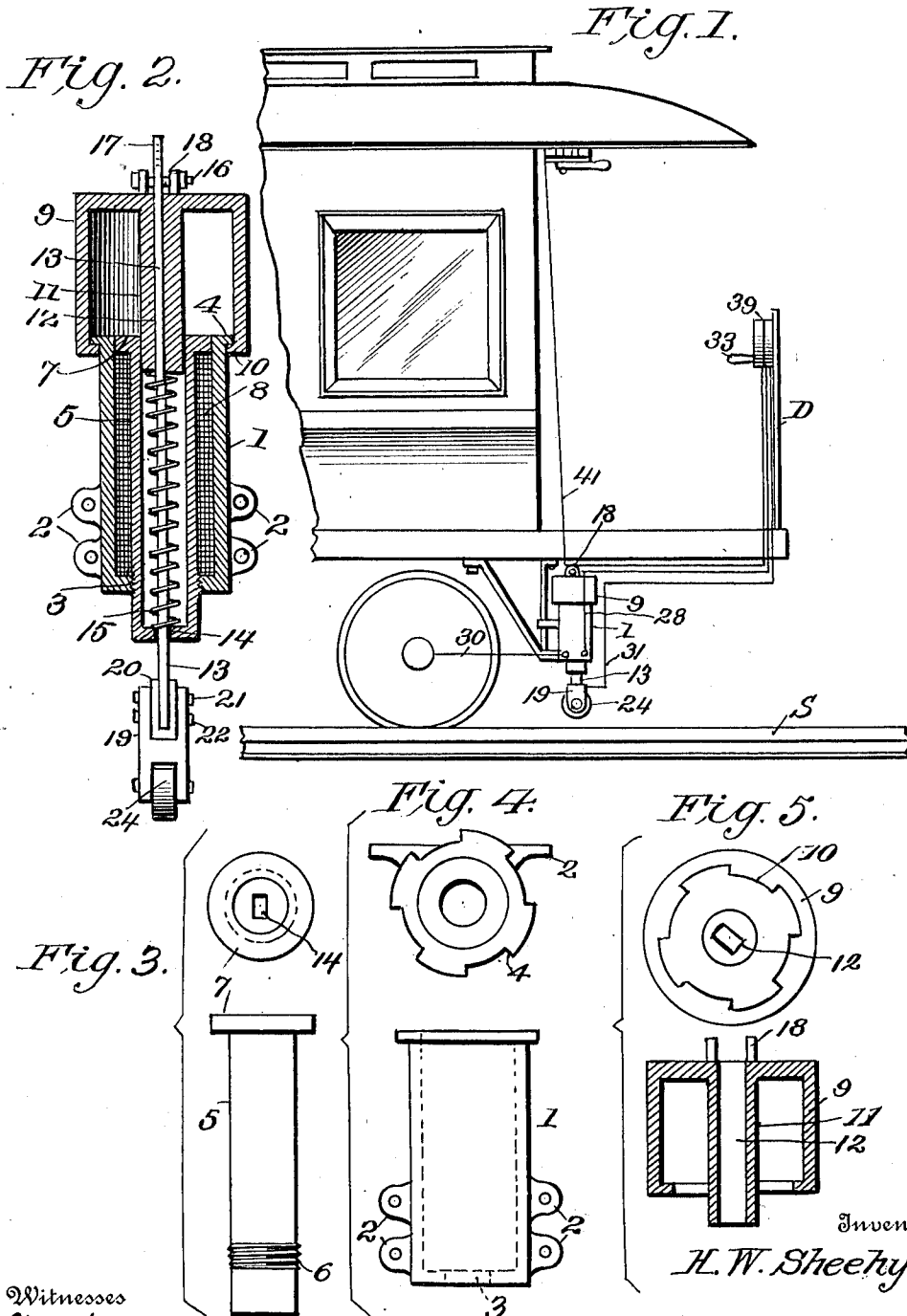


H. W. SHEEHY.
CIRCUIT CLOSING APPARATUS.
APPLICATION FILED MAY 25, 1910.

1,020,520.

Patented Mar. 19, 1912.

2 SHEETS—SHEET 1.



Witnesses
W. P. Woodson,
J. M. Fallin.

By

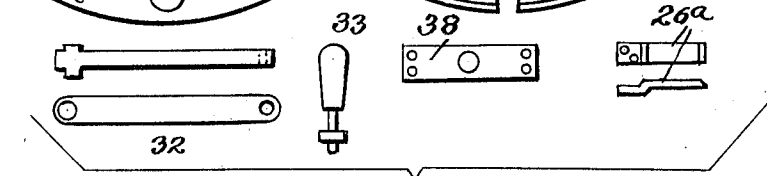
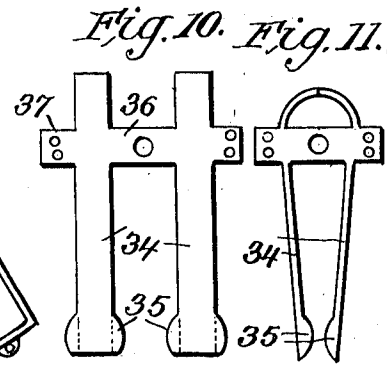
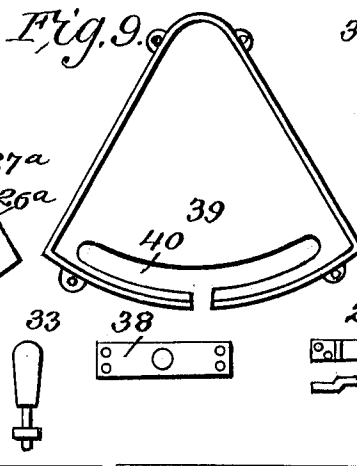
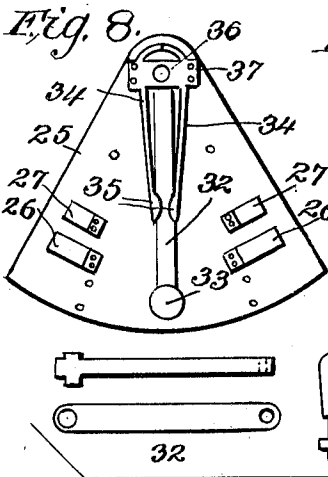
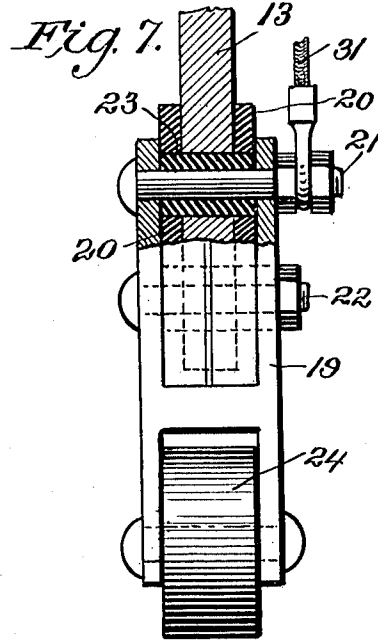
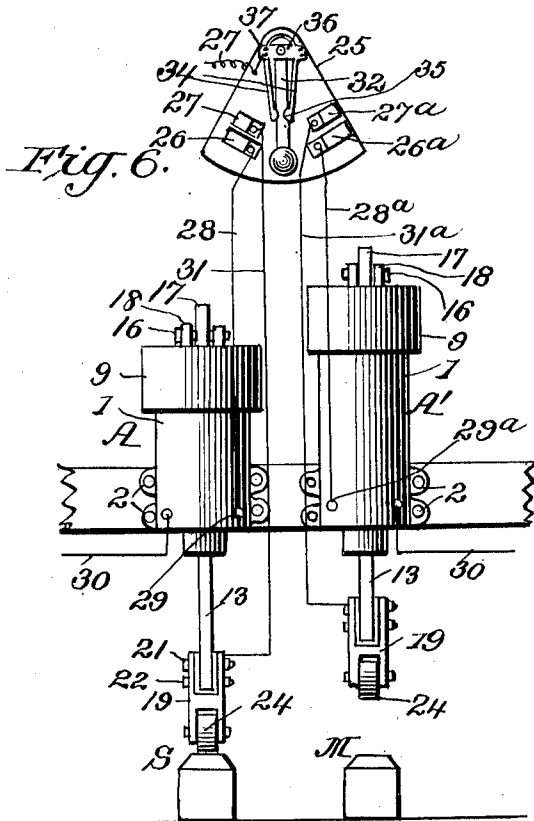
H. W. Sheehy, Attorney.

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2 SHEETS—SHEET 2.



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Fig. 12.

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UNITED STATES PATENT OFFICE.

HARRY W. SHEEHY, OF AKRON, OHIO.

CIRCUIT-CLOSING APPARATUS.

1,020,520.

Specification of Letters Patent.

Patented Mar. 19, 1912.

Application filed May 25, 1910. Serial No. 563,419.

To all whom it may concern:

Be it known that I, HARRY W. SHEEHY, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Circuit-Closing Apparatuses, of which the following is a specification.

This invention comprehends certain new and useful improvements in circuit controlling apparatus for use in connection with electric railway switches, the present invention being designed particularly for use with electrically operated street cars.

The invention has for its primary object a simple, durable and efficient magnetic circuit closing mechanism which will be positive in its action and under the control of the motorman of the car, and arranged to be actuated by him without leaving the platform, thereby avoiding the delays and consequent losses that are incidental to the ordinary hand-operated switches, which require either that a switchman be employed along the track, or that the motorman or conductor leave the car platform and work a switch while the car is stopped both before and after it has gone through the switch.

The invention has for a further object an improved mechanism of this character which may be easily applied to any ordinary or conventional type of street railway car without any material alterations therein, and which may be easily operated merely by the manipulation of a simple switch handle which may be secured to the car dashboard or otherwise located where it will be in convenient reach of the motorman.

The invention also has for its object a magnetic switch closing apparatus which embodies a single switch handle capable of operating two magnetically actuated circuit closing bars whereby either one or the other may be moved down into engagement with a conductor rail which forms a part of the electrically operated switch or frog actuating mechanism, the said handle being arranged to not only close the magnetic circuits so as to move the operating bars downwardly, but being also arranged to effect the closing of the switch operating circuits (including the conductor rails with which the operating bars contact), after the operating bar has been moved downwardly to an operative position. And the invention

also has for its object to generally improve this class of devices, render them simple in construction as well as durable and not liable to get out of order and to also render them more commercially desirable.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a side elevation of a portion of a car equipped with the improvements of my invention. Fig. 2 is a longitudinal sectional view of one of the electro-magnets, parts being shown in elevation. Fig. 3 illustrates in side elevation and top plan view part of the electro-magnet, as does also Fig. 4. Fig. 5 illustrates a top plan and longitudinal sectional view of a portion of another part of the magnet. Fig. 6 is a front elevation of the parts illustrating them in assembled relation to each other. Fig. 7 is an enlarged view partly in section and partly in front elevation of one of the parts for carrying the contact members. Fig. 8 is an elevation of part of the electric switch. Fig. 9 is a view of the cover-plate thereof. Figs. 10 and 11 are detail views of the spring-arms designed to return the switch-handle to neutral position, and Fig. 12 illustrates some of the details of the switch.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

It is to be understood that my invention is applicable for use with any type of electrically actuated switch or frog which includes as part of the actuating mechanism an electric circuit designed to be closed by parts carried by the car and including, for instance, conductor rails which may be mounted between the ordinary track-rails, one of said rails being designed to move the switch to a position in which the car will take the siding and the other rail being arranged to move the switch to a position where the car will take or continue on the main track. However, as the switch mechanism along the track forms no part of the

present invention, I have omitted any illustration or description thereof with the exception of the two conductor rails which I have designated S and M respectively, indicating that when the rail S is engaged by one of the operating bars carried by the car the switch or frog will be moved so the car can take the siding, and that when the conductor rail M is engaged by the other operating bar, the switch will be moved for the car to move onto or to continue on the main track, as the case may be. Coming then to the parts which form the basis of my present invention, A and A' designate two peculiarly constructed solenoids or electro-magnets which are carried by and secured upon any suitable part of the car. As these magnets are both substantially alike in construction and formation, a description of one of them will be sufficient. For example, the magnet A embodies a preferably cylindrical casing 1 which is secured to the car as by oppositely projecting pairs of apertured lugs 2, as shown, said casing being formed at its lower end with a screw-threaded opening 3, and being provided at its upper end with a plurality of equally spaced outstanding segmental lugs 4. A barrel 5 is designed to fit within the casing 1, said barrel being formed on its exterior wall intermediate of its ends with screw-threads 6, designed to engage the threads of the opening 3, whereby the lower end of the barrel will protrude to some extent below the bottom of the casing 1. The parts are preferably so proportioned that when they are thus connected the annular outstanding flange 7 which is formed on the upper end of the barrel lies substantially flush with the upper edge of the casing 1.

8 designates a magnetic coil which encircles the barrel 5 and preferably fills the space between the exterior wall of the barrel and the adjoining or interior wall of the casing 1, as clearly illustrated in Fig. 2, the coil extending from the flange 7 to the bottom of the casing 1. A cap 9 which is substantially cylindrical as shown, is adapted to fit over the top of the casing 1 with its inclosed barrel 5, said cap 9 being formed at its lower edge with inwardly extending segmental lugs 10 designed to interlock with the outstanding lugs 4 of the casing 1, so as to permit the cap to be slipped over the upper end of the casing and be given a slight turn to interlock the parts. The cap 9 is also formed with a centrally disposed and longitudinally extending stem 11, said stem being formed with a longitudinal opening 12 extending entirely therethrough and through the top of the cap, said opening being designed to receive an operating bar 13 which may be of any desired length, according to the requirements of the case.

The operating bar 13 extends entirely

through the stem 11 and downwardly entirely through the barrel 5, projecting out of the lower end of the barrel and through an opening 14 formed therein. A coil expansion spring 15 encircles the operating bar 13 and is mounted within the barrel 5, the lower end of the spring bearing against the bottom of the barrel and the upper end of the spring bearing against the inner or lower end of the stem 11, such end of the stem being received and guided in the upper end of the barrel 5, as shown. It will thus be understood that in the normal position of the parts with the magnet deenergized, the spring 15 will be permitted to exert its full tension to hold the cap 9 at the upper limit of its movement, that is, with the lugs 10 in engagement with the lugs 4. Upon the energization of the magnet, the stem 11 will serve as a core and be drawn downwardly so as to compress the spring and at the same time carry the operating bar 13 downwardly, it being noted that the operating bar is connected to the cap 9 by a bolt or pin 16 which passes through any one of the series of openings 17 formed in the bar at the upper end of the latter and through apertured ears 18 which are formed on the top of the cap 9.

The operating bar 13 is received at its lower end in the upper end of a fork 19, and is preferably incased in fiber insulating sections 20. The bar 13 is secured within the members of the fork by upper and lower transverse bolts 21 and 22, fiber insulating bushings 23 surrounding the bolts, as clearly illustrated in Fig. 7. The fork 19 carries a roller 24 which is journaled in the lower end of the fork and which is adapted for contact with the conductor rail.

The switch for controlling the circuits of the two electro-magnets A, A' comprises a base-plate 25 which is somewhat triangular in form in the present instance, as shown, said base being secured in any desired way and in a vertical position in the present instance, to some part of the car, as for example, the dashboard D. The base 25 has four contact members connected thereto, said members being arranged in pairs near the opposite side edges of the base and preferably embodying spring blades, as clearly illustrated in the drawings, having one end attached to the base and the other slightly offset therefrom. These contact members or blades are designated 26 and 26^a, and 27 and 27^a. A conducting wire 28 connects the contact member 26 with one end of the coil 8 of the magnet A, as at 29, and a conducting wire 28^a similarly connects the contact member 26^a with one end of the coil 8 of the magnet A', as indicated at 29^a. The other end of the two coils are grounded as by wires 30 connected thereto and to the car-truck. The contact member 27 is connected by a conductor wire 31 to the bolt 21 of one

of the forks 19, and the contact member 27^a is similarly connected by a wire 31^a to the bolt 21 of the other fork 19.

To close the various circuits, by the parts
5 of which have just been described, I have provided a switch handle 32 which is drilled at one end to carry an insulated hand-grip 33 and which is drilled at its opposite end and provided with trunnions by which it is
10 journaled on and supported for a laterally swinging movement on the base-plate 25. In the present embodiment of the invention the switch handle 32 is normally held in its neutral and substantially vertical position by means of spring arms 34 which receive
15 the handle, as shown, being preferably formed at their free lower ends with side flanges 35 to engage the front and rear edges of the handle and thereby prevent the spring arms from slipping out of proper engagement with the handle. The spring arms
20 34 may be formed as integral parts of a bearing strap 36, as best illustrated in Fig. 10, said strap being composed of spring metal and bent from the blank shape shown in Fig. 10 to the shape shown in Fig. 11, the
25 end 37 of the laterally projecting portion and connecting web of said strap being secured by screws or other fastening devices to the base-plate 25. The connecting web of the strap is formed with an opening or with a bearing for one of the trunnions of the switch handle 32, and another strap 38 is
30 connected to the base-plate and is formed with an opening forming a bearing for the other switch handle trunnion. A movement of the switch handle in one direction will first cause it to engage the contact member 26, and a continued movement of the switch
35 handle in the same direction will then cause it to subsequently engage the contact member 27. A movement of the switch handle in the opposite direction will first cause it to contact with the member 26^a and a continued
40 movement in this last named direction will cause the switch handle to contact with the member 27^a. This is due to the fact that the contact members 26 and 26^a are longer than the complementary members 27 and 27^a, extending inwardly toward the middle of the
45 base-plate farther than said members 27 and 27^a.

39 designates a cover or lid which is adapted to inclose the switch handle 32 and
50 its concomitant parts, said cover being formed with a curved slot 40 in which the hand-grip 33 is movable, and out of which it protrudes, the said cover preferably displaying at its ends the letters S and M, indicating the direction of movement of the switch-
55 handle to open the track to the siding or to the main line.

41 designates the feed-wire which may receive its current from any suitable source
60 of supply, as for instance, the same source

from which the car derives its propelling power, the said feed-wire being operatively connected to the switch-handle 32, and the current being thereby conducted through the contact members before described when any
70 of them are overlapped by the switch-handle.

From the foregoing description in connection with the accompanying drawings the operation of my improved circuit controlling apparatus will be apparent.

In the practical use of the mechanism when the motorman desires to actuate the switch, say for the siding, he will move the switch-handle in the indicated direction
75 which will first bring said handle into engagement with, say, the contact member 26. Whereupon, as is manifest, the current will flow from the feed-wire 41 through the contact member 26, through the conductor wire
80 28 and through the electro-magnet A, thereby energizing said magnet and causing the core or stem 11, and the cap 9 which carries it, to move downwardly, whereby to carry the operating bar of said magnet
85 downwardly and effect the contact of the corresponding roller 24 with the conductor rail S. A continued movement of the switch-handle 32 in the same direction will cause the current to flow through the contact
90 member 27, conductor wire 31 and the corresponding fork 19, the actuating circuit for the track switch being thereby closed and the switch or frog being thrown to open the track to the siding in any preferred
95 manner well-known to those skilled in the art to which my invention appertains, as for instance, by a mechanism substantially like or of the type corresponding to that illustrated in my prior Letters Patent of
100 the United States, No. 949,404, issued to me February 15, 1910. Obviously, a movement of the switch-handle in the opposite direction will first energize the electro-magnet
105 A' and then close the actuating circuit for moving the switch-point in a direction to open the track to the main line. In either event, it is clear that there is no current in the fork and wheel until after it has made the proper connection with the conductor
110 rail, all sparking at the point of contact being thereby prevented. In the reverse movement to open the circuit which operates the switch-point or fork, the latter will be opened before the magnet circuit, and all liability to the formation of arcs and destructive burning of the contact will be
115 precluded both when the circuits are being closed and when they are being opened. In order to open the circuits, it is only necessary for the operator to release the switch-
120 handle 32, whereupon the spring arms 34 will act to swing the handle back to its middle or neutral position.

In the preferred manner of assembling
130

the parts, the coil 8 is first placed in the casing 1, the barrel 5 is then screwed in place with its upper end flush with the upper edge of the casing, the spring 15 is then placed in the barrel, and the top or cap 9 is slipped over the upper end of the casing, the cap being given a partial turn so as to interlock the lugs 4 and 10 and adjusted for the alinement of the opening in the stem 11 and the opening 14 in the lower end of the barrel 5. The operating bar 13 is then equipped with the fork 19 and its lower end is inserted up through the opening 14 and opening 12 and adjusted at its upper end by the passage of the bolt 16 through any one of the apertures 17 in the upper end of the operating bar.

Having thus described the invention what is claimed as new is:—

1. In an electrically actuated railway switch operating mechanism, an actuating circuit including a conductor, a contact-bar arranged to engage said conductor to close the circuit, an electro-magnet having a movable core carrying said contact-bar, an electric circuit in which the electro-magnet is included, and a switch-handle arranged to close the circuit for the electro-magnet prior to and distinct from the closing of the first named circuit which is also effected by said switch-handle.

2. In an electrically actuated railway switch operating mechanism, a circuit closing apparatus including a conductor, a contact-bar arranged to engage said conductor to close the switch actuating circuit, said circuit including a terminal, an electro-

magnet having a movable core carrying said contact-bar, an electric circuit for said magnet including a terminal, and an electric switch embodying a handle movable in a definite plane and arranged to engage the last named terminal prior to the first named terminal for the purpose specified.

3. In an electrically actuated railway switch operating mechanism, an actuating circuit including a conductor, means for engaging said conductor to close said circuit, an electro-magnet having a movable core carrying said conductor engaging means, an electric circuit in which the electro-magnet is included, and means for first closing the circuit of the electro-magnet and for subsequently closing a circuit through the conductor and conductor engaging means after the latter has been moved into engagement with the conductor by the electro-magnet.

4. In an electrically actuated railway switch operating mechanism, a conductor, a contact bar arranged to engage said conductor, an electro-magnet having a movable core carrying said contact bar, and means controlling a circuit through the electro-magnet arranged to effect the engagement of the contact bar with the conductor and to subsequently close a circuit in which the conductor and contact bar are included.

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

HARRY W. SHEEHY. [L. S.]

Witnesses:

FRED WILHELM,
CHARLES HEBBICK.