(Model.) 2 Sheets—Sheet 1.

W. D. HOOKER.

PUMP.

No. 255,990. Patented Apr. 4, 1882.

Fig 1.

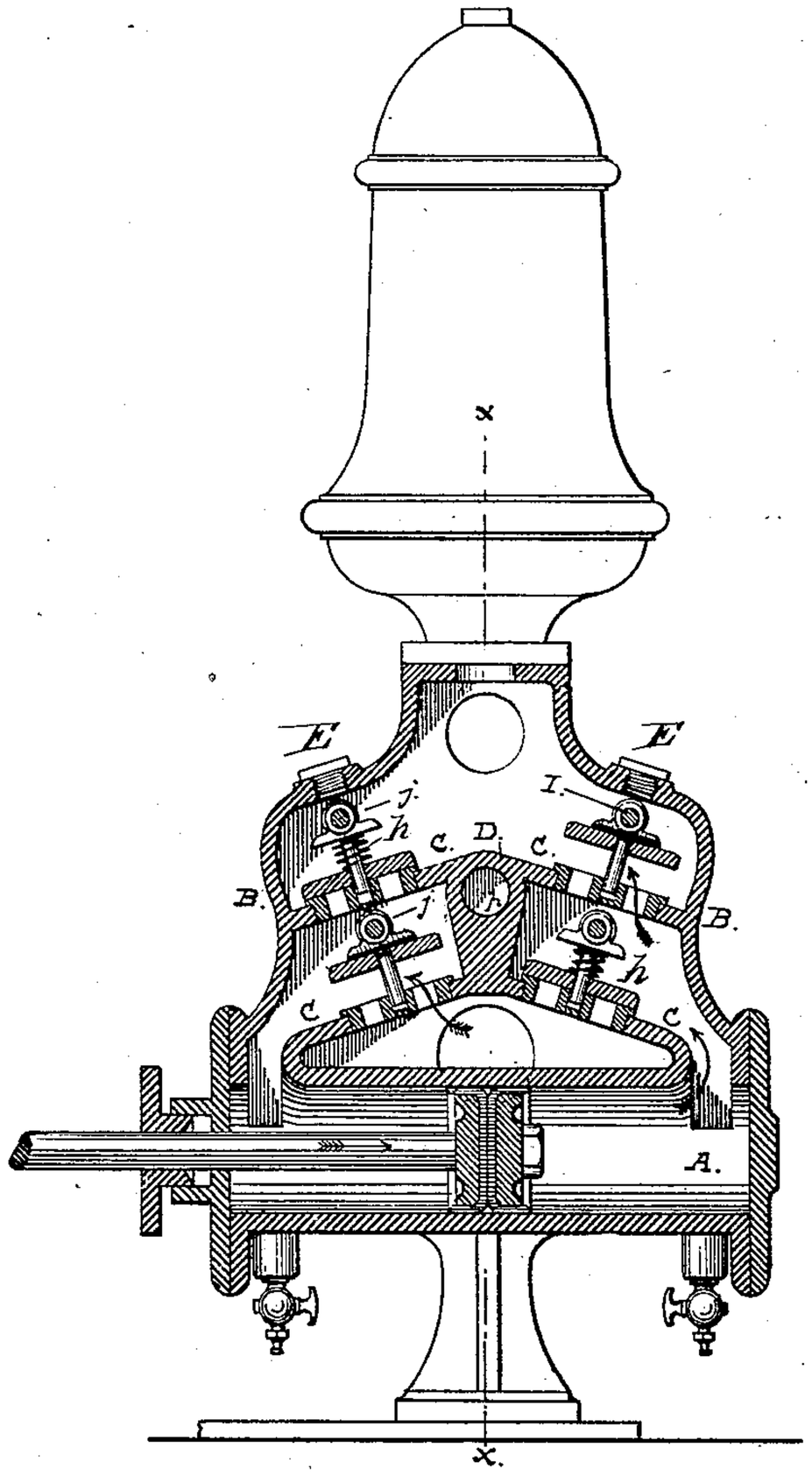


Fig. 2

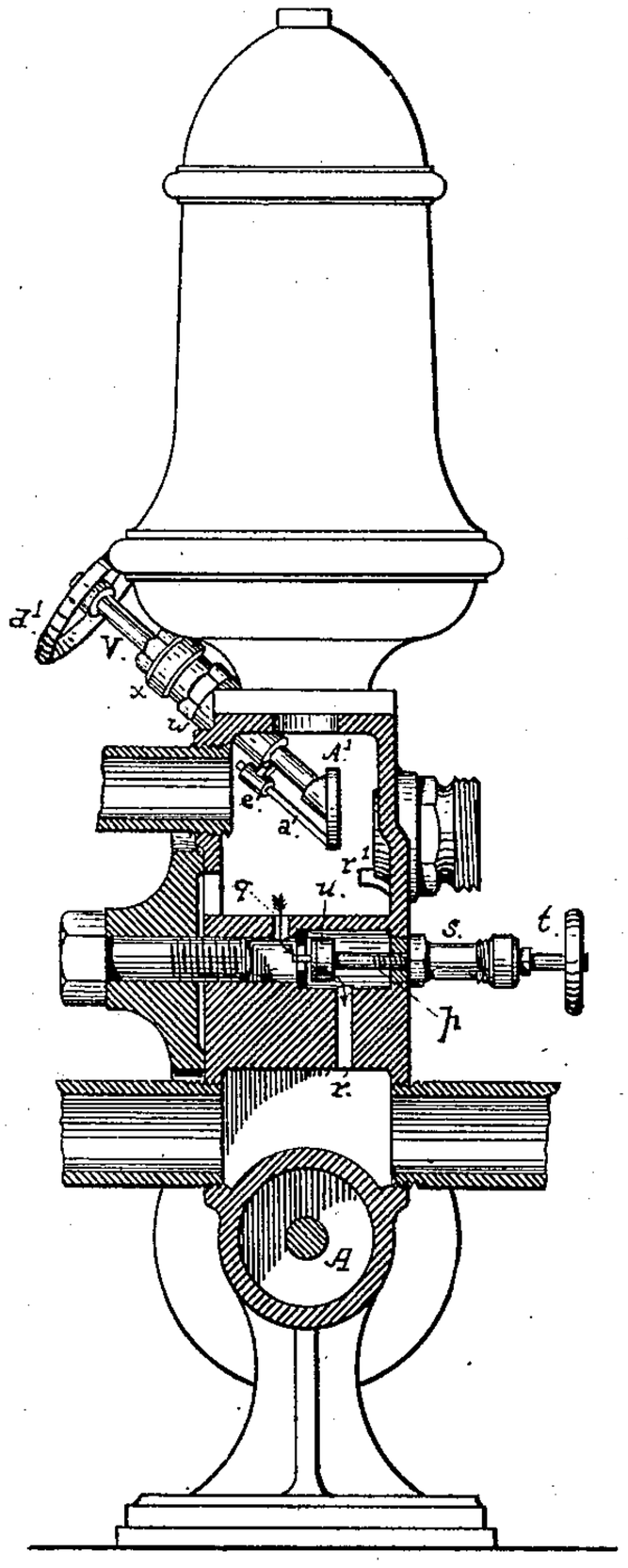


Fig. 4.

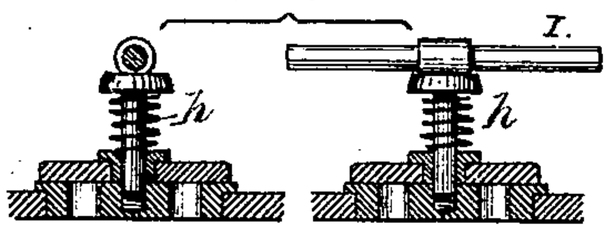


Fig. 3.

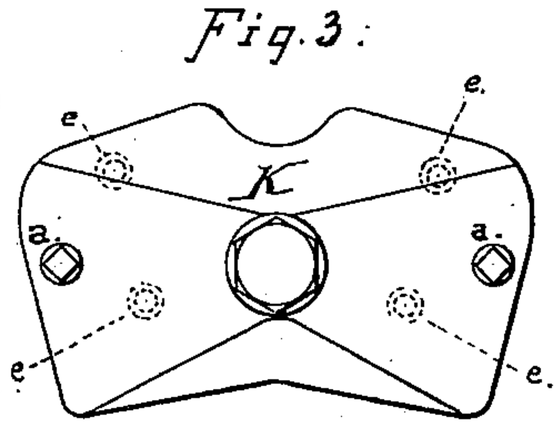
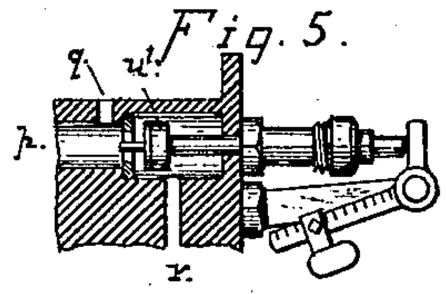


Fig. 5.



Witnesses:

W. C. Voit.

W. E. Roberts.

Inventor:

William D. Hooker.

By His Attys., Dana & Dana.

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W. D. HOOKER.

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Fig. 7

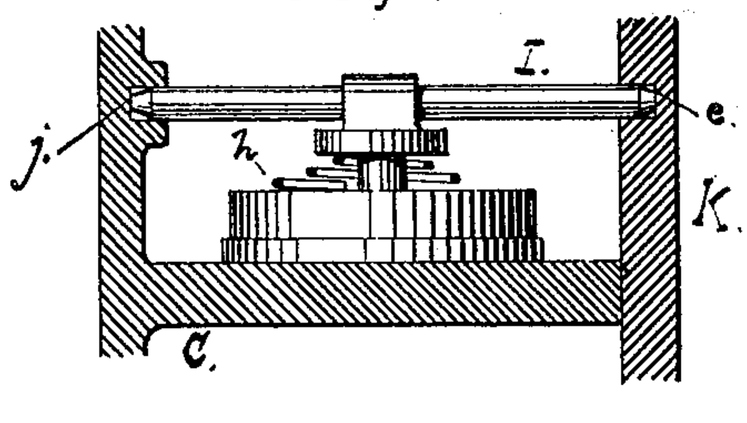


Fig. 6

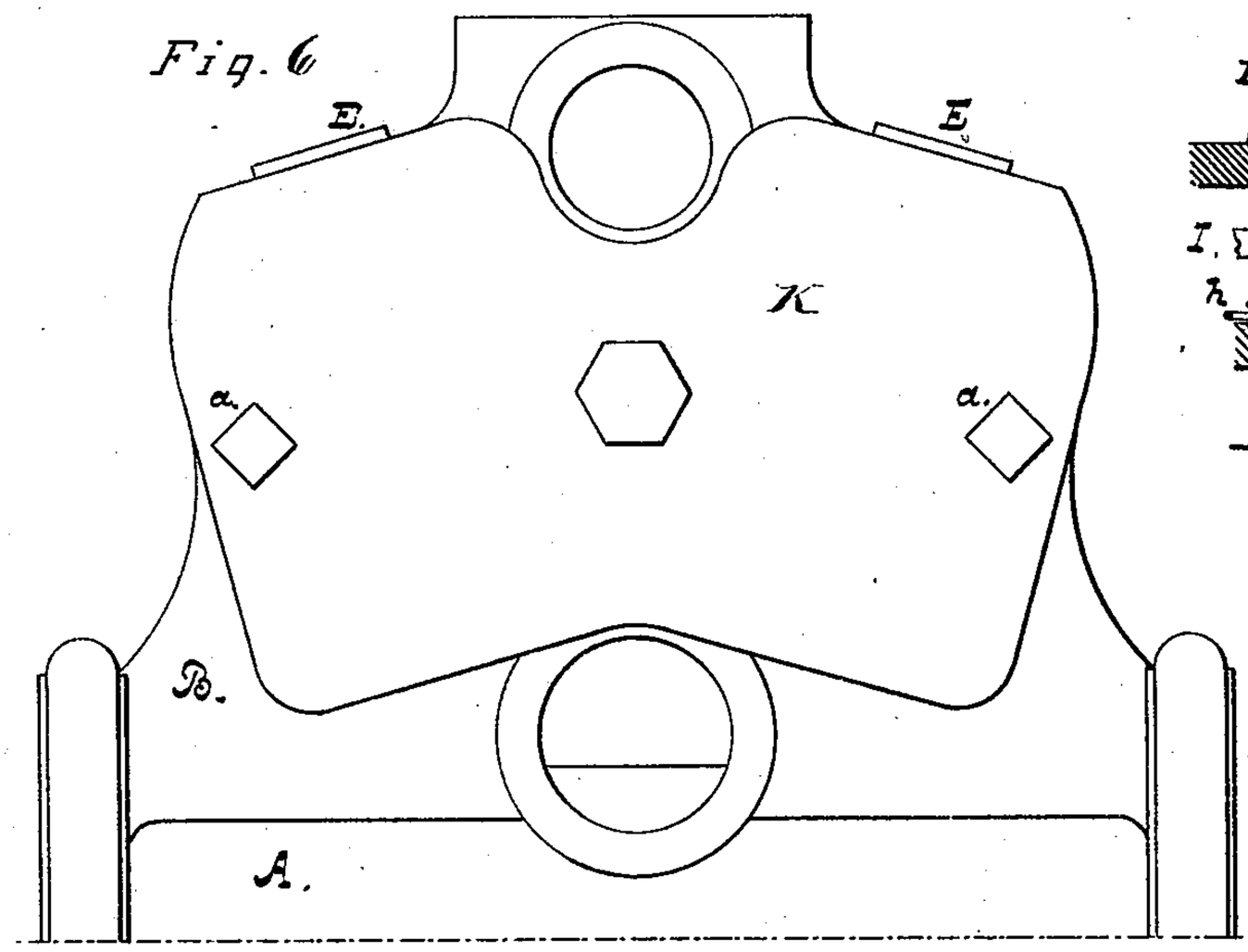


Fig. 8.

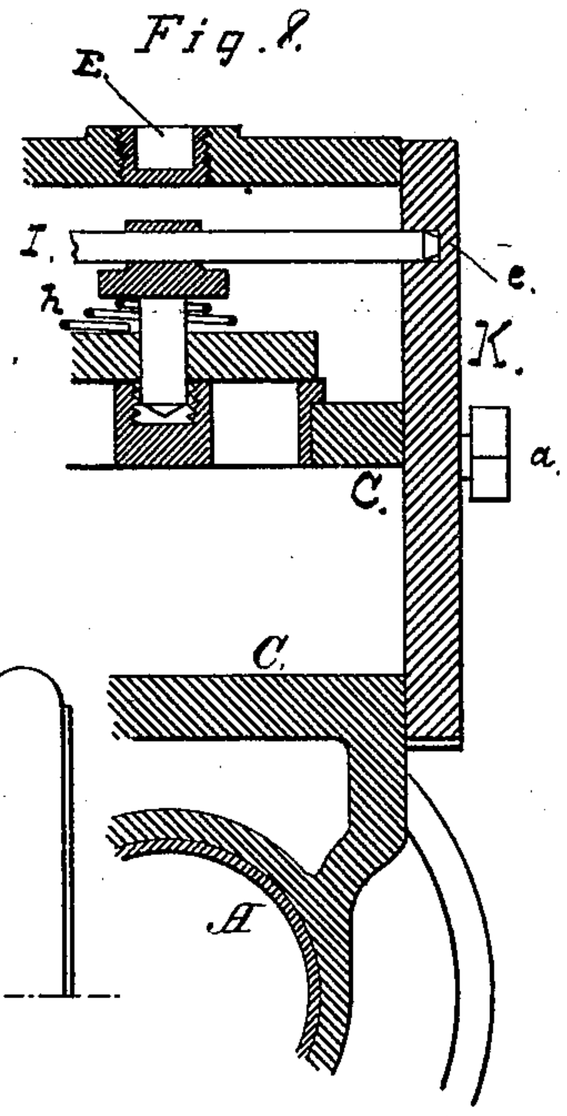
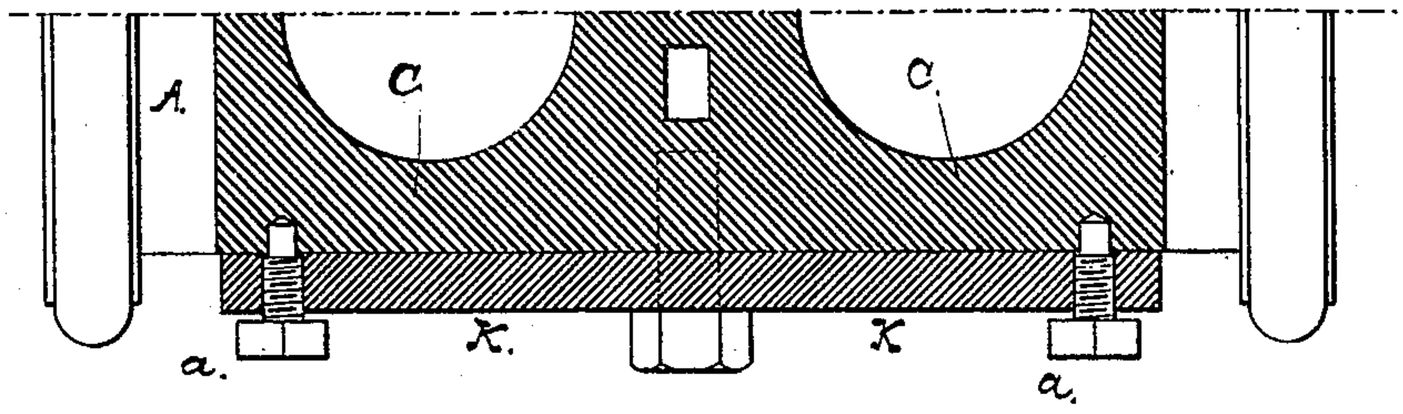


Fig. 9.



Witnesses:
John L. Boone
Wm. F. Clark

Inventor:
William D. Hooker
By His Attys.,
Boone & Osborn

UNITED STATES PATENT OFFICE.

WILLIAM D. HOOKER, OF OAKLAND, CALIFORNIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 255,990, dated April 4, 1882.

Application filed June 1, 1881. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM D. HOOKER, of Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to certain improvements in pumps; and it consists, first, in arranging the inclined partitions that separate the induction and eduction chambers in each end of the pump in a position parallel with each other, and in such relation to the case or shell that the openings for the valve-seats shall be directly in line one over the other, and in providing a small hole or opening in the top of the case over the said partitions, through which to reach and bore out the valve-seats, whereby I am enabled to cast the shells or cases of the pumps and the partition all in one piece with the cylinder, and to bring the valve-openings in line with the discharge-outlet at the top to give a straight and direct passage for the water through the pump; secondly, in a simple and effective arrangement for mounting and securing the valves upon their seats in the chambers of the pump, so that they can be readily removed and replaced when desired; thirdly, in providing a valved water way or passage between the discharge and suction chambers of the pump, through which the water in the discharge-chamber can be drawn or returned back into the suction; and, fourthly, in a novel cut-off valve for closing the discharge-opening that leads from the discharge-chamber of the pump, all as hereinafter more fully described.

Referring to the accompanying drawings, Figure 1 is a longitudinal vertical section. Fig. 2 is a transverse section through *x x*, Fig. 1. Fig. 3 is a view of the cap or cover. Fig. 4 is a detail view of the valves. Fig. 5 shows the valve *u* as arranged to act automatically. Fig. 6 is an elevation of one side, showing the cap. Fig. 7 is a detail. Fig. 8 is a section of the cap and immediate parts, taken in a vertical line. Fig. 9 is a section of the same, taken in a horizontal line.

A is the pumping-cylinder, and B the shell or case inside of which the water-chambers and valve mechanism of the pump are contained. The shell or case with its partitions I cast in one piece with the cylinder A, with the exception of one side, which is removable, so as to uncover the ends of the water-chambers for the purpose of placing and removing the valves.

The partitions C C, which separate the chambers of the pump, I construct upon an incline, so that the two partitions on each side of the vertical wall or partition D will be parallel with each other. These partitions slope downward from the central partition, D, toward the sides of the case on both sides, so that after the shell and the partitions have been cast a hole or opening, E, can be made in the shell or case above the middle of the partitions and a tool-holder or drill inserted through it into the upper chamber. This tool or drill can then be used for making the openings in the partitions over which the valves are placed by drilling directly through both partitions. The opening in the shell can be quite small, as it is only necessary that it be large enough to admit the shank of a drill or drill-holder through it. A larger drill or reamer can then be inserted into the chamber through the side opening and secured to the shank or drill-holder for increasing the size of the opening in the partitions. By this arrangement, therefore, I am enabled to cast the partitions as a permanent part of the shell or case, and to drill the openings in each pair through one small hole in the case, which can be subsequently plugged up, thereby reducing the number of joints and openings which are otherwise required. The arrangement of the partitions is also advantageous in giving sufficient room in the suction and discharge chambers for connecting the suction and discharge pipes directly to them without having to core a passage around the cylinder.

My improved arrangement for holding the valves in place and keeping them to their seats is extremely simple and efficient, and possesses several advantages not heretofore obtained in the application of valves to pumps. It consists in supporting the upper end of the guide-spindle of each valve by a transverse rod, which passes across the chamber above the valves, and has its ends supported in sockets in the sides of the case or shell. The arrange-

ment is as follows: A hole is made through the center of the valve, through which the guide-spindle *f* passes. The upper end of this spindle is attached to a rod, I, which is long enough to extend across the chamber and project a short distance outside of the wall at the open end of the chambers, and a spiral spring, *h*, surrounds the guide-spindle between the valve and rod.

In casting the case or shell B, I cast or form a socket, *j*, in the closed side of each chamber directly opposite the middle of the valve and near the top of the chamber. I then take the rod I, to which the valve-guide is attached, and introduce one end of it and the valve into the chamber through the side opening. The opposite or farthest end of the rod I introduce into the socket *j* and place the valve upon its seat, allowing the outer end of the rod to project through the opening in the side of the case. The valve in each chamber is placed in this position. The springs *h* are long enough to press the outer end of the rod upward slightly above its proper position, when the opposite end of the rod is secured in its socket. The cap or cover K, which fits against the side of the case or shell and covers the open ends of the chamber, is then fitted and secured in place. This cap or cover I provide with shallow sockets, *e*, on its inside, in the proper position to receive and hold the outer ends of these rods, so that in placing the cover on I first introduce the ends of the rods in the sockets, and then press the cover to its place, which brings the rod to a horizontal position and presses the spring upon the valve. The cover is then fastened in place, thus holding the rod in a horizontal position and securing the valves upon their seats. This arrangement enables me to remove and replace the valves readily when desired, as all I have to do is to remove the cap or cover K and withdraw or replace the rods with their attached valves. When several valves are required to be secured in a line with each other a single rod supported in the above manner can be used for all of them.

Another improvement which I introduce into my pump, as before stated, is what I call a "draining-valve," the object of which is to connect the discharge-chamber with the suction-chamber, so that when desired the water in the discharge-chamber can be drawn down into the suction, from whence it can pass back into the well or source from which the pump draws the supply. This is of special advantage in cold weather, as it prevents the pump from freezing up when it is allowed to stand still. To do this I make a hole or orifice, *p*, horizontally through the upright partition D, from side to side of the pump, directly opposite the point where the central screw or bolt that fastens the cover or cap K to the side of the pump enters. I then tap the end of the hole or orifice on the side against which the cap fits and screw the bolt that fastens the cap or cover in place directly into the end of this hole. This serves a twofold purpose: First, the screw plugs the end of the hole, and, secondly, it avoids making an extra hole to fasten the screw in. I then make a port or passage, *q*, leading from the discharge-chamber of the pump down through the upright partition and connect it with the horizontal passage near the end of the screw that fastens the cover on. I then make another and independent port or passage, *r*, leading from the horizontal passage, near its opposite end, down into the suction-chamber. In the opposite end of the horizontal passage, on the opposite side of the pump, I screw a plug, *s*, through which a hole is made which is tapped with screw-threads, and through this hole a screw-rod, *t*, passes. On the end of this rod, which projects into the orifice, is a valve, *u*, that fits in the horizontal passage between the two vertical passages *q r*, so as to cut off communication between them. A hand-wheel on the outer end of the rod then serves to turn the rod and move the valve. Now, when the pump has been stopped the valve *u* can be moved back by turning the hand-wheel and rod, so as to uncover the vertical passage *r* and allow the water to pass through the horizontal passage or orifice from one vertical port or passage to the other, thus draining the discharge-chamber of the pump into the suction.

By substituting a stuffing-box for the plug *s* and using a smooth rod for the screw-rod *t*, I can place a weighted lever (shown at Fig. 5) so as to press against the end of the rod and counteract any given pressure against the piston or valve *u* in the horizontal passage. This arrangement will prevent any unusual strain or pressure in the discharge chamber or pipe by yielding to the pressure and allowing a portion of water to pass down into the suction.

I also provide an improved valve arrangement for opening or closing the exit or discharge opening in the discharge-chamber when the pump is in operation. This valve A′ is moved by a screw rod or spindle, *v*, which passes diagonally through the discharge-chamber and through a screw-bushing, *w*, which is secured in a hole in the case or shell. The inner end of the rod is attached to the center of the valve at an angle to its plane by a loose joint, which will allow it to adjust itself upon the valve-seat when it is pressed against it. The bushing has a sleeve or stuffing-box, *x*, projecting from it inside of the chamber, through which the rod passes, so as to make a tight joint and to prevent the valve from getting displaced when it is drawn away from its seat. A rod, *a′*, passes through a hole in a lug, *e′*, on the inner end of the sleeve, and has its opposite end attached to the valve at one side of its center. This holds it in the proper position to drop squarely on the seat, but permits sufficient movement of the valve to allow it to adjust itself when pressed down against the seat. The diagonal arrangement of the rod

that moves the valve will have a tendency to slide the valve across the seat when a strong pressure is applied. To prevent this I cast a curved lug or bead, r', around a portion of the valve-seat, against which the edge of the valve will strike when it is forced down on the seat, and this prevents it from sliding across the valve-opening and bending the rod. A hand-wheel, d', on the outer end of the rod serves to turn it to move the valve. By this means the valve is opened and closed by an angular movement of the valve that lifts it bodily from its seat by a cut-off movement, which immediately relieves it from the excessive pressure of the water in the chamber and leaves the opening free and unobstructed.

The cap or cover K, which fits against the side of the pump and covers the ends of the chambers, as above stated, I secure by means of a single bolt, which passes through its center and into the upright partition. I employ, however, at or near each end a steady-pin, which enters a socket in the shell or case and keeps the cover in the proper position. These steady-pins I also make to serve another purpose. Each pin a has screw-threads cut on it close to its head, as shown, and the hole through the cover in which it is secured is tapped with screw-threads, so that when the screw portion of the pin has been screwed into the hole in the cover the end of the screw that projects to the inside of the cover, being plain, will form the steady-pins that enter the sockets in the shell. Now, when it is desired to remove the cover and the central bolt has been removed, I can, by turning the screw steady-pins slightly inward, force the cover outward and break the adhesion of the cover and packing, so that the cover is loosened and easily taken off without the use of chisels or hammers.

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

1. In a pump, the outside shell or case, B, having the central upright partition, D, and the inclined partitions C C, that separate the induction and eduction chambers at each end of the pump, said partitions C C, being so arranged that while they incline toward the said central partition, D, they are also parallel with each other, in combination with the passages E in the top of the shell, directly over and in line with the valve-seats in the partitions C C, substantially as described and set forth.

2. The improvement in mounting valves upon valve-seats, consisting in connecting the upper ends of their guide-spindles to a transverse rod, I, the ends of which are supported by bearings in the sides of the case, substantially as described.

3. The rod I, having the guide-spindle f attached to it, in combination with the socket j on the case or shell B and the removable cover K, with its sockets e, substantially as and for the purpose described.

4. In a pump, the transverse passage or orifice p, connected by the vertical passage q with the discharge-chamber of the pump, and also connected by another and independent vertical passage, r, with the suction-chamber of the pump, in combination with the valve or piston u, arranged to move in the horizontal passage and open or close communication between the vertical passages, substantially as specified.

5. The plug-valve arrangement for closing the discharge-opening, consisting of the valve A′, attached loosely to the screw-rod V, said screw-rod passing diagonally through a stuffing-box, w, in the side of the case, and connected by a rod, a', with the sleeve of the stuffing-box, in combination with the lug or bead z around the discharge-opening, substantially as described.

6. The cover K, having the steady-pins a, provided with a threaded portion near their bases, which screw into threaded holes in the cover, while the projecting portion or pin is plain, for the purpose specified.

In witness whereof I have hereunto set my hand and seal.

WILLIAM DAVIS HOOKER. [L. S.]

Witnesses:
W. F. CLARK,
EDWARD E. OSBORN.