No. 620,041. Patented Feb. 21, 1899.

M. L. KOOGLER.

DOUBLE ACTING PUMP.

(Application filed Mar. 4, 1898.)

(No Model.)

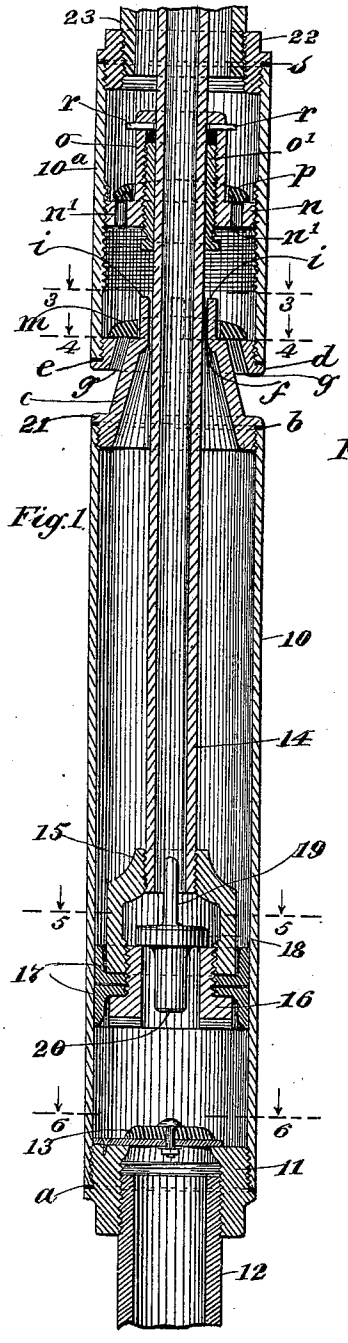


Fig. 1.

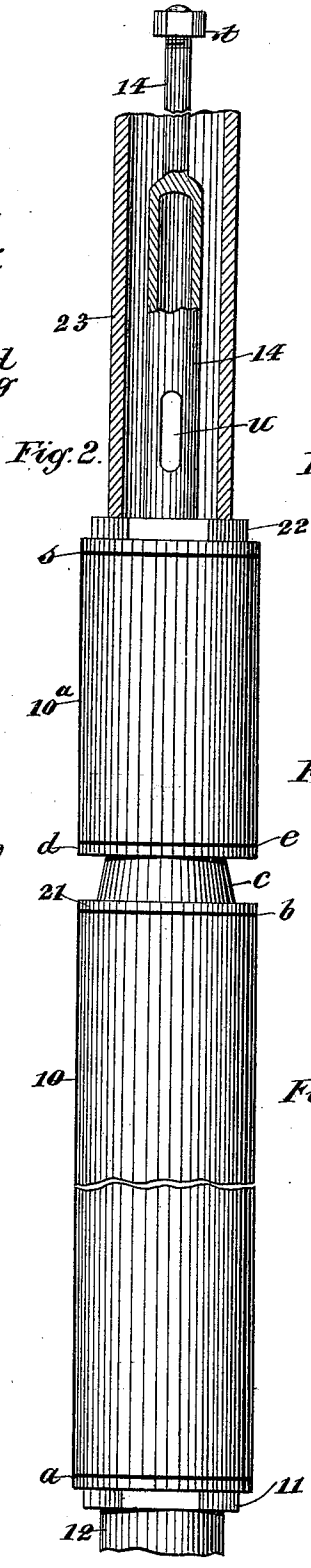


Fig. 2.

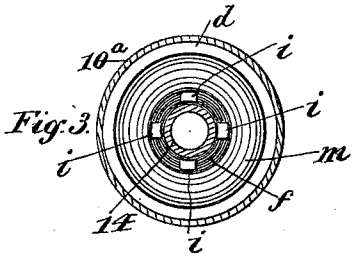


Fig. 3.

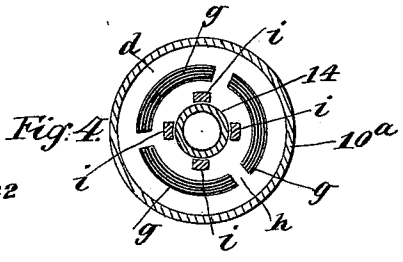


Fig. 4.

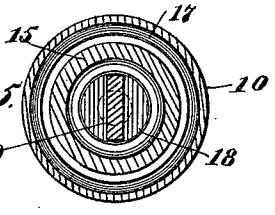


Fig. 5.

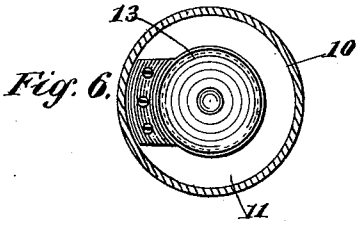


Fig. 6.

WITNESSES:

Wm. P. Patton

D. M. Bancroft

INVENTOR

M. L. Koogler.

BY Munn & Co.

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MATHIAS L. KOOGLER, OF DE GRAFF, OHIO.

DOUBLE-ACTING PUMP.

SPECIFICATION forming part of Letters Patent No. 620,041, dated February 21, 1899.

Application filed March 4, 1898. Serial No. 672,561. (No model.)

To all whom it may concern:

Be it known that I, MATHIAS L. KOOGLER, of De Graff, in the county of Logan and State of Ohio, have invented certain new and useful Improvements in Double-Acting Pumps, of which the following is a full, clear, and exact description.

This invention relates to a class of pumps wherein liquids are lifted and forced and which are adapted to receive such liquid at two points.

The object of my invention is to provide a pump of the indicated type with simple novel details of construction, whereby the pump is rendered highly efficient and affords means for ready access to all working parts to facilitate inspection and repairs of the same.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal sectional view of the pump, taken through its center. Fig. 2 is a partly-sectional and broken elevation of the device, illustrating the construction of the pump-rod at its upper end. Fig. 3 is a sectional plan view substantially on the line 3 3 in Fig. 1. Fig. 4 is a similar view on the line 4 4 in Fig. 1. Fig. 5 is a sectional plan view essentially on the line 5 5 in Fig 1, and Fig. 6 is a similar view substantially on the line 6 6 in Fig. 1.

The barrel 10 of the pump is of a diameter and length suited to the desired capacity of the pump and is preferably formed of seamless metal tubing. A filling-block 11 is screwed upon or preferably into the lower end of the pump-barrel 10, and into said block is screwed the upper end of a water-supply pipe 12. A joint-ring *a* is introduced between the filling-block 11 and the lower end of the pump-barrel 10. On the upper side of the block 11 is adapted to work a foot-valve 13, and said valve may be a flap-valve, as shown, or be of any other available construction.

A tubular pump-rod 14 is provided of sufficient length for effective service, the lower portion of said pump-rod being secured to the upper portion of a valve-cage 15, which cage is not perforated in its side walls, as usual in such constructions. In the lower end of the valve-cage 15 a packing-clamp 16 is screwed, said clamp being cylindric and exteriorly threaded and having a circumferential flange on its lower end.

Two similar packing-cups 17, of the usual form, have their side walls held concentric with the cage 15 by the packing-clamp 16, as clearly shown in Fig. 1, the cups being thus held back to back with their free edges projecting in opposite directions, and said cups fit water-tight within the pump-barrel 10.

A heavy valve-disk 18 is seated upon the upper end of the cylindric packing-clamp 16, and from said disk a guide-wing 19 projects upwardly, so as to enter and have a loose engagement with the lower end of the hollow pump-rod 14.

At the center of the disk 18 a weighty stem 20 projects downwardly into the cylindric clamp 16, this stem and the wing 19 insuring a proper play of the disk for effective operation of the plunger-valve when the pump-rod whereon said valve is held is reciprocated in the pump-barrel.

The pump-barrel 10 has a cylindrical extension 10^a, held in axial alinement therewith at its upper end by a hollow casting 21, forming the seat for the lowermost of two pump-valves that are located in the barrel extension 10^a. The casting 21 is formed as a threaded nipple at the lower end, which is screwed into the upper end of the barrel portion 10, and preferably a joint-ring *b* is introduced between the end of the barrel and a flange on the casting 21.

A coniform portion *c* of the barrel connection 21 projects above the upper end of the pump-barrel 10, and from the upper part of said coniform portion an annular flange *d* projects, and a portion of the periphery of the flange *d* is threaded. The threaded portion of the flange *d* is screwed into the lower end of the barrel extension 10^a, and a joint-ring *e* is placed between the lower edge of the flange *d* and the lower end of said barrel extension. The upper end of the connecting-piece 21 has such a diameter in its bore as will provide an annular crevice or water-passage *f* between its wall and the body of the tubular pump-rod 14, as is clearly shown in Figs. 1 and 3. In the flange *d*, between its periphery and the coniform wall *c*, said flange is perforated to form a plurality of passages

g, which are spaced apart by the radial webs h, as best shown in Fig. 4, said passages being arranged concentric with the periphery of the part in which they are formed. On the upper edge of the coniform wall c a set of guides i project vertically, four of these spaced guides being shown in Figs. 3 and 4. The upper surface of the flange d is rendered level to adapt it to become a true seat for the annular valve m.

Considerable weight is afforded the valve m to adapt it to reliably close the water-passages g when seated upon the flange d, and said valve is made to encircle the guide-posts i, with which it loosely engages when it is in place.

The barrel extension 10^a is threaded interiorly to adapt it for the reception and longitudinal adjustment therein of the circular valve-seat n, which is peripherally threaded to engage with said extension. Concentrically within the barrel extension 10^a an upwardly-projecting packing-box o is formed on the valve-seat n, a gland o' screwing upwardly into the packing-box and encircling the pump-rod 14, as shown in Fig. 1.

In the valve-seat n spaced passages n' are formed, which are concentric with the packing-box o and are arranged similarly to the passages g in the flange or valve-seat d. On the true cylindric body of the packing-box o an annular check-valve p is loosely held to slide vertically, the weight of the valve-block insuring the closure of the passages n' when it is seated thereon. The check-valve p is guarded from displacement by pins r, inserted in lateral perforations in the packing-box o, said pins serving to determine the extent of the lift of the valve from its seat.

The valve-seat n being adjustable in the barrel extension 10^a it will be evident that its position therein may be such as will adapt the lower end of the adjustable gland o' to check the valve m from leaving the guides i. In the top of the barrel extension 10^a a reducing-nut 22 is screwed, said nut having a threaded periphery to facilitate such an engagement and a radial flange above said thread, between which flange and the end of the barrel extension a joint-ring s is located.

In the reducing-nut 22 the lower extremity of a tubular conduit 23 is screwed, and said conduit, which is shown broken away, is in service to be extended vertically to a desired point for the discharge of liquid therefrom.

For a suitable distance from its upper end the pump-rod 14 is rendered solid, and at its upper extremity it is threaded and provided with a nut t, which affords means for an attachment of the pump-rod to an actuating-lever or other device for the reciprocation of said rod.

At a proper distance from the upper valve p two opposite discharge-apertures u are formed in the tubular portion of the hollow pump-rod 14, as shown in Fig. 2.

Assuming that the pump in complete form is held erect in a well or other source of water or other liquid that is to be raised by the same, and that the barrel 10 and its extension 10^a are sufficiently immersed in the water to locate the valve m below the surface of the liquid, the operation is essentially as follows: A reciprocation of the plunger-rod 14 will on an upstroke of the same close the valve 18 and open the foot-valve 13, thereby drawing water into the pump-barrel 10 above the foot-valve. The subsequent downstroke of the plunger-valve 18 will open it and close the foot-valve 13, thus passing water through the valve 18 into the plunger-rod 14 above said valve. After one or two reciprocations of the pump-rod 14 the two valves 13 18 will effect a filling of said rod, so that the liquid forced upward in the pump-rod will be discharged from the apertures u and thence into the conduit-pipe 23.

The downstroke of the pump-rod 14 will create suction in the barrel 10 above the plunger-valve 18, and this will lift the valve m and draw water down through the crevice f into the pump-barrel 10. The next upstroke of the plunger-valve 18 will close the valve m and open the valve p, which latter will again become seated on a subsequent downstroke of the pump-rod 14. A continuation of the operation will cause a copious elevation of water through the hollow pump-rod and also through the barrel 10 and its extension 10^a, the double-acting pump thus being very effective for the elevation of liquids.

As the connections are easily separated for obtaining access to the valves of the pump, inspection or repair of the pump may be readily effected.

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

1. The combination with a pump-barrel, a foot-valve on the lower end of said barrel, a hollow pump-rod, and a plunger-valve on the lower end of the pump-rod, adapted to pass liquid into said rod when the plunger-valve is depressed, of a pump-barrel extension, a coniform connection secured by one end on the top of the pump-barrel and having an apertured circumferential valve-seat, secured on the lower end of the pump-barrel extension, an annular valve engaging said seat, guides holding the valve spaced from the hollow pump-rod to provide a liquid-passage around said rod, and a check-valve in the barrel extension above the annular valve, substantially as described.

2. In a pump, the combination of a barrel, a foot-valve at the lower end thereof, a hollow pump-rod working in the barrel, a piston carried by the pump-rod, a lifting-valve commanding the lower end of the pump-rod, a barrel extension located above the barrel, a coniform connection between the barrel and barrel extension, through which connection the pump-rod passes, the connection serving to permit communication between the barrel

and barrel extension, a joint-ring carried by the connection and having orifices communicating with the exterior of the barrel, a valve seated on the joint-ring to command the orifices, and a check-valve mounted in the barrel extension above the first-named valve of said extension.

3. In a pump the combination of a barrel, a hollow pump-rod working in the barrel and serving to lift a column of water through the pump-rod, a barrel extension located above the barrel and having the pump-rod passed therethrough, a conical connection between the barrel and barrel extension, the connection permitting communication between the barrel and barrel extension, a joint-ring at the lower end of the barrel extension and having orifices communicating with the exterior of the barrel, a valve-seat on said ring to command the orifices thereof, and a check-valve mounted in the barrel extension above the first-named valve thereof.

MATHIAS L. KOOGLER.

Witnesses:
H. W. KOOGLER,
W. E. HARRIS.