No. 796,287. PATENTED AUG. 1, 1905.

T. BOVEY.

ELECTRICALLY CONTROLLED SHIFTING SYSTEM FOR TRACK SWITCHES.

APPLICATION FILED JULY 11, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

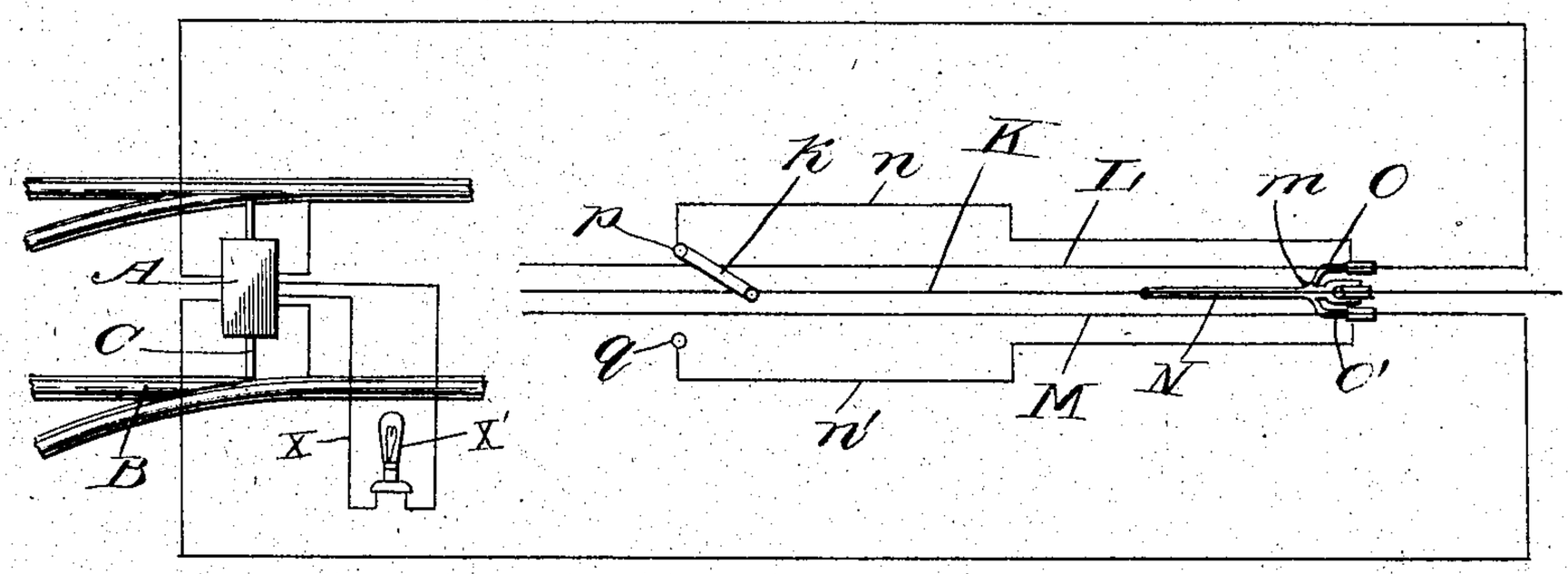
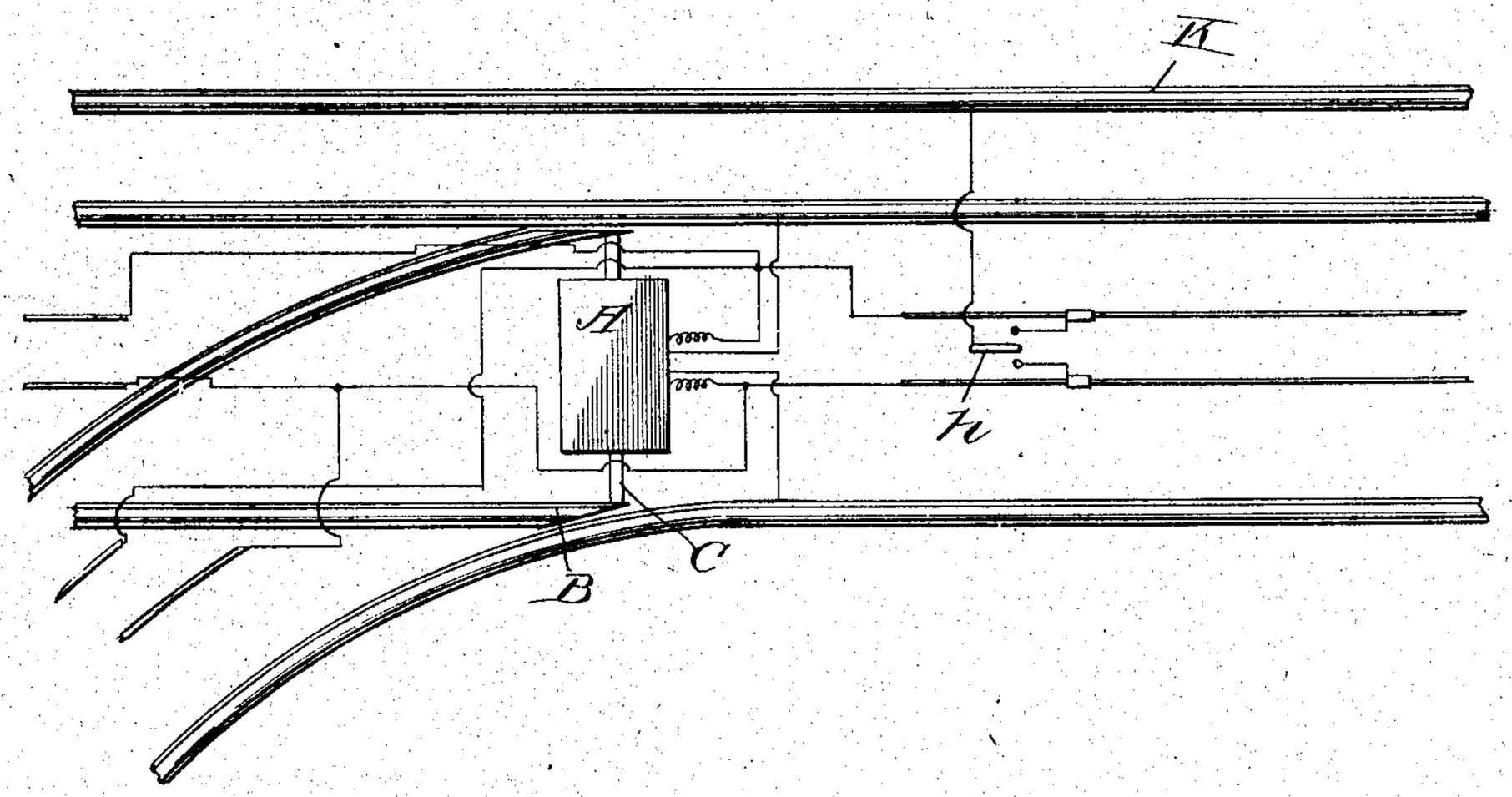


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4

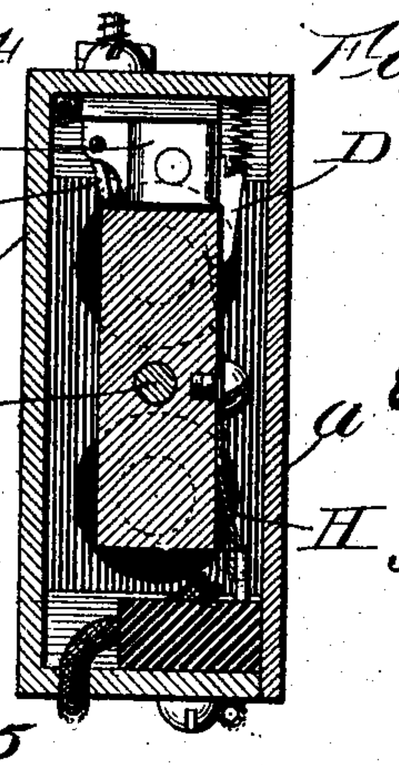


Fig. 5

Fig. 3.

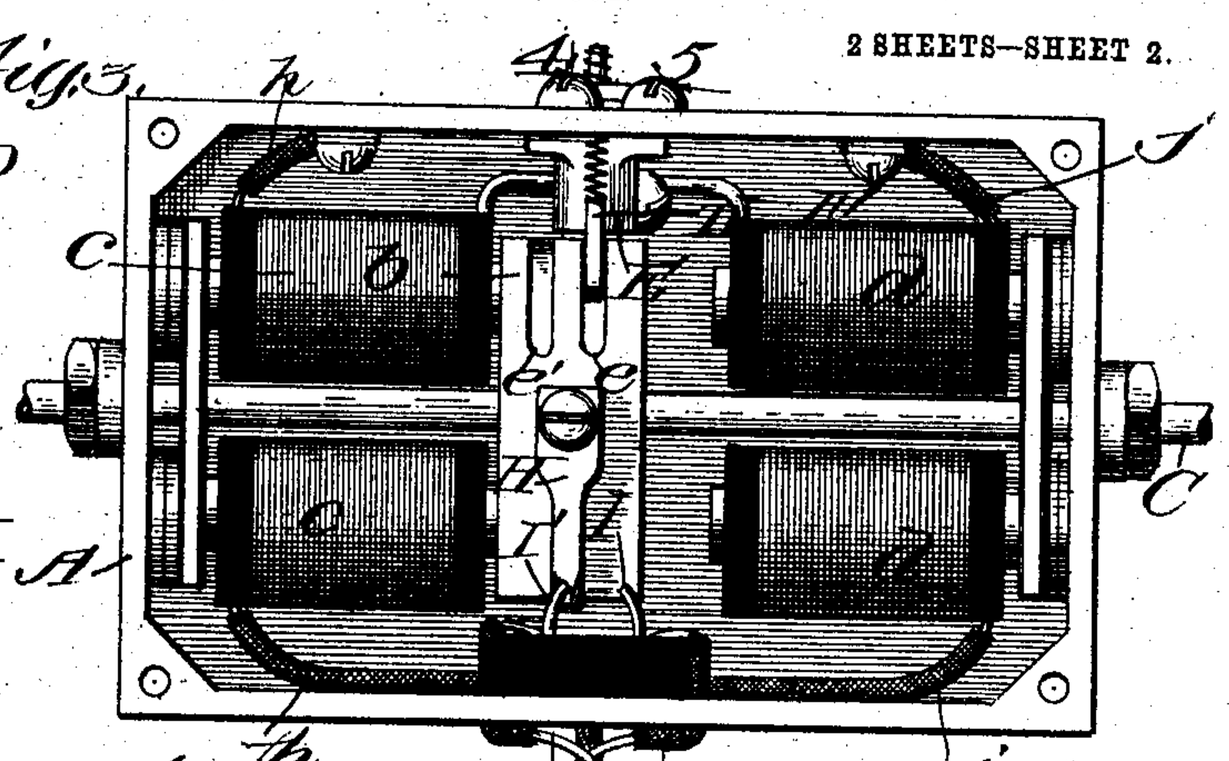


Fig. 6.

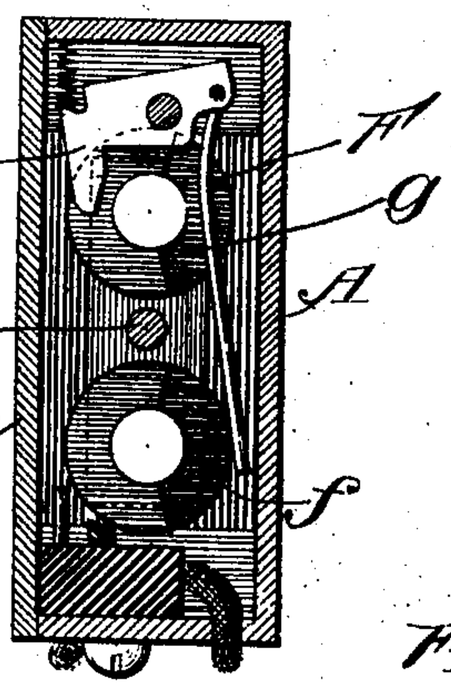
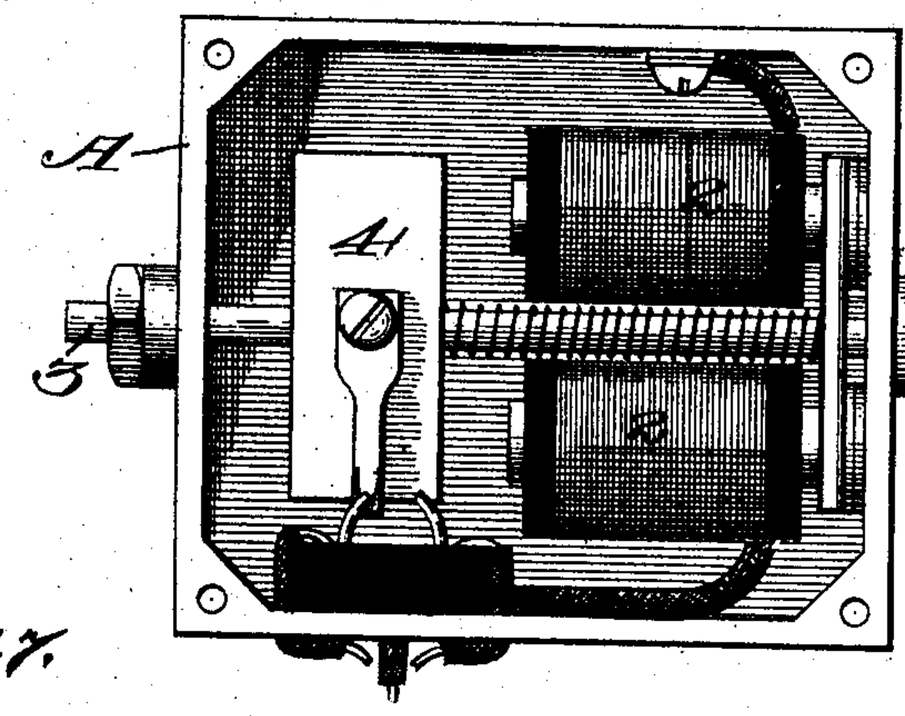
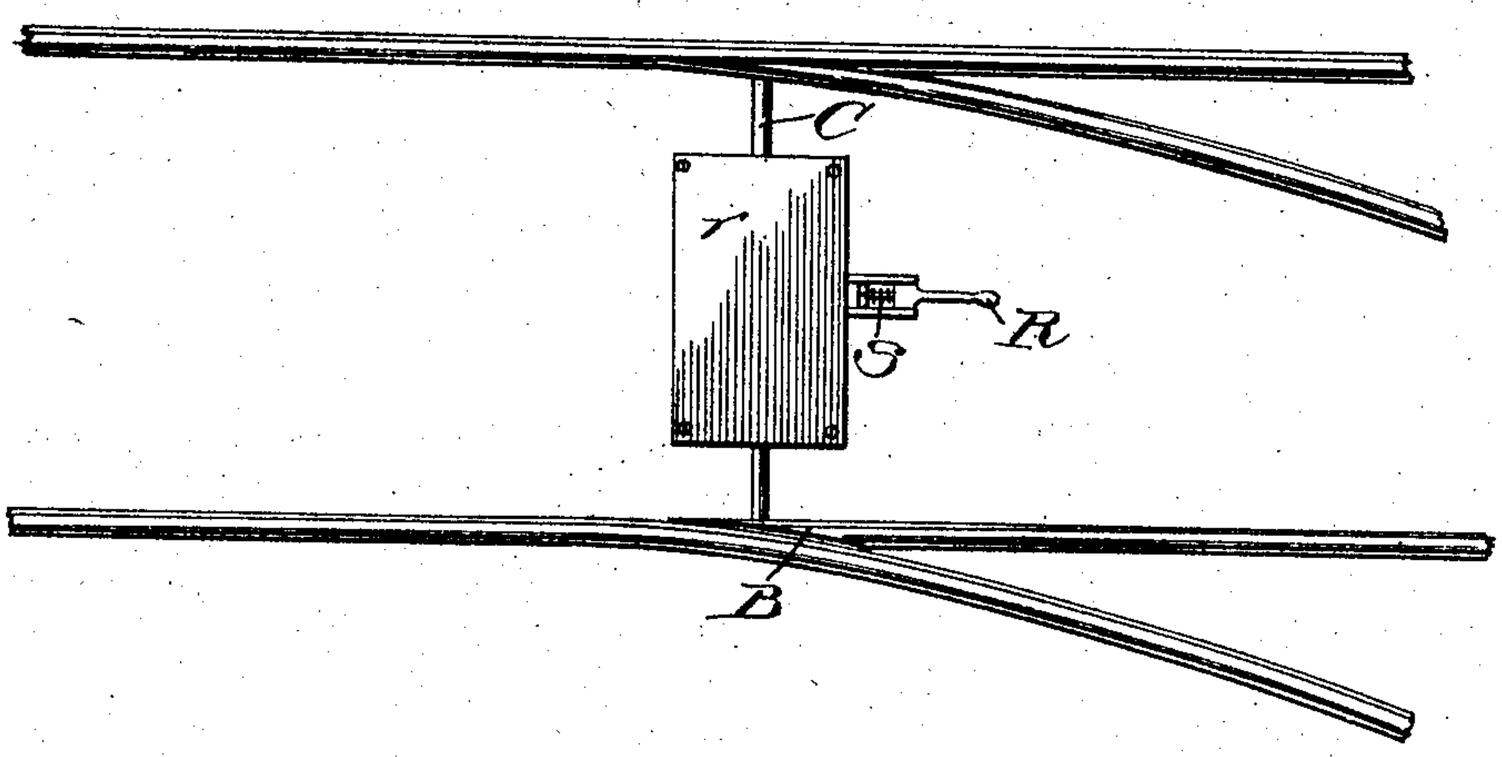


Fig. 7.





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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-CONTROLLED SHIFTING SYSTEM FOR TRACK-SWITCHES.

No. 796,287. Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed July 11, 1904. Serial No. 216,166.

To all whom it may concern:

Be it known that I, THOMAS BOVEY, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrically-Controlled Shifting Systems for Track-Switches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

Heretofore switches for the tracks of electric railways have been operated either directly or indirectly by manual power and involved both labor and delay.

The object of my invention is to operate said switches electrically through means controlled by the motorman, which are equally effective when in the vicinity of the switch either while the car is in motion or standing still. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a diagrammatical view of the electric system employed in my invention on a two-rail track. Fig. 2 is a diagrammatical view of the same, showing its application to a third-rail electric road. Fig. 3 is a plan view of the electric switch used in connection therewith with the cover of the case thereof removed. Fig. 4 is a cross-section thereof, taken on dotted line 4 4, Fig. 3, looking in the direction indicated by the arrows. Fig. 5 is also a cross-section, but taken on dotted line 5 5, Fig. 3, looking in the direction indicated by the arrows and having the armature removed. Fig. 6 is a plan view of a modified construction of said electric switch with the cover of its case removed. Fig. 7 is a diagrammatical view of my invention, showing yet another modified construction of my invention.

In the drawings, A represents a suitable case, which is preferably of a rectangular shape and provided with a suitable cover *a*, which is removably held in place by screws located at the corners thereof. This case is preferably made of cast metal and is insulated in any suitable manner from the mechanism housed therein, and it is placed mediate the rails of a straight track at about the junction of a track-switch B, substantially as shown in Figs. 1, 2, and 7 of the drawings. The ends of this case are provided with suitable guide bearings or openings through which a reciprocal bar C extends, one end of which latter extends and is suitably secured to the lower portion or flange of the movable rail of the switch and the other end of which is secured in a similar manner to the movable section of the straight rail on the opposite side of the track. At about the center of length of the case this bar C has a straight armature *b* secured transversely thereto, and at each end of the case a pair of corresponding magnets *c c* and *d d* are secured, preferably to the end walls of said case, but insulated therefrom. The armature is attracted first by one set of magnets *c c* to move bar C longitudinally to open the track-switch and then by the opposite set of magnets *d d* to move bar C in the opposite direction to close the said track-switch.

When the armature *b* is moved to the limit of its movement in either direction, it is automatically locked by an inverted-L-shaped dog D, which is fulcrumed at about the center of length of its longer vertically-disposed branch between the bifurcations of a lug E, secured to the side wall of the case, so that said dog moves in a vertical plane midway between the magnets. The upper horizontally-disposed branch of dog D normally enters and engages either one of the grooves *e e'*, made longitudinally in the upper surface of the contiguous end of the armature, and thus holds the bar C stationary at the extremes of its movement. Near the lower extremity of the vertically-disposed branch of the dog the bend of a U-shaped armature-frame F is secured thereto. This frame consists, preferably, of iron, and the parallel arms thereof extend horizontally between the case and the core of the magnets, the fiber heads *f* and *g* of which latter are depressed or cut away, so that when energized the magnets attract the arms of frame F and through the latter move the dog, so that its engaging end moves out of whichever one of grooves *e* and *e'* it may be in and releases the armature, so that it may be attracted by and move toward the energized magnet.

Magnets *c c* are closed to a normally open circuit *h h*, the positive end of a portion of which latter enters the case through a suitable opening in the side thereof opposite dog D

and the negative end of which is grounded by a suitable binding-post in the case and from thence to the rails. The armature is provided with a suitable brush-contact H, which when it is at the limit of its movement either in the one direction or the other engages the inwardly-projecting terminal I and I′ of the signal or lamp circuit X, which is electrically connected to the main circuit. When thus engaged, the signal X′ on the said circuit is operated or the lamp lighted automatically, as the case may be, and thus the necessity of manual effort avoided to operate the same. This signal and lamp circuit operates and lights the semaphore-target located at one side of the track and indicates whether the track-switch is "straight ahead" or "open," as the case may be. Magnets *d d* are closed to a normally open circuit *j*, the positive end of a portion of which enters the case about at the same point where circuit *h* enters the same and the negative end of which is grounded by being connected to a binding-post. From thence it flows to the rails of the track.

In order to actuate the mechanism hereinbefore described, I provide the car with an ordinary metallic shunt *k*, the pivoted end of which is closed to the main circuit K. This main circuit is in the vicinity of the track-switch paralleled by wires L M on each side of it, and the trolley N, engaging the main wire, has a bracket *m* secured to but insulated from the pole N′, carrying the same, which consists of a collar and arms *o o′*, branching out from either side of the same, like horns, the extremities of which have shoes or other devices that come in contact with wires L and M when the car approaches the track-switch. The arms *o o′* are each electrically connected by independent wires *n n′* to the contacts *p q*, which are engaged by the shunt *k*. The circuit, closed by throwing the shunt into engagement with either contact *p* or *q*, flows through the wire connecting the same to arm of bracket coöperating therewith into the wire engaged by the shoe thereof and from thence either to the circuit *h h* or *j j* to energize the magnets that will throw the bar C either in one direction or the other to open or close the track-switch, as hereinbefore explained.

In Fig. 2 is shown a third-rail system to which my improvements are applied and which is wired so that the switch can be operated by a car approaching from either direction. This arrangement of electrical connections, as well as the modified construction of the means for locking the armature in position at the end of its movement in either direction, which is shown in Fig. 7, I desire to be understood as contemplating within the scope of my invention. In Fig. 7 the devices in the case *r* are the same as shown in Figs. 3 and 4 of the drawings. The only difference is that the dog is moved into and out of engagement with the armature by manual power exercised through the medium of a lever R, having an eccentric-shaped boss which engages a spring-returnable plunger *s*, whose inner end is pivotally connected to the upper portion of the vertical branch of dog D.

In Fig. 6 I show a modified construction of the shifting devices. In this modification I employ but one set of magnets 2, which are, as shown in the drawings, located at right end of the case. The reciprocal bar 3 and armature 4 mounted thereon are constructed and operate the same as the bar C and the armature shown in Fig. 3, except that in order to move the said armature away from the magnets a powerful expansion-spring surrounds the bar 3 between the armature and the case, and when the current is switched from the magnets 2 2 the bar automatically returns to its original position.

What I claim as new is—

1. An electric switch-shifting system comprising a main circuit; a normally open auxiliary circuit; a shunt on a car for connecting said main circuit and auxiliary circuits; a transverse reciprocal bar connecting the movable members of a track-switch; a signal circuit independent of said main and auxiliary circuits adapted to be opened and closed by the operation of said bar; devices closed to said auxiliary circuit for actuating said bar; and means for locking said bar at the extremities of its movement.

2. An electric switch-shifting system comprising a main circuit; a normally open auxiliary circuit; a shunt on a car for connecting said main circuit and auxiliary circuits; a transverse reciprocal bar connecting the movable members of a track-switch; a signal-circuit independent of said main and auxiliary circuits adapted to be opened and closed by the operation of said bar; devices closed to said auxiliary circuit for actuating said bar; and automatic means for locking said bar at the extremities of its movement.

3. An electric switch-shifting system comprising a main circuit; a normally open auxiliary circuit; a shunt on a car for connecting said main circuit and auxiliary circuits; a transverse reciprocal bar connecting the movable members of a track-switch; a signal-circuit independent of said main and auxiliary circuits adapted to be opened and closed by the operation of said bar; devices closed to said auxiliary circuit for actuating said bar; and electrically-controlled means for locking said bar at the extremities of its movement.

4. An electric switch-shifting system comprising a main circuit; two normally open auxiliary circuits each having portions paralleling said main circuit one on each side thereof; a car-carried shunt for connecting said main circuit with either of said auxiliary circuits; a transverse reciprocal bar connected to the

movable member of a track-switch; a signal-circuit independent of said main and auxiliary circuits adapted to be opened and closed by the operation of said bar; devices closed independently to said auxiliary circuits respectively; and means for locking said bar at the extremes of its movement.

5. An electric switch-shifting system comprising a main circuit; two normally open auxiliary circuits each having portions paralleling said main circuit one on each side thereof; a car-carried shunt for connecting said main circuit with either of said auxiliary circuits; a transverse reciprocal bar connected to the movable member of a track-switch; a signal-circuit independent of said main and auxiliary circuits adapted to be opened and closed by the operation of said bar; devices closed independently to said auxiliary circuits respectively; and automatic means for locking said bar at the extremes of its movement.

6. An electric switch-shifting system comprising a main circuit; two normally open auxiliary circuits each having portions paralleling said main circuit one on each side thereof; a car-carried shunt for connecting said main circuit with either of said auxiliary circuits; a transverse reciprocal bar connected to the movable member of a track-switch; a signal-circuit independent of said main and auxiliary circuits adapted to be opened and closed by the operation of said bar; devices closed independently to said auxiliary circuits respectively; and electrically-controlled means for locking said bar at the extreme of its movement.

7. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; and means carried by said armature that automatically close an alarm or signal circuit when said armature is at the end of its movement toward said magnets.

8. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; and a brush-switch carried by said armature that automatically closes an alarm or signal circuit when said armature is at the end of its movement toward said magnets.

9. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; means carried by said armature that close the alarm or signal circuit when said armature is at the end of its movement toward said magnets; and devices for locking said bar at the extremes of its movement.

10. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; means carried by said armature that automatically close an alarm or signal circuit when said armature is at the end of its movement toward said magnets; and automatic devices for locking said bar at the extremes of its movement.

11. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; means carried by said armature that automatically close an alarm or signal circuit when said armature is at the end of its movement toward said magnets; and electrically-controlled devices for locking said bar at the extremes of its movement.

12. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; a brush-switch carried by said armature that automatically closes an alarm or signal circuit when said armature is at the end of its movement toward said magnet; and devices for locking said bar at the extremes of its movement.

13. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; magnets by which the same is attracted; a brush-switch carried by said armature that automatically closes an alarm or signal circuit when said armature is at the end of its movement toward said magnets; and electrically-controlled devices for locking said bar at the extreme of its movement.

14. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; a magnet placed on each side of said armature and alternately attracting the same; a brush-switch carried by said armature that automatically closes an alarm or signal circuit when at the limit of its movement in either direction.

15. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; a magnet placed on each side of said armature and alternately attracting the same; and means carried by said armature that automatically closes an alarm or signal circuit when at the limit of its movement in either direction.

16. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; a magnet placed on each side of said armature and alternately attracting the same; means carried by said armature that automatically close an alarm or signal circuit when at the limit of its movement in either direction; and devices for locking said bar at the extremes of its movement.

17. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; a magnet placed on each side of said armature and alternately attracting the same; means carried by said armature that automatically close an alarm or signal circuit when at the limit of its movement in either direction; and automatic devices for locking said bar at the extremes of its movement.

18. In an electric switch-shifting system a reciprocal bar; an armature secured transversely thereto; a magnet placed on each side of said armature and alternately attracting the same; means carried by said armature that automatically close an alarm or signal circuit when at the limit of its movement in either direction; and electrically-controlled devices for locking said bar at the extremes of its movement.

In testimony whereof I have hereunto set my hand this 6th day of July, 1904.

THOMAS BOVEY.

Witnesses:

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EDW. J. LEHMANN.