

UNITED STATES PATENT OFFICE.

JAMES J. RYLANDS, OF MILLVALE, PENNSYLVANIA, ASSIGNOR TO HOMESTEAD VALVE MANUFACTURING COMPANY, OF HOMESTEAD, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 701,509, dated June 3, 1902.

Application filed September 25, 1901. Serial No. 76,438. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. RYLANDS, of Millvale, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Valves, of which improvement the following is a specification.

My present invention relates to three-way valves for controlling the flow of fluid under comparatively high pressures and is an improvement upon that for which Letters Patent of the United States No. 655,996 were granted and issued to the Homestead Valve Manufacturing Company, as my assignee, under date of August 14, 1900.

The object of my invention is to provide a valve of the type above indicated which shall attain the useful and advantageous operative results of that set forth in Letters Patent No. 655,996 aforesaid and shall embody the further beneficial features of simplification and reduced structural cost.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a valvular mechanism, illustrating an embodiment of my invention; and Fig. 2 a similar section taken at right angles to Fig. 1.

In the practice of my invention I provide a valve case or shell 1, which is preferably of cylindrical form and has an inlet-passage 2 for connection with a fluid inlet or delivery pipe 2^a, leading from a pump, accumulator, or other source of fluid under pressure, a machine supply-passage 3 for connection with a supply-pipe 3^a, leading to a cylinder, press, or other apparatus in which fluid-pressure is to be exerted, and an outlet-passage 4 for connection with an exhaust or waste pipe 4^a, leading to a suitable point of discharge. A partition 5 is interposed between the inlet and machine supply passages and a partition 6 between the machine supply and outlet passage, said partitions dividing the case into three superposed chambers. The valve-case is closed at one end by a removable cap or head 1^a, which may either be blank or, as in the instance shown, provided with an inlet-passage 2^b for connection with an inlet-pipe 2^a, and when the inlet-pipe is connected there-

to the inlet-passage 2 may be closed by a removable cap or plug or it may be entirely dispensed with. An upwardly-opening supply-valve 7, which is of the lift or puppet type, is fitted to seat upon a face or valve-seat on the partition 5 and controls an opening or passage through the same, and an upwardly-opening exhaust-valve 8, also of the lift or puppet type, is fitted to work substantially in line axially with the supply-valve and to seat upon a face or valve-seat on the partition 6 and controls an opening or passage through the same. The supply-valve 7 is normally held to its seat by a spring 7^a, which bears at one end on the cap 1^a and at the other on the valve or, as shown, on a preliminary valve 12 thereon, hereinafter described.

In order to facilitate the manipulation of the supply-valve 7, it is preferably, as shown, provided with a preliminary or auxiliary valve 12 of smaller diameter, controlling a passage through the main supply-valve, to which it is applied. The preliminary valve 12 is connected to a stem having a head 13 located on the lower or delivery side of the valve 7. The exhaust-valve may also be provided with a preliminary or auxiliary valve, if desired.

The supply and exhaust valves are independently unseated in the sequence required by the conditions of machine operation by an operating-shaft 9, which is journaled transversely in the case 1 between said valves and passes through a removable cap 10 and properly-packed stuffing-box 10^a on one side of the case. A hand-wheel 9^c or, as an equivalent therefor, an operating-arm or lever-handle is secured to the outer end of the shaft 9. A cam 9^a is fixed upon the shaft 9, its curved face being located in such relation to the supply-valve 7 as to be adapted to bear on and unseat the same in and by the rotation of the shaft 9 in one direction and to be released therefrom by the rotation of said shaft in the opposite direction. Where, as in the instance shown, an auxiliary supply-valve is employed, the cam 9 acts preliminarily thereon and through the intermediation thereof upon the main supply-valve 7.

The exhaust-valve 8 is unseated by a lift-

ing-arm 9^b, fixed upon the shaft 9 and engaging an eye or staple 8^a on the exhaust-valve, the lifting-arm being preferably, as shown, formed integral with and constituting an extension of the cam 9^a. The lifting-arm is so set relatively to the cam that movement of the operating-shaft 9 in the direction to permit the seating of the supply-valve unseats the exhaust-valve at any determined point in the traverse of the shaft succeeding that at which the supply-valve is seated.

In the operation of a valvular mechanism embodying my invention movement of the operating-shaft 9 in the direction of the arrow in Fig. 2 first unseats the preliminary supply-valve 12 through the contact of the cam 9 with the head 13 of the central stem of said valve, and thereby by relieving the unbalanced pressure on the top of the main supply-valve 7 facilitates the subsequent unseating of the latter, which is effected when in the continued traverse of the shaft 9 the head 13 is brought into bearing upon the lower side of the valve 7. Fluid from the inlet-passage 2 is thereupon admitted to the machine supply-passage 3 and thence through the usual pipe connections to the cylinder-press or other apparatus in which its pressure is desired to be exerted. The exhaust-valve 8 is meanwhile held firmly seated by the fluid-pressure on its upper surface. To effect the release of pressure from the machine supply-passage 3 the shaft 9 is turned in the opposite direction, and when in its traverse the cam 9 is released from contact with the supply-valve 7 the latter is seated by the pressure on its upper surface and the spring 7^a. In the further traverse of the shaft 9 the exhaust-valve 8 is unseated by the action of the lifting-arm 9^b on the eye 8^a of the exhaust-valve, thereby fully releasing the fluid from the operated apparatus and the machine supply-passage 3 to the outlet-passage 4, from which it is discharged through the ordinary connections. When the moving parts are in their normal positions, as shown in the drawings, the supply-valve is held firmly seated by the pressure in the inlet-passage 2 and by the spring 7^a when the latter is employed.

The provision of a rotatable operating-shaft and means fixed thereto for unseating the

supply and exhaust valves, respectively, by movements thereof in opposite directions, as hereinbefore set forth, materially simplifies the construction of a valvular appliance of the class to which my invention relates by the elimination of the levers and link connections, and there being no movable members exterior to the case other than the projecting portion of the operating-shaft and its hand-wheel or handle the dimensions of the appliance are correspondingly reduced.

I claim as my invention and desire to secure by Letters Patent—

1. In a valvular mechanism, the combination of a case or shell divided by transverse partitions into three superposed chambers, an inlet-passage, a machine supply-passage and an outlet-passage, communicating, respectively, with the several chambers of the case, a supply-valve controlling communication between the inlet and machine supply passages, an exhaust-valve working substantially in line with the inlet-valve and controlling communication between the machine supply and exhaust passages a shaft entering the casing between the said valves, a cam on said shaft operating the inlet-valve, and a finger or arm on said cam and operatively engaging the outlet-valve.

2. In a valvular mechanism, the combination of a case or shell divided by transverse partitions into three superposed chambers, an inlet-passage, a machine supply-passage and an outlet-passage, communicating, respectively, with the several chambers of the case, a supply-valve controlling communication between the inlet and machine supply passages, a preliminary valve mounted on said supply-valve, an exhaust-valve working substantially in line with the inlet-valve and controlling communication between the machine supply and exhaust passages, a shaft entering the casing between the inlet and outlet valves, a cam on said shaft engaging said preliminary valve to first operate the preliminary valve and then the inlet-valve, and finger or arm on said cam operatively engaging the outlet-valve.

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Witnesses:

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