

No. 892,591.

PATENTED JULY 7, 1908.

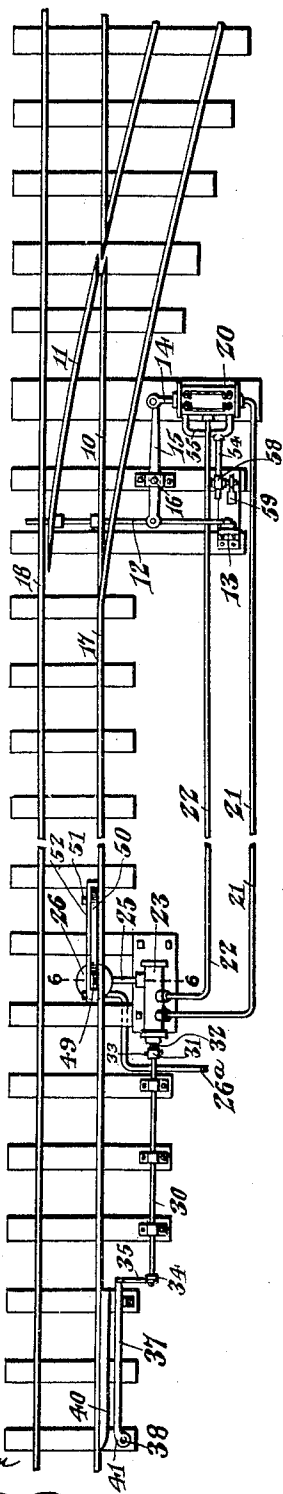
J. D. GUILFOYLE.

SAFETY APPLIANCE FOR RAILWAY SWITCHES.

APPLICATION FILED JULY 26, 1907.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Jas. E. McEachern
J. F. Piley

Fig. 3.

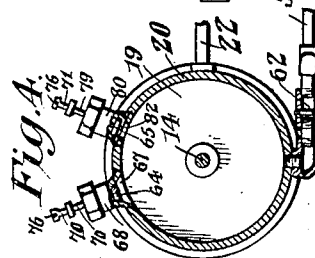
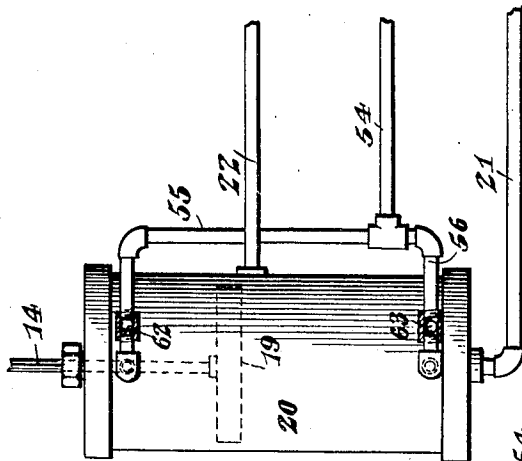
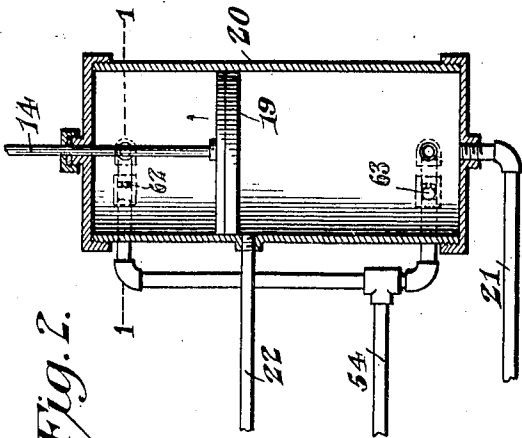


Fig. 2.



James D. Guilfoyle, Inventor

By

E. G. Siggers

Attorney

No. 892,591.

J. D. GUILFOYLE.

PATENTED JULY 7, 1908.

SAFETY APPLIANCE FOR RAILWAY SWITCHES.

APPLICATION FILED JULY 26, 1907.

4 SHEETS—SHEET 2.

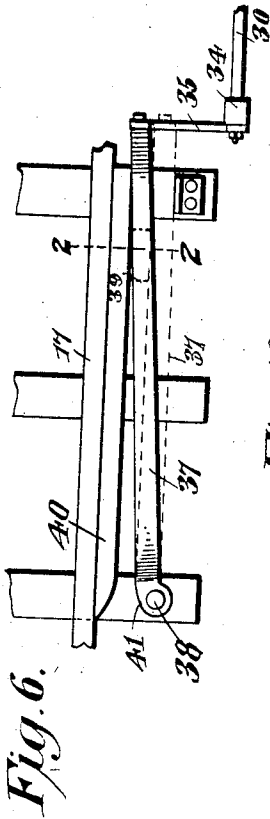


Fig. 6.

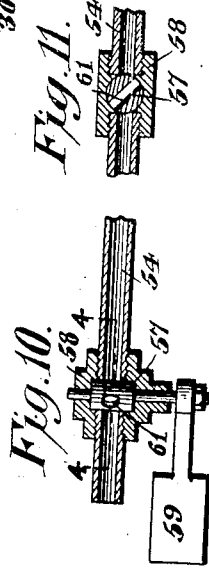


Fig. 10.

Fig. 11.

Fig. 9.

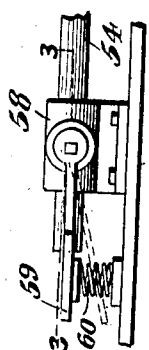
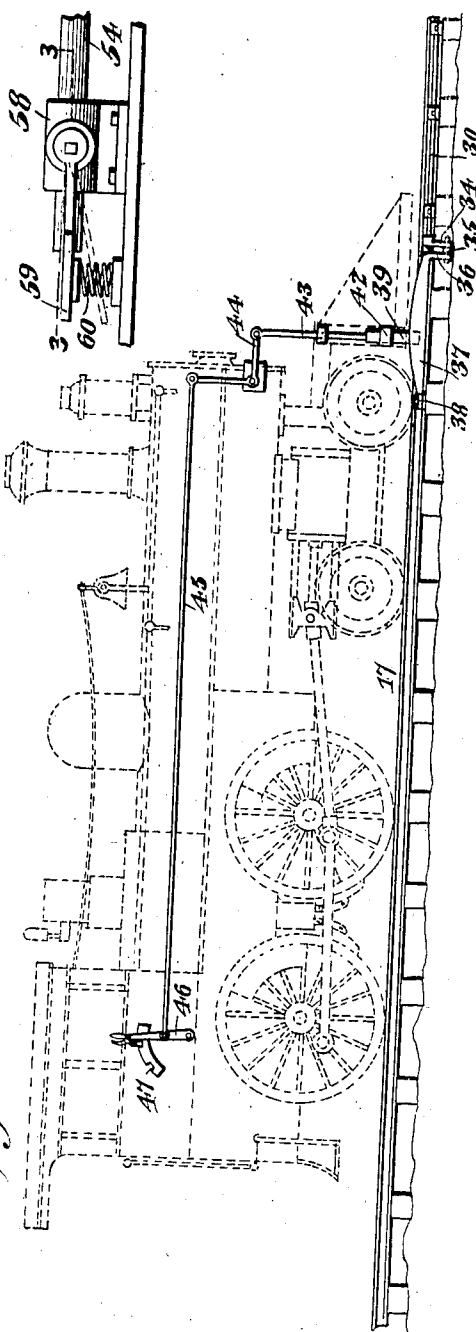


Fig. 5.



Witnesses
Jas. V. McLaughlin
J. F. Rely

James D. Guilfoyle, Inventor

By *E. J. Siggers*
Attorney

No. 892,591.

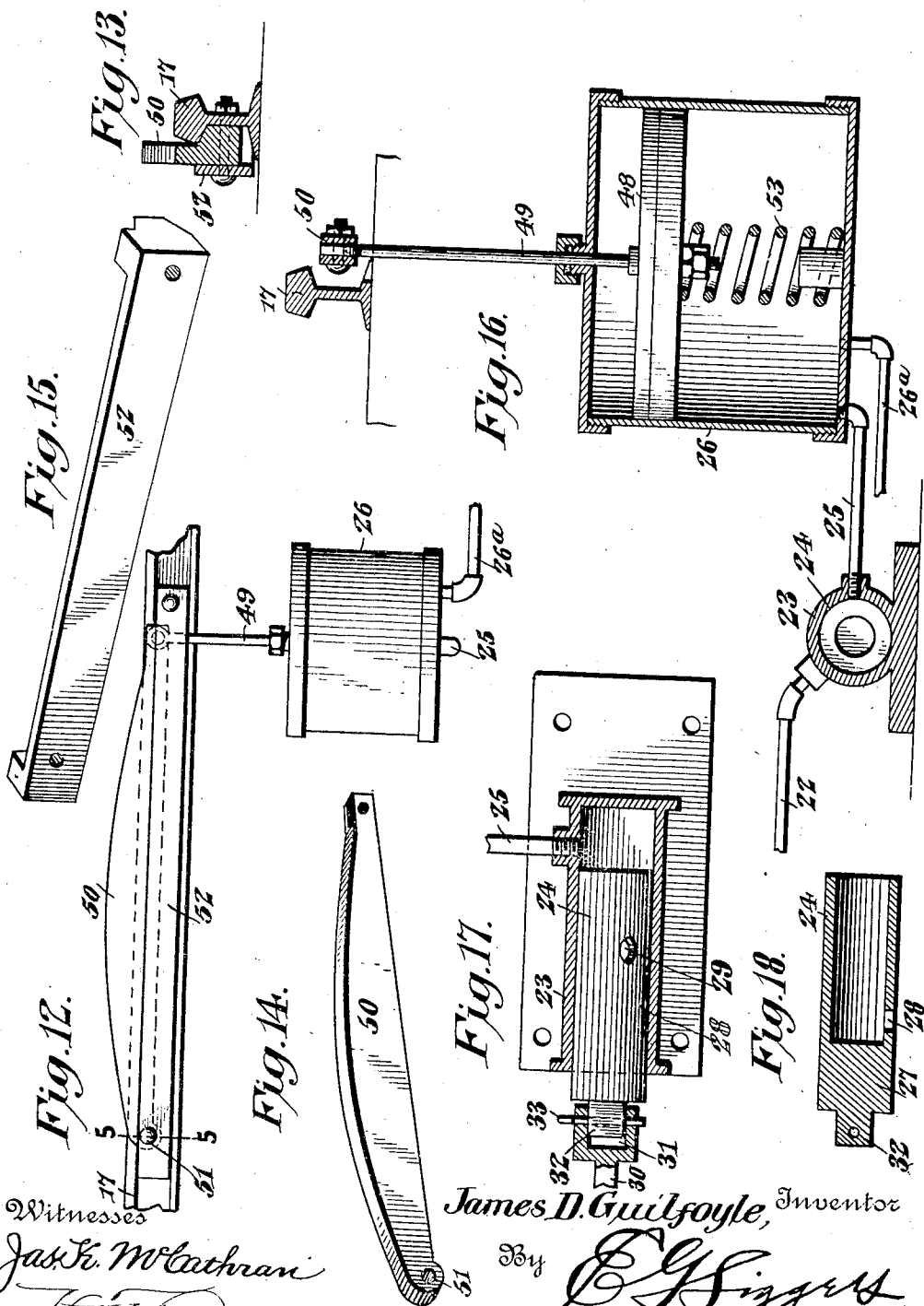
J. D. GUILFOYLE.

PATENTED JULY 7, 1908.

SAFETY APPLIANCE FOR RAILWAY SWITCHES.

APPLICATION FILED JULY 28, 1907.

4 SHEETS—SHEET 3.



Witnesses
Jas. E. McLaughlin
H. J. Riley

James D. Guilfoyle, Inventor

By

E. J. Siggers

Attorney

No. 892,591.

J. D. GUILFOYLE.

PATENTED JULY 7, 1908.

SAFETY APPLIANCE FOR RAILWAY SWITCHES.

APPLICATION FILED JULY 26, 1907.

4 SHEETS—SHEET 4.

Fig. 20.

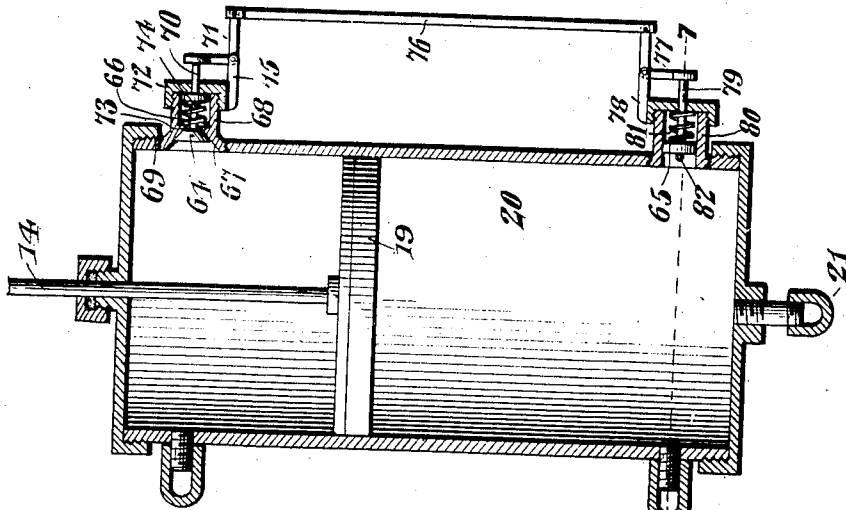


Fig. 21.

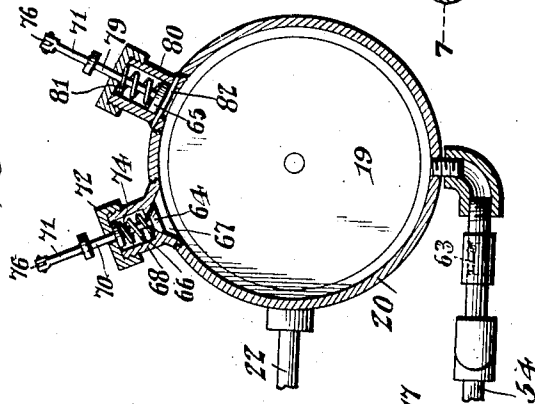
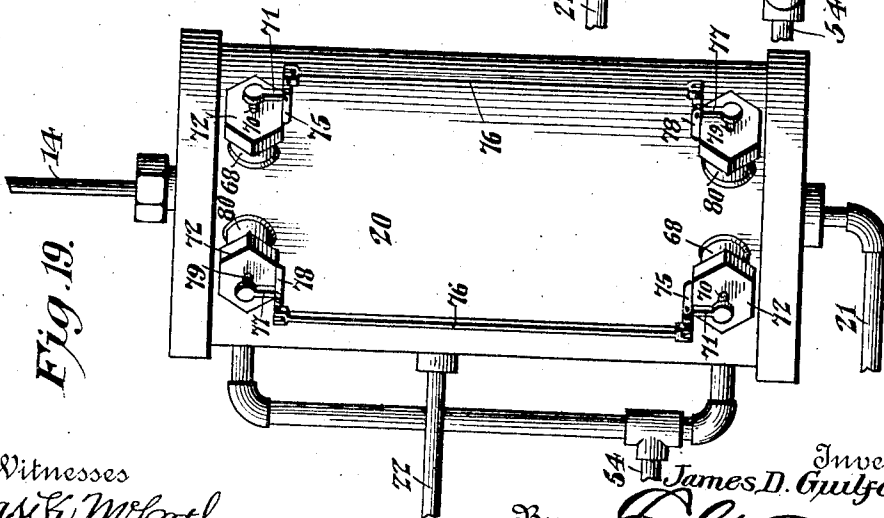


Fig. 19.



Witnesses
Jas. E. McEachran
J. F. Riley

By

James D. Guilfoyle,
C. G. Siggers

Attorney

UNITED STATES PATENT OFFICE.

JAMES DANIEL GUILFOYLE, OF JACKSONVILLE, FLORIDA, ASSIGNOR OF ONE-SIXTH TO WM. B. MCGROARTY, ONE-SIXTH TO CHARLES L. BAGWELL, AND ONE-SIXTH TO EMMET B. HUFF, OF JACKSONVILLE, FLORIDA.

SAFETY APPLIANCE FOR RAILWAY-SWITCHES.

No. 892,591.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed July 26, 1907. Serial No. 385,663.

To all whom it may concern:

Be it known that I, JAMES D. GUILFOYLE, a citizen of the United States, residing at Jacksonville, in the county of Duval, and State of Florida, have invented a new and useful Safety Appliance for Railway-Switches, of which the following is a specification.

The invention relates to improvements in safety appliances for railway switches.

Heretofore numerous wrecks and other accidents have occurred at switches, by reason of the movable switch rails not being in close contact with the adjacent rails, through the spreading of the latter and other causes, and when a movable switch rail does not fit closely against the adjacent rails, there is always a liability of the switch rail being split by the wheels of a train, and causing some of the wheels to follow the switch or siding, while the other wheels of the train are following the main rails, thereby causing serious accidents and great damage.

The object of the present invention is to provide a simple and comparatively inexpensive safety appliance capable of enabling a switch, when open, to be closed by an approaching train, and adapted to positively hold the movable switch rail tightly against the adjacent rail, and of effectually preventing the wheels from striking and splitting the point of the switch rail.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a plan view of a safety appliance, constructed in accordance with this invention and shown applied to a railway switch. Figs. 2 and 3 are enlarged detail views of the switch-actuating cylinder and piston. Fig. 4 is a sectional view on the line 1—1 of Fig. 2. Fig. 5 is a side elevation of the train operated mechanism for controlling the valve. Fig. 6 is an enlarged plan view of a portion of the same.

Fig. 7 is an enlarged detail perspective view of the laterally shiftable train-actuated lever. Fig. 8 is a detail sectional view on the line 2—2 of Fig. 6. Fig. 9 is a side elevation of the foot-actuating exhaust valve. Fig. 10 is a horizontal sectional view, taken substantially on the line 3—3 of Fig. 9. Fig. 11 is a longitudinal sectional view, taken substantially on the line 4—4 of Fig. 10. Fig. 12 is an enlarged side elevation of the air pump and the depressible train-actuated lever for operating the same. Fig. 13 is a detail sectional view on the line 5—5 of Fig. 12. Fig. 14 is a detail perspective view of the depressible train-actuated lever. Fig. 15 is a detail view of the bracket bar or member on which the train-actuated lever is mounted. Fig. 16 is an enlarged detail sectional view, taken substantially on the line 6—6 of Fig. 1. Fig. 17 is a detail view, illustrating the construction of the train operated valve for controlling the passage of the air to the cylinder of the switch-actuating piston, the casing of the valve being in section. Fig. 18 is a detail sectional view of the hollow tubular valve. Fig. 19 is an enlarged plan view of the cylinder of the switch-actuating piston, illustrating the mechanism for operating the automatic relief valves. Fig. 20 is a longitudinal sectional view of the same. Fig. 21 is a transverse sectional view, taken substantially on the line 7—7 of Fig. 20.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

10 and 11 designate movable switch rails, which are connected by a rod 12 with a switch stand 13 of the ordinary construction and which are adapted to be shifted laterally to and from the position illustrated in Fig. 1 of the drawings to set the switch either for the main line, or for the siding. The switch stand and the connections between the same and the movable switch rails may be of any preferred construction, and in order to hold the movable switch rails tightly against the adjacent rails, when the switch is set for the main line or for the siding, a pneumatically operated piston 14 is connected by a lever 15 with the switch rod 12. The lever 15 is fulcrumed at an intermediate point at 16, and the pneumatically actuated piston is

operated through the mechanism hereinafter described, to hold either the movable switch rail 10 tightly against the contiguous rail 17, or the movable rail 11 against the opposite
 5 fixed rail 18 to prevent either of the movable switch rails from being split by the wheels of a train, so that there will be no liability of a train being wrecked by reason of some of the wheels following the main line and others
 10 following the siding. Switches require continual care to insure the safety of trains, and a slight spreading of the rails will, even when the switch is properly thrown, result in the switch rail not being in proper contact with
 15 the adjacent rail. This is particularly true of switches at curves where the rails are subjected to lateral pressure. The pneumatically operated piston is adapted to force either of the rails 10 and 11 tightly against
 20 the contiguous rails, and will maintain the movable switch rail in such position to insure the safety of a train in passing over the switch.

The piston 14 is provided with a piston
 25 head 19, arranged within a horizontal cylinder 20, which is disposed transversely with relation to the main rail at one side thereof, as clearly illustrated in Fig. 1 of the drawings. Compressed air is admitted at the outer end
 30 of the cylinder 20 to a pipe 21 for moving the piston towards the inner end of the cylinder for holding the rail 10 tightly against the adjacent rail 17, when the switch is closed or set for the main line. The piston 14 is also
 35 adapted to be moved inwardly towards the track by the means hereinafter explained to automatically close the switch and set the same for the main line, should the switch be open when a train approaches it. When the
 40 switch is open or set for the siding, the piston is carried outward beyond the center of the cylinder by the switch operating mechanism, and compressed air will then be admitted to the cylinder at a point near the center there-
 45 of through a pipe 22, and this will cause the rail 11 to be held tightly against the adjacent rail 18.

The cylinder of the switch actuating piston 19 is provided at each end with a relief valve
 50 64, which is automatically operated by an auxiliary piston 65, located at the other end of the cylinder 20. The mechanism for operating the two relief valves is reversely arranged so that one of the relief valves will be
 55 operated when compressed air is admitted at either side of the piston 19. Each relief valve, which is automatically closed by a coiled spring 66, opens inwardly and is arranged to engage a beveled seat 67 of a substantially cylindrical valve casing 68. The
 60 valve casing 68 has its inner end 69 threaded and screwed into a threaded aperture of the cylinder 20. The valve 64, which is beveled to conform to the configuration of the valve

seat, is provided with a stem 70 extending 65 through the outer end of the tubular valve casing 68, and arranged to be engaged by one arm of a bell crank lever 71. The tubular valve casing may be provided at its outer end with a removable cap or head 72, and it 70 has an interior shoulder 73, forming a seat for the coiled spring, which engages a pin or projection 74 of the valve stem. The bell crank lever is fulcrumed at its angle to a support 75, consisting of a rigid arm or project- 75 ing portion, extending upwardly from the cap or head of the tubular valve casing 68. One arm of the bell crank lever is arranged horizontally and extends from the arm or support 75 to a point directly above the up- 80 per end of the stem of the valve 64. The other arm of the bell crank lever extends upwardly and is connected by a rod 76 with an upwardly extending arm of a similarly arranged bell crank lever 77, fulcrumed at its 85 angle on a support 78 and having its other end arranged to be engaged by a stem 79 of the auxiliary piston 65. The auxiliary piston 65 operates in an auxiliary cylinder 80, extending outwardly from the cylinder 20 90 and having its inner end threaded and screwed into a threaded aperture of the said cylinder 20, as clearly illustrated in Fig. 20 of the drawings. The auxiliary piston, which is automatically moved inwardly by a 95 coiled spring 81, is adapted to be moved outwardly by compressed air to actuate the bell crank lever 77 and communicate motion to the other bell crank lever 71 for opening the relief valve. The pressure is maintained 100 within the cylinder 20 at either side of the piston head only while the air compressor, hereinafter described, is operated by a train and for a short time thereafter as the compressed air will leak from the cylinder 20 and 105 the pressure at each side will become normal within a very short time after the air compressor has been operated by a train. As soon as the pressure within the cylinder 20 becomes normal or nearly so, the coiled 110 springs of the automatic valve and the auxiliary piston will operate to close the valve and move the piston inwardly, the inward movement being limited by a transverse pin 82, which extends across the auxiliary cylinder 80. The coiled spring 81 is interposed between the piston 65 and the outer end or head of the auxiliary cylinder 80, and it operates to move the piston inwardly. The other coiled spring 66 by being interposed between 120 the shoulder 73 and the pin or projection of the valve stem is adapted to lift the valve and close the same.

The air pipes 21 and 22 are connected with a cylindrical valve casing 23, in which oper- 125 ates a tubular valve 24 and which is connected by a short pipe 25 with an air pump or compressor 26. The tubular valve 24,

which is cylindrical to fit the casing 23, is closed at its outer end 27 and it is provided with ports 28 and 29, adapted to register with the pipes 21 and 22 to admit air to the cylinder 20 at either the outer or inner side of the piston head 19. The valve 24 has a limited rotary movement, and when it is partially rotated in one direction, the port 28 is carried into register with the air tube 21, and when it is moved in the opposite direction, the other port 29 is caused to register with the air pipe 22.

The outer end of the tubular valve is coupled to a shaft 30, journaled in suitable bearings at one side of the track and provided adjacent to the valve 24 with a socket 31 in which fits a stud or projection 32 of the valve 24. The stud or projection 32 is secured in the socket 31 by a key 33, or other suitable device, and the shaft 30 is provided at its outer end with a depending arm 34, which is connected by a link 35 with an arm 36 of a laterally shiftable lever 37. The arm 36 is located at one end of the laterally shiftable lever 37, which is pivoted at its other end 38, and it is arranged at an angle to the track and is adapted to be moved outwardly by a slidable bar or member 39, carried by the locomotive of the train and operated by the engineer. The laterally shiftable lever 37 is spaced from the adjacent rail by a horizontal bar 40, having its end 41 beveled to provide a flaring mouth or entrance to the space between the bar and the lever 37. When the shiftable lever is at the limit of its outward movement, the port 28 of the valve is in register with the air pipe 21, and when the lever 37 is at the limit of its inward movement and in contact with the horizontal bar or member 40, the other port 29 is in register with the air pipe 22.

The operating bar or member 39, which may be mounted on an engine in a variety of ways, is preferably slidable vertically in a guide 42, and it is connected by a shank or rod 43 with one arm of a bell crank lever 44, the other arm being connected by a rod 45 with an operating lever 46, located in the cab of a locomotive and provided with a dog or detent for engaging an arcuate ratchet member 47, having opposite notches for locking the operating bar or member 39 at the limit of its upward and downward movements. When the train is running along the main line, the operating bar or member is lowered, and if a switch should be open, the laterally shiftable lever 37 will be moved outward to set the valve in proper position for automatically closing the switch and for holding the switch in its closed position. If it is desired to take the siding, the operating bar or member 39 is raised and the switch is operated by hand, and the shiftable lever 37 is also moved inwardly to arrange valve 24 for admitting

air through the pipe 22 to the inner side of the piston head.

The air pump or compressor, which may be of any preferred construction, has an intake pipe 26^a, and is provided with a vertically movable piston head 48, which is connected by a rod or stem 49 with a depressible operating bar or lever 50, fulcrumed at one end 51 and pivoted at its other end to the said rod or stem 49. The depressible bar or lever 50 has an oppositely inclined upper edge, which is arranged to be engaged by the flanges of the car wheels. The depressible bar or lever 50 is arranged within a horizontal bracket bar or member 52, which is secured to the inner side of the adjacent rail. The depressible bar or lever 50 projects sufficiently above the tread of the rail to secure about a two-inch and a half stroke for the pump, and the upward movement of the piston is effected by a spring 53, located below the piston head and interposed between the same and the bottom of the casing.

When the switch is operated by hand, the compressed air within the cylinder is exhausted, and each end of the cylinder is placed in communication with the atmosphere to permit the piston to be readily moved from one end of the cylinder to the other. This is effected by means of an exhaust pipe 54, provided with branches 55 and 56, extending to the inner and outer ends of the cylinder, and the said exhaust pipe is controlled by a valve 57, arranged within a suitable casing 58 and connected with a treadle or foot lever 59. The treadle or foot lever is normally held elevated by a coiled spring 60, which maintains the exhaust valve in a closed position. The valve 57, which is cylindrical, is pivotally mounted and is capable of a limited oscillatory movement to carry a port or passage 61 into and out of communication with the exhaust pipe. The branches 55 and 56 of the exhaust pipe are provided with outwardly opening valves 62 and 63, which will permit air to pass readily out through the branches, when the exhaust valve is open. These valves, however, are adapted to permit the escape of the pressure through the exhaust pipe during the pumping operation. When the pressure is admitted at the outer side of the piston head, as indicated in Fig. 2 of the drawings, the compressed air will open the valve 63 and acting on the outer face of the valve 62 will maintain the same firmly closed to prevent the air from passing around the piston head through the exhaust pipe. When the air is admitted at the inner side of the piston head, the reverse operation takes place and the other valve 63 will be closed to prevent the compressed air from passing around to the opposite side of the piston head.

Having thus fully described my invention,

what I claim as new and desire to secure by Letters Patent, is:—

1. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of pneumatically operated means connected with the manually operable means for holding the switch tightly in either position.

2. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of pneumatically operated means connected with the manually operable means for holding the switch tightly in either position and also for automatically closing the switch.

3. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of a cylinder, a piston operating in the cylinder and connected with the manually operable means, a train-actuated air compressor, and means for admitting compressed air to either side of the said piston for holding the switch tightly in either position.

4. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of a cylinder, a piston operating in the cylinder and connected with the manually operable means, a train-actuated air compressor, and means for admitting compressed air to either side of the said piston for holding the switch tightly in either position and for also automatically closing the switch.

5. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and operating mechanism therefor, of pneumatically operated means for holding the switch tightly in either position, said means including a cylinder, a piston operating in the cylinder and connected with the switch, and an air compressor connected with the cylinder and arranged to be continuously operated by the wheels of a train during a passage of the train over the air compressor for supplying compressed air to the cylinder.

6. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a train operated air compressor, a valve connected with the air compressor and with the cylinder for admitting air to either side of the piston for holding the switch in either position and for automatically closing the switch, and means arranged to be operated by a train for moving the valve to its position for closing the switch.

7. In an automatic compressed air safety

appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a train operated air compressor, a valve connected with the air compressor and with the cylinder for admitting air to either side of the piston, a shaft connected with the valve for actuating the same, a shiftable lever arranged to be operated by a train, and means for communicating motion from the shiftable lever to the shaft.

8. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a train operated air compressor, a valve provided with a casing connected with the air compressor, air pipes extending from the valve casing to the cylinder, said valve being provided with ports arranged to be carried into communication with the said air pipes, and train operated means for actuating the valve.

9. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a train operated air compressor, a tubular valve provided with a casing connected with the air compressor, said valve being tubular and provided with ports, air pipes extending from the valve casing to the cylinder for cooperation with the said ports, a shaft coupled to the said valve, and train operated means for actuating the shaft.

10. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a train operated air compressor, a valve having a casing connected with the air compressor and with the cylinder, a shaft for actuating the valve, a laterally shiftable lever, means for communicating motion from the lever to the shaft, and means adapted to be carried by a train for actuating the lever.

11. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of pneumatic means for automatically closing the switch and for holding the switch tightly in either position, said means embodying a valve, a bar or member designed to be arranged at one side of the track, and a laterally shiftable lever arranged at an angle to the bar or lever and connected with the valve for operating the same.

12. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of pneumatic means for automatically closing the switch, said pneumatic means embodying a cylinder having a piston connected with the manually operable

means, an exhaust pipe having branches connected with the cylinder, and an exhaust valve for opening and closing the exhaust pipe.

13. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of pneumatic means for automatically closing the switch, said pneumatic means embodying a cylinder having a piston connected with the manually operable means, an exhaust pipe having branches connected with the cylinder, an exhaust valve for opening and closing the exhaust pipe, and a spring supported foot lever or treadle connected with the valve.

14. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of pneumatic means for automatically closing the switch, said pneumatic means embodying a cylinder having a piston connected with the manually operable means, an exhaust pipe having branches connected with the cylinder, an exhaust valve for opening and closing the exhaust pipe, and outwardly opening valves mounted in the branches of the exhaust pipe.

15. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a relief valve arranged at one end of the cylinder, an auxiliary piston located at the other end of the cylinder and arranged to be actuated by interior pressure, and means for communicating motion from the auxiliary piston to the relief valve to open the latter when the former is actuated.

16. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a relief valve arranged at one end of the cylinder, an auxiliary piston located at the other end of the cylinder and arranged to be actuated by interior pressure, a bell crank lever arranged to be operated by the piston, a second bell crank lever arranged to actuate the valve, and a rod connecting the bell crank levers.

17. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, an inwardly opening relief valve arranged at one end of the cylinder, a spring for normally closing the same, an auxiliary piston located at the other end of the cylinder, a spring for moving the piston inwardly, and means actuated by the piston for moving the relief valve inwardly to open the same.

18. In an automatic compressed air safety appliance for railway switches, the combina-

tion with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, relief valves located at the ends of the cylinder and provided with projecting stems, auxiliary pistons also located at the ends of the cylinder and having projecting stems, and mechanism arranged to be actuated by each of the auxiliary pistons for operating the valves at the opposite end of the cylinder, said mechanism embodying levers arranged in the path of the said stems, and a rod connecting the levers.

19. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a tubular valve casing located at one end of the cylinder and provided at its inner end with a valve seat and having an interiorly arranged shoulder, a valve arranged to engage the seat and provided with a stem extending from the valve casing, a spring engaging the shoulder, and a stem for closing the valve, an auxiliary cylinder mounted on the said cylinder, a piston operating in the auxiliary cylinder and having a projecting stem, means carried by the auxiliary cylinder for limiting the inward movement of the auxiliary piston, a spring for moving the same inwardly, and means actuated by the auxiliary piston for operating the relief valve.

20. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, and means operated by the excess of pressure at one side of the piston for relieving the other side of the piston of pressure.

21. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, a relief valve located at one end of the cylinder, and means actuated by the excess of pressure at the other end of the cylinder for opening the relief valve.

22. In an automatic compressed air safety appliance for railway switches, the combination with a switch, of a cylinder, a piston operating in the cylinder and connected with the switch, an auxiliary piston located at one end of the cylinder and arranged to be operated by the excess of pressure at one side of the piston, and means operated by the auxiliary piston for relieving the cylinder pressure at the other side of the piston.

23. In an automatic compressed air safety appliance for railway switches, the combination with a switch, and means for manually operating the same, of pneumatically operated means connected with the switch for holding the same tightly in either position,

said pneumatically operable means including
an air compressor, operating mechanism ar-
ranged to be depressed by the wheels of a
train, and a spring for moving the operating
5 mechanism upward after each depression of
the said wheels, whereby the air compressor
is continuously operated while the train is
passing over it.

In testimony, that I claim the foregoing as
my own, I have hereto affixed my signature 10
in the presence of two witnesses.

JAMES DANIEL GUILFOYLE.

Witnesses:

C. L. BAGWELL,
A. CLEVELAND.