N° 19,268 A.D. 1913

Date of Application, 25th Aug., 1913
(Patent of Addition to No. 10,100, 29th Apr., 1913)
Complete Specification Left, 26th Nov., 1913
Complete Specification Accepted, 12th Mar., 1914

PROVISIONAL SPECIFICATION.

Improvements in and relating to Electric Clocks.

I, THOMAS RUSHTON, Electric Clock Maker, of 51, Birnam Road, Tollington Park, London, do hereby declare the nature of this invention to be as follows:—

In my earlier Application No. 10,100 of 1913 I have described an electric clock in which a substantially constant or standard pressure is applied to the driving of the clock by the aid of gearing which is arranged to be driven by the electro-magnet and which is such that the driving power of the electro-magnet is applied simultaneously to the restoration of the member by which the standard pressure is applied and to the drive of the clock. In the particular clock described in detail in my said application, this gearing does not operate directly upon the clock train, but upon a driving spring of the ordinary type. Now it is apparent that the shorter this driving spring is made the less will be the amount of its unwinding corresponding to the difference in the extreme positions of the member which maintains the standard pressure. Hence if the driving spring is shortened the intervals of winding by the electro magnet are shortened and the amount of winding upon each occasion is lessened.

For certain purposes I have found it convenient to make the intervals between successive windings quite short amounting to less than a minute. In such cases according to the present invention I now omit the driving spring altogether, and permit the gearing which is rotated by the electro magnet to act directly upon the clock train as well as the member maintaining the standard pressure.

In a preferred construction according to this present invention, I retain the type of gearing described in my former application, *viz.*, a worm adapted to be rotated by a pawl attached to the armature of the electro magnet, and engaging a worm wheel geared to the clock train. The member which maintains the driving pressure upon the clock train is a spring bearing end-wise upon the worm shaft, and the opposite end of the worm shaft is preferably employed as a contact-making device in the manner described in my former application. The pawl carried by the armature conveniently takes the form of a leaf spring and engages a very finely serrated ratchet wheel; a second similar stationary pawl may engage the ratchet wheel to prevent any possibility of the electro-magnet dragging the wheel in the reversed direction.

As this new form of clock is commonly constructed the necessary winding on each occasion is effected by a single vibration of the armature. It might therefore seem unnecessary to employ an armature contact as well as the contact which is operated by the worm shaft, if the armature is made to drive during attraction. In point of fact however, I find it better that the driving should not take place during the attraction, for there is a possibility of the armature being set into minute vibrations insufficient to effect any winding at a position in which the contact in its circuit is all but broken. Instead therefore, I make

[*Price 8d.*]

the armature drive as it recedes from the electro magnet under the action of its spring. The exact operation therefore, is as follows:—

The standard spring bearing on the end of the worm shaft in driving the clock through the worm (acting as a rack) pushes the remote end of the worm shaft into engagement with a stationary contact thereby completing the circuit of the electro-magnet through the ordinary back contact of its armature, which consists as usual of a spring normally slightly bent resting against an adjustable screw. The armature is therefore attracted, and as it approaches the poles of the magnet its armature contact breaks. The motion of the armature will continue a little due to its momentum, but finally will cease and reverse, the armature being forced back by its spring. In this movement the pawl on the armature rotates the ratchet wheel and in so doing causes the worm to screw past the worm wheel and press back the standard spring to its end position. This movement almost immediately breaks the contact at the other end of the worm shaft, and it is important that this contact should be broken before the back contact of the armature is re-made if the winding is to be confined to a single vibration. The return movement of the armature of course continues after the breaking of this contact until it is restored to its original position after re-making its armature contact.

It will be apparent that the spring bearing upon the worm shaft instead of being a leaf spring might be a spiral spring or of any other suitable form. Further it may if desired be replaced by a weight. This will ensure the winding being limited to a single vibration of the armature if the armature drives when receding from the magnet.

Dated this 25th day of August, 1913.

W. P. THOMPSON & Co.,
285, High Holborn, London, W.C., and at
Liverpool and Bradford,
Patent Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in and relating to Electric Clocks.

I, THOMAS RUSHTON, Electric Clock Maker, of 51, Birnam Road, Tollington Park, London, 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 comprises improvements in and modifications of the electric clocks protected by Patent No. 10,100 of 1913. These have an electromagnet the armature of which is connected with the clock train through a worm and worm wheel; and the circuit of the electromagnet is completed at intervals through a contact operated by longitudinal motion of the worm under the action of a spring pressing upon it, and another contact operated by the electromagnet armature. In the particular clock described in the specification of the said patent winding is effected at intervals by a series of rapid vibrations of the armature; but by stiffening the spring interposed between the worm and worm wheel driven by the electromagnet and the rest of the clock train, the number of vibrations which occur at each winding may be lessened. If the armature is arranged to drive the worm as it recedes from its attracted position the total omission of this spring, as in the clocks about to be described, causes winding to be effected by single separate vibrations of the armature, the contact controlled by the worm being broken through the effect of the drive before the armature back contact is re-made.

The invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation, and

Figs. 2 and 3 end elevations from opposite ends of one construction of clock according to the present invention.

Fig. 4 shows part of the contact mechanism of the said clock separated from the rest of the mechanism.

In the arrangement of these figures the operating electromagnet is indicated at 1. Its armature 2 is pivoted at 3 and is normally pressed into unattracted position by the spring 4 the tension of which may be adjusted by a screw 5. The prolongation of spring 4 forms also the back contact 6 of the armature which, when the armature is unattracted, rests against adjustable screw 7. At its free end the armature carries a leaf spring 8 forming a pawl which engages with a fine milled ratchet wheel 9 secured on a worm shaft 10 carrying at 11 a worm which engages the first wheel 12 of the clock train. The last wheel 13 of the clock train is a crown wheel engaging an escapement mechanism, not shown.

The spindle 10 is longitudinally movable and is normally pressed to the right in Fig. 1 by a leaf spring 14. Its right hand end forms a contact—it preferably being somewhat pointed and formed with facets which can abut upon the fixed contact 15.

The method of operation of this apparatus is closely analogous to that of the clock described in the former specification referred to. But now the spring 14 is the only spring of the clock. The armature 2 when attracted breaks its back contact 6, and proceeding further under its own momentum takes up a tooth of the ratchet wheel 9. In returning under the action of its spring 4 it rotates the ratchet wheel 9 and screws the worm 11 past the wheel 12, pressing back the spring 14 and also breaking contact between the shaft and the contact 15. The spring 14 drives the clock train through the worm 11 acting as a rack until contact is again made in the worm spindle and contact 15. Winding then again takes place, the armature 2 making a single vibration and breaking the contact between the worm spindle and contact 15 before it re-makes its back contact 6.

It will be apparent that the spring 14 could readily be replaced by a weight bearing directly or indirectly upon the spindle so as to press it endwise. Such a construction would be useful in connection with turret and other large and exposed clocks.

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

1. An electric clock of the kind claimed in Patent No. 10,100 of 1913 in which the drive effected by the armature opens the contact controlled by the worm before the armature back contact is closed, so that the winding is effected by separate single vibrations of the armature.

2. An electric clock of the kind claimed in Patent No. 10,100 of 1913 in which the spring acting on the worm shaft is the sole driving spring of the clock train, and winding is effected by single separate vibrations of the armature.

3. The improved constructions of electric clock substantially as described with reference to the accompanying drawings.

Dated this 26th day of November, 1913.

W. P. THOMPSON & Co.,
285, High Holborn, London, W.C., and at
Liverpool and Bradford,
Patent Agents for the Applicant.

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RUSHTON'S Complete Specification.

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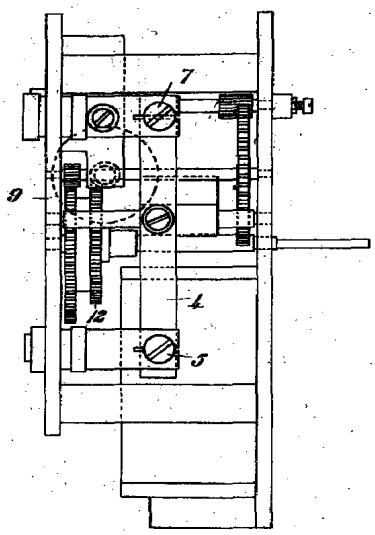


Fig:3.

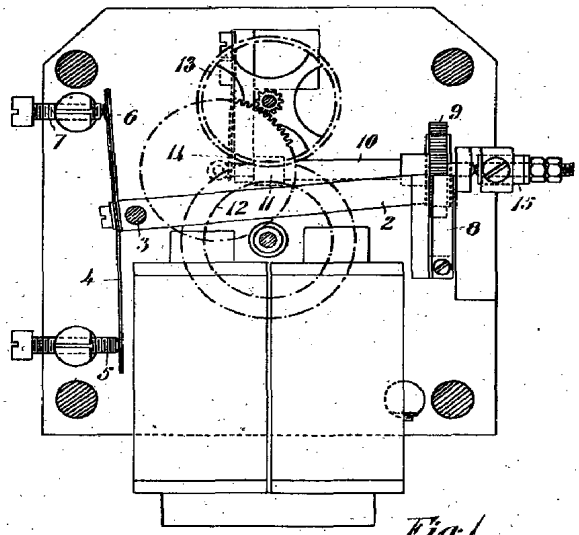


Fig:1.

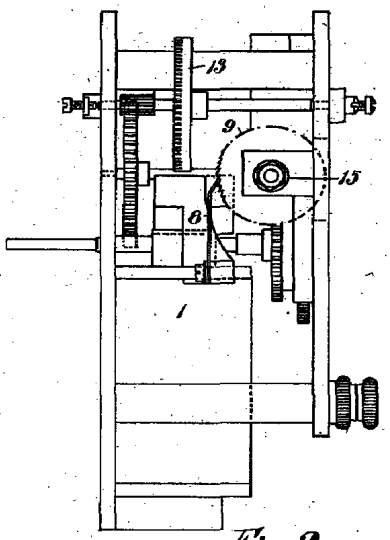


Fig:2.

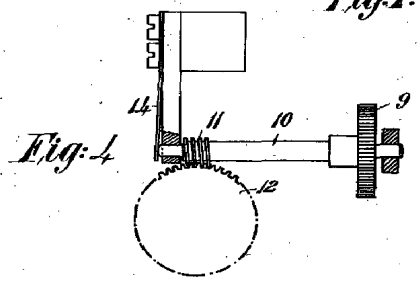


Fig:4

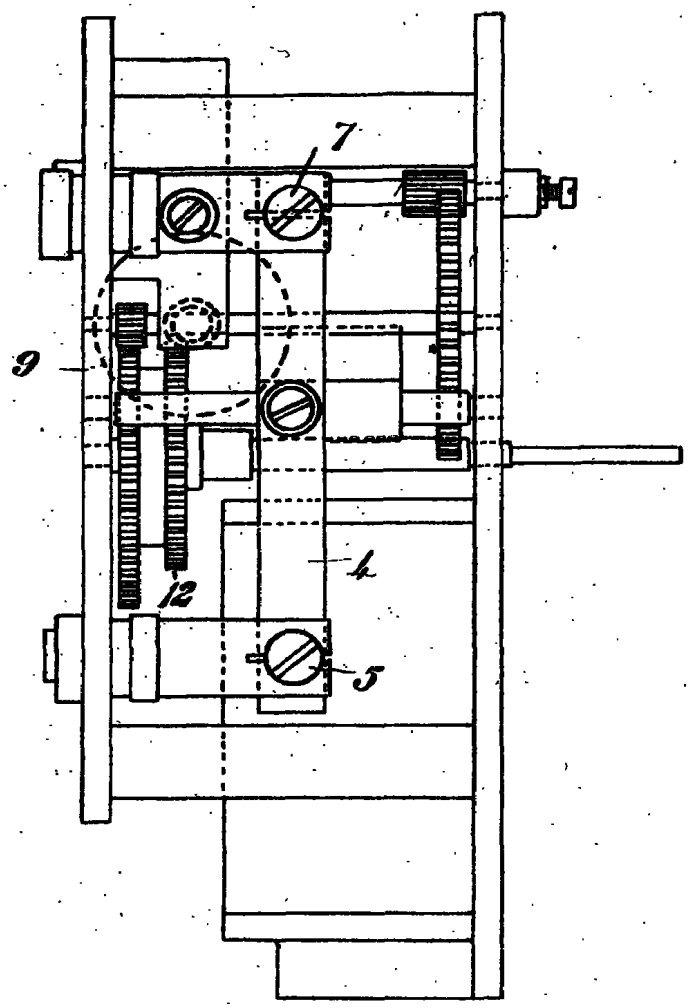
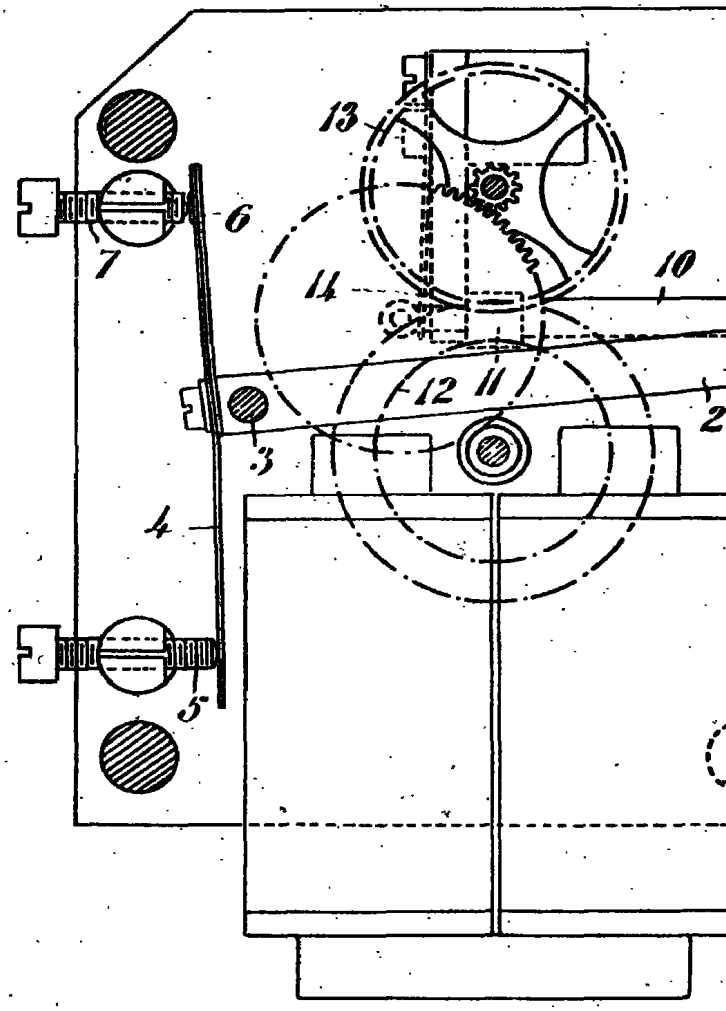


Fig: 3.



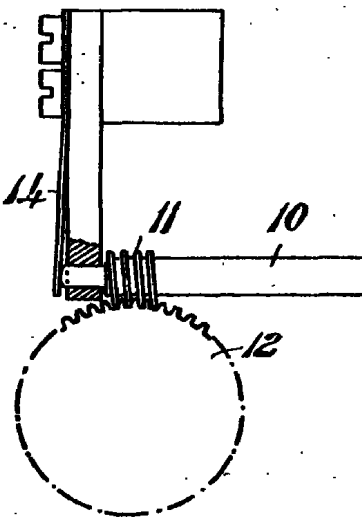


Fig: 4

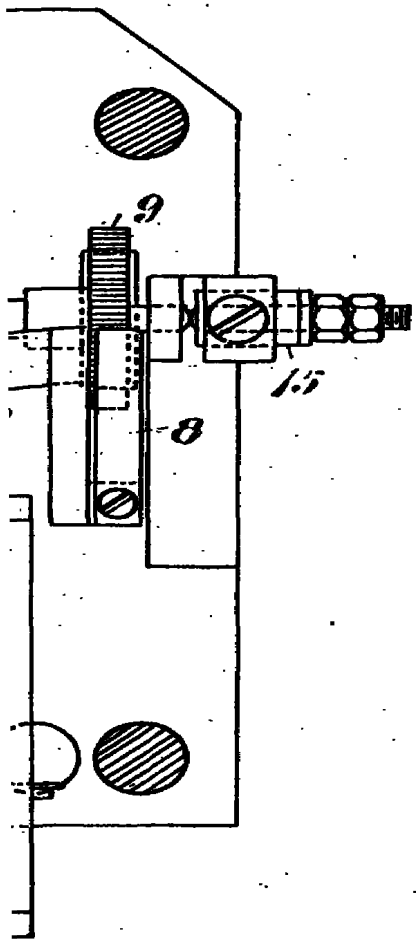


Fig: 1.

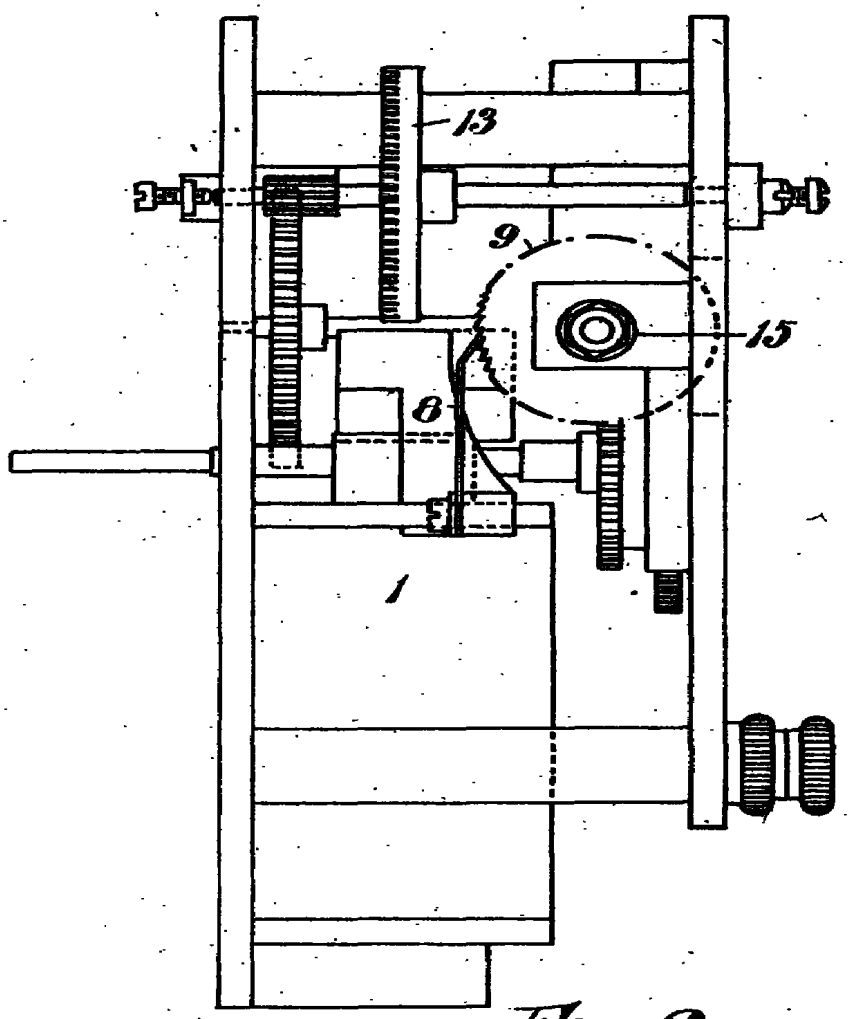
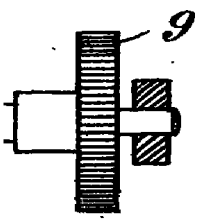


Fig: 2.



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