July 7, 1925. 1,544,659

C E. LAWSON

OIL WELL CASING SPEAR

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FIG. 2

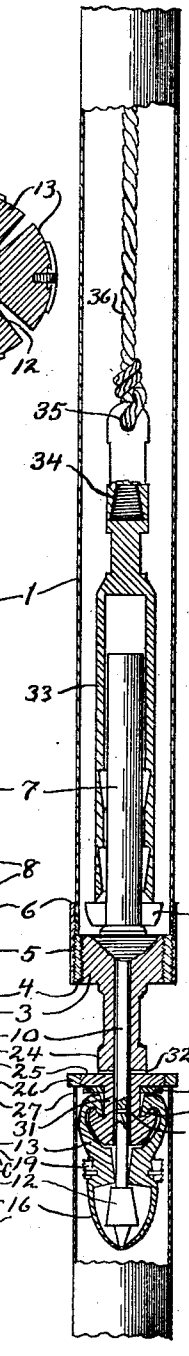


FIG. 3

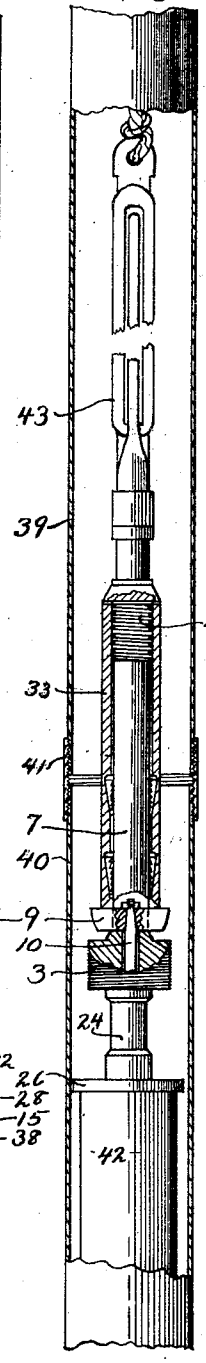


FIG. 4

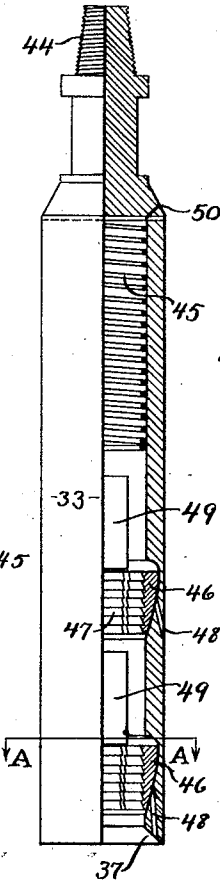


FIG. 5

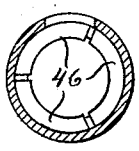


FIG. 6

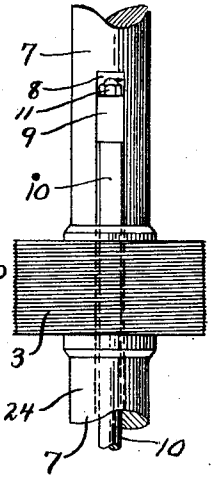


FIG. 7

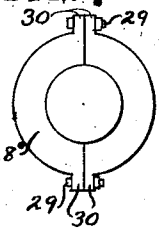


FIG. 8

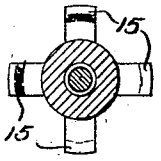
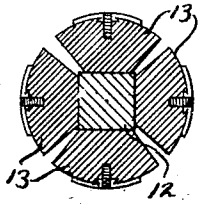


FIG. 9



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FIG. 10

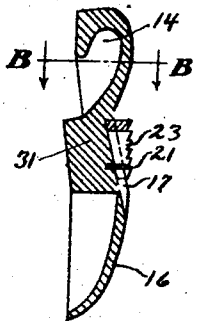


FIG. 12

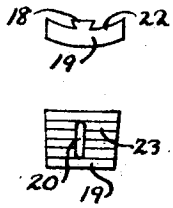


FIG. 13

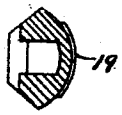
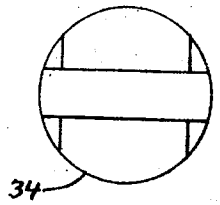


FIG. 11

FIG. 15



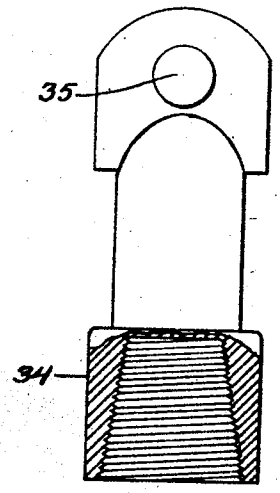


FIG. 14

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UNITED STATES PATENT OFFICE.

C EDWARD LAWSON, OF SEATTLE, WASHINGTON.

OIL-WELL-CASING SPEAR.

Application filed July 9, 1923. Serial No. 650,428.

To all whom it may concern:

Be it known that I, C EDWARD LAWSON, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented new and useful Improvements in Oil-Well-Casing Spears, of which the following is a specification, reference being had to the accompanying drawings, which form a part of this application.

The object of my invention is as follows, first to provide a spear that can be operated with a cable, or stern.

Second, to provide a casing spear that can be released, and withdrawn at the discretion of the operator.

Third, to provide a casing spear, having means for stopping the spear and gripping at the end of the casing, and means for lowering the spear, gripping the casing at any point desired.

Referring to the drawings, Fig. 1 is a sectional view, showing the spear in engagement with the inner walls of the casing. Fig. 2 is a sectional view showing the spear disengaged from the casing. Fig. 3 is a sectional view through the casing, and parts removed from the parts of the spear, for convenience of illustration. Fig. 4 is an elevation of the sleeve, one half being in section. Fig. 5 is a sectional top view, taken on line A in Fig. 4, looking in direction of arrow. Fig. 6 is a fragmentary view, showing the slot key, and stem. Fig. 7 is a plan view of the sustaining plate. Fig. 8 is a top view of expansion block hangers. Fig. 9 is a sectional view through the expansion block. Fig. 10 is a longitudinal section through the extension block. Fig. 11 is a cross section through the block, taken on line B in Fig. 10, looking in the direction of the arrow. Fig. 12 is an end view of the friction slip. Fig. 13 is a side view of Fig. 12. Fig. 14 is an elevation of the sand line socket. Fig. 15 is top view of Fig. 14.

In the following description it will be understood that there are two ways by which my fishing spear may be used. First, a casing may be attached to the spear proper and used as the drawings means, as shown in Figs. 1 and 2, and in the event of releasing the spear to withdraw from the casing to which it is attached, a sleeve having clutching means, is lowered in the casing by means of a cable and this sleeve is adapted to pass over a stem, and driving downward will release the spear for withdrawal, and the detail of the mechanism will be more clearly defined hereinafter. Second, the spear may be operated by employing a steel cable, having some standard jar attached to said cable, and the opposite end of said jar, being adapted to connect to my casing spear, this system being shown in Fig. 3, and will be hereinafter described in detail.

In Figs. 1 and 2, 1 is a casing being firmly attached to an enlarged member 3, by placing on said member a collar 4, said collar being threaded in and outside, and the enlarged member 3, being threaded to receive said collar substantially as shown and on the outside of said collar is screwed a standard casing collar 5, said collar being wide enough to receive the threaded end of casing 1 as shown at 6, the said collar functioning as a union. This system of connection above described, is employed in the event that a larger casing is required, and that in the manufacturing of the stock proper the same diameters are attained, using standard threads and doing the work with one setting up of the lathe, and when a greater diameter is required, collars as heretofore described, may be applied as bushings. 7 is a stem protruding upward for the purpose hereinafter described. 8 is a slot passing through said stem through which passes a key 9, said key being centrally bored on a taper, and adapted to receive a plunger 10, and on the top of said key, screwed on the end of said plunger is a nut 11, functioning as binding means to hold said 9 and 10 firmly together, and tapered end B functions as means preventing said key from sliding downward on the shaft of said plunger 10 when a load is imposed on said key, on the opposite end of said plunger 10 is an expansion member 12, said expansion member functioning as spreading means for expansion blocks 13, said blocks having a socket 14 adapted to engage over hanging member 15, said members being integral with the stock proper, on the opposite end of said block is a curved member 16, functioning as guiding means for entering the spear, and in the side of said block is a slot 17, same being dove tailed to receive the dove tail member 18 of friction slip 19, and in said slip is a slot 20, adapted to engage over a pin 21, said pin being means to prevent said slip from passing downward out of engagement with the dove tail. The concave walls 22 of said slip engage firmly against

the outside walls of the block when teeth 23, which are on the convex side of said slip contact with the walls of the casing, will when the spear is being raised, slide downward along the converging plane of the block, which is means of expansion forcing the teeth of said slip into the metal pipe attaching the spear firmly thereto, for the purpose of pulling said casing from the earth, and when the tension on said spear is relaxed, it can be slid downward taking a new hold on the casing, and the slip will function the same as in the first action. The said block above described is one of four that are employed in the construction of my casing spear, and all being made alike, and hung concentric to the plunger 10, as shown in Fig. 9, which is a sectional view on line C, looking in the direction of the arrow. 24 is the neck connecting the spear head, and enlarged member 3, functioning as means to which a casing may be attached, as heretofore described. 25 is a disk like member being threaded and adapted to receive a ring 26, said ring functioning as a stop contacting on the end of casing 27, the principle of which is to attach the spear to the end of the casing. 28 is a ring divided on its axis and fastened together by means of bolts 29, passing through ears 30, the object of said ring is to be placed around the neck 31, filling the space above the block 13, so that said block cannot be dismounted from hangers 15, and at the same time allow room for the blocks to swing free while expanding or contracting as the condition may require.

In Fig. 1 my spear is shown to be engaged in the end of a casing 27, the blocks being expanded by expansion member 12, said member being integral with plunger 10 and the said member 12 being held in position by means of a pin 32, shown in Figs. 1 and 2, passing through the walls of neck 24 and the plunger rod 10, by this means the spear blocks are braced in their normal position, for the action of attaching to, and drawing the casing, and should it become necessary to withdraw the spear from the casing, I have provided a tubular member 33, having a threaded tool joint to which is connected a sand line socket 34, and the said socket having a shank with an eye, in which is attached a steel cable 36, as means for raising and lowering said tube, and to release said spear from the casing in lowering the tube above referred to, the open end of which is bevelled as at 37, functioning as guiding means to pass over stem 7, and when dropped downward contacting with key 9, the plunger 10 is driven downward shearing off the pin 32, a portion of which remains in plunger as shown at 38, by which action the blocks are disengaged, collapsing sufficiently to disengage the slip members 19, then the spear is drawn upward by means of the pipe 1, first removing the tube from the casing. It will be understood that by this process the spring, and segmental tooth members, hereinafter referred to, are removed, as the tube and cable are not employed to raise the casing spear.

In Fig. 3, is shown the process of pulling the casing by the use of the cable, and a standard jar member. 39 is a section of casing connected to a section of casing 40, by means of a union 41. 42 is the end of an inside casing as they are usually placed in the oil well. When it is desired to draw the casing, the smaller casings being at the bottom, are removed first. Assuming that 42 is the next lowest casing to be removed, and in the end of which is inserted the spear head, and in which instant the ring 26 is employed, so that spear head will attach to the top end of the casing. Then by the tube 33 being attached to a standard jar 43, said jar being manipulated by a cable as heretofore described, the process of pulling the casing will be as follows: The said tube 33 is constructed as shown in Fig. 4, (33 being the walls of the tube), the open end of which is bevelled as at 37, and the top being closed, having a tool joint which is a cone shaped threaded member 44, and to said member will be attached some standard make of jar, similar to that shown at 43 in Fig. 3. 45 is a spring, functioning as tension means for stem 7, said spring being adapted to carry the weight of the adjacent link of the jar, but when the entire weight of the jar is imposed, the said spring will compress as shown in Fig. 3, allowing the tube to slide downward over the stem 7, and contacting with the key 9, driving it downward, shearing the pin 32 as heretofore described, which is the releasing means for the blocks, and at which time the casing spear may be removed from the well.

It will be understood that when the spear is entered with the intention of drawing the casing, the manipulations required to attach the spear at the end or at any point farther down in the casing, will not be sufficient to engage the full weight of all the jar members therefore, the pin 32 will not be sheared, and by which means the blocks of the spear will remain expanded as shown in Fig. 1, and the slip members 19 will recede as the spear slides downward in the casing, but when reversed in its travel the tendency of the said slips is to expand, engaging with the inside walls of the casing and holding firmly thereto, as heretofore described.

The sleeve 33, engaging over the stem 7 becomes firmly attached by action of slips 46, said slips being placed in an annular groove around the inside walls of said tube, and said grooves being shaped to converge to the center, and the slips coinciding with said angle, function as binding means by reason

of the teeth 47 contacting with the stem 7, and when said teeth have become set in the metal of said stem, by reason of the converging line of travel of said slips, the load is sustained firmly and prior to entering the spear for action, the stem is entered into the tube, and forced to engagement with the spring 45, and under this tension the stem is held firmly therein by the same clutching process of the slips as heretofore described, and to release the stem a punch is employed by entering an aperture 48, driving said slip to its greater depth, disengaging the teeth. In the side wall of the tube, are two openings 49, the object of which is to insert the slip members 46, and to remove same, should they become inferior, and the spring 45 is held firmly by inserting a pin 50 passing over one of its coils substantially as shown.

Such modifications may be employed as lie within the scope of the appended claims, and having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an oil well casing spear, the combination of a spear head comprising a plurality of engaging members adapted to expand, engaging the inside walls of the casing and plunger means to cause engagement and disengagement of the said engaging members, a stem adapted to receive a tubular member, said tubular member functioning as releasing means and as means for hoisting said casing spear, the said tube having slidably mounted within its walls binding slips as means for gripping said stem automatically and means for hoisting the mechanism for the purpose specified.

2. In an oil well spear, the combination of an adjustable spear head, comprising a plurality of expansion blocks, said blocks mounted on hangers, a stock integral with said hangers, a plunger extending through said stock, functioning as expansion means for said block, means for holding said stem in expansion engagement, and means for disengaging said expansion means, connecting means for extracting said casing spear from the well, for the purpose set forth and described.

3. In an oil well casing spear, means for raising and lowering said spear and the said means functioning as contacting means for the engaging and hoisting blocks of said spear head curved members pending downward from said blocks as guiding means toothed slips slideably mounted in said blocks a collar engaging between the socket end of said blocks and disk member 25, a ring 26 attached to said disk 25 by threaded means, functioning as a stop for said spear head, means for holding said plunger with expansion member expanding the pulling blocks of said spear head, a bushing threaded on member 3, a casing collar 5 threaded on said bushing, a casing threaded on the inner walls of said collar for the purpose set forth and described.

4. In an oil well casing spear, a stock, a plurality of expansion blocks, movably mounted thereon, a stem slideably mounted, said stem having a key mounted on the end thereof, and an expanding member on the opposite end of said stem, an aperture passing through the shaft of said stem and registering with an aperture passing through the shaft of said stem and registering with an aperture in the stock, a pin passing through said aperture holding said stem engaging as expansion means for said blocks, a means for holding said blocks in mounted position hangers, a slot passing through the stem of said stock, a pipe connecting to said stock functioning as hoisting means, a tube depending from a cable adapted to engage over said stem contacting the key 9 as shearing means for pin 32, releasing said spear for the purpose set forth and described.

5. In an oil well casing spear an adjustable and expanding spear head of the kind described, said members being supported by a stock comprising hanging members 15, a disk member 25, a ring 26 threaded thereon, necks 31, and 24, an enlarged member 23, a bushing 4, and a stem 7, and through said stock longitudinal and concentric with said stock is an aperture bored, a stem extending through said aperture having an expanding means 12 adapted to engage with corresponding inside planes of the blocks, means for holding said stem and expanding member in engagement with said blocks in an expanded position, a key 9 attached to the opposite end of said stem, said key interposed within an opening 8 in stem 7, the ends of said key protruding to engage a tubular sleeve member in its descent functioning as shearing for pin 32, and disengaging the expansion member 12, from the blocks 13, a tube having a plurality of toothed slips interposed within converging annular depressions in the inside walls of said tube, openings in the wall of said tube to insert or remove said slip members, apertures communicating with the back of said slips, a spring interposed in said tube engaging and attached to the end thereof, a conical threaded connecting means for cable or jar members, the open end of said tube being bevelled as guiding means and the said tube member adapted to engage over stem 7, for the purpose set forth and described.

C EDWARD LAWSON.