J. BRUNKER & C. A. MATTMILLER.

FLUID PRESSURE CONTROLLING VALVE.

APPLICATION FILED DEC. 31, 1914.

1,153,759. Patented Sept. 14, 1915.

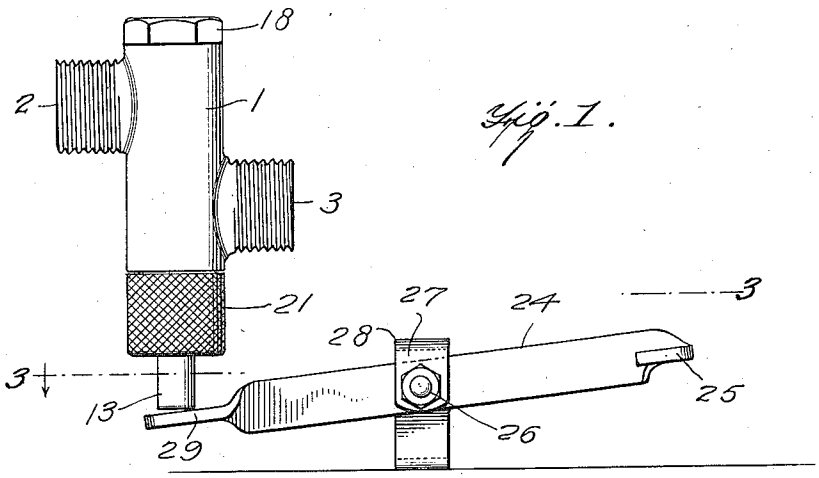


Fig. 1.

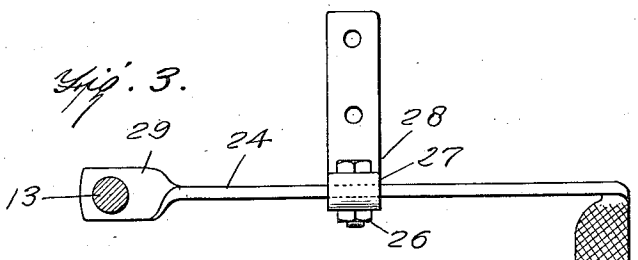


Fig. 3.

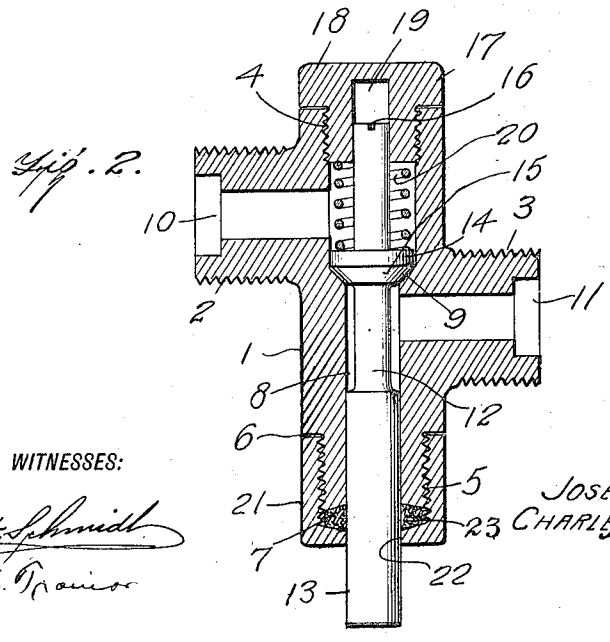


Fig. 2.

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UNITED STATES PATENT OFFICE.

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FLUID-PRESSURE-CONTROLLING VALVE.

1,153,759. Specification of Letters Patent. Patented Sept. 14, 1915.

Application filed December 31, 1914. Serial No. 879,908.

To all whom it may concern:

Be it known that we, JOSEPH BRUNKER and CHARLEY A. MATTMILLER, citizens of the United States, and residents of Helena, in the county of Lewis and Clark and State of Montana, have invented a new and useful Improvement in Fluid-Pressure-Controlling Valves, of which the following is a specification.

Our invention is an improvement in fluid pressure controlling valves, and has for its object to provide a valve of the character specified, especially adapted for use with locomotives or electric motors for controlling the operation of the compressed air used in braking sanding or bell ringing, wherein mechanism is provided adapted to be operated by a pedal or in any other suitable manner for admitting the full pressure of the air instantaneously, that is, for opening the valve to its full extent with a very slight movement.

In the drawings: Figure 1 is a side view of the improved valve and its operating mechanism, Fig. 2 is a longitudinal section of the valve, and Fig. 3 is a section on the line 3—3 of Fig. 1, looking in the direction of the arrows adjacent to the line.

The usual valve for controlling the supply of air for sanding devices, bell ringers, and the like, on steam locomotives or electrical motors, is a valve similar to the usual globe valve, the said valve having however, a warning port in the handle so that when the sander is in operation the air is escaping through this warning port to warn the engineer that the valve is open to avoid leaving the valve open inadvertently after the sand is no longer needed. It is a fact that because of the noise on the locomotive or motor or for some other reason, the engineer often fails to hear the whistle of the escaping air and neglects to close the same when the sand is no longer needed, thus a great waste of air and sand occurs, and also a considerable loss in power, due to the retardation caused by the unnecessary sand on the rails.

The present embodiment of the invention comprises a valve casing or body 1 of approximately cylindrical form, having lateral nipples 2 and 3, each of which is externally threaded, and the said nipples communicate with the bore of the casing. The casing is internally threaded at the end adjacent to the nipple 2, as indicated at 4, and the opposite end is reduced and internally threaded as indicated at 5.

An annular shoulder 6 is formed between the threaded portion 5 and the body of the casing, and the outer end of the said threaded portion is tapered or concave as indicated at 7 for a purpose to be presently described. The bore of the body or casing is reduced at the inner side of the nipple 2 from the said nipple to the outer end of the reduced portion 5 as indicated at 8, and a tapered or beveled seat 9 is formed between the reduced portion and the remaining portion of the bore, the said seat being between the nipples 2 and 3.

Each of the nipples 2 and 3 has its outer end enlarged or counterbored as indicated at 10 and 11, respectively, and a valve stem 12 is arranged within the bore of the casing. The said stem is provided with an enlarged portion 13 fitting the reduced portion 8 and forming a guide to hold the valve and the stem concentric with the casing, and a valve 14 is secured to the stem about half way between the inner end of the enlarged portion and the opposite end of the stem. This valve as shown, is beveled or tapered on its inner side as indicated at 15, to fit the seat 9, and the opposite end of the stem from the enlarged portion is provided with a transverse kerf 16 for engagement by a screw driver or the like, to turn the stem. The end of the casing adjacent to the nipple 2 is closed by a plug or cap 17, the said plug or cap being externally threaded to fit the threaded portion 4 and the plug or cap is provided at its outer end with an annular rib 18 having a polygonal contour for engagement by a wrench to turn the plug. The inner end of the plug is recessed as shown at 19 to receive the end of the stem remote from the enlargement 13, the said recess assisting to guide the stem and valve in their movement in the casing.

A coil spring 20 encircles the stem between the outer face of the valve 14 and the inner end of the plug and the spring acts normally to hold the valve against the seat 9, thus closing the communication between the nipples 2 and 3. The enlarged portion 13 of the valve stem extends beyond the valve casing, and a packing nut 21 is engaged with the reduced threaded portion 5 of the casing.

The enlarged portion of the stem extends through the packing nut as shown, and a

packing 23 is arranged between the nut and the tapered or beveled portion 7 of the casing to make a fluid tight joint at this point. The valve casing 1 is interposed in the fluid pressure supply pipe, one end of the said pipe being connected to the nipple 2 and the other to the nipple 3, and it will be obvious that when the stem 12—13 is pressed toward the plug or cap 17 the valve 14 will be unseated to permit the passage of air between the nipples 2 and 3.

As soon as the pressure is relaxed the coil spring 20 will force the valve to its seat. The preferred form of operating mechanism used to operate the valve, that is, to move the stem longitudinally against the pressure of the spring is that shown in Fig. 1. The said mechanism comprises a treadle lever 24, having at one end a foot plate 25 and pivoted intermediate its ends as indicated at 26 to one of the arms 27 of an angle bracket, the other arm 28 of the bracket being rigidly connected to a fixed support.

The valve is arranged as shown in Fig. 1 with the stem in vertical position, and with the end of the enlarged portion 13 depending below the casing. The angle bracket 27—28 is so arranged that the opposite end of the treadle lever from the foot plate 25 is directly below the said lower end of the stem, and this end of the lever has a plane portion 29, which is adapted to engage the said lower end of the valve stem to lift the stem when the foot plate is depressed.

In operation, the connection from the main reservoir of the fluid under pressure is connected with the nipple 2 and the discharge pipe to the sander or bell ringer is connected to the nipple 3. The coil spring 20 together with the valve and its stem normally holds the valve 14 closed against its seat 9. When it is desired to open the valve to permit the fluid pressure to pass to the nipple 3, the foot plate of the lever is depressed, thus moving the portion 29 upward and lifting the valve and the stem. A single movement of the lever 24 is sufficient to open the valve to its fullest extent, thus admitting the fluid pressure to the discharge pipe. Since the valve is operated by a treadle, the hands of the engineer or motorman are free, and he can operate the sander or the bell ringer or any other mechanism that is to be operated without removing his hands from the controlling levers of the motor or engine. It will be obvious that immediately the pressure on the foot plate 25 is relaxed the coil spring 20 will seat the valve, so that there is no possibility of the valve being inadvertently left open. For this reason the usual warning signal is not necessary, since the valve cannot be left open. It will be understood that the coil spring 20 is necessary to close the valve only when there is no pressure in the reservoir, that is, in the nipple 2. When the foot lever 24 is operated in a direction to lift the valve the packing in the nut 21 might hold the valve from its seat because of the friction between the packing and the stem. When however, the air compressor is started the air will blow through the open ports until a few pounds pressure is attained to force the valve shut. The only function of the spring is to force the valve shut when there is no air pressure in the casing. The counterbores 10 and 11 are for engagement by standard pipe unions.

We claim:—

In combination a valve comprising a casing having a vertical bore and having inlet and outlet ports, and a valve seat between the ports, the inlet port being at a higher level than the outlet port, a valve coöperating with the seat, a stem to which the valve is connected, and extending through the casing at the lower end thereof, and extending above the valve, said casing having a guide for the upward extension of the stem above the inlet, a spring arranged between the guide and the valve and normally pressing the valve downwardly, said stem being enlarged below the outlet to fit the bore of the casing tightly to close the same, and a treadle lever pivoted intermediate its ends and having one end in position to engage the downward extension of the stem to lift the stem when the outer end of the treadle is depressed.

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