(No Model.) 2 Sheets—Sheet 1.

W. C. PHILLIPS.

Rotary Pumps.

No. 232,901. Patented Oct. 5, 1880.

Fig. 1.

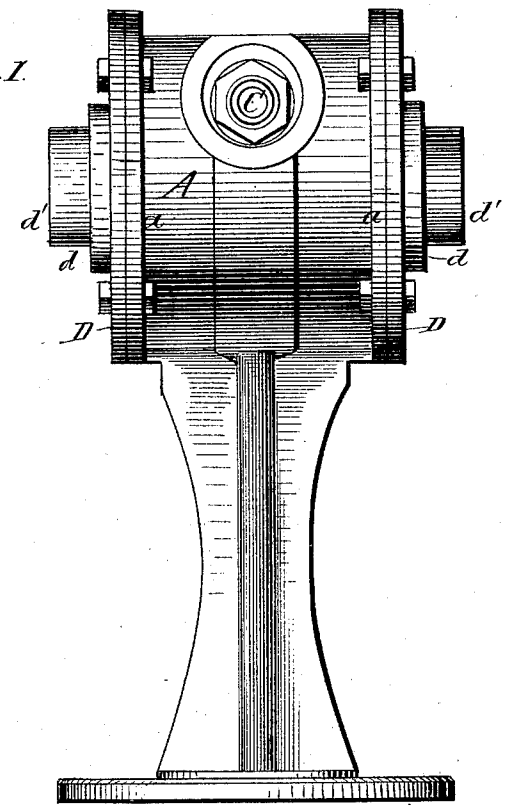


Fig. 2.

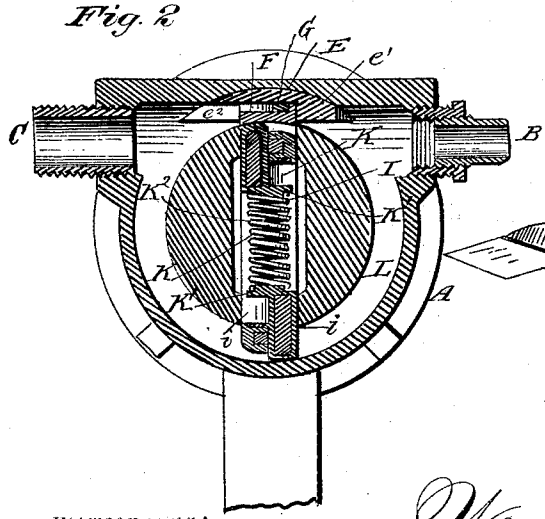
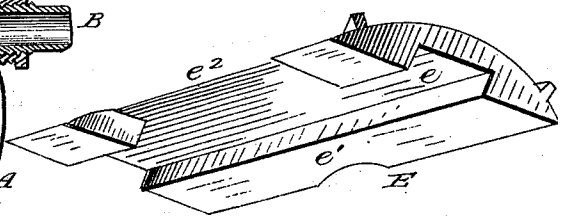


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

W. C. PHILLIPS.

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Fig. 4.

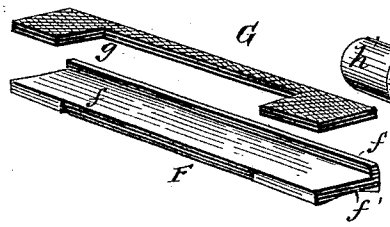


Fig. 5.

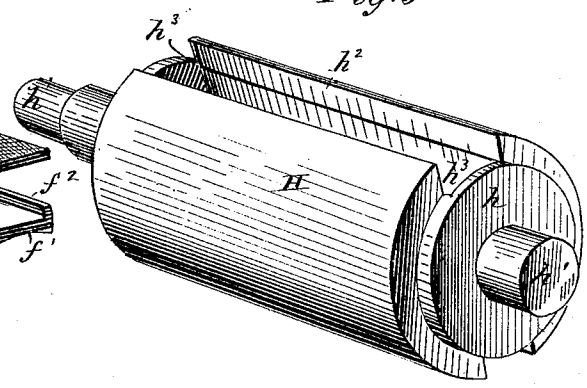


Fig. 6.

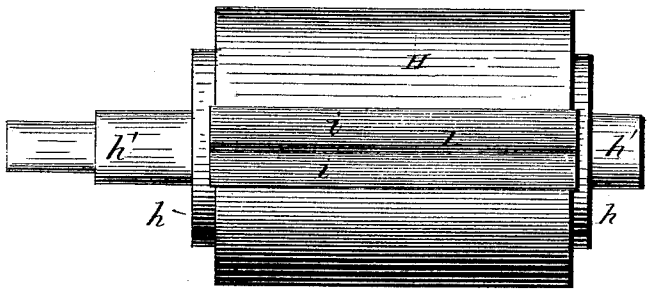
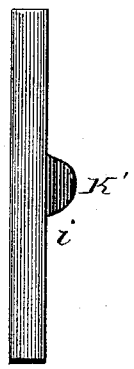


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM C. PHILLIPS, OF NEWPORT, KENTUCKY.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 232,901, dated October 5, 1880.

Application filed June 30, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. PHILLIPS, of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Rotary Pumps; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The nature of my invention relates to an improved rotary pump, which I propose designating as an "endless-plunger pump;" and it consists in the features of construction and combination hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the pump, showing the exterior thereof. Fig. 2 is a transverse section taken on a vertical plane indicated by the dotted line *x x*, Fig. 1. Fig. 3 is a perspective view of the seat. Fig. 4 is a like view of the tangent-plate and its accompanying packing. Fig. 5 represents the piston detached. Fig. 6 is a plan view, and Fig. 7 an edge view, of the plunger.

Like letters in the several figures indicate like parts.

As herein shown, the barrel A, which is formed of iron or other suitable metal, is bored out smooth and formed with the faced-off flanges *a* at each end. The length and diameter of this barrel may be equal, or the proportions may be varied as desired.

B designates the inlet-opening, and C the outlet-opening, these being located at the sides of the barrel midway of its length and at a distance apart equal to about one-third of the diameter of the barrel at the inside.

D D represent the heads, which are faced smooth on the sides joining the flanges *a*, each head being formed with a central opening for the shaft, and a depression or socket, *d*, to receive the shoulders of the piston. The exterior of each head is preferably formed with a hub, *d'*, which constitutes a bearing for the shaft passing through it.

The seat E, which is fitted to the inside of the barrel, is of even length with the said barrel, and is arranged between the inlet and outlet openings. The upper surface of this seat is made to correspond with the inner side of the cylindrical barrel, so that the seat will fit closely thereto. The lower face of the seat is formed with a longitudinal recess, *e*, equal in length to the length of the barrel, and running parallel with the axis of the piston. This recess is closed on the inlet side of the barrel by the part *e'* of the seat, but opens at the outlet side of the barrel through the enlarged recessed portion e^2 of the seat. The depth from the center of the under side of the seat to the barrel may be about one-eighth the diameter of the barrel. This seat may be made of Babbitt metal and cast in place after boring out the barrel, or it may be made in any suitable way and then secured within the barrel by screws.

The tangent-plate F may be made of the same material as the seat E. This tangent-plate consists of a rectangular bar, flat upon one side, as at *f*, and concaved upon its other side, as at *f'*, and being also formed with a rib or flange, f^2, along one of its edges. It is arranged in the recess *e* of the seat E, with its rib or flange within said recess and its flat surface resting upon springs or upon a packing, G. The concave face of the tangent-plate fits the face of the piston, and its back and ends may be indented to receive packing. The packing G next to the outlet side is cut away, as at *g*, so as to allow any pressure from the water to act under and thus hold the plate against the piston.

The piston H is made of iron or other metal, and has at each end a shoulder, *h*, from which projects a shaft, *h'*. The piston is preferably made in one piece, and is formed with a slot or mortise, h^2, which extends through its middle from side to side and between the shoulders *h*. The jaws of this slot or mortise are parallel with each other, and they may be recessed, as at h^3, to receive packing. The width of this slot or mortise may be one-fifth the diameter of the barrel.

The length of the piston is the same as the length of the barrel. Its diameter may be three-quarters that of the barrel; also, the shoulders *h* may be one-half the diameter of that of the barrel, and in thickness one-tenth or one-fif-

teenth, as may be desired for strength. The shafts may be one-fourth or one-fifth the diameter of the barrel, and as long or short as desired.

The plunger I is composed of two plates, *i i*, which are fitted together and arranged to work in the slot or mortise of the piston. These two metal plates are alike in their conformation, and they are made smooth upon all sides. The two plates comprising the plunger have their adjacent faces provided with sheet-packing, and the said plates are held together by stubs or screws, or I may form each plate with a recess, K, and at one end of each recess form a lug, K′, in such manner that when the plates are placed together and a coiled spring, K^2, arranged within the recesses, the lug of one plate will bear upon one end of the spring, while the lug of the other plate will bear upon the remaining end of the same. In this way an expansible plunger will be formed which during operation will always ride easily over the surfaces with which it comes in contact.

The dimensions of the piston are such that when it is in the position shown in dotted lines, Fig. 2, the beveled ends will touch the barrel and the tangent-plate, while the square ends thereof touch the heads of the barrel, as clearly illustrated. While the plunger should fill the mortise through the piston, it must be free to slide therein at right angles to the axis of the piston.

The several parts being adjusted in position, the ends of the piston will touch the heads of the barrel, the side of the piston will touch the tangent-plate, which, as before stated, is concaved so as to conform to the diameter of the piston, and an annular chamber, L, will be left between the piston and the inner cylindrical face of the barrel, excepting where the piston comes in contact with the tangent-plate in the seat E. When the plunger is vertical to this seat the chamber L will be divided equally.

The operation is as follows: The piston being turned so as to bring the plunger intermediate of the inlet and outlet, one end of the plunger will touch the tangent-plate F, while the other end will touch the barrel, as illustrated in Fig. 2. As the piston and plunger are rotated in the direction of the arrow the pressure on the end exposed in the outlet side forces half the plunger into the suction side, thus forcing and drawing the liquid until a half-revolution is made. As the plunger continues to rotate it strikes against the seat, and is therefore forced into the slot of the piston, as at the start, just described.

The continual replacement of the plunger by its own action makes a continuous pump, which will draw and force a liquid in a constant stream.

The constant capacity of the pump will be as the area of the chamber and the velocity of the plunger, less a slight loss by the retrocession of each half-plunger.

What I claim, and desire to secure by Letters Patent, is—

1. In a rotary pump, the combination of the barrel with a slotted or recessed seat, E, arranged intermediate of the inlet and outlet openings, and a concaved tangent-plate, F, arranged within the recess of the seat, substantially as set forth.

2. In a rotary pump, the combination, with the barrel, of a recessed seat, E, arranged intermediate of the inlet and outlet openings, a concaved tangent-plate, F, arranged in the recess of the seat, a rotary piston arranged to be in constant contact with the tangent-plate, and formed with a mortise from side to side, and a plunger, I, composed of two plates fitted together, as described, and arranged to slide in the mortise of the piston at right angles to the axis of the same, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

WILLIAM CHURCH PHILLIPS.

Witnesses:
JACOB N. M. CREUTZ,
JOHN PHILLIPS.