

H. Locke,
Steam-Pump Valve.

N^o 32,196.

Patented Apr. 30, 1861.

Fig. 3.

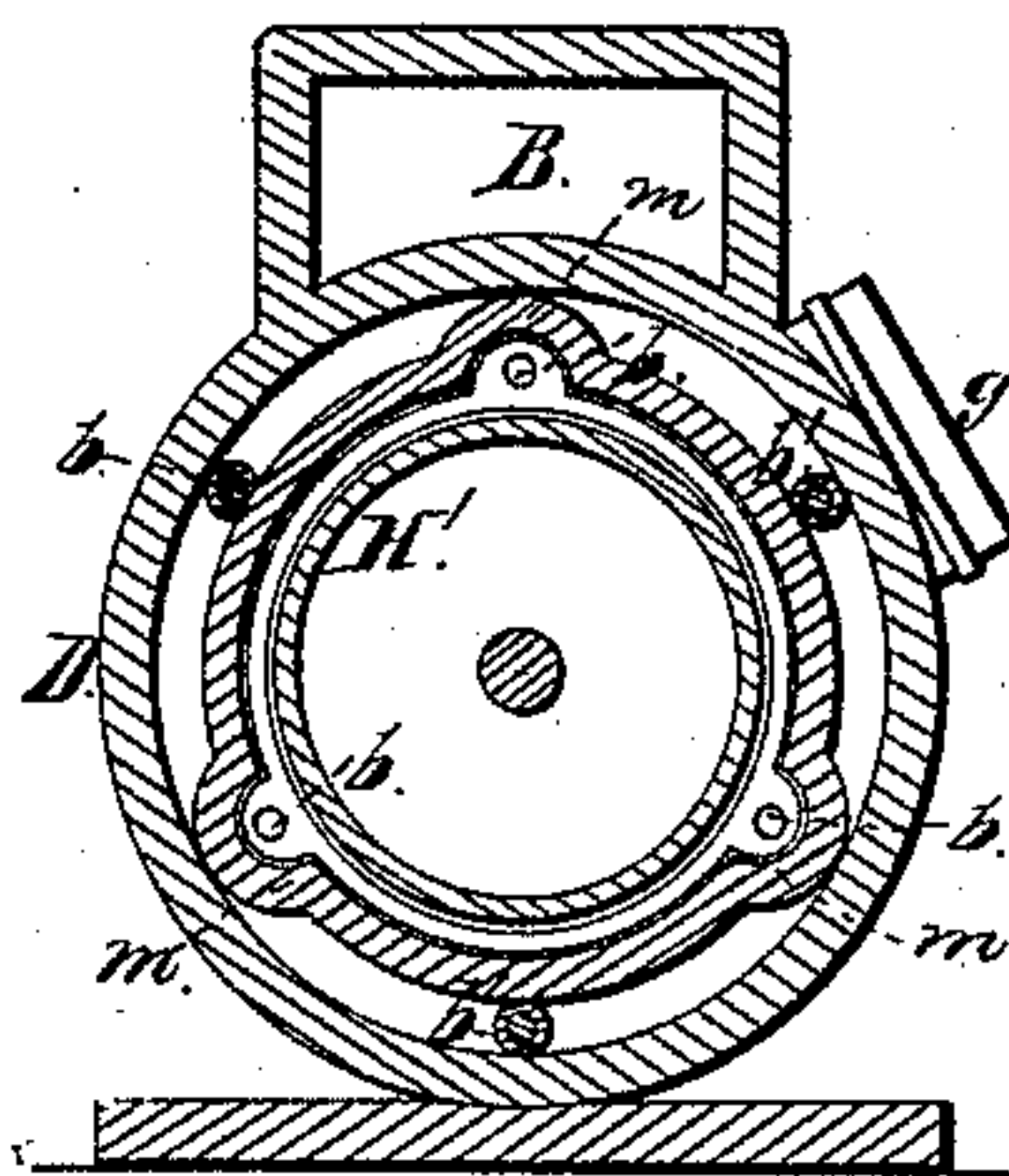


Fig. 2.

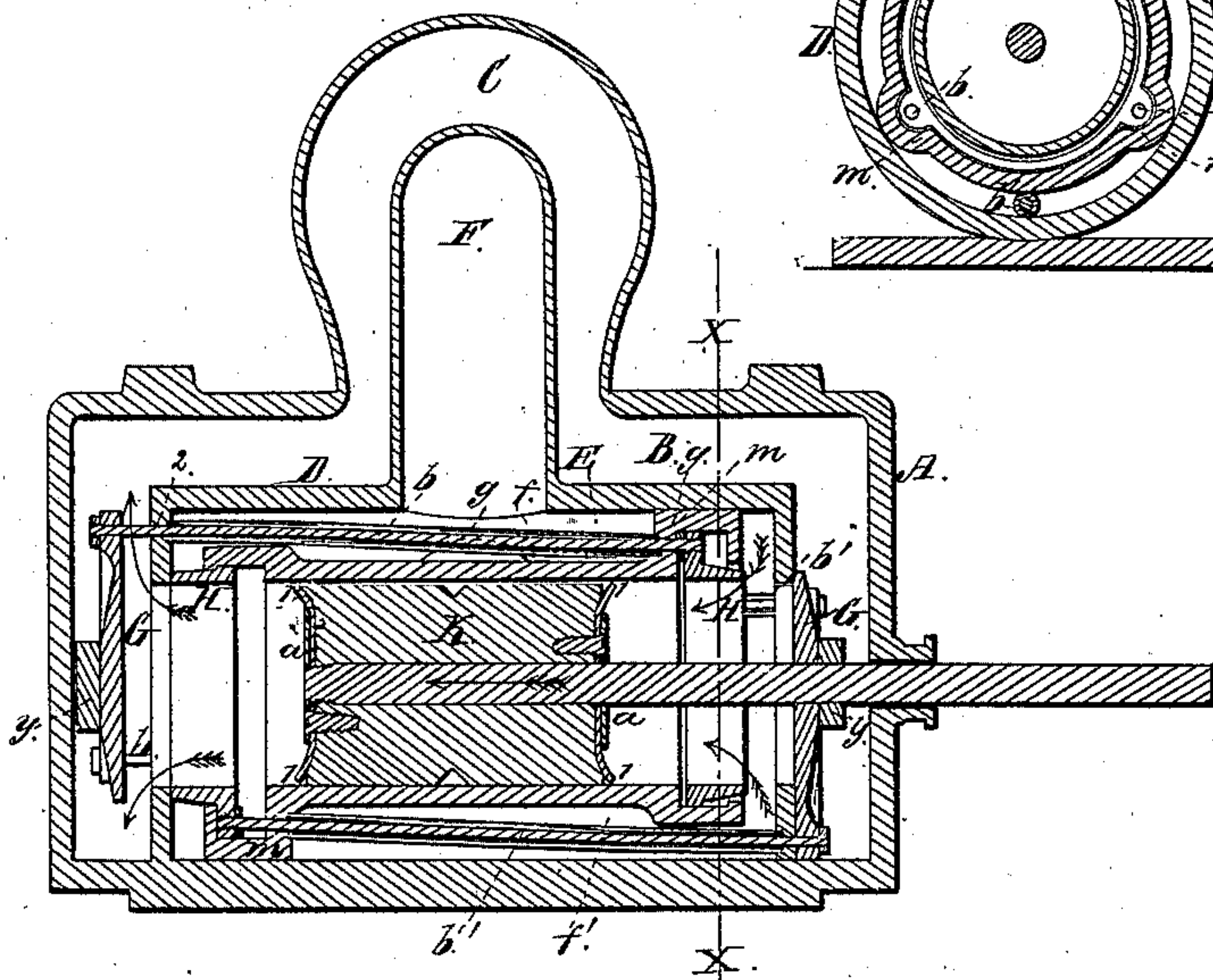
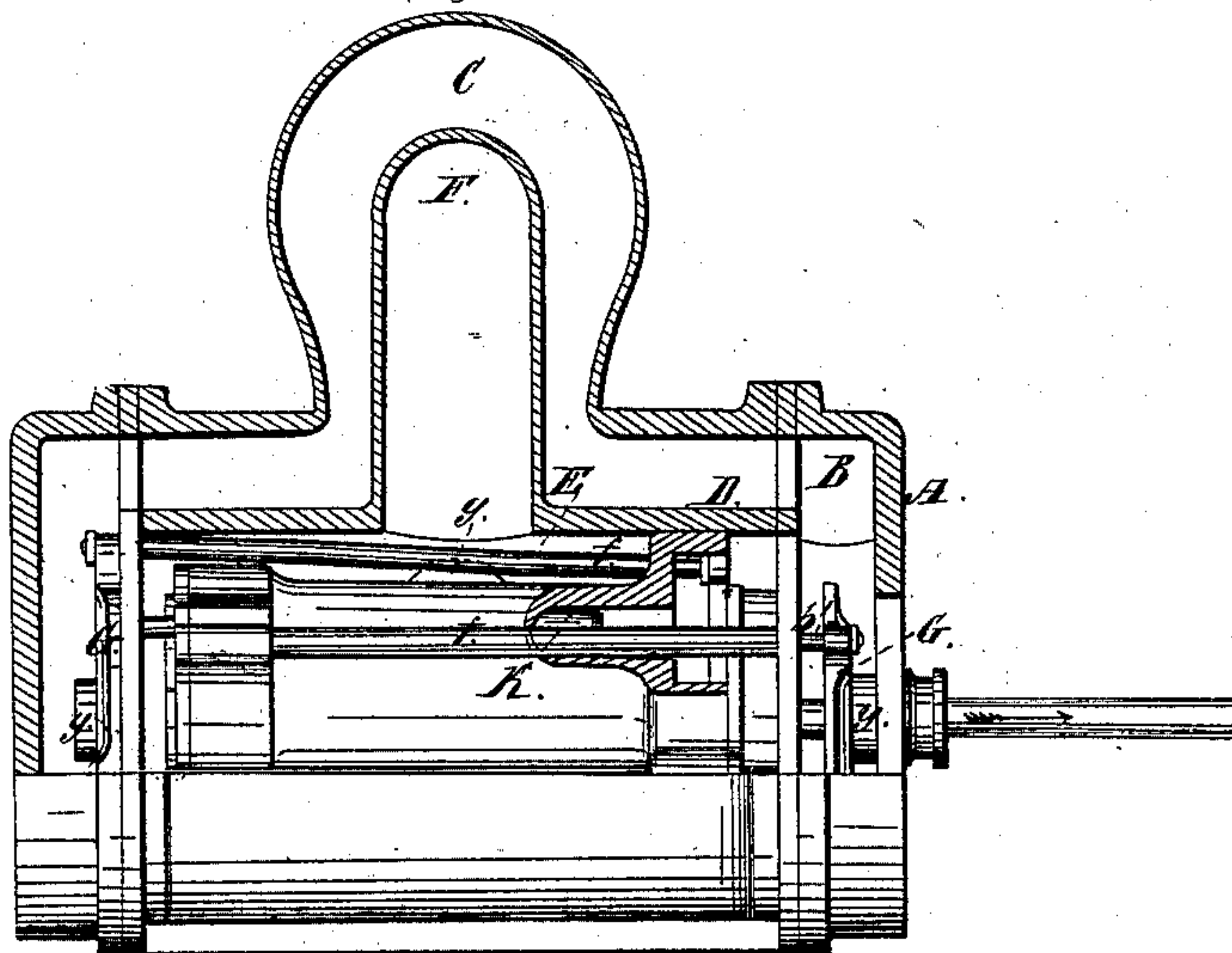


Fig. 1.



Witnesses:

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UNITED STATES PATENT OFFICE.

HARVEY LOCKE, OF SOUTH BOSTON, MASSACHUSETTS.

PUMP.

Specification of Letters Patent No. 32,196, dated April 30, 1861.

To all whom it may concern:

Be it known that I, HARVEY LOCKE, of South Boston, in the county of Suffolk and State of Massachusetts, have invented a certain Improvement in Pump-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is an elevation, certain portions being cut away to show the parts within; Fig. 2, a longitudinal central section; Fig. 3, a section on the line X X of Fig. 2.

My invention is particularly applicable to the pumps of steam fire engines, and my improvements have for their object to give a great opening to both the induction and eduction valves with a very small amount of motion, and at the same time to entirely empty the cylinder each stroke of the piston. To accomplish these ends I make the induction valve annular and cause it to surround the end of the cylinder so that by a very slight motion of the valve an opening is effected all around the cylinder, and for the same purpose I construct the cylinder of my pump open at each end and close these ends by disk valves, by a slight motion of which the whole end of the cylinder may be opened.

My invention also consists in certain details which will be fully described hereafter.

In the accompanying drawings, A is the exterior shell which incloses the eduction chamber B, the latter being surmounted by an air chamber C.

An interior shell D incloses the induction chamber E which is surmounted by a vacuum chamber F and is provided with an induction passage *g*—there is a suitable eduction passage from the chamber B not shown in the drawings.

G G' are the eduction valves which close the entire end of the cylinder and when moved but a short distance as at G Fig. 2 open a free passage for the exit of the water.

The induction valves are seen at H H' Fig. 2, H being closed and H' open. The piston K has a ring or disk of india-rubber or leather secured to each of its ends by plates *a* the ends of the piston being made concave or dished for the purpose of causing the edges of the rubber disk to project out beyond its center as seen in Fig. 2 for a purpose which will be presently described.

The eduction valve G is connected by

three or more rods *b* with the induction valve H' and the eduction valve G' is in a similar manner connected with the induction valve H by rods *b'*, the valves H and H' are thus moved by the valves G G'. The rods *b b'* pass through tubes *f f'* which form tight joints with the shell D and with the projections *m* from the cylinder through which the rods *b b'* pass.

When the piston is moving in the direction of its arrow there will be no tendency to leak through the tubes *f'* as there will be a corresponding pressure at both ends of them. At the same time however there will be a tendency to leak through the tubes *f* from the eduction chamber at 2 to the induction chamber at 3 and this is counteracted by the disk of india-rubber or other suitable packing *s*, which closes the end of the tubes as seen at the right hand end of Fig. 2.

The valves G G' are provided with india rubber or other suitable buffers *y*, which serve to prevent jar and noise which otherwise might result from the motion of these valves.

Operation: In Fig. 2 the piston is moving in the direction of its arrow. As the piston started from the right hand end of the cylinder the vacuum formed between it and the valve G' closed this valve, the adhesion of the edges 1 of the india rubber disk packing the joint between the piston and the disk and insuring the closing of the valve. So soon as the valve G' and with it the valve H is closed, the valve G will be opened by the pressure of the water within the cylinder and with it the valve H'. Both ends of the cylinder are thus entirely open for the passage of the water the ends of the tubes *f* as before described being closed by the packing. The piston proceeds in the direction of its arrow until it presses up against the valve G' by which the cylinder is entirely emptied; whereby it is caused to act surely and empty itself of air when working as a suction pump. On the piston starting back in the opposite direction the vacuum formed between it and the valve G causes this valve to follow it and thus the valves G and H' are closed and immediately afterward the valves G and H are opened, the water then continues to flow in at the valve H and out at the valve G' until the piston again moves in the other direction. In the pump described above the annular cylindrical valve is used for the inlet and

the disk valve for the outlet, but it is obvious that the pump may be so arranged as to cause these valves to change places with each other, the annular valve being used for the outlet and the disk valve for the inlet.

The annular valve also instead of being made cylindrical may be flat, with an opening in its center, and be applied to the end of the cylinder instead of to an opening around the side of it.

The valves G G' H H' are supported entirely upon their rods *b b'* and without other bearings against the cylinder or piston.

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

1. The annular valve H so constructed as to disclose when opened a water way around

the whole circumference of the cylinder as described.

2. The disk valve G covering the whole end of the cylinder as described for the purpose set forth.

3. And in combination with the valve G the disk of india rubber or leather confined to the piston as set forth and operating as described.

4. So connecting the inlet and outlet valves together that the motion of one of them shall control the motion of the other as set forth.

HARVEY LOCKE.

Witnesses:

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