R. V. CHEATHAM.

FLUID PRESSURE SWITCHING DEVICE.

APPLICATION FILED APR. 1, 1909.

934,138. Patented Sept. 14, 1909.

Fig. 1.

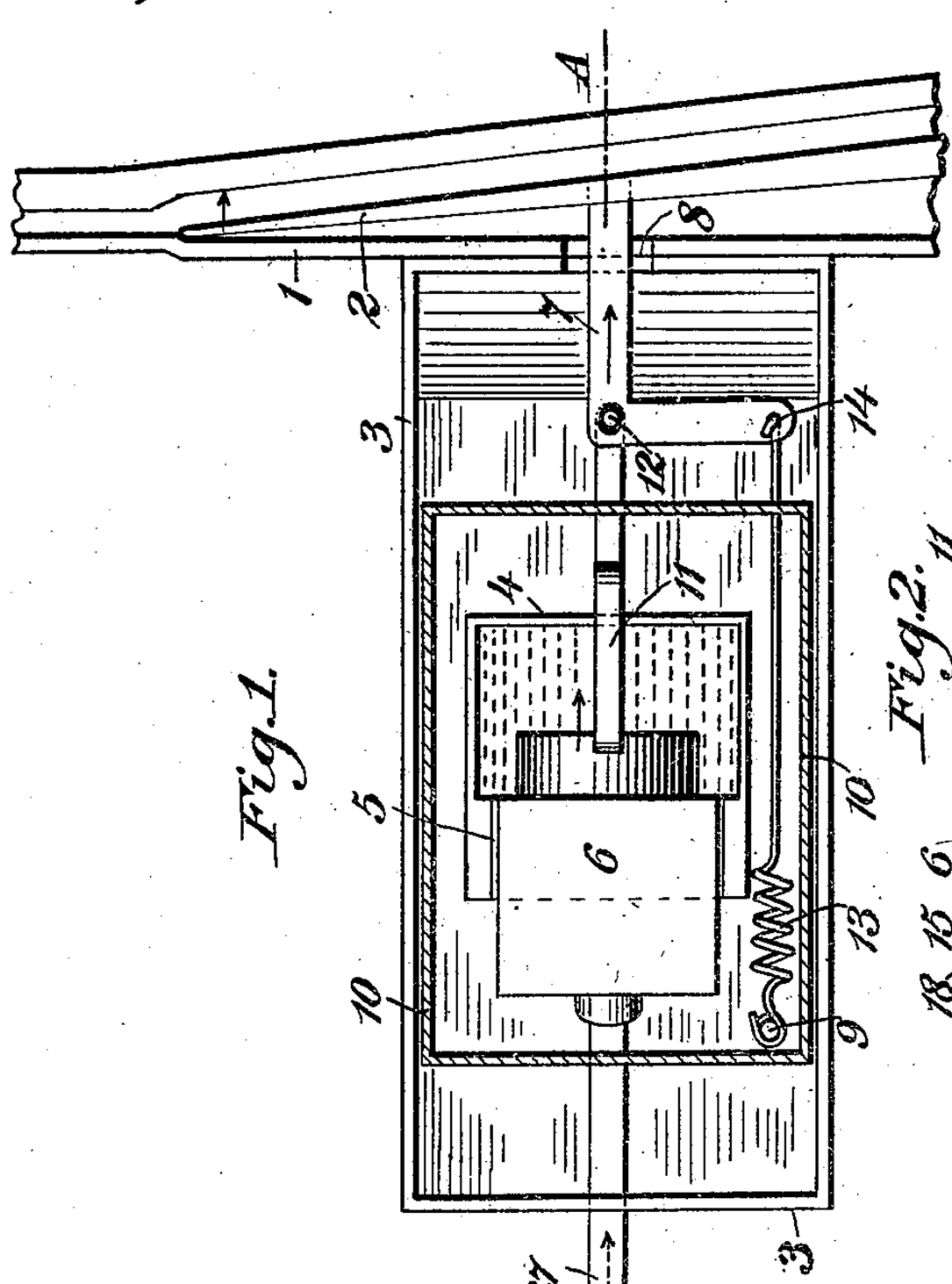


Fig. 2.

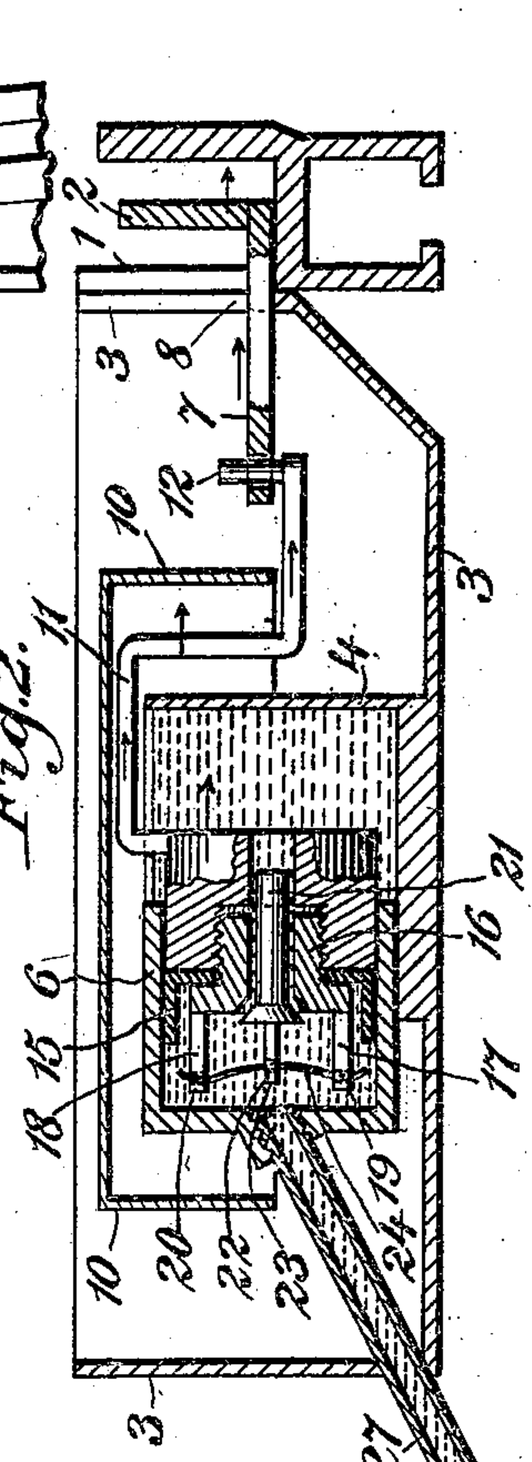
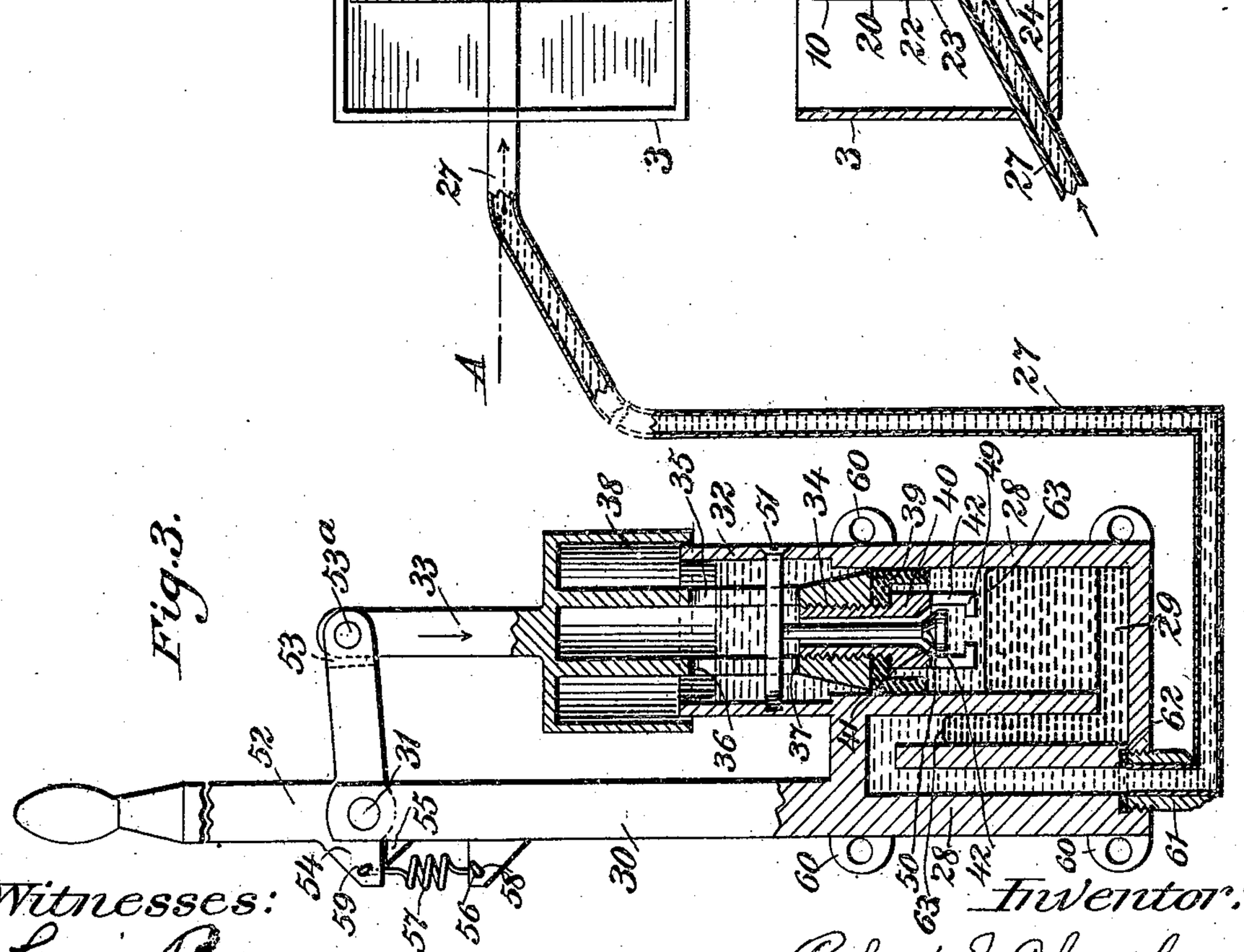


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT V. CHEATHAM, OF ST. MATHEWS, KENTUCKY.

FLUID-PRESSURE SWITCHING DEVICE.

934,138. Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed April 1, 1909. Serial No. 487,268.

To all whom it may concern:

Be it known that I, ROBERT V. CHEATHAM, a citizen of the United States, residing at St. Mathews, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Fluid-Pressure Switching Devices, of which the following is a specification.

My present invention relates to improvements in fluid pressure switching devices. The one herein described being used at the intersection of a street railway and a steam railway, the tongue being normally set in a position to derail the street car. The flagman or operator may at his discretion operate a lever and close the switch to allow a street car to pass the switch and across the intersection. Upon his releasing the lever the switch will be opened again to derail the following car.

I do not claim priority of invention in using a fluid pressure to move a switch tongue.

The greatest obstacle in throwing a switch tongue by any machine located below the surface of the street has been found to be in keeping the water and mud out of the interior compartments, whether they be hydraulic cylinders or electrical machines. In all systems so far as I have observed, there is of necessity a movable rod extending from within an interior compartment through a stuffing box into an exterior one which is flooded by rains or choked sewers. The result is that the packing around the rod wears and the muddy water leaks through the packing into the interior compartment and the sediment chokes the pipes or short-circuits the electric work.

My improvement consists of an open end cylinder having no stuffing box and being protected from the entrance of water and mud by an air chamber or inverted pan or hood.

My present arrangement is novel in that only one line of pipe is required for each switch point as any fluid which escapes past the pistons is drawn back by the action of the mercurial column.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts, all of which will be hereinafter more fully described.

In the accompanying drawing: Figure 1 is a perspective of a part of the switching arrangement connected to the switch tongue or movable rail. Fig. 2 is a vertical section through line A—A Fig. 1 showing the interior of the cylinder and the valves, enlarged for clearness. Fig. 3 is a vertical view of the pump, one side of the interior of which is shown in perspective.

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

In Fig. 1, 1 is a switch as ordinarily constructed for street railway work and having a movable tongue, 2.

3 is a cast iron box or housing placed against the side of the switch and having its lid removed.

4 is a box or reservoir within the box 3, and cast upon the bottom of box 3. A channel 5 is formed in one end of reservoir 4. In this channel is fastened, by means of Babbitt metal, an elongated block of steel 6 having a hole bored lineally through its center to form a cylinder.

7 is an L-shaped strip of iron welded to the tongue 2 and extending through opening 8 and into the box 3.

9 is a vertical stud cast upon the bottom of box 3, and having its upper end reduced in size.

10 is an inverted pan or air chamber with a portion broken out for observation. This chamber covers the reservoir 4 and a portion of the mechanism for the purpose of excluding the water, which will run into box 3 during rains or floods.

11 is a piston-rod bent to form eccentrics and extends from within cylinder 6 into the reservoir 4, then upward and over the edge of reservoir 4, then downward and under the edge of pan 10, then upward and through the hole 12 in iron strip 7.

13 is a coil contractile spring, one end of which is bent and hooked around the stud 9, the other end is bent to pass under the edge of pan 10 and is then hooked into the hole 14 in the iron strip 7.

15 is a leather cup-valve with a hole through the center.

16 is a screw having a countersunk hole through its center and two parallel prongs 17, 18 extending lineally from its head with holes 19, 20 being bored in each prong.

21 is a screw-head valve shown in its open or normal position having a flat projection 22 extending lineally from its head. Near

the outer end of this projection 22 is a hole 23. A wire spring 24 is threaded through the hole 23 and through holes 19, 20. The ends of wire spring 24 being bent to hold it in place, this spring acts to open valve 21 as soon as the pressure on the fluid ceases.

27 is the fluid supply pipe and is screwed into the cylinder 6, Fig. 2 in such a way as to connect to the hole bored through the center of cylinder 6.

28 is a casting forming the main body of the fluid pump. The N shaped cavity 29 which contains the fluids is so shaped to form a fluid trap. The upward extending arm 30 which is integrally cast to the pump body 28 is slotted transversely near its top, said slot forming a receptacle for the L shaped lever 52. Pin 31 extends through the slotted end of arm 30 and forms a journal for lever 52.

32 is a fluid reservoir cast on top of the main pump body 28.

33 is a plunger, the lower portion of which is hollow and cylindrical in shape. The lower end of plunger 33 is slightly enlarged and threaded internally at 34.

35 is a transverse slot which extends through both sides of the cylindrical portion of plunger 33 and extends vertically between lines 36 and 37. Said slot forms an elongated opening in the plunger 33 through which the screw 51 extends.

38 is a hood or inverted cup integrally cast around plunger 33 and overhanging and extending below the top of reservoir 32 to exclude rain from the interior of reservoir.

39 is a cup-valve preferably of leather bored through its center and attached to the lower end of plunger 33 by screw 40.

40 is a screw bored through its center and countersunk to form a valve seat 41. Two parallel prongs 42 are formed on the head of screw 40 and project therefrom lineally. The projecting ends of these prongs 42 turn inward to form shoulders 49 which retain the screw shaped valve 50.

51 is a screw which extends through one side of the reservoir 32, then through the slotted plunger 33, slot 35 in the plunger 33, and then screws into the opposite side of reservoir 32. Screw 51 is stationary and engages the upper end of valve 50 when said valve and plunger 33 are near their limit of upward motion, thus making a positive mechanical means of opening valve 50 in case it should stick and fail to open by gravity when the plunger 33 is being raised.

52 is a bell crank lever mounted in the slotted end of arm 30 and secured by a pin 31 which forms a journal upon which it moves. The end of lever 52 is slotted at 53 and attached to the plunger 33 by means of pin 53[a].

54 is a stationary lug integrally cast on lever 52 and engages a corresponding lug 55 integrally cast on arm 30 to form a stop to the backward movement of lever 52.

56 is a stationary lug forming a portion of arm 30.

57 is a coil contractile spring having one end hooked in the hole 58 in lug 56 and the other end hooked in the hole 59 in lug 54. Said spring serves to return the lever 52 to its normal or upright position.

Ears 60 are a part of casting 28, a hole being bored through each to receive screws which fasten casting 28 to a post or other support not shown. Pipe 61 screws into casting 28 against gasket 62 and forms an outlet or continuation of the N shaped channel 29 and contains the fluid connecting the pump Fig. 3 and the switching mechanism Fig 1.

Lines 63 mark the surfaces of a body of quicksilver placed in the N shaped cavity 29 formed in the casting 28. This quicksilver serves to balance the column of fluid (oil, for instance), so that in case the operating pump Fig. 3 and the switching mechanism Fig. 1 are on different levels the oil will stand at the required height in the pump, and will not flow out through the valves even though they be worn or loose or standing open.

Various modifications of the construction may be made without departing from the spirit of the invention, and no limitation is intended by the specific disclosure and illustration.

Method of operation: The motorman in approaching an intersecting railroad finds a switch with the tongue set to derail his car. He stops and the conductor goes ahead onto the intersecting railroad where the fluid pump is located. He pulls on the lever 52 which forces the plunger 33 downward. The pressure of oil beneath the valve 50 closes it and the leather cup valve 39. A further movement of lever 52 in the same direction forces the plunger 33 downward forcing the oil or fluid before it thus causing a movement through the entire pipe line. This movement of the column of oil or fluid forces the plunger 11 outward which closes the switch allowing the car to proceed. The conductor maintains a pull on the lever until the car has passed the switch tongue. He then releases the lever and spring 13 returns the tongue and plunger 11 to their normal position, thereby forcing back the oil in the pipe line, and trap 29. The working parts of the pump are reset to a normal position by spring 57. The valve 50 must be open while the plunger 33 is in its normal position because stationary screw 51 bears against the upper end of said valve.

I claim as my invention:

1. A fluid-operated switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or chan-

nel, said secondary cylinder having an open and non-packed end for a combined outlet for its fluid contents and piston rod.

2. In a fluid-operated switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or channel, a secondary cylinder having its open non-packed end terminating within an open-top or unsealed reservoir.

3. In a fluid-operated switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or channel, an open-top or unsealed reservoir inclosing the outlet of the secondary cylinder.

4. In a fluid-operated switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or channel, a piston-rod or bar bent to form an eccentric or bridge spanning over the side of the reservoir and forming a movable means for transmitting the power or movement from the interior of the secondary cylinder or reservoir to the movable tongue or parts on the exterior of the reservoir.

5. In a fluid-operated switching device consisting of a primary cylinder and a secondary cylinder which terminates in an open-top reservoir, an inverted air chamber or hood covering the reservoir and adjacent parts and extending downward far enough to form an air seal which will prevent the water on the outside of the reservoir from overflowing the sides of the reservoir.

6. In a fluid-operated switching device consisting of a primary cylinder and a secondary cylinder terminating in an inclosing reservoir covered with an inverted pan or hood, a coil-contractile spring located within the hood and having one end fastened to a stationary support and the other end bent to form an eccentric to pass under the bottom edge of the air chamber or hood and attached to the switch tongue or parts thereof for the purpose of holding the tongue in a derailing or normal position.

7. In a fluid-operated switching device consisting of primary and secondary cylinders connected by a pipe line or fluid channel, a U-shaped trap or bend formed in the connecting pipe line or channel and containing a body of mercury to act as a counterbalance to return and hold the operating fluid to its normal position or level in the fluid channel, cylinders, and reservoirs.

8. In a fluid-pressure switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or channel, a cup-valve attached to the piston in the secondary cylinder and arranged to be closed automatically by a pressure of the fluid in the connecting pipe-line or channel.

9. In a fluid-pressure switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or channel, a relief valve located in the piston of the secondary cylinder and arranged to be closed automatically by a pressure of the fluid in the connecting pipe line or channel and to be opened automatically when the fluid-pressure ceases.

10. In a fluid-pressure switching device consisting of primary and secondary cylinders connected by a fluid-pressure pipe or channel, a pump having a relief valve opening through the piston-head, said valve operating or opening when the pressure is taken off the operating fluid.

11. In a fluid-operated switching device consisting of a primary cylinder or pump connected to a secondary cylinder by means of a fluid-pipe or channel, a movable hood connected to the primary piston rod and forming a cover to the reservoir-top of the primary cylinder.

12. In a fluid-operated switching device consisting of a primary pump connected to a secondary cylinder by a fluid-pressure pipe or channel, a spring attached to an arm of the primary pump to return said pump and piston to their original or normal position.

13. In a fluid-presure switching device consisting of a fluid pump connected by a fluid pressure pipe to a secondary cylinder, a pin or obstruction located in the primary cylinder and acting as a stop to open the relief valve operating through the cylinder head.

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