May 26, 1931. A. W. FOWLER 1,806,969

CLOCK WINDING MECHANISM

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Fig. 1.

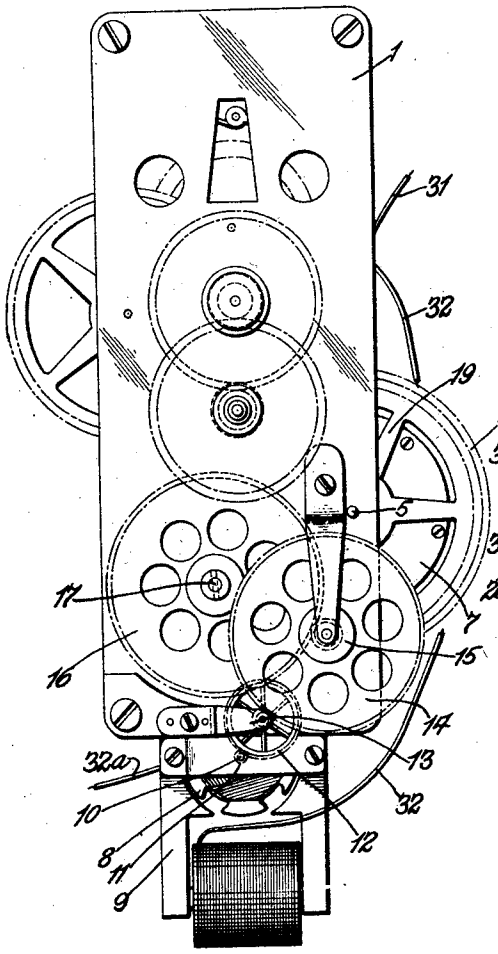
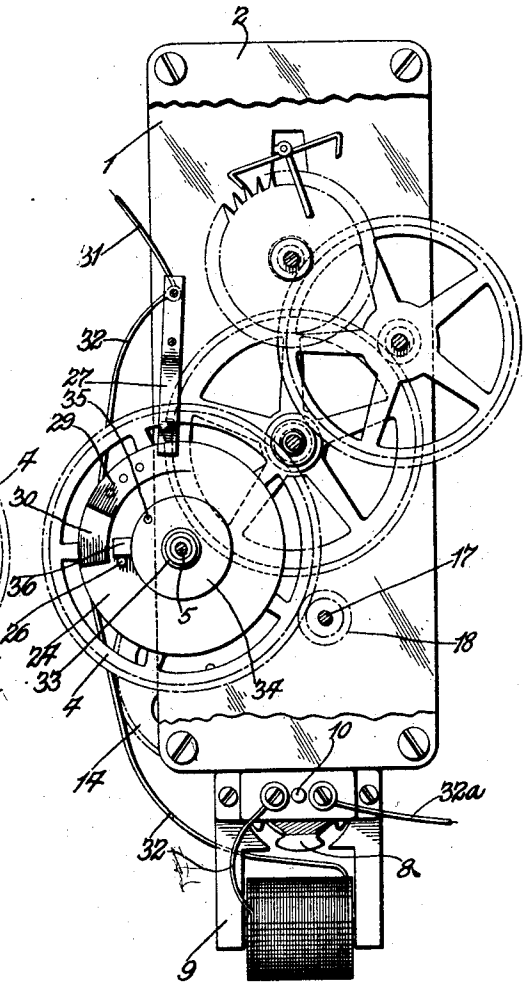



Fig. 2.




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Fig. 3.

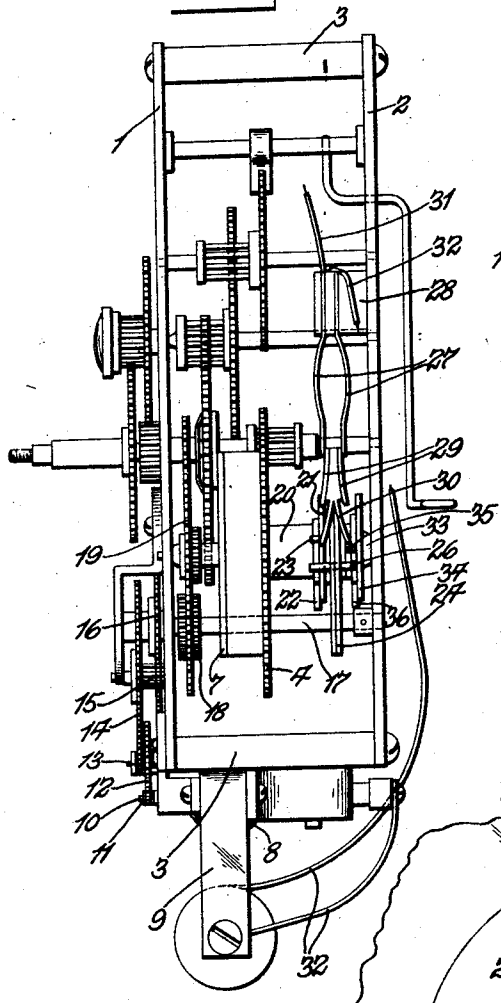



Fig. 4.

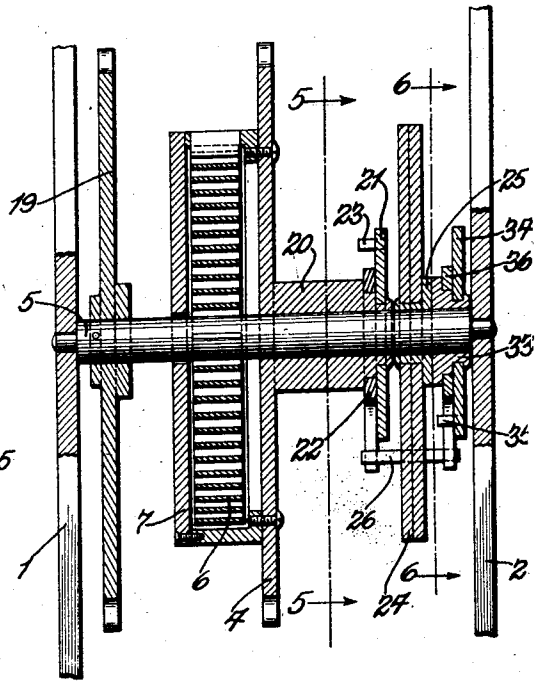
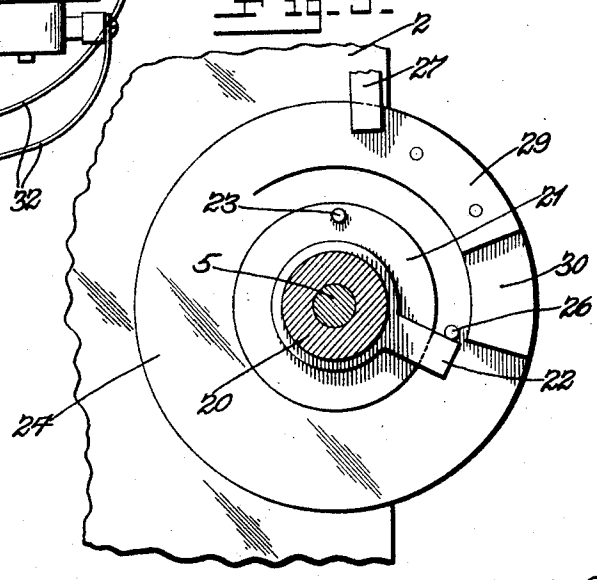



Fig. 5.




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Fig. 6.

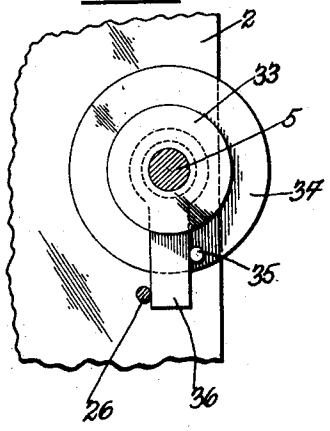



Fig. 7.

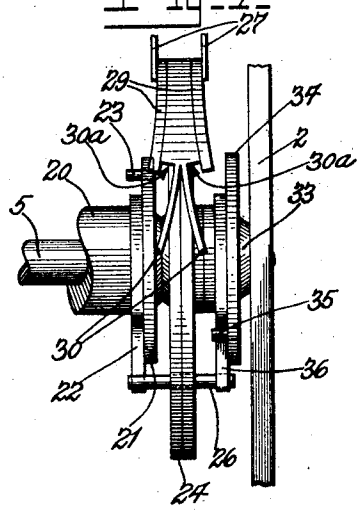
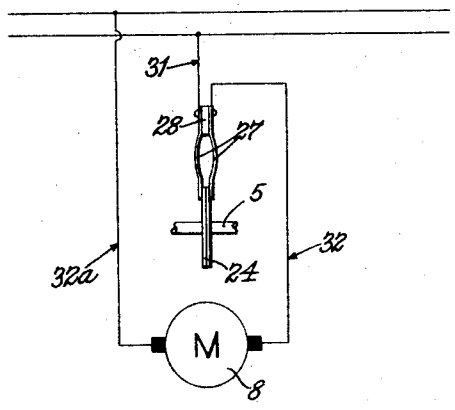



Fig. 8.




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Patented May 26, 1931 1,806,969

# UNITED STATES PATENT OFFICE

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## CLOCK WINDING MECHANISM

Application filed May 23, 1928. Serial No. 279,885.

This invention relates to clock winding mechanism and an object is to provide an improved electrically operated mechanism for winding a clock, and means for automatically controlling said mechanism in the performance of its intended operations.

Another object of the invention is to provide a simplified electrically operated winding mechanism for embodiment in connection with the clock to wind the main spring thereof, in combination with means for controlling said mechanism in the highly efficient manner herein disclosed.

Other objects will appear from the following description, reference being made to the drawings in which

Fig. 1 is a front elevation of the mechanism of a clock embodying the present invention.

Fig. 2 is a rear elevation, a part of the rear frame plate being removed and the spindles being shown in section.

Fig. 3 is a side elevation of the clock containing my improved winding mechanism.

Fig. 4 is an enlarged view, parts being in section, showing the winding devices directly associated with the spring to be wound.

Fig. 5 is a sectional view on the line 5—5 of Fig. 4.

Fig. 6 is a sectional view on the line 6—6 of Fig. 4.

Fig. 7 is a view showing a detail of the circuit breaking device whereby arcing of the circuit is prevented.

Fig. 8 is a diagrammatic view of the electric circuit controlling operation of the motor.

The clock mechanism is supported by a frame comprising a front plate 1, a rear plate 2, and spacers 3 mounted between said plates and to which said plates are secured.

The time indicating mechanism of the clock is operated by a spring-actuated gear wheel 4 rotatively supported on a shaft 5. The wheel 4 is rotated around the shaft 5 as an axis by a spring 6 having one end attached to the shaft 5 and the other end attached to the inside of an enclosing spring drum 7 rigid with said wheel 4. It is to wind the spring 6 that the present invention is provided and this winding operation is performed by rotating the shaft 5 in a direction to wind said spring 6 while the gear wheel 4 by its entrained connections is held from rotation with said shaft 5.

An electric motor 8 is supported in a frame 9 attached to the clock frame. The motor shaft 10 drives a small pinion 11 meshing with a gear 12 provided with a gear hub 13 meshing with a larger gear 14 having a gear 15 on its hub which meshes with a gear 16 attached to a shaft 17. The shaft 17 has a pinion 18 attached thereto and meshing with a gear 19 rigid on the shaft 5. It is obvious that by these connections the shaft 5 will be rotated when the motor 8 operates.

The hub 20 of the gear 4 has a disc 21 rigid thereon at the side of which disc 21 an arm 22 is pivoted on said hub 20. A pin 23 projects from the disc 21 so as to engage and move the arm 22 therewith.

A laminated disc 24 is attached to a hub 25 loosely mounted on the shaft 5. A pin 26 projects through the laminated disc 24 to opposite sides thereof, one end of said pin being in the line of movement of the arm 22 so that during the cycle of operation of said arm 22 by the pin 23 which moves with the gear 4 said arm 22 is eventually engaged against the pin 26 and is caused to rotate the disc 24.

A pair of spring contact members 27 is mounted on an insulated support 28 on the frame plate 2. These contact members 27 embrace the disc 24 between their free ends. Two laminations of the disc 24 are split to form diverging arms 29. Strips of insulating material 30 are secured between the arms 29 and extend circumferentially along the sides of the disc 24 for a short distance beyond the ends of the arms 24 to provide insulating contacts for the ends of the contact members 27 in order to open the circuit to stop the winding mechanism when these extended portions of the strips 30 are between the members 27. A wire 31 from a plug or other connection with a source of electrical energy leads to one of the contact members 27; a wire 32 connects the other contact member 27 with one end of the motor mechanism;

and a wire 32ª connects the other end of the motor mechanism with said plug or other connection with a source of electrical energy; so that when the circuit is closed by engagement of the contact members 27 with the disc 24 the motor will operate the train of connections previously described to rotate the shaft 5 and thereby wind the spring 6.

A feature of the invention consists in the novel construction of the disc 24 for making and breaking the circuit. The arms 29 formed by splitting the laminations of the disc 24 have their ends flared so that, as they pass between the ends of the contact members 27, said contact members 27 are spread apart relatively a much greater distance than when they contact with the sides of the thinner portion of the disc 24. Continued rotation of the disc 24 by mechanism driven by the motor, as presently described, moves the ends of the arms 29 beyond and from between the contact members 27, placing the exposed portions of the insulation strips 30 between and in contact with the contact members 27, thus instantly opening and breaking the circuit, preventing arcing across the space between the contact members 27 and causing the motor instantly to stop. The parts remain in this position in which the exposed portions of the insulation strips 30 are between the contact members 27 and hold said contact members spread apart almost to their greatest extent of spreading until it is time for the clock to be rewound. When it is time for the clock to be rewound the disc 24 is turned by the devices shown in Fig. 5, and, as described above, to move the strips 30 beyond and out of contact with the contact members 27, permitting the resiliency of said contact members 27 to spring them into contact with the sides of the metallic disc 24, thereby closing the circuit and causing the motor to operate to rewind the clock.

When the ends of the arms 29 pass beyond and from between the contact members 27 the circuit is completely broken because of gaps 30ª in the insulation strips 30 under the ends of the arms 29. These gaps are of greater width than the thickness of the contact members 27 so that the latter are spaced sufficiently from the arms 29 to break the circuit completely.

A hub 33 is rigid on the shaft 5 and has a disc 34 rigidly attached thereto and provided with a laterally projecting pin 35. An arm 36 is pivoted on the hub 33 in position to engage the pin 26 that is carried by the disc 24 so that at the proper time the disc 24 will be rotated by the shaft 5 a sufficient distance to place the insulation strips 30 between the ends of the contact members 27 and thus break the circuit.

From the foregoing it is apparent that at the proper time the circuit is closed by the operation of the continuously running gear 4 which operates the time indicating mechanism, this being effected by the pin 23 moving the pivoted arm 22 in a direction to turn the disc 24 (in a counter-clockwise direction as seen in Fig. 5) until the disc 24 is moved a distance sufficient to carry the insulation strips 30 beyond and out of contact with the resilient contact members 27. This closes the circuit whereby the motor 8 is operated to rotate the shaft 5 in a direction to wind the spring 6. And this rotation of said shaft 5 for winding said spring 6 continues until the pin 35 has caused the arm 36 to engage the pin 26 and move the disc 24 nearly a complete revolution which is a distance sufficient to carry the insulation strips 30 between the ends of the resilient contact arms 27. This breaks the circuit and the motor is stopped until the proper time for a rewinding operation, as before.

It is now clear that my invention is of a highly simplified and efficient nature, almost infallible in operation, and obtains all of its intended objects and purposes. The construction, arrangement and relationship of parts may be varied within a wide range of equivalents without departure from the nature and principle of the invention. I do not restrict myself unessentially, but what I claim and desire to secure by Letters Patent is:—

1. A device of the character described comprising a rotary shaft, a pair of resilient contact members, a metallic disc mounted for rotation about said shaft as an axis and arranged to contact with said members and close the circuit between them, insulating means mounted on said disc for breaking the circuit between said contact members, two independently rotatable concentric members, an element rotative about said shaft for rotating one of said members, a device pivoted on and operated by said one member for moving said disc a distance sufficient to carry said insulating means beyond said contact members, an arm pivoted co-axially with said shaft, and means operated by said shaft for causing said arm to rotate said disc a distance sufficient to interpose said insulating means between said contact members.

2. A device of the character described comprising a rotary shaft, a pair of resilient contact members, a metallic disc mounted for rotation about said shaft as an axis and arranged to contact with said members and close the circuit between them during a portion of each complete revolution of said disc, insulating means mounted on said disc for breaking the circuit between said contact members, two independently rotatable concentric members, an element rotative about said shaft and rigid with one of said members, an arm pivoted coaxially with said shaft and operated by said one member for moving said disc a distance sufficient to carry said insulating means beyond said contact members and to cause said

disc to close said circuit between said contact members, and mechanism for rotating said shaft when said circuit between said contact members is closed by said disc.

3. A device of the character described comprising a rotary shaft, a pair of resilient contact members, a metallic disc mounted for rotation about said shaft as an axis and arranged to contact with said members and close the circuit between them during a portion of each complete revolution of said disc, insulating means mounted on said disc for breaking the circuit between said contact members, two independently rotatable concentric members, an element rotative about said shaft and rigid with one of said members, an arm pivoted coaxially with said shaft and operated by said one member for moving said disc a distance sufficient to carry said insulating means beyond said contact members and to cause said disc to close said circuit between said contact members, mechanism for rotating said shaft when said circuit between said contact members is closed by said disc, an arm pivoted coaxially with said disc, and means operated by said shaft for causing said second arm to rotate said disc a distance sufficient to interpose said insulating means between said contact members to break the circuit.

4. A device of the character described comprising a pair of resilient contact members, a metallic disc mounted for rotation and arranged to extend between and contact with said members and close the circuit between them, insulating means mounted on said disc for breaking the circuit between said contact members in one position of said disc about its axis, two independent rotatable concentric members, an element rotative about said shaft and rigid with one of said members, an arm pivoted co-axially with said shaft and operated by said one member for turning said disc a sufficient distance to carry said insulating means beyond said contact members and to cause said disc to close the circuit between said contact members, an actuator for said disc pivoted concentrically with said disc, and means operated by said other concentric member for causing said actuator to turn said disc to position in which said insulating means is between said contact members.

5. A device of the character described comprising a shaft to be rotated, a pair of resilient contact members, a rotary metallic disc arranged to extend between and to contact with said contact members and to close the circuit between them during a portion of each complete revolution of said disc, insulating means mounted on said disc for breaking the circuit between said contact members during the remaining portion of each complete revolution of said disc, two independently rotatable concentric members, a relatively rotative device operated by one of said concentric members independently of said shaft for turning said disc a distance sufficient to carry said insulating means beyond said contact members and to cause said disc to close said circuit between said contact members, mechanism for rotating said shaft when said disc is moved by said one of said concentric members as aforesaid, and means pivoted for swinging movements about and controlled by said shaft for causing said other concentric member to turn said disc to position in which said insulating means is between said contact members.

6. A device of the character described comprising a shaft to be rotated, a pair of resilient contact members, a metallic disc mounted for rotation and arranged to extend between and contact with said members and close the circuit between them during a portion of each complete revolution of said disc, insulating means mounted on said disc for breaking the circuit between said contact members during the remainder of each complete revolution of said disc, two rotatable concentric members, an arm pivoted concentrically with said shaft, a device operated by one of said concentric members for causing said arm to turn said disc a sufficient distance to carry said insulating means beyond said contact members and to cause said disc to close said circuit between said contact members, mechanism for rotating said shaft when said circuit between said contact members is closed as aforesaid, an arm pivoted co-axially with said disc, and means operated by said shaft for causing said second arm to turn said disc a sufficient distance to place said insulating means between said contact members to break the circuit between them.

7. A device of the character described comprising a shaft to be rotated, a pair of resilient contact members, a metallic disc arranged to extend between and contact with said contact members to close the circuit between them during a portion of each complete revolution of said disc, insulating means on said disc for breaking the circuit between said contact members during the remainder of each complete revolution of said disc, two independently rotatable concentric members, an arm pivoted co-axially with and operated by one of said concentric members for moving said disc a sufficient distance to carry said insulating means beyond said contact members and to place said disc in position to close the circuit between said contact members, mechanism for rotating said shaft when the circuit is closed between said contact members by said disc, an arm pivoted coaxially with said second concentric member, and means operated by said second member for causing said second arm to turn said disc a sufficient distance to interpose said insulating means between said contact members to break the circuit.

8. A device of the character described com-

prising a rotary shaft, electric contact means, a metallic disc mounted for rotation about said shaft as an axis and arranged to contact with said contact means to close an electric circuit, insulating means mounted on said disc for engagement with said contact means to break the circuit, a member mounted for rotation about said shaft as an axis, a device pivoted concentrically with said member, means for moving said device by said member, means for turning said disc by said device, an arm pivoted co-axially with said device, means for rotating said shaft, means operated by said shaft for moving said arm, and means operated by said arm for moving said disc a sufficient distance to place said insulating means in contact with said contact means.

9. A device of the character described comprising a rotary shaft, electric contact means, a metallic disc mounted for rotation about said shaft as an axis and arranged to contact with said contact means and close an electric circuit, insulating means in connection with said disc for engagement with said contact means to break the electric circuit, two independently rotatable co-axial members, a pair of arms pivoted co-axially with said members, means for operating said arms by the respective co-axial members, means for moving said disc by one of said arms a distance sufficient to carry said insulating means beyond said contact means, and means operated by said shaft for causing the other one of said arms to move said disc a distance sufficient to place said insulating means in contact with said contact means.

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