Aug. 19, 1941. F. M. HUDSON 2,252,767

STANDING VALVE PULLER

Original Filed May 4, 1936 2 Sheets-Sheet 1

Fig. 1.

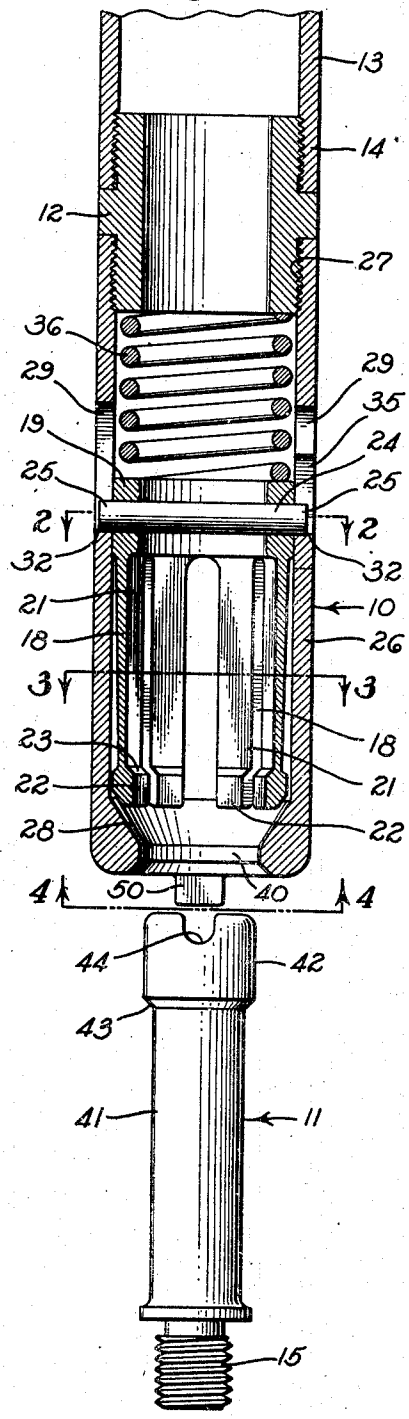

Fig. 2.

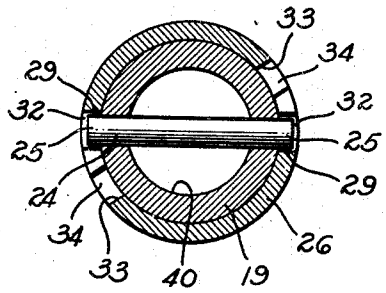

Fig. 3.

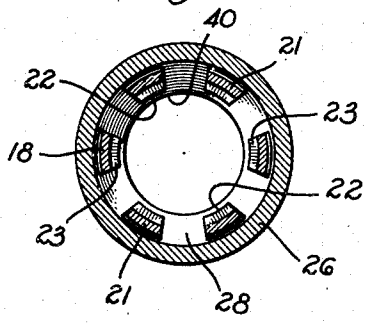

Fig. 4.

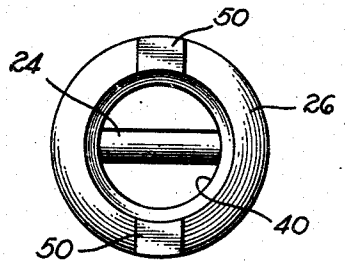

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Fig. 5.

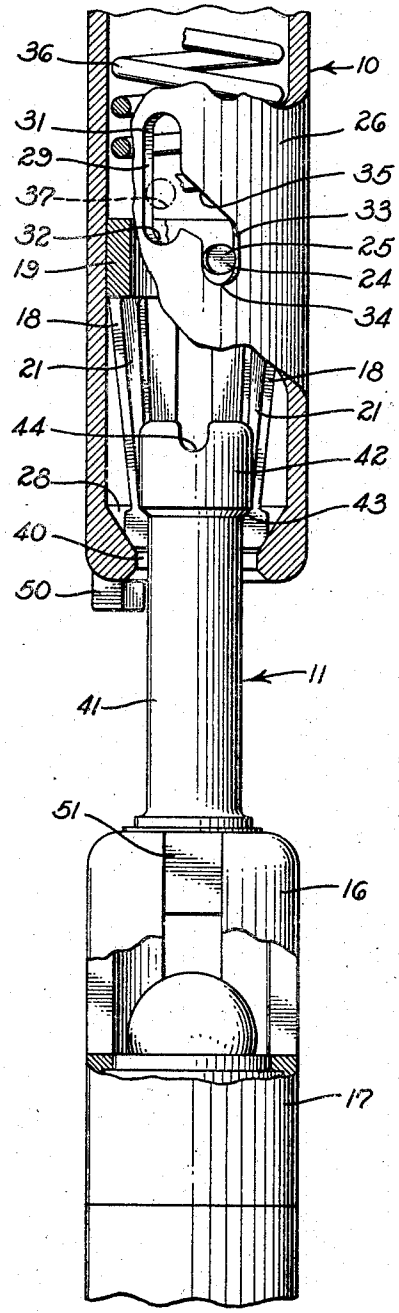
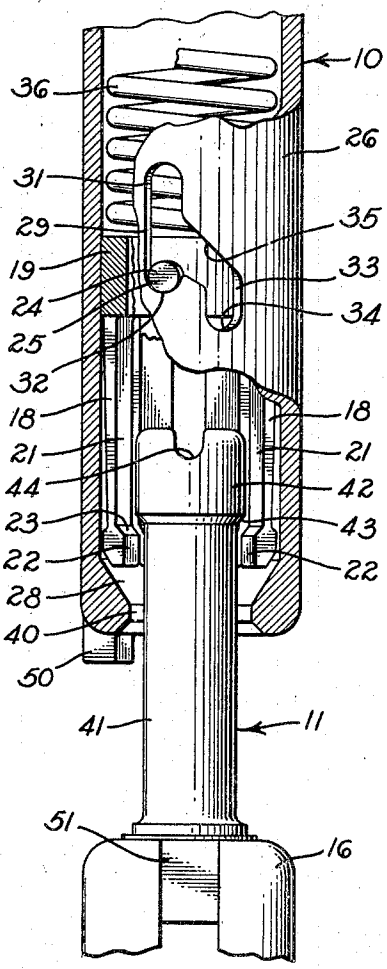


Fig. 6.



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2,252,767

UNITED STATES PATENT OFFICE

2,252,767

STANDING VALVE PULLER

Frank M. Hudson, Walnut Park, Calif., assignor to Pacific Pump Works, Huntington Park, Calif., a corporation of California

Continuation of application Serial No. 77,749, May 4, 1936. This application December 31, 1938, Serial No. 248,850

8 Claims. (Cl. 294—102)

This application is a continuation of my application Serial No. 77,749, filed May 4, 1936, for "Standing valve puller."

My invention relates to a pulling and installing means for standing valves of the character employed in conjunction with the pumping of oil wells. Standing valves of this character are used at the lower end of a pump barrel in pump installations where the pump barrel is secured to the lower end of a string of oil tubing, the pump plunger being removable from the pump barrel, and in installations where the pump is of insertable type so that the entire pump including the barrel and plunger can be lifted from the oil production tubing. In such latter installations a standing valve may be left seated in the lower end of the oil tubing when the insert pump is removed, so that the oil in the tubing will not drain out into the well.

Various types of standing valve pullers are now in use employing the principle of a projecting pin engaging a bayonet type of slot. In such construction, the valve is carried on the pin or pins engaging the slots or shoulders, and it is found that such types of standing valve pullers are subject to a condition known as "floating off" of the valve, which consists in the rising or floating of the standing valve due to a sudden upward surge or flow of gas in the well, causing the valve lifting means to become disconnected from the valve, whereupon it will fall back to the bottom of the oil tubing. It is an object of my present invention to provide a standing valve lifter, which may be selectively employed to engage or release the valve at the will of the operator, which standing valve puller does not carry the load of the valve on pins which project into engagement with shoulders, and which has means which will effectively prevent the valve from "floating off."

In the standing valve pullers with which I am familiar, the interengageable parts are exposed to abuse and wear, with the result that after a period of use they become ineffective or uncertain in operation. For example, it is found that in those types employing projecting pins, the pins will shear off, and in other types having wedge-shaped connecting members the interengaging parts become badly worn so that they do not function properly. It is an object of my invention to provide a standing valve puller having interengageable parts so formed and so placed that they will not become worn or injured in such a manner as to render them ineffective or uncertain in their operation.

Further objects and advantages of the invention will be made evident throughout the following part of the specification.

Referring to the drawings, which are for illustrative purposes only,

Fig. 1 is a vertically sectioned view showing the cooperating parts of a preferred form of my invention in detached relation.

Fig. 2 is a cross section on a plane indicated by the line 2—2 of Fig. 1.

Fig. 3 is a cross section on a plane indicated by the line 3—3 of Fig. 1.

Fig. 4 is a bottom plan view taken as indicated by the line 4—4 of Fig. 1.

Fig. 5 is a partly sectioned elevational view looking toward one side of Fig. 1, this view showing the cooperating parts of the valve puller in engagement.

Fig. 6 is a fragmentary sectional view similar to Fig. 5, showing the engager or clamping element of the device in releasing position.

The preferred form of my invention shown in the drawings includes two engageable elements 10 and 11, one of which is adapted to be secured to a member vertically movable within an oil tubing, such, for example, as the lower end of a pump plunger, and the other of which is adapted to be connected to a standing valve. In the preferred practice of the invention, the element 10 may be connected by means of a bushing 12 with the lower end 13 of a pump barrel 14, and the element 11 is preferably provided with a threaded projection 15 whereby it may be secured, as shown in Fig. 5, to the cage 16 of a standing valve structure 17.

One of the cooperating elements, in this instance the element 10, has engaging or clamping means 18 adapted for movement relative to the remaining part of the element 10, between an engaging position and a releasing position. The engaging member 18 is cylindrical in its general form and includes an upper ring portion 19 from which a plurality of arcuate fingers 21 project downwardly, the lower portions of these fingers 21 having arcuate enlargements 22 forming inwardly and upwardly presented shoulders 23. Extending across the ring portion 19 and rigidly secured therein is a diametral pin 24 of such length that its ends 25 project from the outer face of the ring 19.

The element 10 also includes a cylindrical shell 26 in which the member 18 is loosely fitted and within which it is freely slidable both vertically and angularly. The upper end of the shell 26 is provided with internal threads 27 where-

by it may be screwed onto the bushing 12, and at its lower end the shell 26 is decreased in internal diameter so as to form a conical inwardly and upwardly directed face 28. Intermediate its ends the shell 26 has diametrically opposed openings 29 into which the ends 25 of the pin 24 project, these openings 29 having the form clearly shown in Figs. 5 and 6. An upper portion of each opening 29 is in the form of a slot 31 with a shoulder or pocket 32, which may be referred to as the primary pocket, at its lower end, and a lower portion is in the form of a slot 33, the lower end 34 of which is disposed in a horizontal plane below the pocket 32 of the upper slot 31, the end 34 constituting a shoulder or pocket which may be referred to as the secondary pocket or shoulder. The upper end of the lower slot 33 is connected by means of a diagonal slot 35 with an intermediate part of the upper slot 31. Otherwise described, it may be stated that the upper part of the lower slot 33 curves toward and into the central part of the upper slot 31.

As shown in Fig. 6, when the pin ends 25 are in the pockets 32 of the upper slots 31, the lower ends of the fingers 21 will be disposed above the conical face 28, and the lower ends of the fingers 21 will be in what may be termed "expanded" or "released" position. When the pin ends 25 are in the positions in which they are shown in Fig. 5 in the lower portions of the slots 33, the engaging member 18 will be lowered to such an extent that the lower ends of the fingers 21 will engage the conical face 28 and be forced inwardly thereby into what may be termed "engaging" position. A compression spring 36 is placed between the upper end of the ring portion 19 and the lower shoulder of the bushing 12. This spring 36 yieldably applies a relatively strong force downwardly against the engaging member 18 so that the pin ends 25 are held forcibly downwardly either in the pockets 32 or the lower portions of the slots 33.

When the engaging member 18 is caused to move upwardly with respect to the shell 26 from the position in which it is shown in Fig. 5, the diagonal slots 35 will direct the pin ends 25 laterally into the upper slots 31, or into such positions as indicated by the dotted circle 37 of Fig. 5, which causes the member 18 to rotate clockwise with respect to the shell 26 through a small angle. This angle is measured by the angular distance between the slots 31 and 33. Then, upon release of the upward force which has moved the member 18 upwardly as described, the member 18 will move vertically downwardly, and the pin ends 25 will travel vertically downwardly in the upper slots 31 into the pockets 32 formed at the lower ends thereof. It will be perceived that upward movement of the member 18 relative to the shell 26, or, what is the same thing, downward movement of the shell 26 relative to the engaging member 18, followed by a relative movement in the opposite direction, will automatically move the pin ends 25 from the lower portions of the lower slots 33 into the upper slots 31 and thence into the pockets 32, and that by this simple relative movement of the parts 18 and 26 the engaging member 18 may be moved from engaging position, as shown in Fig. 5, to released position, as shown in Fig. 6. To accomplish return of the engaging member 18 from released position, as shown in Fig. 6, to engaging position, as shown in Fig. 5, requires, first, a relative downward movement of the shell 26 relative to the engaging member 18 so as to bring the pin ends 25 into alignment with the diagonal slots 35, and then clockwise rotation of the shell 26 relative to the engaging member 18, as will be hereinafter described, to position the pin ends 25 in the slots 33, when an upward movement of the shell 26 may be permitted to cause the pin ends 25 to travel to the lower portions of the lower slots 33.

The element 11 is adapted to pass through the opening 40 at the lower end of the shell 26 and within the space enclosed by the fingers 21 of the engaging member 18. The fingers 21 and the element 11 are cooperatively prepared so that when the fingers 21 are in engaging position, as shown in Fig. 5, the element 11 will be engaged in such a manner that it cannot be removed from the lower end of the shell 26. The element 11 comprises a bar or stem 41 with a head 42 at its upper end providing a downwardly faced annular shoulder 43 adapted to engage the shoulders 23 of the fingers 21 in the manner shown in Fig. 5. The upper end face of the head 42 is provided with a diametral groove 44 of a size to receive the central portion of the pin 24 when the element 11 is brought longitudinally and angularly into a position relative to the shell 26 wherein the head 42 will engage the pin 24, and the groove 44 and pin 24 are angularly coincident.

When the head 42 of the element 11 is engaged in the manner shown in Fig. 5, the downward force exerted by the spring 36 causes the lower ends of the fingers 21 to ride downwardly and inwardly on the conical face 28 and to be thereby forced tightly into engagement with the element 11. For purpose of explanation, it may be said that the element 11 and its attached standing valve 17 are, in Fig. 5, supported or suspended from the lower part of the shell 26 in the relative position which they have when being lowered down through an oil tube in a well into engagement with a standing valve seat at the lower end of such oil tube, not shown. When the standing valve 17 reaches its seat in the oil tube, its downward movement will be stopped. The downward movement of the element 10 may be continued so that the pin 24 will be brought into engagement with the head 42, thereby stopping the downward movement of the engagement member 18. When the pin 24 thus engages the head 42, the pin may or may not be seated in the groove 44, depending upon the chance relative angular position of the pin 24 and head 42. Then, further downward movement of the shell 26 will cause the lower slots 33 to move downwardly relative to the pin ends 25, and the upper edges of the diagonal slots 35 will contact the pin ends, causing clockwise rotation of the pin and ring portion 19 within the shell 26 and bringing the upper slots 31 into angular alignment with the pin ends 25, whereupon a lifting of the shell 26 will raise the pockets 32 into engagement with the pin ends 25, as shown in Fig. 6. When the pin ends 25 are thus seated in the pockets 32, the lower ends of the fingers 21 will be held above the conical shoulder 28, and the fingers 21 will be permitted to flex outwardly into disengaged position, as shown in Fig. 6, whereupon further upward movement of the shell will cause it to pass over and above the upper end of the element 11, leaving the standing valve seated in operative position.

Operation of the pump may then be carried on, the puller reciprocating idly at the lower end of

the sucker rod string through a vertical range of movement such that it is out of contact with the standing valve cage. Full stroke of the pump may be obtained, however, as the stem head 42 is of smaller diameter than the internal diameter of either the opening 40 or arcuate enlargements 22 when expanded.

It will be noted that if, during the operation of lowering the standing valve, the angular position of the pin 24 and groove 44 is such that the pin rides upon the top of the head 42 when it contacts the head, and does not slip into the groove 44, the engaging element 18 will be caused to rotate with respect to both the shell 26 and the stem 41 by the interaction of the pin ends 25 and the upper walls of the slots 35. The stem will be held against rotation by the friction of the standing valve cage with the bottom or the pump barrel or oil tubing, as the case may be. The pin 24 will then turn bodily in angular relationship with both the shell and the valve cage stem 41. There will be, due to sliding friction, a slight torque applied to the shell tending to turn it in an anti-clockwise direction and consequently to tighten the threaded connections between the sections of sucker rods, which are formed with right-hand threads. If the pin 24 drops into the groove 44 as it turns under the cam-like action of the upper walls of the slots 35, or if it is initially in engagement with the groove 44, the pin 24 and the valve cage will be locked against relative rotation, and the friction of the standing valve cage with the bottom of the pump barrel or oil tubing, as the case may be, will be effective to apply a heavier torque tending to turn the shell in an anti-clockwise direction and tighten the threaded joints of the sections of sucker rods. It will thus be seen that no matter what the angular position of the groove 44 is, there is applied to the shell 26, during the operation of releasing the standing valve cage, a torsional force tending to tighten the sucker rod connections. The groove 44 performs no function during the operation of releasing the valve cage. If the pin 24 is seated in the groove 44 at the end of the releasing operation, the engaging member 18 rests in a position with respect to the stem 41 which is lower by a distance equal to the depth of the groove 44 than is the case when the pin straddles the groove, a difference in position which is of no consequence in the operation of the device. The same may be said of the shell 26 which is held in fixed longitudinal relationship with the member 18 by the spring 36.

When it is desired to pull the standing valve from its seat at the lower end of the oil tube, the element 10 is lowered over the stem of the element 11 to such position that the pin 24 will be brought into engagement with the head 42, with the weight of the string holding the lower end of the shell 26 down upon the top of the valve cage 16. The pin ends 25 will, during this downward movement of the string, travel upward in the slots 31 to a point adjacent the upper end thereof. A torque tending to turn the string in a clockwise direction is then applied to the string and thereby to the member 18 by giving the string several turns at the surface of the well. The string is then lifted. When the shell 26 breaks frictional contact with the top of the well cage, the torque of the string gives the shell a clockwise movement. The member 18 at first turns with it due to friction between the two ends of the spring 36 with the lower end of the bushing 12 and the upper end of the ring 19, respectively. The pin 24 carried by the ring 19 of the member 18 will turn with the shell 26 until it registers angularly with the groove 44, at which time it will be forced into the groove by the spring 36, locking the ring 19 and the valve cage against relative rotation. The friction of the bottom of the valve cage with the bottom of the pump barrel or oil tubing, as the case may be, being greater than the friction of the ends of the spring 36 with its seats, will cause the member 18, which is now locked with the valve cage, to resist the rotational effect of the torque of the string. The pin ends 25 at this juncture are traveling downward in the slots 31. When they arrive at a point opposite the slots 35, the shell 26 is permitted to turn in a clockwise direction, for the slots 35 now pass over the pin ends 25, forcing them down into the slots 33 and into the lower end portions thereof. The engaging member 18 has then assumed a position relative to the shell 26 such that the lower ends of the fingers 21 will engage the conical shoulder 28 and be forced inwardly into engagement position, so that as the element 10 continues upwardly, the shoulders 23 of the fingers 21 of the element 18 will engage the shoulders 43 of the stem head 42 and lift the stem 41 with its attached standing valve 17 up through the well to the surface of the ground.

It will be observed that during the releasing operation the downward thrust of the string is converted into a torque upon the string which tends to tighten the sucker rod joints. During the operation of picking up the valve cage, a torque is applied to the string which, acting against the frictional resistance of the valve cage, tends to again tighten the threaded joints.

The lower end of the shell 26 has downwardly extended projections 50 which are preferably diametrically disposed, these projections 50 being adapted to engage notches 51 in the upper part of the cage 16 of the standing valve 17 when the shell 26 is lowered a sufficient distance, the purpose thereof being to provide a means of interengagement whereby the parts to which the shell 26 is attached may be locked against rotation relative to the valve cage when it is desired to tighten the threaded connections between sections of the well string which have accidentally become loosened in operation. To accomplish this purpose, the string is dropped under the force of its weight until the lower end of the shell rests upon the upper end of the valve cage. As the shell drops, the middle portion of the pin 24 engages the upper end of the head 42 of the stem 41 and forces the ends 25 of the pin 24 upward toward the upper ends of the slots 31 which are prolonged upwardly a sufficient distance to permit the shell 26 to be lowered not only to a point where the projections 50 rest upon the valve cage but also to a lower point where the projections 50 enter the notches 51 when they are in angular register. The string is then given a clockwise torque which rotates the shell until such registry is established and the projections 50 enter the notches 51, the torque then acting to tighten the threaded connections of the string sections, since the valve cage is held against rotation by frictional contact of its lower end with its support.

If at this juncture the pin 24 happens to be seated in the groove 44, or to become seated therein during the rotation of the shell 26 prior to the moment at which the projections 50 come

into registry with the notches 51, the torsional force of the string imparted to the pin 24 by the right-hand walls of the upper portions of the slots 31 causes the pin to ride out of the groove 44, thereby permitting relative angular movement of the shell and valve cage until registry of the projections 50 and notches 51 is established. The upper portions of the side walls of the groove 44 are rounded to permit the pin 24 to ride out of the groove 44 in this fashion when the ratio of the torsional force acting upon the member 18 to the thrust of the spring 26 exceeds a given value.

The shell and valve cage are not locked together by interengagement of the projections 50 and notches 51 at any stage in the operations of releasing or picking up the valve cage. The longitudinal dimensions in the shell, engaging member, and valve stem, and the position of the slots 31 and 33 longitudinally of the shell are such that the projections 50 and notches 51 are always out of engagement during all of the steps of the operations of releasing and picking up the valve cage. The slots 31, however, are prolonged upwardly a sufficient distance so that the shell 26 may be lowered against the compression of the spring 36 until the pin ends 25 enter the extreme upper portions of the slots 31, permitting engagement of the projections 50 with the notches 51. This upward prolongation of the slots 31 is therefore a feature of my invention, making possible the combination of the valve pulling intermediate engaging member 18 with an interlocking means for the valve cage and the string of sucker rods when it is desired to tighten the threaded connections of the sucker rods.

The upper ends of the slots 31 are sufficiently prolonged so that when the projections 50 are fully seated within the notches 51, and the lower end of the shell 26 contacts the upper end of the valve cage, the pin ends 25 do not quite contact the upper end walls of the slots 31. This feature of the design of my valve puller prevents the pin ends 25 from being sheared off when the sucker rod string is rapidly lowered and the shell 26 is bumped violently against the valve cage, even though the projections 50 and notches 51 are at that moment in angular registry.

It is another feature of my invention that the slots 33 are sufficiently prolonged downwardly that their lower end walls are not in contact with the pin ends 25 when the valve cage is being lifted, since, as will be seen by reference to Fig. 5, when the valve cage is being lifted, the arcuate enlargements 22 support the ring 19 at such a position longitudinally with respect to the shell 26 that the pin ends 25 are not quite seated in the pockets 34 at the lower ends of the slots 35. It will thus be apparent that the pin ends 25 are never called on to support any other body than the relatively light member 18, nor are they ever subjected to any shock or blow.

There is no danger, as the valve is being lifted out of the well, of a sudden upward surge of oil in the tubing releasing the valve from the puller. If such a surge of oil lifts the valve cage and stem 41 into contact with the pin 24, the spring 36 holds the fingers 21 in position.

Although I have herein shown and described my invention in simple and practical form, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be used in substantially the same manner to accomplish substantially the same results; therefore, it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

I claim as my invention:

1. In a pulling tool of the character described, the combination of: an elongated shell adapted for connection to a member insertable in a well to be operated thereby; an engager arranged in said shell for limited rotational and slidable movement relative thereto and having grasping fingers adapted to encompass an object to be pulled from a well; means carried by said engager and adapted to engage said object to be pulled for preventing relative rotational movement of said object to be pulled and said engager when said shell is rotated; means operable by a longitudinal movement of said shell relative to said engager when said engager is in an operative position to force said grasping fingers into engagement with said object to be pulled; and a pin and slot means between said shell and said engager normally holding said engager in an inoperative position, said slot having a wall forming a cam surface engaged by said pin and operable by rotation and longitudinal movement of said shell to move said engager longitudinally relative thereto into operative position, and said cam surface being operable upon subsequent longitudinal movement of said shell to rotate said engager into inoperative position to release said object engaged thereby.

2. In a pulling tool of the character described, the combination of: an elongated shell adapted for connection to a member insertable in a well, to be operated thereby; an engager arranged in said shell for limited rotational and longitudinal movement relative thereto and having normally inoperative grasping fingers adapted to liftably engage an object to be pulled from a well; means carried by said engager additional to and independent of said grasping fingers and adapted to engage said object to be pulled for preventing relative rotational movement of said object to be pulled and said engager when said shell is rotated; means operable by a longitudinal movement of said shell relative to said engager in one longitudinal direction to one limit of its longitudinal movement for moving said grasping fingers into operative position for lifting engagement with said object to be pulled; means tending to effect said longitudinal movement toward said one limit; and inter-engaging cam and follower means arranged operatively between said shell and said engager to permit said limited relative rotational and longitudinal movement, said inter-engaging means normally retaining said engager in a longitudinal position relative to said shell remote from said one limit, said inter-engaging means being also capable of releasing said engager from said position and of permitting relative rotational movement and relative longitudinal movement of said shell and said engager in said one longitudinal direction to said one limit upon manipulation of said shell, said manipulation comprising application of a torque to said shell in one angular direction, and said inter-engaging means being also adapted upon the application of a longitudinal force to said shell in the opposite longitudinal direction to cause said engager to apply a torque to said shell in the opposite angular direction and to move said engager angularly and rotationally into said normal position.

3. A combination as specified in claim 1, in which said pin and slot means comprises walls forming diametrically opposed slots in said shell

and a transverse pin extending through said engager having outer ends extending into said slots, said slots having radially spaced, vertically extending upper and lower portions to hold said engager in inoperative and operative positions and a diagonally extending portion forming a cam surface operable through engagement with said outer ends of said pin to move said engager into operative position by a longitudinal movement and a rotation of said shell relative to said engager and operable by a longitudinal movement of said shell relative to said engager to move said engager into inoperative position.

4. In a puller of the character described, the combination of: a cylindrical shell secured to a well string and open at its lower end; a cylindrical member rotatably and longitudinally slidable therein; depending grasping fingers carried by said member; a vertical stem adapted to be rigidly secured to an object to be pulled and when so secured to project upwardly through said open shell end and inside of said grasping fingers and member; an annular cam face at the lower end of said shell adapted to engage said fingers and force them inwardly from said shell into grasping engagement with said vertical stem as said member moves relatively downward; a spring mounted between said shell and said member to urge said member relatively downward; a radially projecting follower pin on said member; a cam opening in said shell for said follower pin having a first vertical slot, a second vertical slot laterally placed with respect to said first slot, and an inclined slot connecting the upper portion of said first slot with said second slot at a point above the lower end thereof, the lower end of said first slot being lower than the lower end of said second slot, said pin and opening being arranged to permit said member to occupy its lower finger grasping position when said pin is disposed in the lower portion of said first slot and to occupy a higher position in which said fingers are in a position above said annular cam and where they are incapable of grasping said stem when said pin is seated in the lower end of said second slot; and means rigidly secured to said member and adapted to vertically separably abut in an angularly locked relationship the upper end of said stem when said shell and member move downwardly, whereby an object to be pulled when held angularly stationary may angularly fix in position said member as said shell is angularly moved with respect thereto as permitted by the relationship of said pin and inclined slot.

5. In a puller of the character described, the combination of: an object to be lifted; a supporting member secured to a well string; a member for engaging said object and movably mounted on said supporting member to have limited longitudinal movement with respect to said supporting member; a spring mounted operatively between said members to urge said engaging member toward its lower limit of relative movement; means on said engaging member adapted to be moved by said supporting member into vertically supporting relationship with said object when said engaging member is adjacent the lower limit of its range of movement, and to be devoid of supporting relationship with said object at all upper relative longitudinal positions of said engaging member with respect to said supporting member, said supporting member and means being provided with interacting surfaces to cause said movement of said means into and out of vertically supporting relationship, and said object having two transverse surfaces so formed respectively that as said members are lowered with respect to said object, one of said surfaces first vertically abuts from below said engaging member and lifts said engaging member relative to said supporting member against the action of said spring and the other of said surfaces subsequently vertically abuts from below said supporting member, said surfaces on said object being so disposed and said members being so proportionately dimensioned and shaped that said object vertically abuts said supporting member only when said engaging member is adjacent and not at the upper limit of its range of longitudinal movement; and means for securing said engaging member against the action of said spring in an intermediate position of its range of movement.

6. In a device for pulling a standing valve having a stem projecting upwardly therefrom and a slot extending across the upper end of said stem, a puller including a body member having a longitudinal bore therein to telescopically receive the upper end of the stem, a slip carrier longitudinally slidable in said bore, a plurality of slips on said carrier movable therewith between an inwardly extending stem engaging position to a retracted non-enaging position, means for locking said slips in non-engaging position, means for releasing said locking means upon relative rotation between said puller and said valve comprising a pin on said carrier extending across said bore to be received in the slot in the top of said stem when said stem is inserted in said bore to non-rotatably intercouple said stem and carrier whereby subsequent rotation of said puller relative to said stem will rotatably shift said carrier in said bore.

7. In a device for pulling a standing valve having a stem projecting upwardly therefrom and a slot extending across the upper end of said stem, a puller having a longitudinal bore therein to telescopically receive the upper end of said stem, coupling means carried by said puller for securing said puller to said stem, restraining means normally restraining said coupling means from engaging said stem, releasing means for releasing said restraining means actuatable by insertion of said stem into said bore and subsequent rotation of said puller relative to said coupling means, and means for actuating said releasing means including a pin carried by said coupling means and extending across said bore for engaging the slot in the upper end of said stem to non-rotatably couple said coupling means to said stem and cause relative rotation between said puller and said coupling means when said puller is rotated.

8. The combination of a standing valve with a puller therefor, which combination comprises: a standing valve body having a stem projecting upwardly therefrom; a puller body having a bore therein for receiving said stem; a coupling means carried by said puller body and actuatable to secure said puller body to said stem in response to relative rotation between said puller body and said coupling means; and means for rotating said coupling means in said puller body in response to rotation of said puller body relative to said valve including a pin carried by said coupling means and extending across said bore, and a slot extending transversely across the upper end of said stem for receiving said pin to non-rotatably couple said coupling means to said valve.

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