(No Model.) 2 Sheets—Sheet 1.

V. HIMMER.

PRIMARY ELECTRIC CLOCK.

No. 356,069. Patented Jan. 11, 1887.

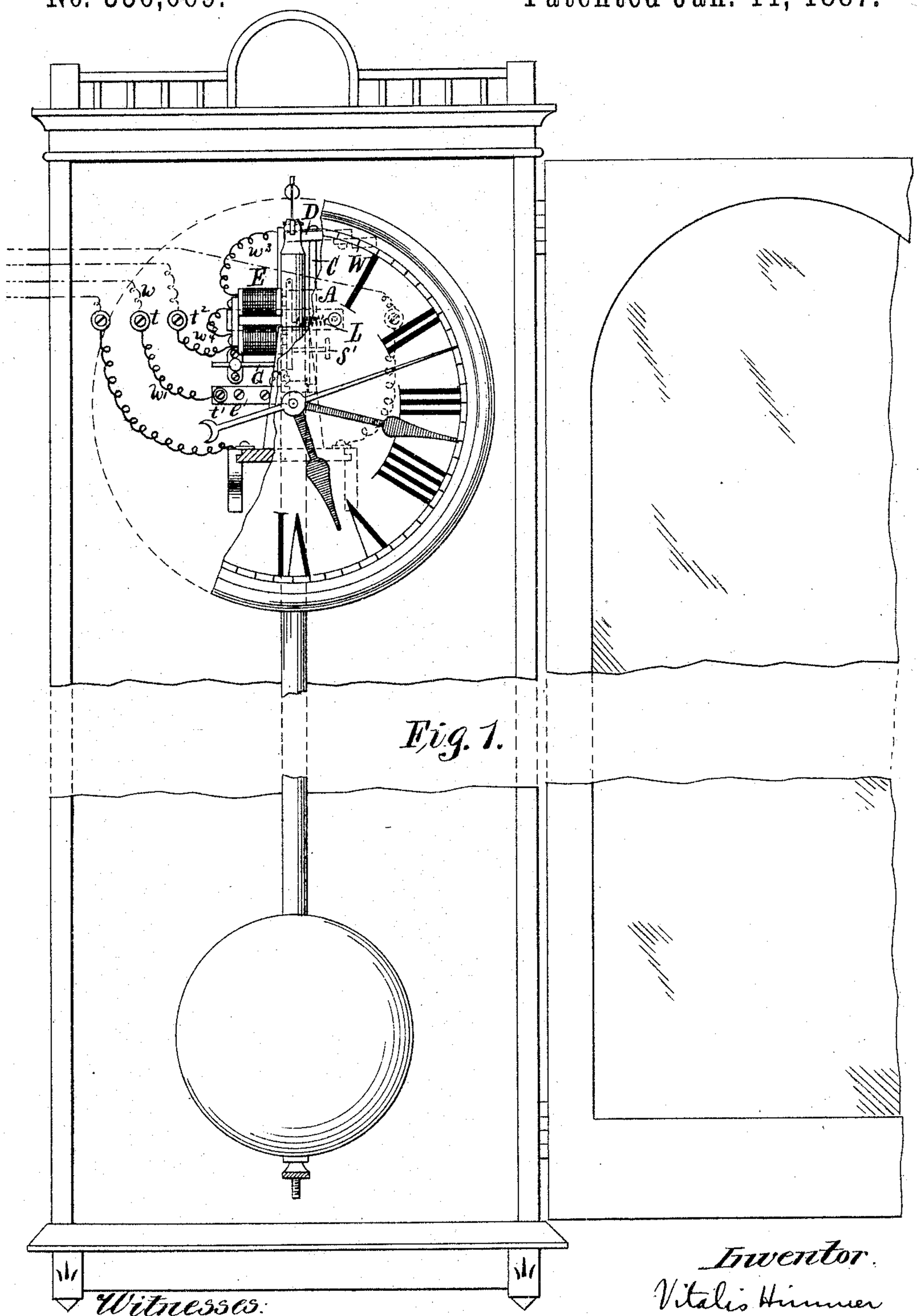

Fig. 1.

Witnesses:
Thomas Hunt.
J. Frank Walters.

Inventor.
Vitalis Himmer
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atty

(No Model.) 2 Sheets—Sheet 2.

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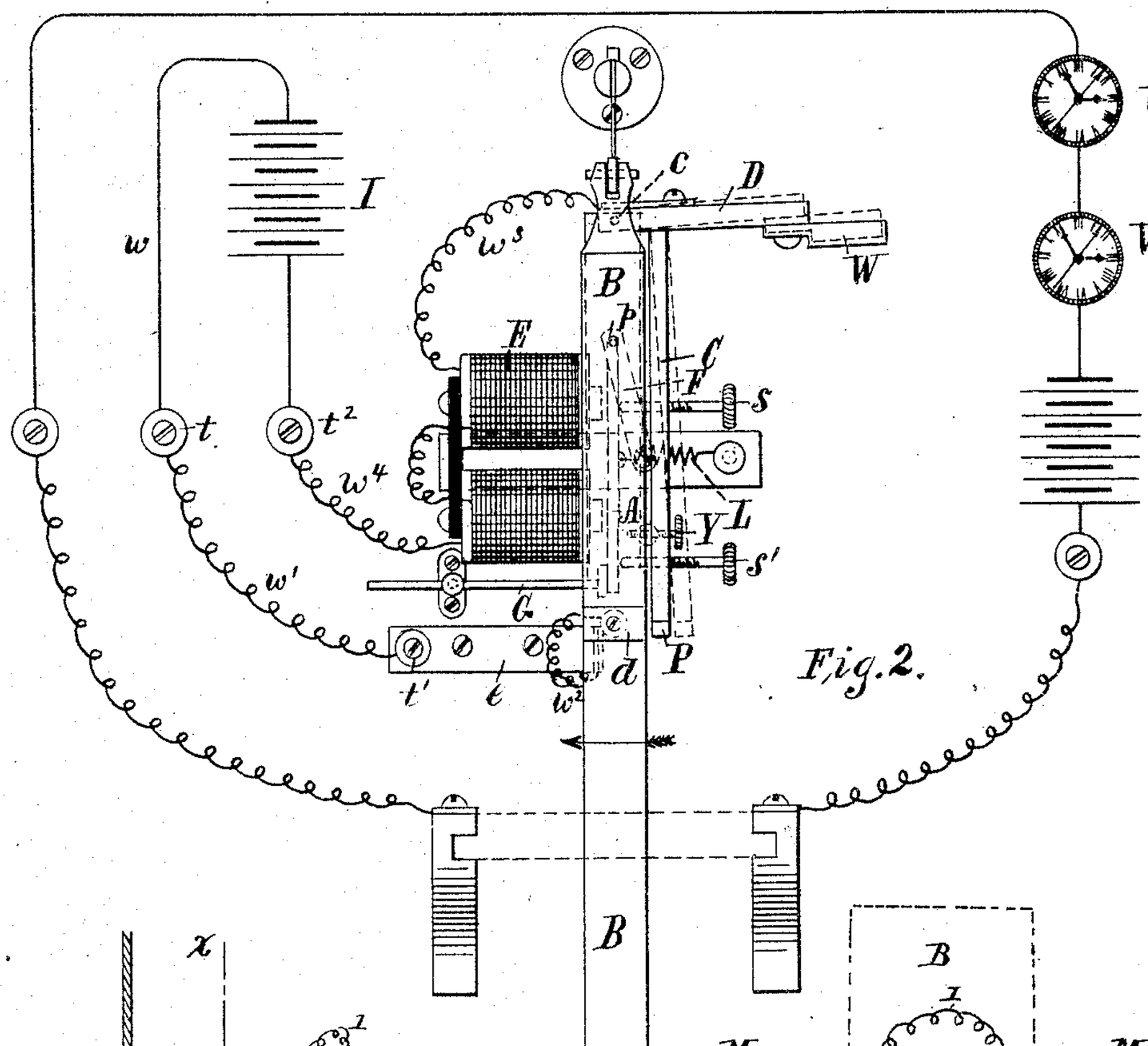

Fig. 2.

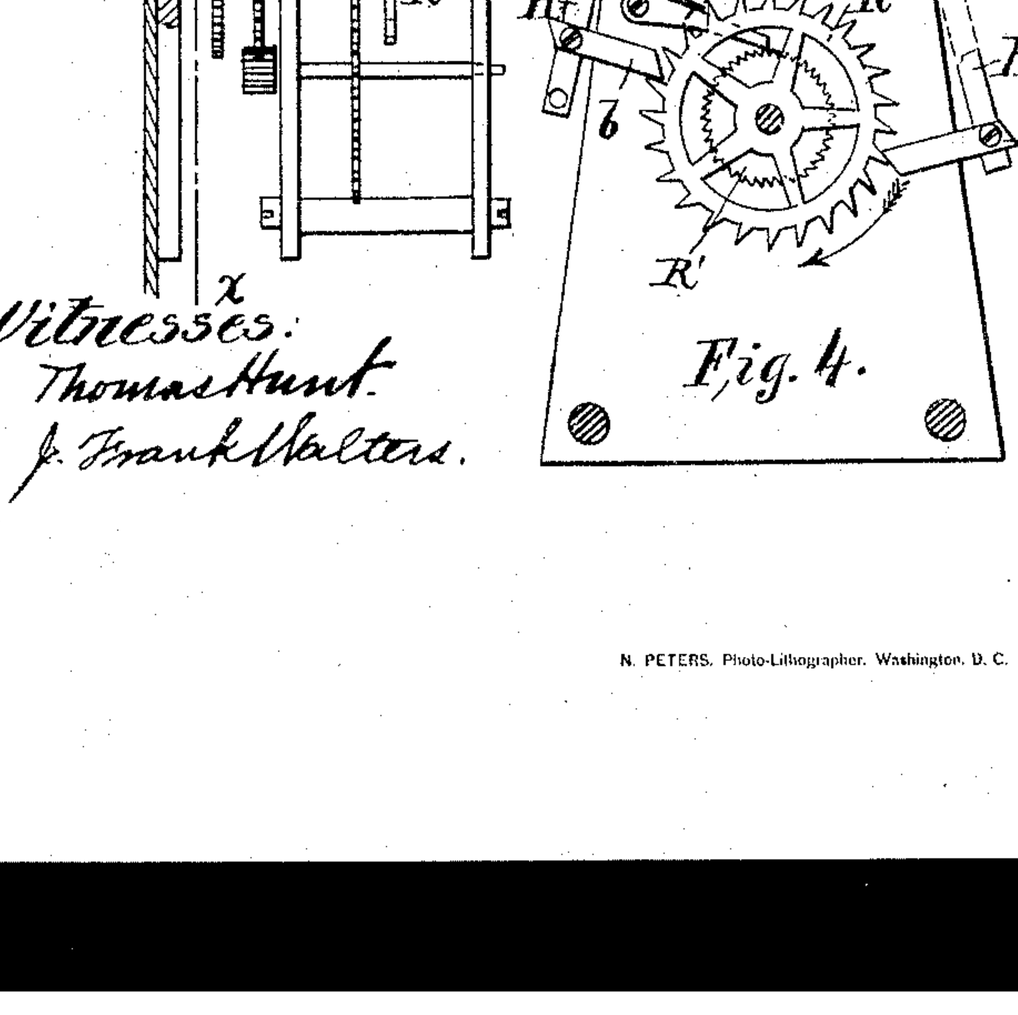

Fig. 5.

Fig. 4.

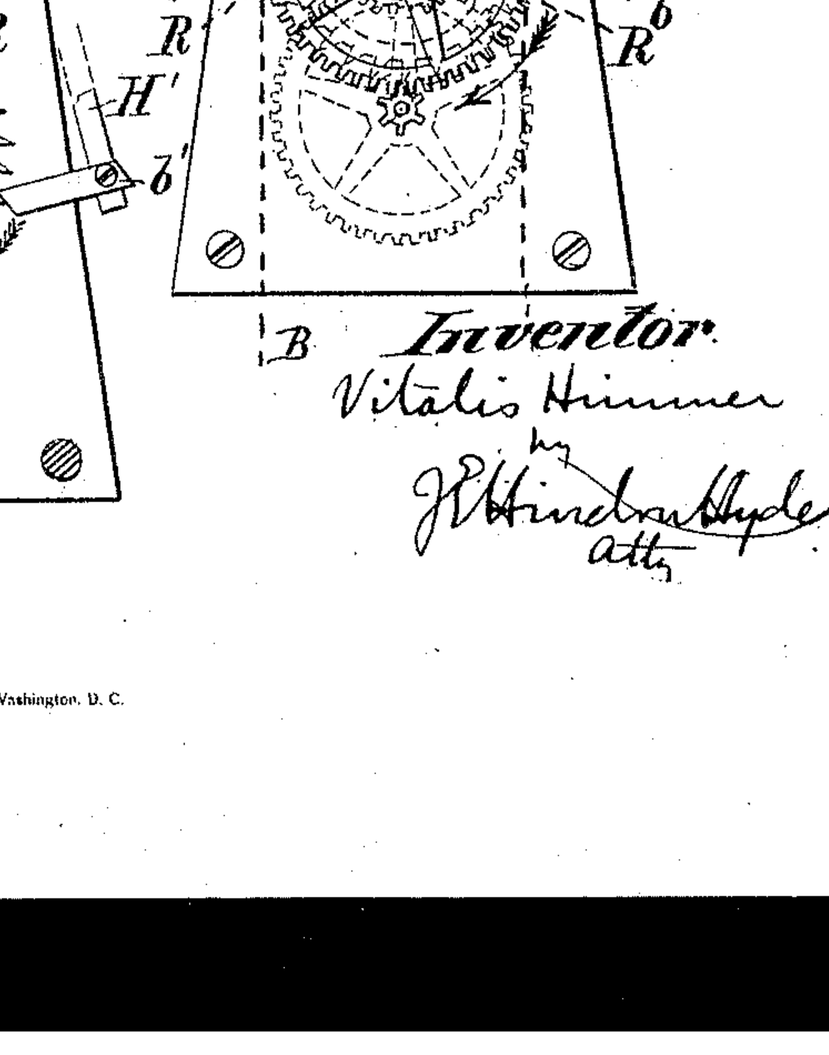

Fig. 3.

Witnesses:
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J. Frank Walters.

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UNITED STATES PATENT OFFICE.

VITALIS HIMMER, OF NEW YORK, N. Y., ASSIGNOR TO THE STANDARD ELECTRIC CLOCK COMPANY, OF SAME PLACE.

PRIMARY ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 356,069, dated January 11, 1887.

Application filed January 14, 1886. Serial No. 188,532. (No model.)

To all whom it may concern:

Be it known that I, VITALIS HIMMER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention is designed to be used as the central clock of a system of clocks placed in an electric circuit and run by the movement of said central clock; but it may be used as a clock independently of any secondary clocks.

The object of my improvement is to devise mechanism which enables said central clock to be run by the electric current; and it is illustrated in the accompanying drawings, in which similar letters refer to similar parts throughout the several views.

Figure 1 is a front view of the face of the clock, with a portion of the face broken away to show the construction of the mechanism for giving the necessary impulses to the pendulum. Fig. 2 is an enlarged view of said mechanism, and also shows two secondary clocks in circuit with the central clock. Fig. 3 is a view of the train of wheels of the central clock, and the mechanism by which they are driven, located in front of the pendulum and the actuating mechanism therefor. It also shows a part of the construction of the circuit-breaker by which the secondary clocks are run. Fig. 4 is another view of the driving-pawls by which the central wheel of the train of wheels is driven. Fig. 5 is a side view of the mechanism shown in Fig. 3.

Referring to Figs. 1 and 2, which show the mechanism for driving the pendulum, I will now proceed to describe this part of my invention. B is the pendulum-rod, the movement of which acts to drive the wheels of the central clock, as hereinafter described. C is the longer arm of an elbow-lever pivoted to the frame of the clock at *c*. The shorter arm, D, of this lever carries the weight W. The arm C carries the two set-screws *s s'*, which bear against the armature A of the electro-magnet E, said armature A being loosely pivoted at the point *p* to the support F. G and Y are two stops, which limit the vibration of the swinging armature A, and L is a retractile spring, which draws the armature A away from the poles of the magnet E when the latter is not energized. It will thus be seen that whenever the magnet E is energized the armature A is drawn toward its poles, thus leaving the weighted lever C D free to fall through the action of the weighted arm D. The projecting pin P is fastened to the longer arm, C, of this lever and bears against the pendulum-rod, the latter thus receiving an impulse each time the weighted lever drops. When the magnet E is not energized, the retractile spring L draws the armature A away from the poles of the magnet E, and with it, by means of the screws *s s'*, raises the lever C D, thus leaving the pendulum-rod B free to vibrate on its backward stroke. In this way there is an impulse given to the pendulum-rod every time that the magnet is energized, and this stated succession of impulses keeps the pendulum vibrating. The magnet E is energized at each swing of the pendulum to the right by the local battery I, whose circuit may be traced on the drawings, Fig. 2, as follows: battery I, wire *w*, binding-screw *t*, wire *w'*, binding-screw *t'*, plate *e*, wire w^2, plate on the pendulum-rod *d*, projecting pin P, lever-arm C, lever-arm D, wire w^3, magnet E, wire w^4, binding-screw t^2, battery I. Of course each time the pendulum swings to the left this circuit will be broken at the point P, and the lever C D will be free to perform its function of moving the pendulum-rod B.

I have shown two secondary clocks, V V', in circuit with the central clock, said secondary clocks being moved by said central clock by means of the circuit-breaker which is attached to said central clock, and one form of which I have partially shown in Figs. 3 and 4.

Referring now to Figs. 3 and 4, there is shown in said figures the mechanism by which the pendulum-rod B is made to move the hands of the central clock. Upon a suitable plate secured to the back of the clock-case are loosely pivoted at *m m'* the swinging levers M M', the free ends of which rest upon the adjusting-screws M^2 M^3. Two contact-plates, *n n'*, are fastened upon the lower side of the levers M M' near the free ends. Two levers, H H', are loosely pivoted to the frame of the clock, or to the plate attached thereto, at the

points *m m'*. The shorter arms of these levers carry the contact-points *o o'*, while the longer arms have near their lower ends two side extension-arms, I I', carrying at their inner extremities the projecting pins O O', which embrace the pendulum-rod B on either side. Each swing of the pendulum therefore moves one of the levers H H', and the return swing allows such lever to drop back by gravity, and at each swing contact is made between the points *n* and *o* or *n'* and *o'*, and the levers M M', being pivoted as described, make little resistance to the swing of the pendulum. The levers M M' are electrically connected by the wire 1 and to the battery by wire 2, the other pole of the battery being connected by wire 3 to the lever H', and the two levers H H' are connected by wire H. There are thus two paths for the electric current, and the circuit is made or broken by each swing of the pendulum. The two driving-pawls *b b'* are secured to the levers H H' in the manner shown, one to each lever, and the free ends of these pawls *b b'* gear into the teeth of the toothed wheel R, the ends of the pawls and the teeth of the wheel being shaped as shown, in such manner that by the rise and fall of the pawls the wheel R will be revolved in the direction of the arrow, Fig. 3. This wheel R has thirty teeth, the fall of each pawl revolving it through a distance of one-sixtieth of a revolution. This wheel therefore makes one complete revolution during sixty beats of the pendulum. The second, minute, and hour hand wheels are all run by this wheel R in the well-known manner, and, although shown in the drawings, need not be particularly described.

The construction of the wheel R and the pawls *b b'* are shown more clearly in Fig. 4. In said figure there is shown a locking-pawl, S, which gears into the ratchet-wheel R', fastened to the arbor of the wheel R, and which thus locks the wheel R from revolving in the wrong direction. This pawl S is kept down upon the teeth of the wheel R' by the spring *u*.

What I claim is—

1. In an electric clock, the combination, with an electro-magnet and a pendulum-rod bearing a plate in the same circuit as said magnet, of a weighted lever electrically connected with said magnet and bearing a contact-pin which makes and breaks contact with said plate on the pendulum-rod at each alternate vibration of said pendulum-rod, said weighted lever being actuated by the periodic movements of the armature of said magnet and imparting periodic impulses to said pendulum-rod, all substantially as shown and described.

2. In an electric clock, the combination of the wheel R, pawls *b b'*, mounted on the levers H H', carrying circuit-controlling devices, and pendulum-rod B, substantially as shown and described.

3. In an electric clock, the combination of the clock-propelling wheel R, levers H H', operated by the pendulum-rod B, and carrying pawls *b b'* and circuit-controlling devices, holding-pawl S, and wheel R', substantially as described.

4. In an electric clock, the combination of a pendulum-rod, which is caused to vibrate by periodic impulses given to it by means controlled by the periodic movements of the armature of an electro-magnet, with a driving-wheel for the train of wheels of said clock revolved by two pawls, one on either side of said driving-wheel, said pawls being actuated by the vibrations of said pendulum-rod, all substantially as shown and described.

5. In an electric clock, the combination of a pendulum-rod, which is caused to vibrate by periodic impulses given to it by the rise and fall of a weighted lever actuated by the periodic movements of the armature of an electro-magnet, with a driving-wheel for the train of wheels of said clock revolved by two pawls, one on either side of said driving-wheel, said pawls being actuated by the vibrations of said pendulum-rod, all substantially as shown and described.

6. In an electric clock, the combination of a pendulum-rod, which is caused to vibrate by periodic impulses given to it by the rise and fall of a weighted lever actuated by the periodic movements of the armature of an electro-magnet, with a driving-wheel for the train of wheels of said clock revolved by two pawls, one on either side of said driving-wheel, mounted on loosely-pivoted levers, said levers being alternately raised and allowed to fall by the vibrations of said pendulum-rod, all substantially as shown and described.

7. A circuit-controlling device consisting of the combination, with a clock mechanism and a vibrating pendulum, of the pivoted levers *m m*, carrying contact-plates *n n*, and pivoted levers H H', carrying contact-points *o o'* and pins O O', all arranged in an electric circuit and operated substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 7th day of January, 1886.

VITALIS HIMMER.

Witnesses:
THOMAS HUNT,
J. E. HINDON HYDE.