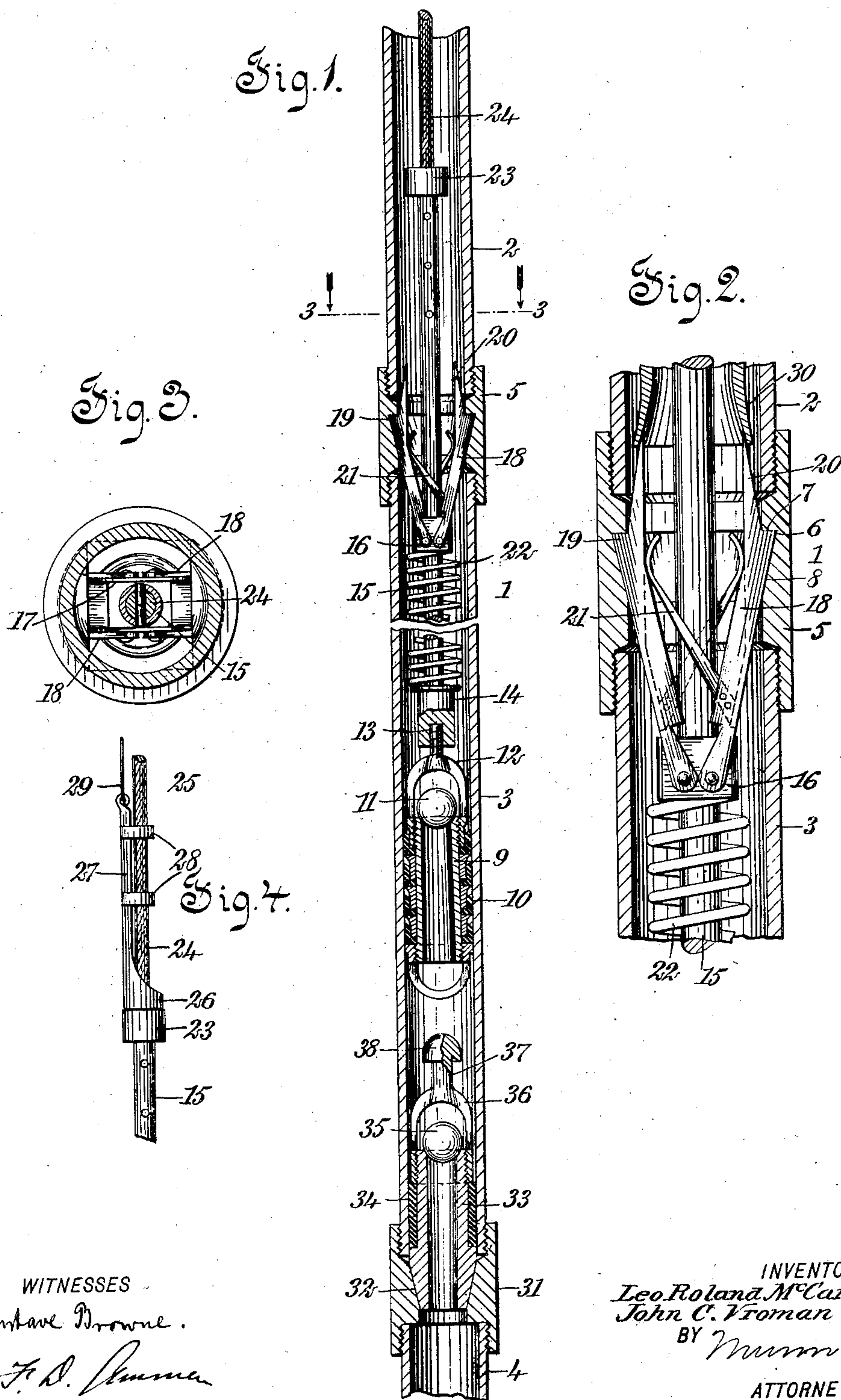


L. R. McCARTHY & J. C. VROMAN.
 PLUNGER MECHANISM FOR OIL WELLS.
 APPLICATION FILED JUNE 28, 1907.

940,347.

Patented Nov. 16, 1909.



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LEO ROLAND McCARTHY AND JOHN C. VROMAN, OF SPARTANSBURG, PENNSYLVANIA.

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Specification of Letters Patent.

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Application filed June 28, 1907. Serial No. 381,248.

To all whom it may concern:

Be it known that we, LEO ROLAND McCARTHY and JOHN C. VROMAN, both citizens of the United States, and residents of Spartansburg, in the county of Crawford and State of Pennsylvania, have invented a new and Improved Plunger Mechanism for Oil-Wells, of which the following is a full, clear, and exact description.

10 This invention relates to the construction and operation of oil wells and the like, and concerns itself especially with the construction and operation of the plunger mechanism.

15 In the type of oil well to which this invention relates a collar is lowered into the pipe, and connected with this collar there is arranged a plunger or piston which can be reciprocated from the mouth of the well.

20 This collar is provided with means for locking itself automatically at a predetermined point in the well.

The object of this invention is to provide an improved construction for controlling the pawls which lock the collar in the pipe in the manner suggested.

25 The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claim.

30 Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

35 Figure 1 is a vertical central section through the lower portion of a well having a plunger mechanism constructed according to our invention; Fig. 2 is a view similar to Fig. 1, but showing details of the mechanism shown in Fig. 1 upon an enlarged scale; Fig. 3 is a cross section on the line 3—3 of Fig. 1; Fig. 4 is a side elevation showing, in detail, a portion of the lower end of the cable which operates the plunger.

40 Referring more particularly to the parts, and especially to Figs. 1 to 3, 1 represents the oil well or pipe formed in sections 2, 3 and 4. The sections 2 and 3 are connected by a special coupling 5 which is provided on its inner side and near its middle point, with a circumferential groove 6 which presents an abrupt shoulder 7 on its upper side, and an inclined face or cheek 8 on its lower side.

55 This special form of coupling is adapted to facilitate the anchoring in position of the

plunger 9. This plunger is illustrated in Fig. 1; it comprises a tubular body provided on its outer face with packing rings 10, and on the upper end of this body a valve or ball 11 seats, the said valve being held in position by a cage 12. This cage 12 is provided with an upwardly projecting threaded stud 13 to which there is rigidly attached a head 14, and this head is formed at the lower extremity of a stem 15 which extends vertically upwardly within the pipe; this stem slides freely through a collar 16, which collar is disposed in the pipe just below the coupling 5. The collar 16 presents oppositely disposed flat fins or side plates 17 to which pawls 18 are pivotally attached. The pawls extend upwardly within the pipe in an inclined position as shown, and are formed near their upper extremities with outwardly projecting teeth or shoulders 19 which are adapted to engage with the groove 6 in the manner illustrated. Beyond these teeth 19 the pawls are provided with upwardly projecting inclined spurs 20, which are useful in facilitating the dislodgment of the pawls when the plunger is to be removed. The inner edges of the pawls 18 are provided with leaf springs 21 which thrust against the opposite pawls so as to press them outwardly toward the side walls of the pipe.

45 Disposed around the stem 15 there is provided a helical spring 22, the lower end of which thrusts against the head 14, and the upper end of which thrusts against the collar 16. The stem 15 extends some distance above the collar 16, and is provided with a head 23 or coupling, which attaches it to a cord wire or rope cable 24. In anchoring the plunger in position, the plunger is lowered on the cable until its downward movement is stopped by the pawls 18 coming in contact with the coupling. In order to drive the plunger down in the pipe, we provide a drop hammer 25 which is illustrated in Fig. 4. This hammer consists of a heavy ring 26 which is disposed around the cable 24 and normally rests upon the head 23. From this ring 26 a shank 27 extends longitudinally of the cable, and is provided with guide collars 28 which guide the hammer upon the cable as it rises and falls. To the upper end of the shank 27 a light cord 29 is attached. By means of this cord 29 the hammer may be raised from the mouth of the well and then allowed to

descend. In this way the ring 26 will give a blow to the head 23, and the stem 15 carrying the plunger 9 will be forced downwardly in the pipe. As soon as it has advanced a sufficient distance, the springs 21 will snap the pawls 18 outwardly so that their teeth or shoulders 19 engage the groove 6 to hold the parts in position. With the plunger anchored in this manner, the mechanism described affords means for enabling the plunger to be reciprocated simply by means of the cable 24. Evidently, the plunger may be pulled upwardly by the tensile force in the cable, and when this force ceases to act, the spring 22 which was compressed by the upward movement, will extend itself to its normal position. As the spring extends, it forces the plunger back to its lowest possible position. When this operation is taking place, of course, the stem 15 slides freely through the collar 16. In this way the cable affords means not only for giving the plunger its upward movement, but enables it to be reciprocated. When it is desired to withdraw the plunger from the well, this can be accomplished by dropping a sleeve 30 down the pipe, and this sleeve strikes the spurs 20 in the manner illustrated in Fig. 2 and forces them inwardly by reason of their inclined position, and in this way it releases the teeth 19 of the pawls from the groove 6. After the pawls have been disengaged in this manner, the plunger and all its connected parts can be withdrawn by means of the cable, as will be readily understood.

The pipe sections 3 and 4 are connected by a special coupling 31 which presents a conical seat or bore 32 for a fixed valve 33. This fixed valve has a tubular body sur-

rounded by a packing strip or washer 34 which makes it tight in the pipe. Upon the upper end of the valve body 33, a valve or ball 35 is seated, the same being held in position by a suitable cage 36. From the upper end of the cage 36 a neck 37 extends upwardly, which terminates in a button or round head 38. The fixed valve is adapted to be pushed down into position by means of a rod.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

In a well, in combination, a pipe having an annular groove on the inner side thereof, a square collar, a pair of pawls pivotally attached to said collar on one side thereof, a second pair of pawls pivotally attached to said collar on another side thereof, said pawls being adapted to engage said annular groove to lock said collar within said pipe, springs rigidly attached to individuals of said pawls and thrusting against the opposite pawl, said pawls having upwardly extending spurs at their upper extremities, and shoulders adjacent to said spurs for engaging said groove, a stem passing through said collar, a reciprocating plunger having a valve and attached to said stem, a spring thrusting against said collar and constraining said plunger downwardly, and a cable attached to said stem for raising said plunger.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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Witnesses:

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