

(No Model.)

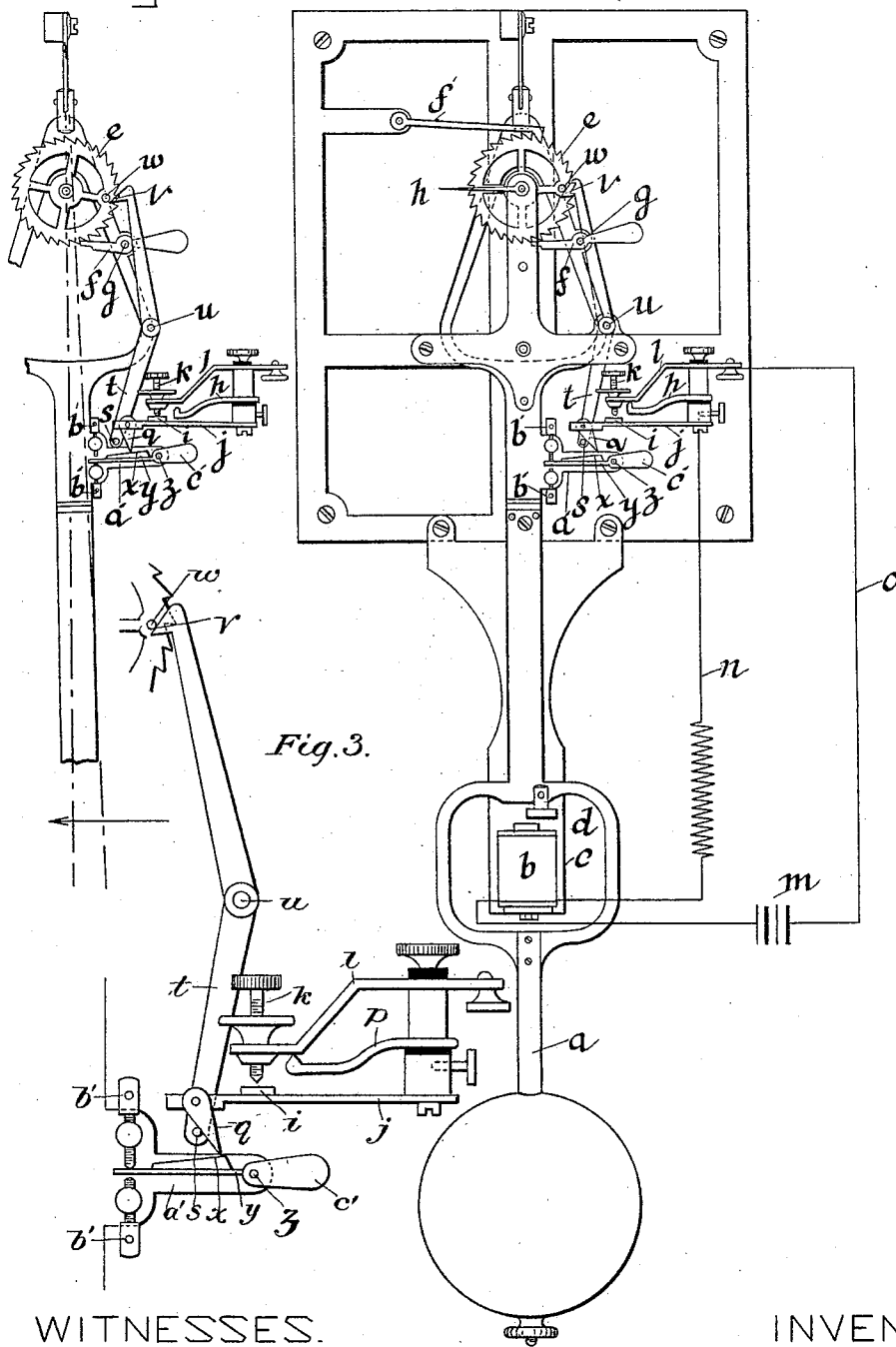
C. GULLBERG.
ELECTRIC CLOCK.

No. 527,528.

Patented Oct. 16, 1894.

Fig. 2.

Fig. 1.



WITNESSES.

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ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 527,528, dated October 16, 1894.

Application filed September 16, 1893. Serial No. 485,684. (No model.)

To all whom it may concern:

Be it known that I, CARL GULLBERG, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Primary Electric Clocks, of which the following is a specification.

My invention consists of improved simple, cheap and reliable apparatus of the circuit closing and breaking mechanism for periodically energizing the electro-magnet by which the impulses are given to the pendulum through the armature carried thereon, as hereinafter fully described reference being made to the accompanying drawings, in which—

Figure 1, is a front elevation of my improved clock with the pendulum in the middle position as at rest, and Fig. 2, is a detail in front elevation with the parts in the positions showing the circuit closed. Fig. 3 is an elevation of some of the parts of Figs. 1 and 2 on a larger scale for greater clearness.

An impulse is given to the pendulum *a*, once in sixty seconds by the attraction of the electro-magnet *b*, said magnet being on a fixed support *c*, and taking effect on the armature *d*, located on the pendulum in suitable proximity to the magnet for the purpose, and preferably a little to that side of the vertical center of the range of the pendulum from which it is to be pulled by the magnet, the magnet being the said center.

Near the upper end of the pendulum but a little below is a ratchet wheel *e*, placed in a plane parallel to the plane in which the pendulum swings, and having thirty teeth on which the gravitating pawl *f*, pivoted on a branch of the pendulum at *g*, takes effect to turn the wheel to the extent of one tooth at each double beat of the pendulum. The retaining pawl *f*, prevents reverse action of the ratchet wheel.

The second hand *h*, is carried on the front end of the axis of the wheel, and in practice the minute and hour hands will be geared with it by the usual time train.

The button *i*, on the spring *j*, and the point of the screw *k*, carried on spring *l*, are the contact points for closing and breaking the electric circuit of the battery *m*, for periodi-

cally energizing the electro-magnet *b*, spring *j*, being connected with the wire *n*, of the circuit, and spring *l*, being connected with wire *o*. The springs are suitably insulated. The circuit is normally broken by the action of the springs. *p* is a steady rest for spring *l*.

For effecting the periodical closing of the circuit, spring *j*, has suspended from it near its free end the pivoted switch point *q*, which is normally maintained in the inclined position represented in Fig. 1, by the stud pin *s*, of the lever *t*, pivoted on the clock frame at *u*, and having the inclined upper end *v*, subject to thrust by the stud pin *w*, of the ratchet wheel *e*, once during each revolution of said wheel to cause stud pin *s* to release switch point *q*, and allow it to swing in the direction of the vertical position to which it normally tends.

Under the switch point is a friction piece *x*, the upper surface of which inclines downward toward the pendulum. It is carried on a supporting bar *y*, pivoted at *z*, to the arm *a'*, projecting laterally from the pendulum and near the outer end of said arm, the free end of which bar, extended nearly to the pendulum, is carried between the points of the adjusting screws *b'* and the other end of said bar preferably has a counter-balance arm *c'* tending to hold the inner end up against the point of the upper adjusting screw *b'* when not rigidly confined between the points of the screws.

Figs. 2 and 3, illustrate the operation, the switch point being released from stud pin *s*, by the thrust of stud pin *w*, of the ratchet wheel *e*, on the inclined head *v*, at the moment of, or slightly before the pendulum starts in the movement to the left hand, drops so that the point catches on the friction piece *x*, the movement of which causes a slight rise of the upper end through swinging the lower end into the vertical line of the point and thus makes contact of the button *i*, with the point of the contact screw *k*. The lower adjusting screw *b'* determines to some extent the rise of the button *i*, and the upper screw *b'* being slacked off to some extent may allow the friction piece *x*, to rise a little through the effect of weighted arm *c'* to catch the point of the switch a little earlier than it would if

bar y were held down on the point of the lower screw, and thus insure more positive action, but this is not essential, for good results are obtained with the bar normally resting on the lower screw b' and either clamped thereon by the upper screw or not, the weighted arm c' being dispensed with.

The purpose of the inclined friction surface of the piece x , is to automatically vary the force of the impulses as the strength of the battery current varies, through varying the pressure and time of the contacts.

It will be seen that when through stronger impulses of the current the pendulum swings farther, the point of the switch will catch lower down the incline of the contact piece and the electric contact will be less forcible and of less duration so that the impulse will be less, and on the other hand when the pendulum swings a shorter range in consequence of a weaker impulse the switch will catch higher up the incline and the said electric contact will be more forcible and of longer duration and the impulse on the pendulum greater.

By providing ratchet wheel e , with another stud w , opposite the one shown, two impulses a minute will be given to the pendulum, and the studs may be arranged to give one, two, three or four, or more impulses a minute if desired.

I claim—

1. The combination of the contact springs, the gravitating switch point on one of the contact springs, the pendulum the friction piece carried on the pendulum, and means to normally hold the switch point clear of the friction piece, and to periodically release said switch point and allow it to catch on the friction piece, said switch point adapted to close the contact when actuated by the friction piece substantially as described.

2. The combination of the contact springs, the gravitating switch point on one of the contact springs, the pendulum the friction piece carried on the pendulum, and having its friction surface inclined downward toward the center of the range of the pendulum, and means to normally hold the switch point clear of the friction piece and to periodically release said switch point and allow it to catch on the friction piece, said switch point adapted

to close the contact when actuated by the friction piece substantially as described.

3. The combination of the contact springs, the gravitating switch point on one of the contact springs, the pendulum the friction piece carried on the pendulum, the lever normally holding the switch point clear of the friction piece, the ratchet wheel actuated by the pendulum, and the stud pin on said wheel periodically thrusting the lever to release the switch point, said switch point adapted to close the contact when actuated by the friction piece substantially as described.

4. The combination of the electro magnet, the pendulum subject periodically to the pull of the electro-magnet, the ratchet wheel actuated by the pendulum, the circuit closing switch and the switch releasing lever said lever periodically subject to the stud of the ratchet wheel, said wheel adapted for actuating the time train substantially as described.

5. The combination of the contact springs, the gravitating switch point on one of the contact springs, the pendulum, the pivoted adjustable bar on the pendulum the friction piece carried on the pivoted adjustable bar, and means to normally hold the switch point clear of the friction piece, and to periodically release said switch point to allow it to catch on the friction piece, said switch point adapted to close the contact when actuated by the friction piece substantially as described.

6. The combination of the contact springs, the gravitating switch point on one of the contact springs, the pendulum, the pivoted adjustable bar on the pendulum the friction piece carried on the gravitating adjustable pivoted bar, with its free end between the adjusting screws, and means to normally hold the switch point clear of the friction piece and to periodically release said switch point and allow it to catch on the friction piece, said switch point adapted to close the contact when actuated by the friction piece substantially as described.

Signed at New York city, in the county and State of New York, this 1st day of September, A. D. 1893.

CARL GULLBERG.

Witnesses:

W. J. MORGAN,
JOS. S. LOCKWOOD.