J. G. WOLF.
Double-Acting Pump.

No. 212,777. Patented Feb. 25, 1879.

Fig. 1.

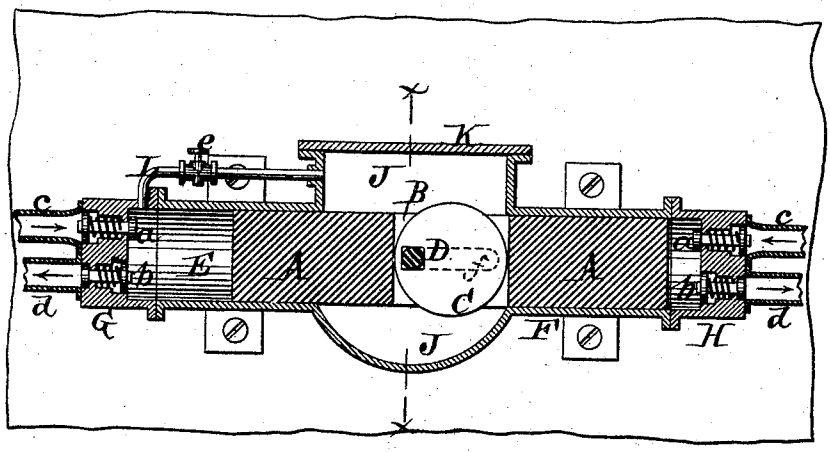



Fig. 2.

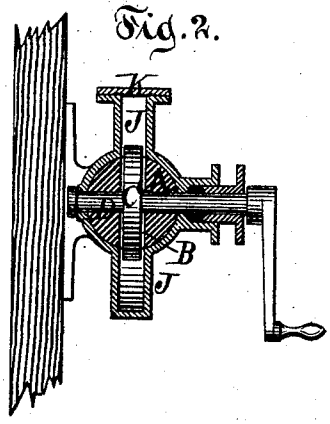



Fig. 5.

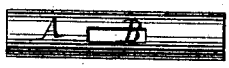



Fig. 6.




Fig. 3.

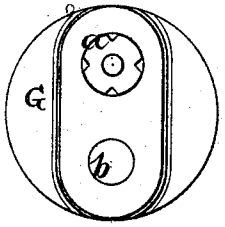
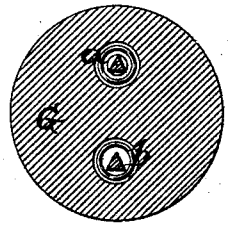



Fig. 4.




Witnesses.
Chas. Wahlers.
W. C. Hauff.

Inventor.
John G. Wolf.
by his attys.
Van Santvoord & Hauff

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

JOHN G. WOLF, OF NEW YORK, N. Y.

## IMPROVEMENT IN DOUBLE-ACTING PUMPS.

Specification forming part of Letters Patent No. **212,777**, dated February 25, 1879; application filed September 25, 1878.

*To all whom it may concern:*

Be it known that I, JOHN G. WOLF, of the city, county, and State of New York, have invented a new and useful Improvement in Double-Acting Pumps, which invention is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section of a pump embracing my invention. Fig. 2 is a cross-section thereof in the line *x x*, Fig. 1. Fig. 3 is an end view of one of the cylinders on a larger scale than in the previous figures. Fig. 4 is a cross-section of the same. Figs. 5 and 6 are detail views of the piston.

Similar letters indicate corresponding parts.

My invention consists in the combination, in a pump, of a solid piston, a recess formed in the body of said piston, an eccentric working in said recess, two cylinders inclosing the piston, and a suction and discharge valve arranged in the outer end of each of said cylinders, so that when a revolving motion is imparted to the eccentric the piston receives a reciprocating motion, and alternately acts in or upon each of the cylinders. The two cylinders emanate from a closed box or chamber, in which the eccentric moves or plays, and by which the same is inclosed or protected. This box or chamber is connected with one of the cylinders, at or near the outer end of the latter, by means of a pipe having a suitable valve, so that if this valve is opened the box or chamber is freed of any liquid or gas that may have found its way therein by leakage around the pistons, as hereinafter fully set forth.

In the drawings, the letter A designates the piston. B is its recess, and C is the eccentric working in said recess.

The piston A is made solid, and can be cast in one piece or made of sheet metal, the recess B being formed in the central part thereof.

The eccentric C is mounted on a shaft, D, which passes through a slot, *f*, formed in the sides of the recess B, as indicated in Figs. 1 and 6, so that the piston is allowed to move to and fro without obstruction from the shaft.

The letters E F designate the two cylinders inclosing the piston A. The outer end of each of these cylinders is closed by means of a head, G or H, in which are arranged a suction-valve, *a*, and a discharge-valve, *b*. These valves are of the class commonly used in pumps, and a detailed description thereof is deemed unnecessary.

To each of the heads G H is connected a liquid or gas supply pipe, *c*, and a discharge-pipe, *d*, these pipes being respectively arranged opposite to the valves *a b*.

When the shaft D is revolved a reciprocating motion is imparted to the piston A by means of the eccentric C, and the piston is caused to act alternately on each of the cylinders E F, the liquid or gas being drawn in through the valve *a* and forced out through the valve *b*.

The letter J designates a closed box or chamber, from which the two cylinders E F emanate. This box or chamber is intended to inclose and protect the eccentric C, and it has a removable top, K, to permit of introducing the eccentric, while it is made of sufficient size to afford room for the movement or play of the eccentric.

The letter L designates a pipe, by which the box or chamber J is connected to the cylinder E near its outer end, this pipe being provided with a check-valve, *e*. If, from leakage around the piston A, liquid or gas passes into the chamber J, the working of the piston is interfered with. When this is observed to have taken place, the check-valve *e* is opened, when, by the suction of the piston in the cylinder E, the gas or liquid is drawn out of the chamber J into said cylinder and discharged from the latter, the valve being closed when the piston moves outward in the cylinder, so that the liquid or gas is prevented from being forced back into the box or chamber.

The valve *e* may be so constructed as to open and close automatically.

By constructing the box J to admit the eccentric C, I can make the latter of any desired diameter without regard to the diameter of the cylinders E F—that is to say, if the box were not used it would be necessary to introduce the eccentric through one of the cylinders, and the latter would have to be made of equal diameter to the eccentric.

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

1. The combination of the solid piston A,

constructed in one piece and having an elongated recess, B, at or near its center, an eccentric, C, arranged in said recess and mounted on a transverse shaft, D, passing through the piston and recess, the two cylinders E and F, and suction and discharge valves *a b*, substantially as and for the purpose specified.

2. The combination, in a pump, of a solid piston, a recess formed in the body of said piston, an eccentric working in said recess, two cylinders which inclose the piston and emanate from a closed box or chamber, serving to protect the eccentric, and a suction and discharge valve arranged in the outer end of each of said cylinders, all constructed and adapted to operate substantially as described.

3. The combination, in a pump, of a solid piston, a recess formed in the body of said piston, an eccentric working in said recess, two cylinders which inclose the piston and emanate from a closed box or chamber, serving to protect the eccentric, a suction and discharge valve arranged in the outer end of each of said cylinders, and a pipe connecting said box or chamber with one of the cylinders, and having a suitable valve, all constructed and adapted to operate substantially as described.

In testimony whereof I have hereunto set my hand and seal this 24th day of September, A. D. 1878.

JOHN GEO. WOLF. [L. S.]

Witnesses:

W. HAUFF,

CHAS. WAHLERS.