No. 741,744. PATENTED OCT. 20, 1903.

M. D. VAN WHY.

AUTOMATIC SWITCH.

APPLICATION FILED APR. 1, 1903

NO MODEL. 2 SHEETS—SHEET 1.

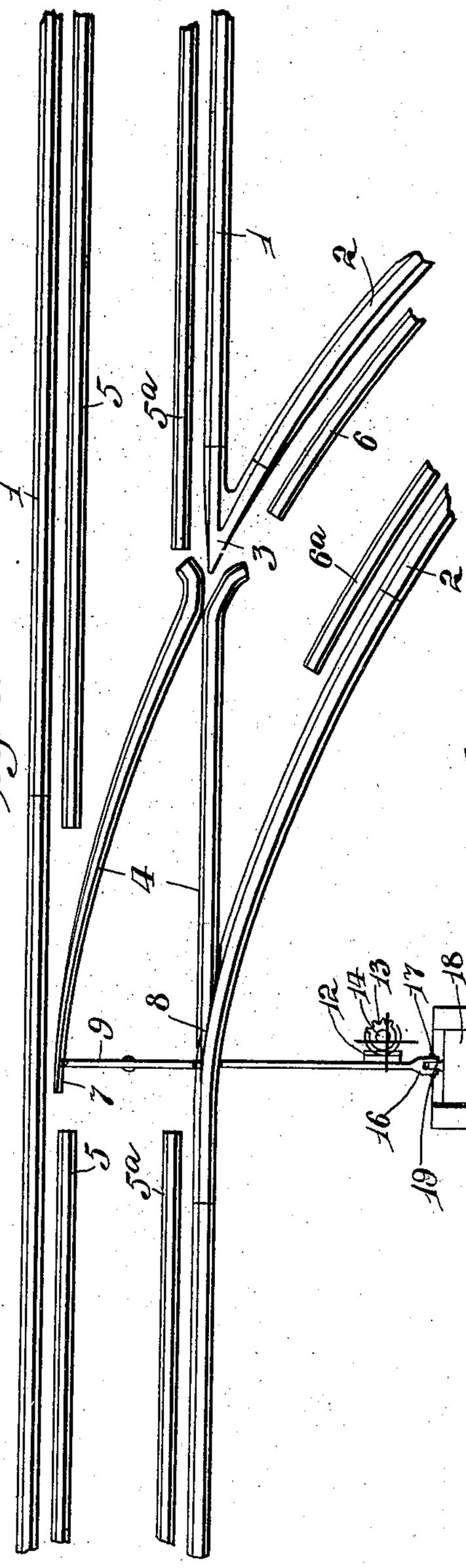

Fig. 2.

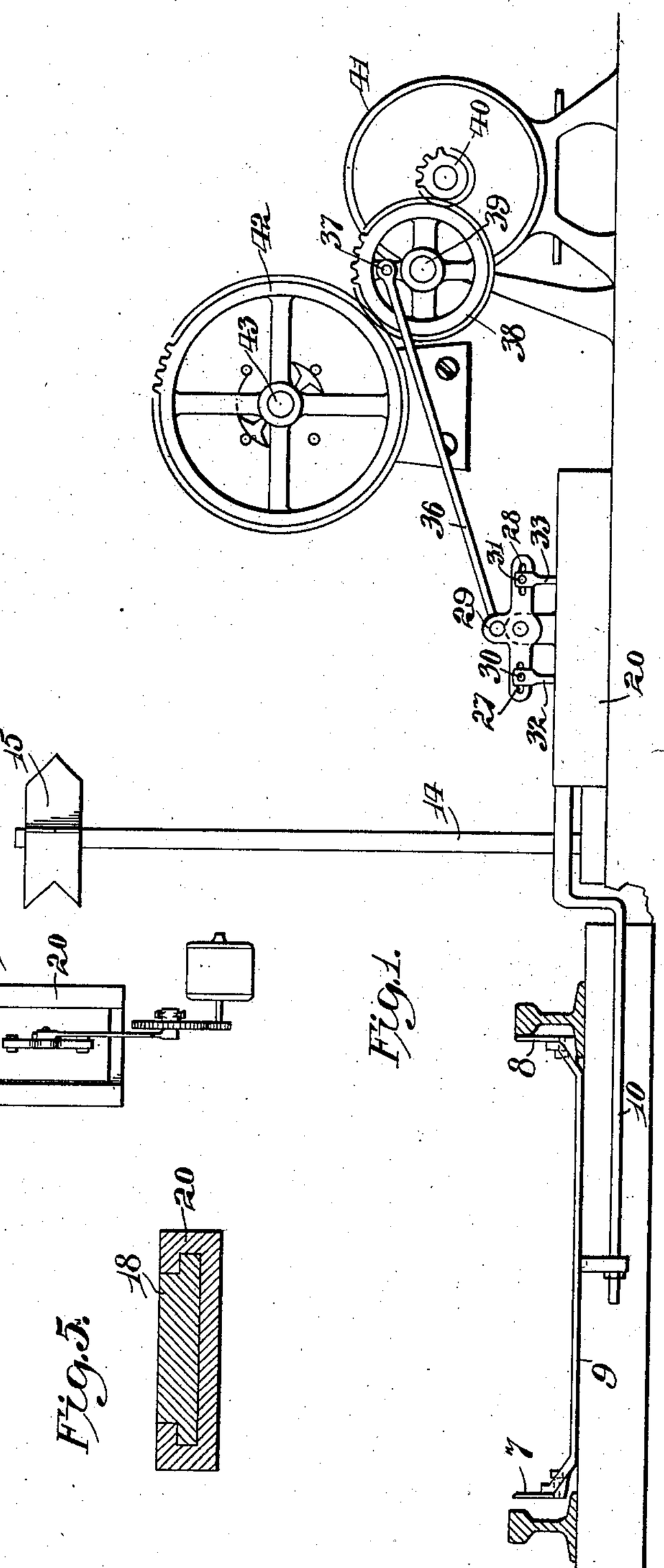

Fig. 4.

Fig. 5.

Witnesses
C. Mitchell
J. L. Pybas.

Inventor
Melvin D. Van Why
By his Attorneys,
J. R. Littell

No. 741,744. PATENTED OCT. 20, 1903.

M. D. VAN WHY.

AUTOMATIC SWITCH.

APPLICATION FILED APR. 1, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

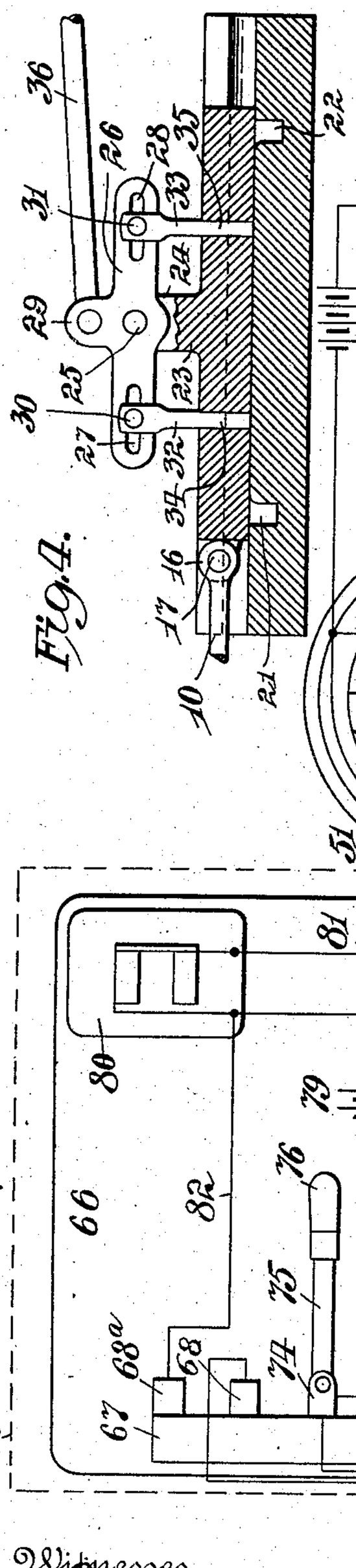

Fig. 4.

Fig. 3.

Witnesses
C. Mitchell
J. L. Sybas.

Inventor
Melvin D. Van Why
By his Attorney,
L. R. Littell

No. 741,744. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

MELVIN D. VAN WHY, OF EAST STROUDSBURG, PENNSYLVANIA.

AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 741,744, dated October 20, 1903.

Application filed April 1, 1903. Serial No. 150,587. (No model.)

To all whom it may concern:

Be it known that I, MELVIN D. VAN WHY, a citizen of the United States, and a resident of East Stroudsburg, in the county of Monroe and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Switches, of which the following is a specification.

My invention relates to switches. Heretofore in devices of this kind it has been customary to provide switches with means external to the track or outside the same for operating the switch, so that the switch cannot be operated from a car, but is controlled by a person not in any way connected with the car or train. The disadvantage of this is that a switchman must be employed or else the train must be stopped to enable one of the trainmen to operate the switch before the train can be shunted onto a different track.

The object of my invention is to provide means by which both of these objections may be overcome—that is, to enable the switch to be operated from the moving train with perfect accuracy, certainty, and despatch, so that the train may be shifted onto any track desired or to enable a train to be broken up into several parts, and these several parts may be shifted onto various tracks as desired. I accomplish this object by providing the usual railroad-tracks with parallel conductor-rails and provide the switch with an electric actuating mechanism which is controlled through the conductor-rails by means of electric switches in the various cars of the train.

While my invention is particularly adapted for electric trains used in interurban traffic, it may be used on any kind of railroad and as many cars or locomotives may be equipped with the proper controlling apparatus as is desired.

For a more particular description of one embodiment of my invention reference is to be had to the accompanying drawings, forming a part hereof, in which—

Figure 1 is an elevation of a switch and switch-operating mechanism made in accordance with my invention. Fig. 2 is a plan view of the same somewhat reduced. Fig. 3 is a diagrammatic view showing the electrical connections. Figs. 4 and 5 are details of the switch-actuating mechanism.

Corresponding parts in all the figures are denoted by the same reference characters.

In Fig. 2 I have shown diagrammatically railway-rails 1 and 2, which are connected in the usual way with a frog 3 and the switch 4. As these are of the ordinary construction, it is not considered necessary to describe them further. Parallel with the rails 1 and 2 and extending on each side of the switch any convenient distance are conductor-rails 5, 5ª, 6, and 6ª, which are supported inside of and a little above the railway-rails, as is customary in third-rail constructions for electric roads. The movable rails 7 and 8 of the switch 4 are connected with the usual bar 9, and extending under one of the rails 1 is a link 10, which is secured to the rod 9 at one end, and near its other end it is offset and provided with a horizontal rack 12, which engages a pinion 13 of the target-post 14, which is provided with the usual target 15 to indicate which way the switch is thrown. The extreme end of the link 10 is provided with an eyelet 16, which engages a pin 17 on the sliding block 18, the said pin 17 passing through a perforated ear 19 in said block. The block 18 slides in a guide-block 20, which is fixed to the ground in any suitable manner. This block 20 is provided with two holes 21 and 22, as will appear below. These holes 21 and 22 are situated near each end of the block 20 and about the transverse center thereof. The slide 18 is provided on its upper surface with upwardly-projecting and perforated ears 23 and 24, and through these ears is passed a pivot 25, on which is mounted a rocking arm 26, which is slotted at each end at 27 and 28, and above the pivot 25 it is provided with a perforated projection 29. Sliding in the slots 27 and 28 are pins 30 and 31, to which are secured rods 32 and 33, which pass through perforations 34 and 35 in the slide 18, and these rods 32 and 33 are so shaped that they fit the holes 21 and 22, respectively. The perforated ear 29 is pivotally connected with a link 36, which at its other end is connected with a crank-pin 37 in the usual manner, and the crank-pin 37 is fixed to one of the spokes of a gear-wheel 38. This gear-wheel oscillates on a shaft 39, and one side of it meshes with a spur-gear 40 on the armature of a motor 41, and another portion of the

gear-wheel 38 meshes with a gear 42 on a shaft 43. The gear 42 has twice the number of teeth of the gear 38, and concentric with the gear 42 and loosely mounted on the shaft 43 are the segment-arms 44 and 45, which project from a hub or boss 46. The hub 46 is cut away on radial lines to form shoulders 47 and 48, which ultimately engage a pin 49, fixed to the shaft 43, so that the said shaft may revolve a certain predetermined distance without moving the segment-arms 44 and 45. The segment-arms 44 and 45 and their hub 46 are preferably made integral and out of some non-conductor, such as fiber or vulcanite, and they are provided on their peripheries with metal contact-pieces 50 and 51, and these contact-pieces are connected by a suitable insulated conductor 52. The contact-strip 51 is in constant engagement with a curved piece of metal 53, and the strip 53 is connected with any suitable source of electrical supply, such as a storage battery 54, and is supported on any suitable framework. The contact-strip 50 is adapted to contact with either of two terminals 55 or 56. The contact 55 is connected by a conductor 57 to the conducting-rails 5 and 6 and also to one terminal 58 of the field-coil of a motor, and the terminal 56 is connected by a conductor 59 to the electrical conducting-rails 5ª and 6ª and also to the terminal 60 of the field-coil of the motor 41. This motor 41 is preferably a series motor, and one terminus, 61, leading from one brush, is connected directly by a conductor 62 to the storage battery 54, and the other brush-terminal, 63, is connected directly to the rails 1 and 2 by a conductor 64.

A car 65 is indicated diagrammatically in Fig. 3 and is provided with a panel 66, on which is placed a switch 67, which may be of any suitable type, although I prefer to provide the well-known type of double-pole switch, which has two sets of spring-jaws 68 68ª and 69 69ª, the jaw 68 being connected with a conductor 70, which carries the current from a shoe 71, which is adapted to engage either the rail 5 or 6 in the customary manner, and the jaw 69 is similarly connected by a conductor 72 to a shoe 73, which is adapted to contact with the rail 5ª or 6ª. Midway between the jaws 68 and 69 and in alinement therewith is a pivot-block 74, in which is pivoted a knife-blade 75, with a handle 76, so that the blade 75 may be made to connect either the jaw 68 or the jaw 69 with the pivot 74, but cannot connect both at one time. The pivot-block 74 is connected by a conductor 75ª to the trucks of the car, thereby having electrical connection with the conductor 64 through the rail 1 or 2, depending upon the position of the car. The pivot-block 74 is also connected by a conductor 78 to a small battery 79, which is in circuit with an electric bell 80 by a conductor 81, and the bell is also connected by a second conductor, 82, to both the jaws 68ª and 69ª. This bell 80 may be placed in any convenient location, although it is preferably placed on the panel 66, so that the bell will ring whenever the blade 75 engages either the jaw 68ª or the jaw 69ª and warn the operator that the switch is closed in order that the switch will not be left closed longer than is necessary.

The operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains. Assume the train to be on the track 1 and approaching the switch 4, the switch being shown in the position indicated in Fig. 2, so that the train will continue on the same track unless the said switch is operated. Assuming that the train is to be shunted to the track 2, the switch 67 is closed, so that the circuit is complete from the pivot-block 74 through the blade 75 and jaw 68. As soon as the shoes 71 and 73 engage the rails 5 5ª, respectively, which they will do when the car is about one hundred feet from the switch 4, as conducting-rails are preferably extended this distance, the circuit from the storage battery 54 will then be complete through the conductor 62, terminus 61, armature and terminus 63, conductor 64, rails 1, truck of car, and conductor 75ª to the switch 67, and from thence through the conductor 70 to the shoe 71, conductor-rail 5, and thence through the conductor 59 to the terminus 60, and from thence through the field-magnet of the motor 41 to the terminus 58, and from thence through the conductor 57 to the contact 55, and from thence through the contacts 50 and 51 and conductor 52 to the contact 53, and from thence through the terminus of the storage battery, thus completing the circuit. This completing of the circuit starts the motor 41, which through the spur-gear 40 rotates the gears 38 and 42, and the gear 42 rotates the shaft 43, which is fixed to it. This rotation continues until the pin 49 engages the shoulder 48 in the hub 46 and causes the contact 50 to leave the contact 55, thereby breaking the circuit and stopping the rotation of the motor. In the meanwhile the gear 38 through the crank-pin 37 has thrown the link 36, so that the slide 18 is moved until the pin 34 engages the hole 21 in the guide 20 and locks the slide against further movement. The link 10 through its rack 12 has caused the rotation of the pinion 13 and caused the proper throwing of the target, and the said link 10 has also thrown the rail 7 against the rail 1 and the rail 8 from the other rail 1 by means of the connecting-rod 9, so that when the car reaches the switch 4 it will pass from the rails 1 to the rails 2, and the switch will remain in this position until returned to the one formerly occupied. Assuming that a second train is passing in the same direction on the track 1 and wishes to continue on said track, thereby making it necessary to return switch 4 to its original position, the operation is as follows: The blade 75 is thrown into engagement with the jaws 69, so that the circuit is complete through the conductors 72 and 75ª from the rail 5ª to

the rails 1. The current flows in the same manner as before from the storage battery 54 through the conductor 62 to the terminus 61, and thence through the armature and terminus 63 and conductor 64 to the rails 1, and from thence, as described above, to the conducting-rail 5^a, from whence it flows through the conductor 57 to the terminus 58, and from thence through the field-magnets to the terminus 60 and then through the conductor 59 to the terminus 56 and through the contact-strips 50 and 51 and conductor 52 to the contact 53, and from thence to the battery 54, thus completing the circuit. As the current flows through the armature of the motor 41 in the same direction as before and through the fields of said motor in the opposite direction, it is obvious that the direction of rotation of the motor will be reversed and that the gears 38 and 42 will be rotated in the opposite direction from that above described, and the shaft 43 will also be rotated in the opposite direction, so that the pin 49 will leave the shoulder 48 and continue its movement until it rotates the segments 45 and 44 through the shoulder 47 sufficiently to disconnect the contact-strip 50 from the contact 56, thereby breaking the circuit and causing the motor to stop. This backward rotation of the gear 38 has caused the crank-pin 37 to return the link 36, and the link 36 engages the perforated ear 29, thereby causing the bolt 34 to be withdrawn from the hole 21, and the slide 18 is moved until the bolt 35 engages the walls of the hole 22, thereby locking the slide in this position. The link 10, which is connected to this slide by the pivot 17, returns the target 15 to its proper position in the manner described above and at the same time through the rod 9 takes the rail 7 away from the rail 1 and places the rail 8 against the other rail 1, so that the train will continue on the rails 1 and not be shifted to the rails 2.

From the above it is obvious that as many cars and locomotives as desired may be equipped with the electrical conductor, switches, and shoes, so that each of these locomotives or cars may be used to operate the switch in the manner hereinbefore described, so that if a train is divided into several parts to make a flying switch, as is very common in railroad practice, the trainmen on the various cars may control the switching mechanism so as to place the cars on the various tracks as desired.

To make my invention clear and to avoid complications, I have shown my invention as applied to the simplest form of a switch, although it is obvious that it may be applied to any form or to as many switches as desired.

I do not desire to be understood as limiting myself to the details of construction and arrangement as herein described and illustrated, as it is manifest that variations and modifications may be made in the features of construction and arrangement in the adaptation of the device without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variation and modification as properly fall within the scope of my invention and the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In an automatic switch mechanism, the combination of a track, a switch, locking mechanism for said switch comprising a slide connected to said switch, a guide-block in which said sliding block moves, and means in said sliding block for engaging said guiding-block and locking said sliding block thereto, a car, electrically-operated means for operating said switch and locking mechanism, and means on said car for controlling said electrically-operated means, substantially as described.

2. In an automatic switch or similar mechanism, the combination of a switch, locking mechanism for said switch comprising a guiding-block with holes therein, a sliding block with bolts adapted to engage said holes to lock said sliding and guiding blocks, a car, electrically-operated means for operating said switch and locking mechanism, and means on said car for controlling said electrically-operated means, substantially as described.

3. In an automatic switch or similar mechanism, the combination of a guiding-block with holes therein, a sliding block with bolts adapted to move over said holes and the bolts arranged to engage said holes, a rocking arm engaging the ends of said bolts, and ears extending from said sliding block to which said rocking arm is pivoted, substantially as described.

In testimony whereof I have signed my name in the presence of the subscribing witnesses.

MELVIN D. VAN WHY.

Witnesses:
W. H. LODER,
V. S. LODER.