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DOUBLE ACTING PUMP

Filed June 21, 1929

Fig. 1.

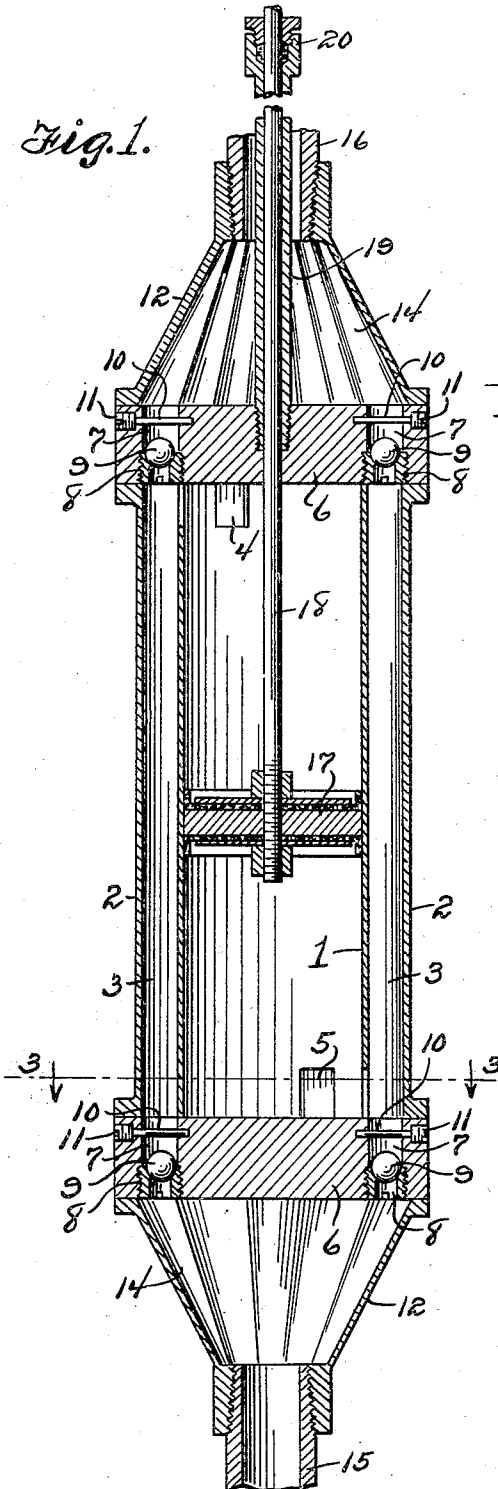


Fig. 2.

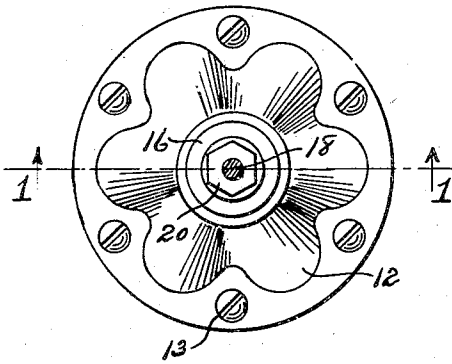
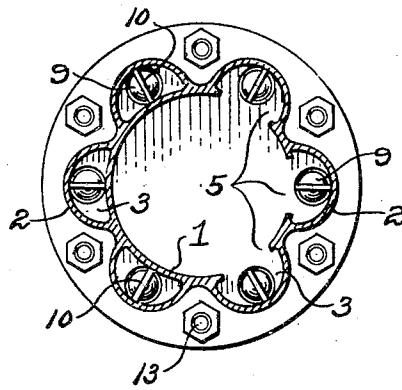


Fig. 3.



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DOUBLE-ACTING PUMP

Application filed June 21, 1929. Serial No. 372,686.

This invention relates to a double action pump, the general object of the invention being to provide a pump of great simplicity and compactness and with the parts so arranged that a single piston will act to draw water from a well or the like and discharge the water from the pump on each stroke of the piston.

Another object of the invention is to provide a pump which can be operated with the minimum amount of power and the action of which is smoother and faster than pumps as now constructed.

A still further object of the invention is to so construct and arrange the parts that they are easy of access for repair and cleaning purposes and new parts can be readily substituted for worn parts.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claim.

In describing the invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a section on line 1—1 of Figure 2.

Figure 2 is an end view.

Figure 3 is a section on line 3—3 of Figure 1.

In these views, the numeral 1 indicates the cylinder of the pump and the numeral 2 indicates a plurality of substantially semi-circular members formed with or connected to the exterior of the cylinder and forming the vertical passages 3. Ports 4 are formed in the upper end of the cylinder and communicate with the upper ends of some of the passages and ports 5 are formed in the lower end of the cylinder and communicate with the other passages. The ends of the cylinder and passages are closed by the plates 6, each plate being formed with an annular row of ports 7, each port forming an extension of a passage. The lower end of each port has its walls threaded to receive the tubular valve

seats 8 for the ball valves 9. A pin 10, having a threaded head 11 thereon, extends across each port 7 above the valve to limit the upward movement of the valve, each pin passing into an opening formed in the plate and having its head threaded in a socket formed in the exterior part of the plate. A substantially frusto-conical cap 12 covers each plate 6, these caps and plates being bolted or otherwise fastened to the ends of the cylinders, as shown at 13. Each cap is formed with the corrugations 14 which provide passages which communicate with the ports 7 in the plates. The lower cap is threaded to an inlet pipe 15 and the upper cap is threaded to an outlet pipe 16.

A piston 17 is located in the cylinder 1 and its rod 18 passes through the center of the upper plate 6 and through the guide pipe 19 which has its lower end threaded in the plate 6 and its upper end carries the packing gland 20 for the rod 18. As shown in Figure 1, this guide pipe is of much smaller diameter than the pipe 16 so as to leave a space through which the water or other liquid can pass through the discharge pipe 16.

From the foregoing it will be seen that the suction created in the lower part of the cylinder by the up stroke of the piston will draw liquid through the pipe 15 into the lower cap 12 and through those ports 7 which are in communication with the lower part of the cylinder through the ports 5 so that the liquid will be drawn into the lower part of the cylinder. On the down stroke of the piston, this liquid in the lower part of the cylinder will be forced through the ports 5 and into the passages 3 which are connected with said ports 5 and the liquid will pass from said passages through the ports 7 in the top plate 6, lifting the valves 9 in said ports and then the liquid will pass through the upper cap into the discharge pipe 16. The upper valves 9 will prevent the water from flowing into the passages which are out of communication with the lower end of the cylinder but are in communication with the upper end thereof, and the valves 9 of the ports of the lower plate which are in communication through the ports 5 with the lower end of the cylinder

der will prevent the water from being forced back into the well on the downward stroke of the piston. On the downward stroke of the piston, a suction will be created in the upper end of the cylinder so that water will be drawn from the pipe 15 and the lower cap 14 through the ports 7 of the passages which are in communication with the upper end of the cylinder by the ports 4 through said passages and ports into said upper part of the cylinder and then on the upward stroke of the piston, this water will be discharged through the ports 4 and the ports 7 in the top plate. Thus on each stroke of the piston, liquid is drawn into one end of the cylinder and discharged through the other end.

The advantages of this pump are its compactness and simplicity. It can be used in a deep or shallow well and can be placed in a three inch or larger tubular well with or without being submerged beneath the water. It will work equally as well in wells where it is necessary to use a sand point or drive point. It will deliver as much water with less power than a single stroke cylinder, especially where it operates against a pressure. The plunger in the double stroke cylinder is smaller in diameter than it is required in the single stroke cylinder in order to deliver the same amount of water. Hence, less power is required.

The load being the same on the down stroke as it is on the up stroke, makes a smoother and a more equally balanced pump.

This cylinder, having six water ports, makes it a stronger cylinder and makes it possible to use twelve small valves which operate much smoother and much more efficiently than where larger and less valves are used. This cylinder, with twelve small valves, will operate by power, one third faster than any other deep well cylinder.

The valve plates in this cylinder are made so that the valve seats can be replaced by new ones, making this a big improvement.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claim.

What I claim is:—

A pump of the class described comprising a cylinder provided exteriorly with a surrounding series of vertically, longitudinally extending passages, heads closing the upper and lower ends of the cylinder and having passages therein in registration with the respective ends of the passages of the cylinder, the cylinder passages, at one side of the cylinder being in communication at their lower ends with the interior of the cylinder at the lower end thereof, the passages at the other

side of the cylinder being in communication, at their upper ends, with the cylinder at the upper end of the cylinder, valve seats in the passages of the heads, check valves normally resting on said seats, a conical cap fitted to and extending above the upper head of the cylinder, a similar cap fitted to and extending below the lower head of the cylinder, each of said caps having a neck at the minor end thereof for the passage of fluid, a sleeve mounted axially at its lower end in the upper head of the cylinder and extending upwardly through the neck of the upper cap and axially thereof, a piston working in the cylinder and including a head and a rod extending upwardly from the head and slidably through the sleeve, each of the caps, being formed with a circumferential series of flutes communicating at their major ends with the passages in the head to which they are secured, the flutes being of gradually decreasing dimensions in the direction of the necks of the caps and in communication at their minor ends with the bores of the necks.

In testimony whereof I affix my signature.
JAMES C. CAIRNCROSS.