N° 10,100 A.D. 1913

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COMPLETE SPECIFICATION.

# Improvements in and relating to Electric Clocks.

I, THOMAS RUSHTON, of 84, Tytherton Road, Tufnell Park, London, N., Electric 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 relates to electric clocks which are wound at intervals by an electromagnet the circuit of which is automatically closed by the clock. According to the invention the armature of the electromagnet is connected with the clock mechanism through a worm and worm wheel; the worm is arranged to be longitudinally movable under the action of a spring which through it exerts pressure on the clock train. The longitudinal movement is utilised to bring about the closing of the circuit of the electromagnet, the worm shaft itself preferably forming one contact.

Constructions according to the invention are illustrated in the accompanying drawings, in which

Fig. 1 shows the complete electromagnetic winding and contact apparatus for a clock.

Fig. 2 shows a detail of an alternative construction, and

Fig. 3 a detail of a third form.

In the arrangement of Fig. 1 a spur wheel 1 on the spring drum is rotated for winding purposes by means of a pinion 2 on the shaft 3. This latter carries a worm wheel 4 meshing with the worm 5, the shaft 6 of which bears a ratchet wheel 7 adapted to be rotated by the electromagnetic winding device. The shaft 6 is movable longitudinally in bearings. The tension of the driving spring acting through the gearing 1, 2, 3, 4, 5 tends to move it in one direction, and a leaf or other spring 8 bearing on one end of it counteracts this pressure. The opposite end of the shaft 6 is cut into facets 9 so as to present grinding edges and bears against a silver or like facing 10 upon an adjustable terminal block 11 which is mounted on but insulated from the frame of the clock. This block is joined by a conductor 12 to one pole of a suitable battery or other source of supply.

The electromagnetic winding device by which the spring 8 is restored to its initial position, after it has caused the closing of the circuit may be of the form shown in Fig. 1. This comprises an electromagnet 13 the armature 14 of which carries a hammer 15 to regulate its rate of vibration. It also bears a contact spring 16 which when the armature is not attracted rests against a contact screw 17 which is joined by a conductor 18 to one terminal of the magnet winding, the remaining terminal being connected by the lead 19 to the other pole of the battery or other source of power. The terminal screw 17 is insulated from the clock frame. Thus the complete circuit of the electromagnetic device is as follows; from the battery by lead 12, through terminal 11, contact 10, shaft 6 of the worm, the frame of the clock, the armature 14, the spring 16, the contact 17, lead 18, the windings of the electromagnet, and lead 19 to the

[Price 8d.]

battery. When the armature is attracted, contact is broken between 16 and 17, with the result that the armature is at once released and moves back to the position under the action of spring 20. Pivoted upon the armature 14 is a spring-pressed pawl 21 which engages the ratchet teeth 7. Thus as the armature oscillates it rotates the shaft 6. If desired the armature may carry two pawls, one of which operates when the armature is attracted and the other when it recedes from the magnet, so that the shaft 6 is rotated one step for each stroke of the armature, *i.e.* two steps for each complete oscillation.

When the driving spring is sufficiently wound its pressure upon the worm shaft 6 through the gearing 1, 2, 3, 4, 5 moves the shaft longitudinally against the action of spring 8 so as to separate the end 9 from the contact 10. As the tension in the spring lessens the spring 8 is able to press down the shaft 6 thus virtually winding the clock a very little without rotation of the worm. The result of this is finally to bring about contact between 9 and 10, thus closing the circuit above described. The armature 14 then vibrates, rotating the shaft 6 as it recedes from its attracted position and through the gearing winding the driving spring. This continues until the tension of the spring is sufficiently increased to cause the worm shaft 6 to be moved again against the action of spring 8 to break contact.

It is not necessary that the operating contact should be actually made by the shaft 6. An alternative construction is illustrated diagrammatically in Fig. 2. There, 22 represents a snail cam upon the shaft 6, the circumference of which is approximately circular throughout the greater part of its circumference. This forms one of the contact members. The other is a spring or spring-pressed arm 23 notched at 24. Normally this arm rests upon the edge of a spring 25 which corresponds with the spring 8 bearing upon the end of the shaft 6.

When the shaft yields owing to the lessening of tension of the driving spring, the movement of spring 25 brings it opposite the notch 24, with the result that the arm 23 falls. It thus makes contact with the cam 22 completing the winding circuit. In winding, the cam 22 is rotated and lifts the arm 23 to such a position that the spring 25 can re-engage with it. Such re-engagement will take place when the driving spring is sufficiently tensioned to overcome the spring 25. After this has occurred the further rotation of the cam 22 will break the circuit because the arm 23 will not fall when it comes to the step of the cam.

Yet another arrangement of the contacts is shown diagrammatically in Fig. 3 where 26 represents a snail cam upon the shaft 3 or other shaft driven therefrom. Upon this cam rests the insulating end 27 of a contact spring 28. A second contact spring 29 is pressed against the spring 28 except in the position shown in the drawing. In this position the end of the spring 29 is upheld by the step of the cam for a short interval after the spring 28 has fallen.

When the spring 8 is able to overcome the driving spring the longitudinal motion of the worm 5 will cause the cam 26 to rotate slightly just sufficient to release the spring 29. The two springs thus come in contact and the winding circuit is closed. They continue in contact until the cam has made one revolution, when the fall of spring 28, which is prior to the release of spring 29, breaks the circuit.

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 in which driving pressure is maintained on the clock train by a spring bearing endwise on a worm, said worm by its longitudinal motion operating a contact controlling the circuit of an electromagnetic winding device by which said worm is rotated.

2. An electric clock in which the armature of an electromagnet in receding from its attracted position rotates a worm shaft which is movable longitudinally

under the action of a spring to make and break contact for completing the circuit of the electromagnet, while the attraction of the electromagnet armature breaks another contact.

3. In an electric clock in which the circuit of the electromagnetic device for winding the clock is closed at intervals by the clock, the use of a rotating arbor preferably formed with facets on its end, as one member of the contact.

4. The improved constructions of contact making device for electrically driven clocks, substantially as described, with reference to the accompanying drawings.

Dated this 29th day of April, 1913.

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Liverpool and Bradford,
Patent Agents for the Applicant.

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RUSHTON'S Complete Specification.

( 1 SHEET )

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

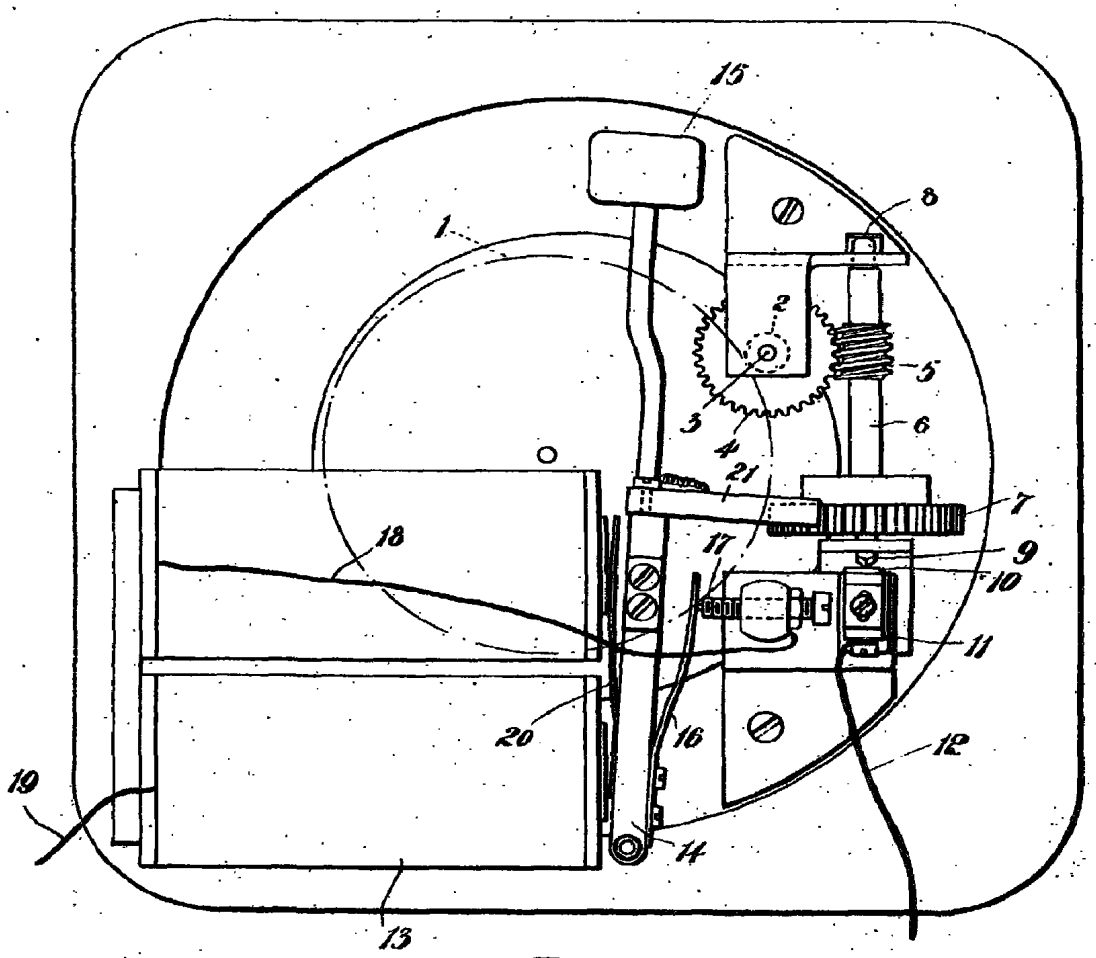


Fig:1.

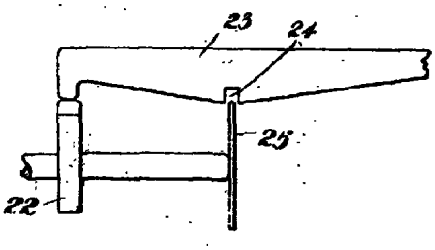


Fig:2.

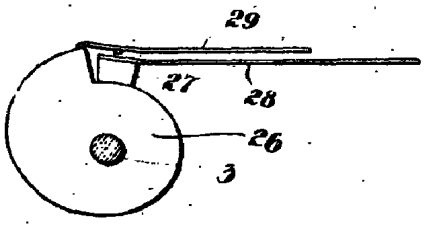


Fig:3.



Malby & Sons, Photo-Litho.