

(No Model.)

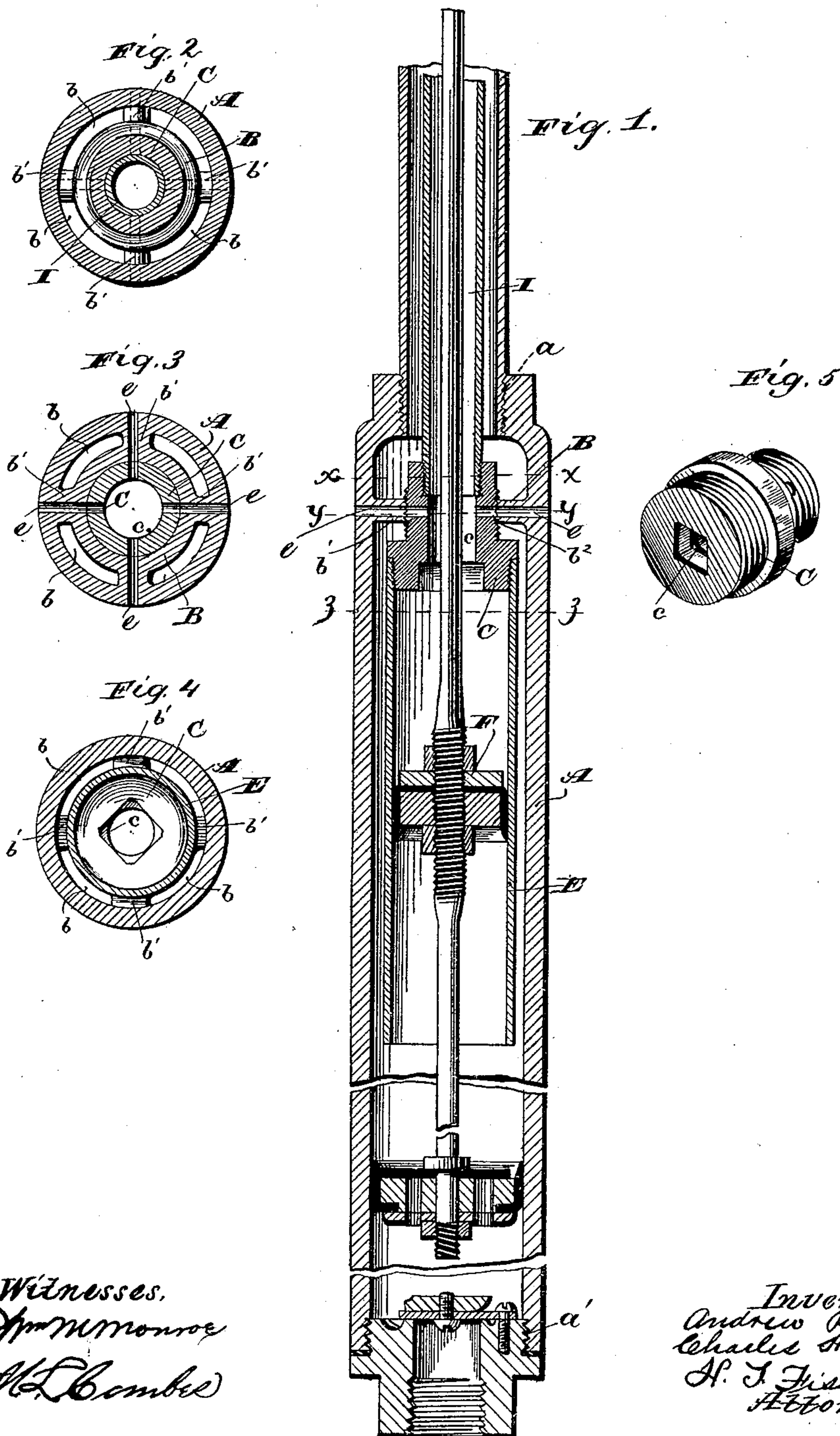
2 Sheets—Sheet 1.

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DOUBLE ACTING FORCE PUMP.

No. 371,518.

Patented Oct. 11, 1887.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 7.

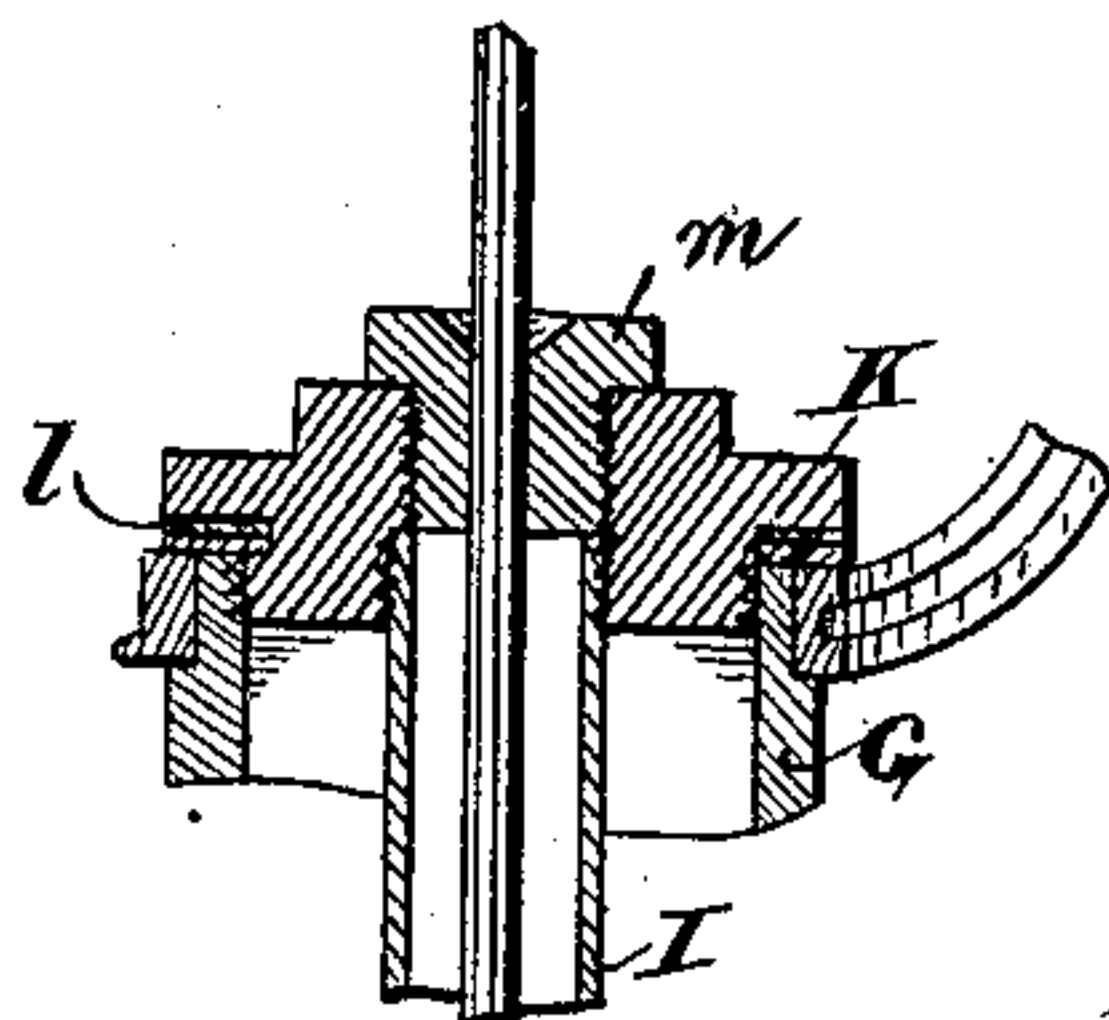


Fig. 6.

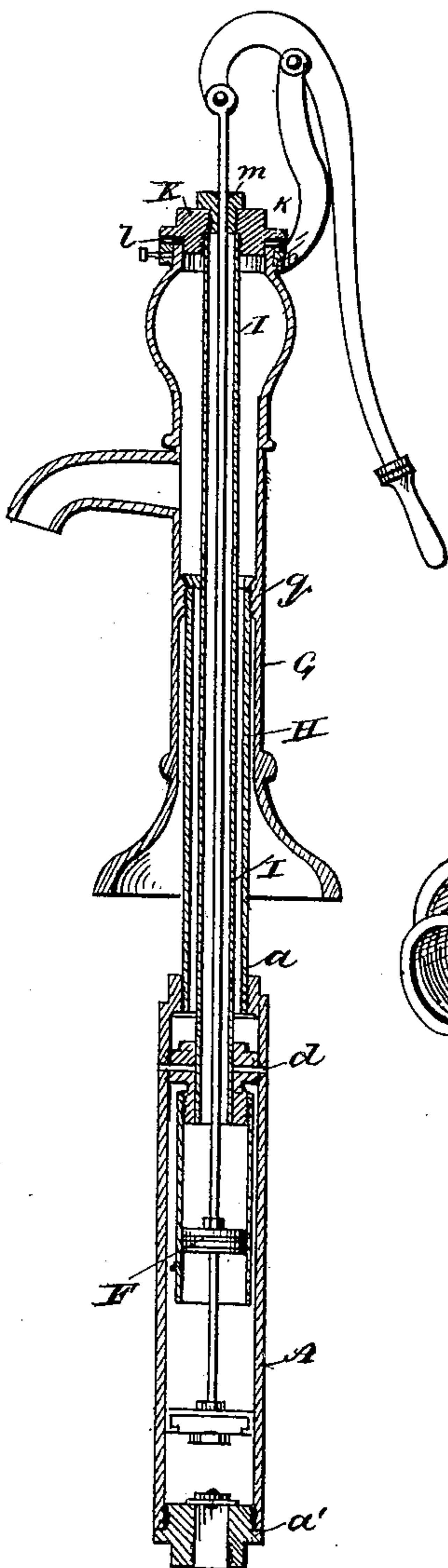
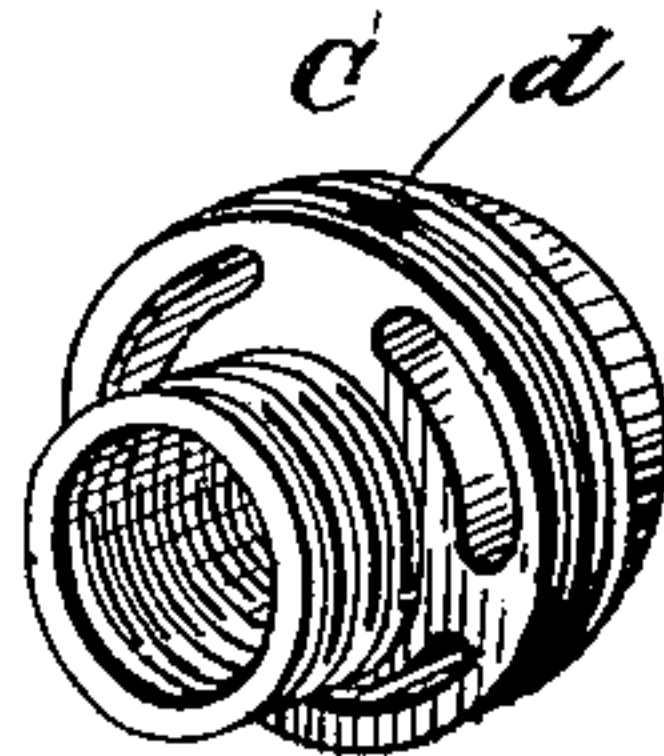


Fig. 8.



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UNITED STATES PATENT OFFICE.

ANDREW POTTER AND CHARLES H. BETTS, OF SALEM, OHIO, ASSIGNORS TO
THE SILVER & DEMING MANUFACTURING CO., OF SAME PLACE.

DOUBLE-ACTING FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 371,518, dated October 11, 1887.

Application filed November 13, 1886. Serial No. 218,832. (No model.)

To all whom it may concern:

Be it known that we, ANDREW POTTER and CHARLES H. BETTS, citizens of the United States, residing at Salem, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Double-Acting Force-Pumps; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in double-acting force-pumps; and it consists in details of construction and combination of parts as shown and described, and fully pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a central longitudinal section of the portion of the pump-tubing to which the invention appertains. Figs. 2, 3, and 4 are transverse sections of the tubing, taken on lines $x x$, $y y$, and $z z$, respectively, the view in Fig. 2 looking downward and the view in Fig. 4 looking upward. Fig. 5 is a detail in perspective of the coupling by which the submerged cylinder is attached to the diaphragm. Fig. 6 is a central longitudinal section of the pump, showing the standard and method of coupling the parts together, as well as a modification of the diaphragm in the main cylinder. Fig. 7 is an enlarged vertical section of the pump-top, and Fig. 8 is an enlarged perspective of the diaphragm shown in Fig. 6.

A represents the outer or main cylinder of the pump, within which the pistons or plungers are located, and $a a'$ the respective ends screw-threaded interiorly, so that when the tubing is secured therein a perfectly smooth and unobstructed exterior is presented, and the pump is adapted to be inserted in wells having a drill but slightly greater in diameter than the said pumps. Inside the main cylinder and transversely across its bore we provide a diaphragm, B, preferably cast integral therewith, as shown in Fig. 1, although this diaphragm may be formed separately with a coupling, as shown in Figs. 6 and 8, and as hereinafter more fully described. About the edge of the diaphragm are formed ports b , for the passage of water through the pump, and between these are the webs b' , by which the

ports are separated and the diaphragm is connected to the cylinder. In the center of the diaphragm is an opening, b^2 , screw-threaded to attach the coupling C.

The coupling C, as shown in Figs. 1 and 5, is provided with a longitudinal central bore, c , for the passage of the piston-rod and the attachment of the inside tube or pipe inclosing the piston-rod, and is threaded about its center to screw into the opening b^2 in the diaphragm, and about its lower larger diameter to attach the submerged or inner cylinder, E.

The parts being placed in position, as seen in Fig. 1, horizontal openings e are bored through the webs of the diaphragm and the coupling to tap the space above the inside piston, F, and provide passages for the escape of fluid that may accumulate above or behind said cylinder, as well as to provide for the admission of air to said space and prevent the creation of a vacuum.

If the diaphragm is cast separately from the main or outer cylinder, as shown in Figs. 6 and 8, the said cylinder may have a bead or rib, d , formed about its inside, and the diaphragm screwed thereon or held by the inner pipe. In that case the coupling would be cast with the diaphragm. In other respects the construction and arrangement of the parts would be the same as hereinbefore described.

G is the pump-standard, having an air-chamber above the spout, as is common in this class of pumps. The base, preferably, is made flaring to give it a firm support upon the floor, and the standard is screw-threaded interiorly, as at g , to attach the outer tube, H, which has its lower end screwed into the neck of the main cylinder A.

I is the inner tube or pipe, which incloses and protects the piston-rod above the main cylinder, and is of such size as to leave a sufficient water-space between it and the outer cylinder. The lower end of this tube is here shown as screwed into the coupling C, while its upper end is screwed into the cap K, surmounting the pump-standard. The body of this cap projects into the standard more or less, in order that it may be firmly sealed, and has a flange, k , which extends over the edge of the standard. Between the flange and the edge we place leather or other suitable pack-

ing-rings, *l*. A close-fitting plug, *m*, occupies the space in the head about the piston-rod.

Now, it will be observed that when the parts are in working position, as shown in Fig. 6, the outer tube connects the main cylinder and the standard, while the inner tube connects the coupling in the main cylinder and the cap which surmounts the standard. In this manner we utilize the inner tube not merely as a guide and protection for the piston-rod, but make it serve as well to draw down and seal the cap on the pump, and to assist in locking all the parts firmly together. The peculiar construction of the cap with the packing and the novel means of locking herein described enable us to avoid screw-threading the parts or doing other machine-work in making a tight joint about the head of the standard, thus greatly simplifying and cheapening the construction, as well as making it more firm and durable.

The advantages of a pump constructed according to the foregoing description are obvious. In the first place it will be seen that a perfectly smooth cylindrical exterior is provided at all points, and that there are no flanges or enlargements anywhere which extend beyond the outer surface of the main cylinder; but, on the contrary, all the projections and connections are interior of the cylinder, where they are unexposed and out of the way. This enables us to use our pump in drills or bores which are practically of the same diameter as the outer cylinder, which cannot be done when there are flanges or the like extending beyond the cylinder, thus effecting a great saving in the cost of the drill, as well as making it easier and better for introducing the cylinder into the drill or removing it therefrom. It will also be seen that the submerged cylinder is firmly

and immovably attached to the coupling and cannot work loose or up through the hub of the outer cylinder by the constant jarring to which these cylinders are exposed.

In operation the water is forced up between the two cylinders outside the coupling and through the ports in the diaphragm, when it enters the chamber above the diaphragm, and flows thence between the two upper tubes to the point of delivery.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a force-pump, a main cylinder contracted at its upper end and screw-threaded, substantially as described, in combination with a coupling-piece contained bodily on the inside of said cylinder and attached to a screw-threaded portion thereof, said coupling-piece extending above and below the diaphragm within said cylinder, and having attached to said extensions the tube, as *I*, and cylinder, as *E*, substantially as set forth.

2. In a force-pump, a main cylinder having a plain smooth exterior and a diaphragm with enlarged water-passages within the body thereof, in combination with a coupling secured in the center of said diaphragm and extending above and below the same, the upper extension of the coupling being screw-threaded for the attachment of a tube, as *I*, the lower extension enlarged and carrying the inner tube, as *E*, and an open annular space being allowed between said enlarged portion and the diaphragm, substantially as set forth.

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