

(No Model.)

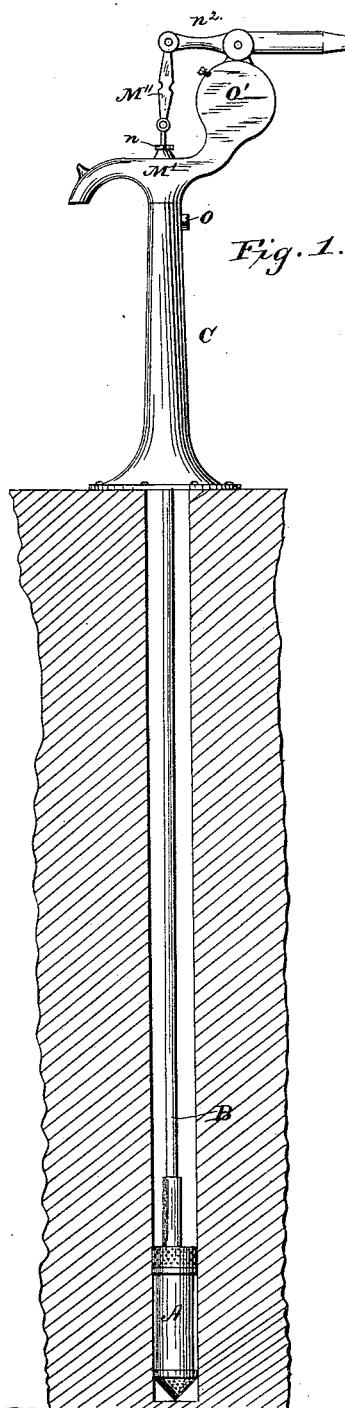
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O. E. DAVIDSON.

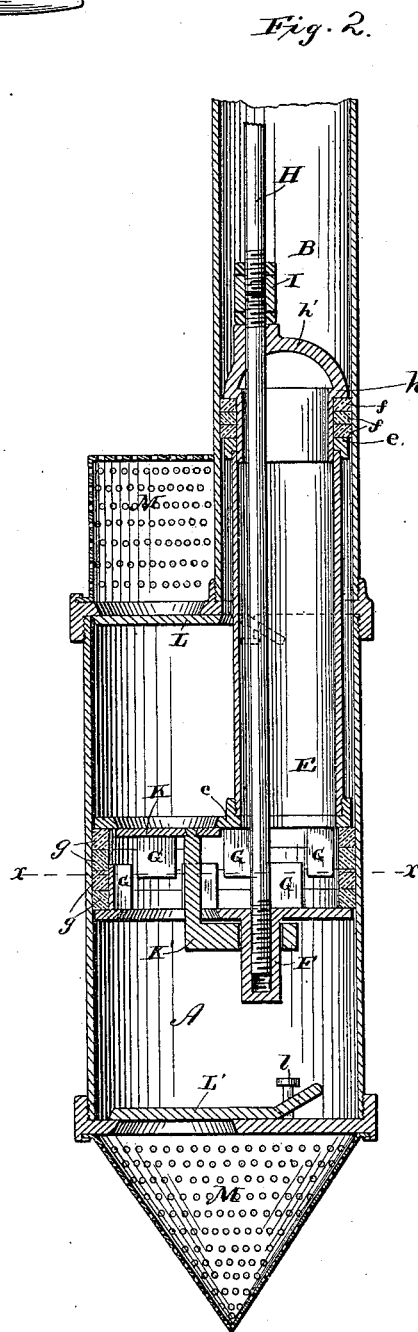
WELL PUMP.

No. 386,456.

Patented July 24, 1888.



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(No Model.)

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Fig. 3.

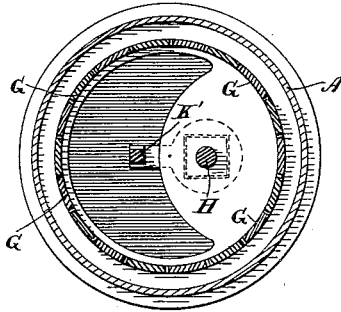


Fig. 4.

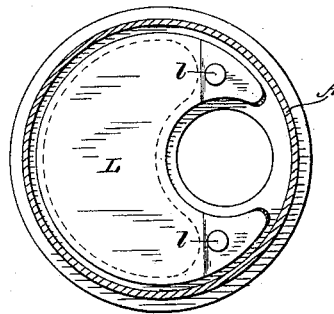


Fig. 6.

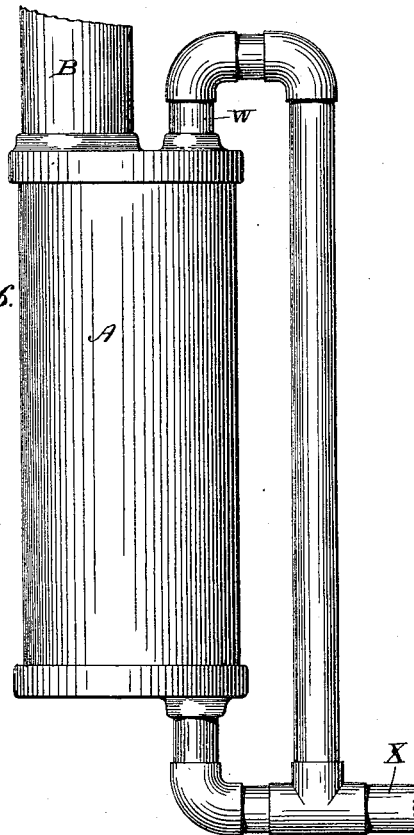
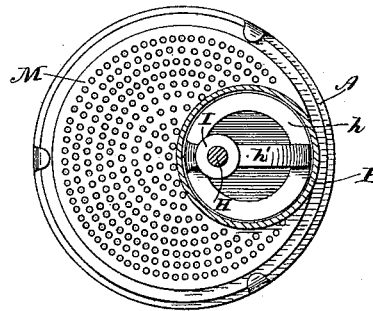


Fig. 5.



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UNITED STATES PATENT OFFICE.

OTIS E. DAVIDSON, OF NASHVILLE, TENNESSEE, ASSIGNOR OF TWO-THIRDS
TO C. A. BLACK AND W. W. MARTIN, OF SAME PLACE.

WELL-PUMP.

SPECIFICATION forming part of Letters Patent No. 336,456, dated July 24, 1888.

Application filed September 7, 1887. Serial No. 249,036. (No model.)

To all whom it may concern:

Be it known that I, OTIS E. DAVIDSON, of Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Well-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

The present invention relates to that class of pumps commonly known as "double-acting" pumps—i. e., those in which the water is raised during both the up and down movements of the piston—and has for its object to simplify and reduce the number of parts, render the pump more efficient, and reduce the cost of construction.

To this end the said invention consists in certain novel details of construction and combinations and arrangements of parts to be hereinafter described, and pointed out particularly in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a side elevation of a pump in position ready for operation. Fig. 2 is a sectional view of the cylinder and piston. Fig. 3 is a sectional view of the piston on line *x x*. Fig. 4 is a view of the inside of the top or cap of the cylinder, showing the valve. Fig. 5 is a top plan view of the upwardly-extending portion of the piston. Fig. 6 is a view of a modification.

Similar letters of reference in the several figures indicate the same parts.

The letter A designates the cylinder; B, the pipe connecting it to the pump above ground, and forming the up-passage for the water. This pipe, it will be observed, is screwed into the cylinder-top at a point to one side of the center, thus permitting a much larger opening to be made therein for the passage of water into the cylinder. Within the cylinder is a hollow piston composed of two sections, the upper one, *c*, being provided with two openings, into one of which screws the short piece of pipe E, projecting upward into the main pipe B, the other serving to admit water into the piston. The lower section is provided with

an opening located directly beneath the last-mentioned one in the upper section; also with a downwardly-projecting lug, F, into which the piston-rod screws, as will be presently explained.

Located on the under side of the upper section and the upper side of the lower section are a series of wings or flanges, G, those on one section interlocking with those on the opposite section. These wings or flanges are slightly removed from the circumference of the two sections, so as to leave a space in which the packing-rings *g g g* may lie, the latter being of such width as to slightly more than fill said space and take a bearing against the inside of the cylinder.

On the top of the short pipe E, secured to the upper section, is a collar or ring, *e*, above which is a packing-ring or series of packing-rings, *fff*, and on top of the latter is a cap, *h*, having a depending flange fitting snugly against the inner circumference of the packing-rings and holding their outer faces against the pipe B. A bridge-piece, *h'*, with a hole therein for the passage of the piston-rod, crosses the cap *h*, as clearly shown in Fig. 5.

In order to hold the various parts of the piston just described together and render the same adjustable from the top of the well to take up wear on the packing-rings, I provide the piston-rod H with a projection or collar, I, preferably formed by an ordinary socket-joint, as shown, which is adapted to abut against the bridge-piece *h'*, the end of the rod being passed down through the pipe E and screwed into the lower section of the piston.

I preferably provide a single valve, K, located within the piston for closing both the opening in the upper and that in the lower section, and in order that it may always maintain its proper relative position in shifting from one opening to the other I provide it with an arm, K', which, after passing down through the opening in the lower section, is bent at right angles, a square hole adapted to fit loosely around the lug F being made in the end of the same.

The valve-openings in the top and bottom of the cylinder are covered, respectively, by valves L and L'—the former of crescent shape,

Fig. 4, and the latter of the segment of a circle—both being preferably of iron, with the inner ends or edge turned up to permit them to open the requisite distance. They are secured in position by screws or bolts *l*, passing loosely through holes near the bends and screwing into the top and bottom, respectively, as will be readily understood upon an inspection of Fig. 2.

Over each of the last-mentioned valve-openings are located strainers *M*, fastened securely in position, preferably by turning small lugs or ears on the ends of the cylinder down over their flanged edges, although it is obvious that they may be fastened in position in any desired manner.

Pipe *B* passes up above the surface of the ground, and is either screwed into the spout-section *M'* at the top or is held by a set-screw, *O*, and the piston-rod working therein when the pump is used as a force-pump passes through an ordinary packing-box, *n*, in the upper part of the spout-section, its end being connected through the medium of a short rod, *N''*, to the end of the lever or handle *n'*.

A portion of the spout-section is extended out sidewise and expanded into an air-chamber, *O'*, on the top of which the handle or lever *n'* pivots.

From this description the operation of the pump will be readily understood. Assuming that the piston is at the highest point and is being moved downward through the medium of the piston-rod and handle, the valve *L* will be opened and water drawn into the upper part of the cylinder through its top. At the same time the valve *L'* in the bottom is closed, and the one inside the piston will, by the action of the water beneath it, be moved upward and close the opening in the upper section. This forces the water in the lower part of the cylinder up through the pipe *E* into the pipe *B*. When the motion is reversed and the piston moved up, the lower valve, *L'*, is opened, valve *L* closed; and the opening in the lower section of the piston closed, the water then being forced from the upper part of the cylinder through the piston into the pipe *E*, and thence into pipe *B*, thence out at the spout.

Should it be found after the pump has been long in use or from other cause that the packing-rings have become worn, the wear may be readily compensated for by removing the bolt connecting the piston-rod to the handle and turning the rod in a direction to draw the sections of the piston together, thus forcing the packing-rings outward and into contact with the sides of the cylinder or pipe, as the case may be, the piston itself being prevented from turning by the walls of the cylinder, as it will pivot on the piston-rod and section of pipe *E*, which are screwed into it at a point to one side of its center, thus making the piston practically an eccentric.

By placing the air-chamber *O* to one side, I do away with the necessity of providing a packing-box on its top for the piston-rod, through

which it has been found that the air is constantly escaping when under pressure, and at the same time it does away with the necessity of providing a special standard or support for the handle or lever, as is done in the iron pumps at present in use.

I do not wish to be limited to the precise kind or shape of valve shown, as it is perfectly obvious that ordinary flap-valves, or any of the valves well known in the art for use in such places, may be employed to good advantage.

It is also obvious that any of the well-known contrivances for forcing the packing-rings outward by drawing the confining-disks toward each other—such, for instance, as conical flanges bearing against their inner circumferences—may be employed without departing from the spirit of my invention.

In order to hold the cylinder away from the bottom of the well it may be desirable in some instances to secure a rod or piece of timber thereto which will extend downward beyond the end of the cylinder.

The modification illustrated in Fig. 6, it will be seen, enables me to use the pump as a suction as well as a force pump, a pipe, *W*, being secured over the valve-opening in the top of the cylinder, which is in communication with pipe *X*, leading to the valve-opening in the lower end of the cylinder, the entire water-supply being drawn through the said pipe *X*, as will be readily understood.

Having thus described my invention, what I claim as new is—

1. The combination, with the cylinder of a pump, of a piston working therein having suitable packing-rings thereon, with a piston-rod for tightening said packing-rings connected thereto at a point to one side of its center, whereby the piston will be prevented from turning while the packing is being tightened, substantially as described.

2. The combination, with a pump-cylinder and a piston working therein composed of top and bottom sections, with intermediate packing-rings, of a piston-rod screwing into the lower section at a point to one side of its center and provided with a stop abutting against the upper section for preventing its passage therethrough, whereby when the rod is turned the piston will be held stationary and the two sections be brought together and the intermediate packing tightened, substantially as described.

3. The combination, with the pump-cylinder and the hollow piston having the short section of pipe through which the water passes connected thereto and extending into the passage leading from the top of the cylinder, of packing-rings on said piston and at the top of said short section of pipe, and a rod passing through said pipe and piston for tightening both packings simultaneously, substantially as described.

4. The combination, with the pump-cylinder having the up-passage for the water connected to its top at a point to one side of the

center and the hollow piston having the short section of pipe through which the water passes connected thereto at a point corresponding to said up-passage, of packing-rings on said piston and a rod passing through said pipe and into the piston for tightening the said packing, substantially as described.

5 The combination, with the pump-cylinder, the valved hollow piston having packing-rings thereon, and the short pipe through which the water passes on its upward passage, with packing-rings thereon and a cap for holding them in position, of a rod abutting against said cap and screwing into the piston, whereby the said packing may be adjusted to take up wear, substantially as described.

6 The combination, with the pump-cylinder, the valved hollow piston having packing-rings thereon and the short pipe through which the water passes on its upward passage connected thereto at a point to one side of its

center, substantially crescent-shaped valve-openings partially surrounding said pipe, and packing-rings on said pipe held in place by a suitable cap, of a rod abutting against said cap and screwing into the piston, whereby the said packings may be adjusted to take up wear, substantially as described.

7 The combination, with the pump-cylinder, the hollow valved piston therein composed of two sections, the lower one having the downwardly-projecting lug thereon, with packing-rings between said sections, of a rod abutting against the upper section and screwing into the lug on the lower section for adjusting the said packings, and a valve in said piston, provided with the arm surrounding said lug, substantially as described.

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