Jan. 13, 1931. W. J. MILLER 1,789,247

RELEASE SPEAR

Filed May 13, 1930

Fig. 1.

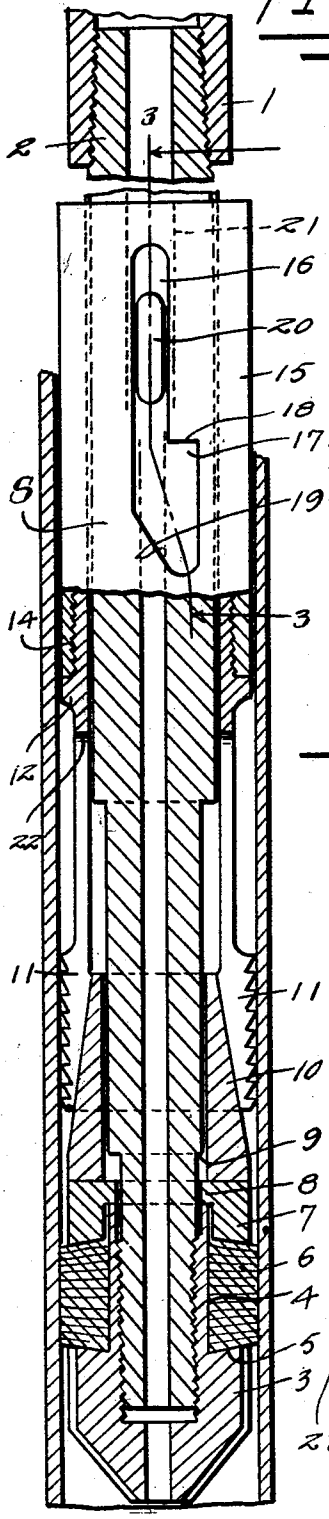


Fig. 2.

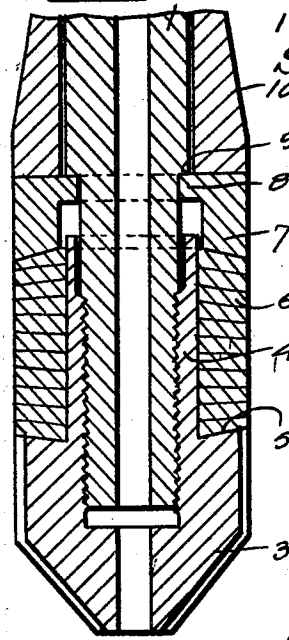


Fig. 3.

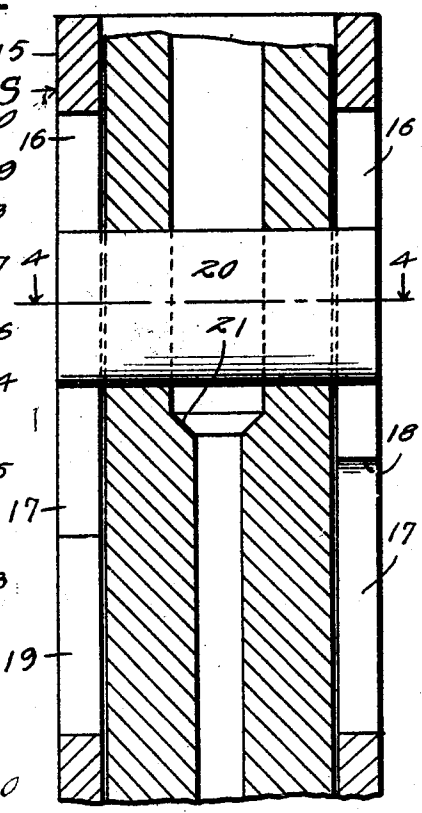


Fig. 5.

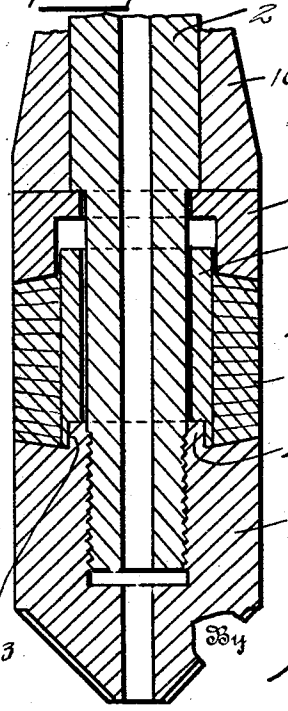
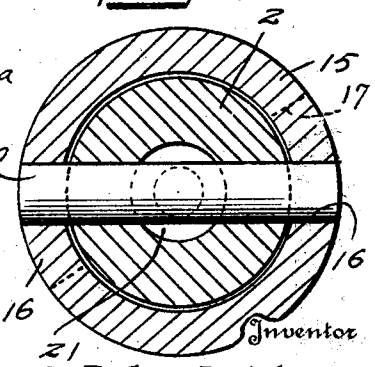


Fig. 4.



Inventor

W. J. Miller

By Watson E. Coleman

Attorney

Patented Jan. 13, 1931 1,789,247

UNITED STATES PATENT OFFICE

WILLIAM J. MILLER, OF SULPHUR, LOUISIANA

RELEASE SPEAR

Application filed May 13, 1930. Serial No. 452,095.

This invention relates to a release spear and it is an object of the invention to provide a device of this kind constructed in a manner whereby a packer may be readily applied and wherein the structure is such to assure sufficient tension against the packer to hold the same firm.

It is also an object of the invention to provide a spear of this kind with a packer associated therewith, the assembly being such to cause the packer to expand under pulling strain on the spear to add an upward kick to the fish and wherein the packer, upon lowering of the spear, goes back to normal to allow free circulation between the spear and pipe to speed up the pump.

An additional object of the invention is to provide a spear of this kind which will pull the fish with the pump pressure.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved automatic release spear whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a view partly in section and partly in elevation illustrating a spear constructed in accordance with an embodiment of my invention, the associated casing being fragmentarily shown in section and the shank under pulling strain;

Figure 2 is a fragmentary sectional view of the lower portion of the spear with the parts in normal position;

Figure 3 is an enlarged sectional view taken substantially on the line 3—3 of Figure 1;

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 3;

Figure 5 is a sectional view similar to Figure 2 but illustrating a further embodiment of my invention.

As disclosed in the accompanying drawings, 1 denotes the lower portion of a drill stem which has threaded therein the upper portion of an elongated tubular shank 2. Threaded or otherwise engaged with the lower portion of the shank 2 is a tool 3, herein disclosed, as constituting a guide member or reamer. The upper or inner portion of the guide member or reamer 3 has its wall materially reduced from without in diameter, as at 4, the bottom annular wall or shoulder 5 resulting from such reduced portion being inwardly and downwardly inclined.

Surrounding the portion 4 of the guide member or reamer 3 is a packer 6 having its lower edge face beveled to have snug or close contact with the beveled or inclined shoulder 5, while the opposite end face of the packer 6 is beveled for close contact with the beveled edge face of the ring member 7 surrounding the portion 4. The upper or inner end of this ring member 7 is defined by an inwardly disposed flange 8 overlying the inner or upper end of the applied guide member or reamer 3. Normally the packer 6 is fully expanded with its outer or peripheral face substantially flush with the outer face of the guide member or reamer 3 and with the flange 8 of the ring member 7 spaced upwardly from the guide member or reamer 3 and preferably in contact with the shoulder 9 disposed circumferentially around the shank 2 and which shoulder is, in the present embodiment of my invention, obtained by reducing the lower end portion of said shank 2 for a desired distance lengthwise thereof.

Surrounding the shank 2 above the ring member 7 and having contact with said member 7 from above is a tapered mandrel 10. The mandrel 10 is freely mounted on the shank 2 and said mandrel coacts from within with the elongated gripping arms 11 carried by the lower section 12 of a slip sleeve S. This lower section 12 is in threaded engagement, as at 14, with the upper section 15 of the sleeve S. By providing the separate sections 12 and 15 the lower sec-

tion 12 together with the gripping arms 11 can be readily replaced when desired.

The section 12 can be readily removed after taking off the guide member or reamer 3, the packer 6, the ring member 7 and the mandrel 10. Upon removal of the guide member or reamer 3 the packer 6 may be replaced as required.

At this time it is to be stated that the packer 6 preferably constitutes fabric reinforced rubber although other suitable material may be employed which will assure the requisite outward expansion of the packer under the lifting pull or strain imposed upon the guide member or reamer 3.

The upper section 15 of the sleeve S at diametrically opposed points is provided with the elongated slots 16, the lower portion of each of which being transversely enlarged, as at 17, to provide an upper shoulder 18 substantially straight from end to end. The lower edge wall of the enlarged portion 17 of the slot remote from the shoulder 18 is disposed downwardly on an incline, as at 19, toward the opposed edge wall. Tightly engaged with the shank 2 is a key 20 of desired dimensions and of a length to project beyond opposite sides of the shank with each extended end portion being received within a slot 16 and its enlarged portion 17. The bore of the shank 2 adjacent to the key 20 is enlarged, as at 21, to allow water passage around the applied key 20.

The inclined edge walls 19 are for the purpose of automatically placing each extended portion of the key 20 directly under a shoulder 18 when the shank 2 is lowered to permit the annular shoulder 22 of the shank 2 to contact with the upper end of the mandrel to jar said mandrel from the gripping arms 11.

This shoulder 22 surrounds the shank 2 at a desired point thereon below the key 20. This shoulder 22 is also provided by reducing in diameter the shoulder 2.

With the spear under pulling strain the packer 6 expands against the inner wall of the pipe P and the ring member 7 moves downwardly until the internal flange 8 thereof contacts with the upper or inner end of the guide member or reamer 3. With the packer 6 so expanded the pump can be used for circulation around the fish and thus help lift the fish with hydraulic pressure. By lowering the spear the packer 6 will return to normal and allow free circulation between the spear and pipe or fish P so as to speed up the pump. While pump is running fast and spear pulled quickly in the pulling strain, the sudden packing off will add an upward kick to the fish.

In the embodiment of my invention as illustrated in Figure 5, the guide member or reamer 3′ has its reduced portion 4′ extremely short and with the outer end portion of which is adapted to be engaged a sleeve 4*a*. The lower end portion of this sleeve 4*a* is provided with an internal rabbet 23 which snugly receives the reduced portion 4′, the interfitting of the sleeve 4*a* and portion 4′ being preferably a driven pin. The packer 6′ surrounds the sleeve 4*a* which is relatively long, one end face of the packer having snug or close contact with the shoulder 5′ of the member or reamer 3′ while the opposite end face of the packer 6′ has engaged therewith the ring member 7′ in the same manner and fashion as previously described with respect to the packer 6.

From the foregoing description it is thought to be obvious that an automatic release spear constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. A release spear of the class described comprising an elongated shank, a member engaged with the inserting end portion of the shank, the wall of said member being reduced from without providing a lower shoulder, an expansible packing surrounding said reduced portion of the member, a ring member surrounding said reduced portion of the first named member above the packing, a mandrel freely mounted upon the shank for coaction with the ring member, means for limiting the movement of the ring member in a direction away from the first named member, and a slip sleeve surrounding the shank and having expansible pipe engaging means, the mandrel coacting with said expansible pipe engaging means.

2. A release spear of the class described comprising an elongated shank, a member engaged with the inserting end portion of the shank, the wall of said member being reduced from without providing a lower shoudler, an expansible packing surrounding said reduced portion of the member, a ring member surrounding said reduced portion of the first named member above the packing, a mandrel freely mounted upon the shank for coaction with the ring member, means for limiting the movement of the ring member in a direction away from the first named member, and a slip sleeve surrounding the shank and having expansible pipe engaging means, the mandrel coacting with said expansible pipe engaging means, said ring member having an inwardly disposed flange for coaction with

the adjacent end of the first named member for limiting the movement of the ring member toward said first named member.

3. A release spear of the class described comprising an elongated shank, a member engaged with the inserting end portion of the shank, the wall of said member being reduced from without providing a lower shoulder, an expansible packing surrounding said reduced portion of the member, a ring member surrounding said reduced portion of the first named member above the packing, a mandrel mounted upon the shank for coaction with the ring member, means for limiting the movement of the ring member in a direction away from the first named member, and a slip sleeve surrounding the shank and having expansible pipe engaging means, the mandrel coacting with said expansible pipe engaging means, the shoulder of the first named member being inwardly and downwardly inclined, the adjacent end of the packing having close contact at all times with such shoulder.

4. A release spear of the class described comprising an elongated shank, a member engaged with the inserting end portion of the shank, the wall of said member being reduced from without providing a lower shoulder, an expansible packing surrounding said reduced portion of the member, a ring member surrounding said reduced portion of the first named member above the packing, a mandrel freely mounted upon the shank for coaction with the ring member, said shank being provided therearound with a shoulder for contact by the ring member for limiting the movement of the ring member away from the first named member.

5. A release spear of the class described comprising an elongated shank, a member engaged with the inserting end portion of the shank, the wall of said member being reduced from without providing a lower shoulder, a sleeve having one end portion engaged with said reduced portion of the member, an expansible packer surrounding the sleeve, a ring member surrounding the sleeve above the packer, a mandrel freely mounted upon the shank for coaction with the ring member, means for limiting the movement of the ring member in a direction away from the first named member, and a slip sleeve surrounding the shank and having expansible pipe engaging means, the mandrel coacting with said expansible pipe engaging means.

6. A release spear of the class described comprising an elongated shank, a member engaged with the inserting end portion of the shank, the wall of said member being reduced from without providing a lower shoulder, a sleeve having one end portion engaged with said reduced portion of the member, an expansible packer surrounding the sleeve, a ring member surrounding the sleeve above the packer, a mandrel mounted upon the shank for coaction with the ring member, means for limiting the movement of the ring member in a direction away from the first named member, and a slip sleeve surrounding the shank and having expansible pipe engaging means, the mandrel coacting with said expansible pipe engaging means, an end portion of the sleeve having a rabbet tightly receiving the reduced portion of the member.

7. A release spear comprising an elongated shank, expansible pipe engaging means carried by the shank, an actuating member for expanding such means upon pull on the shank, and an expansible packing mounted upon the shank below the actuating member, said actuating member upon pull of the shank expanding the packing.

In testimony whereof I hereunto affix my signature.

WILLIAM J. MILLER.