Sept. 15, 1942. W. O. BATSON ET AL 2,296,135

HYDRAULIC VOLUME STANDING VALVE

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Fig. 1.

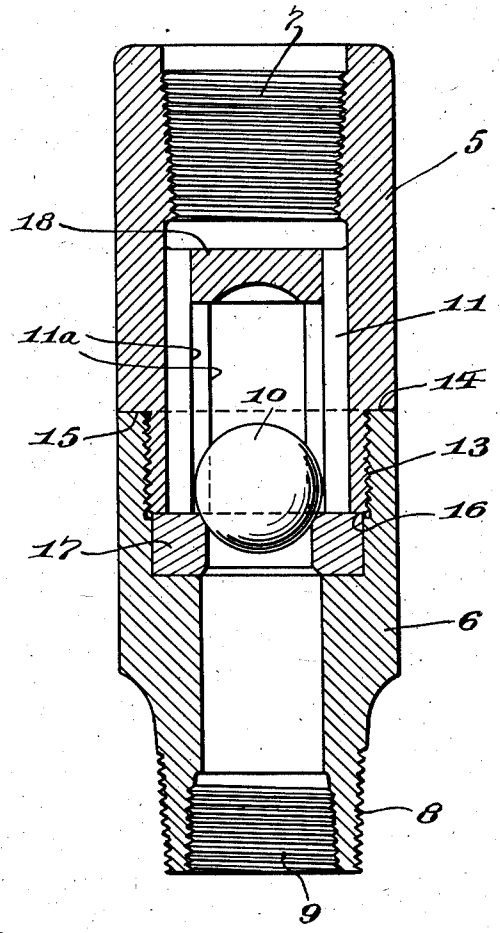
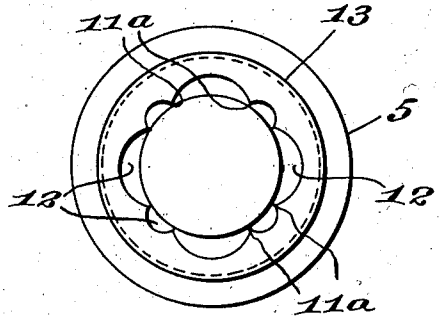


Fig. 2.



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HYDRAULIC VOLUME STANDING VALVE

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2 Claims. (Cl. 251—121)

This invention relates to hydraulic volume standing valves adapted to be used on the bottom of any type of pumping barrel that is provided with a traveling plunger within a tube so fitted to create a suction on the upward stroke. On the upward stroke the ball or drop lifts and permits the fluid to enter the tube or barrel, said stroke varying in inches of travel in accordance with the type and length of the barrel tube, the length of the plunger and stroke facilities provided at the surface on the power equipment. At the limit of the suction stroke, the plunger drops due to the weight of the pumping rods, and immediately after the upward stroke is reached. At this point the ball or drop falls to its seat and holds the fluid until the upward stroke starts. This process is known as pumping when the lift of the fluid is caused by plunger and suction force when such equipment is used on the bottom of a string of tubing and mechanically powered with a rod or string of rods so connected to the power employed at the surface.

As will presently appear, our invention is an improvement over the types and designs of present-day volume standing valves employed in the use of pumping wells as set forth hereinbefore.

An important object of the invention is to provide a device of the above-mentioned character embodying a two-part body construction connected in such a manner as to assure a perfect sealing joint and friction hold to properly assemble the seat, ball and drop in working position.

Another object is to provide a valve which eliminates the necessity of additional couplings commonly required in connecting other valves to the pumping barrel, thus diminishing the cost of the construction as well as reducing threaded connections and their attendant leaks.

Still another object of the invention is to provide a valve constructed to permit the use of an oversize suction opening, and in addition the seat, ball or drop are considerably larger in dimensions, these features being important factors in obtaining volume in the plunger tube for discharge force lifting.

Another object is to provide a construction that will permit the outside dimensions to be of greater diameter and thus materially increase the wall thickness of the valve. This important feature serving as a protection against cracking or breaking in the body of the valve frequently caused by pumping strokes and plunger travel within the pumping tube.

Another object is to provide a valve that can be used on the bottom of any type of pumping barrel or tube that has a traveling plunger within a tube, so fitted to create a suction on the upward stroke.

Further important objects and advantages of the invention will become apparent as the description proceeds.

In the accompanying drawing:

Figure 1 is a central longitudinal sectional view of the device.

Fig. 2 is an inverted plan view of the upper section removed from its companion lower section.

Referring now more in detail to the accompanying drawing, **5** denotes the upper section of our improved valve, **6** indicating the lower section, said section **5** being provided with a female coupling thread at **7**, whilst section **6** is furnished with male and female threads **8** and **9** for connecting anchor coupling body and anchor, respectively. As shown in the drawing the ball or drop **10** operates in guide **11**, the latter being case-hardened and presenting a plurality of guide points **11***a* (see Fig. 2), to define fluid-passage openings **12** therebetween, these being semi-circular in formation to present large and small passages that will permit a direct lift of the fluid, and also being of sufficient cross-sectional area to take care of the intake of fluid opening at **9**. The lower part of said upper section is reduced in diameter and threaded at **13** to connect with the internally threaded portion of said lower section, the abutting faces **14** and **15** of said upper and lower sections respectively being machined to provide a friction grip joint. Likewise the face **16** is machined for a similar purpose, this construction assuring a tight connection and seal at these points of jointure between the section and the steel seat **17**. This is a feature of some importance.

As shown in Fig. 1 the ball or drop bumper **18** is positioned above the guide **11**, the ball or drop **10** operating between said bumper **18** and seat **17**. This particular combination assures a positive travel mechanism of either ball or drop and in shortening the length of travel of these members a positive cut off is secured when the plunger stroke starts downward. This retains more fluid within the tube and naturally less slippage through the valve seat is assured, thus producing more fluid for lifting and determining the volume of oversize hydraulic standing valve. It will be readily appreciated that the ball or drop can be used to seat and cause the cut-off of fluid and the interchangeability of these very important elements will save the consumer the

price of purchasing other members of a standing valve when a drop or ball is so desired. The valve guide is a built-in feature not requiring an extra slide or ball bumper upper seat construction. The upper seat construction is for the drop when used, and if a ball is used this element will not hinder the use of a ball. In the ball bumper of this member, openings of sufficient size may be provided that will permit the ball or drop to descend to the lower seat more quickly than permitting the ball or drop to spin from pressure applied when the plunger starts on the downward stroke. Further, in using a spool-type drop in our valve we have a positive cut-off at the top or bumper seating, as well as a quicker cut-off in the seat. These features are very important in obtaining volume from a hydraulic valve.

From the foregoing it will be seen that in the assembly of the ball and drop and seating feature, a larger ball or drop can be used and in shortening the lift of these elements we eliminate excessive ball and drop travel and since the ball or drop reaches its seat more quickly we obtain a substantially instantaneous cut-off. The extra volume obtained through our oversized passageway serves and adds to the weight of the fluid within the tube. The plunger on its downward stroke naturally produces more pressure and tends to hold the valve, known as the ball and drop, in a more rigid position, thus sealing off the fluid and preventing downward slippage through the course of the plunger travel to the point of upward travel.

Any type thread can be used in our valve that complies with recognized standards, adapted on pumping barrel couplings, extension nipples and connections necessary in making a pumping barrel assembly that has a plunger travel feature. This will eliminate extra substitute fittings commonly required on other hydraulic valves used in this method of force lifting.

Our improved valve is designed primarily for the pumping of oil, water and combination oil and gas wells when each of these liquids or combination of liquids are required to be lifted by plunger, barrel tube, rod or rods connected to a power force for lifting fluid. The oversized gas anchor connection at the bottom of the valve serves to eliminate gas locking by its extreme oversize. In lifting a greater amount of oil and water we increase the oil production. Our valve can be used in any other type well with fluids required to be lifted by force.

We claim:

1. A hydraulic standing valve comprising interconnected upper and lower sections, the latter section being provided with an opening therethrough, a valve seat mounted in the upper end of said opening, a drop valve operable within said upper section and cooperable with said seat to control the flow of a fluid through said standing valve, a plurality of spaced radial guides borne by and extending inwardly from the internal wall of said upper section to present longitudinally disposed passages for the flow of a fluid around said drop valve, the edges of said guides being apiculated and contacting said drop valve to provide a minimum of bearing surface for the travel of the latter, and means for limiting the upward travel of said drop valve, said means being borne by the apiculated edges of said guides whereby uninterrupted passages are formed along their entire lengths.

2. A hydraulic standing valve comprising upper and lower interconnected sections provided with threaded connections for attachment with an anchor coupling body and anchor, there being a fluid passage within said sections, one end of said lower section being internally threaded and having a machined end face portion, the lower portion of said upper section being reduced in diameter and externally threaded, and presenting a shoulder having a machined face, the lower end face of said section being also machined, and a seat interposed in said passage, the arrangement being such that when said sections are assembled the machined end face portion of said lower section abuts said shoulder to provide a seal and friction grip joint therebetween and said end face of said upper section abuts said seat to provide a similar seal and friction grip joint, the organization thus providing a two-point double sealing joint.

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