FIG. C36. BAKELITE IMPULSE WALL CLOCK, with glazed bezel. This Clock is made in two sizes only, with 9-inch and 12-inch faces. These most popular sizes will largely take the place of C10 as catalogued to-day in wooden cases.

FIG. C109. BAKELITE IMPULSE WALL CLOCK, square Case, one size only, 6-inch face. Bezel of Brass or Bakelite, a most popular square Wall Clock where a small dial only is needed.

Bakelite Cases have the advantage of being Uninflammable, Heat-resisting, Damp-proof, and suitable for High Voltage, and the Bezels containing the Glasses are of Bakelite also, and so not subject to tarnish in any ordinary vitiated atmosphere.

The terminals are inside the case, and at the same time available to the fixer without opening same. No wiring need be visible, and the hanging plate or plates are arranged inside the case, and so also are not visible. They can be reversed if desired.

Correcting Studs are available for putting the hands to correct time after fixing. (E)

	Fig. C36.		Fig. C109.
Diameter of Face	9-in.	12-in.	6-in.
Overall diameter (approximately)	12½-in.	15½-in.	7½-in.
PRICE, with Standard Movement, each ...	£3 14 0	£3 16 0	£3 14 0
Code word	zojup	zoity	zokem
PRICE, if with Inaudible Movement, each ...	£4 4 0	£4 6 0	£4 4 0
Code word	zokme	zoman	zokla

"PUL-SYN-ETIC" SYSTEM.

Insertion Impulse Clocks. All Metal. For Interior Use.

Made adaptable for insertion in any existing or prospective panelling or customers' own cases, mantel or wall pattern, or where a protruding clock is undesirable. The case being of metal permits of its use in humid or ant-infested regions, hence the design is largely used on ships and in the Tropics, but sometimes we make all in wood to customers' special requirements.

They are fitted with correcting studs, i.e., with two unobtrusive pins forming terminals, by which Clocks can be set to time by means of a dry cell, in case adjustment is required owing to interference of the system.

FIG. C11. INSERTION IMPULSE CLOCK. Movement sunk into shallow metal dish with hermetically-sealed joint. Enamelled metal dial, strong glazed brass bezel. Other designs and finishes of dial and bezel to order.

We recommend the adaptability and general utility of this model.

Diameter of Face ...	6-in.	8-in.	9-in.	10-in.*	12-in.	16-in.*	18-in.*
Overall diam. (approx.)	7⅛-in.	9¼-in.	10⅛-in.	11⅛-in.	13⅛-in.	17½-in.	19½-in.
PRICE, with Standard Movement, each ...	**£4 16**	**£5 9**	**£5 16**	**£6 5**	**£7 6**	**£10 2**	**£12 10**
Code word	**zinno**	**zinon**	**zinup**	**zioxy**	**zipal**	**zomus**	**zipem**
With Patent Triangle Inaudible Movement,	**£5 6**	**£5 19**	**£6 6**	**£6 15**	**£7 16**	each	
Code word	**zodfa**	**zodge**	**zodjo**	**zodly**	**zodoj**		

Bronze, Antique Brass, Silver-plated, Oxidized Silver, Chromium-plated; these finishes can be supplied at small extra price.

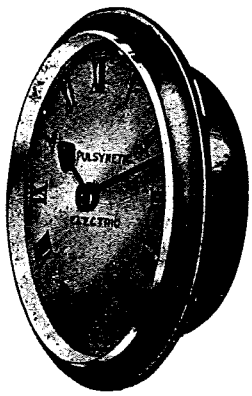


FIG. C11. INSERTION CLOCK.

*N.B.—Sizes marked thus * are made to order only. We also make Clocks of 14-in. diameter of face to order only.*

INSERTION IMPULSE CLOCKS.

Of Special Design.

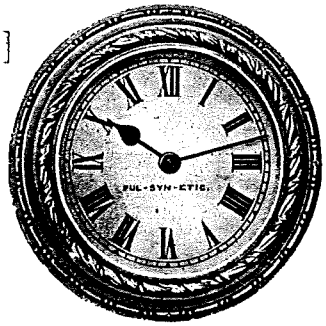


FIG. C141

Special design, Roman Chapters on engraved Silvered dial, hand carved metal Bezel of art finish, and of wide proportion with bevelled plate glass front, clear plain spade hands.

PRICE, with face 6″ diam., **£9 5 0**
Code word ... **zosuz**

FIG. C138

Special design, Arabic Chapters on engraved Convex Silvered Dial, massive Bezel with Convex glass front, ornamental Hands.

PRICE, with face 6″ diam., **£7 10 0**
Code word ... **zosoy**

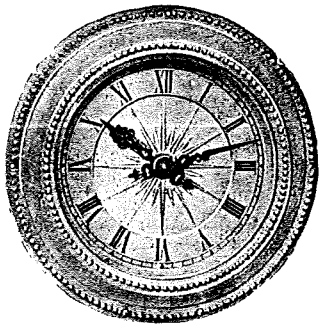


FIG. C140

Special design, Roman Chapters, Ornamental engraved Silvered two-piece Dial with Sunray centre, Ornamental Hands and Bezel in pearl-bead pattern, with plate glass front in any art finish.

PRICE, with face 6″ diam., **£9 2 0**
Code word ... **zosta**

Special Designs made to Order or Customers' own cases can be fitted.

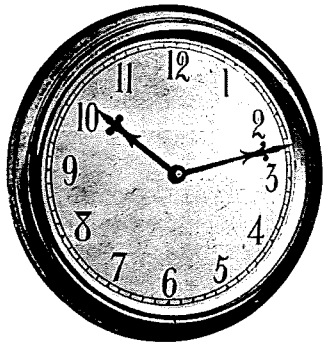


FIG. C143

Special design, Arabic Chapters, Engraved Convex Silvered Dial, Convex Bevelled glass, Heavy Bezel, art finished, Fleur de Lys hands.

PRICE, with face 6″ diam., **£7 16 0**
Code word **zosve**

"PUL-SYN-ETIC" SYSTEM.

Mantel Impulse Clocks.

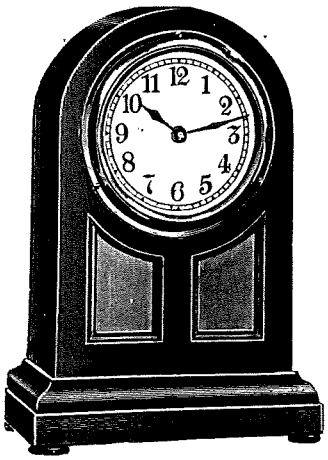


FIG. C21.

IMPULSE MANTEL CLOCKS, in ornamental hardwood and other cases. Dials and bezels of various designs and finish are manufactured. For some other standard designs, see Book 5, Section 3.

PATENT TRIANGLE INAUDIBLE MOVEMENTS are particularly recommended for Mantel Clocks, and may be used with advantage in Insertion Clocks shown on page 11.

ROSETTE, flexible, and a chain to prevent removal are fitted to Mantel Clocks.

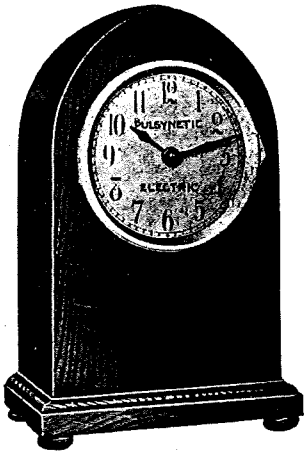


FIG. C22.

FIG. C21. IMPULSE MANTEL CLOCK, Standard in Walnut, other woods to order, enamelled metal Dial 5-in. diameter, Arabic Chapters, Diamond-shaped Hands, Brass Bezel with Bevelled Plate Glass Front.

PRICE ... **£5 15 0** each. Code word: **zinka** followed by kind of wood if not walnut.

IF WITH INAUDIBLE MOVEMENT, Each ... **£6 5 0.** Code word: **zodeg**

FIG. C22. IMPULSE MANTEL CLOCK, Standard in Walnut, other woods to order, Silvered Dial, Engraved, 5-in. diameter, Arabic Chapters, Diamond-shaped Hands, Oxidised Silvered Bezel, Bevelled Plate Glass Front.

PRICE ... **£6 11 0** each. Code word: **zokop**(E) followed by kind of wood if not walnut.

IF WITH INAUDIBLE MOVEMENT, Each, **£7 1 0.** Code word: **zokpo**

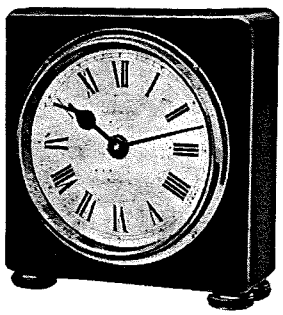


FIG. C129.

Other Patterns can be supplied.

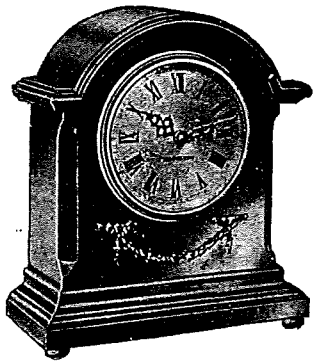


FIG. C136.

FIG. C129. BAKELITE MANTEL CLOCK, Standard model, 6-in. diameter White Enamelled Dial, Roman Chapters. Hands as shown, Brass or Bakelite Bezel.

PRICE ... **£4 2 0** each. Code word: **zokyr**

IF WITH INAUDIBLE MOVEMENT, Each, **£4 12 0.** Code word: **zolam**

FIG. C136. IMPULSE MANTEL CLOCK, Adams Pattern, in various woods to match existing furniture, Convex Silvered Dial 5-in. diameter, Roman Chapters, Ornamental Hands, Art Metal Bezel, Bevelled Convex Glass Front.

PRICE ... **£9 4 0** each. Code word: **zofag** followed by kind of wood.

IF WITH INAUDIBLE MOVEMENT, Each ... **£9 14 0.** Code word: **zofga**

Illustrations of other designs forwarded on application.

"PUL-SYN-ETIC" SYSTEM.

Mantel Impulse Clocks.

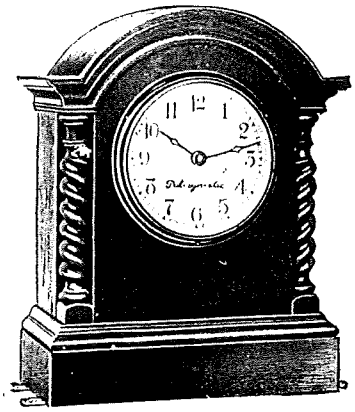


FIG. C132.

Special Designs made to Order or Customers' own cases can be fitted.

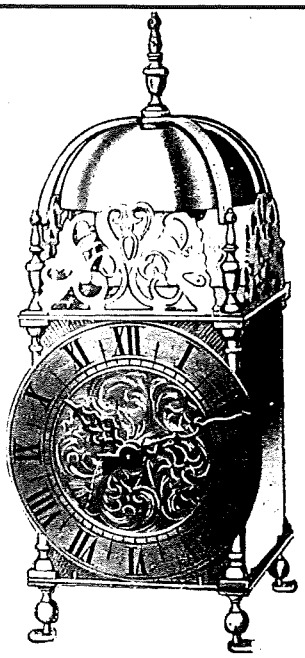


FIG. C137.

FIG. C132. MANTEL IMPULSE CLOCK, Jacobean Pattern, in Oak, Flat Silvered Dial 5-in. diameter, Arabic Chapters, Ornamental Diamond-Pattern Hands, Art Metal Bezel, Bevelled Flat Glass Front.

PRICE ... **£9 1 6** each. Code word : **zoury**

FIG. C137. MANTEL IMPULSE CLOCK, Cromwellian Model, in all lacquered Brass of design shown, Flat Brass Dial, approximately 5-in. diameter, Ornamental Exposed Hands friction-tight on spindle. The Gong does not strike. (E)

PRICE ... **£15 10 0** each. Code word : **zovye**

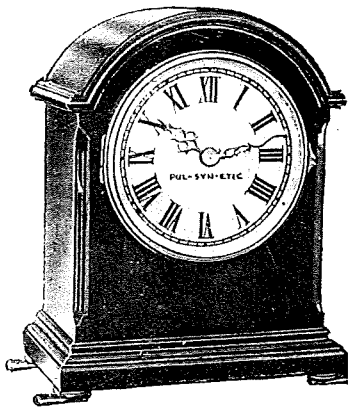


FIG. C135.

Other Patterns can be supplied.

FIG. C133.

FIG. C135. MANTEL IMPULSE CLOCK, Old English Pattern, various woods to match surroundings, Silvered Dial 6-in. diameter, Roman Chapters, Ornamental Hands, Art Metal Bezel, Bevelled Plate Glass Front.

PRICE ... **£8 13 6** each. Code word : **zovbo** followed by kind of wood.

FIG. C133. MANTEL IMPULSE CLOCK, Old English Design, with handle, in various woods to match surrounding furniture, Carved Ornamental Face, Raised Silvered Chapter ring 6-in. diameter, Roman Chapters, Ornamental Hands, Plate Glass Front.

PRICE ... **£10 10 0** each. Code word : **zoviz** followed by kind of wood.

If in lacquered case, as illustrated, **£15 11 0.** Code word : **zovuc**

Illustrations of other designs forwarded on application.

"PUL-SYN-ETIC" SYSTEM.

Hermetic Impulse Pillar Clocks.

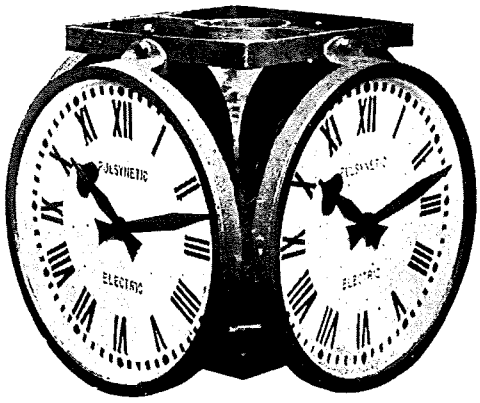


FIG. C38.

FIG. C38 shows a nest of four Clocks as Fig. C24 with the necessary ironwork for holding them together and clipping to a Tramway Standard or other pillar.

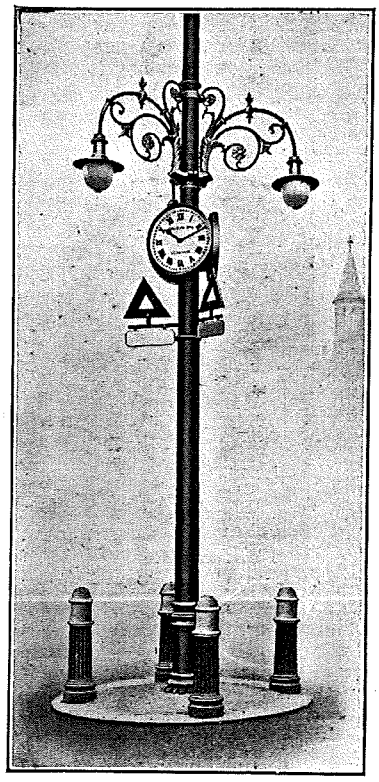


FIG. C76.

FIG. C76 shows a nest of three such Clocks fixed on a steel pillar which is incidentally used:—

(1) To support Trolley Wires.

(2) Lamps for illuminating the roadway.

(3) Road Signs.

Obviously, the variations of requirements are so great that prices can be quoted only on receipt of details, from when we shall be pleased to give all information available.

"PUL-SYN-ETIC" SYSTEM.

Hermetic Impulse Wall Clocks.

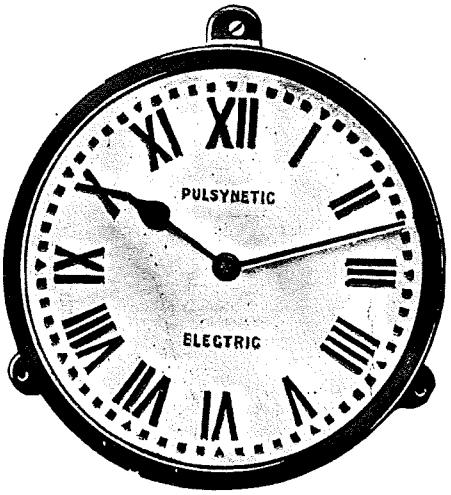


FIG. C24.
"UNDERGROUND" IMPULSE WALL CLOCK. Cast-metal Case.

In All Cast-Metal.
For exterior or damp interior use. Fume-proof.

The Impulse Clocks shown on this page may be used in outdoor and exposed or damp indoor positions.

FIG. C24. THE "UNDERGROUND" PATTERN IMPULSE WALL CLOCK, for outdoor and exposed positions. Cast-metal case, water and air-tight, steam and fume-proof. Dial of cast-metal, enamelled white with raised black chapters and minute marks. Strong glazed bezel, hermetically sealed, "Pul-syn-etic" simple locked movement. Substantial terminals in separate compartments.

This type of clock CANNOT BE SUPPLIED WITH OPAL DIALS. (E)

Diameter of Face ...	9-in.	12-in.	16-in.	18-in.	20-in.	24-in.	30-in.
PRICE, each	£5 0	£5 4	£6 6	£7 12	£9 0	£12 0	£17 5
Code word	zipla	zipme	zipop	zippo	zipry	zipyr	ziran

Hermetic Impulse Wall Clocks.

Wrought Metal Case.

FIG. C20. IMPULSE WALL CLOCK, hermetically sealed, for exterior and exposed positions. Strong wrought-iron lead coated case, water and air-tight. White enamelled metal dial with glazed bezel, all hermetically sealed. "Pul-syn-etic" simple locked movement. Can also be supplied with parallel sides of special dimensions to fit into openings or recesses in walls.

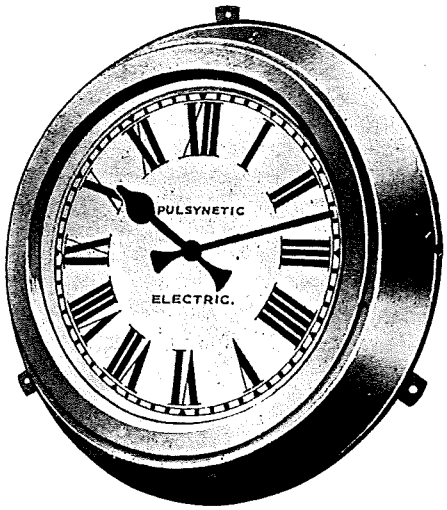


FIG. C20. IMPULSE WALL CLOCK.

Diameter of Face	18-in.	24-in.	30-in.	36-in.
Overall diameter (approximately) ...	25½-in.	31½-in.	37½-in.	43½-in.
PRICE, each*	£14 2	£20 8	£28 4	£38 5
Code word	ziror	zirpe	zirro	zirty

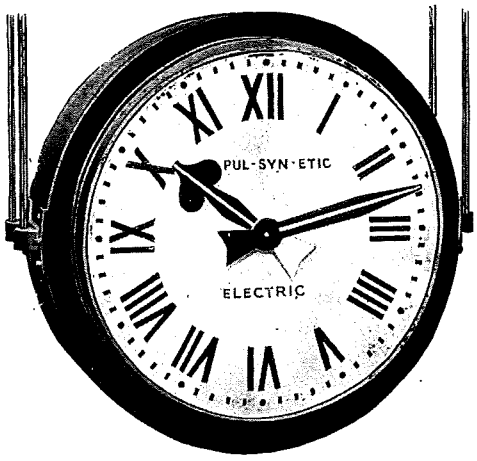
**These prices are for opaque faces. Opal dials can be supplied where desired, at extra cost.*

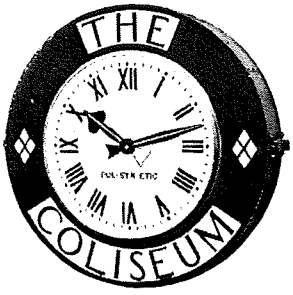
"PUL-SYN-ETIC" SYSTEM.

Impulse Drum Clocks. Double faced. For exterior use.

Illuminated or Opaque.

SPECIALLY SUITABLE FOR FRONT OF BUILDINGS, YARDS, STATIONS, AND OTHER PUBLIC POSITIONS.





Shows a **FIG. C32** arranged for an internal illumination, and illustrates how this standard Clock can be adopted to illuminate any legend that it is desired to advertise.

FIG. C32 and C33. TWO-FACED DRUM CLOCK.

Owing to its design and comparatively light construction, it is specially suitable for Bracket suspension. Typical designs of ornamental supports are shown in the illustrations pages 17 and 18.

Nothing is sacrificed in the way of durability, reliability and efficiency.

The fact that it has been adopted in various sizes by some of the leading Railways and Tramways in this Country is sufficient guarantee of its value and permanent utility.

When supplied with Opal Dials, Fig. C32, provision is made for illuminating the Clock internally. Wiring and Lamp Holders are provided, but Lamps are not included.

The Dials are of Opal, Fig. C32, or of Enamelled Iron, Fig. C33, as ordered. A detachable door or manhole is provided, usually at the side, to give access for the fitting of new Lamps, etc.

Plates, Lugs or eyes are provided approximately in positions opposite chapters 9 and 3 for suspension by rods, brackets or chains.

FIG. C32 or C33. IMPULSE DRUM CLOCK (Two Dials) consisting of Standard Pattern Impulse Movement in heavily galvanized or lead covered wrought iron Drum Case, suitably painted. Opal or Enamelled Metal Dials and Aluminium Hands (Black Finish), protected by Heavy Glass Fronts, all hermetically sealed, with tapped bolting pieces or rings for securing or hanging. (E)

Diameter of Faces	12-in.	16-in.	18-in.	24-in.	30-in.	36-in.	42-in.
Overall diameter (approx.) ...	15¼-in.	21-in.	23-in.	29-in.	35-in.	41-in.	47-in.
FIG. C32, with Opal Dials fitted for internal illumination ...	**£12 0**	**£16 5**	**£18 5**	**£24 0**	**£29 0**	**£34 10**	**£54 0**
Code word	**zogha**	**zogik**	**zogje**	**zoglo**	**zogny**	**zogol**	**zogum**
FIG. C33, with Metal Dials (for outside illumination) ...	**£10 0**	**£13 12**	**£16 0**	**£20 0**	**£26 0**	**£31 0**	**£48 0**
Code word	**zogyn**	**zohaj**	**zohek**	**zohil**	**zohja**	**zohke**	**zohmo**

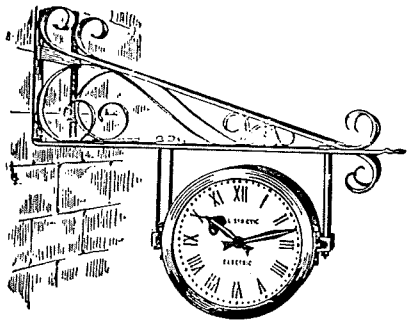
"PUL-SYN-ETIC" SYSTEM.

Impulse Drum Clocks, etc.

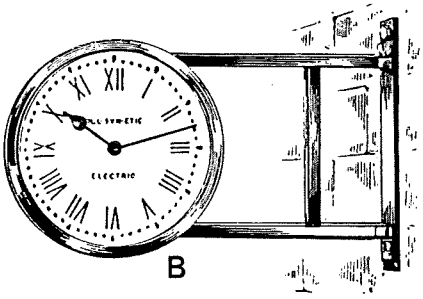
Illuminated or Opaque Faces. Suggestions for Iron Work.

The Drum Clocks illustrated on page 16 can be fitted into fixing iron work of such character, and of so many forms, plain or ornamental, that it is impossible to catalogue many designs, but the outline drawing of some iron work we have made may be quoted for as required, or will suggest to architects and others, lines on which they may like to work out their own designs.

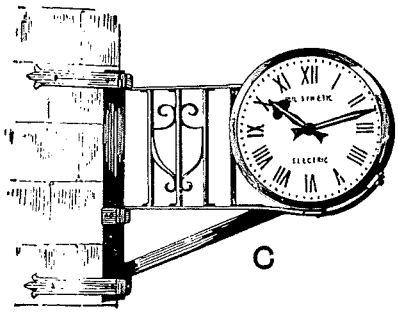
Some of the drawings show single faces, some two faces, some two faces set at an angle, some three faces, others four faces, and in some cases the Dials are not the same diameter.



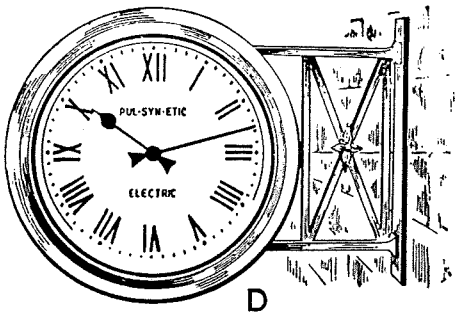
A



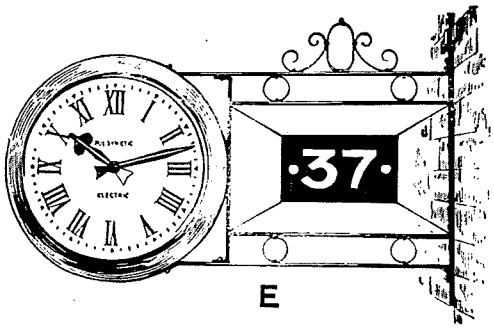
B



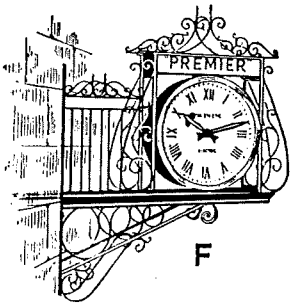
C



D



E



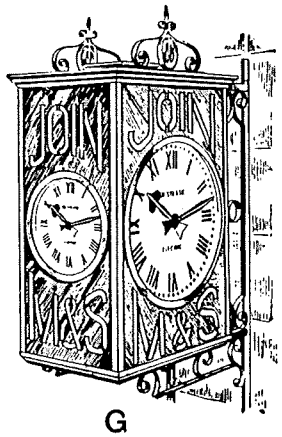
F

"PUL-SYN-ETIC" SYSTEM.

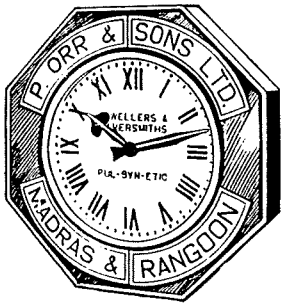
Impulse Drum Clocks, etc.

Illuminated or Opaque Faces.

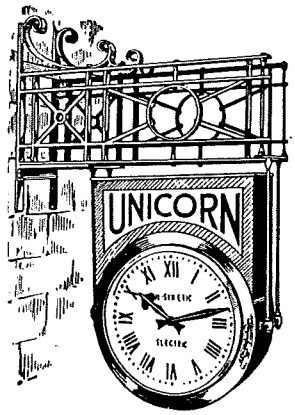
Suggestions for Iron Work (*continued*).



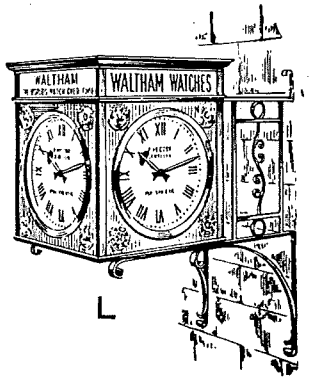
G



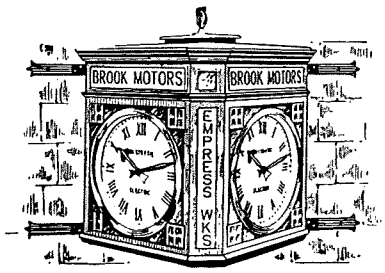
H



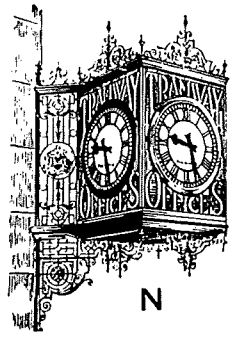
K



L



M



N

Some of the designs shown are not, strictly speaking, Drum Clocks, but the principle on which some of the three and four-faced clocks are built allows of their being shown here.

"PUL-SYN-ETIC" SYSTEM.

Impulse Clocks without Cases.

For inserting in Glazed Openings in Walls, Partitions, etc. Suitable for Internal Illuminations.

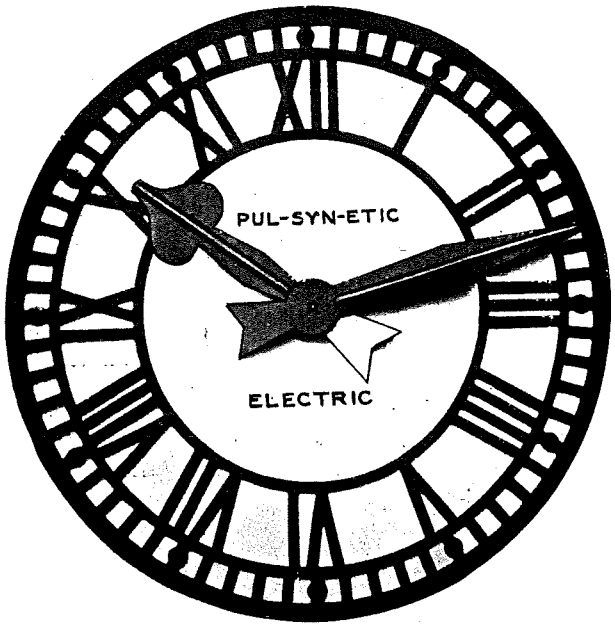
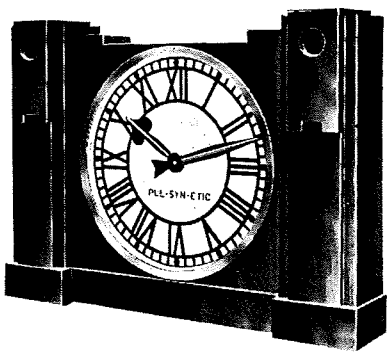


FIG. C49. CASELESS CLOCK.



Shows how a Caseless Clock can be inserted into a Wooden Case if desired. In the instance illustrated, a number of such Caseless Clocks, 48" in diam., were supplied, and were fixed in Solid Teak woodwork designed by the purchaser's architect.

These Clocks are designed to fix into openings in walls, etc., the sides of the opening forming the housing for the Dial movement.

We list below these Clocks in various sizes from 18 inches to 60 inches dial diameter, and special sizes are often made to order.

These Clocks consist of an opal glass dial of suitable size for the opening, complete with the movement (fitted in dust cover) and hands, the dial being mounted in an angle-iron ring in the smaller sizes. In the larger sizes, the Clocks consist of a skeleton cast-iron dial fitted with sections of opal glass. As the hands of the Clock are driven by Impulse Movements, the Clocks are not suitable for direct exposure to the wind and weather unless protected by a glass front.

If not already existing, suitable glass fronts can be supplied at extra cost. These are mounted in angle-iron rings, made to fit within the opening and in front of the dial.

No such protection is needed, however, when the Clocks are fixed under cover, or where shielded.

Being fitted with opal glass, these Clocks may be illumined internally by simply fixing lamps behind the dials.

Clocks to suit square, octagonal or other shapes of openings can be supplied where necessary, at extra cost. (E)

Diameter of Face ...	18-in.	24-in.	30-in.	36-in.	42-in.	48-in.	54-in.	60-in.
PRICE, each ...	**£6 5**	**£8 10**	**£14 10**	**£18 0**	**£23 10**	**£26 10**	**£31 0**	**£34 0**
Code word ...	**ziugh**	**ziuhj**	**ziujk**	**ziulm**	**ziumn**	**ziurs**	**ziust**	**ziuzb**

N.B.—Sizes 18-in. to 30-in. have one-piece opal glass dials, mounted in angle-iron ring, with chapters of the design shown at Fig. C33 (page 16).
Sizes 36-in. to 60-in. (inclusive) have skeleton cast-iron dials with opal glass sections (approximately as illustrated at Fig. C49).

PUL-SYN-ETIC ELECTRIC

"PUL-SYN-ETIC" SYSTEM.

Impulse Contact Makers.

For operating "Start-and-Cease-Work" Sound Signals.

ADJUSTABLE TYPE.

This **CONTACT MAKER** may be included in the "Pul-syn-etic" system and operated by a Time Transmitter, as shown on page 5.

An Impulse Movement drives a wheel—revolving once in 24 hours—containing a graduated scale and pin holes. By inserting pins provided in appropriate holes, any programme of signals may be operated, arranged at 5 or 15 minute periods.

Where a number of sound signals are employed, or service mains are used to operate the sound signals, a relay is necessary.

CONTACT MAKER (Adjustable Programme). Consisting of impulse movement, 24 hour wheel with graduated scale, spring contacts and pins for closing circuit at required times. All contained in well finished hardwood case with glazed front panel and provided with lock and key.

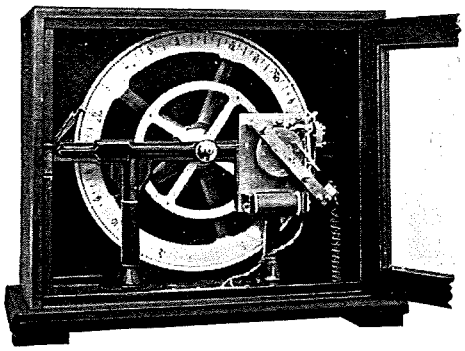


FIG. C69. ADJUSTABLE CONTACT MAKER. Any 5 minutes.

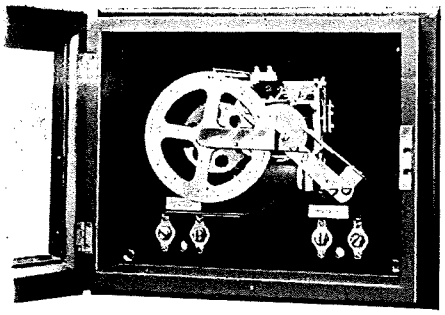


FIG. C79. ADJUSTABLE CONTACT MAKER. Any 15 minutes.

PRICES :— (E)

Fig. C79 for 15 minute intervals, each	£13	10	0	zomep
Fig. C69 for 5 minute intervals, each	£19	2	0	ziwas
EXTRA PRICE FOR 7-day wheel to automatically cut out Saturday afternoon and Sundays, and other reasonable times, in either C79 or C69, each...	£3	10	0	ziwet

Where a fixed programme of times is adhered to, or where times requiring odd half-minutes are involved, the Fig. C68 Contact Maker is recommended.

The signal contacts are operated by means of notches cut in a disc and therefore cannot be varied except by alteration at these works. The programme of times must therefore be stated when ordering.

For complicated programmes, two or even three movements mounted in same case are necessary.

FIG. C68. CONTACT MAKER (Fixed Programme). Consisting of impulse movement, and contact mechanism with setting dial and terminals. All mounted in hardwood case with glazed front panel and lock and key.

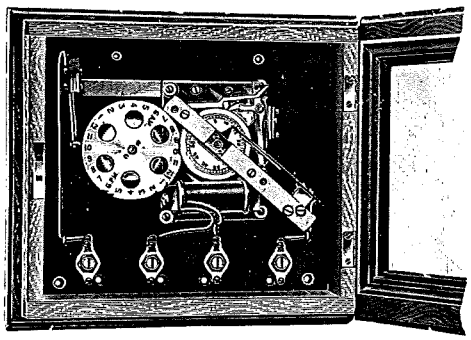


FIG. C68. NON-ADJUSTABLE CONTACT MAKER. Any ½ minute.

PRICES :—

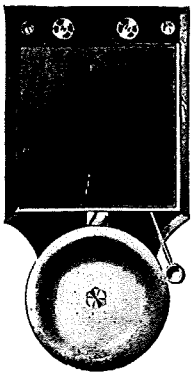
	£	s.	d.	Code words
One Impulse Contact-Movement and one (the first) Contact	9	0	0	zivra
Extra for each additional Contact		9	0	zivyx
If with two Impulse Contact-Movements and two (the first two) Contacts ...	18	0	0	zivvo
Extra for each additional Contact		9	0	zivyx
Extra for 7-day Wheel (generally sufficient for one or all Impulse Movements) ...	1	10	0	zivse
CHEAPER MODEL, in metal case, **FIG. C102**, with one Impulse Contact-Movement and one (the first) Contact	7	10	0	zolen

Additional Contacts, etc., the same prices as mentioned above.

PUL-SYN-ETIC ELECTRIC CLOCK SYSTEMS

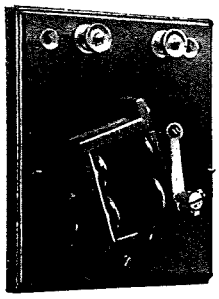
"PUL-SYN-ETIC" SYSTEM.

SOUNDERS for "Start-and-Cease-Work" Signals.



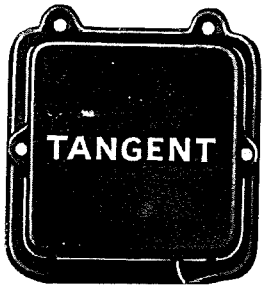
WOODEN CASE BELLS, designed for Battery Circuits all size Gongs, 2½" up to 8".

See Book 1, Section 1.



WOODEN CASE BUZZER, designed for Battery Circuits, one size only.

See Book 1, Section 1.



IRON CASE BUZZER, Incombustible, designed for Battery or Power Circuits, one size only.

See Book 1, Section 1.

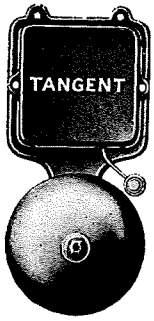


FIG. P145.

POWER BELL, incombustible, for working direct on A.C. or D.C. mains up to 250 volts, as ordered.

All sizes of gongs up to 12-in. diameter.

See Book 1, Section 1.

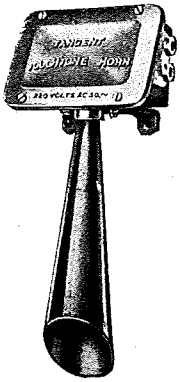
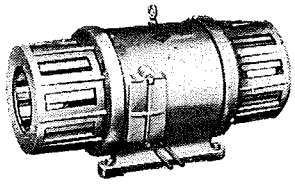


FIG. 365. "TANGENT" "TOUCHTONE" HORN

A watertight, incombustible, industrial Hooter, in cast-metal case. Can be supplied to work off Batteries or direct from Power Mains, up to 250 volts, A.C. or D.C., as ordered.

See Book 1, Section 1.



"TANGENT" ELECTRO MOTOR SYREN, for working direct on A.C. or D.C. mains up to 500 volts. Sizes varying from $\frac{1}{10}$-h.p. to 4-h.p.

The small $\frac{1}{10}$-h.p. is designed for and can be heard above the din of the workshop.

See Book 7, Section 2.

These different type Sounders, by means of the Relays shown on page 22, can be operated by the Contact Makers, Fig. C68, etc., shown on page 20, or by Contacts contained in Fig. C10, 12-in. Impulse Clocks or equivalent. The duration of the signal can be definitely adjusted by the Duration Contact, also shown on page 22.

For fuller details of such Sounders, see the Catalogues referred to.

PUL-SYN-ETIC ELECTRIC

"PUL-SYN-ETIC" SYSTEM.

DURATION CONTACTS

For operating "Start-and-Cease-Work" Sounders.

For working in conjunction with Contact Makers shown on page 20.

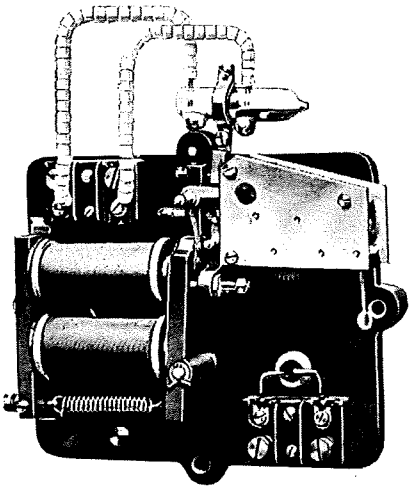


FIG. 1432.

When the Sound Signals illustrated on page 21 are operated by the Contact Makers, Fig. C68 or C69, the duration of the contact is for half-a-minute.

Where this period is too long, a Duration Contact may be used to deal with shorter periods of from five to fifteen seconds by adding it to the Sound-Signal Circuit.

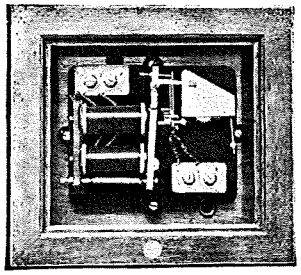


FIG. C60.
DURATION CONTACT.

FIG. C60. DURATION CONTACT on cast-metal base, with heavy gold-silver contacts and necessary terminals. All contained in polished wood case with glass door, lock and key. Suitable for Bell Circuits and the like.

PRICE, each ... **£8 15 0.** Code word: **ziyat** (E)

FIG. C101. Ditto. Cheaper Model, in Metal Case, without lock, etc.

PRICE, each ... **£6 10 0.** Code word: **zoiry**

FIG. 1432. Ditto. In Metal Case with mercury tube contact. Suitable to carry up to 1000 watts.

PRICE, each ... **£9 10 0.** Code word: **yefid.**

RELAYS

For operating "Start-and-Cease-Work" Sounders.

Current from Service Mains can be employed for operating sounders, provided the usual current is employed on the Contact-maker to energise the Coils of the Relay. The armature contacts of Relay are capable of carrying current of high voltage and considerable strength, A.C. or D.C., as is specified.

FIG. P1438. POWER RELAY. In cast-iron case with cover, machined joint; coils designed for battery current. Contacts consist of reinforced electrolytic copper break. All is mounted on high-insulation base. Capacity of Contacts; 2 amperes at 250 volts, or 4 amperes at 100 volts (or less). (H)

PRICE, each D.C., generally as illustration, **£3 15 0.** Code word: **yeffo**

" A.C., " " **£4 10 0.** Code word: **yefhy**

Approximate size ... ... 9¼-in. × 10-in. × 3½-in. deep.

An ordinary push can be employed, in addition to the Impulse Auto Contact-Maker, Fig. C68 or C69, to send current to the coils of these relays, to sound the signals at special times in case of emergency; such a push is connected " in parallel " with the Auto Contact-Maker.

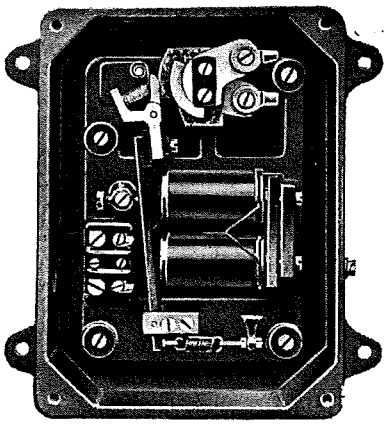


FIG. P1438.

PUL-SYN-ETIC ELECTRIC CLOCK SYSTEMS

"PUL-SYN-ETIC" SYSTEM.

AUTO. CUT-OUT for guarding Clock Circuits.

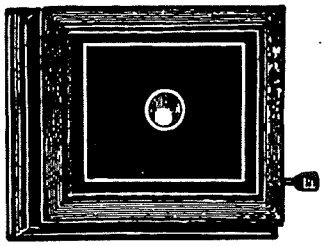


FIG. C125. AUTO. CUT-OUT

FIG. C125. AUTO. CUT-OUT, for Time Circuits, consisting of Relay Movement, Indicator with hand replacement. Relay armature operating contacts controlling special equivalent resistor. All mounted in polished hardwood case with glazed front, for use in bottle-neck wiring as shown below. (E)

PRICE, each ... £3 8 0. Code word : **ziyve**

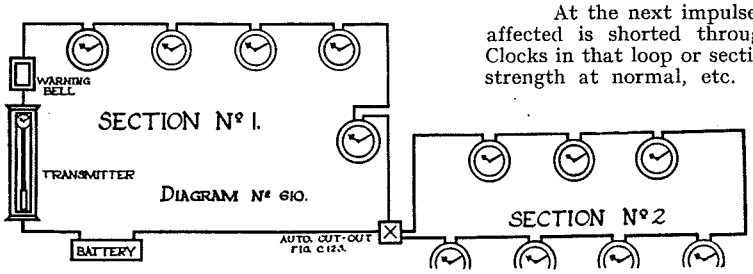
NOTE.—When ordering the number and size of Clocks in each Circuit must be given so that an equivalent resistor can be fitted.

AUTO. CUT-OUT FOR LOOP CIRCUITS.

When the layout of the building is such that the wiring takes a form shown in Diagram No. 610, an Auto. Cut-out, as Fig. C125, shown at X in the Diagram, should be employed. Normally, the Clocks of Section No. 1 and of Section No. 2 are in series, both sections being driven by the Transmitter shown.

In the event, however, of a break occurring in the wiring of Section No. 2, this section is automatically cut-out, and Section No. 1 operates as usual. The Auto. Cut-Out is particularly useful in cases where Section No. 2 is across a street and overhead wiring risks are present. See Book 5, Section 5 for further hints *re* wiring.

By connecting this Auto. Cut-Out across any such looped Section, interruption of the Main Circuit is prevented in the event of a dislocation of the looped Section.



At the next impulse after an accident, the loop affected is shorted through a resistor equal to the Clocks in that loop or section, thus keeping the current strength at normal, etc. The action takes place instantly without the loss of half-a-minute impulse. A red disc appears in the indicator as a warning that the loop is out of operation.

TEST BOX.

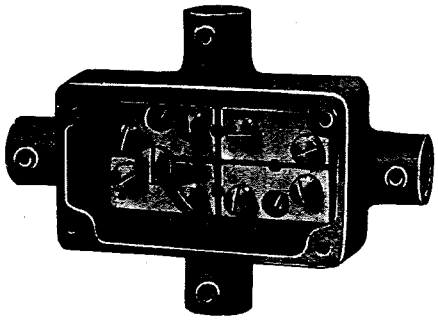


FIG. C120. JUNCTION TEST BOX.

In some large installations, it is often desirable that the wiring is led off in loops (an example of this is shown at Diagram No. 610) and for this purpose the Junction Box shown at Fig. C120 can advantageously be employed.

If it is desired to cut out a Circuit, the Screwed Plugs shown can be inserted, so that any particular Circuit can be shortened.

Prices will be quoted on receipt of details as to requirements.

For General Diagrams of Clock Circuits, see pages 25, 28, 29 and 32.

"PUL-SYN-ETIC" SYSTEM.

SUB-CONTROL of Groups of Impulse Clocks.

The Standard "Pul-syn-etic Home Transmitter" is capable of controlling the time, not only of an installation of 50 or even 100 Impulse Clocks, but also of dealing with scattered buildings over a large area, such as are found in some modern works. "The Home Transmitter" will control all the Clocks in a large city in a similar manner by the use of Sub-Transmitters.

In any such large area, it is desirable, on account of the risks to lines, often fixed overhead, to divide up into a number of separate Time Circuits or "Groups," all controlled by one Transmitter, which is then termed the "Prime Transmitter," and dealing with the separate groups by means of Sub-Transmitters.

The operation of these "groups" is dealt with mainly in two ways or systems :—

"A"—By means of Sub-Transmitters which consist of a Standard Home Transmitter with its Pendulum governed by "Reflex Control."

"B"—By means of Sub-Transmitting Relays.

With System "A" using Sub-Transmitters, a Prime Transmitter is employed, and in its Time Circuit as well as Impulse Clocks, is inserted a "Reflex" Fitment, fixed in the case of and controlling the Pendulum of a Home Transmitter, which then becomes a "Sub-Transmitter." This principle is what we call cascading, and can go on *ad infinitum*.

Now it will be obvious that, if the Prime Transmitter Circuit were extended by means of lines fixed overhead, interference with such overhead lines would break the Prime Circuit and stop the Clocks in this section. Therefore, instead of carrying the Prime Time Circuit overhead, a Sub-Transmitter may be inserted in the Prime Time Circuit to prevent the necessity of carrying this circuit overhead. If the Circuit of the Sub-Transmitter is then carried overhead, and these overhead lines do get carried away, the Prime Time Circuit and all its Clocks are unaffected, and the Sub-Transmitters are also unaffected except that they are ungoverned for the time being.

With System "B" using Sub-Transmitting Relays, the operation is generally the same, but while interference with the overhead lines will stop the action of the Sub-Transmitting-Relays and the Time Circuits they control, the Prime Time Circuit would be unaffected by such interference.

N.B.—A good deal, therefore, depends upon the proportion of Clocks in each group, as to whether Sub-Transmitters or Sub-Transmitting Relays be used. With a fairly large Prime Time Circuit, and one or two distant Clocks, Sub-Transmitting Relays will suffice, but where subsidiary groups of Clocks are of equal importance to the Prime Time Circuit, then Sub-Transmitters are recommended, although somewhat more expensive.

The Prime Transmitter may itself be controlled from Greenwich or other Observatory. For "See-Saw" Control—see Book 5, Section 4.

"PUL-SYN-ETIC" SYSTEM.

SUB-CONTROL Apparatus.

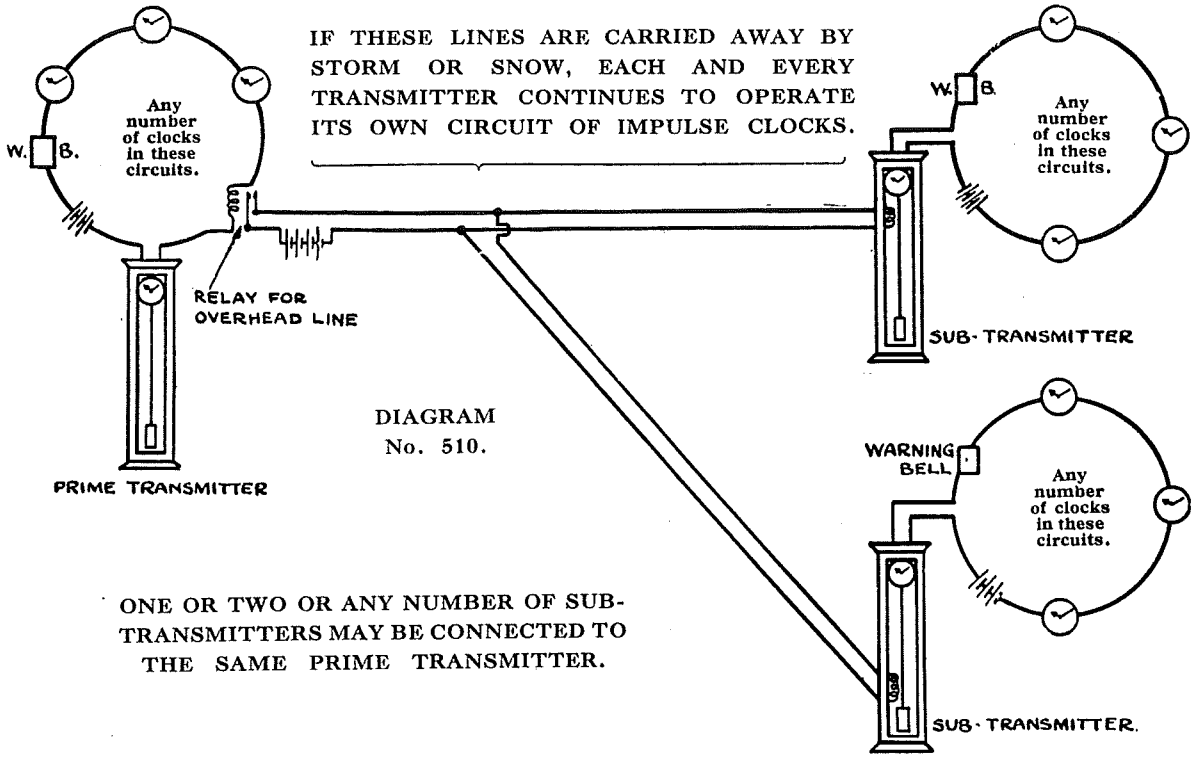


DIAGRAM No. 510.

ONE OR TWO OR ANY NUMBER OF SUB-TRANSMITTERS MAY BE CONNECTED TO THE SAME PRIME TRANSMITTER.

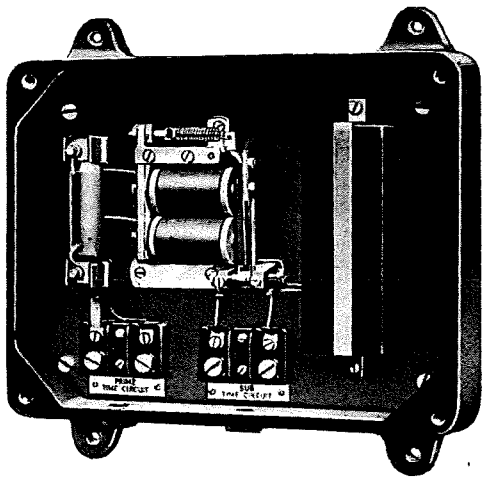


FIG. C63.

(E)

SUB-TRANSMITTER. "Reflex Control," as Fig. C104, page 26, fitted to the pendulum of any standard Home Transmitter chosen, making it thereby a Sub-Transmitter to operate as System "A."

PRICE, each. Add to price of Transmitter chosen, **£5 12 6.** Code word : **zoeln**

SUB-TRANSMITTING RELAY. Fig. C63, impulsing a Sub-Time Circuit. Of suitable construction, correctly proportioned electro-magnet, heavy contacts of gold alloy, all mounted on cast-iron base with shunt and condenser, and contained in suitable case, to operate as System "B."

This Sub-Transmitter Relay is so constructed that the current in the Time Circuit which it closes, has a slightly longer duration than that of the Time Circuit operating it.

PRICE, each ... **£5 4 0.** Code word : **zoebd**

OVERHEAD-LINE RELAY. Fig. C106, for use when required for guarding Prime Transmitter Time Circuit, as shown in Diagram No. 510 above. Suitable magnet and armature, with gold alloy contacts. All on cast-metal base, with condenser, etc., in cast-iron case with removable front.

PRICE, each ... **£5 4 0.** Code word : **zoecf**

"PUL-SYN-ETIC" SYSTEM.

"REFLEX" Pendulum Control.

For Workmen's Recorders or any type of clock with Pendulum.

N.B.—We do not make Workmen's Time Recorders, but can fit "REFLEX" Control to those you now have and use.

The introduction of the "Pul-syn-etic" Electric Impulse Clocks for Industrial purposes has resulted in universal and accurate time being available throughout the factory, works, etc., where installed. The bringing in line of Workmen's Time Recorders with such a system was originally accomplished by fitting an impulse driven escapement to the time gear in lieu of the spring driven escapement.

With the Patent "Reflex Control" the clock mechanism of such Recorders remains intact, the controlling device operates on the pendulum, which is given a slight losing rate, and by this means when controlled by Reflex keeps the time—and consequently the printing—uniform with the other time clocks.

As will be seen from the illustration, the "Reflex Control" consists of a small attachment secured to the existing pendulum which is engaged by a rack attached to an electro-magnet energised by the half-minute impulse of the system.

The "Reflex Control" can be fitted to existing or new Recorders of any modern make using a pendulum.

You can fit the "Reflex."

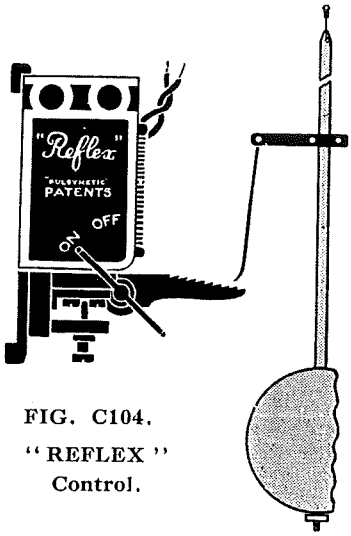


FIG. C104.
"REFLEX" Control.

FIG. C104. REFLEX CONTROL FITMENT, including "Stator" for fixing to case and "Vibrator" for clipping on existing pendulum rod. (E)

PRICE, **£4 10 0.** Code word: **ziybd.**

If Recorder or Clock is sent to these Works for fitting. **£5 12 6.** Code word: **zoejl**

WHEN A BALANCE WHEEL MECHANISM operates any form of Recorder, or where desired, a half-minute Electrical 'Scapement can be fitted at the same price as the "Reflex" or the Recorder can be actually "impulsed" or driven at half-minute or minute impulses, as desired.

For further and fuller details, see "Unification of Workmen's Recorders," Book 7, Section 4.

SPECIAL REGULATION OF TRANSMITTER PENDULUM.

Where "Reflex Control" obtains on the Pendulums of Sub-Transmitters, of Workmen's Recorders, or of other Clocks, the time of the Prime Transmitter must not be altered suddenly as by "stopping" for the few seconds necessary, or "advancing" by pulling the "half-minute cord" (otherwise the "Reflex" Control will not function properly until reset), but the regulation of the Prime Transmitter Pendulum must be made by an adjusting-weight.

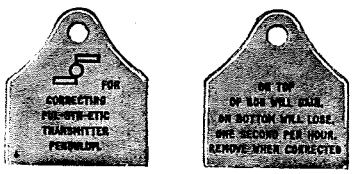


FIG. C108.

Such properly designed adjusting-weight is illustrated at Fig. C108.

To make the Pendulum go "fast," place the weight on the top of the Pendulum Bob, in the space provided. To make the Pendulum go "slow," the weight should be placed on the rating nut below the Pendulum Bob until the system is brought to time. Then remove and hang the weight on the hook provided for its reception in the Transmitter Case.

PRICE, each ... **1/-.** Code word: **zohpy**

OBSERVATORY CONTROL. Weight may be added, or deducted Automatically to the Pendulum by a local or other "Observatory Signal." For "See-Saw" Observatory Control, see page 5 and Book 5, Section 4.

"PUL-SYN-ETIC" SYSTEM.

SERVICE MAINS

Now that the Grid System of A.C. makes Service Mains available throughout this Country and Ireland, it should be remembered that :—

A.C. from the Mains can be employed to operate "Pul-syn-etic" Electric Clocks—**DIRECT or preferably with an Accumulator.**

If either **A.C.** or **D.C.** are available, an Accumulator is desirable but not essential, but an accumulator trickle-charged is recommended.

If high voltage is to be eliminated or D.C., the Accumulator is recommended in duplicate.

We are often told the current from the Mains never "goes off," even for a few seconds in good Installations, but experience has shown that, while such instructions are given by the Management, the instructions are not always carried out, and Transmitters accordingly stop sometimes from this cause. Consideration should, therefore, be given to the small extra cost only entailed by an Accumulator and the Switchboards shown below.

For details of Accumulators, voltage, etc., see para. 12*a Section* 5.

CHARGING BOARDS and UNITS

For Impulse Clocks on Service Mains.

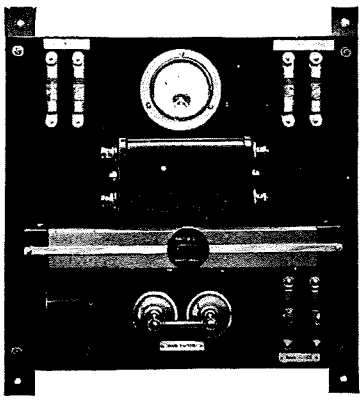


FIG. C2164. Charging Board for Clock Circuits from A.C. Mains.

Consisting of All-Metal Rectifier, Transformer, Adjustable Resistance Double Pole Main Switch, Milli-Ammeter, Double Pole Main Fuses, Double Pole Charge Fuses, Double Pole Discharge Fuses. All suitable for Trickle Charging an Accumulator Battery.

Mounted on Panel with fixing battens. Generally as illustrated, approximately 16 × 16.

PRICE, each **£14 - 0 - 0.**

Code Word : **zolma**

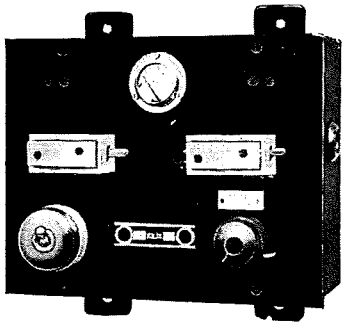


FIG. C151. Charging Unit for Clock Circuits from A.C. Mains.

FIG. C151. For A.C.

Consisting of Transformer, All-Metal Rectifier, Adjustable Resistance, Milli-Ammeter, Single Pole Fuse for charging and for Clock Circuit and D.P. Main Switch.

All mounted on Insulated Panel with all live Parts enclosed at back of same. Protected in stout Sheet Iron Case with Fixing Lugs and Insulated Bushes. Generally as shown. PRICE, each **£6 - 0 - 0.**

Code word : **zomna.**

FIG. C152. For D.C. Mains.

Generally as above, but without Transformer and fitted with Two Rectifiers and Double Pole Main Switch. PRICE, each **£6 - 0 - 0.**

Code word : **zomor**

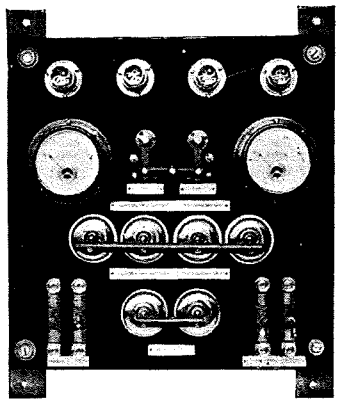


FIG. C2154. Charging Board for Clock Circuits from D.C. Mains.

Consisting of four Lamp Holders (to govern current to two Batteries), DoubleAmmeter, Voltmeter, Pole Main Switch, Change-over Switch (i.e., Coupled Switches for controlling Charge and Discharge of the two Batteries), Double Pole Fuses for Charging Circuit, Double Pole Fuses for Clock Circuit. All mounted on Panel and with fixing battens. Generally as illustrated, approximate size 16 × 16.

(E)

PRICE **£11 - 10 - 0.**

Code Word ... **ziyuz**

Extra to FIG. C151 or FIG. C152. Charging Units if mounted with terminals at front of insulated panel, and in Cast-Metal Case with hinged front, suitably glazed and with screw-down fastening.

EXTRA PRICE, **£1 - 10 - 0, FIG. C150.** Code word : **zompe**

N.B.—Any of the above Charging Units may be connected to any Branch of Supply Mains provided that a 3 *or* 5 *amp. Fuse exists in same.*

For Accumulators, see page 30.

PUL-SYN-ETIC ELECTRIC CLOCK SYSTEMS

"PUL-SYN-ETIC" SYSTEM.

A.C. SERVICE MAINS.

(1)—**DIRECT**—by putting in a Transformer to ensure the voltage being rendered suitable for the Clock Circuit and a Westinghouse all-metal Rectifier (full-wave) so that the current supplied to the Clock Circuit becomes direct, such an arrangement is shewn at diagram below.

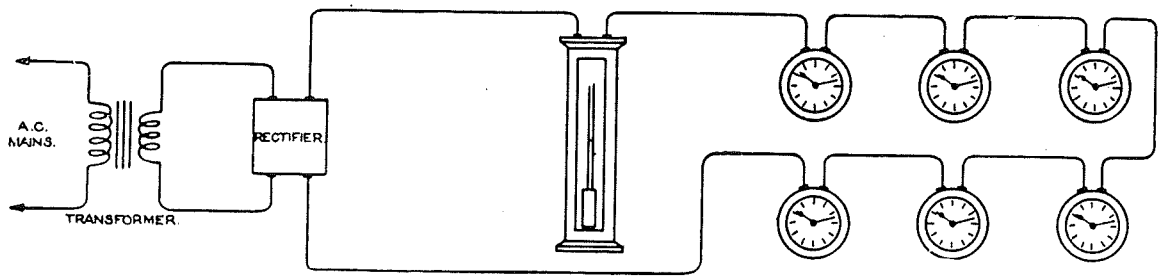


DIAGRAM C520.

Showing a "Pul-syn-etic" Clock System driven direct off A.C. Mains.

If the current is cut off from the mains for a few seconds, or for half-a-minute, the Clocks lose an impulse, and therefore, the Transmitter may stop or the Impulse Clocks be slow, so that the after-mentioned Accumulator is desirable.

(2)—BY ACCUMULATOR. We, therefore, recommend the addition of a Trickle-Charged Sealed Accumulator which is merely put across the Circuit, as shewn in diagram below.

Then it does not matter if the current is cut off from the Mains for testing purposes for a few seconds or for an hour or more. The Transmitter and the Impulse Clocks will still go on keeping their uniform good time.

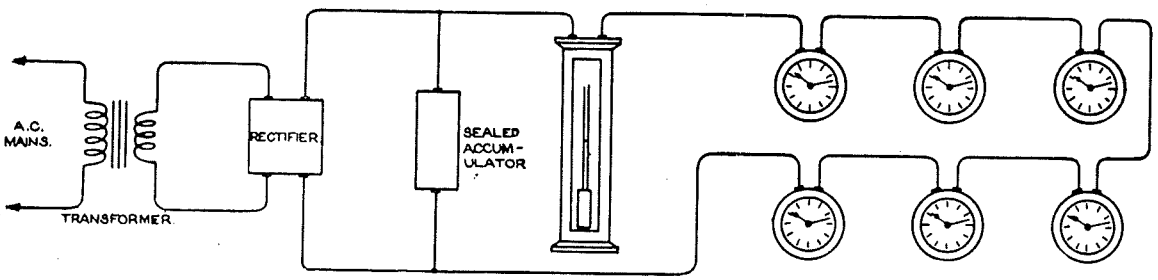


DIAGRAM C514.

This Diagram shows the method of using the A.C. on "Pul-syn-etic" Clock Circuits with a Trickle-Charged Accumulator.

A.C. is taken from the Mains, transformed to the voltage required, rectified by the Westinghouse all-metal Rectifier, and it then puts a trickle charge into the small Sealed Accumulator.

This trickle current keeps the small Accumulator fully charged, so that if the A.C. is cut off for testing or other purposes, the Transmitter and the Impulse Clocks "carry on."

The essential fitments for effecting a trickle charge as Diagram C514 above, can be supplied mounted on Switchboard for convenience of fixer. See page 27.

For Prices of Accumulators, see page 30.

For details of Voltage, etc., see paragraph 12a, Section 5, Book 5.

"PUL-SYN-ETIC"
ELECTRIC CLOCKS AND SERVICE MAINS.
D.C. SERVICE MAINS.

D.C. from the mains can be employed to operate "Pul-syn-etic" Electric Clocks—**DIRECT or by Accumulators.**

(1)—DIRECT—by putting in the circuit carbon lamps or other fixed resistances to limit the current on the Clock Circuit to approximately ¼ amp. Metal filament lamps will not do.

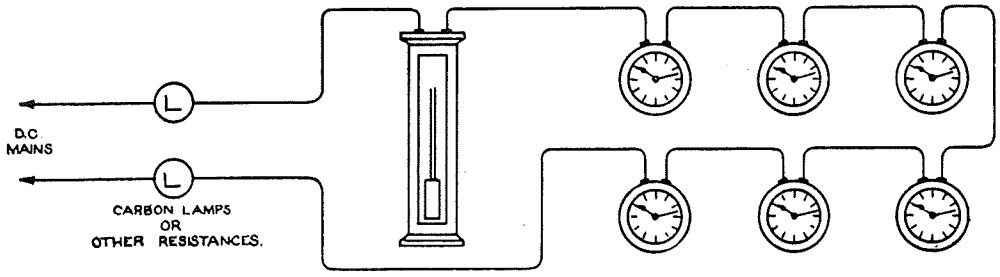


DIAGRAM C515.

"Pul-syn-etic" Impulse Clocks driven direct off D.C. Service Mains.

Note the Carbon Filament Lamps in circuit to keep the current about 0·22 or approximately ¼ ampere.

Caution is necessary for two main reasons :—

a.—The voltage of the D.C. Mains comes directly on to the Transmitter and the Impulse Clocks. Consequently, incombustible Impulse Clocks should be employed, and Attendants should be aware that a shock from the Circuit is possible.

b.—If the current is cut off from the mains for a few seconds, or for half-a-minute, the Clocks lose an impulse, and therefore, the Transmitter may stop or the Impulse Clocks be slow.

(2)—BY ACCUMULATORS. These are charged by the D.C. Mains. In order to keep the voltage of Mains from the Clock System, and to guard against surgings which occur through starting motors and heavy loads, etc., two Batteries of Cells are advised, the second battery always charged ready to switch in.

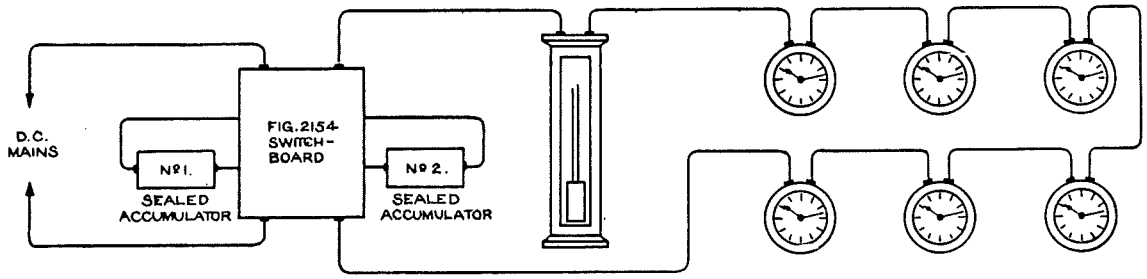


DIAGRAM C516.

"Pul-syn-etic" Impulse Clocks driven off D.C. Service Mains with two batteries of Accumulators, one always in use, the second being charged as a stand-by.

All the essential fitments for effecting the charge to the duplicate batteries are supplied mounted on a Switchboard for the convenience of the fixer. See page 27.

For prices of Accumulators, see page 30.

For details of Voltage, etc., see paragraph 12a, Section 5, Book 5.

PUL-SYN-ETIC ELECTRIC

"PUL-SYN-ETIC" SYSTEM.

ACCUMULATORS

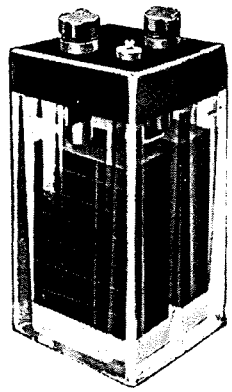


FIG. C6543. ACCUMULATOR. 2-volt.

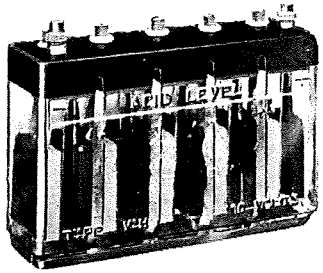


FIG. C6551. ACCUMULATOR. 10-volt block.

Where an Electric Supply is available, it is a great advantage to install Accumulators instead of Leclanche Cells for operating "Pul-syn-etic" Clocks, mainly because of the absence of attention and renewals. A Trickle Charging Current is small and "gassing" does not take place, therefore, the Cells do not require frequent "topping up."

Such Cells are non-sulphating and only require filling with 1·215 acid to be ready for use. (It is advantageous, however, to give them a first charge as directed on the Cell or to give them an increased trickle charge for a few weeks only and then to drop down to the normal charge).

The best service is obtained from a small capacity Sealed Accumulator kept constantly charged by a Trickle Current from the mains. One or more Fig. C.6551—10-Volt Blocks illustrated above should be installed according to size of System. For example, 3 such Blocks are sufficient for an Installation of 35-12 inch Clocks, and occupy a negligible amount of space. The Trickle Charging Unit may conveniently be Fig. C.151 (shown on page 28), if the supply is A.C. or Fig. C.152 if D.C. The Trickle current is absolutely negligible being approximately 6 milli-amps only.

Fig. C.6561 Block should be used when the same Battery has to operate a "Waiting-Train" Movement or has to ring Bells, also Fig. C.6543 or C.6543a should be used when only periodical charging is practiced, in conjunction with Charging Board Fig. C.2154.

For details of Voltage, etc., see para. 12a, Section 5.

Catalogue Fig. No.	C6543	C6543a	C6551	C6561
Voltage per cell, or block	2	2	10 volt	10 volt
Capacity in A.H., intermittent discharge ...	20	45	5	10
Normal discharge not to exceed in amps. ...	$\frac{1}{4}$	$\frac{1}{2}$	—	—
Recharging current should not exceed ...	$\frac{1}{2}$	1	$\frac{1}{4}$	$\frac{1}{2}$
Approximate dimensions	$2\frac{3}{4}'' \times 2\frac{3}{4}''$ $\times 5\frac{1}{4}''$ high	$3\frac{1}{4}'' \times 3\frac{1}{4}''$ $\times 7\frac{5}{8}''$ high	$2\frac{7}{16}'' \times 7''$ $\times 5\frac{1}{4}''$ high	$3\frac{1}{4}'' \times 8\frac{5}{8}''$ $\times 6\frac{1}{4}''$ high
Weight in lbs., including acid	$3\frac{3}{4}$	7	6	$11\frac{1}{4}$
"Accumulator" acid required, in pints ...	$\frac{1}{3}$	$\frac{3}{3}$	$\frac{3}{4}$	$1\frac{1}{2}$
PRICE, per cell (excluding acid) ...	**4/6**	**8/6**	**6/3**	**12/-**
Code words	**zohyp**	**zoijm**	**zokal**	**zomro**

LEAD STRAPS for connecting-up cells and units, as illustrated at Fig. 6543c.
PRICE, per dozen ... **5/-** Code word ... **zoips**

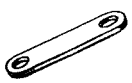


FIG. 6543c.

"PUL-SYN-ETIC" SYSTEM.

Battery for Impulse Clocks (H)

We cannot too strongly emphasize the fact that the quality of the Battery and its housing are most important factors in the Clock Installation.

In the majority of cases we recommend a battery of high-efficiency Leclanche cells for such purpose and the "Heavy-Duty" Cells illustrated below are recommended for such work, and when housed in the Fig. 1048 filleted and felted "showcase airtight" Battery Box, form a very efficient and reliable source of energy, protected from evaporation and external damage.

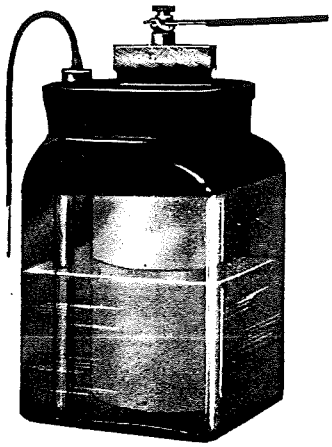


FIG. 1046. "HEAVY-DUTY" CELL.

FIG. 1046. LECLANCHE CELLS. "Heavy-Duty" (three-pint size), specially prepared Porous Pots and Zinc Rods, including Salammoniac, Porous Pots fitted with "Tangent" Patent Anti-Vibration Terminals.

PRICE, per dozen ... **£2 17.**

Code word : **ziycf**

FIG. 1048. AIRTIGHT BATTERY BOX, in well-seasoned wood, with square dove-tailed joints, removable lid provided with filleted and felted airtight and dust-proof joint.

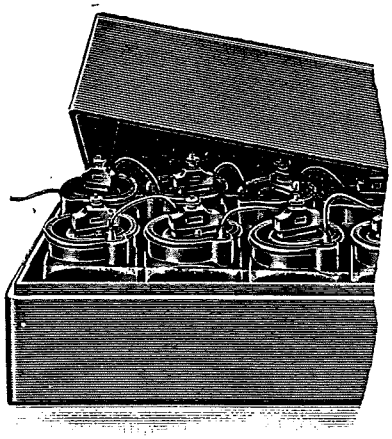
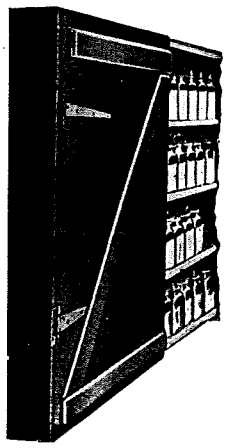


FIG. 1048. AIRTIGHT BATTERY BOX (Showing cells in position)

PRICES (Boxes only), each		Code word			Code word
6-Cell Box ...	**£1 2 0**	**ziyev**	10-Cell Box	**£1 7 3**	**ziyjl**
8-Cell Box ...	**1 4 9**	**ziyhk**	12-Cell Box	**1 13 0**	**ziyln**

N.B.—The above Boxes are supplied in three-pint size only.

Cells fitted in these boxes need no attention whatever for many months, we have known such batteries to operate Clock Circuits for considerably over 15 months without any attention, and the cells to last in operation for 5 or 6 years.



BATTERY CUPBOARD.

BATTERY CUPBOARD. Heavy Duty Leclanche Cells may be housed in a suitable Battery Cupboard where such is available or obtainable. Such a Cupboard should be arranged so that it is only one cell deep, and should be show-case air-tight to prevent undue evaporation, and to be efficient.

As these vary in size and detail, they are mostly made and erected by the Purchaser, but special PRICES are quoted, when desired, on application.

DRY CELLS. Dry Cells will operate the "PUL-SYN-ETIC" System efficiently when this type of Cell is preferred and it is not necessary that the box or cupboard containing same be air-tight. But so much depends upon the Time Circuit that a reliable cell must be used, not the cheapest cell obtained from any dealer.

The "Cogent" Cell made and stocked by us, and illustrated here, is ideal for Clock Circuits.

	Size No. 60	Size No. 7
"COGENT" DRY CELLS	**Round**	**Square**
PRICES, each	**3/0**	**4/3**
Code word	**yuhzy**	**yuhte**

These Cells may be housed in any convenient cool situation in Box or Cupboard, where they are protected from dust, dirt, and interference.

"COGENT" DRY CELL.

"PUL-SYN-ETIC" SYSTEM.

Clock Circuits. Simple Series.

All Clocks must be connected in simple series, as illustrated in Diagram No. 506, and the method shown of running a single wire round the building should be followed when convenient.

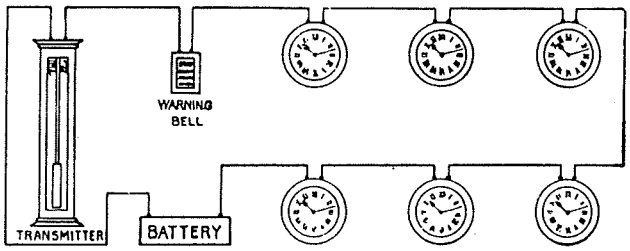


DIAGRAM No. 506.

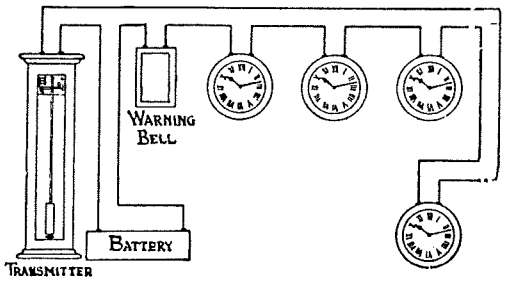


DIAGRAM No. 507.

The layout of the building, however, sometimes makes it more convenient to run the return wires as shown in Diagram No. 507, and it will be observed that the principle of series wiring is adhered to here also.

Clock Circuits with Time Signals.

Time Signal Sounders can be added to any simple Clock circuit. Any wooden case Impulse Clock can form the contact-maker or special contact-maker employed see pages 20, 21 and 22. Diagram No. 609 shews the connections.

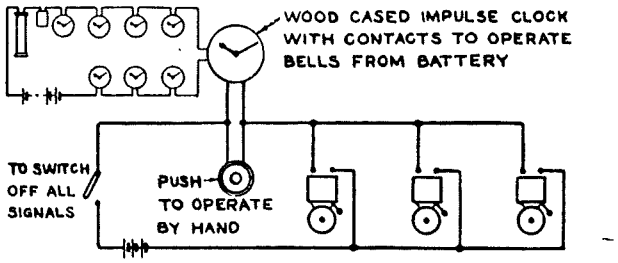


DIAGRAM Nº 609

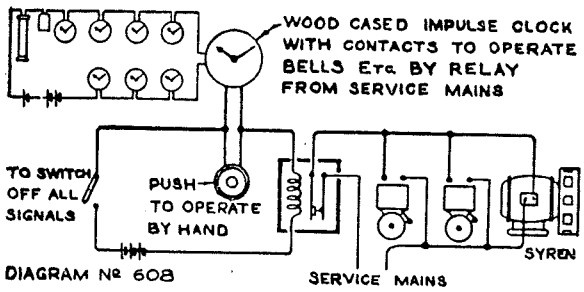


DIAGRAM Nº 608

With a large number of Bells, or when current is taken from the service mains, the Clock contacts are employed to operate the coils of a Relay, and the heavy current used to operate large Bells or a number of Bells, and also to automatically operate, say, a Syren taking a $\frac{1}{16}$ h.p. or more, is passed by the Relay contacts. Diagram 608 shows such a Relay added to the System. See pages 20, 21 and 22.

" PUL-SYN-ETIC " SYSTEM.

PROCESS-TIMING

(FOR THE INDUSTRIES)

IMPULSE CLOCK.

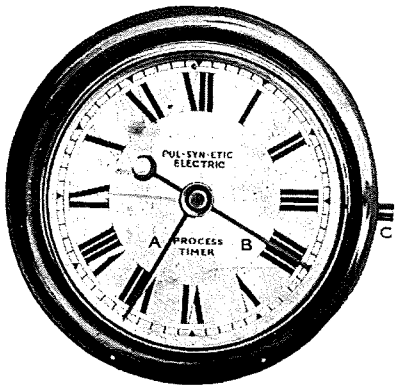


Fig. C39.

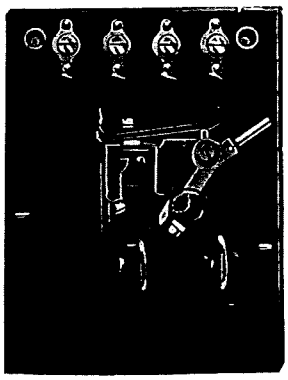


Fig. 263. RELAY, with Cover Removed (Bell Stop).

This " Process Impulse Clock " takes the standard current of a " PUL-SYN-ETIC " Circuit, i.e., 0·22 ampere, and can be connected in any existing Circuit where desired.

It is designed for any Industrial Process, and it rings a Bell when any number of minutes or hours have elapsed as in :—

Baking bread, biscuits, etc.
Vulcanising Rubber and Ebonite, etc.
Artificial Silk Processes, etc.

The Standard Clock is an Impulse Wall Clock with a 12-inch Dial. When a Process does not exceed 59 minutes, a Standard Dial face is employed. If, however, a process takes upwards of an hour (it may be 4 or 5 hours) then a special Dial face is fitted.

An adjustable Hand Stop marked " A " is provided. This is adjusted to the number of minutes required at the will of the operator by a milled nut projecting from the Glass front of Clock.

When the moving finger " B " starting from zero reaches this adjustable hand stop, a Bell of pre-determined size will ring, by a suitable battery, until stopped by re-setting the Relay provided.

When re-starting a Process, it is only necessary to press the Button and momentarily hold same pressed, shown at " C " on the Clock Case, when the hand flies back to zero and timing commences.

This action of so re-starting, also re-sets the Relay for the next call, and the hand at once begins to advance in half-minute impulses, making contact in due course and so ringing the Bell again, after the time arranged for has elapsed.

PRICE on application. Code word: **zoizd.**

"PUL-SYN-ETIC" SYSTEM.

SOME PROMINENT USERS. SOME NAMES YOU KNOW.

SEND FOR MORE COMPREHENSIVE LIST IF REQUIRED.

GOVERNMENT WORKS, Etc.

Admiralty, London.
Air Ministry.
Canterbury Barracks.
Crown Agents for the Colonies, London.
H.M. Dockyard, Chatham.
H.M. Dockyard, Portsmouth.
H.M. Dockyard, Rosyth.
H.M. Dockyard, Woolwich.
H.M. Office of Works, London.
H.M. Post Office, London.
India Office, London.
India House, London.
India Store Depot, London.
School of Military Engineering, Chatham.
War Office, London.

PROPRIETARY FIRMS.

Bells United Asbestos Co., Ltd., Rickmansworth.
Boots, Ltd., (Chemists), Bath.
Brand & Co. Ltd. (Sauce), London.
British Enka Artificial Silk Co., Aintree, Liverpool.
Bryant & May, Ltd. (Matches), Liverpool.
Cadbury Bros., Ltd. (Chocolate), Bournville.
Chilprufe Manufacturing Co. (Underwear), Leicester.
Columbia Graphophone Co., Ltd., London.
Courtaulds, Ltd. (Art Silk), Coventry.
Crosse & Blackwell, Ltd. (Pickles), London.
Fairy Dyes, Ltd. (Dyes), Glasgow.
Horlicks' Malted Mlik Co., Slough.
James Pascall & Co., Ltd. (Sweets), Mitcham, Surrey.
J. S. Fry & Sons, Ltd. (Chocolate), Bristol.
J. Terry & Sons, Ltd. (Chocolate), York.
Macfarlane, Lang & Co., Ltd. (Biscuits), Glasgow.
Planters Margerine Co., Ltd., New Ferry.
Platt Bros. & Co., Ltd. (Engineers), Oldham.
Reckitt & Sons, Ltd. (Blue), Hull.
Singer Mfg. Co., Ltd., (Sewing Machines), Clydebank.
Synthetic Ammonia Ltd., (Chemicals), Stockton-on-Tees.
Tootall, Broadhurst, Lee & Co., Ltd. (Fabrics), Manchester.
W. & R. Jacob & Co. (Biscuits), Dublin and Liverpool.
W. D. & H. O. Wills (Tobacco), Bristol.
W. Dunmore & Son (Biscuits), Wigston and London.
W. Crawford & Sons (Biscuits), Liverpool.
Wm. Gossage & Sons, Ltd. (Soap), Widnes.
Wolsey Ltd. (Underwear), Leicester and Keighley.

EDUCATIONAL ESTABLISHMENTS, Colleges, Schools, Churches, Etc.

Aberavon Town Hall.
Borough Polytechnic, London.
Chequer Road Girls' High School, Doncaster.
County Hall, Cardiff.
Grammar School, Thorne.
Gulval Church, Penzance.
"Henry Mellish" County Secondary School, Basford.
Herts. Training School Ltd., Ware.
Holy Trinity Church, Southport.
Merchant Venturers' Technical College, Bristol.
Moray House Training College, Edinburgh.
Municipal Secondary Schools, Swansea.
New Central School, Farnworth.
Northampton Polytechnic Institute, London.
Oratory School, Reading.
Pipworth Road School, Manor Estate, Sheffield.
Reading University.
Royal Military College, Sandhurst.
Rugby School, Rugby.
School of Arts and Crafts, Peckham Road, London.
Selwyn College, Cambridge.
Southampton Education Committee.
St. Augustine's Church, Norwich.
St. George's Church, Leicester.
St. Giles' Church, Cambridge.
St. James, West Malvern.
St. Luke's Church, Leicester.
St. Nicholas Church, Leicester.
St. Thomas' College, Newbridge, Ireland.
Taunton's School, Southampton.
Technical and Art Colleges, Leicester.
The University, Bristol.
University College, Cardiff.
University College, Leicester.
Westminster Public Library.
Wyggeston Boys' Schools, Leicester.

MOTOR CAR MANUFACTURERS.

Albion Motor Car, Ltd., Glasgow.
Armstrong Siddeley Motors, Ltd., Coventry.
Arrol Johnston, Ltd., Dumfries.
Daimler Co., Ltd., Coventry.
Dennis Bros., Guildford, London.
Ford Motor Co., Ltd., London.
Halleys Industrial Motors, Ltd., Glasgow.
James Cycle Co., Birmingham.
Lanchester Motor Co., Ltd., Birmingham.
Morris Motors (1926) Ltd., Radiator Branch, Oxford.
Rolls-Royce Ltd., Derby.
Standard Motor Co., Coventry.
Sunbeam Motors, Wolverhampton.
Swift Motor Co., Ltd., Coventry.
Vauxhall Motors, Ltd., Luton.

HOSPITALS, INFIRMARIES, HOTELS, Etc.

Cardiff Mental Hospital.
City Mental Hospital, Leicester.
Faire's Hospital, Leicester.
Grand Hotel, Leicester.
Grove Park Hospital, London.
Hatton Sanatorium, Warwickshire.
Haven Hotel, Sandbanks.
High Wood Hospital, Brentwood.
Hospital for Sick Children, Tadworth Court.
Leasowe Children's Hospital.
Leicester City Isolation Hospital and Sanatorium.
Leicester and Rutland Mental Hospital.
Loughborough Hospital, Leicestershire.
Motherwell Hospital, Glasgow.
Motherwell Maternity Home, Glasgow.
Metropolitan Asylums Board, London.
New Palace Hotel, Paignton.
North Evington Infirmary, Leicester.
Park Prewett Mental Hospital, Basingstoke.
Poor Law Infirmary, Rochdale.
Royal Hospital, Halifax.
Royal Infirmary, Leicester.
Seamen's Hospital, Greenwich.
Selly Oak Hospital, Birmingham.
St. Luke's Hospital, Lowestoft.
St. Thomas's Hospital, London.
Tooting Bec Hospital, London.
War Memorial Hospital, Woolwich.
West Riding Hospital, Wakefield.
Weavers' New Convalescent Home, Poulton-le-Fylde.
Wishaw Hospital, Glasgow.
Winson Green Mental Hospital, Birmingham.

"PUL-SYN-ETIC" SYSTEM.

SOME PROMINENT USERS. SOME NAMES YOU KNOW—*Continued.*

CORPORATIONS, POWER STATIONS, TRAMWAYS, Etc.

Ballymena Town Hall.
Barking Power Station.
Birkenhead Fire Station.
Blackburn Corporation Tramways.
Blackpool Corporation Tramways.
Bradford City Tramways Offices.
Carville Power Station, Wallsend-on-Tyne.
Chesterfield Corporation Tramways and Electricity Works.
Coalville Memorial Tower.
County Hall, Cardiff.
Deptford Power Station (London Power Co.).
Essex County Council, Chelmsford.
Glasgow City Electricity Works.
Glasgow City Tramways.
Hull City Tramways.
Leamington Public Clock.
Leeds City Tramways.
Leek Memorial Tower.
Leicester City Electricity Works.
Leicester City Fire Station.
Municipal Offices, Salisbury.
Newcastle-on-Tyne Electricity Supply Co.
Portishead Power Station, Bristol.
Reddish Memorial Tower.
Salford Corporation, Agecroft Power Station.
Shropshire, Worcestershire and Staffordshire Electric.
Southall Town Hall.
South Wales Electrical Power and Distribution Co., Pontypridd.
South Wales Power Co., Treherbert.
Spenny Moor U.D.C. Offices.
St. Helen's Town Hall.
Stirling Town Hall.
Syston Memorial Tower, Leicestershire.
The Council House, Coventry.
Torquay Town Hall.

RAILWAYS, FERRIES, DOCKS, Etc.

Aberdeen Joint Station.
Berwick Station, L.N.E.R.
Birkenhead Corporation Ferries.
Birmingham & Midland Motor Omnibus Co., Ltd., Leicester, Birmingham, etc.
Bridlington Station, L.N.E.R.
Brighton Station, S. Railway.
Bristol Goods Station, G.W.R.
Camden Town Goods Station, L.M.S.
Crewe Station, L.M.S.
Dublin, Amiens Station.
Hull Docks.
Liverpool Overhead Railway.
Locomotive Works, Derby, L.M.S.
Manors Station, Newcastle-on-Tyne, L.N.E.R.
Mersey Railway, Liverpool.
Newport (Mon.) Station, G.W.R.
Newton Abbot Station, G.W.R.
Nuneaton Station, L.M.S.
Paddington Station, G.W.R.
Port of London Authority.
Riverside Station, Hull, L.N.E.R.
St. Pancras Station, L.M.S.
Stoke-on-Trent Station, L.M.S.
Tilbury Dock Station, L.M.S.
Wallasey Ferries, Liverpool.
Whitley Bay Station, L.N.E.R.
Willesden Junction, L.M.S.
York Station and Offices, L.N.E.R.

OTHER PROMINENT USERS.

Avery, W. & T., Ltd., Birmingham.
Asquith, W., Ltd., Halifax.
Adamson, G. L., Ltd., Rochdale.
Automatic Standard Screw Co., Halifax.
Anglo Enamelware, Ltd., Stourport.
Anglo-Persian Oil Co., Ltd., Abadan, Persia.
Ambler, Thos. & Sons, Wakefield.
Arbro, Ltd., London.
Arks Publicity, Ltd., London.
Arts Theatre Club, London.
Armstrong Whitworth, Newcastle & Walker-on-Tyne.
Atkins Bros., Hinckley.
Baburizza & Co., London.
Bairstow, T. & M., near Keighley.
Barlow & Jones, Ltd., Bolton.
Bastard, J. & W., Keighley and Leicester.
Bates, W. & A., Ltd., Leicester.
Bedford Cinemas, Ltd., Birkenhead.
Belling & Co., London.
Bemrose & Sons, Ltd., Derby.
Birkenhead Corporation Fire Station.
Birmingham Small Arms Co., Ltd., Birmingham.
Blakeborough, J. & Sons, Ltd., Brighouse.
"Blue Bird" Toffee, Hunnington.
Bolton, T. & Son, Leicester.
Bolton, J. A., Leicester.
Bolton Eagle Spinning Co., Ltd., Bolton.
Boots Pure Drug Co., Ltd., Nottingham.
Boulton & Paul, Ltd., Norwich.
Bristol Goldsmith's Alliance.
Brecknell, Munro & Rogers, Ltd., Bristol.
British Oxygen Co., Ltd., Birmingham.
British Quilting Co., Waterfoot.
British Engine, Boiler and Electrical Insurance.
British Thomson-Houston Co., Ltd., Rugby.
British Electrical Engineering and Machinery Co.
British Art. Silk, Ltd., Kirkcudbright.
British Broadcasting Corporation, London.
British Broadcasting Corporation, Birmingham.
Brockhouse & Co., Ltd., West Bromwich.
Brown, T. & Co., Ltd., Leicester.
Broom & Wade, Ltd., High Wycombe.
Bryant & May, Ltd., London.
Burndept, Ltd., London.
Burntisland Shipbuilding Co., Ltd., Burntisland.
Burrel, A. G. & Co., Ltd., Sheffield.
Butlin, J. T. & Son, Ltd., Rothwell.
Butterfly Co., Ltd., Alfreton.
Carborundum Co., Ltd., Manchester.
Cassiobury Park, Watford.
Cammell Laird & Co., Ltd., Birkenhead.
Cadbury Bros., Bournville.
Chadburn's (Ship) Telegraph Co., Ltd., Bootle.
Chance & Hunt, Ltd., Oldbury.
Charnley & Sons, Leicester.
Clayton Wagons, Ltd., Lincoln.
Clarke, T. & Co., London.
Clifford, C. & Son, Ltd., Birmingham.
Components, Ltd., Birmingham.
Cooper Roller Bearing Co., Kings Lynn.
Cooper, McDougall, Ltd., Berkhamsted.
Co-operative Wholesale Society, Ltd., Cardiff.
Co-operative Wholesale Soc., Ltd., Manchester (New Bank).
Corah, N. & Sons, Ltd., Leicester.
Courtaulds, Ltd., Wolverhampton.
Coventry Electrical & Engineering Co. Coventry.
Coventry Swaging Co., Ltd., Coventry.
Colville & Sons, D., Motherwell.
Crowther, W. & E., Ltd., Slaithwaite.
Davies, A., Ltd., Manchester.
De Montfort Hall, Leicester.
Derry's, Plymouth.
Dunlop Cotton Mills, Rochdale.
Dunlop Rubber Co., Ltd., Fort Dunlop.
Eatoughs, Ltd., Earl Shilton.
Evington Cinema, Leicester.
Excelsior Wire Rope Co., Ltd., Birmingham.
Faire Bros. & Co., Ltd., Leicester.
Frear's & Black's Bread Co., Leicester.
Friends Trust Corporation, London.
Galleries Lafayette, Ltd., London.
Gimson & Co., Ltd., Leicester.
Glasgow Co-operative Society.
Gossage & Sons, Ltd., Widnes.
Grant & Son, Newcastle-on-Tyne.
Greenwood & Co., Ltd., Leicester.
Graves' Park Pavillion, Sheffield.
Grieve, T. & Co., Ltd., Leicester.
Haddon Hall, Derbyshire.
Herbert, Alfred, Ltd., Coventry.
Hollins, Wm. & Co., Ltd., Pleasley.
Holloway Bros., London.
Hunt & Winterbottom, Dursley.
Iliffe & Sons, Ltd., Publishers, London.

"PUL-SYN-ETIC" SYSTEM.

OTHER PROMINENT USERS—*Continued.*

Institution for the Blind, Leicester.
International Holidays & Investment Co.
Jackson Buckle, Birmingham.
Jenner & Co., Ltd., Birmingham.
Johnson & Barnes, Ltd., Leicester.
Johnson, Joseph & Co., Ltd., Leicester.
Jones & Attwood, Ltd., Stourbridge.
Kynoch, Ltd., Birmingham.
Lea Recorder Co.
Leicester Co-operative Society, Braunstone.
Leicester Mail, Leicester.
Leicester Mercury, Leicester.
Lewis, J. B. & Sons, Ltd., Nottingham.
Lloyds Bank, Paignton.
Lucas Electrical Co., Ltd., Birmingham.
Martin's Bank, Ltd., London.
Manchester and Salford Equitable Co operative.
Mitchells & Butlers, Ltd., Birmingham.
Model Laundry, Fordingbridge.
Morley, T. & Sons, Leicester.
Mobbs & Lewis, Ltd., Kettering.
Macintosh & Co., Ltd., Manchester.
Madame Tussaud's, Baker Street, London.
Napier & Son, Ltd., D., Acton.
New Exchange, Nottingham.
New Market Hall, Nottingham.
Palfreyman, F. J. & Co., Leicester.
Pavilion, Sheffield.
Platt Bros. & Co., Ltd., Oldham.
Purnell & Son, Paulton, Bristol.
Raleigh Cycle Co., Ltd., Nottingham.
Richards, Ltd., Aberdeen.
Richardson & Co., Chemical Manu., Leicester.
Robinson, E. S. & A. Ltd., Bristol.
Roper Bros., Dublin.
Rossiter, G., Leignmouth.
Rouse Bros., Keighley.
Rugby Football Union, Twickenham.
Russel & Sons, Leicester.
Rowley, R. & Co., Ltd., Leicester.
Royal Liver Friendly Society, Liverpool.
Royal Mail Steam Packet Co., Ltd., London.
Shaw, M. & Sons, Huddersfield.
St. Mary's Church, Northampton.
Standard Telephones & Cables, Ltd.
Steels & Busks, Ltd., Leicester.
Smedley, John, Ltd., Lea Mills, near Matlock.
Smith, W. H. & Sons, Gloucester.
Spillers, Ltd., Cardiff.
Sun-Life Assurance of Canada, London.
Taylor, Yielding & Co., Ltd., Birstall.
Terry's Chocolate Works, York.
The New Library, Orange Street, London.
The Times Publishing Co., London.
Toon, J. & Sons, Earl Shilton.
Tootal, Broadhurst, Lee & Co., Ltd., Manchester.
Transport House, Westminster.
Tricketts, Sir H. W., Ltd., Waterfoot.
Veritys, Ltd., Aston.
Westminster Bank, Ltd., London.
Wheeler, A. & Co., Leicester.
Wildt & Co., Leicester.
Willowbrook Motors, Loughborough.
Wilson, Ltd., Grange Shed, Bradford.

OVERSEAS INSTALLATIONS OF "PUL-SYN-ETIC" ELECTRIC CLOCKS.

AUSTRALIA.

Abbotsford Brewery, Melbourne.
Adelaide Railway Station.
Adelaide Electric Supply Co., Ltd.
"Age" Office, Melbourne.
Bryant & May, Match Factory, Richmond, Vic.
Buckley & Nunn, Ltd., Melbourne.
Cadbury, Fry and Pascall, Ltd., Tasmania.
Camberwell Town Hall, Vic.
Carlyon's Hotel, Melbourne.
Caulfield Racecourse, Vic.
Central Railway Offices, Melbourne.
David Jones, Ltd., Sydney.
Dimelow & Gaylard, Richmond, Vic.
Flemington Racecourse, Vic.
Geelong Grammar School, Corio, Vic.
Harbour Trust Offices, Devonport, Tas.
Hydro-Electric Dept., Hobart, Tas.
Marine Board, Burnie, Tas.
Marshall Boot Factory, Melbourne.
Maryborough Railway Station, Vic.
Melbourne Harbour Trust Offices, Vic.
Mildura Town Hall, Vic.
Moonee Valley Racecourse, Vic.
Moore's Departmental Store, Perth.
Myers' Emporium, Melbourne.
Point Heathcote Hospital, Perth.
Post Office, Newcastle, N.S.W.
P.M.G. Department, Perth.
Richmond Town Hall, Vic.
Royal Automobile Club, Sydney.
Scott's Hotel, Melbourne.
Soldiers' Memorial, Canterbury, Vic.
Soldiers' Memorial, Corowa, N.S.W.
Soldiers' Memorial, Young, N.S.W.
State Savings Bank of Victoria, Melbourne.
Sydney Railway Station.
"Sydney Morning Herald" Office, Sydney.
Thebarton Town Hall.

CANADA.

Assumption Street School, Windsor.
Eastern High Schools, Toronto.
Gordon McGregor School, Windsor.
Jarvis Collegiate, Toronto.
Kitchener & Waterloo Memorial Schools.
St. Catherine's Collegiate, Toronto.
Toronto Station, C.P.R.
Victoria School, Windsor.
Wyandotte School, Windsor.

CHINA.

British Municipal Council, Tientsin.
Canton-Kowloon Railway.

CHINA—*Continued.*

General Post Office, Shanghai.
Hongkong Railway Station.
Memorial Tower, Shanghai.
Peking-Mukden Railway.
Shanghai Municipal Electricity Dept.

INDIA.

Bombay, Baroda and Central India Railway.
Delhi New Legislature.
Delhi Station, East Indian Railway.
Great Indian Peninsular Railway.

NEW ZEALAND.

Ballantyne & Co., Ltd.
Blundell Bros., Wellington ("Evening Post").
Bryant & May, Bell & Co., Wellington.
Colonial Mutual Life Assurance, Auckland.
"Evening Star," Dunedin.
Hawera Public Hospital.
Otago University.
Petone Borough Council Chambers.
Pidgeon & Co., Ltd., Christchurch.
Pinny, Ltd., F. J., Piano Merchants, Wellington.
Railway Workshops Auckland, Christchurch, Dunedin & Wellington.
St. Patrick's College, Silverstream.
Technical College, Wellington.
Wellington Municipal Milk Depot.
Wellington Publishing Co. ("The Dominion").
Wellington Tramways Overhead Equipment Dept.
Wellington Tramways Workshops.

SOUTH AFRICA.

Grey Institute High School.
Murzenburg Railway Station.
Pretoria Railway Station.
South Africa Railways.

SPAIN.

Barcelona General Omnibus Co.
Barcelona Terminal Station, M.Z.A. Railway.
Barcelona Tramways (Workshops).
Compañia Nacional de Explosivos, Cardona.
Hotel Ritz, Barcelona.
Orfelinato Ribas (Orphan's School), Barcelona.
Plaza España Station, Ferrocarriles Catalanes.
Port-Bou Frontier Station, M.Z.A. Railway.
Puigcerda Station, Northern Railway.

OTHER OVERSEAS INSTALLATIONS.

Admiral Simpson, Valpariso, South America.
Gordon School, Khartoum, Egypt.
Lourenco Marques Station, South America.
G.P.O., Singapore, F.M.S.

For Ship Installations see Book 5, Section 3, "Marine Clocks."