July 2, 1957 J. M. WEBRE 2,797,757

PARAFFIN SCRAPER

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Fig. 1

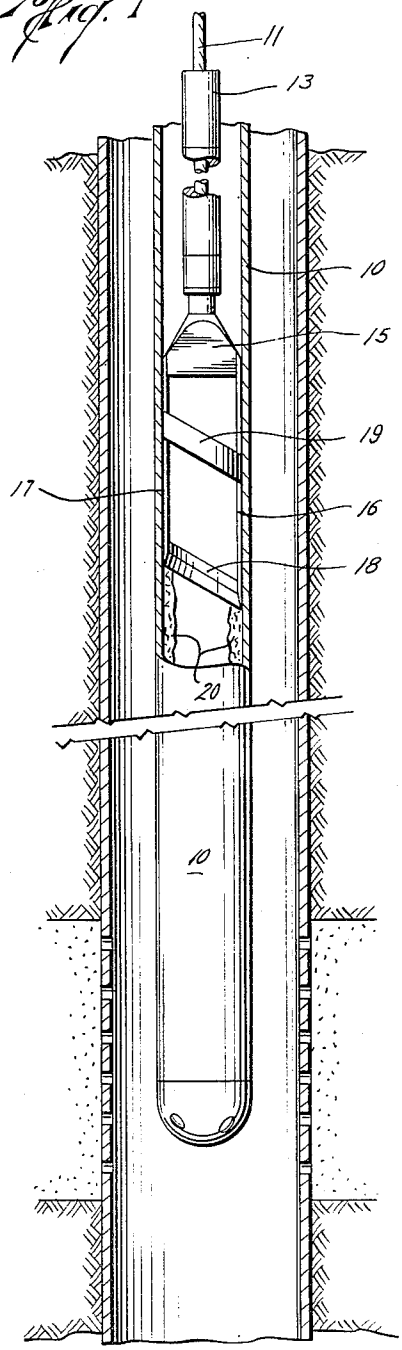


Fig. 2

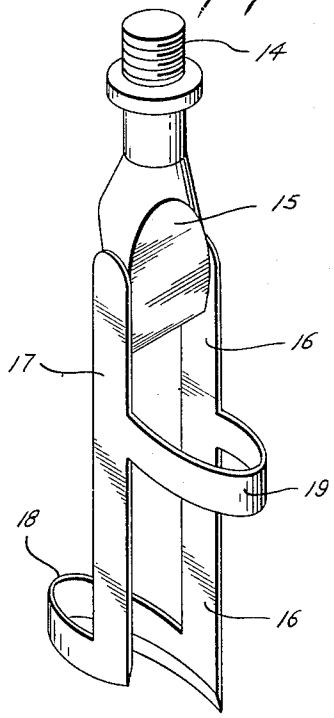
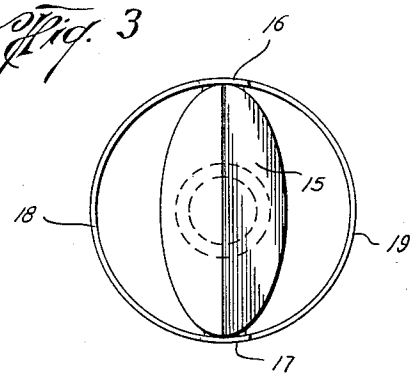


Fig. 3



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PARAFFIN SCRAPER

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5 Claims. (Cl. 166—176)

This invention relates to paraffin scrapers for use in the removal of paraffin deposits from the interior walls of oil well production tubing and the like.

When paraffin base oil is being produced, it occurs that the temperature of the oil is reduced during its flow to the surface of the ground through the production tubing. As the oil cools, paraffin deposits frequently form on the interior walls of the tubing. Frequently the deposits are particularly bad in one area of the tubing because it is at this point in the journey to the surface, that the oil cools to a temperature at which the paraffin solidifies.

Such paraffin deposits tend to decrease the effective internal diameter of the tubing, and block and restrict the flow of oil therethrough. It is therefore necessary to remove the paraffin, as by scraping the solid paraffin off the pipe wall and letting it be washed on to the surface by flowing oil.

Many devices have been used for this purpose. This invention is an improved device in several particulars, it being of particular significance that neither the scraping blades or other parts of the device should become clogged or fouled by the paraffin being scraped.

It is therefore seen that an object of this invention is to provide an improved paraffin scraper which operates easily from a wire line without becoming fouled.

Other objects are apparent from the following description and accompanying drawing, wherein:

Figure 1 illustrates a tool depended from a wire line in production tubing in a well.

Figure 2 is an isometric view of the tool.

Figure 3 is a bottom view of the tool.

Referring to Figure 1, there appears a string of production tubing **10** positioned in a well. Within this tubing, a preferred embodiment of the invention is shown depended from a wire line **11**. Alternatively, the tool may be operated from a sucker rod or from any other means for supporting and operating it from the surface of the well. When the tool is operated from a wire line, it is preferred that weights **13**, be secured immediately thereabove.

A preferred embodiment of the invention itself is best observed in Figure 2. The upper end or head **15** is adapted by thread means or the like **14** to be secured to a wire line, or sucker rod or other support and operating means.

Extending in the normally downward direction from each side of the head portion **15**, there are arms **16** and **17** which are parallel to each other. The outside surfaces of the two arms are slightly less distance apart than the inside diameter of the tubing to be scraped.

The arm **16** is somewhat longer than the arm **17**. A lower blade **18** extends from the lower end of arm **16** to the lower end of arm **17** along a generally helical path, the helical path, sometimes herein referred to as the helix having a diameter substantially equal to the distance between the outside surfaces of the two arms, and somewhat shorter than the inside diameter of the pipe being scraped.

Preferably the lower edge of the blade **18** is sharpened along with the lower end, i. e. edge of the two arms **16** and **17**, so that together, the lower edges of the arms **16** and **17** and the blade **18** constitute a scraping edge of helical form extending more than 180 degrees of the circle but quite substantially less than a full circle, the optimum being roughly 200 degrees. The reason for this is explained hereinafter.

Intermediate the lower blade **18** and the head portion **15**, there is another blade **19** which extends from the arm **16** to the arm **17** in a helical path similar to that of the blade **18**, excepting that the helical path of the intermediate blade **19** is preferably opposite that of the lower blade **18**. For example, one is a left hand helix and the other is a right hand helix.

Preferably the lower edge of the blade **19** is sharpened. The lower edge of one or both blades may be turned slightly outward, if desired. As illustrated, the two blades are on opposite sides of the plane defined by said two arms so that together the two blades scrape a full 360 degrees.

With the construction defined wherein the two arms are directly opposite each other and the blades are as described, a balanced tool is easily constructed. Such a tool lowers easily into tubing when suspended on a wire line.

As indicated in the preferred embodiment illustrated in the drawings, the lower edges or ends of the arms are also preferably shaped to constitute or define a helical line. While the helical line defined by the ends of the arms may be a continuation of the helical line defined by the lower edge of the lower blade, as illustrated, it is also possible for the helical line defined by the ends of the arms to be of a different helix angle from that of the lower blade.

In the preferred embodiment illustrated, the arm ends are so formed as to define a scraping edge which is integrated with the lower edge of the lower blade. A single continuous scraping edge of a single helical form is defined by the lower end of the arms and the lower edge of the lower blade, taken together. With this structure, the total length of the lower blade edge, including the lower helically formed edge of the arms, is greater than the length of the upper blade edge. Consider Figures 2 and 3, for example. Since the lower edge, i. e., the primary scraping edge, of the intermediate blade **19** does not include the arm ends, this helical edge covers only some 160 odd degrees, while the helical edge of the lower blade and the arm ends covers some 200 odd degrees.

In the operation of the tool, it is worked up and down. In such operation, the paraffin engaging the blade, of say the right hand helical form, produces a rotative force on the tool in one direction, while the paraffin engaging the other blade, of say left hand helical form, produces a rotative force in the opposite direction. Since one blade, including the arm ends, is effectively longer than the other, a net rotative force in one direction is produced when the paraffin is of uniform consistency and thickness. Further since paraffin engaged by the shorter blade may be more firm or thicker than that engaged by the longer blade, on occasion such circumstance may produce a rotative force on the shorter blade that is greater than that on the longer blade, thus effecting a net rotative force on the tool in the opposite direction from that expected in uniform paraffin. Accordingly, up and down movement of the tool on a wire line, effects various rotations of the tool, which help prevent paraffin fouling and assures thorough scraping.

Also, the fact that each scraper covers only a semicircle, or only slightly more in the case of the lower scrap-

er, means that the paraffin scraped by each blade can be moved freely away from the tubing wall without being urged toward and squeezed together with paraffin being simultaneously scraped from the direct opposite wall of the tubing. The result is that this scraper with blades covering only half circles, or thereabout, which half circle blades are displaced from each other in a direction longitudinally of the tubing, operates much more freely and efficiently than scrapers with circular blades. Still the half circle blades in combination effect full 360 degree scraping.

Modifications may be made in the device as disclosed herein without departure from the scope of the invention. Accordingly, this description is to be construed as illustrative only, and is not to be construed as a limitation upon the invention defined in the following claims.

I claim:

1. A tool adapted for the scraping of paraffin from the inside of oil well production tubing and the like comprising; a head portion adapted to be suspended from support and operating means down into production tubing in a well; two straight arms depending parallel to each other in the normally downward direction from said head portion, the two arms being depended from different sides of said head portion; a first blade having one end thereof secured to the normally lower end of the first of said arms, and having the other end thereof secured to the normally lower end of the second of said arms, said blade extending from said first arm to said second arm along a generally helical path; a second blade disposed between said first blade and said head portion, one end of said second blade being secured to an intermediate point on the first of said arms, the other end of said second blade being secured to an intermediate point on the second of said arms, said second blade extending from said first arm to said second arm along a generally helical path of substantially the same diameter as that of said first blade; said two blades being positioned on opposite sides of the plane defined by said two arms.

2. The invention defined in claim 1, wherein one of said blades is of the form of approximately a half turn of a right hand helix and the other of said blades is of the form of approximately a half turn of a left hand helix.

3. The invention defined in claim 2, wherein the lower ends of said arms are both of generally helical form similar to the helical form of one of said blades, whereby the total length of lower edge of the form of a right hand helix is different by a significant amount from the total length of lower edge of the form of a left hand helix.

4. The invention defined in claim 2, wherein the edges of the lower ends of said arms are both of generally helical form.

5. A tool adapted for the scraping of paraffin from the inside of oil well production tubing and the like comprising a head portion adapted to be suspended from support and operating means down into a well; two arms depending substantially parallel to each other in the normally downward direction from said head portion, a first blade having one end thereof secured to the first of said arms, and having the other end thereof secured to the second of said arms, the normally lower edge of said blade extending from said first arm to said second arm along a generally helical path; a second blade disposed between said first blade and said head portion, one end of said second blade being secured to an intermediate point on the first of said arms, the other end of said second blade being secured to an intermediate point on the second of said arms, the normally lower edge of said second blade extending from said first arm to said second arm along a generally helical path; said two blades being positioned on opposite sides of the plane defined by said two arms.

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