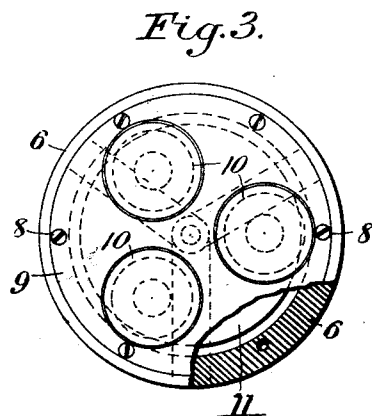
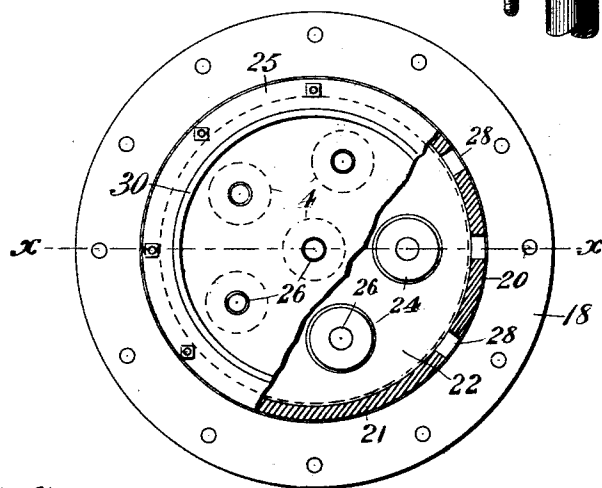
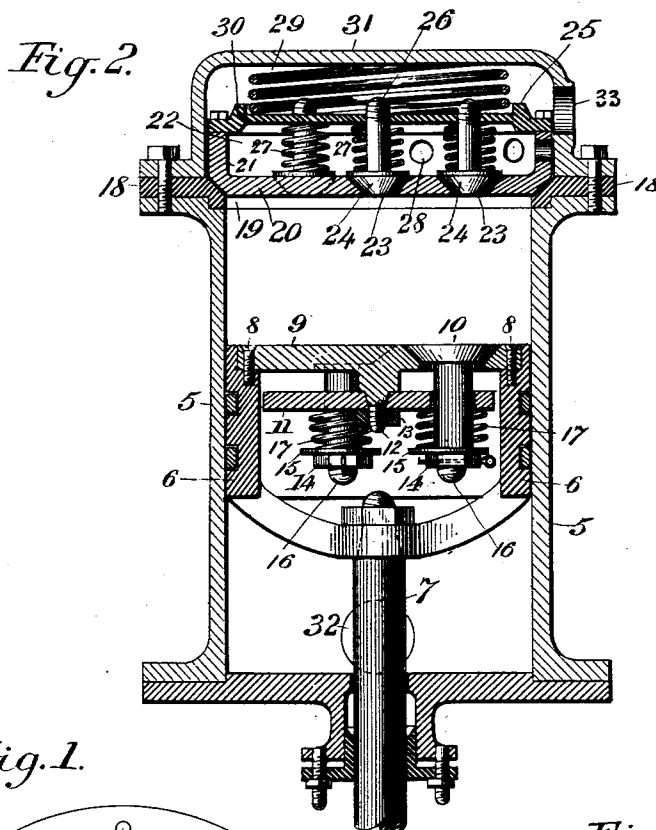


(No Model.)

C. ZIES.
PUMP VALVE.

No. 520,349.

Patented May 22, 1894.



Witnesses:

Wm. T. Buck

Chas. J. Jarvis.

Inventor:

Charles Zies

By his Attorney

Wm. L. Bailie

UNITED STATES PATENT OFFICE.

CHARLES ZIES, OF BALTIMORE, MARYLAND.

PUMP-VALVE.

SPECIFICATION forming part of Letters Patent No. 520,349, dated May 22, 1894.

Application filed April 25, 1892. Serial No. 430,588. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ZIES, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Pump-Valves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in that class of pump valves which are employed principally in compression pumps, and consists of a movable head on the pump cylinder whereby a large, auxiliary eduction valve is formed for the easy discharge of the liquids of condensation or any foreign matter that may have entered the cylinder; a valve chamber being provided in said movable head wherein are provided the desired number of eduction valves that control discharge passages formed in said movable head and, which, under ordinary conditions, perform all the work of this part of the pump; the piston being provided with induction valves of particular construction whereby a flush surface will be formed on the piston that may be brought in contact with the said movable head and thereby avoid the loss due to clearance between the said head and piston; the object of my invention being, first, to provide a system of pump valves whereby the loss from "clearance" will be avoided; second to provide an auxiliary eduction valve of such form and size as to permit the easy escape of liquids or any foreign substance and, third, to provide a set of eduction and induction valves for the general work of the pump, so divided in number as to be noiseless in their operation and thus avoid the noisy jar which necessarily accompanies the continuous working of the larger valves. All of which I accomplish by the devices hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1. shows a view looking down on the pump; the top bonnet removed and a part of the valve guide-plate broken away. Fig. 2. shows a vertical section through the device,

the section being indicated by the line $x-x$ in Fig. 1. Fig. 3. shows a detailed view looking down on the piston; a part of the valve seat being broken away.

The same numbers refer to the same or similar parts throughout the several views.

The number 5 denotes the pump cylinder that is provided with a hollow piston 6 to which a reciprocating movement is given by the piston rod 7 in any well known manner.

Secured to the top of the piston by the screws 8 is the plate 9, wherein are formed the seats for the induction valves 10, the desired number being placed thereon according to the size of the piston, in this case three valves being employed as shown in Fig. 3.; the valve seats being of a bevel form whereby when the valves 10 are seated therein the top of the piston will present the flush form shown in Fig. 2.

To provide a suitable guide for the valve stem 16 there is suspended under the plate 9 the guide plate 11 that is held in position by the bolt 12 projected from the said plate 9 and secured thereto by the nut 13. A collar 15, and nut 14 provided with a splint pin on the end of the valve stem 16, serve to hold the spring 17 in position between said guide plate and collar 15 whereby the induction valves 10 are normally held in the closed position.

On top of the cylinder is placed the auxiliary-valve seat 18, whereon is seated the auxiliary valve 20; the port 19 thereof being of the same diameter as the bore of the cylinder, whereby, when the piston is at or near its top center, it will be brought in contact with the auxiliary valve 20 and both piston and auxiliary valve may be caused to move a small distance together. This contact avoids any clearance between the piston and valves, and on the downward stroke of the piston gets the full value of the displacement thereof; this movement of the larger auxiliary valve permitting any liquid or foreign matter to easily escape from the cylinder. As stated, this auxiliary valve 20 is not intended to do the general work of an eduction valve.

I am aware that the employment of one large valve to avoid the loss from "clearance," &c., is not new: the constant working

of a large valve of this description, however, in consequence of its size and weight, entails a noisy chattering and jar that is not only disagreeable but causes an unnecessary wear and consequent inefficiency of this part of the pump. To avoid these objectionable features I construct the auxiliary valve 20 of the form shown in Fig. 2, with the wall 21 extended around the periphery thereof, where-
 10 by the valve chamber 22 is formed: the auxiliary valve being provided with suitable bevel ports 23 in which are seated the main eduction valves 24 that control the passage of gases from the cylinder through the said
 15 ports 23; a guide plate 25 forming a cover for the valve chamber 22 through which the valve stems 26 are free to move; the springs 27 backed by the guide plate and pressing upon the valves 24 serving to hold them nor-
 20 mally in the closed position; suitable openings 28 being provided in the wall 21 through which the gases may escape from the chamber 22, and a spring 29 being seated in a pocket 30 provided therefor in the guide plate
 25 25, and backed by the bonnet 31 serving to normally hold the auxiliary valve in its seat.

The manner of operating is as follows:—
 The cylinder is placed in the vertical position shown and on the downward stroke of the
 30 piston the air or other gas to be compressed enters through the port 32 and thence passes through the induction valves 10 in the piston filling the space in the cylinder thereover; on the return or upward stroke of the piston
 35 the gas is compressed and forced through the main eduction valves 24 and into the chamber 22, thence escaping through the openings 28 in the wall thereof and is finally delivered through the opening 33 in the bonnet 31; the

upward stroke of the piston being stopped 40 when it is just in contact with the auxiliary valve and so that this valve will not be moved off its seat thereby. The main eduction valves 24 are sufficient in number and area 45 to permit an easy escape of the compressed gas and to perform all the ordinary work required except at such times when an extra liquefaction occurs or some foreign substance gets in the cylinder, which being between the piston and the auxiliary valve will cause the 50 latter to be raised by the movement of the piston and the cylinder will be freed.

Having described my invention and the manner of operating, what I claim, and desire to secure by United States Letters Patent, is— 55

In a pump, the combination, with the cylinder, the outer end of which is provided with an auxiliary valve seat, of a cap or bonnet, a substantially cup shaped auxiliary valve upon the seat, the walls of which are 60 perforated, and the bottom is provided with a series of valve seats, a plate secured to the top of said valve provided with openings registering with the valve seats and having a pocket in its upper surface, a valve in each 65 valve seat of the auxiliary valve, the stem of which projects through the opening in the plate, and a spring in the pocket of the upper surface of the plate, the upper end of which engages with the bonnet, substantially 70 as set forth.

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

CHARLES ZIES.

Witnesses:

WM. L. BAILIE,
JNO. T. MADDOX.