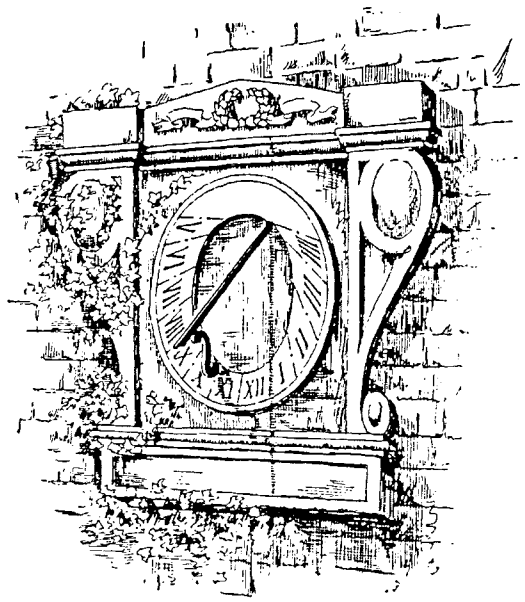
March, 1905.

# Silent Electric Impulse Clocks.



SILENT DIAL.

GENTS'

# PATENT

# SILENT ELECTRIC

# IMPULSE CLOCKS

AND

# IMPULSE TRANSMITTERS

For indicating uniform and accurate time throughout

## WORKS, WAREHOUSES, MILLS, FACTORIES, HOTELS, ASYLUMS, HOSPITALS, PRIVATE HOUSES, AND PUBLIC INSTITUTIONS, &c.

# GENT & CO., LTD.,

Contractors to H.M. Government. On Admiralty List, War Office List, H.M. Office Works, &c.

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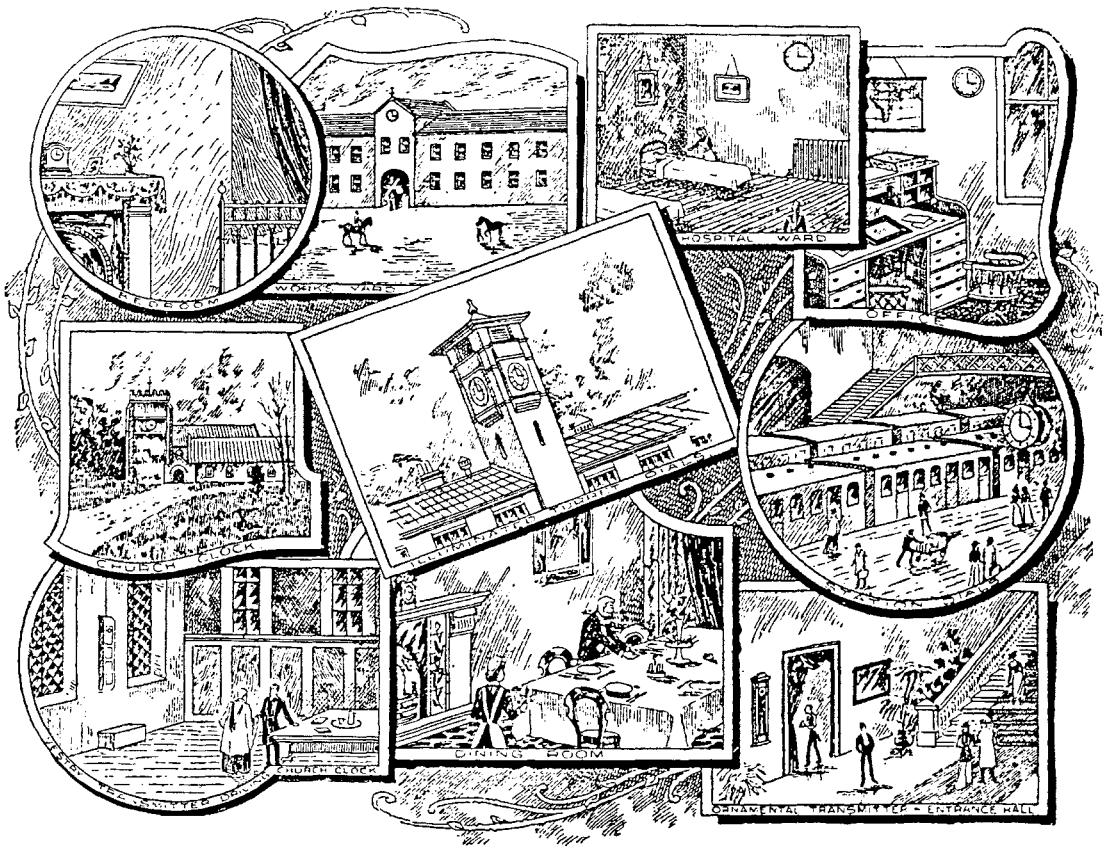
Also at BELFAST, GLASGOW, AND LIVERPOOL.

# INDEX.




# ADVANTAGES OF SYSTEM.

It is unnecessary to point out the need of maintaining accurate and uniform time in a modern institution, factory, warehouse or business establishment. This has become an essential to modern business.

It is common knowledge that it is impossible to maintain accurate and uniform time with ordinary mechanically driven clocks, and that such clocks are expensive to wind weekly, to clean, and to keep in repair.

In response to a steadily increasing demand for Clocks electrically driven, we have standardised our patent impulse Transmitters and Dials, and effected such improvements in them, that we now offer a system which is second to none, and has many important advantages, some of which are detailed on the following page.

# ADVANTAGES OF SYSTEM.—*Continued.*

Compared with mechanical or spring driven clocks, the advantages or our electrical impulse dials are:—

1. Not only uniform time is maintained throughout a works, building or institution, but accurate time is shown on every dial also.
2. No weekly winding and adjusting, and no ordinary cleaning and repairs are needed.
3. The original outlay is not more than for spring driven timekeepers where only a few dials are required, and where a larger number, say from 6 to 8 and upwards are to be used, the outlay is less, and as the number of dials increases the saving is more apparent. It is of course understood, however, the impulse dials do not attempt to compete with the cheap foreign and other spring driven clocks, which are made for counter sale, and can never possibly be time-keepers even in a commercial sense.
4. All our impulse transmitters are governed by a compensated seconds pendulum approximately 44″ long overall, and can, when in position, be regulated to an accuracy of within one to three seconds per week. Every impulse dial being absolutely governed by the transmitter is necessarily of equal accuracy.

## Compared with electrical driven systems.

5. Prices of our electric dials are favourable, and in many instances lower than other makes. With us, effectiveness has been the aim in design, not cheapness. We do not attempt to compete in the matter of price alone. We invite comparison, because no better or even equal value is obtainable.
6. Our system is designed to last, both Transmitters and Dials being fixed in cases of solid construction and rendered air-tight, and the mechanisms are substantial and wear resisting. The contact of the impulse transmitter is far superior to anything hitherto produced, in fact its action gives perfect results.
7. The size of the battery required to drive is reduced to the absolute minimum, and the duration of each impulse is reduced to so small a fraction of a second that the battery lasts for years.
8. Owing to the construction of our impulse maker, our dials cannot race, and as it takes less current to drive the dials than the transmitters a dial cannot become slow through a weak battery.
9. By connecting up to the nearest telegraph office, the signal which is sent from Greenwich to every office in the kingdom daily, will regulate this transmitter, so as to give Greenwich time continuously.
10. When in the course of time the battery needs attention, a warning bell can be automatically struck at half minute intervals till the necessary attention to the cells has been given, thus insuring against the system stopping through battery failing.

# General Description of System.

The necessary apparatus consists of:—

1. An ordinary electric battery which supplies the motive power.
2. The impulse dials which are driven by the power from the battery.
3. The impulse Transmitter which sends a current from the battery to the dials.
4. The wiring which connects battery, dials, and transmitter together.

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1. The battery consists of ordinary Leclanche cells or dry cells as desired.
2. The impulse dials are designed for all requirements, wall dials, bracket dials, turret dials, illuminated turret dials. Any number and any type can be impelled from the same transmitter.
3. The transmitter is an accurate time measuring mechanism. The function of which is to send the current generated by the battery to the impulse dials at half minute intervals; it also automatically controls the duration of the impulse to suit the exact requirement of the dials.
4. The wiring consists of copper wire insulated exactly as used for electric bell systems or electric light purposes, a single line only being used connecting the dials, transmitter, battery, and alarm bell in a simple circuit.

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*No expert knowledge is needed with this system, any electric contractor can fit with as much ease and assurance as he can carry out an electric bell or electric light installation.*

# The Choice of Transmitter.

The four Impulse Transmitters, illustrated and described in the four following pages, are standard patterns, all are arranged to give impulses at half-minute intervals, all have seconds pendulums, and all are equally accurate and reliable Transmitters.

The choice of the most suitable of the four patterns for any particular installation, depends upon the position the Transmitter is to occupy, and the degree of case ornamentation desired.

No. **c 1** is suitable when it is decided to fix Transmitter in an out of the way position, where a time dial would be useless, such as in a pantry, lavatory, or passage, and such positions are often to be recommended.

No. **c 2** is for fixing in more prominent position, where a time dial is useful, such as in general office, warehouse, workroom, or time-keeper's office, etc., etc.

No. **c 3** is designed for those instances where circumstances or choice demand that the Transmitter become an ornament in keeping with existing furniture and fittings, as in an entrance hall, lobby, main staircase or private office.

No. **c 4** is a similar Transmitter but is also fitted with a time dial.

*Where desired, special cases can be made to architect's own designs, or to match existing furniture.*

# SPECIFICATION OF

# STANDARD IMPULSE TRANSMITTERS

# Nos. c1 and c2.

*Illustrated on opposite page.*

**CASE.**—Mahogany or walnut case of design illustrated, 5ft. x 12½" x 7" overall, dovetailed together, polished and finished, and rendered airtight, fitted with screwed front, framed and panelled, the lower panel contains an airtight door secured by reliable lock and key, to allow of pendulum adjustment. A glazed and brass mounted opening for impulse indicator is fitted as illustrated at Fig. c 1.

**MOVEMENTS.**—Extra strong and heavy pattern movement, consisting of seconds pendulum, compensated with wood and zinc alloy, heavy cylindrical brass cased bob with indicating micrometer adjustment available by the lower door shown in illustration. Escapement jewelled in agates. Improved patent quick break "sparkless" half minute automatic adjusting impulse action, with extra large platinum surfaces. Impulse indicator visible through glazed opening in case. All parts accurately made and properly finished with silver steel arbors ground after hardening and tempering. The complete movement can be regulated when fixed in position to keep time within from one to three seconds per week, and is capable of impelling **any number of dials of any size or type.**

**FITTINGS.**—Substantial terminal screws at top, and fixing plates provided at top and bottom of case. These fittings protected under curved panels available without opening the case proper.

**TIME DIAL.**—In No. c 2 Transmitter a standard 8" time dial is added as illustrated.

# THE B.P. PATENT
# IMPULSE TRANSMITTER,

## In Glazed Air-tight Hard-wood Cases.

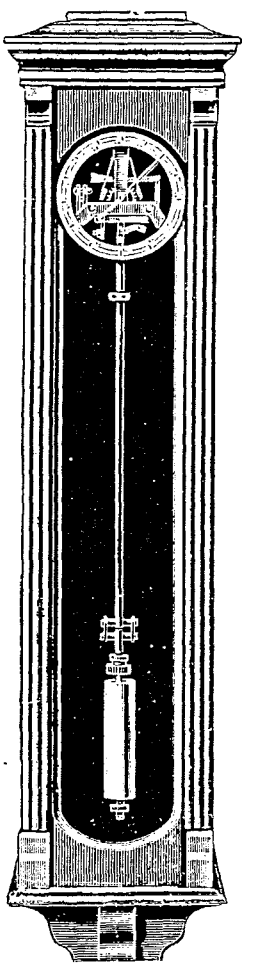


Fig. C 3.

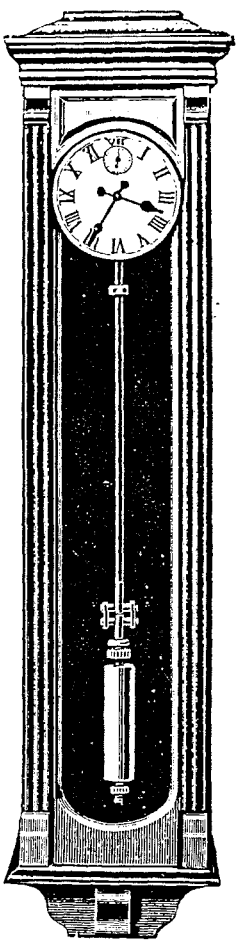


Fig. C 4.

These Transmitters being fitted in handsome and highly finished cases are designed for fixing in conspicuous positions. They can be supplied in any hard-wood and so be en suite with existing furniture and becomes ornamental fixtures in rooms, entrance halls, staircases, etc.

Complete to specification on opposite page and as illustrated, with centre seconds ring dial.

**No. c 3 .. .. .. £20.**

Complete to specification on opposite page and as illustrated. With 9″ time dial and sunk seconds dial as illustrated.

**No. c 4 .. .. .. £25.**

# SPECIFICATION OF
# STANDARD IMPULSE TRANSMITTERS
# Nos. c 3 and c 4.

**CASE.**—Solid mahogany, walnut, oak or teak, 5ft. x 14″ x 8″ overall, of design illustrated, dovetailed, highly polished and finished and rendered air-tight ; with hinged door, framed and glazed and fitted air-tight, with secure lever lock and key.

**MOVEMENT.**—Extra strong and heavy pattern movement, consisting of seconds pendulum, compensated with wood and zinc alloy, heavy cylindrical brass cased bob, with indicating micrometer adjustment. Escapement jewelled in agates. Improved quick break "sparkless" half minute automatic adjusting impulse action, with extra large platinum surfaces. Centre seconds hand moving round engraved and silvered circular ring dial. All parts accurately made and highly finished with silver steel arbors ground after hardening and tempering. The complete movement can be regulated when fixed in position to keep time within from one to three seconds per week, and is capable of impelling any number of dials of any size or type.

**FITTINGS.**—Substantial terminals and a fixing plate is contained in the moulded ornamental top and an adjusting plate in the lower part of the case.

**TIME DIAL.**—In No. c 4 Transmitter is fixed an 8″ silvered dial with a smaller sunk dial in which moves a seconds hand as illustrated.

# THE B.P. PATENT
# IMPULSE TRANSMITTERS,
## In Airtight Hardwood Cases.

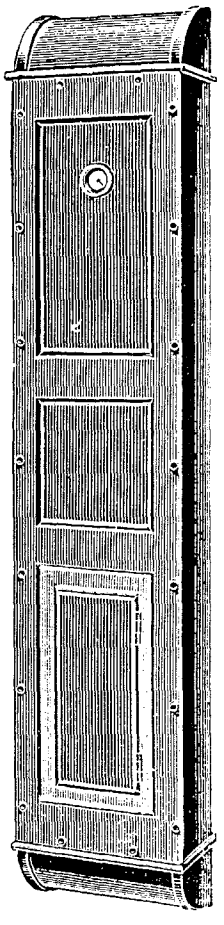


Fig. c 1.

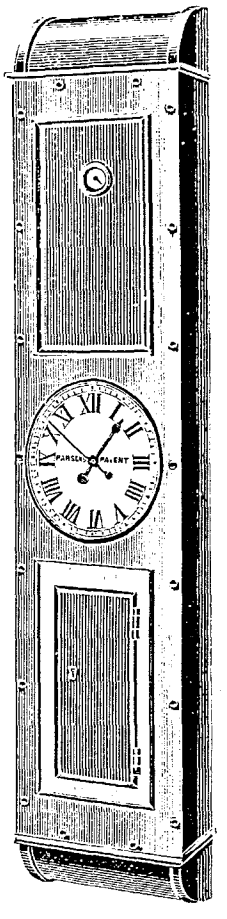


Fig. c 2.

This Transmitter having no dial, need not be fixed in a conspicuous place. Any spare wall space in a position that is not damp is suitable, such as a pantry, cloak room or passage.

Complete to specification on opposite page and as illustrated.

**No. c 1 .. .. .. £16.**

Where the position chosen for fixing the Transmitter is a more prominent one, and when desired a time dial may be added, when the appearance is as illustrated above.

Complete with 8″ Time Dial to specification on opposite page and as illustrated.

**No. c 2 .. .. .. £18.**

# IMPULSE DIALS.

## General Application.

Impulse Dials can be made of any size or design. On the following pages we list those which are our standard patterns, and those which are generally in demand ; but it should be understood that Dials to suit any position—and in cases of special design—to suit any particular requirement, can be supplied with dispatch, and with equal facility.

Customer's existing clocks can, where their value merits the change, have their present spring driven movements removed and be re-fitted with our Patent Impulse Actions without any alteration to the outside appearance.

Existing Mechanical Turret Clocks, with or without striking and chiming, can be also so altered.

Workman's Check Clocks and Watchman's Tell-Tale Clocks can also be so re-fitted. As often required in works, factories, etc., bells can be rung at prearranged times or steam whistles be sounded at starting and stopping of work. Special quotations for this class of work are given on receipt of details.

There is no limit to the number and size of Dials that can be impelled by one Transmitter.

Where more than 100 dials are required, the system is preferably divided into separate circuits, each containing about 50 dials, and each such circuit being impelled by a Secondary Transmitter, which has all the characteristics of the Primary Transmitter, but is actuated by the Primary or Master Transmitter, instead of by a separate time measuring mechanism.

# IMPULSE DIALS.

## General Description.

**AIR-TIGHT CASES.**—With the exception of Turret Clocks and large unglazed dials for outside use, all the dials shown here are in air-tight cases, and so remain for years unaffected by dust and insects. Flies, spiders, cockroaches, etc., often enter or are hatched inside the cases not so made air-tight, especially in warm situations and hot climates, and eventually stop the mechanism or spoil its time keeping qualites.

**ABSOLUTELY WATER-TIGHT CASES.**—For wet positions and where exposed to rain and weather and where corrosive chemical fumes would attack the mechanism, glazed dials are listed in iron cases hermetically sealed.

**SILENT WORKING.**—With the "Quiet" Dials here listed, no sound is noticeable under the ordinary conditions of every day life. The sound of the impulse when it occurs every half minute being less loud and far less noticeable than the tick of any ordinary clock, while with the "Silent" Dials the stillness of any ordinary room even in the night is not disturbed, any sound that is made being less than created by a watch. This is a most important consideration, especially in hotel bedrooms, libraries, hospital dormitories, etc.

**MAKER'S GUARANTEE.**—In all these air-tight cases the connecting terminals are available to the workman or fixer without opening the case, and we, the makers, are answerable for any faults or misadjustment in the mechanism, should any occur when the case has not been opened or actual damage done. We unhesitatingly accept and even court such responsiblity for any reasonable period of time.

# SPECIFICATION OF

## PARSONS' PATENT

# ELECTRIC IMPULSE MOVEMENT,

## For Dials up to 18-in. diameter.

Heavy hand wrought brass plate 3½″ x 4″, machined, finished and lacquered, accurate machine cut ratchet wheel 2″ diameter, with 120 teeth, pawls of hardened steel, balanced aluminium hands, extra powerful electro magnet, with boxwood bobbin wound to suitable resistance with silk covered high conductivity copper wire.

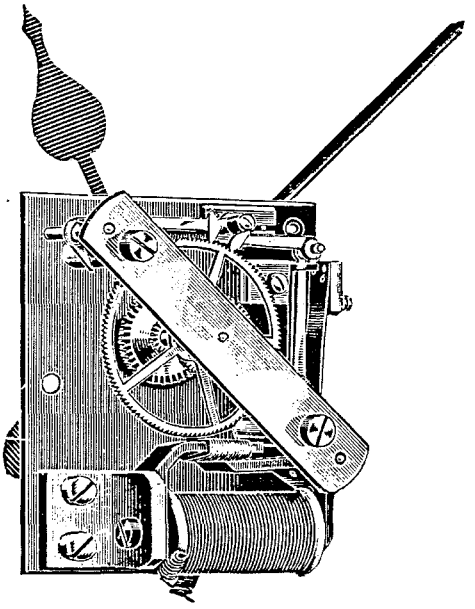


Fig. c 9.

In the standard movement illustrated above, all moving parts are designed to resist wear, and the design of the pawls and the stops is such that it is absolutely impossible for them to advance the rachet 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.

Dials larger than 18″ are operated by larger and stronger movements of the same pattern and construction.

# PARSONS' PATENT

# STANDARD PATTERN WALL CLOCKS,

## In Air-tight Wooden Cases.

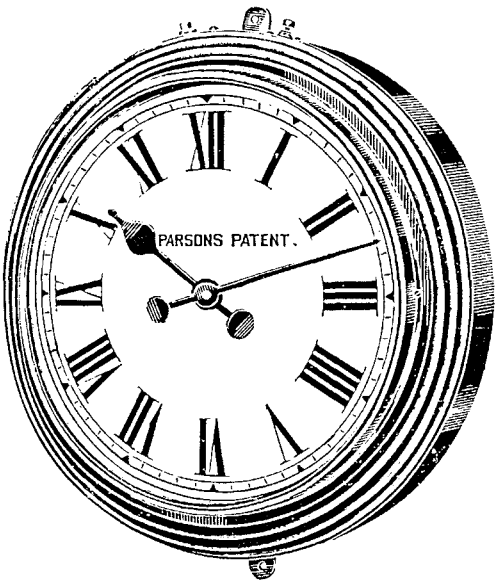



**Fig. c 10.**

The above Dials are of good design and being well finished are suitable for offices, school rooms, hospital wards, and domestic use wherever a wall clock is suitable and at the same time their strongly constructed and air-tight wooden cases render them equally suitable for work-shop and engine room, and dirty and dusty situations.

The cases are of extra solid construction, have walnut fronts, strong glazed bronzed bezels, and enamelled metal faces.

The movements are our standard pattern Parsons Patent, as illustrated on opposite page.

Substantial Terminals are provided available to fixer without opening the case, which is rendered air-tight and sealed, see guarantee on page 13.

**Fig. C 10.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Diameter of Face .. | 6″ | 9″ | 12″ | 16″ | 20″ | 24″ | 30″ |
| Approx. Diameter of Case | 8½″ | 11″ | 14½″ | 21″ | 25″ | 30″ | 36″ |
| Price .. .. .. | **38/-** | **40/-** | **46/-** | **76/-** | **98/-** | **120/-** | **170/-** |

The above prices are for "Quiet" Dials, if "Silent" Dials are necessary add 30/- each extra, see page 13.

# PARSONS' PATENT

# STANDARD PATTERN WALL CLOCKS,

## In Air-tight Fancy Wooden Cases.


Fig. c 12.

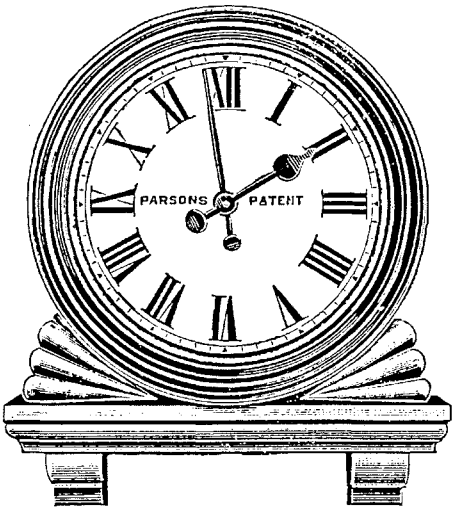



Fig. c 14.

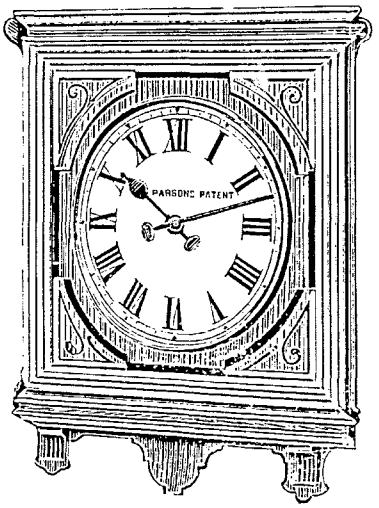



Fig. c 16.

The internal mechanism of these Clocks is identical with those listed on the previous page, but the cases are more elaborate and of the designs shown.

**Fig. c 12.—Rope pattern case** in solid light or dark oak, enamelled face, brass bezel, with bevelled plate glass front.

| Approximate Diameter of Face | 8″ | 12″ |
|---|---|---|
| Size of Case .. | 11″ | 15″ |
| Price .. | **£2 10s.** | **£3 1s.** |

**Fig. c 14.—Bracket pattern case** in walnut, enamelled face, bronze or brass bezel, and strong glass front.

Without feet this pattern becomes eminently suitable for mantle clocks.

| 6″ | 9″ | 12″ | 16″ |
|---|---|---|---|
| 11″ x 9″ | 13″ x 12″ | 20″ x 15″ | 27″ x 22″ |
| **£2 18 6.** | **£3 4.** | **£3 16.** | **£5 6.** |

**Fig. c 16.—In rectangular case**, in walnut, light or dark oak or mahogany enamelled face, bronze or brass bezel, strong glass front.

| 12″ | 16″ | 20″ |
|---|---|---|
| 24″ x 16″ | 32″ x 21″ | 40″ x 27″ |
| **£5 8s.** | **£7 5s.** | **£9 12s.** |

The above prices are for "Quiet" Dials if "Silent" Dials are necessary add 30/- each extra, see page 13.

# PARSONS' PATENT WATER-TIGHT
# STANDARD PATTERN WALL CLOCKS,

## In Hermetically Sealed Metal Cases.
## For outside use.

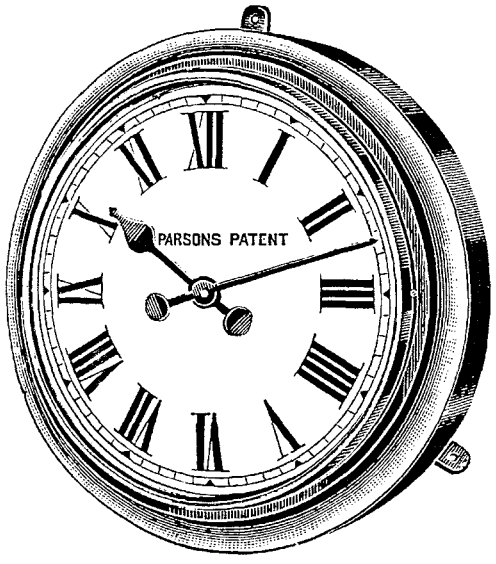



**Fig. c 20.**
**Outside Wall Dial.**

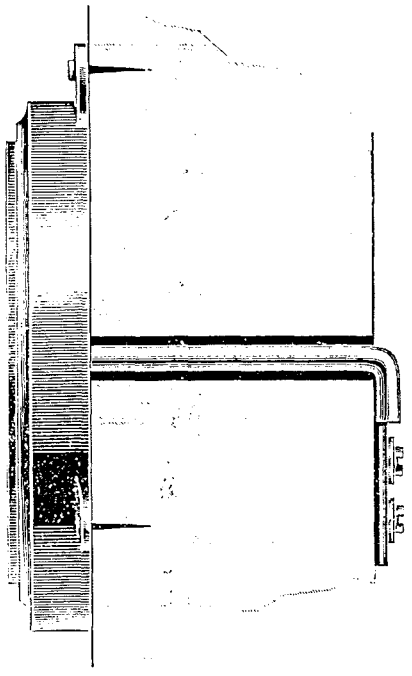


**Fig. c 21.**
**Sectional View Shewing Terminals led indoors.**

These Clocks are designed for fixing directly in the open, will stand wet and weather without any shelter being necessary ; in fact they will work equally well when fixed under water.

They are in heavy galvanised iron cases suitably painted and finished with strong glass fronts all hermetically sealed.

The Terminals for connecting are carried by a projecting flexible metallic tube which passes through the wall on which the dial is fixed, so that the actual electric connection is made indoors.

All moisture is removed from the air inside the case, which prevents sweating or steaming of the inside of the glass, so that the dial and hands are not hidden from view by mist during rapid changes of temperature.

The movements are standard pattern Parsons' Patent, as illustrated on page 14, and being in airtight cases are guaranteed, see page 13.

| | | | | | |
|---|---|---|---|---|---|
| Diameter of Face .. | 16″ | 20″ | 24″ | 36″ | 42″ |
| Diameter of Case .. | 21″ | 25″ | 30″ | 42″ | 48″ |
| Price .. .. .. | **£4 12s.** | **£5 10s.** | **£7 10s.** | **£15.** | **£20.** |

# IMPULSE CLOCKS FOR SMALL TOWERS.

## Correct Time in Villages.

**Dials Fig. c20 on Tower.**

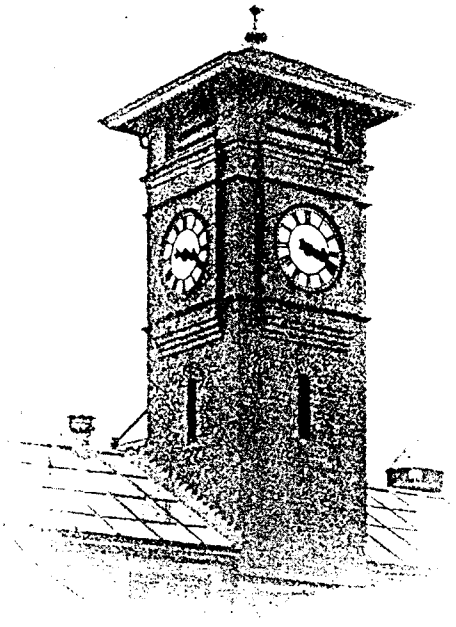
For small Towers the Impulse Dials shown on the previous page form perfect efficient Turret Clocks, and solve the problem of correct time-keeping in remote villages.

The first cost is less than mechanically driven clocks. The masonry of the tower has not to be knocked about, a very great consideration in old church towers. The movements being in glazed and air-tight cases are not affected by wind and snow, or exposed to the atmosphere or dust and dirt always present in a church tower. No periodic cleaning and oiling is necessary, a particular consideration in remote villages where skilled attention is only obtained at great expense.

From one to four dials may be fixed according to the number of faces required on the tower.

The Transmitter and Battery are fixed in the vestry, and when the system is actuated by a dry battery, no attention is necessary for years, beyond that which can be given by the village carpenter, viz. : removing the complete battery and substituting a new one.

# LARGE IMPULSE TURRET CLOCKS AND ILLUMINATED DIALS.



Impulse Turret Clocks and Illuminated Dials are made to any diameter, but as it is impossible to catalogue the many sizes, prices will be given on receipt of details.

The Tower illustrated above contains two Illuminated Dials, each 4 feet diameter, which are driven by one Impulse Mechanism fixed in the tower by six No. 80 "Royal" Dry Cells. The hands are balanced and fitted with vanes, by which they remain unaffected by wind. The Transmitter is fixed in a distant part of the building, and besides the Turret Dials drives a large number of 8″, 12″ and 16″ Dials, in various parts of the building.

Existing Mechanical Turret Clocks can be made to move, governed by a Transmitter, in half-minute impulses, without structural alteration to existing mechanism. The going, striking and chiming trains are wound as usual but the clock then is compelled to keep time with the dials in the system.

Four Illuminated Dials, each 9 feet in diameter, have been working for years in the tower of one of the largest Terminal Railway Stations in the Kingdom, being driven by ordinary Leclanche Cells, controlled by our Patent Transmitter.

*Prices of Turret Clocks and Illuminated Dials will be sent on receipt of particular requirements.*

# PATENT
# WEAK BATTERY WARNING BELL.

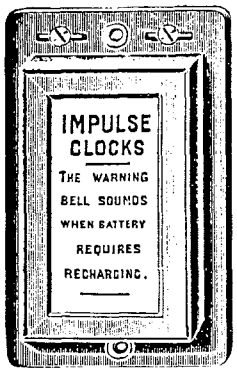



Fig. c8.

## Impulse Clocks.

**The Warning Bell sounds when the battery requires recharging.**

In some of the older systems of Synchronized Clocks, it was claimed that the Transmitter had the faculty of adjusting the duration of the current impulse, to meet the exact requirements of the Secondary Dials. Without casting any reflection on previous types, we must here state that the B.P. Transmitter really does give this effect, and advantage has been taken of the fact in producing our Patent Weak Battery Warning, which consists of a gong with a striking mechanism, so arranged that when in course of time the battery weakens and the smaller current sent round the circuit must of necessity be of longer duration, the gong is struck at each half minute impulse until the battery has been given the necessary attention, or until a reserve battery has been switched in, see paragraph 5, page 22. The Warning Apparatus, requiring no separate battery to work it, can be fixed in any suitable situation along the circuit, being simply connected in the circuit exactly as is a dial. Upon the importance of this alarm arrangement it is unnecessary to make comment. No Galvanometer, Battery Testing Apparatus or periodical inspections are now necessary.

The arrangement at once frees our system entirely from the only charge that could now be brought against battery driven clocks, viz: the battery might fail and the dials stop without warning. The butler, porter, caretaker or office boy has merely to report that the gong is sounding, and if attention is given to the battery any time within a few days of the first warning no stoppage of the dials can possibly occur through a worn out or weak battery.

"Warning" Bell" Fig. c8, with 3" gong, substantial metal parts, all contained in solid hardwood case. Price, 40/- each.

# "GREENWICH TIME" CONTROL.

In some instances where it is necessary that any regulation shall be accomplished by the Greenwich Time Signal, a Chronographic Attachment can be fitted to the Impulse Transmitters, so that every morning at 10 a.m., by the signal sent daily to all Telegraph Offices, the Transmitter is corrected instantly of the error that it may have acquired, if any, during the past 24 hours.

A connection to the nearest Telegraph Office is of course necessary, for which a small annual charge is made by the Authorities, such charge generally including the necessary wiring from the Telegraph Office to the subscriber.

In the best previous practice of automatic regulation from Greenwich it has been customary to set the system to lose or gain up its error during the day, or, in accordance with another method, to stop a gaining system at 10 a.m., leaving it entirely dependent on the arrival of the Greenwich Signal to restart it.

In our improved method of automatic regulation from Greenwich, the "Impulse" is set forward if slow, and backwards if fast, and it will at once be recognised that this method is far in advance of previous practice, the method being one of immediate correction.

# FIXING INSTRUCTIONS.

**FIXING TRANSMITTER.**—The Transmitter should be fixed to a perpendicular wall. If after plumbing, the wall chosen is found to be not perfectly upright, a deal board, two or three inches larger each way than the Transmitter case, should be first secured to the wall and rendered vertical by means of packing, and the transmitter fixed directly upon it. Such a fixing board is always to be recommended, as walls even if vertical are often irregular on the surface, and have at least a tendency to dampness.

Fixing plates are provided at both the top and the lower end of transmitter case, and become available without opening the case proper by the removal of the curved or moulded covers found at each end of the case. The top plate should be hung on a strong spike or screw, say $\frac{3}{8}$" diameter, or sufficiently strong to support the whole weight of the transmitter, while the lower plate, which carries a horizontal slot at each end, should be clamped by means of coach screws with washers under heads. Two small brass studs with notches will be seen on the front of the transmitter case, and when these are plumbed and found vertical the coach screws should be clamped tight, thereby securing the transmitter permanently in a perpendicular position.

When the transmitter has been thus firmly fixed, the door of the case can be opened and the heavy cylindrical "bob," which is packed separately, must be hung on the double hook, provided at the lower end of the pendulum rod to receive it, the indicating pointer (for regulation) on the pendulum "bob" being outwards. The pendulum rod should then be released from the cradle to which it has been screwed for transit. When all is ready and the terminals connected, the system will start on giving the pendulum its usual swing.

# FIXING INSTRUCTIONS—*Continued.*

**THE DIALS.**—No special instruction is necessary for fixing the impulse clocks. Dials up to 12″ diameter are hung upon one nail or screw by the plate provided, while all dials of 16″ diameter and upwards are secured in their place by screws passing through two or more fixing plates, according to the weight and shape of the dial.

**THE BATTERY.**—The necessary number of No. 3 (large size) or No. 2 Leclanche Cells should be contained in a sound wooden battery box, with substantial terminals and with a tight fitting lid, making the case air-tight and thereby preventing evaporation.

**POSITION OF BATTERY.**—The position chosen for battery must be cool and not excessively damp ; a shelf in a cellar is often an ideal situation. On no account fix a battery in a hot or dry situation, or frequent attention will be needed, not for any electrical fault, but because it will become necessary to refill the cells to make up the water lost by evaporation.

**DRY CELLS.**—Dry Cells may be used with advantage in many instances, provided a make of cell is employed that does not " dry up," either when in use or " standing by." We particularly recommend the " Royal Dry " Cell for clock driving, owing to its long capacity, either after being held in stock or in immediate and actual use. No. 80, 8″ high by 3¼″ diameter is the size most suitable.

**DUPLICATE BATTERIES.**—A practice to be recommended is that of having duplicate batteries connected to the system by means of a two-way Switch, so that either may be brought into use as desired, and the second battery is always " resting." A great advantage of this practice is that when in course of time battery cleaning is required the time-keeping of the system is unaffected or uninterrupted.

**SMALL CURRENT REQUIRED.**—No clock system works with so little current as that listed here ; the only reason large size cells and duplicate batteries are recommended is to avoid anything like frequent attention to batteries being required.

To give some idea of the small amount of current taken from the battery, we may state that we have had a battery of dry cells operating a clock circuit for between two-and-a-half and three years without requiring any attention. Leclanche cells last equally long but require water being added from time to time to make good that lost by evaporation.

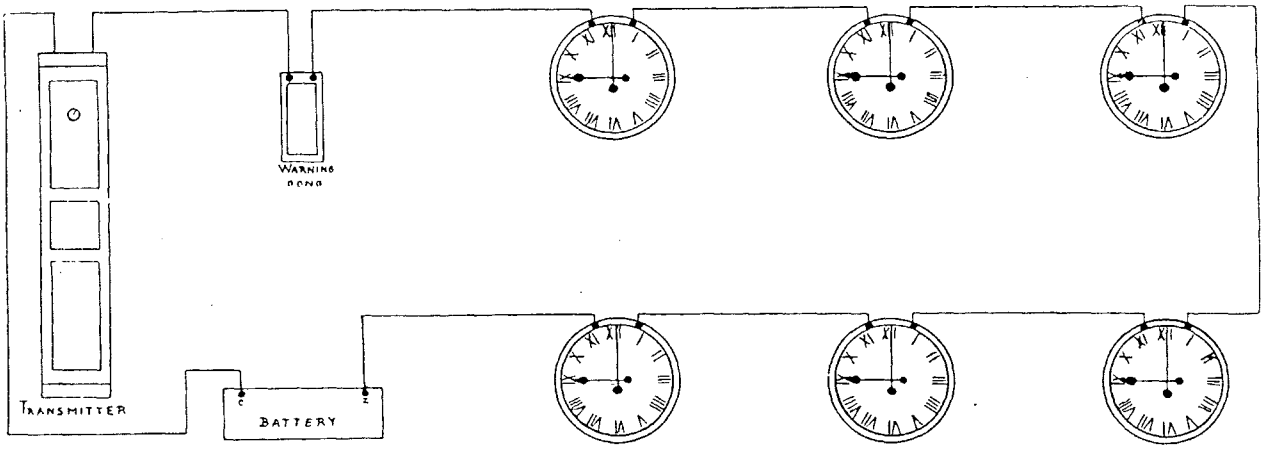
**ESTIMATING BATTERY POWER.**—The battery power (viz., the number of cells) required for driving turret clocks and dials varies in accordance with the size of the dials, and details will be given on receipt of enquiries.

With dials up to 12″ diameter the following rule should be observed for finding the necessary number of cells for any installation :—Allow three cells for driving the transmitter, add one cell for every **two** dials, and two or three extra cells according to the length of the lines, for overcoming the resistance of the circuit and the warning bell. Thus an installation of 18 12″ dials requires :—

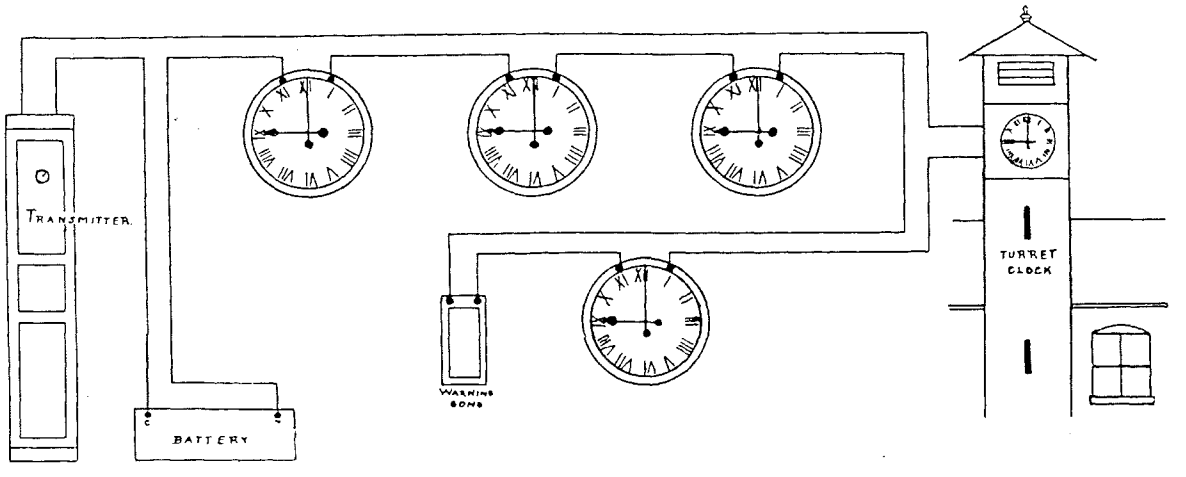
| | |
|---|---|
| For Transmitter .. .. .. .. .. | 3 Cells |
| For overcoming resistance of lines, say .. | 3 Cells |
| 1 Cell for every two clocks, .. .. | 9 Cells |
| Total | 15 Cells |

# FIXING INSTRUCTIONS—*Continued.*

**ARRANGEMENT OF CIRCUIT.**—The Transmitter, the Dials, and the Battery are connected together " in series," that is, a single line is run from one terminal of the transmitter to the battery, from the battery to the nearest dial, then from dial to dial, and on from the last dial to the second terminal of the transmitter.




The above diagram illustrates this principle of " series wiring " and shows clearly the circuit of wire and the dials, etc., included therein, but in many places, the plan of the building will not permit of the dials being arranged in a complete ring as shown above. The principle of series winding must however be still followed, and it is then often advantageous to run the return wire from the *last* dial back to the transmitter, alongside the wire connecting the dials, as shown in diagram below, where the turret clock is the " last " dial.




**LINE WIRES.**—An ordinary 18 or 20 gauge electric bell wire, insulated with india rubber and double cotton covered will suffice for the work, but by reason of the extra mechanical strength which can be afforded without materially increasing the cost of an installation we recommend, say, a 16 gauge 300 or 600 Meg-ohm electric light wire being used. If the wire is not cased or drawn into a tube, no matter whatever type of insulated wire be employed, use insulated saddle staples, as with these the lines can be stapled without fear of abrasion, and the cotton braiding is not rotted by iron rust in the course of time.