No. 730,302. PATENTED JUNE 9, 1903.

W. S. SCALES.

CLOCK.

APPLICATION FILED FEB. 1, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

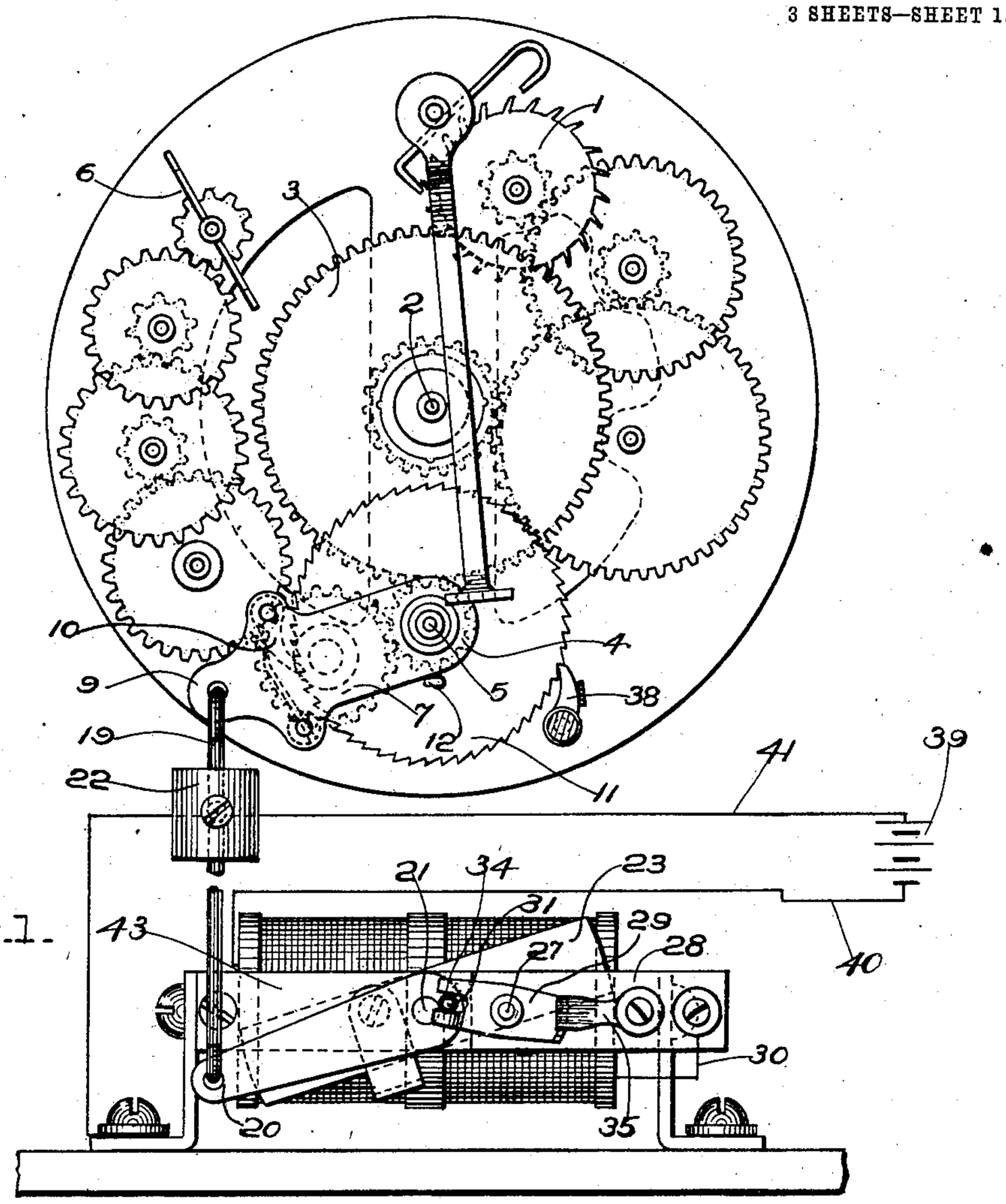
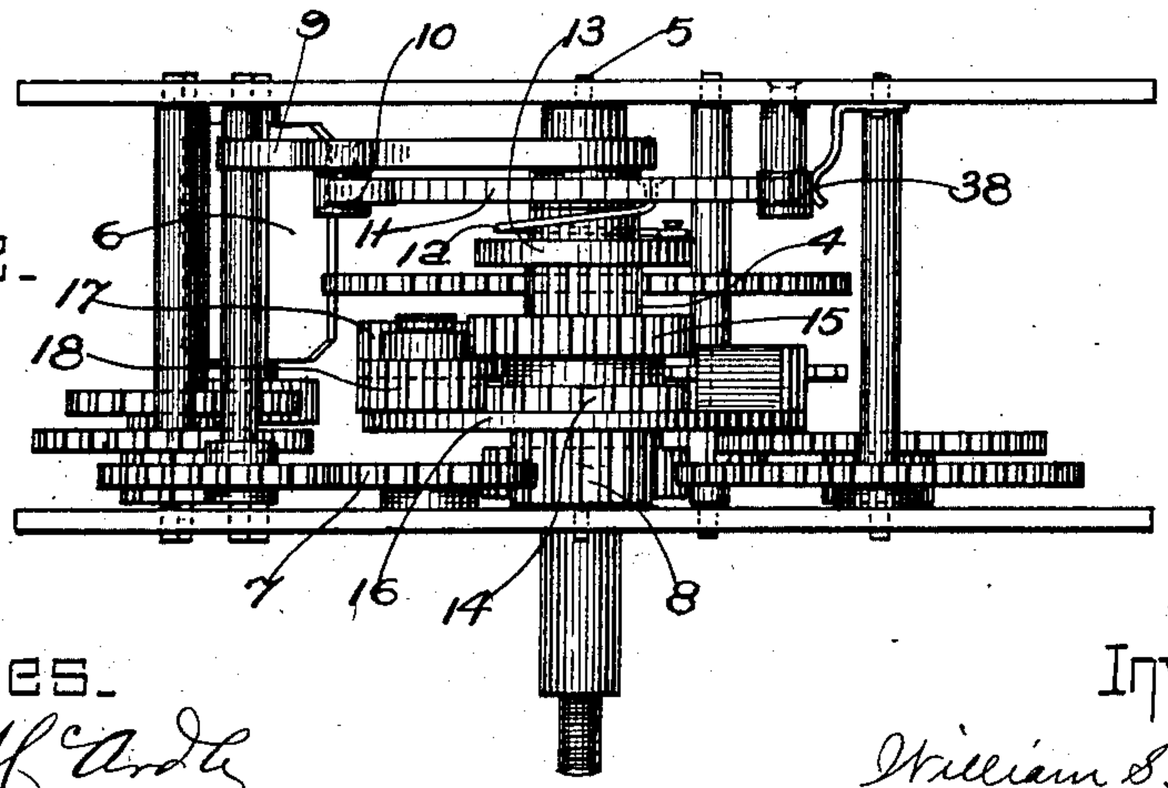


Fig. 2.



Witnesses.

Fred W. McCurdy

Charles B. Cocker.

Inventor.

William S. Scales

by William A. Copeland

atty.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

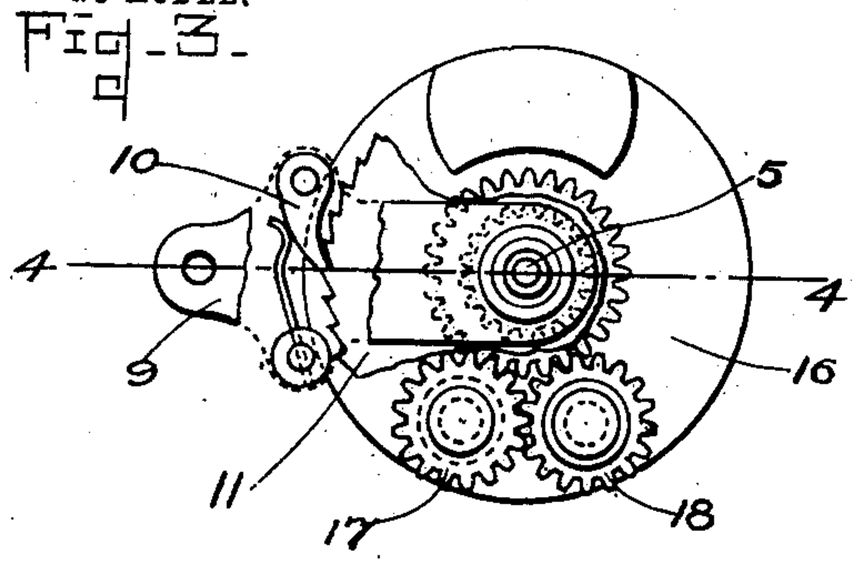


Fig. 6.

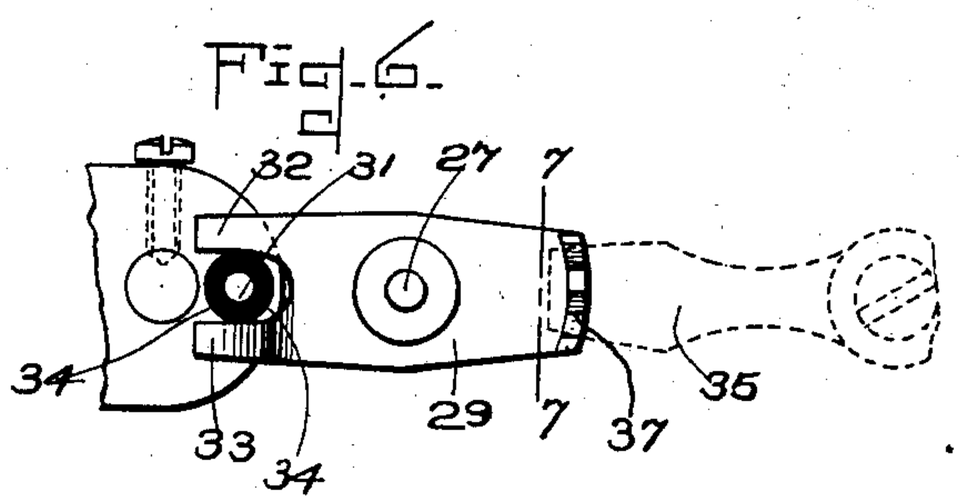


Fig. 4.

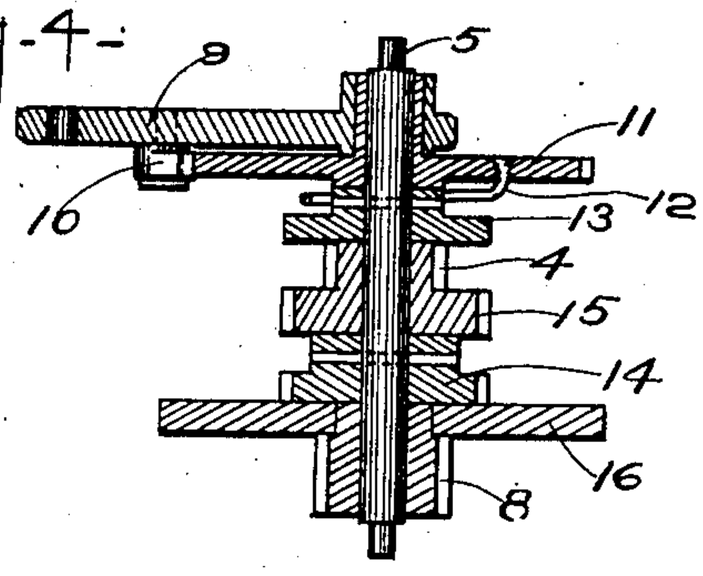


Fig. 7.

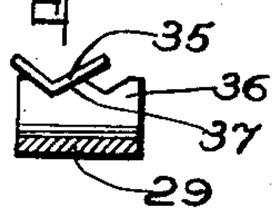
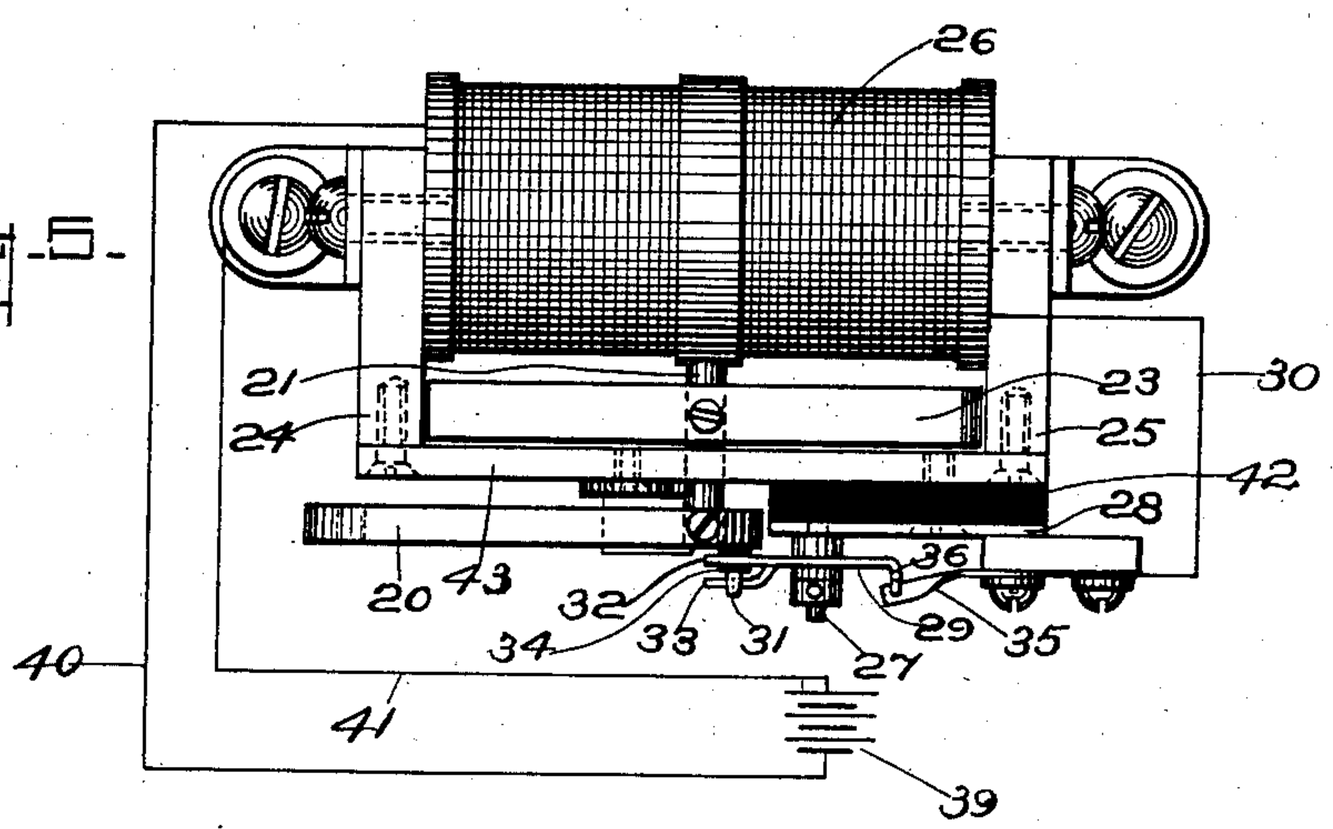


Fig. 5.



Witnesses.
Fred W. Mc Ardle.
Charles B. Cocken.

Inventor.
William S. Scales
by William A. Copeland
atty.

No. 730,302. PATENTED JUNE 9, 1903.

W. S. SCALES.

CLOCK.

APPLICATION FILED FEB. 1, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

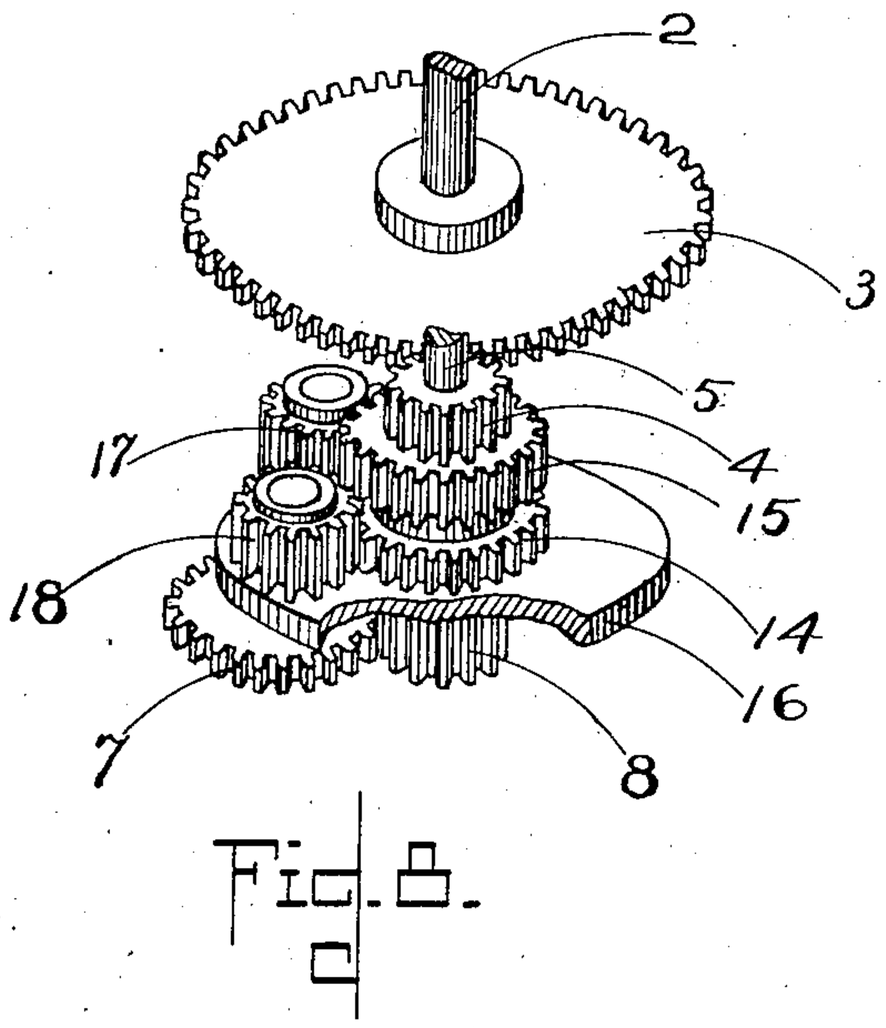


Fig. 8.

Witnesses.
Chas. B. Cocker.
Fred W. McArdle

Inventor.
William S. Scales
by Wm. A. Copeland
atty.

No. 730,302. Patented June 9, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM S. SCALES, OF BOSTON, MASSACHUSETTS.

CLOCK.

SPECIFICATION forming part of Letters Patent No. 730,302, dated June 9, 1903.

Application filed February 1, 1902. Serial No. 92,151. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. SCALES, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

The main object of the invention is to provide means for automatically winding both the time and the strike mechanism; also, to provide a winding mechanism common to both the time and strike mechanism.

The invention is also adapted to be applied to a common time-clock where no strike mechanism is employed.

The invention will now be fully described by reference to the accompanying drawings, and the novel features thereof will be particularly pointed out in the claims at the close of the specification.

In the drawings, Figure 1 is a diagrammatic rear elevation of a clock embodying the invention. Fig. 2 is a plan of Fig. 1 looking up from the under side. Fig. 3 is a detail elevation of the winding-gear. Fig. 4 is a section on line 4 4 of Fig. 3. Fig. 5 is a plan of the actuating-magnet. Fig. 6 is an enlarged detail view of the circuit making and breaking mechanism. Fig. 7 is a section on line 7 7 of Fig. 6. Fig. 8 is a perspective view showing gears 17 and 18 and the gears with which they coöperate.

The escapement-wheel 1 is connected by a train of wheels with the center arbor 2 in any common and well-known way. Mounted on the arbor 2 is the wheel 3, which engages with pinion 4, which is loose on shaft 5. The fly 6, which is connected with the striking mechanism, is connected by a train of wheels in well-known way with idle wheel 7, which engages a pinion 8, which is loose on shaft 5. Loosely mounted on shaft 5 is a lever 9, carrying pawl 10, which engages with ratchet-wheel 11. Ratchet-wheel 11 is also loosely mounted on shaft 5 and is flexibly connected with said shaft by a spring 12, one end of which is connected with said ratchet-wheel and the other end with a disk 13, which is fixed to said shaft 5. Wheel 14 is also rigid on said shaft 5. Between wheel 14 and disk 13 are the wheels 15 and 4, wheel 15 being fast to wheel 4 and therefore loose on shaft 5. Rigidly connected with pinion 8 is disk 16, which is also loose on shaft 5. Mounted upon disk 16 are two planet-wheels 17 18, which engage with each other, pinion 18 engaging with pinion 14 and pinion 17 engaging with wheel 15. Motion of ratchet-wheel 11 communicates motion to pinion 4 on the time-train continuously through the planet-wheels 17 and 18 and wheel 15 and communicates motion to pinion 8 on the strike-train intermittently at the proper time through the planet-wheels 17 and 18 and disk 16, which is rigidly connected with pinion 8. Pawl-carrying lever 9 is connected by rod 19 with lever 20, mounted rigidly on the pivoted armature-shaft 21. Fastened to rod 19 is the weight 22, which tends to draw pawl-carrying lever 9 downwardly, and thus through pawl 10 to communicate motion to ratchet 11. Rigidly mounted on shaft 21 is an armature 23, which is so arranged as to oscillate between the pole-pieces 24 25 of magnet 26. Pivoted on stud 27, projecting from insulated plate 28, is a contact-piece 29, which is electrically connected through insulated plate 28 and wire 30 with one end of the magnet-coil. Contact-piece 29 is forked at one end, as shown in Figs. 1 and 6. Finger 33 is bent to one side, as shown in Fig. 5. Projecting from armature-lever 20 is a contact-pin 31, which extends between the two fingers 32 33 of the forked contact-piece 29. When the long arm of lever 20 is lowered by weight 22, it brings contact-pin 31 into engagement with finger 32, but is prevented from making electrical contact therewith by insulation 34. (See Fig. 5.) As said lever 20 continues its movement downward it moves the forked contact-piece 29 until the spring 35, which engages the notched heel of the contact-piece 29, rides over the hump 37, which throws the contact-piece 29 so that finger 32 is disengaged from its insulated connection with the contact-pin 31, and finger 33 is brought into electrical contact with pin 31 away from insulation 34. Thereupon the circuit is closed, the magnet is energized and brings armature 23 back into line between the pole-pieces, thus moving armature-lever 20 upward and lifting weight 22 and rod 19, which carries with it pawl-lever 9, and the weight is in position to continue its actuation of the clock mechanism. The retaining-pawl 38 prevents ratchet-wheel 11 from rotating

backward during that movement, and the maintaining-spring 12 carries the train or trains during the short interval of the raising of the weight 22.

When the armature has approached a position nearly in line with the pole-pieces, the finger 33 of the contact-piece 29 is disengaged from the contact-pin 31 through the action of spring 35, which rides over the hump 37 in the reverse direction from that previously described and breaks the circuit, thereby allowing the weight to carry the armature-lever down again.

What I claim is—

1. In a clock, time mechanism, strike mechanism, a rotatable shaft, mechanism connecting both the time and the strike mechanism with said shaft, an electromagnet, a train-actuating armature, a circuit-controller, mechanism connecting said train-actuating armature with said rotatable shaft, mechanism which rotates said shaft and actuates both the time and strike mechanism and turns said armature, said circuit-controller being actuated by the armature to complete the circuit and energize the magnet, the armature being moved in a reverse direction by the magnet when energized and thereby winding up the shaft-rotating mechanism and breaking the circuit, the armature being moved to close the circuit by either the time-train or strike-train whichever is in operation, if only one is in operation, and by both together if both are in operation, substantially as described.

2. In a time and strike clock, a train for indicating time by dial, a second train for indicating time by sound, an actuator for said trains, an electromagnet for winding said actuator, a circuit-controlling device, and means which operate said circuit-controlling device to energize said magnet by the combined movement of both trains when both are in operation, and by the time-train alone if the strike-train is not in operation, the energized magnet rewinding the actuator at each operation the full extent that it is unwound, substantially as described.

3. In a time and strike clock, a train for indicating time by dial, a second train for indicating time by sound, a single actuator constantly tending to propel both said trains, an electromagnet for winding said actuator as much as it has unwound, a circuit-controlling device, and means whereby said circuit-controller is actuated by the unwinding of the actuator to energize the magnet which then rewinds the actuator, the rewinding of the actuator breaking the circuit, substantially as described.

4. In an independent electric clock, a time-train and a striking-train, an actuating device which drives either of said trains independently of each other or both together according as either or both are in operation, a magnet and armature which rewind said actuating device, and means whereby the unwinding of either train operates to engage said magnet, without manual interference, substantially as described.

5. In an independent electric clock, a time-train and a striking-train in combination with an electromagnet and armature, said magnet being adapted to actuate either the time or the striking train independently of each other, and means operated by either train independently of the other whereby said magnet is energized, without manual interference, substantially as described.

6. In an independent electrically-driven clock, a time-train and a strike-train, an electromagnet and armature, a circuit-closer for controlling the electric circuit through said magnet, and means whereby the circuit-closer is controlled by the action of either of said trains or by the action of both together, without manual interference, substantially as described.

7. In a strike and time clock, an actuator for actuating the time and the strike mechanisms independently of each other and for actuating both together, an electromagnet adapted to operate the actuator, a circuit opening and closing device controlling an electric circuit through said magnet, and means whereby the circuit-controlling device closes the circuit by the combined action of the time and strike mechanism, or by the action of either alone, without manual interference, substantially as described.

8. In a strike and time clock, an actuator for actuating the time and the strike mechanisms independently of each other and for actuating both together, an electromagnet adapted to operate the actuator, a circuit opening and closing device controlling an electric circuit through said magnet, and means whereby the circuit-controller closes the circuit by the combined action of the time and strike mechanism or by the independent action of the time mechanism, without manual interference, substantially as described.

9. In a clock, a rotatable shaft which actuates the clock mechanism, an electromagnet, an armature pivoted so as to oscillate between the pole-pieces of the magnet, a lever fixed to the armature-shaft, a crank-arm which turns said rotatable shaft when the crank moves forward and which can be moved backward without turning said shaft, a rod connecting said crank-arm with the armature-lever, mechanism which causes said rotatable shaft to turn and through the connecting-rod causes the armature to dip, a circuit make and break mechanism actuated by the armature-lever when it dips a certain distance to make the circuit and energize the magnet, the magnet then turning the armature in a reverse direction and through the connecting-rod to rewind the shaft-actuating mechanism, substantially as described.

10. In an electrically-propelled clock, a train for indicating time by dial, a second train for indicating time by sound, a propelling-weight common to both of said trains, an

electromagnet for actuating said propelling device, a circuit-controlling mechanism, and means whereby said circuit-controlling mechanism operates to energize said magnet by the combined movement of both the time and strike train or either, substantially as described.

11. In a clock, two independently-moving trains, an electromagnet which rewinds said trains, a circuit-controlling device which is operated to energize said magnet by the motion of either train or of both together, substantially as described.

12. In a clock of two independently-moving trains, means for electrically actuating said train, and a circuit-controlling device which is operated by the motion of either one of said trains alone if only one is in operation, and by both together if both trains are in operation, substantially as described.

13. In an independent electrically-driven clock, a time-train and a strike-train, an electrically-operated actuator for propelling both said trains, an electric-circuit-controlling device and means operated by either of said trains independently of each other to close said circuit-controlling device, substantially as described.

14. In an electrically-propelled clock, a train for indicating time by dial, a train for indicating time by sound, train-propelling mechanism common to both trains at the same time, an electromagnet for actuating said propelling device, a circuit-controller and mechanism connecting said train-propelling mechanism with said circuit-controller, the train-propelling mechanism being actuated by the movement of either one or both of said trains according as either one or both are in motion, the movement of the train-propelling mechanism actuating the circuit-controller to close the circuit, and the magnet when energized rewinding the train-propelling mechanism, substantially as described.

15. In a clock, a time-train, a strike-train, a propelling-weight common to both the time and the strike train, an electromagnet, a circuit-controller, mechanism connecting the circuit-controller with the said propelling-weight by means of which the movement of the said propelling-weight closes the circuit, the magnet rewinding the propelling-weight when both the time-train and strike-train are in operation and when either the time-train or the strike-train alone is in operation, substantially as described.

16. In a clock, a time-train, a strike-train, a propelling-weight common to both the time and the strike train, an electromagnet, a circuit-controller, mechanism connecting the circuit-controller with the said propelling-weight by means of which the movement of the said propelling-weight closes the circuit, the magnet rewinding the propelling-weight when both the time-train and strike-train are in operation and when the time-train alone is in operation, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM S. SCALES.

Witnesses:
WILLIAM A. COPELAND,
ALICE H. MORRISON.