(No Model.) 2 Sheets—Sheet 1.

H. C. STOUFFER.

PUMP.

No. 309,662. Patented Dec. 23, 1884.

Fig. 1.

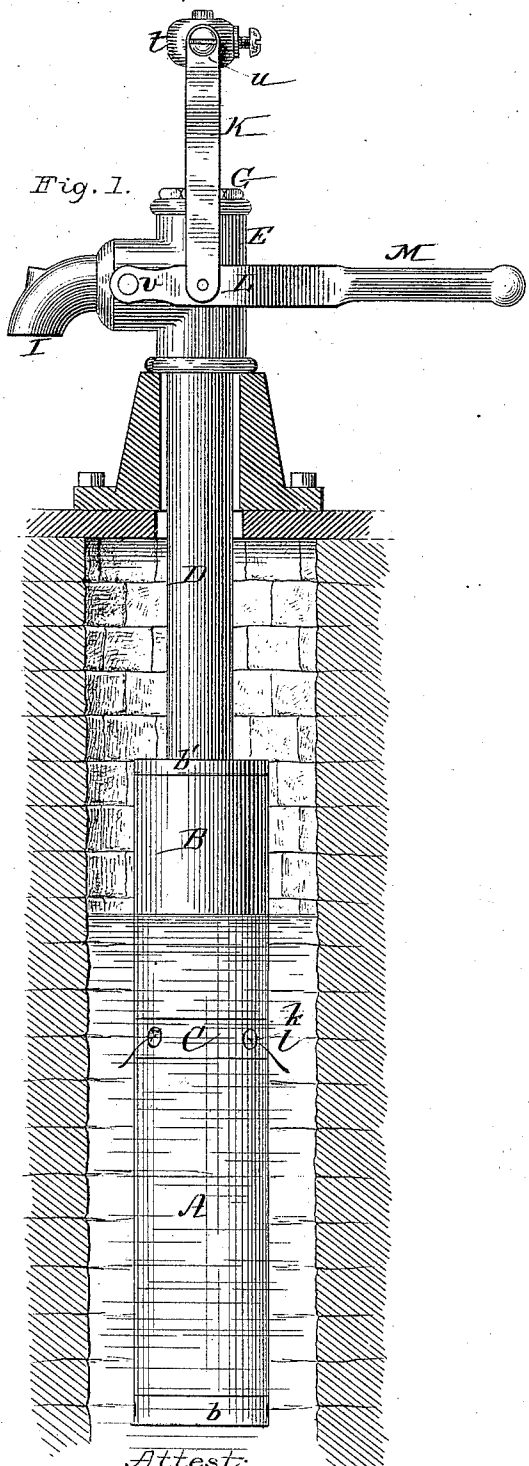
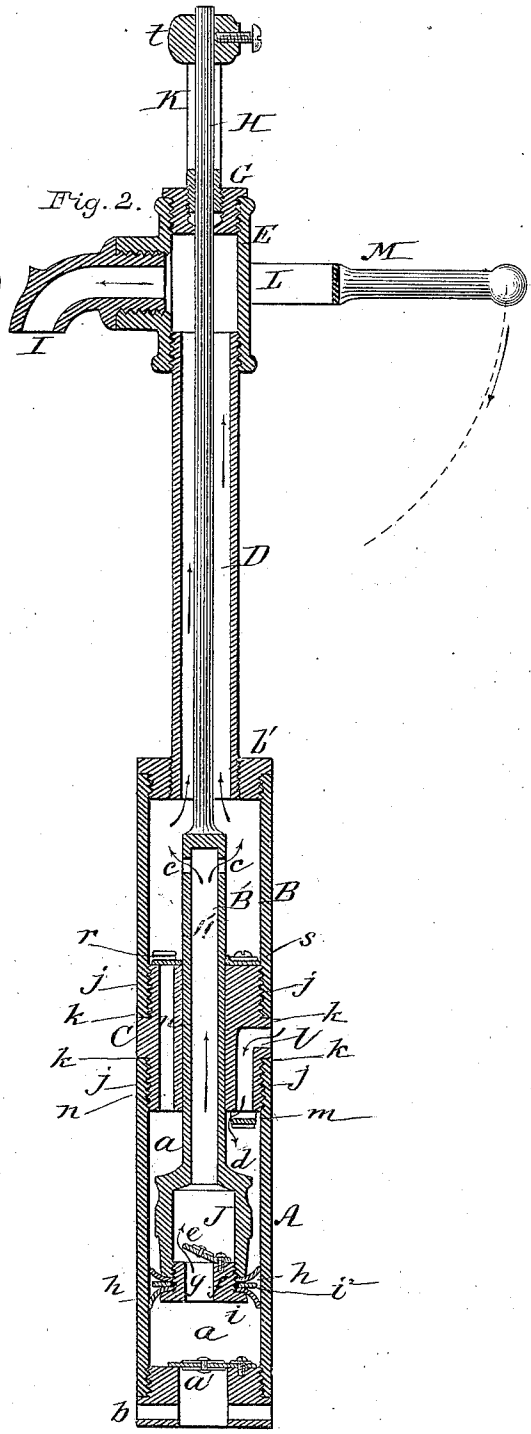


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

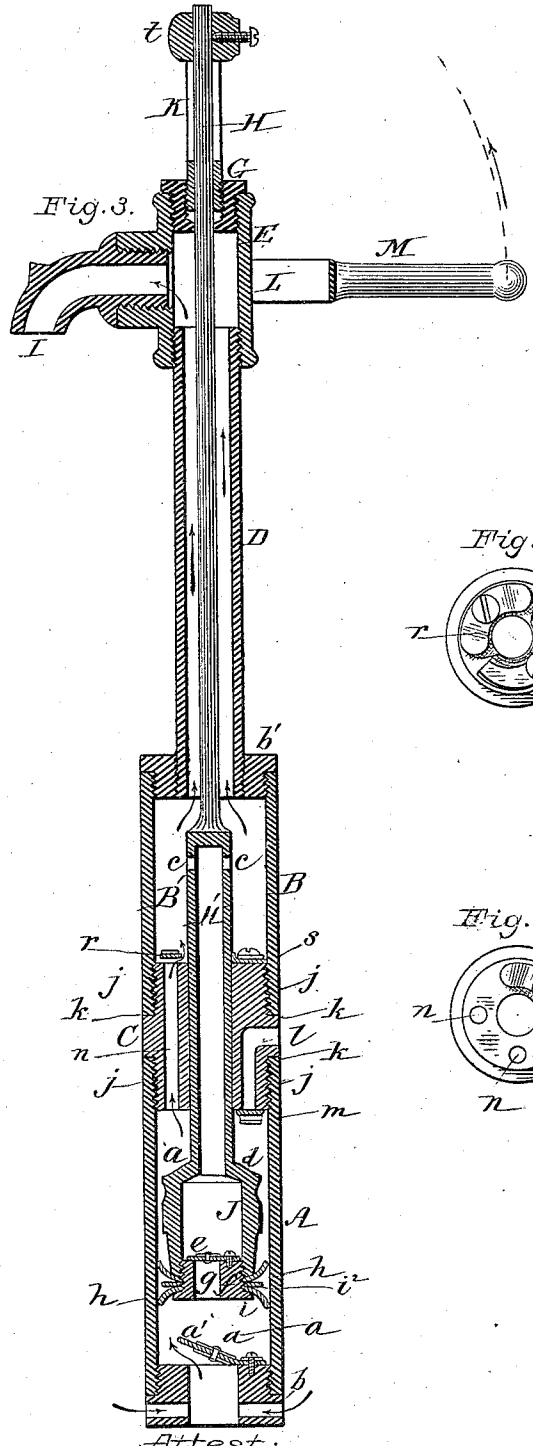


Fig. 4.

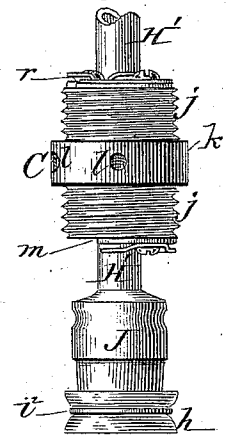
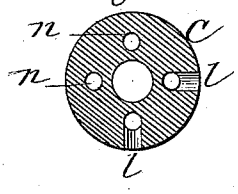


Fig. 5.

Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

HIRAM C. STOUFFER, OF CORTLAND, OHIO.

PUMP.

SPECIFICATION forming part of Letters Patent No. 309,662, dated December 23, 1884.

Application filed February 26, 1884. (No model.)

To all whom it may concern:

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

I have improved the double-acting submerged force-pump in which a valved plunger operates to raise and discharge water through a hollow plunger-rod on both the up and down strokes of the plunger in a single pump-barrel; and the objects of my improvements are to provide for a continuous inflow and discharge of water from a single pump-barrel by combining a single-valved plunger with a fixed double-valved plug, through which the hollow rod of the valved plunger works, and through outside valved ports, in which the water is caused to enter the chamber above the plunger and be discharged from said chamber through other inside valved ports in said fixed plug into an upper chamber of the pump-barrel, into which the valved plunger also discharges. The fixed valved plug divides the pump-barrel into a lower receiving and an upper discharging chamber, and has outside valved ports, which open into the well and the receiving-chamber, and inside valved ports which form the direct communication between the two chambers. From the lower receiving-chamber the valved plunger discharges direct through its hollow rod on its downstroke, while its upstroke effects the discharge of the water from the lower into the upper pump-chamber direct through the fixed valved plug, so that under the action of a single-valved plunger and a fixed valved plug having inner and outlet ports a continuous stream of water is forced into the discharging-chamber above said valved plug, and from thence to the discharge-nozzle.

Referring to the accompanying drawings, Figure 1 represents in elevation my improved pump; Fig. 2, a vertical section of the same, the valved plunger being shown on its downstroke; Fig. 3, a similar section, the valved plunger being shown on its upstroke; Fig. 4, an elevation of the valved plunger and the fixed valved plug; Fig. 5, a top view of the valved plug; Fig. 6, a bottom view, and Fig. 7 a horizontal section taken through the outside ports of the valved plug.

The pump-barrel or cylinder proper is in three sections, of which the lower section, A, forms the working-chamber *a*, into which the water is received, and from which it is forced by both the up and the down strokes of the plunger, the upper section, B, forming the discharging-chamber B′, and an intermediate double-valve plug-section, C, which screws into the lower end of the upper section and into the upper end of the lower section, and divides the receiving from the discharging chambers. The lower section has a foot-valve, *a′*, opening inward, attached to an open screw-plug, *b*. The upper end of the upper section is closed by a suitable screw-cap, *b′*, into which the discharge-pipe D screws, and extends to the top of the well, a T-union, E, being screwed on its upper end, closed at its top by a stuffing-box, G, for the plunger-rod H, and to the side of which the discharge-spout I is screwed.

The plunger consists of a chambered head, J, secured at its upper end to a hollow section, H′, of the plunger-rod, which hollow section passes through a central opening in the valve-plug and opens by side ports, *c*, at its upper end into the discharge-chamber B′, above said double-valve plug. The end *d* of the chambered head forms a lifting-head for the water, while the lower open end of said plunger-head is provided with a valve, *e*, carried by a plug, *f*, so as to open upward within the chamber of the plunger. This valved plug has a central opening, *g*, which opens into the receiving-chamber, and its lower end has a ring shoulder or collar, *i*, between which and the lower end of the plunger is clamped a double cup-shaped leather packing, *h*, a metal ring, i^2, being interposed at the junction of the packing-cups to render effective the clamping of each separate leather cup when the valved plug is screwed hard upon the end of the plunger. This construction places the packing at the lower end of the plunger, and gives the advantage of securing it by the same screw-plug which carries the plunger-valve, and affords facility for quickly and easily renewing the packing when required. This double-valved plug is an important element

in the organization of my pump, and is practically a solid body of metal, through which the hollow plunger-rod passes, dividing the receiving from the discharging chambers of the pump-barrel, being provided with a screw-thread, *j*, on each end, upon which the cylinder-sections are screwed up against a middle ring-shoulder, *k*, which forms a dividing-band between the cylinder-sections. This plug has two or more ports, *l l*, drilled in its lower half, opening at the lower end of the plug into the receiving-chamber *a* above the piston-head, and at the middle ring-shoulder, *k*, into the well, below the body of the water therein. The lower ends of these ports *l l* are provided with suitable valves, *m m*, secured to the lower end of said plug, so as to open downward, to allow the water to pass by atmospheric pressure from the well into and through these ports into the receiving-chamber above the piston-head on the downstroke of the plunger, while at the same time the water is forced up through the plunger, as shown in Fig. 2. On the other side of the plug it is provided with two or more ports, *n n*, which open at their lower ends into the receiving-chamber above the plunger-head, and at the upper end of said plug into the discharging-chamber. The upper ends of these ports *n n* are provided with suitable valves, *r r*, secured to the top of the plug, so as to open upward to allow the water to be forced, by the ascent of the plunger-head, from the receiving-chamber *a* into the discharging-chamber B′ above the plug, as shown in Fig. 3, while at the same time water is sucked into the lower chamber. In this action the lower plug-valves, *m m*, are closed, while in the downstroke of the plunger the upper plug-valves, *r r*, are closed. The hollow section of the plunger-rod is fitted so as to make a close joint with the valved plug, and the latter has a piece of leather, *s*, on its upper end, which, with the leather valves *r*, forms a top packing for the valve-plug with the hollow plunger-rod. The solid section H of the plunger-rod passes up through the discharge-pipe and through the stuffing-box G at the top of the T-union, and is connected above the latter to a cross-head, *t*, mounted by trunnions or pivots *u* upon the upper ends of two arms, K, which stand on each side of the T-union, and are pivoted at their lower ends to the arms or forks L of a handle, M, the arms of which are pivoted at their ends to the middle branch of the T-union at *v*, in front of the arms K. This handle-operating attachment gives an easy movement to the plunger-rod by relieving it from side strain and undue friction.

My improved pump can be used for driven and for bored wells, and for oil-wells; and the pump-barrel is suspended by the discharge-pipe D in any suitable manner.

I claim—

1. The combination, with the pump-barrel having the foot-valve *a′*, and connected with the discharge-pipe D, of the middle plug, C, having outside ports, *l*, communicating with the lower chamber, *a*, and inside ports, *n*, communicating with the chambers *a* and B′, the valves *m* and *r*, for said ports, and the plunger having the valve *e*, and a hollow plunger-rod, H′, opening into said discharging-chamber B′, substantially as described, for the purpose specified.

2. The combination, with the pump-sections A and B, the former having the foot-valve *a′* and the latter connected with the discharge-pipe D, of the double screw-plug having the ports *l n* and valves *m* and *r*, the plunger-head having the hollow plunger-rod H′, provided with the ports *c*, and the solid rod-section H and suitable operating connections, the said valved plug dividing the chambers of the barrel-sections, substantially as described, for the purpose specified.

3. The combination, in a double-acting pump, of the plug C, having screw-threaded ends *j*, and an intermediate ring-shoulder, outside ports, *l*, and inside ports, *n*, and top and bottom valves for said ports, substantially as described, with the barrel-sections A and B, united by said screw-plug, the plunger J H′ H, the foot-valve *e*, and the discharge-pipe D, all constructed to operate as described.

4. The combination, in a double-acting pump, of the plug C, having outside valved ports, *l*, and inside valved ports, *n*, and adapted to divide the pump-barrel into a receiving-chamber, *a*, and a discharging-chamber, B′, with a valved plunger adapted to discharge through its hollow rod from the receiving-chamber *a*, and from said chamber through the inside plug-ports, *n n*, substantially as described.

5. The combination, with the pump-barrel having the discharge-pipe D, and a valved plunger, of the plunger-operating device consisting of the pivoted cross-head *t*, the pivoted arms K K, and the handle pivoted to said arms and to the T-union E at the point *v* between the discharge-nozzle and the said pivoted arms, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HIRAM C. STOUFFER.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.