

No. 618,876.

Patented Feb. 7, 1899.

A. T. HILL.

CIRCUIT BREAKER AND CLOSER.

(Application filed June 8, 1897.)

(No Model.)

Fig. 1.

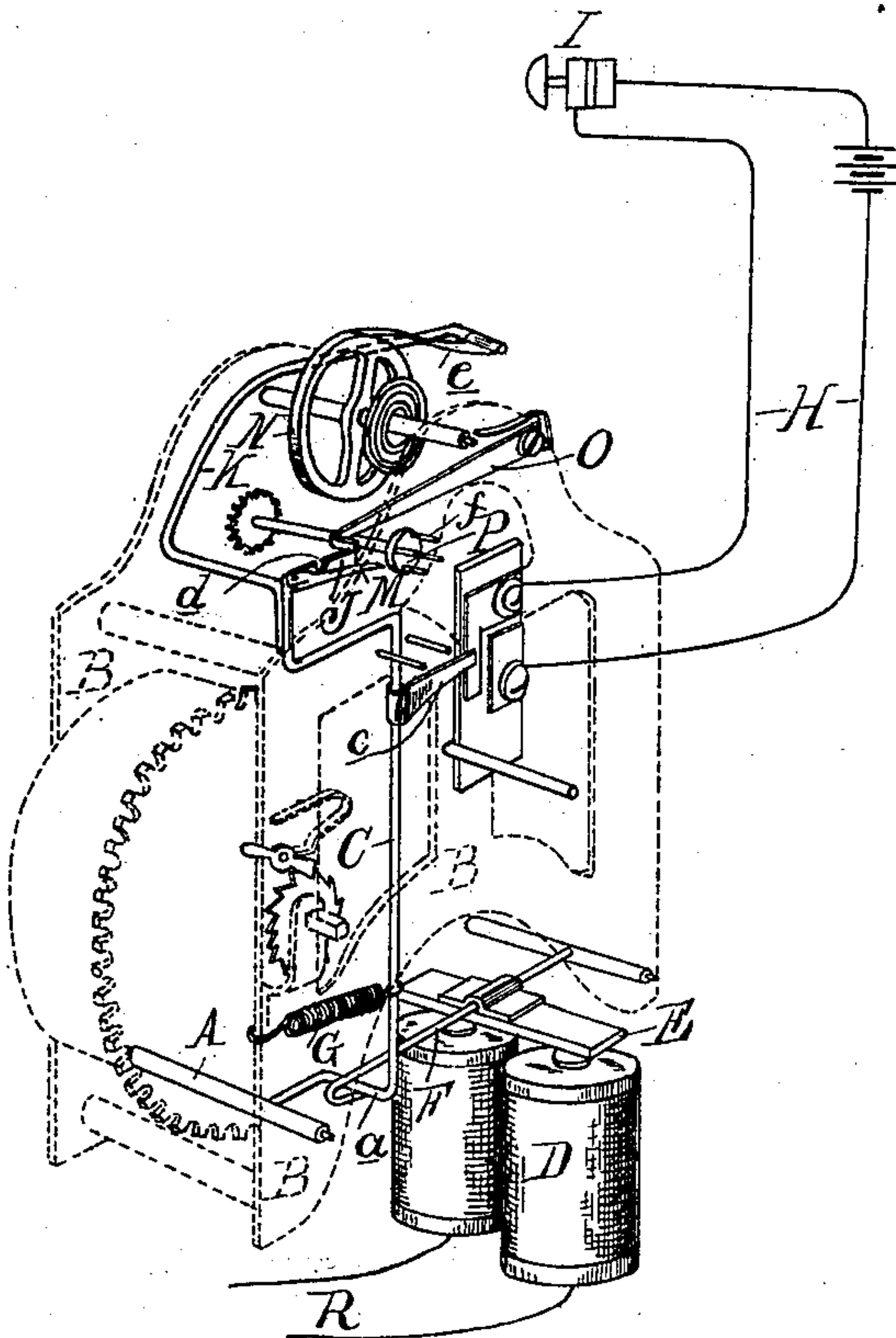


Fig. 3.

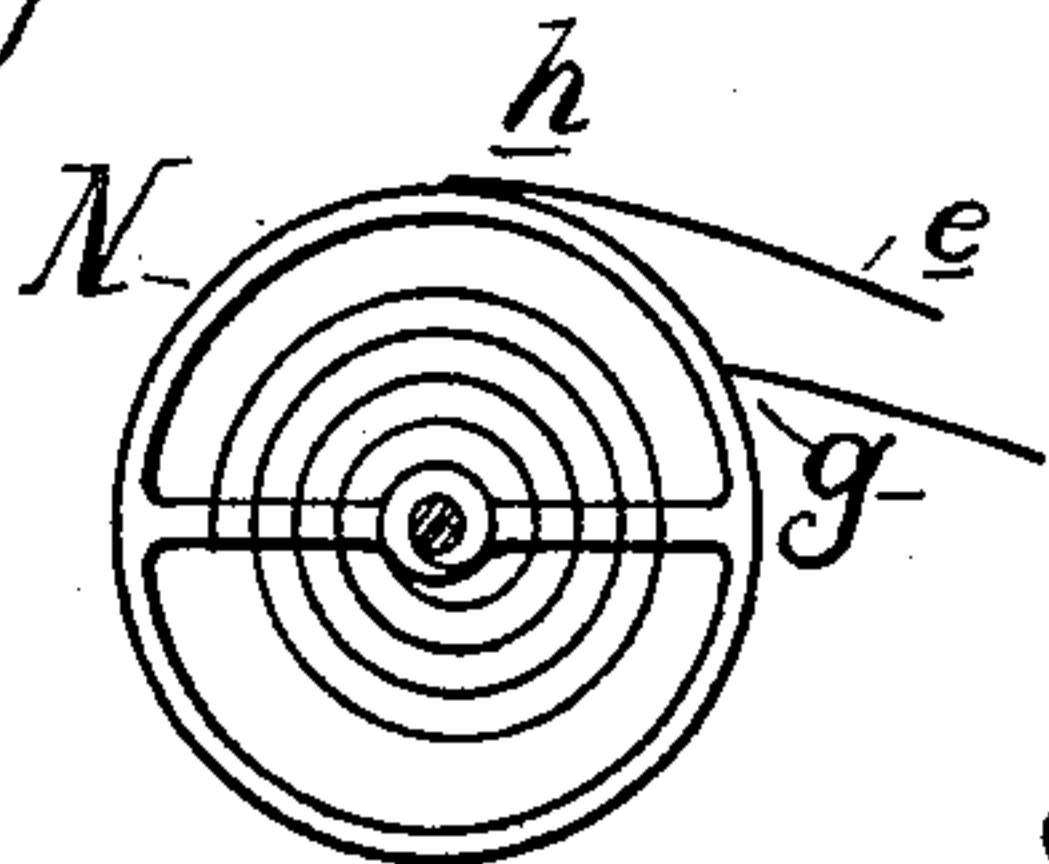
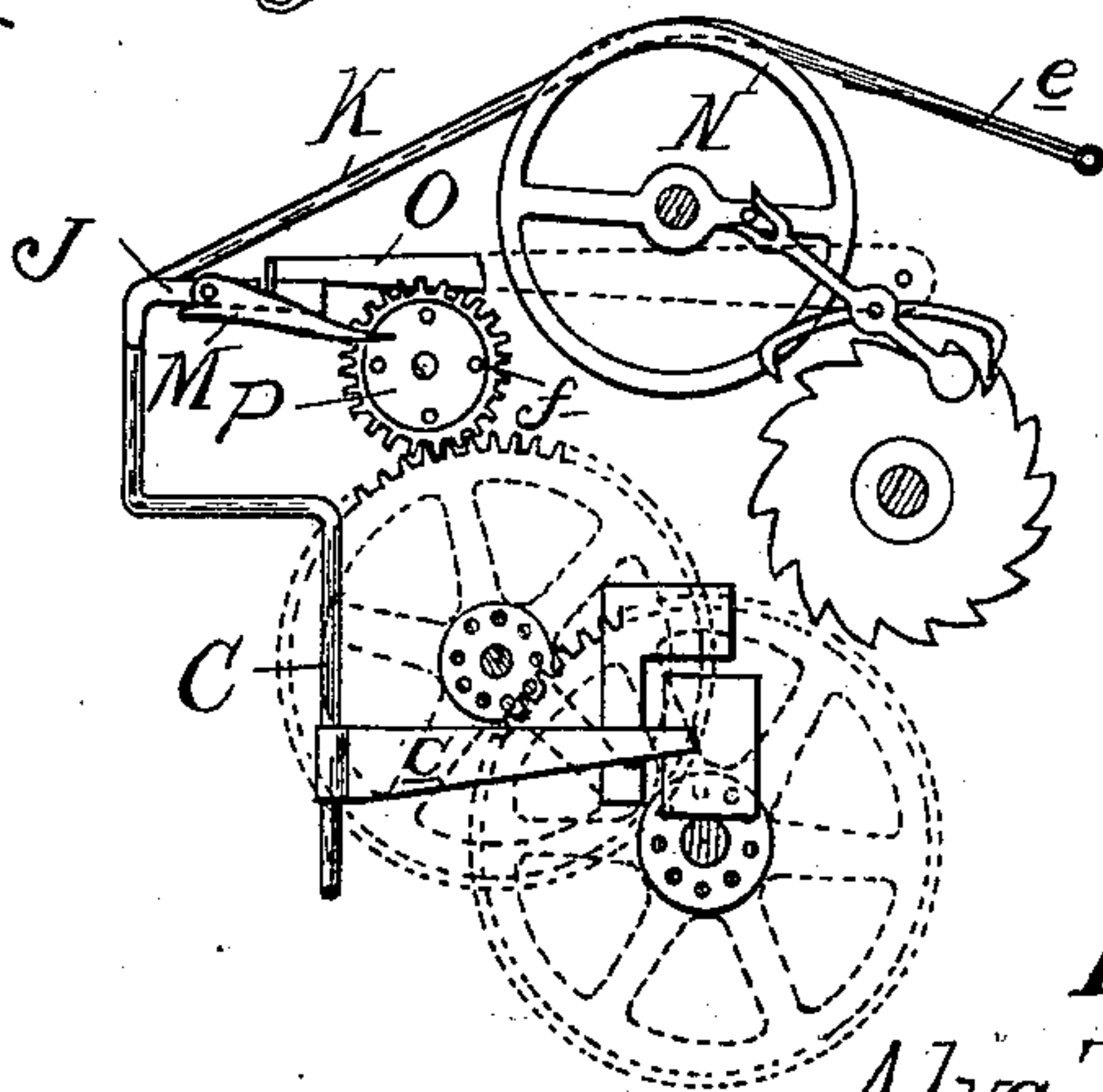


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CIRCUIT BREAKER AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 618,876, dated February 7, 1899.

Application filed June 8, 1897. Serial No. 639,794. (No model.)

To all whom it may concern:

Be it known that I, ALVA T. HILL, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Circuit Breakers and Closers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention has reference to a signaling mechanism for guarding railway-crossings in which open signal and track circuits are employed, with an alarm mechanism, such as a bell or other signal, arranged in the signal-circuit, which in turn is adapted to be closed and the signal operated for a determined interval of time upon the closing momentarily of the track-circuit by the train, thereby giving warning of an approaching train or car.

20 One of the essential objects of my invention is the production of a mechanism of the type referred to in which the operative parts will be positively actuated, particularly the closing device for the signal-circuit, whereby the liability of the non-operation of the mechanism will be reduced to a minimum.

Another object of my invention is to provide means for positively locking the closing device of the signal-circuit in said circuit to insure the operation of the signal for the required period of time and for positively unlocking the parts after the set period of time has elapsed.

30 A still further object of the invention is to provide an impelling device for the motor employed to actuate the releasing mechanism that will start the motor in operation after the circuit has been closed.

40 With these objects in view my invention consists in an improved signaling mechanism for grade-crossings and in the novel construction, arrangement, and combination of the various parts of the mechanism, as will be more fully hereinafter described, and shown in the drawings, in which—

45 Figure 1 is a perspective view of my improved signaling mechanism in its normal condition, parts of the mechanism which have no direct connection with the invention being omitted. Fig. 2 is an elevation of my device

with the parts in position to ring the alarm. Fig. 3 is a diagram elevation of the balance-wheel and spring-stop, illustrating its operation.

My invention comprises, preferably, a clock-movement which may be of the ordinary character as used in the construction of clocks and comprising the usual clock-train driven by a clock-spring and provided with an escapement controlled by a balance-wheel.

A is a transverse rock-shaft journaled in the frame-plates B (shown in dotted lines in Fig. 1) and serving as a pivot for the contact-arm C.

D is an electromagnet secured in proximity to the contact-arm and provided with an armature E, carried on a lever F, which is pivotally secured at one end in the clock-frame and engages with its free end an arm or offset *a* on the contact-arm in such manner that the movement of the armature oscillates the contact-arm from the position shown in Fig. 1 to the position shown in Fig. 2.

The contact-arm has a retracting-spring G and carries a circuit-closing device *c*, which by the movement of the contact-arm is adapted to make and break, preferably, an independent electric circuit H of an alarm-bell I or other signal, Fig. 1 showing the circuit open and Fig. 2 showing it closed.

The contact-arm is provided at its upper end with two offsets or branches J and K. The branch J is provided with a notch *d* and with a trip-lever M, pivotally secured to the offset J. The branch K carries a spring-stop *e*, which in the movement of the contact-arm is adapted to bear against the periphery of the balance-wheel N of the escapement.

O is a latch-bar pivotally secured to the frame of the clock in such relation to the offset J of the contact-arm that it will automatically engage into the notch and hold the contact-bar in the position shown in Fig. 2.

P is a small pin-wheel the pins of which revolve in the path of the detent M when the latter is in the position as in Fig. 2. This pin-wheel is driven by means of suitable gearing with the clock-train.

In practice the parts being arranged and constructed as shown and described they are

intended to operate as follows: The electromagnet D is included into an electric track-circuit R, which is momentarily closed by the passage of a train or car over a given point in the track in approaching the crossing to be guarded, as in the well-known operation of electric-signal crossings. The armature E being attracted by the closing of the circuit oscillates the contact-arm through the lever F pressing on it. By this movement the notch *d* is moved under the latch-bar O, which latter automatically engages in it, and thus holds the contact-arm against the tension of the spring G. At the same time the contact-arm not only closes the alarm-circuit H, which rings the alarm-bell, but also withdraws the spring-stop *e* from the balance-wheel, and thereby sets the clock-movement free. The clock-train in revolving the pin-wheel will after a predetermined interval release the latch-bar O by lifting the trip-lever M with one of its pins *f*, whereupon the spring G (provided the magnet is no more active) retracts the contact-arm, which breaks the alarm-circuit and stops the clock-train.

An important part of my invention is the way in which the clock-train is started by the spring-stop *e*, as illustrated in Fig. 3. The latter moves in such relation and proximity to the balance-wheel that its free end is pushed from *g*, where it first strikes against the periphery of the wheel, until it has reached the point *h*. The stop, therefore, not only holds the balance-wheel and prevents further movement of the clock-train, but it will also act as an impelling device for the balance-wheel whenever the contact-arm withdraws the stop, as it will remain in spring-pressed contact with it from *h* to *g*. By this arrangement I overcome in a very simple way the possibility of the clock-train not starting from causes incident to the use of an escapement, which, as in all clock-movements, sometimes requires a little shaking to start it when it has been accidentally stopped.

It is obvious that my invention is applicable to different forms or parts of an escapement, as it merely requires a disk or wheel to be placed on any of the shafts of the different parts of an escapement to effect with a stop of the same character the same result.

What I claim as my invention is—

1. The combination with a track-circuit and an independent signal-circuit both normally open, of an electromagnet arranged in the track-circuit, an independently-operating motor, a circuit-closing device actuated and controlled by the magnet, said device being adapted to be driven positively by the magnet, upon the closing of the track-circuit, into the signal-circuit to close the latter, means for automatically and positively locking the closing device in the signal-circuit, means, operating independently of the magnet, for withdrawing the closing device from said circuit when unlocked, a tripping device operated and controlled by the motor, adapted

to release the closing device, and an automatically-operating starting and stopping device for said motor.

2. The combination with a track-circuit and an independent signal-circuit both normally open, of an electromagnet arranged in the track-circuit, an independently-operating clock-movement, a circuit-closing device actuated and controlled by the magnet, said device being adapted to be driven positively by the magnet, upon the closing of the track-circuit, into the signal-circuit to close the latter, a catch constructed to automatically engage with and lock the closing device in the signal-circuit, a retracting-spring for withdrawing the closing device from said circuit when unlocked, a tripping device operated at intervals by the clock-movement, constructed to actuate the catch and release the closing device, and an automatically-operating starting and stopping device for the clock-movement.

3. The combination with a track-circuit and a signal-circuit both normally open, of an electromagnet arranged in the track-circuit, an independently-operating clock-movement provided with a balance-wheel, a circuit-closing device actuated and controlled by the magnet, said device being adapted to be driven positively by the magnet, upon the closing of the track-circuit, into the signal-circuit to close the latter, means for automatically and positively locking the closing device in the signal-circuit, a retracting-spring for withdrawing the closing device from said circuit when unlocked, a tripping device operated by the clock-movement adapted to release the closing device, and a combined brake and impelling device, secured to said closing device, carried by the latter into frictional engagement with the balance-wheel by the action of the spring to form a stop for the clock-movement, and out of frictional engagement with the wheel by the magnet, to rotate the balance-wheel and start the movement.

4. The combination with a track-circuit and a signal-circuit both normally open, of an independently-operating clock-movement, an electromagnet arranged in the track-circuit, an oscillating arm operated in one direction by the magnet, a circuit-closing device secured to said arm and adapted to be carried by the latter, when actuated by the magnet, into the signal-circuit to close the same, a catch-receiving device upon the arm, a spring-actuated catch adapted to engage with said device, upon the movement of the arm in one direction and positively lock said arm from further movement, a releasing device operated by the clock-movement for unlocking the arm, a retracting-spring for returning the said arm to its initial position, and means for automatically starting and stopping the clock-movement.

5. The combination with a track-circuit and a signal-circuit, both normally open, of an independent clock-movement, an electromagnet

arranged in the track-circuit, an oscillating arm operated in one direction by the magnet, a circuit-closing device secured to said arm and adapted to be carried by the latter, when
 5 actuated by the magnet, into the signal-circuit to close the same, a catch-receiving device upon the arm, a spring-actuated catch adapted to engage with said device, upon the movement of the arm in one direction and
 10 positively lock said arm from further movement, means for releasing the arm comprising a trip-lever pivoted to the arm and a pin-wheel, operated by the clock-movement, with which said lever engages, the parts being ar-
 15 ranged and adapted to operate as described, a retracting-spring for returning the arm to its initial position, and means for automatically starting and stopping the clock-movement.

20 6. The combination with a track-circuit and a signal-circuit both normally open, an electromagnet and its armature, an oscillating arm secured to said armature carrying at its free end the spring-brake *e*, a clock-move-
 25 ment provided with the balance-wheel *N* and pin-wheel *P*, the circuit-closing device *c*, secured to the arm and adapted to be driven by the latter into the signal-circuit to close the same, the spring-catch *o* constructed to en-
 30 gage with and lock the arm when in its extreme forward position, the trip-lever *M* pivoted to the arm and adapted to engage with and be operated by the pin-wheel, in the manner set forth, and a retracting-spring for
 35 returning the arm to its initial position after its actuation by the magnet.

7. The combination with a track-circuit, and

a signal-circuit normally open, of an electro-magnet arranged in the track-circuit, a circuit-closing device for the signal-circuit con- 40
 trolled by the magnet, means for automatically locking the closing device in the signal-circuit, a tripping device for releasing the closing device, an independent motor operat-
 45 ing the tripping device, and means for automatically starting and stopping the motor.

8. The combination with a track-circuit, and a signal-circuit normally open, of an electro-magnet arranged in the track-circuit, a circuit-closing device for the signal-circuit con- 50
 trolled by the magnet, means for automatically locking the closing device in said signal-circuit, an independent motor for releasing the closing device, and a combined brake and
 55 impelling device for stopping and starting the motor.

9. The combination with a track-circuit, and a signal-circuit normally open, of an electro-magnet arranged in the track-circuit, a circuit-closing device for the signal-circuit con- 60
 trolled by the magnet, means for automatically locking the closing device in said signal-circuit, an independent clock-movement for releasing the closing device, and a spring-arm
 65 operating as a brake and impelling device to stop and start the escapement of the clock-movement.

In testimony whereof I affix my signature in presence of two witnesses.

ALVA T. HILL.

Witnesses:

OTTO F. BARTHEL,
 M. B. O'DOHERTY.