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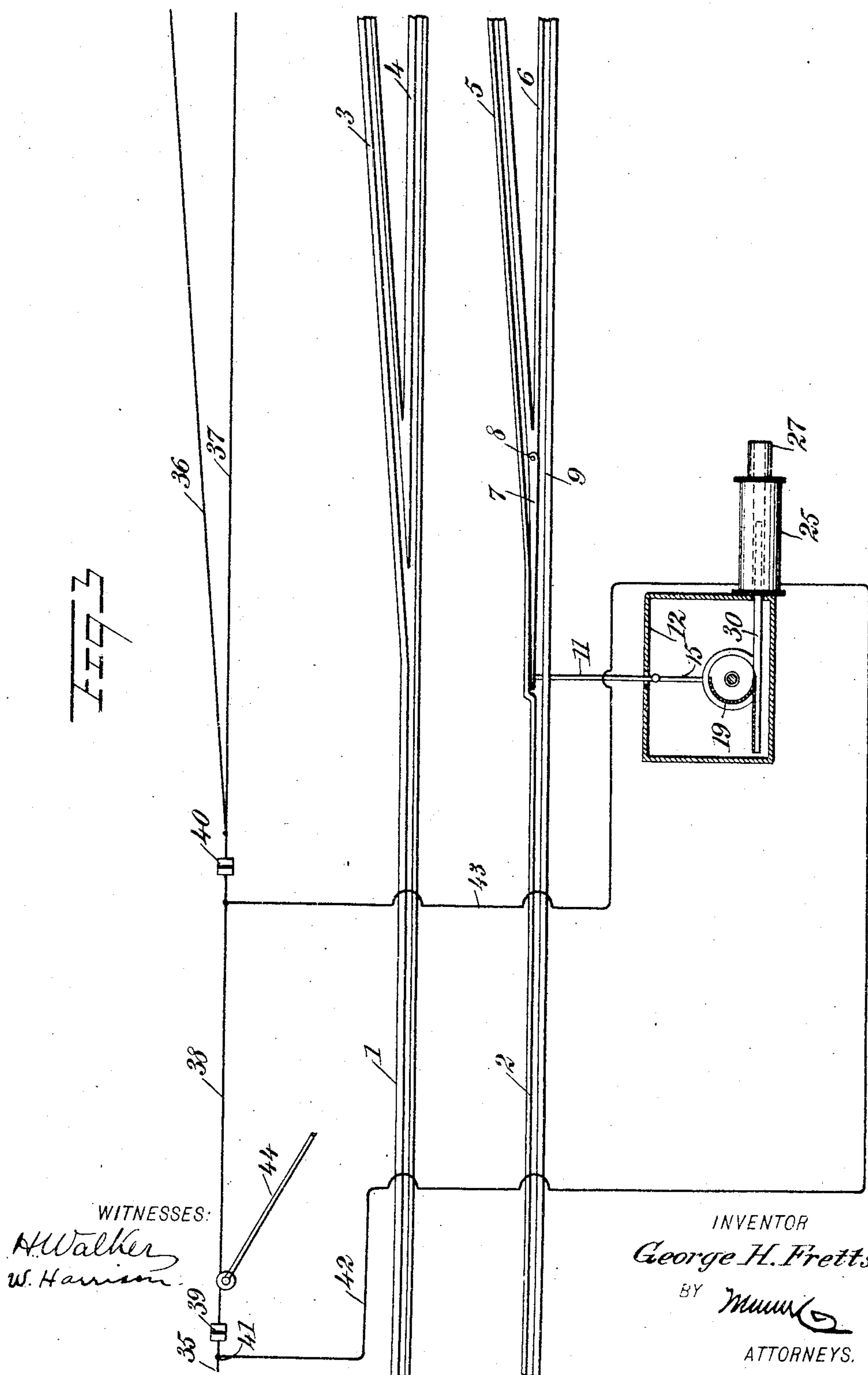
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# TRACK SWITCH FOR ELECTRIC RAILWAYS.

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2 SHEETS—SHEET 2.





# UNITED STATES PATENT OFFICE.

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## TRACK-SWITCH FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 779,920, dated January 10, 1905.

Application filed March 25, 1903. Serial No. 149,454.

*To all whom it may concern:*

Be it known that I, GEORGE H. FRETTS, a citizen of the United States, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and Improved Track-Switch for Electric Railways, of which the following is a full, clear, and exact description.

My invention relates to electric-railway switches, my more particular object being to produce a type of switch which may be advantageously controlled from a moving car.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical cross-section through the switch mechanism, taken upon the line 1 1 of Fig. 2 looking in the direction of the arrow. Fig. 2 is a horizontal section taken upon the line 2 2 of Fig. 1 looking in the direction of the arrow, and Fig. 3 is a diagrammatic plan view of the wiring and switch connections.

The rails of the track are shown at 1, 2, 3, 4, 5, and 6. The main track consists of the rails 1, 2, 4, and 6, and the rails 3 5 constitute a branching track. A movable tongue 7 is pivoted at 8 upon a frog 9, as indicated in Fig. 3. This frog is provided with an aperture 10, into which passes a thrust-rod 11, which engages the tongue 7 for the purpose of actuating the same. A casing is shown at 12, and is provided with an aperture 13, through which the thrust-rod 11 passes. The casing 12 is provided with a top 14 for excluding moisture and for rendering the parts readily accessible. A pitman 15 is connected with the thrust-rod 11 for the purpose of moving the same longitudinally, and thereby causing the tongue 7 to assume the respective positions indicated by dotted and full lines in Fig. 2.

Mounted within the casing 12 is a bracket 16, provided with a journal 17, upon which is mounted a wheel 18 and a pinion 19, provided with semicircular teeth, as indicated in Fig. 1. A revoluble disk 20 is provided with locking-notches 21 and with shoulders 24. Pivotally mounted upon the wheel 18 is a pawl

22 and also a spring 23 for pressing the pawl into engagement with the disk 20.

A solenoid 25 is mounted upon the casing 12 by means of screws 26 and is provided at its lower end with a tube 27, of non-magnetic material, this tube being coaxial with the cylindrical space 28. A movable armature 29 is mounted within the solenoid and is normally free to play vertically within the same.

Mounted rigidly upon the upper end of the armature 29 is a rod 30, provided with rack-teeth 31. A roller 32 is pivotally mounted within a bracket 33 and engages the rod 30, forming an antifriction device for the same. The rod 30 is provided with a shoulder 34, which engages the roller 32 upon the descent of the armature 29 and forms a limiting-stop for the armature.

In Fig. 3 the electric mains are shown at 35 36 37, the two mains last mentioned corresponding, respectively, with the branching line represented by the tracks 3 5 and the main line represented by the tracks 4 6. A sectional conductor 38 is connected by insulating-blocks 39 40 with the mains. A wire 42 is connected by a junction 41 with the main 35 and is also connected with the solenoid 25, forming one of the terminals thereof. The other terminal is the wire 43, which is connected with the insulated section 38. The trolley is shown at 44 and is connected in the manner well known in the art with the motor mechanism of the car, and thereby to the ground.

My invention is used as follows: The car, we will say, is traveling toward the right from the view-point of Fig. 3 and is approaching the tongue 7. The switch-tongue 7 may obviously be in one of the two positions indicated in Fig. 2. Say, for instance, that the tongue occupies the position indicated in full lines in Figs. 2 and 3 and that the motorman desires to go straight ahead—that is, to keep his car upon the tracks 4 6. He can accomplish this purpose in either of two ways: first, to cut off the current by means of his controller before reaching the insulated section 38 and simply coasting until the car passes out under the wire 37 without disconnecting the



trolley; second, he can leave the current on until the block 39 is reached, whereupon the following circuit is completed: main 35, junction 41, wire 42, solenoid 25, wire 43, conducting-section 38, trolley 44, to the ground. This energizes the solenoid 25 and raises the armature 29 in the position indicated in Fig. 1. The bracket 45 enters one of the notches 21, and thereby maintains the disk 20 in the position indicated in Fig. 1, so that the tongue 7 is held rigidly in one or the other of its positions indicated in Fig. 2. In the particular instance above mentioned, as the tongue 7 is found already occupying the position indicated in Fig. 3 the effect of energizing the solenoid is to retract the thrust-rod 11 a slight distance, causing the tongue 7 to move toward the casing 12. The motorman then cuts off the current, as above described, whereupon the weight of the armature 29 causes the same to drop. The bracket 45 is thus retracted from the notch 21, and the weight of the armature acting upon the teeth 31 causes a semi-revolution of the disk 18 in a clockwise direction from the view-point of Fig. 1, thereby causing the pawl 22 to be dragged through a semicircle and made to engage the notch 24 shown upon the upper half of the disk 20. The weight of the armature 29 having thus shifted the pawl 22 from one of the notches 24 to the other, the current is again turned on, the circuit above described is again completed, and the armature once more rises to the position indicated in Fig. 1. The second upward movement of the armature 30 causes the pawl 22 to partially rotate the disk 20, thereby moving the pitman 15 and thrust-rod 11 so as to restore the tongue 7 to the position which it originally occupied before the arrival of the car. In other words, the motorman simply looks ahead and ascertains the condition of the tongue 7 and governs himself according to the condition in which he finds it by turning off and on the current. Each time the current is turned off and on the position of the switch-tongue is shifted. If the motorman desires his car to turn out upon the rails 3 5 and finds the tongue 7 in the position indicated in Fig. 3, he simply causes the trolley 44 to engage the insulated section 38, as above described. This energizes the solenoid 25 and draws the tongue 7 toward the casing 12, so that the car passes upon the tracks 3 5. If, however, he wishes the car to go upon the tracks 3 5 and finds the tongue 7 in its reversed position, as indicated by dotted lines in Fig. 2, he can either turn off the current and coast under the rail-section 38 and then apply his power again or else he can allow the trolley 44 to make contact with the section 38 and then by turning off the current cause the same to break the contact and finally making contact again between the trolley and the section, substantially in the same manner as above described. Each time the contact is

made and broken between the trolley and the rail-section the tongue 7 is shifted to the right or to the left, according to the position it first occupied. It has, therefore, no definite normal position and may be shifted at the will of the motorman. The tongue 7 is always held firmly in position for the reason that the pitman 15 always stops upon a center.

Where a part of the current is used for auxiliary purposes—such as lights, heating, and air-brakes—I make the magnet-wire heavy, so that the magnet is not affected by the current used for these auxiliary purposes. In other words, I make the magnet less sensitive, so as not to be affected except by the entire current used for operating the car-motor.

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

1. In a track-switch for electric railways, the combination of a mechanical switch provided with a movable tongue, a revoluble member connected with said tongue and free to actuate the same, said revoluble member being provided with notches, motor mechanism for actuating said revoluble member and provided with a locking-detent for engaging said notches, and electrically-operating mechanism controllable at will from a movable vehicle, for actuating said motor mechanism.

2. In a track-switch for electric railways, the combination of a mechanical switch provided with a movable tongue, a revoluble member connected with said tongue and free to engage the same, a one-way clutch connected with said revoluble member, an armature connected with said one-way clutch, magnetic mechanism controllable at will, for attracting said armature, and a locking device connected with said armature and free to engage said revoluble member for the purpose of maintaining said tongue rigidly in a predetermined position.

3. In a track-switch for electric railways, the combination of a mechanical switch provided with a movable tongue, a revoluble member connected with said mechanical switch, one-way clutch mechanism for actuating said revoluble member, an armature provided with a surface for engaging said clutch mechanism and with a locking member for engaging said revoluble member, magnetic mechanism for actuating said armature, and means controllable at will from a movable vehicle, for energizing said magnetic member.

4. In a track-switch for electric railways, the combination of a mechanical switch provided with a movable member, gearing connected with said movable member for shifting the same into different positions, a magnetic member controllable at will from a movable vehicle for actuating said gearing, and mechanism controllable by said magnetic member for locking said member in certain predetermined positions.

5. In a track-switch for electric railways,



the combination of a mechanical switch provided with a movable member, ratchet mechanism connected with said movable member, said ratchet mechanism being provided with  
5 a movable rack-bar, an antifriction device for said rack-bar, magnetic mechanism for moving said rack-bar, and means controllable at will from a movable vehicle for energizing said magnetic member.

10 6. In a track-switch for electric railways, the combination of a mechanical switch, a revoluble member connected therewith and adapted to shift the same back and forth once in each half-turn of said revoluble member, a

second revoluble member disposed adjacent to 15 said first revoluble member and normally free to rotate relatively thereto, clutch mechanism connecting said revoluble members together interdependently, and mechanism controllable at will from a movable vehicle for actuating 20 one of said revoluble members.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE H. FRETTS.

Witnesses:

F. G. BURNHAM,  
GEO. A. SEIB.