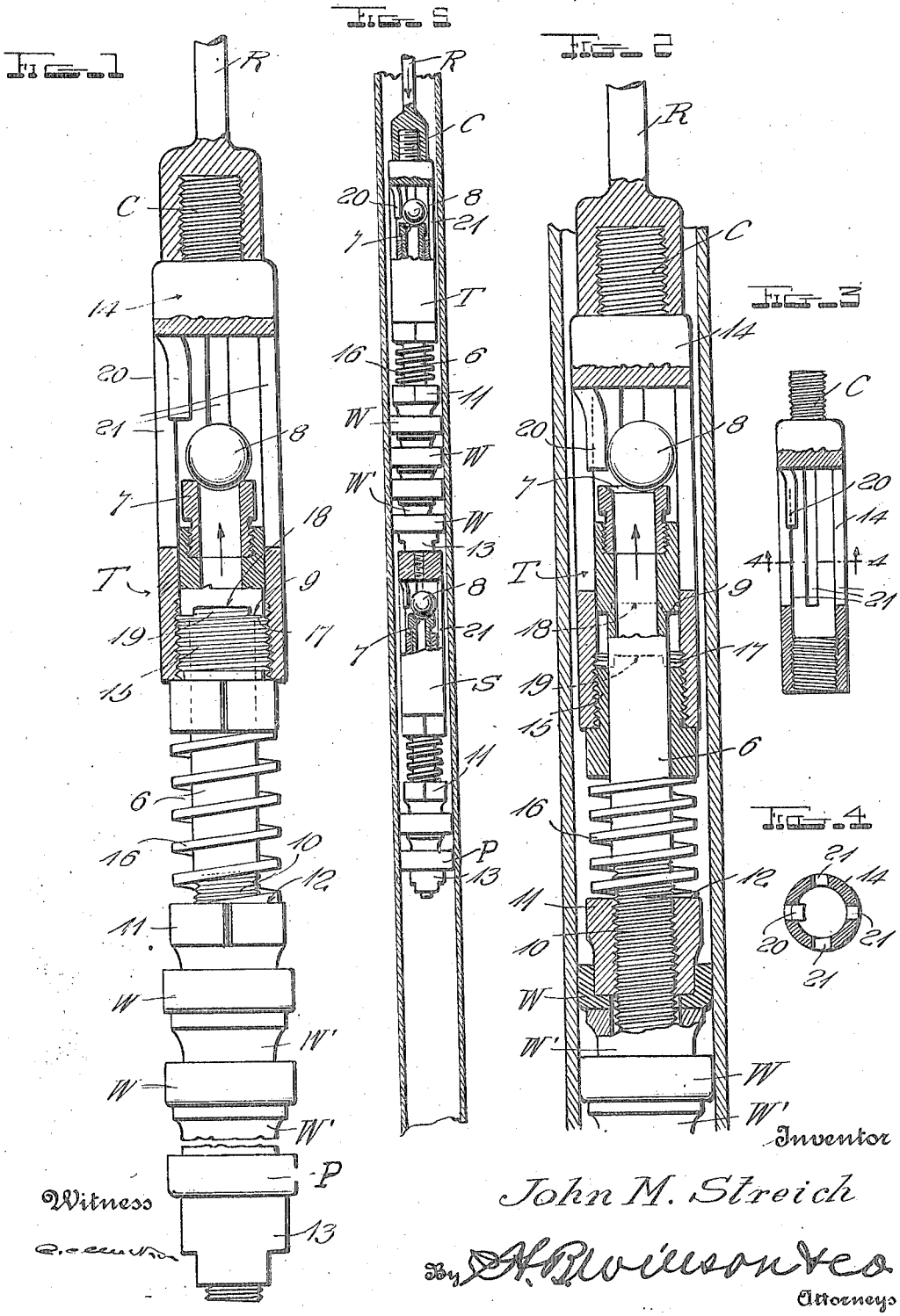
Sept. 25, 1928. 1,685,650

J. M. STREICH

PUMP VALVE

Filed April 14, 1928



Patented Sept. 25, 1928. 1,685,650

UNITED STATES PATENT OFFICE.

JOHN M. STREICH, OF CLARENDON, PENNSYLVANIA.

PUMP VALVE.

Application filed April 14, 1923. Serial No. 270,113.

The invention relates to improvements in pump valves designed primarily for oil well pumps and of such construction as to permit draining of the tubing when the latter is to be pulled, or for the purpose of washing deposits of foreign matter from the valve seat or seats.

It is the object of the invention to provide a new and improved construction which will be simple and inexpensive, and may be readily operated, for the purpose of forcing the valve member or members from the co-operating seat or seats, when it is desired to wash deposits from said seats or to drain the tubing, preparatory to pulling the latter.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished be reference to the accompanying drawing.

Fig. 1 is a side elevation partly broken away and in section showing a traveling valve constructed in accordance with my invention, the parts being in the relative positions which they occupy when the pump is in operation.

Fig. 2 is a view similar to Fig. 1 but showing additional parts in section and illustrating the manner in which the valve may be forced from its seat.

Fig. 3 is a detail vertical section partly in elevation, of the principal portion of the valve cage.

Fig. 4 is a horizontal sectional view on line 4—4 of Fig. 3.

Fig. 5 is a view showing both a traveling valve and a standing valve constructed in accordance with the invention and illustrating the manner in which the valve members thereof may both be opened when desired, this view being partly in section.

In the drawing above briefly described, T denotes a traveling valve connected with a pump rod R and provided with cup washers W and S denotes the standing valve secured in the well tubing by appropriate packers P. These packers may well be substantial duplicates of the cup washers W but are preferably less in number, and aside from this difference and the connection C for the pump rod R, the standing valve S and the traveling valve T are of the same construction. Hence, only the traveling valve has been shown in detail. and specific description of the invention will be confined to this traveling valve.

The numeral 6 denotes a tubular body having a valve seat 7 at its upper end, cooperable with a ball valve 8. Below this seat, the body 6 is provided with a peripheral, downwardly facing shoulder 9, and the lower portion of said body is threaded as at 10. By means of these threads, a collar 11 is threaded upon the body 6, the upper end 12 of said collar constituting an upwardly facing peripheral shoulder for said body. Below the collar 11, a nut 13 is threaded upon the body 6, and between said collar and body, the washers W and spacers W′, are mounted.

Slidably surrounding the upper portion of the body 6, is a valve cage 14 carrying the male portion of the connection C. This cage surrounds the valve 8 and embodies a bushing 15 threaded into the lower end of the cage body, said bushing slidably surrounding the tubular body 6 below the shoulder 9 and above the shoulder 12. A coiled compression spring 16 rests upon this shoulder 12 and abuts the lower end of the bushing 15, serving to normally force the entire cage 14–15, upwardly to the limit permitted by the shoulder 9 and the upper end of said bushing, which end constitutes an internal, upwardly facing shoulder 17, for the valve cage.

Preferably, shoulder 9 is formed with notches 18 and the bushing 15 is provided with upwardly projecting portions 19 received in said notches, so that the body 6 is held against rotation within the cage 14, when the collar 12 is rotated to adjust the spring 16 and when the nut 13 is rotated to tightly clamp the washers W.

While the spring 16, forcing upwardly upon the cage 14 and downwardly upon the tubular body 6, maintains these parts in the relation shown in Fig. 1 to permit ordinary operation of the traveling valve, said spring also permits downward sliding of the cage upon the body 6, upon disconnection and lowering of the pump rod R and holding the body 6 against descent beyond a predetermined extent, for instance by permitting it to come in contact with the upper end of the standing valve S. I utilize this downward sliding of the cage upon the body 6, to effect unseating of the valve 8. To accomplish this, the cage 14 is provided with means for unseating the valve when said cage moves downwardly with respect to said valve. In the present disclosure, this means is in the

form of a finger 20 integral with the upper end of the cage 14 and projecting downwardly therefrom within the upper portion of one of the usual liquid escape slots 21 of said cage. This finger is inwardly spaced sufficiently from the periphery of the cage, to contact with the valve 8 and force it from its seat 7 as shown in Fig. 2, upon sufficient depression of the cage with respect to the valve and the body 6. Thus, any accumulated matter upon such seat may be washed therefrom by the discharge of liquid permitted to flow through the body 6, while valve 8 is open. Moreover, if the tubing is to be pulled, this same valve-opening operation permits the desirable draining.

In the present showing, lowering of the traveling valve to a sufficient extent, permits contact of its lower end with the cage 14 of the standing valve S (Fig. 5), thus depressing this cage against the action of the underlying spring 16 to cause the finger 20 of the standing valve to open the valve member 8 of this valve. At the same time, downward sliding of cage 14 of the traveling valve T, serves to cause the finger 20 of said traveling valve, to unseat the valve member 8 of this traveling valve. Thus, with the valve members of both the standing and the traveling valves held open, effective drainage and washage of accumulated matter from the valve seats, is effected.

On account of the excellent results obtainable from the details disclosed, they are preferably followed. However, within the scope of the invention as claimed, variation may be made.

I claim:

1. In a pump valve, a tubular body having a valve seat at its upper end, a valve co-operable with said seat, a valve cage whose lower portion slidably surrounds the upper portion of said body, means for limiting the upward sliding of said cage on said body, spring means acting on said cage and reacting on said body for upwardly forcing the cage to the extent permitted by said limiting means, and means carried by said cage for laterally forcing said valve from said seat upon downward forcing of said cage against the action of said spring means.

2. In a pump valve, a tubular body having a valve seat at its upper end, a downwardly facing peripheral shoulder below said seat, and an upwardly facing peripheral shoulder below said downwardly facing shoulder, a valve co-operable with said seat, a valve cage whose lower portion slidably surrounds said tubular body above said upwardly facing shoulder, said cage being provided with an upwardly facing internal shoulder normally abutting said downwardly facing shoulder of said body to limit upward sliding of the cage, a coiled compression spring surrounding said body and contacting with the upwardly facing shoulder thereof and the lower end of the cage to hold the latter in normal position and to permit downward sliding of said cage from said normal position, and means carried by said cage for laterally forcing said valve from said seat upon depression of said cage.

3. In a pump valve, a tubular body having a valve seat at its upper end and a downwardly facing peripheral shoulder below said seat, a collar threaded on said body below said shoulder, a nut threaded on said body below said collar, tubing-engaging means on said body confined between said collar and said nut, a valve cage whose lower portion slidably receives the upper portion of said body, said cage embodying a bushing at its lower end slidably surrounding the body between said shoulder and said collar, a coiled compression spring resting on said collar and abutting said bushing to yieldably hold the cage with its bushing against said shoulder, and means carried by said cage for laterally forcing said valve from its seat upon depression of said cage.

4. A structure as specified in claim 3; said bushing and said shoulder having interfitting means for holding said body against rotation within said cage when turning said nut or said collar.

5. In a pump valve, a seat-engaging valve member, a cage surrounding said valve member and depressible in its entirety with respect to said valve member, and means carried by said cage for unseating said valve member upon depression of said cage.

6. In a pump valve, a seat-engaging valve member, a cage surrounding said valve member and depressible in its entirety with respect to said valve member, and a downwardly projecting finger rigid with the upper end of said cage for unseating said valve member upon depression of said cage.

7. In a pump valve, a seat-engaging valve member, a cage surrounding said valve member and depressible in its entirety with respect to said valve member, and a downwardly projecting finger integral with the upper end of said cage for unseating said valve member upon depression of said cage.

In testimony whereof I have hereunto affixed my signature.

JOHN M. STREICH.