March 23, 1926. 1,577,833

G. E. McCRACKEN

GRAB

Filed Oct. 20, 1924

Fig. 1.

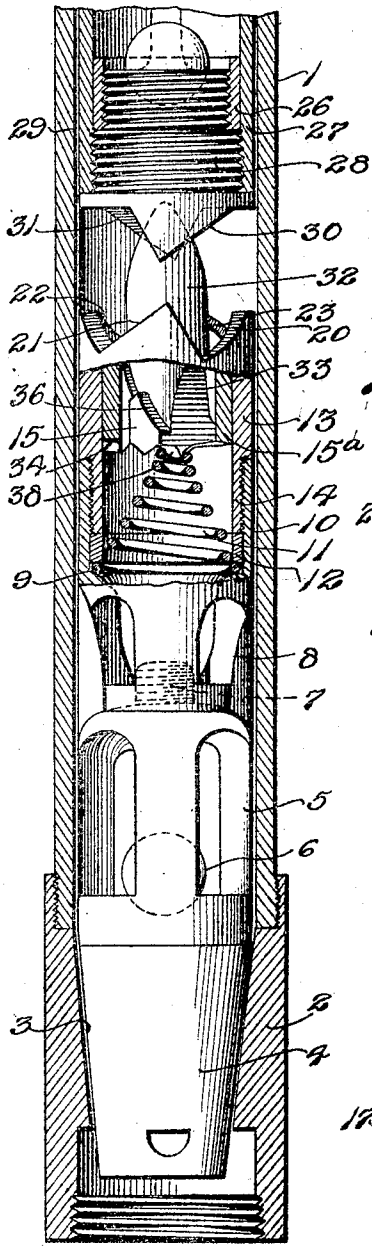


Fig. 5.

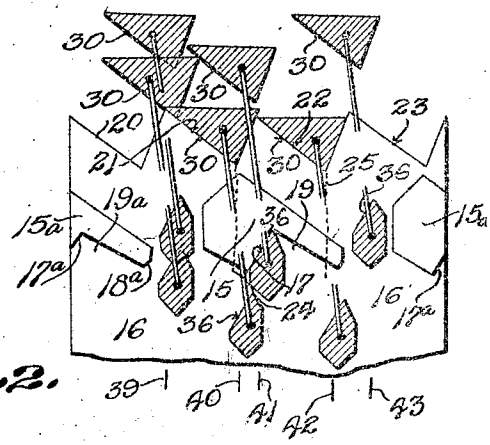
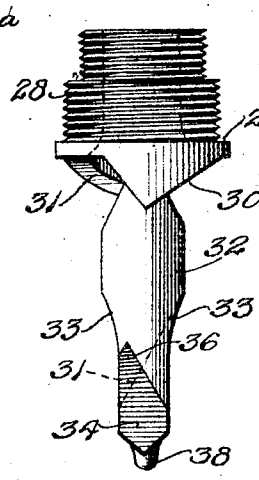


Fig. 2.



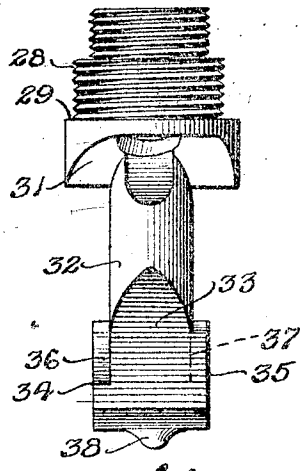


Fig. 3.

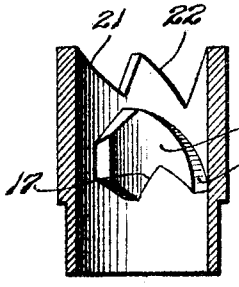


Fig. 4.

Inventor
George E. McCracken

By Ellen A. Rainsmith
Attorney

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UNITED STATES PATENT OFFICE.

GEORGE E. McCRACKEN, OF LONG BEACH, CALIFORNIA.

GRAB.

Application filed October 20, 1924. Serial No. 744,744.

To all whom it may concern:

Be it known that I, GEORGE E. McCRACKEN, a citizen of the United States, and a resident of Long Beach, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Grabs, of which the following is a specification.

This invention relates generally to a releasable lifting grab, and particularly to means for unseating the standing valve in an oil well pump.

It is one object of the invention to provide a grab of the character indicated that may be thrown into and out of engagement with a standing valve without unscrewing the sucker rod while disengaging the grab from the valve.

It is another object of the invention to obviate the necessity of using a garbut rod for unseating the standing valve in an oil well pump whereby a valve may be provided in the lower end of the pump plunger.

It is another object of the invention to provide a grab of the character indicated that will permit the withdrawal of the plunger from the well without withdrawing the standing valve.

In the drawing:—

Figure 1 is a vertical transverse section through a portion of a well pump embodying my invention, parts being broken away.

Figure 2 is an edge elevation of one portion of the grab.

Figure 3 is a side elevation of the same.

Figure 4 is a vertical transverse section through the fixed cam bushing forming a portion of the grab.

Figure 5 is a diagrammatical illustration of the two cam portions of the grab showing the movements of one portion relative to the other when entering into engagement with it and being released therefrom.

Referring more particularly to the drawing, I show at 1 a pump jacket connected at its upper end to a discharge casing column not shown, the bottom of the jacket being fitted with a collar 2 provided with a seat 3 to engage a standing valve 4.

To standing valve 4 is connected a bottom cage 5 with a ball check valve 6 positioned therein, the upper end of the cage being provided with a threaded lug 7.

On threaded lug 7 is screwed an inverted cage element 8 having an internal shoulder 9 and an upstanding internally threaded flange 10. On shoulder 9 is placed a conically spiralled spring 11 held in position by a ring 12 on its lower coil. At 13 is shown a grab nut having an externally threaded flange 14 to engage the threaded flange 8, thereby holding the ring 12 and spring 11 in position and becoming a unitary part of the standing valve.

On diametrically opposite sides of the interior surface of grab nut 13 are formed bosses 15—15ª. These bosses are exactly alike and are spaced a distance apart at both ends as at 16. On the lower edge of each boss are formed cam surfaces 17 and 18, the surface 17 forming one side of a reentrant angle 19, and surface 18 being formed on the extreme right end of the boss substantially parallel with surface 17.

The upper edge of grab nut 13 is formed into four cam surfaces 20—21—22—23 lying at substantially the same angle to a horizontal plane and similarly directed around the periphery of the nut 13 as shown. These cam surfaces bear a definite relation to cam surfaces 17 and 18 on bosses 15, 15ª. The lower end of cam surface 21 for instance, lies in a vertical line as 24 passing a little to the left of the lower end of cam surface 17, and the lower end of cam surface 22 lies in a vertical line as 25 passing a little to the left of the lower end of cam surface 18. Cam surfaces 23, 20, bear the same relationship to cam surfaces 17ª, 18ª.

At 26 is shown a valve cage and at 27 a pump plunger, both of these parts being threaded on to a bushing 28, the latter forming a seat at 29 for the plunger sleeve 27. The bottom edge of the bushing 28 is formed to present two diametrically opposite and similarly formed and directed cam surfaces 30 and 31 adapted to engage and co-operate with cam surfaces 20, 21, 22, 23 to impart a turning movement to parts 26 to 29 inclusive.

Depending from the center bushing 28 and in axial alignment therewith is a finger 32 flattened on both sides at its lower end as at 33 and provided with diametrically opposite and laterally extending bosses 34—35, these bosses being formed with cam surfaces 36, 37 respectively, similarly arranged and oppositely directed with relation to cam surfaces 17—17ª when the device is assembled. These cam surfaces 30—31 also bear definite relations to cam surfaces 36—

37, the lower end of cam surface 30 lying in a vertical line offset a distance to the right of the upper end of cam surface 36, the surfaces 31 and 37 of course bearing a similar relationship.

Now, it follows that when the device is assembled as shown in Figure 1, the point or projection 38 on the lower end of finger 32 rests on spring 11, the cam surface 30 slightly overhanging cam surface 21. When, therefore, pressure is applied to the grab (parts 28 to 38 inclusive) the spring 11 is depressed and the cam surfaces are advanced with surface 30 in engagement with cam surface 21, this being the first position indicated at 39 in the diagram. Continued pressure forces surface 30 to slide along surface 21 to its lower end thereby rotating the grab clockwise a distance into the position 40. The grab now being pulled upwardly the cam surface 36 engages cam surface 17 on boss 15 and slides along the same to the end thereof thereby causing the grab and parts connected thereto to rotate a distance clockwise into the position 41. Continued raising of the grab will lift the standing valve from its seat and permit the desired draining of the well.

The draining having been accomplished, the grab is again dropped, the surface 30 engaging and sliding along surface 22 of the grab nut to its lower end, thereby again rotating the grab a distance to the position 42. Upon raising the grab again the surface 36 engages surface 18 on boss 15 and again rotates the grab a distance to the position 43 where the grab is again entirely free from the standing valve as in original position 39.

In this operation the grabbing and releasing movements have been automatic, the only voluntary movements applied to the grab being vertical, and the rotation of said grab occasioned by engagement of the several cams by the raising and lowering of the plunger being always in one direction, clockwise, it is impossible to unscrew any joints in the line.

This construction is of such a nature that it obviates the necessity of using a garbut rod for unseating the standing valve, and a valve may be arranged in the bottom end of the plunger if desired.

It is to be understood, of course, that while I have herein shown and described one specific embodiment of the invention, changes in form, construction, and method of operation may be made within the scope of the appended claims.

I claim:—

1. A grab comprising a pair of telescoping members, one member having a hooked engagement with the other, means rendered operable by the successive opposite axial movements of one member relative to the other for effecting said hooked engagement, and means rendered operable by the successive opposite axial movements of the one member relative to the other for effecting the disengagement of said hooked members.

2. A grab comprising a pair of telescoping members, one member having a hooked engagement with the other, means rendered operable by the successive opposite axial movements of one member relative to the other for effecting said hooked engagement, means rendered operable by the successive opposite axial movements of the one member relative to the other for effecting the disengagement of said hooked members, and resilient means for urging the one member into hooked engagement with the other.

3. The combination with a standing valve of a cylindrical member carried thereby having four similarly directed cams formed on its upper edge and having two diametrically opposite bosses formed on its inner surface, and each boss having an upwardly extending recess in its lower edge, and a grab element having a pair of diametrically opposite similarly directed cams adapted to engage said first mentioned cams and carrying a depending finger having diametrically opposite laterally extending bosses formed thereon offset a distance relative to the said cams on said grab, said boss being adapted to engage said recess in said boss on said cylindrical member.

4. The combination with a standing valve of a cylindrical member carried thereby having four similarly directed cams formed on its upper edge and having two diametrically opposite bosses formed on its inner surface, and each boss having an upwardly extending recess in its lower edge, and a grab element having a pair of diametrically opposite similarly directed cams adapted to engage said first mentioned cams and carrying a depending finger having diametrically opposite laterally extending bosses formed thereon offset a distance relative to the said cams on said grab, said bosses being adapted to engage said recesses in said bosses on said cylindrical member, and resilient means for urging said second mentioned bosses into engagement with said recesses.

GEORGE E. McCRACKEN.