

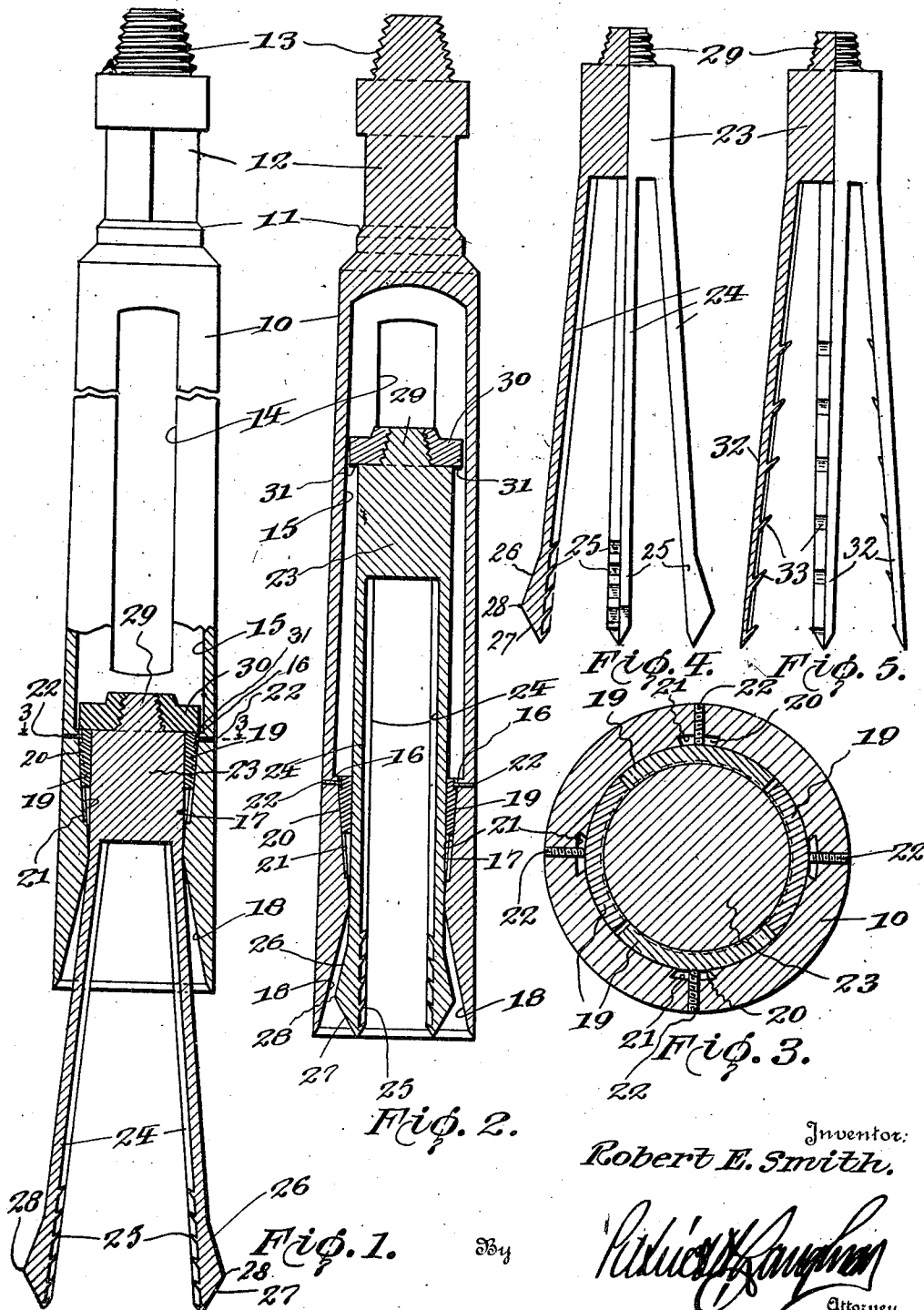
May 29, 1923.

1,456,943

R. E. SMITH

GRAPPLING TOOL

Filed June 2, 1922



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ROBERT E. SMITH, OF THERMOPOLIS, WYOMING.

GRAPPLING TOOL.

Application filed June 2, 1922. Serial No. 565,312.

To all whom it may concern:

Be it known that I, ROBERT E. SMITH, a citizen of the United States, residing at Thermopolis, in the county of Hot Springs and State of Wyoming, have invented certain new and useful Improvements in Grappling Tools, of which the following is a specification.

This invention relates to grappling tools designed more particularly for removing stuck or broken tools or other obstructing objects from oil wells, and it is the object of the invention to provide a tool of this kind embodying certain novel and improved features of construction and modes of operation to be hereinafter described in detail.

In order that the invention may be better understood, reference is had to the accompanying drawings, wherein—

Figure 1 is an elevation of the tool, partly in section; Fig. 2 is a longitudinal section of the tool showing the gripping jaws closed; Fig. 3 is an enlarged cross-section on the line 3—3 of Fig. 1, and Figs. 4 and 5 are elevations of modified forms of jaw members, partly in section.

Referring specifically to the drawing, the tool consists of a supporting-member and resilient jaws carried thereby, said supporting member being slidable over the jaws to close up the same on the object to be gripped.

The supporting-member consists of a tubular, elongated body 10 open at the bottom, and having at the top a solid shank 11 having a wrench surface 12, and a tapered screw-threaded stud 13 for connection to the rod, stem or other means whereby the tool is lowered into the well and withdrawn therefrom. The body 10 has side slots 14 to provide hand holes for access to the interior or bore 15 of the body.

Near its lower end, the wall of the body 10 is thickened to produce an internal annular shoulder 16 which serves as an abutment, for a purpose to be presently described. Below the shoulder 16, the body 10 has a downwardly tapered bore 17 terminating short of the bottom of the body, and below this bore, to the bottom of the body, is a downwardly flared bore 18. The body 10 also has a slight taper upwardly from its bottom to the shoulder below the wrench surface 12.

The bore 17 forms a socket having a downward taper in which seat gripping devices 19 commonly known in the art as "slips".

On the back of each slip is a dovetailed lug 20 which seats in a correspondingly shaped vertical slot 21 in the wall of the socket. A series of four slips is provided, said slips forming a ring inside the socket. When the slips go down, this ring contracts and grips the object inside the same, whereas a movement of the slips in the opposite direction causes the ring to expand and release the object, these actions being due to the taper of the socket. It will therefore be seen that the greater the downward tendency of the object engaged by the slips, the greater will be the gripping action. The gripping faces of the slips are serrated as usual, and their upward movement is limited by screws 22 extending into the upper ends of the slots 21.

The jaw member of the tool consists of a short solid cylindrical body 23 having depending from its bottom the resilient shanks 24 of a pair of jaws 25, these parts being all integral. The jaws 25 are diametrically opposite, and their inner faces are serrated to obtain a good grip on the object to be held. It will also be noted that the jaws, at the back, have a slight outward bevel, as shown at 26, up to a point short of their extremities, and then an inward bevel 27 to their extremities. This gives the jaws a taper toward their extremities which is for the purpose of preventing them from catching on the wall of the well. The jaw shanks 24 have a normal spreading tendency, and when the tool is going down in the well, the apex of the ridge 28 formed at the back of each jaw by the two oppositely beveled surfaces 26 and 27, is held lightly pressed against the wall of the well.

At the top of the body 23 is a stud 29 to hold a cap nut 30 which is of such external diameter that its base projects from the side of the body to form a shoulder or abutment 31 thereon.

The jaw-member seats in the bore 15 of the supporting-member 10, and when the tool is open and in position for use, the body 23 of the jaw member is located at the bottom of the supporting member, inside the circle or ring of slips 19. The shoulder 31 now seats on the shoulder 16, and hence these shoulders limit the downward movement of the jaw-member in the supporting-member. The jaw shanks 24 project in spread position from the bottom of the supporting-member. With the parts in this position the tool is lowered into the well, and when the

jaws 25 strike the object to be removed, the descent of the jaw-member is stopped thereby, and as the supporting-member 10 continues to descend it closes down over the shanks 24 and forces them, with the jaws 25, together, thus causing the jaws to grip the object, after which the tool may be withdrawn from the well to remove the object. The slips 19 firmly lock the jaw-member in the supporting-member to prevent the jaws from spreading and thus losing their grip on the object being removed.

The tool is very efficient and reliable in operation, and the shape of the jaws 25 tends to force the object to be removed from the well toward the center thereof, making it more readily grasped by the jaws. Fig. 1 shows the jaws open, and the tool ready to go down into the well, whereas Fig. 2 shows the jaws closed and in gripping position.

Figs. 4 and 5 show slightly modified forms of jaw-members. The jaw-member shown in Fig. 4 is provided with four jaws, whereas the jaw-member shown in Fig. 5 has four resilient shanks 32 having their inner faces provided with barbs 33 throughout their entire length.

I claim:

1. A grappling tool comprising a tubular supporting-member, a jaw-member consisting of a body portion seating in the supporting-member and having resilient jaws adapted to project from the latter, said jaws having a normal tendency to spread, means for so positioning the jaw-member relative to the supporting-member as to leave the jaws projecting from the latter, said members being free to move relative to each other to bring the supporting-member down over the jaws for closing the same, and means for thereafter preventing a return movement of said members in a direction tending to effect opening of the jaws.

2. A grappling tool comprising a tubular supporting-member having an internal shoulder and open at one end, a jaw-member consisting of a body portion seating in the supporting-member, and provided with an abutment at its inner end and with resilient jaws at its outer end, said jaws having a normal tendency to spread and projecting from the open end of the supporting-member when the shoulder thereof is

engaged by the abutment, said members being free to move relative to each other to bring the supporting-member over the jaws for closing the same, and means for thereafter preventing a return movement of said members in a direction tending to effect opening of the jaws.

3. A grappling tool comprising a tubular supporting-member open at one end and having its bore provided with a portion which is tapered in the direction of said open end, a series of slips slidably supported on the wall of said tapered portion of the bore, a jaw-member seating in the bore of the supporting-member and having resilient jaws at its outer end, said jaws having a normal tendency to spread and adapted to project from the open end of the supporting-member, and means for maintaining such relative positions of the supporting and jaw-members in which the jaws project from the former, said members being also free to move relative to each other to bring the supporting-member down over the jaws for closing the same, the aforesaid slips being engageable with the jaw member for preventing a return movement in a direction tending to permit the jaws to open.

4. A grappling tool comprising a tubular supporting-member having an internal shoulder and open at one end, the bore of said member being provided below the shoulder with a portion having a taper in the direction of the open end, a series of slips slidably supported on the wall of said tapered portion of the bore, and a jaw member consisting of a body portion located in the bore of the supporting-member and provided with an abutment at its upper end adapted to seat on the aforesaid shoulder, said body portion being provided with resilient jaws at its outer end having a normal tendency to spread, and said jaws projecting from the open end of the supporting-member when the abutment seats on the shoulder, the supporting and jaw-members being free to move relative to each other to bring the former down over the jaws for closing the same, and the aforesaid slips being engageable with the jaw-member for preventing a return movement in a direction tending to allow the jaws to open.

In testimony whereof I affix my signature.

ROBERT E. SMITH.