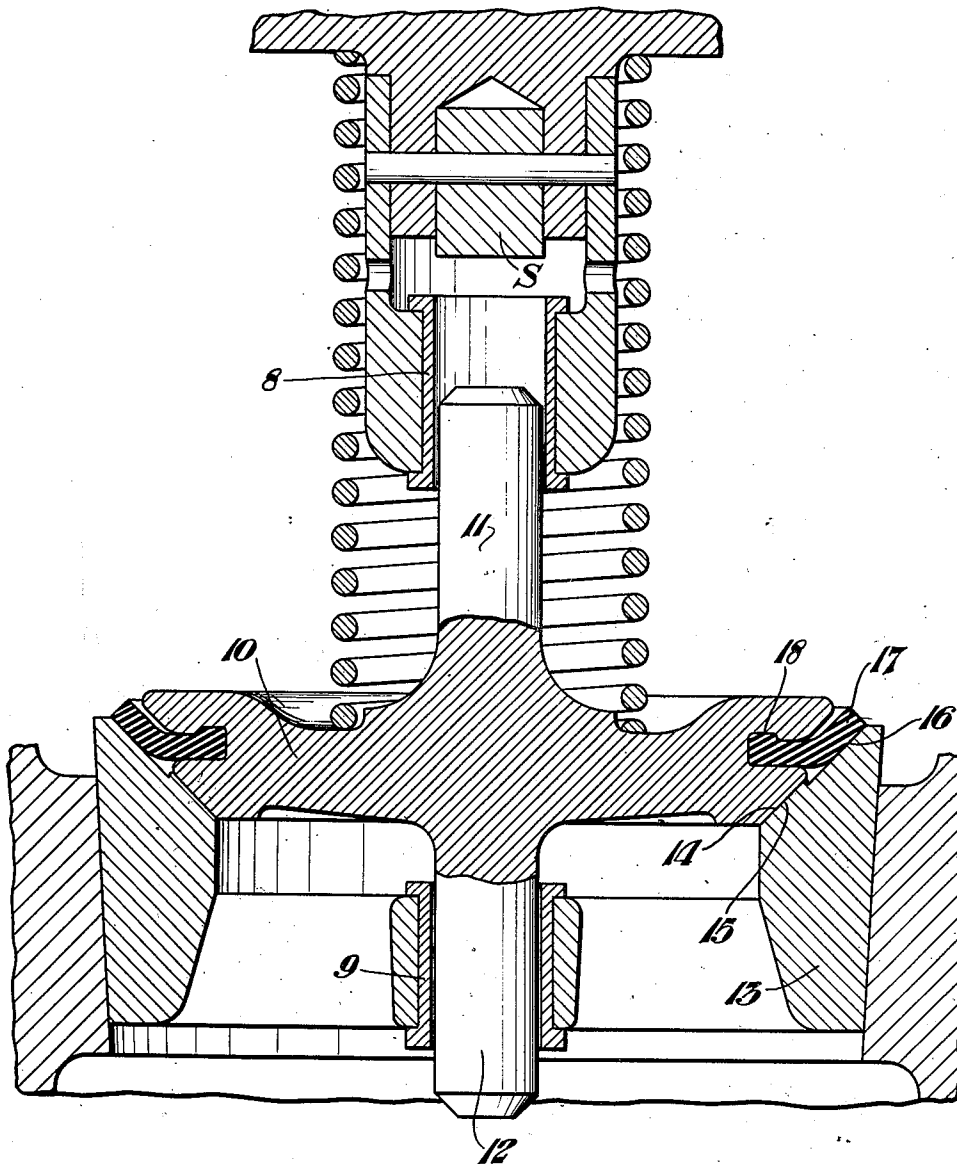


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J. M. SHIMER
VALVE AND VALVE SEAT
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VALVE AND VALVE SEAT

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1 Claim. (Cl. 251-144)

This invention relates to valves of the character employed in mud pumps or other pumps adapted to fluid pump mixtures containing abrasive materials, and relates particularly to an improved form of valve capable of longer periods of uninterrupted use than valves heretofore employed in pumps of this nature.

Mud pump valves of the character to which this invention relates are subject to vary rapid wear owing to the presence of abrasive materials such as sand, etc., contained in the drilling fluid or mud and, therefore, must be replaced after comparatively short periods of time. These valves ordinarily include a tapered metallic seat member for coaction with a similarly tapered valve element. These valves in their closed position have combination sealing areas; one of metal-to-metal contact and the other of a resilient material engaging the tapered metallic seat surface.

The present invention is an improvement over that of Shimer application Serial No. 305,542, filed November 21, 1939, and that of United States Patent No. 2,163,472, issued June 20, 1939.

It is an object of the present invention to provide a valve of the above character capable of giving a much longer period of service before requiring replacement.

It is a further object of this invention to provide a valve element having a metallic ring portion engaging the seat, combined with a flexible sealing member adapted to contact the valve seat when the valve is in the closed position.

Another object is to provide a valve seat having two engaging areas in offset relationship so that the useful life of the area contacted by the metal portion of the valve approaches the useful life of the area engaged by the flexible sealing member of the valve.

The invention is illustrated in the accompanying drawing, in which the single figure is a longitudinal section through the valve body and the seat with which it coacts.

Referring to the drawing, a valve disc 10 having an upper valve stem 11 and a lower valve stem 12 is mounted for coaction with a valve seat 13. The guides 8 and 9 for the oppositely extended stems 11 and 12 are shown, but it is to be understood that the valve disc could be guided by a single stem without departing from the scope of this invention. A suitable stop S limits the opening motion of the valve disc 10, and a spring, as shown, tends to hold the valve closed. The outer edge of the valve disc 10 is beveled to provide an inverted conical surface 14 to coact

with a similar conical surface 15 formed on the valve seat 13. This valve seat surface 15 is offset relative to another tapered conical seat portion 16 which is arranged to coact with the resilient insert 17, of rubber or equivalent material, secured within the outer confines of an annular recess 18 formed in the valve body. The flexible insert extends outwardly and upwardly, as shown, so that it is self-sealed by the fluid pressure of the pump fluid above the valve disc when it assumes the closed position, as illustrated.

It has been found in practice that this type of resilient insert tends to rupture prematurely by the ever decreasing clearance occasioned by wear on the metallic portion of the seat member which reduces the clearance necessary for the resilient sealing member 17 mounted in the valve 10. The present invention takes advantage of the fact that the resilient sealing member 17 has, under normal conditions, a marked ability to resist wear by the abrasive mud-like fluid pumped. It is a particular feature of the invention to so construct and arrange the parts that the life of the coating metal-to-metal parts approaches the life of the coating metal-to-resilient-material parts. To this end I increase the more quickly wearing metallic portion 15 to such an extent that its useful life approaches that of the portion 16 which coacts with the resilient element.

In the embodiment of the invention illustrated, this increased life is secured by the provision of the built-up frusto-conical seat portion 15 which is offset from the similar frusto-conical seat portion 16. The area of the portion 15 is preferably greater than that portion of the surface 16 which is engaged by the flexible resilient member 17. This built-up or offset portion 15 of the valve seat 13 is not necessarily limited to the valve seat itself, as it could to the same advantage be in the form of a raised portion on the valve disc or any part of the tapered valve which is in metal-to-metal contact as distinguished from the metal-to-resilient-material contact, both of which areas require a seating coaction in order to effect a multiple sealing action of the valve, as disclosed. In this way the normal life of the coating metal-to-metal portions of the valve disc and seat approaches the normal life of the metal-to-resilient-portion of the same seat. Thus the seat element need not be prematurely or unnecessarily replaced.

I claim:

A valve apparatus such as used for slush pumps having a multiple sealing action compris-

ing a metallic valve seat consisting of two contiguous inverted truncated cone faces inclined at the same angle to the valve axis, one of said faces being offset inwardly from the other so as to compensate for the wear to which slush pump valves are subjected due to the high frequency of operation thereof, a metallic truncated cone valve disc having a surface for coaction with the

innermost cone face of said seat for effecting a sealing action when the valve contacts said innermost seat, and a nonmetallic flexible member mounted on said valve disc for effecting a sealing contact with the outermost cone face of said seat when the valve disc approaches the closed position relative to said innermost seat.

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