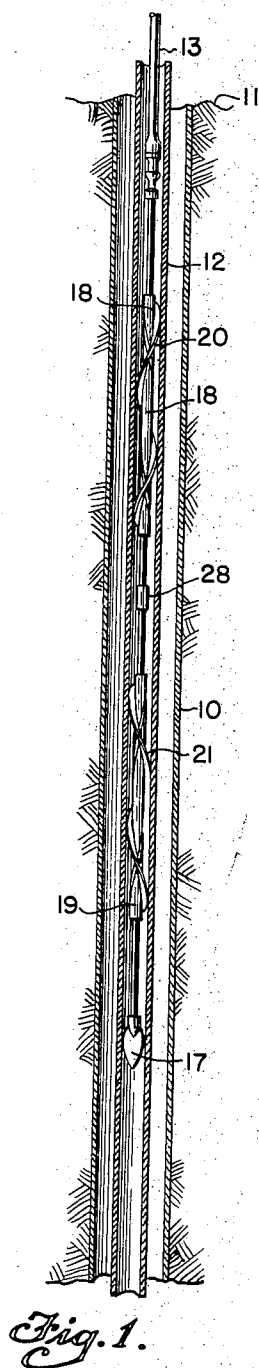
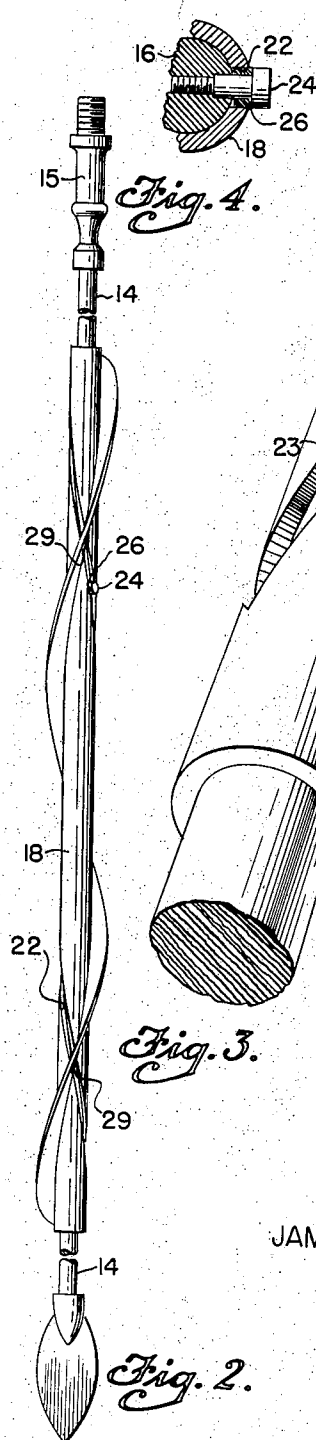
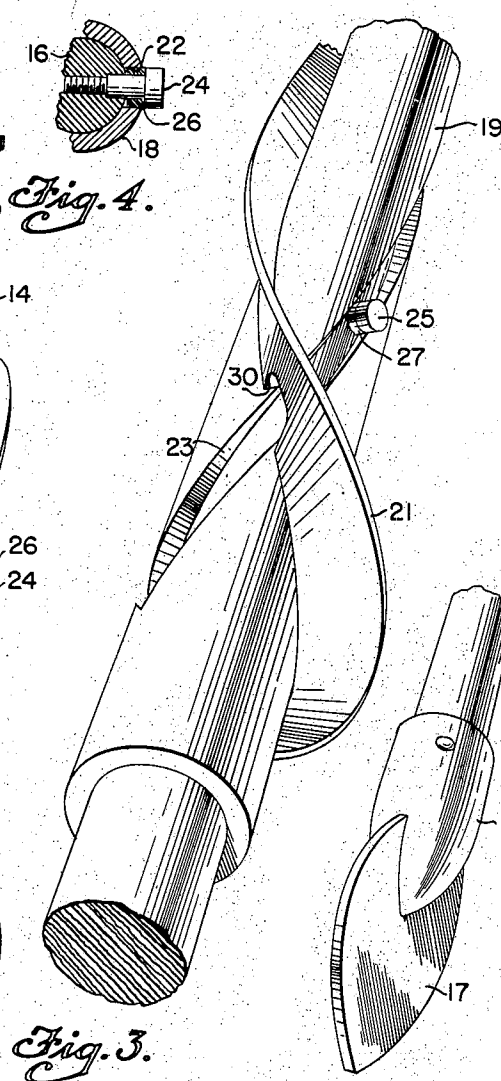
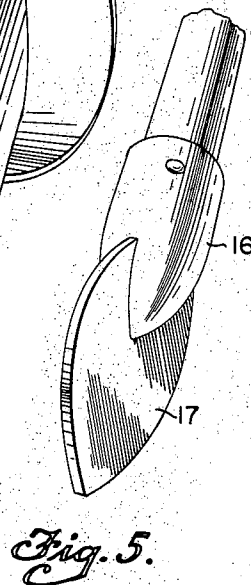


June 1, 1954

J. N. MANGUM ET AL
PARAFFIN REMOVER FOR OIL WELLS

2,679,905

Filed April 7, 1952



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2,679,905

PARAFFIN REMOVER FOR OIL WELLS

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Application April 7, 1952, Serial No. 280,992

5 Claims. (Cl. 166—18)

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This invention relates to tools for removing paraffin and other foreign matter from the tubing and casing of oil wells. Particularly, the invention has reference to improvements in paraffin removing tools having spiraled blades arranged for vertical movement in the tubing or casing to be cleaned.

An object of the invention is to impart rotation to a paraffin remover of the spiralled blade type in a direction whereby the efficiency of the tool is increased.

Another object of the invention is to provide, in addition to the foregoing object, an arrangement and construction whereby the torque applied to such tool is substantially reduced or eliminated.

These and other objects of the invention will become apparent from the following description and the accompanying drawing, wherein:

Figure 1 is a vertical sectional view of a length of well casing in an earth formation and showing the invention positioned within a length of well tubing.

Figure 2 is an enlarged broken elevation showing one of the spiralled units mounted on the mandrel comprising a part of the invention.

Figure 3 is an enlarged broken perspective view showing the arrangement of one of the spiralled guide slots relative to the spiral of its associated blade.

Figure 4 is a broken transverse sectional view showing a pin projecting from the tool mandrel and engaging a spiralled slot in a blade supporting sleeve for turning the latter.

Figure 5 is an enlarged broken perspective view of the spear head guide secured to the lower end of the mandrel.

A typical well installation is shown in Figure 1 wherein a well casing 10 is positioned in an earth formation 11, and wherein a length of tubing 12 is provided through the casing for raising oil to the earth surface. The present invention is secured to the lower end of a sinker bar 13, and which sinker bar is secured to jars and a cable, not shown, capable of vertical reciprocating movement, such as employed in the cable tool method of drilling wells. The invention includes a mandrel 14 of round stock and is provided with a threaded shouldered fitting 15 on its upper end for attachment to the sinker bar 13. The lower end of the mandrel 14 is provided with a shouldered fitting 16 having a downwardly directed flat spear head guide 17 secured therein. The width of the spear head guide 17 is slightly less than the diameter of the tubing 12 to be cleaned. Upper and lower sleeves 18 and

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19 are rotatably mounted on the mandrel 14 and each sleeve is provided with spiralled blades 20 and 21 therearound, the said blades being spiralled in opposite directions and each including at least one complete revolution around its axial center. The blades 20 and 21 are rigidly secured to their respective sleeves 18 and 19 by any suitable means, such as welding. Each sleeve 18 and 19 is provided with a spiralled slot 22 and 23, each slot being spiralled in a direction opposite that of its associated blade. Laterally projecting pins 24 and 25, in the form of shouldered screws, are attached to the mandrel 14 and are provided with rollers 26 and 27 for engaging the sides of the respective slots 22 and 23. A tubular spacer 28 is mounted for free rotation and sliding movement on the mandrel 14 between the sleeves 18 and 19. The outside diameters defined by the spiralled blades 20 and 21 are slightly less than the inside diameter of the well tubing 12. It is to be understood that the described construction may be employed in connection with the removal of paraffin and foreign matter from the inside walls of casing, such as 12, by making the diameters of the spirals 20 and 21 of sufficient size; similarly, the spear head 17 would have to be correspondingly wider. The inner edges of the blades 20 and 21 may be provided with notches 29 and 30, if necessary, to accommodate the projecting ends of the pins 24 and 25.

In operation, the tool is lowered with a vertical reciprocating movement in the well tubing 12 to be cleaned. The opposite sides of the spear head or guide 17 contact and penetrate the paraffin lining the wall of the tubing 12 and thus reduce torque which might otherwise be applied to the mandrel 14. At the beginning of each down stroke, the sleeves 18 and 19 are in their lowermost positions. As the blades 20 and 21 contact the paraffin they are retarded against rotation by the relative action of the projecting pins 24 and 25 in the spiralled slots 22 and 23, but the continued downward movement of the pins causes the blades to rotate and to provide a rotary scraping action for removing the paraffin. The displaced paraffin is removed from the well by a washing action, such as ordinarily employed for removing cuttings when drilling a well.

The invention is not limited to the construction herein shown and described, but may be made in many ways within the scope of the appended claims.

What is claimed is:

1. A tool for cleaning paraffin and other foreign matter from the tubing or casing of a well, said

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tool comprising a relatively long mandrel adapted to be lowered vertically in the tubing or casing of the well to be cleaned, at least one tubular sleeve mounted for rotation on said mandrel, said sleeve including a spiralled slot therein and generally arranged lengthwise thereof, a pin projecting from said mandrel and extending into said slot, and a spiralled blade rigid with and projecting from the outer surface of said sleeve, the spiral of said blade being in a direction opposite that of said slot.

2. A tool for cleaning paraffin and other foreign matter from the tubing or casing of a well, said tool comprising a relatively long mandrel adapted to be lowered vertically into the tubing or casing to be cleaned, two tubular sleeves mounted for rotation on said mandrel, each said sleeve including a spiralled slot therein generally arranged lengthwise thereof, the curves of said spirals being arranged in directions opposite to each other, pins projecting from said mandrel and respectively extending into said slots, and a spiralled blade projecting the outer surface of each said sleeve, the spirals of each said blade being in a direction opposite that of the slot in its associated said sleeve.

3. In combination with a tool for cleaning par-

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affin and other foreign matter from the tubular casing of a well as defined in claim 1, a flat spear head guide rigidly secured to the lower end of said mandrel, the width of said spear head being substantially equal to the outside diameter defined by said spiralled blade.

4. A tool for cleaning paraffin and other foreign matter from the tubing or casing of a well as defined in claim 2, a flat spear head guide secured to the lower end of said mandrel, the width of said spear head being substantially equal to the outside diameter defined by said spiralled blade.

5. A tool for cleaning paraffin and other foreign matter from the tubing or casing of a well as defined in claim 1, the construction wherein a roller is rotatably mounted on said pin and arranged for contacting the sides of said spiralled slot.

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