

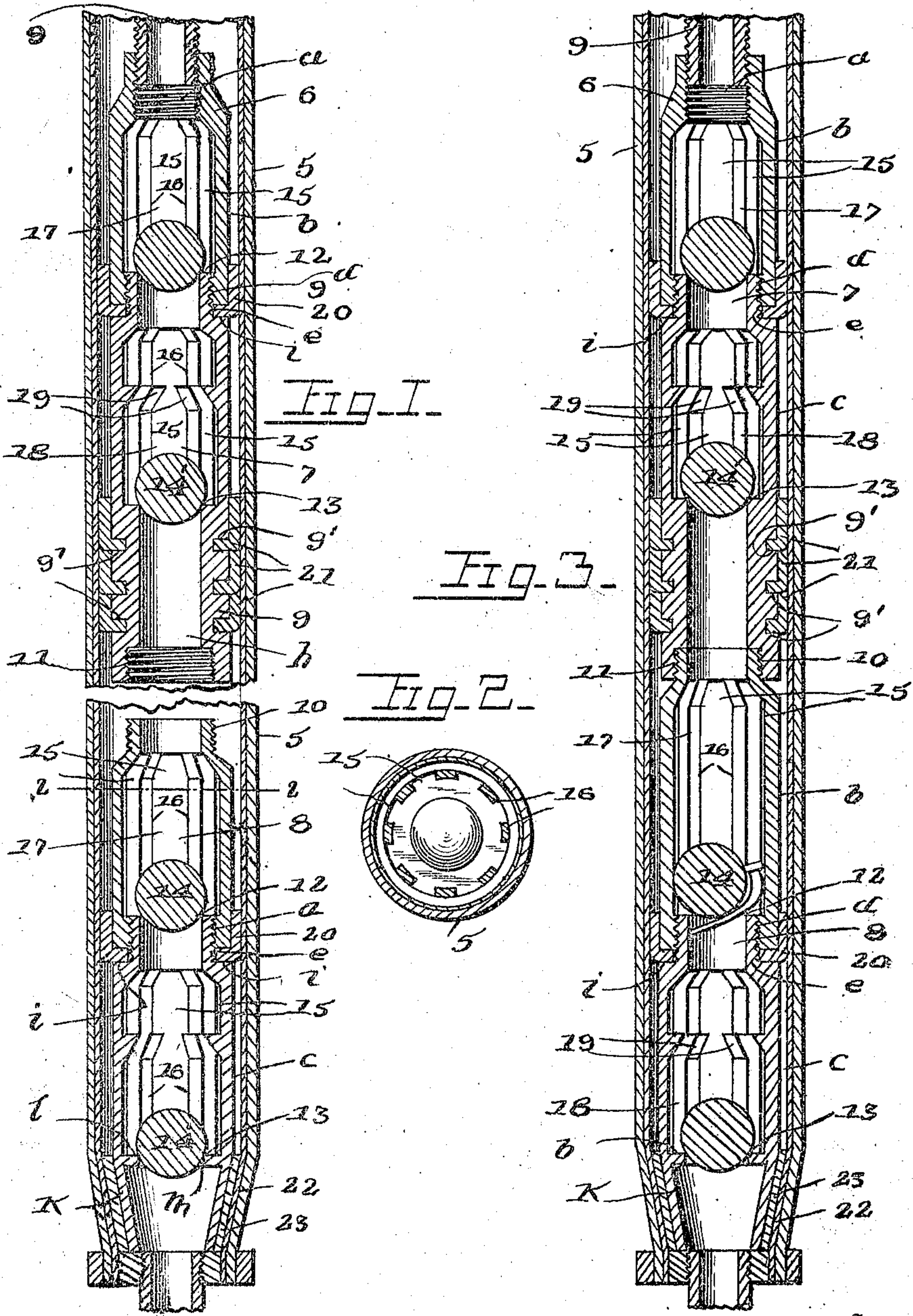
No. 867,402.

PATENTED OCT. 1, 1907.

R. B. McMAKIN.

PUMP VALVE.

APPLICATION FILED SEPT. 21, 1904.



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# UNITED STATES PATENT OFFICE.

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## PUMP-VALVE.

No. 867,402.

Specification of Letters Patent.

Patented Oct. 1, 1907.

Application filed September 21, 1904. Serial No. 225,333.

*To all whom it may concern:*

Be it known that I, RICHARD B. McMAKIN, a citizen of the United States, residing at Clayton, in the county of Union, Territory of New Mexico, have invented certain new and useful Improvements in Pump-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

10 This invention has relation to hoisting pumps, and particularly to the valves or valve-provided buckets in the cylinder or penstock through which the water, oil or other liquid is raised.

It is the object of the invention to so improve the standard and piston valves that the same may not only be prevented from becoming inoperative by reason of an obstacle accidentally or mischievously dropped into the penstock, but that the valves may free themselves from said obstacle and allow it to eventually be dropped to the bottom of the wells. To provide for this the bars composing the valve-cages are so disposed as to have wide interspaces occur between each two of them, which wide interspaces extend down to the plane of the valve-seat, and a wide space is left, in virtue of the construction, between the valve-cage and the pump cylinder, above the valve seat.

Other objects and advantages will be apparent from the following description, and it will be understood that modifications of the specific construction shown may be made, and any suitable materials may be used without departing from the spirit of the invention.

In the drawings forming a portion of this specification and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a longitudinal section of the cylinder or penstock, showing the standard or step valve, and the piston or suction valve separated. Fig. 2 is a transverse section taken on the line 2 2 of Fig. 1, showing the relative size of the ball valves and the diameter of the cage above the valves and their seats. Fig. 3 is a view similar to Fig. 1 but representing the piston valve as connected to the standard and valve, as when it is proposed to withdraw the latter, and representing a nail as an obstruction caught in one of the valves and rendering it inoperative for the time being.

Referring now more specifically to the drawings, there is shown a pump cylinder 5 provided with the standing valve 8 and a slidably mounted piston 6 which includes the working valve 7. Each of these valves is in reality two valves disposed one above the other. The standing valve and the piston are similar in general arrangement and construction, both being cylindrical in form, and both being reduced at their upper ends, the

piston terminating in a coupling screw 9 for engagement with a pump rod, the coupling screw being engaged in a threaded recess *a* in the upper end of the piston 6. The reduced portion of the standing valve is indicated at 10 and is exteriorly threaded for a purpose to be presently described.

The piston 6 and the standing valve 8 each consists of an upper section *b*, and a lower section *c*, which are hollow and which are longitudinally slotted as shown at 15 to form valve cages 17 and 18 respectively. The lower end of each of the sections *b* has an inwardly extending flange *d* which is interiorly threaded for the reception of the upper reduced end *e* of the corresponding lower section *c*. The lower sections *c* are interiorly threaded at their lower ends, as shown at *f*, and engaged with these threads of the pistons 6, there is a cylindrical member *g* having a passage *h* formed there-through which communicates with the interior of the sections *c* centrally of the bottom thereof, the upper end of this passage forms a valve seat 13 for the reception of a ball valve 14 disposed within the section *c* of the piston, similar ball valves 14 being disposed within the sections *b* of both the piston and standing valve, and resting normally upon seats 12 formed at the upper ends of the reduced portions *e* of the sections *c*.

A shoulder *i* surrounds each of the reduced portions *e*, and engaged between these shoulders and the adjacent ends of the sections *b* are packing washers 20 of suitable fibrous material which are directed upwardly, as shown. The member *g* is provided with a plurality of circum-scribing grooves *g'* in which are engaged packing washers 21, similar to the packing washers 20. The outer faces of the several sections of both the standing valve and the piston lie flush with each other, as shown.

Engaged with the threads *f* of the section *c* of the standing valve, there is a downwardly tapered end piece *k* having an inwardly extending flange *l* at its upper end which forms a bottom for this section *c*, and which has an opening *m* therethrough having a valve seat 13 at its upper portion upon which there rests a ball valve 14', similar in every way to the balls 14. There are thus formed a plurality of upwardly opening valves, and it will be observed, that if a nail or other similar article enters the cylinder, it will be unable to unseat more than one valve at a time, for the reason that the valves are disposed a considerable distance apart, and it will therefore be impossible for such an article to effect the operation of the pump. The member *g* is provided with an interiorly threaded recess 11, the threads of which may be engaged with the threads of the reduced portion 10 when it is desired to remove the standing valve from the pump.

The slotting of the several sections results in a plurality of spaced fingers 16 which form the ball cages, and these fingers of the sections *c* are provided with



inwardly extending triangular ball stops 19 which prevent balls located therebelow from rising and filling the passages formed through the portions *c*.

The end piece *k* is provided with an interior layer of packing 23 which fits within the lower tapered end of the cylinder 5, and the cylinder is provided with a lining 22.

It will be noted from the foregoing, in view of the drawings, that the cage of each valve or valve-provided bucket, both in the standard valve and in the piston or sucker valve, is larger in diameter above the valve seat than is the ball valve which closes upon the seat. Again, it is to be kept in mind that the piston-valve as well as the standard valve is of dual construction—that is, each valve is provided with two ball-valves and two cages, each having a valve seat with which its particular ball valve coöperates. As these valves are in their nature check-valves, and as each operates in the same way, it will be understood that if one of the piston valves becomes inoperative or one of the standard valves is rendered ineffective by reason of an obstruction, such as a nail, shown in Fig. 3, coming into engagement therewith, the other valve will operate and the effectiveness of the pump will not be interfered with. On the next succeeding operation of the piston valve, however, the ball valve interfered with by the nail or other obstruction will be raised into the enlarged diameter

of the valve cage and the obstruction will be freed from the valve and be allowed to drop down out of the way. If it should interfere with the next valve below, the latter valve will free itself therefrom when it is next operated. This action will continue until the obstruction reaches the bottom of the penstock or well.

What is claimed is:

A lifting-pump and its cylinder or penstock provided with a standing valve and a piston or suction valve, each of said valves being of dual construction and each comprising two valve-cages one above the other and each cage having a valve seat, a ball valve in each cage adapted to rest closely upon the seat, each valve cage being appreciably larger in diameter than the diameter of the ball-valve the bars of the valve-cage having wide interspaces between its bars extended down to the plane of the valve-seat, and the valve-cage being widely spaced from the pump-cylinder above the plane of the valve seat, whereby an obstruction dropped into the penstock and lodging upon or being caught by one valve of a dual set, and rendering it inoperative, will leave the other valve undisturbed, and at a successive operation of the pump the obstruction will be released from the valve upon which it was caught and allowed to drop through the wide interspaces in the valve-cage to the valve below, and eventually be discharged from the valves.

In testimony whereof, I affix my signature, in presence of two witnesses.

RICHARD B. McMAKIN.

Witnesses:

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