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SHIFTING MECHANISM FOR RAILWAY SWITCHES.  
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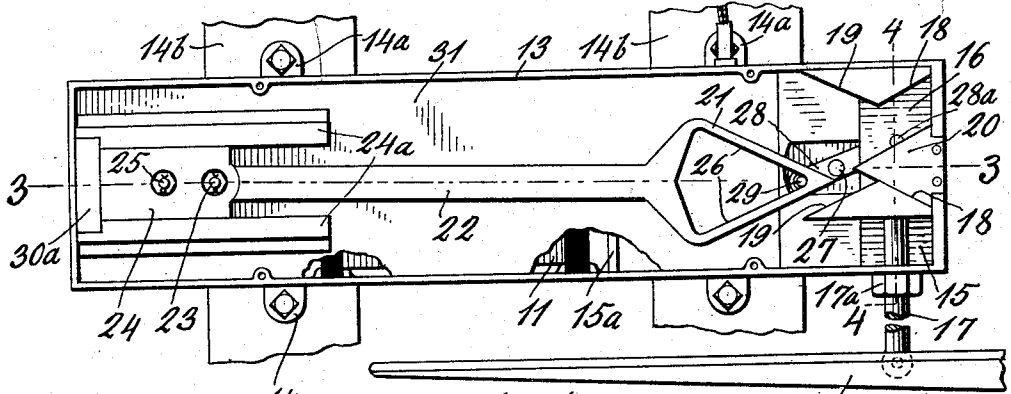


Fig. 1.

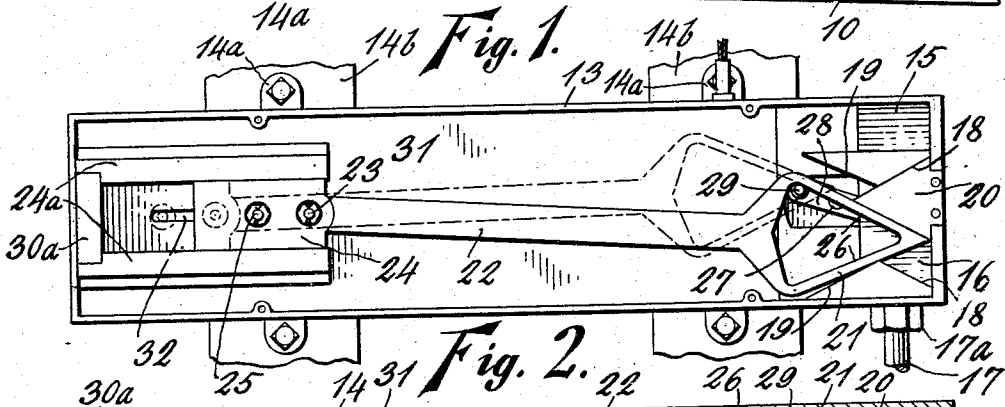


Fig. 2.

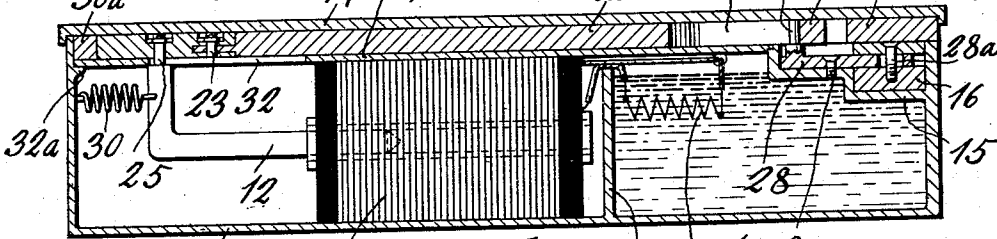


Fig. 3.

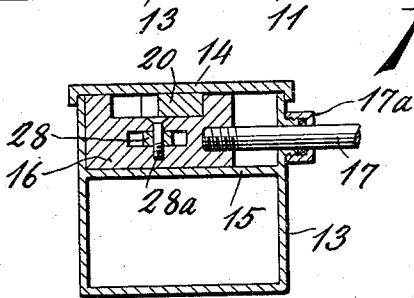


Fig. 4.

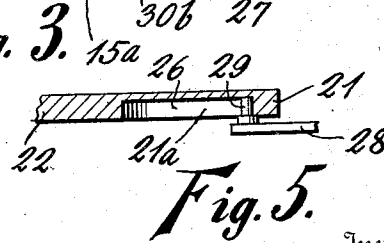


Fig. 5.

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SHIFTING MECHANISM FOR RAILWAY-SWITCHES.

1,176,494.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, JOHN SPELLING, citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Shifting Mechanism for Railway-Switches, of which the following is a specification.

The switch mechanism which is the subject-matter of the present application for patent is designed more particularly for electric railways, although it is not limited thereto, and the invention has for its object to provide a novel and improved mechanism for imparting the required movement to the switch tongue, said mechanism being operated by means of electric apparatus.

In order that the invention may be better understood, reference is had to the accompanying drawings, in which—

Figure 1 is a plan view of the mechanism by which the switch tongue is operated; Fig. 2 is a similar view showing the parts in another position; Fig. 3 is a longitudinal section on the line 3—3 of Fig. 1; Fig. 4 is a cross-section on the line 4—4 of Fig. 1, and Fig. 5 is a sectional detail showing a modification.

Referring specifically to the drawings, 10 denotes the switch tongue, the same being movable to make a path over which to shunt a train or car from one track to another. For imparting the movement to the switch tongue a solenoid or electro-magnet 11 is employed, the same having a movable core 12 which is operatively connected to a switch tongue shifting mechanism which will now be described.

At 13 is indicated a box which incloses the solenoid 11, and other parts to be described hereinafter. The box is provided with a tight fitting removable cover 14 which has not been shown in Figs. 1 and 2, and on the outside of the box, at the bottom thereof, are lugs 14<sup>a</sup> for bolting the box to the stringers or ties 14<sup>b</sup> of the track. The side walls of the box, on the inside thereof, have slots in which the solenoid is held, no bolts being necessary. In the box, at one end thereof, is located a shelf 15, and in front of this shelf the box contains a partition 15<sup>a</sup> rising from the bottom of the box and terminating a short distance from the top thereof.

On the shelf 15 is mounted a transversely slidable block 16 having a connection 17 with the switch tongue 10, said connection pass-

ing through a stuffing box 17<sup>a</sup> on one of the side walls of the box 13. The top of the slide block 16 has a recess, the end walls of which are beveled to produce two angular surfaces 18 and 19, respectively. The end wall of the box, adjacent to the shelf 15, carries an abutment 20 which extends into the recess in the block 16, said abutment being wedge-shaped and its width being less than the width of the recess. The bevel of the sides of the abutment conforms to the angle of the surfaces 18, so that when the slide block is at the limit of its movement in one direction, one of the surfaces 18 abuts against one beveled side of the abutment, and at the limit of the movement of the slide block in the opposite direction the other beveled side of the abutment is engaged by the other surface 18 of the slide block. With the slide block in either one of these positions, the beveled side of the abutment and the opposite and adjacent surface 19 defines a wedge-shaped recess into which a wedge 21 is adapted to be driven, whereby the slide block is forced to one side, and through the connection 17 the switch tongue 10 is shifted in a corresponding direction. The wedge 21 is at the outer end of a thrust rod 22 which is pivotally connected at its inner end, as indicated at 23, to a slide 24, which latter is operatively connected to the solenoid core 12 as indicated at 25. The wedge-shaped head 21 of the thrust rod 22 has an opening, the opposite side walls of which are parallel to the sides of the head, thus forming two opposite cam surfaces 26 which are inclined in opposite directions.

On the shelf 15 is pivoted, as indicated at 27, a lever 28 having one of its ends pivotally connected to the slide block 16 as indicated at 28<sup>a</sup>. The other end of the lever has an upstanding pin 29 which extends into the opening in the wedge 21. To the solenoid core is connected a spring 30 for returning the same when the solenoid is de-energized. To the rear end of the slide 24 is located a wooden bumping block 30<sup>a</sup>. The slide block 16 and the slide 24 work at right angles to each other.

In the circuit of the solenoid 11 is interposed a resistance coil 30<sup>b</sup>. The slide 24 is mounted between guides 24<sup>a</sup> on a tight fitting shelf 31, removably mounted in the box 13, so that it may be taken up to inspect the solenoid 11 and the resistance coil 30<sup>b</sup>, and in said shelf is a slot 32 in which the up-

standing connection 25 of the solenoid core with the slide is mounted. The shelf 31 is supported at one end on the shelf 15, and at its other end on a flange 32<sup>a</sup> on the adjacent end wall of the box 13. The shelf 15 is shaped to form a recess in which the slide block 16 works. The resistance coil 30<sup>b</sup> is located between the partition 15<sup>a</sup> and that end of the box 13 provided with the shelf 15, this portion of the box containing oil as shown in Fig. 3 in which the resistance coil is immersed.

When the switch tongue 10 is at the extremity of its movement in one direction, one side of the abutment 20 is engaged by the surface 18 of the slide which is on the corresponding side of the abutment and at the extremity of the movement of the switch tongue in the opposite direction; the other side of the abutment 20 is engaged by the surface 18 of the slide which is on the corresponding side of the abutment, as shown in Figs. 1 and 2. As shown in Fig. 1, the slide block 16 has been moved inward, and the switch tongue has been correspondingly shifted. If now the switch tongue is to be shifted in the opposite direction, the solenoid 11 is energized, whereupon its core 12 is drawn in and the rod 22, through the slide 24, is thrust forward. The wedge-shaped head 21 thereupon enters the wedge-shaped space between the surface 19 and the opposite and adjacent side of the abutment 20 in front of the abutting parts 18 and 20. The continued forward movement of the head causes the latter to push the slide block 16 in a direction to shift the switch tongue to the desired position. The pin 29 is at the forward end of the opening in the head 21 when the same is in retracted position, and when the head moves forward to shift the slide block 16, the latter, by reason of its connection with the lever 28, swings the same, so that at the end of the forward movement of the head the pin has been swung over toward one of the cam surfaces 26 and it is now located in the rear end of the opening in the head. Thus, when the solenoid is deenergized, the rod 22 is drawn back by the spring 30, the aforesaid cam surface, acting on the pin 29, swings the lever 28 in a direction to return the slide block 16 to the first-described position, and the switch tongue is restored to its normal position. The pin 29 is now again at the forward end of the opening in the head 21, and the parts are ready for another operation.

The mechanism hereinbefore described is designed for use in connection with street railways. If used on steam railroads, the parts are arranged so that the operation of the thrust rod 22 is the opposite of that hereinbefore described, the spring 30 being arranged to advance the thrust rod, and the solenoid retracting the same. Thus, the

switch tongue is held tight up against the rail and an engine or car can run through the switch and not injure the same, for the reason that when the car wheel is between the rail and the switch tongue, the thrust rod is forced back by the slide block 16, and when the wheel clears the switch tongue the thrust rod is again advanced by the spring to restore the switch tongue to its normal position. When the switch is to be thrown, the solenoid retracts the thrust rod, and when the solenoid circuit is broken the spring advances the thrust rod to restore the switch tongue to normal position.

The mechanism hereinbefore described is not limited to the operation of switches, but may be employed for operating signals and other apparatus.

The connection 17 with the switch tongue 10 or other part to be operated, may be placed on the opposite side to that shown in the drawings, in which event the wedge 21 will operate on the corresponding side of the abutment 20.

The current wires of the solenoid circuit will be suitably incased in a piping, the same being connected to the box 13 where said wires enter the same, as shown in Figs. 1 and 2.

Fig. 5 illustrates a modified form of wedge-head 21 of the thrust rod 22 in which the two opposite cam surfaces 26 are formed by a wedge-shaped recess 21<sup>a</sup> in the underside of the head, into which recess the pin 29 extends.

I claim:

1. A shifting mechanism comprising a slide block connected to the part to be shifted and having a recess, a stationary abutment extending into the recess, the opposite walls of the recess and the abutment being beveled and defining a wedge-shaped recess, a thrust-rod having a wedge head adapted to enter the wedge-shaped recess to force the slide block to one side, and actuating means for the thrust-rod.

2. A shifting mechanism comprising a slide block connected to the part to be shifted and having a recess, a stationary abutment extending into the recess, the opposite walls of the recess and the abutment being beveled and defining a wedge-shaped recess, a thrust-rod having a wedge head adapted to enter the wedge-shaped recess to force the slide block to one side, means for moving the slide block in the opposite direction, and actuating means for the thrust-rod.

3. A shifting mechanism comprising a slide block connected to the part to be shifted and having a recess, an abutment extending into the recess, the opposite walls of the recess and the abutment being beveled and defining a wedge-shaped recess, a thrust-rod having a wedge head adapted to enter

the wedge-shaped recess to force the slide block to one side, said wedge head having a cam surface, a lever connected to the slide block and engageable by the cam surface when the wedge head is retracted, for moving the slide block in the opposite direction, and actuating means for the thrust-rod.

4. A shifting mechanism comprising a slide block connected to the part to be shifted and having a recess, an abutment extending into the recess, the opposite walls of the recess and the abutment being beveled and defining a wedge-shaped recess, a thrust-rod having a wedge head adapted to enter the wedge-shaped recess to force the slide block

to one side, said wedge head having an opening, the wall of which is beveled to produce a cam surface, a lever connected to the slide block and having a part extending into the aforesaid opening, and engageable by the cam surface when the wedge head is retracted, for moving the slide block in the opposite direction, and actuating means for the thrust-rod.

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

JOHN SPELLING.

Witnesses:

EDNA HART,

M. SEIDENBACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."