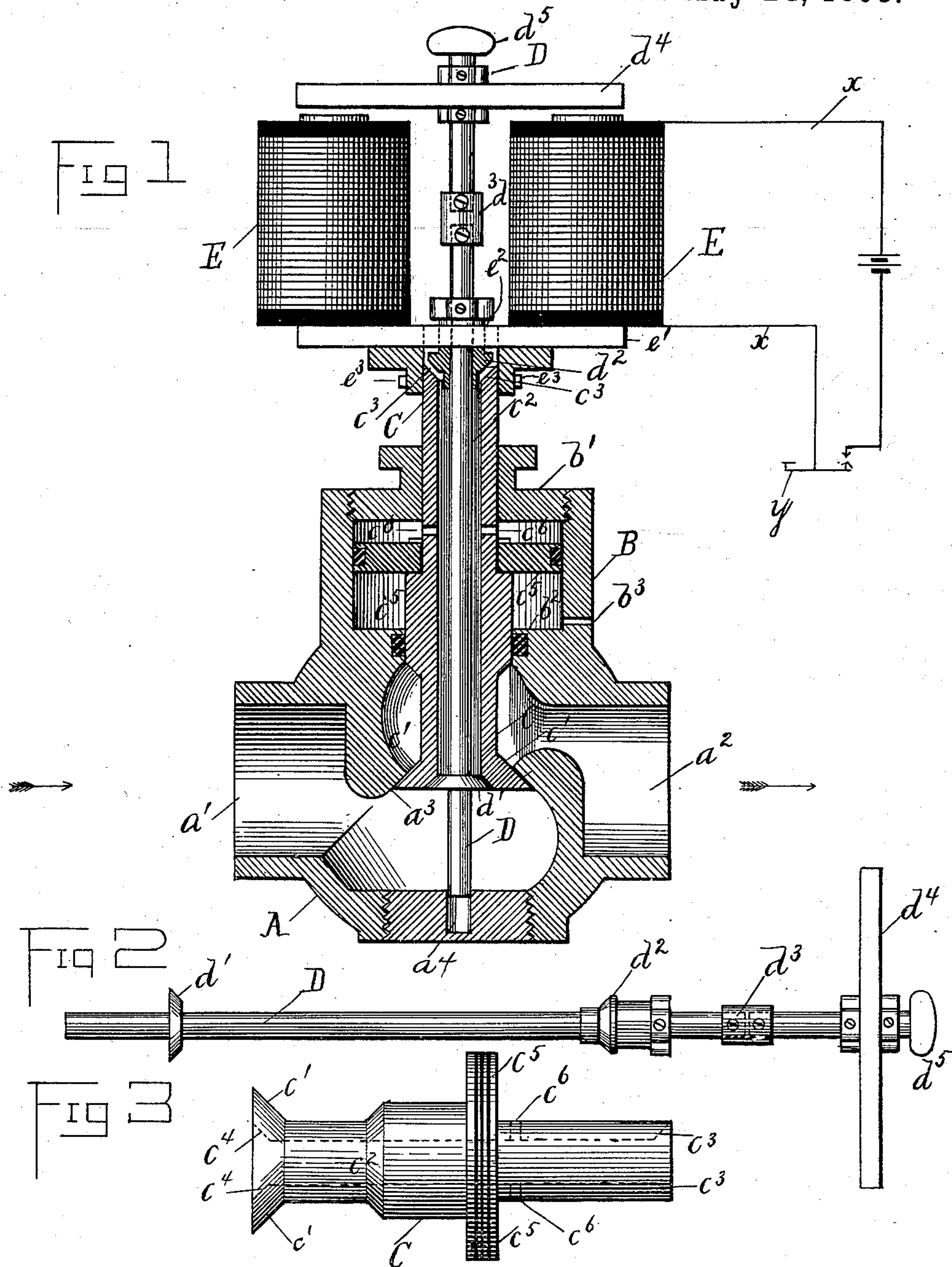


(No Model.)

W. S. ALEXANDER.
VALVE CONTROLLING DEVICE.

No. 604,358.

Patented May 24, 1898.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WALTER S. ALEXANDER, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NEW JERSEY VALVE COMPANY, OF NEW JERSEY.

VALVE-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 604,358, dated May 24, 1898.

Application filed February 24, 1896. Serial No. 580,341. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. ALEXANDER, a citizen of the United States, and a resident of New York, in the county of New York 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 improvements in valve-controlling devices, and particularly to that class of valve-controllers wherein a valve of comparatively large capacity is controlled through the operation of a valve of comparatively small capacity. I accomplish this result by the use of a motor operated by the pressure controlled by the main valve, and I control the pressure to this motor by the use of an auxiliary system of valves operated either manually or electrically.

I have illustrated my invention in the accompanying drawings and designated the parts by letters, referring to like parts by like letters.

Figure I is a view of my valve in section, with the auxiliary-valve stem and magnets in elevation. Electrical connections to the magnet and a circuit-controller are also shown. Fig. II is a detailed view of the auxiliary-valve stem and its connections. Fig. III is a detailed view in section of the main-valve stem.

A is a valve-chest, with ports a' and a^2 and ports within the valve-seat a^3 . I prefer also to provide a recess a^4 to receive one end of the auxiliary-valve stem as a guide for the same.

B is a cylinder, preferably made integral with the valve-chest. The heads of the cylinder, b' and b^2 , are suitably bored to receive the main-valve stem C, hereinafter described, and a port b^3 is provided to permit an escape of pressure before the piston c^5 .

C is a valve-stem, referred to as the "main-valve" stem. It is shown in detail in Fig. III. It is provided with a valve-head c' , and is bored through its axis to form a channel or port c^2 . At each end of this channel or port are provided valve-seats c^3 and c^4 . A piston c^5 is mounted on the main-valve stem C to operate within the cylinder B to open the main valve, and the ports c^6 and c^6 lead from

the channel c^3 into the cylinder B before the piston c^5 .

D is a valve-stem, referred to as an "auxiliary-valve" stem. It is shown in detail in Fig. II. Mounted on this stem are the valve-heads d' and d^2 and the armature d^4 and knob d^5 . An adjustable connection is made in this stem with the yoke d^3 , which is threaded with right and left hand screws to permit the adjustment of the armature d^4 in relation to the magnet E. This auxiliary-valve stem is mounted within the hollow stem C and preferably works in the ways a^4 and c^2 .

E and E are electromagnets mounted on a base-plate e' , said plate being bored at e^2 to receive the auxiliary-valve stem D, and said plate is suitably mounted on the main-valve stem C, preferably by the set-screws e^3 and e^3 . I have shown the magnets in an electric circuit x x , with a circuit-controller y interposed in said circuit.

The apparatus above described is operated as follows: Assume that pressure is lying within the valve-chest A before the valve-heads c' and d' such pressure will maintain said valves closed. To open the main valve, pressure must be exerted against the auxiliary-valve stem D sufficient to overcome the pressure within the valve-chest affecting the valve-head d' . I may exert this pressure manually by pressing the knob d^5 , or I may bring the electromagnets E into circuit through the circuit-controller y , when the armature d^4 will be attracted to said magnets and the force of magnetism will be exerted to move the auxiliary-valve stem D. The movement of the auxiliary-valve stem D in a direction to unseat the valve-head d' will also operate to seat the valve-head d^2 . This operation will open the ports c^2 and c^6 and permit the pressure lying within the valve-chest to pass into the cylinder B, when such pressure will effect the piston c^5 and move the same within the cylinder B and thus operate to move the main-valve stem C, and thus unseat the main-valve head c' and permit the main body of pressure controlled by the main valve to pass through the same and out of the port a^2 .

When the pressure exerted on the auxiliary-

valve stem D as above is released, the pressure lying before the valve-head d' will cause the same to be again seated, and at the same time the valve-head d^2 will be raised off its seat, and the pressure lying within the cylinder B will exhaust to the atmosphere and the pressure lying before the valve-heads d' and c' will close the main valve.

What I claim is—

10 1. In a valve-controlling device the combination of a main valve normally closed by the pressure controlled thereby, a motor to operate said main valve, consisting of a cylinder and piston, a valve-stem secured to the piston
15 and valve-head with a port passing through said stem to the pressure lying before the valve, and leading to the cylinder and an exhaust, two auxiliary valves interposed within said port operating conjointly, one adapted
20 normally to close the supply-port to the motor, by the operation of the pressure controlled by the main valve, and the other operating abnormally to close the exhaust from the motor while the supply-port is opened, and means
25 to operate said auxiliary valves substantially as described.

2. In a valve-controlling device, the combination of a main valve, having a valve-head adapted to be seated by the pressure controlled by said valve; a motor to operate said
30 main valve, consisting of a cylinder and piston, a valve-stem secured to the piston, and the main-valve head, a port through said main-valve head and stem, leading to the cylinder and an exhaust, an auxiliary-valve stem adapted to operate within said port through
35 the main-valve stem, said auxiliary-valve stem provided with two valve-heads, one head adapted normally to be seated by the pressure controlled by the valve, and to close the
40 said supply-port leading to the motor, and the other head operating conjointly with the first to close the said port leading from the motor to an exhaust when the supply-port is
45 open, and to open said exhaust when the supply-port is closed, and means to operate said auxiliary-valve stem, substantially as described.

3. In a valve-controlling device the combination of a main valve having a valve-head adapted to be seated by the pressure controlled by said valve, a motor to operate said
50 main valve consisting of a cylinder and piston, a valve-stem secured to the piston and the main-valve head, a port through said main-valve head and stem, leading to the cylinder and to an exhaust, an auxiliary-valve stem adapted to operate within said port through
55 the main-valve stem, said auxiliary-valve stem provided with two valve-heads, one head adapted normally to be seated, by the pressure controlled by the valve, and to close the
60 said supply-port leading to the motor, and the other head operating conjointly with the first to close the said port leading from the motor, to an exhaust when the supply-port is
65 open, and to open said exhaust when the supply-

ply-port is closed, and a motor suitably mounted and connected with the auxiliary-valve stem to operate the same substantially as described. 70

4. In a valve-controlling device, a main valve normally closed by the pressure controlled by said valve, a hollow valve-stem carrying the main-valve head, and a piston, a
75 cylinder for said piston, a port through said hollow stem leading from the pressure lying before the valve to the cylinder, and to an exhaust, two auxiliary valves interposed in said port, operating together, to open the supply-port, and close the exhaust, or to close the
80 supply-port and open the exhaust; an electromagnet suitably mounted on the main-valve stem, in circuit, and means to control said circuit, with an armature for said magnet secured to the auxiliary valves, to operate
85 the same, substantially as described.

5. In a valve-controlling device, a main valve normally closed by the pressure controlled by said valve, a hollow valve-stem carrying the main-valve head, and a piston, a
90 cylinder for said piston, a port through said hollow stem leading from the pressure lying before the valve to the cylinder, and to an exhaust; an auxiliary-valve stem adapted to operate within said hollow stem, and carrying
95 two valve-heads suitably interposed in said port, and operating together to open the supply-port, and close the exhaust, or to close the supply and open the exhaust; an electromagnet suitably mounted on the main-valve
100 stem, in circuit, with means to control said circuit, an armature for said magnet secured to the auxiliary-valve stem substantially as described. 105

6. In a valve-controlling device, a valve-chest with inlet and outlet ports through the same, and a valve-seat, a main-valve stem carrying a main-valve head and a piston, a
110 port through the axis of said main-valve stem, leading to a cylinder and an exhaust; said port having valve-seats at either end, a cylinder for said piston, and an auxiliary-valve stem carrying two valve-heads, and means to operate said auxiliary-valve stem substantially as described. 115

7. In a valve-controlling device, a valve-chest with inlet and outlet ports through the same, and a valve-seat, a main-valve stem carrying a main-valve head; a piston and
120 magnets, a port through the axis of said main-valve stem, leading to a cylinder, and an exhaust, said port having valve-seats at either end, a cylinder for said piston, an auxiliary-valve stem carrying two valve-heads, and an armature, an electromagnet, mounted on the
125 main-valve stem said magnet in circuit, and means to control said circuit, substantially as described.

8. In a valve, the combination of a main valve, valve-stem, steam-cylinder and piston secured to the valve-stem for operating it, a
130 steam-port for supplying steam to the cylinder, a valve controlling said port and an aux-

iliary-valve stem operating said valve, with an electromagnet, mounted upon the main-valve stem and moving with it, and an armature for said magnet operating the auxiliary-valve stem.

9. The combination of the main valve, a piston whose movement controls the movement of the main valve, an auxiliary valve for controlling the movement of the fluid to the piston, an exhaust-valve whose movement is controlled by the movement of the auxiliary valve, an electromagnetic mechanism for moving the auxiliary valve from its seat, and means connecting the part upon which the electromagnetic mechanism is mounted with the main valve.

10. The combination of a main valve, a piston whose movement controls the movement of the main valve, an auxiliary valve for controlling the movement of the fluid to the piston, an armature secured to the stem of the auxiliary valve, a yoke secured to the main valve, and an electromagnetic mechanism mounted upon said yoke.

11. The combination of a main valve, a piston whose movement controls the movement of the main valve, an auxiliary valve for controlling the flow of the fluid to the piston, an electromagnetic mechanism for moving the auxiliary valve from its seat, and means for connecting the part upon which the electromagnetic mechanism is mounted to the main valve.

12. The combination of a main valve, a piston whose movement controls the movement of the main valve, a hollow valve-stem connecting the main valve with the piston, an auxiliary valve for controlling the flow of the fluid to the piston, and an electromagnetic mechanism for operating the auxiliary valve.

Signed at New York, in the county of New York and State of New York, this 18th day of February, A. D. 1896.

WALTER S. ALEXANDER.

Witnesses:

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EDWARD J. MCGUIRE.