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VALVE MECHANISM FOR AIR PUMPS AND THE LIKE

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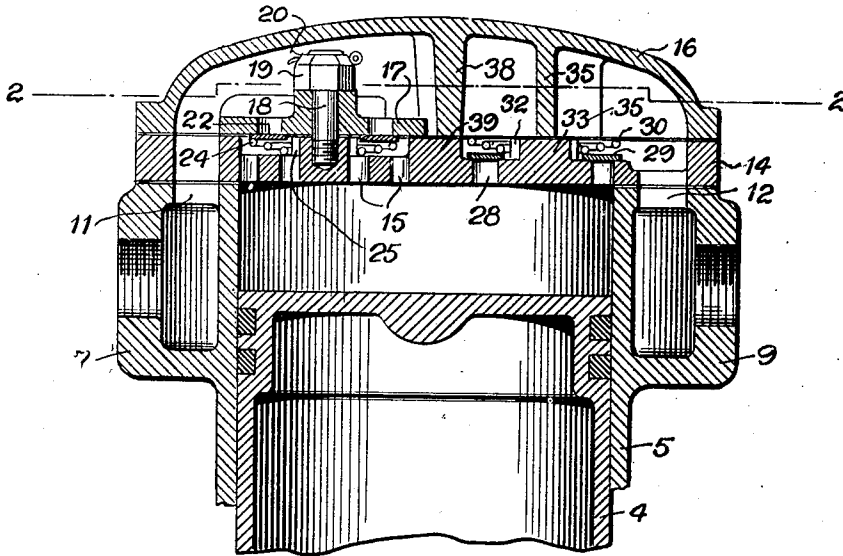


Fig. 1

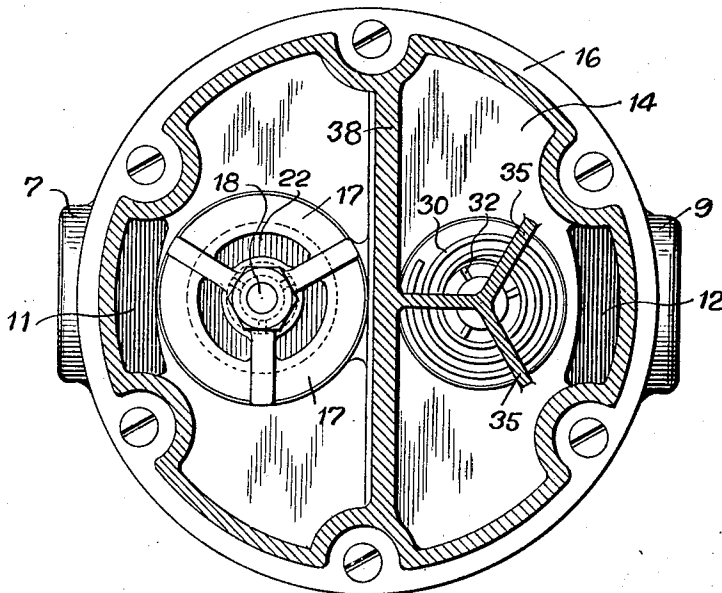


Fig. 2

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UNITED STATES PATENT OFFICE.

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VALVE MECHANISM FOR AIR PUMPS AND THE LIKE.

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My invention relates to cylinder heads and valve mechanisms for pumps, compressors, engines and similar devices, and is particularly useful in connection with air pumps such for example as used with cow-milking apparatus.

The general object of the invention is to provide a new and improved cylinder head and valve mechanism which is simple in construction, efficient in operation, cheap to manufacture and easily assembled and dismantled. One of the specific objects of the invention is to provide a cylinder head and valve mechanism such that the possibility of any part of the valve mechanism falling into the cylinder, in case such part becomes detached through breakage or otherwise, is reduced to a minimum. This is an important matter, inasmuch as the clearance between the end of a pump piston and the cylinder head is usually so small that in case loose parts drop into the cylinder serious damage to the machine results.

The invention will be understood from the following description taken in connection with the accompanying drawing in which Figure 1 is a sectional elevation of a portion of the pump having the invention embodied therein; and Figure 2 is a sectional plan view on the line 2—2 of Figure 1.

Referring to the drawing, at 4 is shown a piston located with an air pump cylinder 5, both these parts being only partially shown. The cylinder 5 is provided with hollow projections 7 and 9, adapted to serve as the intake and outlet passages of the pump. The outside vertical walls of these hollow projections 7 and 9 are shown as provided with threaded holes into which pipes may be screwed; and the top walls of said projections are provided with openings 11 and 12 adapted to communicate with openings through a valve plate 14 into intake and outlet valve chambers formed between said valve plate 14 and a cover 16, as hereinafter described. The top of the cylinder 5 is machined to a plain surface, and is adapted to be engaged by the valve plate 14, a gasket being preferably introduced between these two parts. The valve plate 14, which also serves as the cylinder head, has parallel machined faces and one face has an annular recess and an annular valve seat with which valve mechanisms cooperate. The recess for the inlet valve mechanism, shown at the left in both figures of the drawing, is provided

at its bottom with opening 15 extending through the valve plate; and the top of said recess is covered with a cover plate 17 having ports therein. Said cover plate 17, which is machined on its bottom surface, is secured to the valve plate 14 by means of a stud 18 screwed into the valve plate 14 and extending through the hub of the cover plate 17 and provided at its upper end with a nut 19 which may be secured from working off of said stud by means of a cotter-pin 20. Cooperating with the bottom of the cover plate 17, is a valve 22 in the form of a flat ring, this valve being yieldingly held in a position to close the openings through the cover plate 17 by means of a coiled wire spring 24. The valve 22 and the spring 24 may be held from lateral movement by means of radial lugs 25 extending outwardly into the annular recess in which the valve 22 and the spring 24 are located.

The valve at the right side of both figures of the drawing is the outlet valve of the pump. The valve seat for this valve mechanism is provided by machining an annular portion of the top surface of the valve plate 14 at a portion where there are openings 28 through said plate which serve as valve ports. These valve ports 28 are closed by a valve 29, in the form of a flat ring like the ring 22 used in the inlet valve; and this valve 29 is yieldingly held in its closed position by means of a coiled spring 30, said valve and spring being held against lateral movement by lugs 32 projecting outwardly from an upwardly extending portion 33 of the valve plate 14. The coiled spring 30 is held under compression by wings cast in the cover 16, which is adapted to cooperate with the top of the valve plate 14. The cover 16 is provided with a transversely extending rib 38 which makes contact with a rib 39 extending across the top of the valve plate 14, and said rib 38 thus serves to divide the space between the valve plate 14 and the cover 16 into an intake valve chamber and an outlet valve chamber, as will be obvious from the drawing.

It will be noted that all of the separate parts of the valve mechanisms are located on the side of the valve plate 14 opposite the cylinder, thereby avoiding the possibility of any of the parts of the valve mechanism dropping into the cylinder should said parts become detached for any reason.

While I have shown one form in which my invention may be embodied, it is my intention

in the following claims to cover all equivalent arrangements which come in the spirit of my invention.

What I claim is:

1. In a device of the character described, a valve plate having openings therethru extending into an annular recess on one side of the plate and into an annular valve seat on the same side of the plate as said recess, valve mechanism located in said recess and on said valve seat, a valve seat member attached to said plate over said annular recess so as to form a seat for the valve contained therein, and a cover adapted to cooperate with that face of said plate which is provided with said recess and valve seat and so formed as to provide two separate valve chambers, one of said chambers containing said valve seat member and the other chamber having formed therein a stop member adapted to overlie the valve mechanism on said annular valve seat so that when said cover is applied it will retain said last named valve mechanism in position with respect to its seat.
2. In a device of the character described, a valve plate having an annular valve seat from which ports extend thru said plate, a valve cooperating with said valve seat and adapted to cover said ports, a spring engaging said valve for yieldingly holding said valve in its closed position, and an imperforate cover mounted directly on the valve plate and conjointly therewith forming a valve chamber and holding the spring in compression.
3. In a device of the character described, a valve plate having an annular valve seat from which ports extend thru said plate, a valve cooperating with said valve seat and adapted to cover said ports, a spring engaging said valve for yieldingly holding said valve in its closed position, and a cover mounted directly on the valve plate and cooperating with said valve plate to form a valve chamber, said cover having means cooperating with said spring and putting the latter under compression.
4. In a device of the character described, a valve plate having an annular valve seat from which ports extend thru said plate, a valve cooperating with said valve seat and adapted to cover said ports, a spring engaging said valve for yieldingly holding said valve in its closed position, and a cover, mounted directly on the valve plate and adapted to cooperate with said valve plate

and form a valve chamber and having wings projecting into said chamber and cooperating with said spring whereby the latter is put under compression.

5. In a cylinder head construction for pumping mechanism, in combination, a valve plate having intake and outlet passages therethrough, valves on said valve plate, and a cover outside the valve plate, said cover having a partition between the valves dividing the space between the cover and the valve plate into intake and outlet chambers.

6. In a cylinder head construction for pumping mechanism, in combination, a valve plate adapted to cover an end of a cylinder, and having intake and outlet channels therethrough, said valve plate also having inlet and outlet passages adapted for communication with the cylinder, inlet and outlet valves carried by the valve plate, and a cover co-extensive with the valve plate, said cover having a partition between the valves dividing the space between the valve plate and the cover into inlet and outlet chambers.

7. In a cylinder head construction for pumping mechanism, in combination, a valve plate adapted to cover an end of a cylinder and having portions adapted to project out beyond the cylinder, said valve plate also having intake and outlet channels extending through said outwardly projecting portions, and inlet and outlet passages adapted for communication with the cylinder, inlet and outlet valves carried by the valve plate for controlling said passages, a cover co-extensive with the valve plate, and a partition dividing the space between the valve plate and the cover into inlet and outlet chambers.

8. In a cylinder head construction for pumping mechanism, in combination, a flat, plane surfaced valve plate adapted to cover a cylinder end and to project outward beyond the cylinder, and having intake and outlet channels through marginal portions thereof, said valve plate also having intake and outlet passages adapted for communication with the cylinder, valves associated with the latter passages, and a dome-shaped cover having a partition dividing the cover to form intake and outlet chambers, said cover terminating marginally in a single plane to fit the margin of the valve plate.

In testimony whereof I have affixed my signature to this specification.

GEORGE F. PFEIFER.