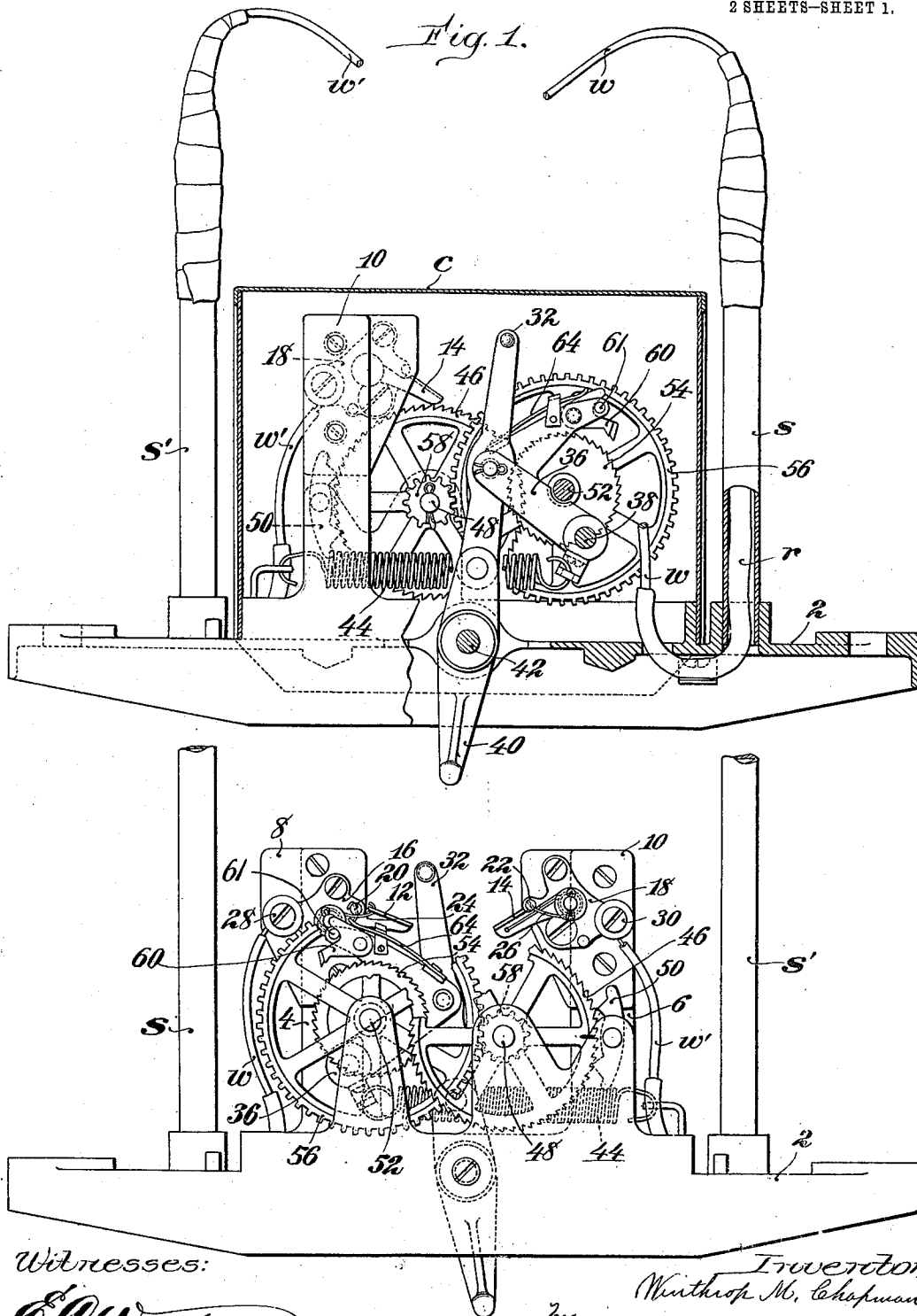


W. M. CHAPMAN.
CIRCUIT CLOSER FOR TROLLEY SIGNALS.
APPLICATION FILED MAY 28, 1908.

1,006,996.

Patented Oct. 24, 1911.

2 SHEETS—SHEET 1.



Witnesses:

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Fig. 2. *by* *Phillips Van Ceven & Fish*
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Fig. 3.

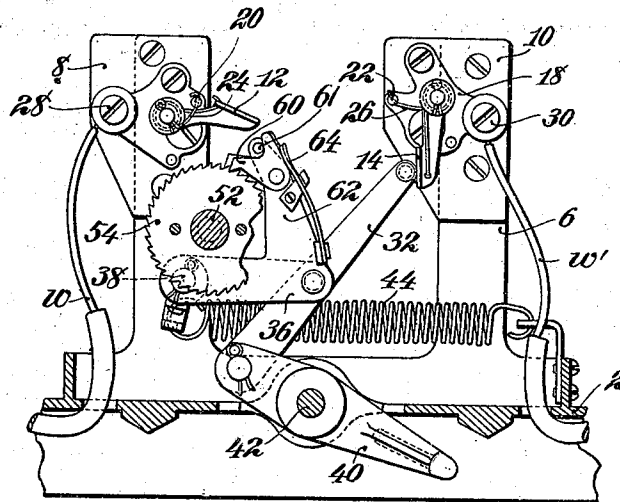
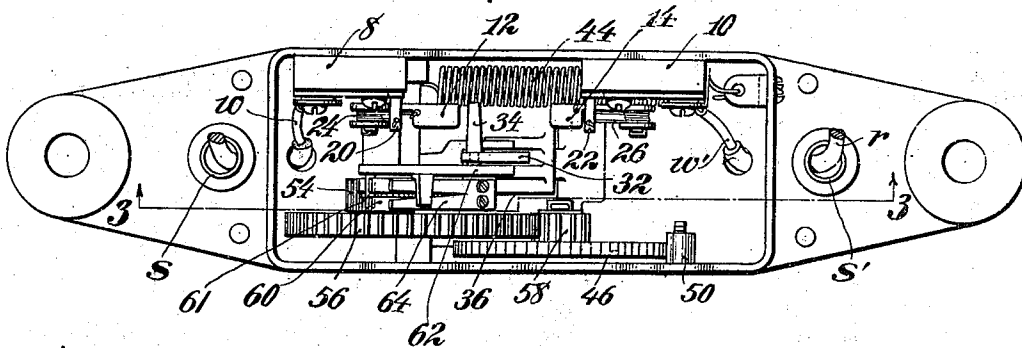


Fig. 4.



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UNITED STATES PATENT OFFICE.

WINTHROP M. CHAPMAN, OF NEEDHAM, MASSACHUSETTS, ASSIGNOR TO ELECTRIC-RAILWAY SIGNAL COMPANY, OF KITTERY, MAINE, A CORPORATION OF MAINE.

CIRCUIT-CLOSER FOR TROLLEY-SIGNALS.

1,006,996.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed May 28, 1908. Serial No. 435,371.

To all whom it may concern:

Be it known that I, WINTHROP M. CHAPMAN, a citizen of the United States, residing at Needham, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Circuit-Closers for Trolley-Signals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to circuit closers for operating signals, and more particularly for operating signals in a trolley system.

It is customary in the use of signal circuit closers in trolley systems so to dispose the actuator for the circuit closer, relative to the trolley wire, as to be engaged by a passing car. The contact thus made is of very short duration and is apt to be ineffective to operate the signals, therefore retarding devices have been provided for maintaining the contact for a suitable length of time to insure a proper operation of the signals. A simple retarder is, however, objectionable, as the slow breaking of the circuit, thus enforced, permits the drawing of an arc across the contact points.

One object of the present invention is to provide a circuit closer that will secure the advantage of an extended contact, but will effectually prevent the drawing of an arc at the time the circuit is broken. This object may be attained by the provision of a normally quick acting circuit closing and breaking mechanism, combined with a retarder for maintaining a comparatively extended contact, and means for controlling the period of time during which the retarder acts, the control being such that there is no interference with the normal quick breaking of the circuit. Preferably, a reciprocating circuit closing arm is provided which is operated by the trolley wheel of a passing car to engage a spring-pressed terminal and thus close the circuit, the circuit being sharply broken by a restoring spring acting to return said device to its initial position. A retarder is connected to the circuit closing arm through a locking mechanism which conveniently in the form of a ratchet and pawl device. In the illustrative embodiment of the invention, the forward or closing

movement of the circuit closing arm places the pawl in engagement with its ratchet, thus connecting the retarder to the circuit closing arm. The construction of the locking device is such that the pawl is released from its ratchet before the completion of the return movement of the circuit closing arm under the action of its restoring spring, thus concurrently stopping the action of the retarder and permitting a quick and sharp breaking of the circuit by the continued action of the restoring spring.

Another object of the invention is to adapt a circuit closer of the character above described to use on a single track trolley system so that the signals may be operated by the contact, with the circuit closer, of a car passing in either direction. To this end there is provided a pair of terminals to be engaged respectively by a reciprocation of the circuit closing arm in each direction, and also a two-way-moving actuating lever for said arm.

To the accomplishment of these objects and such others as may hereinafter appear, as will be readily understood by those skilled in the art, the invention comprises the features and combinations of parts hereinafter described and particularly pointed out in the appended claims.

The various features of the invention will be best understood from a description of one embodiment thereof, such, for instance, as illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation, with part of the frame and the cover broken away to show the interior mechanism; Fig. 2 is a side elevation of the opposite side of the mechanism from what is shown in Fig. 1, with a part of the interior mechanism broken away for clearness; Fig. 3, is an elevation, in section, on the line 3—3 of Fig. 4; and Fig. 4 is a plan, with the cover removed.

In the embodiment of the invention selected for illustrative purposes, the circuit closing mechanism is mounted upon a frame 2 which is adapted to be secured in any convenient manner to a trolley wire. The frame 2 is provided with two upright brackets 4 and 6, each respectively provided at their upper ends with blocks of insulating material 8 and 10. On these blocks 8 and 10 are mounted respectively terminals 12 and 110

14. The terminals are carried on metallic brackets 16 and 18 secured respectively to the blocks 8 and 10 and are preferably spring pressed so as to be held normally upwardly against stops 20 and 22. This spring pressure is secured through suitably connected torsion springs 24 and 26. The terminal brackets 16 and 18 are provided with binding posts 28 and 30 from which lead wires w and w' passing downwardly through rubber casings, indicated in Fig. 1, by r , and then upwardly through standards s and s' .

Between the terminals 12 and 14 there is hung a circuit closing arm 32 provided with a pin 34, Fig. 4, arranged for contact with the terminals. The circuit closing arm 32 is pivoted between its ends to a supporting lever 36 fulcrumed on a stud 38 mounted in the frame 2. To the lower end of the circuit closing arm 32 is pivoted one end of an actuating lever 40 fulcrumed on a stud 42 in the lower part of the frame 2. The actuating lever 40 is provided with a yoked lower end adapted to embrace the trolley wire. A coiled spring 44 is connected by one end to a lug on the supporting lever 36 and by its other end to an eye on the frame 2, and acts normally to maintain the circuit closing arm in the position shown in Figs. 1 and 2. With the mounting of the circuit closing arm just described, a blow on either side of the yoke of the actuating lever 40 will pull the circuit closing arm supporting lever 36 downward and will reciprocate the circuit closing arm 32 to the right or the left according to the direction of the blow. The actuating lever rests in a position to be engaged by the trolley wheel of a passing car, and if the car is passing to the right in Fig. 3, the circuit closing arm will be rocked to the right also to engage the terminal 14 as indicated in said figure. A car passing in the other direction would move the actuating lever 40 in an opposite direction to that shown in Fig. 3, and the circuit closing arm would then be rocked in a direction to engage the terminal 12. The lever 40 may therefore be termed a two-way-moving actuating lever. The spring 44 is expanded by a movement of the circuit closing arm 32 in either direction and acts as a restoring spring to return said arm to its normal inactive position between the terminals.

In order to maintain an extended contact between the circuit closing arm 32 and either of the terminals a retarding mechanism, of any convenient form, is provided. This mechanism is herein shown as comprising an escapement wheel 46, mounted on a stud 48 in the frame 2, and a pallet 50. The retarding mechanism may be connected to the circuit closing arm actuating mechanism by any convenient form of locking device. In the present instance the locking device

is preferably in the form of a ratchet and pawl mechanism. The ratchet 54 of this mechanism is pinned to one side of a gear 56, mounted on a stud 52 preferably placed a little eccentric with the stud 38. This gear meshes with a pinion 58 in turn rigidly connected to the escapement wheel 46, so that a rotation of the ratchet wheel 54 will operate the escapement mechanism.

In order to control the operation of the escapement mechanism so as to provide an extended contact and yet permit a quick breaking of the circuit by means of the restoring spring 44 means have been provided to release or disconnect the mechanism for locking the retarder to the circuit closing arm actuating means before the circuit closing arm 32 has assumed its normal position. A convenient arrangement to this end is to utilize the lever 36 which is eccentrically pivoted relatively to the ratchet 54, as a pawl carrier. A pair of pawls 60 are therefore mounted in the usual manner on an extension 62 of the lever 36 and are spring pressed toward the ratchet by suitably mounted leaf springs 64 which normally hold them against a stop pin 61 which serves to limit the motion of the pawls 60 toward the ratchet 54. The pawl carrier by reason of its eccentric movement relative to the periphery of the ratchet 54 will cause the pawls 60 after having once engaged the ratchet, to disengage it automatically at a certain point in its movement.

The operation of the circuit closer is obvious. Upon engagement of the actuating lever 40 by a car passing in either direction, the circuit closing arm 32 will be moved to make contact with one or the other of the terminals 12 or 14, and in so doing will rotate the lever 36, and with it the pawl carrier, about the stud 38, thus bringing the pawls into a position where they will engage the ratchet 54. As soon as the car has released the actuating lever 40 the contraction of the restoring spring will act to return the circuit closing lever 32 to its initial position. The return movement of the lever will act on the pawl carrier to rotate the ratchet 54, and this in turn will put in operation the retarding device. Thus the first portion of the return stroke of the circuit closing arm will be slow, the spring-pressed terminal following the arm in its movement, and the desired extended contact will be obtained. As soon, however, as the pawls 60 have reached a position where the arc on which they move passes off at a tangent to the circumference of the ratchet wheel 54, said pawls will automatically disengage themselves from the ratchet, which disengagement will immediately stop the action of the retarding device, permitting the circuit closing arm quickly to move away from the terminal with which it has been in contact

under the action of the restoring spring and thus sharply break the circuit. It will be noted that the arrangement and timing of the parts is such that the retarding device operates during a portion only of the return stroke of the reciprocatory circuit closing arm, and is always thrown out of engagement with the actuating mechanism of said arm before the circuit is broken, thus insuring the desired quick breaking of the circuit. This effectually prevents the drawing of an arc across the contact points at the time the circuit is broken.

It should, of course, be understood that the form of circuit closer herein described is applicable to use with a single terminal only, and would be so used if adopted on a double track trolley system where contact would be made with the actuating lever 40 by cars passing in one direction only. Where, however, the circuit closer is to be adopted for a single track trolley system, a single device having a pair of terminals, and the two-way-moving actuating lever as shown in the drawings is preferably used.

A casing *c* of tin or other suitable material may be used if desired to protect the mechanism from the weather. It will be noted that the passing of the wires *w* and *w'* downward through the base of the frame and then upward through the standards *s* and *s'*, located adjacent the mechanism, permits the use of a readily removable cover which also has the advantage of being water tight as it is unnecessary to pierce or cut it for the egress of the wires.

Nothing herein contained is to be construed as limiting this invention in the scope of its application to the particular embodiment herein selected for purposes of illustration and explanation. While the particulars of construction herein set forth are well suited to one form of the invention, it is not to be understood that these particulars are essential, since they may be variously modified within the skill of the artisan without departing from the true scope of the actual invention as defined in the following claims.

What is claimed as new is:

1. A circuit closer for signaling systems comprising in combination, a terminal, a circuit closing member for engaging said terminal, means for moving said member to break the circuit thus formed, a mechanical retarding device including an escapement wheel and a pallet permitting movement of the circuit closing member and acting to retard the movement of said member, said retarding device having provision for limiting the period of time during which it acts to permit a quick break.

2. A circuit closer for signaling systems comprising in combination, a terminal, a normally free reciprocatory circuit closing

arm for engaging said terminal, means for moving said arm to break the circuit, a retarding device permitting movement of the circuit closing arm and acting to retard the movement of the arm, said retarding device having provision for connecting said retarding device and circuit closing arm and for disconnecting the retarding device from said arm on its return movement and before the circuit is again broken.

3. A circuit closer for signaling systems comprising in combination a terminal, a circuit closing member for engaging said terminal, means for moving said member to break said circuit, a mechanical retarding device actuated by said means during the movement of said member to delay the operation of said moving means, said retarding device having provision for stopping the action of the retarding device before the circuit is broken to permit a quick break.

4. A circuit closer for signaling systems comprising in combination, a terminal, a circuit closing member for engaging said terminal, means for actuating said member to break the circuit thus formed, means including a retarding device for delaying the operation of said actuating means while permitting movement of the member, a pawl and ratchet mechanism connecting said actuating means and retarding device, said retarding device and pawl and ratchet mechanism having provision for limiting the duration of operative contact between said ratchet and pawl to permit a quick break by said actuating means.

5. A circuit closer for signaling systems comprising in combination, a terminal, a circuit closing arm for engaging said terminal, a restoring spring for said circuit closing arm, means including a retarding device for retarding the movement of the arm while permitting it to move under the force of said spring, a ratchet connected to the retarding device, and a pawl carrier and pawl, said retarding device, ratchet, pawl carrier and pawl having provision whereby the pawl is normally out of engagement with said ratchet, and whereby the pawl engages the ratchet to operate the retarding device and is disconnected from the ratchet during the operation of the restoring spring.

6. A circuit closer for signaling systems comprising in combination, a terminal, a reciprocatory arm for engaging said terminal, a retarding mechanism for the arm, a ratchet connected to the retarding mechanism, a pawl to engage the ratchet, a pawl carrier eccentrically hung relatively to said ratchet, and a connection between the pawl carrier and the circuit closing arm.

7. In a circuit closer for signaling systems, a pair of terminals, a reciprocatory circuit closing arm, a two-way-moving actuating lever for said arm adapted to be

operated by a passing car to cause engagement of said arm with either terminal, a restoring spring for said arm, and a retarding device acting when connected to said arm to retard its movement while permitting it to move, and having provision whereby the retarding device is disconnected from the arm before the arm is returned to normal position.

8. A circuit closer for signaling systems comprising in combination a terminal, a circuit closing arm to engage said terminal, means for moving the arm to break the circuit, a retarding device to retard the movement of the arm while permitting it to move comprising an escapement wheel and a pallet, said retarding device having provision for connecting and disconnecting said retarding device and circuit closing arm to permit a quick break of said circuit.

9. A circuit closer for signaling systems comprising in combination a pair of terminals, a reciprocatory circuit closing arm, a two-way-moving actuating lever for said arm adapted to be operated by a passing car to cause engagement of said arm with either terminal, restoring means for said arm, a retarding device comprising an escapement wheel and a pallet to retard the movement of the arm while permitting it to move, said retarding device having provision for connecting and disconnecting said circuit closing arm and said retarding device to permit a quick break of the circuit.

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

WINTHROP M. CHAPMAN.

Witnesses:

HORACE VAN EVEREN,
O. E. CHAPMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."