(No Model.)

C. S. CURRIE.

FORCE PUMP.

No. 580,848. Patented Apr. 20, 1897.

Fig. 3.

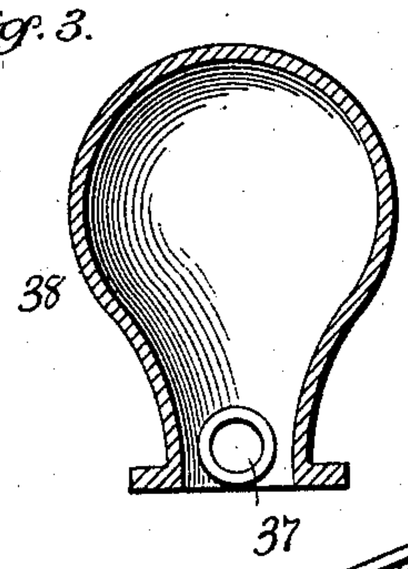

Fig. 1.

Fig. 2.

Fig. 5.

Fig. 6.

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CHARLES S. CURRIE, OF CALDWELL, OHIO.

FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 580,848, dated April 20, 1897.

Application filed June 9, 1894. Serial No. 514,057. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. CURRIE, a citizen of the United States, residing at Caldwell, county of Noble, State of Ohio, have invented an Improvement in Force-Pumps, of which the following is a specification.

This invention aims to provide an apparatus for protecting farm-houses, villages, and suburban property from fire, and to supply a means for effectually and thoroughly extinguishing fire, and which is convenient and easy of operation, throwing a continuous stream and drawing its supply from a well, cistern, or other fount.

The apparatus consists of a pump which is portable, capable of being operated by hand, and which is adapted for a variety of uses other than as a fire-extinguisher, such as irrigating, lifting water to an elevated tank or reservoir, and for purposes where an effective force-pump is required.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a vertical central section of a force-pump embodying the essential features of the invention rigged for lifting water, as an ordinary well or reservoir pump, parts being broken away. Fig. 2 is a detail view of the upper portion of a plunger-rod, showing the instrumentalities for connecting it with the handle. Fig. 3 is a detail view of the air-dome used with the pump when the latter is equipped for extinguishing fire. Fig. 4 is a detail view of an elbow for connecting the hose-pipe with the suction end of the pump. Fig. 5 is a top plan view of the base-plate applied to a well-curb. Fig. 6 is a vertical section of a well-curb and base-plate, showing a portion of the plunger-rod and the suction-pipe.

Corresponding and like parts are referred to in the following description and designated in the several views of the accompanying drawings by the same reference-characters.

The body or valve casing 1 is formed with lateral branches 2, a vertical branch 3, and a pendent collar or nipple 4. A core 5 is formed centrally within the lower portion of the casing, and its upper part 6 is made conical and is in line with the vertical branch 3 and the nipple 4. The lower portion of the valve casing or body is contracted, forming narrow passages 7 and 8 upon opposite sides of the core 5. These passages are closed by ball-valves 9 and 10, which obtain seats at the upper end of the passages, where they flare, substantially as shown. A shell 11 projects into the valve-casing from its top side, and surrounds the inner end of the vertical branch 3 and is practically a continuation thereof. This shell gradually contracts toward its lower end, and its inner or lower portion surrounds the upper part of the conical portion 6 of the core 5 and forms with the latter passages 12 and 13, which are closed by ball-valves 14 and 15, and this shell incloses a chamber 16, which receives the water as it is forced from the pump-barrels.

The passages 12 and 13 are contracted at their lower ends and flare at their upper ends, the latter being due to the conico-cylindrical form of the shell 11 and the conical shape of the upper part of the core 5. The pump-barrels 17 are bolted or otherwise secured to the lateral branches 2 and may incline rapidly from the perpendicular, as shown by the full lines, or only slightly, as shown by the dotted lines, according to the distance between the pump-barrels and the operating-lever 18. Where the distance is comparatively short, which will be the case when the invention is applied to fire apparatus solely, the pump-barrels will incline from the vertical to a greater extent than when the invention is constructed as a well-pump and where the distance between the pump-barrels and the operating-lever is considerable. A suction-pipe 19 will be fitted to the collar or nipple 4 when the pump is to be used for raising water from a well or cistern, and this pipe will extend to the bottom of the well or cistern in the ordinary way to draw the water therefrom when the lever 18 is operated. However, when it

is desired to use the apparatus as a portable fire-extinguisher, the suction-pipe 19 is replaced by the elbow 20, (shown in Fig. 4,) and to which is fitted a hose-pipe, which extends to a convenient water source for supplying the pump when the latter is in operation.

The operating-lever is suitably fulcrumed between its ends and may be of any desired construction, and as shown is composed of a tubular part 21 and a handle 22, the latter being removably fitted in the end of the part 21, it being understood that each end of the tubular part will be supplied with a handle substantially as shown. The tubular part 21 is metal and composed of similar halves, which are secured together by bolts or other fastenings 23, the terminal portions of the said halves having pendent ears 24, formed with openings 25, which are in transverse alinement when the halves or parts are secured together. A block 26 is had for each end of the tubular part 21 and is formed with trunnions 27, which obtain bearings in the openings 25, and this block has an opening 28, through which passes a rod 29, forming an element or part of the connection or plunger-rod between the plunger 30 and the operating-lever 18. The upper end of this rod 29 is threaded and receives binding-nuts 31, which are disposed the one above, the other below the block 26, and by means of these nuts the plunger can be expanded to compensate for any looseness between it and the pump-barrel. The lower end of the rod 29 terminates in a head 32, and a tube 33 is slipped upon the upper portion of the rod 29 and has a head 34 at its lower end to bear against the upper portion of the plunger 30, the latter being held between the heads 32 and 34, and being composed of rubber or similar elastic material can be expanded by bringing the heads 32 and 34 closer together, as will be readily understood. The upper end of the tube 33 obtains a bearing against the lower binding-nut 31, and by moving the latter upon the rod 29 the parts 29 and 33 can be adjusted longitudinally, so as to bring the heads 32 and 34 nearer together or farther apart, thereby adjusting the diameter of the plunger 30 to secure the required fit between the plunger and the pump-barrel.

It will be seen that the binding-nuts 31 serve to adjust the fit of the plunger to the pump-barrel and at the same time secure the plunger-rod to the block 26 or the operating-lever. It must be remembered that the fulcrum of the operating-lever and the pump-barrels are relatively fixed. Hence upon operating the lever 18 the plunger-rods receive a combined reciprocating and oscillatory movement. Hence the necessity of the pivotal connection between the plunger-rods and the operating-lever, and in order to prevent binding of the plungers within the pump-barrels the said plungers are made spherical or ball-shaped, thereby adapting them to simultaneously reciprocate and oscillate within the pump-barrels without creating any binding or undue friction, which would be the case if the plungers were elongated in the direction of their reciprocating motion. To the successful operation of the apparatus it is highly important that the plungers be given a spherical or ball shape; otherwise the pump-barrels would become unevenly worn and the load upon the operating-lever would vary, thereby causing the operation to be unsteady and jerky. Moreover, the parts would be subjected to unnecessary strain and the usefulness of the apparatus short-lived and considerable force would be required to operate the pump.

The air-dome 35 is connected by a pipe 36 with the vertical branch 3 and its tubular portion has an opening 37, to which is fitted a hose-pipe by means of which the stream is conveyed to the required point of use. The air-dome 35 and pipe 36 are resorted to when the apparatus is to be used as a well-pump, but when the latter is rigged as a portable fire-extinguisher the parts 35 and 36 are substituted by an air-dome 38, substantially as shown in Fig. 3, said dome being secured directly to the branch 3, as will be readily understood. The air-dome is employed for the ordinary purpose—namely, to secure a steady and uniform stream.

When the pump is fitted to a well or cistern, a base-plate 39 is secured to the curb 40 and is provided with a central opening 41, through which the suction-pipe 19 passes, said opening being reinforced by vertical and pendent bosses in line with the opening and the said suction-pipe being secured in the opening at the required point by means of a binding-screw 42. Elongated openings 43 are formed near the ends of the base-plate 39 and are reinforced by pendent bosses, and through these openings 43 operate the plunger-rods, the said openings being elongated to allow for the oscillatory movements of the plunger-rods, as will be readily comprehended.

From the foregoing it will be seen that the pump can be used for elevating water the same as any ordinary lift-pump and is especially adapted as a portable fire-extinguisher, the parts being arranged with especial reference to diminishing friction and securing a maximum amount of stream.

Having thus described the invention, what is claimed as new is—

1. In a double-acting pump, the combination of a valve-casing having an inner shell pendent from its top side and contracted at its lower end forming a chamber, a centrally-disposed core having its upper part made conical and extending within the lower contracted portion of the said shell and forming with the latter vertical passages and with the casing lateral passages, and ball-valves located within the said shell and exterior to the core for controlling the upper and lower passages, substantially as set forth.

2. In a double-acting pump, the combina-

tion of a valve-casing contracted at its lower end, a core located centrally within and formed with the casing and having its upper portion made conical, a shell integral with and pendent from the top side of the casing and having its lower portion contracted and surrounding the conical end of the core and forming passages therewith, and the said core forming passages with the lower portion of the casing and having the said passages flaring at their upper ends, and ball-valves located within the said shell and exterior to the core for controlling the several passages, substantially as specified.

3. In a double-acting pump, the combination of a valve-casing comprising a body having lateral branches, a vertical branch intermediate of the lateral branches, a pendent collar or nipple in line with the said vertical branch, a core in line with the vertical branch and nipple and having its upper portion made conical or tapering, and a pendent shell converging at its lower end and forming a continuation of the aforesaid vertical branch, and having its lower end projecting below a plane passing horizontally through the apex of the said core, and ball-valves for closing the upper ends of the passages formed at the sides of the said core and between it and the said shell and casing, substantially as shown and described.

4. In combination, a pump-barrel, an operating-lever having offstanding ears, a block journaled between the said ears to one side of the lever and having an opening, an elastic ball-shaped plunger, a plunger-rod passing through the plunger and headed at its lower end, and threaded at its upper end and passing through the opening in the said block, a tube mounted upon the plunger-rod and headed at its lower end, and bearing against the plunger, and binding-nuts located upon opposite sides of the block for connecting the plunger-rod thereto and moving it longitudinally within the tube so as to compress and expand the plunger, substantially in the manner and for the purpose set forth.

5. In a pump, the combination of a pump-barrel, an operating-lever comprising a tubular portion and a handle, the tubular portion consisting of two parts separable longitudinally and secured together, each part having an offstanding ear, and the ears having openings in transverse alinement, a block having integral trunnions obtaining bearings in the said ears and provided with an opening, an expansible plunger, a plunger-rod headed at its lower end and passing through the plunger, and threaded at its upper end and passing through the said block, a tube mounted upon the plunger-rod and headed at its lower end and obtaining a bearing against the opposite portion of the plunger, and binding-nuts mounted upon the threaded end of the plunger-rod upon opposite sides of the block, and adjustably connecting the plunger-rod with the said block for moving it within the tube so as to expand the plunger, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 6th day of June, 1894.

C. S. CURRIE.

Witnesses:
I. B. PHILLIPS,
A. C. OKEY.