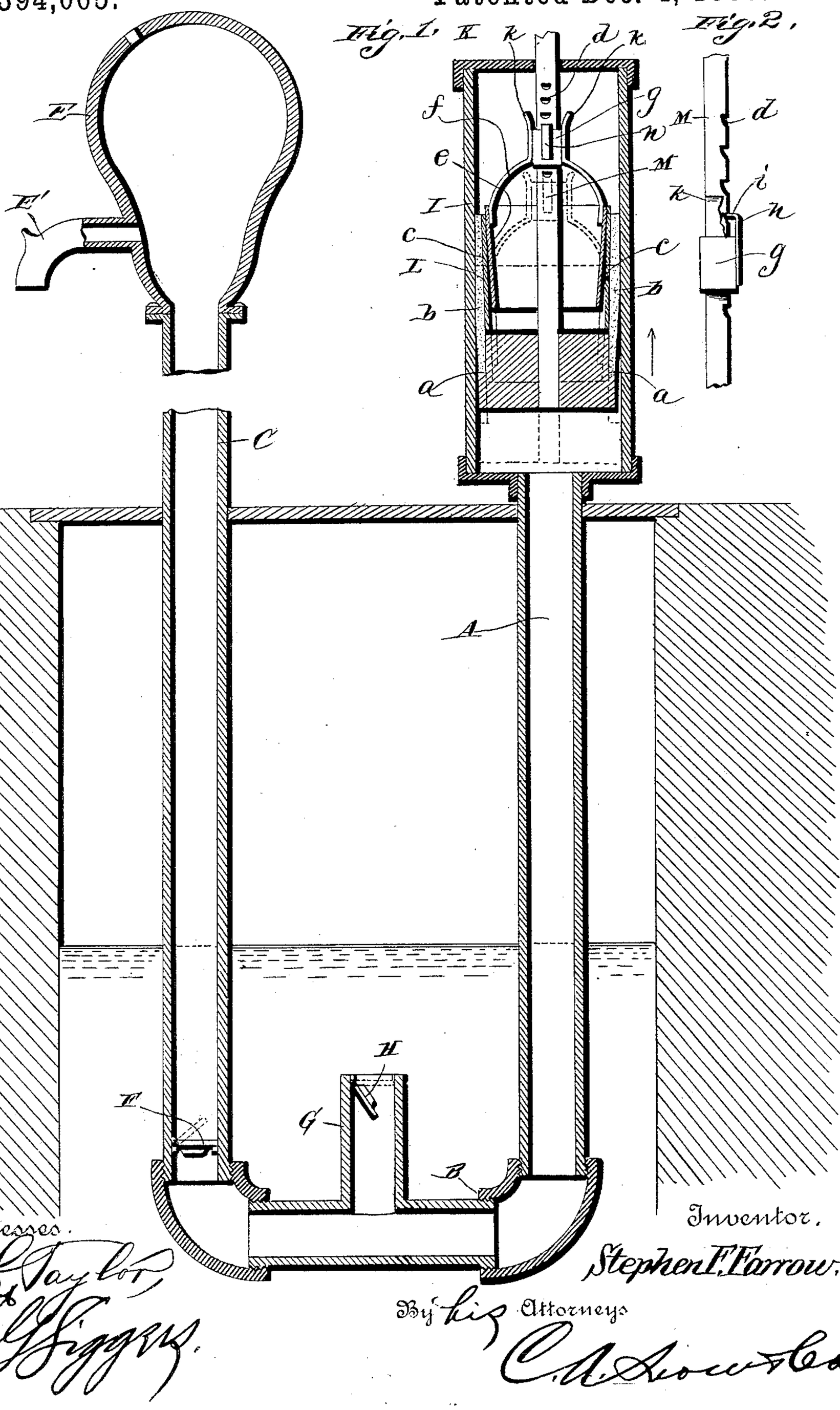
(No Model.)

S. F. FARROW.

FORCE PUMP.

No. 394,065. Patented Dec. 4, 1888.



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UNITED STATES PATENT OFFICE.

STEPHEN FRENCH FARROW, OF RAGO, KANSAS.

FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 394,065, dated December 4, 1888.

Application filed February 9, 1888. Serial No. 263,465. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN FRENCH FARROW, a citizen of the United States, residing at Rago, in the county of Kingman and State of Kansas, have invented a new and useful Improvement in Force-Pumps, of which the following is a specification.

My invention relates to an improvement in force-pumps; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claim.

In the accompanying drawings, Figure 1 is a vertical sectional view of a force-pump embodying my improvements. Fig. 2 is a detail of a portion of the plunger.

A represents a vertical pipe, which extends downward in a well or other source of water, and has its lower end curved at B. Connected to the said curved end of pipe A is a discharge-pipe, C, which extends vertically from the bottom of the well or other source of water to a suitable height above the mouth of the well or level of the earth, and is provided at its upper end with an air-chamber, E, and a discharge-spout, E′. In the lower end of the pipe C is seated an upwardly-opening valve, F.

G represents a short vertical pipe, which projects from the upper side of the curved portion B of the pipe A, and is provided in its open upper end with a downwardly-opening valve, H.

I represents a vertical cylinder, which is attached to the upper end of the pipe A, communicates therewith, and has its upper end closed by a removable head or plate, K.

L represents a plunger, which is fitted and adapted to reciprocate vertically in the cylinder. The upper side of this plunger has an annular groove, *a*, in which is fitted and secured the lower edge of a leather split packing-ring, *b*. On the inner side of said ring *b* is arranged a metallic split expansible ring, *c*.

M represents the plunger-rod, which passes through an opening in the head or plate K, has its upper end connected to a hand-lever, or to a suitable motor, (not shown,) and has its lower end rigidly attached to the plunger. This plunger is provided on one side with a series of ratchet teeth or notches, *d*.

In the upper portion of the expansible ring is fitted a tapered plug, *e*, having a yoke, *f*, on its upper side, which yoke has a central sleeve, *g*, that fits and is adapted to slide on the plunger-rod. A spring-detent, *h*, is secured to one side of the sleeve. The upper end of this detent projects beyond the upper end of the sleeve, and has a lip, *i*, that engages one of the ratchet teeth or notches *d*, so as to prevent the plug from slipping upward on the plunger-rod, and thereby keeping said plug in the expansible ring, and causing the latter to spread the leather packing-ring, and thereby fit the plunger snugly in the cylinder. The upper end of the sleeve has a pair of arms, *k*, that are adapted to come in contact with the lower side of head or plate K when the plunger is raised to the extreme upper end of the cylinder.

The operation of that portion of my invention is as follows: When the leather packing wears or shrinks, so as to no longer effect a tight packing between the plunger and the cylinder, the operator uncouples the upper end of the plunger-rod from the hand-lever or motor and draws upward on said plunger-rod, so as to bring the plunger to the extreme upper end of the cylinder, when the arms of the sleeve connected to the yoke to the plug come in contact with the head or plate K and force said plug downward in the expansible ring, and cause the latter to expand the leather packing and fit the plunger snugly in the cylinder again. The detent is moved downward with the sleeve and plug by the operation, and is caused to engage a lower notch or ratchet-tooth, so as to again secure the plug in position. By this means the packing of the plunger may be expanded from time to time without the necessity of removing the plunger from the cylinder, so as to keep the plunger at all times fitted snugly in the cylinder.

The operation of my improved pump is as follows: The inlet-pipe G is arranged on the bottom of the well or source of water and submerged. The pressure of the water on the valve H normally opens the latter, and water finds its way into the lower curved portion, B, of pipe A. When the plunger descends in the cylinder I, it forces air downward in the pipe A, and thereby forces the columns of wa-

ter in the part D of said pipe A upward through valve F into the pipe C, and while the plunger is descending and the pressure of the air is on the column of water in pipe B and pipe A the valve H is closed by the pressure of the water under it, as will be readily understood. On each upstroke of the plunger K a partial vacuum is formed in the pipe A, and the valve H immediately opens and water enters the lower portion, B, of pipe A, as before. After a few operations of the plunger the pipe C becomes entirely filled with water, and the same is discharged through the spout E. The chamber D on the upper end of pipe C incloses a quantity of water through the spout E when the pump is being operated.

It will be observed by reference to the drawings that the cylinder I and the plunger K form an air-pump, which is arranged entirely above the surface of the earth at the mouth of the well, and may therefore be readily inspected and repaired without the necessity of withdrawing the pump from the well. Another advantage gained by thus arranging the plunger at the upper end of the suction-pipe is, that the water does not come in contact with the plunger, and therefore the packing of the latter and the cylinder in which it operates are not liable to be cut and injured by sand and grit.

Having thus described my invention, I claim—

The combination, in a pump, of the cylinder having the head or plate K, the plunger in said cylinder having the expansible packing *c* extending from its upper side, the plunger-rod having the ratchet teeth or notches, the conical plug fitting in the packing, the sleeve attached to said plug and adapted to move on the plunger-rod, and the detent *m*, attached to said sleeve and engaging the teeth or notches of the plunger-rod, substantially as described.

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

STEPHEN FRENCH FARROW.

Witnesses:

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DAVID L. STRATTEN.