(No Model.)

V. HIMMER.

CIRCUIT CLOSER FOR ELECTRIC CLOCKS.

No. 298,301. Patented May 6, 1884.

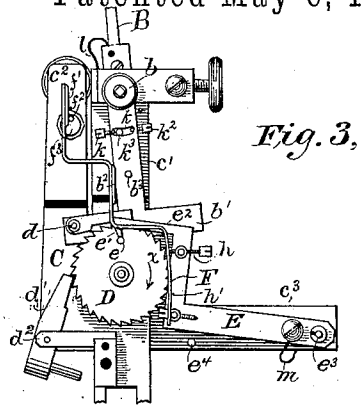

Fig. 3.

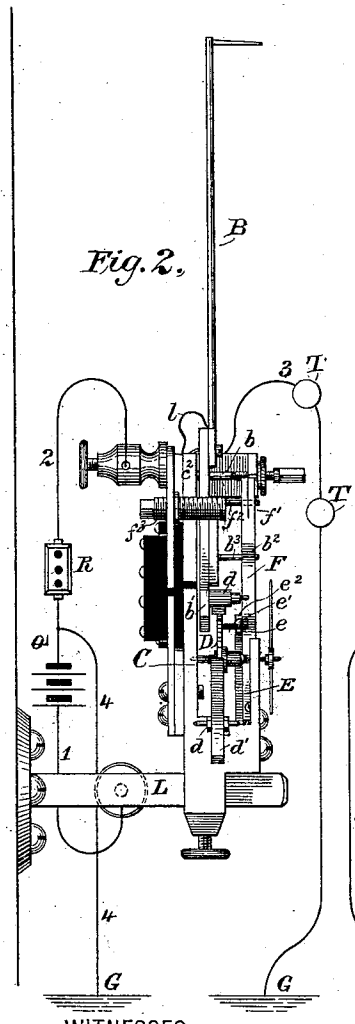

Fig. 2.

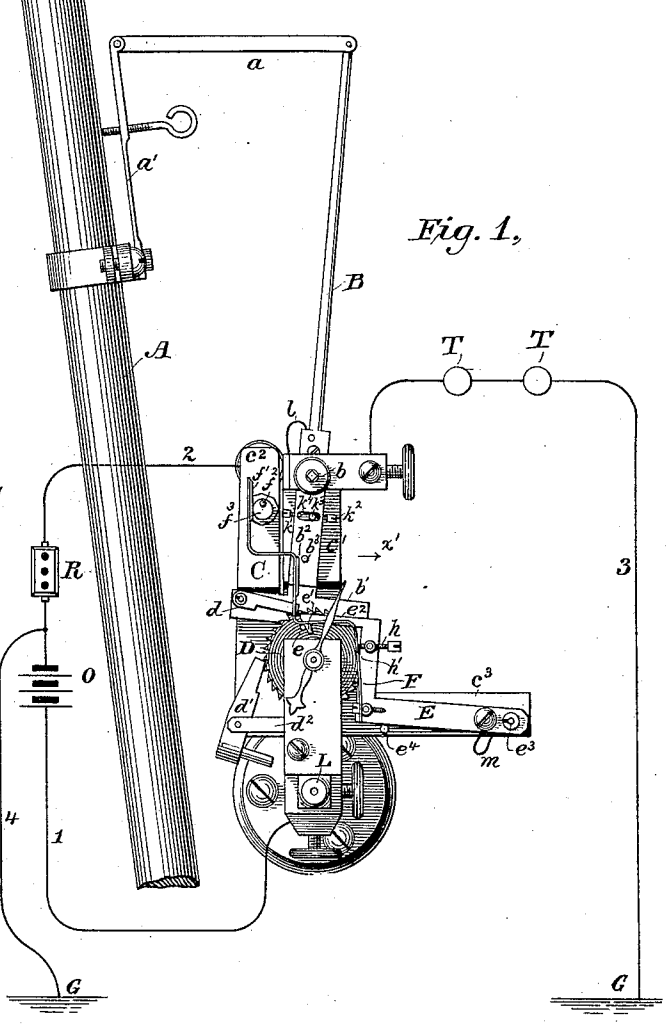

Fig. 1.

WITNESSES

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UNITED STATES PATENT OFFICE.

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CIRCUIT-CLOSER FOR ELECTRIC CLOCKS.

SPECIFICATION forming part of Letters Patent No. 298,301, dated May 6, 1884.

Application filed April 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, VITALIS HIMMER, a citizen of the United States, and a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Circuit-Closers for Electric Clocks and Indicators, of which the following is a specification.

My invention relates to certain improvements in the class of instruments employed for automatically transmitting, through the agency of a standard time-piece or other automatically-operated machinery, periodic electric impulses of proper character for actuating a series of secondary electric clocks or dials.

The object of my invention is to provide a device for automatically closing at regularly-recurring intervals the circuit of a battery through a system of secondary clocks or indicating devices, and at the same time preventing the occurrence of disruptive electric discharges at the circuit-closing points.

The invention consists, generally, in combining with the pendulum of an automatically-operated clock or regulator a pivoted lever vibrated thereby and in unison therewith, and carrying a pawl for actuating a ratchet-wheel, and in applying to this wheel a device mechanically operated thereby to close the circuit of a battery at predetermined intervals through a conductor, which includes an artificial resistance, and constituting an artificial line, and by the same operation to place a contact-point electrically connected with one pole of the battery in the path of a contact-point carried upon the vibrating lever, and electrically connected through the system of secondary clocks with the remaining pole of the battery. The parts are so adjusted that the next succeeding vibration of the lever closes this circuit and temporarily opens the circuit of the artificial line. Immediately after the lever has acted to transmit an impulse through the clock-circuit its connections are interrupted, the artificial line is simultaneously closed, and the ratchet-wheel is further actuated, again severing the connections of the artificial line.

In the accompanying drawings, which illustrate my invention, Figure 1 is a front elevation of the circuit-closing device, showing in diagram its electric connections. Fig. 2 is a side elevation of the same, and Fig. 3 illustrates the device in the position which it assumes preparatory to transmitting an electric impulse.

Referring to these figures, A represents a portion of the pendulum-rod of a standard time-piece or regulator, and B a lever pivoted at *b* to an insulated portion, *c'*, of a supporting-frame, C. The upper extremity of the lever B is adjustably united with the pendulum-rod A by means of a link, *a*, pivoted at one extremity to an adjustable flexible arm, *a'*, secured to said pendulum, and at the other extremity to the lever B. By this means synchronous vibrations are imparted to the lever B from the pendulum A. The lever B is delicately counterpoised by an arm or extension, *b'*, in such a manner that as little resistance as possible will normally be offered thereby to the movement of the pendulum A. At the lower extremity of the arm *b'* is carried a pawl, *d*, the face of which rests upon the periphery of a ratchet-wheel, D, and is caused by the successive vibrations of the lever B to engage the successive teeth of the wheel, and thus to thereby advance the same in the direction indicated by the arrow *x* through the space occupied by one tooth for each complete vibration of the lever B. A dog, *d'*, pivoted in a suitable support, d^2, extending from the frame C, serves to prevent a retrograde movement of the ratchet-wheel D.

Carried upon the face of the wheel D, near its periphery, is a pin, *e*, which, once in each revolution of the same, is brought into contact with a beveled finger, *e'*, carried at the extremity e^2 of a lever, E. The lever E is pivoted to the frame C at a point, e^3, and normally rests, by virtue of its own weight, upon a pin, e^4. The action of the pin *e* is to raise the lever E from this position by striking the beveled contact-point *e'*. The parts are so adjusted that the pin *e* will act in this manner to elevate the lever E through the influence of one vibration of the lever B in the direction indicated by the arrow *x'*, and to maintain it

in that position until the ratchet-wheel is again advanced by the next vibration of the lever B in the same direction. The pin *e*, by this second vibration, is advanced a sufficient distance to free the lever and permit it to resume its normal position.

Upon the lever E is mounted a flexible arm, F, carrying two contact-points, f' and b^2, respectively, provided with circuit-closing points f^2 and b^3. While the lever E remains in its normal position, resting upon the pin e^4, these contact-points are held away from their respective circuit-closing contacts f^2 and b^3. When, however, the lever E is elevated in the manner already described, through the agency of the pin *e*, and the movement of the arm b' in the direction indicated by the arrow x', the contact-point f' will be pressed against the circuit-closing point f^2, which is supported from a screw-post, f^3, extending through an insulated portion, c^2, of the frame C. The subsequent movement of the arm b' in the direction opposite to that indicated by the arrow x' causes the contact-point b^3 to be pressed against the contact-point b^2. The vibration of the lever B is of sufficient amplitude to afford a firm and secure contact between the two points b^2 and b^3, and the parts are preferably so adjusted as to cause the vibration of the lever to deflect the flexible arm F sufficiently to carry the contact-point f' away from its circuit-closing point f^2 during the time while the points b^2 and b^3 impinge upon each other. In some instances, however, it may be found desirable that the parts be so adjusted that both contacts will remain closed; but I prefer usually that the pressure of the point b^2 should serve to separate the points f' and f^2 for the reason hereinafter set forth. When the contact of the two points b^2 and b^3 has been made in the manner described, the subsequent movement of the arm b' of the lever B in the direction indicated by the arrow serves first to sever the connection between these two points, and then by further actuating the ratchet-wheel to release the lever E and arm F, thus severing the contact at f' f^2.

For the purpose of readily adjusting the position of the spring-arm F and the contact-points carried thereby, with reference to their respective circuit-closing points, an adjusting-screw, *h*, is carried upon the lever E, and by pressing against the arm F at a point, h', above that of its attachment to the lever E, the former may be sprung outward to any required distance. The contact point or pin f^2 is rendered adjustable by mounting it at the end of the screw f^3, and eccentric therewith, in such a manner that by turning the screw the pin will be thrown toward or away from the point f'.

The amplitude of the vibration of the lever B, while primarily dependent upon the amplitude of the beat of the pendulum at the particular point of the attachment of the link *a* thereto, may be adjusted within certain limits by means of adjusting-screws k k', extending from opposite sides of the arm b' toward a fixed stop, k^3, projecting through an aperture, k^4, formed in the arm.

The entire frame C is adjustably supported upon an arm, L, which may be screwed or otherwise supported from the back board of the clock. For the purpose of securing a good electrical connection with the point b^3 upon the lever B, I prefer to unite the lever with the supporting-plate c' by means of a flexible conducting strip or cord, *l*. A similar cord, *m*, is employed for connecting the movable lever E with the support c^3.

It is designed that one pole—say the positive—of a battery, O, should be connected by a conductor, 1, with the support L, and thus with the lever E and flexible arm F, carrying the two contact-points f' and b^2. The contact-point f^2 is electrically connected through its support f^3 and a conductor, 2, in which is included an adjustable artificial resistance, R, with the negative pole of the battery O. The contact-point b^3 is likewise connected with a conductor, 3, constituting the main line, in which are included the secondary electric clocks T, and through the earth with a conductor, 4, leading to the negative pole of the battery O. The resistance of the two circuits of the battery O thus formed are preferably made approximately equal. It is evident thus that at the predetermined intervals, which may be once a minute or any other desired interval, the circuit through artificial line 2 will be closed at the points f' and f^2, and subsequently the circuit, through the main-line conductor 3, will be momentarily substituted for that circuit, owing to the flexure of the arm F causing a separation of the points f' and f^2. After the main-line circuit has again been opened, the artificial circuit will also be opened, and they remain in this condition until the operation is repeated. By thus closing the contact-points f' and f^2 and holding them closed until the points b^2 and b^3 have been closed, subsequently separating the points f' and f^2, and then reclosing the latter before the points b^2 and b^3 are separated, the occurrence of disruptive discharges of any considerable force at these last-named points is prevented.

The device hereinbefore described is primarily intended to be actuated to close a circuit once a minute, and for that purpose, when it is applied to a second-beating clock, the ratchet-wheel D should be provided with thirty teeth. It is evident, however, that the number of teeth may be varied, or more than one pin may be carried upon the ratchet-wheel D when it is desired to close the circuit at other intervals.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a battery, a series of electric clocks included in a normally-open circuit of said battery, a normally-open shunt-circuit around said clocks, means for periodic-

ally closing said shunt-circuit, and means, substantially such as described, for momentarily substituting said clock-circuit for said shunt-circuit.

2. The combination, substantially as hereinbefore set forth, of a battery, a series of electric clocks included in a normally-open circuit of said battery, a normally-open shunt-circuit around said clocks, and means, substantially such as described, for causing the connections of said shunt-circuit to remain completed during the operation of closing and interrupting the connections of said clock-circuit.

3. The combination, substantially as hereinbefore set forth, with the pendulum of a clock, of a lever actuated thereby, a pawl carried upon said lever, a ratchet-wheel actuated by said pawl, a pin carried upon said ratchet-wheel, a second lever periodically actuated by said pendulum through the agency of said first lever, ratchet-wheel and pin, and two contact-points, one of which acts when the second lever is actuated to close an electric circuit, while the other is placed in the path of a circuit-closing point carried upon said first lever.

4. The combination, substantially as hereinbefore set forth, of a vibrating lever, a pawl carried upon said lever, a ratchet-wheel actuated by said pawl, a circuit-closing lever, means for periodically actuating said circuit-closing lever through the agency of said ratchet-wheel to close an electric circuit, and a contact-pin carried upon said vibrating lever acting to momentarily interrupt said circuit and complete the connections of a second circuit.

5. The combination, substantially as hereinbefore set forth, of a vibrating lever, a pawl carried upon said lever, a ratchet-wheel actuated by said pawl, a circuit-closing lever, means for periodically actuating said circuit-closing lever through the agency of said ratchet-wheel to close an electric circuit, a contact-pin carried upon said vibrating lever acting to momentarily interrupt said circuit and complete the connections of a second circuit, and means, substantially such as described, for interrupting the first-named circuit after the action of said contact-pin.

6. The combination, substantially as hereinbefore set forth, of a vibrating lever, a circuit-closing point carried thereon, a pawl actuated by said lever, a ratchet-wheel actuated by said pawl, a circuit-closing arm, and means, substantially such as described, for causing said arm to be periodically placed in the path of said circuit-closing point through the action of said pawl and ratchet-wheel.

In testimony whereof I have hereunto subscribed my name this 5th day of April, A. D. 1883.

VITALIS HIMMER.

Witnesses:
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CHARLES A. TERRY.