W. J. SHEEHAN.

CASING SPEAR.

APPLICATION FILED APR. 16, 1920.

1,383,345. Patented July 5, 1921.

Fig. 1.

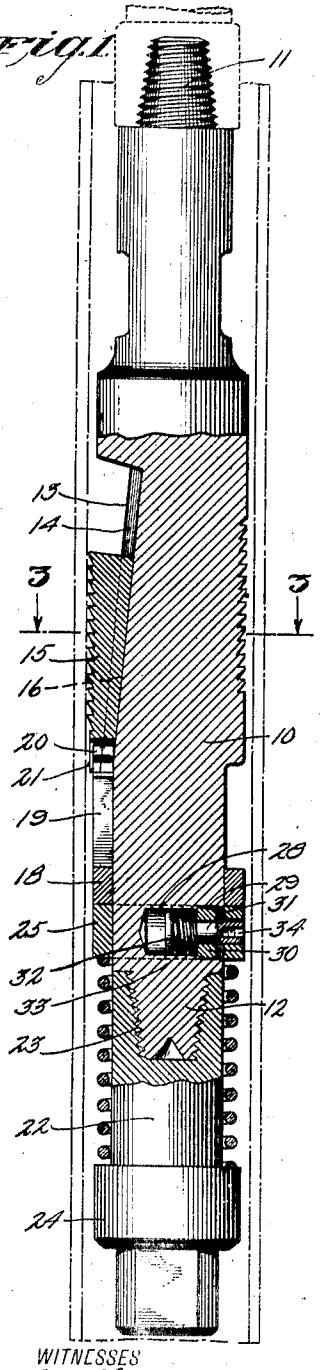


Fig. 3.

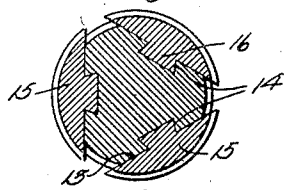


Fig. 2.

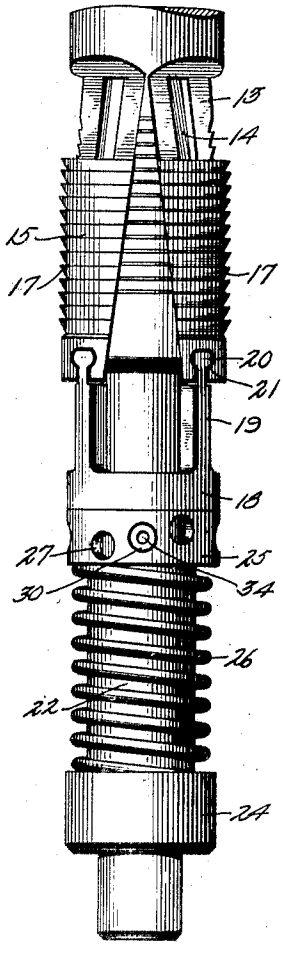
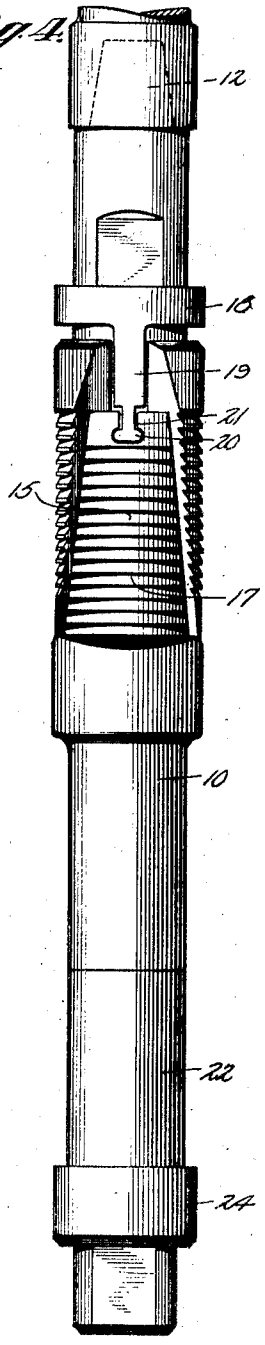


Fig. 4.



WITNESSES

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CASING-SPEAR.

1,383,345. Specification of Letters Patent. Patented July 5, 1921.

Application filed April 16, 1920. Serial No. 374,406.

To all whom it may concern:

Be it known that I, WALTER JAMES SHEEHAN, a citizen of the United States, and resident of Santa Paula, in the county of Ventura and State of California, have invented a new and Improved Casing-Spear, of which the following is a full, clear, and exact description.

This invention relates to tools used in drilling wells and more particularly to fishing tools, the same being in the nature of an improvement in casing spears.

One of the principal objects of the present invention is to combine with and generally improve the structure and function of a casing spear whereby to increase its scope of usefulness and eliminate a multiplicity of separate and individual tools.

Another object of the invention is to provide a casing spear which is provided with means rendering the same reversible to permit of its use either as a "jar up" or "trip spear," or as a "jar down" spear.

As well casings of the same external diameter are manufactured of different weights the bore of the heavier casings is necessarily smaller. However, even though the difference in the diameters of the bores is very slight, it is necessary to employ casing spears of different sizes for each weight. A further object therefore, of the present invention is to provide a casing spear having adjustable means permitting of its use in connection with casings of various weights and different internal diameters.

Ordinarily it is the general practice to provide the body of the casing spear with the longitudinal slots to permit of the coupling of the slips for simultaneous movement, and a still further object of the present invention is to provide a casing spear provided with means arranged exteriorly of the body for coupling the slips for simultaneous movement in order to eliminate the use of slots for this purpose as the same tend to weaken the structure.

Another object of the present invention is to provide a device of the character described including means for carrying out the foregoing objects and which is comparatively simple and inexpensive to manufacture, which is strong and durable in construction and highly efficient in its purpose.

With these and other objects in view some of which will be more readily apparent hereafter from the following description and claims, reference is had to the accompanying drawings forming a part of the application in which:

Figure 1 is a side elevation of the spear with parts shown in section to disclose the underlying structure.

Fig. 2 is a fragmentary elevation of the same.

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is an elevation of the spear illustrating the same used as a "jar down" spear.

Referring to the drawings by characters of reference which denote like parts throughout the several views thereof, 10 designates the spear body which is provided at its opposite ends with the taper joint pins 11 and 12, the same being designed to threadedly engage the taper joint boxes of a tool or other appliance. The medial portion of the body is cut away to provide the inclined faces 13 each of which is provided with a longitudinal dove tailed groove 14. Wedge shaped slips 15 having dove tailed ribs 16 and outer serrated gripping surfaces 17 are provided and are designed to slide on the faces 13, the ribs 16 engaging the grooves 14 whereby upon longitudinal movement of the slips the same will be radially adjusted. Means is provided for coupling the slips for simultaneous movement and said means comprises the ring 18 having legs 19 extending therefrom and provided with reduced headed portions 20 received by the sockets 21 formed in the slips. By this arrangement the slips and ring will move in unison thus preventing one slip from traveling ahead of the other and doing away with slots through the body of the spear which tend to weaken the structure. It will be seen from the arrangement in Figs. 1 and 2 that as the slips are moved downward they expand radially and in order to provide means for limiting and adjusting the limit of the expansion of the slips use is made of a tail piece 22 which is provided with a taper box joint 23 for coupling the same to the spear body by means of the taper joint pin 12. The tail piece is provided with an enlarged annular head 24 and a setting ring 25 is arranged on the spear body and is normally forced toward the ring 18 by means of an expansible coil spring 26 surrounding the tail piece above the annular head 24. The setting ring is provided with a plurality of apertures 27 out of longitudinal alinement as clearly illustrated in Fig. 2 of the drawings.

The spear body adjacent its lower end is provided with a transverse radial socket 28 provided with threads 29 adjacent its open end for the reception of the exteriorly threaded bushing 30. A trigger 31 having an enlarged head 32 disposed within the socket 27 is adjustable through the central aperture of the bushing and a coil spring 33 is interposed between the head 32 and the bushing to normally retract the extremity of the trigger and position the same within the periphery of the spear body. The extremity of the trigger is provided with a threaded bore 34 which is adapted to receive an eye-bolt for withdrawing the trigger extremity and disposing a portion of the same beyond the peripheral edge of the spear body.

In use of the device as a "jar up" or "trip spear" for removing a casing, the tail piece is applied to the pin 12 and the proper opening 27 in accordance with the adjustment desired, registered with the trigger socket 28. The trigger is then projected through the opening and the tension exerted by the spring 26 against the setting ring 25 will set up sufficient frictional engagement of the opening with the trigger extremity to retain the same in place. It will be noted that the setting ring 25 will then serve as an abutment with which the ring 18 will contact to limit its downward movement and consequently serve to prevent a spreading or further expansion of the slips beyond the adjustment selected. The casing spear in its entirety is then lowered into the casing illustrated in broken lines in Fig. 1 and when an upward pull or jar is transmitted to the spear head the slips will engage and bite into the inner sides of the casing as the inclined faces move upwardly against the inner inclined faces of the slips. As soon as the spear body has moved up through the ring 18 a sufficient distance to compress the spring 26 the frictional engagement of the opening 27 with the trigger extremity will be destroyed, thereby permitting the spring 33 to retract the trigger extremity into the socket 28. So long as an upward pressure is exerted on the spear body, the slips will remain in engagement with the sides of the casing but as soon as a slight downward pressure is exerted on the spear body, the spring 26 will function to advance the ring 25 against the ring 18 and force the slips upward which will hold the same in an inactive position where all possibility of their gripping the casing sides is eliminated. The spear may then be withdrawn from the casing at the will of the operator.

In use of the device as a "jar down" spear as illustrated in Fig. 4 of the drawings, the tail piece 22 is removed and applied to the opposite end of the spear body by engaging the taper joint box 23 with the taper joint pin 11. In this use of the spear, the setting ring 25 and the spring 26 are eliminated and the spear is inserted into the well casing reversely to the position illustrated in Figs. 1 and 2 of the drawings. In operation of the device as a "jar down" spear the tool which is now connected to the opposite end of the spear is lifted and dropped quickly in order to throw the slips outwardly into contact with the casing.

While there has been shown and described a single and preferred embodiment of the invention, it is understood that the same is merely illustrative of one construction and arrangement of parts for carrying the invention into practice and such changes and modifications as fall within the scope of the appended claims may be resorted to when found expedient.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,

1. The combination with a casing spear including a body having casing gripping devices longitudinally movable thereon for effecting radial adjustments thereof, of means for adjustably limiting the movement of said gripping devices in a direction to effect radial expansion comprising an axially rotatable ring provided with a plurality of radial spirally arranged openings, and a radially movable key carried by the spear body and adapted to selectively engage said openings.

2. In a casing spear, a body portion, radially adjustable gripping devices, means for controlling said gripping devices for simultaneous radial adjustments, adjustable means co-acting with the controlling means for limiting the radial expansion of said gripping devices and means for effecting the contraction of said gripping devices upon their disengagement from the casing.

3. In a casing spear a body portion provided with radially expansible slips, means for coupling and simultaneously controlling the movements of said slips, and means adapted to co-act with the coupling means for limiting the expansion of the slips, said means being axially rotatable on the spear body to obtain the various adjustments thereof.

4. A casing spear, comprising a body portion, casing gripping devices longitudinally adjustable thereon for radial contraction and expansion, a stationary abutment for limiting the contraction of said gripping devices, an adjustable abutment for limiting the expansion of said gripping devices, means for normally advancing the gripping devices toward the stationary abutment for effecting the contraction of the same and means for rendering the advancing means inactive, the said latter means also co-acting with the adjustable abutment to retain the same in its adjusted positions.

5. In a casing spear, a body portion, a plurality of interior casing gripping devices longitudinally adjustable on the body portion for radial contraction and expansion, an abutment on the body portion for limiting the contraction of said gripping devices, a coupling means for simultaneously controlling adjustments of the gripping devices, means adapted to normally co-act with the coupling means for effecting the contraction of the gripping devices, an adjustable abutment for limiting the expansion of said gripping devices, and means co-acting with the adjustable abutment for rendering the contraction means inactive.

6. The combination with a casing spear including a body portion, interior casing gripping devices longitudinally adjustable on the body portion for radial contraction and expansion, and an abutment for limiting the contraction of said gripping devices a, of an adjustable means for limiting the expansion of said gripping devices, said means being axially rotatable on the spear body to obtain adjustments thereof.

7. A casing spear comprising a body portion having longitudinally inclined faces, a plurality of wedge shaped gripping devices longitudinally movable over said faces for respective radial contraction and expansion, a coupling member movable over the casing body having connection with each of the gripping devices for moving the same simultaneously, a detachable headed extension carried by the spear body, a setting ring having a plurality of radial openings disposed out of longitudinal alinement, movable on the extension and the spear between the controlling member and its headed portion, expansible means disposed between the ring and the headed portion of the extension for normally forcing the ring into contact with the controlling device to effect the contraction of the gripping devices, and a trigger carried by the spear body and adapted to be projected therefrom to selectively engage the openings in the ring, the expansible means between the ring and the headed portion of the extension serving to retain the trigger therein by the frictional contact of the wall of the opening therewith, and means for retracting the trigger from the opening upon disengagement of the walls of the opening with the trigger as and for the purpose set forth.

WALTER JAMES SHEEHAN.