J. CEVASCO, N. J. CAVAGNARO & C. AMBRETTE.

VALVE MECHANISM.

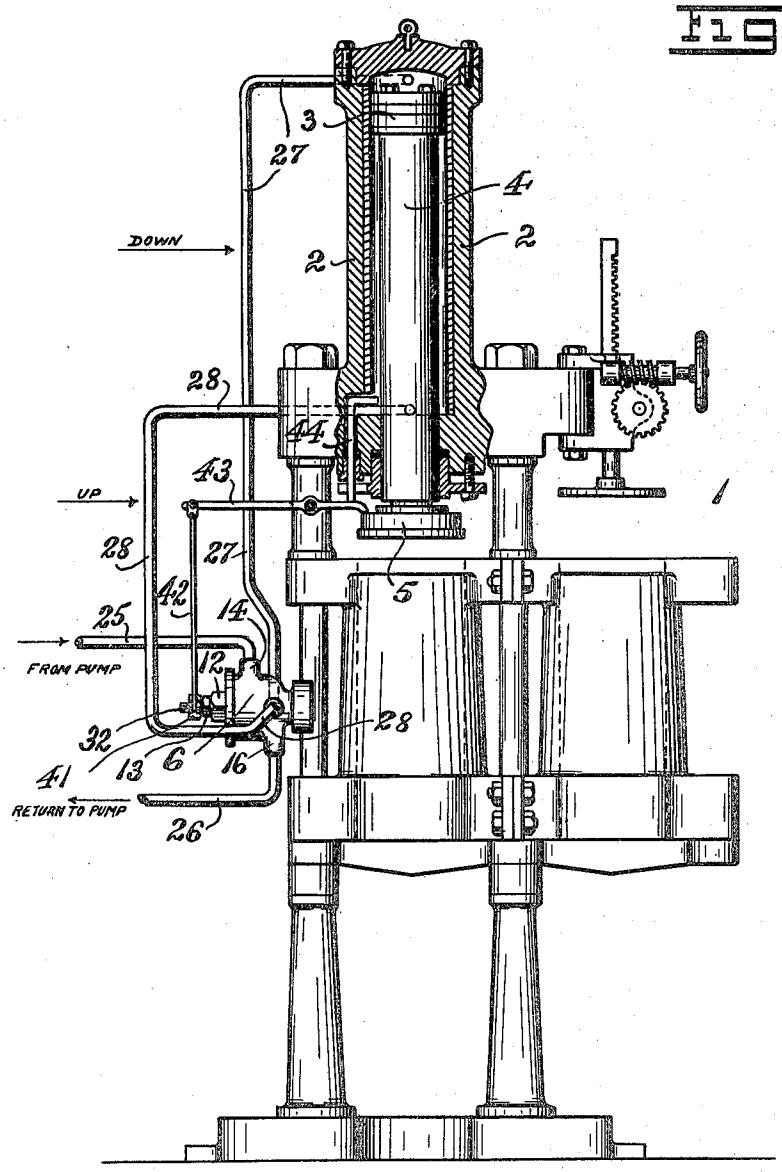
APPLICATION FILED DEC. 17, 1912.

1,072,822.

Patented Sept. 9, 1913.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

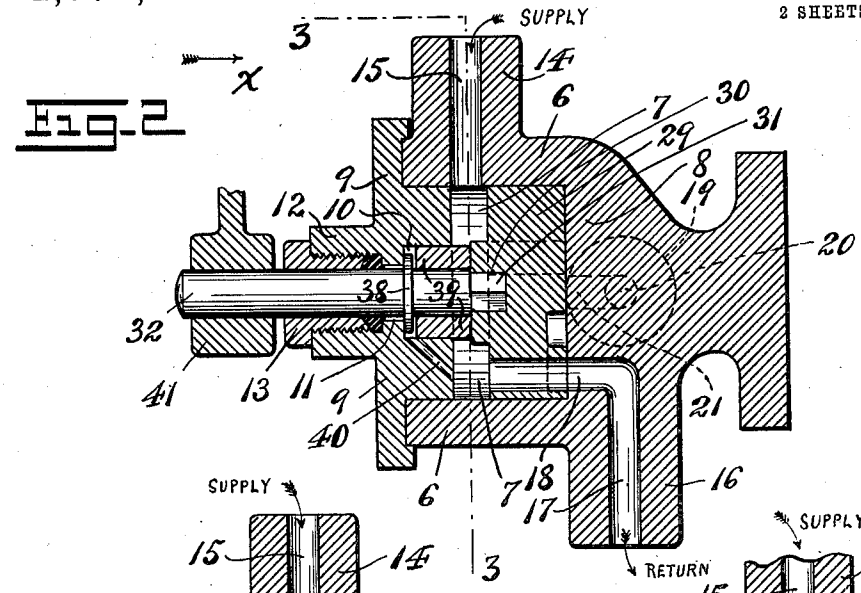


Fig. 2

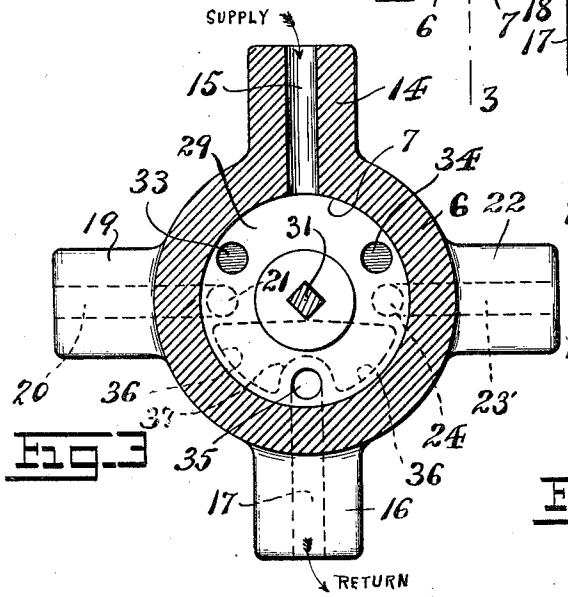


Fig. 3

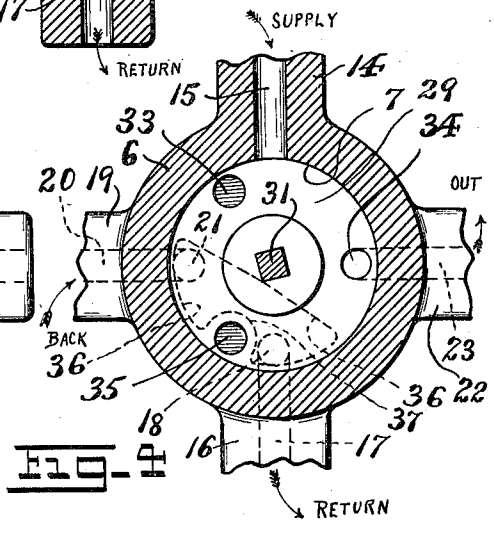


Fig. 4

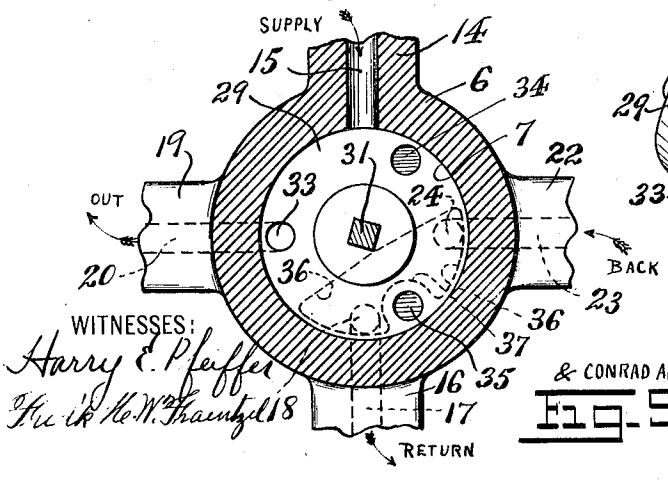


Fig. 5

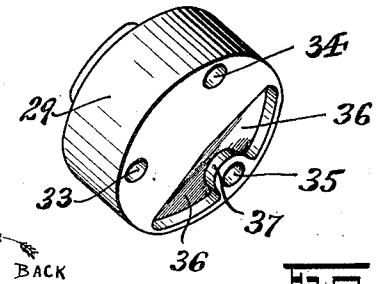


Fig. 6

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UNITED STATES PATENT OFFICE.

JAMES CEVASCO AND NICHOLAS J. CAVAGNARO, OF BROOKLYN, AND CONRAD AMBRETTE, OF NEW YORK, N. Y.

VALVE MECHANISM.

1,072,822. Specification of Letters Patent. Patented Sept. 9, 1913.

Application filed December 17, 1912. Serial No. 737,251.

To all whom it may concern:

Be it known that we, JAMES CEVASCO, a subject of the King of Italy, and NICHOLAS J. CAVAGNARO, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, and CONRAD AMBRETTE, a subject of the King of Italy, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Valve Mechanisms; and we 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 characters of reference marked thereon, which form a part of this specification.

This invention has reference to improvements in valve-mechanism, and the present invention relates, more particularly, to a novel construction of three-way valve having means providing automatically for a return circulation of the fluid passed therethrough. The said valve-mechanism is adapted for many uses, but is particularly applicable for use in controlling the circulation of fluid in hydraulic presses, jacks, lifting devices and similar hydraulic mechanisms.

The present invention has for its principal object to provide a very simple, cheap, effective and easily operated valve-mechanism adapted to control the alternate passage of a fluid through the valve in one of two directions with automatic means permitting the return circulation of the fluid through the valve to the source of supply, and also adapted to permit the direct passage of the fluid through the valve independently of the circulation means.

Other objects of this invention not at this time more especially mentioned will be clearly understood from the following detailed description of the invention.

The invention consists, primarily, in the novel valve-mechanism hereinafter more fully set forth; and, furthermore, this invention consists in the various arrangements and combinations of the parts, all of which will be more particularly described in the following specification and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

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

Figure 1 is a view of a hydraulic press, the cylinder of which is shown in vertical section, and to which is shown the application of the novel valve-mechanism made according to and embodying the principles of the present invention, said valve-mechanism being shown in side elevation. Fig. 2 is a vertical longitudinal section of the novel valve-mechanism; Fig. 3 is a transverse section of the same, taken on line 3—3 in said Fig. 2, looking in the direction of the arrow *x;* Fig. 4 is a view similar to said Fig. 3 showing the valve-mechanism arranged to control the flow of fluid in one direction with a return circulation through the valve-mechanism; Fig. 5 is also a view similar to said Figs. 3 and 4 but showing the valve-mechanism arranged to control the flow of fluid in another direction also with a return circulation through the valve-mechanism; and Fig. 6 is a detail perspective view of a novel rotary valve-member employed in said novel valve mechanism.

Similar characters of reference are employed in all of the above described views to indicate corresponding parts.

Referring now to the several figures of the drawings, the reference-character 1 indicates a hydraulic press, the same being provided with a cylinder 2 within which is slidably arranged the press-piston 3. Extending downwardly from said press-piston is a piston-column 4 which passes through a packed opening in the bottom of said cylinder 2, and upon the exterior end of which is secured the press-foot 5. When fluid is introduced within said cylinder above said press-piston it causes the piston to descend, and owing to the fact that the entire volume of the cylinder must be filled with the fluid this downward movement is slow but powerful; when, however, fluid is introduced within said cylinder beneath said press-piston it causes the piston to ascend, and owing to the fact that the cylinder chamber is partially occupied by

the piston-column 4, less fluid is required to fill the cylinder to the point where the pressure is brought to bear upon the piston, and consequently the piston ascends rapidly.

Connected with said hydraulic press in some suitable location is the novel valve-mechanism made according to and embodying the principles of the present invention, the same comprising a valve-casing 6 provided with an interior cylindrical chamber 7 closed at its rear end by the rear wall 8 of said valve-casing. Secured in any suitable manner to said valve-casing 6 is a cap-plate 9, the same being adapted to close the forward end of said cylindrical chamber 7. The inner face of said cap-plate is provided with a centrally disposed cylindrical chamber or receiving socket 10, said cap-plate being further provided with a centrally disposed opening 11 communicating with the rear end of said chamber or receiving socket 10. Secured upon the outer face of said cap-plate in registration with said central opening 11 is an internally screw-threaded stuffing box member 12 connected with which is the externally screw-threaded stuffing-box cap 13. Connected with the side-walls of said valve casing 6 is a projection or extension 14 provided with a tubular passage 15 which provides an inlet opening communicating with said cylindrical chamber 7. Extending downwardly from the rear wall 8 of said valve-casing is a projection or extension 16 provided with a tubular passage 17 which continues through said rear-wall 8 being so turned as to present its inlet mouth 18 in the inner face of said rear wall in communication with said cylindrical chamber 7. Extending outwardly from one side of the rear wall 8 of said valve-casing is a projection or extension 19 provided with a tubular passage 20 which continues through said rear-wall 8 being so turned as to present its inlet mouth 21 in the inner face of said rear wall in communication with said cylindrical chamber 7. In like manner, extending outwardly from the other side of the rear wall 8 of said valve-casing is another projection or extension 22 provided with a tubular passage 23 which continues through said rear wall being so turned as to present its inlet mouth 24 in the inner face of said rear wall in communication with said cylindrical chamber 7. A suitable pipe connection 25 is secured to said projection or extension 14, and the same being connected with a pump or suitable device which supplies the fluid, the latter is thereby delivered so as to be distributed and controlled by the valve-mechanism. Connected with said projection or extension 16 is a pipe 26 which serves to provide a return conduit for connecting said valve-mechanism with the source of supply from which the pump draws the fluid. Connected with the projection or extension 19 is a pipe 27 which leads the fluid from one of the outlet parts of said valve-mechanism to the cylinder 2 of the hydraulic press, the same being so connected with said cylinder as to introduce the fluid above said press-piston 3. Connected with the projection or extension 22 is a pipe 28 which leads the fluid from another of said outlet parts of said valve-mechanism to the cylinder 2 of the hydraulic press, the same being so connected with said cylinder as to introduce the fluid beneath said press-piston 3. Rotatably arranged within said cylindrical chamber 7 of said valve-casing is a movable valve-member 29, the same fitting snugly within said chamber and adapted to register against the inner face of said rear-wall 8 of the valve-casing. Said valve-member is capable of rotary movements upon its central axis, as thus journaled, against the walls of said chamber. Centrally disposed in the exposed face of said movable valve-member 29 is a receiving socket 30, the same being preferably of polygonal shape and serving to receive the engagement of the coupling-head 31 of a spindle 32 by means of which the proper movements of said valve-member are produced, said coupling-head 31 having a polygonal shape corresponding to the shape of said receiving socket 30. Extending transversely through the body of said movable valve-member are a series of outlet ports comprising, an outlet port 33 which, upon a proper movement of said valve-member, may be caused to register with said inlet mouth 21 of said passage 20 to provide an outlet-communication in one direction for the fluid passed into said chamber 7 through the inlet opening or passage 15; another outlet port 34 which, upon a proper movement of said valve-member, may be caused to register with said inlet mouth 24 of said passage 23 to provide an outlet communication in another direction for the fluid passed into said chamber 7 through the inlet opening or passage 15; and a direct return port 35, which, upon a proper movement of said valve-member, may be caused to register with said inlet mouth 18 of said passage 17 to provide a direct communication through said valve whereby the fluid may be returned directly to the source of supply.

Formed in the inner face of said rotary or movable valve-member 29 is a by-pass depression or cut-away portion 36, the same occupying the lower half of said inner face of said valve-member and being, preferably, of substantially semi-circular outline. Said by-pass depression is so formed, however, as to be non-communicative with said several outlet ports 33, 34 and 35 of said valve-member, and to this end extends around the position of the port 35 so that a wall-portion

37 prevents communication between said by-pass depression and said port 35. The said outlet ports 33, 34 and 35 are separated from each other, as positioned with relation to the circumference of said valve-member, about one hundred and twenty degrees apart, although their relative positions are subject to some variation. Connected with said spindle 32 is a collar or shoulder 38 so disposed as to bear against the inner side of said cap-plate 9, to prevent outward longitudinal movement of said spindle resulting in disconnecting the same from its operative relation to said movable valve-member 29. Slidably disposed upon the inner end of said spindle 32 between said valve-member and said cap-plate, is a holding collar 39. This holding collar 39 fits snugly and slidably within said cylindrical chamber or receiving socket 10 of said cap-plate 9. Formed in said cap-plate 9 is a duct or groove 40 which conveys fluid from the interior of said chamber 7 into said chamber or receiving socket 10 in back of said holding collar 39, and the fluid being under pressure as it is forced through the valve-mechanism transmits some of its pressure to said holding collar thereby forcing the same forward so as to cause the same to bear against the exposed face of said valve-member 29 with sufficient pressure to hold the latter in proper bearing relation against the rear wall 8 of the valve-casing and thus preventing the fluid from flowing between such parts and causing their separation whereby a proper operation of the valve-mechanism would be prevented. Connected with the exterior end of said spindle 32 is a suitable handle or lever member 41 whereby said spindle may be turned to operate said rotary valve-member 29.

The fluid enters the chamber 7 through the inlet passage 15 which is connected to the pump for supplying said fluid. By turning the valve-member 29 so as to register said direct return port 35 with said inlet mouth 18 of the passage 17, the fluid may be conducted directly back to the pump, or source of the supply, or elsewhere, since in this position the outlet ports 33 and 34 are out of registration with said passages 20 and 23, the latter being closed from communication with said chamber 7 by the interposition of the body of said valve-member 29. By a further manipulation of said valve-member 29 in one direction said outlet port 33 may be registered with the inlet mouth 21 of the passage 20, whereby the fluid is caused to enter said pipe 27 and is thereby delivered to said cylinder 2 above the piston 3, the fluid so entering the cylinder causing a downward movement of said piston 3 and the parts connected therewith. When said valve-member is in this position the said direct return port 35 is moved away from its registered position with the inlet mouth 18 of the outlet passage 17 and the body of said valve-member being interposed between the latetr and said chamber 7 direct communication therebetween is closed. At the same time, however, said by-pass depression 36 is so disposed as to straddle said inlet mouth 24 and said inlet mouth 18 so as to establish communication between the passages 23 and 17. This arrangement permits the fluid which is within the cylinder beneath said piston 3 to be driven out by the descending movement of said piston through the pipe 28 and through said passage 23, by-pass depression 36, and passage 17 into the return pipe 26, whereby the fluid is returned to the source of supply. All of which is illustrated in Fig. 5 of the drawings. When said valve-member is turned in an opposite direction said outlet port 34 may be registered with the inlet mouth 24 of the passage 23, whereby the fluid from said chamber 7 is caused to enter said pipe 28 and is thereby delivered to said cylinder 2 beneath said piston 3, the fluid so entering the cylinder causing an upward movement of said piston 3 and the parts connected therewith. When said valve is in this position said by-pass depression 36 is so disposed as to straddle said inlet mouth 21 and said inlet mouth 18 so as to establish communication between the passages 20 and 17. This arrangement permits the fluid with the cylinder 2 above said piston 3 to be driven out, by the ascending movement of said piston, through the pipe 27, and through said passage 20, by-pass depression 36 and passage 17 into the return pipe 26, whereby the fluid is returned to the source of supply. All of which is illustrated in Fig. 4 of the drawings. If it is desired the said operating handle or lever 41 may be connected by the link or connecting rod 42 to a pivoted lever 43 which is operated by contact with the push-piece 44 or press-foot 5 of the press to automatically turn said spindle 32, and thereby automatically operate said valve-member to alternately cause the flow of fluid to be directed into the cylinder 2 upon opposite sides of the piston 3, all in a manner clearly to be understood from an inspection of Fig. 1 of the drawings.

We are aware that some changes may be made in the arrangements and combinations of the parts, as well as in the details of the construction of the same, without departing from the scope of this invention. Hence, we do not limit our invention to the exact arrangements and combinations of the parts as described in the foregoing specification and as illustrated in the accompanying drawings, nor do we confine ourselves to the exact details of the construction of the said parts.

We claim:

1. In a valve mechanism, a valve casing providing a cylindrical interior chamber, said valve-casing having an inlet passage leading to said chamber, a rear-wall connected with said valve-casing for closing one end of said chamber, a cap-plate for closing the other end of said valve-casing, said rear-wall having a pair of outlet passages and a return passage communicating with said chamber, a valve-member rotatably mounted in said chamber and registering against said rear-wall so as to cover said outlet passages and said return passage, said valve-member having a pair of valve ports adapted to register upon a proper movement of said valve-member respectively and alternately with said pair of outlet passages and a direct return valve port adapted to register upon a proper movement of said valve-member with said return passage, said valve-member being further provided in its registering or abutting face with a by-pass depression adapted to interconnect one of said outlet passages with said return passage when a valve-port is registered with the other outlet passage to provide for a return circulation through said valve mechanism, and means for rotating said valve-member.

2. In a valve mechanism, a valve casing providing a cylindrical interior chamber, said valve-casing having an inlet passage leading to said chamber, a rear-wall connected with said valve-casing for closing one end of said chamber, a cap-plate for closing the other end of said valve-casing, said rear-wall having a pair of outlet passages and a return passage communicating with said chamber, a valve-member rotatably mounted in said chamber and registering against said rear-wall so as to cover said outlet passages and said return passage, said valve-member having a pair of valve ports adapted to register upon a proper movement of said valve-member respectively and alternately with said pair of outlet passages and a direct return valve-port adapted to register upon a proper movement of said valve-member with said return passage, said valve-member being further provided in its registering or abutting face with a by-pass depression adapted to interconnect one of said outlet passages with said return passage, when a valve-port is registered with the other outlet passage to provide for a return circulation through said valve mechanism, and means for rotating said valve-member comprising a spindle rotatably mounted in said cap-plate, means for connecting the inner end of said spindle with said valve-member, and means connected with the outer end of said spindle for manipulating the same.

3. In a valve mechanism, a valve casing providing a cylindrical interior chamber, said valve-casing having an inlet passage leading to said chamber, a rear wall connected with said valve-casing for closing one end of said chamber, a cap-plate for closing the other end of said valve-casing, said rear-wall having a pair of outlet passages and a return passage communicating with said chamber, a valve-member rotatably mounted in said chamber and registering against said rear-wall so as to cover said outlet passages and said return passage, said valve-member having a pair of valve ports adapted to register upon a proper movement of said valve member respectively and alternately with said pair of outlet passages and a direct return valve-port adapted to register upon a proper movement of said valve-member with said return passage, said valve-member being further provided in its registering or abutting face with a by-pass depression adapted to interconnect one of said outlet passages with said return passage when a valve-port is registered with the other outlet passage to provide for a return circulation through said valve-mechanism, and means for rotating said valve-member comprising a spindle rotatably mounted in said cap-plate, means for connecting the inner end of said spindle with said valve-member, means connected with the outer end of said spindle for manipulating the same, and means for holding said valve-member in its abutting relation to said rear-wall of said valve-casing.

4. In a valve mechanism, a valve-casing providing a cylindrical interior chamber, said valve-casing having an inlet passage leading to said chamber, a rear-wall connected with said valve-casing for closing one end of said chamber, a cap-plate for closing the other end of said valve-casing, said rear-wall having a pair of outlet passages and a return passage communicating with said chamber, a valve-member rotatably mounted in said chamber and registering against said rear-wall so as to cover said outlet passages and said return passage, said valve member having a pair of valve ports adapted to register upon a proper movement of said valve member respectively and alternately with said pair of outlet passages and a direct return valve-port adapted to register upon a proper movement of said valve-member with said return passage, said valve-member being further provided in its registering or abutting face with a by-pass depression adapted to interconnect one of said outlet passages with said return passage when a valve-port is registered with the other outlet passage to provide for a return circulation through said valve mechanism, means for rotating said valve-member, comprising a spindle rotatably mounted in said cap-plate, means for connecting the inner end of said spindle with said valve-member, means con-

nected with the outer end of said spindle for manipulating the same, and means for holding said valve-member in its abutting relation to said rear-wall of said valve-casing, comprising the provision of a cylindrical receiving socket in the inner face of said cap-plate, a holding collar slidably mounted on said spindle and fitting slidably within said receiving-socket, and the provision in said cap-plate of a duct for conveying fluid from said interior chamber into said receiving socket and in back of said holding collar.

5. In a valve-mechanism, a valve-casing providing a cylindrical interior chamber, a cap-plate for closing one end of said chamber, a rear-wall connected with said valve-casing closing the other end of said chamber, said valve-casing having an inlet passage, said rear wall having a series of outlet passages, a rotary valve member having ports, said valve-member abutting said rear-wall and being adapted to open and close said outlet passages, a spindle rotatably mounted in said cap-plate, means for connecting said spindle with said valve-member, and means for holding said valve member in its abutting relation to said rear wall comprising the provision in said cap-plate of a cylindrical receiving socket, a holding collar slidably fitted within said receiving-socket one end of said holding collar bearing against said valve-member, and the provision in said cap-plate of a duct for conveying fluid from said chamber into said receiving socket and in back of said holding collar.

6. In a valve-mechanism, a valve-casing 6 having the inlet opening 15 and the outlet passages 17, 20 and 23, a rotary valve-member 29 having the valve-ports 33, 34 and 35 and provided on its inner face with the by-pass depression 36, and means for rotating said valve-member.

7. In a valve-mechanism, a valve-casing 6 having the inlet passage 15 and the outlet passages 17, 20 and 23, a cap-plate for closing the interior of said valve-casing, a rotary valve member 29 having the valve-ports 33, 34 and 35 and provided on its inner face with the by-pass depression 36, a spindle rotatably mounted in said cap-plate, and means for connecting said spindle with said valve-member.

8. In a valve-mechanism, a valve-casing 6 having the inlet passage 15 and the outlet passages 17, 20 and 23, a cap-plate for closing the interior of said valve-casing, a rotary valve member 29 having the valve-ports 33, 34 and 35 and provided on its inner face with the by-pass depression 36, a spindle rotatably mounted in said cap-plate, means for connecting said spindle with said valve-member, and means for holding said valve-member in operative position.

9. In a valve-mechanism, a valve-casing 6 having the inlet passage 15 and the outlet passages 17, 20 and 23, a cap-plate for closing the interior of said valve-casing, a rotary valve member 29 having the valve-ports 33, 34 and 35 and provided on its inner face with the by-pass depression 36, a spindle rotatably mounted in said cap-plate, means for connecting said spindle with said valve-member, and means for holding said valve-member in operative position, comprising the provision in said cap-plate of a cylindrical receiving socket, a holding-collar slidably fitted within said receiving socket one end of said holding collar bearing against said valve-member, and the provision in said cap-plate of a duct for conveying fluid into said receiving socket and in back of said holding-collar.

In testimony, that we claim the invention set forth above we have hereunto set our hands this 13th day of December, 1912.

JAMES CEVASCO.
NICHOLAS J. CAVAGNARO.
CONRAD AMBRETTE.

Witnesses:
GEORGE D. RICHARDS,
MAYBELLE MCADOO.