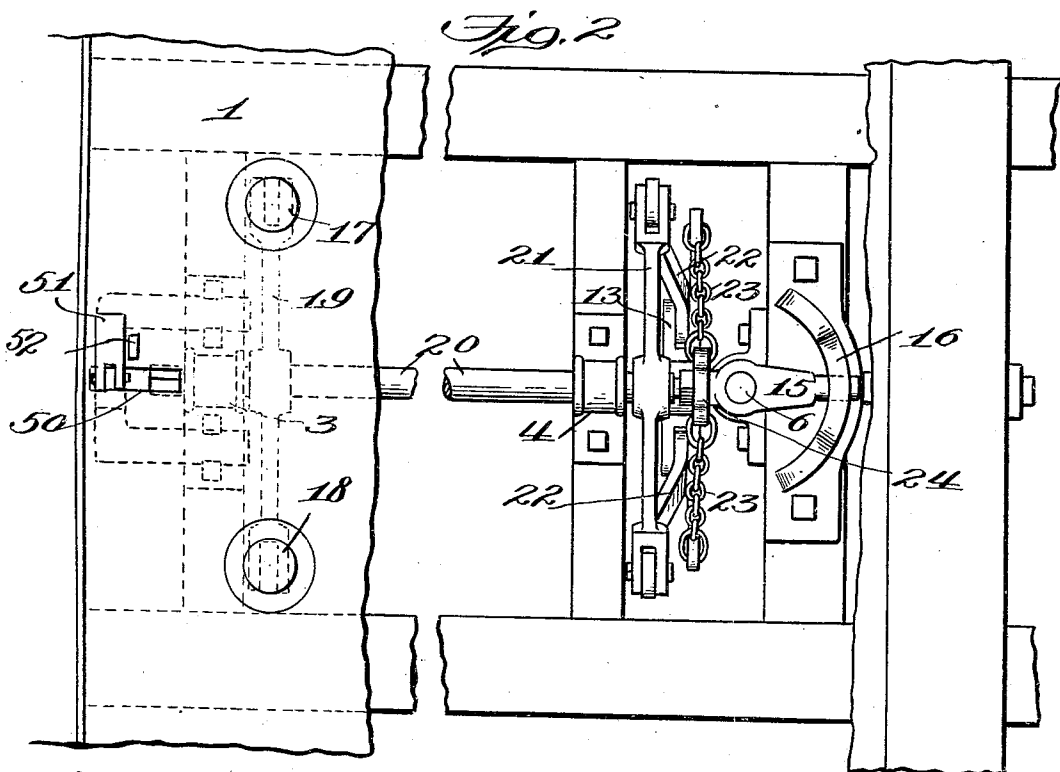
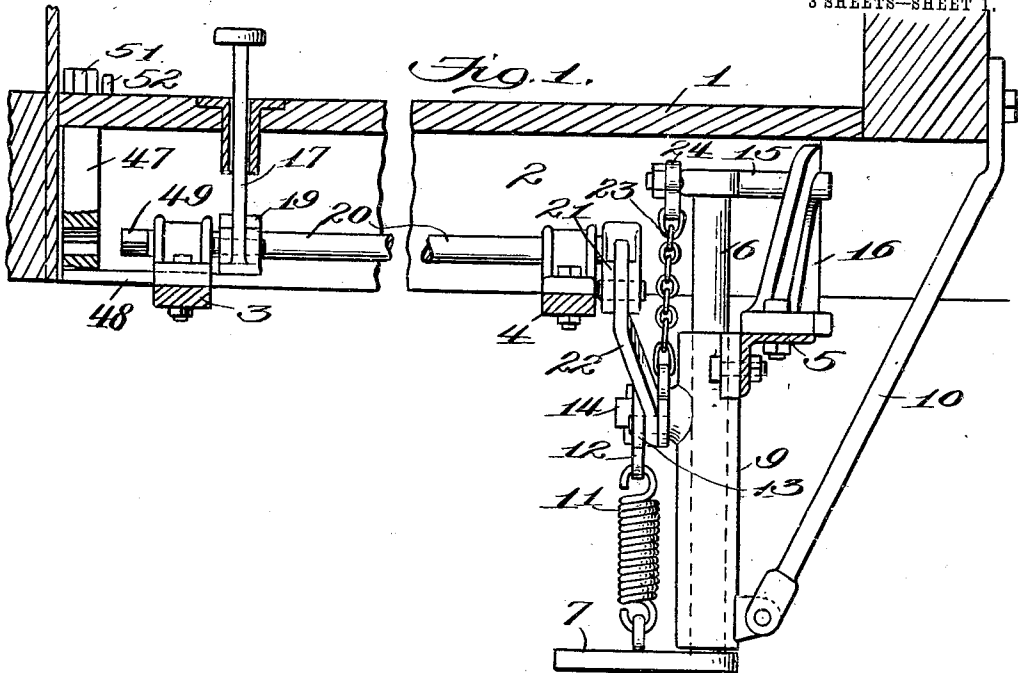


H. SHEMWELL.
 SWITCH THROWING MECHANISM.
 APPLICATION FILED MAY 29, 1909.

945,621.

Patented Jan. 4, 1910.

3 SHEETS—SHEET 1.



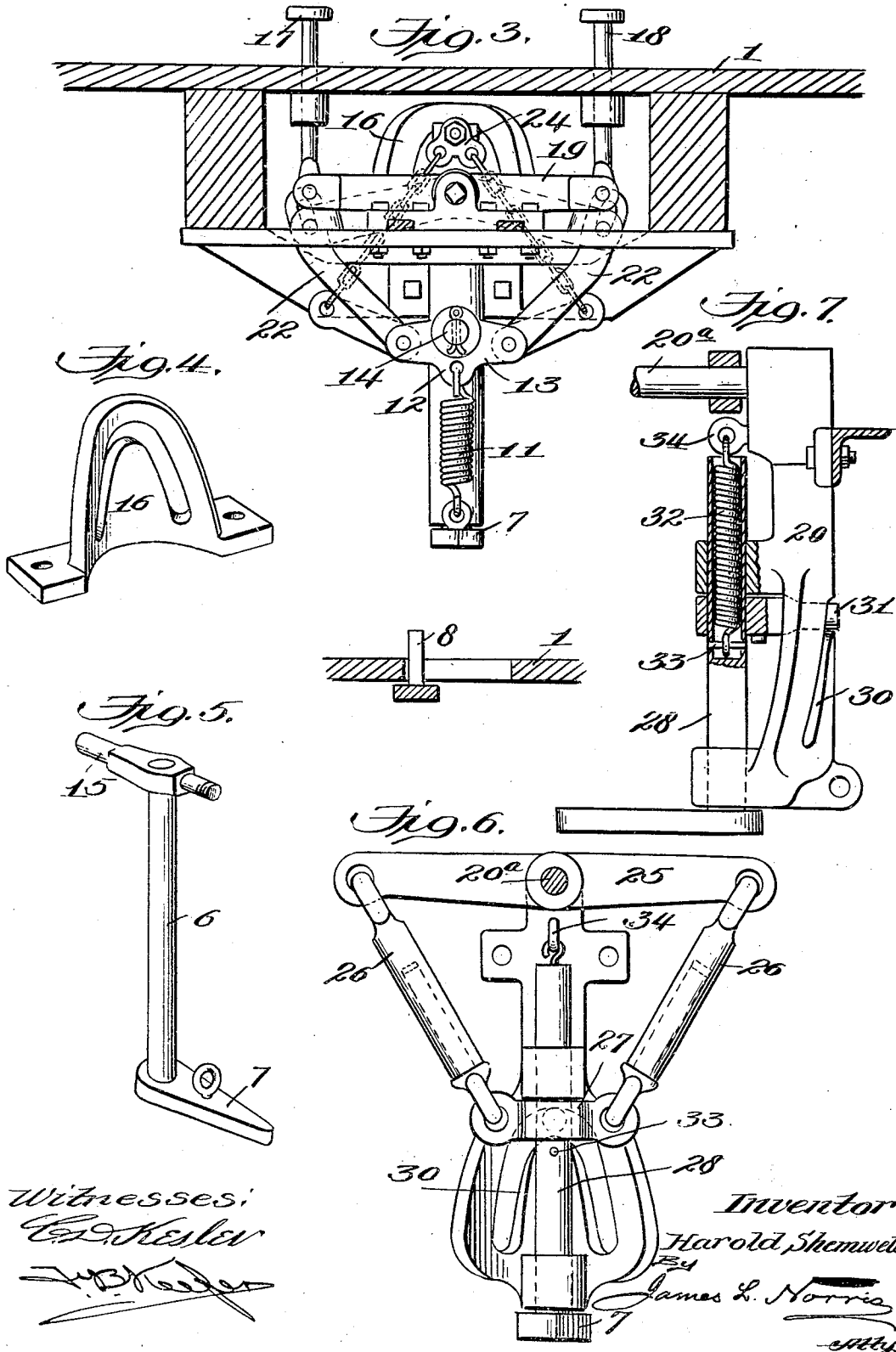
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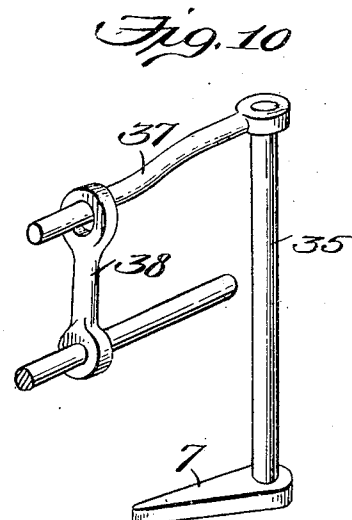
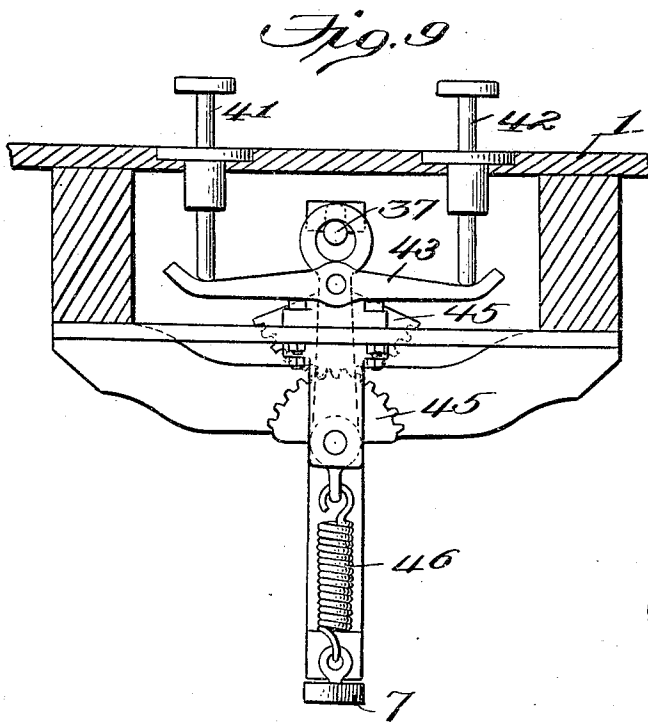
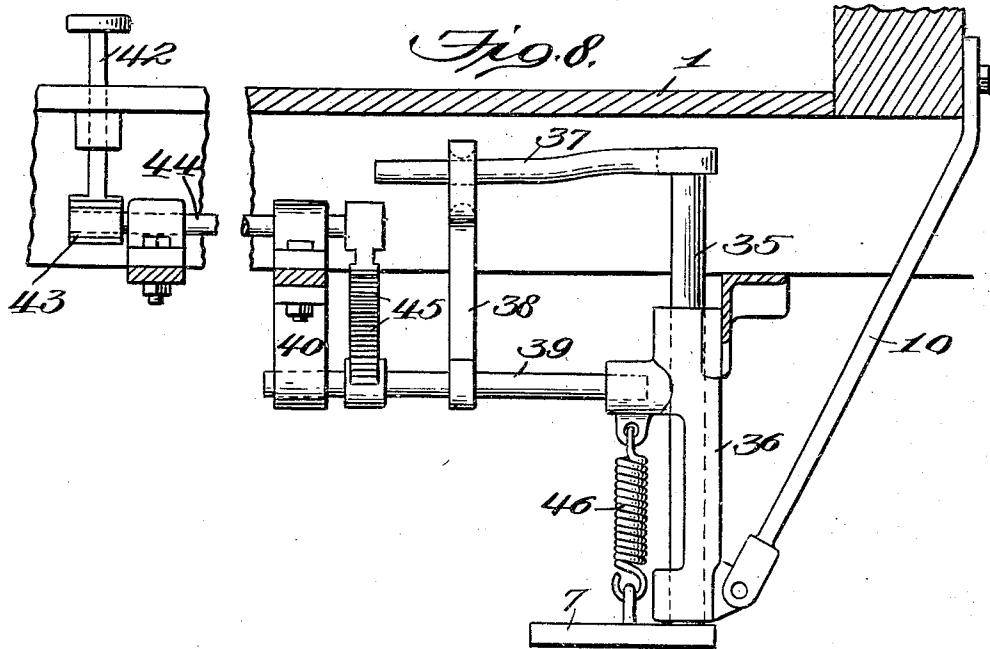


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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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SWITCH-THROWING MECHANISM.

945,621.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed May 29, 1909. Serial No. 499,186.

To all whom it may concern:

Be it known that I, HAROLD SHEMWELL, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in Switch-Throwing Mechanism, of which the following is a specification.

My present invention relates to improvements in switch throwing mechanism, and more particularly to the type wherein such mechanism is carried by the car or vehicle and is operative by the motorman or other operator of the car or vehicle whereby the switch may be properly set by the motorman and without the necessity of stopping the car, and it has for its object primarily to provide an improved mechanism of this type which may be easily actuated by a single movement of the foot of the motorman and which in operation will act with certainty to set the switch in an appropriate position according to the route of the car, the mechanism preferably restoring itself automatically to an inoperative position.

Another object of the invention is to provide a switch throwing mechanism of this class that normally clears the track so as not to be struck by any obstructions thereon but which when actuated will be lowered into a position to engage a projection or other part which is operatively connected to the switch point or points, the movement of the switch throwing device into operative position also serving to set the switch throwing device into a position that will throw the switch in one direction or the other as may be desired.

Further objects of the invention are to provide a switch throwing mechanism of this class which is strong so that it will not become broken, while in operation it acts with certainty whereby the switch will be positively set in the appropriate position while the car approaches the switch and, moreover, it is an object of the invention to provide suitable means for locking the mechanism so as to prevent its unauthorized operation in those cases for instance where the switch throwing mechanism is applied to both ends of the car, in which case the mechanism at the forward end of the car only would be in use.

To these and other ends, the invention

consists in certain improvements, and combinations and arrangements of parts, all as will be hereinafter more fully described, the novel features being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing:—Figure 1 represents a longitudinal section of a portion of a car platform showing the switch-throwing mechanism applied thereto which is constructed in accordance with the present invention; Fig. 2 represents a top plan view of the apparatus as shown in Fig. 1; Fig. 3 represents a front elevation of the mechanism as illustrated in the two preceding figures; Fig. 4 is a detail perspective view of the cam which serves to set the switch throwing device in either of two positions as the said device moves into an inoperative position; Fig. 5 is a detail perspective view of the vertically movable and rotatable switch throwing member; Figs. 6 and 7 illustrate in front and side elevations, respectively, another form of the invention wherein the construction of the mechanism is somewhat simplified; Fig. 8 is a view similar to Fig. 1 showing a further modification of the invention; Fig. 9 represents a front elevation of the mechanism shown in Fig. 8; and Fig. 10 is a detail perspective view of the vertically movable and rotatable switch throwing member together with the rocker arm which simultaneously rotates and depresses it.

Similar parts are designated by the same reference characters in the several views.

Switch throwing mechanism constructed in accordance with the present invention is capable of application generally to railways of various kinds, although it is especially applicable to street railways owing to the numerous switches and the saving of time in the operation of such switches and, in view of the fact that the services of the usual switchmen may be dispensed with, as the switches may be properly set by the motorman or operator of the car and without the necessity of stopping the car.

In the accompanying drawing, I have shown certain embodiments of the invention as applied to a street railway car. It will be understood, however, that these embodiments of the invention are shown as examples only, and that certain modifications and changes may be made in the mechanism

in order that the invention may be applied to the best advantage in each particular case.

In practice, the mechanism is mounted at one or both ends of the car and the mechanism is preferably operable from the platform on which the motorman stands. In those cases where the car is to travel in both directions, the mechanism would preferably be arranged at both ends of the car, although the mechanism at the forward end only would be in use.

In that form of the invention shown in Figs. 1 to 5 inclusive, 1 designates the platform of a car, and the operating mechanism is preferably mounted upon suitable supports at the under side of the platform although the part of the mechanism which is actuated by the motorman is at the upper side of the platform. In the present instance, the mechanism is hung from a pair of longitudinal sills 2 by means of suitable bearings 3, 4 and 5. In the present instance, the mechanism is adapted for use in connection with switches which are thrown by a pin or projection which is exposed in the track between the rails, the pin being movable transversely of the track and appropriately connected to the switch points so as to throw them in one direction or the other. That part of the mechanism which engages the switch throwing pin or projection consists in the present instance of a vertically movable and rotatable member 6, the lower end of which carries a forwardly extending and preferably pointed foot 7 which may be lowered and turned in one direction or the other whereby either side of this foot will engage the pin or projection 8, the latter being operatively connected to the switch point or points and, as the car travels forward, this pin or projection will be shifted to the right or left according to the direction in which the foot points. The switch throwing member is supported by a vertical bearing 9 within which it may move vertically and also rotate, this bearing being rigidly supported in position by the transverse bearing or support 5 and by a brace member 10 which may be attached to the bearing 9 at or adjacent to its lower end. The switch throwing member is normally held in an elevated or inoperative position by means of a spring 11, a tension spring being shown in the present instance one end of which is attached to the foot and the other is attached to an eye 12 formed in a rocker arm 13, the latter being pivoted to turn in a vertical plane by means of a stud 14 which projects forwardly from the bearing 9. The upper end of the switch throwing member 6 carries an arm 15 which is rigid therewith and coöperates with a cam, the function of which is to insure a proper turning of the foot at the lower end of the switch throwing member as the latter

descends into the switch throwing position. In the present instance a cam 16 is provided which is preferably segmental in form and may be bolted or otherwise secured to the transverse bearing member 5, this cam having a cam slot formed therein which proceeds from an upper central point and slopes downwardly in divergent relation, the end of the arm 15 being arranged to traverse the cam slot. While the switch throwing member is held in an elevated position under the tension of its spring, the arm 15 will engage the upper central portion of the cam slot, the pointed end of the foot extending directly forwardly. When, however, a force is applied to the switch throwing member in a direction to both turn and depress it, the arm 15 will traverse the cam slot and the foot 7 will be thereby turned positively in a given direction which will be determined according to the direction in which the force is applied to the switch throwing member.

It is generally preferable to provide means whereby the switch throwing mechanism may be actuated by the foot of the motorman. In that form of the invention shown in Figs. 1 to 5 inclusive, I have shown a pair of treadles 17 and 18 which are suitably guided to operate vertically through the platform and the tops of which are exposed above the platform, these treadles being preferably placed toward the right and left hand sides of the platform and either may be depressed by the foot of the motorman. The lower ends of these treadles are in the present instance pivotally connected to a lever 19, the intermediate portion of which is fixed to a shaft 20, this shaft being suitably journaled or supported on the bearing members 3 and 4. That end of the shaft 20 adjacent to the switch throwing member 6 is provided in that form of the invention shown in Figs. 1 to 5 inclusive, with a lever 21 which is fixed to the said shaft at an intermediate point whereby this lever will rock in one direction or the other according to which treadle is depressed, and a pair of links 22 operatively connect the opposite ends of the lever 21 to the rocker arm 13 at opposite sides of the stud 14. Owing to the fact that the links 22 are connected to the lever 21 and the rocker arm 13 at different distances from their respective centers, a suitable degree of lost motion is provided by these links, those ends thereof which are connected to the lever 21 in the present instance being slotted as shown in Fig. 3 for this purpose.

The opposite ends of the rocker arm 13 are operatively connected to the switch operating member 6 whereby a force may be applied to the latter which will serve both to depress and rotate it, a pair of chains 23 being provided in the present in-

stance the upper ends of which are attached to a hanger 24, the latter having eyes for the attachment of the respective chains and the hanger in turn is pivotally mounted preferably on the arm 15 at one side of the axis about which the member 6 rotates. Obviously, by depressing either the treadle 17 or the treadle 18, the levers 19 and 21 and also the shaft 20 connecting them will be rocked, the links 22 causing a corresponding rocking movement of the rocker arm 13 which acting through one or the other of the chains 23 will exert a tension upon the hanger 24 in a direction oblique to the axis of the switch throwing member 6. The resultant force thus applied to the switch throwing member 6 will act to rotate it, thereby carrying the end of the arm 15 into one of the diagonal portions of the slot in the cam 16 and at the same time the same force so applied will depress the switch throwing member 6 whereby the foot 7 will be lowered into a plane to engage the switch operating projection 8 and at the same time this foot will be turned at the proper angle to throw the projection 8 in the desired direction. During the throwing of the switch, any shock or strain that might be exerted on the foot 7 tending to deflect it will be sustained by the engagement of the arm 15 with the walls of the slot in the cam 16, the cam slot being so formed that its walls engage both sides of the arm 15 while the member 6 is depressed. After the switch has been thrown, the pressure of the foot upon the treadle is released, the tension spring 11 serving to immediately elevate the mechanism and restore it to a normally inoperative position, the cam slot 16 coöperating with the arm 15 to return the foot to a central or neutral position.

By attaching the spring 11 to the depending eye 12 on the rocker arm 13, both ends of this spring act to restore the mechanism to initial position, the upper end of the spring acting directly through the links 22 to return the shaft 20 and the treadles and other operating parts thereon to a normal or inoperative position while the lower end of this spring acts directly upon the member 6 both to elevate it and to return the foot to a central or neutral position. In this form of the invention, the treadles may remain attached to the lever 19. However, in order to prevent unauthorized operation of the mechanism in those cases for instance as when the mechanism is at the rear end of the car, I provide means for locking the mechanism so as to prevent its operation. Locking means of various kinds can be used for this purpose, that shown in the present instance consisting of a member 47 having one or more arms 48 which serve to guide it for movement in a direction longitudinally of the shaft 20, and this member 47 may be

provided with an angularly-shaped socket or opening to engage a corresponding angularly-shaped end 49 which is formed on the adjacent end of the shaft 20, an interlocking connection being thereby formed between the said shaft and the member 47 which will prevent operation of the mechanism. The member 47 may be operated from any convenient position, it extending upwardly through a slot 50 in the platform in the present instance and having a latch 51 pivoted thereon which may serve as a handle to move the member 47 either into locked or unlocked position, this latch being arranged to engage opposite sides of a projection 52 and thereby retain the locking member in either position.

In that form of the invention shown in Figs. 7 and 8, the shaft 20^a which may correspond to the shaft 20 in the preceding construction is connected more directly to the switch throwing member, the shaft 20^a in the present instance having a lever 25 fixed thereto, the opposite ends of which are pivotally connected to a pair of extensible or telescopic links or members 26, the opposite ends of these links or members being pivotally attached to a bracket 27 which is fixed to the vertically movable and rotatable switch throwing member 28. This switch throwing member in this form of the invention is supported by a standard or bearing member 29 and in this form of the invention, the cam which insures a proper turning of the switch throwing member is formed direct therewith, the lower portion of the standard being widened and slotted as at 30, the form of the slot being substantially the same as that of the cam shown in Fig. 4. An arm 31 which may be a part of the bracket 27 fixed to the switch throwing member 28 coöperates with the slot 30 so as to insure a proper turning of the foot at the lower end of the switch operating member as the latter is depressed. In order to avoid injury to the spring which serves to restore the mechanism to a normally inoperative position, and to render the mechanism more compact, the spring in this form of the invention is incased within a part of the switch operating member, the upper end of this member in the present instance being tubular or formed hollow, and the spring 32 is contained therein, the lower end of the spring being connected to a cross-arm 33 suitably fixed to the member 28 while its opposite or upper end may be attached to an eye 34 which may be fastened to the upper portion of the standard. In this form of the invention, a tilting of the lever 25 will cause a pressure to be exerted upon one of the extensible or telescopic links or members 26, the force so applied acting diagonally of the axis of the member 28 and thereby serving to both depress it and to turn it

so as to set the foot on its lower end at a proper angle to throw the switch in the desired direction, the cam in this construction also serving to positively turn the switch
5 throwing member so that the foot thereon will stand at an angle to properly engage and throw the projection 8 connected to the switch point.

Figs. 8, 9 and 10 show another form of
10 the invention wherein the vertically movable switch throwing member 35 is mounted in a standard 36 whereby it may both rotate and move vertically, a foot being provided on the lower end of the member as in the preceding
15 constructions, while its upper end carries an operating arm 37. A rocker arm 38 has an enlarged eye at its upper end which loosely fits the arm 37, and the rocker arm is fixed to an operating shaft 39, one end of which
20 may be journaled in a part of the standard 36 while its opposite end is journaled in a bearing 40. The treadles 41 and 42 are operable vertically through the platform as in the previous constructions and their lower
25 ends rest upon a lever 43 which is fixed at an intermediate point to a rock shaft 44. In this construction, the treadles merely rest upon the lever 43 and therefore they can be withdrawn and removed from the platform
30 and used at the opposite end of the car, it being necessary only to provide a single pair of treadles for both ends of the car and at the same time it will not be possible for unauthorized persons to actuate the switch
35 throwing member which is not in use. The shafts 39 and 44 are operatively connected by segmental gears 45 and, in this construction, a tension spring 46 is also provided for automatically restoring the mechanism to an inoperative position. A depression of either treadle will rock the lever 43
40 together with the shaft 44, and this rocking movement is transmitted through the gears 45 to the shaft 39, the rocker arm 38 being moved to one side or the other of the shaft
45 39 and also turning about this shaft as an axis. That end of the rocker arm 38 therefore which engages the arm 37 will move in an arc-shaped path, causing simultaneous depression and rotation of the member 35, the
50 foot at the lower end of this member being thereby brought into a position and set so that it will throw the switch in the desired direction. The spring in this construction
55 also automatically restores all parts of the mechanism to the initial position.

I claim as my invention:

1. Switch throwing mechanism for rail-
60 ways comprising an operating member carrying a part to throw the switch, said part being capable of combined axial and rotary movement, and means operative to exert a force on said member in an angular direction with respect to the axis of said member
65 whereby the force applied to the operating

member serves in itself to produce simultaneous depression and rotation of said member to carry the switch throwing part into operative position and to set it at a proper angle to throw the switch.

2. Switch throwing mechanism of the class described comprising an operating member carrying a part to throw the switch, and means for exerting a force on said member in a direction inclined with respect to the axis of said member to simultaneously depress it and turn the switch throwing part thereon at a proper angle to operate the switch.

3. Switch throwing mechanism for rail-
80 ways comprising a vertically movable and rotatable operating member carrying a switch throwing foot, and means for exerting a force on said member in a direction oblique to the axis thereof to positively depress it and simultaneously turn said foot
85 at a proper angle to throw the switch.

4. Switch throwing mechanism for rail-
ways comprising a vertically movable and rotatable operating member adapted to be
90 carried by a car, and means connected to said member at one side of its axis and operative in a direction oblique to said axis to exert a force on said member to simultaneously depress and rotate it at a proper
95 angle to throw the switch.

5. Switch throwing mechanism for rail-
ways comprising an operating member adapted to be carried by a car, said member being movable vertically and rotatable, actuating mechanism embodying a pair of
100 treadles and a rock shaft to be operated thereby, and an operative connection between said rock shaft and said member and operable in divergent directions and at opposite sides of the axis of said member to positively depress and simultaneously rotate the switch operating member.

6. Switch throwing mechanism for rail-
ways comprising a switch operating part
110 adapted to be carried by a car, said member being movable vertically and capable of rotation, actuating mechanism comprising a pair of treadles and a rock shaft to be operated thereby, and connecting members between said shaft and member and arranged
115 in divergent relation for exerting a force on said member at an oblique angle to its axis whereby said member will be simultaneously depressed and turned about its axis.

7. Switch throwing mechanism for rail-
ways comprising a vertically movable and rotatable operating member adapted to be
120 carried by a car, actuating mechanism embodying a rock shaft together with means for rotating it, a lever operatively connected to said rock shaft, and a pair of connecting devices between the opposite ends of said lever and the switch operating member, each of said devices serving when the rock shaft
130

is turned to exert a force on said member at an angle to its axis to both depress and rotate it.

8. Switch throwing mechanism comprising a depressible and rotatable switch operating member, means arranged to exert a force on said member in a direction to simultaneously depress and rotate it, and a cam or guide for insuring rotation of said member through a proper angle while being depressed or elevated.

9. Switch throwing mechanism comprising a member adapted to be carried by a car

and capable of simultaneous depression and rotation to engage and throw a switch operating part, actuating mechanism connected to said member, and locking means for preventing operation of said actuating mechanism by unauthorized persons.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HAROLD SHEMWELL.

Witnesses:

ADDISON LYMAN,
W. M. SORRELL.