(No Model.)

T. ROSE.

PUMP.

No. 244,673. Patented July 19, 1881.

Fig. 2.

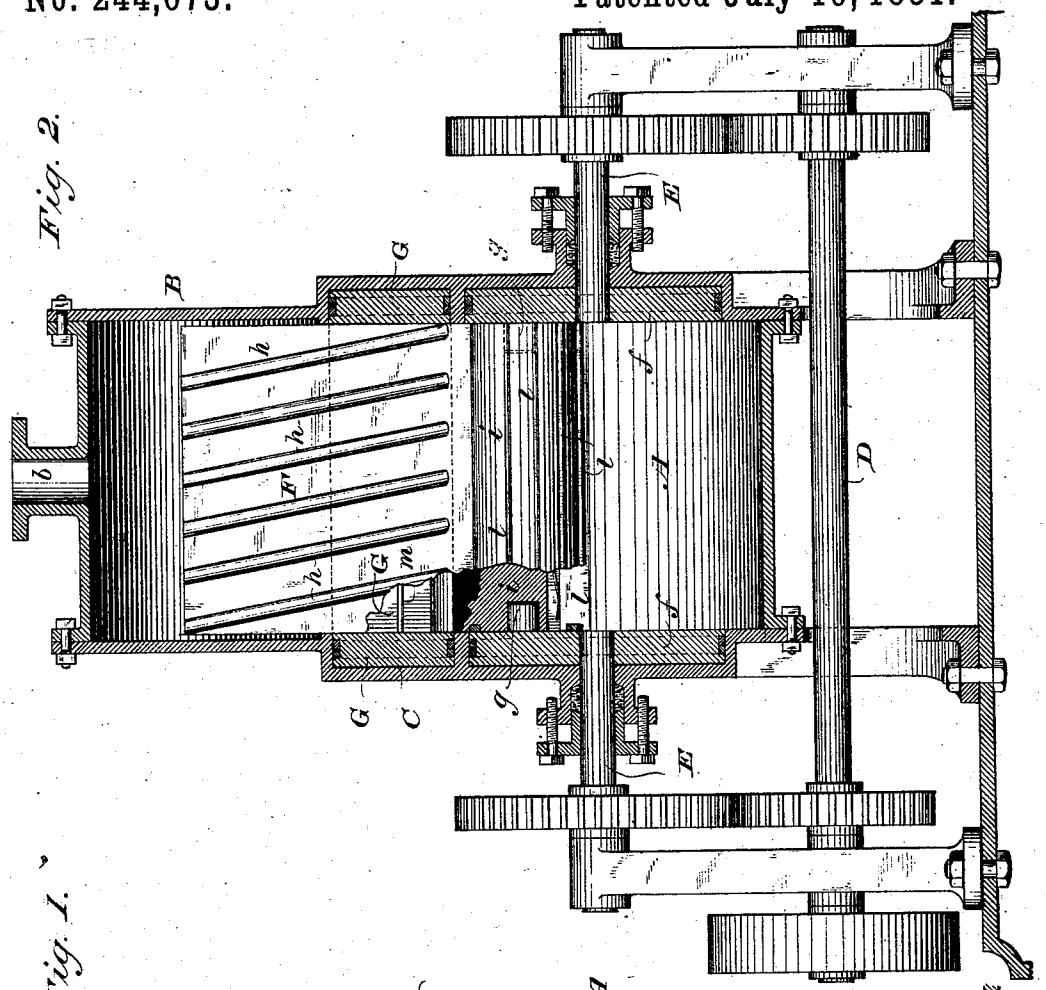
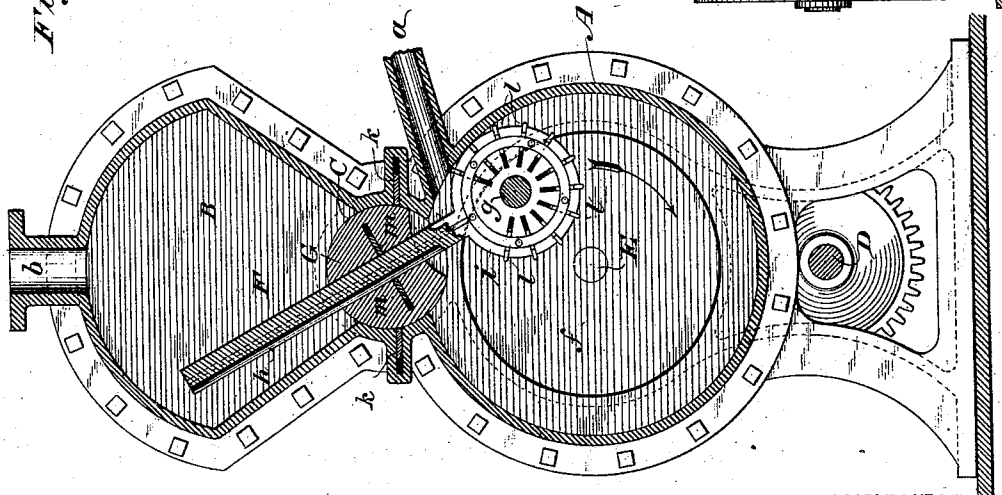


Fig. 1.



WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS ROSE, OF SAN ANTONIO, TEXAS, ASSIGNOR TO ROYAL CHAPIN, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 244,673, dated July 19, 1881.

Application filed November 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS ROSE, of San Antonio, in the county of Bexar and State of Texas, have invented a certain new and useful Pump; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My novel pump has been specially devised for use in pumping gas, air, or vapor—as in ice-machines, for instance—and mainly with reference to attaining circulation with low pressure; but when operated at high speed considerable pressure may be attained therewith, whether operating upon vapor or liquids, as I believe my pump involves a novel mode of operation, in that it possesses characteristics partially common to pumps of the rotary system, as well as to those having a reciprocating piston. Otherwise stated, my pump contains a piston which is operated rotatively, as in a rotary pump, and also reciprocally, as in the sliding-piston pump; and, further, no valves are required therein, because of its analogy to a rotary pump. The piston, however, by reason of its peculiar construction, operates in one sense as a valve, in that the exit from the pump-chamber is opened or closed according to the position occupied by the sliding piston during its reciprocating motion.

To more particularly describe my invention I will refer to the accompanying drawings, in which Figure 1 is a transverse vertical central section of a pump embodying my invention. Fig. 2 is a central vertical section of the same in a plane at right angles to that shown in Fig. 1.

The pump-casing will usually be composed of metal, and in such sectional arrangement as may be conducive to economic construction. It essentially contains a main chamber, A, and an auxiliary chamber, B, and what I will term a "rock-shaft chamber," C, located between them. The interior walls of the main chamber A and rock-shaft chamber C must be truly finished, the former being a hollow cylinder and the latter practically so, for receiving the rock-shaft and affording a good bearing therefor, after the manner of a journal-box. The induction-port *a* is located in the circular wall of the main chamber, closely adjacent to the rock-shaft chamber, and the exit-port *b* is located in the top of the auxiliary chamber B. The casing is mounted firmly upon suitable supports, and provided with a foundation, upon which the boxes for the driving mechanism are also supported; or these latter may be sustained wholly by the casing if it be constructed heavily enough for that purpose.

The main shaft D is driven by a pulley or gear, and it communicates with the piston-shaft E by counterpart pinions on said shaft and gears on the pump-shaft, which is constructed in two parts, so as not to occupy the interior of the pump-chamber. Each portion of the pump-shaft has keyed to its inner end a disk, *f*, which occupies an annular recess in the head of the pump-chamber, and said two disks are either coupled together by a rod, or each may be provided, as shown, with a cylindrical journal-stud, *g*, located on the inner side of the disk and near its periphery, after the manner of a crank-pin, and the gearing so drives the disks that these studs always occupy the same position with reference to each other.

The piston F is in form flat, straight plate, well finished on both sides, and provided on one side with a series of longitudinal channels, *h*, and at one end with a solid cylinder, *i*, axially chambered at each end to receive the journal-studs *g*, and be thereby operatively connected with the disks *f* and their driving mechanism. The periphery of the cylindrical portion of the piston is closely located adjacent to the interior surface of the main chamber A, and the flat portion, occupying the same plane as the axis of the cylindrical portion, extends from the main chamber through a rectangular opening in the center of the rock-shaft G into the auxiliary chamber B. The rock-shaft G is journaled throughout its length, and has its bearings afforded by the finished walls of the rock-shaft chamber C and annular recesses in the end plates of the casing.

With the parts as thus described it will be readily seen that as the disks are rotated in the direction of the arrow in Fig. 1 the lower end of the piston will be carried thereby in a

circular line away from the induction-port *a*, thereby inducing the vacuum requisite for charging the main chamber, and that when one or more revolutions have been made the contents of the main chamber will each time be forced through the several channels *h* in the rear side of the flat portion of the piston upward and into the auxiliary chamber, and thence through the outlet-port *b*. The channels *h* in the piston extend from the outer end thereof to such a point thereon as will enable them to be practically closed by the rock-shaft during the passage of the lower end of the piston in its closest proximity to the rock-shaft, and just prior to its passage across the inlet-port. The longitudinal movement of the piston in its passage through the rock-shaft imparts to its upper end a vibratory movement, and therefore the auxiliary chamber need only be of such internal dimensions and form as will afford the requisite space traversed by the piston during its complex movements.

With reference to the packing of the several parts of the pump at which leakage should be prevented, I am aware that further use and experience are probably required to develop the systems of packing best adapted thereto; but so far as my experience goes the usual and well-known forms of gland-packing may be relied upon adjacent to the piston-shaft E, as indicated in the drawings. As between the peripheries of the disks *f* and the coincident surfaces of the annular recesses in the casing, I employ expansive metallic segmental sections, after the manner of piston-packing in steam-engine cylinders, and the same method may be also relied upon for packing between the rock-shaft and the recesses in which its ends are respectively located. As between the rock-shaft and its main or longitudinal bearings, I rely upon a pair of straight metallic bars or plates, *k*, housed in recesses in the casing or wall of the rock-shaft chamber C, and so backed up by springs as to cause them to bear with regularity and in close contact with the periphery of the rock-shaft.

In packing with relation to the piston I have to provide for its complex movement and its constantly-varying relations to the interior surface of the chamber A. The lower end or cylindrical portion *i* of the piston enables it to present consecutively and progressively different portions of its periphery for close contact with the chamber, and therefore I provide a series of independent packing-strips, *l*, located in longitudinal radial recesses at equidistant intervals throughout its periphery, so that some one or more of these strips will always be in packing contact with that portion of the chamber-wall for the time being traversed thereby. These packing-bars *l* are preferably capable of radial movement within certain limits, and so backed up by springs as to enable them to compensate for wear and to maintain good packing contact. In each end of the cylindrical portion of the piston annular grooves cotaining flat ring-packing backed by springs may be relied upon for maintaining a packed joint between it and the disks *f*.

For packing between the reciprocating flat portion of the piston F and the coincident surfaces of the rock-shaft I employ the strips or bars *m*, occupying oppositely-located recesses in the interior of the rock-shaft, and so backed up by springs as to force them into good packing contact with both sides of the piston. For obviating irregular wear of the packing *m* on the channeled side of the piston, the channels *h* are inclined or laid out angularly with reference to the edges of the piston, so that in the reciprocating movement of the piston the packing on that side throughout its length will be swept or traversed by the channels, they being inclined sufficiently to cause the upper end of each to extend beyond a right line occupied by the lower end of the next adjacent channel.

I am well aware that much variation may be made in details of construction without departing from the main feature of my invention, and I do not therefore limit myself to the precise construction illustrated and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The pump, substantially as hereinbefore described, embodying the main and auxiliary chambers and the rotary reciprocating channeled piston.

2. The combination of the two chambers, the rock-shaft and its chamber, the revolving disks, and the piston, substantially as described.

3. The combination of the chambers, rock-shaft, and revolving disks, and the piston, partially flat and channeled and partially cylindrical, substantially as described.

4. The reciprocating rotary piston provided with inclined channels, in combination with packing upon the channeled face of the piston, substantially as described.

5. The reciprocating rotary piston provided with a cylindrical lower end and longitudinal packing, in combination with the chambers, rock-shaft, and disks, substantially as described.

THOMAS ROSE.

Witnesses:
W. W. HERRON,
JAMES DURYEE STEVENSON.