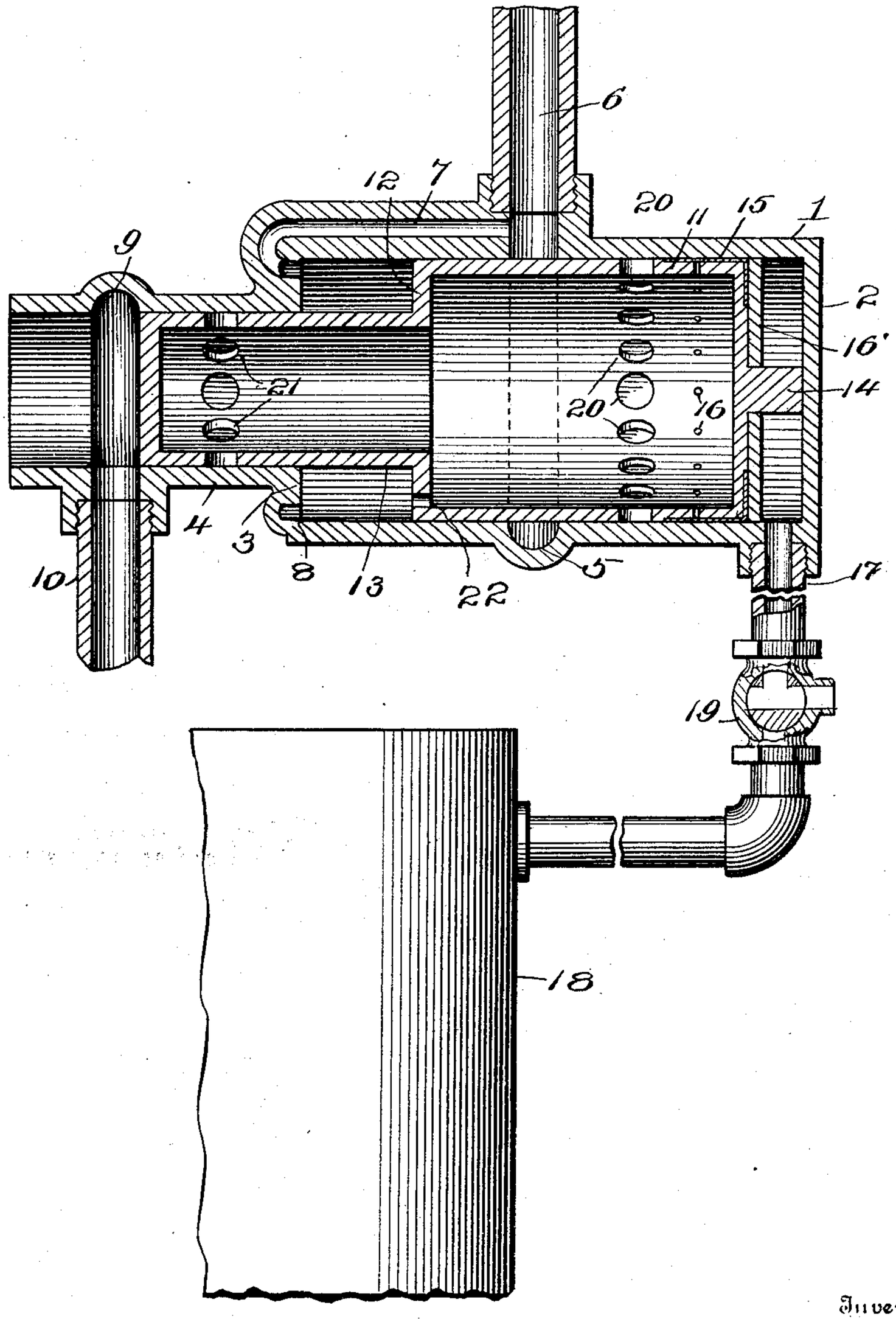
No. 785,646. PATENTED MAR. 21, 1905.

J. G. WESTBROOK.

VALVE.

APPLICATION FILED JAN. 17, 1905.



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No. 785,646. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

JAMES G. WESTBROOK, OF OGDENSBURG, NEW YORK.

VALVE.

SPECIFICATION forming part of Letters Patent No. 785,646, dated March 21, 1905.

Application filed January 17, 1905. Serial No. 241,500.

To all whom it may concern:

Be it known that I, JAMES G. WESTBROOK, a citizen of the United States, residing at Ogdensburg, in the county of St. Lawrence and State of New York, 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.

This invention relates to improvements in sliding valves, and more particularly to the pressure-controlled type.

The object in view is the provision of means for maintaining a pressure-controlled piston-valve upon its seat under pressure and insuring the reseating of such valve after the same has been moved from its seat.

With this and further objects in view the invention comprises certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully disclosed and claimed.

In the accompanying drawing the figure represents a longitudinal vertical central section through a valve and its casing, embodying the features of the present invention.

The present improved structure involves features of invention disclosed in my prior application, filed April 1, 1903, and designated by Serial No. 150,618, and for the purpose of pointing out the utility of the present improvement the features of invention will be briefly described.

1 in the drawing indicates a valve-casing which is preferably cylindrical and formed with an integral head 2 at one end and at its opposite end provided with an annular inwardly-projecting shoulder 3, formed integral with which is a reduced casing 4, the reduced casing 4 being arranged with its longitudinal axis in line with the longitudinal axis of the casing 1. An annular groove 5 is formed in the inner surface of the casing 1 intermediate the length thereof, and a pressure-supply pipe 6 communicates with said groove, a by-pass 7 leading from the supply 6 longitudinally of the casing 1 and discharging through the shoulder 3 into the end of said casing. An annular groove 8 is formed in the shoulder 3 and crosses the path of discharge of pressure from the by-pass 7, so that pressure supplied through said by-pass will be equally distributed about the end of the casing 1, provided with the shoulder 3. The reduced casing 4 is formed with an annular groove 9 intermediate its length, with which communicates a pipe 10, leading to the engine to be actuated by pressure supplied through pipe 6. The end of the casing 4 beyond the groove 9 is left open for permitting exhaust from the pipe 10, as will hereinafter appear. A hollow piston-valve 11 snugly fits within the casing 1 and is sufficiently shorter than the casing for permitting the desired amount of reciprocation, said valve 11 being formed with an annular shoulder 12 opposing the shoulder 3. A hollow cylindrical reduced extension 13 projects from the shoulder 12 into and snugly fits within the casing 4 and is adapted to reciprocate therein. At the opposite end of the valve 11 from the extension 13 said valve is preferably provided with a boss or other suitable buffer 14, projecting from the end of the valve in position for contacting with the head 2 when the valve is seated, said boss 14 serving to maintain a space between the head of the valve 11 and the head 2 of the casing 1. A suitable packing-strip 15 surrounds the valve 11, and pin-holes 16 16 supply pressure from within the valve to the inner face of said packing for causing the same to engage snugly the wall of the casing, a suitable disk 16′ being provided for retaining the package in place during the reciprocation of the valve. Communicating with the casing 1, contiguous to the head 2, is a pressure-supply pipe 17, said supply-pipe being designed to supply pressure to the space between the head 2 and the contiguous head of the valve 11, the pressure supplied through pipe 17 being of sufficiently high degree relative to the area of the head of the valve 11 exposed to cause the valve to travel against the pressure supplied through the by-pass 7, acting against the shoulder 12. The pressure supplied through pipe 17 is derived from any suitable source—as, for instance, from a pres-

sure-tank 18—and is controlled by a suitable three-way valve 19, interposed in the pipe 17, said valve 19 being preferably manually operated and being designed when in one position to establish communication between the tank 18 and the interior of the casing 1 and when in the other position to cut off communication with the tank 18 and to open communication between the casing 1 and the atmosphere. Apertures 20 are formed in a series through the wall of the valve 11, and all of said apertures are arranged in the same transverse plane of the valve. Similar apertures 21 are formed in the extension 13, and the apertures 21 are spaced from the apertures 20 exactly the same distance as the distance between the groove 5 and the groove 9, so that when the valve 11 is thrown from its seat and moved longitudinally in the casing 1 for its full stroke the apertures 20 are caused to register with the groove 5 and the apertures 21 are caused to register with the groove 9, whereby pressure may enter from supply-pipe 6 through apertures 20, move longitudinally of the interior of the valve 11, and be discharged through apertures 21 into pipe 10 for actuating the engine or other mechanism controlled by the pressure in pipe 10.

The foregoing simply involves features disclosed and covered by my prior above-mentioned application, and the operation of the structure should be apparent, but will be mentioned briefly as follows: When it is desired to open communication between the pipes 6 and 10, valve 19 is operated for admitting pressure for throwing the valve 11 off its seat and causing registration of the apertures 20 and 21 with the grooves 5 and 9, respectively. This position of the elements is maintained as long as it is desired to retain the pressure within the pipe 10, and when it is desired to exhaust pressure therefrom the valve 19 is turned for cutting off communication with the tank 18 and opening communication with the atmosphere, whereupon the pressure supplied by pipe 17 will exhaust from the casing 1, and the pressure supplied by by-pass 7, acting upon the shoulder 12, will throw the valve 11 to its seat and permit an exhaust of pressure from the pipe 10 through the open end of the casing 4. This operation I find in practice to be quite successful and efficient; but at times the by-pass 7 becomes clogged by oil, scales, or other foreign substance, and the pressure supplied through said port is either cut off or reduced to such an extent that the valve 11 will not be seated at all or else will be seated very slowly against the exhausting pressure through pipe 17, whereby the pressure in pipe 10 is maintained longer than desired. For the purpose of illustration it will be obvious that if the pipe 10 is employed for supplying pressure to a clutch-throwing cylinder the failure to exhaust pressure from pipe 10 at the required moment may be fatal to the utility of the structure. In view of this fact I propose to obviate the possibility of a failure of the valve 11 to be seated immediately upon the cutting off of the supply from tank 18 and the opening of the rear of the casing 1 to the atmosphere, which seating I propose to accomplish by the provision of a port 22, formed in the seat of the valve 11 and extending through the shoulder 12 in position for establishing communication between the interior of the valve 11 and the casing 1 in the rear of the shoulder 12, so that should the by-pass 7 become clogged, as above suggested, the expansion of the pressure within the valve 11 will effect a discharge of a certain quantity thereof into the space between the shoulder 12 and shoulder 3 and cause longitudinal travel of the valve 11 to its seat. Further, by the use of the port 22 it will be obvious that the by-pass 7 may be made comparatively small, and the port and by-pass will act together to effect a throwing of the valve 11 to its seat immediately upon the operation of the valve 19.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a valve mechanism, the combination with a casing, of a hollow valve slidably mounted therein, pipes communicating with said casing and adapted to have communication established therebetween through said valve, and means for supplying pressure to the interior of said casing for throwing said valve from its seat, said valve being formed with a port establishing communication between the interior of said valve and the interior of said casing for supplying pressure from the valve to the interior of the casing for throwing the valve to its seat.

2. In a valve mechanism, the combination with a casing formed with an annular shoulder, of a hollow valve arranged within said casing and formed with a shoulder opposing the shoulder of said casing, pipes communicating with said casing and adapted to have communication therebetween established through said valve, and means for supplying pressure to said casing for moving said valve from its seat, a port being formed in said valve communicating between said shoulders for supplying pressure from the valve for throwing the valve to its seat.

3. In a valve mechanism, the combination with a casing formed with a shoulder, of a valve arranged therein and formed with an opposing shoulder, pipes communicating with said casing and adapted to have communication established therebetween through said valve, and means for supplying pressure to said casing for moving said valve from its seat, said valve being formed with a port through its shoulder establishing communication between the interior of the valve and the casing between said shoulders.

4. In a valve mechanism, the combination

with a casing, of a hollow valve movably mounted therein, pipes communicating with said casing and adapted to have communication established therebetween through said valve, and means for supplying pressure to one end of said casing for throwing said valve from its seat, a port being formed in the valve for establishing communication between the interior of the valve and the other end of said casing.

5. In a valve mechanism, the combination with a casing, of a pressure-supply pipe communicating therewith, a pipe leading from said casing, a hollow valve movably mounted within said casing and adapted to establish communication between said pipes, and means for supplying pressure to said casing in the rear of said valve for moving the valve from its seat, a port being formed for establishing communication between said supply-pipe and said casing in front of said valve, and a port being formed in said valve for establishing communication between the interior of the valve and the casing in front of the valve.

6. In a valve mechanism, the combination with a casing formed with a shoulder, of a reduced casing extending from said shoulder, a hollow valve slidably mounted within said first-mentioned casing, a reduced, hollow extension projecting from said valve into said reduced casing, a pressure-supply pipe communicating with said first-mentioned casing, and a discharge-pipe communicating with the reduced casing, said valve and extension being formed with apertures for establishing communication between said supply and discharge pipes when said valve is off its seat, a by-pass being arranged to communicate between said supply-pipe and said first-mentioned casing through the shoulder thereof, and a port being formed in said valve for establishing communication between the interior thereof and said casing.

7. In a valve mechanism, the combination with a casing, a supply-pipe communicating therewith, and a discharge-pipe leading therefrom, of a hollow valve slidingly mounted in said casing, means for supplying pressure between the casing and valve from said supply-pipe, a port being formed in said valve for establishing communication between that portion of the casing supplied with pressure from said supply-pipe and the interior of the valve, apertures being formed in said valve for establishing communication between said pressure-supply pipe and said discharge-pipe, and means for supplying pressure from an independent source to the opposite side of the valve from that supplied with pressure from said supply-pipe for moving the valve against such pressure.

8. In a valve mechanism, the combination with a casing and pressure supply and discharge pipes communicating therewith, of a valve adapted to establish communication between said pipes, means for supplying pressure from said supply-pipe to the interior of said valve and to a portion of the exterior thereof for normally retaining the valve in position for closing communication between said pipe, and means for supplying pressure from an independent source to an exterior portion of said valve opposing the pressure on the first-mentioned exterior portion of the valve for moving the valve to a position for establishing communication between said pipe.

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

JAMES G. WESTBROOK.

Witnesses:

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