May 19, 1931. G. A. LOWREY ET AL 1,805,828

SPEAR

Filed July 19, 1927

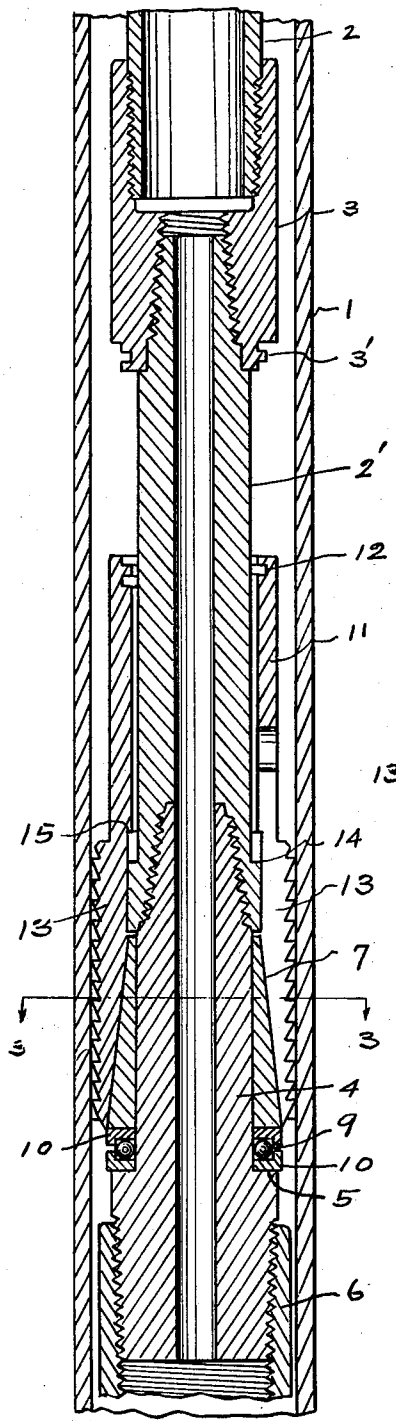


Fig. 1

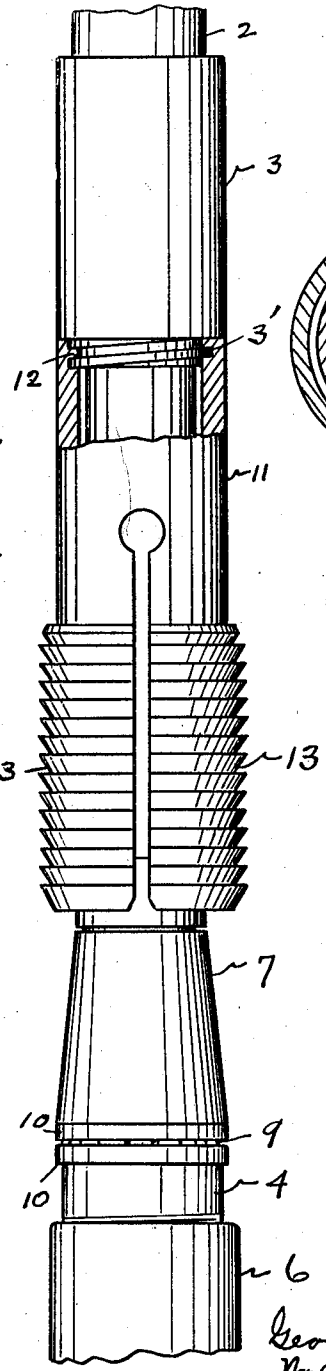


Fig. 2.

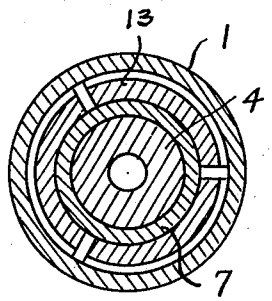


Fig. 3.

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UNITED STATES PATENT OFFICE

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SPEAR

Application filed July 19, 1927. Serial No. 206,974.

This invention relates to new and useful improvements in a spear.

One object of the invention is to provide a device, of the character described specially designed for the purpose of engaging a pipe, stuck in a well bore, and through which the stuck pipe may be withdrawn from the bore; and the invention also embodies means for releasing the spear from the pipe to permit the withdrawal of the spear in case the pipe cannot be dislodged.

Another object of the invention resides in the provision of a spear of the character described which also embodies means through which a pipe cutter may be operated to the end that the stuck pipe may be cut into sections and then withdrawn by the spear, a section at a time.

A further feature of the invention resides in the provision of a device of the character described through which an upward pull may be exerted on the stuck pipe while the cutter is being operated, thus facilitating the cutting operation.

With the above and other objects in view this invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 shows a vertical sectional view of the spear.

Figure 2 shows a side view thereof, partly in section, and

Figure 3 shows a cross sectional view taken on the line 3—3 of Figure 1.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures the numeral 1 designates the pipe or casing to be pulled.

The numeral 2 designates a tubular operating stem, incorporated into which there is a coupling 3, the lower of which is reduced and outwardly threaded, as at 3′, the section 2′ of said stem beneath said coupling being connected to the coupling and being somewhat reduced. Forming a part of the stem and threaded into the lower end of the stem section 2′ there is a depending tubular nipple 4 whose lower end is enlarged, forming the annular external shoulder 5, and said enlarged end is externally threaded so that the upper end of a conventional pipe cutter, designated generally by the numeral 6, may be connected thereto. Around the nipple 4, above the enlarged lower end thereof, there is a sleeve like mandrel 7 whose external surface is flared downwardly. Between the lower end of the mandrel 7 and the shoulder 5 are the anti-friction bearings 9 which are confined by the annular upper and lower raceways 10, 10.

Fitted over the section 2 there is a sleeve 11 whose upper end has the internal coarse threads 12 adapted to intermesh with the threads 3′. The lower end of the sleeve 11, is vertically slotted to form the separate pipe engaging jaws 13 arcuate in cross sectional contour. The outer sides of the jaws are toothed, as shown, and their inner sides are downwardly flared to conform to the contour of and to fit closely against the outer surface of the mandrel. The mandrel is confined against upward movement relative to the nipple 4 by the lower end of this stem section 2′ which has somewhat greater diameter than the adjacent portion of the nipple. The stem section 2′ also has an external annular shoulder 14 which is spaced beneath the internal shoulders, as 15, carried by the jaws 13.

In operation the device is assembled as shown in Figure 1 with the sleeve 11 disconnected from the coupling 3, and then let down into the casing or pipe to be removed. The jaw teeth will usually be in frictional contact with the pipe while the tool is being lowered. If an upward pull be now exerted on the operating stem 2 the mandrel will be wedged tightly between the jaws 13 and will expand them in secure engagement with the pipe 1 and a continued upward pull may result in the dislodgement of the stuck pipe and effect its removal from the bore. In case the pipe cannot be thus removed the upward pull may be continued and the operating stem 2 rotated so as to operate a pipe cutter, as 6, of conventional construction.

The construction and mode of operation of conventional pipe cutters is well known to those familiar with the art and a specific description and illustration thereof is not deemed necessary.

During the operation of the cutter to sever the stuck pipe the stem and nipple 4 rotate, with the mandrel 7 and sleeve 11 stationary. When the pipe is severed a renewed upward pull may effectuate the withdrawal of the severed section. If for any reason said pipe or the severed section cannot be pulled the stem may be lowered, carrying the mandrel downwardly with it, and the outward pressure on the jaws 13 thus released and the lower end of the coupling 3 then screwed into the upper end of the sleeve 11 and the jaws 13 thus maintained out of operative relation with the mandrel and the entire device then pulled out of the bore, or relocated in the pipe 1 for another cut. In case of such relocation when the desired point for making a new cut is reached the stem 2 may be rotated backwardly to disengage the threads 3′ and 12 and the cutting and pulling operation hereinbefore described, repeated.

While we have shown what we now consider the preferred form of the apparatus it is obvious that mechanical changes may be made and equivalents substituted for the parts shown without departing from the principle of the invention, and it is contemplated that such mechanical changes may be made by us so long as the principle of the invention as comprehended within the scope of the appended claims is not departed from.

What we claim is:—

1. A pipe puller including an operating stem having an annular external abutment, a sleeve-like downwardly flared mandrel on said stem and supported by said abutment, expansible pipe engaging means around the stem above the mandrel, releasable interengaging means carried by the stem and engaging means respectively, adapted, when engaged to hold said pipe engaging means out of cooperating relation with the mandrel, said pipe engaging means having a free longitudinal movement on the stem when said interengaging means are released, and anti-friction means between said abutment and mandrel to facilitate the free rotation of the stem relative to the mandrel.

2. A device of the character described including an operating stem and means at the lower end thereof for connecting the same to a casing cutter, means for anchoring said stem to a surrounding casing in a well bore, said anchoring means comprising an upwardly tapering mandrel on the stem and rotatable independent thereof and expansible casing engaging means about the stem and adapted to be expanded by said mandrel into engagement with the casing.

3. A spear comprising in combination with a drill stem, a shank operatively connected with the drill stem, a tapered mandrel carried by and surrounding the lower portion of the shank, a slip sleeve surrounding the shank and having its lower end portion provided with gripping arms, the tapered mandrel engaging said gripping arms from within, and a thrust bearing carried by the shank and with which the lower end of the mandrel engages.

In testimony whereof we have signed our names to this specification.

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