

June 17, 1930.

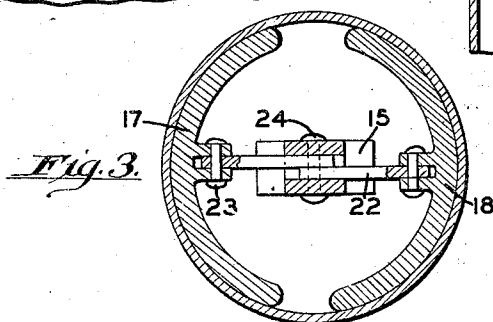
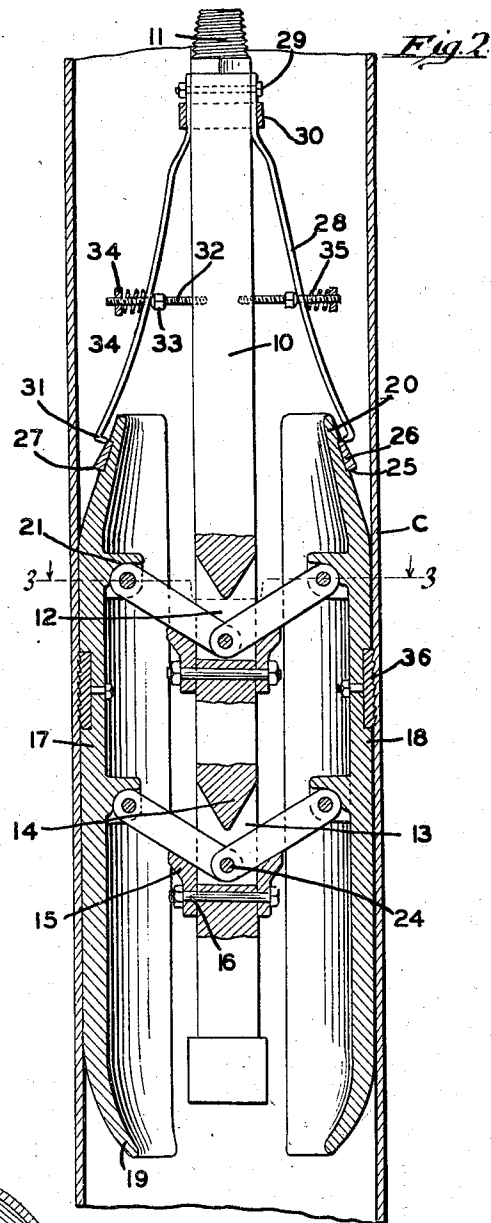
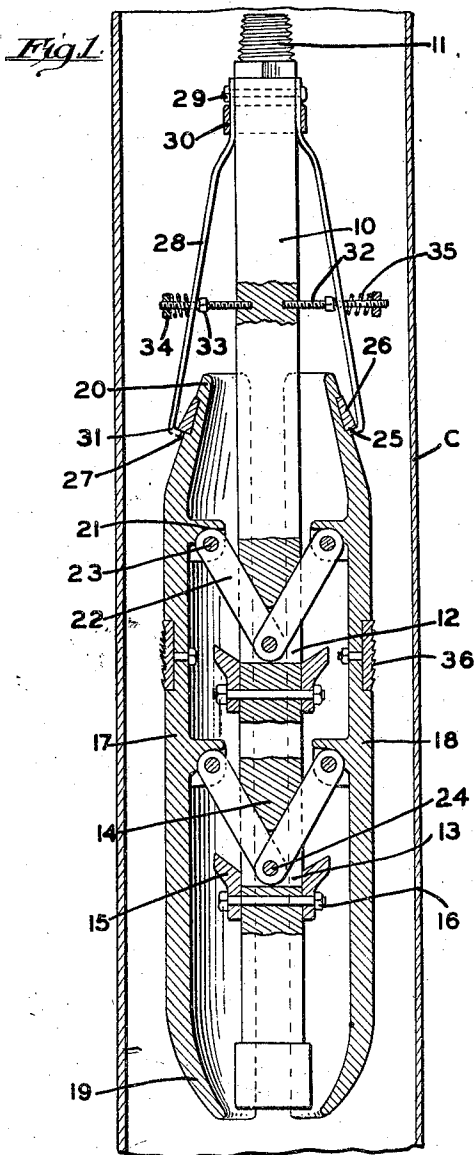
A. B. WATKINS

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COMBINED FISHING AND SWAGING TOOL

Filed May 29, 1929

2 Sheets-Sheet 1



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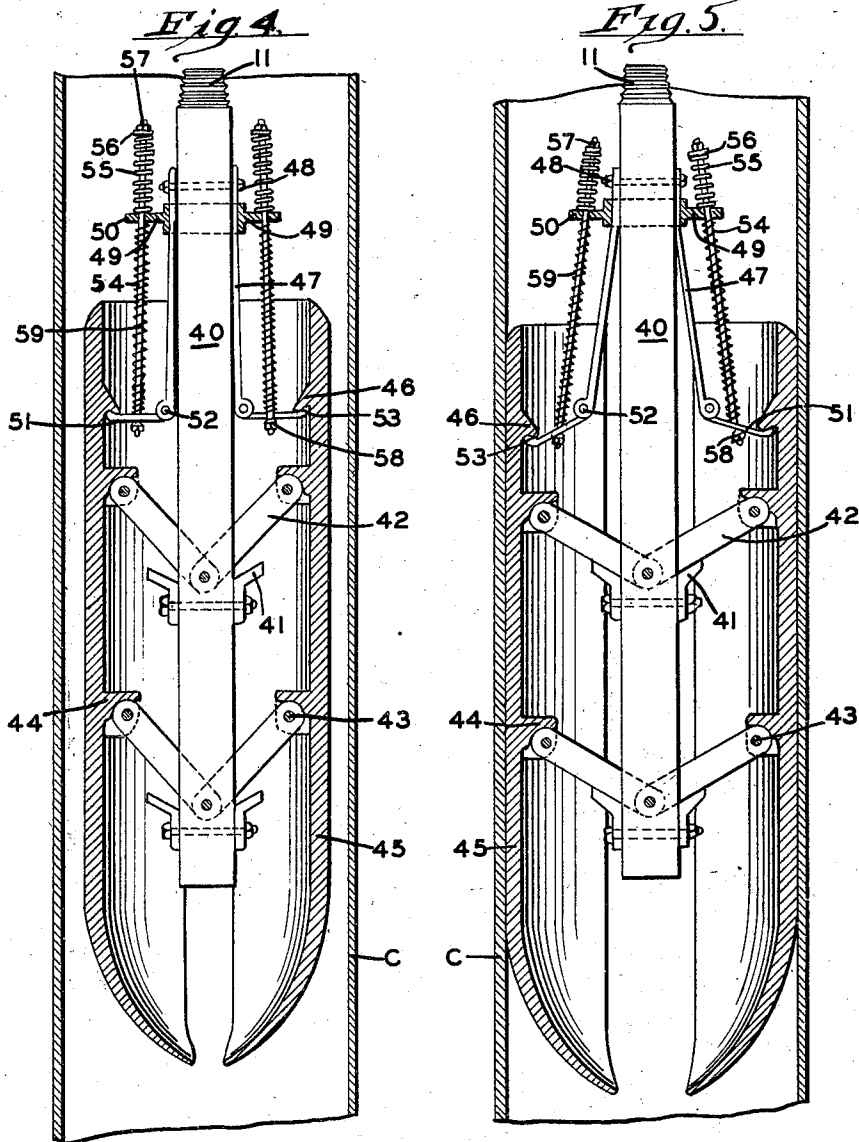
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UNITED STATES PATENT OFFICE

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COMBINED FISHING AND SWAGING TOOL

Application filed May 29, 1929. Serial No. 366,971.

This invention relates to improvements in combined fishing and swaging tools and may be considered as an improvement over the construction disclosed in my prior Patent No. 1,455,314, issued May 15, 1923.

An object of the invention is to provide a combined fishing and swaging tool that is adapted to be used for removing well casings from well holes and for swaging casings that may have become collapsed or partially collapsed while being placed in a well hole.

Another object of the invention is to provide an improved combined fishing and swaging tool which is adapted to be lowered into a casing in a well hole in a collapsed or contracted position and then expanded into engagement with the interior of a casing by being suddenly jarred. In my prior patent there is disclosed a construction wherein a central bar supports the casing engaging parts and is adapted to lift these parts with the casing when the casing has been caught. A cable is employed to hold the parts in contracted or collapsed positions so that two separate elements are lowered simultaneously into the well. These elements interfere with each other and are apt to cause difficulty. By the improved construction the use of the cable for holding the casing engaging parts in contracted position is entirely eliminated.

Another object of the invention is to provide an improved combined fishing and swaging tool having a central supporting or suspending member carrying casing engaging parts adapted to be expanded into engagement with a casing and to provide a spring construction which will hold the casing engaging parts in contracted positions until the tool is suddenly jarred and to have the spring construction so arranged that if the casing engaging parts are again contracted while in a well hole that the spring construction will again hold them in this position until the tool is again jarred.

With the foregoing and other objects in

view which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein

Fig. 1 is a vertical section illustrating the improved tool in contracted position in a well casing.

Fig. 2 is a view similar to Fig. 1 illustrating the tool in expanded position.

Fig. 3 is a vertical section taken substantially upon the line 3-3 upon Fig. 2.

Fig. 4 is a vertical section through a tool embodying the invention which is of modified construction, illustrating the tool in collapsed or contracted position.

Fig. 5 is a view similar to Fig. 4 illustrating the tool in expanded position.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the improved tool comprises a vertical central supporting or suspending bar 10 having its upper end threaded as indicated at 11 to provide for attachment to a drill pipe or equivalent suspending construction. Extending through the supporting bar are two or more transverse apertures 12 and 13, the tops of which present upwardly diverging bearing surfaces 14. Near the bottom of each aperture 12 and 13 and on opposite sides of the bar 10 there are positioned stops 15 which are fastened in place as by bolts 16. A pair of casing engaging members indicated at 17 and 18 are associated with the supporting bar 10 and are arranged on opposite sides thereof. These casing engaging members are semi-cylindrical in form and have their bottoms bent inwardly as indicated at 19. The upper ends of the casing engaging members are also bent inwardly as indicated at 20. On the interior surfaces of the casing engaging members 17 and 18 there are formed ears 21 to

which the outer ends of the links 22 are pivotally connected as by rivets 23. The inner ends of the links 22 extend into the apertures 12 and 13 and are pivotally connected thereto as by rivets 24. By reason of the pivotal connections between the links and the casing engaging members 17 and 18 and the supporting bar 10 the casing engaging members may assume a collapsed or contracted position as shown in Fig. 1 or an expanded position as shown in Fig. 2. In the position shown in Fig. 1 it will be noted that the links 22 bear against the divergent bearing surfaces 14 at the tops of the apertures 12 and 13 whereas when the casing engaging members 17 and 18 are in expanded positions the links bear against the stops 15 limiting the downward movements of the links so that the links will not be capable of swinging past the horizontal. In the inwardly bent upward ends 20 of the casing engaging members there are formed grooves 25 which contain inserts 26 forming shoulders indicated at 27. Leaf springs 28 have their upper ends secured as by bolts 29 to the upper end of the supporting bar 10. A collar 30 is also preferably employed to assist in holding the upper ends of the leaf springs against the supporting bar. The lower ends of the leaf springs are bent inwardly to form hooks 31 engageable upon the shoulders 27. Suitable studs 32 are secured to the supporting bar 10 and have shoulders or stops 33 formed thereon as by nuts. These nuts are adjustable and are adapted to limit the inward movements of the leaf springs 28. Nuts 34 are screwed onto the outer ends of the studs and coil springs 35 are compressed between the leaf springs and the nuts 34, urging the leaf springs inwardly.

The operation of the improved combined fishing and swaging tool is as follows. Before lowering the tool into the well the casing engaging members 17 and 18 are caused to assume the collapsed positions shown in Fig. 1. In this position the hooks 31 are engaging the shoulders 27. The device is then lowered into a well and suitable provision is made for suddenly jarring the tool while it is in the well. This may be accomplished by incorporating a tool commonly known as a jar in the suspending structure or the suspending structure may be connected to a walking beam or a pitman at the surface. The particular manner in which the tool is suddenly jarred may be varied and is immaterial in so far as the present invention is concerned. When the tool is lowered into the casing C which it is desired to lift in the well and reaches the desired location the tool is given the sudden jar above referred to, by having its downward movement suddenly arrested. The inertia of the casing engaging parts 17 and 18 is such that these parts will swing downwardly springing past the hooks

31 on the leaf springs 28. The tool will then expand into engagement with the interior of the casing C, after which the casing may be elevated by the supporting or suspending bar 10. Suitable jaws or slips 36 may be secured to the casing engaging parts 17 and 18 which have upwardly directed teeth to facilitate lifting the casing by the tool. If for any reason it should be desired to cause the tool to disengage the casing and leave the casing in the hole the central supporting bar 10 can be suddenly dropped and if this dropping of the bar 10 is fast enough the bar 10 will return to the position shown in Fig. 1 with respect to the casing engaging parts 17 and 18. In so doing, the hooks 31 will slide on the outer surfaces of the inserts 26 and ride over the shoulders 27 so that the leaf springs will again hold the casing engaging parts in collapsed positions so that the tool can be withdrawn from the well.

The construction shown in Figs. 4 and 5 is quite similar to that disclosed in Figs. 1, 2 and 3. This construction comprises a central supporting bar 40 carrying the stops 41 and having the transverse apertures in which the links 42 are pivoted. The links 42 have their outer ends pivoted as at 43 to ears 44 on the interiors of the casing engaging parts 45. The construction differs from that disclosed in Figs. 1, 2 and 3 in that the interior surfaces of the casing engaging parts 45 have hooks or shoulders 46 formed adjacent their upper ends. Leaf springs 47 are fastened as by bolts 48 to the upper end of the supporting bar 40. A collar 49 encircles the upper ends of the leaf springs and this collar is provided with outwardly projecting ears 50. The lower ends of the leaf springs have latches 51 hingedly connected as at 52 and these latches have their ends hooked as at 53, which are engageable upon the hooks or shoulders 46. Rods 54 slidably extend through the ears 50 and have leaf coil springs 55 disposed thereabout which are compressed between the ears, and washers 56 fastened onto the upper ends of the rods by nuts 57. The lower ends of the rods extend through apertures in the latches and are provided with nuts 58. Coil springs 59 are compressed between the ears 50 and the latches.

The operation of this form of tool is identically the same as that previously described. The coil springs 55 are insufficient to cause the latches 51 to lift the casing engaging members 45 into collapsed positions but when the casing engaging members are in collapsed positions these springs are strong enough to retain them there. It will be appreciated from the disclosures made on the drawing that when the links are in their uppermost positions that these links carry most of the weight of the casing engaging members. However, when the casing engaging members are jarred or urged into expanded positions,

by virtue of the fact that the links swing outwardly, the portion of the weight of the casing engaging members carried by the links decreases. This causes an increased portion of the weight of the casing engaging members to be sustained by the spring actuated means so that although the springs may be flexed or compressed when the casing engaging members are expanded, the increase in upward force exerted by the spring means is more than overcome by the increased portion of the weight of the casing engaging members left unsupported by the links. When the supporting or draft rod 40 is suddenly stopped or suddenly jarred in any suitable manner such as by a cable jar which is incorporated in the cable which may suspend the draft bar 40, the casing engaging members 45 by reason of their momentum swing downwardly and outwardly into engagement with the casing so that the casing may be elevated by the tool. The casing engaging members are prevented from expanding too far by reason of the links 42 engaging the stops 41 which stops prevent the links from swinging past the horizontal or past center. To release the casing the draft or supporting bar 40 may be suddenly dropped, causing the casing engaging members to swing back into collapsed positions with respect thereto and in this position the springs 55 will be capable of retaining the casing engaging parts in their uppermost positions.

From the above described constructions it will be appreciated that an improved combined fishing and swaging tool is provided which is so constructed that only one suspending means is necessary in lowering the tool into the well. The tool is capable of being expanded into engagement with the casing by jarring or suddenly stopping the downward movement of the draft or supporting bar. In small size tools the links 22 and 42 are pivotally connected to the draft bar at the center but in large size tools these links may have their inner ends pivotally fastened to pintles or bearings arranged on the sides of the draft bar. An important feature of the present invention resides in the fact that the stops which limit the downward movements of the links are so arranged that these links have their downward movements limited or stopped wherein they assume positions materially above the horizontal. By virtue of such construction it is always easy to cause the tool to disengage the casing and assume its collapsed position for withdrawal.

If a casing is partially collapsed or indented the improved tool may be used merely as a swage. The rounded or contracted lower ends of the casing engaging parts enable the lower end to enter the partially collapsed or indented portion of the casing and the tool may be used as a hammer pound-

ing or swaging the casing back into its initial position.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A fishing and swaging tool comprising a central support, convex members arranged about said support, links pivotally connecting the convex members to the support, and means attached to the support providing stops for the links to limit the downward movement of the links.

2. A fishing and swaging tool comprising a central support, convex members arranged about said support, links pivotally connecting the convex members to the support, said links having their movements limited, and means for normally holding the convex members in collapsed position about the central support but adapted to allow them to move into expanded positions when the tool has its downward movement suddenly arrested.

3. A fishing and swaging tool comprising a central support, convex members arranged about said support, links pivotally connecting the convex members to the support, and resilient yieldable means for normally holding the convex members in collapsed position until the tool is jarred and then allow them to move into expanded positions in engagement with the well casing.

4. A fishing and swaging tool comprising a central supporting member, casing engaging members disposed about the supporting member, links pivotally connecting the casing engaging members to the supporting member whereby the casing engaging members may swing from contracted positions into expanded positions, and spring means normally holding the casing engaging members in contracted positions but adapted to allow them to move into expanded positions when the supporting member has its downward movement suddenly arrested.

5. A fishing and swaging tool comprising a central supporting member, casing engaging members disposed about the supporting member, links pivotally connecting the casing engaging members to the supporting member whereby the casing engaging members may swing from contracted positions into expanded positions, and spring means normally holding the casing engaging members in contracted positions but adapted to allow them to move into expanded positions when the supporting member has its downward movement suddenly arrested, said spring means being adapted to subsequently hold the casing engaging members in contracted positions upon their being returned thereto.

6. A fishing and swaging tool comprising a central supporting member, casing en-

gaging members disposed about the support-
ing member, links pivotally connected to the
supporting member and extending upward-
ly and outwardly therefrom, said links be-
ing pivotally connected to the casing engag-
5 ing members, and means normally holding
the casing engaging members in contracted
positions about the support but enabling
them to move into expanded positions when
relative vertical movement between the cas-
10 ing engaging members and the support is
suddenly urged.

In testimony whereof I have signed my
name to this specification.

ALBERT B. WATKINS.

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