

No. 657,707.

Patented Sept. 11, 1900.

T. REESE, JR.
VALVE.

(Application filed Mar. 26, 1900.)

(No Model.)

2 Sheets—Sheet 1.

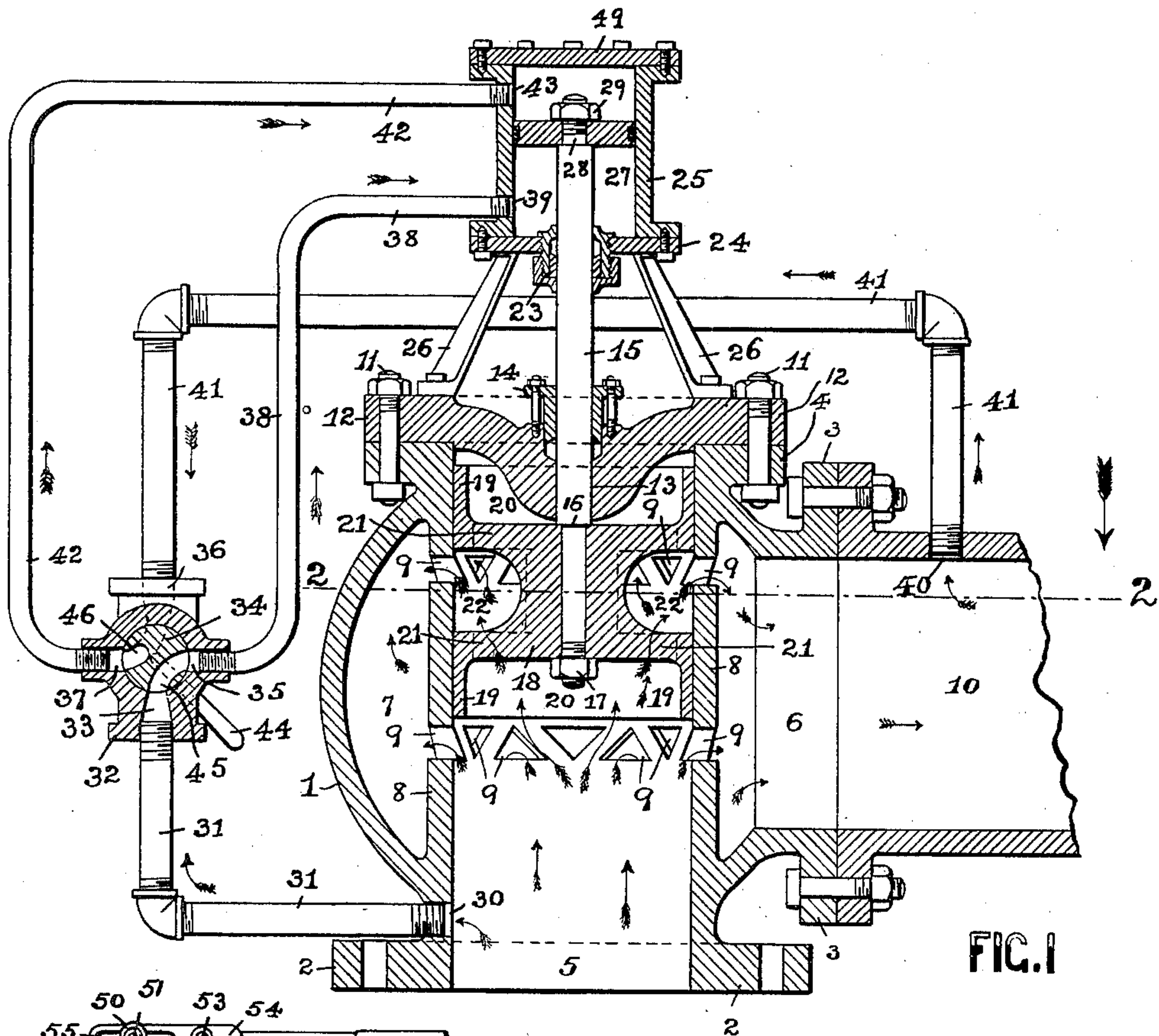


FIG. 1

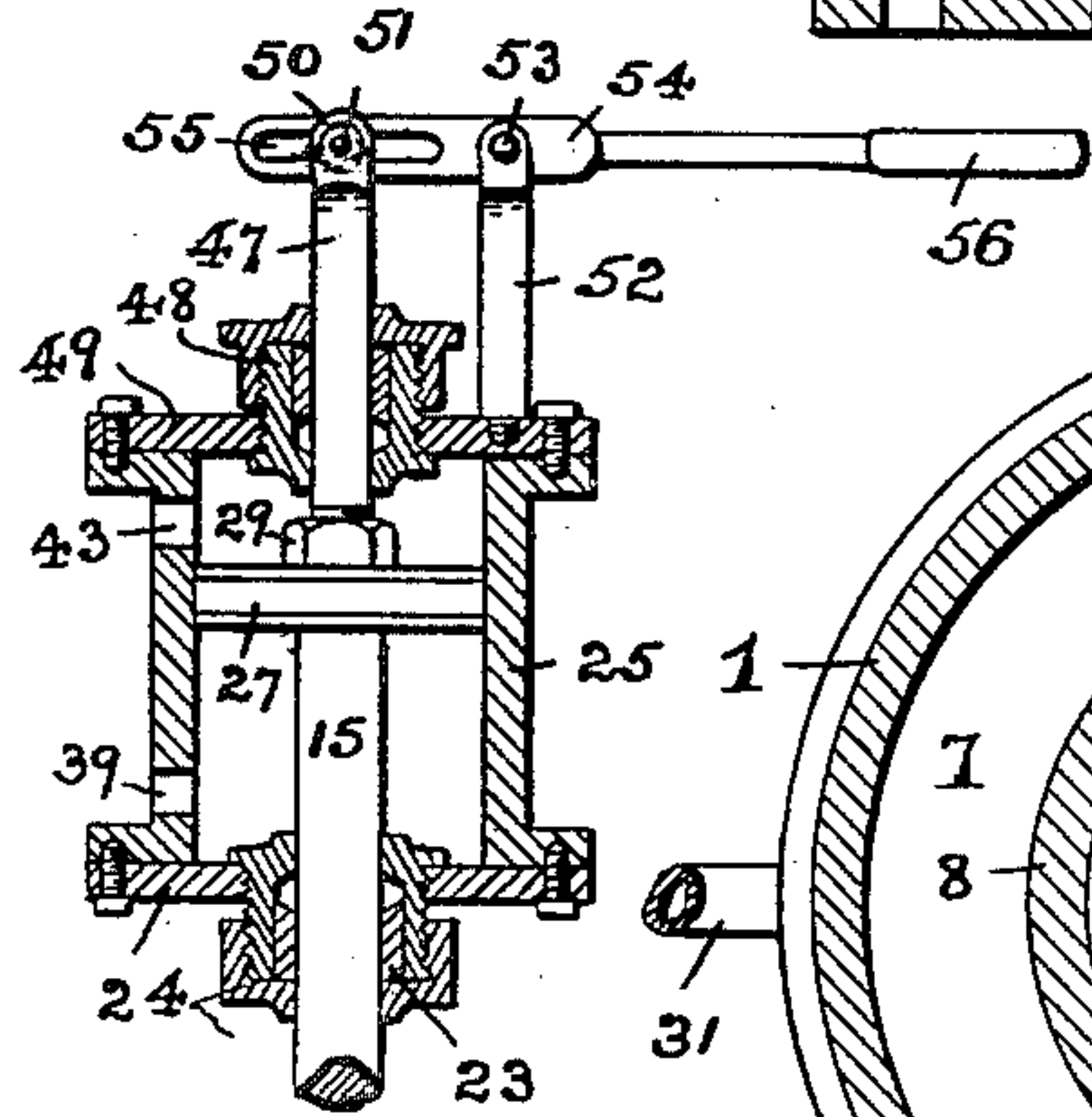


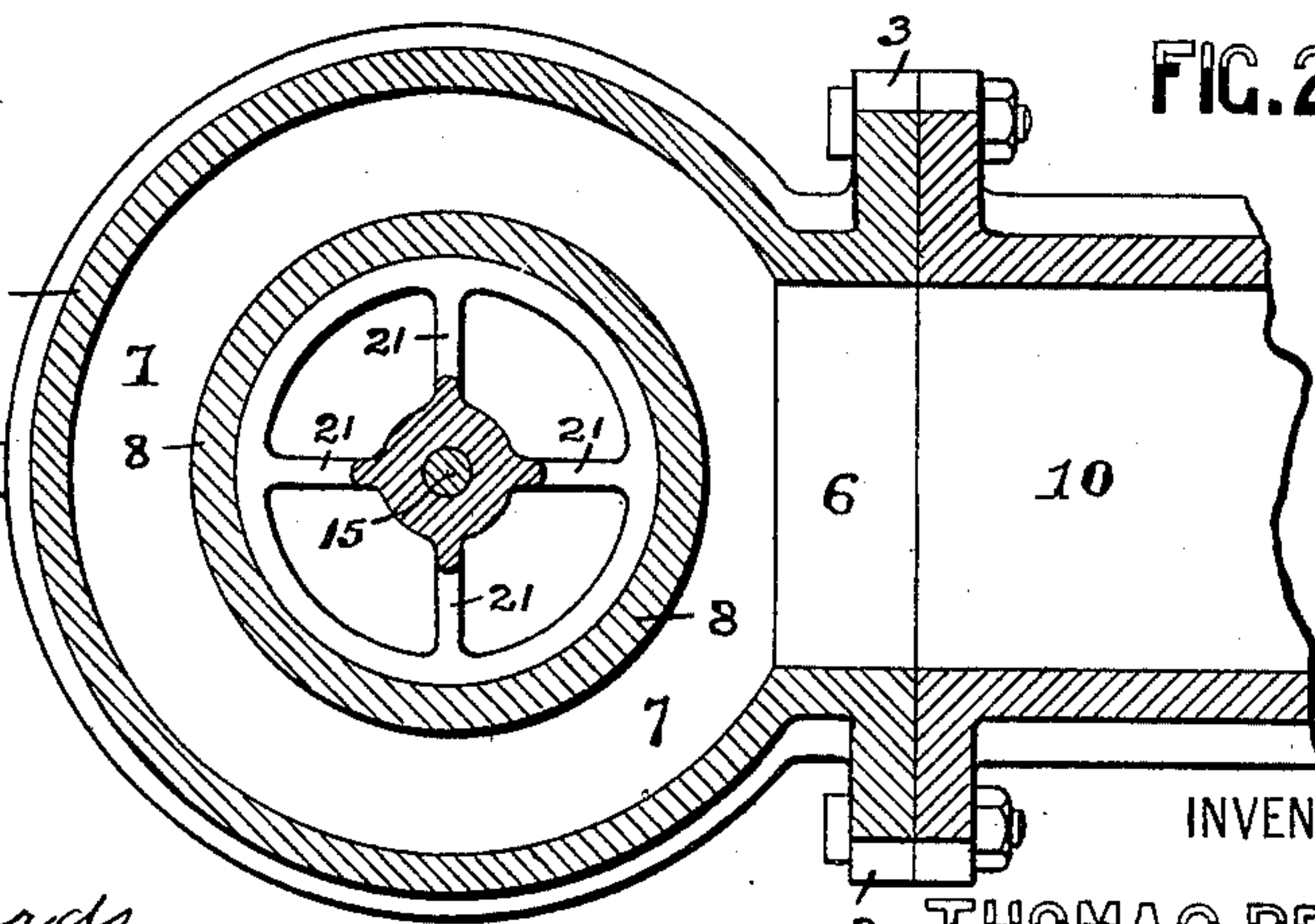
FIG. 5

WITNESSES:

Geo. D. Richards

Marcy Z. Orndell

FIG. 2



INVENTOR:

THOMAS REESE JR

BY

Fred C. Fraentzel,
ATTORNEY

No. 657,707.

Patented Sept. 11, 1900.

T. REESE, JR.
VALVE.

(Application filed Mar. 28, 1900.)

(No Model.)

2 Sheets—Sheet 2.

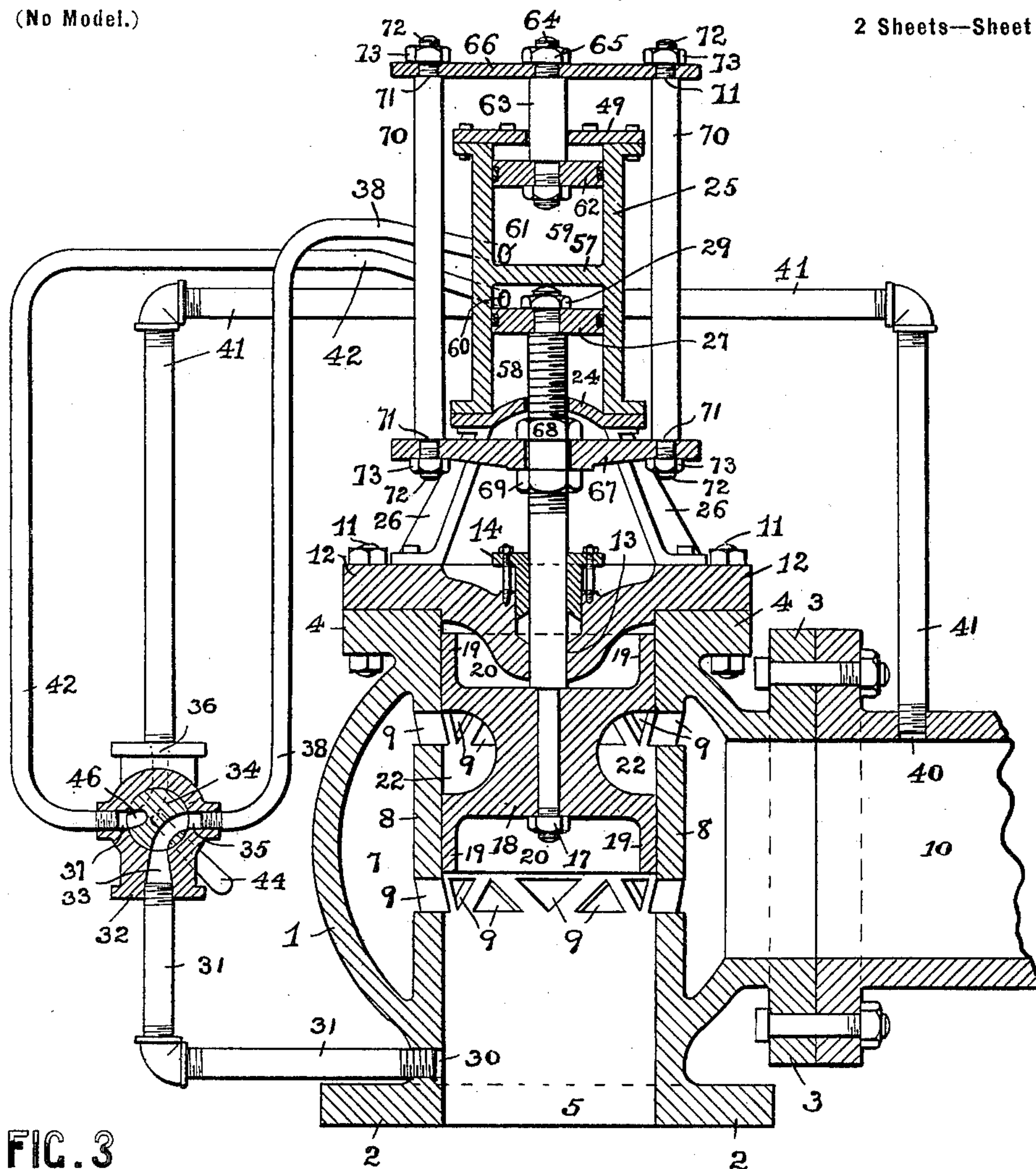


FIG. 3

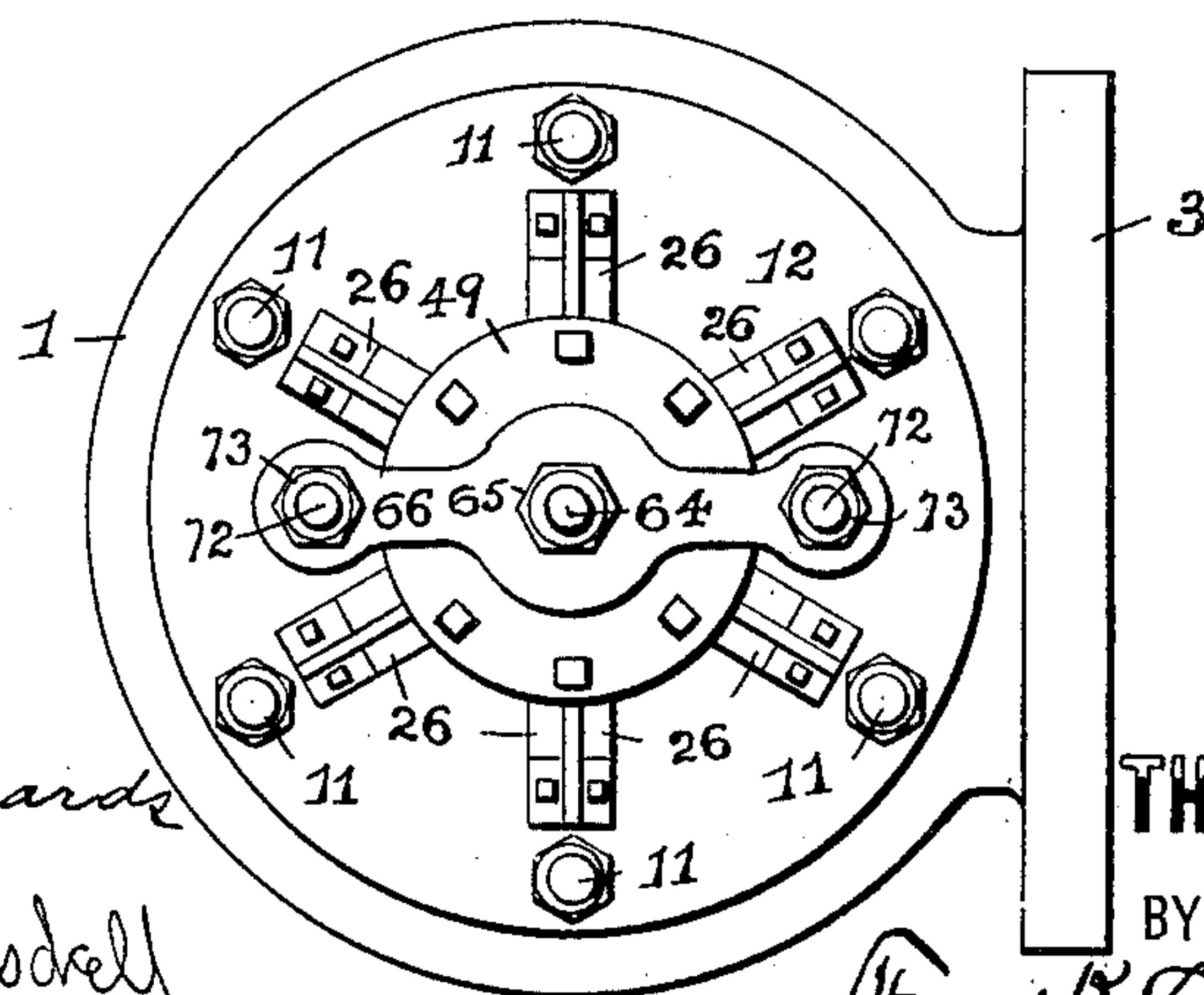


FIG. 4

WITNESSES:

Geo. D. Richards
Marcy Z. Drusell

INVENTOR:

THOMAS REESE JR.

BY

Fred C. Graentzel
ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS REESE, JR., OF NEWARK, NEW JERSEY.

VALVE.

SPECIFICATION forming part of Letters Patent No. 657,707, dated September 11, 1900.

Application filed March 26, 1900. Serial No. 10,143. (No model.)

To all whom it may concern:

Be it known that I, THOMAS REESE, Jr., a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to numerals of reference marked thereon, which form a part of this specification.

This invention relates to improvements in valves, and has for its primary object to provide a novel construction of balanced valve, which is preferably used in the lines of piping connecting a series of boilers, said valve being what might be termed in practice an "emergency-valve," and its construction is such that it closes automatically when the steam in the boiler with which the inlet of the valve is in communication is below that of another boiler in the line of piping connected with the outlet of the valve, but the valve being automatically retained in its opened condition when the steam below the valve-disk is greater than the steam-pressure in the outlet-pipe of the valve, and thereby maintaining the equalization of the steam-pressure after the valve has been opened and an equal pressure of steam in the connected boilers.

A further object of this invention is to produce a novel construction of valve which closes automatically when there is a serious break in the line of piping connected with the inlet of the valve or when there has been an accident to the boiler in said line of piping and, furthermore, to provide in connection with this novel construction of valve a means for entirely closing the valve-disk down in case of a serious break in the line of piping connected with the outlet of the valve-casing or in case of an accident to the boiler in said line of piping.

A further object of my invention is to provide a valve which will act in this manner to produce a novel form and construction of valve which is very simple and effective in its operation, as well as strong and durable and positive in its results, also preventing any hammering of the valve-disk on a valve-seat,

which soon renders an emergency-valve inoperative.

With these several objects in view my present invention consists in the general construction of valve hereinafter described, as well as in the novel arrangements and combinations of the several parts, all of which will be fully set forth in the accompanying specification and then finally embodied in the clauses of the claim which are appended to and form a part of the said specification.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my novel construction of emergency-valve and various parts connected therewith, and Fig. 2 is a horizontal section of the valve, taken on line 2 2 in said Fig. 1. Fig. 3 is a vertical section of an emergency-valve of a slightly-modified form of construction, but still embodying the principles of this invention; and Fig. 4 is a top or plan view of this form of valve. Fig. 5 is a vertical section of an auxiliary casing or steam-cylinder employed with the valve construction and illustrating the valve spindle or stem connected with a hand-lever or similar means for closing the valve by hand.

Similar numerals of reference are employed in all of the said above-described parts to indicate corresponding parts.

In said drawings, 1 represents the usual valve-casing, provided with the flanges 2, 3, and 4 and an inlet 5 and an outlet 6. The chamber 7 of said valve-casing is formed with an inner cylindrical casing 8, open at the bottom and top, as illustrated in Figs. 1 and 3, said cylindrical casing 8 being provided with a suitable arrangement of ports 9 of any desirable shape. Suitably secured to the flange 3, which surrounds the outlet 6, I have represented in the several views a portion of a pipe 10, and upon the flange 4 at the top of the valve-casing I have secured, by means of bolts 11 or in any other suitable manner, a cover 12, which has a central opening 13 and a stuffing-box 14. Movably arranged in said stuffing-box 14 and the opening 13 is a stem or spindle 15, to the lower end of which is secured against a shoulder 16 on said stem or spindle and preferably by means of a nut 17 a plunger 18. This plunger may be and hereinafter is preferably termed the "valve-disk"

and is employed for opening and closing the ports 9 in the cylindrical casing 8, in the manner to be hereinafter fully set forth. The said valve-disk 18 is preferably provided on its opposite sides with upwardly-extending annular flanges or shoulders 19, forming the cup-shaped portions 20 on opposite sides of the valve-disk. These flanges or shoulders are not absolutely necessary, but are preferred, since thereby the disk is considerably lightened and at the same time strengthened.

While the cylindrical casing 8 in the present instance is shown with a double arrangement of ports 9, such arrangement is not an absolute necessity, but is preferable, to provide greater port area. When two rows of ports 9 are employed, the disk or plunger 18 has its radial arms 21, which connect the annular portion or edge of the plunger or valve-disk with its central hub, as illustrated more particularly in Fig. 2, formed to provide the open spaces 22, (see Figs. 1 and 3,) and thereby permit an unobstructed passage and free deliverance of the steam or other medium entering the valve-casing 1 at 5 through the lower row of ports 9, and also between the radial arms 21 into the upper row of ports 9 into the pipe 10, connected with the outlet 6 of the valve-casing when the valve-disk 18 has been raised, as indicated in the several figures of the drawings and as will be hereinafter more fully set forth.

As previously stated, the valve-stem or spindle 15 extends upwardly through the cover 12 and into and through a stuffing-box 23 in a cover 24 of an auxiliary steam-cylinder 25. Said cylinder 25 is suitably secured upon the upper or other suitable portion of the valve-casing 1, preferably in the manner illustrated, by means of suitably-constructed standards or supporting-legs 26, and movably arranged within said cylinder 25 is a piston 27, which is suitably secured upon the upper and screw-threaded end 28 of the valve-stem or spindle 15 by means of a nut 29; but of course it will be understood that these parts may be otherwise connected, if desired.

In the lower portion of the valve-casing 1, at or near the inlet 5, is a hole 30, into which is secured the screw end of a conveying duct or pipe 31, which is connected with and leads into the inlet-opening 33 of a three-way cock 32. The casing of said cock is provided with the usual outlet 35, a second inlet 36, and a second outlet 37, and movably arranged within said casing is the usual plug 34, which can be operated by a handle or lever 44, said plug being provided with the usual ducts or passage-ways 45 and 46, whereby direct communication may be established between the parts 33, 45, and 35, and the parts 36, 46, and 37 at the one time, or with the parts 33, 45, and 37 when the plug 34 is turned by means of the lever 44, as will be clearly understood.

Connecting the outlet 35 with a hole 39 in the lower part of the steam-cylinder 25 is a pipe 38, and it will thus be evident that the steam

entering at the inlet 5 of the casing 1 when the valve-disk 18 is down and closes the parts will pass through the pipe 31 and parts 33, 45, and 35 of the cock 32 into the pipe 38, and thence into the lower portion of the steam-cylinder 25. Immediately the steam will act against the under surface of the piston 27 in said cylinder and raise the same. The upward movement of said piston 27 causes a similar movement of the valve-stem 15, and raises the valve-disk 18 to the position indicated in the drawings. The ports 9 are thus opened, and the steam passes freely through said ports in the direction of the arrows from the inlet 5 to the outlet 6 and into the pipe 10. In order that the ports 9 may be closed should the steam-pressure in said pipe 10 become greater than that in the pipe connected with the inlet 5 in case of a break in the inlet-pipe or an accident to the boiler from which the inlet-pipe receives steam, I have provided said pipe 10 with a hole 40, in which I have secured the end of a pipe 41, which has its opposite end secured directly in the inlet 36 of the three-way cock 32. Connected with the opening or outlet 37 of said cock is a pipe 42, which is connected with the steam-cylinder 25 by being secured in a hole 43 in the upper part of said cylinder, substantially as illustrated in Fig. 1 of the drawings. From an inspection of said Fig. 1 it will thus be evident that when there is no pressure against the under surface of the piston in said cylinder 25 in case of a break in the line of piping connected with the inlet 5 or an accident to the boiler the steam in pipe 10 will pass into the pipe 41, through the parts 36, 46, and 37 into the three-way cock, and through the pipe 42 into the upper part of the cylinder 25. The steam then forces the piston 27 in a downward direction, and the stem 15 will cause the closing of the ports 9 in the valve-casing 1 by the corresponding downward movement of the valve-disk 18, attached to said stem. In case of a break or an accident in the line of piping 10 the valve may be closed by turning the plug 34 in the three-way cock by means of the lever 44 that the parts 33 and 37 may communicate directly with the duct 45 in said plug 34. The steam will then pass from the inlet 5 in the valve-casing 1 through the pipes 31 and 42 into the cylinder 25 and above the piston therein, thereby forcing the valve-disk 18 down and closing the ports 9, as will be clearly evident.

In some cases the stem or spindle 15 may be extended above the piston 27 in the cylinder 25, thereby providing a post 47, as shown in Fig. 5 of the drawings. This post extends through a stuffing-box 48 in the top cover 49 of said steam-cylinder 25 and has a forked end 50 and laterally-extending pin 51 at its upper end. Pivotaly arranged on a pin 53 in a post 52 is a lever 54, having a slotted end portion 55 operatively connected with the pin 51, and also having a handle 56, substantially as shown. By operating this

lever 54 the valve-stem 15 and the parts connected therewith can be raised or lowered at will for suitable adjustment of the valve-disk 18 or for entirely shutting off the flow of steam through the ports 9, if desired.

In Figs. 3 and 4 I have illustrated my novel construction of emergency-valve provided with a steam-cylinder 25 of a slightly-modified construction. In this construction the said cylinder 25 is provided with a dividing-wall 57, thereby forming a lower chamber 58 and an upper chamber 59 in said cylinder. The lower chamber 58 has a suitable hole or opening 60, with which the end of the pipe 42, above mentioned, is in communication, while the upper chamber 59 is provided with a hole or opening 61, with which the end of the pipe 38, above mentioned, is in communication. The valve-stem 15 extends into said lower steam-chamber 58 and is provided with the piston 27; but in the upper steam-chamber 59 I have arranged a second piston 62, which has an upwardly-extending stem 63, passing through a suitable opening in the top cover 49. Secured to the upper end of said stem 63, preferably on a screw portion 64 and held in position by means of a nut 65, is a saddle-bar 66, having perforated end portions. Suitably arranged on a screw portion of the stem 15 and preferably held in place thereon by a pair of nuts 68 and 69 is a second saddle-bar 67, also provided with perforated end portions. These two bars 66 and 67 are operatively connected by means of rods 70, having shoulders 71 and screw ends 72, suitable nuts 73 being employed to properly and operatively connect these several parts of the mechanism together. From an inspection of said Fig. 3 it will be seen that the steam entering the valve-casing 1 at the inlet 5 will pass into the pipe 31 through the cock 32 and pipe 38 into the upper steam-chamber 59. The second piston 62 is thus raised, and by means of the stem 63, the saddle-bar 66, the rods 70, and the second saddle-bar 67 on the main valve-stem 15 the said valve-disk 18 is also raised to open the ports 9 in the valve-casing 1. At the same time the piston 27 assumes the position illustrated. When, however, there is a reduction of steam-pressure at the inlet 5, due to an accident or for some other cause, then the steam from the pipe 10 will pass into the pipe 41 through the cock 32, into the pipe 42, and into the lower steam-chamber 58 of the cylinder 25. Immediately the piston 27 moves downward, and the remaining parts will move in the same direction, whereby the valve-disk 18 will close the steam-ports 9 in said valve-casing 1.

From the above description it will be seen that I have devised a simple construction of emergency-valve, which in case of an accident to one of a series of boilers or a serious leak in the pipe connections immediately and automatically closes and shuts off the supply of steam. The loss of steam, therefore, will

be but trifling, and by thus automatically closing the connection with the other boilers the steam in said boiler is saved and can be used without interruption. Furthermore, there will be less escaping steam, which enables the workmen to enter the boiler-room much sooner to make the necessary repairs.

I am aware that changes may be made in the several arrangements and combinations of the various parts, as well as in the details of the construction thereof, without departing from the scope of my present invention. Hence I do not limit my invention to the exact arrangements and combinations of the parts as herein described, and illustrated in the accompanying drawings, nor do I confine myself to the details of the construction of any such parts.

Having thus described my invention, what I claim is—

1. In a valve, the combination, with a valve-casing forming a chamber provided with an outlet, an inner cylindrical casing having an open top and bottom in said valve-casing, the outer cylindrical surface of said inner casing forming a portion of said chamber, and a balanced valve-disk slidably arranged in said inner casing, and means in said inner cylindrical casing for admitting a pressure-exerting medium into the chamber of the valve-casing and upon the opposite sides of the valve-disk, of an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, substantially as and for the purposes set forth.

2. In a valve, the combination, with a valve-casing forming a chamber provided with an outlet, an inner cylindrical casing having an open top and bottom in said valve-casing, the outer cylindrical surface of said inner casing forming a portion of said chamber, and a balanced valve-disk slidably arranged in said inner casing, and means in said inner cylindrical casing for admitting a pressure-exerting medium into the chamber of the valve-casing and upon the opposite sides of the valve-disk, of an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, substantially as and for the purposes set forth.

3. In a valve, the combination, with a valve-casing forming a chamber provided with an outlet, an inner cylindrical casing having an open top and bottom in said valve-casing, the outer cylindrical surface of said inner casing forming a portion of said chamber, and a balanced valve-disk slidably arranged in said inner casing, and means in said inner cylindrical casing for admitting a pressure-exert-

ing medium into the chamber of the valve-casing and upon the opposite sides of the valve-disk, of an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, substantially as and for the purposes set forth.

4. In a valve, the combination, with a valve-casing forming a chamber provided with an outlet, an inner cylindrical casing having an open top and bottom in said valve-casing, the outer cylindrical surface of said inner casing forming a portion of said chamber, and a balanced valve-disk slidably arranged in said inner casing, and means in said inner cylindrical casing for admitting a pressure-exerting medium into the chamber of the valve-casing and upon the opposite sides of the valve-disk, of an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, and a three-way cock in said pipes, substantially as and for the purposes set forth.

5. In a valve, a valve-casing forming a chamber provided with an outlet, an inner cylindrical casing having an open top and bottom in said valve-casing, the outer cylindrical surface of said inner casing forming a portion of said chamber, having an inlet 5 and an outlet 6, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, substantially as and for the purposes set forth.

6. In a valve, a valve-casing, having an inlet 5 and an outlet 6, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with an auxiliary

cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, substantially as and for the purposes set forth.

7. In a valve, a valve-casing, having an inlet 5 and an outlet 6, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, substantially as and for the purposes set forth.

8. In a valve, a valve-casing, having an inlet 5 and an outlet 6, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with an auxiliary cylinder, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, and a three-way cock in said pipes, substantially as and for the purposes set forth.

9. In a valve, a valve-casing, having an inlet 5 and an outlet 6, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with standards or supports on said valve-casing, an auxiliary cylinder on said standards or supports, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, substantially as and for the purposes set forth.

10. In a valve, a valve-casing, having an outlet 6 and an inlet 5, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 5 7, a balanced valve-disk in said cylindrical casing, combined with standards or supports on said valve-casing, an auxiliary cylinder on said standards or supports, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, substantially as and for the purposes set forth.

11. In a valve, a valve-casing, having an outlet 6 and an inlet 5, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with standards or supports on said valve-casing, an auxiliary cylinder on said standards or supports, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, substantially as and for the purposes set forth.

12. In a valve, a valve-casing, having an outlet 6 and an inlet 5, a chamber 7, and a cylindrical casing in said chamber provided with ports which communicate with said chamber 7, a balanced valve-disk in said cylindrical casing, combined with standards or supports on said valve-casing, an auxiliary cylinder on said standards or supports, a piston in said cylinder, and a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, and a three-way cock in said pipes, substantially as and for the purposes set forth.

13. In a valve, the combination, with a valve-casing, a cylindrical casing having an

open top and bottom in said valve-casing, and a balanced valve-disk slidably arranged in said cylindrical casing, of an auxiliary cylinder, a piston in said cylinder, a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, a post on said piston, and means connected with said post for moving the piston and the valve-disk, either upwardly or downwardly for adjustment, substantially as and for the purposes set forth.

14. In a valve, the combination, with a valve-casing, a cylindrical casing having an open top and bottom in said valve-casing, and a balanced valve-disk slidably arranged in said cylindrical casing, of an auxiliary-cylinder, a piston in said cylinder, a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, a post on said piston, and means connected with said post for moving the piston and the valve-disk, either upwardly or downwardly for adjustment, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, substantially as and for the purposes set forth.

15. In a valve, the combination, with a valve-casing, a cylindrical casing having an open top and bottom in said valve-casing, and a balanced valve-disk slidably arranged in said cylindrical casing, of an auxiliary cylinder, a piston in said cylinder, a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, a post on said piston, and means connected with said post for moving the piston and the valve-disk, either upwardly or downwardly for adjustment, and a means of direct communication between the valve-casing or parts connected therewith and with said cylinder for conducting a pressure-exerting medium against said piston in the cylinder and thereby operate the valve-disk in the valve-casing, consisting, essentially, of pipes 31 and 38 connecting the inlet portion of the valve-casing with a portion of said cylinder, and pipes 41 and 42 connecting the outlet portion of the valve-casing with another portion of said cylinder, substantially as and for the purposes set forth.

16. In a valve, the combination, with a valve-casing, a cylindrical casing having an open top and bottom in said valve-casing, and a balanced valve-disk slidably arranged in said cylindrical casing, of an auxiliary cylinder, a piston in said cylinder, a stem connected with said valve-disk extending into said cylinder and connected with the piston therein, a post on said piston, and means connected with said post for moving the piston and the valve-disk, either upwardly or downwardly for adjustment, and a means of direct communication between the valve-cas-

ing or parts connected therewith and with
said cylinder for conducting a pressure-exert-
ing medium against said piston in the cylin-
der and thereby operate the valve-disk in the
5 valve-casing, consisting, essentially, of pipes
31 and 38 connecting the inlet portion of the
valve-casing with a portion of said cylinder,
and pipes 41 and 42 connecting the outlet
portion of the valve-casing with another por-
10 tion of said cylinder, and a three-way cock in

said pipes, substantially as and for the pur-
poses set forth.

In testimony that I claim the invention set
forth above I have hereunto set my hand this
22d day of March, 1900.

THOMAS REESE, JR.

Witnesses:

FREDK. C. FRAENTZEL,
GEO. D. RICHARDS.