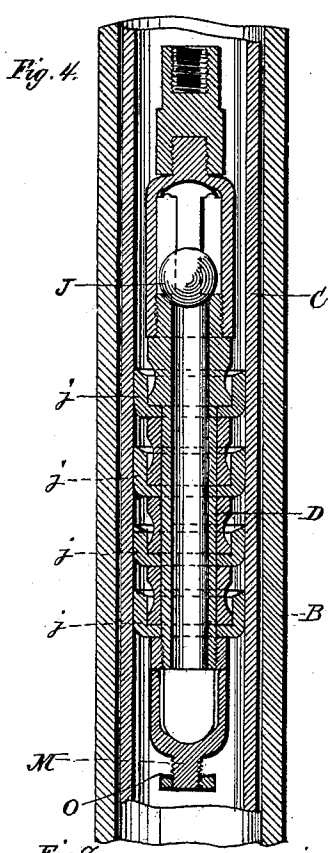
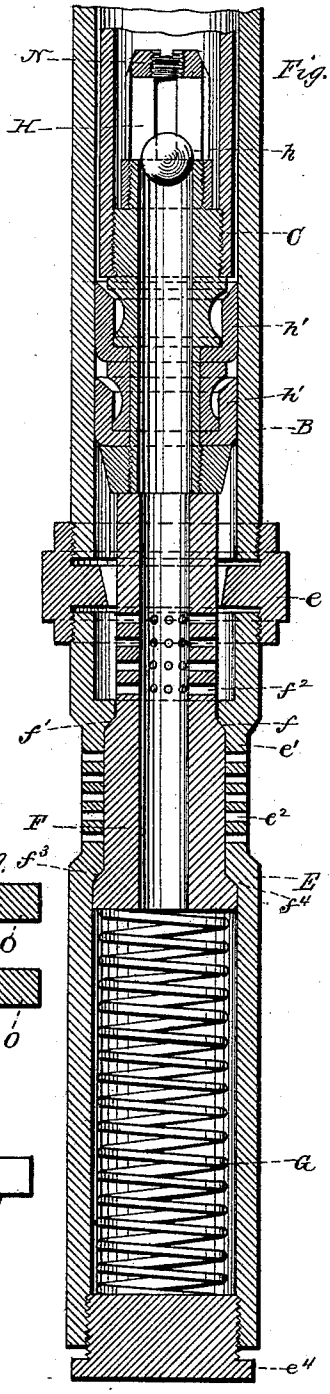
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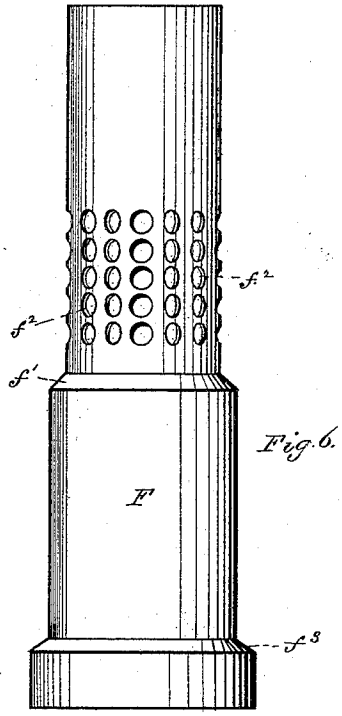
J. DARLING.

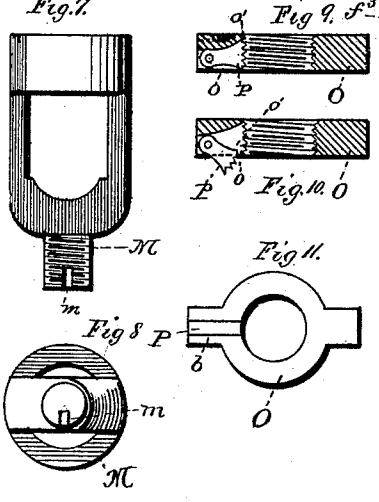
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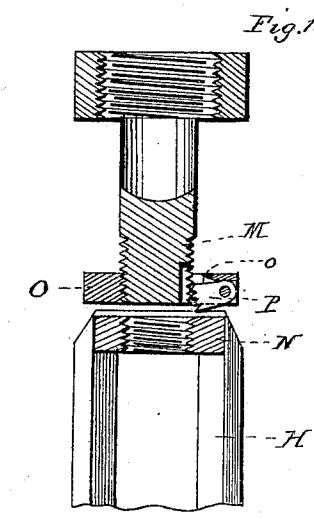
No. 395,772. Patented Jan. 8, 1889.











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PUMP.

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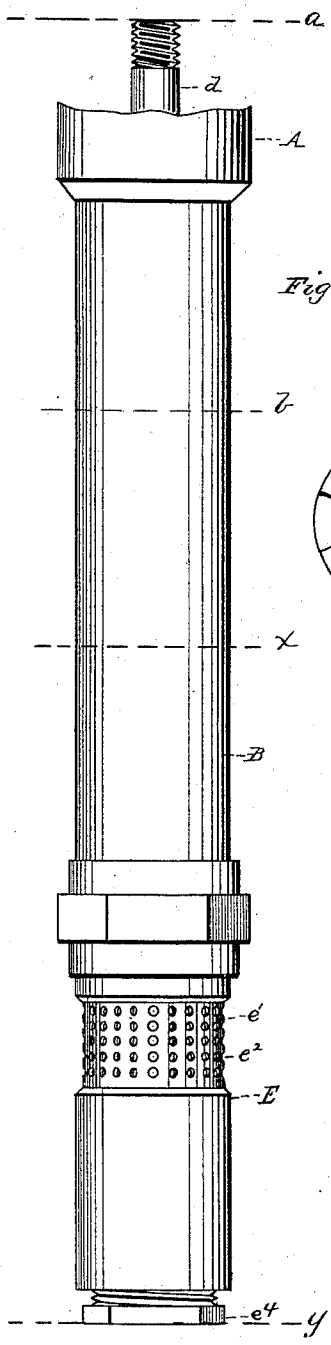


Fig. 1.

Fig. 3.

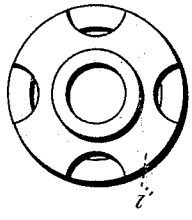
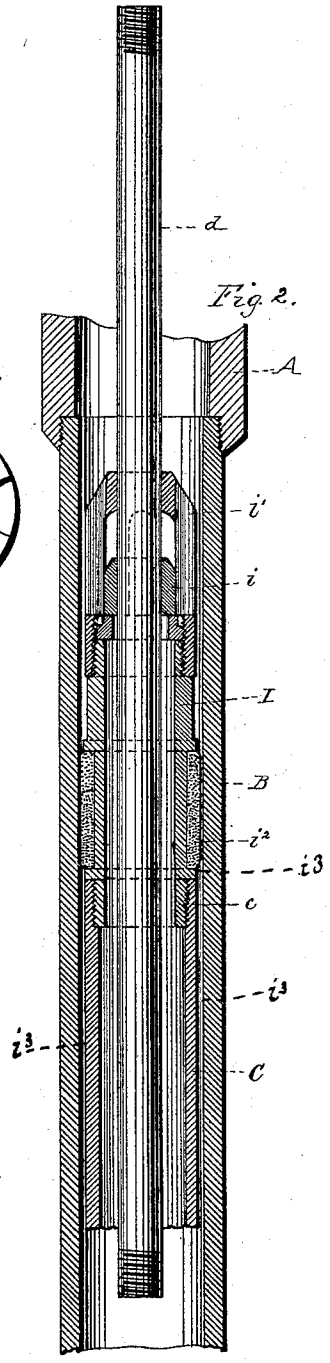


Fig. 2.



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UNITED STATES PATENT OFFICE

JOSEPH DARLING, OF PETROLIA, PENNSYLVANIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 395,772, dated January 8, 1889.

Application filed November 10, 1887. Serial No. 254,821. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH DARLING, a citizen of the United States, residing at Petrolia, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Pumps; and I do 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of my improved pump. Fig. 2 is a vertical section from *a* to *b*, Fig. 1. Fig. 3 is a plan view of part *i*. Fig. 4 is a vertical section from *b* to *x*, Fig. 1. Fig. 5 is a vertical section from *x* to *y*, Fig. 1. Figs. 6, 7, 8, 9, 10, 11, and 12 are detail views of parts of my improved pump.

The invention relates to improvements in pumps for wells and other cavities; and it consists in the construction and novel combination of parts, as hereinafter set forth.

Referring to the drawings by letter, A designates the well-tubing, and B a socket for the reception of a removable barrel or section, C, in which reciprocates the plunger D, attached to the lowest end of the section of the pump-rod *d*. The socket is connected to the adjoining section of the tubing A by a coupling-piece, and is of somewhat less diameter than the tubing to permit the barrel and plunger being removed without binding.

E is a section connected to the lower end of the socket B by a screw coupling-piece, *e*, in its lower end. The section E is provided with a wide circumferential recess or groove, *e'*, having the series of perforations e^2, and has on its interior above said perforations the circumferential flange *f*, which serves as a seat for the shoulder *f'* of the tubular trap-valve F, provided with the perforations f^2. The valve has a flange, f^3, around its lower end, which rests against a circumferential shoulder, f^4, within the section E, the said shoulder serving as a seat for the flange. The section has consequently two valve-seats—the flange *f* above the inlet-perforations, upon which the shoulder *f'* rests when the valve is closed, and the shoulder f^4 below the perforations, and upon which the flanges f^3 rest. This serves to hold the pressure of the fluid in the tubing while the removable barrel is withdrawn without permitting the fluid or air to escape into the well.

G is a coiled spring bearing against the screw-plug e^4, holding the valve up against its seat.

When in use, the socket is inserted in the well with the circumferential recess *e'* opposite the point from which the fluid is to be pumped, so that the fluid can enter the perforations e^2. Then when the tubular valve is depressed from its seat the fluid will pass also through the perforations f^2 and flow up through the tubular valve. When the downward pressure is taken off the valve, the spring G returns it to its seat.

H is a hollow valve-block screwing into the lower end of the removable barrel C, and having the upwardly-opening valve *h* at its upper end, and *h' h'* are circumferential packing-strips that surround the block below the valve and serve to keep the lower end of the barrel C tight in the socket. The said strips are preferably cup-shaped, as shown.

I is a hollow valve-block, provided with a threaded lower end, *c*, to engage within the tapped upper end of the barrel C, and threaded at its upper end to engage with an upwardly-opening check-valve, *i*, having a hollow block, *i'*, through which the plunger-rod passes. The valve-block I is also surrounded by a packing-strip, i^2, to keep the upper end of the barrel tight in the socket, and provided with a space, i^3, to allow the fluid to fill the space between the packing-strips i^2 and *h'*, so that the pressure on the interior of the barrel will be equalized by that outside. If the upper packing, i^2, is not used, the space i^3 is not made, as the space exterior to the barrel will be filled with the fluid from the valve *i*. The barrel is inserted into the socket until the lower open end of the valve-block H presses down the tubular valve F against the action of the spring G, and permits the fluid to flow up into the barrel through the perforations e^2 and f^2 and through the said valve-block.

The hollow plunger D is provided with the upwardly-opening valve J, and is surrounded at proper points by the packing ring or cups *j j*, which keeps it tight within the barrel.

Standing centrally from the lower end of

the plunger is a screw-threaded extension, M, provided with a longitudinal notch, *m*. The said projection is adapted to engage in a threaded opening, N, in the upper end of the valve-block H.

O is a circular nut provided with opposite lugs, one of which is radially notched or recessed, as at *o*, for the reception of the pivoted detent P. The said detent has its free end toothed or threaded, so as to form, when turned fully within the notch *o*, a continuation of the threads of the nut O. The said nut is designed to protect the thread of the projection M and the thread of the opening N from damage should the plunger accidentally fall on the valve-block. The normal position of the nut O on the extension M is on the extreme end and turned so as to bring the detent in line with the notch *m*, within which the upper tooth of the detent projects as the detent falls slightly on its pivot, as shown in Fig. 12, thus preventing it from turning. When it is desired to connect the plunger-rod to the valve-block thread, the plunger is lowered thereon and turned until the opposite lugs of the nut O enter the transverse slots on the top of the valve-block, carrying the detent out of engagement with the notch *m*, and continuing the thread of the nut so that the extension M may be screwed down into the thread of the valve-block. The barrel is then fast to the plunger and the pump-rod can be lifted out therewith. When the plunger-rod is detached from the valve-block H, the pump-rod may be drawn upward in the removable barrel, and a shoulder on it above the plunger will come in contact with the lower part of the check-valve block I, so as to jar the barrel and loosen it if it sticks in the socket, so that it can be easily removed.

Should I desire to use the trap-valve alone with the common form of valves, I use the nut O and projection M on this plunger to draw the standing valve, which will act on the trap-valve. The fluid tamping or weight or pressure of the fluid in the tubing, acting directly on the top of the removable barrel and bottom packer of the same, serves to hold it down securely in its seat, overcoming the necessity of using grabs or catches to anchor the same. The pressure of fluid also has an upward action on the tubular trap-valve when the removable barrel or valves have been withdrawn, making it positively acting and assuring tight joints.

In pumping, *h* is the stationary valve, and J the reciprocating valve, of the pump, *i* being merely a check-valve commonly known as the "Crocker check." By the described construction the barrel may be put in place and removed without displacing the tubing, letting the fluid back into the well, or allowing the air to fill the vacuum created by a vacuum or gas pump.

The check-valve is held steadily and in proper position by screwing into the barrel, and the valves need not be backed.

If desired, the check-valve may be replaced by a bushing of suitable construction. The trap-valve F prevents all the fluid or air returning below the socket when the barrel and plunger are removed.

Any style valves may be used in the pump mechanism proper.

I do not in this application claim, broadly, the combination, with a trap-valve, of a tripper for positively operating valve, nor the construction of the barrel with a vent by which the water may pass out and fill the space between the said barrel and the tubing in such manner as to equalize the pressure on opposite sides of the said barrel to prevent bursting the same, for the reason that such features are included in the claims of a separate application for patent filed by me December 11, 1888, and numbered 293,324.

Having described my invention, what I claim is—

1. In a pump, the combination, with a plunger and removable barrel, of the socket having the lower section, E, provided with a perforated circumferential recess and having its lower end closed, the perforated tubular valve having seats within said section, and the spring holding said valve up against its seat, substantially as specified.

2. In a pump for wells and other cavities, the combination of the plunger provided with an upwardly-opening valve, the removable barrel having an upwardly-opening valve in its lower end, the check-valve screwing into the upper end of the barrel, the section E, provided with a perforated circumferential recess and having its lower end closed, the perforated tubular valve having seats within said section, and the coiled spring holding said valve on its seat, substantially as specified.

3. In a pump, the combination, with the tube B and the plunger D, of the circular nut O, provided with the radial notch *o*, and the detent P, having the toothed end corresponding to the thread of the circular nut O, engaging the lower end of the projection M, substantially as specified.

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

JOSEPH DARLING.

Witnesses:
JOHN ELANBARGER,
NELSON SUTTON.