Dec. 27, 1949 D. W. OSMUN 2,492,813

OVERSHOT

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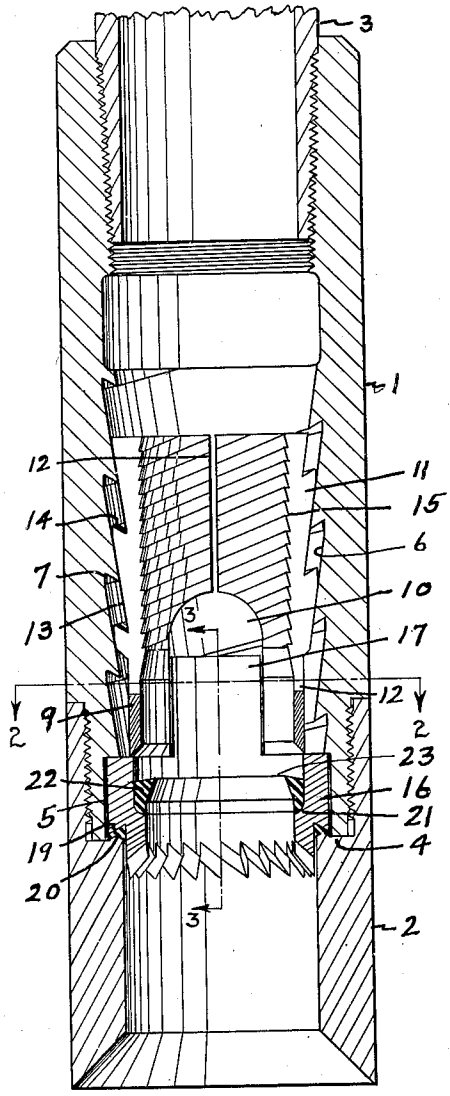


Fig. 1

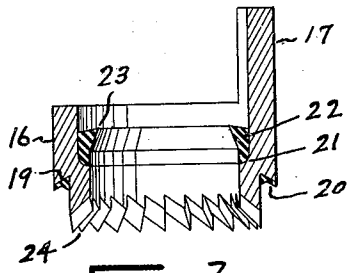


Fig. 3

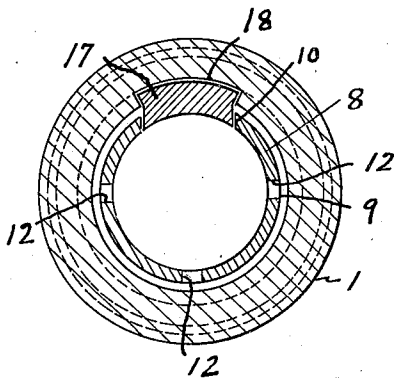


Fig. 2

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OVERSHOT

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5 Claims. (Cl. 294—102)

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This invention relates to an overshot.

The type of overshot herein described has been provided, generally, for the same purpose as the overshot disclosed in my co-pending application for Spiraled seat releasing and circulating overshot, filed in the United States Patent Office on February 26, 1946, under Serial No. 650,264 but also includes certain improvements over the construction disclosed in said last mentioned application.

It is a general object of the invention to provide a tool of the character described specially designed for removing stuck objects, such as pipe and the like, from wells and which is so designed that a given size of overshot may engage stuck objects of variable transverse diameters and embodies a novel type of grapple control which is of such novel formation that it will form a seal between the stuck object and outer body of the overshot.

It is another object of the invention to provide, in a tool of the character described, an annular grapple control which embodies, as a unit, not only the sealing means above referred to but also an annular cutter for reshaping the distorted upper end of a stuck object.

Other objects and advantages will be set forth in connection with this 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, and

Figure 3 is a vertical, sectional view of the grapple control taken on the line 3—3 of Figure 1.

Referring now more particularly to the drawings, wherein like numerals of reference designate the same parts in each of the figures, the outer body of the tool is composed of the bowl 1 of general tubular formation and the tubular guide 2. The lower end of the bowl may be reduced in external diameter and outwardly threaded and the upper end of the guide may be enlarged in internal diameter and inwardly threaded and screwed onto the lower end of the bowl.

The upper end of the bowl may be internally threaded for the connection of a tubular operating string 3 thereto.

As above indicated the guide, beneath the lower end of the bowl, is inwardly thickened forming an internal annular shoulder 4 and the lower end of the guide is internally flared so as to readily telescope over the stuck object to be pulled.

The lower end of the bowl is internally countersunk forming an annular recess or groove 5.

Above the recess 5 the bowl is formed with an inside, spiraled downwardly converging seat 6

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and above said seat is provided with an undercut, spiraled groove, or recess, 7.

There is a grapple 8 of similar construction to the corresponding grapple disclosed in said co-pending application. Its lower end is formed into a tension ring 9 having a notch 10 in one side thereof so that it will be expansible and formed integrally with the ring and upstanding therefrom the grapple is formed with the jaws 11 which are separated by longitudinal slits 12. These slits extend from the tension ring to the upper end of the grapple, as shown in Figure 1.

The grapple is formed with the external, spiraled, downwardly tapering face, or seat, 13 which is shaped to conform to, and which rides against, the seat 6 and the seat, or face, 13 terminates in an upwardly directed spiraled edge 14. This edge is normally spaced beneath the groove 7.

The jaws may have the inside spiraled teeth 15 to engage with and grip the object to be pulled.

Located in the recess 5 there is the annular grapple control 16 which may be provided with an upstanding key 17. This key is seated in a longitudinal keyway 18 in the inner side of the bowl and which may, or may not, be dovetailed in cross-section. As shown in Figure 2 it is dovetailed.

The key 17 projects inwardly radially into the notch 10 of the grapple and holds the grapple against turning relative to the bowl but, as will be noted, the grapple has a limited longitudinal movement relative to the bowl.

It may be here noted that the specific type of key 17 shown is not indispensible but any other selected means may be employed for retaining the controlling member 16, the grapple and the body against relative rotation.

The member 16 is preferably reduced in diameter at its lower end thus forming an external annular shoulder 19 therearound and underneath said shoulder there is provided an annular seal ring 20 designed to form a seal with the shoulder 4 beneath.

The grapple control may also have an inside annular upwardly facing seat 21 on which there is located the annular seal ring 22 whose inside, preferably converging upwardly and terminates in an annular lip 23.

The lower end of the control 16 may, if desired, be formed with an annular series of cutting teeth 24. These teeth, or cutters, are useful only in case the upper end of the stuck object has become distorted so that the grapple will not telescope over said object. In such case the distorted portion of the stuck object may be cut, or milled, away and thus shaped so that the tool will telescope over it.

In use the tool may be lowered into the well

and guided over the object to be pulled any selected distance. As the grapple passes over said object it will grip the same and being expansible will take hold of and grip objects of different outside diameters.

Upon upward movement of the tool the seat 6 will move upwardly relative to the spiraled face 13, thus contracting the grapple into secure engagement with the object gripped thereby, and unless too tightly stuck the object will be released and removed from the well.

Should it be desired to release the tool from said object it may be lowered and when the bowl reaches the limit of its downward movement relative to the grapple, which remains engaged with said object, the spiraled edge 14 will enter the spiraled groove 7 with the result that the grapple will be expanded and thereupon, upon rotation of the bowl in an appropriate direction, the grapple will remain in its upper position relative to the bowl and will remain expanded even though the tool may move upwardly as the turning movement takes place. The tool should be rotated in a direction opposite the direction of pitch and the friction between the bowl and the grapple will maintain the spiraled edge 14 in the spiraled groove 7 and thus maintain the grapple expanded. While the threads, or wickers, 15 are not in all cases indispensible they are usually provided and if pitched in the same direction as the pitch of the seat 6 they will assist in releasing the grapple. A continuation of this rotation will release the tool from the stuck object and it may be withdrawn.

When the tool is telescoped over the stuck object the seal ring 22 forms a seal between the control member 16 and the stuck object and the seal ring 20 forms a seal between the control 16 and shoulder 4 so that a washing fluid may be forced down through the operating string 3 and through the tool and on through the stuck object and back up around the stuck object so that said object may be washed loose and may be lifted out or at any rate the washing operation will assist in releasing said stuck object.

When the pressure of the washing fluid is applied it will act against the upper end of the seal ring 22 to force the same into close sealing relationship with the stuck object and it will also force the control 16 downwardly so that the seal ring 20 will form a fluid tight seal with the shoulder 4 to thus prevent all leakage.

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 stuck in a well bore and comprising, a tubular body having a downwardly converging, inside seat, a grapple on the seat shaped to engage about a stuck object, an annular grapple control seated in the body beneath the seat to hold the grapple against turning in the body, an inside annular seal in the grapple control to form a seal with the stuck object and an annular seal between said grapple control and the body.

2. An overshot adapted to telescope over an object stuck in a well bore and comprising, a tubular body having a downwardly converging, inside seat, a grapple on the seat adapted to engage about a stuck object, an annular controlling member seated in the body beneath the seat, an inside annular seal in the controlling member to form a seal with the stuck object, said controlling member being inter-connected with the grapple and body to retain said parts against relative rotation.

3. An overshot adapted to telescope over an object stuck in a well bore and comprising, a tubular body having a downwardly converging, inside seat, a grapple on the seat adapted to engage about a stuck object, an annular controlling member seated in the body beneath the seat, an inside annular seal in the controlling member to form a seal with the stuck object, said controlling member being inter-connected with the grapple and body to retain said parts against relative rotation and an annular seal between said grapple controlling member and the body.

4. An overshot adapted to telescope over an object stuck in a well and comprising, a tubular body having an inside, downwardly converging seat, a grapple on the seat adapted to engage the stuck object, an annular grapple controlling member seated in the body beneath the seat, said grapple being slidably but nonrotatably engaged with the controlling member, a seal ring in said controlling member adapted to form a seal with the stuck object, an annular series of reaming cutters on the controlling member and a seal between the controlling member and body.

5. An overshot adapted to telescope over an object stuck in a well and comprising, a tubular body having a downwardly converging, inside upper seat, a grapple on the seat shaped to engage about a stuck object, an inside annular lower seat in the body spaced beneath the upper seat, an annular member within the body between said seats, means on said member slidably engaged with the grapple to hold the grapple against turning in the body, an inside annular seal in said member arranged to form a seal with the stuck object and an annular seal between said member and the lower seat.

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

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