

Dec. 20, 1927.

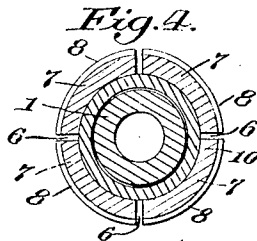
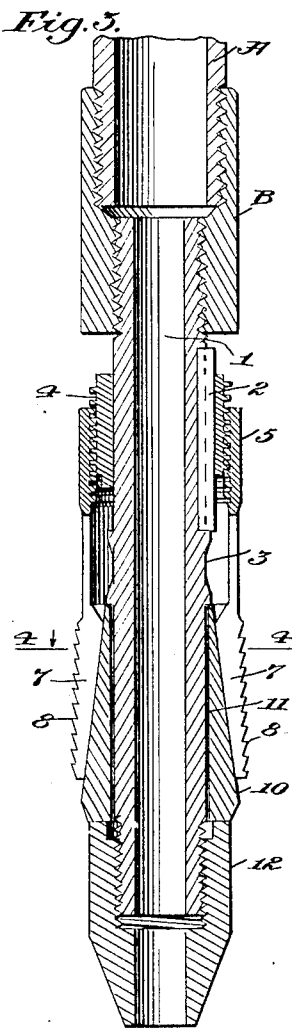
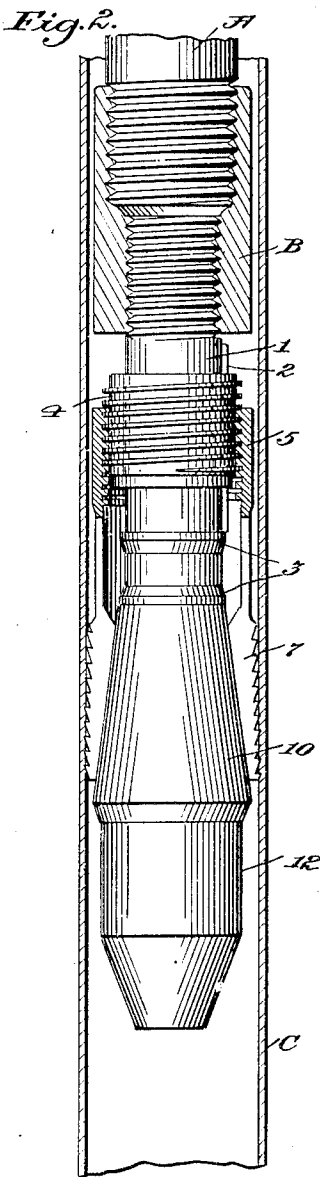
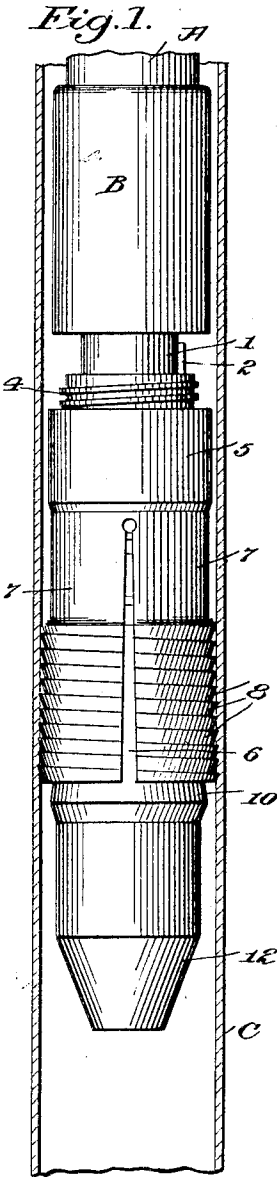
1,653,547

J. L. CAMERON

SPEAR FOR OIL WELL CASINGS OR TUBING

Filed May 10, 1927

2 Sheets-Sheet 1



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

Dec. 20, 1927.

1,653,547

J. L. CAMERON

SPEAR FOR OIL WELL CASINGS OR TUBING

Filed May 10, 1927

2 Sheets-Sheet 2

Fig. 5.

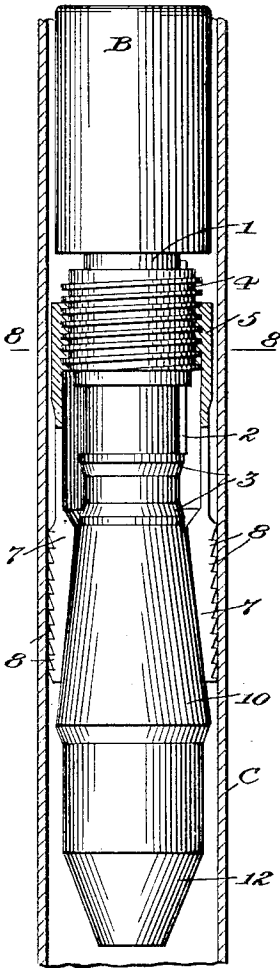


Fig. 6.

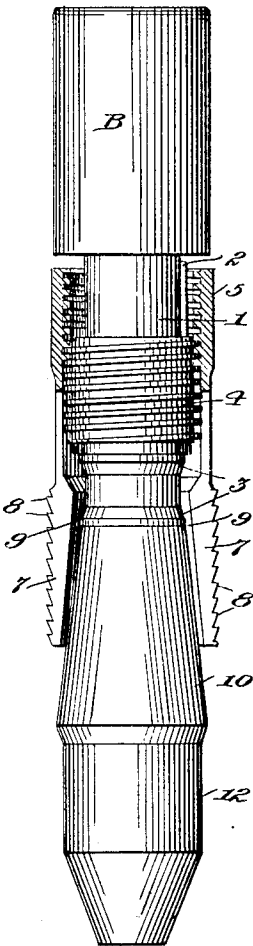


Fig. 7.

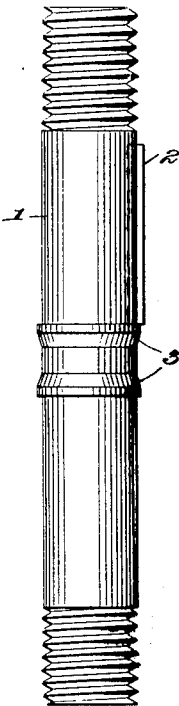
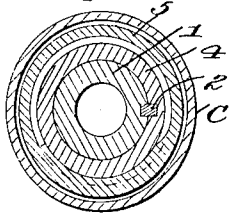


Fig. 8.



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.

SPEAR FOR OIL-WELL CASINGS OR TUBING.

Application filed May 10, 1927. Serial No. 190,256.

This invention relates to a spear for use in recovering disengaged casings or tubing from oil and other deep wells, and has in view particularly such a spear provided with means for certainly disengaging it from such casing or tubing in case the latter cannot be pulled or recovered, and is designed 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 positively acting releasable spear; to decrease friction and facilitate the ease of the releasing operation; to provide a mandrel below the gripping means and adapted to be drawn up into the same by lifting the drill pipe or piping in the usual way, said mandrel being freely rotatable and substantially stationary in an axial direction with relation to the other parts of the spear and permitting the independent rotation of the part on which it is mounted; to provide a very simple combination of parts permitting free axial or slip movement of the gripping elements with relation to the mandrel and providing for the positive reverse movement of the solid slip-ring and depending gripping segments, all of which objects, among others, are accomplished by the construction, combination and arrangement of parts all as hereinafter more particularly set forth and described.

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

Figure 1 represents a side elevation of a device embodying my invention as introduced into, and gripping, a well casing or tubing, which is shown in section;

Figure 2, a view similar to Fig. 1, the solid ring-slip gripping member, and the coupling to the drill piping being shown in section;

Figure 3, a view in longitudinal cross-section of the spear as coupled to the drill pipe, and omitting the tubing or casing to be pulled;

Figure 4, a section on line 4—4 of Fig. 3;

Figure 5, a view, similar to Fig. 2, of the spear as introduced into the tubing or casing and as lowered therein prior to any gripping action;

Figure 6, a view, similar to Fig. 5, of the spear by itself, the ring-slip gripping element being shown as positively raised and

held away from the mandrel positively preventing any gripping action;

Figure 7, a side elevation of the hollow stem or shaft on which the other elements of the combination are mounted; and

Figure 8, a section on line 8—8 of Fig. 5.

Referring now in detail to the drawings, A designates the externally screw-threaded lower end portion of a string or drilling pipe to which the fishing spear may be connected by means of an internally screw-threaded collar B having a reduced internally screw-threaded bore in its lower portion to receive the externally screw-threaded upper end portion of the tubular stem or shaft 1 of the fishing spear, said stem or shaft 1 being hollow or tubular to permit the circulation of fluid.

Said shaft 1 is provided with upper and lower stops 3, which stops may be integral with said stem, though this is not essential, and which may be of any form suitable to the purpose, including the annular collar form illustrated, and which may be formed as a single broad stop band with upwardly and downwardly presented stop shoulders or faces, or as to flanges as illustrated.

A rib 2 extending radially beyond the cylindrical outer face of the shaft 1 to turn therewith, and which may be a separate part or key embedded therein and extending longitudinally of the upper portion of said shaft 1 may be provided for cooperation with a releasing nut 4 having a large smooth inner bore slotted to receive said rib 2 to be thereby feathered to the shaft 1, or of other irregular internal contour to cooperate with said shaft 1 to turn therewith, is slipped over the upper end of said shaft 1 and is freely slidable axially thereof but locked, as explained, against independent rotation, and is limited in its axial movement toward the lower end of the shaft 1 by the upper stop 3.

This nut 4 is formed with a large coarse external right-hand screw-thread for its entire length, as shown, to engage in the corresponding internal screw-thread in the upper portion of the solid slip-ring 5, which has a depending resilient skirt longitudinally slotted at regular intervals by downwardly flaring slots 6 extending through its lower edge, there being four such slots in the embodiment illustrated, to form a plurality of resilient segments 7 integral with said solid

slip-ring 5, there being four such segments in the embodiment illustrated, and the integral construction of said slip-ring and segments is preferred, though this is not essential.

The lower portion of said skirt prior to the slotting operation has a cylindrical outer face which is serrated to form the gripping teeth 8, and a downwardly flaring inner conical face to provide the upwardly radially inwardly inclined wedging faces 9 of the segments 7 to be engaged by the opposing face of the conical spreading mandrel 10, which has a large smooth central bore 11 of appreciably greater diameter than the external diameter of the shaft 1 and which is applied in an axial direction over the lower end of shaft 1 and moved axially thereof until the upper end of said mandrel 10 is adjacent to the lower face of the lower stop 3. An internally screw-threaded guide or pilot nut 12, which is longitudinally central bored to permit the circulation of fluid between the casing C to be pulled and the shaft 1, is then applied to the externally screw-threaded lower end portion of the shaft 1 to hold the mandrel 10 against axial displacement or separation from the shaft 1 while permitting free rotation of said mandrel 10 on said shaft 1, or the free rotation of said shaft 1 in said mandrel 10, so that in case the tubing or casing C cannot be pulled, so that it becomes necessary to release the grip of the spear, the rotary movement necessary will not be opposed by opposed surfaces held in tight locking frictional engagement over a large area.

To insert the spear in a casing C, the parts are adjusted approximately as illustrated in Fig. 5, the release nut 4 extending slightly above the solid slip-ring 5, so that said release nut 4, slip-ring 5, and its depending segments 7 may move freely on the shaft 1 in either axial direction, the contact with the casing C as the spear is lowered therein holding said parts raised, as shown in Fig. 5. When the spear has been lowered to the desired point to grip, the drill piping A, with the attached spear, is gently raised, the weight of the releasing nut 4, slip-ring 5 and integral segments 7, plus the frictional contact with the inside of the casing or tubing C serving to hold said parts relatively stationary while the mandrel 10 is drawn upward, spreading the segments 7 as it is drawn upward and forcing the teeth 8 of said segments radially outward into the tubing or casing C, and when this is accomplished the hoist will be operated as usual to raise pull or recover such casing or tubing C.

If, for any reason, the casing or tubing C is caught or tightly held and cannot be pulled, it is of importance to be able to let go and so avoid loss of the drilling piping

and fishing spear. To do this, the hoist line will be eased off slightly so as to exert the weight of the string of drilling pipe on the spear, tending to force it down in the tubing or casing C, and the string or drilling piping A, with shaft 1, release nut 4 and stops 3, and pilot or guide nut 12 will all be rotated together to the right, causing the nut 4, by reason of its engagement in the now stationary slip-ring 5, to move axially of the shaft 1 toward the lower end thereof until it abuts against upper stop 3, when further movement of the nut in that axial direction will be thereby prevented, so that continued rotation to the right causes the slip-ring 5 to ride up on the nut 4, that is, move in the reverse axial direction upward away from the mandrel 10, as indicated to an exaggerated degree in Fig. 6, until the segments 7 have sprung back to normal unexpanded or contracted position, being held positively in this relation and so preventing further gripping of the tubing or casing C and permitting the unimpeded withdrawal of the string or drill piping A and the fishing spear.

During such right hand rotation of the drill piping A and shaft 1 and parts turning therewith, with the hoist line slightly eased off as mentioned, the mandrel will not need to turn with relation to the segments 7, as explained, so that there will be no excessive friction or frictional grip to overcome or break. Further, throughout such release operation, the weight of the string of drill piping A will be exerted through lower stop 3 upon the upper end of the mandrel 10, tending to force it down out of wedging position between said segments 7, and the only frictional contact will be between the upper end of said mandrel 10 and the opposed face of the lower collar or stop 3, which prevents upward axial movement of the mandrel with relation to the shaft 1, so preventing said mandrel from being moved axially upward with said segments 7 due to the frictional grip of the latter, as spread, on said mandrel, the combination resulting in positively holding the mandrel against upward axial movement while positively moving said segments 7 in an axial direction upward away from said mandrel.

All couplings or screw-thread connections throughout are right-hand screw-threads so that rotation to the right serves to tighten up all couplings and avoids all risk of unscrewing at any point of connection.

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

1. A spear comprising a shaft provided with a stop, and a gripping element having an internally screw-threaded solid ring portion and formed with gripping means depending therefrom, in combination with an externally screw-threaded actuating nut slid-

ably mounted on said shaft to turn therewith and engaging with its thread in the corresponding thread in said ring portion and adapted to rest upon said stop and by rotation with said shaft to cause said ring and gripping elements to move axially upward with relation to said stop.

2. A spear comprising a shaft provided with a stop, and an internally screw-threaded ring portion formed with gripping means integral therewith and depending therefrom, in combination with an externally screw-threaded actuating nut slidably mounted on said shaft to turn therewith and engaging with its thread in the corresponding thread in said ring portion and adapted to rest upon said stop and by rotation to cause said ring and gripping means to move axially upward with relation to said stop and shaft.

3. A spear comprising a shaft provided with a stop, and an internally screw-threaded ring formed with integral gripping means depending therefrom, in combination with an externally screw-threaded actuating nut feathered to said shaft to turn therewith and slidable thereon and engaging with its thread in the corresponding thread in said ring and adapted to rest upon said stop and by rotation to cause said ring and gripping means to move axially with relation to said stop and shaft.

4. A spear comprising a hollow shaft provided with an external stop, and an internally screw-threaded ring formed with integral depending gripping means, in combination with an externally screw-threaded actuating nut feathered to said shaft to turn therewith and slidable thereon and engaging with its thread in the corresponding thread

in said ring and adapted to rest upon said stop and by rotation to cause said ring and gripping means to move axially with relation to said shaft.

5. A spear comprising a shaft provided with an annular stop shoulder, in combination with an upwardly presented conical mandrel loosely mounted on said shaft in such manner as to permit relative rotary movement between said shaft and mandrel, and a retaining element applied to said shaft below said mandrel to retain said mandrel thereon, said stop and retaining element limiting movement of said mandrel axially of said shaft.

6. A spear comprising a shaft, an externally screw-threaded nut slidably mounted on said shaft to turn therewith, an internally screw-threaded ring engaged internally by said nut and formed with depending gripping segments, and means for limiting the downward movement of said nut axially of said shaft, in combination with an upwardly presented conical mandrel mounted on said shaft to permit relative rotary movement freely between said shaft and mandrel and adapted to be engaged by the cooperating inner faces of said segments and to spread said segments radially as said shaft and mandrel are moved axially upward with relation to said nut, ring and segments, and means carried by said shaft for limiting the axially upward movement of said mandrel with relation to said shaft.

In testimony whereof, I have signed my name to this specification at Orangefield, Texas, this 6th day of May, 1927.

JARRETT L. CAMERON.