

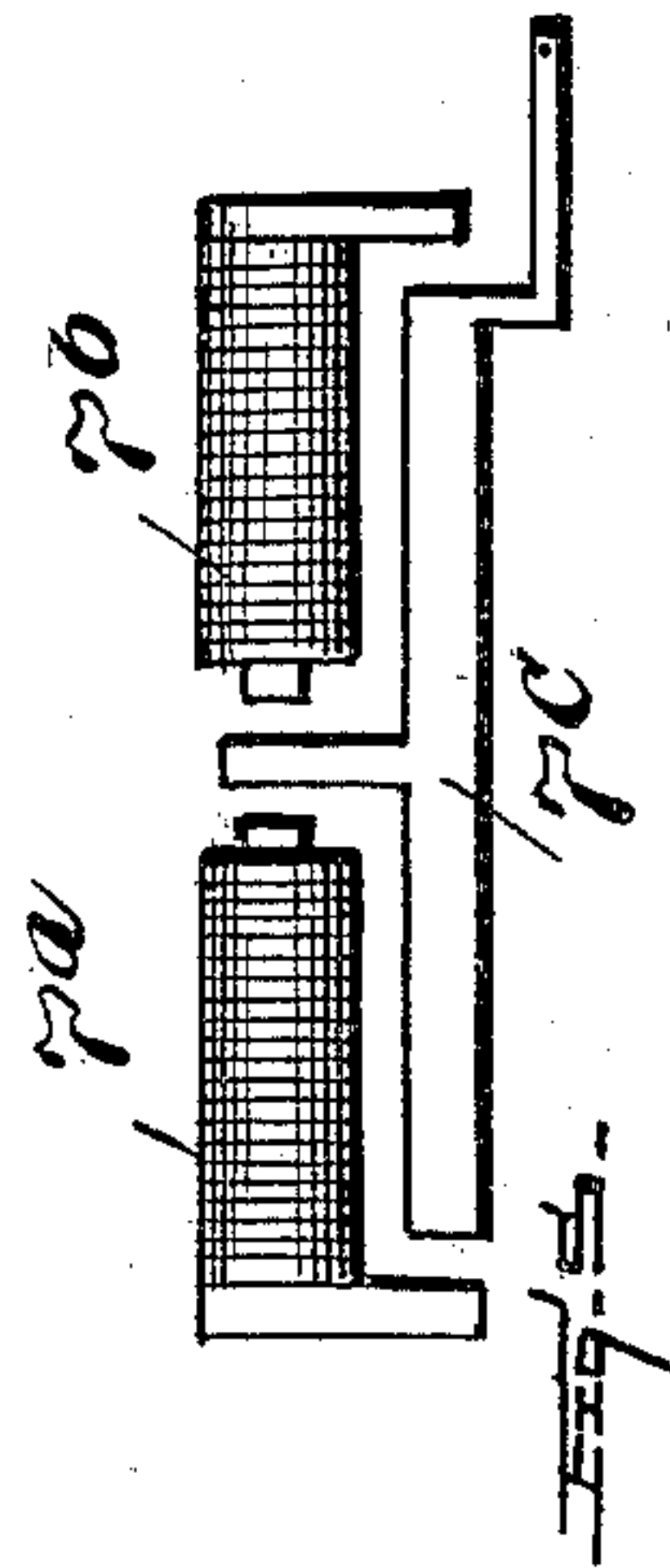
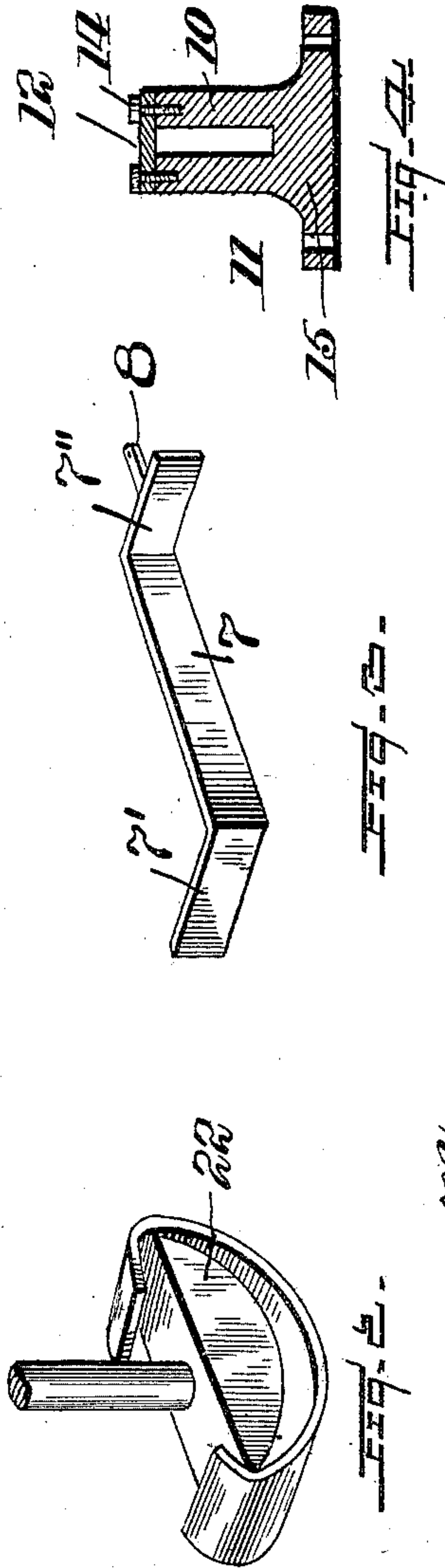
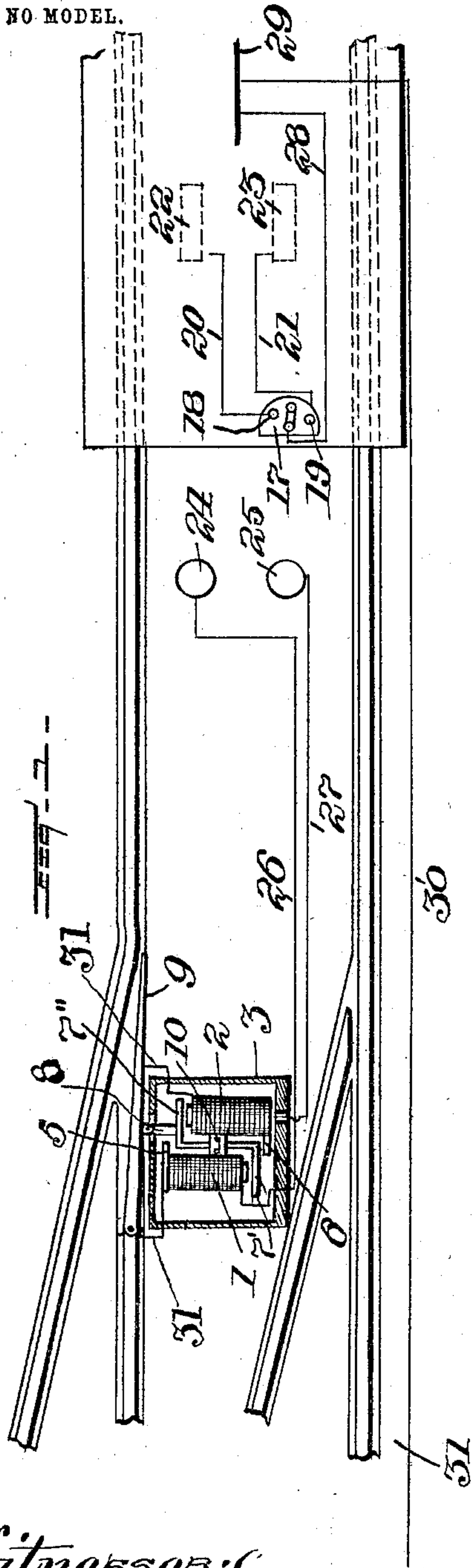
No. 725,221.

PATENTED APR. 14, 1903.

T. COPE.
ELECTRIC SWITCH.

APPLICATION FILED MAY 6, 1902.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

TROY COPE, OF NEW WATERFORD, OHIO.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 725,221, dated April 14, 1903.

Application filed May 6, 1902. Serial No. 106,173. (No model.)

To all whom it may concern:

Be it known that I, TROY COPE, a citizen of the United States of America, residing at New Waterford, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in electric switches, and relates particularly to an electric switch adapted to be employed in connection with electrically-operated street-car systems, the
15 main object of the invention being to provide means whereby the motorman may readily throw the switch in the desired direction without stopping the car or, in fact, materially checking the speed of the latter.

20 It is a further object of my invention to materially simplify the construction of electrical switches of this nature by practically dispensing with all mechanism other than a pair of magnets having their armature connected direct to the switch-tongue, a pair of
25 contacts located in the bed of the track and in circuit with the magnets, a double-point switch located on the car in convenient position for the motorman, and contact-blocks carried by the car for engagement with the
30 contacts located in the track to complete the circuit and operate the switch-tongue when one or the other of the contact-blocks are placed in circuit by the motorman operating the double-point switch, all of which construction will be hereinafter more specifically described, and then particularly pointed
35 out in the claims.

40 In describing the invention in detail reference will be had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference will be employed for indicating like parts throughout the several views of the drawings, in
45 which—

Figure 1 is a diagrammatical plan view of my improved switch, the casing for the magnets being in section. Fig. 2 is a detail perspective view of one of the contact-blocks
50 carried by the car. Fig. 3 is a detail perspective

view of the armature of the magnets, and Fig. 4 is a central transverse vertical sectional view of the armature-guide. Fig. 5 is a plan view showing a modified form of arrangement for the magnets and armature. 55

To put my invention into practice, I provide a pair of magnets 1 2, which are arranged within a suitable casing 3, that is conveniently placed in the road-bed of the track, and in practice will have a suitable cover. 60 (Not shown in the drawings.) The magnet 1 carries an extension 5, projecting beyond the magnet, and the current is completed to this magnet 1 through contact-blocks to be hereinafter described. Connection of the circuit-wire is made with the magnet 2 direct, and this magnet also carries an extension 6, projecting in the opposite direction to the extension 5. The armature 7 in the present illustration is substantially Z-shaped in form 70 and is placed directly between the magnets 1 2, with its angular end 7' extending outwardly in front of the magnet 1 to be attracted thereby and its end 7'' extending outwardly in the opposite direction in front of the magnet 2 at the opposite end of the latter. Although I have shown an armature of substantially Z-shaped form, yet I do not wish to limit myself to this form, as I may employ a pair of magnets placed end to end 80 within the casing, as shown in Fig. 5, wherein the magnets 7^a 7^b are shown so placed, and the armature 7^c instead of being Z-shaped lies parallel with the magnets and is connected to the switch-tongue in the same manner as the form shown in Fig. 1. In this form of construction I would also support the armature in a bearing, as will be described hereinafter for the preferred. The form end 7'' of the armature carries an arm or rod 8, which extends through an opening provided therefor in the wall of the casing 3, adjacent to the switch-tongue 9, and is pivotally connected to said tongue, as shown in Fig. 1. This armature is guided in its movement and held in proper position by means of a guide, Fig. 4, consisting of a standard 10, having a slot 11 to receive the armature, the latter being held therein by means of a small plate 12, secured to the top of the standard by small screws 14, 100

as shown, or other suitable means. The standard has a suitably-apertured base 15, by means of which it is bolted or otherwise secured to the bottom of the casing 3. In connection with these magnets as just described I provide at any suitable point in the front of the car 16 a two-point switch 17, in which 18 indicates the one contact and 19 indicates the other contact. Circuit-wires 20 and 21 connect these contacts with the contact shoes or blocks 22 23, suitably suspended beneath the car. Mounted in the road-bed of the track is a pair of contacts 24 25, spaced an equal distance apart to the shoes 22 23, so as to be engaged by the latter. The contact 24 is connected by wire 26 to the magnet 1 and the contact 25 is connected by wire 27 to the magnet 2. Connection is made by wire 28 from the double-point switch 17 to the trolley-wire 29, which is supplied with current through the supply-line 30.

31 indicates the connecting-wires between magnets 1 2 and the rails of the track.

The wires 26 27 in practice are insulated where they pass through the casing 3 in order that the current may not pass to the latter.

In operation if the switch-tongue 9 is in the proper position when the car approaches the track no operation will take place; but if it is desired to throw the switch-tongue the operator moves the switch either onto contact 18 or 19, according to the direction in which it is desired to move the switch-tongue, thus completing the circuit when the shoes or contact-blocks 22 23 come in engagement with the contact 24 25 either through wire 26 27 and through magnet 1 or 2, according to whether the switch is on contact 18 or 19. When the circuit is completed from contact 18 through wire 20, shoe or block 22, contact 24, wire 26 to magnet 1, the core of magnet 1 and the extension 5 attract the armature 7, and the latter in its movement throws the switch-point 9 over against the main rail, so as to pass the car onto the main track. When the circuit is completed through wire 27 to magnet 2, the core of said magnet and the extension 6 will attract the armature 7, so as to open the switch and allow the car to pass onto the side track.

It is thought that the construction and operation of the device will be apparent from the foregoing description, and in practice it will be observed that various changes may be made in the details of construction without departing from the general spirit of my intention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric switch, the combination with a pair of magnets provided with end extensions, of a slidable armature, the body portion of which is arranged between the said extensions and having its ends bent outwardly

across the ends of the said magnets, an arm secured to one end of the said armature and having its outer end pivotally connected to the switch-tongue, and means for completing the circuit through the magnets for operating the switch-tongue.

2. In an electric switch, the combination with a pair of magnets provided with end extensions and arranged at one side of the switch-tongue, and a pair of contacts arranged in the road-bed and electrically connected to the said magnet, of an armature having a portion of its length arranged between the said magnets and extensions, and having one of its ends pivotally connected to the switch-tongue, and means carried by the car for completing the circuit through the said contacts and magnets for operating the switch.

3. In an electric switch, the combination with a casing arranged in the road-bed at one side of the switch-tongue, and a pair of magnets arranged in the said casing, of a standard having a slotted upper end, said standard arranged between the said magnets, a horizontally-slidable armature mounted in the said standard, said armature having its ends bent outwardly in opposite directions, and having one of its ends pivotally connected to the switch-tongue, and means for energizing and deenergizing the said magnets separately for operating the switch-tongue, substantially as described.

4. The combination with a switch, of a casing located contiguous to the switch, spaced electromagnets arranged side by side within the casing and comprising a plurality of electrically-connected magnets, open electric circuits connected with each magnet, means mounted on a car for separately closing the circuits, an actuating-rod attached to the switch and extending between the magnets, and armatures secured to the rod and projecting from opposite sides of the same, said armatures coacting respectively with the magnets.

5. The combination with a switch, of separate electromagnets arranged side by side and having their active portions arranged at opposite ends, means for separately energizing said magnets, separate armatures coacting with the magnets, and means connecting the armatures and the switch.

6. The combination with a switch, of separate electromagnets arranged side by side and having the active portions of their cores arranged at opposite ends, means for separately energizing said magnets, separate armatures coacting with the magnets, and a common connection between the armatures and the switch.

7. The combination with a switch, of an actuating-rod pivotally attached to the switch, separate electromagnets arranged side by side and having the active portions of their cores arranged at opposite ends, means for separating the ends of the said magnets, an arm secured to one end of the said armature and having its outer end pivotally connected to the switch-tongue, and means for completing the circuit through the magnets for operating the switch-tongue.

rately energizing the magnets, and separate armatures fastened to the rod and coacting with the magnets.

5 8. The combination with a switch, of horizontally-disposed electromagnets arranged side by side, means for separately energizing the magnets, a horizontal actuating-rod attached to the switch and extending longitudinally of and between the magnets, and ar-

matures connected to opposite sides of the actuating-rod and coacting respectively with the opposite ends of the magnets.

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

TROY COPE.

Witnesses:

JOHN NOLAND,
E. E. POTTER.