

July 31, 1945.

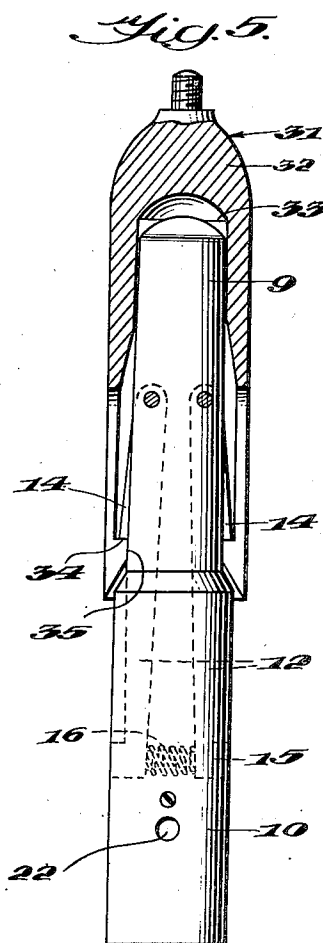
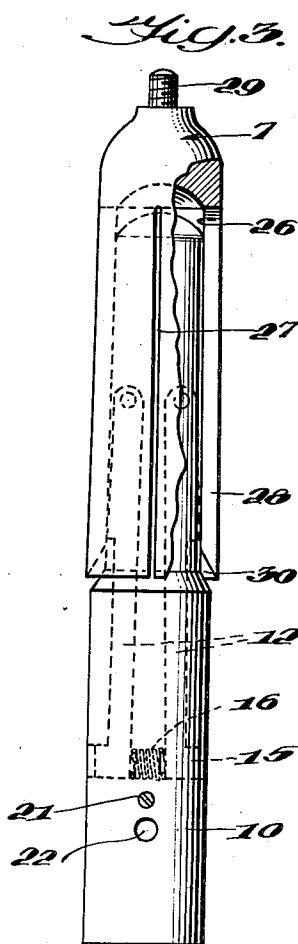
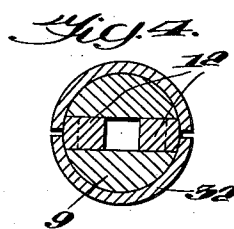
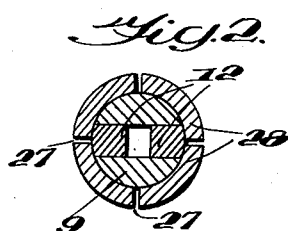
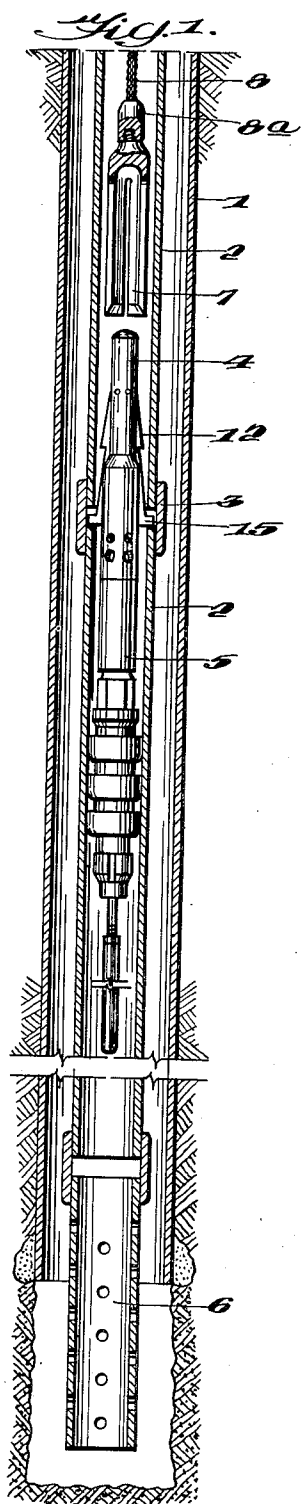
L. D. MOWREY

2,380,669

WELL ANCHOR

Filed March 11, 1943

2 Sheets-Sheet 1



INVENTOR.
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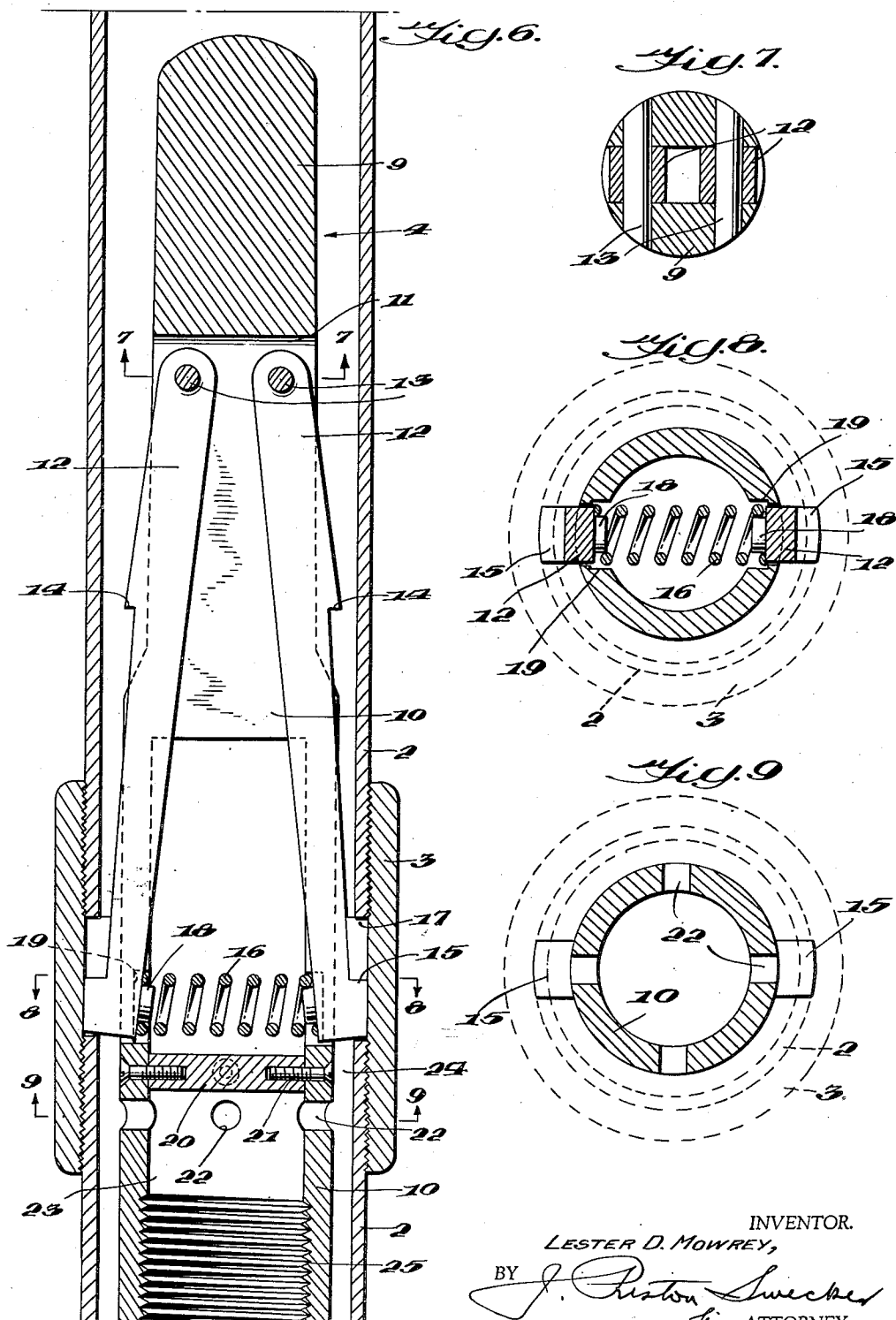
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WELL ANCHOR

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,380,669

WELL ANCHOR

Lester D. Mowrey, Wichita Falls, Tex.

Application March 11, 1943, Serial No. 478,777

7 Claims. (Cl. 166—1)

This invention relates to an improvement in anchors, and more particularly to anchors for positioning and holding bottom hole regulators or chokes and the like in place in the tubing of oil and gas wells.

Various attempts have been made to hold bottom hole regulators in place, but most of these mechanisms do not function under all service conditions, and therefore, much trouble is encountered in placing and removing them.

Various types of slips have been proposed for engaging the tubing, but they have been ineffective generally in gripping the side walls of the tubing, and, when once engaged with the side walls of said tubing, are often difficult, if not impossible to remove, without pulling the tubing, a process which is not only time consuming, but which causes considerable loss of oil and gas.

The primary object of this invention is to provide an anchor that is simple to install, positive in operation, and which may be removed readily.

This anchor, taken in conjunction with the setting tool and the tool for removing the same, comprise an inter-related system which permits the anchor to be set in any desired place within the well tubing, to be held there as long as desired and to be removed therefrom without the necessity of pulling the well tubing, as has been necessary generally with anchors heretofore in use.

The preferred embodiment of this invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical sectional view through a well, with parts shown in elevation and showing the anchor in place;

Fig. 2 is a cross section through the anchor and tool;

Fig. 3 is a side elevation, partly in section, of the anchor with the setting tool in place thereon;

Fig. 4 is a cross section through a removing tool on the anchor;

Fig. 5 is a side elevation, partly in section, showing the removing tool in place on the anchor.

Fig. 6 is an enlarged longitudinal sectional view of the anchor shown installed within the tubing;

Fig. 7 is a cross section therethrough on the line 7—7, of Fig. 6;

Fig. 8 is a similar view on the line 8—8 of Fig. 6; and

Fig. 9 is a similar view on the line 9—9 of Fig. 6.

With more detailed reference to the drawings, the numeral 1 designates the lower portion of the casing of an oil well or the like, in which is placed the usual tubing 2. The tubing 2 is made in sections secured together by couplings 3. The numeral 4 designates generally the anchor which is shown to be anchored intermediate the ends of tubing sections 2 and within the coupling 3. A bottom hole regulator 5 is shown suspended within the tubing beneath the anchor 4, which device regulates the flow of oil therethrough. A perforated pipe 6 is shown at the bottom of the tubing 2. A setting tool 7 is shown suspended through the tubing by a cable 8, above the anchor 3.

The anchor 3 comprises a tapered neck 9 and a hollow tubular body 10, the said body having a slotted portion 11 in which is disposed a pair of latch members 12 which are pivoted to the neck 9 at 13. Each latch member 12 is enlarged and has an off-set portion as shown at 14. At the lower end of the latch members 12 are lateral projections 15 which are pressed outward by an interposed spring 16 to engage a recess 17 formed between the ends of tubing sections 2. The latch members 12 also carry inwardly protruding bosses 18 which hold the ends of the spring 16 in alignment. Recesses 19 are provided in opposite sides of the body 10 to accommodate the ends of the spring 16 and permit the spring 16 to push the latch members 12 outward the maximum distance. A plate 20 is secured in the body portion 10 beneath the spring 16 to prevent the spring 16 from dropping downward, should it become dislocated from its set position. The plate 20 also closes the tubular body beneath the latches. The plate 20 is held in place by screws 21.

Holes 22 are provided in the body of the anchor and lead from the inner bore 23 thereof to the annular space 24 between the anchor and the tubing 2, so as to permit the oil which flows upward through the regulator 5 to pass outward through the holes 22 and upward through tubing 2. Threads are provided at 25, which may be of any suitable design, for connecting the regulator 5, to the lower end of the anchor 4.

The anchor 4 is set in place by the setting tool 7 (Fig. 3) which has a tapered bore 26 that conforms substantially to the taper of the neck 9. The tool is slit at 27, forming resilient fin-

gers 28 which frictionally embrace the neck 9 and hold the anchor 4 until it is desired to release the same. The tool 7 has a threaded pin 29 on the upper end thereof for connecting it with a conventional threaded coupling 8a, which is attached to cable 8. The lower ends of the fingers 28 are beveled at 30 so as to aid in guiding the tool over the neck 9 of the anchor and also to depress latch members 12 as the tool moves into place on the neck 9. The tool 7 completely depresses the latch members, as shown in Fig. 3.

The removing tool, designated generally as 31, and shown in Fig. 5, is provided for the removal of the anchor from the tubing and comprises a body 32 having a bore 33 to receive therein the neck 9. The bore 33 is enlarged near the lower end so as to form an annular shoulder 34 with the inner bore 35 substantially of the same diameter as the neck 9 at that point. This tool 31 will depress the projections 15 within the body 10 of the anchor and yet let the off-sets 14 of the latches 12 project sufficiently to rest upon the annular shoulder 34 to permit the anchor to be removed from the well. The lower end of the body 32 of the removing tool is tapered downwardly and outwardly so as to guide the neck 9 into the removing tool. The removing tool 31 is shown in place on the anchor in Fig. 5.

The bottom hole choke or regulator 5 may be attached to the anchor 4 by the threads 25. The anchor and regulator may be lowered through the tubing 2 by the setting tool 7 which is pressed downward on neck 9 of the anchor 4 until the off-sets 14 of the latch members 12 are depressed as shown in Fig. 3. This will depress, in turn, projections 15 into the body 10 of the anchor.

The setting tool 7 is attached to cable 8 for lowering the tool into the well to a point near the desired depth at which point the setting tool 7 may be released from the anchor 4 by a jerk on the cable 8. The weight of the anchor normally will cause the regulator to move further downward until the projections 15 engage the annular recess 17 between the ends of two joints of tubing 2. The spring 16 will force the projections 15 outward into this recess preventing further descent. The projections 15 also prevent upward movement of the choke 5 when gas pressure below the packing members increases sufficiently otherwise to tend to lift the anchor and regulator. Therefore, the anchor positively holds the regulator in place until its removal is desired.

The upward flow of the oil causes it to pass through the regulator into the lower end of the bore 23 and outward through the radial holes 22 into the annular space 24, thence upward through tubing 2 in the usual manner.

To remove the anchor 4 from the tubing 2, the removing tool 31 is attached to the cable 8 and dropped downward over the neck 9 with sufficient force to cause the latch members 12 to spring inward and permit the annular shoulder 34 in the tool to pass beneath the off-sets 14 on the latch members, which latch members will be forced outward sufficiently by the spring 16 to retain the anchor in the tool. Then the anchor and regulator may be lifted upward through the tubing by raising the removing tool. At the particular position shown in Fig. 5, the latch members 12 are depressed so that the projections 15 are substantially flush with the body 10 to prevent them from engaging pipe couplings while being removed from the well.

I claim:

1. In an anchor of the character described, a body having an upstanding neck portion thereon, said body having a depending tubular portion with means for attachment with an object in a well to support said object therein, latch members extending downwardly within the body and having their upper ends pivoted to the body for outward swinging movement relative thereto, means tending to force the latch members outwardly to supporting positions, each of said latch members having an outwardly extending projection thereon in position to engage an abutment in the well to support said anchor, and off-set shoulder portions on the latch members in position for engagement by a supporting tool.

2. In an anchor of the character described, a body having an upstanding neck portion thereon, said body having a depending tubular portion with means for attachment with an object in a well to support said object therein, latch members extending downwardly within the body and having their upper ends pivoted to the body for outward swinging movement relative thereto, each of said latch members having an outwardly extending projection thereon in position to engage an abutment in the well to support said anchor, resilient means tending to force the latch members outwardly to supporting positions, and off-set shoulder portions on the latch members above the projections in position for engagement by a supporting tool.

3. In an anchor of the character described, a body having an upstanding neck portion thereon, said body having a depending tubular portion with means for attachment with an object in a well to support said object therein, said body having peripheral slots therein, upwardly extending latch members having their upper ends pivotally mounted in said slots and their depending ends having outwardly extending projections thereon in position to engage an abutment in the well to support said anchor, resilient means tending to force said projections outwardly to supporting positions, and off-sets on the latch members externally of the body and above the projections in position for engagement by a supporting tool.

4. In an anchor of the character described, a body having an upstanding neck portion thereon, said body having a depending tubular portion with means for attachment with an object in a well to support said object therein, said body having peripheral slots therein, upwardly extending latch members having their upper ends pivotally mounted in said slots and their depending ends having outwardly extending projections thereon in position to engage an abutment in the well to support said anchor, resilient means tending to force said projections outwardly to supporting positions, off-sets on the latch members externally of the body and above the projections, and a tubular supporting tool embracing said neck portion and latch members and supporting the anchor.

5. In an anchor of the character described, a body having an upstanding neck portion adapted to be connected with an object in a well, elongated latch members extending lengthwise relative to the body and having outwardly extending projections on the lower end portions thereof in position to engage an abutment in the well to support the anchor, means pivotally connecting the upper end portion of each latch member with the body for lateral swinging movement relative thereto, means tending to force the latch mem-

bers outwardly to supporting positions, and means forming shoulders on the intermediate portions of the latch members at the periphery of the body in position for supporting engagement by a tool.

6. In an anchor of the character described, a body having an upstanding neck portion thereon with a depending tubular portion having means for attachment with an object in a well to support said object therein, said body having a transverse opening therein above the tubular portion, a plurality of latch members extending lengthwise of the body in said transverse opening and disposed substantially at the periphery of the body, said latch members having outwardly extending projections on the lower ends thereof in position to engage an abutment in the well to support said anchor, means pivoting the upper ends of said latch members to the body within the opening, spring means tending to force the latch members outwardly to supporting positions, said latch members having off-set shoulders on the outer sides thereof externally of the body intermediate the pivots and the projections in position for engagement by a supporting tool.

7. In an anchor of the character described, a

body having an upstanding neck portion thereon with a depending tubular portion having means for attachment with an object in a well to support said object therein, said body having a transverse opening therein above the tubular portion, a plurality of latch members extending lengthwise of the body in said transverse opening and disposed substantially at the periphery of the body, said latch members having outwardly extending projections on the lower ends thereof in position to engage an abutment in the well to support said anchor, means pivoting the upper ends of said latch members to the body within the opening, said latch members having off-set shoulders on the outer sides thereof externally of the body intermediate the pivots and the projections in position for engagement by a supporting tool, said latch members being disposed on opposite sides of the body, and a coiled spring interposed between the opposite latch members substantially in radial alignment with the projections at the lower ends thereof tending to force said projections outwardly to supporting positions.

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