

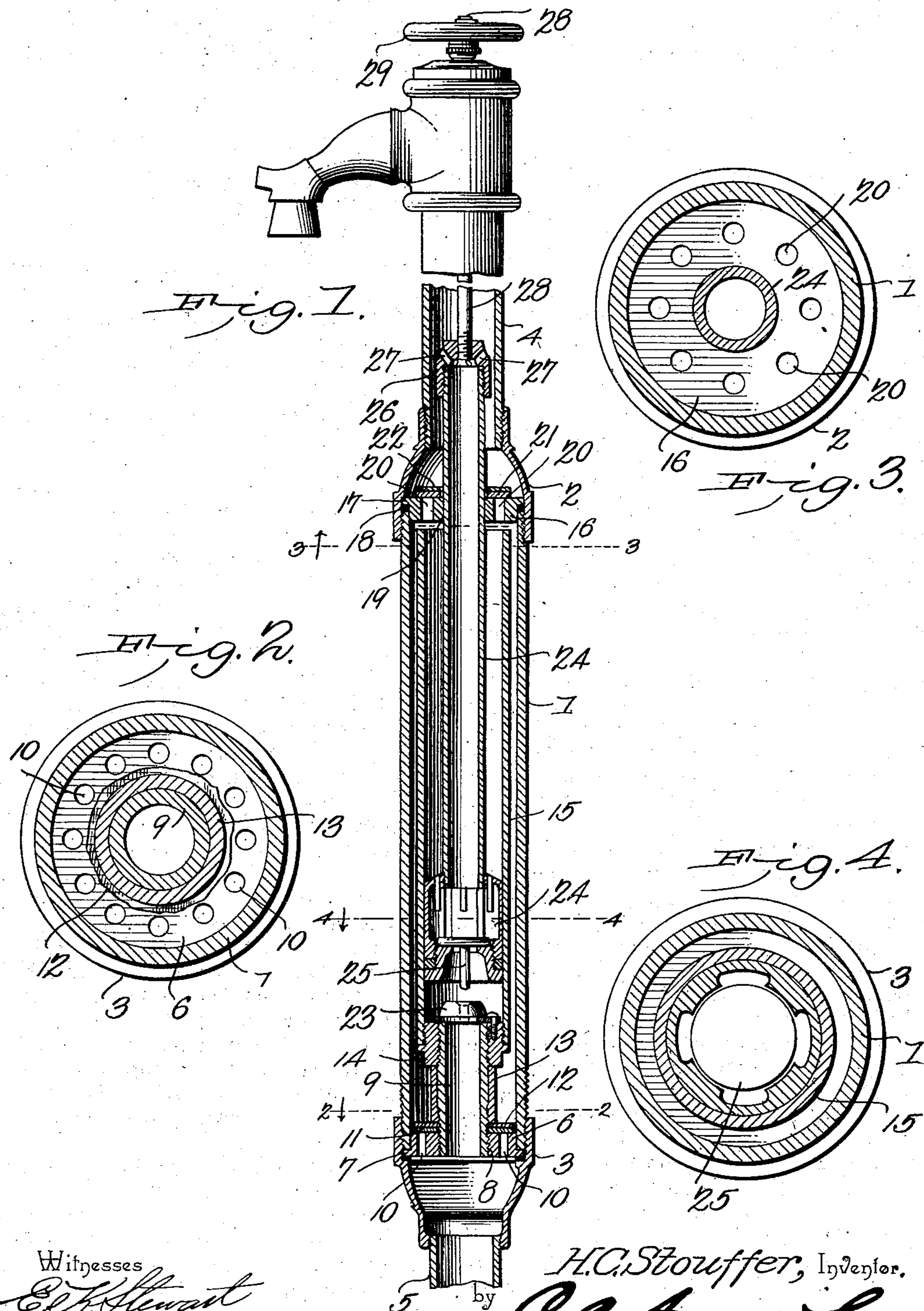
No. 749,239.

PATENTED JAN. 12, 1904.

H. C. STOFFER.
PUMP.

APPLICATION FILED JULY 9, 1903.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

HIRAM C. STOUFFER, OF MINERALRIDGE, OHIO, ASSIGNOR OF NINE-SIXTEENTHS TO JACOB JUSTICE DEAN, ISAAC PEARSON DEAN, AND CHARLES EDWARD MEHARD, OF NEWCASTLE, PENNSYLVANIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 749,239, dated January 12, 1904.

Application filed July 9, 1903. Serial No. 164,894. (No model.)

To all whom it may concern:

Be it known that I, HIRAM C. STOUFFER, a citizen of the United States, residing at Mineralridge, in the county of Trumbull and State of Ohio, have invented a new and useful Pump, of which the following is a specification.

This invention relates generally to pumps, and more particularly to double-action force-pumps.

The object of the invention is to provide an improved pump of the type specified in which the number of parts is small and of a design adapted to withstand hard service and of which the action will be positive and continuous.

In the accompanying drawings there is illustrated a preferred form of embodiment of the invention capable of carrying the same into practical operation, corresponding parts being designated by the same characters of reference in the several views and it being understood that various changes in the form and proportions of the elements exhibited may be made without departing from the spirit of the invention.

In the drawings, Figure 1 is a view in vertical longitudinal section through the axis of the pump-cylinder. Fig. 2 is a detail view of the perforated plate at the bottom of the outer cylinder, and Fig. 3 is a detail view in section on the line 3 3 in Fig. 1. Fig. 4 is a sectional view on line 4 4 in Fig. 1.

Referring to the drawings in detail, 1 designates the barrel of the outer cylinder or casing, which is longitudinally threaded at each end for engagement with caps 2 and 3 at the top and bottom of the barrel, as shown. The cap 2 at the top of the barrel is provided with an internally-threaded extension for the reception of the delivery-pipe 4, and the cap 3 at the bottom of the barrel has an internally-threaded extension for the reception of the intake-pipe 5. At the bottom of the barrel there is secured in position a plate 6, having a flange 7, which contacts with the lower end of the barrel and is held in position by the cap 3, which presses against the lower side of said plate when screwed into position. The diameter of the plate above the flange 7 causes

it to fit smoothly within the barrel and prevent lateral play of the plate therein. The plate 6 is provided with a large central opening 8, which is threaded for the reception of a short pipe 9 and has surrounding the central opening 8 a plurality of smaller openings 10, which are arranged at uniform intervals around the central opening. On top of the plate 6 are secured two washers 11 and 12, of which the former, which lies in contact with the plate, is preferably of rubber, and the latter is preferably of leather. The washers 11 and 12 are held in position by means of a spacing-ring 13, which surrounds the pipe 9 and which is itself pressed downward upon the top of the washer 12 by collar 14, threaded on the upper portion of the pipe 9 and forming the bottom of the inner cylinder 15.

As the washers 11 and 12 are secured by the spacing-ring 13 only at their inner margins, the outer portions thereof are free to move up and down under the influence of currents of water or other liquid which the pump may be used to elevate, forming an inlet-valve at the bottom of the outer cylinder or casing. The inner cylinder 15 is considerably smaller than the barrel 1 of the outer cylinder or casing, so as to present an annular space between the outer surface of the inner cylinder and the inner surface of the barrel 1. The cylinder 15 is open at the top and terminates slightly below the top of the barrel 1, which is closed, as already stated, by the cap 2. Between the cap 2 and the upper end of the barrel 1 is secured a perforated plate 16, similar to the plate 6 at the bottom of the barrel, but turned in the reverse position. The plate 16 is provided with a flange 17, which extends over the upper end of the barrel 1 and is spaced therefrom by packing-washers 18. In the center of the plate 16 is a large opening 19, which is smooth instead of threaded like the central opening of the plate 6, and surrounding the central opening is an annular series of smaller openings 20, spaced equidistant from each other. The upper surface of the flange 17 is engaged by an annular shoulder formed in the cap 2, which forces the

plate 16 downward to make a water-tight joint between the plate and the end of the barrel 1; but the cap 2 does not fit closely upon the entire upper surface of the plate 16, being chambered to afford space for the seating of two washers 21 and 22 on the upper surface of the plate. The chamber in which the washers 21 and 22 are located is sufficiently large to permit the washers to rise therein under the influence of currents of water passing upward through the openings 20, so that the washers form a discharge-valve at the upper end of the outer cylinder or casing.

On the top of the collar 14, which forms the bottom of the inner cylinder 15, is secured a flap-valve 23, of ordinary construction, which permits liquid to pass upward into the inner cylinder.

Mounted for reciprocation within the inner cylinder is a hollow piston 24, having in the head thereof an ordinary puppet-valve 25, which is adapted to permit liquid to pass upward into the hollow piston-rod on the downstroke of the piston. At the top of the hollow piston 24, which is externally threaded for that purpose, is screwed a cap 26, having a plurality of upwardly and outwardly inclined openings 27. The cap 26 is attached to the bottom of a rod 28, which extends upward to the top of the delivery-pipe and is provided at the top with any suitable means for imparting reciprocatory movement thereto—such, for example, as the head 29, which is adapted to be grasped by the hand and by means of which the rod 28, which carries the hollow piston, may be readily reciprocated.

Any ordinary means for reciprocating the rod 28 may be substituted for the head 29, as that forms no part of the present invention.

The operation of the pump is as follows: Assuming that the piston is at the bottom of the inner cylinder 15 at the beginning of the operation, the upward movement of the cylinder will cause the valve 23 to open and water will be drawn into the cylinder 15. At the same time the air in the cylinder 15 above the piston will be forced upward through the openings 20 in the plate 16 and will pass upward to the delivery-pipe 4. Upon the downward movement of the piston the valve 25 in the head thereof will open, and the water in the inner cylinder 15 will pass upward through the hollow piston and out through the openings in the cap 26. At the same time the valve formed by the washers 21 and 22 will close, and the suction created in the upper portion of the cylinder 15, which communicates with the interior of the outer cylinder of the pump, will cause water to be drawn in

through openings 20 in the plate 6 at the bottom of the outer cylinder, the valve formed by the washers 11 and 12 permitting water to enter without obstruction. At each complete reciprocation of the piston for the first two or three strokes at the beginning of the operation of the pump after it has first been placed in position a certain amount of liquid will be forced upward through the hollow piston on its downstroke and some of the air in the outer cylinder will be forced out through the openings in the plate at the top of the outer cylinder on the upstroke of the piston, and simultaneously with the forcing of the water upward through the hollow piston on its downstroke some water will be drawn into the outer cylinder through the openings 10 in the plate at the bottom. A few strokes of the piston will suffice to exhaust completely the air contained in the outer cylinder and to fill it entirely with water, and from that time forward water will be forced upward through the hollow piston on each downstroke thereof and will be forced upward through the openings 20 on each upstroke of the piston, the amount of water forced upward on each stroke being substantially the same and the action of the pump being thereby made continuous and uniform.

Having thus described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination in a pump of an outer cylinder, perforated disks fitted in the ends of said outer cylinder, a pipe secured in the lower disk and extending therethrough, a valve consisting of two washers of flexible material encircling said pipe and resting on the upper surface of said lower disk, a sleeve fitted over said pipe and engaging the upper washer, an inner cylinder supported on said pipe and secured at a fixed distance above said lower disk by the sleeve encircling said pipe, an upwardly-opening valve above said upper disk, an upwardly-opening valve in the bottom of said lower cylinder, a hollow piston arranged for reciprocation in said inner cylinder, a valve for the upward passage of water in the head of said hollow piston, and means for imparting reciprocatory movement to said hollow piston.

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

HIRAM C. STOUFFER.

Witnesses:

J. H. JOCHUM, Jr.,

J. ROSS CALHOUN.