(No Model.) 2 Sheets—Sheet 1.

A. J. REAMS.

ELECTRIC WINDING ATTACHMENT FOR CLOCKS.

No. 384,472. Patented June 12, 1888.

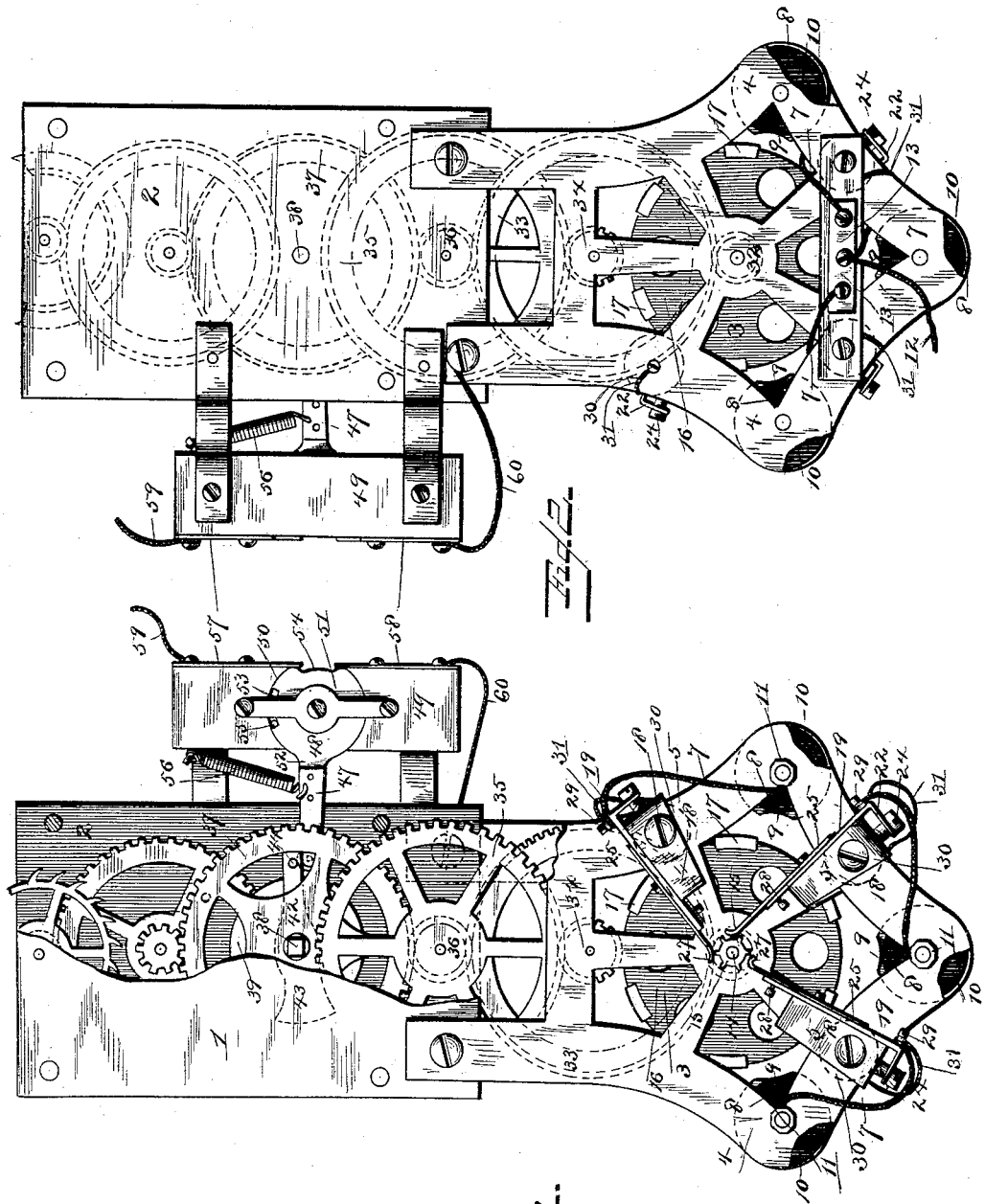

Fig. 1.

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Fig. 3.

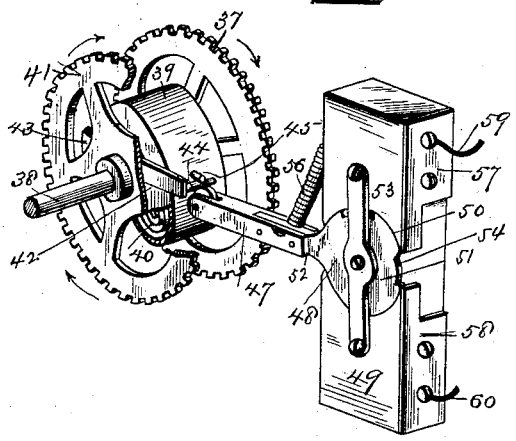


Fig. 4.

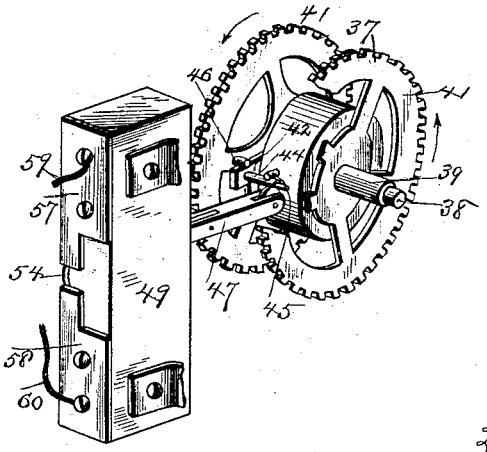


Fig. 6.

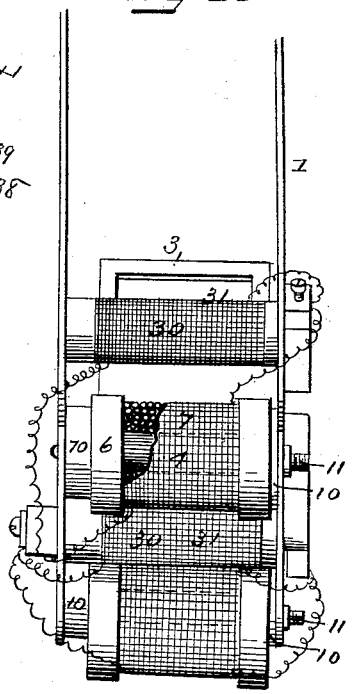
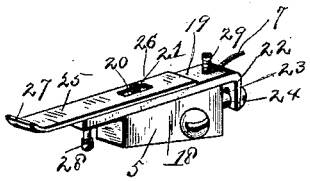


Fig. 5.



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UNITED STATES PATENT OFFICE.

ANDREW J. REAMS, OF AUGUSTA, KANSAS.

ELECTRIC WINDING ATTACHMENT FOR CLOCKS.

SPECIFICATION forming part of Letters Patent No. 384,472, dated June 12, 1888.

Application filed October 29, 1887. Serial No. 253,739. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. REAMS, a citizen of the United States, and a resident of Augusta, in the county of Butler and State of Kansas, have invented certain new and useful Improvements in Electrical Winding Attachments for Clocks; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a front view of as much of the movement of a clock as will illustrate the construction and application of my improved electrical winding attachment. Fig. 2 is a rear view of the same. Fig. 3 is a perspective detail view of the barrel and of the main wheel and the winding-wheel and of the switch, showing the pin upon the barrel engaging the pin of the balanced lever and forcing it against the arm of the switch, cutting off the current. Fig. 4 is a similar view of the same parts, showing the pin upon the main wheel forcing the lever and pin of the barrel past the arm of the switch. Fig. 5 is a perspective detail view of one of the brushes of the motor, and Fig. 6 is a side view of the motor, partly in section.

Similar numerals of reference indicate corresponding parts in all the figures.

My invention has relation to electrical winding attachments for clocks; and it consists in the improved construction and combination of parts of such an attachment, as hereinafter more fully described and claimed.

In the accompanying drawings, the numeral 1 indicates the front of the frame of the clock-works, and 2 indicates the back of the same, the said two portions of the frame forming bearings for all the revolving shafts of the clock-works and of the winding mechanism.

The winding mechanism consists of the motor, which is arranged at the lower end of the frame, and which is composed of a cylinder, 3, forming the armature, magnets 4, and suitable brushes, 5. The magnets are formed in the shape of spools 6, of soft iron, having the coils of wire 7 wrapped around their reduced portions. The end flanges, 8, of the spools are formed with concave portions 9, facing inward toward the armature, the magnets being arranged in a segment of a circle around the armature. The magnets are insulated from the front and back of the frame by means of insulating-plates 10, and are secured between the said front and back by means of nutted bolts 11, which pass through the magnets and serve to secure the lower portions of the front and back together as well as to support the magnets. An insulated switch-plate, 13, is secured to the back of the frame, and the wires of the magnets pass to this plate and are secured to the same, one battery-wire, 12, being also secured to the plate connecting the magnet-coils with the one pole of the battery. The armature is composed of a shaft, 14, journaled in bearings in the frame and having upon its forward end outside of the shaft a commutator, 15, in the shape of a pinion having a number of leaves corresponding to the number of bars or separate armatures in the entire armature cylinder.

The armature-cylinder consists of the heads 16, secured upon the shaft, and the armature-bars 17, secured with their ends to the peripheries of the heads parallel to the shaft and forming the periphery of the cylinder.

The brushes consist of insulating-blocks 18, secured to the front of frame and having metallic bars 19, sliding upon one side of them, with longitudinal slots 20, sliding upon pins 21 upon the sides of the blocks, the outer ends, 22, of the said bars being bent at right angles and having slots 23, through which set-screws 24 pass into the ends of the insulating-blocks, the said screws serving to adjust the metallic bars upon the blocks, adjusting them nearer to or farther from the commutator. Thin flat metallic strips 25 are secured upon the metallic bars having registering longitudinal slots 26, and the inner ends of these strips are bent to form bulges 27 and to bear against the edges of the leaves of the commutator with the said bulges, set-screws 28, passing through the inner ends of the metallic bars and bearing against the free inner portions of the strips, serving to adjust them to have contact with the leaves of the commutator without coming in contact with the spaces between the leaves.

The other ends of the coil-wires of the magnets are secured to the outer ends of the brushes by means of suitable binding-posts, 29.

Spools 30, having coils of shunt-wire 31, are arranged in the frame in the spaces between the magnets, and these shunt-wires are fastened to and in contact with the back of the frame and to the brushes, serving to prevent the forming of sparks between the brushes and the commutator and their consequent oxidation.

The shaft of the armature-cylinder has a pinion, 32, which meshes with a cog-wheel, 33, of a reducing-train of any suitable number of cog-wheels and pinions, the drawings showing a pinion, 34, upon the shaft of the last-named cog-wheel, which again meshes with a cog-wheel, 35, having a pinion, 36, upon its shaft, which meshes with the winding-wheel 37 upon the main arbor 38. This main arbor, which makes one revolution every hour, having the minute-hand attached to its forward end, has a barrel, 39, journaled to revolve upon it, and the spring 40, driving the clock-works, has one end secured to the barrel and the other end secured to the arbor.

The barrel is secured to the winding-wheel, and the other end of the barrel is closed by means of a cover. The driving-wheel 41, which conveys motion to the train of the clock, is secured to the main arbor. A balanced lever, 42, is fulcrumed upon the main arbor between the driving-wheel and the barrel, and has a weighted end, 43, and a laterally-projecting arm, 44, at the other end, the said arm projecting over the periphery of the barrel.

The periphery of the barrel is provided with a radially-projecting pin, 45, which may engage the arm of the lever and carry the lever with it as the barrel revolves, and the inner face of the driving-wheel is also provided with a pin, 46, which may also engage the arm of the lever and carry it around with it.

The arm of the lever may engage an inwardly-projecting arm or lever, 47, of a switch, 48, which may cut off the circuit to the magnets, the construction of which switch will be more fully described hereinafter, being, however, nearly the same as the construction of the switch described and shown in Patent No. 367,663, granted to me on the 2d day of August, 1887, which also shows the same construction of barrel, weighted lever, and driving and winding wheels.

The switch consists of an insulating-block, 49, suitably supported from the side of the frame and having a circular recess, 50, in its forward face, in which a metallic disk, 51, is journaled, the said disk having an arm, 52, projecting inward from its periphery and provided with the insulating arm or lever 47, and having two segmental recesses or notches, 53 and 54, in its periphery at right angles to each other. The upper notch, 53, has a pin, 55, projecting into it from the bottom of the recess, the said pin serving to limit the throw of the disk, and the lever or arm of the disk has a spring, 56, secured to it and to the insulating-block, which spring serves to draw the lever upward after having been depressed and to bring one end of the notch to bear against the stop-pin.

Two strips, 57 and 58, are secured to the outer edge of the insulating-block, having their inner ends in contact with the portions of the periphery of the metallic disk at the ends of the notch or recess 54, and the upper strip has the other battery-wire, 59, secured to it, while the lower strip has a wire, 60, secured to it and to the back of the frame of the works, so that it will be seen that when both strips are in contact with the periphery of the disk the circuit is closed, the magnets magnetized, and the motor revolves; but as soon as the lever of the switch is depressed and the notch of the disk brought to register with the end of the upper strip the circuit is opened, the magnets are demagnetized, and the motor is stopped. When the circuit is closed, the magnets will successively be magnetized as their respective brushes come in contact with the leaves of the pinions, and the magnets will thus attract the armature-bars until the bar comes directly opposite the magnet, when the corresponding leaf of the pinion will leave contact with the corresponding brush, and the circuit for that magnet will be momentarily broken, while the circuit in the next magnet is closed and the armature-bar attracted by that magnet. When the bar arrives directly opposite to this magnet, the circuit is again broken and the circuit in the next magnet is closed, so that the bars in the cylinder will successively be attracted to the magnets, revolving the cylinder and winding the spring upon the arbor through the reducing-train.

The winding-train and the motor will continue to revolve while the circuit is closed, and as the spring-barrel is revolved by the winding-train the radiating-pin upon its periphery will come in contact with the arm of the weighted lever and carry it along with it until they reach the arm or lever of the switch, when they will depress the same, stopping the winding by breaking the circuit. The arm of the weighted lever and the pin of the barrel will hold the lever of the switch depressed, and will thus keep the circuit broken until the pin of the driving-wheel arrives at the point where the weighted lever is, when it will carry the lever forward below the lever or arm of the switch, releasing the latter and again closing the circuit, when the winding will again take place.

In the works shown and herein described the spring will be wound once every hour, as the pin forcing the lever past the switch-arm is upon the face of a wheel revolving once in an hour; but it is evident that by introducing intermediate gearing for the winding-train, as well as for the wheel carrying the starting-pin, the works may be wound oftener or at greater intervals, as may be desired.

The motor and the winding mechanism and switch mechanism are simple of construction and not liable to break or get out of order, rendering the entire clock comparatively inexpensive and very reliable, and adapting it to more general use than very expensive and complicated clocks wound by electricity.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In an electric winding attachment for clocks, the combination of an electric motor having a reducing-train, a main arbor having a driving-wheel upon it provided with an inwardly-projecting pin, a spring-barrel journaled to revolve upon the main arbor and having a spring within it secured to it and to the arbor and provided with a winding-wheel meshing with the train from the motor and a radiating-pin upon its periphery, a weighted lever upon the shaft between the barrel and the driving-wheel, having an arm at one end projecting over the periphery of the barrel and engaged by the pin of the same, and a switch for opening and closing the circuit for the motor and provided with a spring-actuated lever or arm projecting inward to engage and be depressed by the weighted lever, as and for the purpose shown and set forth.

2. In an electric winding attachment for clocks, the combination of a motor having connection to the battery and to the frame, a winding-wheel and spring-barrel revolved by the motor and having a projecting pin upon the periphery of the barrel, a lever upon the arbor of the barrel, having a weighted end and an arm at the other end projecting over the periphery of the barrel and engaging the pin, a driving-wheel upon the arbor having an inwardly-projecting pin engaging the end of the lever, an insulating-block having a circular recess in its face, a disk pivoted in the recess and having segmental notches in its periphery and an inwardly-projecting insulated arm engaged by the arm of the weighted lever, a spring for raising the arm of the disk, a pin in the recess for stopping the disk projecting in one segmental notch, and strips upon one edge of the insulating-block, having their ends in contact with the portions of the periphery of the disk at the ends of the other segmental notch and having wire-connections to the battery and to the frame of the clock, as and for the purpose shown and set forth.

3. In an electric winding attachment for clocks, the combination of magnets arranged in a segment of a circle and having wire-connection at one end with a switch-plate upon the frame connected to the battery, an armature-cylinder having armature-bars in its periphery, shunt-wire coils between the magnets and having one end of their wires connected to the back of the clock-frame, a commutator upon the armature-shaft, brushes having wire-connection with the magnet-coils and the shunt-coils, a barrel upon the main arbor having the spring secured to it and winding the same by being rotated by the motor, a stop upon the main arbor for engaging a switch-lever, and a stop upon the time-train for carrying the stop of the barrel farther, and a switch having a lever engaging the said stops and breaking the circuit when engaged and having wire-connection with the battery and with the frame, as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

ANDREW J. REAMS.

Witnesses:
E. C. BOYLE,
W. D. TRIPP.