D. F. SWEET.
Electric-Clock.

No. 169,057. Patented Oct. 19, 1875.

Fig. 1.

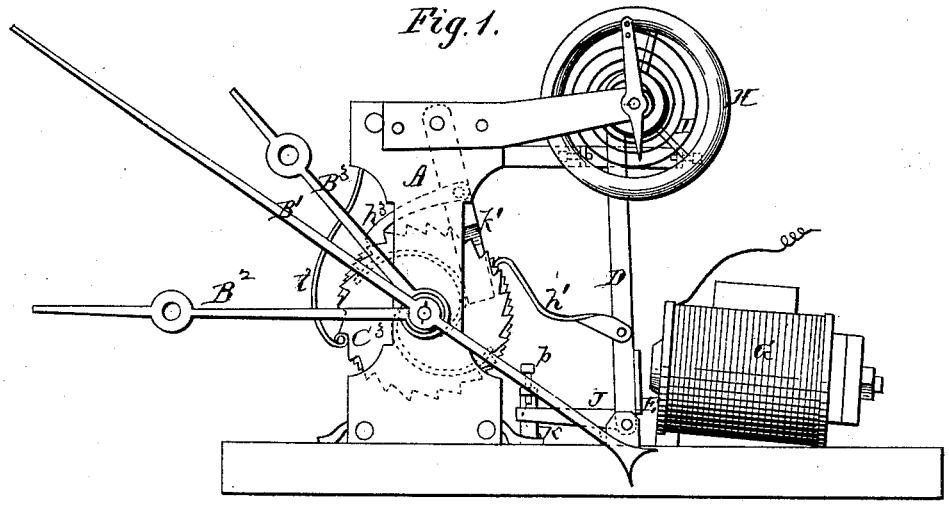


Fig. 4.

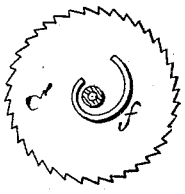


Fig. 5.

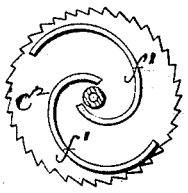
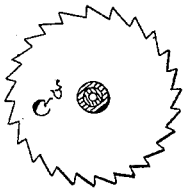


Fig. 6.



WITNESSES

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2 Sheets--Sheet 2.

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Fig. 2.

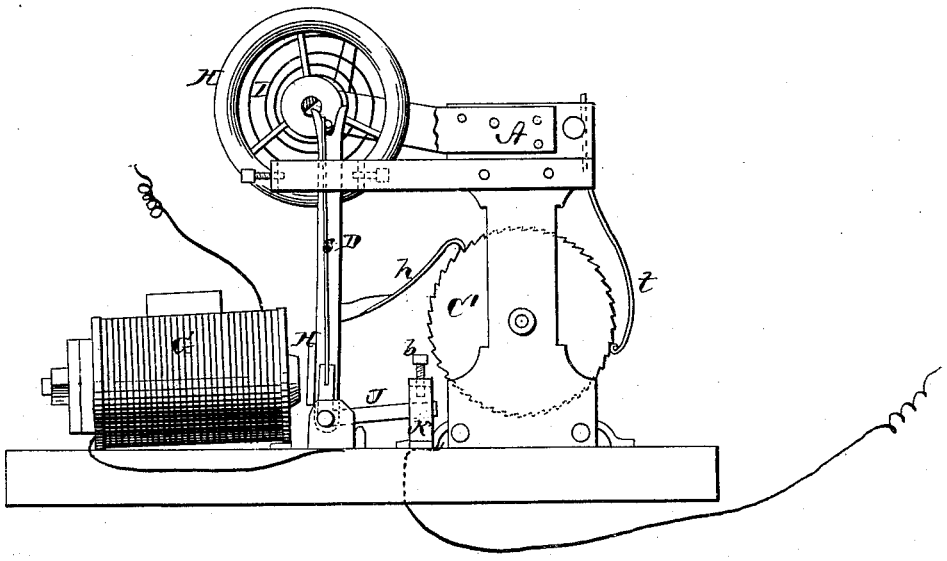
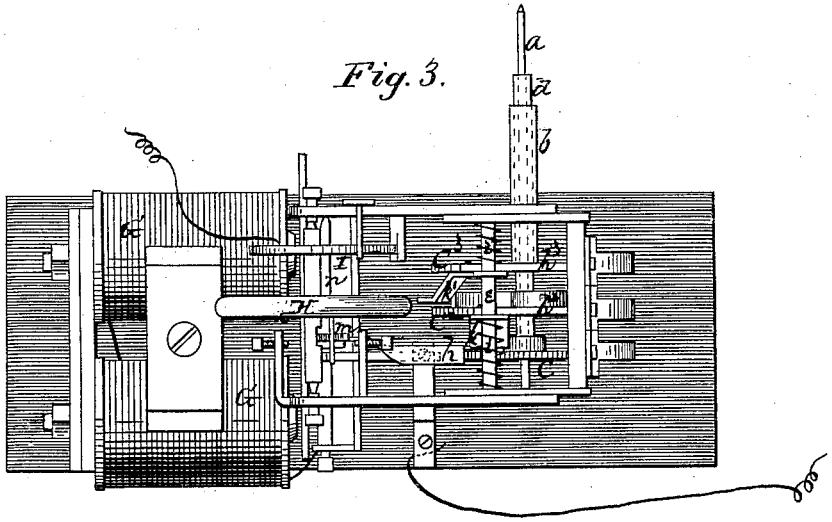


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

DANIEL F. SWEET, OF HASTINGS, MICHIGAN, ASSIGNOR OF ONE-HALF HIS RIGHT TO HOMER MOUL AND J. LEE REED, OF SAME PLACE.

IMPROVEMENT IN ELECTRIC CLOCKS.

Specification forming part of Letters Patent No. **169,057**, dated October 19, 1875; application filed September 14, 1875.

To all whom it may concern:

Be it known that I, DANIEL F. SWEET, of Hastings, in the county of Barry and in the State of Michigan, have invented certain new and useful Improvements in Electric Clocks; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of an electric clock, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a front elevation of my electric clock. Fig. 2 is a rear elevation of the same. Fig. 3 is a plan view. Figs. 4, 5, and 6 are side views of the only three wheels used in my clock.

A represents the frame of the clock, in a suitable part of which is a shaft, *a*, carrying upon its front end the second-hand B^1. On the shaft *a* is a sleeve, *b*, which carries on its front end the minute-hand B^2, and on the sleeve *b* is another sleeve, *d*, which carries the hour-hand B^3 on its front end. C^1, C^2, and C^3 are the three operating-wheels, secured, respectively, upon the shaft *a* and sleeves *b d'* within the frame A. The wheel C^1 is formed with sixty teeth, at equal distances apart, on its circumference. The wheel C^2 has also sixty teeth, and the wheel C^3 has twenty-four teeth. The wheel C^1 is operated by a pawl, h^1, attached to a rocking lever, D, so as to turn said wheel the distance of one tooth at each stroke of the lever. On the side of the wheel C^1 is a cam, *f*, which, once during each revolution of the said wheel, operates on an arm, *k*, hung upon a shaft, *e*, in the top of the frame. To this arm is pivoted a second pawl, h^2, which operates on the second wheel C^2, so that for each revolution of the first wheel C^1 the second wheel C^2 is turned the distance of one of its teeth.

The first wheel C^1 being set for seconds, the second wheel C^2 will, through the hand B^2, indicate minutes. In like manner the third wheel C^3 will, by means of an arm, *k'*, and pawl h^3, and two cams, *f' f'*, on the side of the wheel C^2, be turned the distance of two of its teeth for every revolution of said wheel C^2. The hand B^3, connected to the wheel C^3, will, therefore, be moved every half-hour the required distance. By having four cams on the wheel C^2, and doubling the number of teeth on the wheel C^3, the hour-hand will be moved every quarter-hour the proper distance. As soon as the pawls h^2 h^3 have operated their respective wheels they are brought back to their proper position by means of springs *i i*, applied to the arms *k k'*. To the lever D is attached the ordinary armature E, to be attracted by the electro-magnets G, and the upper end of said lever is forked, as shown in Fig. 2, to receive a pin, *m*, projecting from the ordinary escapement-wheel H, which is attached to a shaft, *n*, in the frame, and which shaft has the usual hair-spring I connected to it. In the same line as the axis of the rocking lever D is pivoted an L-shaped arm, J, the horizontal part of which is below a set-screw, *p*, in a stand, K. In the vertical part of the arm J is fastened a flat spring, *s*, which extends up along the side of the armature-lever D, so that the balance-wheel pin *m* will strike the end of said spring. The magnets G are connected with one pole of the battery, and the stand K with the other pole. The magnet is further connected with the metallic stand in which the lever D and arm J are pivoted. Whenever the arm J is in contact with the set-screw *p* the electric circuit is closed, and as soon as the arm gets away from said set-screw the circuit is broken.

In operation, when the circuit is closed, the magnets at once draw the armature-lever D toward them, whereby the first wheel C^1 is turned the distance of one of its teeth. At the same time the crotched end of the lever, by the pin *m* therein, gives an impetus to the balance-wheel in one direction, and, while turning in that direction, the pin *m* is suddenly released from the spring *s*, which spring, in its recoil, aided by the weight of the arm J, at once breaks the circuit. The return movement of the balance-wheel, caused by the recoil of the hair-spring, moves, by means of the pin *m*, the lever D away from the magnet, so as to set the pawl h^1 on the next tooth of the wheel C^1,

and the pin *m* will again pass by the upper end of the spring *s*. As the balance-wheel again returns, the pin *m*, entering the crotch of the lever D, carries the spring *s* forward until the arm J strikes the screw *p*, when the circuit is closed, and the magnets instantaneously attract the armature E, giving a renewed impetus to the balance-wheel. The wheels C^1 C^2 C^3 are held from any back motion by means of pawls *t*, suitably arranged for that purpose.

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

In an electric clock, the combination of the toothed wheels C^1, C^2, and C^3, cams *f f'*, hands B^1 B^2 B^3, armature-lever D, arms *k k'* and pawls h^1 h^2 h^3, balance-wheel H, having spring I, pin *m*, springs *s*, arm J, and set-screw *p*, all constructed and arranged substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of September, 1875.

DANIEL F. SWEET.

Witnesses:
C. L. EVERT,
JOHN SMITH.