

J. W. Hoagland,

Pump Piston,

N^o 56,414.

Patented July 17, 1866.

Fig: 1.

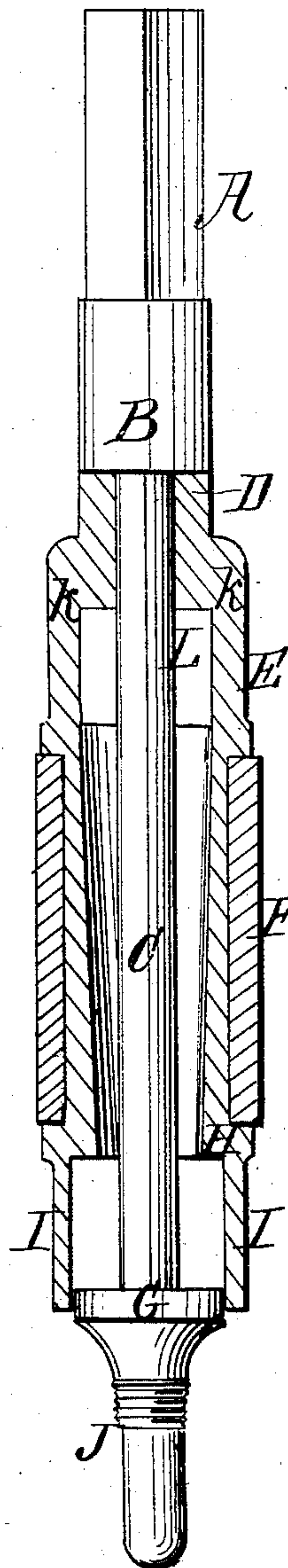
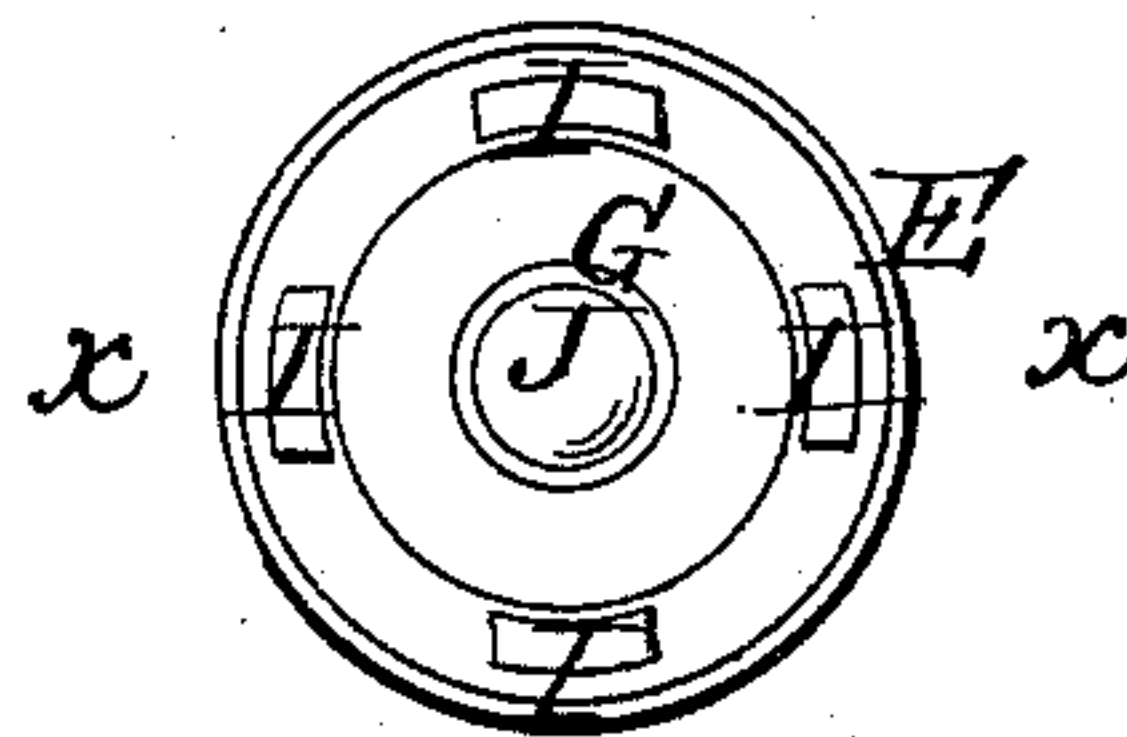


Fig: 2.



Witnesses;
Wm. A. Atwood,
Geo. B. Herrington.

Inventor
J. W. Hoagland.

UNITED STATES PATENT OFFICE.

I. W. HOAGLAND, OF NEW BRUNSWICK, NEW JERSEY.

IMPROVEMENT IN PISTONS FOR DEEP-WELL PUMPS.

Specification forming part of Letters Patent No. 56,414, dated July 17, 1866.

To all whom it may concern:

Be it known that I, I. W. HOAGLAND, of New Brunswick, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Pump-Pistons for Deep Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an axial section of a piston for a pump for oil and other deep wells made according to my invention, the section being indicated on the line *x* of Fig. 2. Fig. 2 is an inverted view of the bottom or end of the piston.

Similar letters of reference indicate corresponding parts.

This invention has for its object the improvement of pumps for oil and other deep wells; and it consists in the construction of the piston, the piston-rod, and its valve. The piston-rod passes through the piston, part of which is encircled by a packing, as usual. The valve of the piston is formed on the lower part of the rod, below the tubular part of the piston, the seat of the valve being formed on the end of such tubular part. The rod extends below the valve, and has a screw-thread cut in it near its extremity, which enables the operator to screw the rod down into the bottom valve of the pump whenever the said valve is to be taken out for repairs or for other purposes. The valve of the piston is opened by pushing the rod down until a shoulder on the rod strikes against the top part of the piston. The upper part of the piston, between the cylindrical or tubular part which holds the packing and the upper extremity through which the rod passes, is left open to allow free communication between the interior of the piston and the pump-cylinder, in which it moves.

A designates the upper part of the piston-rod of a pump. E is a piston, whose sides are partly solid and partly open, its solid sides being surrounded by the ordinary packing F. The upper part of the piston above the packing is open, as shown at L, which part is sustained by ribs K, two or more in number, which connect the solid walls of the piston with the solid extremity or neck D, through

whose center the reduced part C of the piston-rod passes. This part C of the piston-rod moves within the piston and carries at its lower end a valve, G. This part C is separated from the main rod A by a shoulder, B, which rests on the solid neck D of the piston when the valve of the piston is open.

From the lower end of the piston, below the termination of its solid walls, extend several guides, I—four in number in this example—within which the valve G moves and by which it is guided in a straight line.

The seat H of the valve is formed on the bottom of the said solid part, the thickness of the walls of the piston at its bottom being increased so that a seat for the valve may be made at that part within the extensions I without making the said extensions too thin and weak to serve as guides for and to steady the valve. The length of these extensions is to be such as to allow the valve to make its full stroke without passing beyond them, as shown in the drawings.

The piston-rod is extended below the valve a little distance, as seen at J, which extension has a screw-thread cut on it, wherewith the lower or bottom valve of the pump-cylinder may be seized and drawn up out of the pump along with the piston when it is desired to renew the said bottom valve or to raise it for any other purpose.

The operation of the pump is as follows: The piston is placed in a pump-cylinder, (not shown in the drawings,) and on its downward stroke will be in the position and relation to the piston-rod and valve, as shown in the drawings, the shoulder B having struck the top of the neck D of the piston and the valve G being carried below its seat nearly to the ends of the guides I. When the piston-rod begins its descent the valve G is moved downward away from its seat H, thereby opening the piston by positive and direct means and allowing the gas and oil or other liquid present in the pump-cylinder to enter the piston without hinderance. When the shoulder B strikes the top of the neck D of the piston it begins to force the latter downward through the mass of liquids in the cylinder, the valve being still kept in the lead and the piston remaining wide open. It follows from this construction that the gas present in the pump has a free course

through the piston to the upper part of the pump, and that therefore it will not resist the descent of the piston. When the piston has made its full stroke the first part of the upward movement of the rod closes the valve by raising it up to its seat H, when the piston itself will begin to ascend, carrying upward the column of liquid through which it has passed on its downward stroke. When gas is present in a well, as is very commonly the case in oil-wells, the pressure of the gas will aid the piston in its ascent so soon as the valve of the piston is closed, and so relieve the work of the driving-power. When it is desired to withdraw the bottom valve of the cylinder by means of the screw-thread on the extension J of the piston-rod, it is not necessary, in order to screw the part J into the valve, to rotate the piston; but the piston-rod and valve G being cylindrical and being capable of rotation in the neck D and guides I, respectively, it follows that the piston need not be rotated when the piston-rod is turned for the purpose

of screwing the end J into said bottom valve, whereby much labor and time are saved in the operation, and the piston-rod and its joints are saved from the torsion and injury which follow from being compelled, as in ordinary pumps, to rotate the tightly-packed piston with the rod in such operations.

The valve G of the piston may be guided by means of a cross-bar across the interior of the piston instead of by the extensions I, if so desired by the maker.

I claim as new and desire to secure by Letters Patent—

The combination of valve G, rod C, shoulder B, neck D, guards I, and walls E, arranged with a pump-cylinder, and operating in the manner and for the purpose herein specified.

The above specification of my invention signed by me this 17th day of October, 1865.

I. W. HOAGLAND.

Witnesses:

J. VAN SANTVOORD,
WM. E. LYON.