No. 814,535. PATENTED MAR. 6, 1906.

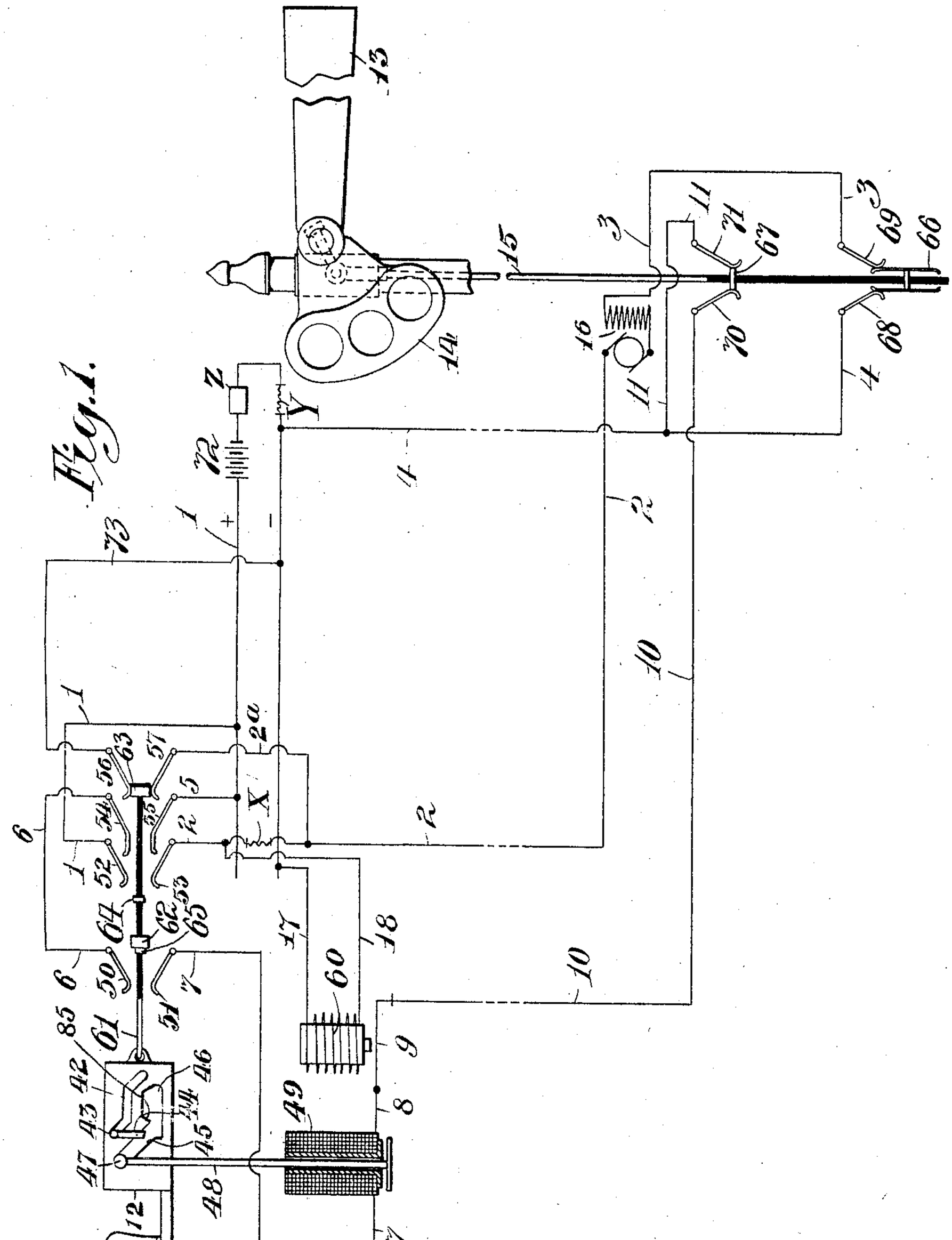
L. GRIFFITH.

ELECTRIC SIGNAL APPARATUS.

APPLICATION FILED OCT. 28, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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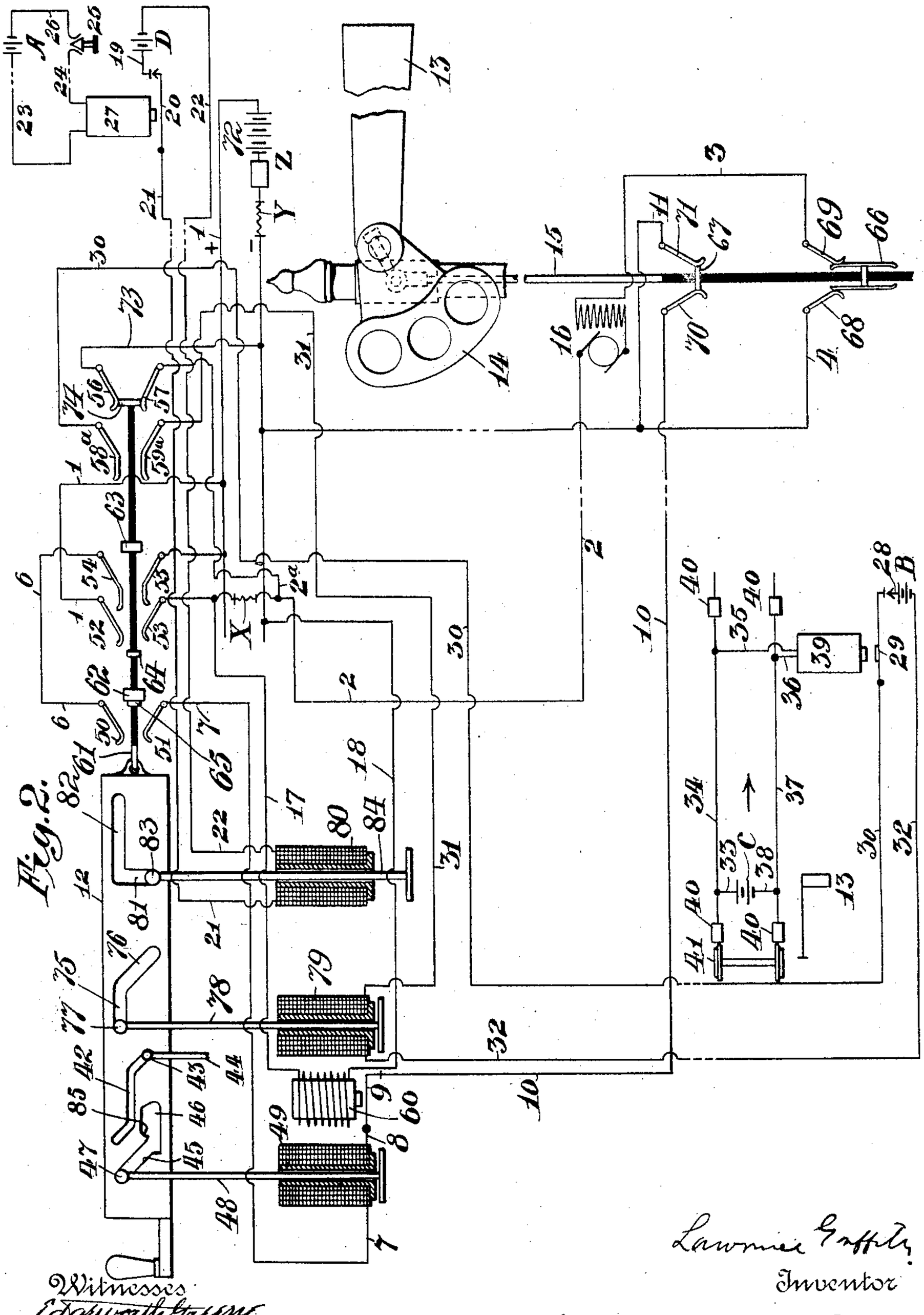

Fig. 2.

UNITED STATES PATENT OFFICE.

LAWRENCE GRIFFITH, OF YONKERS, NEW YORK.

ELECTRIC SIGNAL APPARATUS.

No. 814,535. Specification of Letters Patent. Patented March 6, 1906.

Application filed October 28, 1904. Serial No. 230,360.

To all whom it may concern:

Be it known that I, LAWRENCE GRIFFITH, a citizen of the United States of America, residing in the city of Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Electric Signal Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to electric apparatus for railway-traffic-controlling devices, and is shown and described as applied to a semaphore. Its objects are to provide apparatus of the character shown in my United States Letters Patent No. 776,238 and my pending application for United States Letters Patent, Serial No. 151,578, filed April 8, 1903, with additional features and adaptations.

In order that my invention may be clearly understood, I shall first describe in detail the mode in which I carry the same into practice and then point out the novel features of the invention in the claims, reference being had to the accompanying drawings, forming part of the specification, in which similar parts are designated by like characters in both views.

Figure 1 is a diagrammatic view of the invention as applied to a railway-semaphore, and Fig. 2 is a similar view showing two additional controlling devices for the operator's bar or lever.

12 is the operator's bar or lever in the tower, and 13 the semaphore-blade. The semaphore-blade is normally held at "danger" by the counterweight 14 and is turned to "safety" by the upward movement of the rod 15. Said rod is actuated by electric motor 16. As the motor need move the rod 15 in only one direction, a single-wound motor may be used instead of the double-wound motor shown in my said two pending applications. It will be understood that suitable devices known to the art are employed for connecting the motor with rod 15 and for holding the semaphore-blade at "safety" until the operator breaks the electrical connection in the tower.

The operator's bar 12 may have ordinary tappet-slot 42, which coöperates with a roller 43, attached to the tappet 44, working in the ordinary interlocking board. Another slot in the bar has the inclined portion 45 and the horizontal portion 46. In this slot is a roller 47, connected by rod 48 with the armature of indicating-solenoid 49 or other electric unit. Fastened to the frame which supports the bar 12 and insulated therefrom are four pairs of contact-springs, as follows: 50 and 51, 52 and 53, 54 and 55, 56 and 57. Fastened to and coöperating with the bar 12 is the rod 61. Bridge 63 is securely fastened to rod 61 and moves with it. Bridge 62 is loosely attached to rod 61 and is moved by the stops 64 and 65, coming in contact with it.

Motor 16 is operatively connected with rod 15, so as to raise said rod as said motor revolves. Attached to and coöperating with said rod 15 are two bridges 66 and 67, bridge 66 being adapted to make and break the circuit between the contact-springs 68 and 69 and bridge 67 being adapted to make and break the circuit between the contact-springs 70 and 71.

It will be understood that means well known to the art are employed to maintain the rod 15 in its elevated position, and therefore the semaphore-blade 13 at "safety," until the operator breaks the electric connection holding said rod and semaphore-blade in that position or otherwise releases them.

From any suitable source 72 of electric energy, which may be a primary battery, a storage battery, or a dynamo, a positive common wire 1 connects with contact-spring 52. From contact-spring 53, which is the mate of 52, wire 2 leads to motor 16 and thence by wire 3, contact-springs 69 and 68, bridge 66, and wire 4 back to the battery. It therefore will be readily understood that when bridge 63 is moved into contact with springs 52 and 53 (bridge 62 being at the same time moved by stop 64 into contact with springs 50 and 51) motor 16 will be energized to move rod 15 upward, and therefore the semaphore-blade 13 to "safety." At the same time bridge 67 will be moved from between contact-springs 70 and 71 and bridge 66 from between contact-springs 68 and 69. At this time roller 47 has been moved to the right-hand end of the horizontal portion 46 of the slot 45 46. In returning the semaphore-blade 13 to danger position the operator moves bar 12 until the roller 47 meets the other end of the horizontal portion of the slot 45 46 and by doing so breaks the electric connection, whereby the semaphore-blade 13 is held at "safety," and releases the semaphore-blade 13 and allows its counterweight 14 to carry the same to "danger" and in doing so make connection by bridge 67 between contact-springs 70 and 71 and by bridge 66 between contact-springs 68

and 69. At the same time bridge 63 is removed from between contact-springs 52 and 53, thus deënergizing magnet 60, and makes connection between contact-springs 54 and 55. In this position of the parts the solenoid or magnet 49 is energized from the battery or source of electric energy 72 by wire 5, contact-spring 55, bridge 63, contact-spring 54, wire 6, contact-spring 50, bridge 62, contact-spring 51, wire 7, magnet or solenoid 49, wires 8, 9, and 10, contact-spring 70, bridge 67, contact-spring 71, wire 11, and wire 4 back to the battery. Thereby the armature of the magnet or solenoid 49 is attracted and the rod 48 raised, carrying with it roller 47, which, coöperating with the inclined part 45 of the slot 45 46 moves the bar 12 back to its normal position, as shown in Fig. 1, and breaking the connection between contact-springs 50 and 51, as the stop 65 moves the bridge 62 out of position between said contact-springs, thus automatically cutting off the source 72 of electric energy from the indication apparatus as the indicator operates to indicate. The action of the electric unit 49 is of course an indication to the operator that the semaphore-blade has been returned to "danger." Bridge 63 makes contact between springs 54 and 55 immediately upon its breaking contact between springs 52 and 53, so that should there be any accidental return to battery in the circuit of solenoid 49 while bridge 67 is out of contact between springs 70 and 71 said solenoid 49 will be energized and roller 47 will be forced against shoulder 85 of horizontal portion 46 of slot 45 46, thereby preventing the operator from further moving bar 12 until the defect has been remedied.

It is very important that the indicating-solenoid be not allowed to act should there be a foreign or accidental current in the circuit connected with the motor 16. I therefore provide a safety-magnet or electric unit 60, which when energized is adapted to break connection between wires 9 and 10, or said safety-magnet may be adapted to lock and unlock bar 12. Said safety-magnet is connected in parallel with said circuit by wires 17 and 18, and it will be understood that the circuit through said safety-magnet is made and broken by bridge 63 coöperating with contact-springs 52 and 53 in the same manner as the motor-circuit. The safety-magnet 60 is energized whenever current is on the circuit of motor 16, so that always when current is supplied to the motor 16 the circuit of the solenoid 49 is broken. When the circuit of motor 16 is broken and the apparatus is therefore ready to indicate, the magnet 60 being deënergized will allow connection to be made through the solenoid 49, so as to allow it—said solenoid 49—to operate as an indicator. The bridge 63, coöperating with contact-springs 56 and 57 and wires 73 and 2^a, provide a path back to the battery if there should be any accidental current or cross on the circuit of the motor 16 when the parts are in normal position, as shown in Fig. 1.

X and Y are fuses, and Z a cut-out box for breaking the circuit by an excess of electric energy.

Referring now to Fig. 2, there are two additional devices either one of which, or both, may be used with those shown in Fig. 1 and above described. I first will describe what I call the "actuating-solenoid" or "electric unit" and then the locking-solenoid or electric unit. Bar 12 is provided with a slot 75 76, and coöperating with said slot is roller 77, connected by rod 78 with armature of actuating-solenoid 79. The frame supporting the bar 12 has fastened to it in addition to those shown in Fig. 1 contact-springs 58^a and 59^a. Rails 34 and 37 are insulated by joints 40 from the rest of the track and are connected by wires 38 with battery or source of electric energy C. The wheels 41 of a train when between the insulated joints 40 are adapted to short-circuit battery C, thus deënergizing magnet 39. The deënergizing of magnet 39 will in the ordinary way make connection between wires 30 and 32, thereby actuating solenoid 79, which will be energized as follows: Bar 12 has been pulled by the operator and the semaphore-blade thrown to "safety," as above described, and bridge 74 makes connection between contact-springs 58^a and 59^a. Therefore current will flow from battery B, through wires 29 30, contact-springs 58^a and 59^a, bridge 74, wire 31, solenoid 79, and wire 32 to battery B. Thereby armature of solenoid is operated to raise rod 78, carrying with it roller 77, which coöperates with the inclined part 76 of slot 75 76, moves the bar 12 back to the position in which it will return the signal to "danger" and from which it will be thrown to its full normal position by the indicating electric unit 49, as above described.

It is sometimes advantageous to provide means whereby bar 12 may be locked in normal position until released by apparatus which may be under control of a separate or distant operator. To this end I provide the locking-solenoid or electric unit 80. Bar 12 is provided with a slot 81 82, and coöperating with said slot is roller 83, connected by rod 84 with armature of locking-solenoid 80. Battery or source of electric energy A is in circuit with magnet 27 through wires 23, 24, and 26, said circuit being adapted to be made or broken by switch or bar 25. Battery or source of electric energy D is in circuit with locking-solenoid 80 as follows: wires 19, 20, and 21, solenoid 80, and wire 22. It will be understood that when switch or bar 25 is operated to energize magnet 27 connection will be made between wires 19 and 20, and thereby the solenoid 80 energized, raising roller 83 in the vertical portion 81 of slot 81 82, and

thereby releasing or unlocking bar 12, so that it may be moved by its operator.

It will be understood that by proper wiring batteries A, B, and D may be dispensed with and electric energy obtained from a common source 72.

The operator's bar 12, with its rod 61 and bridges and contact-springs, constitute an electric switch or circuit-controller. The bridge 63 is idle with reference to the pair of contact-springs 54 55 as it moves in one direction, but is operative with reference to said pair of contact-springs as it moves in the reverse direction.

What I claim, and desire to secure by Letters Patent, is—

1. In electric signal apparatus for railways comprising an electric indicator and an electric motor or unit for moving the signal, electric means separate from the indicator for preventing the action of the indicator while there is electric energy supplied to said motor.

2. In electric signal apparatus for railways comprising an electric indicator and an electric motor or unit for moving the signal, means for preventing the action of the indicator while there is electric energy supplied to said motor which consists of a relay adapted to break the electric connection of said indicator at said times.

3. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator.

4. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor, and for setting said apparatus in operative position for said indicator, with means for preventing the action of the indicator while there is electric energy supplied to said motor.

5. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator, with electrically-controlled means independent of the operator of said apparatus for locking and unlocking the same.

6. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator, with means for preventing the action of the indicator while there is electric energy supplied to said motor, with electrically-controlled means independent of the operator of said apparatus for locking and unlocking the same.

7. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator, with means for shunting current on the circuit of said motor to battery when the apparatus is at normal position.

8. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator, with means for preventing the action of the indicator while there is electric energy supplied to said motor, and means for shunting current on the circuit of said motor to battery when the apparatus is at normal position.

9. In electric signal apparatus for railways comprising an electric indicator, automatic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator, with electrically-controlled means independent of the operator of said apparatus for locking and unlocking the same, and means for shunting current on the circuit of said motor to the battery when the apparatus is at normal position.

10. In electric signal apparatus for railways comprising an electric indicator, auto-

matic means for cutting off the source of electric energy from the indicator as the indicator operates to indicate, and an electric motor or unit for moving the signal, the combination of means controlled by a moving train for returning the signal to normal position after it has been moved by said motor and for setting said apparatus in operative position for said indicator, with means for preventing the action of the indicator while there is electric energy supplied to said motor, with electrically-controlled means independent of the operator of said apparatus for locking and unlocking the same, and means for shunting current on the circuit of said motor to battery when the apparatus is at normal position.

11. In an electric switch or circuit controller the combination of three pairs of stationary contact-points with a movable bridge or circuit-maker adapted to make a closed circuit with two of said pairs of points, one upon each limit of its stroke, and to make a closed circuit with the other of said pairs of points upon its movement in one direction and not in the other direction.

12. In an electric switch or circuit controller the combination of two pairs of stationary contact-points with a movable bridge or circuit-maker adapted to make a closed circuit with one of said pairs of points upon the limit of its stroke in one direction and to make a closed circuit with the other of said pairs of points upon its movement in one direction and not in the other direction.

In testimony whereof I have hereunto set my hand this 27th day of October, 1904.

LAW. GRIFFITH.

In presence of—
C. W. WESTON, Jr.,
H. V. N. PHILIP.