

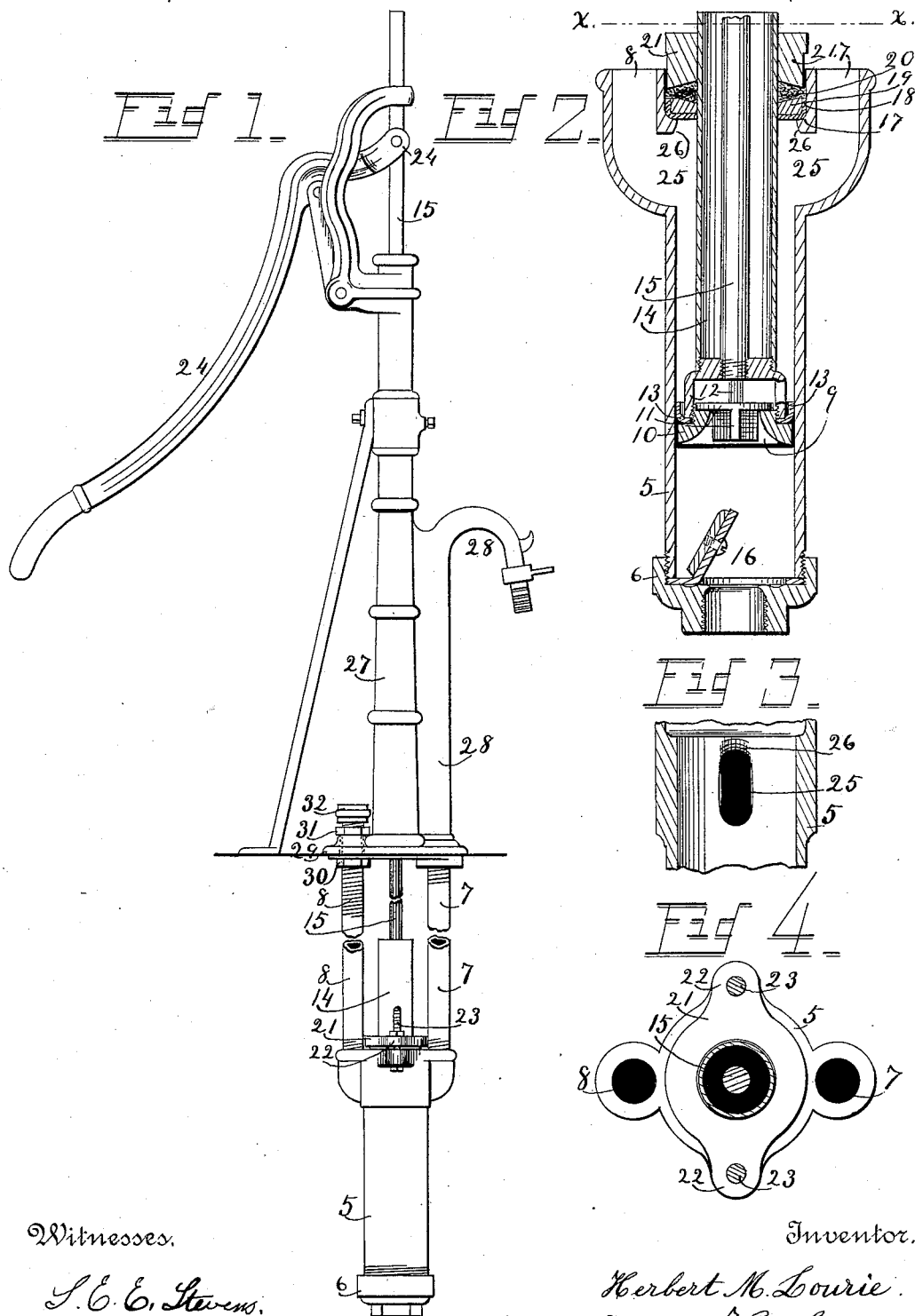
(No Model.)

H. M. LOURIE.

FORCE PUMP.

No. 384,633.

Patented June 19, 1888.



Witnesses,

*L. E. Stevens.*

*P. E. Stevens.*

Inventor,

*Herbert M. Lourie.*

By his Attorney *W. E. Stevens.*

# UNITED STATES PATENT OFFICE.

HERBERT M. LOURIE, OF KEOKUK, IOWA.

## FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 384,633, dated June 19, 1888.

Application filed May 12, 1887. Serial No. 237,941. (No model.)

*To all whom it may concern:*

Be it known that I, HERBERT M. LOURIE, a citizen of the United States, residing at Keokuk, in the county of Lee and State of Iowa, have invented certain new and useful Improvements in Force-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of force-pumps in which the pump-cylinder is usually hung down in the well from a standard which supports the pump handle and spout above ground, and the piston is provided with a forcing-plunger about half as large as the piston-head.

The object of the invention is, first, to provide means whereby the plunger may be tightly packed to prevent leakage around it and yet be readily removed, in connection with the piston, whenever the piston-packing requires attention, and, second, to provide means whereby the air-chamber and delivery-pipe are utilized for attaching the cylinder to the pump top or standard.

To this end the invention consists in the construction and combination of parts forming a force-pump, hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a pump according to my invention, part broken away. Fig. 2 is a longitudinal section of the pump-cylinder and attachments on a larger scale. Fig. 3 is an interior view of one outlet to the cylinder, and Fig. 4 is a horizontal section at the line *x x*.

Number 5 represents the cylinder provided with a screw-cap, 6, at its lower end, adapted to receive an inlet-pipe, and with two bosses beside its upper end to receive the discharge-pipe 7, and the air-chamber 8.

9 represents the piston, comprising the head 10, the valve 11, the cage 12, screw-threaded upon the head, and the leather packing 13, held between the cage and head.

14 represents the plunger, which is in cross-section about one-half the area of the piston 9, and it is secured thereto by being screw-threaded directly upon the cage 12 with an air-tight fit. This method of securing the

plunger directly to the cage without the intervention of bolts or similar parts is the first novelty of my invention.

15 is the piston-rod, which may be secured directly to the cage, as here shown, or to the upper end of the plunger, in case the latter is made solid instead of tubular, as shown. The cage performs the usual service of retaining the valve in working position, connecting the piston head and rod, and allowing free upward escape of water from the valve.

16 represents the usual lower check-valve.

The second novelty of this invention consists in the arrangement of parts at the top of the cylinder whereby the plunger is tightly packed around to prevent leakage, and yet the whole piston and plunger may be bodily removed after merely unscrewing two nuts without the aid of pipe-tongs, as follows: The bore of the cylinder is enlarged down to an abrupt shoulder, 17, forming a stuffing-box, into the lower circumferential corner of which a leather packing-ring, 18, is forced by an iron follower-ring, 19.

20 represents packing of any fibrous material, and 21 is the gland provided with ears 22, perforated to receive bolts 23, which also pass through fixed ears on the cylinder to bind the gland down upon the packing 20, this packing upon the follower 19, the follower upon the leather packing 18, and the packing 18 upon the shoulder 17. As there is no frictional wear upon the packing 18 it may be made a complete ring capable to retain itself in shape when removed, while if it were fibrous material it would fall apart upon removal and occasion inconvenience, especially when done down in a well. The packing 20 is subject to frictional wear by every move of the plunger, and it is necessary to make it of fibrous material in order that a little new packing at a time may be added as the old wears away, and the gland 21 and follower 19 are coned inward or dishing to press the packing 20 against the plunger and to hold the fibrous material from getting loose, so that the packings, follower, and gland will stay together as one piece on removal by the act of pulling out the piston and plunger, and may all be readily returned as one piece with the piston and plunger.

To remove the piston it is only necessary to

disconnect the piston-rod 15 from the hand-lever 24, remove the nuts from the two bolts 23, and then draw out the piston and plunger with all parts contained in the stuffing-box. To thus remove all the works of the pump and to replace them requires the use of no tools down in the well, except a single wrench for the two nuts on bolts 23.

In drawing the piston up for removal its packing ring 13, being necessarily of soft material—such as leather or rubber—will spring out into the openings of the pipes 7 and 8 and catch against the upper edges thereof when these openings are made circular and with square edges, as usual; and the third novelty of this invention consists in making these openings 25 into the bore of the cylinder oblong lengthwise the cylinder, so that the same area of outlet may be had with less width of space for the packing to spring into, and in chamfering or rounding the corners 26 at the upper ends of the outlets, so that what little of the ring still does project into the opening may be easily wedged back into place by the chamfered corners without injury to the packing-ring. The lower edges of the openings might also be rounded; but that is unnecessary, because the direction of the ring 13 causes it to drag freely over the said lower edges when being pushed in.

The fourth novel feature consists in adapting the discharge-pipe and the air-chamber to serve as a frame to connect the cylinder with the standard, and thereby support all the parts within the well. To this end the standard 27 is cored out to form two tubes in one piece. Through the central tube or bore of the standard the piston-rod 15 plays freely. The other tube constitutes the spout 28, which is neatly curved to give free passage to the water. The discharge-pipe 7 is first to be screwed into the lower end of the spout-tube 28. Then the cylinder is to be screwed upon the lower end of pipe 7. The pipe 8 has a long thread upon its upper end, far onto which a nut, 30, is first screwed. Then the end is passed up through a free hole in the base-plate 29 of the standard. Then the lower end of the pipe 8 is to be screwed into the cylinder. Now screw the nut 30 up against the plate 29. Then screw another nut, 31, down on the pipe to bear on top of the plate. Between the nuts 30 and 31 the plate 29 may be adjusted to bring the parts below into the desired linear relation with the standard 27, and thus rigidly bound the pipes 7 and 8 connect the cylinder with the standard and serve as a frame for that purpose. By screwing a cap, 32, upon the pipe 8 the same is made an air-chamber for the cylinder below. This arrangement of an air-chamber has many advantages over the common cast air-chamber besides that of cheapness, among which are the following: Foreign substances are frequently drawn into a pump and become lodged in the air-chamber, clogging it, and difficult to be removed. By unscrewing the cap 32 such matters may be instantly forced

by the pump not only out of the air-chamber, but out of the well, where they cannot further interfere with the pump. This pipe 8 may also be used as a point of attachment in case it were desirable to pump two streams at once. I have shown the standard 27 as comprising two tubes webbed together as one piece; but it is evident that the same result could be produced, though not so simply, by making the spout as a separate pipe from the standard, and it might be secured to the base-plate 29 by check-nuts, like the pipe 8. A portion of the advantages of the construction described would be obtained if the connections 7 and 8 between cylinder and standard were mere solid rods.

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

1. The combination of a pump-cylinder having an enlarged bore at its upper end terminating in an abrupt shoulder and forming a stuffing-box, a piston having a head fitted to the said bore, a plunger of about one-half the cross-sectional area of the piston and secured to the piston, a packing-ring in one piece of material fitted to the lower circumferential corner of the said stuffing-box and part way up its sides, a metallic ring fitting loosely around the plunger and closely above and within the said packing-ring and conically dished in its upper side, fibrous packing material located around the plunger and above the said metallic ring and packing-ring, a gland conically dished on its lower side located above the said fibrous packing and provided with perforated ears, and screw-bolts removably connecting the said ears with the pump-cylinder, substantially as shown and described.

2. The combination of a pump-cylinder, a standard provided with a base-flange, a pipe screwed at one end into the said cylinder and screwed at the other end into the said flange and rigidly connecting the two, a second pipe screwed into the cylinder at the opposite side thereof to the first-named pipe and screw-threaded along its other end and passing freely through a hole in the said flange to open air above and serving as an air-chamber to the cylinder below, and two nuts screwed upon the said second pipe, one above and the other below the said base-flange, substantially as shown and described, whereby the second pipe may be adjusted to the distance between the cylinder and flange as rigidly fixed by the first pipe, the two pipes thus constituting a frame to support the cylinder in line with the standard, and whereby the second pipe constitutes an air-chamber which is accessible at the top of the well.

3. The combination of a pump-cylinder adapted to be located down in a well, a pump-standard adapted to be located at the top of the well and provided with a base-flange, a pipe to serve as an air-chamber, adapted to be screwed down into the said cylinder and provided with a long screw-thread along its upper

end, and two nuts and a cap screwed upon the said long screw, substantially as shown and described.

4. The combination of the pump-cylinder 5, a pump-standard, 27, the connection 7, screwed at one end into the cylinder and at the other end secured to the standard, the connection 8, screwed at one end into the cylinder and screw-threaded along its other end and passing freely through a portion of the said stand-

ard, and two screw-nuts, 30 and 31, threaded upon the connection 8, the one below the said portion of the standard and the other above it, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

HERBERT M. LOURIE.

Witnesses:

J. F. SMITH,  
NANNIE M. SMITH.