J. J. LEWIS.

PUMPING VALVES FOR WORKING BARRELS.

No. 181,457. Patented Aug. 22, 1876.

Fig. 1

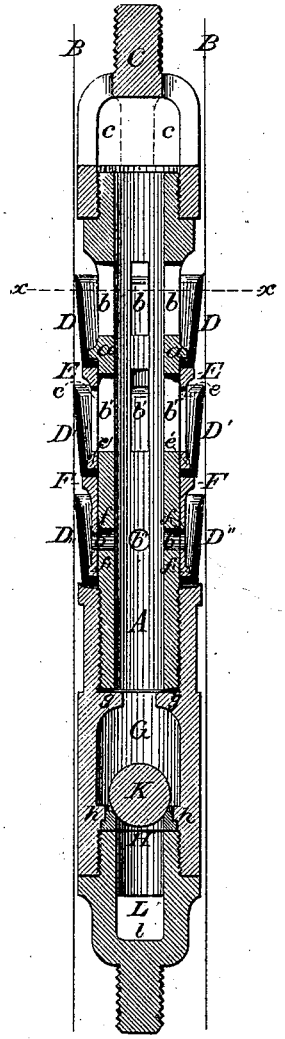

Fig. 2.

Attest:

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UNITED STATES PATENT OFFICE.

JOHN J. LEWIS, OF PETROLIA, PENNSYLVANIA.

IMPROVEMENT IN PUMPING-VALVES FOR WORKING-BARRELS.

Specification forming part of Letters Patent No. **181,457**, dated August 22, 1876; application filed July 22, 1876.

To all whom it may concern:

Be it known that I, JOHN J. LEWIS, of Petrolia, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Pumping-Valves for Working-Barrels; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a vertical section of my improved pumping-valve, and Fig. 2 is a cross-section of the same after the line *x x* in Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention relates to that class of pumping-valves which are used, mainly, in oil-wells of great depth, where it is important that the packing should be perfect and the valve at the same time easily operated; and it consists in the arrangement of a series of flexible packing-cups, acted upon by the pressure of the fluid, in such a manner that the greater the pressure the firmer and more perfect becomes the packing, all as hereinafter more fully shown and specified.

In the drawing, B is the working-barrel, inside of which the valve works. The valve consists of a body, A, which is cylindrical in shape. Its sides have two or more circumferential series of slots or perforations, *b b′ b″*. To its upper end is attached a top-piece, C, which connects with the rods by which the valve is operated, and is provided with suitable openings, *c*, through which the fluid may escape. Below the first round of slots *b* the body A has a projecting step or shoulder, *a*, against which rests a packing-cup, D, made of compressed leather, rubber, or any other suitable material, leather being, however, preferable, on account of its durability. The cup D should be of a depth sufficient to reach to the top of the slats *b*, in order that the fluid passing through these may act upon it with its full force. Below cup D is a jam-ring, E, fitting closely upon body A, and having slots *e*, that correspond with the slots *b′*, which form the next round in body A. Against the step or shoulder *e′*, formed by the lower end of ring E, rests another packing-cup, D′, constructed and operating exactly like cup D. Another jam-ring, F, follows next, having slots (or, as in the drawing, perforations) *f*, corresponding with the perforations *b″*, forming the last round in body A, and a packing-cup, D″, rests against the shoulder *f′*, thus formed. The lower part of body A is screw-threaded, and the valve-cylinder G is attached to it, as shown, thus performing the function of keeping the entire series of packing-cups and jam-rings in position while the valve is in operation.

The construction of the valve-cylinder G will be easily understood by reference to the drawing. In its upper end, below the screw-thread, by which it is attached to body A, it has two or more projecting arms, *g*. In its lower end it has a step or shoulder, *h*, against which rests a steel ring, H, ground to form a seat for the metallic ball K, which has free play between arms *g* and ring H, and forms the operating-valve. The ring H is kept in position by a screw-threaded cap, L, having perforations or openings *l*, through which the fluid enters the device when in operation.

The operation and advantages of my improved pumping-valve will be readily understood from the foregoing description. The working-barrel B, containing the valve, is sunk in the ground to the necessary depth—say, one thousand or fifteen hundred feet. The barrel is connected with the surface by a string of tubing, inside of which works the string of sucker-rods by which the valve is operated. On the downstroke, the fluid enters the valve through openings *l* in cap L, raises the ball K, passes upward through the body A, and out through the openings *c* in top cap C. On the upstroke, the ball K sinks back into its seat, thus preventing any fluid from escaping through the openings in the cap L. At the same time the fluid above the valve exerts its pressure through the openings *b b′ b″* in body A, and *e f* in jam-rings E F, thus causing a direct pressure in the hollow of the packing-cups D D′ D″, which are thus expanded and forced against the inner walls of the working-barrel B. In this manner a perfectly-tight packing is formed, the compactness of which increases in the same proportion as it is

needed—that is, when only a small column of fluid is above the valve, the pressure is proportionately slight, while it increases with the height of the column. Before sinking the barrel with the valve, the pressure may be, to some extent, regulated by partly or wholly covering the perforations *b' b''* with the jam-rings E F, the result of which is to diminish or wholly obviate the fluid-pressure upon cups D' D'', thus making the valve more easily operated.

The construction of my improved pumping-valve is simple and cheap, and, there being no hinged valves or joints, it is not apt to get out of order.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the body A, having step or shoulder *a*, and slots *b b' b''*, flexible packing-cups D D' D'', and jam-rings E F, having slots *e f*, substantially as and for the purpose herein shown and specified.

2. The combination of body A, packing-cups D D' D'', jam-rings E F, and valve-cylinder G, for tightening and retaining the cups and rings, substantially as and for the purpose hereinbefore set forth.

3. The pumping-valve for working-barrels herein described, consisting of body A, having step *a* and openings *b b' b''*, top cap C, having openings *c*, packing-cups D D' D'', jam-rings E F, having openings *e f*, valve-cylinder G, having brackets *g*, seat-ring H, and valve-ball K, and bottom cap L, having openings *l*, all combined and arranged to operate substantially as and for the purposes herein shown and specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN J. LEWIS.

Witnesses:
ALEX. SCOTT,
L. C. KING.