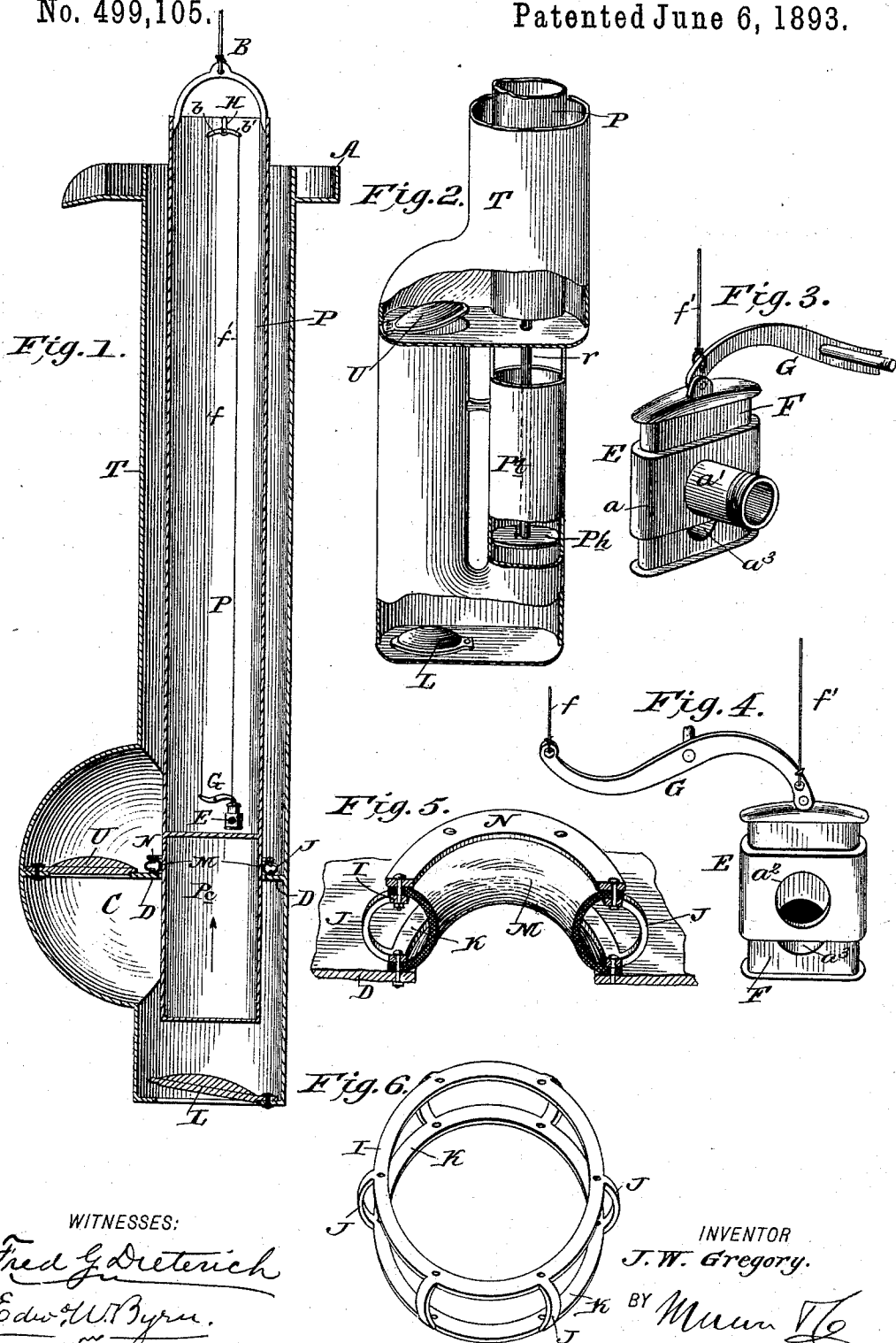


(No Model.)

J. W. GREGORY.
PUMP.

No. 499,105.

Patented June 6, 1893.



WITNESSES:

Fred Godtreich
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INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN WELDON GREGORY, OF GARDEN CITY, KANSAS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 499,105, dated June 6, 1893.

Application filed September 1, 1892. Serial No. 444,751. (No model.)

To all whom it may concern:

Be it known that I, JOHN WELDON GREGORY, residing at Garden City, Finney county, in the State of Kansas, have invented a new and useful Improvement in Pumps, of which the following is a specification.

My invention is in the nature of an improvement in pumps of that form which employ a plunger having a displacing cylinder, and it consists in the peculiar construction and arrangement of parts in which the displacing cylinder is made of equal weight to the liquid which it displaces, so as to reduce the power required to operate it, and whereby also the relative weight and buoyancy of this displacing cylinder are conveniently adapted or adjusted to different depths of wells or heights to which the water is to be raised as will be hereinafter fully described.

Figure 1 is a vertical longitudinal section of my pump. Fig. 2 is a perspective view of the lower portion of a modified form thereof. Figs. 3 and 4 are details in perspective of the opposite sides of the balancing inlet, and Figs. 5 and 6 are details in perspective of the plunger packing.

In the drawings, T, represents a tube extending from a point below the level of the water to be raised to the point to which the water is to be elevated. At the top this tube is provided with an annular trough A, into which the water overflows from the top of the tube and is spouted away at one side to the point of utilization. Into the bottom end of this tube there opens a valve L, and just above the valve there is formed a chamber or enlargement C upon one side of the tube. Transversely across the tube T and this chamber C there is disposed a tightly fitting and rigid diaphragm D. This diaphragm has a circular opening to receive a displacing plunger, and has beside it a valve U opening inwardly from the space below the diaphragm into the space above the diaphragm.

P is the displacing plunger, which is a second tube arranged within the tube T and extending from a point below the diaphragm D through a packed joint in the diaphragm up the tube T to the top of the same, where, by means of a suitable connecting rod B, it is attached to and operated by a pump lever, or other means of reciprocating the plunger. At

the point where the plunger P slides through the diaphragm I provide a packing of peculiar construction as shown in detail in Figs. 55 5 and 6. This consists of a twin ring I K connected by bars J. The part K of this twin is bolted or screwed to the diaphragm, the lower edge of a curved packing ring M being retained between the diaphragm and the lower 60 part of the twin ring. The upper edge of this packing ring, which is a semicircle in cross section, is retained between the top part I, of the twin ring and a retaining plate N. The round or convex side of the packing ring is 65 thus made to project inwardly to contact with the plunger and forms a tight, durable and effective joint at the point where the plunger passes through the diaphragm.

The operation of my pump is as follows: 70 When the plunger is raised, the part Pc below the diaphragm in rising produces a suction below the diaphragm that causes the valve L to open, and the water from the outside to flow in. Then when the plunger descends the valve L closes, and the plunger 75 end Pc forces the water below the diaphragm up through valve U, which opens to allow it to pass, and the water rising in the annular space between the plunger P and the tube T 80 overflows into the trough A at the top. The plunger P is nicely adjusted as to weight to practically balance the amount of water which it displaces within the tube T, so that it is in a condition of equilibrium and only power 85 enough need be applied to work it sufficient to overcome friction and elevate the water in the annular space between the plunger and its containing tube the required distance. To cause this displacing plunger to balance the 90 amount of water displaced, said plunger is made hollow as an air chamber and weighted so as to practically balance the water displaced. As this will vary with the different depths of well or heads of water, I provide a 95 permanent air chamber Pc at the bottom of the plunger, and above this chamber I provide a water inlet E through which water may be allowed to enter until a perfect balance is obtained. This water inlet consists of a screw 100 nipple a' , Figs. 3 and 4, having a case a with an opening a^2 in line with the nipple. Within this case there slides a valve F having an opening a^3 which may be raised to admit wa-

ter through openings a^2 and a^3 through the nipple a' , or be lowered to cut off the influx. For working this slide valve a lever G is fulcrumed to the plunger inside the same, and one end is jointed to the slide valve F. The opposite ends of the lever G are then connected to the opposite ends b b' of a lever H at the top of the plunger by means of wires f f' , so that by deflecting lever H to one side the inlet will be opened, and by deflecting it the other way the inlet may be closed. In this way the admission of water to the plunger from the top may be regulated so as to get an exact balance of the plunger to the amount of water which it displaces.

I do not confine my invention to the form shown in Fig. 1, but may use a construction such as is shown in Fig. 2 in which the plunger is reduced to the size of a small rod r where it passes through the diaphragm and is attached to a piston head Ph working in an open piston tube or cylinder Pt . The reciprocation of the plunger P forces the water beneath the piston head Ph up through valve M on the down stroke and sucks water up through the valve L on its up stroke in a similar manner to that described in Fig. 1, the air chamber and water inlet in this case being located in the plunger above the diaphragm.

I am aware that a plunger with a displacing air chamber is not new in pumps, and I make no broad claim to this, but only to a balanced displacing plunger in which a state of equi-

brium is brought about by the means illustrated in the drawings or their substantial equivalents.

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

1. A pump consisting of an outer tube or case with a diaphragm in the same and having an inwardly opening valve below the diaphragm and an upwardly opening valve in the diaphragm; a balanced displacing plunger operating through the diaphragm; and a water inlet arranged to admit water to the interior of the plunger and provided with operating devices for working the same from above, substantially as shown and described.

2. The combination with the tube T having valves L and U and diaphragm D; of the balanced plunger P having water inlet composed of nipple a' , slide valve F, the levers G H and the adjusting wires f f' , substantially as shown and described.

3. The combination with the tube T having valves L and U and diaphragm D; of the balanced plunger P and the packing consisting of twin ring I K J, plate N and packing ring M, semi-circular in cross section substantially as shown and described.

JOHN WELDON GREGORY.

Witnesses:

EDW. W. BYRN,
 SOLON C. KEMON.