Aug. 30, 1932. J. E. BROTHERTON ET AL 1,874,880

CASING CUTTER

Original Filed April 18, 1927 2 Sheets-Sheet 1

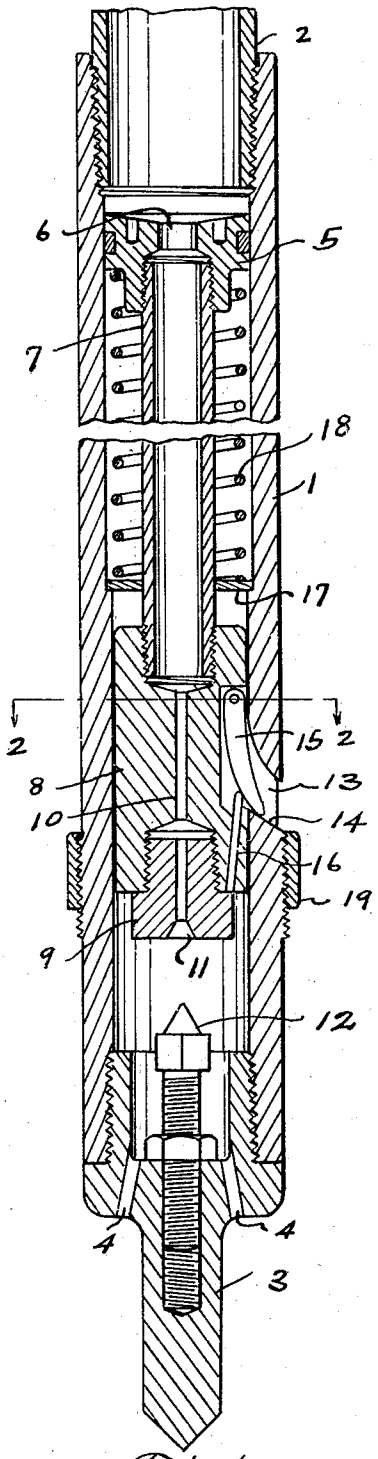


Fig. 1.

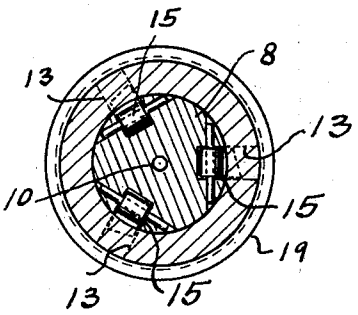


Fig. 2.

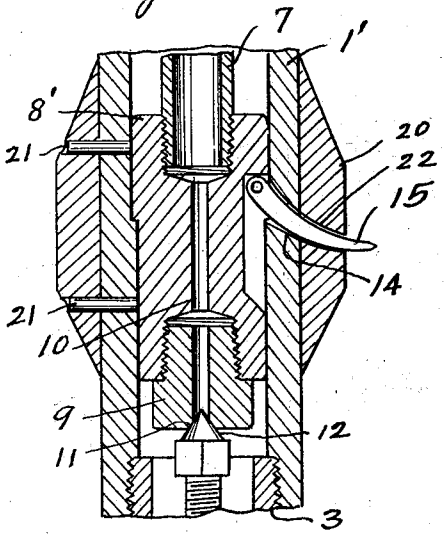


Fig. 3.

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CASING CUTTER

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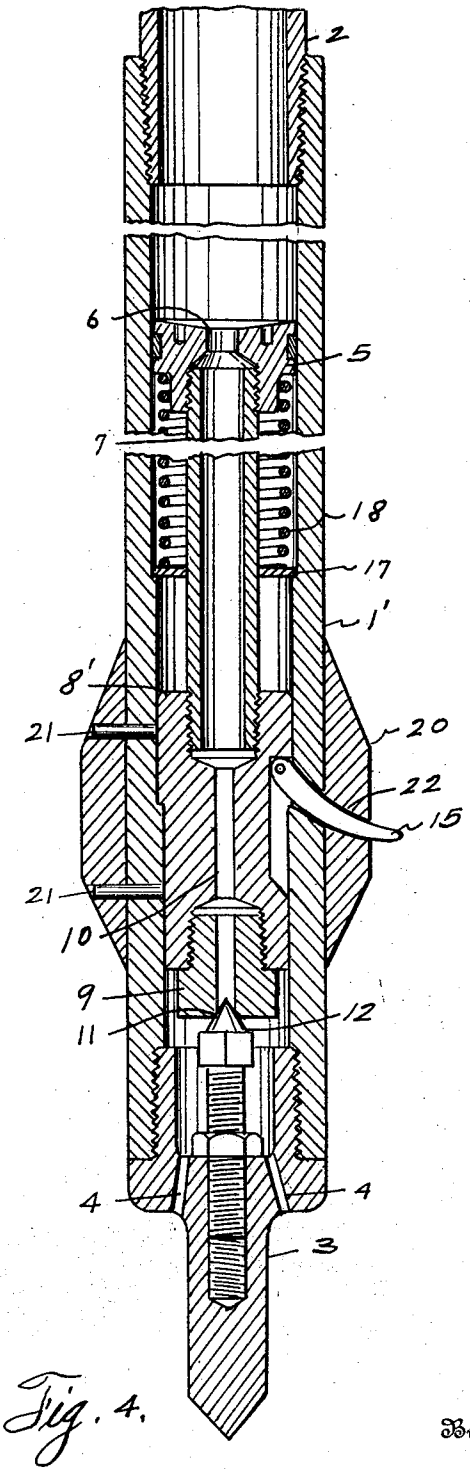


Fig. 4.

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Patented Aug. 30, 1932 1,874,880

UNITED STATES PATENT OFFICE

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CASING CUTTER

Application filed April 18, 1927, Serial No. 184,542. Renewed May 31, 1930.

This invention relates to new and useful improvements in a casing cutter.

One object of the invention is to provide a cutter of the character described, specially designed for cutting pipe, or casing, particularly pipe or casing stuck in a well bore.

Another object of the invention is to provide a casing cutter of the character described, including means operable by fluid pressure for forcing the cutting blades into cutting relation with the pipe or casing to be cut and embodying also means for stopping the flow of pressure fluid through the cutter, and thereby indicating, through the action of the pump, or other source of pressure that the pipe has been severed.

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 cutter.

Figure 2 shows a cross sectional view thereof, taken on the line 2—2 of Figure 1,

Figure 3 shows a fragmentary sectional view of a modified form of the cutter.

Figure 4 shows a vertical sectional view of said modified form.

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 barrel or cylinder which is attached to the lower end of the operating string of pipe 2. Threaded into, and closing the lower end of the cylinder there is a guide point 3 having the outlet ports 4.

Within the cylinder there is a plunger 5 having a central port 6 threaded into which is the upper end of the depending tubular stem 7 and threaded onto the lower end of this stem and located in the cylinder there is a blade carrier 8 which fits snugly in said cylinder. The lower end of the blade carrier carries a valve seat 9 and the carrier and seat having an axial restricted water channel 10 therethrough whose lower end is flared, as at 11. Adjustably secured to the guide point 3 and upstanding in the cylinder there is an upwardly tapering valve 12 which is aligned underneath the channel 10 and which conforms to the shape of and is designed to seat in the flared lower end thereof to block said channel. The walls of the cylinder 1 have the downwardly and outwardly diverging blade guideways 13 cut therethrough whose lower ends form the outwardly sloping guide faces 14.

Cutter blades 15 are pivotally connected, at their upper ends, to the carrier 8 and their lower ends are outwardly curved and these blades are aligned with and adapted to work through the guideways 13 and their outer ends have sharp cutting points which are aligned around the carrier.

In use the cutter is lowered into the pipe, or casing, to be cut to the desired point. The guide point serves not only to guide the cutter into the upper end of said pipe or casing, but also to remove any obstructing material therein. When the desired point has been reached fluid under pressure is forced down through the stem 2 and this will force the plunger downwardly carrying the carrier 8 down with it; and the outwardly curved blades 15 will engage the guide faces 14 and said blades will thereby be deflected outwardly through the ways 13, and into operative engagement with the pipe or casing, to be cut. In order to insure the engagement of the lower ends of the blades with their guides 14 upstanding pins 16 are anchored to the carrier 8 with their upper ends engaging against the inner sides of the lower ends of the blades so as to hold said ends out far enough to engage the guide faces 14 when the carrier is forced downwardly. The cutter is then

rotated and pressure constantly applied, meanwhile, to the plunger 5 to the end that said blades will be firmly held against the work during such rotation until the pipe, or casing, is completely severed.

During this operation a part of the water passes downwardly through the channel 10 and out through the ports 4. When, however, the pipe is severed the carrier 8 will move on downwardly and the seat 9 will seat on the valve 12, which valve will close the lower end of the channel 10 and block said channel. The outlet of the pressure fluid being thus closed the pump will stop thus indicating to the operator that the pipe, or casing has been severed.

The valve 12 may be adjusted up or down, as the pipe or casing, to be cut varies in thickness, and so that the channel 10 will not be prematurely closed before the pipe has been severed.

Within the cylinder 1 above the carrier there is a fixed spring seat 17, and supported on this seat there is a coil spring 18 which surrounds the stem 7 and supports the plunger 5.

When the pipe, or casing, has been severed, and the pressure of the fluid in the stem 2 relieved the spring 18 will elevate the plunger 5 and withdraw the cutter blades 15 within the cylinder 1 and the cutter may then be withdrawn.

Threaded onto the cylinder 1 beneath the guideways 13 there is a collar 19. This collar may be adjusted upwardly to bring its upper end opposite the lower ends of the guides 14 and said upper end will accentuate the outward deflection of the blades 15, as they are forced outwardly into working relation with the pipe, or casing, to be cut, or said collar may be adjusted downwardly so that the blades will clear its upper end and in such position it will not influence the operation of said blades.

In Figures 3 and 4 we have shown a slightly modified form of the cutter wherein the cylinder 1 is slightly reduced beneath the guides 14 and the lower end of the cutter carrier 8′ is correspondingly reduced. This will insure the engagement of the blades 15 with the guide face 14, as the plunger is lowered and dispenses with the necessity of using the pins 16.

When the cutter is used for cutting pipe or casing of very large inside diameter it is necessary to reinforce or support the blades 15 on the outside of the cylinder 1′ and in such case the reinforcing sleeve 20 may be fitted over the cylinder 1′ and secured thereto in any desired manner, as by means of pins 21, as shown in Figure 3. The upper and lower ends of this sleeve 20 are tapered to prevent the cutter from hanging on an inside projection that may be in the pipe to be cut and the sleeve 20 is provided with guide ways, as 22, adapted to register with the guide ways 13 when the sleeve 20 is secured on the cylinder and through which the cutting blades 15 may project when the cutter is at work. In other respects the form shown in Figure 3 is substantially similar in construction and method of operation as the form shown in Figures 1 and 2.

What we claim is:—

1. A casing cutter including a cylinder having guideways through the wall thereof, a fluid operated plunger in the cylinder, a blade carrier in the cylinder beneath the plunger and connected thereto, a reinforcing sleeve of substantial thickness around the cylinder having tapered ends and having guideways which register with the cylinder guideways and blades connected to said carrier and adapted to work through said guideways and secured by said guideways.

2. A casing cutter including a cylinder having guideways through the wall thereof, a plunger in the cylinder, a blade carrier in the cylinder beneath the plunger and connected thereto, a detachable reinforcing member of substantial thickness on the outside of the cylinder and having guideways which register with the cylinder guideways and whose end is tapered and blades connected to said carrier and adapted to work through said guide ways and secured by said guideways.

3. A casing cutter including a cylinder having guide ways through the walls thereof, a carrier fitted within said cylinder, cutting blades on said carrier registering with the said guideways, means to advance said blades through said guideways, and a sleeve on the outside of said cylinder having a tapering lower end forming a guide and also having guide means for said blades registering with said guideways for the purpose set forth.

4. A casing cutter including a body having guideways through the walls thereof, a blade carrier in said body, arcuate cutting blades on said carrier, means to advance said blades through said guideways, and a detachable sleeve on the outside of said body having cutter guiding means thereon, said sleeve acting to increase the outer diameter of said body to reinforce said blades when the blades are in cutting position.

5. A casing cutter including a body having guideways through the walls thereof, a blade carrier in said body, cutting blades on said carrier, means to advance said blades in said guideways, and detachable downwardly tapering means to increase the outer diameter of said body and co-operate with said guideways to support said cutters when the cutters are advanced to cutting position.

6. A cutter for casing and the like including a body, a blade carrier in said body, a substantially arcuate cutting blade on said carrier, said body having an outwardly

thickened portion which tapers downwardly to form a guide, and which has a guide way, for the blade, therethrough, and means to advance the blade through said guideway.

7. A cutter for cutting casing in a well bore including a body, a blade carrier therein, a cutting blade on the carrier, said body having an outwardly thickened portion which reinforces the blade when the latter is advanced and which tapers downwardly to form a guide and which has a guideway for the blade therethrough and means to advance the blade through said guideway.

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

JOSEPH E. BROTHERTON.
RANKIN W. MORRIS.

CERTIFICATE OF CORRECTION.

Patent No. 1,874,880. August 30, 1932.

JOSEPH E. BROTHERTON and RANKIN W. MORRIS.

It is hereby certified that the above numbered patent was erroneously issued to the inventors, said "Brotherton and Morris", and one-half interest to "J. S. Abercrombie, of Harris County, Texas", whereas said patent should have been issued to the inventors, said Brotherton and Morris, as owners of the entire interest in said invention; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of November, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.