March 25, 1930. A. F. BROWN 1,751,789

WELL TOOL

Filed Dec. 17, 1927

Fig. 1.

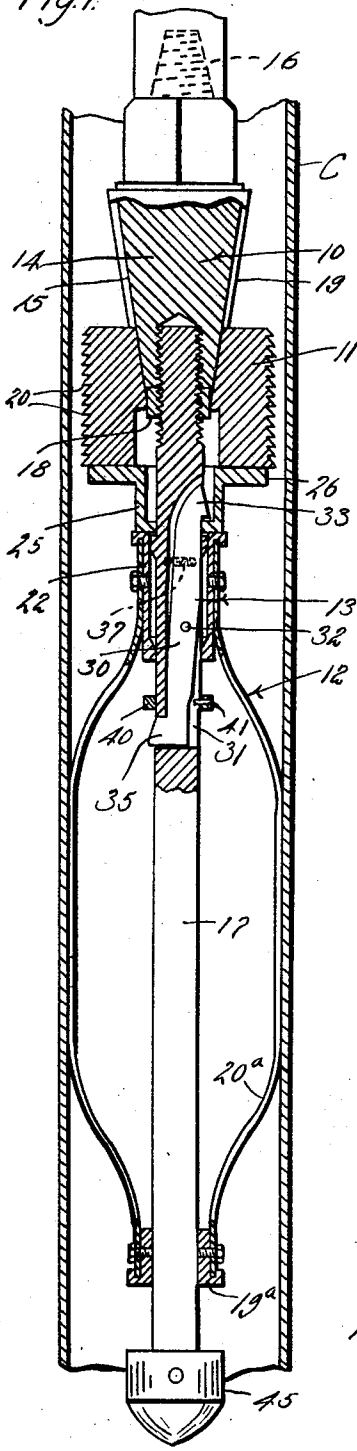


Fig. 2.

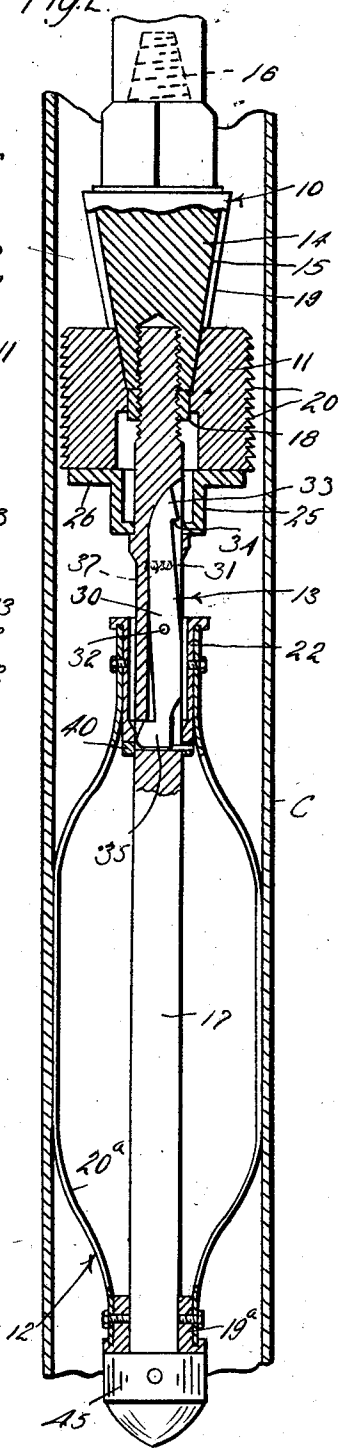
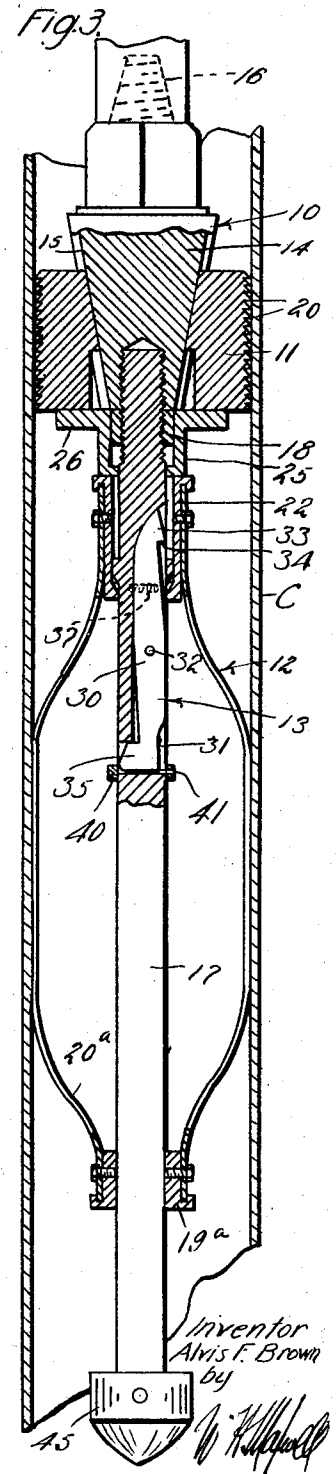


Fig. 3.



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UNITED STATES PATENT OFFICE

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WELL TOOL

Application filed December 17, 1927. Serial No. 240,744.

This invention has to do with a well tool and is related particularly to a tool for use in jarring or forcing casing, or the like, downwardly in a well. It is an object of the invention to provide a simple, practical and effective well tool of the type known in the art as a jar down spear.

In the course of drilling wells, particularly oil wells, it is necessary at times to jar or force casing downwardly in a well. Tools known as jar down spears are used for this purpose and embody, generally, slip means to be set in gripping engagement with the casing so that down strain or jarring action can be applied to the casing from a string of drill pipe, or the like.

It is a general object of this invention to provide a well tool of the character mentioned which is extremely simple, effective and reliable in operation.

Another object of my invention is to provide an improved form of control means for a tool of the character mentioned.

An important object of the invention is to provide a well tool of the type mentioned embodying a single control latch.

The various objects of the invention will be best understood from the following detailed description of a typical form of the invention, throughout which description reference is had to the accompanying drawings, in which:

Fig. 1 is a view showing a tool embodying the present invention arranged in a well casing with the various parts in the unactuated position to freely pass through the casing, parts of the tool being broken away to show in section;

Fig. 2 is a view of the tool showing it in a partially operated position; and

Fig. 3 is a view showing the tool actuated or set to grip the casing.

The tool provided by this invention, includes, generally, a main part or body 10, slips 11 carried by the body to be operable into gripping engagement with a well casing C, a tail piece 12 for actuating the slips, and control means 13 whereby the parts of the tool are held in an unactuated position until the tool is manipulated in a pre-determined manner to cause actuation or setting of the slips.

The body 10 of the tool is provided at its upper end with an enlarged part or head 14 having upward and outwardly inclined faces 15 to carry the slips 11. In the particular construction shown in the drawings, the body has two diametrically opposite slip carrying faces 15. The upper end of the head 14 is provided with a tapered screwthreaded pin projection 16 whereby the tool can be attached to a suitable operating means such as a string of drill pipe, or the like. The lower portion of the body is in a form of a downwardly projecting rod or stem 17 which carries the tail piece 12 and the control means 13. In the particular construction illustrated in the drawings, the stem 17 is formed separate from the head 14 and is screw threaded into an opening in the lower end of the head. In this case, a lock nut 18 is preferably carried by the stem to be set against the lower end of the head.

The slips 11 are slidably carried on the faces 15 of the head 14 and may be of the type commonly employed in well tools of this general character. I have shown the slips guided and retained on the faces 12 by suitable ribs 19, and I have shown the outer faces of the slips provided with downwardly faced teeth 20 to engage and grip the interior of the well casing C.

The tail piece 12 is provided as a means for normally frictionally engaging the interior of the casing to offer resistance to movement through the casing and may be the ordinary type of tail piece used in well tools. I have shown the tail piece as including a top collar 22 slidable on the stem 17, a bottom collar 19^a slidable on the stem, and a plurality of spring members 20^a connected to and extending between the collars. The spring members 20^a are designed and proportioned to normally bear outwardly against the interior of the casing C to offer frictional resistance to movement of the tail piece through the casing. The tail piece 12 is adapted to cause operation of the slips 11 upon the stem 17 being operated through the tail piece between the position shown in Fig. 1 and that

shown in Fig. 3. An operating connection is made between the top collar of the tail piece and the slips through a sleeve 25 slidably carried on the stem 17. The sleeve 25 is adapted to be engaged by the top collar 22 of the tail piece and is provided at its upper end with a radial flange 26 which engages under the slips.

The control means 13 is provided as a means for releasably holding the parts in the unactuated position, as shown in Fig. 1, and includes, generally, a single latch member 30 pivotally mounted in a suitable recess or opening 31 formed longitudinally in the stem 17. A pivot pin 32 is carried by the stem and passes through the middle portion of the latch 30 to pivotally mount the latch in the opening 31. The upper end of the latch 30 is provided with a head 33 having a downwardly facing shoulder 34 operable to hold the parts in the unactuated position, as shown in Fig. 1. A head 35 is provided on the lower end of the latch to project from the stem 17 when the head 33 of the latch is in operating position. In the arrangement shown in the drawings, the shoulder 34 of the latch engages the sleeve 25 to prevent the sleeve from moving upwardly on the stem. When the sleeve 25 is thus held by the latch, it forms an abutment that prevents upward movement of the tail piece on the stem 17 from the position shown in Fig. 1. A spring 37 is provided in connection with the latch to normally yieldingly hold the latch in position where its heads project from the stem and are in operating position. The head 35 is provided on the latch so that the latch is depressed or moved out of operating position upon the tail piece being moved to a down position on the stem 17, as shown in Fig. 2. The top collar 22 of the tail piece engages the head 35 of the latch to move it inwardly or to depress it, and a retaining ring 40 is provided on the stem to be moved downwardly by the top collar of the tail piece to position where it holds the head 35 in and thus locks the latch out of operation. The ring 40 is fitted to the stem 17 so that it will remain in an up position, as shown in Fig. 1, until deliberately operated or moved downwardly by the top collar 22 of the tail piece. In practice, a pin 41 may be carried by the ring to extend into the opening 31 in the stem to prevent movement of the ring downwardly beyond the position shown in Figs. 2 and 3 of the drawings. In this connection, it may be pointed out that a stop 45 may be provided on the lower end of the stem 17 to limit the downward movement of the tail piece on the stem so that the tail piece will not operate the ring 40 beyond the desired position.

In operation, the tool is lowered into the casing C with the parts unactuated, as shown in Fig. 1. In this case, the ring 40 is above the head 35 of the latch so that the latch is in operating position with the head 33 projecting from the stem 17 so that its shoulder 34 engages the sleeve 25 to hold it in the down position. With the sleeve 25 held down, it forms an abutment for the tail piece and, as the body 10 is lowered or forced down through the casing, the sleeve 25 forces the tail piece through the casing. When the tool has been moved to the desired position in the casing, the body 10 is pulled up, causing the stem 17 to slide upwardly through the tail piece so that the top collar of the tail piece forces the locking ring 40 down on the stem to depress the head 35 of the latch so that the latch is held in position where the head 33 is within the opening 31. The body 10 is then moved downwardly, causing the stem 17 to move downwardly with reference to the tail piece 12 so that the top collar of the tail piece engages under the sleeve 25, passes the retracted head 33 of the latch and forces the slips upwardly on the faces 15 until they grip the interior of the casing. The tool is then set against downward movement in the casing, and is in condition to transmit a downward jar or force from the tool to the casing.

Having described only a typical preferred form of my invention, I do not wish to limit myself to the specific details set forth, but wish to reserve to myself any changes or variations that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, and a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation.

2. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, and a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch member.

3. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, and a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece; to release said means for operation, the control including a single latch member pivotally carried by the body.

4. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, and a con-

trol normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch having a part to prevent operation of said means and a part to be engaged for operation of the latch.

5. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch having a part to prevent operation of said means and a part to be engaged for operation of the latch, and means normally yieldingly holding the latch in position where the first mentioned part prevents operation of said means.

6. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch having a part to prevent operation of said means and a part to be engaged for operation of the latch, and a member for operating and holding the last mentioned part of the latch.

7. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch having a part to prevent operation of said means and a part to be engaged for operation of the latch, and a ring carried by the body operable to position where it holds the last mentioned part in an actuated position where the said means is free to operate.

8. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch having a part to prevent operation of said means and a part to be engaged for operation of the latch, and a ring carried by the body to be engaged and operated by the tail piece into position to hold the last mentioned part in an actuated position where the said means is free to operate.

9. A well tool of the character described including, a body, means carried by the body operable to engage a casing, a tail piece for causing operation of said means, a control normally preventing said means from being operated and operable by upward movement of the body relative to the tail piece to release said means for operation, the control including a single latch having a part to normally prevent operation of said means and a part to be engaged for operation of the latch, means normally yieldingly holding the latch in position where the first mentioned part prevents operation of said means, and a ring carried by the body to be engaged and operated by the tail piece into position to hold the last mentioned part in an actuated position where the said means is free to operate.

10. A well tool of the character described including a body, slips carried by the body operable to engage a casing, a tail piece carried by the body and including a collar slidable on the body, means on the body engaging the collar as the tool is lowered in the casing, a single latch member pivotally mounted in the body having a part at one end to normally prevent operation of the slips and an operating part at the other end to be operated to release the slips, means normally yieldingly holding the latch in position where it prevents operation of the slips, and a ring carried on the body operable by the collar to position where it holds the operating part in position whereby the latch is released.

In witness that I claim the foregoing I have hereunto subscribed my name this 15th day of October, 1927.

ALVIS F. BROWN.