No. 832,174. PATENTED OCT. 2, 1906.

J. D. TAYLOR.

# RAILWAY SIGNALING APPARATUS.

APPLICATION FILED JAN. 22, 1904.

2 SHEETS—SHEET 1.

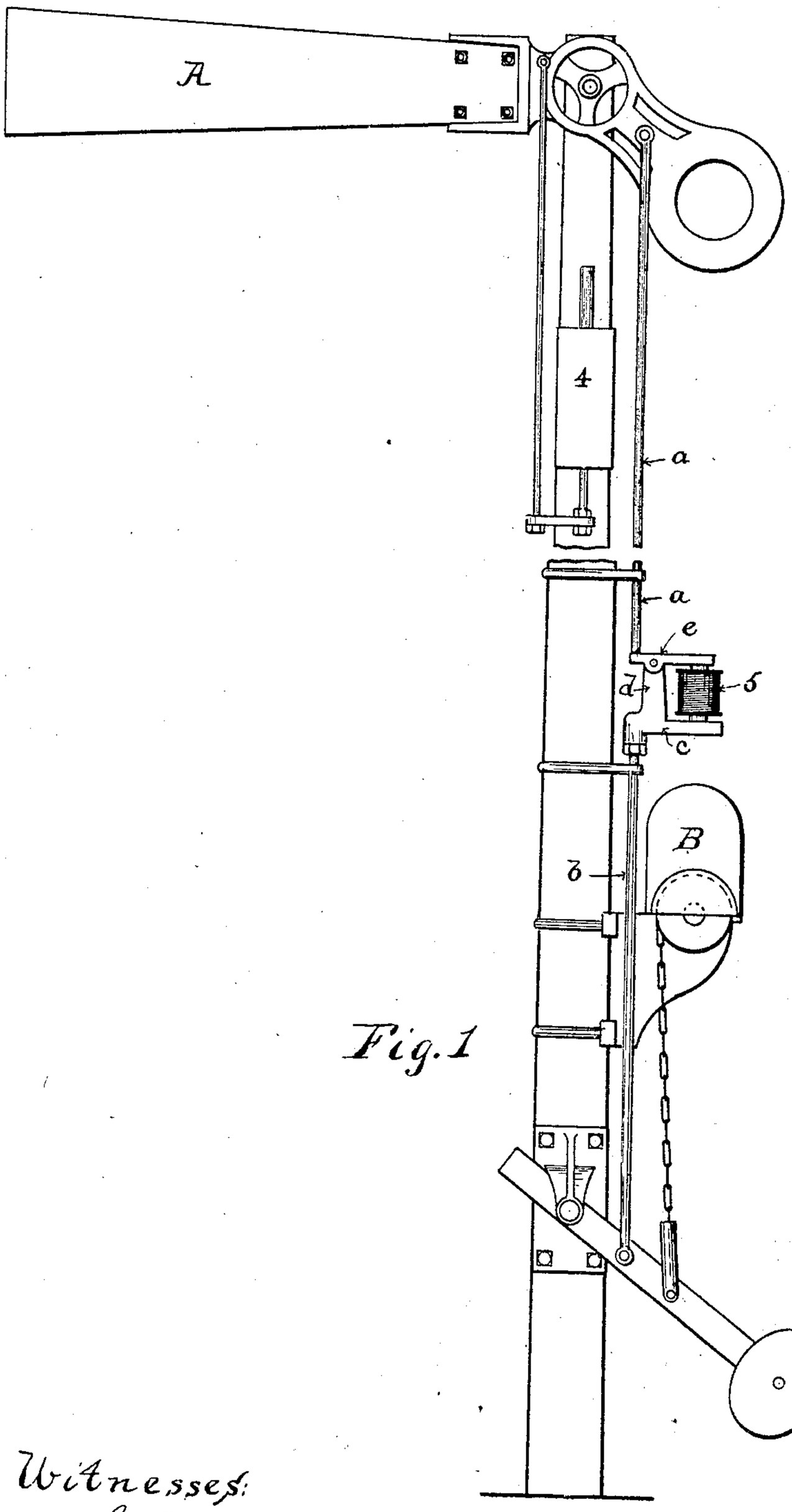


Fig. 1

Witnesses:
S. Brown
E. F. Branch.

Inventor:
John D. Taylor
by his Attorneys,
Macomber & Ellis

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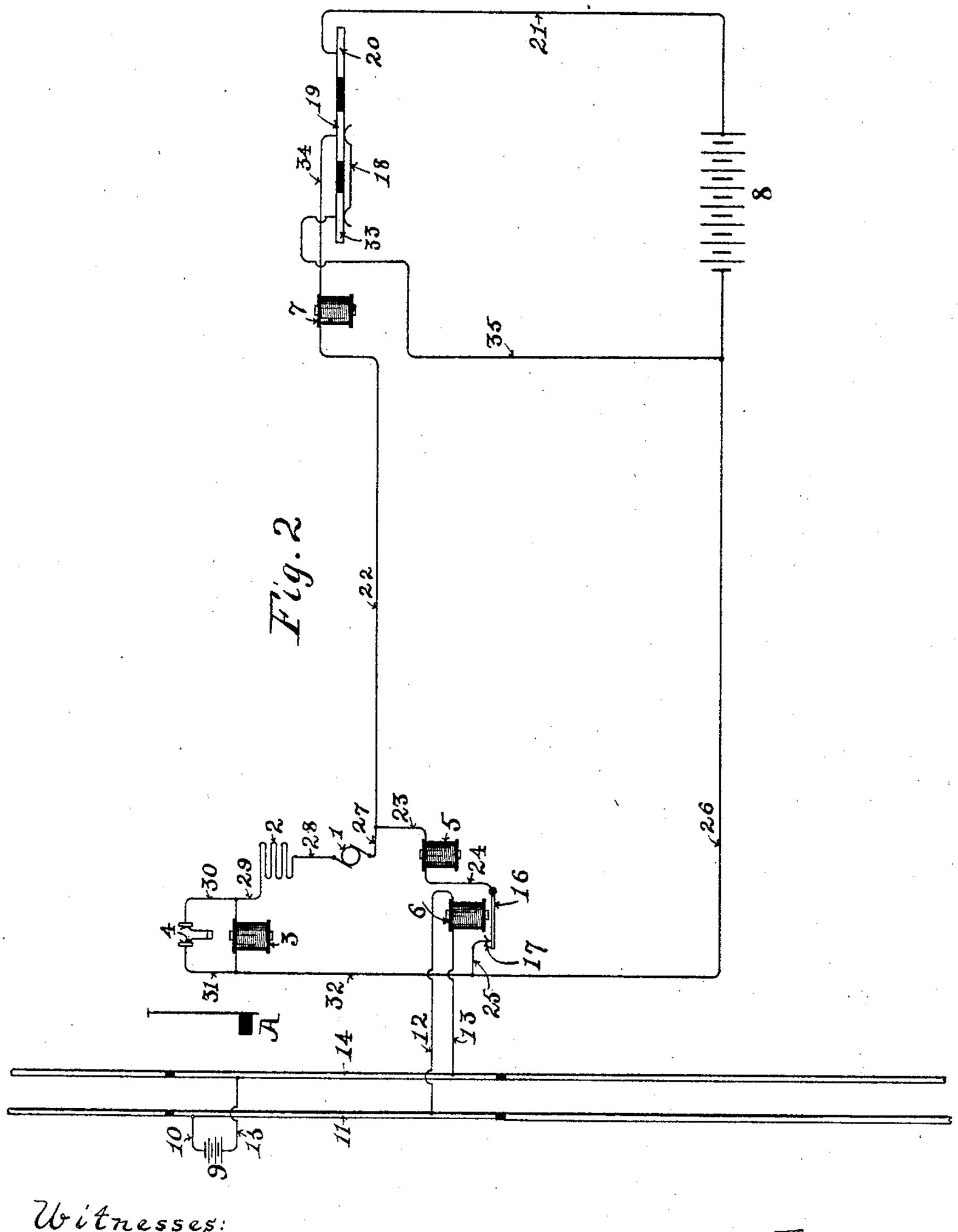


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# UNITED STATES PATENT OFFICE.

JOHN D. TAYLOR, OF BUFFALO, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL RAILWAY SIGNAL COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

## RAILWAY SIGNALING APPARATUS.

No. 832,174. Specification of Letters Patent. Patented Oct. 2, 1906.

Application filed January 22, 1904. Serial No. 190,232.

*To all whom it may concern:*

Be it known that I, JOHN D. TAYLOR, of Buffalo, New York, have invented certain new and useful Improvements in Railway Signaling Apparatus, of which the following is a full, clear, and exact description.

My invention relates to railway signaling apparatus, and more particularly to improvements in mechanism and arrangement of circuits for returning the signal to normal before the controller is put at indication and at the same time secure dynamic indication when the controller is put at indication.

This invention is furthermore an improvement upon the devices of my former patents, No. 516,903, March 20, 1894; No. 554,097, dated February 4, 1896; No. 605,359, reissued as No. 11,983 May 6, 1902, and No. 707,182, issued August 19, 1902.

I carry out my invention by the employment of a "slotted signal," so-called, electromagnetic control of the connections between the signal and the counterweight, a track-relay, and the arrangement of circuits, as herein described.

In the drawings herewith I have shown in Figure 1 an elevation of a signal equipped with my invention and in Fig. 2 a diagram of the circuits.

I have shown only a single signal operated by the signal-motor; but it will be understood that a plurality of signals may be operated by a single motor by the employment of a plurality of slot-magnets and proper electrical connections.

Referring to Fig. 1, A is a signal-blade actuated by a rod *a*. B is the actuating mechanism consisting of a motor and a brake-magnet, fully described in my said patent No. 516,903. By means of the usual chain and sheave connections movement is communicated to the counterweight-rod *b*. Mounted rigidly upon the upper end of the rod *b* is a bracket *c*, having a pivot-post *d*, in which is pivoted a lever-arm *e*. The rods *a* and *b* are properly supported in guide-bearings secured to the signal-post. Mounted upon the bracket *c* is a magnet 5. The outer arm of the lever *e* acts as an armature and is governed by this magnet 5. The inner and shorter arm of the lever engages under the lower end of the rod *a*, or, as is more commonly the case, it may engage in a slot in the rod *a* and hold said rod by contact with a shoulder in such slot. If now the magnet 5 is energized, so as to hold the arm *e* horizontal and in engagement with the rod *a* and the driving mechanism at B is set in motion, the counterweight will be raised, the rod *b* and the bracket *c* will be moved bodily upward, and the arm *e* in engagement with the rod *a* will move said rod *a* upward, and the signal A will be set at "safety." If while in that position the magnet 5 is deënergized, the arm *e* will release the rod *a*, and the signal A will go to "danger" by gravity. If thereafter the counterweight is released, the bracket *c* and connected parts will return to the position shown in the drawings, and the arm *e* will again engage the end of the rod *a*

By referring to Fig. 2 I will now describe the manner in which these several movements are effected. 1 is the armature and 2 is the field of the signal-motor. 3 is the brake-magnet for holding the signal at "safety" when energized, as fully described in my said Patent No. 516,903, and 4 is the snap-switch for shunting the current through said brake-magnet, fully described in my said Patent No. 707,182. 5 is the magnet governing the pivoted arm *e*, and 6 is the track-relay magnet. 7 is the indication-magnet, fully described in my said patent reissued, No. 11,983. 8 is a source of electric energy, and 9 is a gravity battery furnishing current to the track-relay circuit. The rails are insulated, as shown, in the usual manner.

I will now describe the operation by reference to the parts indicated and to the circuits. With no train upon the insulated section of the track the battery 9 maintains current through the wire 10, rail 11, wire 12, magnet 6, wire 13, rail 14, and wire 15. This energizes the magnet 6 and holds the switch-arm 16 against the contact 17. If now it is desired to set signal A to "safety," the brush 18 is put in electrical connection with the contacts 19 and 20. This closes a circuit of the battery 8, so that current flows from battery 8 through wire 21, contact 20, brush 18, contact 19, wire 34, magnet 7, wires 22 23, magnet 5, wire 24, switch-arm 16, contact 17, wires 25 and 26, back to battery 8. This energizes the magnet 5 and holds the arm *e* against the rod *a*. While sufficient current flows through the path indicated to energize

the magnet 5, current also passes from the wire 22 through wire 27, motor-armature 1, wire 28, field-coils 2, wires 29 30, snap-switch 4, wires 31, 32, and 26, back to battery 8. This energizes the motor, and through the connections described the signal A is put at "safety." Near the end of this movement the current is shunted through the magnet 3 by the snap-switch 4, as fully described in my said patents. If while the mechanism is in this position a train enters upon the insulated section of the track 11 and 14, the battery 9 will be short-circuited through the axle and wheels of the train and the magnet 6 will be deënergized. This will allow the switch-arm 16 to open by gravity, and the circuit from the battery through wire 23, magnet 5, wire 24, switch-arm 16, contact 17, and wire 25 will be broken. This will deënergize the magnet 5 and the arm *e* will be freed and the rod *a* will be free to fall and the signal A will go to "danger" by gravity. This is done independent of any movement of the brush 18 of the controller by the operator and before any indication has been given, thus setting the signal A at "danger" whether the operator has moved his lever or not. If now the operator moves the lever on the controller to "danger," the brush 18 will make electrical connection with the contacts 19 and 33 and break the electrical connection between the contacts 19 and 20. This breaks the battery-circuit and deënergizes the magnet 3 and establishes the indication-circuit and allows the counterweight to descend by gravity. This movement of the counterweight rotates the motor-armature 1 (through the interposed mechanism) in the opposite direction, and said motor acting as a generator causes current to flow from said armature 1 through wires 27 22, indication-magnet 7, wire 34, contact 19, brush 18, contact 33, wires 35 26 32 31, snap-switch 4, wires 30 29, field-coils 2, wire 28, back to motor-armature 1. This energizes the indication-magnet and gives the proper indication, and at the same time the arm *e* falls to position of engagement under the rod *a* ready for the next movement. If, on the other hand, the operator desires to set the signal at "danger" again after having set the same to "safety" when no train has entered the insulated sections 11 and 14, he may do so by moving the brush 18, as above described, and the rod *a* will descend by gravity with the rod *b*.

It will thus be seen that while I employ the invention of my former patent, No. 554,095, to obtain dynamic indication I am enabled to separate the movement of the signal-blade to "danger" and the movement of the motor to give indication, thus removing from the operator the responsibility of immediately setting the signal to "danger" after a train has passed.

It will be evident that I may employ the snap-switch 4, actuated by a rod moved by the signal proper, as shown in the drawings, and also an identical snap-switch actuated by the counterweight-rod *b*, both of said switches being situated between the wires 30 and 31, so that current will be held through the brake-magnet 3 until both switches are in a closed position. While I do not claim this construction as part of the invention, I describe it herein, since it may be found desirable not to release the brake-magnet when the track-relay has operated and depend upon the current energizing the motor to hold the current through the brake-magnet until the operator puts his lever back to normal. It will also be evident that I may actuate the snap-switch 4 by the counterweight-rod *d*, if so desired.

Having thus described my invention and its method of operation, what I claim is—

1. In combination with a source of energy, a signal, a motor, a controller, an indication-magnet, electromagnetic means for holding said signal at safety, a counterweight actuated by said motor, a rod actuating the signal-blade, and electromagnetic means for engaging and disengaging a rod of said signal-blade with a rod of said counterweight, whereby said signal-blade may be returned to normal, and whereby subsequently said counterweight may be returned to normal and give the proper indication, substantially as and for the purposes set forth.

2. In combination with a signal, a motor, a source of energy, a controller, an indication-magnet, a brake-magnet, an operating-wire and an indicating-wire, a shunt-circuit around said motor and said brake-magnet, a switch in said shunt-circuit, an electromagnet in said shunt-circuit, a rod connected to said signal-blade, a rod connected to the counterweight of said signal, a lever-arm engaging said rods and governed by said magnet in said shunt-circuit, a track-relay circuit, a battery for said circuit, and a magnet in said track-relay circuit governing said switch in said shunt-circuit, whereby, upon the energizing of said motor, current is carried through said magnet in said shunt-circuit, causing said lever to hold said rods in engagement, and whereby said signal is held at reverse by said brake-magnet, and whereby said shunt-circuit is broken through the short-circuiting of said track-relay circuit by an approaching train, thus permitting said signal-blade to go to normal, whereby, upon the reversal of the controller, said counterweight is permitted to fall, and by its movement rotate said motor-armature to give dynamic indication through said indication-magnet, substantially as and for the purposes set forth.

3. In combination with a slotted signal, an electromagnetically-governed lever for con-

necting and disconnecting the rods of said slotted signal, a source of electric energy, a controller, operating and indicating wires, a motor, a brake-magnet, a shunt-circuit, and a magnet in said shunt-circuit governing said lever, a switch in said shunt-circuit, means for opening and closing said switch, and an indication-magnet, substantially as set forth, for the purpose of electromagnetically engaging the parts of said slotted signal by current through said shunt-circuit, moving said signal by energizing said motor, returning the signal-blade to normal by breaking said shunt-circuit, returning said counterweight to normal by breaking the main operating-circuit, producing dynamic indication through a closed circuit including said motor, said indication-magnet, and said controller by rotation of said motor, due to the fall of said counterweight, substantially as and for the purposes set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN D. TAYLOR.

Witnesses:
GEO. L. HAGER,
A. W. MACOMBER.