

J. W. MITCHELL.
 FLUID PRESSURE ACTUATED VALVE.
 APPLICATION FILED APR. 27, 1916.

1,307,207.

Patented June 17, 1919.

2 SHEETS—SHEET 1.

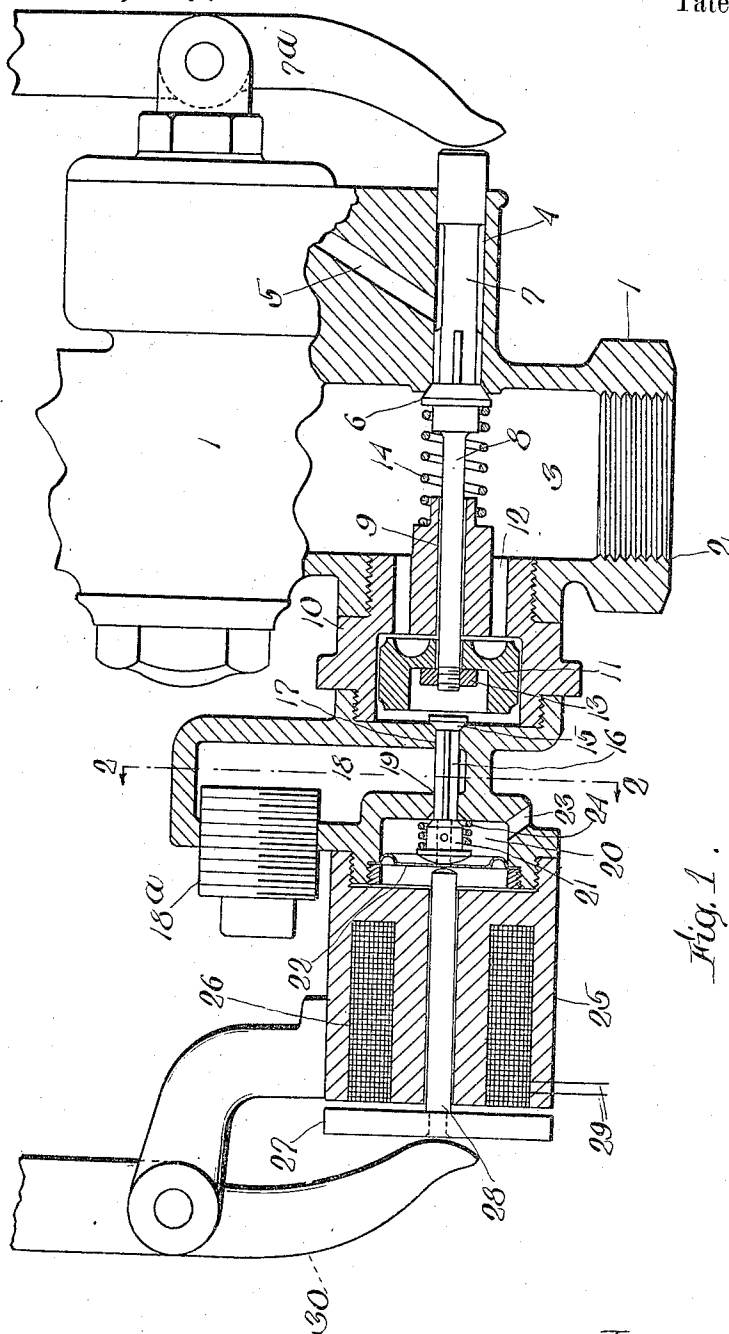


Fig. 1.

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Fig. 2.

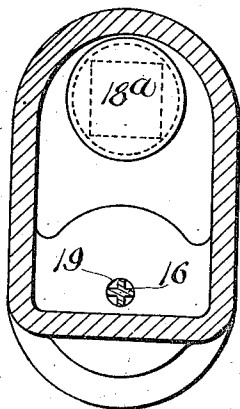


Fig. 3.

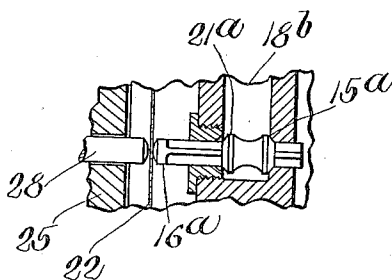


Fig. 4.

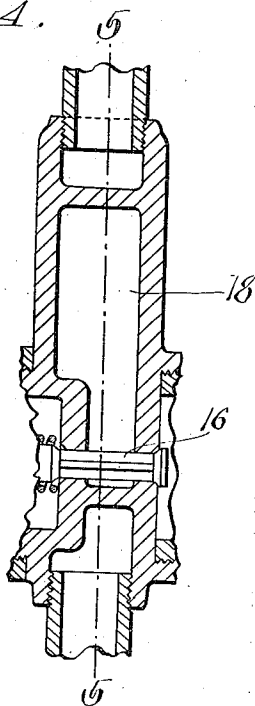
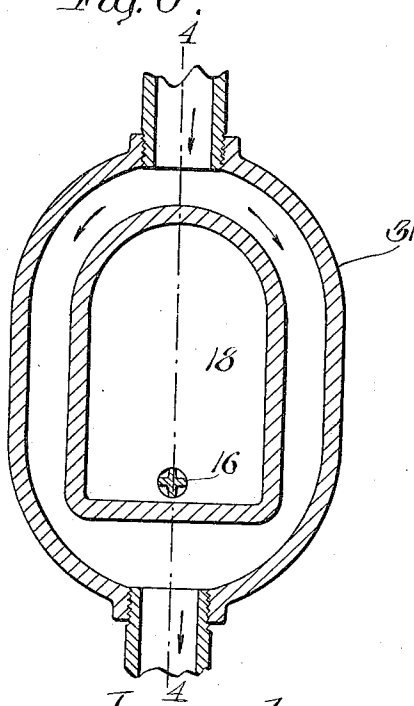


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES W. MITCHELL, OF LUBEC, MAINE, ASSIGNOR TO CROSBY STEAM GAGE & VALVE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION.

FLUID-PRESSURE-ACTUATED VALVE.

1,307,207.

Specification of Letters Patent. Patented June 17, 1919.

Application filed April 27, 1916. Serial No. 94,066.

To all whom it may concern:

Be it known that I, JAMES W. MITCHELL, a citizen of the United States, and a resident of Lubec, in the county of Washington and State of Maine, have invented certain new and useful Improvements in Fluid-Pressure-Actuated Valves, of which the following is a specification.

This invention relates to fluid-pressure-actuated valves and its object is to provide means whereby a valve, opened by the fluid pressure, will automatically close after the expiration of a certain predetermined period of time, during which it has remained open.

The invention is applicable in all cases where it is desired that a fluid-pressure-actuated operation should continue for a certain period of time and then automatically cease, as for instance the blowing of a whistle; and as applied to a steam whistle the invention is illustrated by the accompanying drawings in which:—

Figure 1 is a central, longitudinal, vertical section of the valve;

Fig. 2 is a vertical section on the line 2—2 Fig. 1;

Fig. 3 is a detailed view showing a modification of a portion of the device;

Fig. 4 is a vertical section on the line 4—4 Fig. 5; and

Fig. 5 is a vertical section on the line 5—5 Fig. 4; Figs. 4 and 5 showing a modification of the steam chamber.

1 is a whistle bowl partly broken away and adapted to be surmounted by a whistle bell (not shown); is threaded at 2 for attachment to a steam boiler; and contains the inlet chamber 3 communicating with an outlet chamber (not shown) in any desired manner, as indicated by passages 4 and 5, and as fully illustrated in U. S. patent to Wolfe No. 873,822 dated Dec. 17, 1907. Valve 6 seated in the inlet chamber is furnished with stem 7 exteriorly grooved at its inner end and centrally reduced; and stem 7 is operatively engaged at its outer end by lever 7^a fulcrumed on the bowl and affording means for opening the valve. Valve 6 is furnished with a second stem 8 loosely en-

gaging passage 9 through the inner wall of cylinder 10 laterally projected from the inlet chamber; stem 8 having loosely mounted on its outer end piston 11 loosely disposed in cylinder 10, which further communicates with inlet chamber 3 by additional passages 12. Piston 11 is loosely confined on stem 8 by adjustable nut 13. Valve 6 is normally held to its seat by spring 14 disposed on valve stem 8. The arrangement thus far described is substantially that shown in the Wolfe patent above referred to. Valve 15 normally seated in cylinder 10 is furnished with the exteriorly grooved stem 16 which engages passage 17 leading from said cylinder to steam chamber 18 laterally projected therefrom; said stem 16 engaging also passage 19 leading from steam chamber 18 to diaphragm chamber 20 laterally projected therefrom; said stem terminating at its outer end in valve 21 normally unseated but adapted to be seated on the inner wall of the diaphragm chamber and contacting with diaphragm 22 forming the outer wall of the diaphragm chamber which is furnished with outlet 23. Valve 15 is normally held to its seat and valve 21 is normally held off its seat by spring 24 disposed on valve 21. Laterally projected from the diaphragm chamber is casing 25 in which is disposed electromagnet 26, the armature 27 of which is furnished with stem 28 normally contacting with diaphragm 22 opposite valve 21. Armature 27 may be operated electrically as indicated by wires 29, or it may be operated by lever 30 fulcrumed on casing 25. Steam chamber 18 is made extensible by means of its adjustable threaded wall section 18^a. In Fig. 3 valves 15^a and 21^a are both seated in the steam chamber 18^b. In Figs. 4 and 5 there is shown a steam jacket 31 encircling the steam chamber 18.

The operation is as follows:

Normally, when the whistle is not blowing (as indicated in Fig. 1), valve 6 is held to its seat by spring 14, and valve 15 is held to its seat by spring 24, the springs being assisted in each instance by pressure of the steam, which fills inlet chamber 3 and cylin-

der 10, there surrounding and balancing piston 11; valve 21 is open and there is no steam in chamber 18, which communicates with the diaphragm chamber furnished with outlet 23. To blow the whistle, lever 30 is operated, compressing spring 24, closing valve 21 and opening valve 15, whereupon steam flows from cylinder 10 into chamber 18 (the outlet 19 of which is now closed), thus relieving the pressure on the outer face of piston 11, which is moved outwardly by the pressure on its inner face and opens valve 6 (thereby compressing spring 14) and permits steam to flow from the inlet chamber to the outlet chamber and blow the whistle; and in the meantime the steam escaping from cylinder 10 past valve 15 into chamber 18 has there collected until the pressure on the outer face of the piston again approximately equals that on its inner face, when piston 11 once more becomes balanced and spring 14 (assisted by the steam pressure) seats valve 6 and the whistle stops blowing. The length of time the whistle blows depends upon the time required to balance piston 11, after it has become unbalanced as above explained, and this depends, other things being equal, on the size of steam chamber 18 which, as we have seen, may be made larger or smaller by means of the adjustable wall portion 18^a. During the operation just described, constant pressure is exerted by stem 28, actuated by lever 30, or electrically by electro-magnet 26, to keep valve 15 open and valve 21 closed.

The operation in the case of the modification shown in Fig. 3 is practically the same, except that here constant pressure is exerted by stem 28 to keep valve 15^a seated, and this pressure is relieved to open said valve and blow the whistle. The steam jacket 31 shown in Fig. 5 is to prevent injurious effects from atmospheric conditions.

I claim:

1. A fluid-pressure-actuated valve comprising, in combination, an inlet chamber; a valve controlled outlet therefor normally closed; such controlling valve; a valve stem; a cylinder communicating with the inlet chamber; a piston loosely disposed in the cylinder and mounted on the valve stem; a fluid chamber communicating with the cylinder by a valve controlled passage normally closed; a diaphragm chamber communicating with the fluid chamber by a valve controlled passage normally open; such controlling valves connected by a common valve stem and thereby adapted to act simultaneously, one valve to open while the other closes; an outlet for the diaphragm chamber; a diaphragm in the diaphragm chamber operatively connected with these controlling valves; and means for actuating the diaphragm.

2. A fluid-pressure-actuated valve com-

prising, in combination, an inlet chamber; a valve controlled outlet therefor normally closed; such controlling valve; a valve stem; a cylinder communicating with the inlet chamber; a piston loosely disposed in the cylinder and mounted on the valve stem; a fluid chamber adjustable as to size and communicating with the cylinder by a valve controlled passage normally closed; a diaphragm chamber communicating with the fluid chamber by a valve controlled passage normally open; such controlling valves connected by a common valve stem and thereby adapted to act simultaneously, one valve to open while the other closes; an outlet for the diaphragm chamber; a diaphragm in the diaphragm chamber operatively connected with these controlling valves; and means for actuating the diaphragm.

3. In a device of the character described, an inlet chamber; a valve controlled outlet therefor normally closed; such controlling valve; a cylinder communicating with the inlet chamber; a piston loosely disposed in said cylinder and operatively connected with said valve; a fluid chamber communicating with the cylinder by a valve controlled passage normally closed; such controlling valve; an outlet for the fluid chamber; and means for simultaneously opening the valve controlling the passage from the cylinder to the fluid chamber and closing the outlet from the fluid chamber.

4. In a device of the character described, an inlet chamber; a valve controlled outlet therefor normally closed; such controlling valve; a cylinder communicating with the inlet chamber; a piston loosely disposed in said cylinder and operatively connected with said valve; a fluid chamber adjustable as to size and communicating with the cylinder by a valve controlled passage normally closed; such controlling valve; an outlet for the fluid chamber; and means for simultaneously opening the valve controlling the passage from the cylinder to the fluid chamber and closing the outlet from the fluid chamber.

5. In a device of the character described, an inlet chamber; a valve controlled outlet therefor normally closed; such controlling valve; mechanism subject at all times to the fluid pressure of the inlet chamber for opening said valve; a fluid chamber communicating with the inlet chamber by a valve controlled passage; such controlling valve; an outlet for the fluid chamber; and means for simultaneously opening the passage from the inlet chamber to the fluid chamber and closing the outlet passage from the fluid chamber.

6. In a device of the character described, an inlet chamber; a valve controlled outlet therefor normally closed; such controlling valve; fluid controlled mechanism for open-

ing said valve; a fluid chamber adjustable from the inlet chamber to the fluid chamber and closing the outlet passage from the chamber by a valve controlled passage; such fluid chamber.
controlling valve; an outlet for the fluid In testimony whereof I have affixed my 10
5 chamber; and means for simultaneously signature.
opening the valve controlling the passage

JAMES W. MITCHELL.

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