Dec. 13, 1949 D. W. OSMUN 2,491,392

MULTIPLE SEAT RELEASING AND CIRCULATING OVERSHOT

Filed Feb. 26, 1946

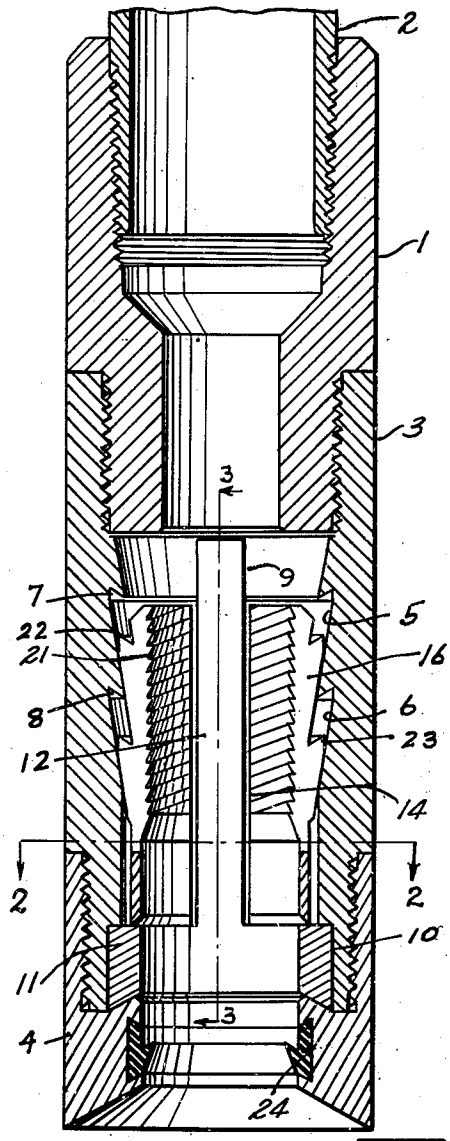


Fig. 1.

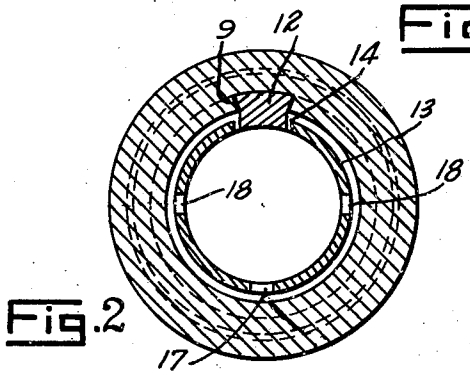


Fig. 2.

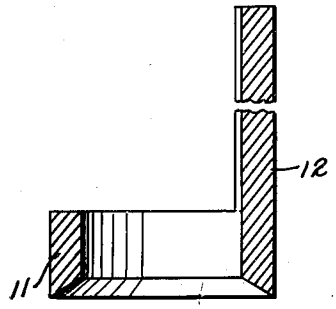


Fig. 3.

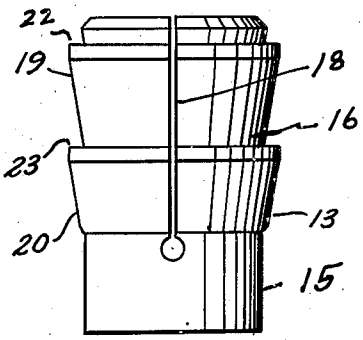


Fig. 4.

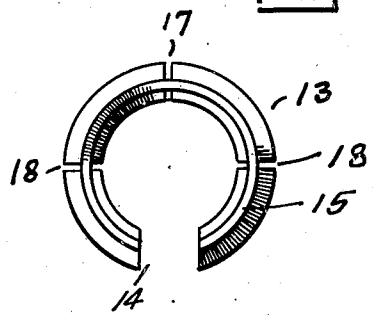


Fig. 5.

Inventor

Dean W. Osmun

By E. V. Hardway,

Attorney

Patented Dec. 13, 1949

2,491,392

UNITED STATES PATENT OFFICE

2,491,392

MULTIPLE SEAT RELEASING AND CIRCULATING OVERSHOT

Dean W. Osmun, Houston, Tex.

Application February 26, 1946, Serial No. 650,265

6 Claims. (Cl. 294—102)

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This invention relates to a multiple seat overshot.

An object of the invention is to provide an overshot adapted to be lowered, on a tubular string, into a well and engaged over a pipe, or other object to be pulled from the well and is of such construction and strength as to maintain a tight grip on an object which is stuck in the well so that the stuck object may be released and removed from the well.

It is another object of the invention to provide, in an overshot, means for disengaging the overshot from the stuck object in case the latter cannot be dislodged and removed from the well.

The overshot herein described is of such construction that the fluid may be forced down through the pipe, or other tubular object, engaged by the overshot, so that the stuck object may be washed loose and thus more readily removed from the well.

It is a further object of the invention to provide an overshot for the purposes specified which is composed of relatively few parts.

Other objects and advantages will be apparent from the following specification which is illustrated by the accompanying drawings, wherein:

Figure 1 is a vertical, sectional view of the tool.

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a vertical, sectional view of the grapple control.

Figure 4 is a side elevation view of the grapple; and

Figure 5 is a bottom end view of the grapple.

Referring now more particularly to the drawings, wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a tubular coupling member whose upper end is internally threaded to receive the lower end of the operating string of pipe, or drill stem, 2 which extends to the ground surface.

The lower end of the coupling 1 is reduced both externally and internally and the reduced portion is outwardly threaded. The numeral 3 designates the grapple bowl whose upper end is screwed onto the lower end of the coupling 1 and screwed onto the lower end of the bowl and externally flush therewith there is the guide 4 whose lower end is flared so as to guide the grappling tool over the object to be pulled.

The bowl is provided with stepped, downwardly converging seats 5, 6, two of said seats being shown in the present illustration. These seats terminate, at their upper ends, in annular grooves 7 and 8 whose upper sides converge downwardly and inwardly.

The bowl also has an internal longitudinal keyway 9, in the wall thereof which is preferably, although not necessarily, dove-tailed in cross section.

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The lower end of the guide 4 is inwardly thickened and the lower end of the bowl is internally counterbored, forming a groove 10.

Within this groove and retained in place by the inwardly thickened portion of the guide there is an annular grapple controlling member 11 and upstanding from this controlling member there is a key 12 which fits into the keyway 9, as shown in Figures 1 and 2. There is a tubular shaped grapple 13 which is provided, at one side, with a longitudinal slot 14 into which the key 12 projects, as shown in Figure 2. This grapple includes a tension ring 15, at its lower end, through which the slot 14 extends so that said tension ring is expansible and formed integrally with the tension ring and upstanding therefrom are the gripping jaws 16. These jaws are separated by the slot 14 and also by the slit 17 which is opposite the slot 14 and by the oppositely disposed slits 18, 18 arranged between the slit 17 and the slot 14. These slits 17 and 18, 18 extend from the tension ring 15 upwardly to the upper end of the grapple, as illustrated in Figure 4.

The jaws 16 have the externally arcuate, downwardly and inwardly tapering surfaces 19, 20 which conform to the shape of, and are adapted to work against, the corresponding seats 5 and 6, as shown in Figures 1 and 4. The inside surface of the grapple is provided with helical wickers or teeth 21 of any selected size and shape to give the grapple an effective gripping surface, and pitched the reverse of the pitch of the threads of the operating string.

The grapple hereinabove described is expansible and contractile, diametrically, throughout its entire length and the lower end of the grapple, that is the tension ring, is of an inside diameter such that it is spaced from the object over which the overshot is telescoped. When the grapple is telescoped over the stuck object the gripping jaws will at once take hold of, or grip, said object, independent of any actuating device and by virtue of the tension of the tension ring 15 the intensity of the grip of the grapple on the stuck object may be varied by varying the thickness of said tension ring.

The upper ends of the tapering surfaces 19, 20 terminate in annular upwardly diverging edges 22, 23 adapted to enter the grooves 7 and 8 as hereinafter explained.

In actual construction the guide 4 may be somewhat longer than it is illustrated in Figure 1 and may be internally recessed to receive a seal ring 24 which forms a seal between the overshot and the stuck object engaged thereby.

The grapple control has been provided to allow vertical movement of the grapple in the bowl.

In operation the tool is attached to the bottom of the drill stem and lowered until it telescopes over the object to be withdrawn from the well.

The telescoping action may be stopped by the engagement of the stuck object with the lower end of the coupling 1. The grapple being freely movable longitudinally on its tapered seats, moves upwardly as the object enters and continues to pass through it.

During this operation and by virtue of the shape of the bowl and grapple the grapple is in an expanded condition and while expanded the grapple still remains engaged with the object to be pulled and upon subsequent upward movement of the bowl the engagement of the grapple with the stuck object will be increased so that it will securely grip said object and withdraw the same from the well.

In case the stuck pipe, or other object, cannot be dislodged, the operating string may be lowered, thus causing a downward movement of the bowl relative to the grapple and the edges 22, 23 will enter the corresponding grooves 7 and 8 thereby expanding the grapple but the wickers, or teeth, 21 will still be in contact with the stuck object. If these teeth 21 are pitched to the left, as illustrated in Figure 1, the operating string and tool should be turned to the right; if, on the other hand, the teeth, or wickers, 21 are pitched to the right the operating string and tool should be turned to the left. This turning movement of the tool will cause an upward movement of the grapple, as the tool is gradually elevated and will maintain the edges 22, 23 seated in the corresponding grooves 7 and 8 and will thus hold the grapple in its upper position, and expanded, so that the tool may be readily detached from the stuck object.

The seats 5, 6 and the contacting, external surfaces of the grapple are annular, but it is obvious that these parts could be of a spiralled or helical shape if desired.

The drawings and description are illustrative merely while the broad principle of the invention will be defined by the appended claims.

What I claim is:

1. An overshot adapted to telescope over an object to be withdrawn from a well and comprising, a tubular bowl adapted to be connected to an operating string of pipe and having an inside downwardly converging, tapering seat and an annular inside recess beneath the seat, said bowl also having an inside longitudinal keyway, a tubular expansible grapple in the bowl having a longitudinal side slot and an external downwardly tapering face to conform to the contour of, and to rest on said seat, a controlling member in said recess including a key seated in the keyway and extended into said side slot.

2. An overshot adapted to telescope over an object to be withdrawn from a well and comprising, a tubular bowl adapted to be connected to an operating string of pipe and having an inside downwardly converging, tapering seat and an annular inside recess beneath the seat, said bowl also having an inside longitudinal keyway, a tubular expansible grapple in the bowl having a longitudinal side slot and an external downwardly tapering face to conform to the contour of, and to rest on said seat, a controlling member in said recess including a key seated in the keyway and extended into said side slot and an annular guide on the lower end of the bowl.

3. An overshot adapted to telescope over an object stuck in a well and comprising, a tubular bowl adapted to be connected to an operating string of pipe and having an inside seat and an inside annular recess beneath the seat and also having an inside longitudinal keyway, a tubular expansible grapple in the bowl having an external face shaped to conform to the contour of, and to rest on, said seat, said grapple being longitudinally movable in the bowl and a controlling member in said recess which includes, also, a key in said keyway engageable with the grapple to prevent rotation of the grapple relative to the bowl.

4. An overshot adapted to telescope over an object stuck in a well and comprising, a tubular bowl adapted to be connected to an operating string of pipe and having an inside downwardly tapering seat with an annular, downwardly flared groove at the upper end of the said seat and an inside recess beneath the seat, a tubular expansible grapple in the bowl having an external downwardly tapering face shaped to conform to the contour of, and to rest on, said seat, and terminating at its upper end in an annular upwardly diverging edge arranged to engage in said groove upon relative upward movement of the grapple in the bowl to expand the grapple said bowl and grapple having aligned keyways, a controlling member in the recess including a key extended into said keyways and an annular guide on the lower end of the bowl.

5. An overshot adapted to telescope over an object stuck in a well and comprising, a tubular bowl adapted to be connected to an operating string of pipe and having an inside downwardly converging, tapering seat and an annular groove at the upper end of the seat, a tubular expansible grapple in the bowl having an external downwardly tapering face shaped to conform to the contour of, and to rest on, said seat and terminating at its upper end in an annular edge arranged to engage in said groove upon relative upward movement of the grapple in the bowl to expand the grapple a controlling member in the bowl beneath the seat which includes a vertical key engageable with the bowl and grapple to prevent rotation of the grapple in the bowl and spiralled wickers, or teeth, on the inside of the grapple engageable with the stuck object.

6. An overshot adapted to telescope over an object to be withdrawn from a well comprising, a tubular bowl adapted to be connected to an operating string of pipe and having an inside, downwardly converging seat and a recess beneath the seat, said bowl also having an inside keyway, a tubular expansible grapple in the bowl having a longitudinal side slot and an external downwardly tapering face to conform to the contour of and to rest upon said seat, a member seated in the recess and including a key which projects into the keyway and into the side slot.

DEAN W. OSMUN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,678,829	Scott	July 31, 1928
1,689,702	Vickers	Oct. 30, 1928
1,750,248	Thompson	Mar. 11, 1930
2,098,332	Church	Nov. 9, 1937
2,184,681	Osmun	Dec. 26, 1939
2,285,838	Rea	June 9, 1942