Jan. 31, 1950 O. COLQUITT 2,495,834

CASING TONG

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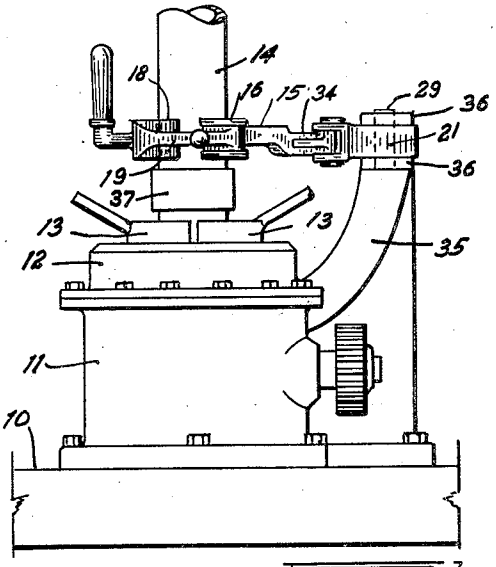


Fig. 1.

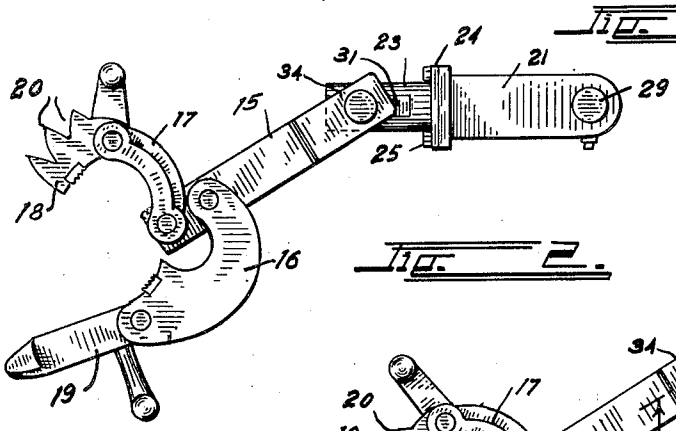


Fig. 2.

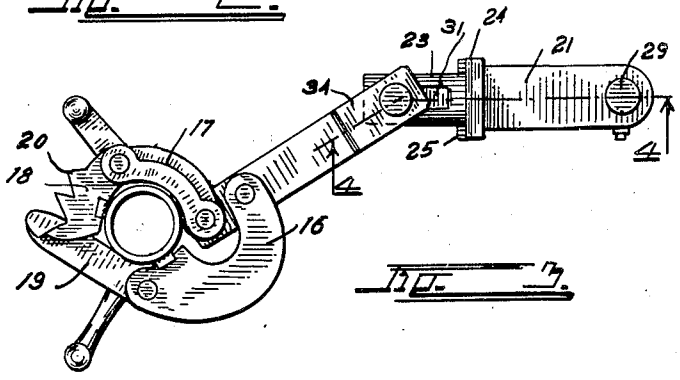


Fig. 3.

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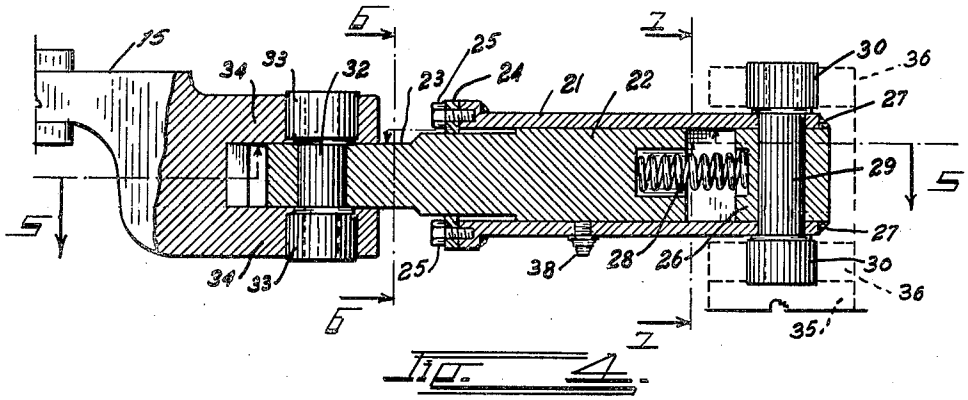


Fig. 4.

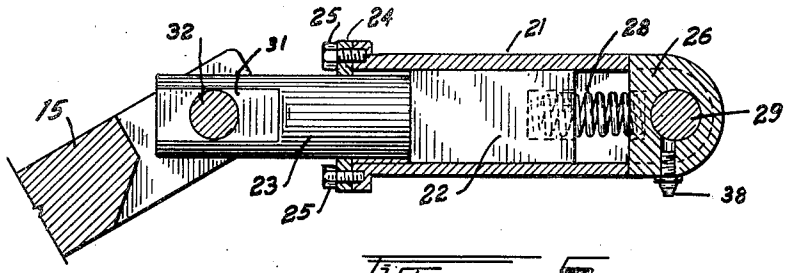


Fig. 5.

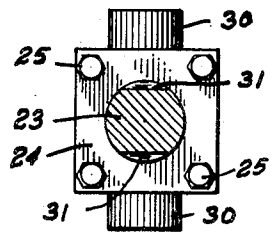


Fig. 6.

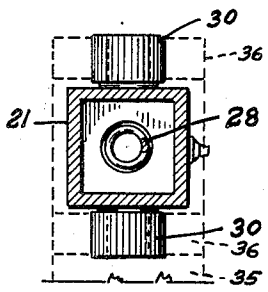


Fig. 7.

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UNITED STATES PATENT OFFICE

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CASING TONGS

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Application October 4, 1946, Serial No. 701,359

2 Claims. (Cl. 255—35)

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This invention might be termed an impact imparter and relates to a device for breaking loose the threads of the sections of oil well drill pipes and casings, as well as tool joints, couplings and bits. The sections of a drill pipe of a rotary drilling rig often become so tightly screwed into the coupling from the action of the drilling that it is exceedingly difficult to break them loose for withdrawing the tool string.

The principal object of this device is to provide means for imparting a powerful impact to a conventional casing tong to assist it in breaking loose the engaged threads so that the sections may be readily separated.

Another object of the invention is to so construct the device that it can be quickly and easily used without the necessity for supporting cables, and so that when not in use can be swung out of the way without requiring any lifting or other strenuous effort on the part of the operator.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawings:

Fig. 1 is a side elevation of a rotary drilling machine, illustrating the relative position of the invention when applied thereto;

Fig. 2 is a plan view illustrating the invention applied to an open conventional casing tong;

Fig. 3 is a similar view illustrating the tong of Fig. 2 in the closed position;

Fig. 4 is an enlarged, longitudinal section of the improved impact imparter, taken on the line 4—4, Fig. 3;

Fig. 5 is a longitudinal section therethrough, taken on the line 5—5, Fig. 4; and

Figs. 6 and 7 are cross-sections, taken on the lines 6—6 and 7—7, respectively, Fig. 4.

In the drawing, typical parts of a rotary drilling rig are designated by numeral as follows: working floor 10; rotary machine 11; rotary table 12; table slips 13; and tubular drill string sections at 14.

The invention may be applied to any type of casing tong or pipe wrench such as used for gripping the drill pipe or casing sections. A typical type is illustrated, consisting of a tong handle 15

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to which a swinging jaw member 16 is attached. Connecting links 17 are also hinged to the handle member 15 to support a second jaw member 18. The two jaw members 16 and 18 are locked about the casing sections 14 by means of a swinging latch member 19 which engages latch teeth 20 on the member 18, as shown in Fig. 3. When in the position of Fig. 3 the two jaw members will be contracted against the sections 14 to multiply their grip thereon under two conditions, that is, if the handle 14 be rotated in a counter-clockwise direction or if the pipe be rotated in a clockwise direction while the handle is held stationary. The latter is made use of in this invention.

The tong itself forms no part of the invention and is simply illustrated and described to show the application of the invention thereto.

The invention comprises a hollow plunger tube 21 of non-circular cross section, preferably rectangular. The plunger tube contains a sliding plunger or hammer 22 having the same cross-section as the tube. A round plunger rod 33 projects from the hammer 22 beyond the open extremity of the tube 21. A head plate 24, secured to the open extremity of the tube by means of cap screws 25, seals the tube against the entrance of dirt or other foreign materials.

The other extremity of the tube 21 terminates in an anvil member 26 which is welded to the top and bottom portions of the tube 21, as indicated at 27. The hammer 22 is constantly urged away from the anvil member 26 by means of a compression spring 28 positioned in receiving sockets in both the members 22 and 26. The anvil member is drilled vertically for the reception of an anchor pin 29, which projects above and below the tube 21.

The projecting portions of the anchor pin are mounted in suitable anti-friction bearings 30. The top and bottom of the projecting extremity of the plunger rod 23 are flattened to provide flat bearing surfaces 31 and the rod is drilled at right angles to these surfaces to receive a hinge pin 32. The hinge pin projects above and below the rod, the projecting portions carrying anti-friction bearings 33.

For applying the device to the tong of Fig. 2, the handle member 15 is bifurcated to pass above and below the extremity of the rod 23, as indicated at 34. The furcations are drilled to receive the bearings 33 so as to hingedly connect the handle member 15 to the plunger rod 23 by means of the hinge pin 32.

The anchor pin **29** is mounted in any desired manner upon any stationary portion of the drill rig. As illustrated, a supporting arm **35** is formed on or secured to the rotary machine **11** and extends upwardly therefrom to one side thereof, as shown in Fig. 1. The arm **35** is provided with bearing ears **36**, between which the anvil member **26** is received. The ears are drilled for the reception of the bearings **30** so that the tube **21** will be hingedly mounted on the arm **35** by means of the anchor pin **29** to swing in a horizontal plane.

The anchor pin forms the entire support for the invention and for the tubing tong. The tong cannot rotate vertically about the axis of the plunger rod, since the rectangular hammer cooperates with the rectangular tube to prevent rotation, and it cannot tilt due to the fixed axis of the anchor pin.

Should it be desired to withdraw the casing string, the latter is raised until a first connecting coupling **37** is positioned above the table and below the casing tong, as illustrated in Fig. 1. The wedge slips **13** are then inserted to grip the lower section, and the casing tong is latched about the upper section. Power is then applied to the table to rotate it in the usual drilling direction.

The first movement of the table causes the handle **15** to swing in a counter-clockwise direction. This acts against the hammer **22**, driving it toward the anvil **26**. When the hammer strikes the anvil, the movement of the arm is suddenly arrested with great impact. This sudden stopping of the rotation of the upper casing section breaks it loose from the coupling so that continued rotation of the table will unscrew the lower section from the upper section. Suitable grease fittings **38** are provided for lubricating the device.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. An impact-imparting device for a well casing tong adapted to rotate in a plane having a lever handle at right angles to the axis of said casing comprising: a hammer hingedly connected to the extremity of said handle; a hammer tube positioned in the plane of rotation of said handle and tangentially to the arc of rotation of said extremity of said handle and telescopically receiving said hammer in its one extremity; an anvil mounted in the other extremity of said hammer tube to receive the impact of the extremity of said hammer; and a fixed hinge member, said other extremity of said hammer tube being hinged upon said fixed hinge member.

2. An impact-imparting device for a well casing tong having a lever handle comprising: a stationary support; an anchor pin supported by said support; a plunger tube hingedly mounted at its one extremity on said anchor pin so as to swing only in a horizontal plane, said plunger tube being non-circular in cross-section; an elongated hammer slidably mounted in said tube and projecting from the other extremity thereof and having a cross-section corresponding thereto; means for preventing withdrawal of said hammer from said tube; an anvil at the anchor pin extremity of said tube; means for hingedly connecting the projecting extremity of said hammer to the lever handle of the tong so that rotation of said handle in one direction will cause said hammer to strike said anvil; and spring means urging said hammer away from said anvil.

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