

Feb. 12, 1924.

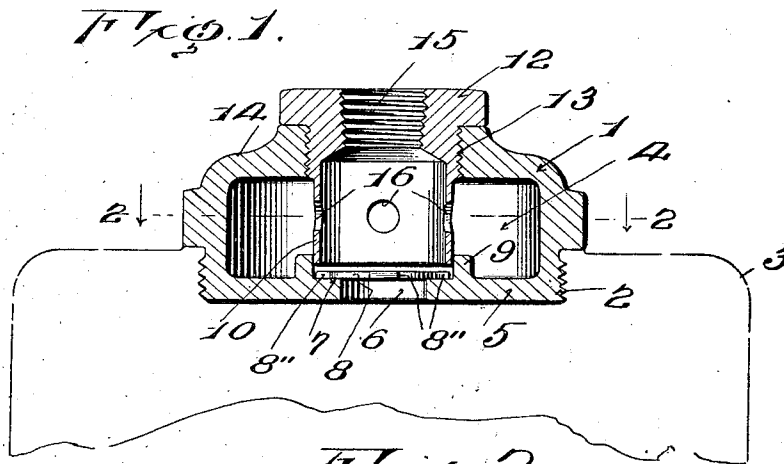
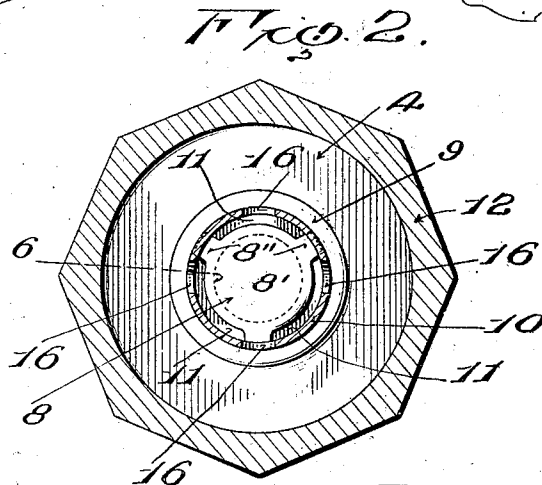
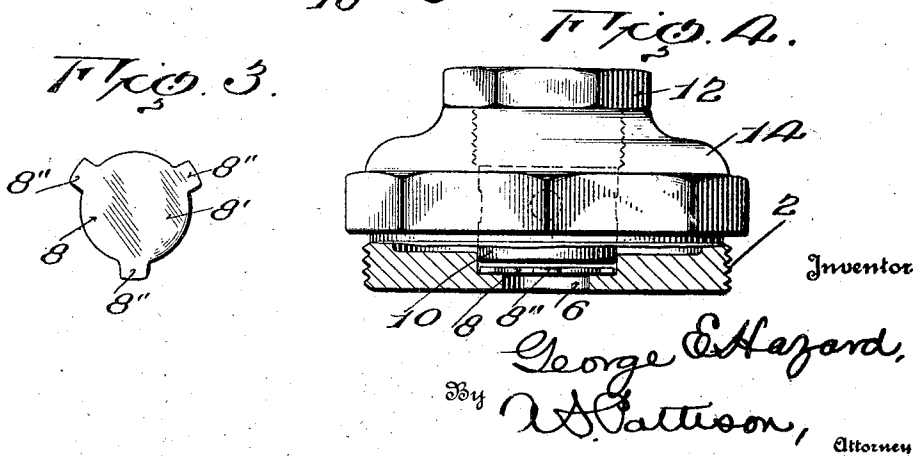
G. E. HAZARD

1,483,436

VALVE

Filed Aug. 30, 1920

2 Sheets-Sheet 1



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G. E. HAZARD

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VALVE

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Fig. 5.

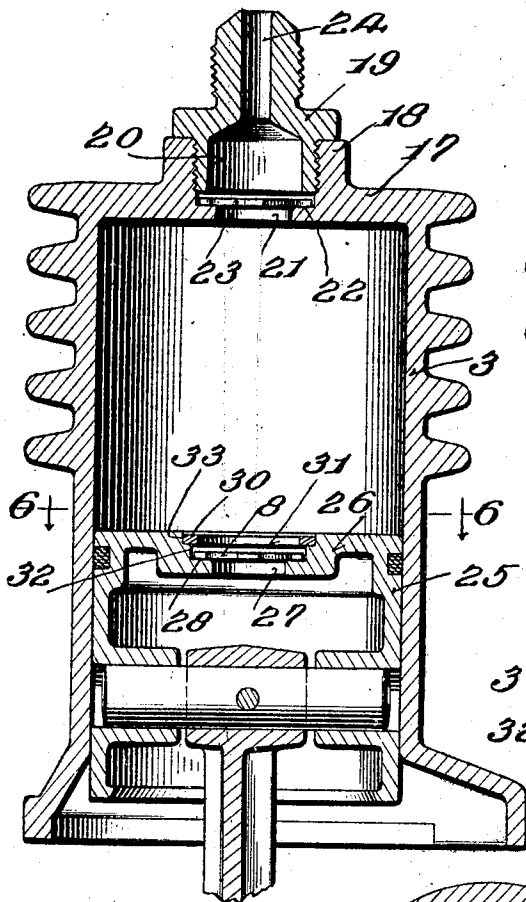


Fig. 7

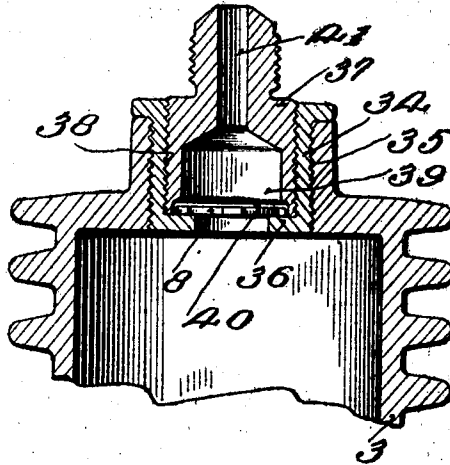


Fig. 8.

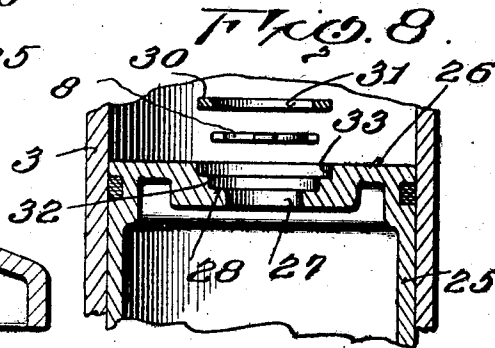
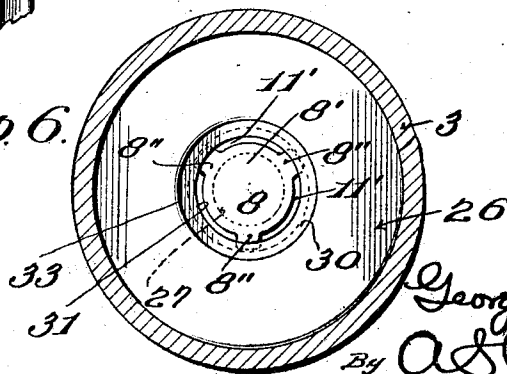


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE EDGAR HAZARD, OF ROCHESTER, NEW YORK, ASSIGNOR TO KELLOGG MANUFACTURING CO., OF ROCHESTER, NEW YORK.

VALVE.

Application filed August 30, 1920. Serial No. 406,920.

To all whom it may concern:

Be it known that I, GEORGE E. HAZARD, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in valves, which is specially intended for use in air pumps, and more particularly air-pumps operated by automobiles for inflating the tires.

The object of my invention is to provide a valve construction comprising a light, flat disk valve having a very slight movement, whereby quietness and quick action is obtained; whereby it is cheap to manufacture in that it can be stamped out very rapidly on a punch press as compared with the turning of a poppet valve with its stem and valve portion from a bar stock, and whereby it is unnecessary to grind the valve to its seat, which is absolutely necessary with the poppet cone valve to get the proper seating thereof.

Further objects of the invention will appear from the following description and disclosure.

In the accompanying drawings:

Figure 1 is a vertical section showing one form of my valve construction as applied to the head of an air-pump cylinder.

Fig. 2 is a horizontal sectional view on the line 2—2 of Fig. 1, looking in the direction indicated by arrow.

Fig. 3 is a detached plan of my improved disk-valve.

Fig. 4 is a side elevation of Fig. 1, showing the lower end thereof in vertical section.

Fig. 5 is a vertical central section through an air-pump cylinder and its piston showing forms of my improved valve applied to the cylinder and piston heads.

Fig. 6 is a horizontal sectional view on the line 6—6 of Fig. 5, looking in the direction indicated by arrow.

Fig. 7 is a vertical sectional view of the outer end of a pump cylinder showing another form of my valve construction applied thereto.

Fig. 8 is a vertical sectional view through the piston of Fig. 5, showing the valve and its holding washer in separated relation.

Referring now to Fig. 1, 1 is a valve housing having a reduced screw-threaded portion 2, which is screwed into the head of an air-pump cylinder 3. In this construction the housing 1 is hollowed out, as shown at 4, for a purpose to be presently set forth. The bottom wall 5, of this housing has a central air-outlet opening 6, and around this opening is a flat flange 7, forming a valve-seat for the disk valve 8. This disk valve 8 has an imperforate central flat portion 8', of larger area than the outlet-opening 6, whereby the periphery of the central imperforate portion seats on the inner edge of the flange 7. Surrounding the flange 7 is an upwardly extending annular flange 9, which forms a retaining flange for the engagement of the outer edge of a plurality of integral laterally extending flat arms 8'', formed on the imperforate portion 8' of the valve 8. A holding member 10 extends downward within the upwardly extending flange 9, to a position very close to the upper surface of the flat disk valve 8. This holding member 10 engages the ends of the arms 8'' at points beyond the periphery of the imperforate central portion 8', as shown in Fig. 2, whereby air escape passages 11 are formed around the central portion 8' of the flat valve between the arms 8''. In the form shown in Fig. 1, the holding member 10 is a part of a plug 12, which has a reduced screw-threaded portion 13 screwed into the top wall 14, of the housing 1, and the holding member 10 is a depending cylinder with its lower end arranged in respect to the flange 9, and the valve 8, previously described. This plug 12, has a central screw-threaded outlet opening 15, for the purpose of receiving any desired form of air-conducting tube (not shown) and the cylindrical member 10 is provided with a plurality of openings 16, which communicate with the hollow portion 4 of the housing 1.

The valve construction just described, is only the outlet for air from the cylinder 1, the air being drawn into the cylinder through any desired form of inlet valve (not shown in Fig. 1) and forced out of the cylinder past the valve 8. The valve 8 is lifted from its flat seat 7 by the compressed air and it flows through the spaces 11 around the periphery of the imperforate portion 8' between the arms 8'' into the cylindrical holding member 10. From this cylindrical

member the air is forced through the outlet opening 15, the chamber or hollow portion 4 serving as a compression chamber to cause a more even flow of the air through the outlet passage 5.

In Fig. 5, I show another form of my improved valve construction applied to the head of the cylinder 1. In this case, the head 17 of the cylinder has an internally screw-threaded upwardly extending flange 18. A plug 19 has an externally screw threaded depending cylindrical flange 20 meshing with the screw-threaded portion 18. Below the flange 18 the cylinder head 17 has a central air-outlet opening 21, and a horizontal flange 22 surrounding the opening 21. This flange 22 forms a seat for a thin light disk valve 23, and the valve is the same construction as the valve 8 of Fig. 1, and it is unnecessary to again describe its specific construction. The screw-threaded cylindrical flange 20 extends down close to the valve 23 and performs the function of a holding member for limiting the unseating movement of the valve 23. The operation of this valve is the same as that described of valve 8 in Fig. 1, and that description need not be repeated except to say that the air flows outward around the periphery of the central imperforate portion of the valve directly within the cylindrical holding member 20, and out through its outlet-opening 24.

In a full sized structure, the movement of the flat valve is approximately one-sixty fourth of an inch, which is less than the thickness of the disk valve.

In the form of pump, shown in Fig. 5, air is taken into the cylinder 3, through the piston 25, the piston head 26, being provided with a central air-outlet opening 27. The piston head is provided with a horizontal flange 28, surrounding the air-passage 27, which forms a flat seat for the flat disk valve 8. The holding member for limiting the unseating movement of the valve 28 in this construction, comprises a washer 30, which has an opening 31 larger than the imperforate central portion 8' of the valve, which forms air passages 11' around the imperforate portion of the valve, 8, as shown in Fig. 6. The piston head 26 has an annular recess 32, formed to receive the valve 8, and this recess forms a vertical wall against which the outer edges of the arms 8'' of the valve engage, for the purpose of holding the valve in its proper operative position within the recess 32. In this construction the washer 30 is forced into a recess formed in the piston head 26 beyond the recess 32 and is held there with sufficient friction to hold the valve in position. In operation when the piston 25 travels down, the valve 8 is unseated and air flows into the cylinder 1, around the valve, and when the piston moves up in the cylinder,

the valve 8 is seated and the air in the cylinder is compressed and forced out of the cylinder around the valve in the head of the cylinder.

In the form shown in Fig. 7, I provide a cage for holding the valve. This cage comprises an annular plug 34, which is externally screw-threaded into the head of the cylinder, as at 35, the inner end of this cylinder 35 having an inwardly extending flange 36, which forms a seat for the disk valve 8. The disk valve 8 is of the same construction shown and described in Figs. 1 to 4, inclusive, and the description thereof need not be here repeated. This annular plug 34 is internally screw-threaded and receives an external screw-threaded plug 37, the last screw-threads of the last said members meshing as at 38. The plug 37 has a chamber 39 formed at its lower end and the lower end of the wall of this chamber has a valve receiving recess 40, the top wall thereof limiting the unseating movement of the valve 8. An outlet passage 41 communicates with the chamber 39 of the plug 37. This construction forms what I term a cage for the valve and it can be bodily removed from the head of the cylinder by unscrewing the plug 34. The operation of the valve is the same as that previously described.

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

1. A valve structure for air pumps, comprising a housing having a compression chamber, the bottom of the chamber having a valve receiving recess, the bottom of the recess having an air passageway the recess provided with a surrounding flat valve seat around the air passageway, a disk valve having an imperforate central portion of greater area than the air passageway, the periphery of the central portion of the valve having laterally extending arms for the purpose described, an annular member extending through the chamber of the housing with its inner end projecting into the valve recess adjacent the valve to limit its unseating movement, the annular member having lateral passageways in communication with the compression chamber, and a passageway communicating outside of said chamber.

2. A valve structure for air pumps, comprising a housing having a compression chamber, the bottom of the chamber having a valve receiving recess the bottom of the recess having an air passageway, said recess provided with a surrounding flat valve seat around the air passageway, a disk valve having an imperforate central portion of greater area than the air-passageway, the periphery of the central portion having laterally extending arms for the purpose described, a plug passing through the outer wall of the housing, the plug having an

annular member passing through the chamber and into the valve receiving recess and adjacent the valve to limit its unseating movement, the lower portion of the annular member having an interior area greater than the area of the imperforate portion of the valve, for the purpose described, the annular member having lateral passageways communicating with the compression chamber and the plug having a longitudinal opening communicating with the interior of the annular member.

3. A valve structure for air pumps, comprising a housing having a compression chamber, an air passage-way in the bottom of the housing, a disk valve for closing said air passage-way, a plug passing through the outer wall of the housing and provided with an air outlet opening, the plug having an annular member passing through the compression chamber to a point adjacent the valve to limit its upward movement, and

the annular member having lateral passageways in communication with the compression chamber, and a passage-way communicating with the plug outlet opening, for the purpose described.

4. A valve structure for air pumps, comprising a housing having a compression chamber, the bottom of the housing having an air-passage-way, a flat valve for closing the passage-way, an annular member extending through the compression chamber of the housing and having its lower end adjacent the valve to limit its unseating movement, the annular member having lateral passageways in communication with the chamber and a passage-way communicating with the outside of the housing, for the purpose described.

In testimony whereof I hereunto affix my signature.

GEORGE EDGAR HAZARD.