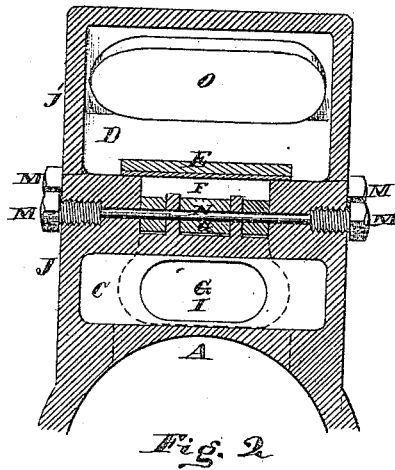
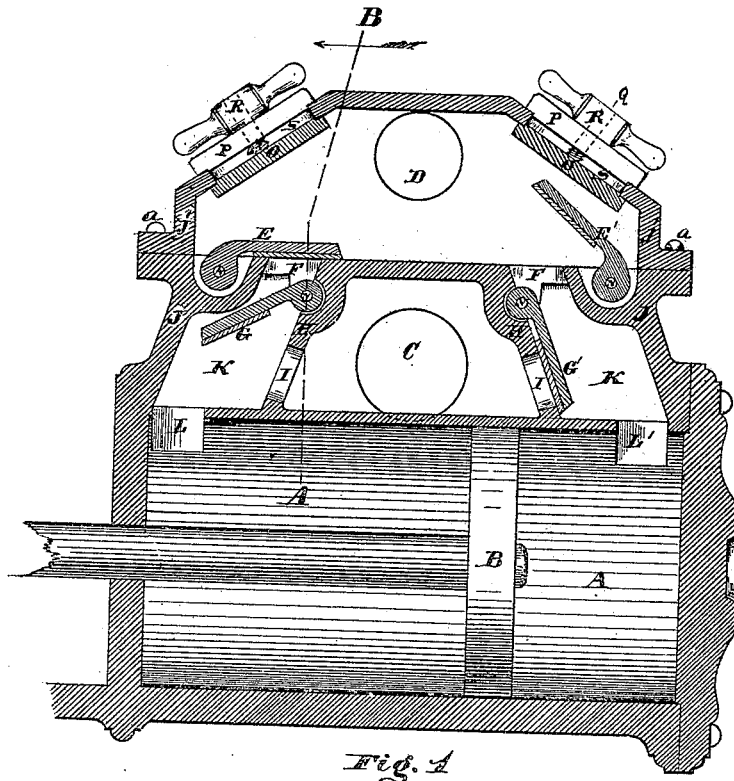


L. J. KNOWLES.  
STEAM PUMP.

No. 113,897.

Patented Apr. 18, 1871.



Witnesses

*Thos. H. Dodge*  
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# United States Patent Office.

LUCIUS J. KNOWLES, OF WORCESTER, MASSACHUSETTS.

Letters Patent No. 113,897, dated April 18, 1871.

## IMPROVEMENT IN STEAM-PUMPS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, LUCIUS J. KNOWLES, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Steam-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing which forms a part of this specification, in which—

Figure 1 represents a central longitudinal section of the pump-cylinder and valve-box.

Figure 2 represents a transverse section of the valve-box at the position indicated by line A B on fig. 1.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

The nature of my invention consists—

First, in the relative arrangement of the induction and eduction-valves, openings S, and removable plates O in relation to each other, as hereafter explained.

Second, in the combination, with the stems of the valves, of removable pivot-rods and pivot-holding screws or bolts, as hereafter explained.

In the drawing—

The part marked A represents the pump-cylinder; B, the piston; C, the supply-chamber; and D, the discharge-chamber.

E E' indicate the eduction-valves, which close the passages F F' from the cylinder A to the discharge-chamber D; and

G G' indicate the induction-valves, which close the passages I I' from the supply-chamber C to the cylinder A.

The lower portion of the shell J or frame of the valve-box, below the discharge-chamber D, is cast with the cylinder, while the upper part J' is cast in a separate piece, and is secured to the lower part J by the screws or bolts a.

Recesses are formed in the upper part of the shell J to receive the stems or hinges of the valves E E', the seats of said valves being in a horizontal position, from which they open upward into the discharge-chamber, as indicated.

The valves G G' are hinged at their upper sides in recesses formed in the diagonal partitions H, which divide the supply-chamber from the spaces K K, above the parts L L', at the ends of the cylinder A.

The valves G G' open outward from the passages I I' into the spaces K.

The valves E E' G G' are hinged upon pivot-rods

N, which pass through the valve-box in a transverse direction, as shown.

The rods N are made shorter than the distance through the valve-box, and the openings at the end of the rod are counter-bored and tapped to receive screws or bolts M, which are screwed into the openings against the ends of the rods N, which latter are thereby retained securely in position.

The screws or bolts M form water-tight joints at the ends of the pivot-rods, and also facilitate the operation of removing the valves, since, by removing the screws at either end of the rods, the latter can be removed, thereby releasing the valves.

Instead of forming the rods N separate from the screws M the rod and screw may be made in the same piece, in which case but one side of the valve-box would require to be bored through the other extremity of the rod N, being simply inserted in a pocket formed for its reception at the inner side of the shell.

Elliptical openings, S, are formed in the upper part of the shell, directly over the valves E E', through which access is permitted to the interior of the valve-box.

These openings are closed by means of removable inside plates O, which fit the interior of the openings, where they are supported by means of cross-bars P arranged across the opening at the outside of the shell, and to which the inside plates are attached by center bolts Q, which pass up through the cross-bars P, and are furnished with hand nuts, R, at their upper ends.

By loosening the nuts R the cross-bars can be swung around, thereby allowing the inside plates O, together with the parts connected therewith, to drop down into the interior of the valve-box, and thus readily allow access to the valves.

When the inside plates are let down the valves E and E' can be raised so that they will stand in a vertical position, their upper ends swinging up into the openings, and when in this position access is obtained to the valves G G' through the passages F F'.

From the foregoing description it will be seen that by my improvements the valves can be readily reached for examination, removal, or repair, and that, too, without the use of any tools or the exercise of more skill than that possessed by an ordinary laborer, the time required for removing and replacing the inside plates being but a few moments, whereby much time and trouble is saved as compared with the time and labor occupied in examining the interior of pumps as ordinarily constructed.

Having described my improvements in steam-pumps,

What I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, with the induction-valves G G' and their seats, of the eduction-valves E E' and their seats, openings S, and inside removable plates O, when said parts are constructed and arranged in relation to each other, substantially as shown and described.

2. The combination, with the valve-stems, of the removable pivot-bars N and holding screws or bolts M, substantially as and for the purpose set forth.

LUCIUS J. KNOWLES.

Witnesses:

THOS. H. DODGE,  
CHAS. H. BURLEIGH.