

No. 619,771.

Patented Feb. 21, 1899.

J. O. LYMAN.
SECONDARY ELECTRIC CLOCK.

(Application filed Aug. 10, 1898.)

(No Model.)

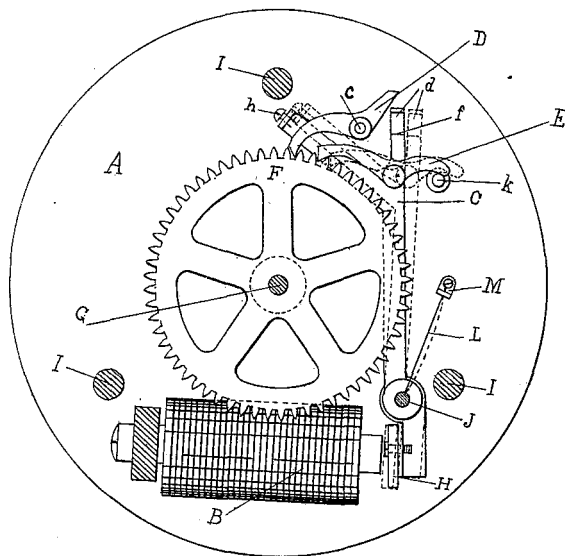


Fig. 1.

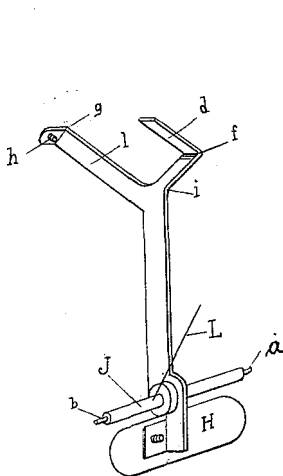


Fig. 2.

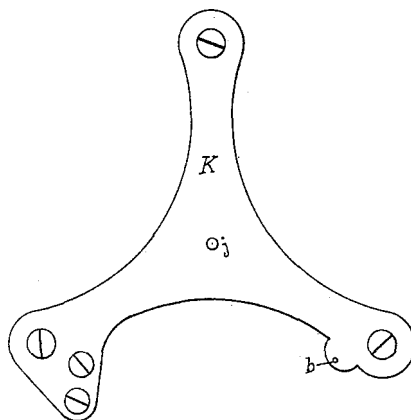


Fig. 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES O. LYMAN, OF WATERBURY, CONNECTICUT.

SECONDARY ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 619,771, dated February 21, 1899.

Application filed August 10, 1898. Serial No. 688,318. (No model.)

To all whom it may concern:

Be it known that I, JAMES O. LYMAN, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Electric Clock-Movements; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in electric time-dial movements; and the objects of my invention are, first, to simplify and cheapen the construction thereof, and, second, to render more certain and positive the operation of the movement.

In the accompanying drawings, Figure 1 is a ground plan of those parts of the movements which are necessary to show my improvements. Fig. 2 is a detailed view in perspective of the lever, pivot, spring, and armature; and Fig. 3 is a ground plan of the back plate.

Similar letters refer to similar parts throughout the views.

The movement here represented is one of a system of movements, all of which are operated from one principal clock and the power of propulsion is produced by the opening and closing of an electric current which passes through a pair of magnets, thereby attracting the armature connected therewith against the opposition of a spring which restores the armature to its normal position when the current is opened. The armature being attached to a lever properly pivoted between the ends thereof causes a forward and backward movement of the end of the lever opposite to that to which the armature of the magnets is attached, and one of the purposes and objects of this invention is to provide devices attached to the moving end of said lever or connected therewith that will move the main wheel of the clock-movement a certain fractional part of a complete revolution at each movement of the armature to and away from the magnets, and to fully explain the operation the several parts of the mechanism are represented as follows:

A is the plate, through the center of which the shafts extend that carry the hands of the

clock, and in this view the back of the plate only is shown. To this plate all the parts of the mechanism are either directly attached or are attached thereto by means of the three posts I.

B represents the magnets that attract the armature H when the current is closed.

C is the lever, to which the armature is attached, and is secured to the arbor J, which extends from the plate A to the back plate K, being pivoted to the plate A at *a* and to the plate K at *b*. The lever C at its end which is opposite to that which the armature is attached is fork shape, having two arms, the one, *d*, projecting forward from the main body of the lever and bent at *i* and *f*, and the other, *e*, which is bent at *g* and through the end of which the set-screw *h* extends.

D is a detent pivoted to the top of a post *c*, said post being secured to and extending from the plate A.

E is the driving-pawl, which revolves the main wheel F when the lever C moves forward and backward in compliance with the forces exerted on the other end thereof.

G is the main shaft, which extends through the plate A, to the outer end of which is attached the minute-hand of the clock, the opposite end thereof being pivoted upon the plate K at the point *j*.

K is the back plate attached to the ends of the three posts I and tends to give rigidity to the mechanism and affords a means for pivoting the main shaft G and the arbor J.

L is the spring which forces the lever C back into its normal position after being moved by means of the attraction of the armature attached thereto.

M is a stay through which one end of the spring passes.

In an ordinary clock and as here shown the main wheel of the mechanism makes one complete revolution in an hour, and to accomplish this end the said wheel has sixty cogs or teeth, and the propelling mechanism moves said wheel the one-sixtieth part of a revolution, or, as measured on its outer edge, the length of the space occupied by one of the teeth or cogs and one of the spaces between the cogs. When the electric current passes through the magnets, the armature H

is attached to the magnets and the lever C and the pawl E assume the positions shown by the dotted lines, the pawl E dropping into a space between the cogs one cog distant from its normal position. The pawl E falls naturally into the position shown by the dotted lines; but to render its so doing certain I have constructed the tailpiece thereof on a curve, which in moving forward and backward follows a pin *k*, which extends at right angles from the plate A.

When the armature is attracted to the magnets, the spring L assumes the tensioned position shown by the dotted lines. When the armature is released from the magnets, the lever is forced back to its normal position by the action of the spring L, and in the transit back to its normal position the pawl E moves the main wheel F the distance of one of its cogs and one space, and the detent D passes over one cog and drops into a space between two cogs at a distance of one cog and one space from its former position. To prevent the detent D from jumping up from any cause or getting out of place when in either of its positions, I have provided the end *d* of the lever to occupy a position so near the tailpiece of said detent that if the end which engages the cogs were to be raised when the lever is in its forward position the tailpiece thereof would immediately come in contact with the end *d* of the lever and prevent the removal of said detent from its position when the lever is at the other extreme of its course. I have provided the screw *h* on the end of the arm *e*, so that in either position of the lever the detent D is held in its place and the wheel F thereby prevented from moving. By means of this mechanism the main wheel is with absolute certainty moved a certain distance at each attraction and release of the armature.

The hands of the clock may be operated by the usual train of wheels common in clocks.

I do not limit my invention to the movement of the armature as attracted to the magnets by the passage of the electric current through the magnets, as any mechanical equivalent may be employed to move the end of the lever that is here shown as moved by said armatures, magnets, and current, nor would I limit the use of the motion of the lever and pawls here shown to the operation of a clock-movement.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

An electric clock-movement comprising a plate A provided with means for attachment to the cooperating parts of the movement; a pair of magnets B; a forked lever C having attached to one end an armature and having one branch of its other forked end bent in the form of a V, the other branch thereof being bent at right angles near its extremity and provided with a set-screw *h*; a detent D having one end thereof formed to engage the teeth of a main wheel F, its outer and opposite end being so formed as to engage the end *d* of a lever C; a pawl E pivoted to a lever C and having one end formed to engage the teeth of said main wheel, the other end thereof being formed to engage a pin *k*; a main wheel F provided with cogs or teeth around its outer circumference, and a spring L provided with means of attachment to a lever C and a plate A, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JAMES O. LYMAN.

Witnesses:

GEORGE L. RIGGS,
J. J. ESTABROOK.