J. M. GONZALES.

AUTOMATIC SWITCH POINT THROWING DEVICE.

APPLICATION FILED OCT. 2, 1917.

1,251,218.

Patented Dec. 25, 1917.

4 SHEETS—SHEET 1.

Fig. 1.

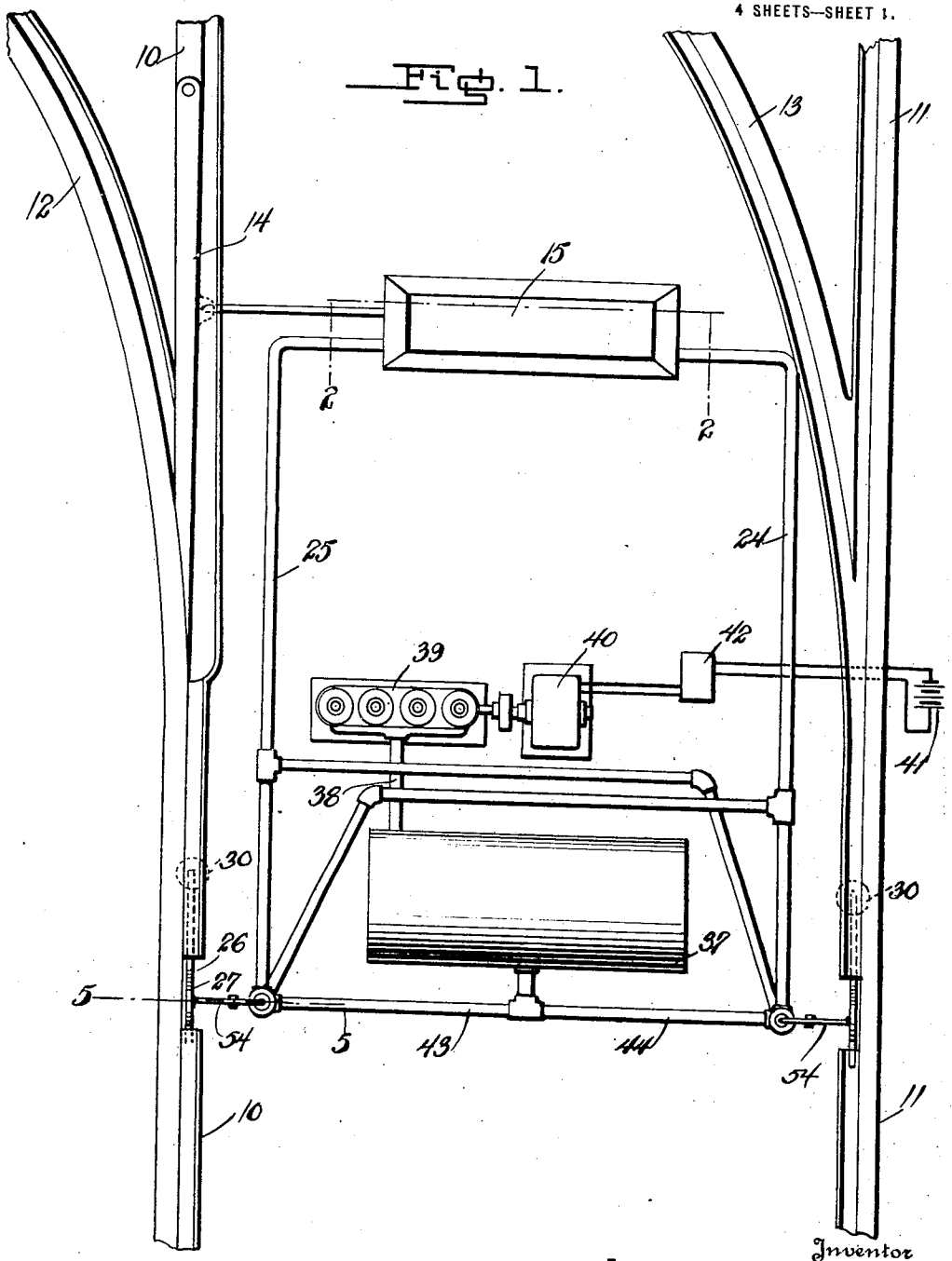

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Fig. 2.

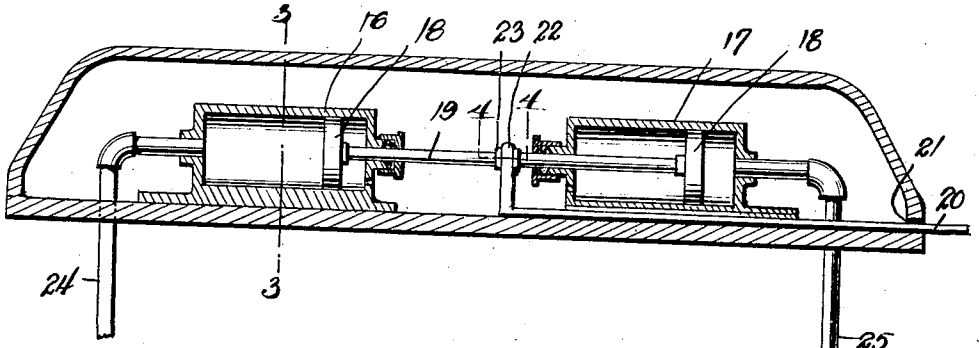


Fig. 3.

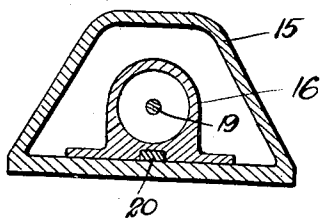


Fig. 4

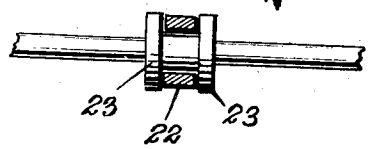


Fig. 13.

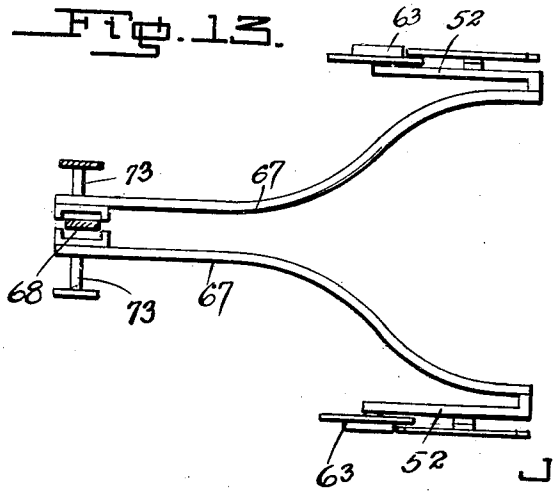
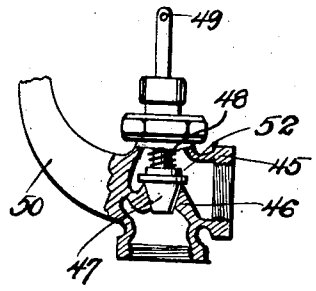


Fig. 14.



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4 SHEETS—SHEET 3.

Fig. 6.

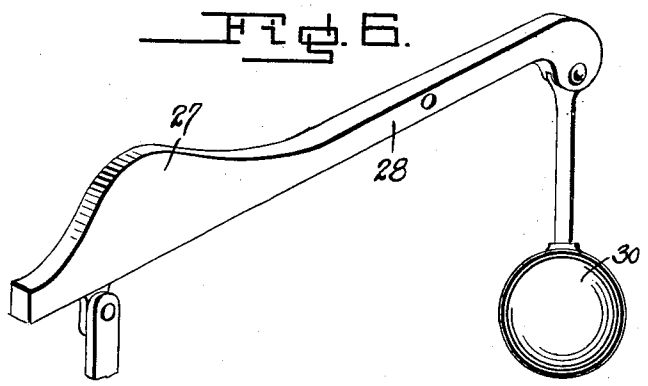
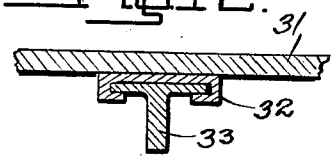


Fig. 5.

Fig. 12.



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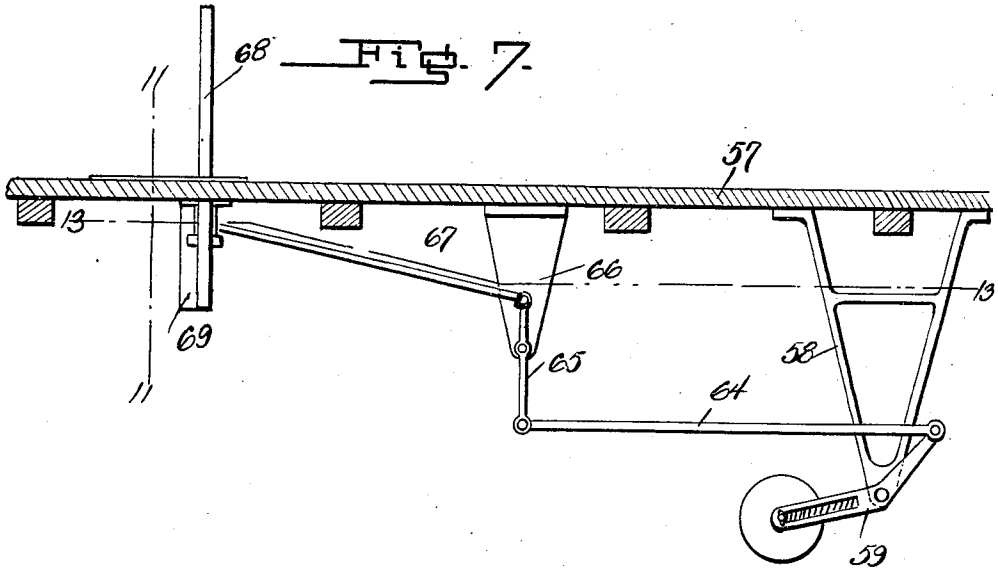
4 SHEETS—SHEET 4.

Fig. 7.



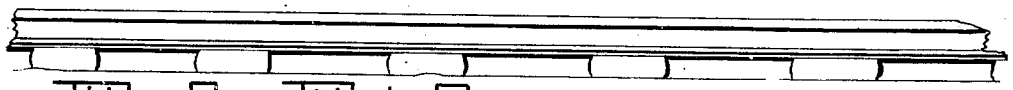
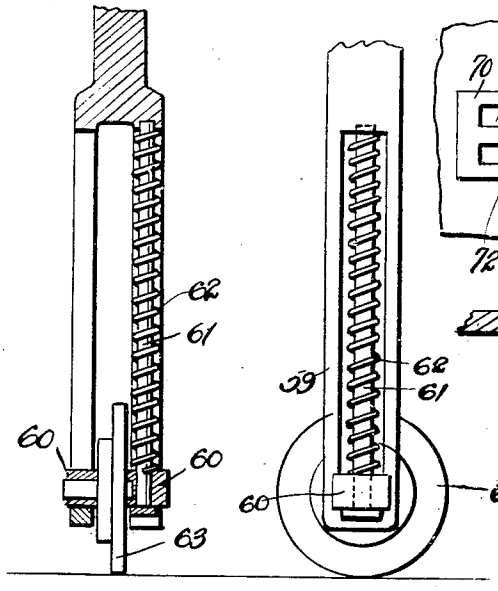


Fig. 8. Fig. 9 Fig. 10



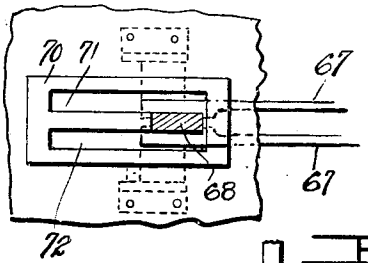
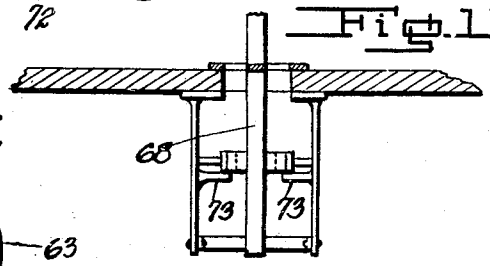


Fig. 11



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UNITED STATES PATENT OFFICE.

JESUS MENES GONZALES, OF HABANA, CUBA.

AUTOMATIC SWITCH-POINT-THROWING DEVICE.

1,251,218. Specification of Letters Patent. Patented Dec. 25, 1917.

Application filed October 2, 1917. Serial No. 194,337.

To all whom it may concern:

Be it known that I, JESUS MENES GONZALES, a citizen of Cuba, residing at Habana, in the State of Habana and Republic of Cuba, have invented new and useful Improvements in Automatic Switch-Point-Throwing Devices, of which the following is a specification.

The present invention relates to railways, and has more particular reference to automatically throwing switch points in directions controlled by the operator of a car or train moving over a track.

An object of the present invention is to provide an improved and simplified means for throwing a switch point when at a distance from the same; to provide pneumatic means for throwing the switch point; to provide improved controlling apparatus for regulating the passage of air to and from the pneumatic devices which directly control the switch point; and to provide means upon rolling stock for selectively operating the mechanism for throwing the switch point in the desired direction.

The invention further aims at the provision of a switch point throwing device of this character, which may be arranged wholly beneath the surface level of the ground and the tracks to protect the device and the part thereof from contact with objects moving over the surface of the ground and the tracks, and also from deterioration and rearrangement incident to weather conditions.

The above, and various other objects and advantages of this invention will be in part described, and in part understood, from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of a portion of a track having a switch point, and disclosing the mechanism of this invention applied thereto.

Fig. 2 is a detail longitudinal section taken on the line 2—2 of Fig. 1 through the pneumatic cylinders and the casing therefor.

Fig. 3 is a transverse section on the line 3—3 thereof.

Fig. 4 is a fragmentary detail section on the line 4—4, showing the connection between the piston rod and the connecting bar which leads to the switch point.

Fig. 5 is a side elevation of the inlet and exhaust valves and the means for operating the same, the view being taken on the line 5—5 through the track of Fig. 1.

Fig. 6 is a detail enlarged perspective view of the track abutment adapted to be engaged by a trip on the rolling stock.

Fig. 7 is a fragmentary longitudinal section taken through the floor of a car, showing the trip mechanism applied thereto.

Fig. 8 is a detail enlarged view in sections of the trip arm.

Fig. 9 is a side elevation of the same.

Fig. 10 is a fragmentary top plan view of the platform of the car, showing the controlling lever and the rods adapted to be selectively engaged thereby.

Fig. 11 is a vertical section taken on the line 11—11 of Fig. 7, showing the controlling lever and its mounting.

Fig. 12 is a detail sectional view through the valve operating mechanism on line 12—12, Fig. 5, showing the vertically shiftable bar and the guide therefor.

Fig. 13 is a horizontal section taken substantially on the line 13—13 of Fig. 7, showing the opposed trips with their connecting rod and the operating handle therefor.

Fig. 14 is a detail vertical section taken longitudinally through one of the controlling valves.

Referring to these drawings, wherein like parts are designated by similar numerals of the reference throughout the several views, 10 and 11 designates the opposite rails of a track, the same having branch rails 12 and 13 leading laterally therefrom to form a siding or a switch, and the rail 10 is disclosed as having a switch point 14 arranged at the juncture of the rail 10 with the branch 12.

Pivotally arranged between the rails of the track is a casing or housing 15 formed preferably of a base section and a hood section, the casing being elongated and extending transversely between the rails. Cylinders 16 and 17 are arranged in the opposite ends of the casing 15 and have pistons 18 therein connected together for simultaneous movement by a common piston rod 19. The cylinders 16 and 17 are spaced apart and are arranged in co-axial alinement. A connecting bar 20 has its outer ends pivotally connected to the switch point 14 and extends inwardly through a slot 21

formed in the adjacent end of the casing 15, and is slidably mounted through the base of the cylinder 17, the latter forming a guide for the bar 20. The inner end of the bar 20 has an upturned fork 22 embracing an intermediate portion of the piston rod 19 and engaged at opposite sides by collars 23 fixed to the piston rod for moving the connecting bar 20 longitudinally therewith. An air pipe 24 projects into the casing 15 and is connected, and communicates with the outer end of the cylinder 16. A second air pipe 25 projects into the casing 15 and communicates with the outer end of the cylinder 17. The pipes 24 and 25 are preferably embedded in the road bed and extend longitudinally of the track to any desired point from which it is desired to throw the switch point 14.

The track is provided, at a point suitably spaced from the switch point 14, with spaced apart or opposed actuating devices for effecting the throw of the switch point 14 in opposite directions. In the present instance, each track, 10 and 11, is provided with a recess in the bottom of the groove thereof through which upwardly projects an abutment 27 in the form of a cam which rises from the free end of a lever 28, the latter being pivotally mounted upon a pin 29 near its opposite end. The inner end of the lever 28 is provided with a weight 30 suitably hinged or otherwise connected thereto for normally urging the abutment 27 upwardly through the recess 26 in the adjacent rail.

As shown in Fig. 5, the adjacent rail 10 may be supported upon a channel iron 31 at a point immediately beneath the recess 26 of the rail. Fixed to the channel iron 31 is a combined bracket and guide 32 in the form of a plate overturned at its opposite longitudinal edges, and which receives therein the head of a T-shaped bar 33. The bar 33 is connected at its upper end by a link 34 to the free end of the lever 28 and is adapted to be moved vertically by the rocking of the lever 28. The web of the vertically movable bar 33 has a relatively narrow notch 35 in its web portion and near the upper end of the bar, and is provided with a relatively wide notch 36 in its web portion near the lower end of the bar.

Arranged preferably below the surface level of the road bed of the track is means for compressing and conveying air to the switch point throwing cylinders above described. The means comprises a storage tank 37 connected by pipe 38 to a compressor pump 39, the compressor pump 39 being actuated by an electric motor 40 or the like, shown in circuit with a source of power 41 and a circuit controller 42 of any desired type. The circuit controller 42 is adapted to maintain operation of the motor 40 until the desired pressure of air is obtained in the tank 37, and to interrupt the operation of the motor 40 when the predetermined air pressure is reached.

Supply pipe branches 43 and 44 lead from the cylinder or reservoir 37 to inlet valves 45 which may be arranged at the inner sides of the rails 10 and 11 and adjacent to the lower ends of the vertically moving bar 33. As shown in Fig. 14, the inlet valves may comprise each a casing having a web or valve seat 46 therein between the port of the valve and provided with a valve head 47 adapted to engage the seat 46 normally by a spring 48 which surrounds the stem 49 of the valve. Each casing of the inlet valves is provided at one side with an upstanding bracket arm 50 to the upper end of which is pivotally connected an intermediate portion of a rocker arm 51 which is connected at its inner end to the valve stem 49, and which projects at its outer end into the relatively wide notch 36 of the vertically movable bar 33.

Arranged above the inlet valves 45 are exhaust valves 52 which are preferably of similar construction to the inlet valves 45 and which are provided with upstanding lateral bracket arms 53 in the upper ends of which are hinged the intermediate portions of operating arms 54 the inner ends of which are connected to the upper extremities of the valve stems and the outer ends of which engage in the relatively narrow notches 35 of bar 33. Pipes 55 extend from the intake ports of the discharge valves 52 to the pipes 24 and 25 at the opposite sides of the track, and exhaust pipes 56 may be connected to the outlet ports of the valves 52 for carrying the discharge air to any convenient point.

Any suitable means may be employed for depressing the abutment 27 at opposite sides of the track, and for selectively operating the abutment to open and close the inlet and exhaust valves 45 and 52 at the opposite sides of the track. In the present instance, the floor 57 of a car or the like, is provided at opposite sides with depending brackets 58 in the lower ends of which are hinged trip arms 59. Each trip arm 59 is in the form of a bell-crank lever, the lower end of which is forked and provided with longitudinal slots or guides in which movable bearing blocks 60 are arranged. One of the fork arms of each trip lever 59 is provided with a guide rod 61 in the slot thereof and about which is placed a coil spring 62 which bears at its lower end against the adjacent bearing block 60. The adjacent bearing block 60 is apertured and receives the rod 61 therethrough for guiding the block and holding the spring in contact therewith. A roller or wheel 63 is journaled in the bearing block 60 and projects below the arm 59 for engage-

ment with the cam or abutment 27 which projects slightly above the rails 10 or 11 of the track.

The opposite or upper ends of the trip lever 59 are connected by rods 64 to a rocker arm 65 pivoted intermediate its ends upon a depending bracket 66 carried by the car 57. A second connecting rod 67 is attached to the upper end of the rocker arm 65 at each side of the car, and the forward ends of the connecting rods 67 are provided at their inner opposite faces with recesses adapted to receive one at a time the opposite side portion of a laterally flexible operating lever 68. The lower end of the lever 68 is pivotally mounted upon a bracket 69 which depends from the car 57, and the upper end of the lever 68 projects through a guide plate 70 secured to the floor of the car. The guide plate 70 is provided near its lateral edges with longitudinal slots 71 and 72 in which the lever 68 is adapted to move, and the plate is suitably apertured at its inner end for intercommunicating the slots 71 and 72 to admit change of the lever 68 from one slot to the other. The forward ends of the connecting rods 67 are slidably mounted upon flanged supports 73 which depend from the floor 57 of the car and over which the forward ends of the connecting rods 67 are adapted to slide. Springs or the like are carried by the supports 73 and bear against the outer faces of the rods 67 to normally urge the same together to a predetermined extent for holding the lever 68 in the selected notch during the longitudinal movement of the connecting rods 67 with the lever.

In operation, when the car, designated as 57, approaches the switch, the operator grasps the lever 68 and flexes it in the desired direction to engage in the notch of the selected connecting rods 67. The operating lever 68 when engaged with one of the connecting rods 67, registers with one of the slots 71 or 72, and is then moved longitudinally in the slot thus pulling the connecting rods 67, pushing the connecting rods 64 and moving the trip arm 59 downwardly at its lower end to engage the roller or wheel 63 with the selected rails 10 or 11 and bringing the wheel 63 into contact with the abutment 27.

When the abutment 27 is depressed the adjacent vertically movable bar 33 is moved downwardly to thus swing the arm 54 and open the discharge valve for exhausting the cylinder, 16 or 17, communicating by pipe 55 and pipes 24 or 25 with the valve. Continued movement of the bar 33 downwardly brings the upper wall of the notch 36 into contact with the arm 51 of the inlet valve and opens the latter to admit air from the tank 37 through the branch 43 or 44 to the valve 45 and to the opposite cylinders, 16 or 17, through the pipe 24 or 25. The pistons 18 in the cylinders are thus shifted laterally and the connecting bar 20 is moved therewith to throw the switch point 14 in the desired direction.

While the present invention has been described particularly as applied to switch points, it may be used in other capacities and be modified with the scope of the claims to suit the changed conditions.

It is of course understood that various changes and modifications may be made in the details of construction and mounting of the above specifically described parts without departing from the spirit of this invention, such changes and modifications being restricted only by the scope of the following claims:

I claim:

1. In means for automatically throwing switch points, the combination of a pneumatically actuated device, means connecting the device to the switch point, a storage tank, means for maintaining a predetermined air pressure in the storage tank, pipes connecting the storage tank to said pneumatically actuated device, intake and exhaust valves arranged at the opposite sides of the track, abutments connected to said valves for alternately opening and closing the same, and means adapted for mounting on rolling stock adapted to selectively engage said abutments.

2. In means for automatically throwing switch points, the combination of a pair of pneumatic cylinders, pistons in the cylinders, a common piston rod for the pistons, a connecting bar connected to the piston rod and to the switch point, pipes communicating with the outer ends of the cylinders, a storage tank adapted to contain compressed air, and valves interposed between said pipes and the storage tank and adapted for selective operation for admitting air to the outer ends of the cylinders one at a time for shifting said pistons.

3. A means for automatically throwing switch points, the combination of a casing adapted to be positioned in a road bed between the rails of a track, cylinders mounted in each end of the casing, pistons in the cylinders, a common piston rod for said cylinders, a connecting rod attached at one end to said piston rod and at its opposite end to the point of a switch, a storage tank, means for maintaining a predetermined air pressure in the storage tank, pipes leading from the storage tank to the outer ends of said cylinders, intake valves in said pipes for opening the same one at a time to said storage tank, exhaust valves connected to said pipes for exhausting air therefrom one at a time, abutments arranged at the opposite sides of the track and having connection with said intake and exhaust valves, and abutment adapted to be mounted on rolling

stock for selectively engaging said abutments at the opposite sides of the track.

4. In means for automatically throwing switch points, the combination of a casing adapted to be positioned between the rails of a track, a cylinder in each end of the casing, pistons in the cylinders, a piston rod connected at each end to the pistons, a connecting bar slidably mounted in the casing and having connection with an intermediate portion of said piston rod at one end and having connection with the switch point at its opposite end, a storage tank, means for maintaining a predetermined pressure of fluid in the storage tank, pipes leading from the storage tank to the outer ends of said cylinders, intake valves arranged in said pipes for communicating the storage tank temporarily with the outer end of a selected cylinder, exhaust valves, connections between the exhaust valves and said pipes between the intake valves and the cylinders, abutments adapted for arrangement at the opposite sides of the track, slidable members arranged beneath the track, connections between the slidable members and the intake and exhaust valves at the opposite sides of the track for opening the exhaust valve leading to one cylinder and opening the intake valve leading to the opposite cylinder, and means carried by rolling stock for engagement with said abutment.

5. In means for automatically throwing switch points, the combination of a reciprocating pneumatic device, a connection between said device and the switch point, pipes leading from each end of the device, a storage tank connected to said pipes, inlet valves in said pipes arranged adjacent the opposite rails of a track, exhaust valves arranged below said inlet valves and having connection with the pipes at each side of the track, abutments carried by the rails, shiftable elements connected to the abutments, valve operating means engaging the shiftable elements and the valve for alternately opening and closing the intake and exhaust valves upon the depression of the abutment, an independent trip carried by rolling stock adapted to be actuated for engagement selectively with the abutment.

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