May 20, 1930. J. C. ARMSTRONG ET AL 1,758,995

TUBING CLEANER AND PROTECTOR

Filed May 18, 1928

Fig. 1.

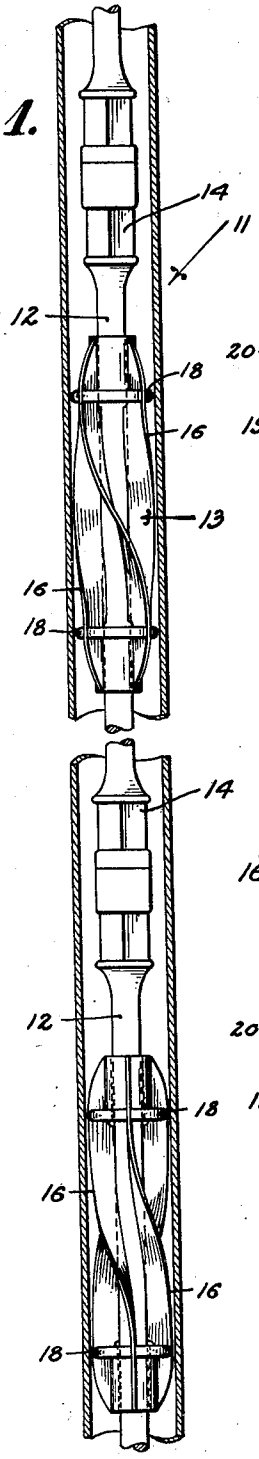


Fig. 2.

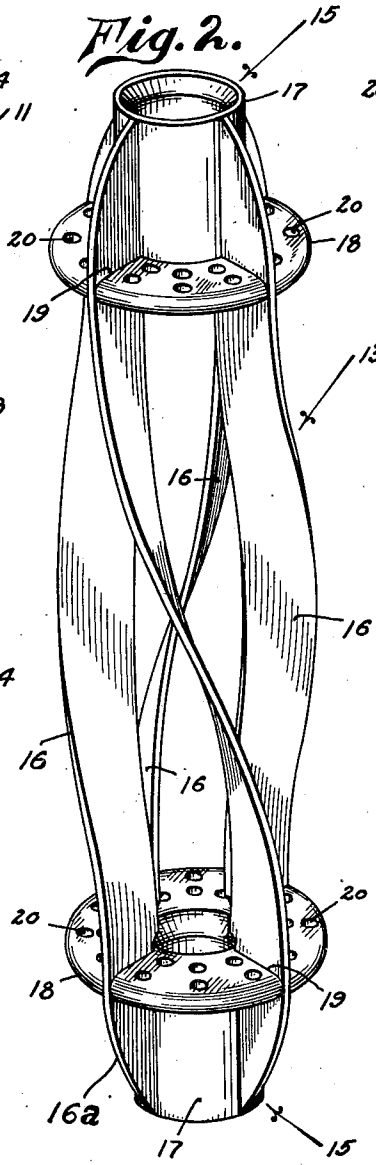


Fig. 3.

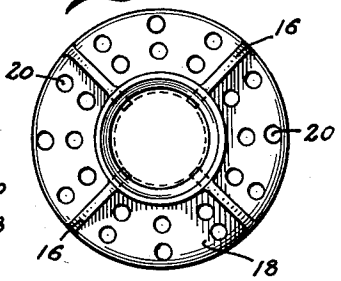
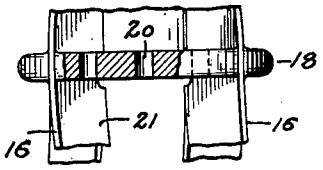


Fig. 4.



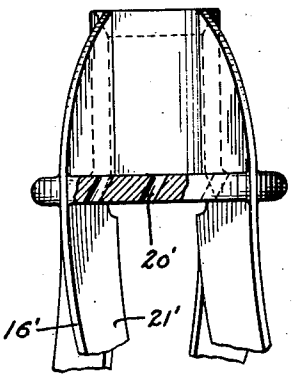


Fig. 5.

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Patented May 20, 1930 1,758,995

UNITED STATES PATENT OFFICE

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TUBING CLEANER AND PROTECTOR

Application filed May 18, 1928. Serial No. 278,758.

This invention is a device used in combination with the tubing and sucker rods of wells, being particularly adapted for use in the pumping of oil, and has as an object the provision of means for removing superfluous deposits of wax and asphaltic or other substances from the inner surface of the tubing, and, secondly, the guiding of the sucker rods in the tubing in such a manner as to prevent direct engagement of the sucker rods with the tubing.

It is well known to those familiar with the art that, due to the fact that oil wells do not follow a perpendicular line, the reciprocation of the sucker rods within the tubing does not follow a line concentric with the tubing.

We are aware of the fact that numerous types of guides have been developed to hold the sucker rods in a substantially central position within the tubing, thus preventing an undue wearing of surfaces, and while it is one object of our invention to develop a guide of the class described, it is a primary object to develop a device which will not only act as a guide but will serve an additional and novel purpose of providing a scraping device for the inner surface of the tube which will remove all deposits of asphalt and wax that commonly accumulate in pumping certain types of crude petroleum.

It is well known to those familiar with the art that in certain types of crude petroleum which contain large quantities of wax or asphaltic compound, the deposition of such compounds upon the inner surface of the tubing will, in the course of time, build up such a resistance to the flow of pumped oil therethrough as to necessitate the withdrawal of the sucker rods and a cleaning of the tubing. The mentioned deposition within the tubing also makes the withdrawal and replacement of the plunger a difficult operation.

Unlike the majority of guides, as commonly used, the invention is so mounted upon the sucker rods that it can move freely upon the rods between the couplings or joints, thus distributing the wear upon a large area in place of an area limited to the length of the vertical movement of the rods.

This invention comprises a plurality of spirally shaped blades which are rotatably and slidably supported upon the sucker rods by means of bearing collars and which tend to rotate during the reciprocation of the sucker rods, scraping the inner surface of the tubing and the outer surface of the rods, thus preventing the mentioned deposition of solid substances thereon.

Other objects of our invention and a particular construction by means of which these objects may be carried out will be better understood from the following description of an illustrated embodiment thereof, as shown in the accompanying drawings, in which

Fig. 1 may be considered as a section of oil well tubing having a sucker rod suspended therein.

Fig. 2 is a perspective view, showing an embodiment of my invention.

Fig. 3 is a plan view corresponding to Fig. 2. Fig. 4 is a partial elevational view, with parts broken away, showing a bearing or head member employed in our invention, and

Fig. 5 is a modified form of bearing or head member similar to that shown in Fig. 4.

More particularly describing the invention as herein illustrated, reference numeral 11 indicates an oil well tubing, having a sucker rod 12 suspended therein, and the sucker rod 12 is illustrated as having tubing cleaners 13 reciprocably mounted thereon.

Due to the fact that the sucker rods as commonly constructed are provided with integrally formed joints or collars, 14, the form of cleaning members illustrated, if positioned upon the rod after the same has been finished, must be placed thereon by cutting the rod, and, after positioning the protecting or cleaning member on the rod, welding the sections together.

The cleaning and protecting member 13 is better illustrated in Fig. 2 as comprising bearing or head members 15, which are rigidly connected by means of spirally shaped blades 16, the radial offset of the blades relative to the oppositely disposed bearing members may be carried to any desired extent, but is illustrated as being substantially 90°. The outer ends 16ª of the blades are illustrated as being tapered toward the axis of the bearings,

a feature which eliminates all sharp edges and corners in the unit and adds materially to the smoothness with which a pump equipped with these devices operates.

The bearing or head members 15 are illustrated as comprising a tubular central bearing section 17 and an annularly extending flange 18, the flange 18 being provided with notches 19 adapted to receive the blades 16 and with a plurality of laterally extending holes or apertures 20 through which the fluid which is being drawn through the tubing by means of the sucker rods is adapted to circulate.

These apertures or passages may be of varying size and arrangement, depending upon the fluid being pumped from the well.

It will be understood that the circulating fluid passing through the apertures 20 tends to impinge upon the blades 16 and to effect a rotation of the cleaning member upon the sucker rod, and in the modified form of our invention shown in Fig. 5, the apertures illustrated at 20′ are shown as being disposed at an angle such that the circulating fluid passing through these apertures strikes the "rear" surfaces 21′ of the blades 16′ in a more direct manner, thus assuring a more positive rotation of the member upon the sucker rod. This mentioned rotation of the cleaner upon the sucker rods obviously prevents the accumulation of sediment upon the inner walls of the tubing.

These protecting members are preferably made of such dimensions that a slight clearance is normally maintained between the outer periphery of the blades and the inner wall of the tubing.

Our invention, as above described, in its operation of removing accumulations from the inner wall of the tubing not only decreases the resistance to the flow of oil through the tubing, but obviously makes the performance of reinserting the plunger into the pump barrel after the rods have been pulled a much easier operation.

It will be understood that while we have herein described and illustrated one particular embodiment of our invention, it is not limited to the precise construction shown, but includes within its scope whatever changes fairly come within the spirit of the appended claims.

We claim as our invention:

1. For use in combination with well tubing and sucker rods, a tubing cleaner device which comprises: bearing members rotatably mounted upon said sucker rods; and radially extending blade members rigidly interposed between said bearing members, said bearing members being provided with fluid circulating apertures.

2. For use in combination with well tubing and sucker rods, a tubing cleaner device which comprises: bearing members rotatably mounted upon said sucker rods; and radially extending blade members rigidly interposed between said bearing members, said blade members being spirally shaped, and the ends of said blades being tapered toward the axis of the bearing members.

3. For use in combination with well tubing and sucker rods, a tubing cleaner device which comprises: bearing members rotatably mounted upon said sucker rods; and radially extending blade members rigidly interposed between said bearing members, said bearing members comprising a central tubular section and an annularly extending flange, said flange being provided with a plurality of liquid circulating apertures.

4. For use in combination with well tubing and sucker rods, a tubing cleaner device which comprises: bearing members rotatably mounted upon said sucker rods; and radially extending blade members rigidly interposed between said bearing members, said bearing members comprising central tubular sections and annularly extending flanges, said flanges being provided with a plurality of liquid circulating apertures, said apertures being adapted to direct a circulating fluid against the rear surfaces of said blades.

5. For use in combination with well tubing and sucker rods, a tubing cleaner device which comprises: spirally shaped blade members adapted to engage the inner wall of said tubing; and the outer surface of said sucker rods and blade supporting members reciprocably and rotatably mounted on said sucker rods, and adapted to rigidly support opposite ends of said blades.

6. For use in combination with the sucker rods of an oil well pump, a rod cleaning device embodying oppositely disposed bearing members; slidably and reciprocably mounted on said rods, and blades rigidly interposed between said bearing members having inner edges adapted to engage said rods.

7. For use in combination with well tubing and sucker rods, a tubing cleaner device which comprises: bearing members rotatably mounted upon the sucker rods, and spirally shaped flat blade members having their ends rigidly and radially mounted in said bearing members, the outer edges of said blades being adapted to engage the inner wall of said tubing.

In testimony whereof, the said JOHN C. ARMSTRONG and JOSEPH E. WALLIS have hereunto set their hands at Fillmore, California, this 27th day of April, 1928.

JOHN C. ARMSTRONG.
JOSEPH E. WALLIS.