No. 674,280. Patented May 14, 1901.

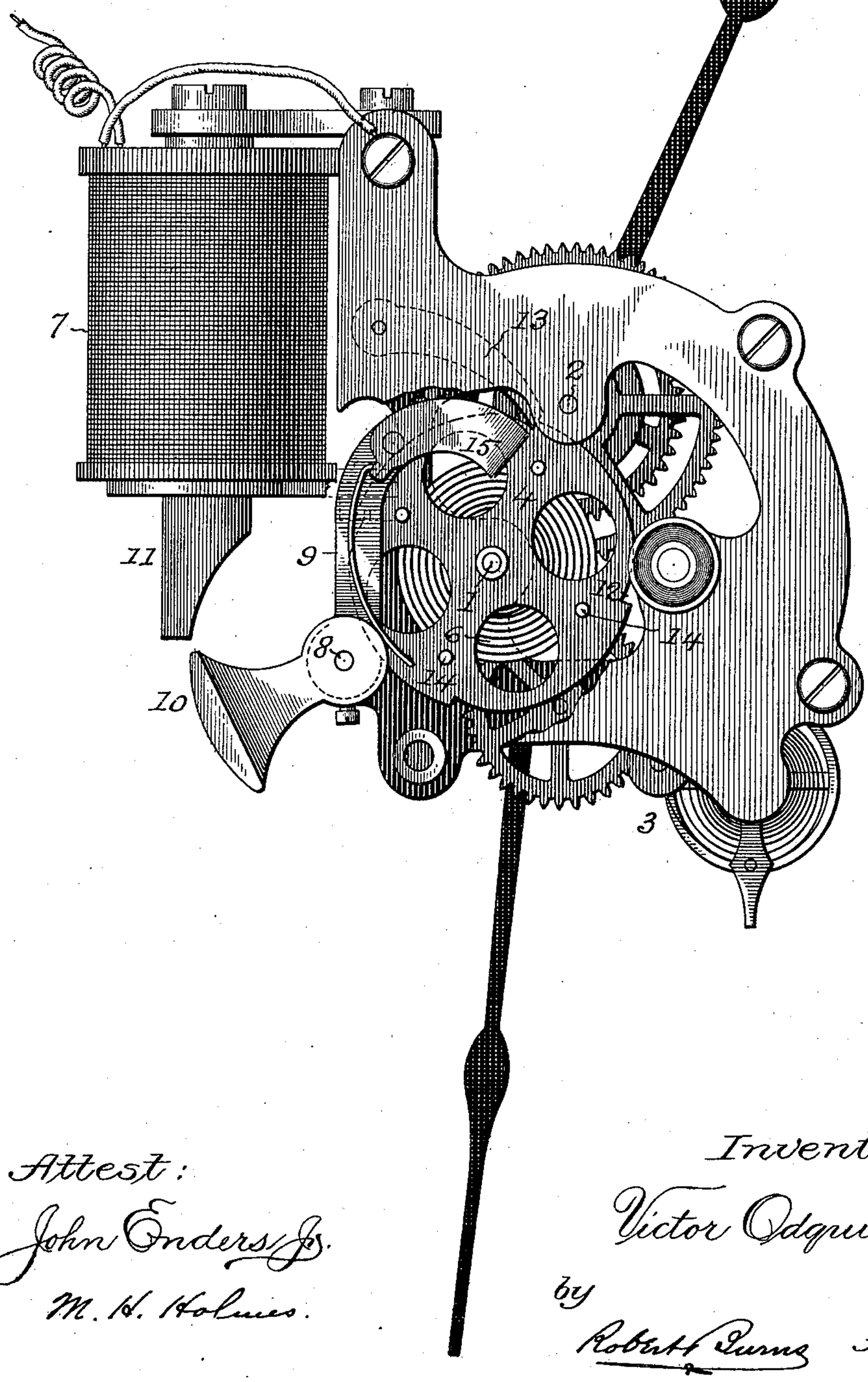
V. ODQUIST.

ELECTRIC CLOCK WINDING MECHANISM.

(Application filed June 25, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

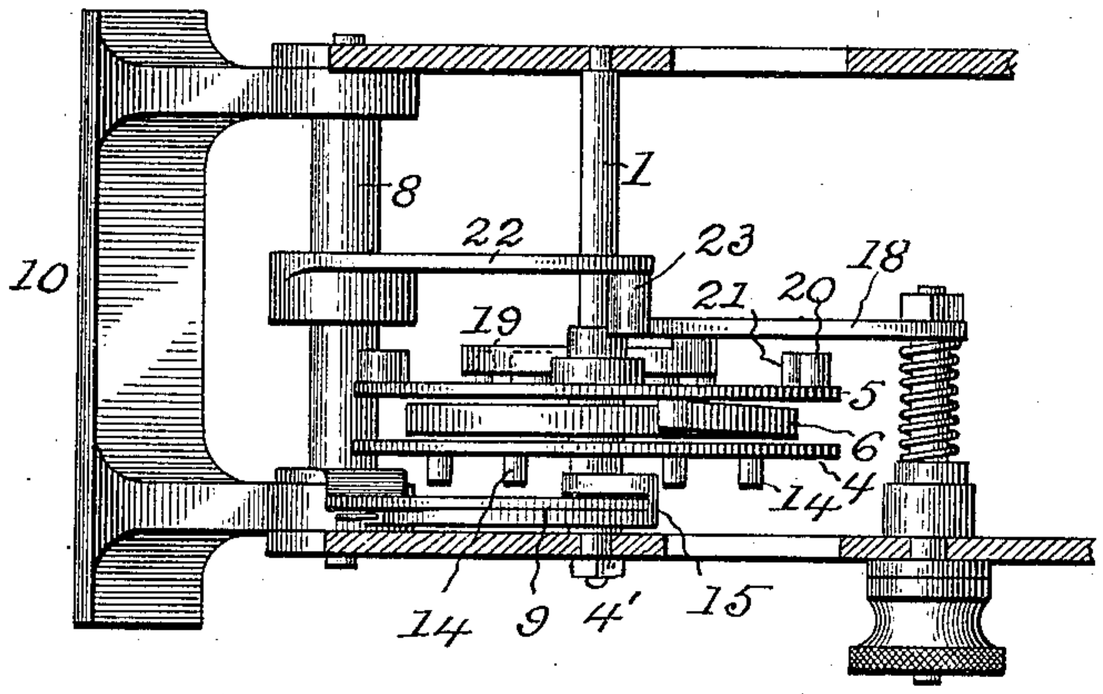

Fig. 3.

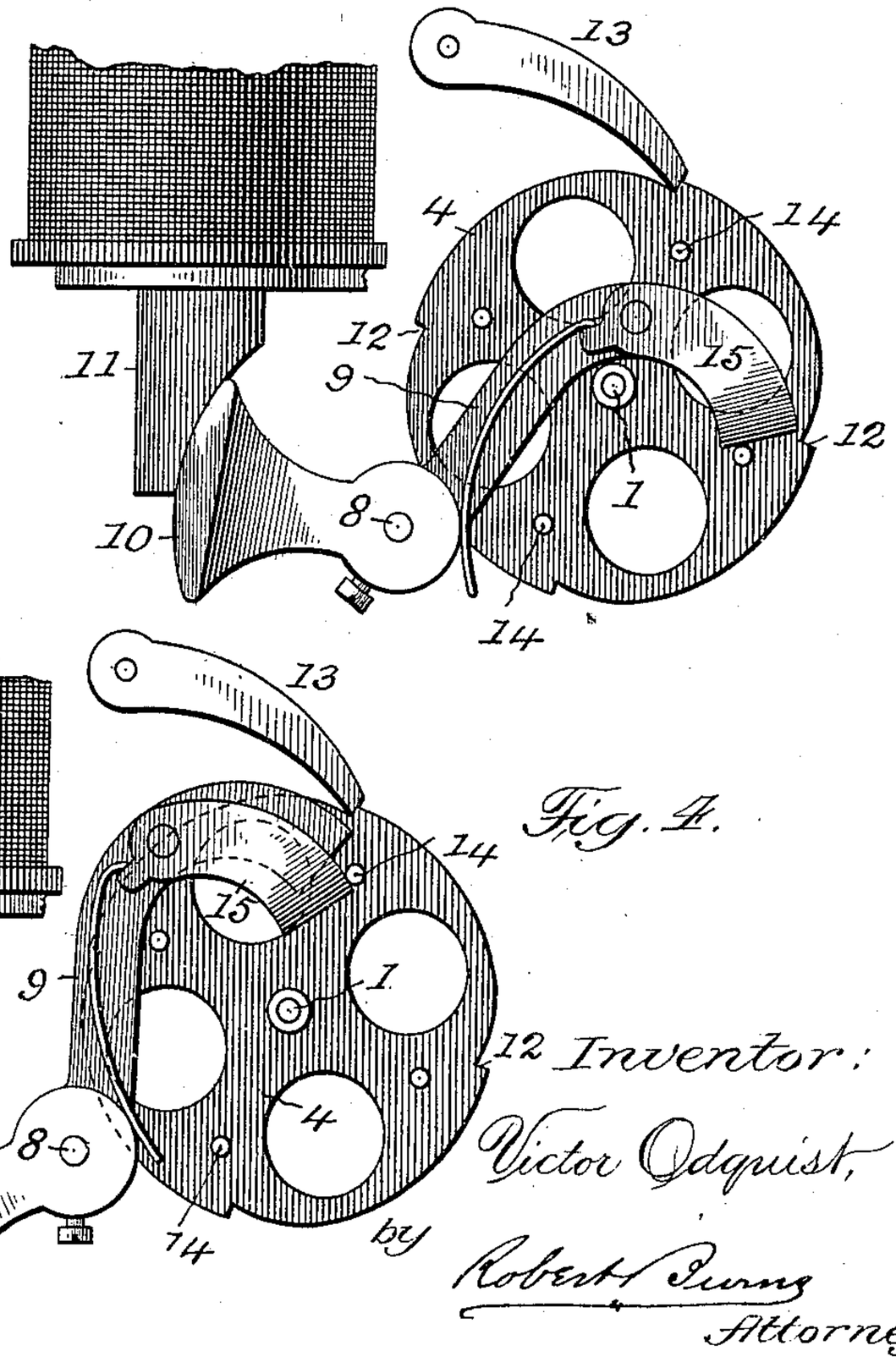

Fig. 5.

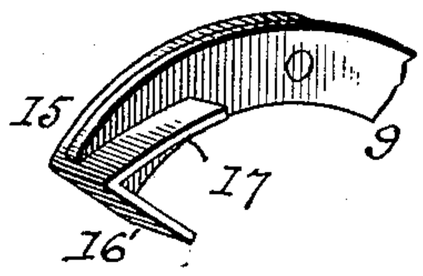

Fig. 4.

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Fig. 6.

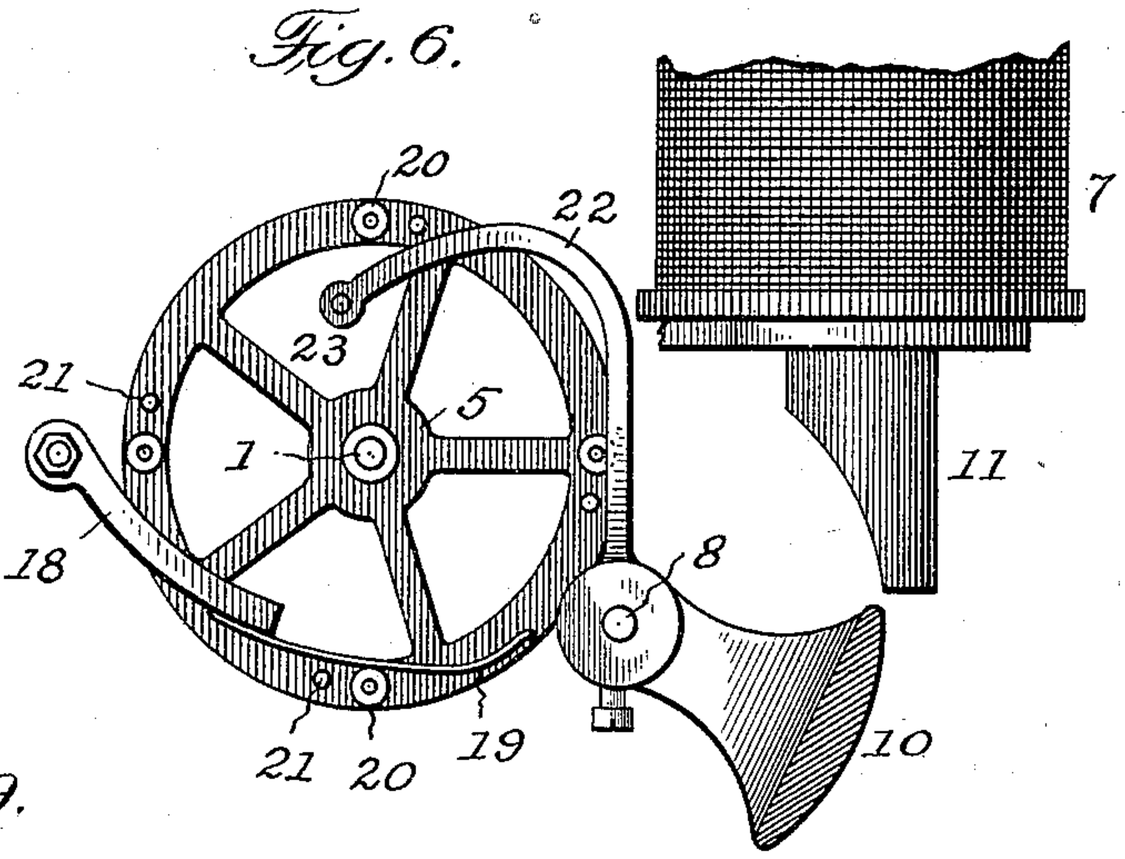


Fig. 9.

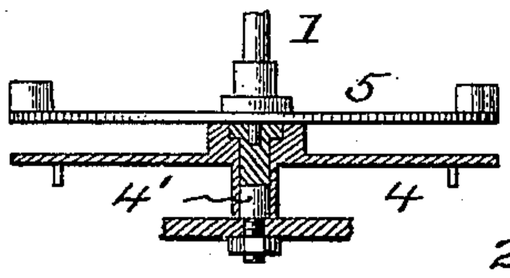


Fig. 7.

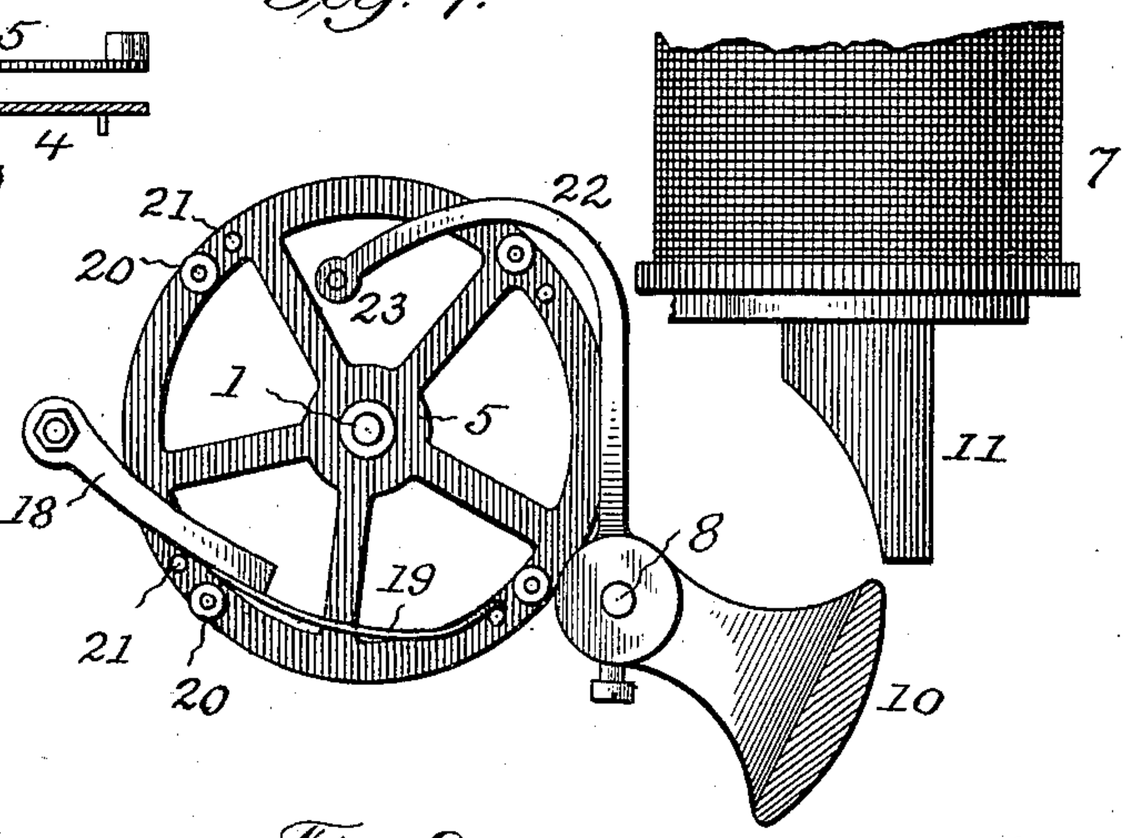
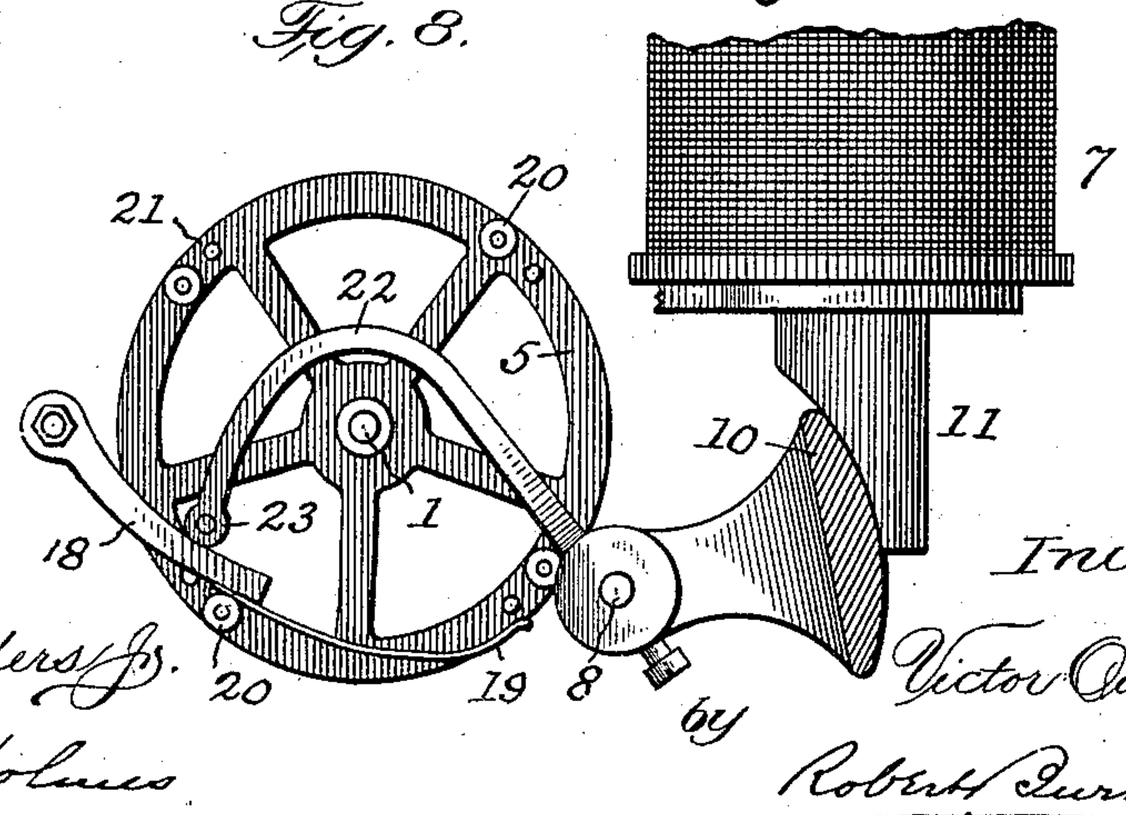


Fig. 8.



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UNITED STATES PATENT OFFICE.

VICTOR ODQUIST, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALBERT TUERK, OF SAME PLACE.

ELECTRIC CLOCK-WINDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 674,280, dated May 14, 1901.

Application filed June 25, 1900. Serial No. 21,422. (No model.)

To all whom it may concern:

Be it known that I, VICTOR ODQUIST, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Clock-Winding Mechanisms, of which the following is a specification.

The present invention relates to that particular type of clock-winding mechanisms in which the actuating-spring or other power is rewound or restored at regular and frequent intervals.

One object of the present invention is to provide a simple, durable, and effective electromagnetic rewinding mechanism in which the periodic winding of the actuating-spring of the clock mechanism is effected by a progressive lever movement of the dog or pawl of the actuating-armature in order to compensate for the progressive decrease in the force or torque of the electromagnet as the armature nears the end of its active movement.

A further object of the present invention is to provide a simple, efficient, and automatic circuit-closing mechanism in which after each active operation of the electromagnetic winding mechanism the circuit is broken in a rapid and positive manner immediately succeeding such active operation and with a view to prevent unnecessary waste of the battery-current and to prolong the period of usefulness of the same, all as will hereinafter more fully appear and be more particularly pointed out in the claims.

I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation with a portion of the main frame broken away, illustrating the application of the present invention to an ordinary clock-movement; Fig. 2, a fragmentary horizontal section of the same on a line cutting the axis of the main shaft of the clock mechanism; Figs. 3 and 4, detail elevations illustrating the electromagnetic winding mechanism of the present invention in their final and initial positions; Fig. 5, a detail perspective view of the pawl and lever of the electromagnetic winding mechanism; Figs. 6, 7, and 8, detail elevations illustrating the circuit-controlling mechanism in its different positions; Fig. 9, a detail section illustrating the support for the winding ratchet-disk.

Similar numerals of reference indicate like parts in the several views.

In the accompanying drawings I illustrate an ordinary type of clock-movement in connection with and illustrative of my present invention, such clock mechanism comprising a main shaft 1, having the usual pinion and gear-wheel connection with the hour-hand shaft 2 and the usual gear-wheel connection with the clock escapement mechanism 3, all of which may be of any usual and approved construction.

In the present invention 4 is the winding ratchet-disk loosely mounted, as hereinafter set forth, on a fixed hub on the main frame in axial alinement with the main shaft 1, so as to be capable of rotation entirely independent thereof, and 5 a disk fixedly attached to said main shaft 1 in separated relation from the winding ratchet-disk 4, so as to leave an intermediate space for the reception of the motive spring 6 of the present clock mechanism.

The motive spring 6, preferably of the volute form shown, is connected at one end with the winding ratchet-disk 4 and at the other end with the fixed disk 5 of the main shaft, and, as usual in the present type of electrical clock-winding mechanisms, constitutes the sole operative connection between the two disks 4 and 5 aforesaid, the arrangement being such that during the periodic winding movement one end of said spring will be revolved around the main axis 1 to effect a winding up of said spring, while the tendency of the opposite end of such spring is to impart a uniform movement to the clock mechanism.

The support for the ratchet winding-disk 4 comprises a stationary hub 4′, secured to the main frame of the clock, and upon which hub the said disk is free to rotate. The end of said hub is formed with a bearing-orifice for the adjacent end of the main shaft 1, all as illustrated in detail Fig. 9.

The electromagnetic actuating or winding mechanism of the clock comprises an elec-

tromagnet 7, arranged in separated relation to the main shaft 1 of the clock-movement, and an intermediate shaft or axis 8, upon which is secured the pawl-carrying lever 9, which extends toward and has operative engagement, as hereinafter described, with the winding ratchet-disk 4. Said shaft or axis 8 also carries the oscillating armature 10 of the electromagnet 7, and which armature extends into adjacent relation with the pole-piece 11 of such magnet, the adjacent faces of the pole-piece and oscillating armature being concentric with the pivot-axis 8 of the armature, as usual in this type of electromagnets, and in which an extended range of movement of the armature is intended.

The winding ratchet-disk 4 in my preferred construction (shown in the accompanying drawings) is formed with a series of four peripheral notches 12 for engagement with the pawl 13 to prevent a retrograde movement of such disk and with a like number of concentrically-arranged and laterally-projecting studs 14, which are consecutively engaged by a spring-pawl 15 on the free end of the carrying lever or arm 9 of the electromagnetic actuating mechanism of the clock to effect an intermittent rotation of the disk 4 and a corresponding winding up of the motive spring 6.

In the present construction the armature lever or arm 9 extends past the main shaft 1, carrying the winding-disk 4, as illustrated in Figs. 1, 3, and 4, in order that its spring-pawl 15 may serially engage the ratchet-studs 14 as they reach the point farthest removed from the pivot-axis 8 of said arm or lever 9 and so that with the initial active movement of the arm or lever 9 its leverage will be the smallest and will progressively increase during an active movement to correspond with the progressive decrease in the power or torque of the electromagnet as the armature oscillates past the magnet-pole in the construction shown, and in order to compensate for the consequent independent movement of such studs with relation to the engaging face of the pawl 15 such face will be formed on a radial line from the axis 8 of the arm or lever 9 and widened sufficiently to permit of such independent movement without disengagement of the parts taking place.

In the particular construction shown the active face of the pawl 15 is formed by a lateral flange 16 on the main body of the pawl, and such flange is provided with an inclined track 17, which in a retrograde movement of the pawl rides upon the next stud 14 in sequence to depress said pawl, so that in the final retrograde movement of the pawl the same will spring into active engagement behind such last-mentioned stud of the winding-disk 4.

The circuit-controlling mechanism of the present invention comprises a pivoted and insulated spring-arm 18, that is connected in any usual manner to one pole of the battery and is provided with a flexible contact-finger 19, by which the circuit is established, as hereinafter described, and a series of insulating support and contact points corresponding in number to the number of studs 14 upon the winding ratchet-disk 4, heretofore described, and carried by the disk 5, that is rigidly secured to the main shaft 1.

In the present construction, as shown in Figs. 6, 7, and 8 of the drawings, the series of insulating supports and contacts above referred to will each comprise a lateral stud 20, of insulating material, and a conducting-stud 21, arranged immediately back of the insulating-stud 20. Normally the flexible contact-finger 19, heretofore mentioned, will rest upon one of the insulating-studs 20 and will drop into contact with the adjacent conducting-stud 21 in the normal rotation of the clock mechanism and the carrying-disk 5 to complete the electric circuit and cause an operation of the electromagnetic winding mechanism heretofore described. With the completion of such operation of the winding mechanism it is desirable to immediately disrupt the electric circuit with a view to economize the motive force of the battery, and this breakage or disrupting of the circuit is in the present improvement effected in a rapid, positive, and automatic manner by means of a curved arm 22, carried by the armature-shaft 8 and having an insulated contact end 23, which is adapted in the final active movement of the armature to engage against the carrying-arm 22 to forcibly depress the same and draw the flexible contact-finger 19 from off the conducting-stud 21 to disrupt or break the circuit. In the construction shown the flexible contact-finger 19 as it leaves the conducting-stud 21 drops onto the next succeeding insulating-stud 20, ready for the periodic repetition of the actions just described in the normal movement of the clock mechanism.

It is preferable to form the flexible contact-finger 19 with a curved contact end and make such finger yielding at a point back of such curved end, as shown in Figs. 6, 7, and 8, with a view to the attainment of the most perfect results in a long-continued operation of the mechanism.

In the present construction the insulated spring-arm 18 will move in a plane removed from the disk 5 and its contact-studs 20 and 21, and the flexible contact-finger 19 will be arranged to project laterally from the arm 18 into the path of such contact-studs 20 and 21 in manner illustrated in Fig. 2 of the drawings.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electromagnetic clock-winding mechanism of the character herein described, the combination with the main shaft, ratchet-disk, and motive spring forming the intermediate operative connection between the same, of a series of lateral studs on the side of the

ratchet-disk, an oscillating arm carrying a dog or pawl adapted to engage said studs, the said arm extending to the side of the ratchet-disk farthest from the pivot-axis of said arm, and the pawl having a widened face formation, an intermediate shaft carrying said arm, an oscillating armature carried by said shaft, and an electromagnet for operating said armature, substantially as set forth.

2. In an electromagnetic clock-winding mechanism of the character herein described, the combination with the main shaft, ratchet-disk, and motive spring forming the intermediate operative connection between the same, of a series of lateral studs on the side of the ratchet-disk, an oscillating arm carrying a spring-pawl formed with a flanged end and an inclined track and adapted to engage said studs, an intermediate shaft carrying said arm, an oscillating armature carried by said shaft, and an electromagnet for operating said armature, substantially as set forth.

3. In an electromagnetic clock-winding mechanism of the character herein described, the combination with an operating-electromagnet, a main shaft, a ratchet-disk and a motive spring forming the intermediate operative connection between said shaft and disk, of a fixed disk on the main shaft, a series of insulating supporting-studs on the said disk, a secondary series of conducting-studs arranged on said disk immediately back of said insulating-studs, and a flexible contact-finger adapted to have engagement with said studs, substantially as set forth.

4. In an electromagnetic clock-winding mechanism of the character herein described, the combination with the intermittent winding mechanism, of a revoluble disk operatively connected with the winding mechanism and provided with an insulating supporting-stud, and a conducting-stud arranged immediately back of said insulating-stud, a flexible contact-finger adapted to have engagement with said studs, and an arm moving with the armature of the winding mechanism and adapted to push the contact-finger away from its electrical contact with the conducting-stud, substantially as set forth.

5. In an electromagnetic clock-winding mechanism of the character herein described, the combination with an operating-electromagnet, an oscillating armature, an oscillating operating-arm, a main shaft, a ratchet-disk and a motive spring forming the intermediate operative connection between said shaft and said ratchet-disk, of a fixed disk on the main shaft, a series of insulating supporting-studs on said disk, a secondary series of conducting-studs arranged on said disk immediately back of said insulating-studs, a flexible contact-finger adapted to have engagement with said studs, and an arm moving with the armature and adapted to push the contact-finger away from its electrical contact with the active conducting-stud, substantially as set forth.

6. In an electromagnetic clock-winding mechanism of the character herein described, the combination of a main shaft, a ratchet-disk mounted on a stationary hub on the main frame and in axial alinement with the main shaft, a motive spring forming the intermediate operative connection between the ratchet-disk and main shaft, and means for imparting periodic movement to the ratchet-winding disk, substantially as set forth.

Signed at Chicago, Illinois, this 22d day of June, 1900.

VICTOR ODQUIST.

Witnesses:
ROBERT BURNS,
M. H. HOLMES.