

June 26, 1934.

H. M. CHASE

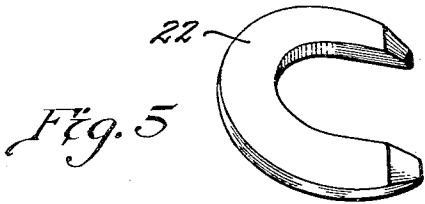
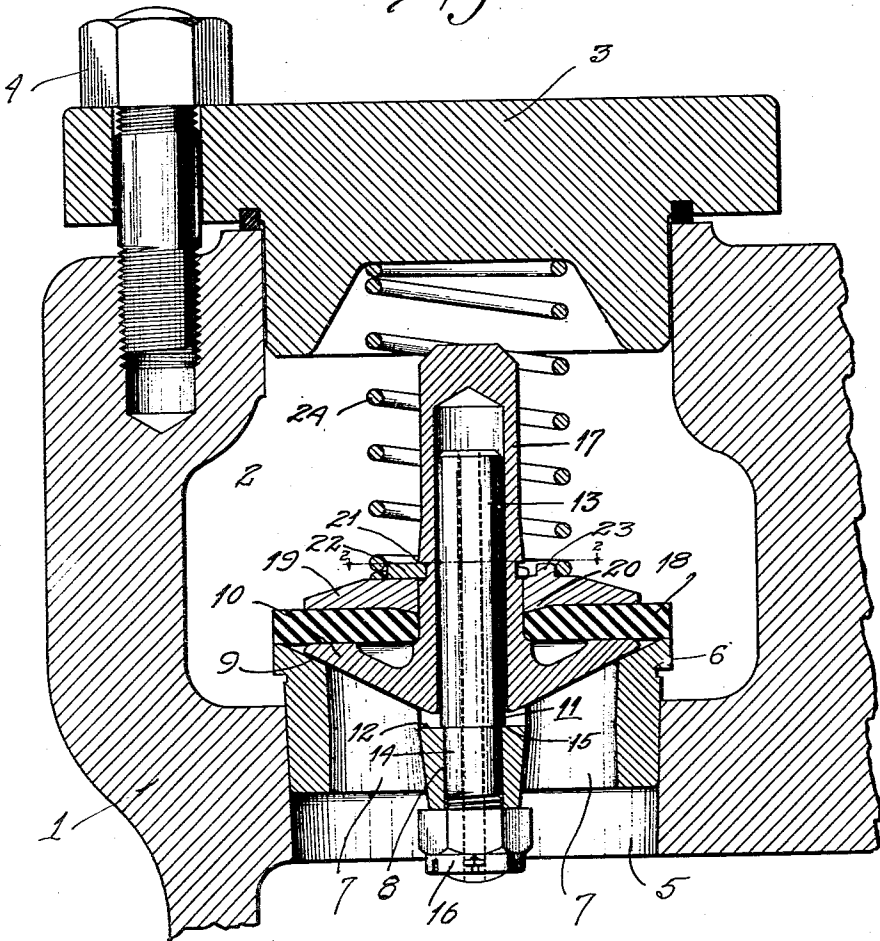
1,964,249

PUMP VALVE

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Fig. 1



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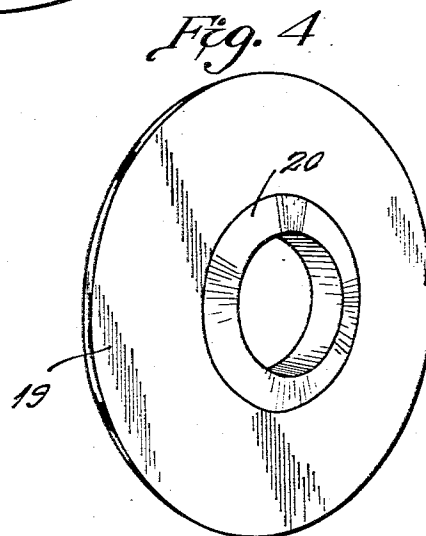
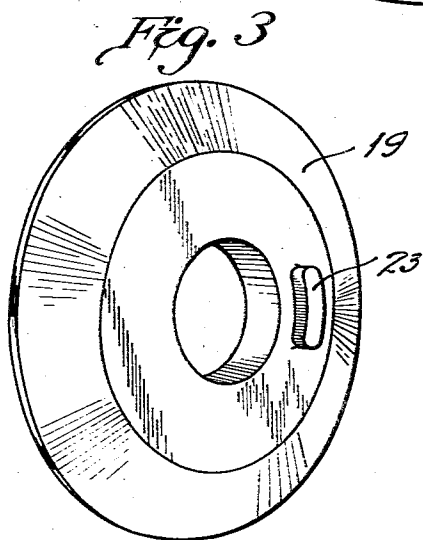
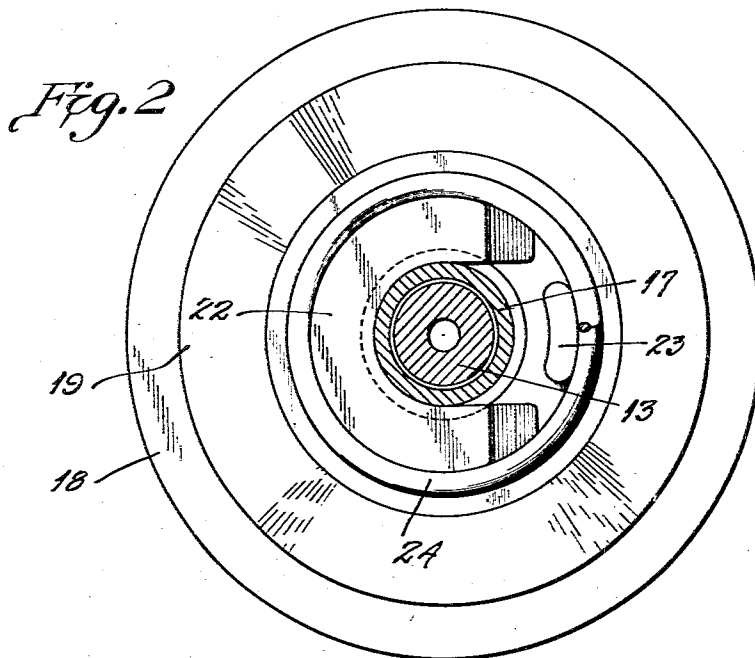
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,964,249

PUMP VALVE

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Application November 13, 1930, Serial No. 495,380

3 Claims. (Cl. 251—144)

My invention relates to improvements in pump valves, particularly to that type of valve designed for use in mud pumps. However, it will be obvious that my invention is not confined to this particular use.

The object of my invention is to provide a pump valve wherein the usual clattering of the parts during its operation is prevented.

Another object of the invention is to provide a pump valve having a packing element which prevents, when acted upon by pressure fluid, the leakage of fluid between the valve and its seat. The packing, furthermore, serving as the means for placing the several parts of the valve under tension so as to eliminate movement of one part with respect to the other.

The preferred form of the construction is shown in the accompanying drawings, in which:

Figure 1 is a vertical sectional view through a portion of a pump casing, showing therein the improved valve.

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a perspective view showing the upper face of the follower plate.

Figure 4 is a similar view showing the under face of the plate.

Figure 5 is a perspective view of the locking element.

Referring to the accompanying drawings in detail, the numeral 1 designates the inner wall of a pump casing, the valve adapted to form a passage from the interior of the pump chamber to a chamber 2. An opening is formed in the chamber 2 above the valve and closed by a suitable cap 3 bolted to the pump wall in any suitable manner, for example, by stud bolts 4.

The wall 1 of the pump casing is provided with a tapered opening 5 which receives therein an annular valve seat 6.

The valve seat 6 is in the form of a plate having a plurality of openings 7 which surround a central opening 8. The upper face of the valve seat 6 is concaved, as indicated at 9, for the reception thereupon of a valve head 10.

The central opening 8 is enlarged in its upper portion, as indicated at 11, to form a suitable shoulder 12. Positioned vertically within the opening 8 is a valve stem 13, the lower end of which is reduced as at 14 to form a shoulder 15, which abuts against the shoulder 12 formed in the plate. The extreme lower end of the stem 13 is threaded to receive thereon a suitable nut 16, locking the stem in place and against the shoulder 12.

Slidable vertically of the stem 13 is a valve having the head 10, the under face of which is cone-shaped, in cross section, so as to seat upon the concaved face 9 of the seat. The valve 10 carries a tubular extension 17 completely enclosing the upper end of the stem 13. Positioned upon the head 10, and over the tubular extension 17, is a flexible packing element 18, the outer edge of which extends beyond the head 10 and forms a seal preventing the passage of fluid between the seat 9 and head 10.

In order to hold the packing element in place upon the head 10 there is provided a follower or retaining plate 19, slidable upon the extension 17. The under face of the plate 19 carries a cone-shaped boss 20 which, when the plate is in place, tends to compress the packing element thereunder, making a semi-rigid structure, including the head, packing element and follower.

To lock the follower 19 in place upon the stem, and at the same time serving to press the boss 20 of the plate 19 into the packing element, there is provided an annular groove 21 around the extension 17 which receives therein a horseshoe locking element 22. The free ends of this locking element 22 are tapered so that it may be readily inserted within the groove and when forced in place depress the follower 19.

The upper face of the follower 19 has an upwardly extending projection 23 which, upon the insertion of the locking element 22 in its place, lies between the legs of the element.

To maintain the valve to its seat there is the usual coiled spring 24, the upper end bearing against the under face of the cap 3, while its lower end engages the upper face of the follower 19 and encloses both the locking element 22 and the upstanding boss 23. The spring thus being held in a relatively fixed position with respect to the follower 19, and at the same time preventing the withdrawal of the locking element 22 from the groove 21.

Briefly, in operation, the valve is moved to and from its seat 9 either under the influence of tension exerted by the holding spring 24, or by the fluid compressed in the pump.

Heretofore, in valves of this type, it has been found that when the packing element wears to some degree the parts become free to move with respect to each other, thus creating an undesirable noise, and at the same time reducing very materially the life of the valve and the packing element. The present invention overcomes this defect, in that applicant has provided a valve wherein the parts are held in a relatively rigid

position but under pressure exerted by the resiliency of the packing element.

From the foregoing it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit of or sacrificing any of the advantages in the invention.

What I claim, is:

1. In a pump valve, the combination of a seat and a valve having a stem, a packing element, a retaining plate for the packing element on the stem, a plate engaging spring surrounding the stem in spaced relation thereto, an upstanding projection on the plate, a locking and spacing key engageable with the stem and plate and disposed in the same plane as the projection, and said key and projection each having its entire outer surface snugly engaged by the portion of the spring that contacts with the plate to lock the key and to hold said spring in spaced relation to the stem.

2. In a pump valve, the combination of a seat and a valve having a stem, a packing element, a retaining plate for the packing element on the stem, a plate engaging spring surrounding the stem in spaced relation thereto, and a flat horse-shoe shaped key engageable with the stem at the inner edge of said key and having its entire outer surface snugly engaged by the portion of the spring in contact with the plate.

3. In a pump valve, the combination of a seat and a valve having a stem, a packing element, a retaining plate for the packing element on the stem, a plate engaging spring surrounding the stem in spaced relation thereto, a flat horse-shoe shaped key engageable with the stem and plate, an upstanding projection on the plate positioned between the ends of said key, and the exterior surface of said key and projection forming a substantially continuous flange snugly engageable by the portion of the spring in contact with the plate.

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