

956,345.

Witnesses:
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Fiq. 4.

Fig. 5.

Inventor

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UNITED STATES PATENT OFFICE.

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TUBING AND CASING SPEAR.

956,345.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES M. HEETER, residing at Butler, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Tubing and Casing Spears, of which the following is a specification.

This invention relates to a tool for removing tubing and casing from wells, and one object is to provide for releasing the hold on the tubing or casing whenever such release is desired, as for instance when it is found that the same is too tightly held within the well to be removed.

A further object is to provide a spear which may be operated as a jar without impairing the hold or grip on the tubing, thus loosening the latter and thereby increasing the efficiency of the tool.

The invention is here shown embodied in a hollow body portion formed with opposite inclined slip-ways, and with two sets of vertical slots, one set intersecting said ways, and the other set at right angles thereto.

A stem portion is movable vertically in the body and carries a transverse key which, by turning the stem, is adapted to move in either set of slots. Upon raising the stem with the key in the slip-intersecting slots, the slips are raised and released, when the tool may be removed. With the stem turned and the key operating in the other slots, the slips are not affected by the upward movement of the stem excepting to make their hold more secure, and by reciprocating the stem when in this adjustment it operates as a jar, tightening the hold of the slips, and loosening the tubing within the well.

In the accompanying drawings, Figure 1 is a side elevation of the improved tool. Fig. 2 is a vertical sectional view of the same gripping the tubing or casing, with the stem in position for either raising or jarring the tool. Fig. 3 is a similar view, showing the stem raising the slips and disengaging them from the tubing. Figs. 4 and 5 are cross-sectional views taken on lines 4—4 and 5—5, respectively, of Fig. 2.

Referring to the drawings, 2 designates the elongated tubular body of the spear formed at its upper end with the annular head or enlargement 3 which engages the upper extremity of the tubing or casing 4, thus stopping the tool in the upper portion of the latter. Head 3 is threaded for the purpose presently to be explained. The up-

per portion of the body 2 is formed on opposite sides with the upwardly converging slip-ways 5, the lower ends of which merge into the outer surface of the body, and confined and slidable on these ways are the toothed slips 6. The lower portion of body 2 is formed with two sets of vertical slots, one set—7 and 7'—intersecting ways 5, and the other set—8 and 8'—arranged at right angles thereto. The lower ends of slot portions 7 and 8' are connected at 9, and there is a corresponding connection 10 between portions 8 and 7'. Owing to these slot connections, prong-like portions 11 are formed on opposite sides of body 2, having beveled extremities 11'.

12 is the stem of the tool having head 13 to which the operating member is connected. The stem extends downward through body 2 and carries transverse key or bar 14 adapted to slide in either set of vertical slots, passing from one to the other through their communicating lower ends by partially turning the stem when in lowered position.

In operation, the tool when being lowered into the casing is in the adjustment shown in Fig. 3, key 14 being in slots 7, 7' and holding the slips elevated and out of engagement with the casing. With the tool in position at the upper end of the casing, the stem is lowered and so turned as to enter key 14 in slots 8, 8', and with the support removed from the slips they move downward on the inclined ways, expand and tightly grip the tube. The stem is then raised, engaging key 14 with the upper ends of slots 8, 8', drawing the spear and the gripped tubing out of the well. If the hold of the slips is not secure, it may be made so by raising and lowering the stem, causing the key to knock against or jar the upper ends of the slots, and the same operation is effective in loosening the tubing or casing if it resists the pull of the spear. If the tubing cannot be started, or if for any other reason it is desired to release the spear, the stem is lowered and turned to place key 14 in slots 7, 7', so that when raised it elevates and releases the slips, permitting the tool to be withdrawn without injury thereto. Heretofore, many spears of expensive construction have been lost owing to the fact that they could not be released after having once gripped an immovable tubing or casing.

The expansive grip of the spear slips, sometimes splits the tubing, making the hold in-

effective. For this emergency I provide an open-end bell or socket 15, which connects with the threaded head 3 and depends around the tool in skirt fashion. This bell or socket 5 embraces the tubing or casing, as shown in dotted lines in Fig. 1, and so confines it that even though split, the slips maintain a firm hold. The spear may be operated at all times with the bell or socket attachment, or 10 the latter may be applied only when a split is encountered.

I claim:

1. The combination of a spear body open downwardly through its upper end and having 15 vertical slots located in different portions thereof and communicating with each other at their lower ends, the body having downwardly diverging slip-ways in opposite sides of its outer surface which intersect one of 20 the slots, slips slidable on said ways, an operating stem movable vertically in the body and adapted to turn therein, and a key at the lower end of the stem movable from one slot to the other when the stem is lowered 25 and movable vertically in either of said slots.

2. The combination of a spear body open downwardly from its upper end and formed with the opposite external downwardly diverging slip-ways, slips slidable in the ways, 30 the body being formed with vertical transverse slots located in different portions thereof with one of the slots intersecting the slip-ways, the slots having communicating passages at their lower ends and the body 35 having downwardly pointed slot-separating portions overhanging the passages, an operating stem movable vertically through the upper end of the body, and a key carried by the lower end of the stem and when lowered 40 movable from one slot to the other and capable of vertical movement in either slot.

3. The combination of a spear body, tube gripping means carried by the body and

adapted to be released from the tube when 45 subjected to an upward pull independently of body, and a lifting device movable with relation to the body with means for connecting the same either with the gripping means or with the body independently of 50 the gripping means.

4. The combination of a body having downwardly diverging slipways, slips movable downwardly on the ways to engage a tube and upwardly thereon to disengage the same, a lifting device movable vertically in 55 the body, means for connecting said device with the slips to disengage them from the tube, and means for engaging the lifting device with the body independently of the slips for exerting an upward pull on the gripped 60 tube.

5. The combination of a spear body slotted vertically—the slots communicating and extending at right angles to each other, the body having downwardly diverging slipways 65 intersecting one of the slots, tube-gripping slips operative on the slipways, an operating stem turnable in the body, and a transverse key carried by the stem and movable in either of said slots. 70

6. The combination of a spear body having downwardly diverging slipways, tube-gripping slips slidable on said ways, the body having vertical slots arranged at right angles to each other and communicating at 75 their lower ends, one of the slots intersecting the slipways, an operating stem turnable and movable vertically in the body, and a transverse key carried by the stem and movable in either of the body slots. 80

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES M. HEETER.

Witnesses:

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