N° 6212 A.D. 1897

Date of Application, 9th Mar., 1897

Complete Specification Left, 7th Dec., 1897—Accepted, 9th Mar., 1898

PROVISIONAL SPECIFICATION.

Improved means for Supplying Electric Current to Electrically Operated Time Keeping Mechanism.

We, ALWYN WALTER STAVELEY, ISAAC HARDY PARSONS, and THOMAS JOHN MURDAY, all of Faraday Works, Braunstone Gate, Leicester, in the County of Leicester, Electrical Engineers, do hereby declare the nature of this invention to be as follows:—

Our invention relates to improved means especially applicable for use in connection with electrical time keeping mechanism for supplying electric current for operating a pendulum or balance wheel.

According to our invention the pendulum or balance wheel is operated by an electro magnet in the circuit of which we introduce a pair of contacts one of which is hinged or adapted to spring. Upon the rod of the pendulum is pivoted so as to swing very freely a trip piece advantageously of wedge or V-shape which normally hangs vertically. On the movable contact is a block having a notch in which the end of the trip piece can engage, the said trip piece and block being arranged in such relation to each other as regards length and thickness, that when the pendulum is in its vertical position and the end of the trip piece is in the notch of the block the contacts will be closed together to complete the electric circuit through the magnet. The length of the said block is such that under the normal swing of the pendulum the trip piece will completely pass over it without moving the contact the said trip piece swinging upon its pivot to permit of its passing the block. When, however, the swing of the pendulum falls below a certain limit the said trip piece will not clear the block whereby on the return swing of the pendulum the trip piece will slide along the top of the block until its free end enters the notch whereupon the pendulum and trip piece (which form a kind of toggle) are moved into alignment and so depress the block to complete the electric circuit. This imparts a fresh impulse to the pendulum through the medium of the electro-magnet, and it can thus be kept working for an indefinite period, so long as current is supplied.

Dated the 9th day of March 1897.

G. F. REDFERN & Co.,
4, South Street, Finsbury, London, Agents for the Applicants.

COMPLETE SPECIFICATION.

Improved means for Supplying Electric Current to Electrically Operated Time Keeping Mechanism.

We, ALWYN WALTER STAVELEY, ISAAC HARDY PARSONS, and THOMAS JOHN MURDAY, all of Faraday Works, Braunstone Gate, Leicester, in the County of

[*Price* 8*d*.]

Leicester, Electrical Engineers, 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:—

Our invention relates to improved means especially applicable for use in connection with electrical time keeping mechanism for supplying electric current for operating a pendulum or balance wheel.

According to our invention the pendulum or balance wheel is operated by an electro magnet in the circuit of which we introduce a pair of contacts one of which is hinged or adapted to spring. Upon the rod of the pendulum is pivoted so as to swing very freely a trip piece advantageously of wedge or V-shape which normally hangs vertically and on the movable contact is a block having a notch in which the end of the trip piece can engage.

To enable our invention to be fully understood we will describe the same by reference to the accompanying drawings in which:—

Figure 1 is a front elevation showing an arrangement for operating a pendulum according to our invention; and,

Figure 2 is a section of the same on the line 2—2 Figure 1:

Figures 3 and 4 are views of some of the parts shown in Figure 1 but in different positions.

Figure 5 is a sectional side view shewing the arrangement of our invention when a balance wheel is employed;

Figures 6 and 7 are sectional plans of the same the sections being taken respectively on the lines 6—6 and 7—7 Figure 5;

Similar letters of reference indicate corresponding parts in the several figures.

a is the pendulum which as shown is carried by an arbor *b* supported in the back or base plate *c* and in the bracket *d* affixed thereto as shown in Figures 1 and 2.

e is the electro magnet for operating the said pendulum the armature e^1 of the magnet being connected with the pendulum by a hook e^2, the said magnet receiving its current from any suitable generator, say the battery *f* through the wires *g*, *h* in one of which, say the latter, are the spring contacts *i*, *j* the normal tendency of which is to retain the circuit open or broken, an adjusting screw *k* serving to regulate the upward movement of the contact *j*.

l is the pendant or trip piece which is pivoted upon the rod of the pendulum so as to swing very freely and *m* is the block notched at m^1 to receive the free end of the trip piece and fixed upon the contact spring *j*.

The said trip piece and block are arranged in such relation to each other as regards thickness that when the pendulum is at rest and the end of the trip piece is in the notch of the block the contacts will be closed together to complete the electric circuit through the magnet *e*. The length of the block *m* is such that with a normal arc of oscillation of the pendulum the trip piece *l* will pass right over the said block *m* without moving the spring *j* but that when the swing of the pendulum falls below a certain limit, the said trip piece *l* will not clear the block but rest upon the top of the same as shewn in Figure 4 so that, on the return swing of the pendulum in the direction of the arrow in the said figure, the said trip piece will slide along the top of the block until its free end enters the notch m^1, when the said spring will be pressed down in a manner which will be readily understood by reference to Figures 1 and 2 whereupon the circuit of the battery *f* will be completed through the magnet *e* which will impart an impulse to the pendulum. This impulse is sufficient as a rule to cause the said pendulum to make several oscillations before the arc of oscillation becomes short enough to again cause the trip piece to rest upon the top of the block as shewn in Figure 4. The number of oscillations which the pendulum makes without a fresh impulse will be dependent upon the amount of work which the pendulum has to perform so that if this work is variable the battery circuit will be completed more often than if the work is light so that practically the oscillation of the pendulum is invariable notwithstanding variations of the load. Of course if the load upon the pendulum is constant as, for instance,

would usually be the case in an electric clock, the number of oscillations which the pendulum will make after each electric impulse will be uniform. The object of the notch m^1 in the block m is to ensure that when the trip piece is in contact with the said block as shewn in Figure 4, it shall not for any reason slide along and off the same without depressing it.

Any suitable means may be employed for converting the oscillating motion of the pendulum into rotary motion. As shewn in Figures 1 and 2, a pin n carrying a roller on the pendulum is designed to operate against an inclined cam surface o upon an arm o^1 pivoted at o^2. This arm o^1 at one end carries a spring pawl p designed to engage with the teeth of a ratchet wheel p^1 carried on an arbor or shaft q, the other end of the said arm o^1 carrying a counterweight r.

With this arrangement it will be understood that the length of the arm o^1 and the ratchet teeth being properly proportioned each oscillation of the pendulum in one direction will allow the pawl to drop whilst the oscillation in the reverse direction will cause the rotation of the ratchet wheel a distance of one tooth.

It will be obvious that the motion of the shaft q can be utilized in any desirable manner.

The arrangement of our invention in connection with a balance wheel is illustrated in Figures 5 to 7, in these figures s is the balance wheel which is mounted upon the arbor t; u is a hair spring in connection with the said balance wheel and v is a lever pivoted at v^1 and having one end bifurcated and a pin w upon the balance wheel projecting into the bifurcation, so that as the balance wheel oscillates an oscillatory motion will be imparted to the lever v; the other end of the said lever v is provided with pawls x, x which work in connection with a ratchet wheel x^1 the motion of the spindle of which is utilized in any desired manner. These pawls x, x and the ratchet wheel x^1 are similar in construction to the ordinary anchor escapement but operate in the reverse manner, that is to say, the anchor instead of receiving its motion from the wheel as is the case in the escapement transmits motion to the wheel.

The armature e^1 is fixed to the arbor t of the balance wheel between the poles of the magnet e in a well known manner so that when the magnet is momentarily energized the armature will be attracted to move the balance wheel and coil the hair spring which will react.

The contacts i, j are arranged in the circuit of the magnet e as hereinbefore described the latter contact having fixed to it the block m which is similar to the block m hereinbefore described except that it is of segmental shape as clearly shewn in Figure 7.

The trip piece l depends from an arm l^1 fixed to the boss of the balance wheel in such a manner that as the latter oscillates the said trip piece will slide over the block m.

It will be understood that so long as the oscillations of the balance wheel are sufficient to carry the trip piece l over the block m the contacts i, j will not close the circuit but that when the oscillations of the balance wheel are shortened to such an extent that the trip piece does not pass over the block m the contact j will be depressed in the manner hereinbefore described.

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. The improved means for supplying an electric current to electrically operated time keeping mechanism wherein a trip piece such as l is arranged in conjunction with an oscillating pendulum or balance wheel and with a pair of electric contacts in such a manner that when the oscillations of such pendulum or balance wheel have a certain amplitude, no contact is made, but that, when the amplitude of the oscillations falls below this point, the contact is completed, whereby a uniform speed of oscillation with variable loads can be obtained, substantially as described.

2. In electrical time keeping mechanism, the combination of a pendulum, a

trip piece pivoted to the said pendulum, and a pair of contacts normally open but adapted to be closed or pressed together when the trip piece bears upon the contact and is in alignment with the pendulum, substantially as described.

3. The improved mechanism for supplying current to electrically operated time keeping mechanism, substantially in the manner hereinbefore described and illustrated in the accompanying drawings.

Dated the 7th day of December 1897.

G. F. REDFERN & Co.,
4, South Street, Finsbury, London, Agents for the Applicants.

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A.D. 1897. March 9. N°. 6212.
STAVELEY & *others'* Complete Specification.

(2 SHEETS)
SHEET 1.

SHEET 2.

Fig. 1

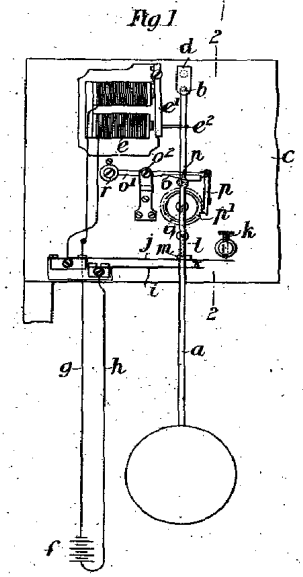

Fig. 2

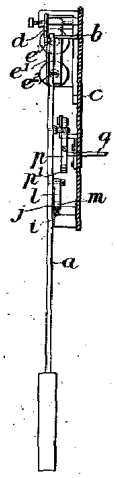

Fig. 3

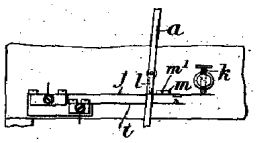

Fig. 4

Fig. 5

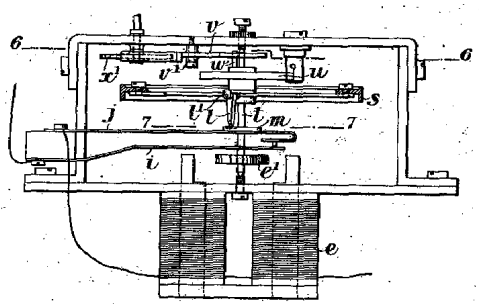

Fig. 7

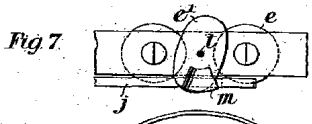

Fig. 6

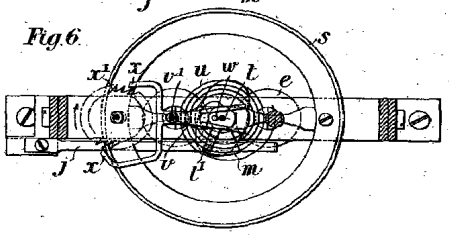

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Fig. 1.

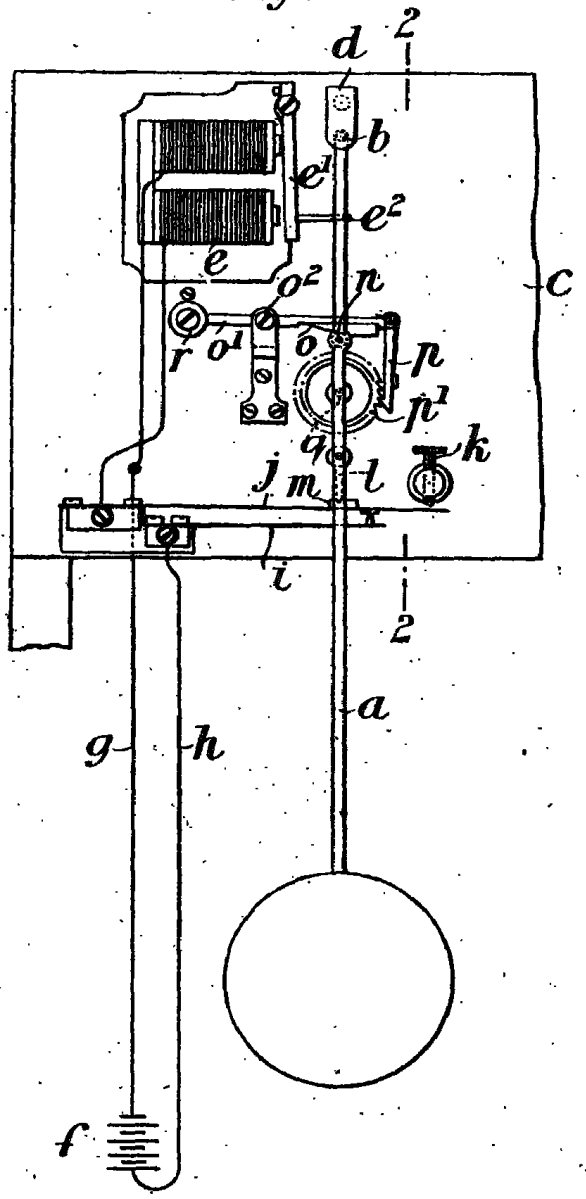


Fig. 2.

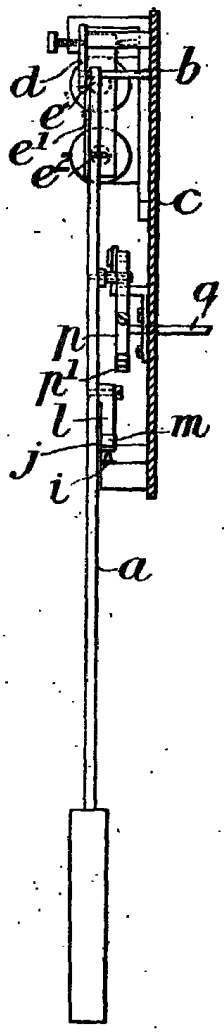


Fig. 3.

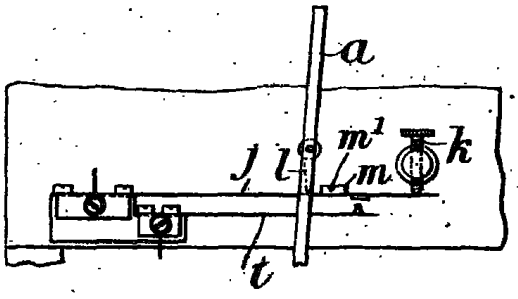


Fig. 4.

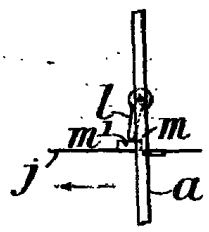


Fig. 5.

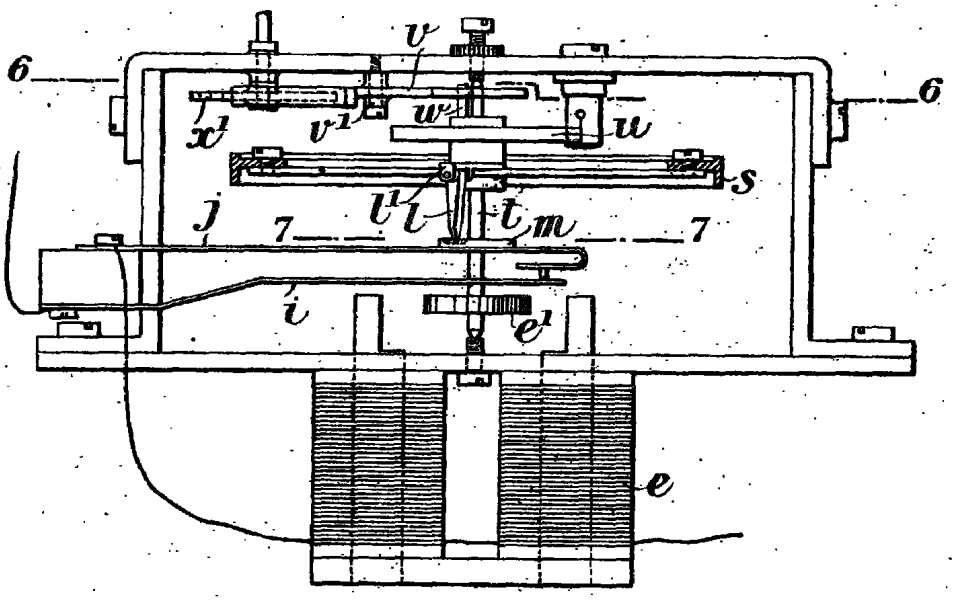


Fig. 7.

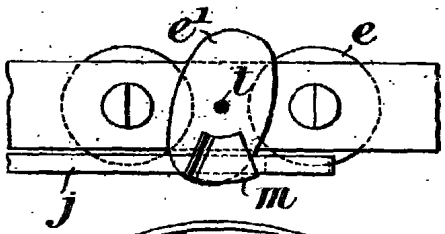
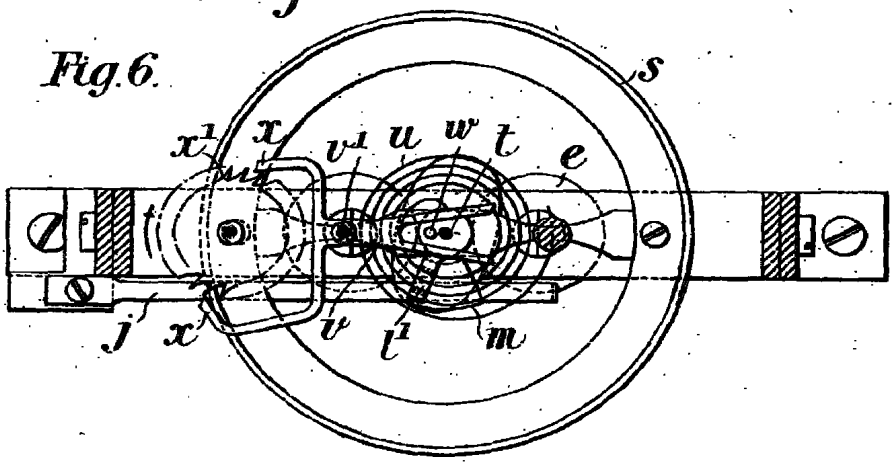


Fig. 6.



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