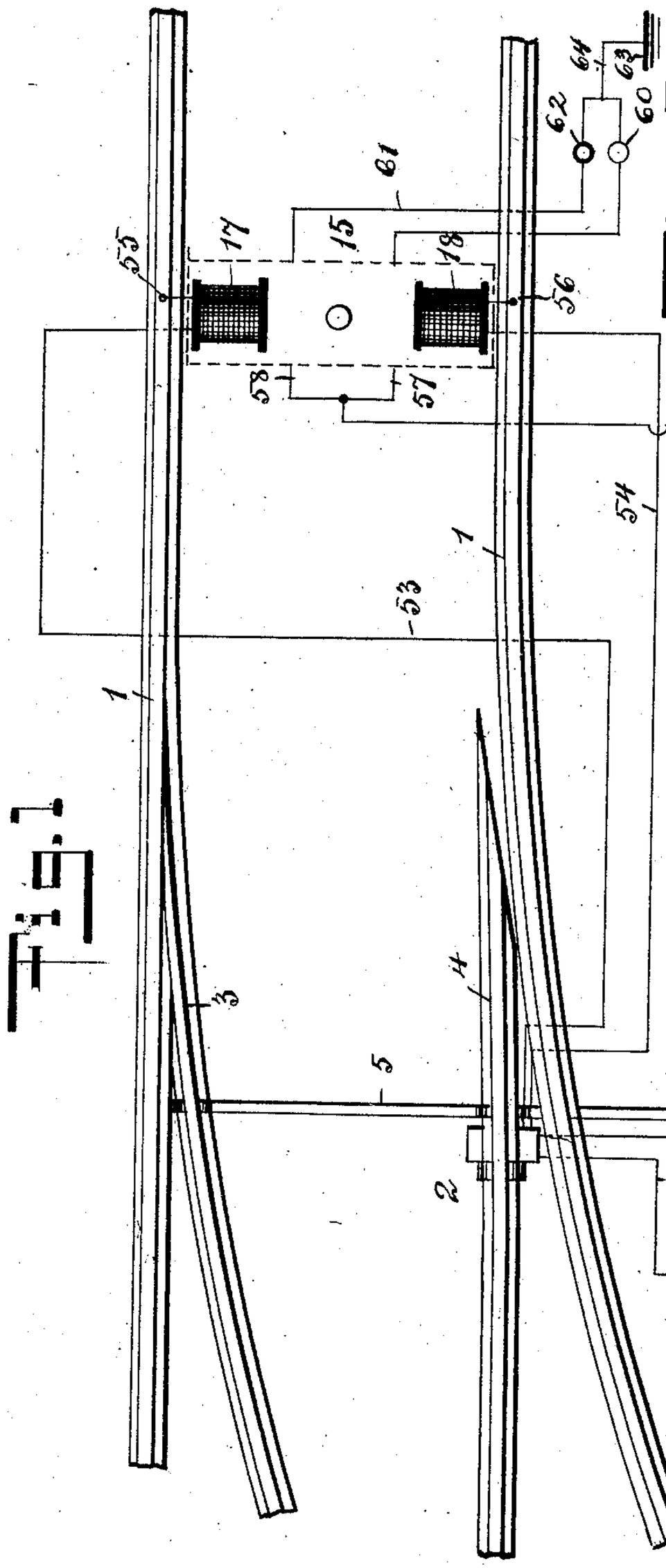
No. 859,694. PATENTED JULY 9, 1907.

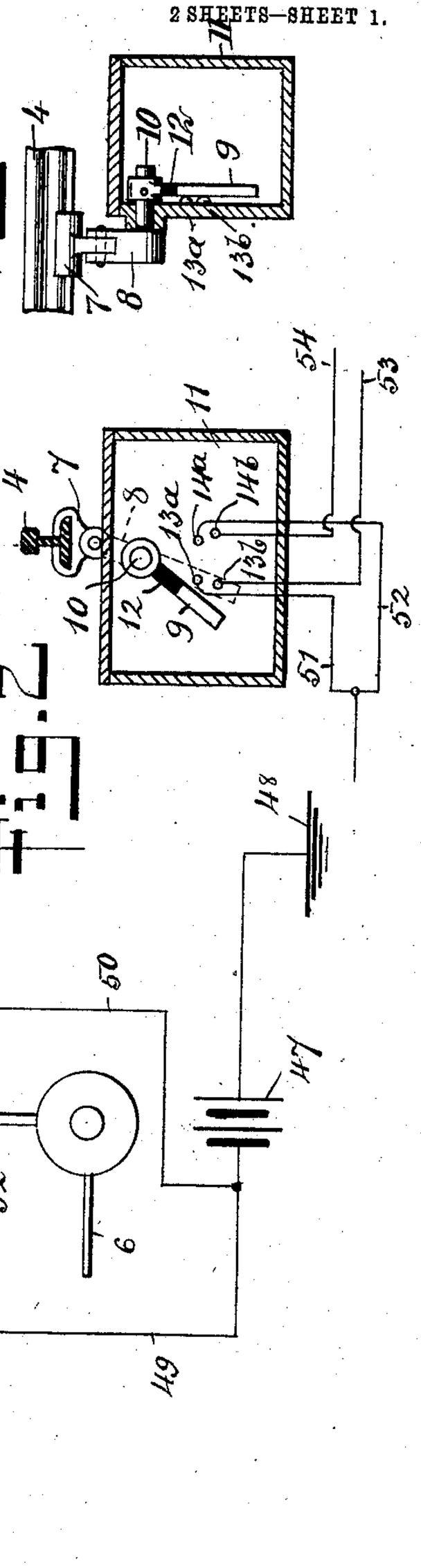
G. E. RYAN.

AUTOMATIC SAFETY SWITCH.

APPLICATION FILED SEPT. 27, 1906.

2 SHEETS—SHEET 1.







WITNESSES

John A. Berglund

F. D. Bonner

INVENTOR

George E. Ryan

BY Munn & Co

ATTORNEYS

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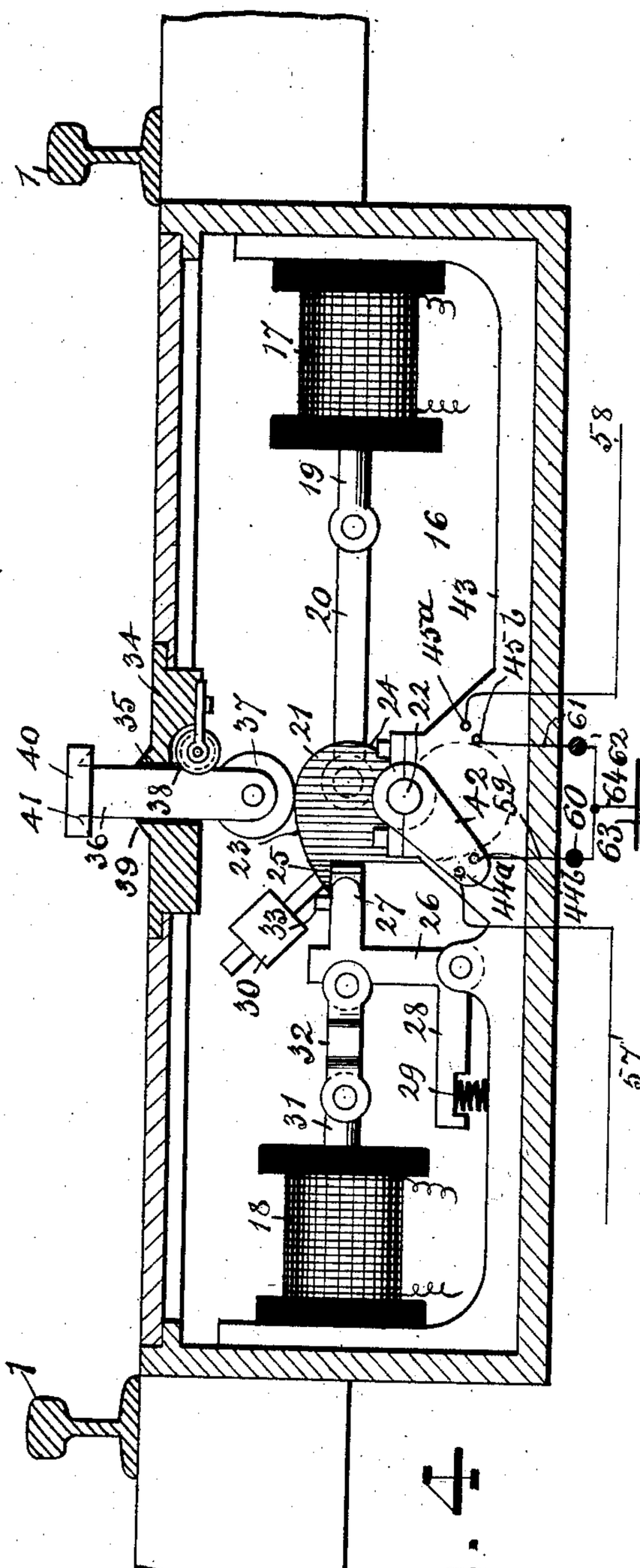


FIG. 4.

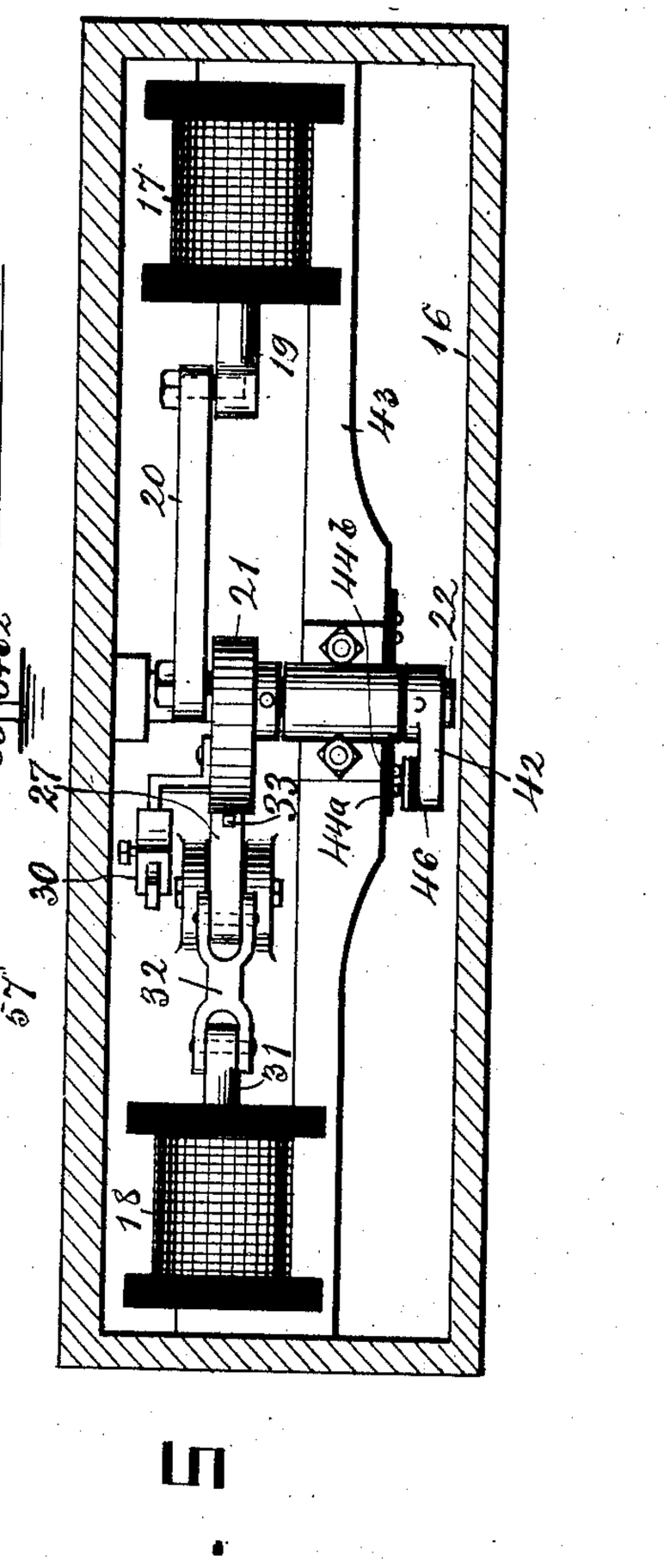


FIG. 5.

WITNESSES

John A. Bergstrom

F. D. Ammen

INVENTOR

George E. Ryan

BY Munn & Co

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

GEORGE E. RYAN, OF NEW YORK, N. Y.

## AUTOMATIC SAFETY-SWITCH.

No. 859,694. Specification of Letters Patent. Patented July 9, 1907.

Application filed September 27, 1906. Serial No. 336,393.

*To all whom it may concern:*

Be it known that I, GEORGE E. RYAN, a citizen of the United States, and a resident of the city of New York, (Laurel Hill, borough of Queens,) in the county of Queens and State of New York, have invented a new and Improved Automatic Safety-Switch, of which the following is a full, clear, and exact description.

This invention relates to railway switches, and the object of the invention is to provide an arrangement which will prevent accidents from trains running into open switches. The invention contemplates the use of a track device which is disposed in the track near the switch and which is controlled by the position of the switch. The locomotive or some part of the train is provided with a trip device which is adapted to be struck by the track device so as to cut off the power.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a diagrammatic view showing a portion of a railway track in plan and indicating the manner in which the apparatus is applied in practice; Fig. 2 is a vertical cross section through one of the switch points and through a contact box, and illustrating the manner in which the position of the switch controls the track device; Fig. 3 is a cross section taken through the contact box shown in Fig. 2, but taken in a plane at right angles to the plane of Fig. 2; Fig. 4 is a longitudinal section through the track device and at right angles to the roadbed, the rails being shown in cross section; and Fig. 5 is a horizontal section taken through the track device.

Referring more particularly to the parts, 1, 1 represent the rails of a railway track, which track is provided with a switch 2 having the switch points 3 and 4. As illustrated, a train could pass upon the switch by passing from the right toward the left on the main track. The switch 2 is adapted to be operated by a switch bar 5 which extends transversely beneath the switch points, as shown, and this switch bar is controlled by a suitable switch lever 6 of any common form.

As illustrated in Fig. 2, the switch point 4 has its flange seated in a saddle or shoe 7. This saddle is pivotally mounted upon the upper arm 8 of a contact lever 9, which lever is pivotally mounted at 10 within a contact box 11. The lower portion of the lever arm 9 is cut off by insulation 12 from the other metal parts of the device. On the side wall of the contact box through which the pivot pin 10 passes, I provide a pair of contacts $13^a$ and $13^b$, and a second pair of contacts $14^a$ and $14^b$. The manner in which the contact box is wired will be described more fully hereinafter.

Referring now to the track device 15, which is indicated in Fig. 1, and which is illustrated in detail in Figs. 4 and 5, this track device comprises a case 16 having the form of an elongated box which is set transversely in the bed of the track as shown, lying between the rails 1, 1. Within this case I provide a pair of coils 17 and 18. The coil 17 is provided with a core 19, the extremity whereof is pivotally attached to a pitman or link 20, and this link is attached pivotally to the side of a cam 21, the said cam being rigidly attached to a shaft 22 which is mounted transversely in the case as shown. This cam 21 is substantially heart-shaped, as shown, so as to present an elevated cam face 23 and a depressed cam face or notch 24. The apex or point of the cam is cut away so as to present a shoulder 25. This shoulder is adapted to be engaged by a pivoted dog 26, which dog is formed with a projecting nose 27 adapted to come under the shoulder as indicated in Fig. 4. This dog 26 is provided with a laterally projecting foot 28, beneath which a spring 29 is provided which thrusts upwardly and tends to hold the nose 27 in engagement with the shoulder. The cam 21 is provided with a counterweight 30 which is disposed on the side thereof toward the dog 26, so that when the dog is in engagement with the shoulder it will operate as a latch to hold the cam in the position shown. Evidently, if the cam is released from the dog, the counterweight 30 will rotate the cam from the position shown and toward the left. In order to release the cam, I provide the coil 18 with a core 31, which core is attached by a suitable link 32 to the dog 26 as shown. In the upper side of the nose 27 I provide an upwardly projecting stop or pin 33 which is adapted to engage the forward edge of the shoulder 25, as indicated.

The upper wall of the case 16 is provided with a removable cover 34 in which there is provided a guide opening 35. In this guide opening there is slidably mounted a vertical pin 36, the lower extremity whereof is provided with a roller 37 which rests upon the face of the cam 21. At one side, a friction roller 38 is provided, which engages the side face of the pin 36 so as to reduce the friction when the pin moves up or down. The upper edge of the opening 35 is provided with an upwardly projecting lip 39, which is adapted to keep the water from draining from the track through the opening. The pin 36 is provided with a cap 40 which is formed on its under side, with a groove 41, and this groove is adapted to receive the lip 39 so that when the pin is down, the cap substantially closes the opening 35. It should be understood that

in Fig. 4, the device is represented in its set position, the pin 36 being held so as to project from the case 16, in a position to be struck by the trip device of a passing train. When the device is not in its set position, the cam 21 occupies a position nearly at right angles to that in which it is shown in Fig. 4, at which time the roller 37 lies in the notch 24; the pin 36 will then occupy a depressed position and will lie out of the path of the trip device carried by the train.

On the end of the shaft 22, I provide a rigid contact arm 42, and on the side face of the frame 43 upon which the mechanism within the case is attached, I provide contact points $44^a$ and $44^b$ and $45^a$ and $45^b$. The end of the arm 42 is cut off from the other metallic parts by insulation 46, as indicated in Fig. 5.

The circuit arrangement will now be described: I provide a suitable source of current, such as a battery 47, one side of the said battery being connected with the ground at 48. From the other side of the battery, branch conductors 49 and 50 extend, the branch 49 being itself formed into two branches 51 and 52. These branch wires 51 and 52 extend into the contact box as shown in Fig. 2, and the branch 51 is attached to the contact $13^a$; the branch 52 is attached to the contact $14^a$. From the contact $13^b$ a conductor 53 extends, and this conductor connects with the coil 17, the opposite side of the coil being grounded by the attachment to the rail at the point 55. A conductor 54 connects with the contact $14^b$, and this conductor connects with the coil 18, the opposite side of the coil 18 being grounded by attachment to the rail at the point 56. The branch 50 extends to a point near the track device 15, where it is formed into branches 57 and 58. The branch 57 extends into the track device and is attached to the contact $44^a$, as illustrated in Fig. 4. The branch 58 extends into the track device and is attached to the contact $45^a$. From the contact $44^b$ a conductor 59 leads outwardly and passes through a suitable signal such as an electric light 60. A similar conductor 61 leads from the contact $45^b$ passing through a similar signal or electric light 62. Beyond the lights 60 and 62, the conductors 59 and 61 unite and are connected with the ground at 63 by means of a common conductor 64.

The operation of the entire switch will now be described: The switch points 3 and 4 are opened and closed by means of the lever 6, in a common manner. When the switch is in its closed position so that a passing train cannot move onto the switch, the pin 36 occupies a depressed position, the roller 37 at the base of the pin lying in the notch 24 on the face of the cam 21. The trip device of the passing train will then not be affected in any way, as the train passes the track device 15. Suppose that the switch is then thrown by means of the lever 6, to the open position in which it is shown in Fig. 1. In passing to this position, the movement of the switch point 4 will swing the contact lever 9 from the right hand side toward the left, as viewed in Fig. 2. During this movement, the contact lever 9 bridges the contact points $13^a$ and $13^b$, so as to close a circuit through the wires 51 and 53. In this way a complete circuit is formed from the ground at 48 through the battery 47 and through the coil 17, to the ground at 55. In this way the coil 17 becomes energized and the core 19 thereof is drawn inwardly. This rotates the cam into substantially the position shown in Fig. 4, so that the dog 26 engages under the shoulder 25. The arrangement is such that the bridging of the contacts $13^a$ and $13^b$ occurs before the switch has moved completely over to its open position. On this account the circuit becomes opened again after the cam has been caught in its set position by the dog 26. In this way the track device becomes set with the pin 36 projecting upwardly from the roadbed. It should be understood that the track device is placed at a considerable distance from the switch, which distance would be sufficient to enable a train to come to a stop after passing the track device before reaching the switch. It then becomes impossible for a train, having a trip device, to run into an open switch without having its power shut off, or receiving a signal having a similar effect. When the track device is in the set position shown in Fig. 4, the contact arm 42 bridges the points $44^a$ and $44^b$, so that a circuit becomes closed through the branch 50 and wire 57, said circuit including the branch 59 and the light 60. From the light 60 the current passes to the ground at 63 through the conductor 64. In this way the track device is not only set, but the electric light 60, which will show red, will indicate that the switch is open. Hence, it will be seen that not only is the track device placed in a set position to shut off, automatically, the power of the train, but a signal is given, which will be seen by the driver of the train. When the switch is returning to its normal closed position, the contact lever 9 moves toward the right, as indicated in Fig. 2, and brushes over the contacts $14^a$ and $14^b$. In this way a circuit is closed through the branch 52 and conductor 54. This conductor 54, it will be observed, is connected with the coil 18. This coil becomes energized and draws the core 31 thereof inwardly. Through the link 32, this core operates to withdraw the dog 26, which unlatches the cam 21. As soon as the cam is released in this way, the counterweight 30 rotates it to its normal inoperative position. The pin 36 then descends to its normal depressed position. As the cam returns to its normal position, the contact arm 42 moves toward the right and comes to a stop over the contacts $45^a$ and $45^b$. In this way it closes a circuit through the conductors 58 and 61 and through the light 62 to the ground at 63; this light will show green. From this arrangement, when a track device is in its unset or inoperative position, the signal adjacent to the track will indicate that the switch is closed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In apparatus of the class described, in combination, a switch, a contact device comprising a pair of coils, cores mounted in said coils, a pin disposed between said coils, means actuated by one of said cores for projecting said pin upwardly, means actuated by the other of said cores for depressing said pin, a circuit leading through one of said coils and adapted to be closed by said switch when in an open position, and a circuit leading through the other of said coils and adapted to be closed by said switch in its closed position.

2. In apparatus of the class described, in combination, a switch, a contact device comprising a pair of coils, cores mounted in said coils, a pin disposed between said coils, means actuated by one of said cores for projecting said pin upwardly, means actuated by the other of said cores for depressing said pin, a circuit leading through one of said coils and adapted to be closed by said switch when in

an open position, a circuit leading through the other of said coils and adapted to be closed by a switch in its closed position, signals, and means for closing the circuits through said signals at said track device.

3. In apparatus of the class described, in combination, a track device having a cam, a pin controlled by said cam, a contact arm rigid with said cam, electro-magnets for controlling said cam, circuits connecting said electro-magnets with said switch and controlled by the position thereof, and signals having circuits controlled by said contact arm.

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

GEORGE E. RYAN.

Witnesses:

F. D. AMMEN,

JNO. M. RITTER.