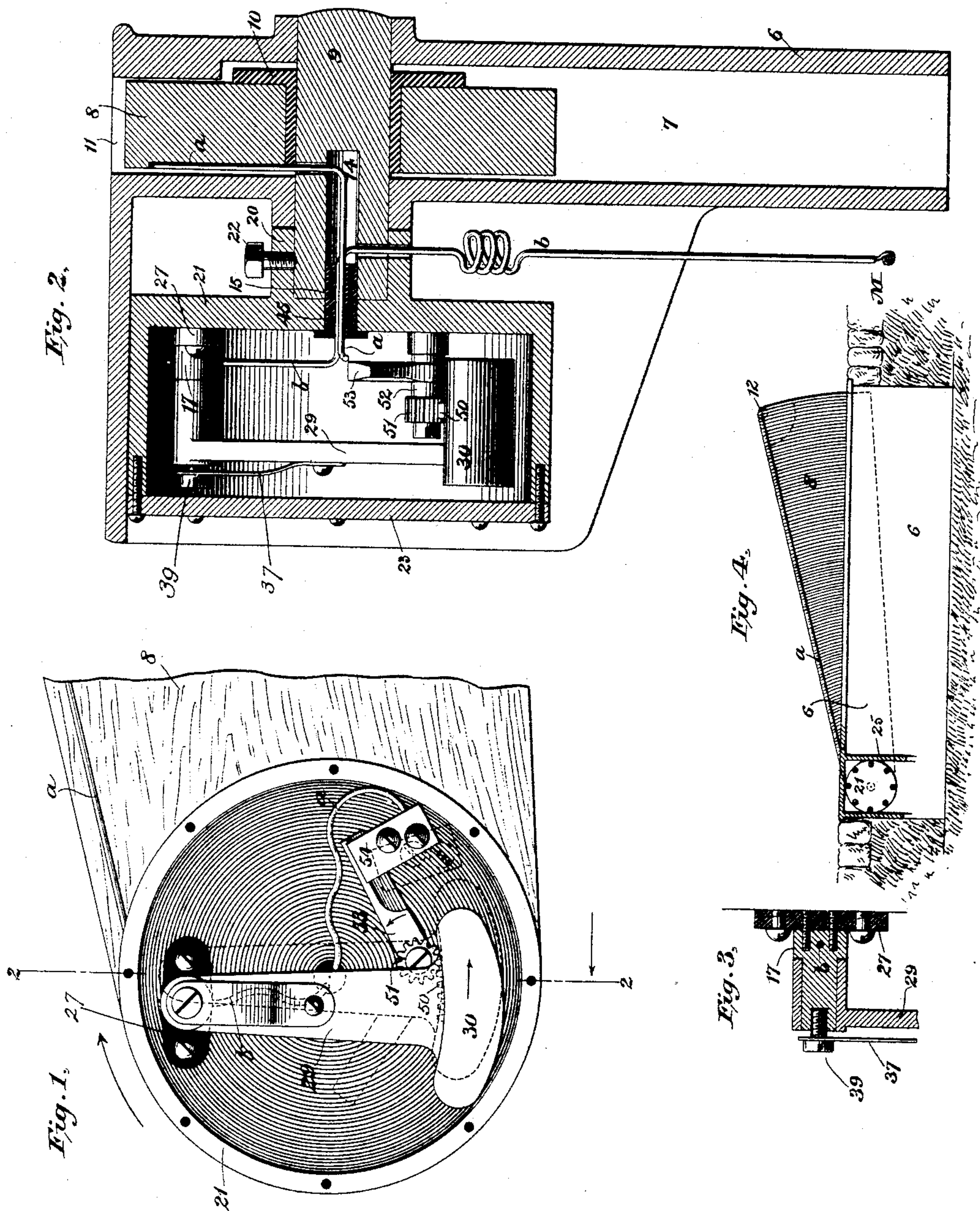


(No Model.)

F. MANSFIELD.
ELECTRIC SWITCH FOR ELECTRIC RAILWAYS.

No. 450,173.

Patented Apr. 14, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK MANSFIELD, OF NEW YORK, N. Y.

ELECTRIC SWITCH FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 450,173, dated April 14, 1891.

Application filed November 18, 1890. Serial No. 371,823. (No model.)

To all whom it may concern:

Be it known that I, FRANK MANSFIELD, a citizen of the United States, residing at New York, county and State of New York, have
5 invented certain new and useful Improvements in Electric Switches for Electric Railways, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to
10 make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an electric switch which is especially designed and adapted for
15 making and breaking the circuit of an electric railway of the class shown and described in United States patents granted to me July 22, 1890, and numbered 432,673, 432,674, and 432,675, respectively.

20 The object of my invention is to provide a switch by which the branch conductors of the class of electric railways referred to in the above-noted patents may be connected with and disconnected from a subterranean main
25 conductor and which may be placed in the ground and be proof against short-circuiting by ordinary surface-water.

The invention consists in the various novel and peculiar arrangements and combinations
30 of the several parts of the device, all as hereinafter fully described, and then pointed out in the claims.

In the accompanying drawings I have illustrated an embodiment of my invention, where-
35 in—

Figure 1 is a view of the switch with the top of the switch-box removed, together with a portion of the operating-lever, which is shown in elevated position, at which time the
40 switch is closed. Fig. 2 is a sectional view of the switch, switch-box, the operating-lever, and its casing and shaft, the section being taken on a plane indicated by line 2 2 in Fig. 1. Fig. 3 is a detached view in section of a
45 detail of the apparatus hereinafter referred to. Fig. 4 is a side view of the casing, switch-box, and the pick-up lever reduced in size. In this view the lever 8 is shown as raised to its highest point of elevation, at which time
50 it is supposed to be in contact with a device carried by a passing car.

In the said drawings like reference-numerals indicate like parts throughout.

Referring to the drawings, 6 designates a
55 suitable casing formed with a narrow chamber 7, in which swings the operating pick-up lever 8, which may be made of wood or any suitable material. This lever is mounted upon a shaft 9 by means of a sleeve 10, and it turns
60 with the shaft which is mounted across the chamber 7 in suitable bearings formed in the sides of the casing. This pick-up lever 8 may be swung in and out of the opening 11 of the casing, and is provided at its free end with a
65 contact-piece 12, which is connected with the branch conductor *a* and is designed to be engaged by a pick-up device or plow carried by a car, as will be readily understood by reference to the hereinbefore-noted patents.

One end of the shaft 9 projects considerably beyond the casing 6, and is recessed centrally at 14, and upon this projecting end of the shaft is mounted a circular switch box or
70 drum 21, which is provided with a centrally-disposed collar or hub 20 for receiving the end of the shaft 9, upon which it is fixed by means
75 of the screw 22, so that the switch-box turns with the shaft in response to the movements of the pick-up lever 8. The switch-box is formed with a perforation 45, arranged so as
80 to come in axial alignment with the chamber 14 of the shaft 9, and a plug 15 of insulating material is fitted into the opening 45 and extends into the recess 14. This plug 15 also
85 forms a water-tight joint, and the branch conductor *a*, which leads from the main conductor *M* through the switch to the contact-piece 12 on the pick-up lever, passes through
90 this plug 15 and also through the chamber 14, and thence out through suitable openings in the shaft 9, as clearly indicated in the drawings.

The switch consists in a swinging arm or member 29, mounted upon the shaft 17, which is fixed to the switch box or plate 21 at a point
95 eccentric to the center of motion of said plate or box, and is suitably insulated therefrom by means of the plate 27. The insulated branch conductor *a* is connected with the shaft 17, which is in circuit with the arm 29 directly,
100 and also indirectly through means of the spring 37, mounted upon the arm, and the

screw 39, engaging the spring and mounted upon the shaft, this spring and screw being used in order to gain a better connection between the two parts, since the joint between the arm 29 and its shaft 17 will not afford a very good electric connection, especially when the same is oiled.

The lower end of the swinging arm 29 is provided with a weight 30, and it carries a slightly-curved rack 50, which is in constant mesh with a pinion 51, which is fixed upon an arbor 52, carrying a contact-arm 53, which at one limit of its movement engages a terminal plate 54, with which is connected the branch conductor *a*. The arbor 52 of the contact-arm 53 is suitably insulated from its support on the switch box or plate, and is adapted to turn through a little more than a quarter of a circle, so as to strain the contact-arm through the same range of movement. The relative arrangement of the swinging arm 29 and the contact-arm 53 will of course determine the extent of the sweep of the latter.

The parts are so arranged that when the pick-up lever 8 is elevated to its highest position they stand related as shown in full lines, in which condition the switch is closed, the path of the circuit from the main conductor to the contact-piece 12 upon the pick-up lever being as follows: Wire *b*, shaft 17, swinging arm 29, weight 30, rack 50, pinion 51, arbor 52, contact-arm 53, terminal 54, wire *a* to contact 12. As the pick-up lever starts to move downward, the arm 29 and the contacts 53 and 54 start to move into the positions indicated in dotted lines. As the swinging arm 29 moves toward the right, (see Fig. 1,) its rack turns the pinion 51 in the direction of the adjacent arrow, so that the circuit of the branch conductor *a b* is broken between the contacts 54 and 53 almost immediately as the pick-up lever 8 starts to move downward. Since the circuit is only completed when the lever 8 is at its highest point of elevation and since all parts of the apparatus are suitably insulated and made water-tight, it will be impossible for ordinary surface-water to short-circuit the current.

The casing 6, upon which the switch-box and the pick-up lever 8 are mounted, is to be placed in the road-bed of the railway, with its upper edge flush with the surface of the ground.

I do not herein claim the combination of a swinging operating-lever and a switch box or plate moving in fixed relation therewith, contacts arranged upon said box or plate eccentrically to the center of motion of said lever, for the same is broadly claimed by me in another application, Serial No. 371,822, filed November 18, 1890.

Having thus described my improvements in electric switches which are especially adapted

to the class of railways hereinbefore referred to, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In an electric switch, the combination, with a swinging lever for operating the switch, of a switch box or plate moving in fixed relation with said lever and provided with a fixed terminal, a pivoted contact-arm mounted upon the said switch-plate eccentrically to the center of movement of the same and adapted to engage the said terminal when moved to one limit of its movement, connections intermediate the said switch plate or box, and the said pivoted contact-arm for moving the latter upon its pivot as the switch plate or box is rotated, substantially as and for the purpose set forth.

2. In an electric switch, the combination, with a swinging lever for operating the switch, of a switch box or plate moving in fixed relation with the lever and provided with a fixed terminal, a pivoted contact-arm for engaging the said terminal when moved to one limit of its movement, a pinion for turning said pivoted arm, and gearing intermediate the said pinion and the switch plate or box, whereby as the latter is rotated in one direction or the other the pivoted contact-arm may be moved into or out of contact with the terminal, substantially as and for the purpose set forth.

3. In an electric switch, the combination, with a swinging lever for operating the switch, of a switch box or plate moving in fixed relation therewith and provided with a fixed terminal, a pivoted contact-arm mounted eccentrically to the center of movement of the switch plate or box and provided with a pinion for moving the arm, a weighted swinging arm provided with a rack meshing with the said pinion and mounted eccentrically to the center of motion of the switch box or plate, substantially as and for the purpose set forth.

4. In an electric-railway switch, the combination, with a swinging pick-up lever 8 and a shaft 9 moving therewith, of a switch box or plate 21, moving in fixed relation with said lever and provided with a terminal 54, a pivoted contact-arm 53, having a pinion 51 and mounted eccentrically to the center of motion of the switch box or plate, a swinging circuit-completing arm 29, mounted eccentrically to the center of motion of said box or plate and provided with a rack 50, gearing with said pinion 51, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 10th day of November, 1890, in the presence of the two subscribing witnesses.

FRANK MANSFIELD.

Witnesses:

W. C. JORDAN,
CHAS. O'REILLY.