F. A. BISHOP.

Pistons for Hydraulic and other Cylinders.

No. 221,390. Patented Nov. 11, 1879.

Fig. 1.

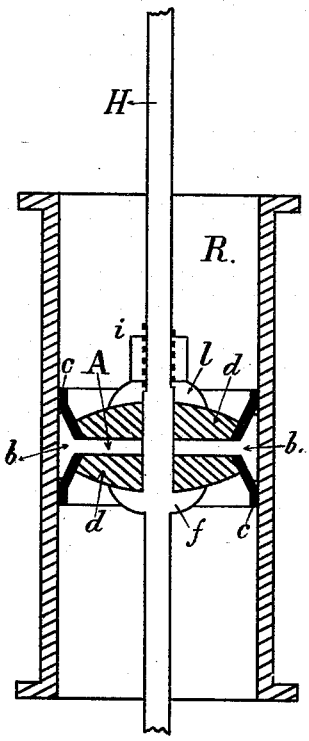


Fig. 2.

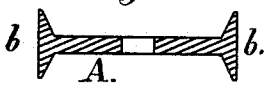


Fig. 3.

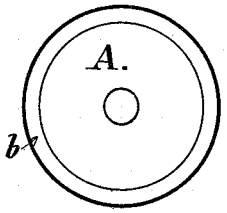


Fig. 4.

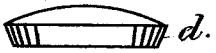


Fig. 5.

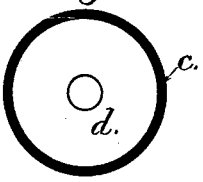


Fig. 6.

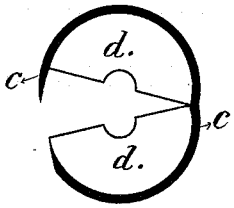


Fig. 7.

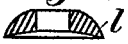
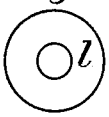


Fig. 8.



Witnesses;

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UNITED STATES PATENT OFFICE.

FRANCIS A. BISHOP, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN PISTONS FOR HYDRAULIC AND OTHER CYLINDERS.

Specification forming part of Letters Patent No. **221,390**, dated November 11, 1879; application filed April 21, 1879.

To all whom it may concern:

Be it known that I, FRANCIS A. BISHOP, of the city and county of San Francisco, and State of California, have invented an Improved Piston for Hydraulic and other Cylinders; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention has reference to that class of pistons for hydraulic and other cylinders in which leather or other equivalent flexible substance is used as a packing; and its object is to construct the piston-head so that the packing can be applied or renewed in a very simple manner, and at the same time provide a cheaper construction of the piston.

Referring to the accompanying drawings, Figure 1 is a section of the piston. Figs. 2, 3, 4, 5, 6, 7, and 8 are details.

Let A represent a circular disk, which, in a double-acting piston, has a rim, *b*, projecting from its edge on both sides, thus forming a cavity or recess on each side of the disk, but in a single-acting piston the disk can be made with a rim or recess only on one side. In the present instance I have represented a double-acting piston.

In the center of the disk is a hole through which the piston-rod will pass.

The leathers *c*, or other flexible substance which I use for a packing, I secure around the rim of a divided circular plate or block, *d*, the rim of which is beveled so as to give the leathers the proper cup or flare.

The circular block *d* is made in two halves, which fit together, and the leather, in one continuous piece, is secured around them as if they were a single block. I commence putting the leather on at the dividing line on one side, and carry it completely around the two half-blocks, so that the middle of the leather serves as a hinge for the two parts to open out on.

The meeting ends of the leather I scarf and overlap, so that when the half-blocks are closed together and the ends of the leather properly overlapped, a cup-shaped leather band will surround them.

Each leather-bound block has a hole in its center, which is large enough to admit the piston-rod, and the division of the block is through the center of this hole. In a double-acting piston I use two of these leather-bound blocks, one on each side of the circular disk A.

The divided circular block *d* is made of such a diameter that when it is bound with the leather band its small end will fit snugly in the cavity or recess in the side of the block A, thus bringing the edge of the leather packing between the block and the projecting rim of the disk A. By then clamping the blocks *d* tightly in the recesses on opposite sides of the disk or diaphragm A, a piston-head with two projecting cup-leathers is made.

To apply this piston-head to the piston-rod H, I make a stop, *f*, on the piston-rod, near its end. This stop can be permanent or removable. The one shown in the present instance is simply an enlargement or fixed collar on the rod.

The disk A being on the rod, I take the leather-bound blocks *d*, open them out on their hinges, and place them over the rod, one on each side of the disk A, until they will close together, with the rod in the central hole. I then slip them into their seats in the recessed sides of the disk A, and, by means of a nut, *i*, and washer *l* on the piston-rod above the piston-head, clamp them tightly together between the fixed collar or enlargement *f* and the nut, thus clamping the edges of the leathers between the edges of the blocks and the rims of the disk, leaving the opposite edges of the leathers projecting to form the packing. The nut *i* works on a screw-thread which is cut on the piston-rod.

I shall usually make the inner sides of the rim *b*, which projects from the disk A, tapering, to correspond with the beveled leather-bound edges of the blocks *d*, so that the leathers will be clamped firmly between them; and I shall also make the outside faces of the blocks *d* convex, and the opposing faces of the stop *f* and washer *l* concave, to correspond, as shown; but these are merely incidental to the peculiar construction of the piston.

The chief advantage of this piston-head is the ease with which the packing can be renewed in case it becomes worn out or injured. To do this I only have to remove one end of

the cylinder R, and lift the piston so that the nut *i* can be loosened, so as to allow the block *d* to be opened out and removed from the piston-rod, after which a new leather can be put on it, and the block replaced and tightened in the same way, as above described.

The block *d* can be made of any desired substance or material; but I prefer to make them of wood, and to secure the leathers around them by means of nails or tacks.

The action of the piston when at work, with a fluid or gas upon it, is for the pressure of the substance to force the sides of the packing *c* (which extend above the edge of the diaphragm) against the sides of the cylinder R, thus covering the slight space between the diaphragm and the cylinder, and making a perfectly tight joint thereby.

To replace the packing when worn out, or for other purposes, the cylinder-head is released and drawn up the rod clear of the piston, while the same is drawn out of the cylinder. The nut *i* is then eased until the collar *l* can clear the disk *d* freely. Said disk, then being in halves, can be easily removed, the diaphragm then may be raised, and the lower disk, *d*, becomes equally accessible.

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

1. In combination with a diaphragm or disk, A, provided with the projecting rim *b*, the divided block *d*, with its beveled edge, and having the packing-leather *c* attached thereto, substantially as and for the purpose described.

2. The two-part block *d*, provided with a beveled edge and having the packing-leather *c* secured around it, so as to form a hinge for the blocks to open on, in combination with the disk or diaphragm plate A, with its projecting edge *b*, the fixed collar *f*, and clamping-nut *i*, all combined and arranged to operate substantially as and for the purpose described.

3. The improvement in pistons for hydraulic and other cylinders consisting in the packing-leather attached to a sectional block, *d*, which is removable from the disk A and piston-rod, and which is adapted to be clamped in a recess in the side of the disk, so as to bind the packing-leather between the edge of the block and edge of the recess, substantially as and for the purpose above described.

In witness whereof I have hereunto set my hand and seal.

F. A. BISHOP. [L. S.]

Witnesses:
W. F. CLARK,
W. FLOYD DUCKETT.