No. 827,054. PATENTED JULY 24, 1906.

C. P. BREESE.

RAILWAY SIGNALING SYSTEM.

APPLICATION FILED AUG. 11, 1902.

2 SHEETS—SHEET 1.

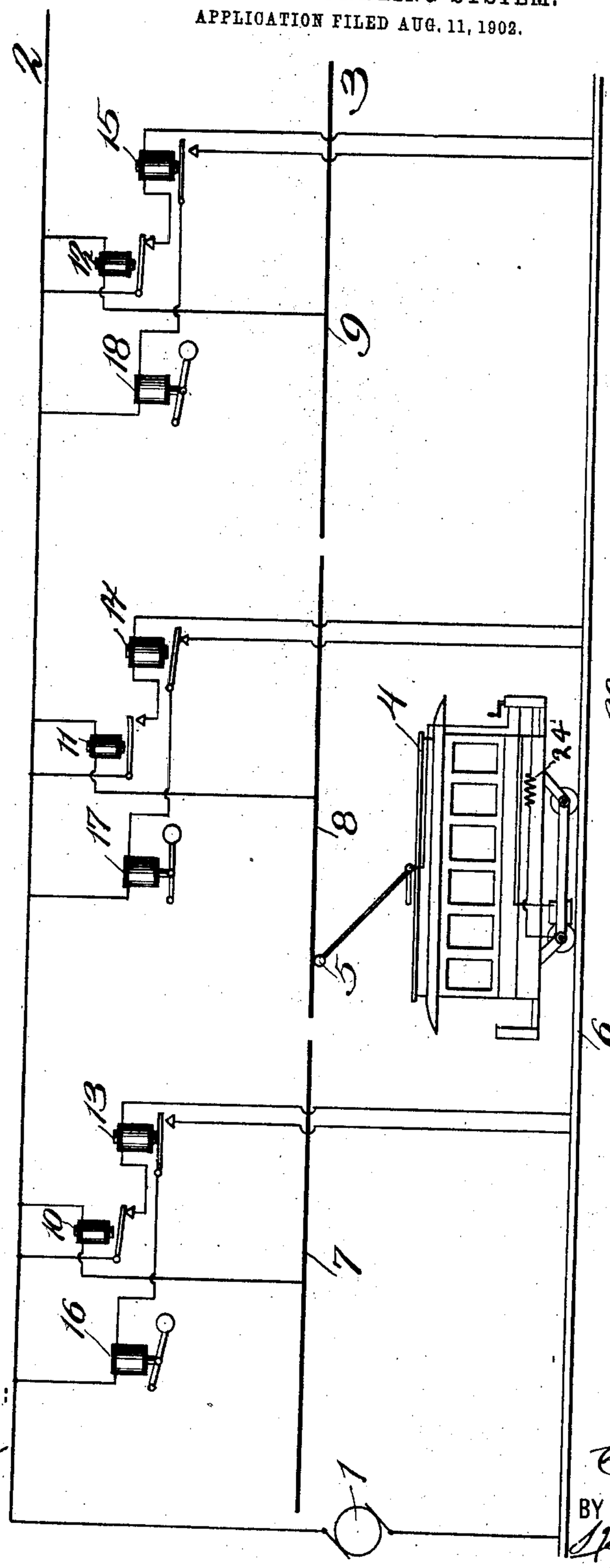

Fig. 1.

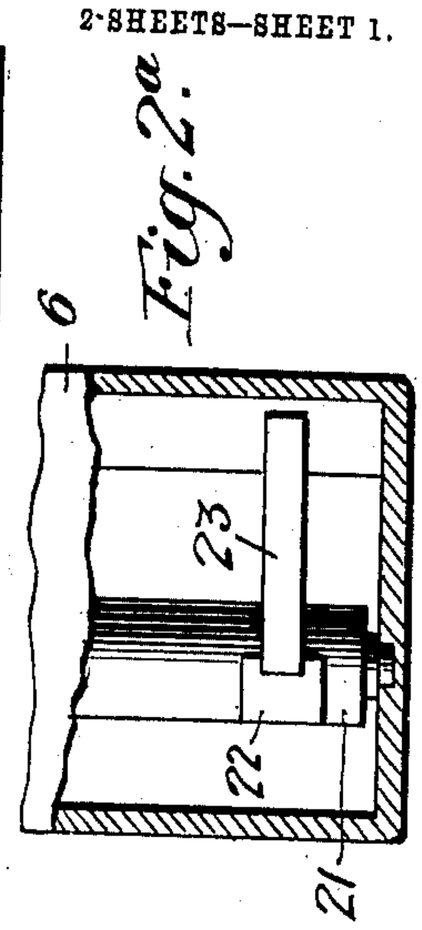

Fig. 2a.

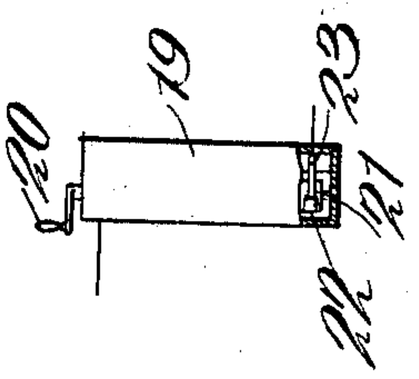

Fig. 2.

WITNESSES:

John O. Semple

Sidney Mann

INVENTOR

Charles P. Breese

BY

Kenyon & Kenyon

ATTORNEYS

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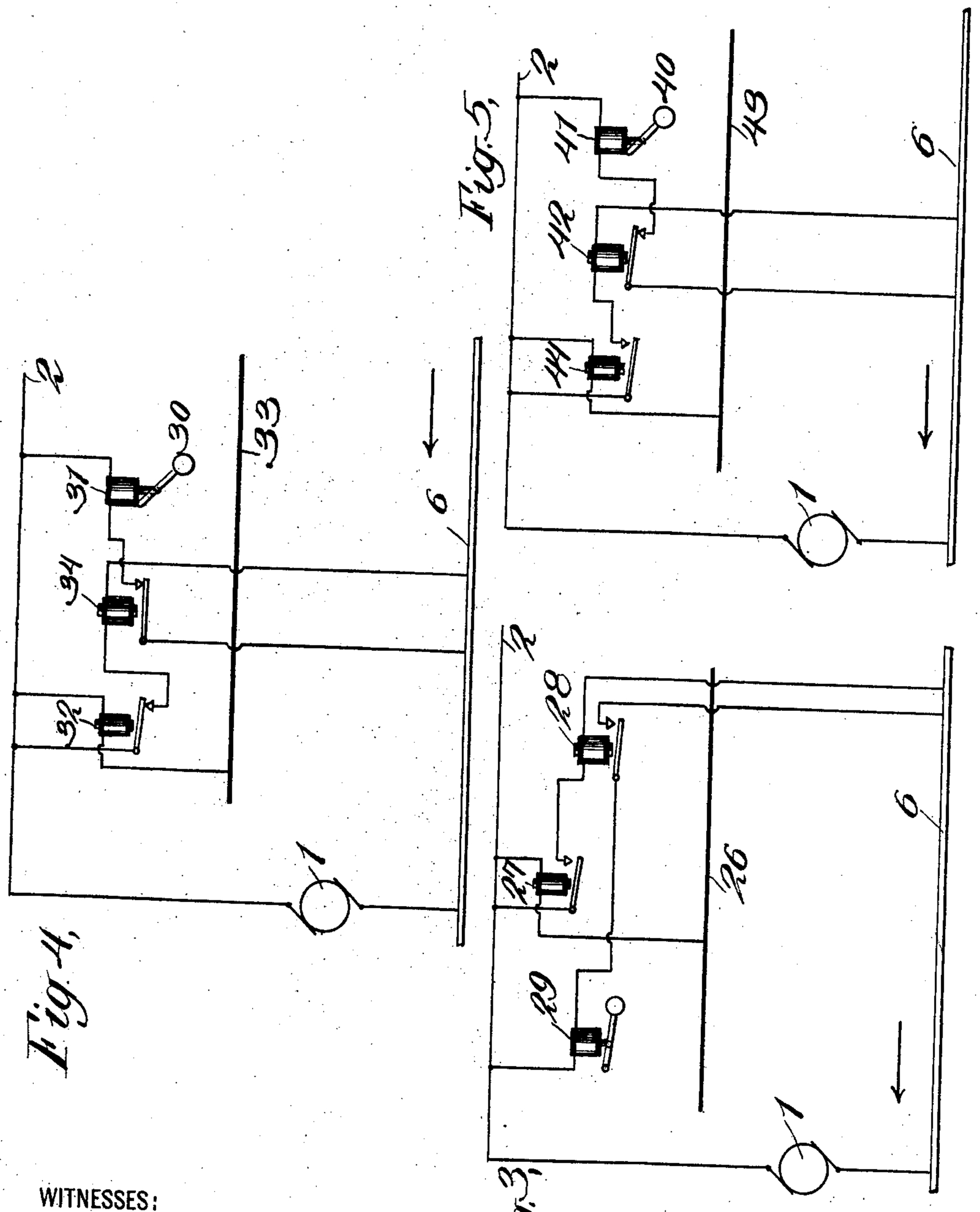

WITNESSES:

J. O. Sempler

Sidney Mann

INVENTOR

Charles P. Breese

BY

Hazzard & Hazzard

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES P. BREESE, OF NORFOLK, VIRGINIA, ASSIGNOR TO HALL SIGNAL COMPANY, A CORPORATION OF MAINE.

RAILWAY SIGNALING SYSTEM.

No. 827,054. Specification of Letters Patent. Patented July 24, 1906.

Application filed August 11, 1902. Serial No. 119,184

To all whom it may concern:

Be it known that I, CHARLES P. BREESE, a citizen of the United States, and a resident of Norfolk, county of Norfolk, and State of Virginia, have invented certain new and useful Improvements in Railway Signaling Systems, of which the following is a specification.

This invention relates to means for signaling the operators of a railway-car.

The object of the invention is to prevent collision between the cars of the system and also to give signals either at or near a crossing or to some other distant point of an approaching car.

The invention consists, first, in the combination of means for signaling and a means for controlling the said signaling means by the flow of the current to the contact wire or conductor of a railway system.

The invention also consists in providing a contact-conductor having a plurality of contact-sections and a signaling means which is controlled by the current fed to each of the said contact-sections.

The invention consists, in addition to the above features, in providing a by-pass or shunt resistance to the motor to allow at all times a sufficient quantity of current to pass to the car to cause the operation of the signaling means.

The invention also consists in other features of construction and combinations of parts hereinafter described and claimed.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 illustrates one form of my invention. Fig. 2 illustrates a detail of the invention. Figs. 3, 4, and 5 illustrate modifications of the invention.

Referring to Fig. 1, 1 indicates a source of current. 2 indicates a main feed-wire. 3 indicates a contact-wire. 4 indicates a railway-car having a trolley contact-wheel 5, which makes contact with the contact-wire 3. The circuit is completed through the return-conductor 6, which may be either the rails of the track or it may be a second contact-wire connected to the dynamo or source of current 1. The contact-wire 3 is divided into a plurality of contact-sections 7, 8, and 9. As the car passes along the track the trolley 5 makes contact with the contact-sections 7, 8, and 9 in succession. Associated with the contact-sections are controlling instruments which control the signaling means for indicating the presence of a car in the sections. The current is fed to the contact-sections 7, 8, and 9 through low-resistance magnets 10, 11, and 12, each of which is connected on one side with the main feed-wire 2 and on the other side with its respective contact-section. As the car passes along the different sections the circuit is completed from the source of current through the low-resistance electromagnet to the contact-sections and thence to the source of current by the return-conductor 6. There is associated with each of the low-resistance magnets 10, 11, and 12 a high-resistance magnet 13, 14, or 15, which latter magnets are controlled by the armatures of the low-resistance magnets. The armatures of the low-resistance magnets are connected to the main feed-wire 2, and normally to the high-resistance electromagnets 13, 14, and 15, through the back contact of the armature. The electromagnets 13, 14, and 15 are connected to the return-conductor 6 and thence to the source of current 1. The high-resistance electromagnets 13, 14, and 15 have armatures which normally complete a circuit through high-resistance electromagnets or high-resistance solenoids 16, 17, and 18. The solenoids in each case are connected on one side with the main feed-wire 2 and on the other side with the armatures of the electromagnets 13, 14, and 15. When the electromagnets 13, 14, and 15 are deënergized, their armatures make contact with their back contacts and complete the circuits of the solenoids 16, 17, and 18 to the return-conductor 6, which causes the solenoids to operate upon their armatures or cores. A signaling means in the form of a disk or semaphore or in the form of an electric bell may be connected to or attached to the armature or core of the solenoids 16, 17, and 18, so that when the said armatures or cores are operated the signal will indicate the presence of the car in the section.

In order that there may be a sufficient current fed to the contact-wire to cause the instruments to operate, and that independently of the motor, there is provided a by-pass for the current. This by-pass consists of a resistance connected in shunt with the motor of the car.

In Fig. 2 I have illustrated a means for controlling the by-pass, which is associated

with the rheostat of the car. 20 indicates the handle for operating the rheostat. 21 indicates the cylinder, operated by the handle 20. A segment 22 is located upon the cylinder 21 and is connected with the source of current through the trolley 5 and contact-wire 3. 23 is a contact-spring adapted to make contact with the contact-segment 22. A resistance 24 is connected with the contact-spring 23 and to the wheel or to any other means, which makes contact with the return-conductor 6. When the rheostat is operated to control the motor, the shaft 21 is turned by the operation of the rheostat-handle 20, which moves the segment 22 relative to the contact-spring 23. This by-pass allows sufficient current to constantly pass through the car to cause the lights of the car to glow and also to cause the signals to operate.

The operation of the form of invention shown in Fig. 1 is as follows: When the car enters one of the sections—as, for instance, section 8—a circuit will be completed from the source of current 1, the main feed-wire 2, the low-resistance electromagnet 11, the contact-section 8 of the contact-wire 3, the trolley 5 to the motor and the return-conductor 6 and also, through the by-pass formed by the high-resistance 24, to the return-conductor, thence from the return-conductor to the source of current 1. This will cause the electromagnet 11 to raise its armature from the back contact. The normal circuit from the source of current to the main feed-wire 2, the high-resistance electromagnet 14, the return-conductor 6, and source of current will be broken and the electromagnet 14 will become deënergized. This will allow the armature of the electromagnet 14 to make contact with its back contact and complete a circuit from the source of current 1 to the main feed-wire 2, the solenoid 17, the armature of the electromagnet 14, return-conductor 6, back to the source of current 1. This will cause the solenoid 17 to become energized and cause the signal to move into a signaling position or to cause a bell to ring, which will indicate the presence of a car in that section. This operation repeats itself in each of the sections as the car passes along the tracks.

In Fig. 3 I have shown a similar system. In this form of the system the high-resistance electromagnet 28 is normally deënergized. The contact-section 26 is connected with the main feed-conductor 2 through the low-resistance magnet 27 the same as in the system illustrated in Fig. 1. The high-resistance electromagnet 28 is connected to the front contact of the armature of the electromagnet 27. The signal magnet or solenoid 29 is connected to the armature of the electromagnet 28 and the main feed-wire 2, as in the system described above; but the circuit of the solenoid 29 is completed through the front contact of the armature of the electromagnet 28. The front contact of the armature of the electromagnet 28 is connected to the return-conductor 6, and when the electromagnet 28 is energized the circuit of the solenoid 29 is completed. This causes the solenoid to operate upon its core. The movement of the core will cause the signaling means to operate and indicate the presence of an electric car in the section associated with the signaling means. The operation of this form of the invention is as follows: When the electric car enters the contact 26, the low-resistance electromagnet 27 is energized, which completes a circuit through the high-resistance electromagnet 28 as follows: the source of current 1, the main feed-wire 2, the armature and electromagnet 27, the high-resistance magnet 28, the return-conductor 6, back to the source of current 1. The flow of the current through this circuit energizes the electromagnet 28, and the armature is drawn up against its front contact. This completes the circuit from the source of current 1, main feed-wire 2, the solenoid 29, the armature of the electromagnet 28, the return-conductor 6, and source of current 1, which causes the solenoid to indicate the presence of a car in its associated contact-section.

In Figs. 4 and 5 I have illustrated a further modification of the invention. In Fig. 4 the signal 30, operated by the solenoid 31, is located at the entrance of the section and is normally in a clear position—that is, it normally indicates that there is no car in contact with its associated contact-section. The arrangement of the instrumentalities for controlling the signal is somwhat similar to the forms of the invention described above. As before, a low-resistance electromagnet 32 is connected with the main feed-wire 2 and the contact-section 33. A high-resistance electromagnet 34 is connected with the back contact of the armature 32 and with the return-conductor 6. The armature of the electromagnet 32 is connected with the main feed-wire 2, so that there is normally a current passing from the source of current 1, the main feed-wire 2, the armature-electromagnet 32 through the electromagnet 34 to the source of current by way of the return-conductor 6. This causes the armature of the electromagnet 34 to make contact with its front contact. The armature of the electromagnet 34 is connected to the return-conductor 6 and its front contact is connected to the main feed-wire 2 through the solenoid or electromagnet 31. Thus a circuit is normally completed from the source of current 1 to the main feed-wire 2, the solenoid 31, the armature of the electromagnet 34, the conductor 6, and the source of current 1. This holds the core of the solenoid 31 in an upward position and also holds the signal in a clear position. When a car makes contact with the contact-section 33, a

circuit is completed through the low-resistance electromagnet 32, which immediately becomes energized and raises its armature. This in turn breaks the circuit through the electromagnet 34 and causes the electromagnet 34 to become deënergized, which in turn permits its armature to fall and breaks the circuit through the solenoid 31. The solenoid 31 becomes deënergized, and its core is allowed to fall. This also permits the signal 30 to drop to a position of danger behind the car. If a second car should enter the contact-section 33, the motorman will see that the signal is in a position of danger and will immediately stop the car. As the cars leave the contact-section 33 the magnet 32 becomes deënergized and the instruments are restored to their normal position. In the form of invention illustrated in Fig. 5 the signal 40 is also located at the entrance of the contact-section and is actuated by the solenoid 41. The circuits in the form of invention shown in Fig. 5 are similar to those of the invention shown in Fig. 4. In Fig. 5 the high-resistance electromagnet 42 is normally deënergized. The contact-section 43 is connected through the low-resistance electromagnet 44, which is also connected to the main feed-wire 2. The front contact of the armature of the electromagnet 44 is connected to the high-resistance electromagnet 42, which is in turn connected to the return-conductor 6. The armature of the electromagnet 42 normally completes a circuit through the solenoid 41, which is connected to the main feed-wire on one side and to the back contact of the armature of the electromagnet 42 on the other side. The armature of the electromagnet 42 is connected to the return-conductor 6. As the car enters the contact-section 43 in the direction of the arrow the circuit is completed from the source of current 1, the main feed-wire 2, through the electromagnet 44, the contact-wire 43, the electric motor and by-pass of the car, the return-conductor 6, back to the source of current. This causes the electromagnet 44 to become energized and to raise its armature, which completes the circuit through the electromagnet 42. This in turn causes the electromagnet 42 to become energized and its armature is raised and the circuit through the solenoid 41 is broken. The core of the solenoid is allowed to drop and the signal 40 is allowed to take a position of danger behind the car. As in the invention illustrated in Fig. 4, when a second car enters the contact-section 43 the motorman will find the signal 40 in a position of danger and will stop the car. When the cars leave the section 43, the electromagnet 44 becomes deënergized and the instruments are restored.

What I have described above is a preferable form of my invention. It may, however, be varied in many ways without departing from the spirit thereof. It may be used in connection with signals located within the car or for controlling the signals of overlapping sections of the railway system.

What I claim, and desire to secure by Letters Patent, is as follows:

1. In a railway signaling system, the combination of a contact-conductor, a return-conductor, a feed-wire, means permanently connecting said contact-conductor to said feed-wire, a signal, a circuit for actuating said signal and a circuit for controlling said actuating-circuit, said controlling-circuit being controlled by the means connecting the contact-conductor with said feed-wire, substantially as described.

2. In a railway signaling system, the combination of a contact-conductor, a return-conductor, means for supplying current to said contact-conductor, a translating device permanently included in said means, a signal, a circuit for actuating said signal and a circuit for controlling said actuating-circuit, said controlling-circuit being controlled by said translating device, substantially as described.

3. In a railway signaling system, the combination of a contact-conductor divided into insulated sections, a return-conductor, a feed-wire, means including a translating device permanently connecting said feed-wire to each of said sections, a signal, a circuit for actuating said signal, and a circuit controlled by said translating device, whereby the energization of said translating device controls said signal, substantially as described.

4. In a railway signaling system, the combination of a contact-conductor divided into insulated sections, means for supplying current to said sections, said means including translating devices of low resistance, permanently connected to said contact-conductor, a signal, a circuit for actuating said signal and a circuit of high resistance controlled by said translating device for controlling the signal-actuating circuit, substantially as described.

5. In a railway signaling system, the combination of a feed-wire, a return-conductor, a contact-conductor divided into sections, a low-resistance magnet permanently connected between said feed-wire and said contact-conductor, a circuit including the armature of said magnet and the coil of a high-resistance magnet, an armature for said high-resistance magnet, a signal and a circuit for actuating said signal, said circuit being made and broken by the armature of the high-resistance magnet, substantially as described.

6. In a railway signaling system, the combination of a contact-conductor divided into insulated sections, a return-conductor, a feed-wire, means including a translating device for permanently connecting said feed-wire to each of said sections, a signal, a circuit for actuating said signal, a circuit con-

trolled by said translating device whereby the energization of said translating device controls said signal, a car, a motor on said car receiving current through said translating device and contact-conductor, a shunt-circuit on the car around said motor, and means for diverting current through said shunt-circuit, substantially as described.

7. In a railway signaling system, the combination of a contact-conductor divided into insulated sections, a return-conductor, a feed-wire, means including a low-resistance translating device permanently connecting said feed-wire to each of said sections, a signal, a circuit for actuating said signal, a circuit controlled by said translating device whereby the energization of said translating device controls said signal, a car, a motor on said car receiving current through said translating device and contact-conductor, and a shunt-circuit of high resistance on the car around said motor, substantially as described.

8. In a railway signaling system, the combination of a contact-conductor divided into insulated sections, a return-conductor, a feed-wire, means including a low-resistance translating device permanently connecting said feed-wire to each of said sections, a signal, a circuit for actuating said signal, a circuit controlled by said translating device whereby the energization of said translating device controls said signal, a car, a motor on said car receiving current through said translating device and contact-conductor, a high-resistance shunt-circuit on the car around the motor, and means for diverting current through said shunt-circuit after the current is shut off from said motor, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES P. BREESE.

Witnesses:

FRIELAY FORBES FERGUSON,

CHAS. J. CALROW.