No. 680,532. Patented Aug. 13, 1901.

F. LUCKING.

SECONDARY ELECTRIC CLOCK.

(Application filed Feb. 8, 1901.)

(No Model.)

Fig. 1.

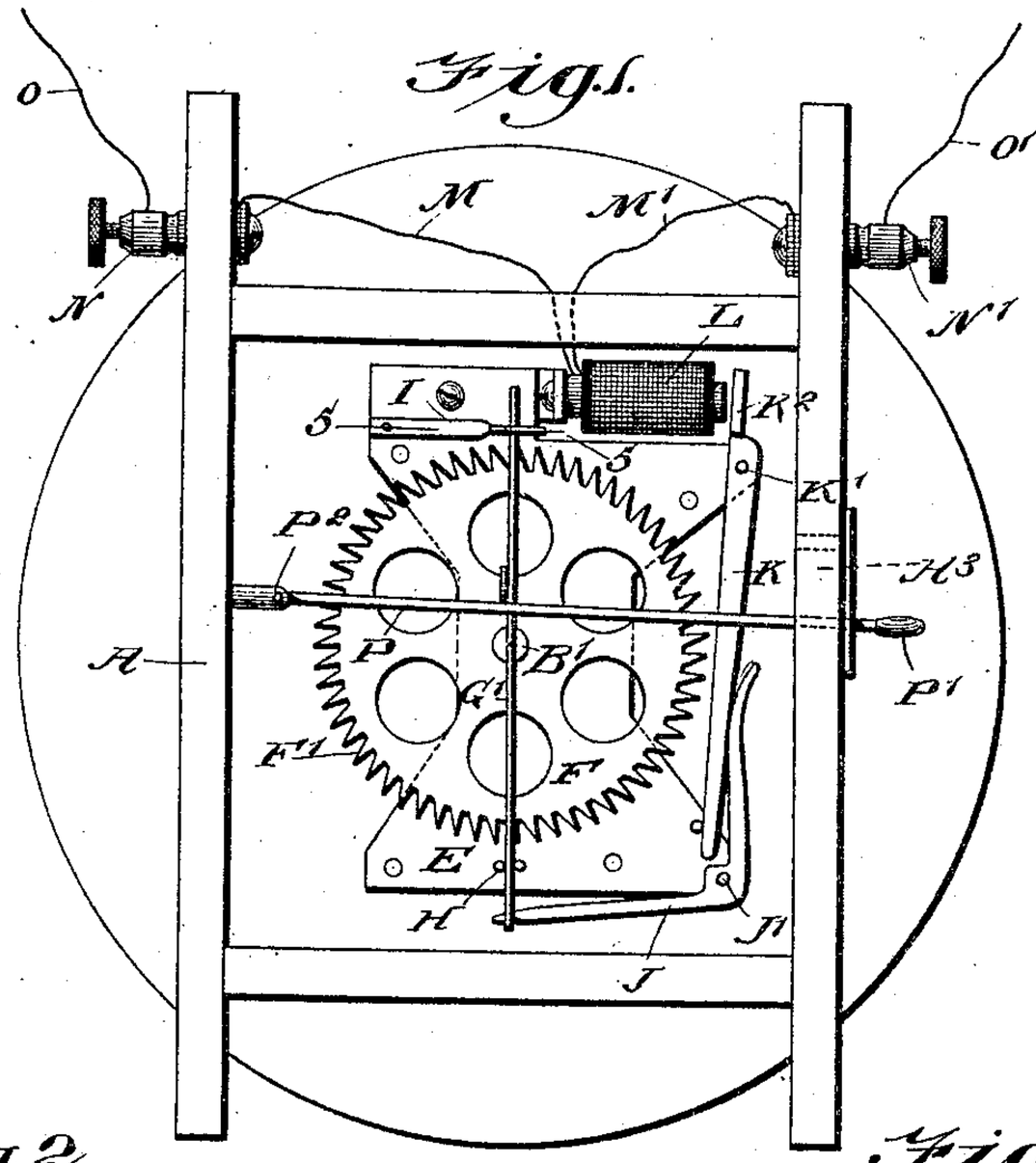


Fig. 2.

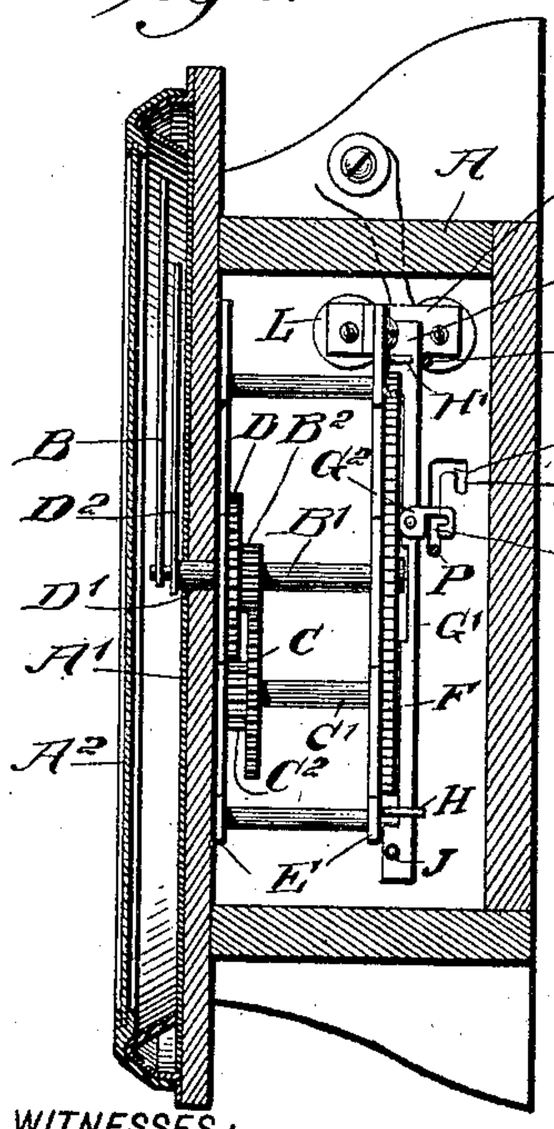


Fig. 4.

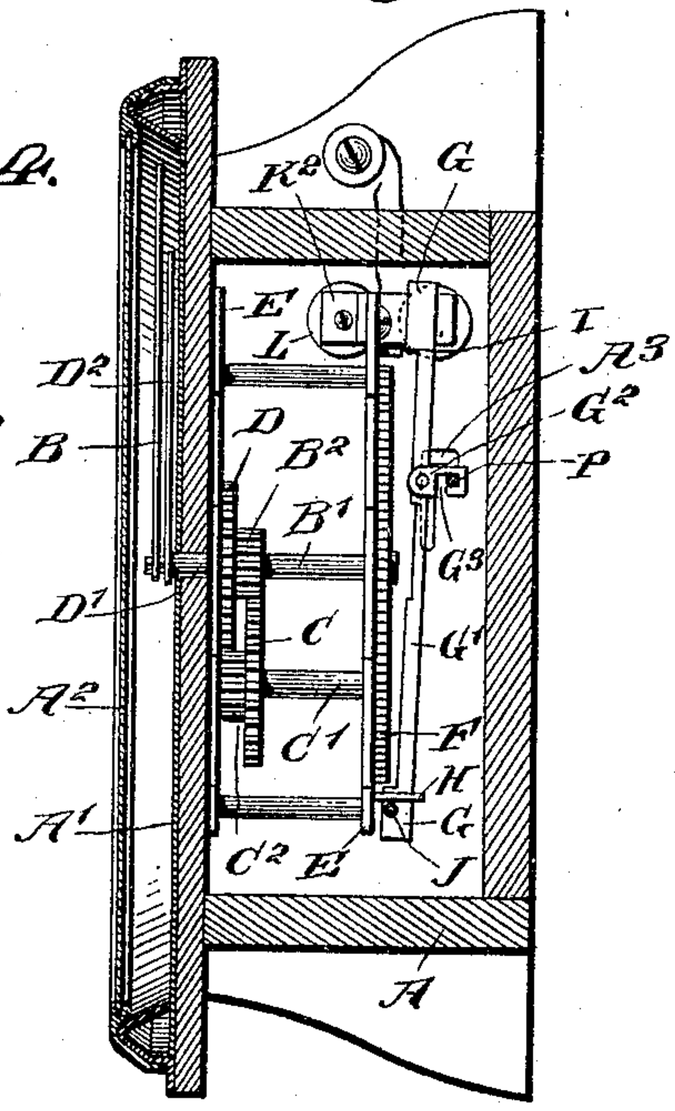
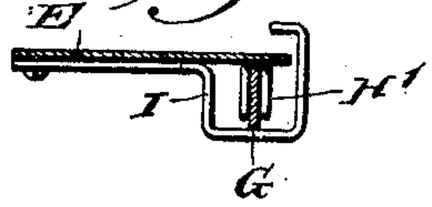


Fig. 3.

Fig. 5



WITNESSES:

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SECONDARY ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 680,532, dated August 13, 1901.

Application filed February 8, 1901. Serial No. 46,519. (No model.)

To all whom it may concern:

Be it known that I, FIDELIS LUCKING, a citizen of the United States, and a resident of Detroit City, in the county of Becker and State of Minnesota, have invented new and useful Improvements in Electric Clocks, of which the following is a full, clear, and exact description.

My invention relates to that class of electric clocks which are operated by a current sent periodically, as every minute, from a controlling-clock—that is, a clock arranged to close a circuit at regular intervals.

The object of my invention is to provide a clock of the above-indicated class which will be simple, effective in operation, requiring little power, not liable to get out of order, and the hands of which may be easily set.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a rear view of my improved clock with the back of the casing removed. Figs. 2 and 3 are elevations thereof with the clock-casing in section, Fig. 2 showing the driving mechanism in the active position, and Fig. 3 showing it out of action to permit the hands to be set. Fig. 4 is a detail view of the actuating member, and Fig. 5 is a detail cross-section on line 5 5 of Fig. 1.

A is the clock-casing, which may be of any suitable construction and carries the dial A′ and glass cover A^2.

B is the minute-hand, mounted on a spindle B′, which also carries a pinion B^2, in mesh with a gear-wheel C on a shaft C′. With the gear-wheel C rotates a pinion C^2, meshing with a gear-wheel D on a sleeve D′, loosely mounted on the spindle B′. To the sleeve D′ is secured the hour-hand D^2. The ratio of the gearing is such as to cause the hour-hand and the minute-hand to travel at the proper relative speed. The various spindles are journaled in plates E, secured to the casing A. At the rear end of the spindle B′ is secured a driving-wheel F, provided with a series of teeth F′, each having a radial side or flank and an inclined flank. These teeth are adapted to be engaged by pawls or heads G at the ends of an actuating member G′, which is held to reciprocate diametrically with respect to the wheel F, being in engagement with guides H H′, which also allow the actuating member to move forward and rearward—that is, toward and from the plane of the wheel F. An elastic stop I limits the outward or rearward movement of the actuating member G′ at its upper end. The lower end of the actuating member G′ has a loose pivotal connection with one end of a bell-crank lever J, fulcrumed at J′. The other end of this lever is engaged by an armature-lever K, fulcrumed at K′ and carrying at its upper end an armature K^2, adapted to be attracted by the electromagnet L, the coil of which is connected by the wires M M′ to the binding-posts N N′, from which the line-wires O O′ lead to the controlling-clock, (not shown,) which may be of any suitable construction, provided it sends an electric current through the line every minute.

On the actuating member G′ is secured a projection G^2, having an inverted-L-shaped slot G^3, and when the actuating member is in the active position, as in Fig. 2—that is, with the pawls or heads G in position to engage the teeth F′—the vertical member of the slot G^3 is in the same plane with the vertical member of a similar slot A^3 in the casing A, and in said slot A^3 is adapted to slide up and down a releasing-lever P, provided at one end with a projecting handle P′ and having at its other end a swivel connection P^2 with the casing A. Normally the lever P is held by gravity in the position shown in Figs. 1 and 2. The distance between the heads or pawls G is such that either of them comes into the path of the teeth F′ before the other clears the teeth on the opposite side of the wheel F. Thus an accidental movement of the wheel in the wrong direction is rendered impossible.

In operation as often as the circuit is closed by the controlling-clock the magnet L will be energized, attracting the armature K^2. The lower end of the lever K will swing the elbow-lever J upward at the end connected with the actuating member G′, bringing the upper pawl G off the radial shoulder or flank of the upper tooth F′ and immediately thereafter bringing the lower pawl G against the inclined shoulder

or flank of the lowermost tooth F′, thus turning the wheel F in the proper direction a distance corresponding to one-half of the interval between two adjacent teeth. As above stated, before the upper pawl G clears the teeth F′ the lower pawl has moved into the path of the teeth without, however, engaging them, the engagement of the lower pawl taking place only after the upper pawl has cleared the wheel. The circuit being broken the parts return to their original position by gravity, (assisted by a spring, if desired,) and in this movement the upper pawl feeds the wheel F a distance again corresponding to one-half of the interval between adjacent teeth. This operation is repeated every time the circuit is closed, giving the minute-hand B a partial rotary motion corresponding to one minute; but one half of this motion only is given by electrical power, the other half being due to gravity.

When it is desired to set the clock, the lever P is raised into engagement with the projection G^2, moving the actuating member G′ upward until the lever P is in registry with the horizontal portion of the slot A^3. Then the lever P is moved horizontally and finally dropped into a vertical notch A^4 at the outer end of the slot A^3. The projection G^2 and actuating member G′ follow the lever P in this outward movement, and the wheel F thus becomes released, as shown in Fig. 3, allowing the hands B D^2 to be set as desired. Thereupon the actuating member G′ is brought back to its active position.

It will be observed that the movement of the armature K^2 may be amplified considerably by means of the levers K J, thus giving the actuating member G′ a relatively considerable stroke, so that a toothed wheel F of large diameter may be employed, insuring an easy and accurate motion.

Various modifications may be made without departing from the nature of my invention.

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

1. In an electric clock, the combination, with the clock-spindle and a toothed wheel thereon, of an actuating member having a pawl movable toward and from the periphery of the wheel to drive the same, the said member being itself movable toward and from the plane of the wheel, a spring for pressing said member toward the wheel, and electromagnetic mechanism for imparting a reciprocating motion to the actuating member.

2. In an electric clock, the combination, with the clock-spindle and a toothed wheel thereon, of an actuating member having a pawl movable toward and from the periphery of the wheel to drive the same, the said member being itself movable toward and from the plane of the wheel, and having a projection with an angular slot, the casing having an angular slot with one member in alinement with the corresponding member of the slot of the projection when the actuating member is in its active position, and a releasing-lever swiveled to the casing and arranged to extend through the alining slots of the said projection and of the casing.

3. In an electric clock, the combination with the clock-spindle and a toothed wheel thereon, of an actuating member arranged to slide rectilinearly in the direction of a diameter of said wheel and also capable of moving toward and from the plane of said wheel, said actuating member carrying a pawl to drive the wheel, an electromagnet, an armature therefor, and an operative connection between the armature and the actuating member.

4. In an electric clock, the combination with the clock-spindle and a toothed wheel thereon, of an actuating member having a pawl movable toward and from the periphery of the wheel to drive the same, the said member being itself movable toward and from the plane of the wheel, means for shifting said member away from the plane of the wheel, and electromagnetic mechanism for imparting a reciprocating motion to the actuating member.

5. In an electric clock, the combination with the clock-spindle and a toothed wheel thereon, of an actuating member having a pawl movable toward and from the periphery of the wheel to drive the same, the said member being itself movable toward and from the plane of the wheel, a releasing-lever arranged to engage the actuating member and to throw it out of the active position, and electromagnetic mechanism for imparting a reciprocating motion to the actuating member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FIDELIS LUCKING.

Witnesses:
L. C. McKINSTRY,
GEO. E. PERLEY.