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W. L. BETTS.

STANDING VALVE FOR PUMPS.

APPLICATION FILED MAR. 26, 1903.

NO MODEL.

Fig. 1.

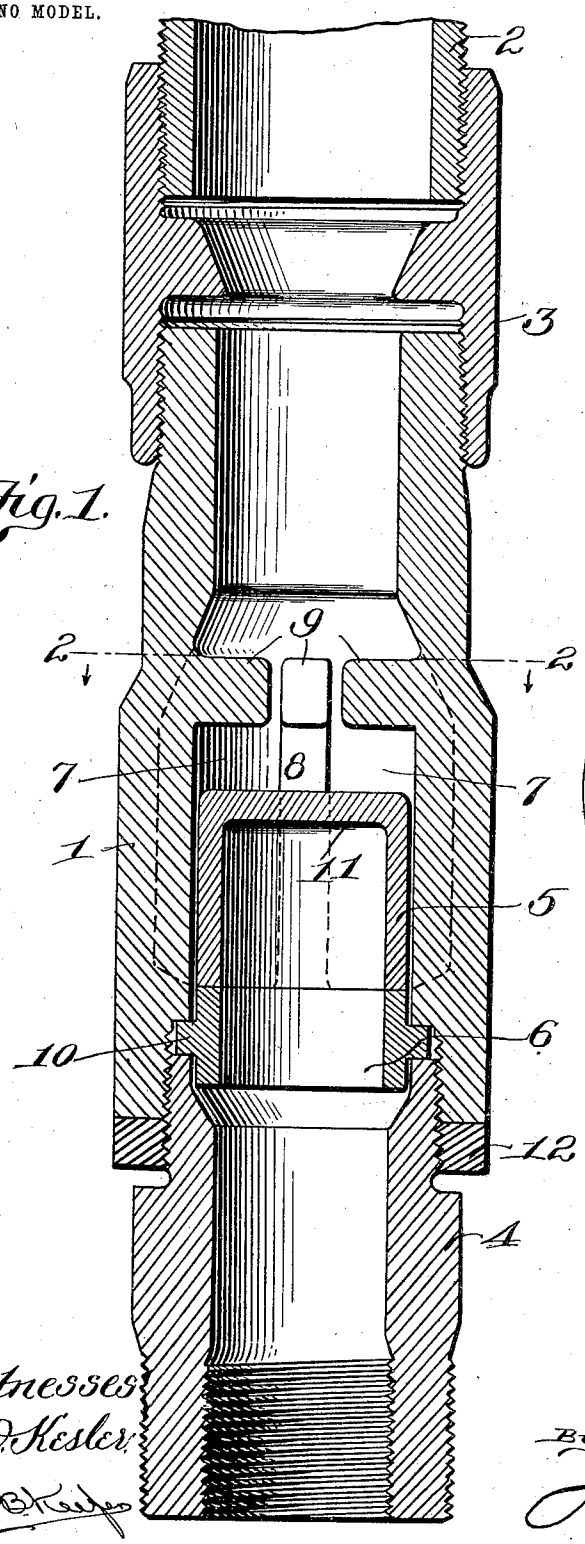
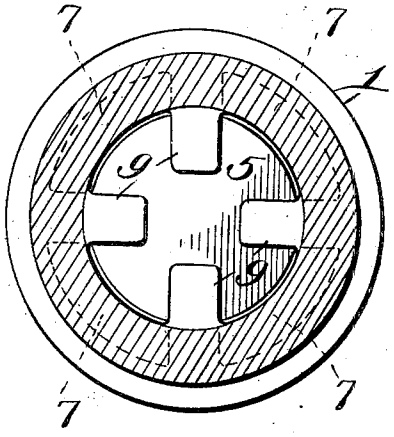


Fig. 2.



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No. 741,217. Patented October 13, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM L. BETTS, OF PETROLEUM CENTER, PENNSYLVANIA.

STANDING VALVE FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 741,217, dated October 13, 1903.

Application filed March 26, 1903. Serial No. 149,732. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. BETTS, a citizen of the United States, residing at Petroleum Center, in the county of Venango and State of Pennsylvania, have invented new and useful Improvements in Standing-Valves for Pumps, of which the following is a specification.

This invention relates to standing-valves for use in connection with the working barrels of oil or Artesian well pumps.

The object of the invention is in a ready, simple, thoroughly efficient, and practical manner to obviate pounding and thus unnecessary wear of the valve with attendant danger of breaking; to dispense with the employment of flanges or wings on the valve to effect its proper guiding within the valve-casing; to render possible the employment of a cup-valve presenting a solid structure—that is to say, one devoid of lateral openings for the passage of oil; to effect positive cushioning; to provide for free passage of a larger volume of liquid through the barrel than with valves of the ordinary construction; to adapt the valve for use either above or in the liquid to be raised; to permit the employment of a larger-size valve without increasing the size of the valve-casing than has heretofore been possible with valves of this character; to provide for free suction without danger of binding of the valve; to adapt the valve-casing for attachment to the working barrel of an oil or Artesian well pump, and, finally, generally to improve, render more durable, simplify the construction, and improve the general details of valves of this character.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a standing-valve for working barrels of oil or Artesian well pumps, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification and in which like characters of reference indicate corresponding parts, there is illustrated one form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the elements therein exhibited may be varied as to shape, proportion, and exact manner of assemblage without departing from the spirit thereof.

In the drawings, Figure 1 is a view in vertical section through a standing-valve constructed in accordance with the present invention, showing the same combined with the working barrel of an oil or Artesian well pump. Fig. 2 is a view in horizontal section, taken on the line 2 2 of Fig. 1 and looking in the direction of the arrow thereon.

Referring to the drawings, 1 designates the valve-casing, the upper end of which is in this instance provided with exterior threads and the lower portion with interior threads, it being understood, of course, that, if desired, this arrangement may be reversed. The casing is adapted to be connected with the working barrel 2 of an Artesian or oil well, the assemblage in this instance being effected through the medium of a coupling or union 3, of the usual or any preferred construction. As above stated, the valve of this invention can operate equally well submerged in the liquid to be raised or disposed above the same, the latter arrangement being shown in this instance, and to the lower end of the casing is connected a coupling or union 4 to be assembled with a length of barrel below it, where the valve is to be disposed at an intermediate point in the barrel—that is to say, above the liquid—but where it is to be submerged in the liquid there will of course be no barrel connected with the coupling.

The valve-casing, its contained valve 5, and reversible valve-seat 6, which constitute the gist of the present invention, are to be made in standard sizes, so that where a part is damaged, thereby requiring replacing, it may be readily effected without the employment of a skilled machinist for the purpose. The parts above enumerated may be made of any suitable material, preferably of cast-iron, although if preferred the valve and its seat may be made of hard brass or of machine-steel.

The valve-casing is provided at a point intermediate of its ends and on its inner side with a plurality of vertical ducts or channels 7, which extend from a point approximately in alinement with the upper face of the valve-seat to any preferred distance above the upper face of the valve, the ribs or partitions 8,

formed by the channels, being formed into inturned or overhanging lugs 9, which constitute stops for limiting the upward movement of the valve. As herein shown, the portion of the valve-casing above the stops 9 is somewhat constricted; but it is to be understood that it may be of the same diameter as that portion in which the valve works and still be within the scope of the invention.

The valve-seat 6, to which reference has been made, is provided intermediate of its ends with a circular flange 10, adapted to be clamped between the valve-casing and the coupling 4 by the latter, thereby to hold it rigidly in place. The flange 10 is by preference disposed approximately midway of the length of the valve, thus to permit the latter to be reversed when one side becomes worn and in a measurable manner to prolong the life of the seat.

The valve 5 is a true cylinder, with its upper end closed by a head 11, and is of a size to work easily within the valve-chamber formed between the stops 9 and the upper face of the valve-seat and to be readily responsive to the suction-strokes of the pump without danger of binding or locking. The combined areas of the ducts or channels will be substantially equal to the cross area of the bore of the valve-casing above the valve, so that in effect the valve does not detract from the full carrying capacity of the casing, which would result if the valve worked closely against the sides of the casing and were provided with openings like ordinary cage-valves to permit passage of the oil. By the provision of the ribs or partitions the employment of a cage-valve is obviated, and the provision of flanges or wings to effect guiding of the valve is rendered unnecessary.

In the use of the valve on the upstroke of the pump the valve is lifted and the oil passes readily through the ducts or chambers upward through the working barrel, the ducts being thus filled with oil; but upon the downstroke of the pump at each time the valve would ordinarily seat itself with great force the oil contained in the ducts passes onto the valve-seat, and thus presents a cushion upon which the valve strikes, causing it to seat itself gradually and without pounding and eliminating all danger of undue or uneven wear.

By the peculiar arrangement of the valve-chamber—that is to say, of the ribs or partitions and ducts or channels—the valve is positively guided in a vertical direction under the impulses of the strokes of the pump, and at the same time free and uninterrupted passage of oil past the valve is secured. On the downward stroke of the pump the valve is caused to seat itself squarely upon its seat without pounding, and by reason of the cushion included between the lower face of the valve and the seat a seal is produced which will effectively prevent escape of oil downward past the valve.

In order to prevent the coupling 4 from working loose, as from jarring of the barrel or an irregular action of the valve, a jam-nut 12 is employed, as clearly shown in Fig. 1, and performs its function in a manner not necessary further to be described.

As a whole, the valve of this invention is exceedingly simple of construction, there being practically no wear either to the valve or to its seat, owing to the constant presence of oil; but should either of these parts become worn or damaged to such an extent as to render them inoperative either or both may be removed with readiness and ease and new parts supplied with little trouble and with but slight expense.

Having thus described the invention, what I claim is—

1. A valve of the class described, embodying a tubular casing having its terminals threaded and provided in its inner walls, intermediate of its ends, with ducts or channels spaced by ribs or partitions integral with the casing, the ribs or partitions terminating at their upper ends in stops, and an inverted cup-valve disposed in the casing and limited in movement by the stops.

2. A valve of the class described, embodying a tubular casing having its terminals threaded and provided on its inner walls with ducts or channels spaced by ribs or partitions integral with the casing and terminating at their upper ends in stops, an inverted cup-valve disposed within the casing and being guided by the ribs or partitions and limited in its movement by stops, and a valve-seat for the valve.

3. A valve of the class described, embodying a tubular casing having its terminals threaded and provided on its inner walls with ducts or channels spaced by ribs or partitions integral with the casing and terminating at their upper ends in stops, an inverted cup-valve disposed within the casing and being guided by the ribs or partitions and limited in its movement by stops, and a reversible valve-seat for the valve.

4. A valve of the class described, embodying a tubular casing having its terminals threaded and provided at its upper end with means of attachment to the working barrel of an oil or Artesian well pump, and at its lower end with means for attachment to a continuation of said barrel, ribs or partitions integral with the casing and disposed intermediate of the ends of the casing and terminating at their upper ends in inturned stops or lugs, ducts or channels formed between the ribs or partitions, an inverted cup-valve guided by the ribs or partitions and limited in its upward movement by the stops, and a reversible valve-seat rigidly clamped in the casing.

5. A valve of the class described comprising a tubular casing having its upper terminal provided with external threads and its lower terminal with internal threads, the two sets of threads to be engaged by couplings to

assemble the casing with the working barrel of the pump, the intermediate portion of the casing being provided internally with ribs or partitions integral with the casing and terminating at their upper ends with inturned stops or lugs, ducts or channels formed between the ribs or partitions, an inverted cup-valve guided by the ribs or partitions and limited in its upper movement by the stops, a reversible valve-seat held in place within the casing by the lower coupling, and a jam-nut carried by the lower coupling and bearing against the lower end of the casing to prevent disconnection of the parts.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM L. BETTS.

Witnesses:
E. H. BESHLIN,
NELLIE S. BESHLIN.