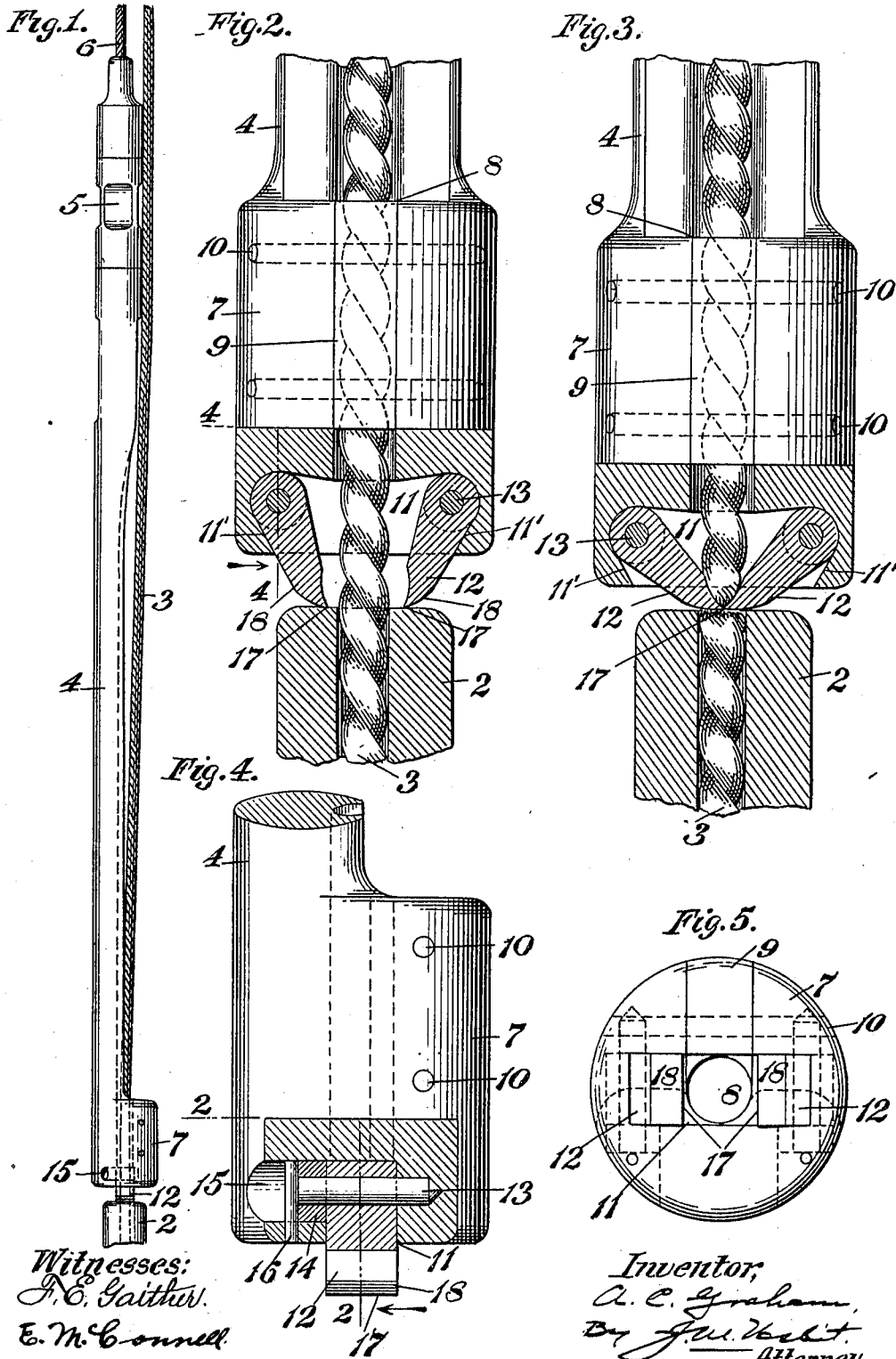


A. C. GRAHAM.
ROPE KNIFE.

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UNITED STATES PATENT OFFICE.

ALBERT C. GRAHAM, OF OILFIELDS, CALIFORNIA.

ROPE-KNIFE.

978,577.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALBERT C. GRAHAM, a resident of Oilfields, in the county of Fresno and State of California, have invented certain new and useful Improvements in Rope-Knives, of which the following is a specification.

The primary object of this invention is to provide a simple and efficient device for severing the cable from a string of drilling tools that have become stuck in a well. The arrangement is preferably such that the cutting means is operated by contact with the rope socket so that the whole length of cable is recovered. The invention includes cutters of improved construction; also improved means for loosely confining the tool on the cable to be cut, the latter operating to guide the tool to the rope socket, which latter causes the cutting means to operate.

The invention consists in certain novel features of construction, and in the assemblage and combination of parts, hereinafter fully described and claimed, and illustrated by the accompanying drawings, wherein—

Figure 1 is a side elevation of a portion of a rope socket and cable having my device adjusted thereto and lowered into operative position. Fig. 2 an enlarged view, partly in elevation and partly in section, of a portion of the device, with the parts in the same relative position as in Fig. 1, the plane of section being indicated by the line 2—2 of Fig. 4. Fig. 3 a similar view illustrating the manner in which the knives are fixed together to sever the cable. Fig. 4 is an elevation, partly in section on line 4—4 of Fig. 2. Fig. 5 is a bottom plan of the cutting head with the knives shown in the same position as in Figs. 2 and 4.

Referring to the drawings, 2 is the rope socket supporting the string of tools, and 3 is the drilling cable.

4 is the cutting tool which may be of any desired size and weight, and is provided at its upper end with a rope socket 5, for its operating cable 6, or the tool may be connected to jars, as will be understood. The lower end of the cutting tool 4, is enlarged to form head 7, provided with a longitudinal vertical slotted opening 8, into which is fitted a block 9, secured in position by pins 10. The block 9 is somewhat shorter than slot 8, and the inner faces of the block and slot are concave to form a round opening

through which the cable 3 passes, as shown in Fig. 5.

The head 7 is formed with an approximately rectangular opening 11 in its lower face, said opening connecting with and extending at right angles to the opening 8. A pair of cutting blades or knives 12 are pivotally mounted at their upper ends in the opening 11 upon pins 13. The inner ends of these pins are entered in openings of like size in head 7, and their outer ends are preferably confined in bushings 14 entered in cavities 15, and locked in position by pins 16. Displacement of pins 13 is thus absolutely precluded.

The knives 12 are located at opposite ends of opening 8 and are free to swing toward each other until their lower or cutting edges 17 meet, and outwardly a sufficient distance to clear the cable when not in use. Said knives are provided upon their outer faces, adjacent the cutting edges, with cam-surfaces 18 adapted to bear upon the top of the rope socket 2 in such a manner as to force the cutting edges 17 toward each other when the weight of the tool is resting thereon, as shown in Fig. 3. The normal inward inclination of the knives is such that downward pressure thereon when in engagement with the socket forces them inward. The rounded end walls 11' of depression 11 provide abutments which back up the knives under the considerable strain to which they are subjected, holding them positively in position.

The operation is as follows: When a string of tools have become lodged in the well and it is desired to recover the cable the tool is placed on the cable by inserting the latter through opening 8, after which block 9 is secured in place and the cutting tool lowered until knives 12 come in contact with rope socket 2. It will be observed that while the cutting tool is being lowered the knives remain in lowered open position, thus allowing the tool to slide freely down the cable 3, until the cam-surfaces 18 of the knives engage the upper extremity of the rope socket, when the weight of the descending tool causes the knives to close together, as in Fig. 3, and sever the cable. The drop of the cutting tool may regulate the cutting force of the knives, and if desired a chopping action may be secured by raising and dropping the cutting tool a number of times.

I claim:

A cutting tool for well drilling cables comprising a body having a cable passage extending vertically therethrough with the
5 lower end of the body recessed upwardly, and with the upper portions of opposite walls of the recess rounded and said opposite walls converging downwardly from their rounded portions, and a pair of cutters
10 sharp at their lower ends and having rounded upper ends fitting the rounded walls

of the recess and pivoted therein and held normally in converging relation by the converging faces of the recess with the lower portions of the cutters depending beneath 15 the lowermost extremity of the body.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT C. GRAHAM.

Witnesses:

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