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F. & G. N. BRIGGS.
DIAPHRAGM PUMP.
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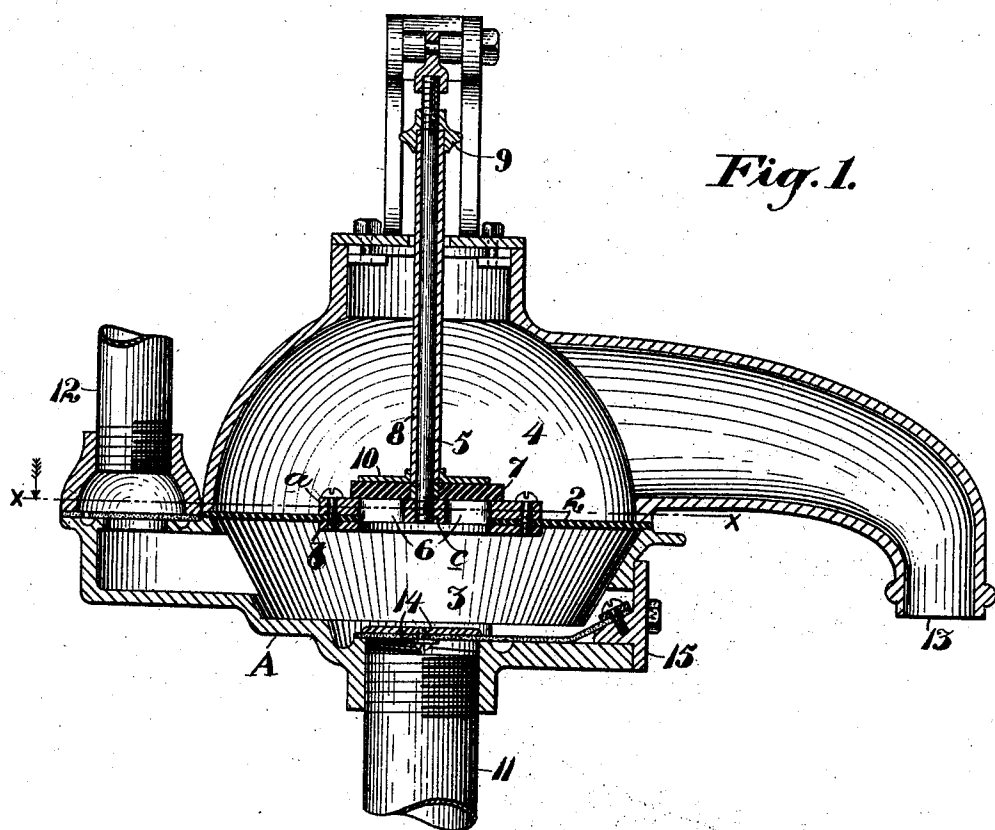
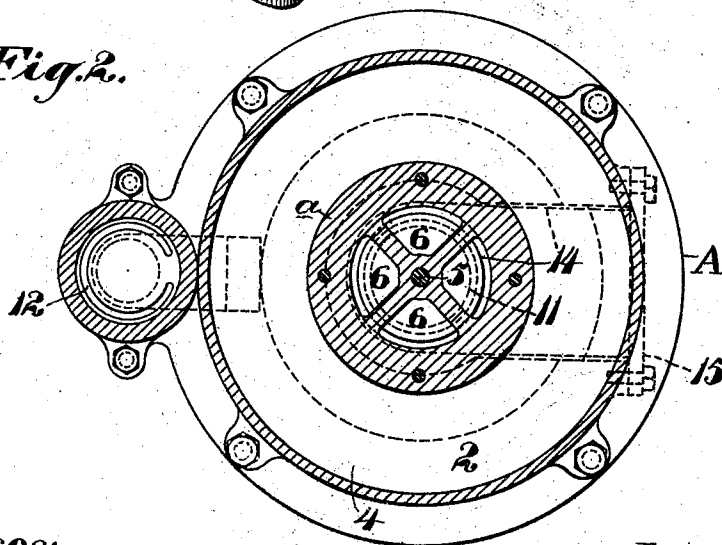


Fig. 1.

Fig. 2.



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UNITED STATES PATENT OFFICE.

FRANK BRIGGS AND GEORGE N. BRIGGS, OF YOUNTVILLE, CALIFORNIA.

DIAPHRAGM-PUMP.

No. 800,356.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, FRANK BRIGGS and GEORGE N. BRIGGS, citizens of the United States, residing at Yountville, in the county of Napa and State of California, have invented new and useful Improvements in Diaphragm-Pumps, of which the following is a specification.

Our invention relates to improvements in pumping apparatus, and particularly in that class of pumps known as diaphragm-pumps as distinguished from the ordinary plunger-pumps. Its object is to provide a simple practical pump devoid of bushings through which leak may occur and convertible at will from a lift to a force pump, or vice versa.

It consists of the parts and the construction and combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a central vertical section of our apparatus. Fig. 2 is a section on line *x x* of Fig. 1.

A represents a shell formed in two separable sections, between which is secured at the edges a flexible vibrating diaphragm 2, dividing the interior of the casing into respective upper and lower chambers 3 4. This diaphragm has a central opening, and secured to the upper and lower sides of the diaphragm and surrounding said opening are the rings *a b*, the former of which is made in the form of a spider with ports and with a central hub portion *c*, having a threaded opening to receive the lower threaded end of a plunger-rod 5, reciprocal by any suitable and well-known means. On top of the upper ring *a* a loose disk valve is adapted to seat, said valve having a central opening through which the plunger-rod loosely passes. The sleeve 8 encompasses the plunger-rod and is adjustable lengthwise thereon from a point exterior to the casing by suitable means, as the thumb-nut 9, which is securely fastened to the upper end of the sleeve and has a threaded engagement with the plunger-rod. The lower end of the sleeve has fixed to it a flange 10, adapted to bear upon the major portion of the upper surface of the valve 7 and hold the latter firmly and uniformly to its seat when the nut 9 and sleeve are turned in one direction, and thus prevent the passage of any water from chamber 3 into chamber 4. Such is the position of valve 7 when the pump is used as a force-pump. In that case the wa-

ter entering through the valved intake-pipe 11 on the upstroke of the diaphragm is discharged from chamber 3 on the same side of the diaphragm as inlet 11 through the valved outlet 12. When the pump is to be used as an ordinary lift-pump, the sleeve 8 and flange 10 are moved upward to free valve 7 and allow it to open on the downstroke of the diaphragm, whereupon the fluid in chamber 3 passes through port 6 into upper chamber 4 and flows thence by gravity through outlet 13. By shifting the sleeve to an intermediate position the size of port 6 may be regulated relative to the capacity of the pump, so that the latter may act simultaneously both as a lift and as a force pump.

Return from chamber 3 into intake-pipe 11 is prevented by means of a weighted flap-valve 14, which has one end secured to a part 15, forming a closure for a valve-recess in the lower section of the casing. This closure part, which is here shown as bolted to the casing from the outside, permits the valve to be gotten at very easily without having to disturb any of the rest of the pump.

The advantage of this pump over the ordinary piston or valve pump is that there is very little friction, a perfect vacuum is formed in the lift-chamber 3, the pump is convertible readily from a lift to a force pump, or vice versa, and when used as a force-pump there are no bushings through which leakage may occur.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An improved diaphragm-pump having in combination a divided casing and a diaphragm secured between the parts thereof said diaphragm having a central opening, rings secured to the upper and lower surfaces of the diaphragm and surrounding said opening, one of said rings having a central hub portion, a disk valve adapted to seat upon the upper of said rings, and having a central opening, a plunger-rod passing through said opening in the valve and having its lower end fixed in the central hub portion of the upper ring, a sleeve concentric with the rod, and means whereby the sleeve may be adjusted relative to the rod, said sleeve having an enlarged foot-piece adapted to clamp the valve tightly against the upper ring to shut off communication with the chamber below the diaphragm, and said foot-piece serving as a stop to limit the opening movement of the valve

when the sleeve is adjusted toward the outer end of the plunger-rod, whereby the chambers above and below the diaphragm communicate, and a separate outlet from each chamber.

- 5 2. A convertible diaphragm-pump having, as a unitary structure, a divided casing and a centrally-apertured flexible diaphragm secured between the two parts of the casing
10 said diaphragm having its aperture reinforced, a non-rotatable guide fixed centrally in the aperture of the diaphragm, a sleeve of less length than the guide and slidably mounted thereon, said sleeve having, at one end, an
15 adjusting-nut engaging a threaded portion of the guide whereby the sleeve is movable ver-

tically on said guide, and having a foot-piece or stop at the opposite end, and a flexible disk valve loose upon the guide and having a central opening through which the guide passes whereby the guide directs the loose valve in
20 its opening and closing movements from and toward the aperture in the diaphragm.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

FRANK BRIGGS.
GEORGE N. BRIGGS.

Witnesses:

CHAS. E. TROWER,
ARTHUR WHEELER.