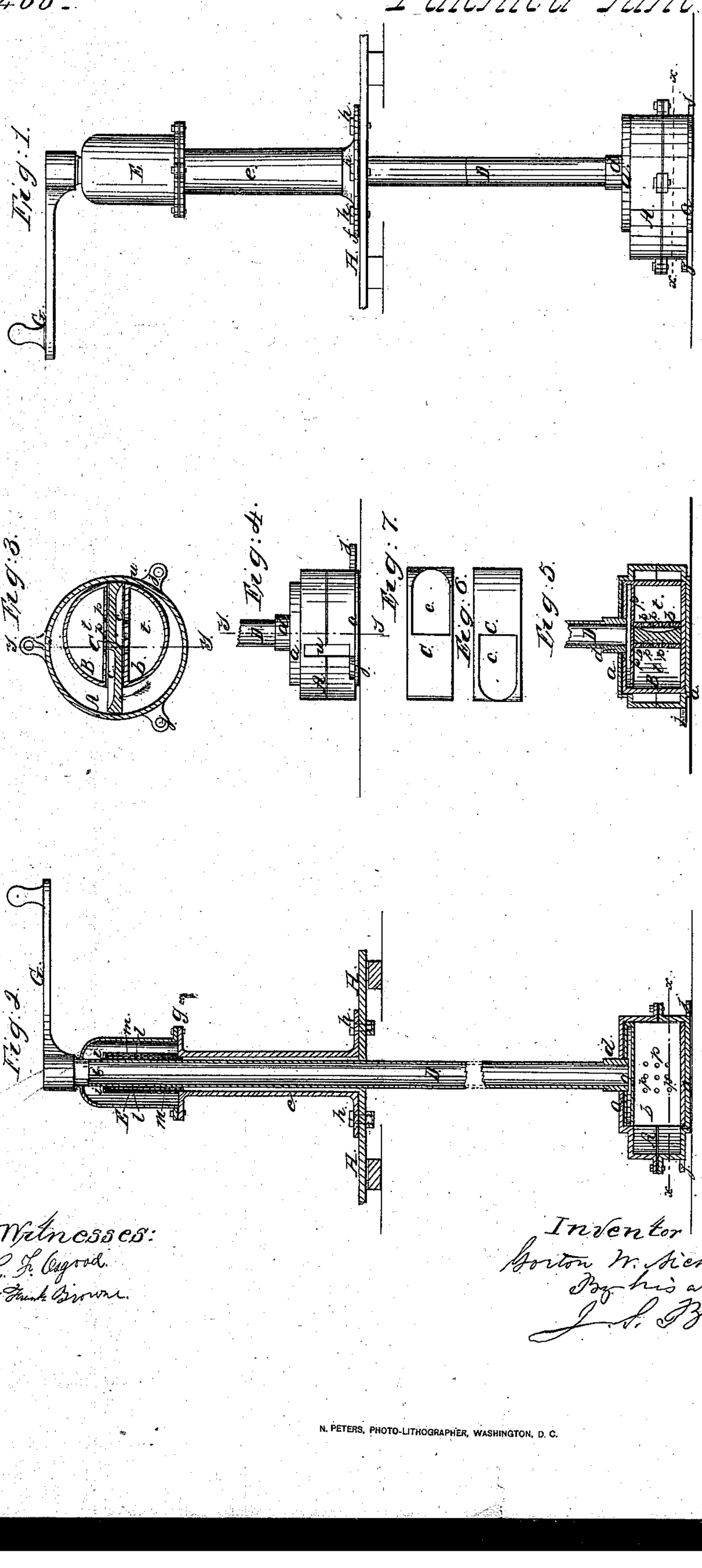
G. W. Nichols,

Rotary Pump,

No. 35,466. Patented June 3, 1862.



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UNITED STATES PATENT OFFICE.

GORTON W. NICHOLS, OF WHEATLAND, IOWA.

IMPROVEMENT IN ROTARY PUMPS.

Specification forming part of Letters Patent No. **35,466,** dated June 3, 1862.

To all whom it may concern:

Be it known that I, GORTON W. NICHOLS, of Wheatland, in the county of Clinton and State of Iowa, have invented a new and Improved Pump; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a side elevation of the pump; Fig. 2, a central longitudinal vertical section thereof; Fig. 3, a horizontal section in the plane indicated by the line *x x*, Figs. 1 and 2; Fig. 4, an elevation of the lower end of the pump, taken at right angles to the elevation, Fig. 1; Fig. 5, a vertical section in the plane indicated by the line *y y*, Figs. 3 and 4; Figs. 6 and 7, opposite side views of a part detached.

Like letters designate corresponding parts in all of the figures.

In this pump the water is raised by the use and combined arrangement of the following principal parts, as specified:

A short inclosing cylinder or case, A, is secured in the well, under the water, by the lugs *j j*, or otherwise. Within the cylinder A another cylinder, B, of smaller diameter, is placed eccentrically, so that one side touches the adjacent inner side of the cylinder A. Through the cylinder B a sliding piston, C, extends and fits closely therein. This piston also serves as the valves of the pump, no others being required. The cylinder B is caused to revolve by a vertical shaft-tube, D, which also serves as the elevating-pipe of the pump. This pipe-shaft turns in an air-chamber, E, as its bearing at the top, and it is actuated by means of a crank, G, or its equivalent. The air-chamber E is supported upon the platform H, being attached thereto by bolts *h h*, or otherwise.

The heads of the outer cylinder, A, have projecting eccentric cavities *a a* to receive the ends of the inner cylinder, B, and serve as bearings for it to revolve in. The upper cavity, *a*, should also afford sufficient room for an exit-chamber, *s*, above or in the upper end of the cylinder B. The shaft elevating-pipe D communicates with this chamber at the lower end. The said shaft-pipe D is fixed to the cylinder B and turns in the upper head of the cylinder A as its lower bearing, there being a journal, *d*, to fit the same, so as to turn water-tight therein.

The inner revolving cylinder, B, has two parallel vertical partitions, *b b*, across it, having between them a space just large enough to receive the piston C, which slides closely therein. On the outer sides of these partitions, also, there are respectively two segmental spaces or chambers, *t t*, which receive the water forced therein by the piston and deliver it through apertures *r r* upward into the exit-chamber *s* alternately. The water is forced into these chambers through single valve-spaces, or, better, through several smaller apertures, *p p*, in each partition *b*, as shown most distinctly in Fig. 2.

The piston C reaches through the cylinder B from side to side of the cylinder A, fitting or packing closely in the said sides and the heads of said cylinder around the cavities *a a*. It is turned sidewise around in the cylinder A by the revolution of the cylinder B in the direction indicated by the arrow in Fig. 3. It has two transmitting-cavities, *c c*, respectively, in the opposite sides and ends thereof, substantially as shown in Figs. 3, 6, and 7. These cavities are in the front or advancing side of each end of the piston, and as the piston in moving round diminishes the space before it in the crescent-shaped chamber in the cylinder A, around the cylinder B, the water is forced successively into these cavities, and thence through the apertures *p p* into the chambers *t t*, whence it is driven upward through the shaft-pipe D, to be discharged. Since the front sides of the piston ends thus alone communicate with the chambers *t t*, the rear sides being closed therefrom by the piston itself fitting closely against the partitions *b b*, it follows that no valves are needed other than the piston itself, and that the water continues to flow upward on the front sides, and not downward again on the rear sides. Hence the water must fill the crescent chamber in the cylinder A behind the piston each time from the well through an induction-aperture, *u*, Figs. 3 and 4, situated just in front of the tangent line of the two cylinders A B, or where the crescent chamber between them begins, substantially as shown. The transmitting-cavities *c c* of the piston are closed between the partitions *b b* just when the piston passes this induction-aperture, so that there is no waste of water there.

The upper end of the shaft-tube D fits air-

tight where it passes through the top of the air-chamber E. From the lower end of the said air-chamber a close tube, *l*, extends upward around the shaft-tube, and another tube, *m*, is secured to the shaft-tube above the tube *l* and extends downward closely outside of the said tube *l* to the bottom of the air chamber. The tube *l* is closed tight to the air chamber at the bottom, and the tube *m* is closed tight to the shaft-tube at the top. The one turns in the other as a bearing, the water being prevented from escaping thereby from the air-chamber.

The water is delivered from the shaft-tube to the air-chamber through apertures *i i*, Fig. 1, and a spout, *g*, delivers the water to the receiving-vessel in the usual manner.

If the water is to be raised no higher than the shaft-tube extends, no air chamber is required.

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

1. The combination of the eccentric inner driving-cylinder, B, transmitting the water through itself, with the outer cylinder, A, and piston C, substantially as herein specified.

2. The sliding piston C, transmitting the water to the cylinder B, in combination with said cylinder B and outer cylinder, A, substantially as specified.

3. The combination of the transmitting-cavities *c c* in the piston C with the valve-apertures *p p* in the cylinder B, arranged and operating substantially as specified.

4. The combination of the side chambers, *t t*, and perforated partitions *b b* in the cylinder B, with the piston C, substantially as herein set forth.

5. The employment of the revolving driving-shaft D as the elevating-pipe, in combination with the cylinders A and B, substantially as herein specified.

6. The combination of the tubes *l* and *m*, arranged and operating substantially as and for the purpose herein specified.

In witness that the above is a true specification of my improved pump I hereunto set my hand this 21st day of December, 1861.

G. W. NICHOLS.

Witnesses:

R. H. RANDALL,

WM. M. MAGDEN.