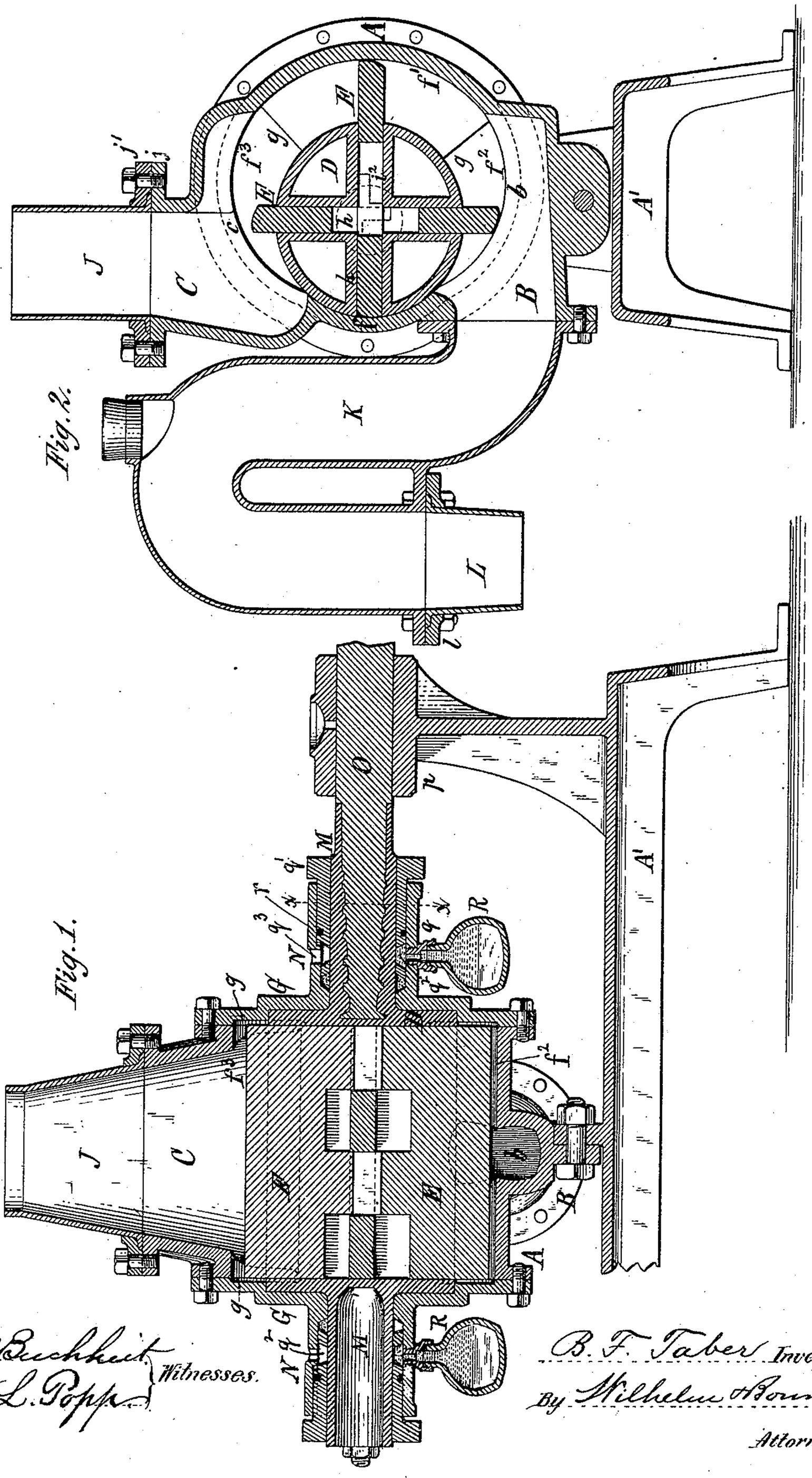
(No Model.) 2 Sheets—Sheet 1.

B. F. TABER.

ROTARY PUMP.

No. 333,356. Patented Dec. 29, 1885.



Witnesses.
Chas. J. Buchheit
Theo. L. Popp.

B. F. Taber Inventor.
By Wilhelm & Bonner
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

B. F. TABER.

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Fig. 3.

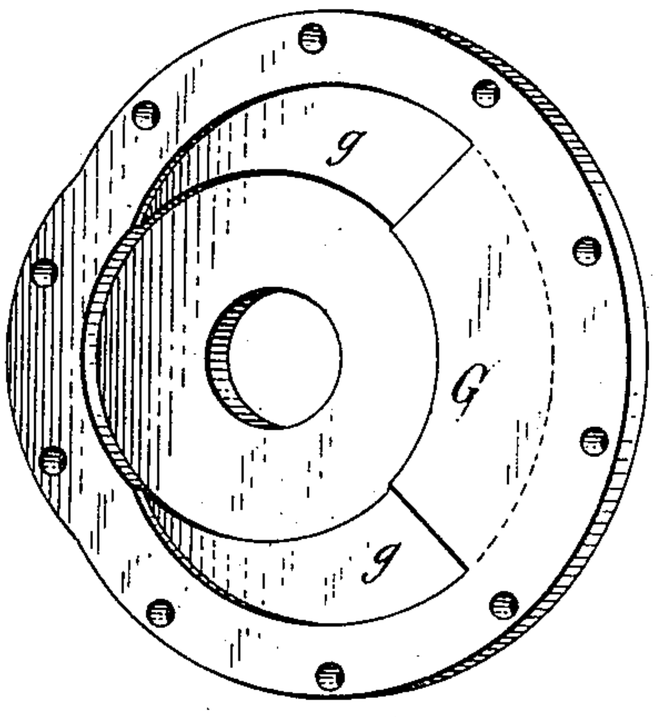


Fig. 4.

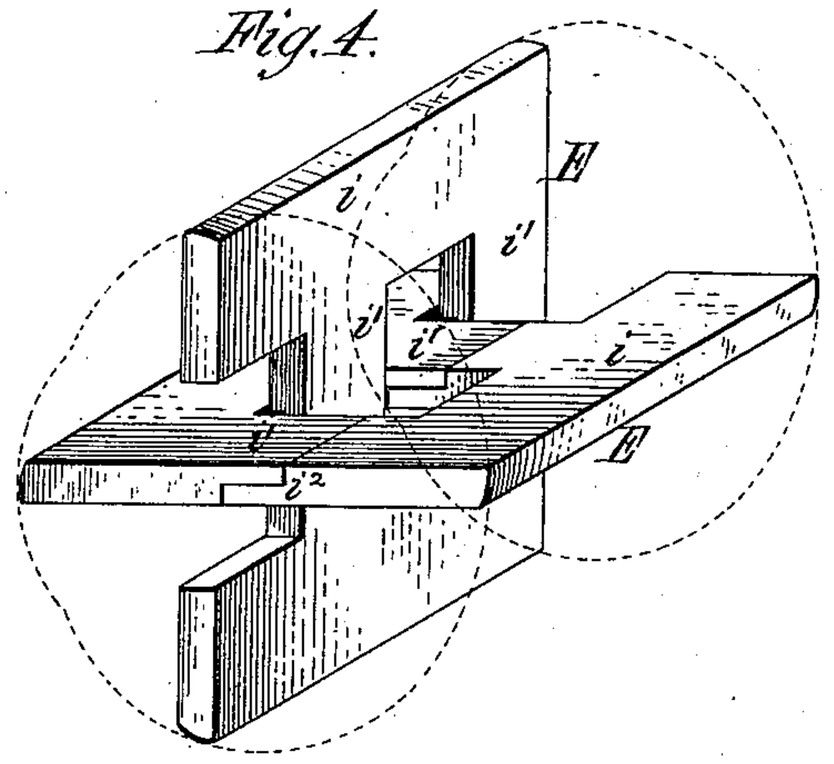


Fig. 5.

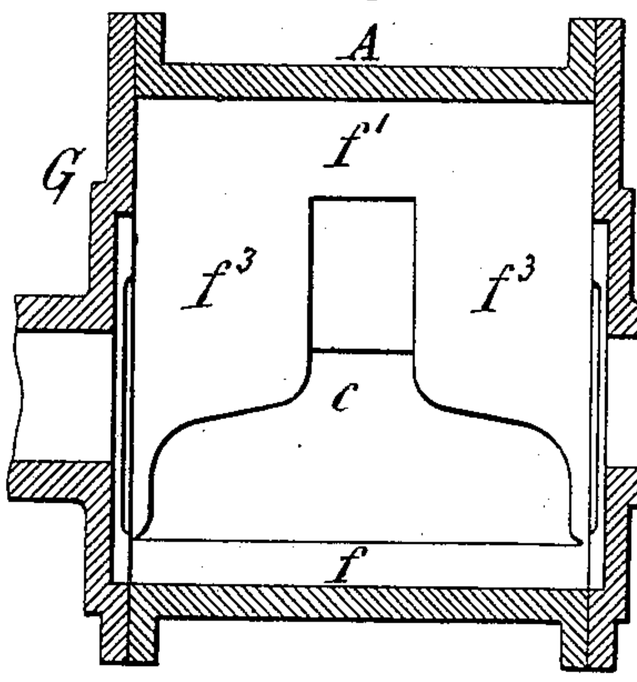


Fig. 6.

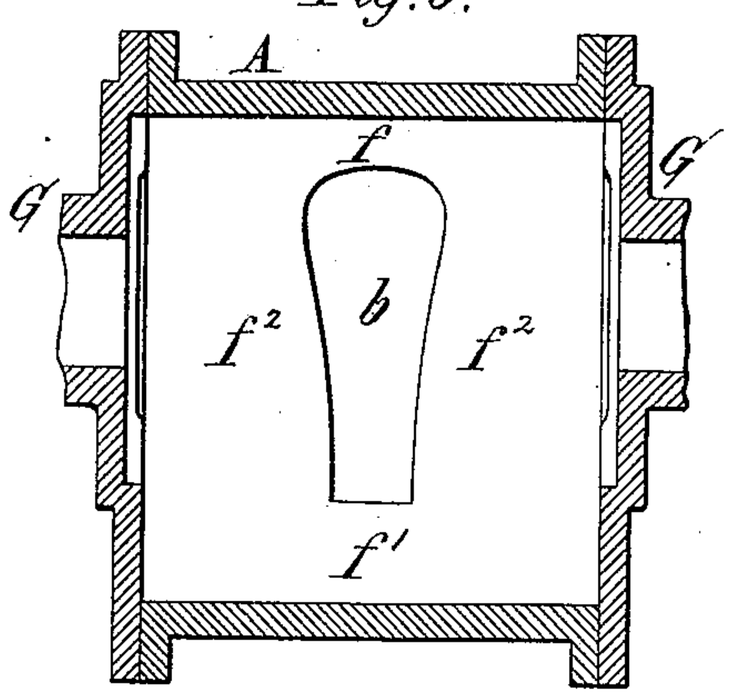


Fig. 7.

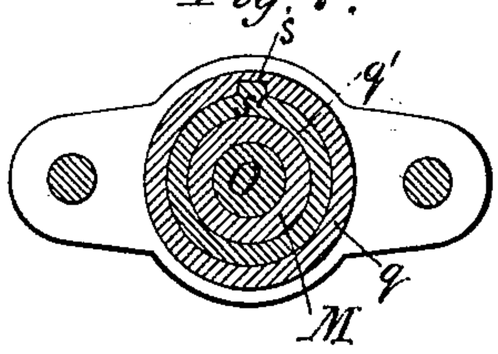


Fig. 9.

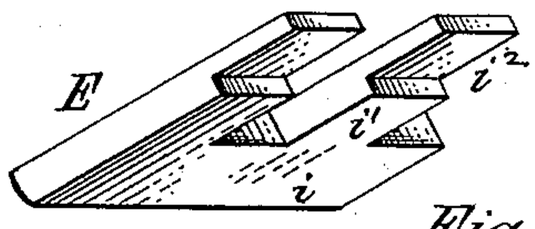


Fig. 8.

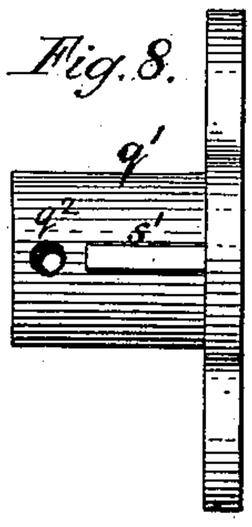
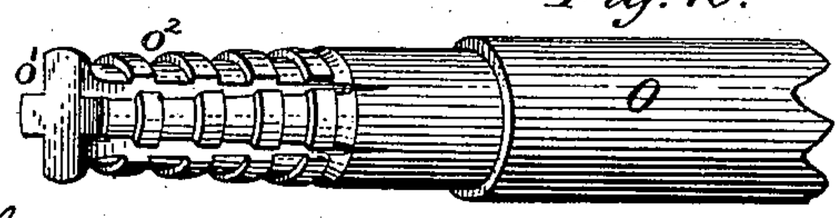


Fig. 10.



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B. F. Taber Inventor.
By Wilhelm & Bonner
Attorneys.

UNITED STATES PATENT OFFICE.

BENJAMIN F. TABER, OF BUFFALO, NEW YORK.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 333,356, dated December 29, 1885.

Application filed March 17, 1885. Serial No. 159,227. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. TABER, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to certain improvements in that class of rotary pumps which are provided with a revolving piston-cylinder arranged eccentrically in the shell or casing, and provided with sliding pistons, whereby the liquid is set in motion.

The object of this invention is to improve the construction of the pump in various respects; and my invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a longitudinal vertical section of my improved pump. Fig. 2 is a cross-section of the same. Fig. 3 is a perspective view of one of the end heads. Fig. 4 is a perspective view of the pistons. Fig. 5 is a horizontal section of the casing, looking upward. Fig. 6 is a horizontal section of the casing, looking downward. Fig. 7 is a cross-section in line *x x*, Fig. 1. Fig. 8 is a top plan view of the gland of the stuffing-box. Fig. 9 is a perspective view of a part of one of the pistons. Fig. 10 is a perspective view of the inner end of the driving-shaft.

Like letters of reference refer to like parts in the several figures.

A represents the shell or casing of the pump, supported on a suitable base-frame, A′.

b represents the suction-opening; B, the nozzle connected therewith; *c*, the discharge-opening, and C the discharge-nozzle.

D represents the piston-cylinder, and E the pistons sliding in ways formed therein. The piston-cylinder D runs with its periphery in close contact with the portion *f* of the peripheral wall of the casing A, which portion is arranged between the inlet and outlet openings thereof, and made of sufficient length to form a reliable abutment. The portion *f* is curved to the same radius as the cylinder D, but preferably made of less length than a quadrant of a circle.

f′ is the working portion of the peripheral wall of the casing, arranged diametrically opposite the abutment *f* and curved concentric with the cylinder D, but having a larger radius, so as to leave a space between the cylinder and the casing, through which the pistons move.

f^2 f^3 represent the portions of the peripherical wall of the casing, in which the suction and discharge openings *b c* are respectively formed, and which are arranged below and above the cylinder D and connect the concentric portions *f f′*. The portions f^2 f^3 are curved eccentric with the cylinder D, and are made of deeper concavity, so that a straight line drawn from any point of either of the portions *f f′* through the center of the cylinder D to the opposite side of the casing is longer than a similar line connecting the portions f^2 f^3. This excess of concavity increases from both ends of each portion *f f′* to the center thereof, and provides ample play for the pistons in the shell when in a vertical position or nearly so. The working portion *f′* is made somewhat longer than a quadrant, so that one of the pistons has come in contact with the lower portion of the portion *f′* before the next preceding piston has left the upper end thereof. This prevents the weight of the column of liquid in the discharge-pipe from falling on the lower piston until the latter is fairly seated against the portion *f′*, in connection with which the pistons perform their work; and it also causes the lower piston to be ready to support the column of liquid when the next preceding piston leaves the upper end of the portion *f′*, thereby relieving the last-named piston from the weight of the liquid as soon as the piston clears the portion *f′*, and permitting such piston to move freely in the ways of the cylinder D. The suction-opening *b* is made elongated—widest near the abutment *f* and contracted gradually toward the opposite end in the direction in which the piston moves over the same—in order to permit of a free flow of the liquid from the suction-nozzle B into the suction-space and a gradual closing of the communication. The discharge-opening *c* is also elongated, and narrowest near the end of the concentric portion *f′* and widest near the abutment *f*. The contracted portion of the discharge-opening *c* relieves the piston as soon as it leaves the upper end of the portion *f′* of

the case, and brings the pressure of the liquid in the discharge-pipe to bear upon the end of the piston, thereby reducing the friction of the piston in its ways and imparting to the piston a tendency to move downwardly in its ways. The curved portion f^2 of the casing on both sides of the inlet-opening *b* forms guide or bearing surfaces, against which the lower ends of the pistons rest in passing from the abutment *f* to the working portion *f'*. As the pistons approach a vertical position they descend in their ways by the combined action of gravity and the liquid pressure against their upper ends until they strike the portion f^2. This movement is facilitated by segmental recesses *g g*, formed in the upper and lower portions of the end plates or heads, G G, of the casing, which recesses leave the pistons free at their ends and prevent binding or end friction. The ways *h* in the cylinder D intersect each other at right angles. Each piston E is composed of two plates, *i*, adapted to bear with their outer edges against the case A, and provided on their inner sides with arms *i'*, which overlap each other, as shown at i^2. The arms *i'* of one piston pass through spaces formed between the plates *i* of the other piston, as represented in Fig. 4, so that each piston can move freely in its ways.

The overlapping portions i^2 of the arms *i'* are so arranged that the pressure of the liquid on the plate *i* will hold the overlapping faces in contact with each other, and as one arm, *i'*, on each piston is arranged at its end and the other arm away from the opposite end of the piston, as represented in Fig. 4, it is necessary to make the pistons right and left. The overlapping ends i^2 of the arms *i'* permit both parts of the same piston to move on each other in adjusting themselves to the inner surfaces of the casing without opening the joint, and the peculiar arrangement of the overlapping ends permits the pistons to move freely in their ways without catching against the corners at the intersection of the ways.

J represents a flanged tapering thimble or nozzle secured to the flanged end *j* of the discharge-nozzle C by a ring, *j'*, and adapted to be inserted into a hollow log or wooden conduit-pipe.

K represents a siphon or bent tube secured to the suction-nozzle B, and L represents a tapering thimble or nozzle secured to the flanged end of the siphon K by a ring, *l*. The thimble L is also adapted to enter a hollow log.

M M represent the journals, formed at both ends of the cylinder D and passing through stuffing-boxes N N.

O is the driving-shaft, supported in a bearing, *p*, which is secured to the base A'. The inner end of the shaft O enters the journal M, and is provided with longitudinal grooves *o'* and circumferential grooves o^2.

The shaft O is made of wrought-iron or similar metal, and the cylinder D, with its journals M M, is made of brass and cast with one of its journals M on the shaft O, the metal of the journal entering the grooves of the shaft, whereby both parts are intimately and securely connected. In this manner the cylinder and journals are constructed of brass, which is best adapted to resist corrosion, and the shaft of wrought metal possessing the required strength and desirable wearing qualities in the bearings.

Each stuffing-box M M consists of a socket, *q*, cast on the end head of the casing A, and a gland, *q'*, seated in said socket. The inner portion of each gland is provided with several openings, q^2, arranged in line with an oil-aperture, q^3, formed in the portion of the socket *q*.

R is an oil-reservoir, of glass or other suitable material, secured to the under side of the socket *q* in line with the openings q^2. If any liquid leaks from the casing past the inner end of the gland, it drains off into the oil-reservoir R and displaces the oil in the same, which oil is forced up into the stuffing-box and lubricates the journal. When the supply of oil in the reservoir is exhausted, the reservoir is removed, emptied of its contents, and refilled with oil. When no leakage takes place, the parts are lubricated through the oil-aperture q^3.

r is a packing-ring, of rubber or other suitable material, secured in the gland outside of the openings q^2, to prevent any liquid from passing through the outer end of the socket.

This method of lubricating the journal is applicable to all machines in which a liquid heavier than oil leaks along the journal. The socket *q* is made cylindrical and provided in its upper side with a longitudinal recess or groove, *s*, in which enters a feather, *s'*, formed on the gland, whereby the latter is prevented from turning in the socket. This construction relieves the screws whereby the gland is fastened from side strains, and is especially desirable when the screws are supported at a considerable distance from the gland.

My improved pump is especially adapted for moving acids and liquids containing solid particles—for instance, tan-liquor.

I claim as my invention—

1. The combination, with the cylinder D, provided with sliding pistons E, of the shell B, having a concave abutment, *f*, and a concentric working-section, *f'*, connecting portions f^2 f^3, of deeper concavity than the working-section *f'*, suction and discharge openings *b c*, and end heads, G, provided with segmental recesses *g g* opposite the connecting portions f^2 f^3, whereby open spaces are formed opposite the ends of the pistons where the latter descend in the cylinder, substantially as set forth.

2. The combination, with the shell, of the cylinder D, provided with ways *h*, and the pistons E, sliding in said ways and composed of an outer plate, *i*, and arms *i'*, having overlapping inner ends, i^2, substantially as set forth.

3. In a pump, the combination, with a jour-

nal, of an oil-reservoir adapted to receive the liquid which leaks along the journal, thereby displacing the oil and lubricating the journal, substantially as set forth.

4. In a pump, the combination, with the cylinder D, provided with a journal, and the shell provided with the socket *q*, of the oil-reservoir R, secured to the under side of the socket *q*, and the gland *q'*, provided with openings q^2 and a packing-ring, *r*, substantially as set forth.

Witness my hand this 10th day of March, 1885.

BENJ. F. TABER.

Witnesses:
EDWARD WILHELM,
CARL F. GEYER.