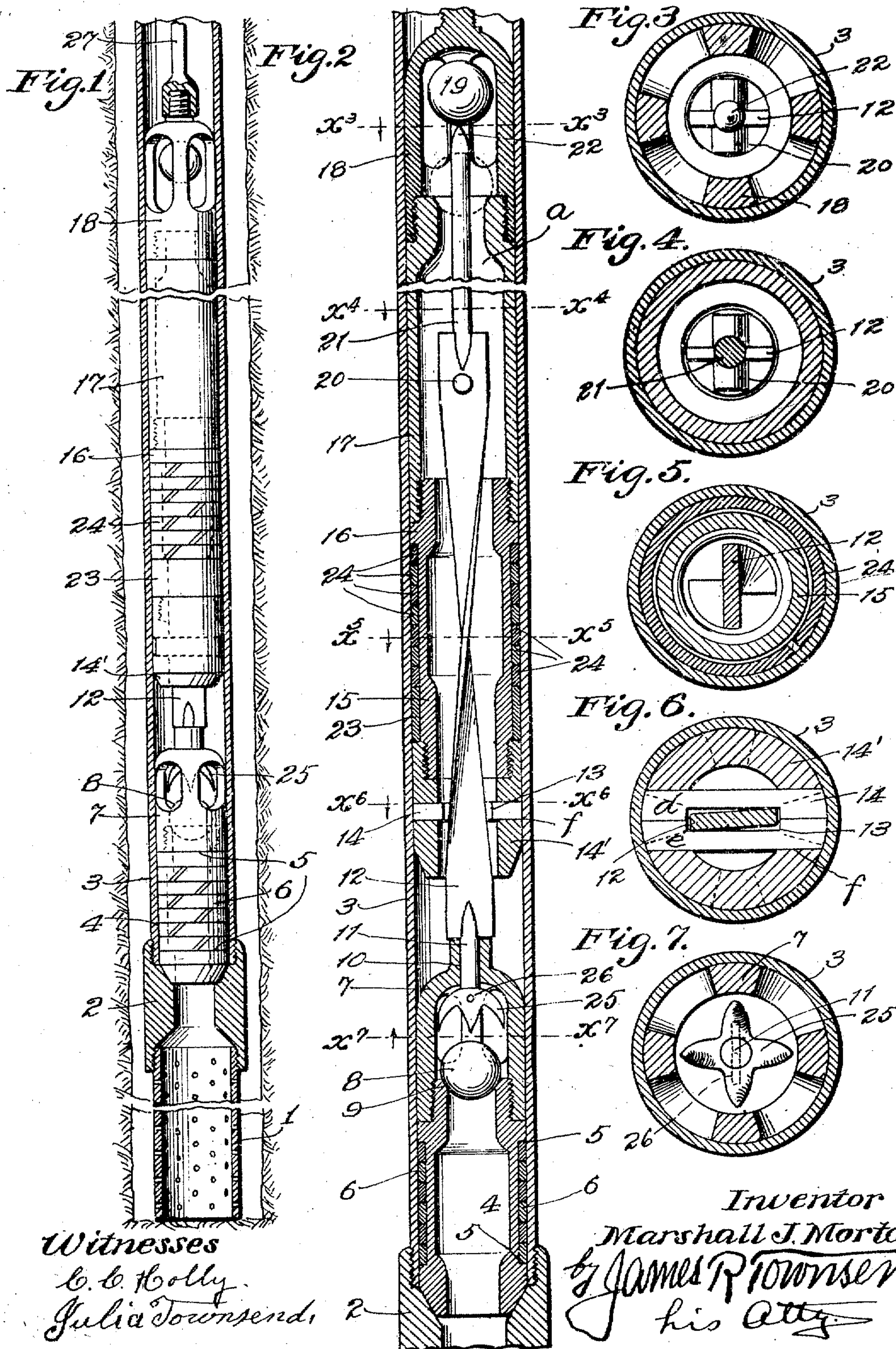


985,052.

Patented Feb. 21, 1911.



UNITED STATES PATENT OFFICE.

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OIL-WELL PUMP.

985,052.

Specification of Letters Patent.

Patented Feb. 21, 1911.

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To all whom it may concern:

Be it known that I, MARSHALL J. MORTON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Oil-Well Pumps, of which the following is a specification.

This invention relates more particularly to pumping appliances for use in oil-wells which produce heavy crude oil carrying sand or other solids, and comprises novel constructions including a snap-ring cup attachment and sand-agitator. In such wells two difficulties are to be overcome,—one being the leakage that occurs on account of the rapid wearing away of the inside of the working-barrel, and the other being the stoppage that occurs from the accumulations of sand inside the plunger and the standing-valve. I overcome these difficulties by providing a plunger having peculiar arrangement of metal packing snap-rings outside of the plunger-body; by also providing the standing-valve with external packing-rings; and by providing inside the plunger a sand-agitator so constructed as to operate automatically to keep the sand loose within the plunger and to prevent the valves of the plunger and standing-valve from sticking.

In oil-well-pumps heretofore employed, the standing-valves have been fitted to the working-barrel by means of leathers or bab-bitt, with the result that when the standing-valve is withdrawn from its seat it must be rebabbitted or supplied with new leathers before it will again serve its purpose satisfactorily without leaking.

Heretofore in pumping wells of the character above stated, the inside of the working-barrel rapidly becomes worn by the action of the plunger, and in time becomes useless because of the enlargement of the chamber around the plunger, which allows the oil to flow back past the plunger.

An object of this invention is to provide a pumping appliance which overcomes all of these difficulties.

A further object is to provide means for preventing the clogging of the pump-valves by sand or other solid substances carried by heavy crude oil.

Another object is to provide a pump apparatus or attachment adapted for use in

worn working-barrels, thereby to prolong the life of the working-barrel over that heretofore common.

Another object is to provide a pump in which the standing-valve may be withdrawn and replaced from time to time without the necessity of rebabbitting.

Other objects of the invention are simplicity, strength, and longer life of the appliance.

The accompanying drawings illustrate the invention.

Figure 1 is a broken, sectional elevation of the lower portion of a pump constructed in accordance with this invention and in position in a well. The plunger is shown unsectioned. Fig. 2 is an enlarged, fragmental, sectional detail of the same. Figs. 3, 4, 5, 6 and 7 are plan sections looking in the directions of the arrows respectively, on lines x^3 , x^4 , x^5 , x^6 , x^7 , in Fig. 2.

1 is the usual strainer; 2, the collar screwed thereon to which the working-barrel 3 is screwed, and in which the standing-valve body 4 seats. All of these parts may be of the usual construction, excepting that the standing-valve-body is grooved with an annular groove of considerable width, as shown at 5, and is provided in the groove with snap metal packing rings 6 which may be of any desired number. Six of such rings are shown in the drawing.

7 is the standing-valve-cage, and 8 the standing-valve stopper which is shown seated in the seat 9 therefor. This cage is provided with a perforation or bore 10 at the top to receive a reduced portion or neck 11 of a twisted agitator-blade 12 which is of a spiral form as seen in Fig. 2, and extends upward in the body of the pump-plunger *a* and through a guide-slot 13 in a cross-bar 14 fixed in the lower end of said plunger. The plunger-body is made in sections and terminates in a solid steel butt 14' which is screwed onto the lower end of a section 15 of the plunger-body, which section is externally screw-threaded at its opposite ends, is provided at its upper end with a shoulder 16 that may fit the inside of the unworn working-barrel 3, and is screwed into the upper valve-seat section 17 of the plunger-body which in turn is screwed into the valve-cage 18 containing the valve-stopper or ball 19. The section 16 is the packing section of the plunger-body. The spiral agitator-

blade 12 is swiveled to the standing-valve-cage and extends therefrom into the plunger-valve-cage and is provided at its upper end with a lateral stud 20 which may be provided by perforating the blade 12 and driving a pin therethrough.

The agitator-blade is provided with an upwardly-projecting spike 21 which is preferably pointed at its upper end, as seen at 22, to engage the ball-stopper 19 when the plunger is lowered below the lower end of its normal stroke for the purpose of bringing the stopper 19 against the spike in case the stopper should become stuck. The agitator-blade is oblong in cross-section, and the guide-slot 13 corresponds in form to such cross-section and is of such size as to allow the bar to slide freely therealong to rotate the same by engagement with the spiral sides thereof.

The cross-bar 14 may be longitudinally divided, each of the parts being notched so that when the two parts *d*, *e*, are brought together the notches thereof together form the slot 13. The same are preferably carried by the steel butt 14' which is perforated transversely to form a seat *f* for said bar.

23 designates a solid band around the lower part of the shouldered section 15 of the plunger to retain split spring snap packing rings 24 which surround said section below the collar 16 and are normally of greater diameter than the bore of the working-barrel, so that they must be compressed in order to enter such bore. The band 23 rests upon the upper end of the butt 14', and the split rings are thereby held in place.

25 designates a cupped, radiate stirring device detachably fixed by a pin 26 to the lower end of the neck 11 of the agitator and inside the standing-valve-cage. The length of the neck 11 is greater than that of the bore 10 through the top of the standing-valve, and thus space is provided between said stirrer and the inside of the top of the cage when the stirrer is free, to allow a measure of vertical play for the agitator and stirrer when the same may be carried up and down by the bar 14 engaging the stud 20 when the plunger is drawn up far enough to accomplish this purpose.

In practical operation, the movement of the plunger up and down in the working-barrel slides the cross-bar 14 along the spiral-blade and thereby causes the blade 12 and the pointed member 25 to rotate relative to other parts of the pump, at each stroke. The rotation of the member 25 agitates the sand in the standing-valve, and the rotation of the blade 12 agitates the sand in the working-barrel and in the plunger. In case the lower stopper or ball 8 becomes wedged in the upper part of the cage, the stirrer 25 may jar the same loose, when said stirrer is raised and lowered by contact of

the pin 20 on the cross-bar 14. In case the upper ball becomes wedged, the plunger may be lowered sufficiently to bring the point 22 against said stopper, thus to loosen it from its wedged position.

The agitation of the sand and the loosening of the valve-stoppers is thus accomplished automatically by appropriate operation of the sucker-rod 27.

The agitation of the sand inside the plunger is accomplished by a rotary motion, thus causing the sand to swirl around inside the plunger and not become packed, and this swirling agitation occurs from the bottom of the plunger upward.

I claim:—

1. An oil-well-pump provided with a standing valve, a plunger, a plunger body, metal snap packing-rings on the plunger outside of the plunger-body and outside of the standing-valve respectively, and provided internally with an automatic sand-agitator inside the plunger to keep the sand loose within the plunger.

2. An oil-well-pump provided with a plunger having metal snap packing-rings outside of the plunger-body and outside of the standing-valve, and provided with an automatic sand-agitator to keep the sand loose within the plunger, said agitator being arranged to engage the valves of the plunger and standing-valve to prevent the same from sticking.

3. A pump provided with a plunger and an automatic rotary sand-agitator inside the plunger to cause a rotative agitation inside of the plunger.

4. A pump provided with a standing-valve and a plunger, and a rotary agitator extending inside the plunger and connected with the standing-valve and operable by the movement of the plunger.

5. In a pump, the combination of a plunger, a standing-valve, a spiral blade swiveled to the standing-valve, and a part carried by the plunger to engage the spiral blades to cause rotary movement thereof when the plunger is operated.

6. In a pump, the combination with the standing-valve, of a spiral blade swiveled thereto, a plunger-body into which the spiral blade extends, and means carried by the plunger and slidable on the spiral blade to engage the same to cause rotation thereto relative to the plunger-body, and means on said spiral blade whereby the same may be lifted by the plunger at the upper portion of its stroke.

7. A pump comprising a working-barrel, an externally-grooved standing-valve-body, packing-rings in the groove of said body, a stopper for said valve-body, a cage for the stopper fastened to the body, a stirrer inside the cage, an agitator swiveled to the cage and fastened to the stirrer and extend-

ing upward from the cage, a plunger provided at its lower end with a butt, a cross-bar in said butt provided with a way through which the agitator extends and adapted to engage said agitator to rotate the same as the plunger moves up and down, a shouldered section screwed into said butt, a band around the section above the butt, spring packing-rings between the band and the shoulder of said shouldered section, a valve-seat section secured to the shouldered section, a cage secured to the valve-seat section, a stopper in said cage, and a spike on said agitator to unseat the stopper.

8. A pump provided with a plunger and an automatic rotary sand-agitator inside the plunger to cause a swirling or rotative agitation inside the plunger.

9. A pump provided with a standing-valve and a plunger, and a rotary agitator having deflected blades and being movable vertically inside the plunger and connected with the standing-valve and operable by the movement of the plunger.

10. In an oil-well pump, the combination with the standing-valve and reciprocating plunger, of an agitator blade in the plunger body and a spike supported by the agitator-blade in the plunger-body to engage the valve of the reciprocating plunger and unseat the valve when the plunger is lowered sufficiently for that purpose.

11. In an oil-well pump, the combination with a standing-valve, and a plunger, of a spiral agitator supported by the standing-valve, and a bearing carried by the plunger, the spiral agitator reciprocating through the bearing, and said bearing causing the rotation of the agitator as the plunger moves up and down.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 29th day of February 1908.

MARSHALL J. MORTON.

In presence of—

J. I. WAGY,

JAMES R. TOWNSEND.