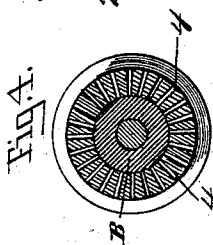
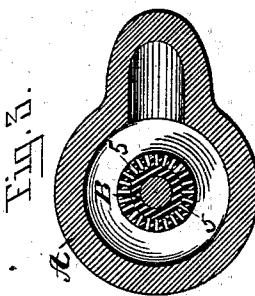
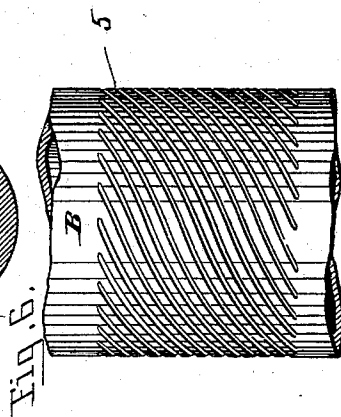
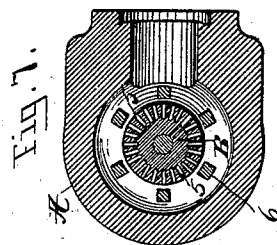
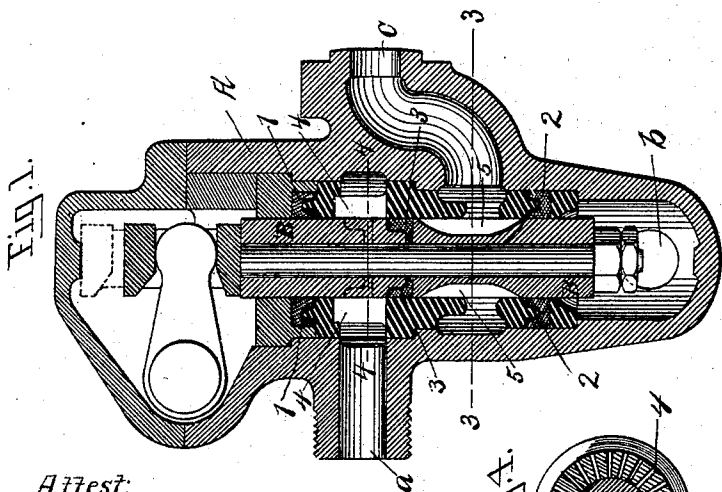
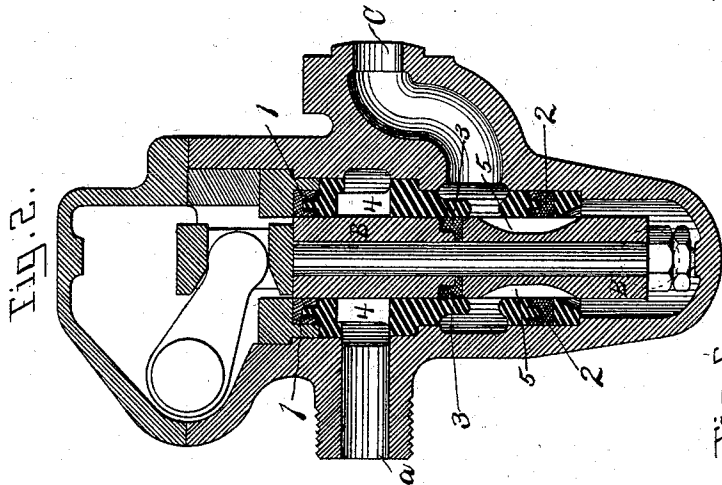
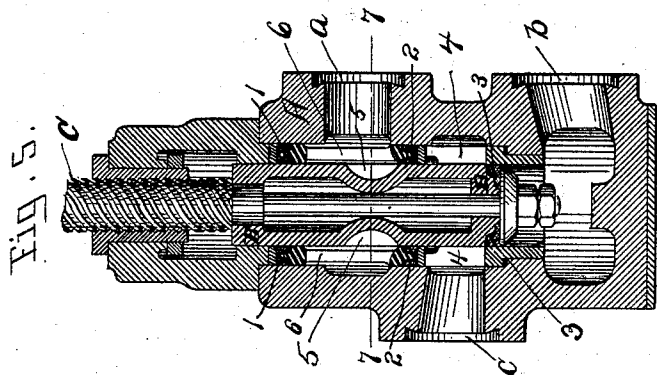


(No Model.)

J. PLATT.
VALVE.

No. 578,831.

Patented Mar. 16, 1897.



Attest:
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UNITED STATES PATENT OFFICE.

JOHN PLATT, OF WESTFIELD, NEW JERSEY.

VALVE.

SPECIFICATION forming part of Letters Patent No. 578,831, dated March 16, 1897.

Application filed May 19, 1894. Serial No. 511,809. (No model.)

To all whom it may concern:

Be it known that I, JOHN PLATT, a subject of the Queen of Great Britain, residing at Westfield, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Valves, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 The object of the present invention is to provide an improved valve construction adapted especially for use with high pressures, as for regulating the supply and exhaust to and from hydraulic presses and other hydraulic machinery. In such constructions piston-valves are usually employed and packing-rings of leather or similar material used for making a tight joint between the piston and valve-box. The projecting edges of such packing are cut by their passage over the edges of the ports or the passage of the ports past them, this resulting chiefly from the high pressures employed, which flattens out the packing into the ports when opposite the latter, and in practice these packing-rings require frequent renewal. I avoid this difficulty by providing a construction in which the free edge of the packing does not come in contact with the edge of the port and in which the body of the packing is supported so as not to cut in passing the port edge, and I secure this result by forming the port of narrow slots extending in the direction of movement of the piston, so that the packing-ring is held from projecting into the port when opposite the latter, and by making the port formed of these slots of such length that the free edge of the packing does not pass the edge of the port or be passed by the port, with the free edge of the packing next the edge of the port.

40 The invention is generally applicable to piston-valves employing packing-rings, and is not limited to any special class or form of such valve. For the purpose of illustration, however, I have shown in the accompanying drawings the invention applied to hydraulic valves of the general form shown in United States Letters Patent Nos. 307,358 and 317,428, and a description thereof will now be given, and the specific features forming the invention then be pointed out in the claims.

In the drawings, Figure 1 is a longitudinal

central section of the valve, showing the valve closed. Fig. 2 is a similar view showing the valve open for exhausting. Figs. 3 and 4 are cross-sections on the lines 3 and 4 of Fig. 1. Fig. 5 is a section similar to Fig. 1, showing a modification with spiral port-slots in the piston and box. Fig. 6 is a detail of the piston of Fig. 5 on a much larger scale. Fig. 7 is a cross-section on the line 7 of Fig. 5.

Referring to said drawings, A is the valve-box; B, the piston-valve; *a*, the inlet; *b*, the outlet or exhaust, and *c* the cylinder-port.

As shown, the valve-box is provided with U-shaped packing-rings 1 2, respectively, above and below the inlet and pressure ports and the piston with the packing-ring 3 above the valve-port. These packing-rings are preferably of leather and of the usual or any suitable construction to make a tight joint between the piston and valve-box. The inner end of the inlet-port *a* next the piston is formed of a series of narrow slots 4, extending in the line of movement of the piston, the face of the ribs between these slots being in the same plane with the valve-box, so that no shoulder is formed at the edge of the port except within the slots, and the port formed by the slots, as shown, is of such length that the edge of the packing 3 does not pass the edge of the port in opening the latter. The position of the piston and packing when the inlet-port is fully open is shown in dotted lines in Fig. 1. The upper or free edge of the packing B, therefore, cannot cut upon the edge of the port, and the ribs between the slots 4 support the body of the packing and prevent this projecting into the port and cutting on the edge of the port as the piston returns from the position shown in dotted lines to that shown in full lines in Fig. 1. The piston-port is also preferably formed of a series of similar narrow slots 5, extending longitudinally of the piston and of such length that the edge of the port does not pass the free edge of the packing-ring 2 in moving downward from the position shown in Fig. 1 to that shown in Fig. 2, and so that the ribs between the slots serve to support the body of the packing-ring 2 as the piston returns to the position shown in Fig. 1.

It will be seen from Fig. 2 that the piston-packing 3, as the piston moves from the cen-

tral position of Fig. 1 to the exhaust position of Fig. 2, does not pass the edge of the port *c*, so that there is no cutting of the piston-packing upon the edge of this port.

5 The construction shown in Fig. 5, 6, and 7 is the same and the operation the same as of the construction shown in Figs. 1 to 4, except that the slots 15 14, forming, respectively, the piston-port and cylinder-port *c*, which latter
10 is the one traversed by the piston-packing in this construction, are spiral and the piston *B'* is given a rotary movement for raising and lowering it by the rotation of the screw-shaft *C*, the screw-threads having the same pitch
15 as the spiral slots. This construction may be found preferable under some conditions, especially in heavy constructions, where greater ease of movement is secured thereby, the screw movement making the leathers pass up
20 through the bore of the valve with much less resistance. The section of the piston *B'* in Fig. 5 is taken in a spiral direction through one of the slots 15. The inlet-port *a* is shown as strengthened by cross-ribs 6, but it will
25 be understood that this is not essential to the invention.

By the term "narrow slots," used in the specification and claims, I mean and intend to cover only slots of such width that the free
30 edge of the packing will be supported by the separating-walls of the slots in such a manner as to prevent the edge being forced into the slots by the pressure of the fluid. It is obvious that the width of these slots may be
35 varied somewhat in accordance with the pressure used in the apparatus, but a width of three thirty-seconds of an inch is recommended, this being found efficient for pressures even of two thousand pounds or more,
40 and this width should not be exceeded for very high pressures. With pressures of only a few hundred pounds, however, the width may be somewhat increased, but should not in any case be much over one-eighth of an
45 inch.

What I claim is—

1. The combination of a rotating and longitudinally-moving piston-valve and valve-

box, one of said members being provided with a packing-ring and the other having a port 50 traversed by said ring during the operation of the valve and formed of narrow spiral slots extending in the line of movement of the piston and beyond the limit of movement of the piston when moving with the free edge of the
55 packing next the edge of the port, whereby the cutting of the packing on the edge of the port is prevented, substantially as described.

2. The combination with the valve-box *A* having packing 2, and inlet-port *a*, exhaust- 60 port *b* and cylinder-port *c*, of a piston having packing 3 and a port formed of narrow slots extending in the line of movement of the piston and of such length that the edge of the port does not pass the free edge of the pack- 65 ing on the movement of the piston toward the free edge, the port in the valve-box traversed by the packing 3 being formed of narrow slots extending in the line of movement
70 of the piston and beyond the limit of movement of the free edge of the packing on the movement of the piston with the free edge in advance, substantially as described.

3. The combination with the valve-box *A* having packing 2, and inlet-port *a*, exhaust- 75 port *b* and cylinder-port *c*, of a rotating and longitudinally-moving piston having packing 3 and a port formed of narrow spiral slots extending in the line of movement of the piston and of such length that the edge of the port 80 does not pass the free edge of the packing on the movement of the piston toward the free edge, the port in the valve-box traversed by the packing 3 being formed of narrow spiral slots extending in the line of movement of
85 the piston and beyond the limit of movement of the free edge of the packing on the movement of the piston with the free edge in advance, substantially as described.

In testimony whereof I have hereunto set 90 my hand in the presence of two subscribing witnesses.

JOHN PLATT.

Witnesses:

C. J. SAWYER.

ARTHUR L. KENT.