

April 2, 1963

R. R. NAGEL ET AL

3,083,773

PARAFFIN SCRAPER

Filed Aug. 4, 1961

Fig. 1

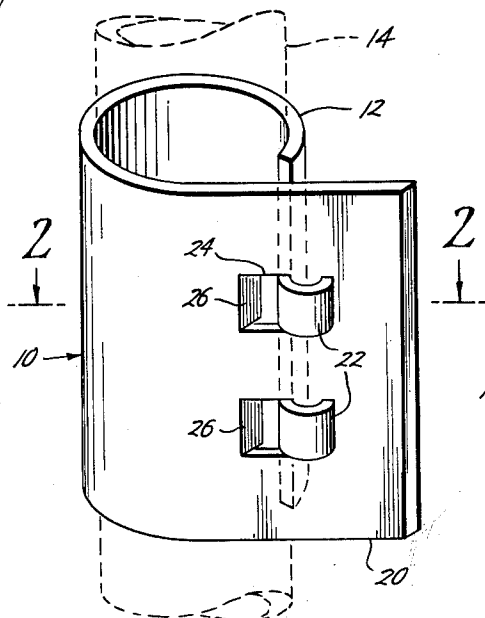


Fig. 2

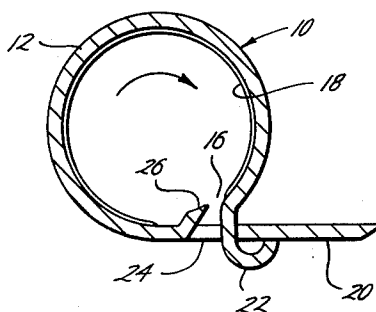


Fig. 3

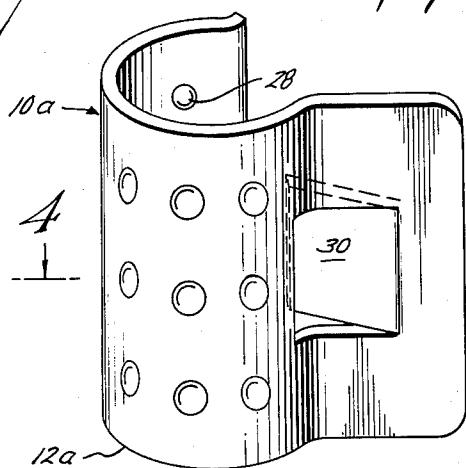
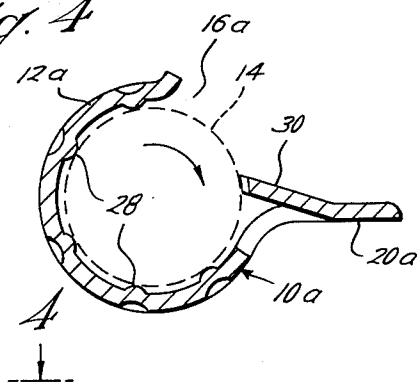


Fig. 4



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PARAFFIN SCRAPER

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Filed Aug. 4, 1961, Ser. No. 129,394

7 Claims. (Cl. 166-176)

The present invention relates to a paraffin scraper, and more particularly, relates to an improvement in a paraffin scraper which can be quickly snapped on and locked in place on a sucker rod.

Generally it is old in the art to attach a paraffin scraper to a string of steel rods operating a pump at the bottom of an oil well. These rods, known as sucker rods, extend from the ground surface through a tubing which also extends from the surface to the oil well pump. Paraffin and other substances tend to precipitate out of the oil well fluid into the tubing. Various types of paraffin scrapers have been used in the past which are connected to the sucker rods and move up and down and rotate with the rods so as to scrape paraffin from the walls of the tubing. For instance, see the patent to Paterson, No. 2,660,893, which discloses a mechanism for rotating sucker rods for operating paraffin scrapers attached thereto, and the patent to Blackburn, No. 2,321,275, which discloses a paraffin scraper for use on a sucker rod which may be simultaneously rotated and reciprocated, and see the patent to Cormany, No. 2,471,198, which shows a device for rotating the tubing instead of the sucker rod. Thus, it is generally known to provide a paraffin scraper attached to sucker rods and provide a simultaneous rotative and reciprocating motion between the sucker rods and the tubing in order that the scraper may clean the interior wall of the tubing. The present invention is directed to various improvements in such a paraffin scraper.

It is therefore a general object of the present invention to provide an improved paraffin scraper which includes a unitary body of resilient spring material so that the scraper can be quickly snapped on and locked in place on a sucker rod without requiring the use of bolts, welding or other expensive and time consuming operations.

It is a further object of the present invention to provide an improved paraffin scraper which includes a unitary body of resilient spring metal so that the scraper can be quickly snapped on and locked in place on a sucker rod without requiring the use of bolts, welding or other expensive and time consuming operations.

It is a further object of the present invention to provide an improved paraffin scraper that can be quickly and easily manufactured out of a single piece of resilient metal and can be quickly installed and removed from the sucker rod without requiring the use of expensive installation equipment and fastening means.

It is a further object of the present invention to provide a paraffin scraper which includes a unitary body of resilient spring steel which includes a curved portion which will snap on and lock on a sucker rod.

It is yet a further object of the present invention to provide an improved paraffin scraper wherein the scraping blade is attached to the scraper body so as to tighten the scraper on the sucker rod as the rod and scraper are rotated.

A still further object of the present invention is the provision of an improved paraffin scraper which may include a pressure sensitive adhesive and/or indentations in the interior of the curved portion of the scraper to firmly and securely lock the paraffin scraper on a sucker rod.

Yet a still further object of the present invention is the provision of an improved paraffin scraper which includes a stop lug which presses against the sucker rod when the

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rod and scraper are rotated to prevent slippage of the scraper on the rod.

A still further object of the present invention is the provision of resilient locking lugs and slots for holding the spring resilient body secured to the sucker rod.

Other and further objects, features and advantages will be apparent from the following description of presently-preferred embodiments of the invention, given for the purpose of disclosure, and taken in conjunction with the accompanying drawing, where like character references designate like parts throughout the several views, and where—

FIGURE 1 is a prospective view, illustrating one form of a paraffin scraper according to the present invention,

FIGURE 2 is a sectional view, taken along the line 2—2 of FIGURE 1,

FIGURE 3 is a prospective view of another form of the present invention, and

FIGURE 4 is a cross sectional view taken along the line 4—4 of FIGURE 3.

Referring now to the drawings, and particularly to FIGURES 1 and 2, the reference numeral 10 generally designates a paraffin scraper according to the present invention.

The paraffin scraper 10 is made of a resilient material, preferably spring steel. Thus, a curved portion 12 of the scraper is sized and shaped to fit around the periphery of a conventional sucker rod 14 and will resiliently snap on and around the rod 14 and securely lock the scraper in place. The curved portion 12 of the body has an axial opening 16 which may resiliently be expanded to permit the placement of the scraper 10 around the sucker rod 14. If desired, a pressure sensitive adhesive 18 may be placed around the periphery of the interior of the curved portion 12 to aid in securing the scraper 10 on the rod 14.

A blade portion 20 is provided which is connected to the curved portion 12 of the scraper. The scraper blade 20 extends outwardly so as to scrape paraffin and other matter from a well tubing (not shown) as the sucker rod 14 and thus the scraper 10 is rotated in a tubing. Preferably, for ease in manufacture, the blade 20 is formed as a tangential extension of one side of the curved portion 12 of the body. In addition, and assuming that the sucker rod and thus the scraper 10 will be rotated in a clockwise direction as shown by the arrow in FIGURE 2, the blade extension 20 is connected to the curved portion 12 on the side leading the opening 16 when the scraper is rotated. This causes the extension 20 to be further pressed against the sucker rod in a direction so as to wrap the scraper about the rod instead of tending to disengage and disconnect it from the sucker rod.

The scraper blade 20 may be coated with a low friction synthetic material such as polytetrafluoroethylene resin, commonly known by the trademark "Teflon," to prevent paraffin and other tubing accumulations from sticking to the scraper blade 20 as it scrapes the tubing (not shown).

Locking lugs 22 which fit through slots 24 and engage and resiliently hold the scraper on the sucker rod may be provided, if desired. Thus, a more secure locking action of the scraper on the sucker rod is provided.

One or more stop lugs 26 may be provided to prevent any slippage of the scraper 12 on the sucker rod. The stop lugs 26 are connected to the scraper 12 and extend from the scraper in a direction opposite from the direction of rotation of the rod 14 and scraper 12 and are positioned to engage the periphery of the sucker rod at an angle. Thus, assuming a clockwise direction as shown in FIGURE 2, the end of the stop lug 26 will press against the periphery of the sucker rod on which the scraper 12 is mounted. As the blade 20 is rotated and encounters paraffin and other matter in a tubing, the force tending to cause slippage between the scraper 12 and the sucker rod is increased. However, as force which tends to cause

slippage is increased, the force pressing the stop lug against the sucker rod is increased and directed so as to prevent such slippage of the scraper 12 on the sucker rod. It is noted that the stop lug 26 may be simply and easily manufactured by utilizing the punched out portion from the locking slots 24.

Of course, various modifications of this paraffin scraper may be made utilizing the basic spring metal body which snaps on and locks on a sucker rod. FIGURES 3 and 4 illustrate a modification of the paraffin scraper according to the invention, the letter "a" being applied to parts corresponding to those in FIGURES 1 and 2 for convenience of reference. In the modification shown in FIGURES 3 and 4, the locking lugs and slots have been omitted, and the pressure sensitive adhesive has been omitted, but a plurality of indentations 28 may be provided, if desired, around the interior of the curved portion 12a of the scraper 10a. Thus, as the resilient spring metal curved portion 12a is compressed around a sucker rod the indentations 28 will provide additional pressure and holding means to secure the scraper 12a to the sucker rod.

In addition, a plurality of stop lugs 30, here shown as one for convenience, may be provided which are connected closer to the free end of the blade 20a than the embodiment shown in FIGURES 1 and 2. This insures that a greater leverage will be exerted on the stop lug 30 against the outer periphery of the sucker rod 14 as the scraper 12a is rotated in a clockwise direction. This provides a structure which will increase the force to prevent slippage between the scraper 12a and the sucker rod 14. It is also noted that the lug 30 readily allows the scraper 10a to be slipped over the sucker rod 14, but blocks the opening 16a to prevent lateral movement off of the rod 14 by the scraper 12a.

It is particularly noted that the paraffin scrapers 10 and 10a can be used for counter clockwise rotation as well as clockwise rotation without requiring any structural modifications. That is, the scrapers 10 and 10a merely need to be inverted on the sucker rod 14 for counter clockwise rotation and thus have the forces acting on the blades 20 and 20a and on the stop lugs 26 and 30 to hold the scrapers on the rod 14 and to prevent slippage between the scrapers and the rod 14.

Thus, the present invention provides a paraffin scraper which may be quickly and easily snapped in place upon a sucker rod and requires no welding, bolts, or holes to be drilled in the sucker rod for attachment. Similarly, the paraffin scraper of the present invention can be quickly and easily detached and removed from a sucker rod. In addition, the present paraffin scraper is made in a unitary body which facilitates the ease of handling and attachment. Furthermore, it is particularly noted that the paraffin scraper of the present invention can be inexpensively and quickly manufactured out of a single plate of spring metal such as steel, by a suitable die, and thus will provide an extremely inexpensive and yet suitable device.

In operation, generally a plurality of paraffin scrapers are attached to the sucker rod 14 of a pumping oil well. As is conventional, a plurality of these paraffin scrapers are placed along the sucker rod at a distance less than the longitudinal stroke of the rod. Thus as the rod is longitudinally moved and rotated the scrapers will prevent the well tubing from becoming caked up with paraffin so as to reduce the flow of well fluid being pumped.

The paraffin scraper of the present invention can be quickly and easily snapped on and locked onto a sucker rod at the desired position. The embodiment shown in FIGURES 1 and 2 may be quickly and easily fastened together by passing resilient locking lugs 22 through the slots 24 and allowing them to catch on the outer edge of the scraper body 12. However, the locking lugs and slots may be omitted and the scraper 12 may be held in place by the resilient action of the spring metal body curved portion 12 and 12a used for the device. In ad-

dition, if desired, other features of the device such as the pressure sensitive adhesive 18, or the indentations 28 (FIGURE 4) or both may be utilized to assist in securing the scraper on a sucker rod.

The use of a stop lug is advantageous in preventing slippage of the scraper 12 or 12a around the rod 14. It is noted that the stop lugs 26 and 30 while allowing the scraper to be passed over and snapped on to the sucker rod, tend to catch and prevent accidental disengagement of the scraper from the sucker rod. It is also noted that as the paraffin scraper is rotated in the well the blade 20 will suitably scrape a tubing of paraffin or other matter which prevents the flow of fluid. As the blades 20 and 20a encounter and scrape this matter a force is exerted on these blades which will tend to wrap them further around the sucker rod and thus tighten the scraper on the rod as well as further forcing the stop lugs 26 and 30 against the outer periphery of the sucker rod to prevent slippage of the scraper on the sucker rod.

Advantageously, the device of the present invention can be positioned on the sucker rod 14, as shown in the drawing or inverted. Thus, depending on the direction of rotation of the sucker rod 14, the paraffin scraper 10 and 10a can be positioned so that the scraping force acting on the blade extension 20 and 20a acts in a direction to both tend to wrap the blade about the rod and acts to force the stop lug 26 and 30 against the rod to prevent slippage. Thus, if the rod 14 were rotating in a counter clockwise direction, the paraffin scraper 10 and 10a would be connected to the rod in an inverted position from that shown in the drawing so that the blade and the stop lugs would be positioned so as to lead the opening 16 and 16a in the direction of rotation when the scraper is rotated.

Thus, the paraffin scraper of the present invention is particularly advantageous in providing an integral resilient spring holding body which grips and secures the scraper to a sucker rod by a snap on action. The scraper body may be provided with indentations or adhesive pressure means for further securing the scraper to the sucker rod. The scraper may further utilize a stop lug which acts to prevent slippage of the scraper on the sucker rod in proportion to the force tending to create such slippage. In addition, it is particularly noted that this integral paraffin scraper is particularly easy to manufacture and inexpensive.

The present invention, therefore, is well adapted to carry out the objects and attain the ends and advantages mentioned as well as others inherent therein. While presently preferred embodiments of the invention are given for the purpose of disclosure, numerous changes in the details of construction and arrangement of parts will readily suggest themselves to those skilled in the art and which are encompassed within the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A paraffin scraper for use on a sucker rod comprising, a unitary body of resilient spring steel and including a tubular portion having an axial opening and sized to snap on and secure the resilient body to a sucker rod, and a blade portion connected to said tubular portion and extending outwardly to scrape paraffin from a well tubing, said blade connected to said tubular portion and extending from one side of the opening and adapted to be positioned on the leading edge of the opening when the rod is rotated thereby tightening the scraper on the rod, locking lugs extending from the body on one side of the opening, and stop lugs being pressed from the body on the second side of the opening leaving receiving slots for said locking lugs.

2. A paraffin scraper for use on a sucker rod comprising, a unitary tubular body of resilient spring steel, said body including an axially extending opening and sized to fit around and snap on and hold the body to a sucker rod, a blade portion extending outwardly from the body at one side of the opening to scrape paraffin from a well

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casing, said blade adapted to be positioned on the leading edge of the opening when the rod is rotated thereby tightening the scraper on the rod, and a stop lug on the body and extending angularly therefrom, said lug adapted to be directed opposite from the direction of rotation of the rod, said stop lug positioned interiorly of said body and in said opening so as to engage the outer surface of the rod at an angle thereby preventing slippage between the scraper and the rod.

3. The invention of claim 2 including a pressure sensitive adhesive material on the interior of the body for holding said scraper to the rod.

4. The invention of claim 2 including protuberances on the interior of the body.

5. The invention of claim 2 including locking lugs connected to the body on one side of the opening, the body having receiving slots for said locking lugs on the other side of said opening.

6. The invention of claim 2 wherein the stop lug is connected to the blade portion of the body.

7. A paraffin scraper for attachment to a sucker rod comprising, a unitary tubular body of resilient spring material, said body having an axially extending opening along the entire length of said body and sized to fit

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around and snap on and hold the body to a sucker rod, a blade portion extending outwardly from the body at one side of the opening to scrape paraffin from a well casing, said blade adapted to be positioned on the leading edge of the opening on rotative movement between the rod and tubing thereby tightening the scraper on the rod, and a stop lug extending from the body and positioned in said opening and adapted to contact the sucker rod, said stop lug positioned to be at an angle to and directed toward the rod when the scraper is attached thereto thereby preventing slippage of the scraper on the rod.

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