(No Model.)

3 Sheets—Sheet 1.

M. L. WOOD.

Pump.

No. 236,747. **Patented Jan. 18, 1881.**

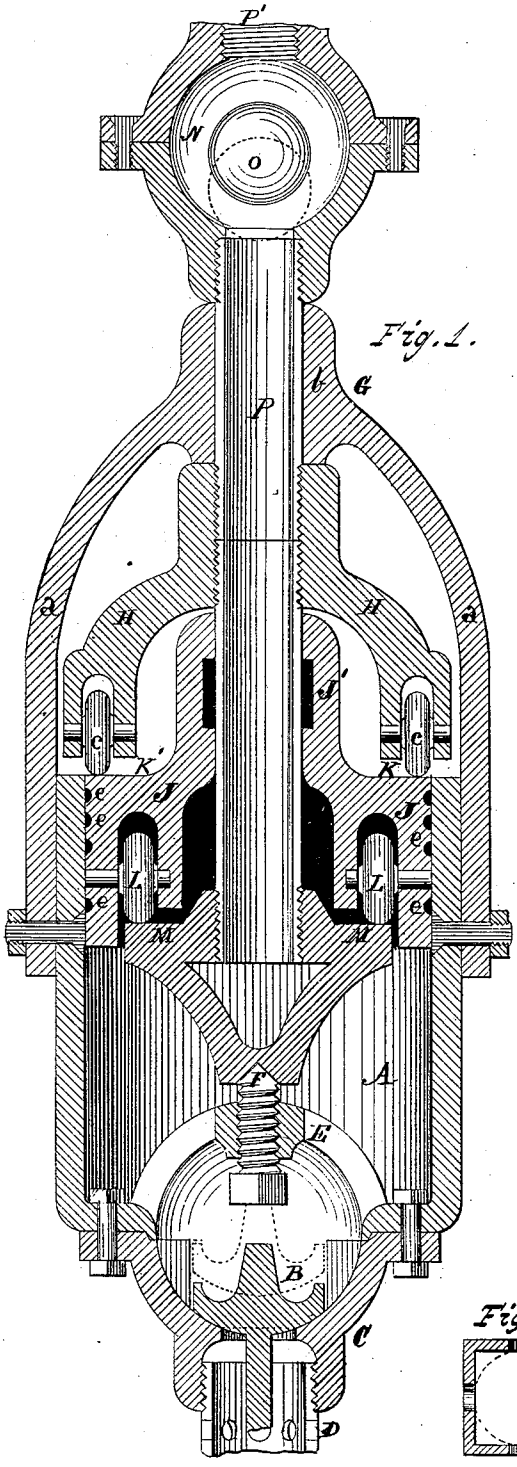


Fig. 1.

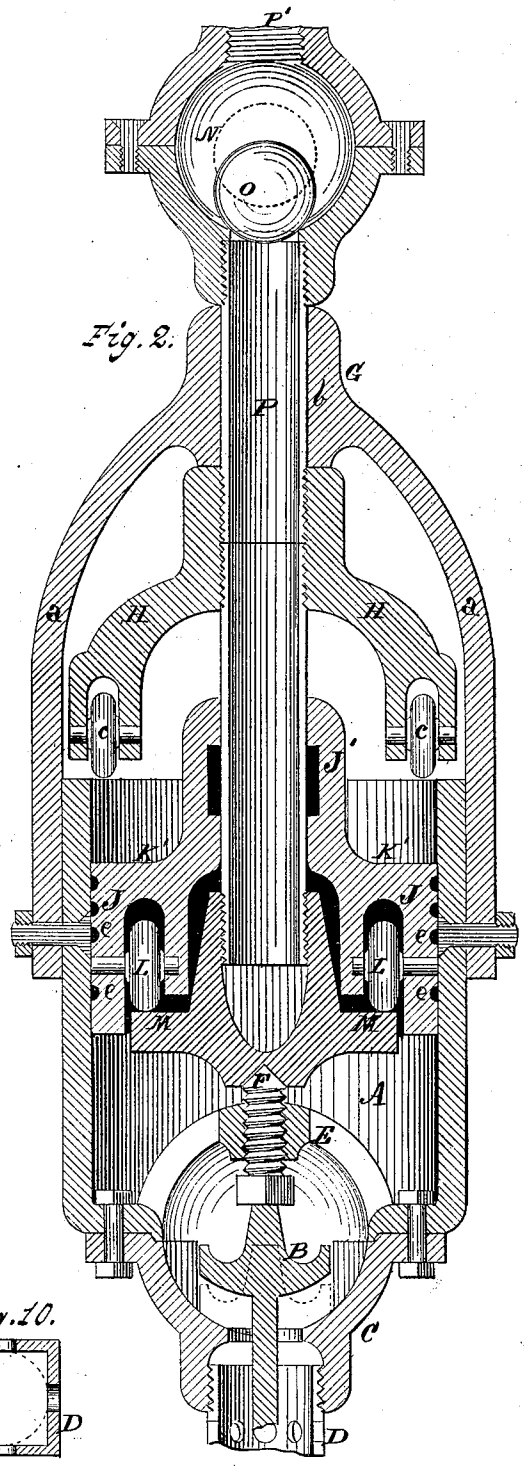


Fig. 2.

Fig. 10.

Witnesses. Fred J. Mosher.
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(No Model.) 3 Sheets—Sheet 2.

M. L. WOOD.

Pump.

No. 236,747. **Patented Jan. 18, 1881.**

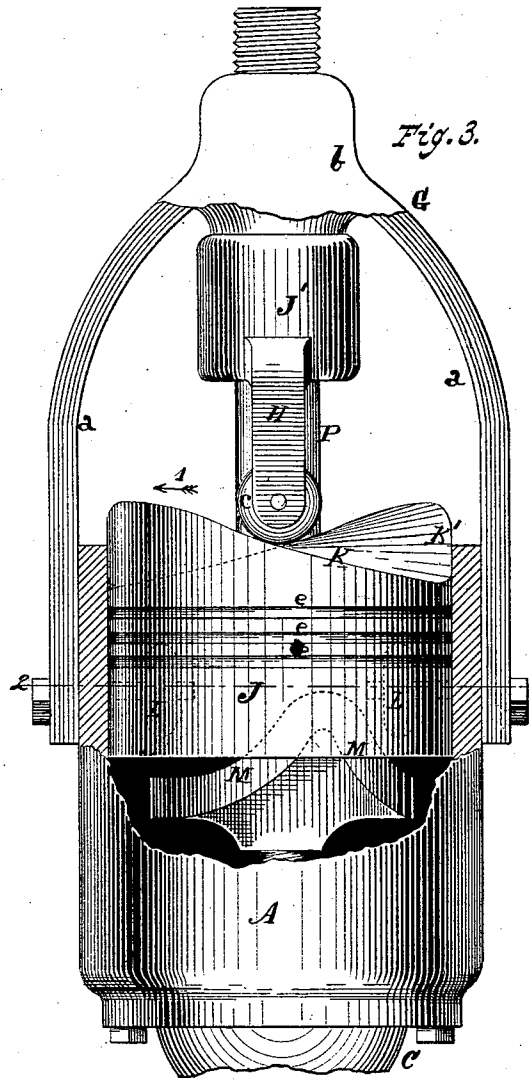


Fig. 3.

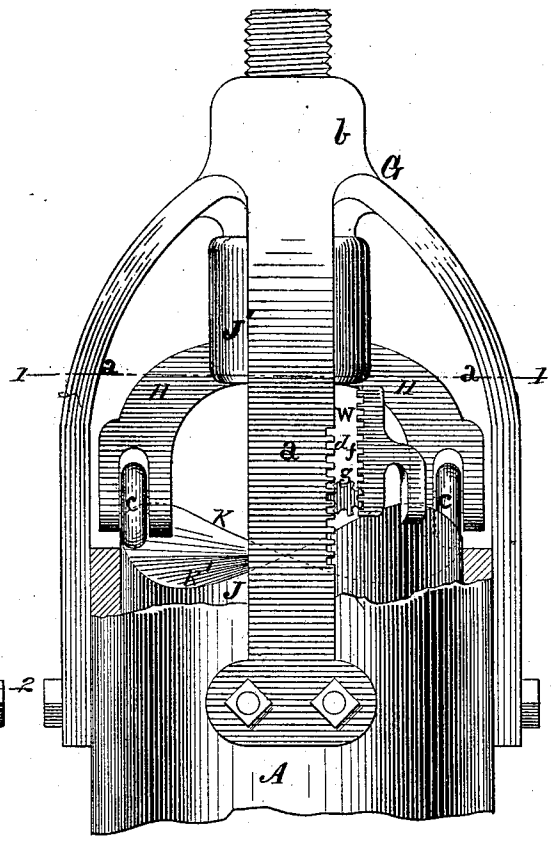


Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

M. L. WOOD.

Pump.

No. 236,747. Patented Jan. 18, 1881.

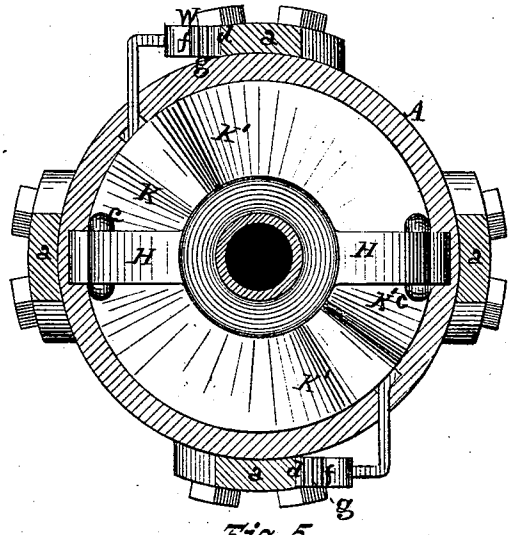


Fig. 5.

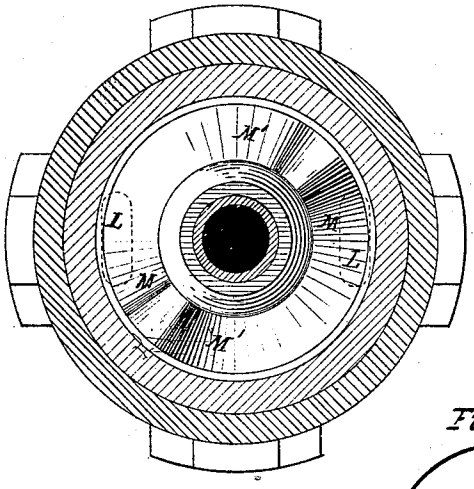


Fig. 6

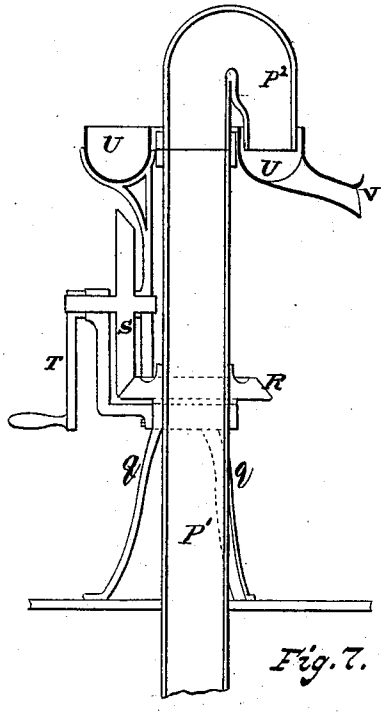


Fig. 7.

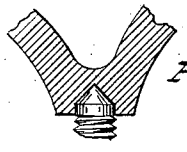
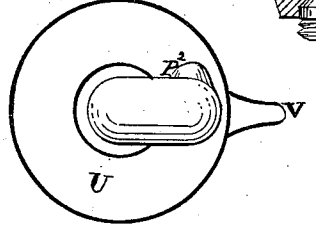


Fig. 8.

Fig. 9.



Witnesses.
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UNITED STATES PATENT OFFICE.

MERRITT L. WOOD, OF ALBANY, NEW YORK.

PUMP.

SPECIFICATION forming part of Letters Patent No. 236,747, dated January 18, 1881.

Application filed September 28, 1880. (No model.)

To all whom it may concern:

Be it known that I, MERRITT L. WOOD, of the city and county of Albany, and State of New York, have invented new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to pumps in which a piston is made to move in a reciprocating manner in a water-cylinder by the operation of a revolving discharge-pipe or water-conveyer, carrying depressing-wheels operating with a cam-track connected with the piston, and an elevating cam-track operating with wheels, also connected with the piston.

The object of my invention is to produce a pump which will operate to force water to any selected elevation by rotating the discharge-pipe, and thereby imparting to the piston a reciprocating motion or movement in the water-cylinder, so as to alternately receive and discharge the water. I attain this object by means of the mechanical devices illustrated in the accompanying drawings, (in three sheets,) in which—

Figure 1 represents a sectional elevation of the pump when the piston is raised to its highest point of elevation. Fig. 2 is a sectional view of the same when the piston is fully depressed and in the act of being elevated. Fig. 3 is a side elevation of the pump with parts broken away, and illustrating the piston partly elevated. Fig. 4 is a side elevation of a section of the pump, illustrating the means for holding the piston from rotating. Fig. 5 is a horizontal view of the pump, taken at line No. 1 in Fig. 4. Fig. 6 is a plan view of the elevating cam-track, taken at line No. 2 in Fig. 3. Fig. 7 is a sectional elevation of the discharge-pipe and means for rotating the same, and the trough into which the water is discharged. Fig. 8 is a sectional elevation of the step supporting the elevating cam-track. Fig. 9 is a plan view of the upper or discharge end of the discharge-pipe and its circular trough. Fig. 10 is a horizontal view of the lower or terminating end of the inlet-pipe, for holding the pump from revolving.

Similar letters refer to similar parts throughout the several views.

In the drawings, A represents the water-receiving cylinder, which cylinder is made of metal and closed below by valve B, and is open at its upper end. The valve B is held in a seat made with the attached bottom piece, C, as shown in Figs. 1 and 2, and when lifted permits the water to enter the receiving-cylinder A from the inlet-pipe D, attached to the bottom piece, C. The said inlet-pipe has its lower end preferably made square in form, as shown in Fig. 10, that it may engage and hold with a supporting-piece (not shown) fixed in the well below the surface of the water, and provided with a square hole corresponding with the square form of said inlet-pipe, so that the said squared inlet-pipe will hold the cylinder A from being turned or revolved. Above the bottom piece, C, and projecting upward to a short distance within the water-cylinder, is a bracket, E, provided with a screw-threaded step, F, the purpose of which will hereinafter be described.

Secured to the upper portions of the water-cylinder, and from its outer side, are a cluster of two or more supporting-arms, *a a*, cast solid with a sleeve, *b*, which sleeve and its said attached arms form a suspension-bracket, G, for holding the water-receiving cylinder, in connection with the discharge-pipe P, which discharge-pipe nicely fits the sleeve *b* and will revolve within the same. If selected, the said suspension-bracket G may be made in shell form and be provided with perforations for the free passage of air and water.

Secured to the discharge-pipe P so as to revolve with the same are arms H H, which arms carry wheels *c c*.

Placed below the arms H H, and within the upper open end of the water-receiving cylinder, is the piston J, which piston nicely fits within said water-receiving cylinder, and freely works within the same in a vertically-reciprocating manner. The said piston is provided with a sleeve, J′, which nicely fits the discharge-pipe P, which pipe revolves within the said sleeve of said piston. The said piston is made of cylindrical form, and has its upper end closed. Made with the upper closed end of the said piston are the duplicated inclined cam-tracks K K′. Secured within the concavity of the piston are wheels L L.

Securely attached to the lower end of the discharge-pipe P, so as to revolve with the same, is the duplicated inclined cam-track M M′, which cam-track is supported on step F,

held in the bracket E, as shown in Figs. 1 and 2. The said step is made in the form shown in Fig. 8, and holds the cam-track M M′ and the lower end of pipe P steady and central within the water-receiving cylinder.

Secured to the discharge-pipe P, immediately above the sleeve *b* of the suspension-bracket G, is the valve-cap N, within which works the valve O. Leading from said valve-cap is the discharge-pipe P′, which discharge-pipe is, in fact, a continuation of the discharge-pipe P, and extends to the top of the well, and is supported in a frame or bracket, Q, and is provided with a bent discharge end, P^2.

Secured to the discharge-pipe P′ at a convenient distance above the covering of the well is a bevel-gear wheel, R, preferably supported by bracket Q, and actuated by a bevel-gear, S, rotated by crank T.

Secured around the upper end of the discharge-pipe P′, and supported from bracket Q at a line about on a horizontal plane with the discharge end P^2, is a circular receiving-trough, U, provided with a discharge-spout, V.

To avoid packing the piston I form on the outer circumference of the same one or more grooves, *e*, Figs. 2 and 3. If desired, the said grooves may be formed in the inner side of the shells or walls of the water-receiving cylinder A.

To prevent the piston J from being rotated or moved about the discharge-pipe P and within the water-receiving chamber A, I employ stops W, (two or more,) which stops are connected by suitable arms to the piston at its upper end, and operate against the edge of arms *a* of the suspension-bracket G, or to a piece fixed thereto, in a direction corresponding with the direction of the revolutions of the discharge-pipe and its attached arms H. To reduce friction of the stop with the surfaces of the arms H and permit the piston to freely move in either direction without binding, I form with said arms racks *d*, and with the stop W rack-teeth *f*, and interpose between these two racks a tooth-pinion, *g*, as shown in Figs. 4 and 5. These racks, together with the interposed pinion, effectually hold the piston from being turned, and at the same time cause the friction to be almost wholly nominal.

Having described the construction of the several parts of my improved pump, I will proceed to describe the operations of its several parts.

The pump is submerged in the water about centrally at or near the bottom of the well, and resting on a supporting-piece and firmly engaged therewith by the inlet-pipe D. Being thus fixed, the water-receiving cylinder A will be held from revolving. When the operator turns crank T, motion will be communicated to the discharge-pipe P^2, P′, and P through the bevel-gears R S, and said pipe will be revolved. The arms H and their attached wheels *c c*, being secured to said discharge-pipe, will also be revolved. When the piston is raised to its highest point of elevation the wheels *c c* will have a bearing on the cam-track at the foot of the inclines K K′. The arms H, being rotated, will carry the wheels *c c* in a circular path and in a uniform horizontal plane, and when said wheels *c c* are at the foot of the incline K′, and made to advance in direction of arrow 1 in Fig. 3, the piston will be gradually depressed by the wheels *c c*, and will force the water within cylinder A to escape (the valve B being closed) through the discharge-pipe P P′ P^2 and opened valve O. When the wheels *c c* have been carried by their rotating arms H H to the apex of the inclines K K′, the piston will be depressed to its fullest extent. I will here observe that the depressing-wheels *c c* are so placed in relation to the cam-track M M′ that said wheels are always on a vertical line drawn through the apex of the inclines of said cam-track, and that the said wheels and cam-track are revolved simultaneously, while the piston is held from turning. When the piston has been fully depressed the wheels L L, secured to the piston J, rest on the cam-track at the foot of their inclines, and the said cam-track, being revolved in the direction of arrow 1 in Fig. 3, will have their inclines moved under wheels L L, and said wheels will be made to mount said incline and force the piston upward. The downward action of the piston being suspended, the force exerted to lift the valve O is thereby withdrawn, and said valve drops to its seat, retaining the column of water above it, and as the piston is forced upward by the operation of the wheels L and the cam-track M M′, the valve B is raised and the receiving-cylinder is refilled by the pressure of water from the outside. When the said piston is fully raised the wheels *c c* will stand at the foot of the inclines K K′, ready for operation to again depress the piston. The rotation of the discharge-pipe and its connected wheels *c c* and cam-track M M′ being continued, the piston will be alternately raised and depressed, and the water will be alternately forced within the cylinder and discharged therefrom.

I would here observe that I prefer to make the incline M of the elevating cam-track measurably abrupt, so that it will operate suddenly to elevate the piston, and also correspondingly to reduce the grade of the inclines K and extend them as much as practicable for the purpose of increasing the time through which the upward flow of water is maintained during the revolution of the discharge-pipe.

I would also remark that if selected the incline K′ may also be dispensed with, as it does not contribute to the depression of the piston. These inclines M′ and K′ are only used as safety devices to prevent a breakage or disarrangement of parts, if in any case the discharge-pipe is accidentally revolved in an opposite direction.

It will readily appear that when the discharge-pipe is revolved the elevating cam-track M M′ and the depressing cam-track K K′ will (when operating with their respective

coacting wheels L and *c*) alternately move the piston in a reciprocating manner within the water-cylinder, and that this movement will be positively effected in all cases.

The stops W W, being placed at opposite points, as shown in Fig. 5, coact with the discharge-pipe centrally in the sleeve of the piston, and the arms *a a* of the suspension-bracket G hold the piston steady and central within the water-cylinder, and from rotating therein, while the racks *d* and *f* and pinion *g*, working with said racks, almost wholly reduce the friction which would attend the immediate contact of the said stops with the said arms. By means of the grooves *e e*, made in the periphery of the piston or in the inner side of the water-cylinder, all necessity of packing is obviated.

I would have it understood that I do not confine myself to any particular form of valves, or to the use thereof, as most of the known valves will be suitable; neither would I confine myself to the particular order of arrangement of parts as above described, as it is evident that their order of arrangement may be reversed when some of the parts are modified to adopt such reversal of parts.

When the discharge-pipe is revolved and the operating parts are made to move, as before described, the water received within the water-cylinder will be forced upward through said discharge-pipe, and the water will be discharged therefrom through the bent discharge end P^2 into the circular trough U, and thence pass out through spout V.

It is clear that if a close hood be employed instead of arms *a a* or suspension-bracket, and a suitable opening be made into the pipe P from the chamber inside the hood, and a valve opening from the water outside into this chamber, the result will be a double action, or, in other words, a discharge of water will be had during the upward as well as the downward movement of the piston.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a stationary water-receiving cylinder and a reciprocating moving piston held from revolving within said cylinder and provided with rollers or wheels L, of the cam-track M M′, attached to the water-conveyer P, and revolved by means of the same, substantially as set forth.

2. The combination, with a stationary water-receiving cylinder, A, and piston J, provided with cam-track K K′, and held from revolving within said cylinder, and adapted to be moved longitudinally within the same, and the wheels L, fixed to said piston, of the cam-track M M′ and depressing-wheels *c c*, revolved by a water-discharge pipe or conductor, substantially as set forth.

3. The combination, with a stationary water-receiving cylinder, A, provided with valve B and piston J, of the wheels carried by said piston, depressing cam-track K K′, made upon the upper end of the same, and the revolving discharge-pipe P, carrying the elevating cam-track M M′ and depressing-wheels *c c*, whereby the said piston will be made to have a reciprocating movement within said cylinder, as and for the purpose set forth.

4. The combination, with the stationary water-receiving cylinder A, provided with a reciprocating moving piston operated by mechanism revolving in a direction at right angles with the direction of the movement of said piston, of the stops W and arms *a a*, whereby said piston will be held from rotating, as set forth.

5. The combination, with piston J, having a reciprocating movement in a longitudinal direction, caused by revolving mechanism operating said piston, of the racks *d* and *f*, and pinion *g*, and arm *a*, and stop W, as and for the purpose set forth.

6. The combination, with the water-receiving cylinder A, provided with valve B, and a reciprocating moving piston, J, which is held from revolving within said cylinder, of the revolving discharge-pipe P P′, carrying a valve-chamber and valve, O, and mechanism operating with said piston to alternately elevate and depress said piston, as and for the purpose set forth.

MERRITT L. WOOD.

Witnesses:
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