

(No Model.)

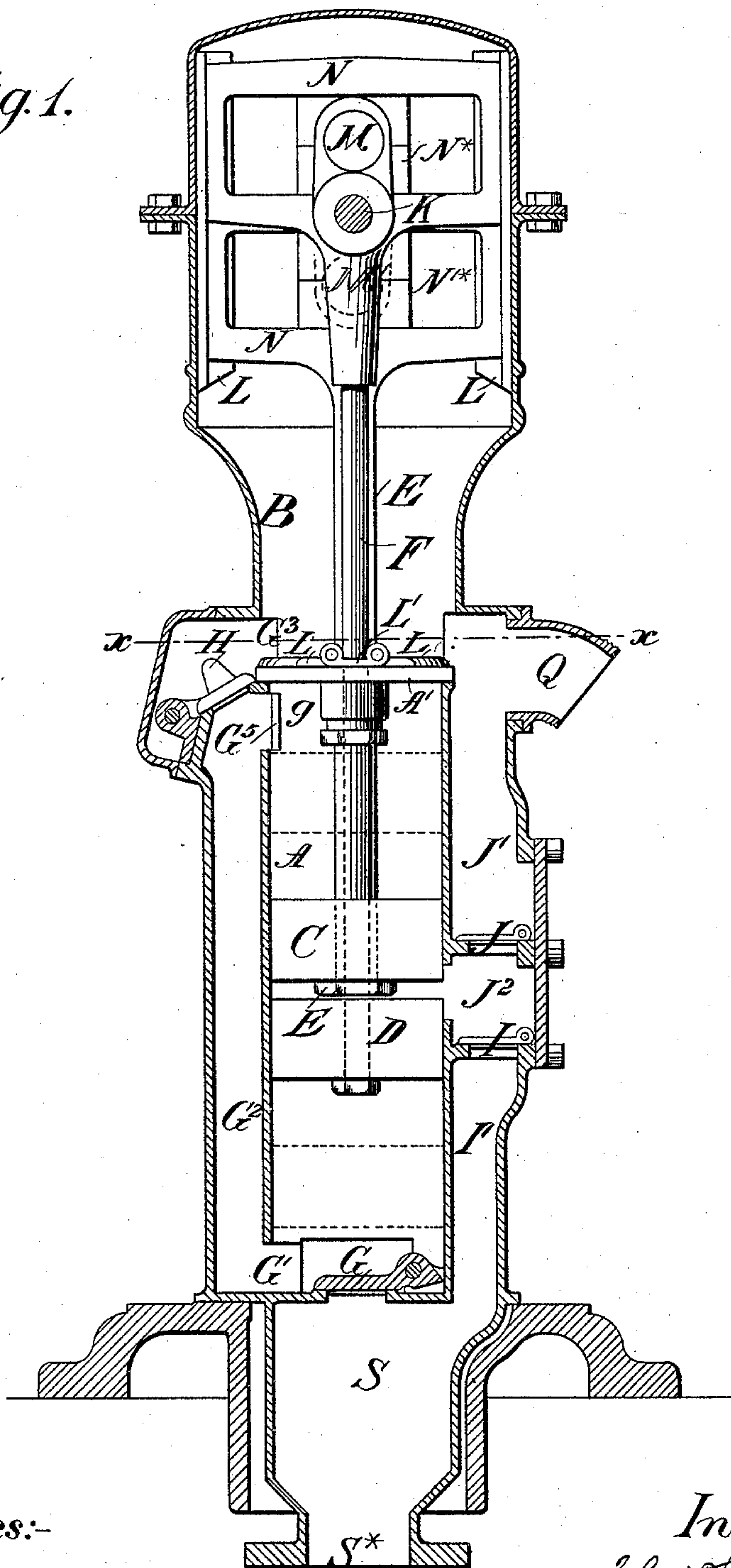
2 Sheets—Sheet 1.

J. SUTTON.
PUMP.

No. 431,220.

Patented July 1, 1890.

Fig. 1.



Witnesses:-
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Olundgren

Inventor:-
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Fig. 3.

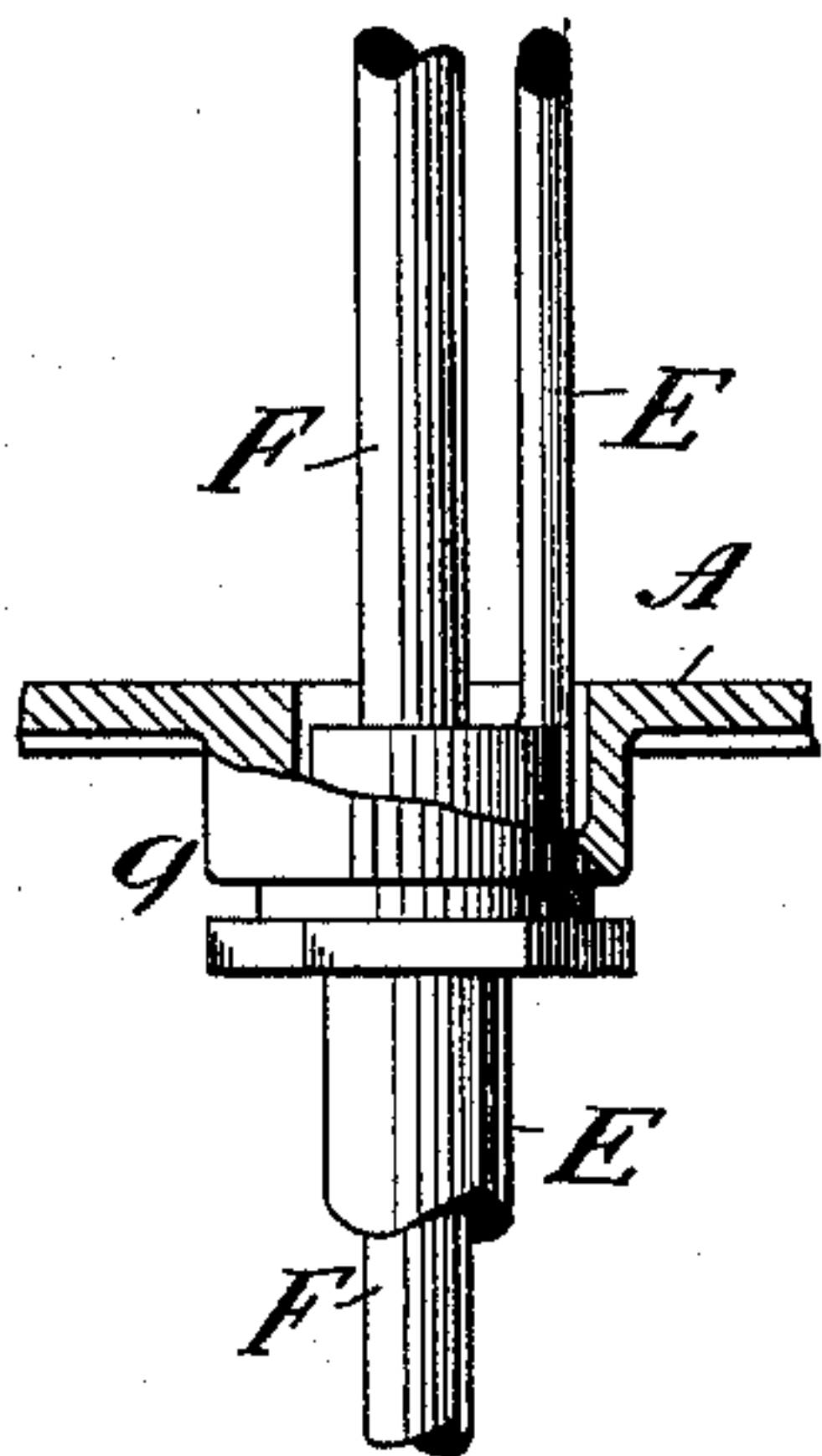


Fig. 5.

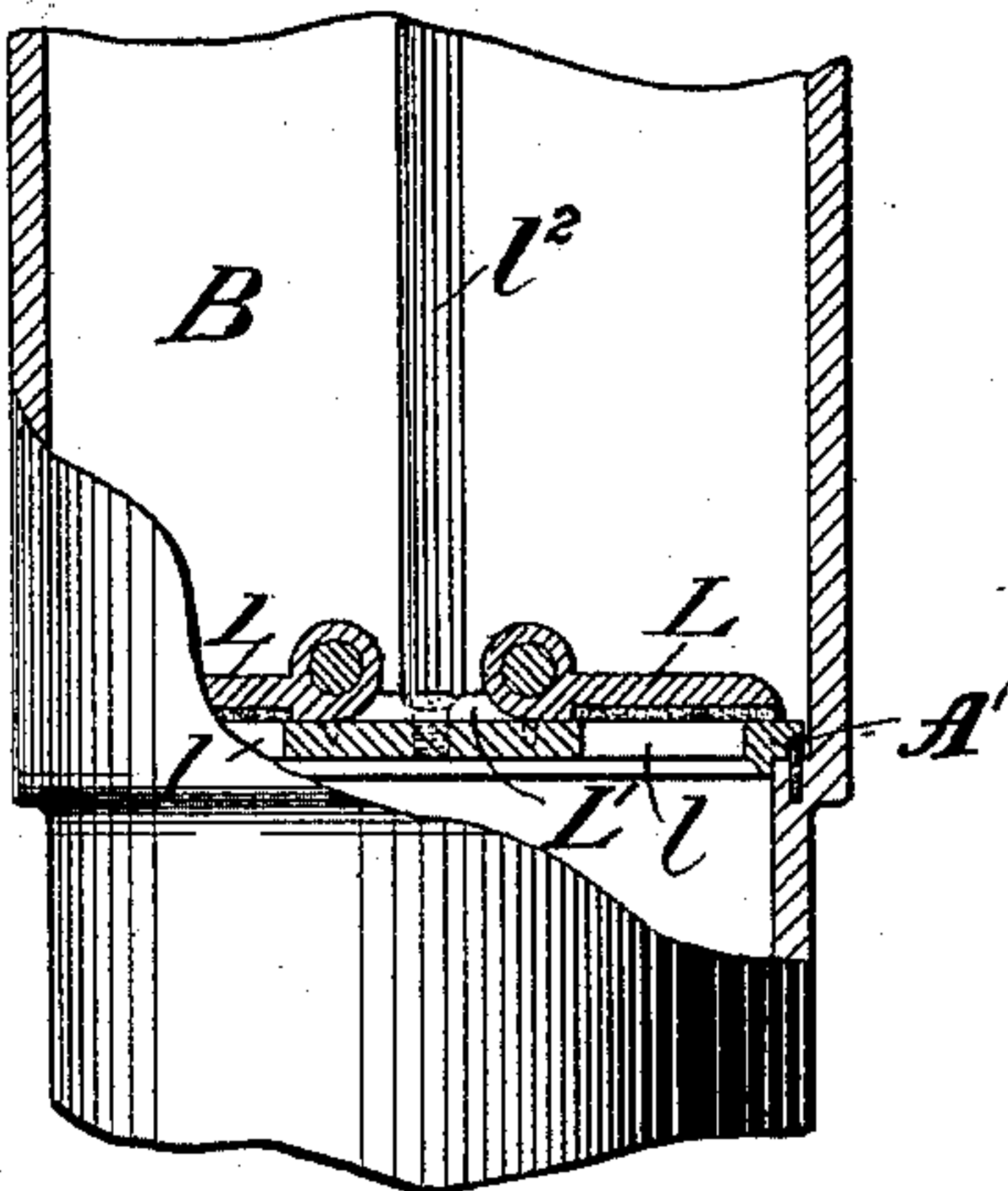


Fig. 4.

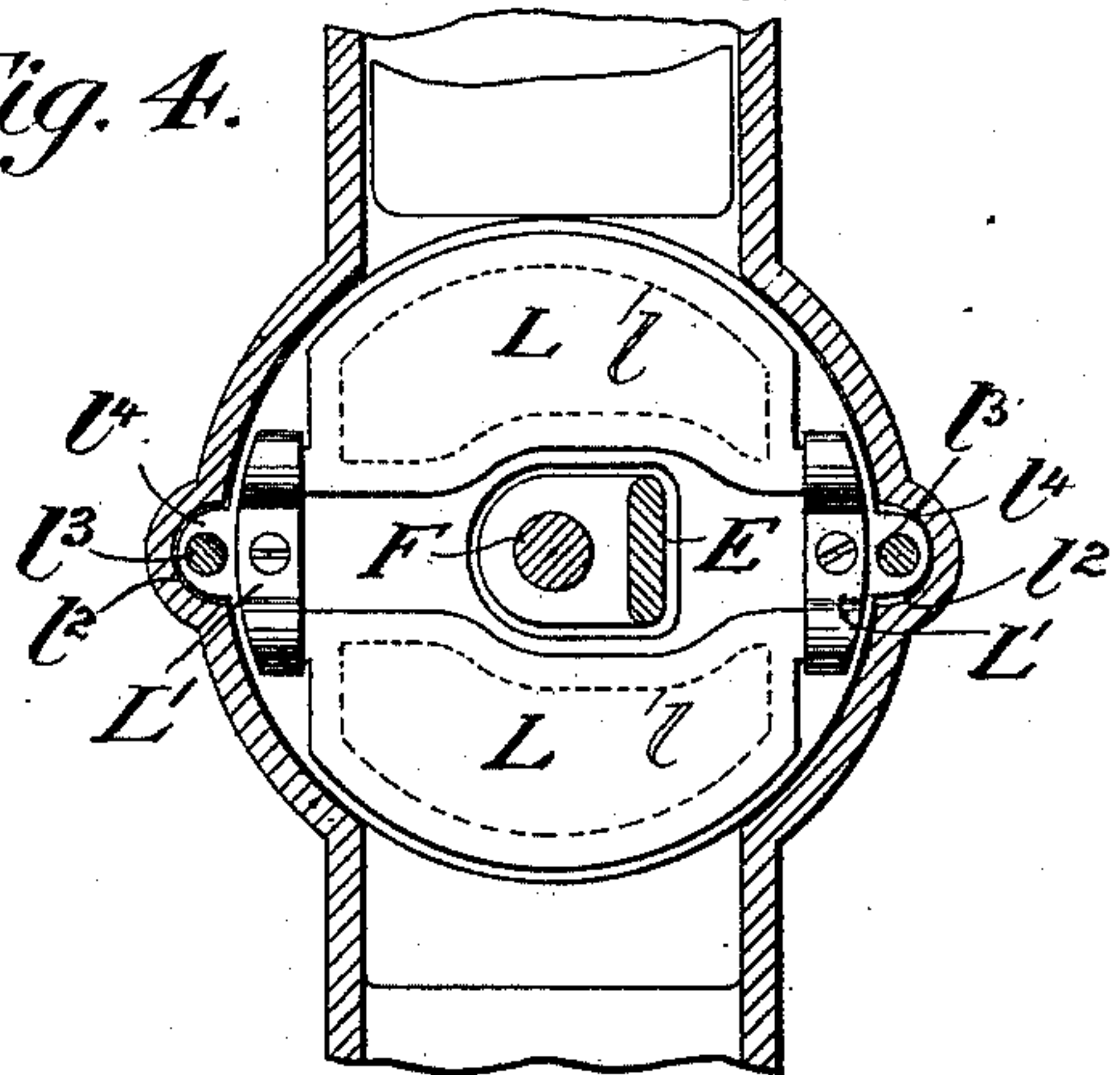
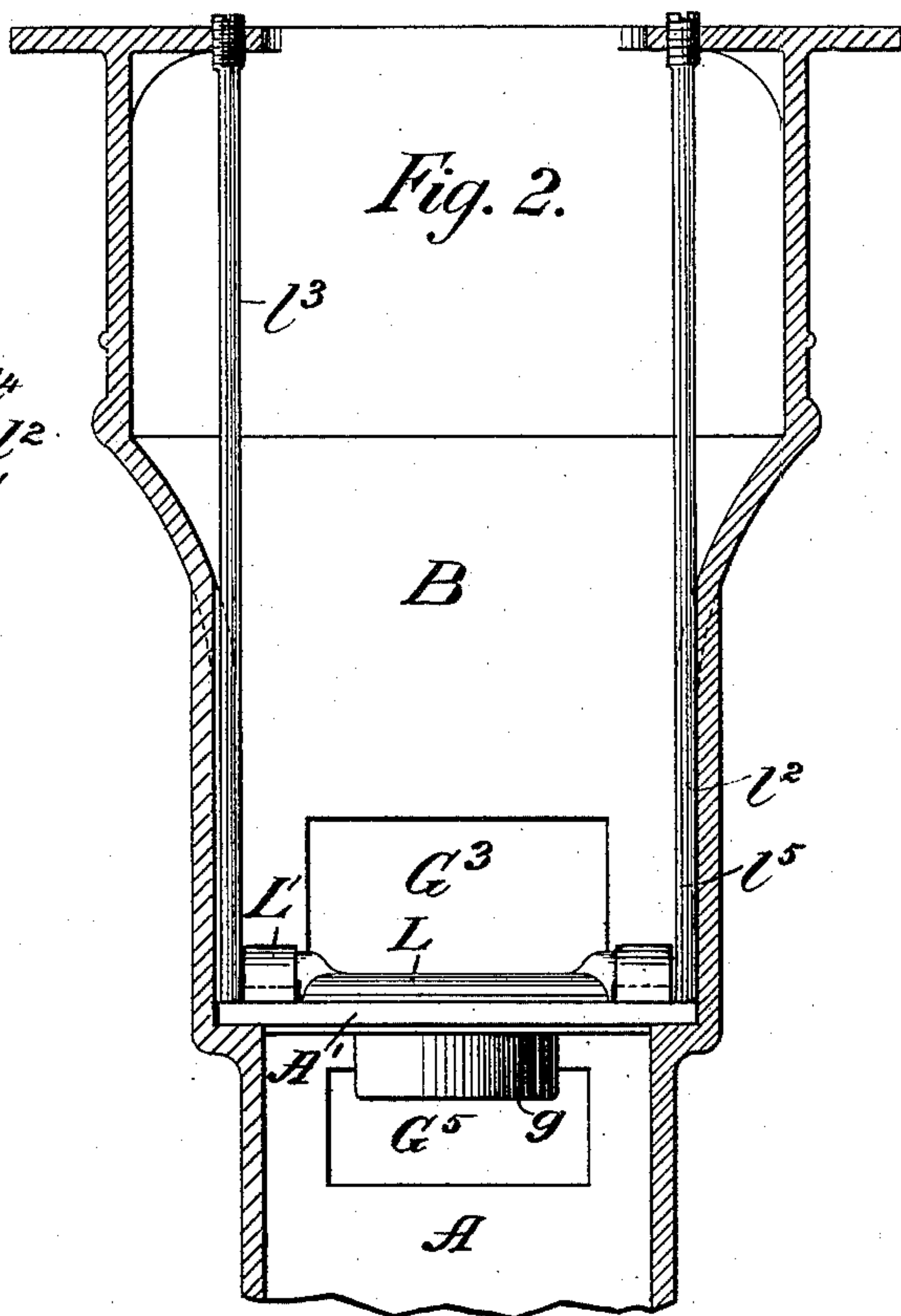


Fig. 2.



Witnesses:-

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UNITED STATES PATENT OFFICE.

JOHN SUTTON, OF ISLIP, NEW YORK.

PUMP.

SPECIFICATION forming part of Letters Patent No. 431,220, dated July 1, 1890.

Application filed June 29, 1889. Serial No. 316,040. (No model.)

To all whom it may concern:

Be it known that I, JOHN SUTTON, of Islip, in the county of Suffolk and State of New York, have invented a new and useful Improvement in Pumps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to that class of pumps in which two pistons work in unison toward and from each other within a working cylinder common to both, each piston having its own piston-rod, and one of the two piston-rods working through the other, and the two being worked by cranks arranged directly opposite each other on a rotary shaft.

In such pumps as heretofore constructed the space in the upper part of the working-cylinder above the upper piston, when it is in any position or at the top or bottom of its stroke, is always open to the air-chamber or to the atmosphere. This space fills and empties itself during every stroke of the piston back and forth, but without any pumping effect, the upper side of the piston merely lifting, lowering, and churning the water that has been pumped and forced by the pistons jointly from beneath up to and into the air-chamber from the bottom side of the top piston and from the top and bottom sides of the bottom piston through the delivery valves and passages.

The object of this improvement is to render the space within the cylinder above the upper piston fully available for pumping.

I will now proceed to describe my invention with reference to the drawings and afterward point out its novelty in the claim.

Figure 1 is a centrally-vertical section of a pump embodying my improvement. Fig. 2 represents a vertical section at right angles to Fig. 1 of the upper part of the working-cylinder and of the air-chamber. Fig. 3 is a detail view also at right angles to Fig. 1, showing portions of the piston-rods and their connections. Fig. 4 is a horizontal section taken on the line $x x$, Fig. 1. Fig. 5 is an enlarged view, partly broken away and partly in section, showing the valves at the upper end of the working-cylinder; the section being taken on the same line as Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A designates the working-cylinder of the pump; B, the air-chamber; C D, the pistons fitted to the cylinder A; E, the piston-rod of the upper piston, and F the piston-rod of the lower piston. The lower part of the piston-rod E is hollow to permit the passage through it of the rod F, and a stuffing box E' is provided in the piston C, that the rod E may work water-tight through it. The upper part of the piston-rod E, above where it is hollow, is offset, as shown in Figs. 3 and 4, to one side of the piston-rod F. These pistons are solid or valveless.

K designates a crank-shaft passing through water-tight bearings, (not shown,) provided in the sides of the air-chamber and furnished with two cranks M M', set in exactly opposite directions from the shaft, one crank-pin M being fitted to a journal-box N^x, fitted to slide horizontally in a yoke N, which is connected with the rod F of the lower piston. The crank-pin M' is fitted to a journal-box N'^x, which is fitted to slide horizontally in a yoke N' on the upper end of the piston-rod E. Upright guides L are provided in the air-chamber B for the yokes N N'. At the bottom of the cylinder A is the seat for a foot-valve G, and below the said seat is the chamber S, with which the suction-pipe is to be connected at S^x. Above the seat of the valve G, in one side of the cylinder A, there is a lateral opening G', communicating with an external passage G², extending all the way up one side of the cylinder and having at its upper end an opening at G³ to the air-chamber above the top of the working-cylinder A.

On the opposite side of the cylinder and the passage G² are upright passages I' J', between which is a valve-box J². The bottom of the passage I' communicates with the suction-chamber S, and at its upper end there is a seat for an upwardly-opening valve I, through which it communicates with the bottom of the valve-box J². At the top of the valve-box J² there is an upwardly-opening valve J, through which communication is made between the said box and the upper passage J'. The upper passage J' is open to the lower part of the air-chamber and has an outward opening Q, which constitutes the discharge-outlet of the pump. The valve-box J² is open at a to the cylinder A about mid-

way of the height thereof, so that the space between the pistons is always in communication with the valve-box through the said opening.

5 The pump as I have thus far described it is in common use. I will now describe the parts which constitute my improvement. At the top of the cylinder A there is firmly secured a cap-plate or cover A'. Upon the lower
10 side of the plate A' is a stuffing-box g, through which the hollow piston-rod e works. I provide the plate A' upon its upper side with a valve or valves (I have shown two such valves) L. The valves, as shown, are ordinary
15 flap or butterfly valves; but other kinds of valves may be used. These valves are adapted to close apertures l in the plate A', which afford communication between the cylinder and the air-chamber. As shown they are
20 hinged upon a plate L', which plate is secured by screws or otherwise to the plate A'.

The means for securing the plate A' to its seat upon the cylinder may be of any suitable kind; but I have shown a convenient means,
25 consisting in providing the inner wall of the air-chamber B with vertically-extending recesses l², of which there may be two or more, as desired. These recesses serve for the housings of certain holding-down screw-bolts l³.

30 I prefer that the periphery of the plate A' shall be provided with lugs or projections l⁴, which extend into the recesses l². The holding-down screw-bolts when in position will then bear upon the lugs or projections l⁴. These
35 lugs or projections also serve to prevent lateral movement of the plate A'. The upper ends of these holding-down screw-bolts may be of larger diameter than the body of the bolt itself, and may be tapped into lugs extending from the air-chamber shell, and into
40 which they may be screwed until they come to a firm bearing upon the plate A'. When thus secured in place, they will operate to firmly maintain the plate A' upon its seat
45 upon the upper end of the cylinder.

Although I have shown but one passage G² for the up-flow of liquid, I may use two or more such passages, as desired. The piston C in its downstroke draws liquid upwardly
50 through an opening G⁵, near the upper end

of the cylinder, into the space at the upper part of the cylinder, the valve G being open. During the upstroke of said piston the valve G is closed and the liquid in the upper part of the cylinder is forced outwardly past the
55 valves L into the air-chamber, and thence outwardly through the passage Q. Of course when the piston C is making its downstroke the valves L are closed. The upper piston C, during its downstroke, forces outwardly past
60 the valve J the liquid which during its upward stroke it has drawn into the space between it and the piston D. The piston D, during its downstroke, forces outwardly the liquid which it has drawn into the lower part
65 of the cylinder through the passage G² and past the valve H into the air-chamber B. During this stroke, also, it has drawn liquid through the passage I', past the valve I, and into the space between it and the piston C.
70 During its upstroke the piston C forces said liquid out past the valve J and into the passage J'. All the liquid passes out through the outlet Q.

It will be seen that by my improvement the
75 upper piston C is double-acting as well as the lower piston, and that liquid is forced by the upper piston out of the cylinder into the air-chamber through an outlet different from the inlet through which the liquid is introduced,
80 and also different from the outlet through which the liquid is forced by the lower piston into the air-chamber.

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

In a pump, the combination, with a cylinder, of a plate upon the upper end of said cylinder, an air-chamber the walls of which are provided with vertically-extending recesses,
90 lugs upon said plate extending into said recesses, holding-down screw-bolts arranged within said recesses and bearing upon said lugs at their lower ends, the upper ends of said screw-bolts being secured in a portion of the shell of the pump, substantially as
95 specified.

JOHN SUTTON.

Witnesses:

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