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PROVISIONAL SPECIFICATION.

Improvements in Electric Clocks.

We, HARRY WHIDBOURNE, of 30, Greenbank Avenue, Plymouth, in the County of Devon, Watch and Clock Maker, and ALFRED ERNEST JOSEPH BALL, of West Hooe, near Plymouth, aforesaid, Watch and Clock Maker, do hereby declare the nature of this invention to be as follows:—

This invention has for its object the construction of mechanism for the purpose of making reliable periodical contacts, for operating electric dials, releasing time balls, or completing the circuit of similar apparatus of precision.

In obtaining a periodical electric contact from a controlling or master clock, we consider it desirable to effect it in such a manner, that power is not taken from the train and that the timekeeping properties of the clock are not interfered with.

In order to obtain these desirable results, we construct a regulator clock with say a seconds pendulum and a dead beat escapement and we mount on the 'scape arbor a disc, into which we fix at equal distances from the centre, one or more studs according to the number of contacts we desire to make during each revolution of the 'scape wheel. When one or two contacts only are required for each revolution, the disc may be replaced with a poised cross-bar. We fix rigidly to the upper part of the pendulum—or by preference on to the pallet arbor—a lever, at an angle to the perpendicular, so that its lower end stands either to the right or left hand side of the 'scape arbor, its end extending somewhat below it. To the end of this lever we pivot at about its centre, a short lever free to move in the same plane and having its ends both bent or turned towards the 'scape arbor. It will be seen that by this arrangement, the long lever on oscillating with the pendulum, carries the short lever (which is connected pivotally to it) with it. The upper bend or turn in the short lever, is made at a suitable height, so that when oscillating with the pendulum, it describes a segment of a circle which bisects the 'scape arbor. The long lever is fixed at such an angle from the perpendicular that during its normal oscillation, the upper bent end of the short lever just enters the circle described by the studs in the disc. On to the plate, but insulated from it and each other, we fix two platinum tipped contact springs approximately parallel to each other and to the lever, so fixed that they are close to, but not touching the lower bent end of the short lever, when the pendulum swings to its normal extent. The spring next the lever we usually construct very thin while we make the other spring strong enough to offer sufficient resistance to make a firm electric contact.

The action of the mechanism is as follows:—

During the time the clock is not making contact, the long lever, together with the short lever connected pivotally to it, oscillates idly with the pendulum, but on the 'scape arbor bringing a stud of the disc or cross-bar within the arc of the upper bent or turned end of the pivoted lever, its forward motion is arrested, causing it to turn on its pivot, thereby causing the lower bent end to advance and press one of the platinum tipped

contact springs against the other, & so make the desired firm contact of short duration, for on the next oscillation of the pendulum, the contact is broken and on the next advance of the lever, the stud on the disc or cross-bar, has passed out of position.

It will be readily seen that with this mechanism, the work of making contact is not imposed on the train, the contact being made chiefly or wholly while the 'scape wheel is still and the slight resistance offered to the pendulum being at regular intervals, it is not found in practice to affect its rate when a pendulum ball of moderate weight is employed. The regulator movement may be of the ordinary weight-driven type or may be electrically wound each half minute or minute as the case may be, the electric winding magent being energized each time contact is made by the pendulum.

It will be obvious that the arrangement & position of the differed parts, may be varied to better suit different requirements or for other reasons without departing from the nature of this our invention.

Dated this 14th day of July 1898.

HARRY WHIDBOURNE,
ALFRED E. J. BALL.

COMPLETE SPECIFICATION.

Improvements in Electric Clocks.

We, HARRY WHIDBOURNE, of 30, Greenbank Avenue, Plymouth, in the County of Devon, Watch and Clock Maker, and ALFRED ERNEST JOSEPH BALL, of West Hooe, near Plymouth, aforesaid, Watch and Clock Maker, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has for object, the construction of mechanism for the purpose of making reliable periodical contacts for operating electric dials, releasing time balls, or completing the circuit of similar apparatus of precision.

In obtaining a periodical electric contact from a controlling or master clock we consider it desirable to effect this function in such a manner as to ensure that power is not taken from the "train," and that the timekeeping properties of the clock are not interfered with.

In order to obtain these results, we construct a regulator clock with say a seconds pendulum and a dead beat escapement, and, we mount on the 'scape arbor, a disc, into which we fix at equal distances from the centre, one or more studs according to the number of contacts we desire to make during each revolution of the 'scape wheel. When one or two contacts only are required for each revolution, the disc aforesaid may be replaced with a poised cross-bar.

We fix rigidly and by preference on to the pallet arbor—or otherwise, to the upper part of the pendulum,—a lever disposed angularly, and so that its lower end is located either to the right or left hand side of the 'scape arbor and extends somewhat below it. To the end of this lever we adapt at about its centre an articulated member hereinafter termed "the pivoted bracket"—free to move in the same plane as the lever and having both its ends bent or deflected towards the scape arbor. It will be seen that by this arrangement, the lever on oscillating with the pendulum, carries the pivoted bracket (which is connected pivotally to the lever) with it. The upper bend or deflection of the pivoted bracket is made at a suitable height so that when oscillating with the pendulum, it describes a segment of a circle which bisects the 'scape arbor. The rigidly fixed lever aforesaid is inclined at such an angle from the perpendicular that, during its normal oscillation, the upper bent or deflected end of the pivoted bracket just enters the circle described

by the studs in the disc. On to the front plate of the clock but insulated from it and each other, we fix two platinum tipped contact springs approximately parallel to each other and to the lever. They are fixed so as to be close to, but not touching, the lower bent end of the pivoted bracket when the pendulum swings to its normal extent. The spring next the lever, we usually construct very thin; while, we make the other spring, strong enough to offer sufficient resistance to make a firm electric contact.

Referring to the annexed drawings (Fig. 1) A shews the cross-bar into which is fixed the studs or pins B & B^1, C the lever above referred to and which is here shewn fixed to the pallet arbor. D is the pivoted bracket fulcrumed at E. F & F^1, shew the platinum tipped contact springs. The action of this mechanism is as follows;—

During the time the clock is not making contact, the lever C, together with the pivoted bracket D being fixed to the pallet arbor oscillates idly with the pendulum (not shewn) but on the 'scape arbor bringing one of the studs B & B^1 of the cross bar A within the arc of the upper end D^1 of the pivoted bracket D its forward motion is arrested, which causes it to turn on its pivot E, thereby, as result, causeing its lower end D^2 to advance & press the contact spring F against the contact spring F^1, and so make the desired firm contact of short duration; for, on the return oscillation of the pendulum, the contact is broken, and, on the next advance of the lever C with the pendulum the studs B & B^1 have passed out of position.

Fig. 2 shews another arrangement of the parts constituting the contact making device according to our invention. Under this modification we invert the pivoted bracket D & make its upper end of such a length that it terminates at or near the pallet arbor; by this disposition of the pivoted bracket, its upper end does not vibrate with the pendulum, and in consequence it advances only when its lower end D^3 is arrested by one of the pins in the cross bar or equivalent; thus permitting the contact springs to be placed very close to the upper end of the pivoted bracket without risk of touching should the vibration of the pendulum be increased by handling or other cause. Said advantage makes this form of contact useful for clocks in which it is preferred that the pendulum should swing in a short arc. In this figure, A shews the cross bar or equivalent carrying the pins B and B^1, C the main lever rigidly fixed to the pallet arbor; D the pivoted bracket fulcrumed at E. F shews a pivoted arm which with its hooked end H constitutes a connection between the pins B or B^1 in the cross bar or equivalent and the lower end D^3 of the pivoted bracket D. G and G^1 shew the platinum tipped springs hereinbefore referred to, which are brought in contact by the upper end of the lever D pressing one in contact with the other by the motion given it by the pendulum on the hooked end H of the pivoted arm F engaging with one of the pins B or B^1 in the cross bar or equivalent. It will be readily seen that with the mechanism hereinbefore described the work of making contact is not imposed on the "train," the contact being made chiefly or wholly while the 'scape wheel is still and the slight resistance offered to the pendulum being at regular intervals, it is not found in practice to affect its rate when a pendulum ball of moderate weight is employed. The regulator movement may be of the ordinary weight-driven type, or, may be electrically wound each half minute or minute as the case may be, the electric winding magnet being energized each time contact is made by the pendulum. It will be obvious that the arrangement & position of the different parts may be varied to better suit different requirements or for other reasons without departing from the nature of this our said invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is;—

1. In electric master or controlling clocks the obtainment of a reliable electric contact by the action of a pendulum or a part in motion with a pendulum pressing

against a pin or pins or equivalents therefore, fixed to and carried by the 'scape arbor or other moving part of the "train," in such a manner that the inertia of the pendulum is used to supply the power necessary to make the said contact reliable.

2. In electric master or controlling clocks the obtainment of an electric contact by the action of mechanism impelled by a pendulum pressing against a projection or against projections carried by or fixed to the 'scape arbor or other moving part of the "train" as herein described and illustrated in Fig. 1 of the accompanying sheet of drawings.

3. In electric master or controlling clocks the obtainment of an electric contact by the action of mechanism impelled by a pendulum pressing against pins or projections fixed to and carried by the 'scape arbor or other moving part of the "train" as described herein and illustrated in Fig. 2.

4. The improvements in electric clocks substantially as described herein and illustrated in the accompanying drawings.

Dated this 14th day of April 1899.

HARRY WHIDBOURNE,
ALF. E. J. BALL.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1899.

Fig. 1

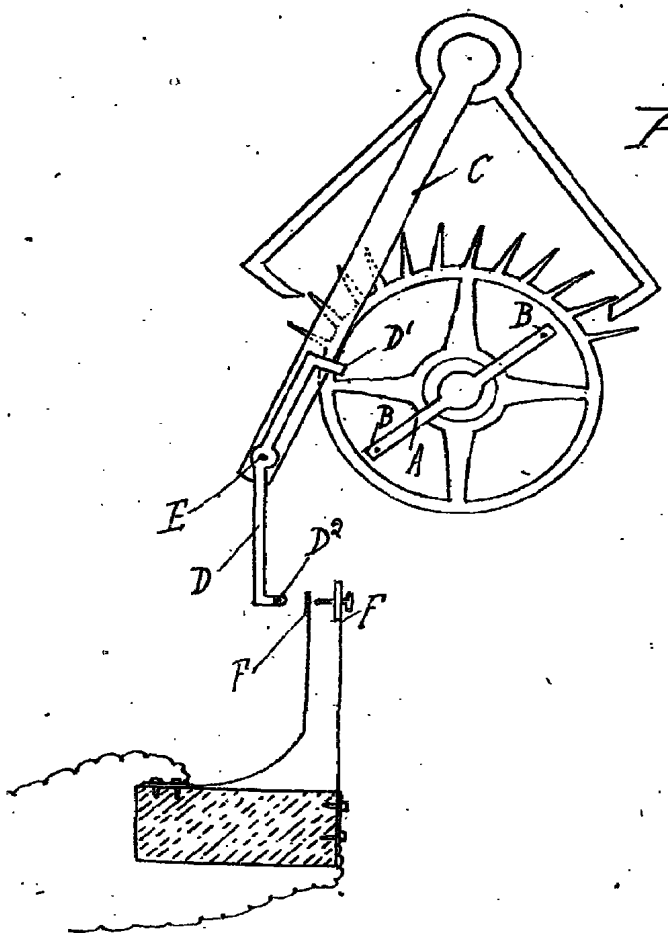
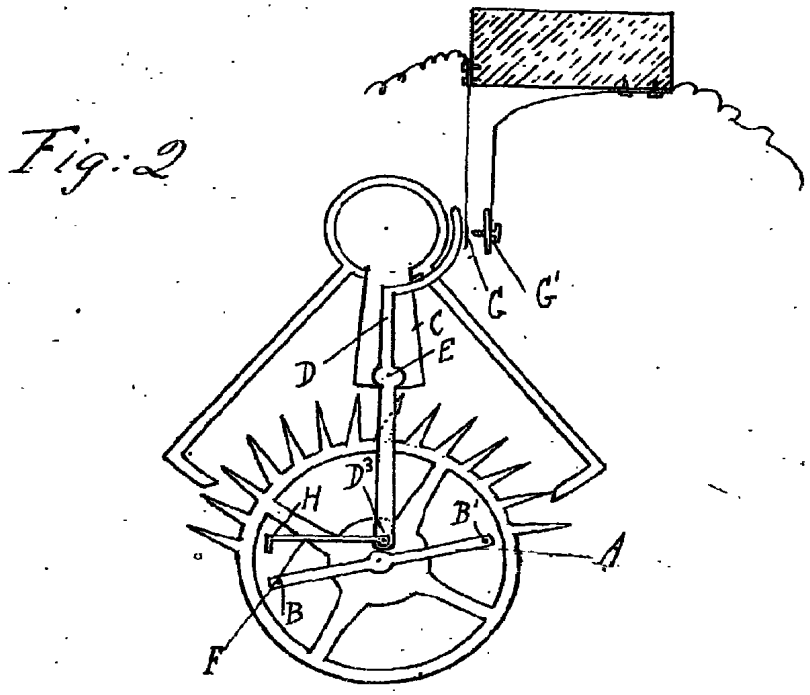


Fig. 2



[This Drawing is a reproduction of the Original on a reduced scale.]

Malby & Sons, Photo-Litho.