(No Model.)

J. F. BATCHELOR.

VALVE CONTROLLING DEVICE.

No. 552,811. Patented Jan. 7, 1896.

Fig. 1.

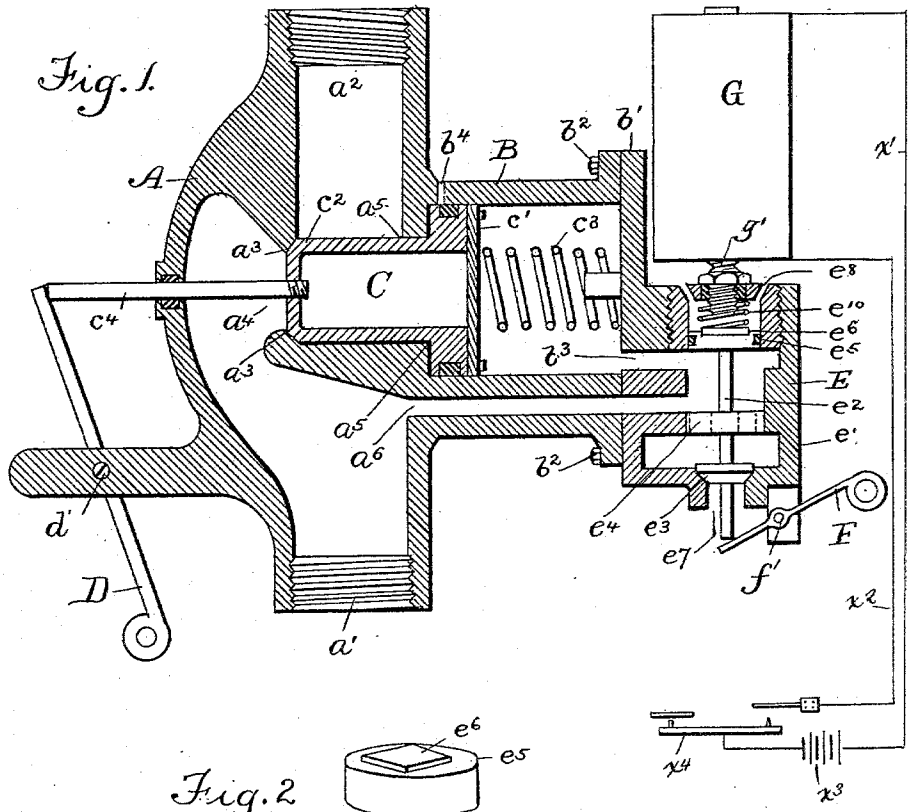
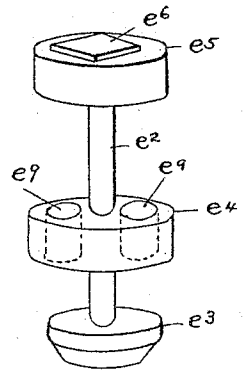


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH F. BATCHELOR, OF BROOKLYN, NEW YORK.

VALVE-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 552,811, dated January 7, 1896.

Application filed July 23, 1895. Serial No. 556,964. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH F. BATCHELOR, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Valve-Controlling Devices, of which the following is a specification.

My invention relates to an improvement in apparatus adapted to control the operation of valves.

I have illustrated my invention in the accompanying drawings, in which like letters refer to like parts.

Figure 1 is a sectional view of the valve shown closed. Fig. 2 is a perspective view of the auxiliary valve-stem and connections.

A is a valve-chest with supply-port a' and exhaust-port a^2, the valve-seat a^3 and a^3, within which is the valve-port a^4. This chest is also made with the aperture a^5 and a^5 and port a^6 leading from the main supply of pressure.

B is a cylinder, preferably made as part of the valve-chest A, of a diameter somewhat greater than the aperture a^5 and a^5 in the chest, the cylinder-head b' preferably secured to the cylinder B by the screws b^2 and b^2. The cylinder B is provided with the ports b^3 and b^4.

C is a cylindrical plunger, one end of which c' is adapted to fit the cylinder B as a piston-head, and the other end c^2 adapted to fit the valve-seat a^3 and a^3 as a valve-head, and arranged also to fit closely the aperture in the valve-chest a^5 and a^5.

c^3 is a spiral spring interposed between the head of the cylinder b' and the plunger or valve-head c', having its tension directed to maintain the valve-head seated.

c^4 is a valve-stem secured to the valve-head c^2 and passing through the valve-chest A.

D is a lever pivoted at d' and engaging the valve-stem c^4 with a pressure to open or unseat the valve.

E is the casing of an auxiliary valve intended to control pressure to the cylinder B in the channel between the ports a^6 and b^3, in which e' is a valve-chest having a cylindrical aperture to receive the piston-head e^5, described hereinafter. e^2 is a valve-stem carrying a valve-head e^3, a perforated slide-valve e^4, and a piston-head e^5. This valve-stem and parts are shown in perspective in Fig. 2, where it will be noted that the perforated slide-valve e^4 is made with apertures e^9 and e^9, through which the pressure may exhaust, as will be hereinafter described. The piston-head e^5 carries an armature e^6. The valve-chest e' has three ports, one connecting with the port a^6 and one connecting with the port b^3, and one, e^7, leading from the valve-chest e' operating as an exhaust.

e^8 is also an exhaust-port leading from before the piston-head e^5.

F is a lever pivoted at f' and engaging one end of the valve-stem e^2.

e^{10} is a spiral spring interposed between the valve-head e^5 and the head of the cylinder in which it operates.

G is an electromagnet in circuit. The circuit connections are shown as x' and x^2 and the battery as x^3, and the means to control the circuit is indicated as x^4, being a Morse key. The core of the magnet g', being extended and provided with a screw-thread, is screwed through the head of the cylinder, which is preferably formed of a non-magnetic material.

The operation of the valve and its controlling devices is as follows: Normally the valve is in the position shown in Fig. 1, the valve being retained seated by the spring c^3. When pressure is introduced through the port a', the position is unchanged. The pressure then lies before the valve-head c^2, and also passes through the port a^6, auxiliary valve-chest e', and port b^3 into cylinder B. It will be noted that the pressure-surface of the plunger presented to the pressure in the cylinder B is greater than the pressure-surface presented to the valve-head c^2. Therefore the valve will remain closed or seated. The pressure-surface presented by the valve-head e^3 and the piston-head e^5 in the valve-chest e' are supposed to be equal, the spiral spring interposed between the valve-head e^5 and the head of the cylinder being directed to maintain the valve-head e^3 seated. Therefore, normally the port a^6 is maintained open to admit pressure into the cylinder B. When it is desired to open the valve in order to permit pressure to pass through the valve and out of the port a^2, the operation is as follows: The electric circuit is closed through the electromagnet G by the operation of the Morse key x^4, whereby the

said magnet is energized and the armature e^6 is attracted to the core g' against the tension of the spring interposed between the valve-head e^5 and the head of the cylinder. The perforated slide-valve e^4 and the valve-head e^3 are thereby brought into position, where the perforated slide-valve e^4 closes the port a^6 and the valve-head e^3 opens the port e^7. The pressure then lying within the cylinder B and the auxiliary valve-chest e' is exhausted through the apertures in the perforated slide-valve e^4 and the port e^7, and the pressure lying before the valve-head c^2 causes the same to open and permit pressure to pass through the main valve and out of the port a^2. The valve is again closed by breaking the circuit to the magnet G by the operation of the Morse key x^4, when the perforated slide-valve e^4 resumes its normal position and the valve-head e^3 is seated, as in Fig. 1, thus permitting the admission of pressure to the cylinder B, when the piston c' will cause the main valve to close because of the greater pressure-surface presented by said piston.

The port b^4 is provided to exhaust any pressure that may escape between the packing of the plunger.

I have described the way in which I control my valve electrically. I may also control the same manually by operating the auxiliary valve E by the pivoted lever F, or I may control the plunger C by means of the valve-stem c^4 and lever D.

I am aware that valves operating on the general principle of the one described have been made—that is to say, wherein a balanced valve has been controlled by an exhaust. I, therefore, do not intend to claim a valve operating on this general principle broadly, but only as to the combination and arrangement of parts which I have shown, by which construction and arrangement I believe that I have made a valve, with means to operate the same, which will overcome the difficulties which have heretofore been encountered in the construction and operation of such valves. I am also able, in the construction shown, to produce a more compact form of valve and controlling devices which are cheaper of construction and more efficient in operation than valves of the same class which have heretofore been constructed.

What I claim is—

1. In a valve controlling device, the combination with a main balance valve of an auxiliary valve having a valve stem carrying a perforated slide valve, and a disk valve adapted to simultaneously control the supply and exhaust of pressure to one side of the main valve and means to operate said auxiliary valve, substantially as described.

2. In a valve controlling device, the combination with a main balance valve of an auxiliary valve having a valve stem carrying a perforated slide valve and a disk valve, adapted to simultaneously control the supply and exhaust of pressure to one side of the main valve, an electro-magnet in circuit, and means to control said circuit, and an armature, for said magnet secured to the auxiliary valve stem, substantially as described.

3. In a valve controlling device, the combination of a valve chest, A, and a cylinder, B, having valve seat and ports with a plunger, C, interposed between the pressure in the valve chest, and the pressure in the cylinder, said plunger presenting greater pressure surface to the pressure in the cylinder than to the pressure in the valve chest, and adapted to be seated in the valve seat, an auxiliary valve casing, E, interposed in the supply of pressure to the cylinder, said casing carrying a perforated slide valve e^4 and a disk valve e^3, with means to operate said valves, e^4 and e^3, substantially as described.

4. In a valve controlling device, the combination of a valve chest, A, and a cylinder, B, having valve seat and ports with a plunger, C, interposed between the pressure in the valve chest and the pressure in the cylinder, said plunger presenting greater pressure surface to the pressure in the cylinder than the pressure in the valve chest, and adapted to be seated in the valve seat, an auxiliary valve casing, E, interposed in the supply of pressure to the cylinder, said casing carrying a perforated slide valve e^4 and a disk valve e^3 secured to a valve stem e^2, an electro-magnet in circuit with means to control said circuit, an armature for said magnet secured to the valve stem, e^2, substantially as described.

Signed at New York, in the county of New York and State of New York, this 19th day of July, A. D. 1895.

JOSEPH F. BATCHELOR.

Witnesses:

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