

F. W. SLAW.  
CONTROLLING VALVE.  
APPLICATION FILED AUG. 3, 1916.

1,256,602.

Patented Feb. 19, 1918.

4 SHEETS—SHEET 1.

*Fig. 1*

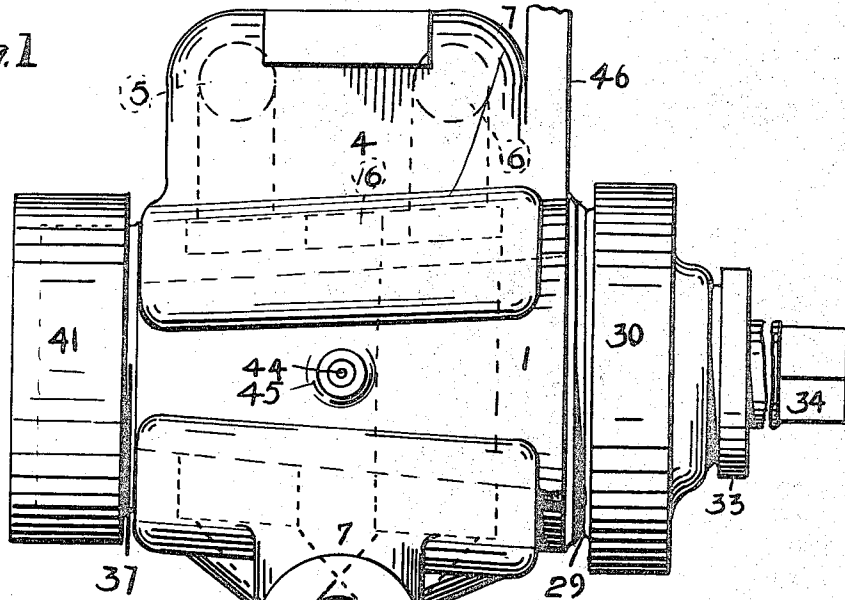
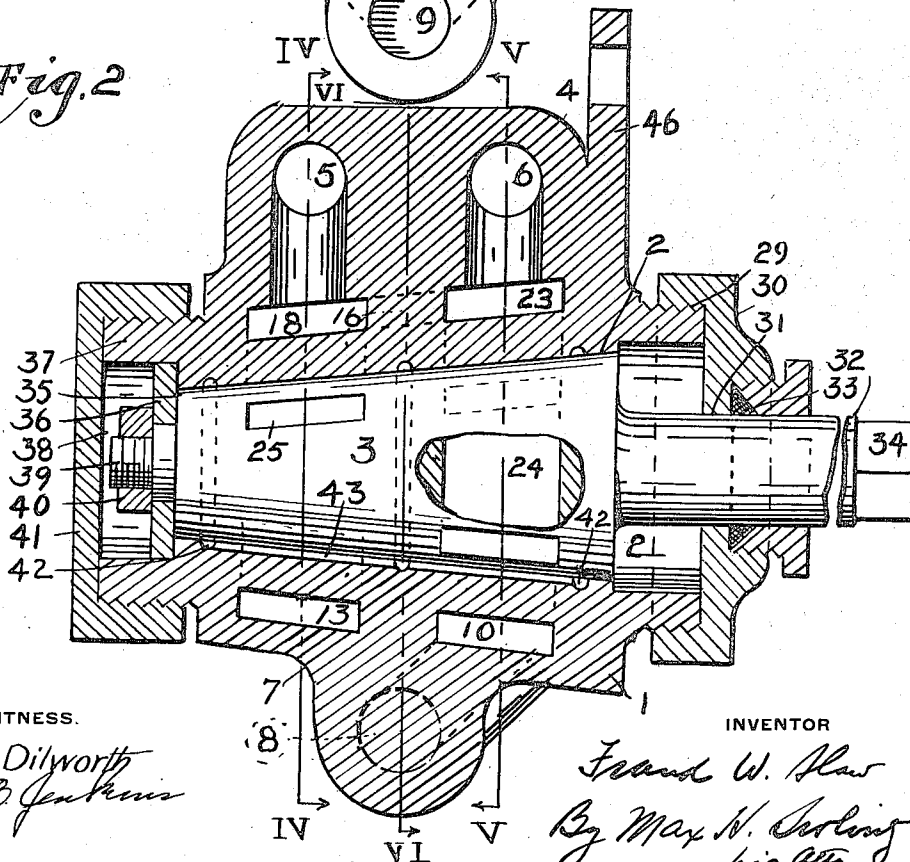


*Fig. 2*



WITNESS.

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INVENTOR

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*By Max N. Iseling*  
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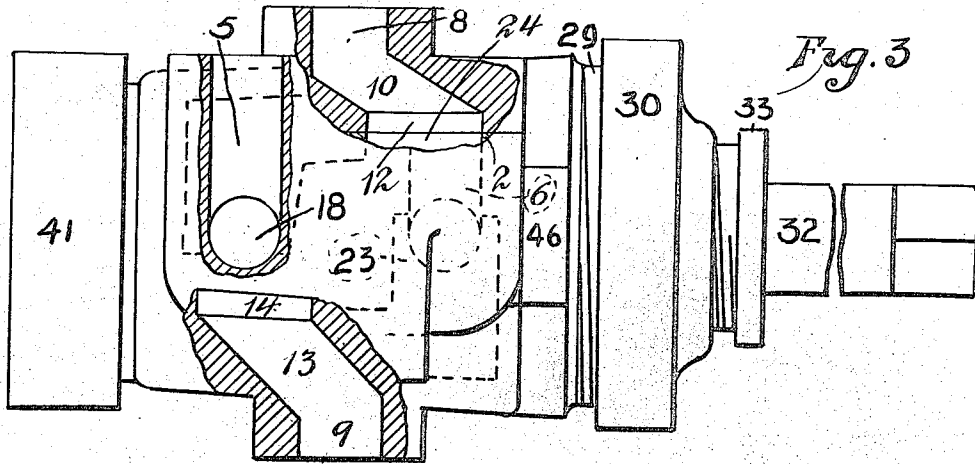


Fig. 4

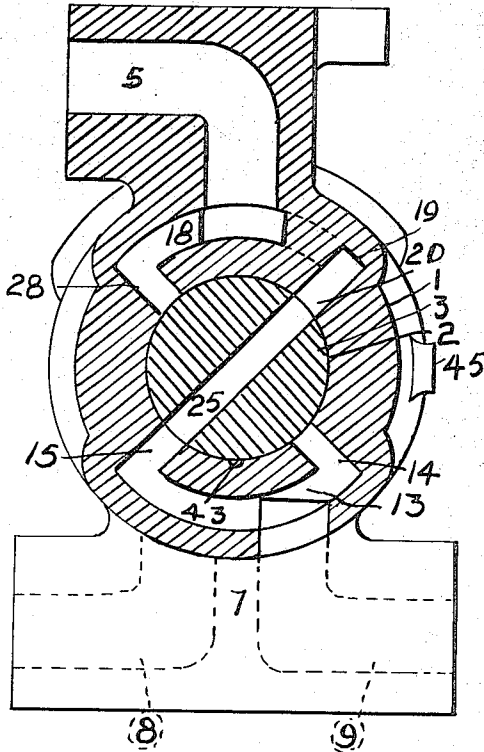
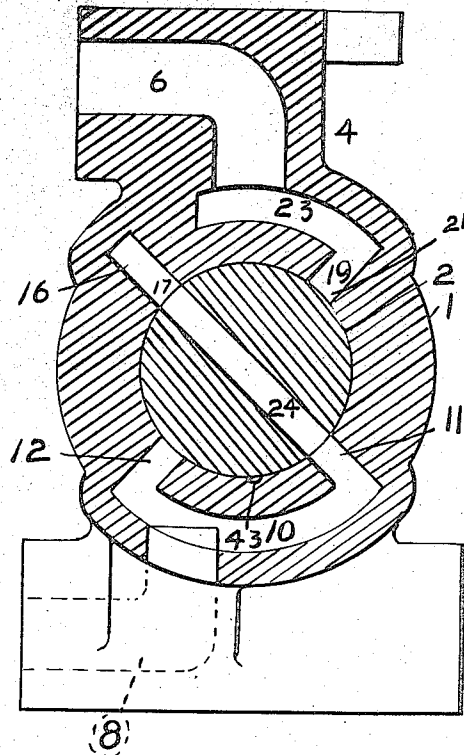


Fig. 5



WITNESS

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4 SHEETS—SHEET 3.

Fig. 6

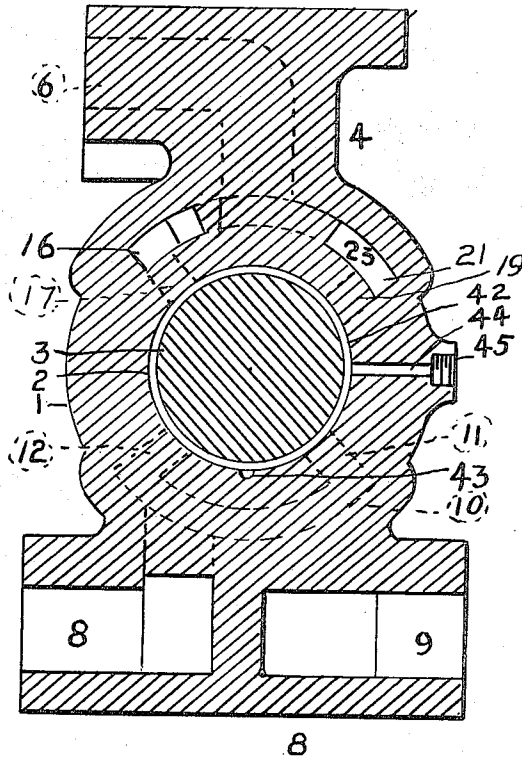
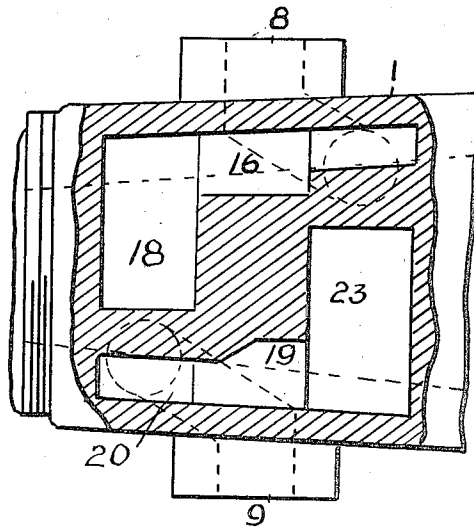


Fig. 7



WITNESSES

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1,256,602.

Patented Feb. 19, 1918.  
4 SHEETS—SHEET 4.

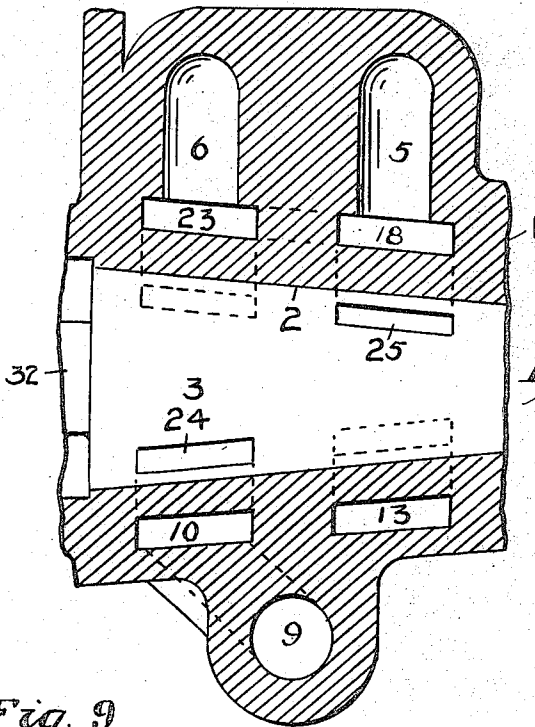


Fig. 9

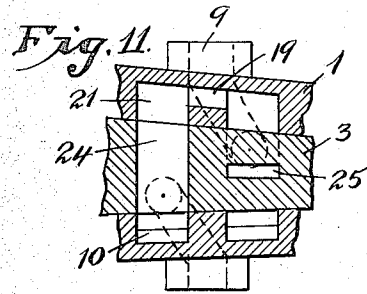


Fig. 11

Fig. 8

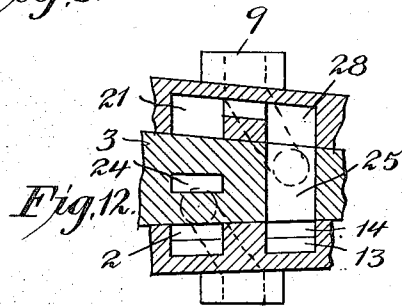
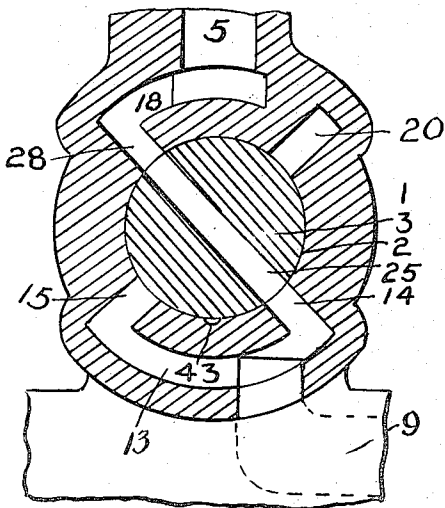
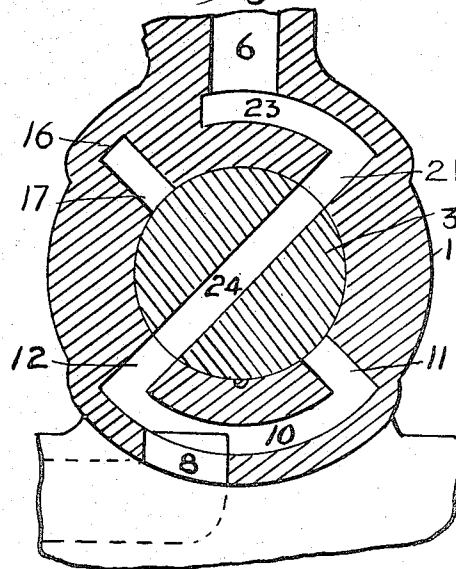


Fig. 12

Fig. 10



WITNESSES

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# UNITED STATES PATENT OFFICE.

FRANK W. SLAW, OF STEUBENVILLE, OHIO, ASSIGNOR OF ONE-HALF TO AUGUST H. SLATER, OF STEUBENVILLE, OHIO.

## CONTROLLING-VALVE.

1,256,602.

Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed August 3, 1916. Serial No. 112,933.

*To all whom it may concern:*

Be it known that I, FRANK W. SLAW, a citizen of the United States of America, residing at Steubenville, county of Jefferson, and State of Ohio, have invented certain new and useful Improvements in Controlling-Valves, of which the following is a specification.

This invention relates to controlling valves for use in connection with hydraulic operated elements, and has for its object to provide a valve of such class, in a manner as hereinafter set forth, with means for controlling the operation of an element or a plurality of elements, such as one or more elevators, vertically movable doors on furnaces, table rolls in rolling mills, and for any other purposes wherein it is found applicable.

Further objects of the invention are to provide a controlling valve for the purpose set forth, which is simple in its construction and arrangement, strong, durable, efficient and convenient in its use, readily set up and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts, as hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:—

Figure 1 is a side elevation of a controlling valve in accordance with this invention.

Fig. 2 is a longitudinal sectional view.

Fig. 3 is a top plan.

Fig. 4 is a section on line IV—IV, Fig. 2.

Fig. 5 is a section on line V—V, Fig. 2.

Fig. 6 is a section on line VI—VI, Fig. 2.

Fig. 7 is a sectional plan.

Fig. 8 is a longitudinal sectional view, broken away, looking in the direction opposite to that of Fig. 2.

Fig. 9 is a vertical sectional view, broken away, on line IV—IV, Fig. 2, with the valve plug shifted to a different position to that shown in Fig. 4.

Fig. 10 is a vertical sectional view, broken away, on line V—V, Fig. 2, with the valve

plug shifted to a different position to that shown in Fig. 5.

Referring to the drawings in detail, which illustrate a valve set up to control a pair of elements, 1 denotes a casing formed with a tapering chamber 2, in which is mounted a tapering valve plug 3.

One side of the casing 1, has an enlargement 4, which is formed with a pair of angle-shaped passages 5, 6, the former leading to one and the latter to the other element (not shown), to be controlled. The passages 5, 6, each constitutes a combined inlet and exhaust passage for the element with which it associates. When supplying controlling fluid through the passage 5 for one element, the controlling fluid which has been supplied to the other element is exhausted through the passage 6, or vice versa.

The other side of the casing 1, is formed with an enlargement 7, provided with an angle-shaped passage 8, leading from a controlling fluid supply (not shown), and the said passage 8 forms a fluid inlet for the casing 1 and is common for the supplying of the fluid to both elements which are to be controlled. The said enlargement 7 is furthermore formed with an angle-shaped passage 9, independent of and extending in an opposite direction with respect to the passage 8, and the said passage 9 constitutes a fluid outlet for the casing 1 and is common for the exhausting of the fluid from both of the elements which are to be controlled.

The body of the casing 1, near one end, is formed with an arcuate channel 10, concentric with the casing, into which the passage 8 opens. The channel 10 at one end communicates with the chamber 2 by a port 11, and at its other end also communicates with the chamber 2, by a port 12.

The body of the casing 1, near the other end thereof, is formed with an arcuate channel 13, concentric with the casing, which communicates at one end with the chamber 2 by a port 14, and at its other end also communicates with the chamber 2 by a port 15, and into which the passage 9 opens.

The channels 10 and 13 are positioned at that side of the casing with which the enlargement 7 is formed integral.

The body of the casing 1 is formed with a longitudinal duct 16, which opens, through the medium of the port 17, into the chamber 2. Said duct 16 opens into the pas-

sage 5 as at 18. The duct 16 is formed in that side of the casing 1 with which the enlargement 4 is formed integral. The body of the casing 1 is provided with a longitudinally extending duct 19, which is arranged on the same side of the casing as duct 16 but at the opposite side of enlargement 4 and communicates with the chamber 2, by a port 20, and also communicates with the chamber 2 by a port 21. The duct 19, opens into the arcuate channel 23, concentric with the casing, which communicates with the passage 6. The valve plug 3, at its larger end, is provided with a port 24 and near its smaller end with a port 25. When the valve plug 3 is shifted so as to cause a supply to the passage 6, the port 24 registers with the ports 12, 21, when shifted to cause a supply to the passage 5, the port 24 registers with the ports 11, 17. When shifted to cause exhaust from the passage 6 the port 25 registers with the ports 15, 20, and when shifted to exhaust from the passage 5 the port 25 registers with the ports 14, 28.

The casing 1 is provided with a threaded end 29, with which engages a flange cap 30, the latter having an opening 31, for the passage of the stem of the plug 3. A packing element 33 surrounds the stem 32 and engages in the cap 30. The stem 32 has a squared end 34 so any suitable means can be connected therewith for operating the plug.

The lower end of the plug 3 is reduced, as at 35, and surrounding said reduced portion, is a washer 36, which bears against the end of the casing 1. The reference character 37 denotes a peripherally threaded collar, which is formed integral with the casing 1, projecting therefrom, and providing a pocket 38, with the wall thereof surrounding the washer 36. Formed integral with the reduced portion 35 is a threaded stem 39, having mounted thereon a retaining nut 40, the latter abutting against the washer 36. The reference character 41 denotes a cap having threaded engagement with the collar 37 for inclosing the stem 39, nut 40, and washer 36.

The wall of the chamber 2 has a series of annular grooves 42, for the reception of a lubricant, to facilitate the movement of the plug 3. The grooves 42 are spaced equidistant from each other and said grooves 42 are connected together by longitudinally extending grooves 43, whereby when a lubricant is fed to the intermediate groove 42 it will be supplied to the outer grooves 42. The body portion of the casing 1 has an inlet port 44 for feeding the lubricant to the intermediate groove 42 and said body portion 41 is furthermore provided with a threaded nipple 45, which communicates with the port 44, and is adapted to have a lubricant supplying means connected therewith.

The enlargement 4 is formed with an arm

46, so that a dial can be attached thereto, to control the throw of the valve plug.

When supplying a controlling fluid to the passage 5, the travel is, through inlet 8, channel 10, port 11, port 24, duct 16, to passage 5. When supplying a controlling fluid to passage 6, the travel is, inlet 8, channel 10, port 24, channel 23, to passage 6. When exhausting the controlling fluid from passage 5, the travel is, port 28, port 25, port 14, channel 13, exhaust 9. When exhausting controlling fluid from passage 6, the travel is, channel 23, duct 19, port 20, port 25, port 15, channel 13, exhaust 9.

What I claim is:—

1. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, said casing further including a fluid inlet and a fluid outlet each common to said passages and each communicating with said chamber at two points, a valve plug operable in said casing and having a pair of spaced ports one for controlling supply to said passages and the other for controlling exhaust from said passages, a supply duct leading from said chamber to one of said passages and controlled by said plug and an exhaust duct leading from the other of said passages to said chamber and controlled by said plug.

2. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, said casing further including a fluid inlet and a fluid outlet each common to said passages and each communicating with said chamber at two points, a valve plug operable in said casing and having a pair of spaced ports one for controlling supply to said passages and the other for controlling exhaust from said passages, a supply duct leading from said chamber to one of said passages and controlled by said plug and an exhaust duct leading from the other of said passages to said chamber and controlled by said plug, said ports in said plug disposed at an angle with respect to each other.

3. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, said casing further provided at each end with a concentric channel open at two points into said chamber and further provided with a fluid inlet and a fluid outlet, one communicating with one of said channels and the other with the other of said channels, said inlet common to both passages, and said outlet common to both passages, a valve plug operable in said casing and having a pair of spaced ports, one for controlling supply to said passages and the other for controlling exhaust from said pas-

sages, a supply duct leading from said chamber to one of said passages and controlled by said plug, and an exhaust duct leading from the other of said passages to said chamber and controlled by said plug.

4. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, said casing further provided at each end with a concentric channel open at two points into said chamber and further provided with a fluid inlet and a fluid outlet, one communicating with one of said channels and the other with the other of said channels, said inlet common to both passages, and said outlet common to both passages, a valve plug operable in said casing and having a pair of spaced ports one for controlling supply to said passages and the other for controlling exhaust from said passages, a supply duct leading from said chamber to one of said passages and controlled by said plug, and an exhaust duct leading from the other of said passages to said chamber and controlled by said plug, said ports in said valve disposed at an angle with respect to each other.

5. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, a longitudinally extending supply duct leading from said chamber to one of said passages, a longitudinally extending exhaust duct leading from the other of said passages to said chamber, a valve plug operable in said casing and having a pair of ports for controlling said ducts, said casing having means to provide a fluid inlet opening into said chamber at two points and controlled by said plug, and said casing further having means to provide a fluid outlet communicating with said chamber at two points and controlled by said plug, said inlet common to both passages and said outlet common to both passages.

6. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, a longitudinally extending supply duct leading from said chamber to one of said passages, a longitudinally extending exhaust duct leading from the other of said passages to said chamber, a valve plug operable in said casing and having a pair of ports for controlling said ducts, said casing having means to provide a fluid inlet open-

ing into said chamber at two points and controlled by said plug, and said casing further having means to provide a fluid outlet communicating with said chamber at two points and controlled by said plug, said inlet common to both passages and said outlet common to both passages, ports in said plug disposed at an angle with respect to each other.

7. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, a longitudinally extending supply duct leading from said chamber to one of said passages, a longitudinally extending exhaust duct leading from the other of said passages to said chamber, a valve plug operable in said casing and having a pair of ports for controlling said ducts, said casing provided near each end with a concentric channel opening into said chamber at two points and controlled by said plug, means to provide a fluid inlet communicating with one of said channels, and means to provide a fluid outlet communicating with the other of said channels, said inlet common to both passages and said outlet common to both passages.

8. A controlling valve comprising a casing forming a plug chamber and having a pair of combined supply and exhaust passages each leading to an element to be controlled, a longitudinally extending supply duct leading from said chamber to one of said passages, a longitudinally extending exhaust duct leading from the other of said passages to said chamber, a valve plug operable in said casing and having a pair of ports for controlling said ducts, said casing provided near each end with a concentric channel opening into said chamber at two points and controlled by said plug, means to provide a fluid inlet communicating with one of said channels, and means to provide a fluid outlet communicating with the other of said channels, said inlet common to both passages and said outlet common to both passages, said ports and said plug disposed at an angle with respect to each other and one associating with one of said channels and the other with the other of said channels.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANK W. SLAW.

Witnesses:

LUELLA H. SIMON,  
B. E. JENKINS.