

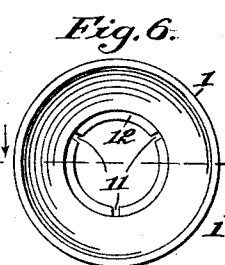
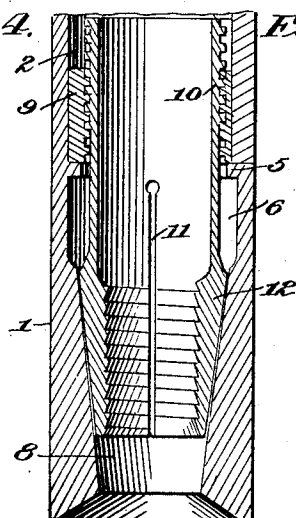
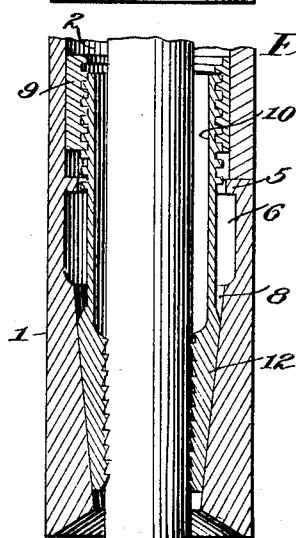
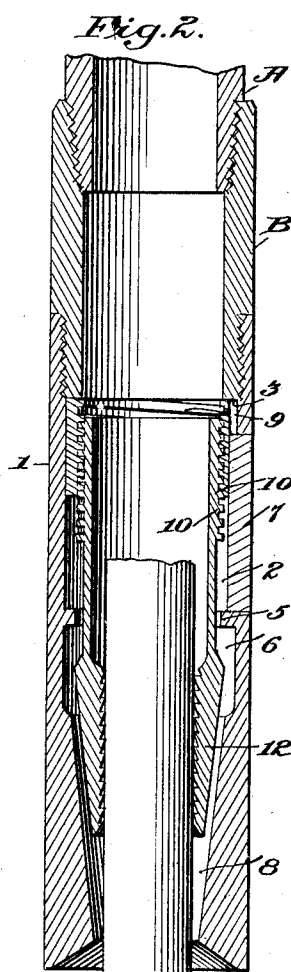
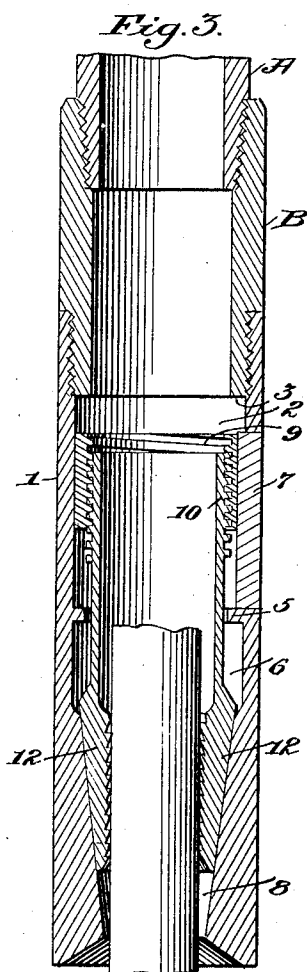
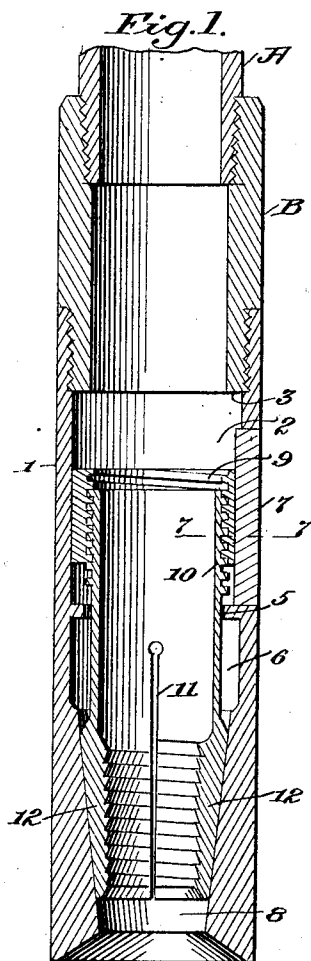
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J. L. CAMERON

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WELL FISHING TOOL

Filed Oct. 31, 1927



Inventor:
Jarrett L. Cameron,
by Richard E. Babcock
Att'y.

UNITED STATES PATENT OFFICE

JARRETT L. CAMERON, OF ORANGEFIELD, TEXAS, ASSIGNOR OF ONE-HALF TO
EVANGELINE IRON WORKS, LTD., OF VINTON, LOUISIANA, A CORPORATION OF
LOUISIANA

WELL FISHING TOOL

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This invention relates to fishing tools of the bowl type for use in recovering broken or disengaged drill pipe, casing, tubing, rods or tools from wells, more particularly oil and deep artesian or bored wells, and has in view particularly such a tool provided with means whereby it may be quickly and certainly released from such articles attempted to be recovered in case the latter cannot be pulled or recovered, and is designed particularly with a view to use with the usual rotary well drilling apparatus now in general use.

The primary objects are to provide a very simple, sturdy and positive acting bowl type fishing tool; to provide a very simple and powerful gripping element housed entirely in the interior of the tool and thereby protected; to provide such a gripping element in combination with means mounted thereon and having movement within the body of the tool longitudinally thereof over a limited path and adapted to be moved in positive engagement with said gripping element longitudinally or endwise thereof and to abut against a suitable stop provided in the body of said tool to hold said gripping element inoperative; to provide simple quickly operable means for adjusting the gripping element from operative to inoperative position manually and prevent accidental change of such adjustment; to provide in such a tool a construction whereby there are no obstructions preventing the passage of the article being recovered completely through the tool in an axial direction, or the slipping downward of the tool over the article being recovered to any desired point of the article being recovered; to provide in such a construction means preventing the upward movement of the gripping element with relation to the body of the tool, and vice versa, beyond a certain point, whereby the weight of the tool and the string of drilling tubing connected to the upper portion thereof will suffice to force said gripping element over and along the article to be gripped; and to otherwise improve and simplify the construction of such fishing tools, all as hereinafter more particularly set forth, described and claimed.

In the accompanying drawings, showing merely the preferred embodiment of my invention simply to illustrate the practice of my invention, as by law required:

Figure 1 represents a sectional view taken on line 1—1 of Fig. 6, looking in the direction of the arrow, of a tool embodying my invention, the parts being arranged in normal operative position as introduced into the well;

Figure 2, a view similar to Fig. 1 showing the tool in the first stage of recovery of a rod, the gripping element with its ring being forced upward into engagement with the stop 3 and receiving between its jaws the upper portion of the rod to be recovered;

Figure 3, a view similar to Fig. 2, the parts being in intermediate position in the initial stage of upward pull, the body 1 having been pulled longitudinally upward with relation to the gripping element until the jaws of the latter have come into initial contact with the downwardly converging open bottom bowl;

Figure 4, a view similar to Fig. 3, the parts being in final firm gripping arrangement, the relative longitudinally upward movement of the body 1 with relation to the gripping element having been completed and all parts of the tool, together with the rod being recovered moving together under the influence of the upward pull;

Figure 5, a view similar to Fig. 4, omitting the rod sought to be recovered, the gripping element having been moved to release its grip on the rod, and being held in such inoperative position, and the tool as a whole having been pulled up from, and free of, the rod;

Figure 6, a bottom end view of the finishing tool; and

Figure 7, a fragmentary detail sectional view on the line 7—7 of Fig. 1.

Referring now in detail to the drawings, A designates the externally screw-threaded lower end portion of a string of drilling pipe or tubing, which may be comprised of any desired number of sections of pipe or tubing as may be necessary, to which the fishing tool may be connected by means of an internally screw-threaded collar B having

its lower portion shouldered and of reduced diameter, the reduced diameter portion being preferably externally screw-threaded to cooperate with the upper end portion of the body 1 of the tool, said upper end portion of said body 1 being preferably internally screw-threaded to be engaged by the externally screw-threaded reduced portion of the collar B, and said parts being screwed together so that in normal assembled condition the upper end of body 1 is in engagement with the opposed face of the shoulder of the collar B.

The screw-threads above mentioned, and all other screw-threads connecting the successive sections of drilling pipe, not shown, where more than one section of pipe is employed, will be right hand threads, so that rotation of the string of drilling pipe to the right to release the article gripped may take place without risk of the disconnection of the string of pipe.

The internal threads in the upper portion of the body 1 are preferably flush, or substantially so, with the inner face of the upper portion of said body 1, and the reduced externally screw-threaded portion of collar B is of relatively heavy thick stock with its extreme lower end squared off so that in assembled relation said lower end of collar B will act as a shoulder or stop 3 extending abruptly at right angles to the adjacent inner face of the body 1.

From said internal screw-threaded portion the body 1 is formed with an internal working chamber or barrel 2, which may be of circular cross-section, extending down to a lower stop 5, and below said stop 5 is formed with an expansion chamber 6, and, below said chamber 6, with a wedging or compressing or bowl portion 8 which is of rigid fixed form continuous in a peripheral direction and of which the inner face will preferably be of inverted frusto-conical conformation as shown, though this is not essential so long as said bowl 8 has opposing inner face portions converging downwardly.

From the foregoing it is to be understood that the fishing tool, comprising the body 1 and collar B is tubular and open at both ends, the various chambers thereof all being in communication, and throughout its length its opposed portions of its interior are spaced at least as far apart as the diameter of its lower opening, which constitutes its mouth, the bottom of the body member 1 being frusto-conically countersunk concentric with said mouth to direct the articles being fished for into said mouth.

The working chamber or barrel 2, while preferably of general circular cross-section is preferably not truly circular, but is irregular so that any article of the proper size and of the same shape as a true cross-section taken through said chamber cannot have ro-

tary movement therein independent of said body 1, but on the contrary will engage some part of the surface defining said chamber 2 and will lock against the same to turn therewith. Such irregularity in cross-section may be obtained in anyone of a number of different ways with resulting different cross-sectional forms. As one economical and practical construction I have provided a rib 7 extending axially for most of the length of working barrel 2 and extending radially inward from the inner face or the wall of said chamber 2, which, except for said rib, is circular in cross section. It is of no importance whether this rib 7 be structurally integral with the body 1, and as a matter of fact I have found it more practical to make a slot in the wall of chamber 2, after first boring or otherwise forming the inner face of the wall defining said chamber 2 to true circular form in cross section, and to then insert the rib 7 as a separate piece or key in said slot so as to extend radially into said chamber 2 and to then secure said rib 7 in said slot, as by welding, or in any other suitable manner, so as to be held immovable with relation to said body 1 to be, operatively considered, integral therewith.

A large operating or release nut 9 of the same cross-sectional shape as, and of a size to make a nice working fit in, the barrel 2 is arranged therein. It follows from the foregoing that said nut 9, in the present embodiment, is externally slotted parallel to its axis to receive and slide longitudinally of the rib 7 and to engage with the same to prevent independent rotary movement between said body 1 and nut 9, though permitting a limited amount of relative longitudinal movement between said parts limited by the stops 3 and 5. Said nut 9 is formed with a right-hand internal screw-thread as shown to receive the cooperating external screw-thread on the upper ring portion 10 of the gripping element which depends therefrom.

The lower portion of said gripping element is formed with an externally downwardly converging wedging face, conforming to the opposed face of the bowl 8, and being of inverted frusto-conical form in the embodiment illustrated, and is preferably of appreciably greater thickness than the rest of said gripping element.

Said gripping element is preferably a single integral piece, tubular in form, and is slotted as at 11 from its lower end through the thickened portion and for the greater portion of the length of said element, there being preferably three such slots, as shown, or more, to form a plurality of segments or gripping jaws 12 depending by integral spring or resilient portions from the ring portion 10 integral therewith, and normally held, by said spring or resilient portions, spaced from each

other so that the walls of said slots 11 are parallel.

The inner faces of said jaws 12 will preferably be serrated and approximately vertical, as shown, or they may be otherwise formed to afford a positive grip for biting into the rod or other article to be recovered. The diameter of the opening defined by said jaws 12 prior to compression by the bowl 8 will be less than the diameter of the mouth in the bottom of the tool, and less than the internal diameter of the gripping element at any other point and less than the internal diameter of any chamber of the body 1 and of the collar B and string of drilling pipe A. Further, all portions of said gripping element below the screw-threaded portion of the ring portion 10 and including the jaws 12 will be of such external diameter as to permit the easy withdrawal of the gripping element completely from the body 1 after the collar B and body 1 shall have been separated by unscrewing.

In operation, the parts are first adjusted approximately as illustrated in Figure 1, the operating or release nut 9 extending slightly above the upper end of the ring portion 10 of the gripping element, so that said nut 9 and the gripping element may move freely in either longitudinal direction in the body 1, the contact, as the tool is lowered, with the rod or article being recovered, holding said gripping element, with the release nut 9, raised until the shoulder 3 drops down on the upper end of nut 9, see Fig. 2, forcing the gripping element down along the rod being recovered, the jaws 12 slightly spreading to admit the said rod. Then the upward pull is begun, pulling the body upward with relation to the gripping element, which is held by its frictional grip with the said rod, until the outer faces of the jaws 12 are engaged by the opposed face portions of the bowl 8, as illustrated in Figure 3, when continued upward pull moves the body 1 longitudinally upward with relation to the jaws 12 in contact with said bowl 8 and thus by wedging action forces said jaws 12 radially toward each other, causing them to bite into the said rod until the adjacent edges of the jaws 12 are in contact, or until relative longitudinal movement between the body 1 and the gripping element ceases, the extent of such movement depending in large part on the weight of the said rod or other article being recovered and the pull necessary to free it if caught.

Assuming that said rod is gripped as above, but is hitched in the well and cannot be pulled, so that it is desired to release the grip and remove the fishing tool, the string of drilling pipe A, collar B and the body 1 are first slackened off so that the parts assume approximately the relation shown in Figure 2, and then rotated to the right, causing the nut 9 to ride down over the ring portion 10 of the

gripping element until said nut 9 engages the upper face of stop 5, so holding the gripping element in raised inoperative position with the outer faces of the jaws 12 held well out of contact with the inner face of the bowl 8, as illustrated in Fig. 5, so that the grip on the said rod is released and the gripping element rendered inoperative to grip again until withdrawn from the well and by hand rearranged to approximately the relations illustrated in Figure 1.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A fishing tool comprising a tubular body formed with a working barrel and a downwardly converging open bottom bowl in its lower portion below said working barrel, said barrel and bowl being in communication, in combination with an internally screw-threaded release nut mounted in said working barrel to turn with said body and adapted to have movement in said working barrel longitudinally thereof, a gripping element comprising an externally screw-threaded upper ring portion in cooperative engagement with said nut, and a plurality of jaws, each said jaw depending from said ring portion and having a downwardly inwardly tapering outer face, whereby said jaws in moving downwardly into contact with the inner face of said bowl are forced radially inward toward each other with a wedging action to grip an article between their inner jaws, and a stop, said nut in rotating in one direction with said body being adapted to move down over said gripping element into contact with said stop to hold said jaws out of contact with said bowl.

2. A fishing tool comprising a tubular body formed with a working barrel and a downwardly converging open bottom bowl in its lower portion below said working barrel, said barrel and bowl being in communication, in combination with an internally screw-threaded release nut mounted in said barrel to turn with said body and adapted to have movement in said working barrel longitudinally thereof, means limiting the longitudinal movement of said nut away from said bowl, a stop limiting such movement of said nut toward said bowl, and a gripping element comprising an externally screw-threaded ring portion in cooperative engagement with said nut, and a plurality of jaws depending from said ring portion, each said jaw having a downwardly tapering outer face adapted to move downward and simultaneously radially inward in contact with the opposing portion of the inner face of said bowl, said nut in rotating in one direction with said body being adapted to move down over said gripping element into contact with said stop to hold said jaws in inoperative position.

3. A fishing tool comprising a tubular body

formed with a working barrel and a downwardly converging open bottom bowl in its lower end portion below said barrel, said barrel and bowl being in communication, in combination with an internally screw-threaded release nut corresponding in shape to the cross-sectional shape of said working barrel and being noncircular in cross-section mounted in said barrel for limited axial movement therein longitudinally thereof, a stop, and a gripping element comprising an externally screw-threaded upper ring portion in cooperative engagement with said nut, and a plurality of jaws integral with and depending from said ring portion, each said jaw having an inner gripping face and a downwardly inwardly tapering outer face adapted to cooperate with the opposed portion of the inner face of said bowl, said nut in rotating in one direction with said body moving endwise of the gripping element into contact with said stop to prevent movement of said gripping element with relation to said body toward said bowl.

4. A fishing tool comprising a tubular body, and a stop extending radially inward from the inner face of said body and operatively immovable with relation thereto, said body being formed with a working barrel above said stop and a downwardly converging open bottom bowl below said stop, in combination with an internally screw-threaded release nut mounted in said barrel to turn with said body and to have limited longitudinal movement in said working barrel, and a gripping element comprising an externally screw-threaded ring portion in cooperative engagement with said nut and a plurality of jaws integral with said ring portion, each said jaw having an inner gripping face and a downwardly inwardly tapering outer face adapted to slidably engage the inner face of said bowl, said nut in rotating in one direction with said body being adapted to move endwise of the gripping element down into engagement with said stop while said jaws are out of contact with the opposed face of said bowl and to hold said jaws in such operative position.

5. A fishing tool comprising a tubular body open at both ends, and a stop provided in said body extending radially inward from the inner face thereof and operatively immovable with relation thereto, said body being formed with a working barrel above said stop, an expansion chamber next below said stop, and a downwardly converging open bottom bowl below said expansion chamber, in combination with an internally screw-threaded release nut mounted in said working barrel to have limited longitudinal movement therein and to turn with said body, and a gripping element comprising an externally screw-threaded ring portion in cooperative engagement with said nut, a plurality of re-

silient segments depending from said ring portion, and a plurality of jaws respectively depending from the respective resilient segments, each said jaw having a serrated inner gripping face and a downwardly inwardly tapering outer face corresponding in form to the opposed portion of the inner face of the bowl portion of the body and cooperating therewith, said nut being adapted to be moved endwise of said gripping element down into contact with said stop while said jaws are out of engagement with the inner face of said bowl.

6. A fishing tool comprising a tubular body open at both ends, an upper stop, a lower stop provided in said body, and a rib extending axially of said body and projecting radially inward from the inner face thereof between said stops, said body being formed with a working barrel between said stops, an expansion chamber next below said lower stop, and a downwardly converging open bottom bowl below said expansion chamber, in combination with an internally screw-threaded externally slotted nut mounted in said working barrel for limited longitudinal movement therein between said stops and receiving in its external slot said rib to be held thereby against rotation independent of said body, and a gripping element comprising an externally screw-threaded upper ring portion in cooperative engagement with said nut, a plurality of resilient segments depending from said ring portion, and a plurality of jaws respectively depending from the respective resilient segments, each said jaw having a serrated inner gripping face and a downwardly inwardly tapering outer face to cooperate with the opposing portion of the inner face of said bowl, said nut being adapted to be moved endwise of the gripping element into contact with said lower stop while said jaws are out of contact with the inner face of said bowl.

7. A fishing tool comprising a collar having its lower portion externally screw-threaded, a tubular body having its upper portion internally screw-threaded and receiving said lower portion of the collar, the lower face of which is of substantial thickness and extends substantially perpendicularly to the adjacent portion of the inner face of said body member, a lower stop provided in said body member and extending radially inward from the inner face thereof and operatively immovable with relation thereto, and a rib operatively immovable with relation to said body and extending axially thereof and projecting radially inward from the inner face thereof between said stops, said body being formed with a working barrel between said stops, an expansion chamber next below said lower stop, and a downwardly converging inverted frustro-conical open bottom bowl below said expansion chamber, in combination with an

internally screw-threaded externally longitudinally slotted nut mounted in said working barrel to have limited longitudinal movement therein between said stops and receiving in its external slot said rib to be held thereby against rotation independent of said body, and a gripping element comprising an externally screw-threaded upper ring portion in cooperative engagement with said nut, a plurality of resilient portions depending from said ring portion, and a plurality of jaws respectively carried by said resilient portions, each said jaw having a serrated substantially vertical inner gripping face and a downwardly inwardly tapering outer face corresponding in form to the opposed portion of the inner face of the bowl portion of said body and cooperating therewith, whereby said jaws in moving downward in contact with said bowl are forced radially inward toward each other with a wedging action to grip an article between their inner faces, said nut being adapted to be turned with said body about said gripping element to move downward of the latter into contact with the lower stop with the said jaws out of engagement with said bowl and to hold said gripping element in such inoperative position.

8. A fishing tool comprising a tubular body open at both ends, a stop immovable with relation to, and projecting from, the inner face of said body, and a nut mounted in said body to turn therewith and to have a limited longitudinal movement above said stop, the said body having a downwardly converging open bottom bowl below said stop, in combination with a tubular gripping element having an engaging in said nut and comprising downwardly depending jaws connected thereto, each said jaw having an inner gripping face and an outer downwardly inwardly tapering face cooperating with the opposed portions of the inner face of said bowl, the said nut being adapted to move downward on said gripping element when the jaws of the latter are out of contact with said bowl and to engage said stop to hold said element in such inoperative position, and the said body, nut and gripping element being of such construction as to provide a straight unobstructed passage through the tool of a transverse area at all points at least as large as the transverse area between said jaws while out of contact with said bowl.

In testimony whereof, I have signed my name to this specification at Orangefield, Texas, this 26 day of October, 1927.

JARRETT L. CAMERON.