

G. NICHOLLS.  
PUMP.  
APPLICATION FILED MAR. 18, 1910.

Patented Dec. 13, 1910.

2 SHEETS—SHEET 1.

978,626.

Fig. 1.

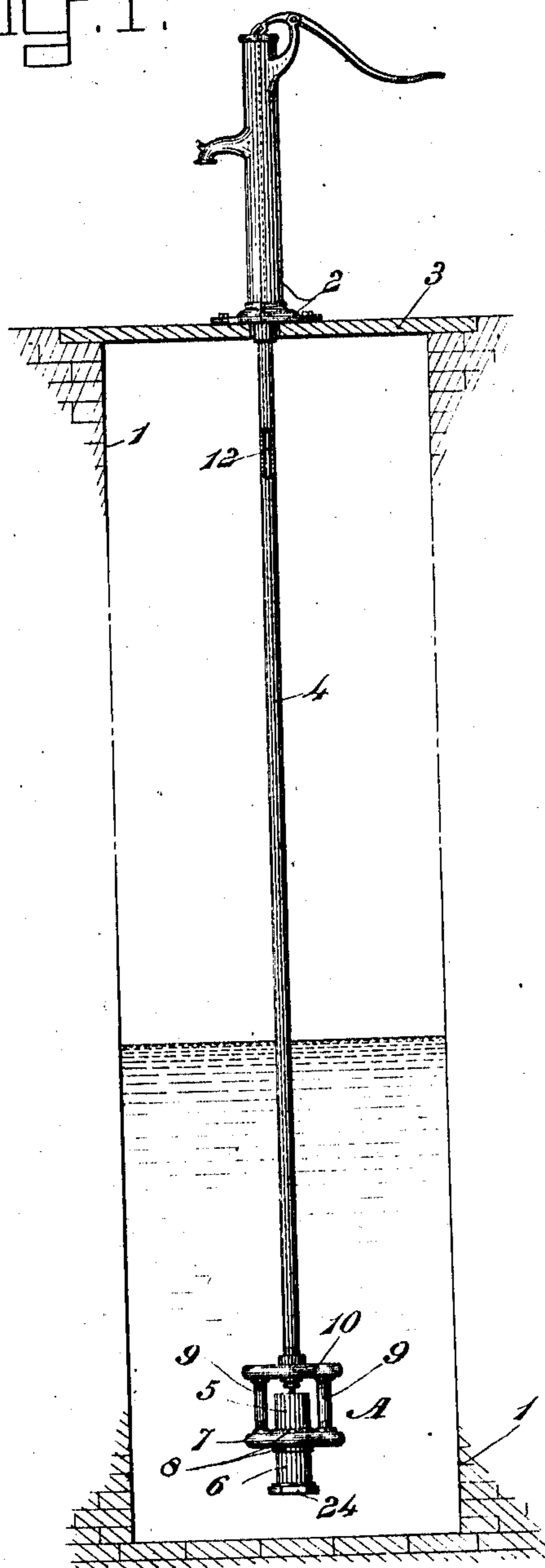
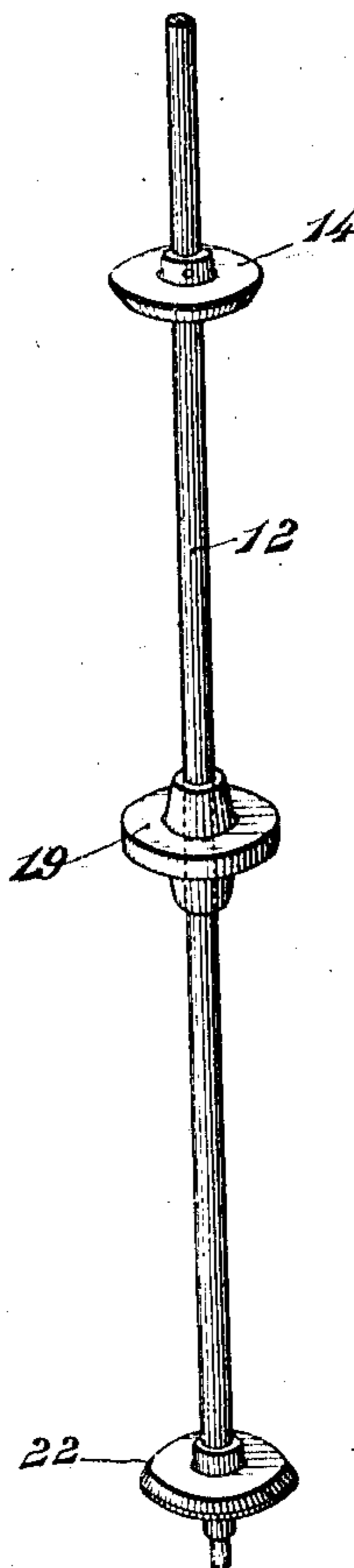


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

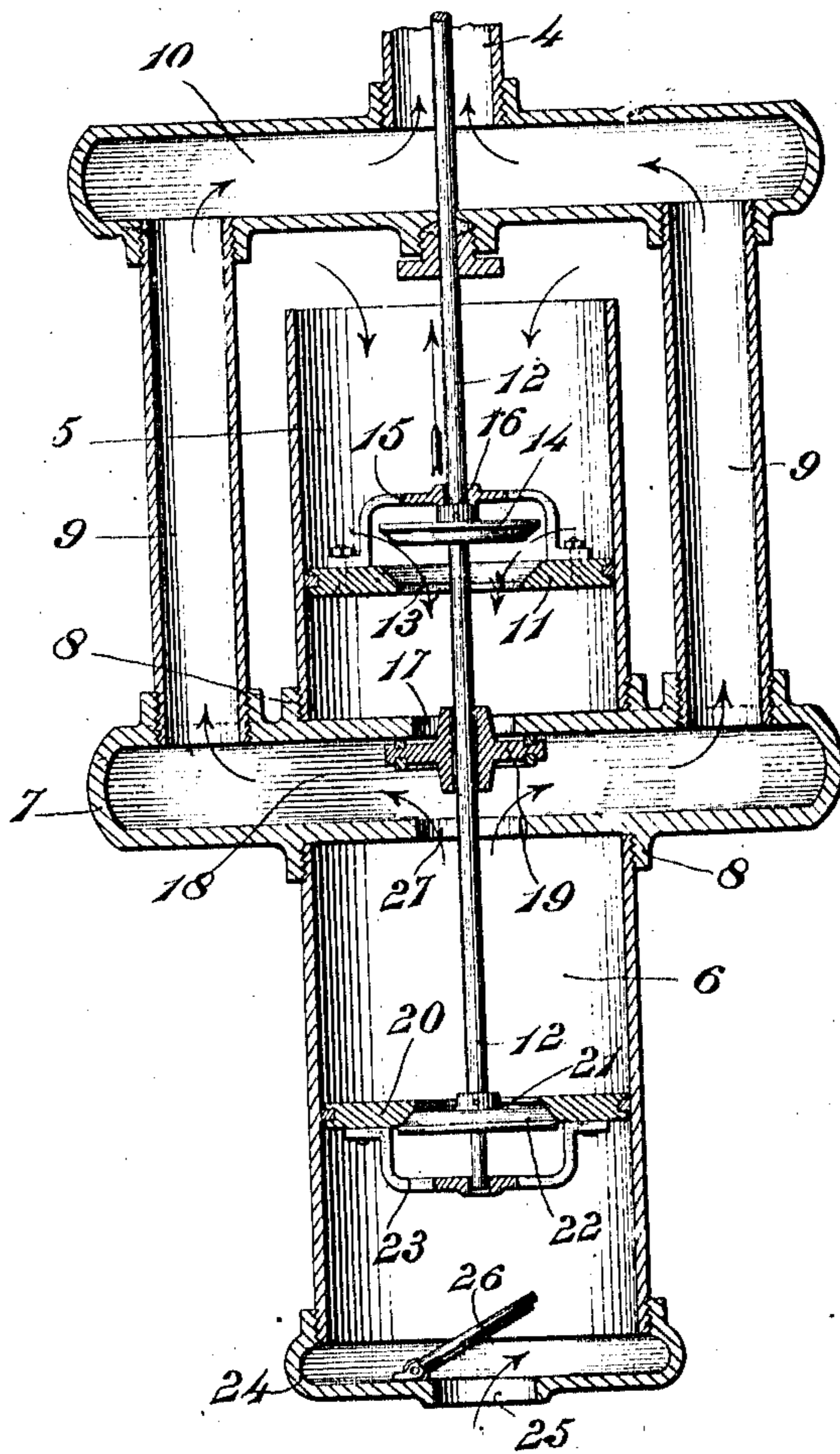
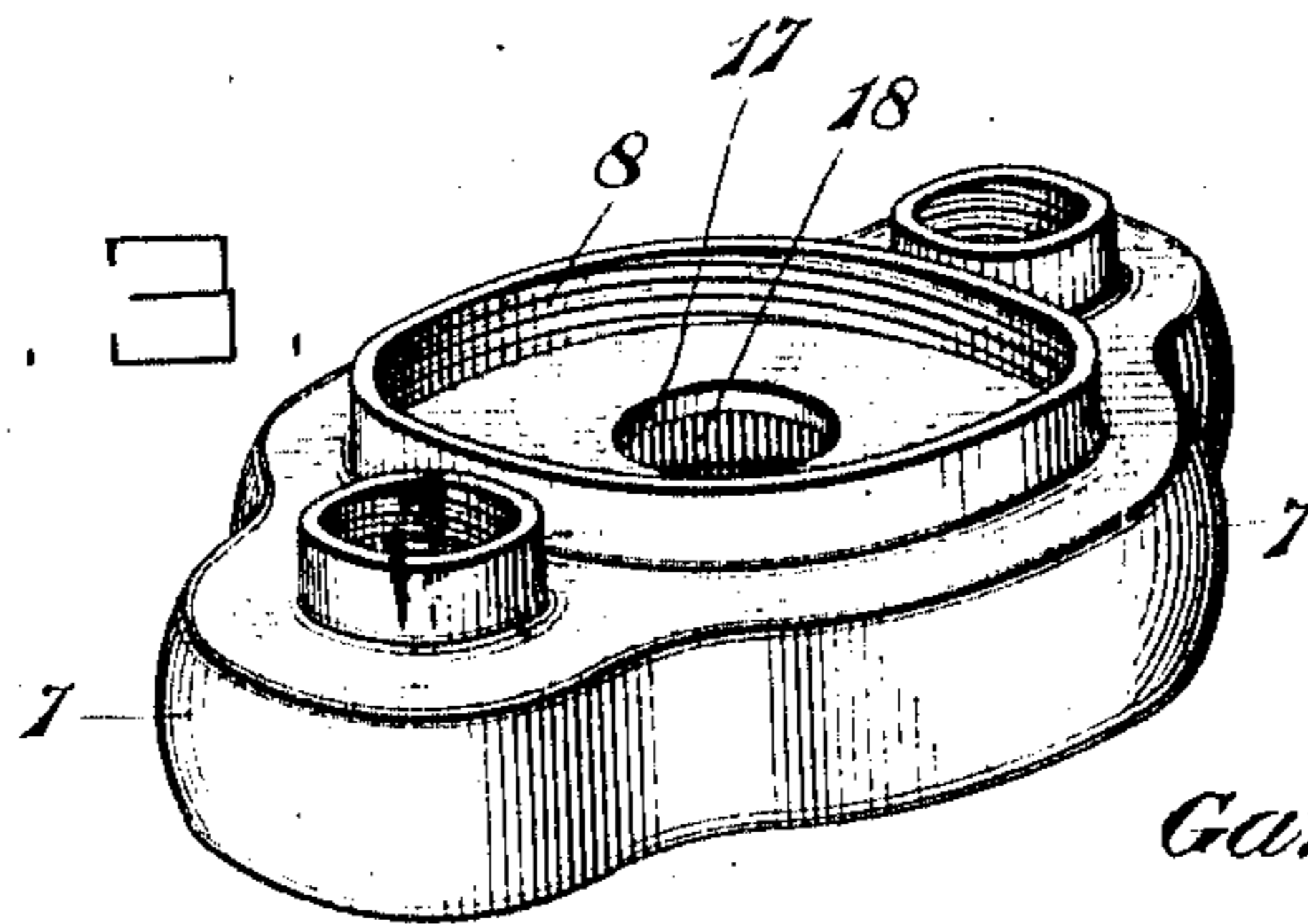


Fig. 3.



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# UNITED STATES PATENT OFFICE.

GARL NICHOLLS, OF McFALL, MISSOURI.

## PUMP.

978,626.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed March 18, 1910. Serial No. 550,099.

*To all whom it may concern:*

Be it known that I, GARL NICHOLLS, a citizen of the United States, residing at McFall, in the county of Harrison and State of Missouri, have invented new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to double acting force pumps and has for one of its objects to improve and simplify the construction and operation of apparatus of this character so as to be comparatively simple and inexpensive to manufacture, reliable, and efficient in use and capable of discharging a large volume of water with a minimum power.

Another object of the invention is the provision of a novel arrangement of cylinders and valves, whereby water can be discharged continuously through a single pipe by reciprocating pistons in the cylinder.

With these objects in view, and others as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claim appended hereto.

In the accompanying drawings which illustrate one embodiment of the invention; Figure 1 is a sectional view of a well showing the pump positioned therein. Fig. 2 is a central vertical section of the cylinder structure of the pump drawn on an enlarged scale. Fig. 3 is a perspective view of a common connecting head and discharge chamber between the cylinders. Fig. 4 is a perspective view of the piston rod, and valves thereon.

Similar reference characters are employed to designate corresponding parts through the several views.

Referring to the drawing, 1 designates a well which is provided with a pump stand 2 on a platform 3 and extending into the well is a discharge pipe 4 that carries at its lower end the pumping apparatus designated generally by A. This apparatus A, as shown in Fig. 2, consists of upper and lower aligned cylinders 5 and 6 that are connected to the top and bottom sides respectively of a combined head and discharge chamber 7 in the form of a hollow casting forming a common head for both cylinders, the cylinders being detachably connected with this device 7 by screwing into annular

flanges 8 on the latter. The well pipe 4 is connected with the opposite ends of the casting 7 by pipes 9 disposed at opposite sides of the cylinder 5 and screwing into a header 10 disposed above the same cylinder, the well pipe 4 being screw-threaded into the header, whereby the header, pipes 9 and casting 7 form a supporting frame for the cylinders and conduits through which the discharge from both cylinders passes.

The upper cylinder 5 is open at the top so as to be constantly supplied with water, the apparatus A being, of course, submerged in the well. In the cylinder 5 is a piston 11, which is attached by a lost-motion connection with the pump rod 12, which extends longitudinally through the cylinders, casting 7 and rises centrally in the well pipe 4. The piston 11 has a central port 13 which is adapted to be closed by a valve 14 in the form of a disk secured to the rod 12 and on the piston is a spider 15 that forms a cage for the valve 14, the spider having a central hub 16 through which the piston rod loosely passes. By this arrangement, the valve can move back and forth between the seat 13 and cage before movement is imparted to the piston in the up and down stroke of the rod and this lost-motion provides for the opening and closing of the valve. The cylinder 5 has a port 17 in its bottom formed by the top wall of the casting 7, whereby the water can be discharged from the cylinder 5 into the chamber 18 of the casting 7, the said port being opened and closed by a free or floating valve 19 slidable on the piston rod. It will thus be seen that when the piston rod moves upwardly, the valve 14 will be open so as to allow water to enter the bottom of the cylinder 5 through the port 13 of the piston, the valve 19 being closed during this upward stroke. Upon the succeeding down stroke, the valve 14 will first close and then the piston 11 will be moved downwardly to cause the water under the piston to open the valve 19 and allow the water to pass out of the cylinder by way of the chamber 18, pipes 9, header 10 and well pipe 4.

The discharge from the cylinders are adapted to occur alternately and consequently the piston 20 in the lower cylinder will be connected with the same piston rod 12, the piston 20 having a port 21, adapted to be closed by a valve 22 rigidly secured to the lower end of the piston rod and movable back and forth between the port or seat 21

and cage 23 of the piston, the piston being thus attached to the rod by lost-motion connection. The lower end of the cylinder 6 has a cap or head 24, which is provided with an inlet port 25 controlled by an upwardly or downwardly closing flap valve 26. The upper end or head of the cylinder 6 has a port 27 disposed opposite the port 17 and so arranged as to be closed by the valve 19. On the up stroke of the piston 20, the valve 22 will be closed so as to form in effect a solid ascending piston in the cylinder 6 and as a result water will be drawn into the lower end of the cylinder and forced out of the upper end of the cylinder from the port 27, chamber 18, pipes 9, header 10 and well pipe 4. The valve 19 is forced open by the pressure of the water being discharged and also the suction in the upper cylinder 5 produced by the piston 11 that ascends therein at the same time the piston in the lower cylinder is ascending. On the down stroke of the piston 20 in the lower cylinder, the valve 22 first opens so as to allow the water entrapped under the piston by the closing of the valve 26 to pass through the piston to the top side thereof. It will thus be seen that the piston operates alternately to discharge water from the cylinders so that a continuous flow can be produced.

From the foregoing description taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention relates, and while I have described the principle of operation of the invention, together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative and that

such changes may be made when desired as are within the scope of the claim.

What I claim as new and desire to secure by Letters Patent is:—

A pump comprising alined cylinders submerged in a body of water, the upper cylinder being permanently open at its top and the lower cylinder having a valve controlled opening at its bottom; an element forming a head for the meeting ends of the cylinders and also a common discharge chamber therefor, a port between each cylinder and the chamber of the element; a valve rod extending through the cylinders and element; a piston in each cylinder attached to the rod by a lost-motion connection, a valve rigidly secured to the rod at each piston and adapted to open and close through the movement provided by the lost-motion connections; a single valve disposed in the chamber of the said element and freely movable on the rod for opening the port of one cylinder while closing the port of the other cylinder to permit an alternate discharge from the cylinders; pipes extending along the upper cylinder and having their lower ends connected and communicating with the element; a header connected with the upper end of the pipe, and a discharge pipe connected with the header and through which the piston rod extends, said discharge pipe and header co-acting with the first mentioned pipes to form discharge conduits common to both cylinders and to also form a supporting structure for the cylinders.

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

GARL NICHOLLS.

Witnesses:

C. M. VANCE,  
G. N. SALMON.