

Dec. 23, 1941.

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2,266,873

OVERSHOT

Filed Nov. 21, 1938

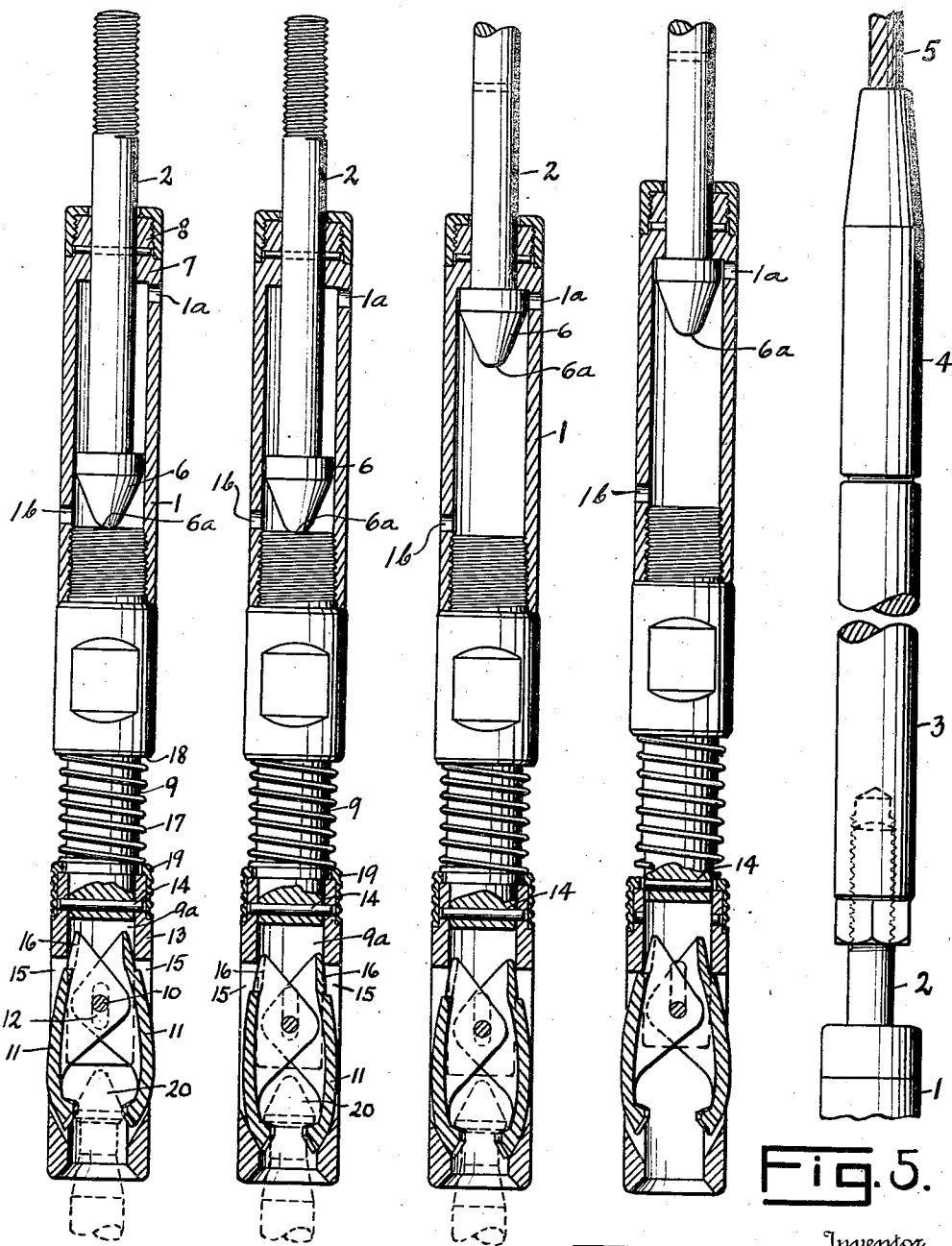


Fig.1. Fig.2. Fig.3.

Fig.4. Charles E. Lang.

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2,266,873

OVERSHOT

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Application November 21, 1938, Serial No. 241,510

3 Claims. (Cl. 294—116)

This invention relates to overshots and although not limited thereto will be found particularly useful in so called wire line core drills.

Conventional wire line core drilling equipment includes a drill stem having a drill bit on the lower end thereof, and a core barrel that is dropped into the drill stem to receive the core and later removed with the core therein by means of a wire line and an overshot. Such core barrels usually have latching means to engage cooperating elements in the drill stem, whereby the core barrel is held in a position to receive the core cut by the bit. Such latching means are usually adapted to be released by an upward pull on an element thereof engaged by the overshot and commonly called a spear head. If the latching means does not release, an excessive tension is placed on the wire line which at times results in breakage thereof. The carriers of center bits, collapsible bits and the like utilize similar latches and wire lines are likewise broken in connection therewith.

This invention has for its specific object the provision of a new and improved overshot embodying means whereby when an upward pull is exerted on it by the wire line, at a time when the latch of the core barrel, center bit carrier or collapsible bit is stuck, the overshot will automatically jar the latching means to cause it to release the spear head, and if such jar is insufficient to cause the latching means to so release the spear head and there exists a danger of the wire line being broken by excessive tension, the overshot will automatically release the spear head.

Other objects will hereinafter appear.

The preferred embodiment of the invention is illustrated in the accompanying drawing wherein:

Fig. 1 is a side elevation of the overshot about to engage the spear head.

Fig. 2 is a similar view of the overshot engaging the spear head.

Fig. 3 is a similar view of the overshot imparting a jar to the spear head to release the latching means not shown.

Fig. 4 is a view similar to Fig. 3, the overshot having released the spear head.

Fig. 5 is a view showing the attachment of the wire line to the overshot.

In the drawing the numeral 1 indicates the overshot body and the numeral 2 the pulling rod, the latter being connected by suitable elements 3 and 4 to the wire line 5 (Fig. 5). Carried by the rod 2 is a hammer 6 tapered downwardly and

having a rounded nose 6a. The purpose of the rounded nose is to make it possible for the hammer to penetrate any debris which may have settled within the body so that the pin 8 may be inserted. The upper end of the hammer 6 is adapted to strike the head 7 of the body 1 when the frangible pin 8 is sheared by an excessive pull on the rod 2, to jar the overshot to effect the release of the latching elements of the device to be removed from the drill stem. The body 1 is provided with vent openings 1a and 1b at its upper and lower ends, respectively, to permit free flow of liquid from the space within the body ahead of the hammer 6 and into the space behind the same when it is moved within the body and especially when it moves upwardly after the shearing of the pin 8. Connected to the body 1 is a plunger 9, having a fork 9-A on its lower end in which are pivoted at 10 the dogs 11. The pivot 10 is vertically movable in oppositely disposed slots 12 in the prongs of the fork 9a of the plunger 9. The plunger 9 is movable in the sleeve 13 when the frangible pin 14 is sheared by an excessive pull on the plunger 9. The sleeve 13 is provided with oppositely disposed vertical slots 15 to permit the free movement of the dogs 11 on the pivot 10, the upper end walls of the slots 15 serving, as will hereinafter appear, to engage the inclined surfaces of the upper ends 16 of the dogs to swing the dogs into their inoperative positions. The numeral 17 indicates a compression spring bearing upwardly against the shoulder 18 of the plunger 9 and downwardly upon the ring 19 of the sleeve 13 to urge said plunger 9 upwardly in the sleeve 13 in a manner to be described subsequently in connection with Fig. 4.

The element 9 has a downwardly facing shoulder intermediate its ends, which prevents the sleeve 13 from moving upwardly thereon any further than shown in Fig. 1. The sleeve 13 is normally held in the position shown by means of the shear pin 14, but is constantly urged downward by the spring 17. The dogs 11 are pivoted to each other on a pivot pin 10, the ends of which float in slots in the bifurcated lower end of the element 9, so that these dogs 11 may move up or down with respect to both the element 9 and the sleeve 13. When the device is engaged over the top of a spear head the dogs are naturally lifted and spread as shown in Fig. 1, until they engage beneath the spear head, whereupon they drop down to the position shown in Fig. 2 and engage the spear head. An upward pull on rod 2 will first sever the upper shear pin, permitting the

rod 2 to move to the position shown in Fig. 3. This gives a jarring action, but if this jarring action is insufficient to dislodge the article on which the spear head is mounted, further pull will shear the pin 14, thus allowing the sleeve 13 to drop down. If this sleeve drops down, the pin 10 reaches the lower end of its slot in the element 9 and the dropping of the sleeve with respect to the dogs permits the dogs to spread, releasing the spear head. The sleeve is prevented from dropping off however, because it engages the shoulder adjacent the upper ends of the respective dogs and is suspended thereby as shown in Fig. 4.

Now, when the overshot is lowered into the drill stem, as shown in Fig. 1, the spear head 20 of the core barrel, or the like (not shown), enters the lower end of the sleeve 13 and moves between the dogs 11; and the dogs 11 engage the spear head 20, as shown by Fig. 2.

When an upward pull is exerted on the wire line 5 and is transmitted through the connecting elements 3 and 4 to the pulling rod 2, the force is transmitted through the shear pin 8, body 1, plunger 9, frangible pin 14, sleeve 13 and dogs 11, to the spear head 20 of the core barrel, or the like. And if the core barrel or the like (not shown) is free to move upwardly in the drill stem, the removal thereof is effected while the elements of the overshot remain in the relative positions illustrated by Fig. 2.

If the latching means of the core barrel, or the like (not shown) do not readily disengage, or if the core barrel is otherwise stuck in the drill stem, then if the pull on the pulling rod 2 is increased to a predetermined point, the frangible pin 8 is sheared and the pulling rod 2 moves suddenly upwardly in the body 1 so that the hammer 6 strikes the head 7 to jar the overshot and the core barrel, or the like, to release the latter. If the core barrel is released and the upward pull on the pulling rod 2 is continued, then the removal of the core barrel, or the like, will be effected by the overshot with the parts in the position illustrated by Fig. 3.

If the jar imparted to the core barrel, or the like, by the hammer 6, as above set forth, does not release the core barrel from the drill stem, and the upward pull on the pulling rod 2 is increased to a point where a danger of breaking the wire line 5 is imminent, then the frangible pin 14 will be sheared and the plunger 9 will move upwardly in the sleeve 13 from the position shown by Fig. 3 to the position shown by Fig. 4. This movement will cause the upper end walls of the slots 15 to move the upper ends 16 of the dogs 11 inwardly, whereby the lower ends of the dogs 11 will be moved outwardly to release the spear

head 20. The spring 17 insures such movement and consequent release by constantly exerting a pressure tending to move the plunger 9 upwardly in the sleeve 13. The core barrel, or the like, will then be left in the drill stem and the overshot, with the parts illustrated in the position shown by Fig. 4, removed from the drill stem, breaking of the wire line 5 and the trouble and expense incident to the removal of the equipment after such breakage being thereby prevented.

Various other advantages of this invention will be apparent to those skilled in the art.

I claim:

1. An overshot including a body; a pulling rod; a hammer carried by said rod; a frangible pin to normally prevent sliding of said rod in said body; said rod being slidable in said body to cause said hammer to jar said body when an excessive pull is exerted on said pulling means; a sleeve; a plunger; dogs pivoted to said plunger; a spring yieldably urging said plunger upwardly in said sleeve; a frangible pin to normally hold said plunger against movement in said sleeve; said plunger being movable upwardly in said sleeve to move said dogs into their inactive positions when a greater excessive pull is exerted on said rod.

2. A retrieving tool including gripping means, means movable to one position with respect to said gripping means to hold the gripping means in gripping position, a pulling means, and means normally connecting said movable means to said pulling means, whereby said movable means will be caused to hold said gripping means in gripping position by a pull on said pulling means, said connecting means being yieldable under an excessive pull on said pulling means to allow said movable means to move with respect to said pulling means and gripping means so as to release said gripping means for movement to inactive position.

3. A retrieving tool including gripping dogs, a sleeve having a downwardly tapered inner surface movable upwardly with respect to said dogs to engage said dogs and hold them in contracted gripping position, a pulling means, and means normally connecting said sleeve to said pulling means whereby said sleeve will be held upwardly to hold said gripping means in contracted gripping position by a pull on said pulling means, said connecting means being yieldable under an excessive pull on said pulling means to allow said sleeve to move downwardly with respect to said pulling means and said gripping dogs thus permitting said gripping dogs to expand to non-gripping position.

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