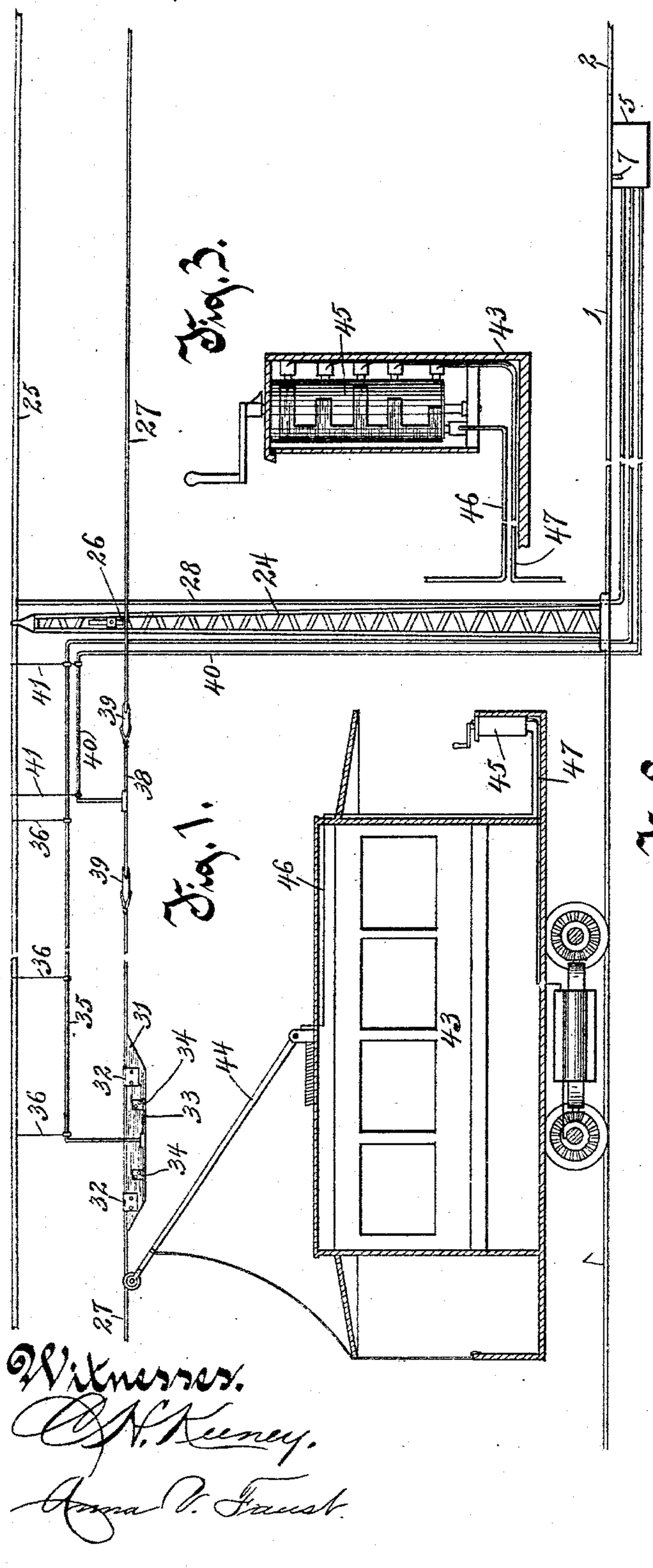
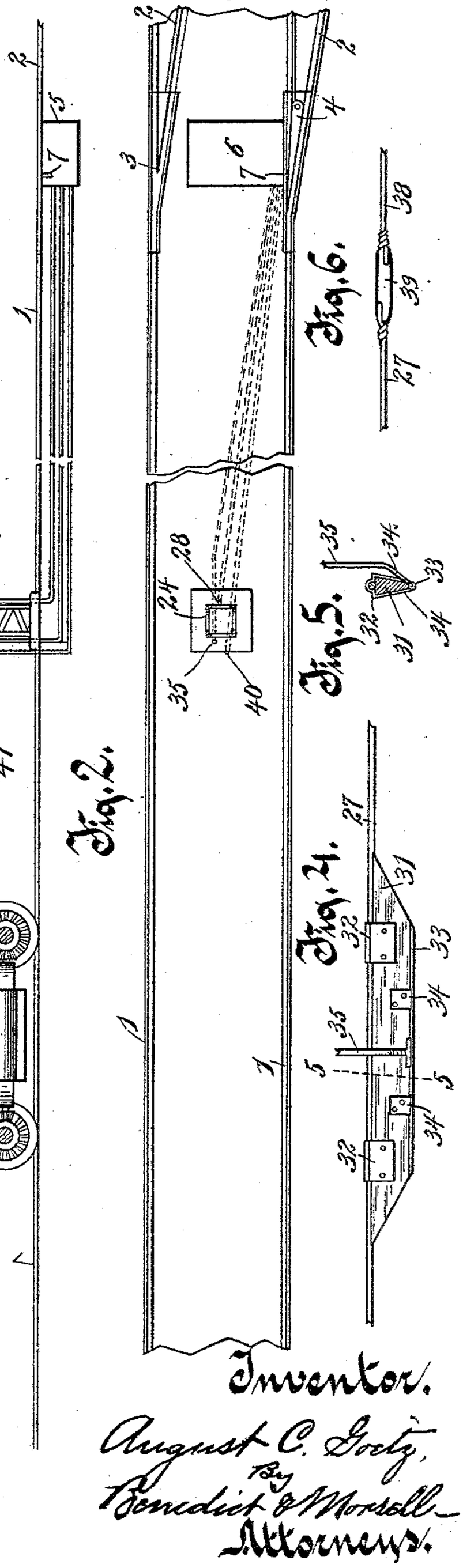
(No Model.) 2 Sheets—Sheet 1.

A. C. GOETZ.

ELECTRICALLY OPERATED RAILWAY SWITCH.

No. 559,796. Patented May 12, 1896.





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(No Model.) 2 Sheets—Sheet 2.

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Fig. 7.

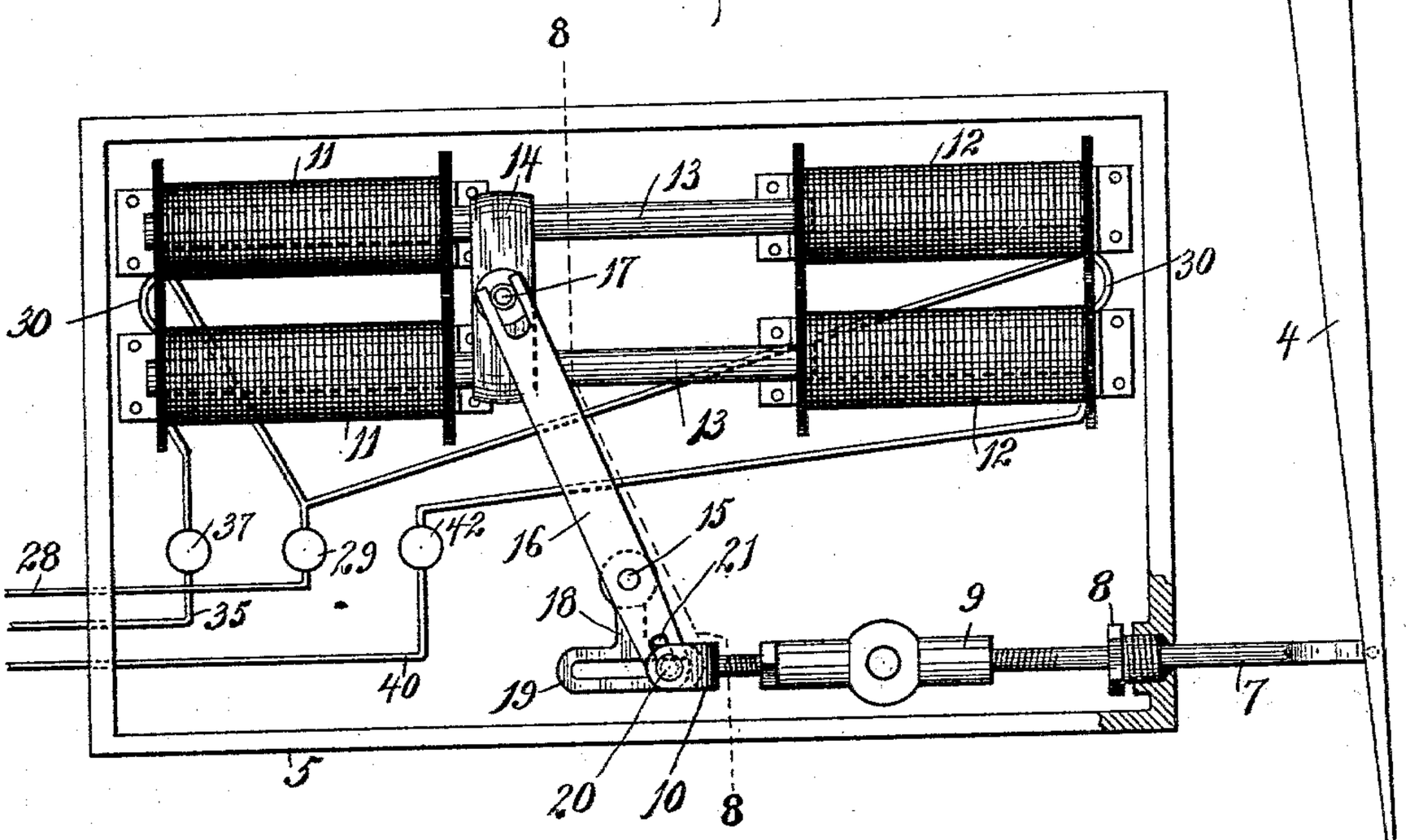
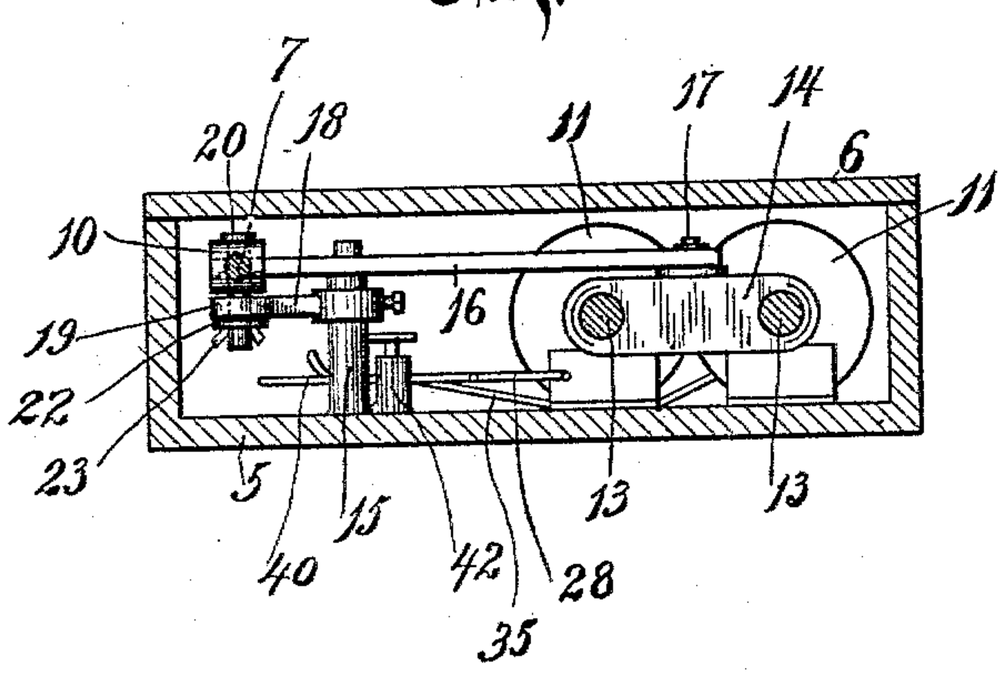


Fig. 8.



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UNITED STATES PATENT OFFICE.

AUGUST C. GOETZ, OF MILWAUKEE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILLIAM C. HENRY AND H. SAMUEL ESCH, OF SAME PLACE.

ELECTRICALLY-OPERATED RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 559,796, dated May 12, 1896.

Application filed August 24, 1893. Serial No. 483,924. (No model.)

To all whom it may concern:

Be it known that I, AUGUST C. GOETZ, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Electric Railway-Switches, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in devices for automatically shifting a switch-point in the track of a railway on which cars are run by electricity.

My invention consists particularly of improvements on the devices for which Letters Patent No. 489,944 were issued to me on January 17, 1893.

The invention consists of the devices hereinafter described and claimed or their equivalents.

In the drawings, Figure 1 is an elevation of so much of an electrical street-railway and its car (the car being in longitudinal section) as is necessary to illustrate my invention. Fig. 2 is a plan of the railway-track with a portion of my improved devices shown and indicated therewith. Fig. 3 is a detail, part in section, of a switch used on the car in connection with my improved devices. Fig. 4 is a detail of an insulating and switch device used in connection with the electric conducting or trolley wire. Fig. 5 is a transverse section of the device shown in Fig. 4 on line 5 5 thereof. Fig. 6 is a detail of a modified form of insulating device. Fig. 7 is a plan view of the electric mechanism connected directly to the switch-point. Fig. 8 is a transverse vertical section of the mechanism shown in Fig. 7 on line 8 8 thereof, looking toward the left.

Like numerals of reference denote like parts throughout the several views.

Referring to the drawings, the numerals 1 1 indicate the main rails, and 2 2 are branches diverging therefrom. One of the rails 2 diverges, at its junction with the contiguous rail 1, in and by a frog 3, while the other rail 2, at its junction with the contiguous rail 1, diverges therefrom in and by a pivoted and swinging point or switch 4.

The numeral 5 indicates a casing, conveniently located below the surface of the ground and provided with a removable cover 6, which is adapted to serve as a manhole or means of conveniently examining and repairing the structure. This casing is adapted to receive the mechanism for shifting the switch-point 4, said mechanism being actuated through the medium of the electricity supplied to drive the car. A rod 7 passes through a bushing or bearing 8 in one end of the casing, said rod being preferably composed of two sections united by means of a turnbuckle 9, whereby its length may be adjusted. The outer end of this rod is pivoted, advisably in the under surface of the switch-point 4. The rod is reciprocable endwise and connects at its inner end with a U-shaped connection 10. Within the casing are suitably arranged opposite sets of helices or solenoids 11 11 and 12 12, respectively, provided with central longitudinal apertures. Within the apertures of the helices or solenoids in longitudinal alinement pass metal cores 13 13, which are arranged to move freely in the longitudinal apertures and connected together medially by means of a transverse connecting-rod 14. The cores 13 are somewhat less in length than the lengths of the helices and the distance between them, so that when the cores pass entirely through the helices on one side they extend only partially through the helices on the opposite side.

Projecting up from the bottom of the casing is a standard or post 15, upon the reduced upper end of which is seated, so as to turn freely thereon, a lever 16, said lever having one end bifurcated so as to embrace a pin or bolt 17, extending up from the connecting-rod 14. The post or standard 15 is also provided with a laterally-extending adjustable arm 18, which is formed at its end with a slotted extension 19 at right angles thereto. A pin or bolt 20 passes through the U-shaped connection 10, through an elongated slot 21 in the end of lever 16, embraced by the arms of the U-shaped connection, and finally through the slotted extension 19, said bolt receiving on its lower end a washer 22, held in place by means of a pin 23.

It will be understood that when the cores

13 13 are in the position shown in Fig. 7 if the helices 12 12 be energized electrically, the other helices being inactive, the cores will be shifted thereby, so as to pass entirely through the helices 12 12, thereby shifting the switch-point 4 to the extent necessary to shunt the car onto the branch or side track. To now reverse the switch 4, it is only necessary to energize the helices 11 11 electrically, the other helices 12 12 being inactive, in order to draw the cores 13 again to the position shown in Fig. 7.

The means for transmitting the required electricity to one or the other of the sets of helices will now be described.

The numeral 24 indicates an ordinary form of wire-supporting post having connected at its upper end a feed-wire 25 and to a laterally-extending arm 26 a trolley-wire 27, which receives its electricity from the feed-wire in the usual and well-known manner. From the feed-wire a wire or electrical conductor 28 leads to a binding-screw 29 in the casing 5 and from said binding-screw connects with opposite ones of the helices, said helices in turn being connected in sets respectively by wires 30 30.

The numeral 31 indicates an insulating-block, (shown clearly in Figs. 4 and 5,) to the upper edge of which the trolley-wire is attached by means of clamping-plates 32 32, said plates embracing opposite sides of the block and having loops at their upper edge for the passage of the wire. The ends of the block are inclined, as clearly shown, while along the lower horizontal edge is secured a short wire 33, held in place by means of plates 34 34 upon opposite sides of the block. Leading to and contacting with the wire 33 is an electrical conductor 35, which is suspended from the feed-wire by means of insulated hanger rods or wires 36. This conductor 35 extends down, preferably alongside of the wire-supporting post, to a binding-screw 37 in the casing and from said binding-screw leads to the inner helix 11.

The block 31 is the preferred means for insulating a section of the wire, inasmuch as it can be quite readily attached to the trolley-wire without the neceessity of cutting the same. In advance of block 31 in Fig. 1, and shown in detail in Fig. 6, is a modification of the means for insulating a section of the trolley-wire. In this case, however, it is necessary to cut said trolley-wire. It consists of a short wire 38, having its ends connected to plates 39 39 of insulating material, preferably wood or rubber, said insulating-plates in turn having the severed ends of the trolley-wire connected thereto. Extending medially from wire 38 is an electric conductor 40, which is suspended by insulated rods or wires 41 from the feed-line. This wire 40 extends down alongside the post 24 to a binding-screw 42 in the casing, and thence to the inner helix 12.

In order to fully illustrate my invention, in Fig. 1 of the drawings is shown a longitudinal section of an ordinary electric street-car, said car being indicated by the numeral 43. The car is provided with the usual trolley 44 and switch mechanism 45, which latter is controlled by the motorman, as is well understood. The switch is of the ordinary and usual form, and for a thorough understanding of the same reference should be had to Fig. 3 of the drawings.

The numeral 46 indicates the wire extending from the trolley to the switch, and 47 the wire leading from the switch and extending to the motor and from the motor to the car-axle.

It will be understood that the action of my improved device is entirely within the control of the motorman on the car. Thus if, when coming toward the switch 4, said switch is in the position illustrated in Fig. 2—that is, in a position to shunt the car onto the branch rail—and it is desired instead that the car should continue along the main rails, it is only necessary for the motorman, through the medium of the switch 45, to allow the electric current passing through the car to continue to pass through it as the trolley travels over the insulating-block 31. When the switch-point is in the position shown in Fig. 2, the cores 13 are in a reverse position to that shown in Fig. 7—that is to say, they extend entirely through the helices 12 and only a short distance into the helices 11. The moment the trolley comes into contact with the short wire 33 of the block 31 the current is completed from the helices 11 by the return-wire 35 to the short wire 33 of the insulated block 31, through the trolley-wire 46, through the switch 45 to wire 47, and, finally, to the earth. The helices 11 are thus energized electrically, and thereby the cores drawn into said energized helices, whereby the point of the switch will be correspondingly shifted and sufficiently to carry the car along the main tracks. When the trolley next reaches the insulating-section 38, the motorman must shut off the electric current, so as not to energize the helices 12 through the conductor 40, or otherwise the switch would be shifted back to its initial position. If now the succeeding car is to pass onto the branching tracks, and therefore the switch is to be shifted to the initial position, (shown in Fig. 2,) the motorman must continue the flow of electricity actively while the car passes over the section 38, whereby the cores will be drawn again into the helices 11 and the switch correspondingly shifted, the current in this case being completed through the return-wire 40 to the insulated section 38, from thence to wire 46, through the switch 45 to wire 47, and, finally, to the earth. In this latter case it would be better that the electric current should be shut off while passing over the insulating-block 31, thus obviating the use of the current when not required.

It will be seen from the construction shown in Fig. 7 that the rod 7 is caused to push in a straight line against the switch-point, this

being attained through the medium of the pin or bolt 20, passing through the slotted extension 19. Lost motion is allowed by means of the provision of the elongated slot 21 in the lever 16 and the bifurcation of the opposite end of said lever.

From the foregoing description it is thought that the operation, construction, and advantages of my improvement will be readily understood. In the device illustrated in Letters Patent No. 489,944, hereinbefore referred to and upon which the present invention is an improvement, the electricity supplied to drive the car is conducted to the mechanism for shifting the switch through insulated sections of the rail. In the present invention, however, these insulated sections are arranged in connection with the trolley-wire and the electrical energy for operating the switch conducted directly from said sections to the switch-operating mechanism. It will be understood that the insulating-section 31 and insulating-section 38 may be used, as shown in the drawings. If preferred, however, two devices similar to 31 may be employed, or, on the other hand, two devices similar to 38 could be utilized. In the latter case, if no means were provided, there would be an unelectrified or "dead" wire between terminal insulating-blocks 39. To guard against this, therefore, it would be necessary to connect the feed-wire 25 with the sections 38 by means of short connecting-wires.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, of a railway-track having a branching track connected therewith, a trolley-wire, insulated sections in said trolley-wire, a section composed of a block of insulating material, to one edge of which the trolley-wire is attached, and having a short wire attached to its opposite edge, said short wire insulated by the block from the main trolley-line, a movable switch in one of the rails, a device connected electrically with the feed-line, and with the insulated sections of the trolley-wire, and also connected with the movable switch for shifting said switch by the energy of the electric current delivered to the device, when the current is completed through one of the insulating-sections, substantially as set forth.

2. An insulating-section for an electric line, consisting of a block of insulating material, to one edge of which the electric line is attached, and having a short wire attached to its opposite edge, said short wire insulated by the block from the main line, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST C. GOETZ.

Witnesses:

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C. T. BENEDICT.