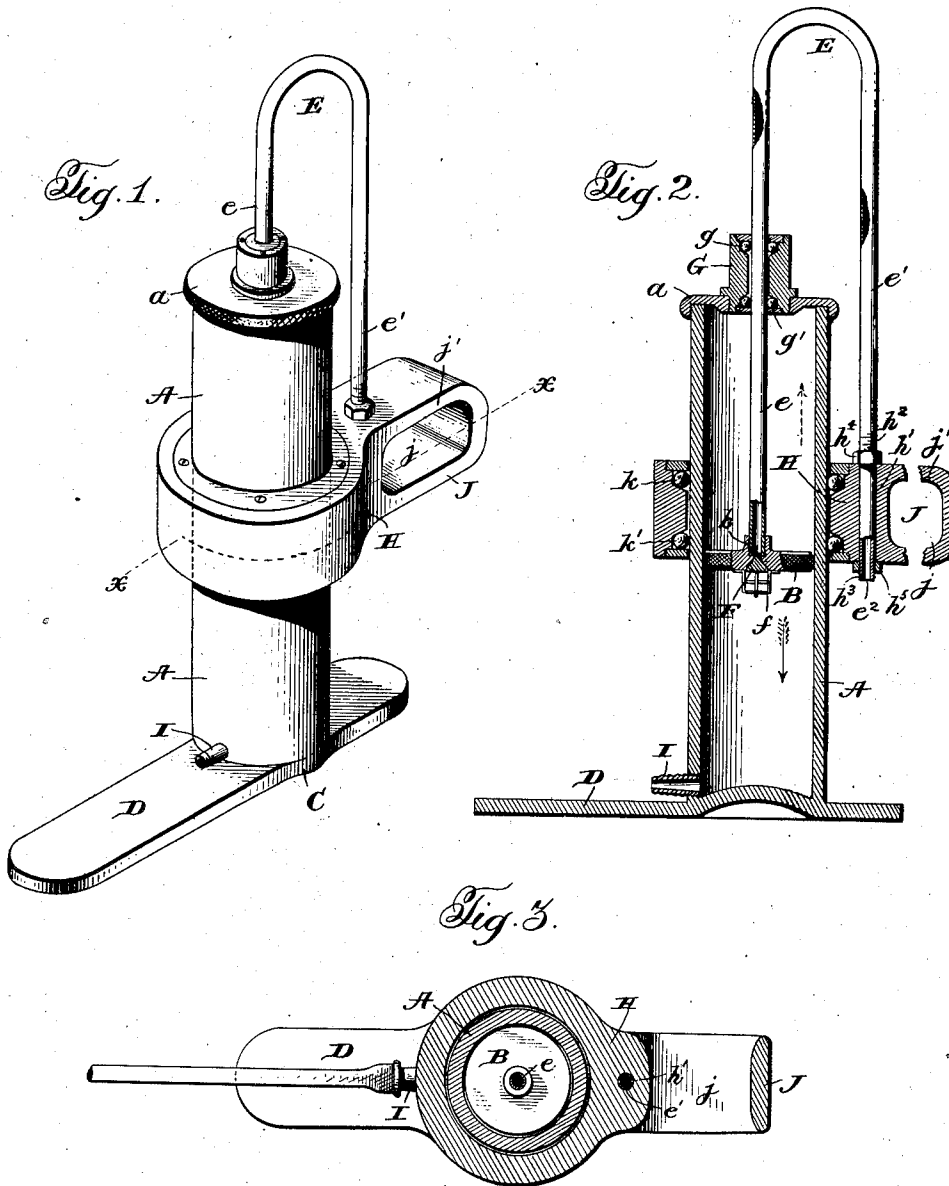


W. C. J. GUILFORD.
PUMP.
APPLICATION FILED JAN. 7, 1910.

1,005,200.

Patented Oct. 10, 1911.



Witnesses:
Jas. Hutchinson:
Chas. Thomas.

Inventor:
William C. J. Guilford,
By T. W. Hutchinson Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM C. J. GUILFORD, OF WASHINGTON, DISTRICT OF COLUMBIA.

PUMP.

1,005,200.

Specification of Letters Patent.

Patented Oct. 10, 1911.

Application filed January 7, 1910. Serial No. 536,914.

To all whom it may concern:

Be it known that I, WILLIAM C. J. GUILFORD, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in pumps and has for its primary object the provision of a practical, simple and inexpensive pump, formed for manipulation by the foot of the user to enable the free use of the hands.

An important characteristic of my improvement resides in means facilitating the easy operation of the pump when used for relatively heavy work such as in connection with vehicle tires; also the easy and delicate operation of the same when used in connection with relatively light work as required, for example, in dental work, in which latter connection I have found my pump peculiarly adapted to expand an impression device, as is more particularly set forth in the copending application executed of even date herewith.

In the accompanying drawings forming a part hereof I have illustrated a convenient embodiment of my invention, and an inspection of said drawings in connection with the detailed description herein contained will disclose the details and arrangement of parts of my improved pump.

In the drawings, Figure 1 is a perspective view of the pump, Fig. 2 is a longitudinal sectional view of the same, Fig. 3 is a transverse section on line $x-x$ of Fig. 1.

Referring more specifically to the drawings, wherein like reference characters designate corresponding parts in the several views, A designates the pump cylinder which is conveniently of an elongated upright type B the piston adapted to be reciprocated vertically in the cylinder, and C is a supporting base having at one side an elongated foot piece D adapted to be engaged by one foot of the user, to steady the pump and maintain it in operative position.

E represents an inverted U-shaped piston rod, the same being formed of a pipe or tube, the inner arm e of which extends through the top a of the cylinder and is connected at b to the piston B. The open end of this arm e of the piston rod is closed in the active or compressing movement of the

piston, designated by the arrow, by a free valve F supported in a cage f and adapted to open by gravity on a reverse or upward movement of the piston. The top of the cap of the cylinder is provided with a guide box G having an upper series of ball bearings g and a lower series of ball bearings g' engaging the arm e of the piston rod and facilitating free and easy movement of the same while at the same time preventing any binding of the piston rod incident to the tilting tendency of the same under actuation of the means now to be defined. The outer or return parallel arm e' of the piston rod depends downwardly outside of the casing A and through the vertical aperture h' in a combined stirrup and guide H, the end of this arm e' being threaded as at h^2 , h^3 , for the engagement of the clamping nuts h^4 , h^5 , adapted respectively to bind upon the upper and lower surfaces of the member H referred to, and as clearly shown in the drawings. The lower end of the pipe or piston rod as shown at e^2 is open to constitute an air induction port, it being understood that the air is drawn through the hollow piston into the cylinder in the upward movement of the piston, as shown by the dotted arrow and forced out of the cylinder in the downward movement of the piston through the outlet nipple I connected to any suitable conducting pipe or tube as desired.

The outer end of the member H is formed into a stirrup J provided with a foot rest j and a supporting member j' connecting the outer edge of the same to the main body or inner portion of the member H to strengthen the stirrup, as is obvious, the member H being of substantial thickness to offer a long, firm fastening for the piston rod passing therethrough. It will be noted that in operation the stirrup may project in a direction outwardly relative to the cylinder away from the foot rest D on the opposite side of the cylinder, so that the latter may be engaged by one of the feet to hold the device while the piston is worked in both directions by the other foot which engages the stirrup. The stirrup, however, being free to turn about the cylinder, the same may assume any position desired for the ease and comfort of the user, for instance, at right angles to the foot rest or even thereabove, if desired. The inner portion of the member H is of annular configuration adapted to work freely over the cylinder A and the same

carries near its upper and lower edges respectively an upper series of ball bearings k and a lower series of ball bearings k' , engaging the outer surface of the cylinder to facilitate easy working of the device and prevent any binding of the guide constituted by this portion of the member H upon the cylinder incident to the tendency of the same to tilt in either direction under the operation of the laterally projecting stirrup.

By having the U-shaped piston rod of tubing throughout, a strong single-piece structure is afforded while obviating the necessity of otherwise providing air inlet passages or the weakening of a solid rod by perforating the same for the inlet of the air.

While I have herein disclosed a specific embodiment of my invention, it is to be understood that other embodiments may be resorted to without departing from the spirit of the invention.

I claim:—

1. The combination with a pump cylinder having a cylindrical outer surface, a piston in said cylinder, and means for operating the piston comprising an inverted U-shaped piston rod, one arm of which is connected to the piston within the cylinder, and the other arm of which is arranged outside of the cylinder, a guide ring surrounding the pump cylinder and connected to the outer arm of the piston rod, said ring being provided with vertically separated upper and lower bearings engaging the cylinder, whereby said ring is free to rotate around the cylinder and to slide freely thereon and binding to the ring incident to its tendency to tilt during reciprocation is prevented, and a closed stirrup projecting from said guide ring.

2. In combination with the cylinder and piston of a pump, means for operating the piston comprising an inverted U-shaped piston rod, one arm of which is connected to the piston within the cylinder, and the other arm of which is arranged outside the cylinder, a foot piece carried by said outside arm for operating the piston, a guide of substantial width for the foot piece comprising a ring secured to be moved therewith surrounding the pump cylinder, and separated upper and lower series of ball bearings in said ring engaging said cylinder to resist binding incident to the tilting tendency of the guide in its reciprocating movements.

3. In combination with the cylinder and piston of a pump, means for operating the piston comprising an inverted U-shaped piston rod, one arm of which is connected to the piston within the cylinder and the other arm of which is arranged outside the cylinder,

a combined foot piece and guide detachably connected to said outside arm, said guide freely embracing the cylinder to shift thereon and provided with separated upper and lower series of ball bearings contacting the surface of the cylinder.

4. In combination with the cylinder and piston of a pump, means for operating the piston comprising an inverted U-shaped piston rod, one arm of which is connected to the piston within the cylinder, and the other arm of which is arranged outside the cylinder, a separately formed foot stirrup having a solid inner portion of substantial thickness carried by said outside arm, said stirrup having a foot rest and a supporting member extending upwardly and inwardly from the outer edge of the said foot rest to the upper edge of the said inner solid portion of the stirrup, and a guide formed with the stirrup, and of corresponding substantial thickness embracing the cylinder, said guide being provided with separated upper and lower series of ball bearings engaging the cylinder.

5. In combination with the cylinder and piston of a pump, means for operating the piston comprising an inverted U-shaped piston rod, one arm of which is connected to the piston within the cylinder, and the other arm of which is arranged outside the cylinder, a stirrup carried by said outside arm, and separated upper and lower series of ball bearings arranged in the head of the cylinder for said inner arm to prevent binding incident to the tilting tendency of the piston rod.

6. In a device of the character described, a base, a pump cylinder supported thereon, a piston in said cylinder, means for operating the piston comprising an inverted U-shaped piston rod, one arm of which passes through the upper head of the pump cylinder, and is connected to the piston within the cylinder and the other arm of which is arranged outside of the cylinder, separated upper and lower series of ball bearings arranged in the head of the cylinder for engaging the inner arm of the piston rod at separated points, a relatively wide bearing ring connected to the outer arm of the piston rod and embracing the exterior of the pump cylinder, said bearing ring being provided with separated upper and lower series of ball bearings engaging the exterior of the cylinder, and a stirrup projecting from said bearing ring.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM C. J. GUILFORD.

Witnesses:

CARRIE A. KREY,
GEO. D. RILEY.