

Oct. 11, 1927.

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DEVICE FOR RECOVERING CASING FROM WELLS

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Fig. 1.

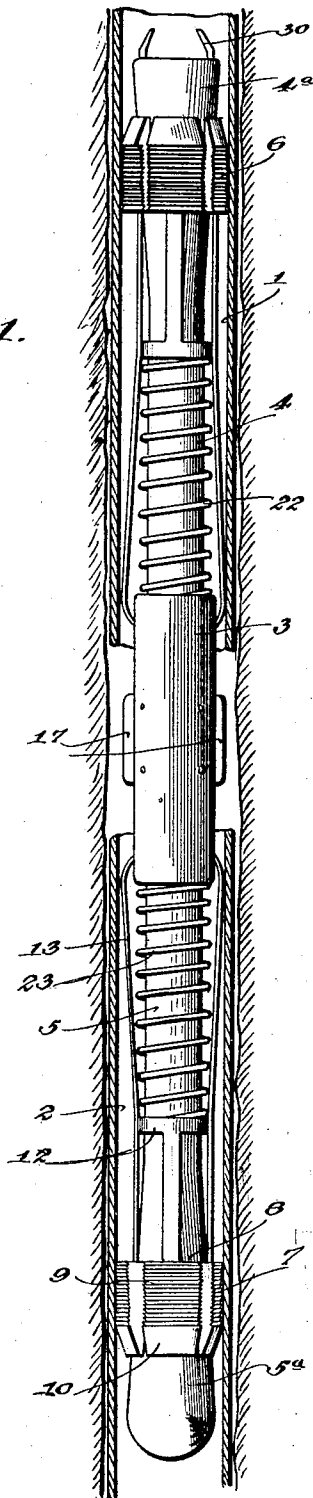
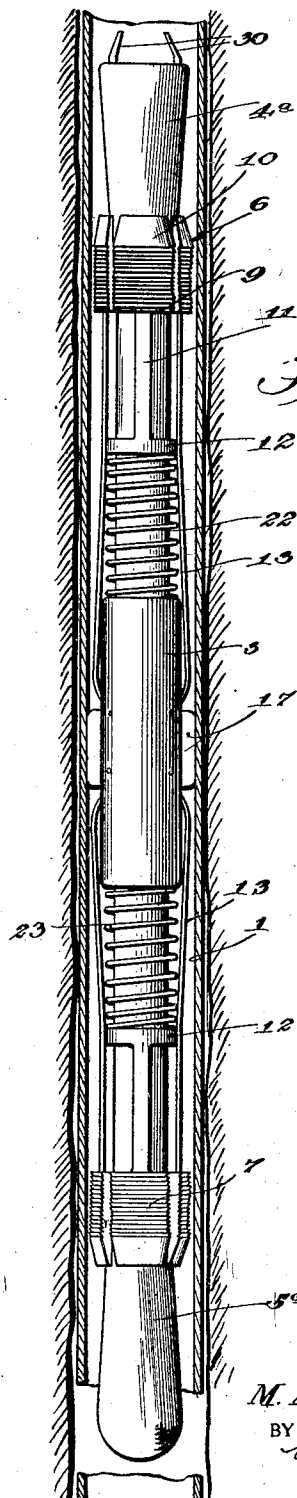


Fig. 2.



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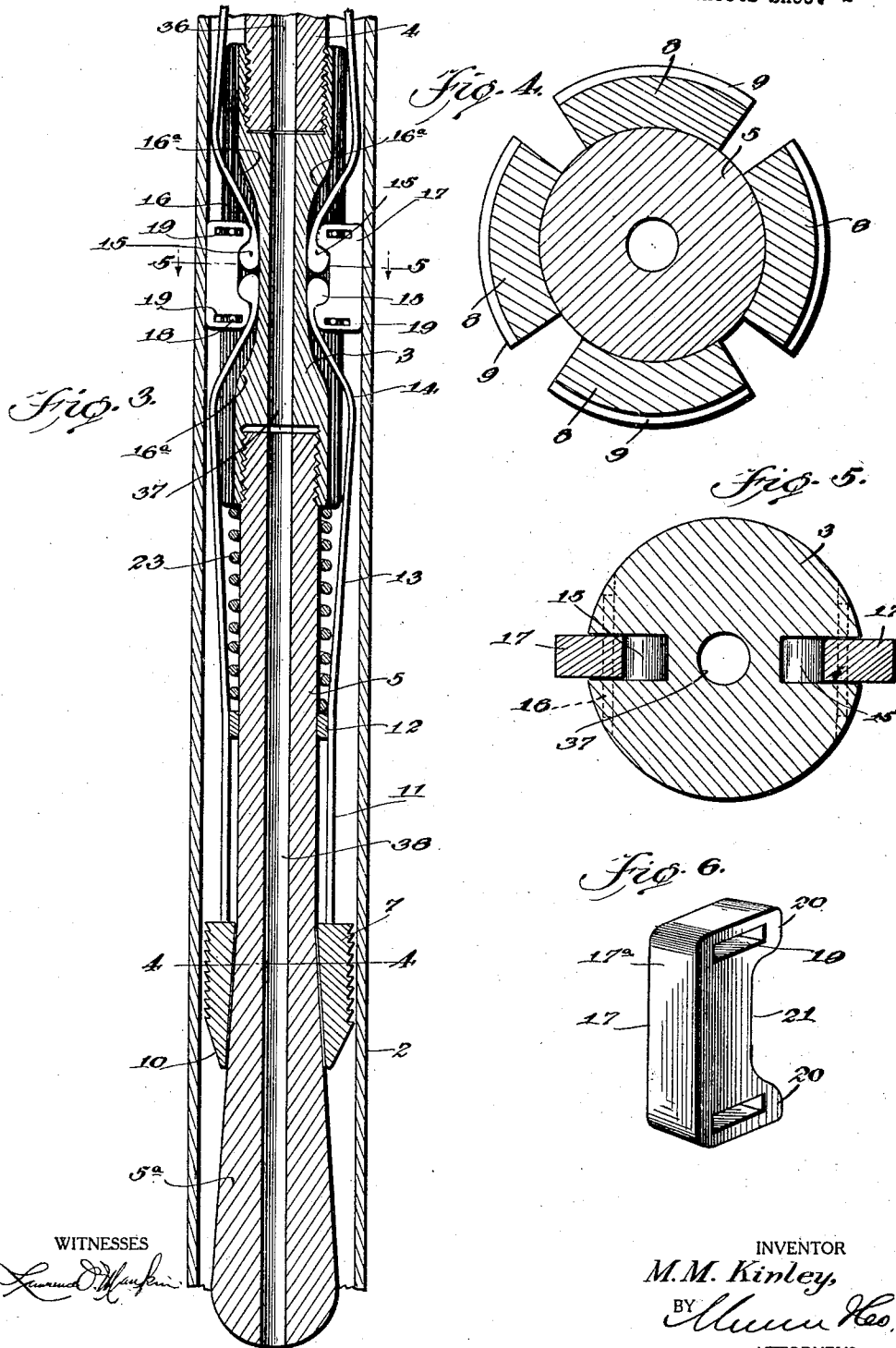
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UNITED STATES PATENT OFFICE.

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DEVICE FOR RECOVERING CASING FROM WELLS.

Application filed February 4, 1926. Serial No. 86,037.

This invention relates to a device for recovering casing from wells when the casing is broken or parted.

The object of the present invention is to provide a device of this character which permits of the speedy recovery of the casing in and as a single string. This feature has very material advantages especially as it permits the upper string to remain in the well and thereby prevent cavings which are liable to and do occur when the upper string is removed first in accordance with the practice prevalent heretofore. The device constituting the present invention positively and rigidly connects or couples the sections of the casing so that the two sections may be removed as a unit.

A further object resides in the provision of a device having these advantages and capacities and which is of simple and durable construction, reliable in operation, and easy and comparatively inexpensive to manufacture.

Other objects and advantages reside in the certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part of this specification, and in which:

Figure 1 is a view in elevation showing a device embodying the present invention when in position to couple and connect the sections of a parted casing,

Figure 2 is a similar view illustrating the device as positioned when being introduced down through the upper section or string of the casing,

Figure 3 is a view in transverse vertical section showing the means for controlling the slips,

Figure 4 is a view in horizontal section on the line 4-4 of Figure 3,

Figure 5 is a similar view on the line 5-5 of Figure 3, and

Figure 6 is a detail perspective view of one of the controlling elements employed for the slips.

Referring to the drawings, the numeral 1 designates the upper section of a parted well casing, and the numeral 2 designates the lower section thereof. Heretofore to effect the removal of the lower section 2, it has been necessary to remove the upper section 1 first, and afterwards to lower a casing spear

or similar fishing tool down through the unlined well hole and introduce such spear into the casing 2 and then remove the casing 2. This practice has a number of serious objections and disadvantages, and among these is the fact that the formation making up the wall of the well hole, frequently caves after the section 1 has been removed, thereby making difficult or impossible the removal of the lower section.

The present invention proposes to remove the sections 1 and 2 simultaneously, and for this purpose, there is provided a casing connector and gripper having a body portion consisting of a central portion 3, an upper section 4, and a lower section 5, the sections 3, 4 and 5 being coupled together in axial alinement. The central section 3 is substantially of cylindrical form and portions of the sections 4 and 5 adjacent the section 3 are likewise of cylindrical form. Adjacent their ends, however, these sections 4 and 5 have their outer surfaces tapering or enlarging gradually toward their extremities, the tapered portions of the sections 4 and 5 being designated at 4^a and 5^a, respectively.

A set of slips or grippers designated generally at 6, is provided on the upper section 4, and a similar set of slips or grippers designated generally at 7 is provided on the lower section 5. These slips 6 and 7 are identical in construction, though oppositely arranged, and each set includes a segmental body 8 having peripheral teeth 9 and a smooth and beveled portion 10. Due to the opposite arrangement of the slips the beveled portions 10 of the lower set are presented at the lower ends thereof, while the similar beveled portions 10 of the upper set are presented at the upper ends of the slips of the upper set. Each body 8 of each slip is welded or otherwise suitably secured to an end of a resilient carrier arm 11. The carrier arms 11 are integrally formed with, or otherwise suitably connected to, carrier rings 12 which are slidably fitted on the cylindrical portion of the section on which they are mounted. In the present instance, four slips and four carrier arms 11 are shown, and two of the carrier arms of each set of slips have integral extensions 13, the extensions 13 having bowed portions 14 and terminal knobs 15. The knobs 15 of the extensions of the carrier arms of the sets of slips are loosely fitted in the diametrically opposite slots 16 provided in the central sec-

tion 3 of the body portion of the device. Controlling blocks 17 are also fitted in these slots 16 and are prevented from entire displacement from the slips by means of pins 18 carried by the section 3 and traversing slots 19 provided in the blocks 17. The pins 18 and slots 19 serve to constrain the controlling blocks 17 to movement substantially radially of the section 3 and in and out of the slots 16.

The outer face of each controlling block 17 is elongated and smooth so as to be adapted to ride along the inner wall of the well casing. The inner portion of each block 17 has a pair of inwardly directed lugs 20 defining a seat 21 between them designed to receive the cooperating knobs 15 of the portions 14 of the arms 11. As shown to advantage in Figure 3, the controlling blocks 17 operate in the central portions of the slots 16, and such central portions of the slots are the deepest portions thereof. As a consequence of this feature, the enlargements 15 may be confined in the seats 21 between the lugs 20 and held against the adjacent portions of the inner walls of the slots 16. This is the position which the parts assume when the device is being introduced in the well, and the parts are held in such position by virtue of the engagement of the blocks 17 with the inner wall of the well casing. The lugs 20 of the blocks 21 coact with the enlargements 15 to hold these enlargements and the arms connected therewith not only against outward movement, but also against movement along the body portion of the device. It is by virtue of this action of the blocks 17 that the slips 6 and 7 are held retracted for the parts are so designed that the slips of the sets are held on the smallest ends of the tapered portions when the enlargements 15 are confined between the lugs of the block.

The slips are expanded at the proper time by means of coil springs designated at 22 and 23, the coil spring 22 encircling the cylindrical portion of upper section 4 and the coil spring 23 encircling the cylindrical portion of the lower section 5. The coil springs 22 and 23 abut the shoulders presented at the ends of the central section 3, and these coil springs also engage the carrier rings 12 whereby they tend to urge the slips to expanded position. It will no doubt be appreciated that when the upper slips 6 are moved upwardly by their coil spring 22 they will be expanded and likewise when the lower slips 7 are moved downwardly by their coil spring 23 they will be expanded.

In order to insure disengagement of the enlargements 15 from the controlling block 17 when the casing no longer engages these blocks 17, the enlargements 15 are rounded to present surfaces cooperable with similarly formed surfaces on the lugs 20. The end

portions of the bottom wall of the slot 16 flare outwardly as indicated at 16^a.

In operation, the slips 6 and 7 are retracted by pulling the arms 11 toward the center of the body portion of the device and engaging the enlargements 15 with the lugs 20 of the blocks 17 and confining such enlargements between the lugs as illustrated in Figure 3. This compresses the coil springs 22 and 23, and so disposes the slips that they will not engage the well casing when being lowered therethrough. The entire device is lowered down through the upper string 1 of the casing, and during its descent its blocks 17 are engaged by the inner wall of the casing, and are held in secure engagement with the enlargements 15 to the end of preventing expansion of the slips. After the device has passed down to the lower end of the string 1, its lower end enters the section or string 2 and eventually the blocks 17 move out of the string 1 and into the space between the strings 1 and 2 where they are not held, but are free to expand.

When the blocks 17 are no longer held, the springs 22 and 23 are effective to expand the slips which they control by forcing these slips along the tapered section on which they are mounted. In this way the upper and lower strings are interlocked, coupled and connected, since the slips 6 have firm and secure engagement with the string 1 while the slips 7 have similar engagement with the string 2. The entire device may be suspended by a suitable cable or other suspension means having a bail at its lower end cooperable with hooks 30 provided on the upper end of the upper section 3. The sections 3, 4 and 5 making up the body portion preferably have alined axial openings 36, 37, and 38 to permit of the introduction of explosives or other agencies should their use be found desirable. With the two strings of casing coupled and connected in the manner described both strings may be removed simultaneously.

I claim:—

1. A device for recovering parted string from well casing, comprising a body portion having oppositely extending tapered portions, a set of slips mounted on each tapered portion, a carrier for said slips, spring means cooperating with the carrier for expanding the slips, and means for retaining the slips retracted comprising arms connected with the carrier and having enlargements, and controlling blocks mounted on the body portion and engageable with the casing and with the enlargements.

2. A device for recovering parted strings of well casing, comprising a body portion having oppositely extending tapered portions, a set of slips mounted on each tapered portion, a carrier for said slips, spring means cooperating with the carrier for ex-

panding the slips, and means for retaining the slips retracted comprising arms connected with the carrier and having enlargements, said body portion having slots in which the enlargements operate, controlling blocks mounted in said slots and having lugs co-operable with the enlargements, means for mounting the controlling blocks on the body portion for limited radial movement, said controlling blocks being cooperable with the casing to regulate the expansion and contraction of the slips.

3. A device for recovering parted strings of well casing including a body portion having oppositely tapered ends, slips co-operable with the oppositely tapered ends, spring means tending to move the slips on the body portion to expand the same, arms directly connected to the slips, and controlling blocks loosely mounted on the body portion and held in engagement with the arms to maintain the arms in such position as to hold

the slips retracted as long as the blocks are engaged with the casing.

4. A device for recovering casing from a well, comprising a body adapted to be lowered into a well casing and having a tapering portion and a radial slot adjacent to the smaller end of the tapering portion, slips movable on the tapering portion of the body between contracted and expanded positions, spring means acting on said slips tending to move the slips to expanded position, an arm connected with said slips and having an end portion adapted to enter the slot of said body when the slips are in their contracted positions, and movable control means partially received in said slot and adapted to be held in engagement with said end portion of said arm when the control means is in said well casing so that said slips will be retained in their contracted positions.

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