Jan. 5, 1943. A. D. LARSON 2,307,688

COMBINATION SUCKER ROD GUIDE AND PARAFFIN SCRAPER

Filed Aug. 8, 1941

FIG. 1.

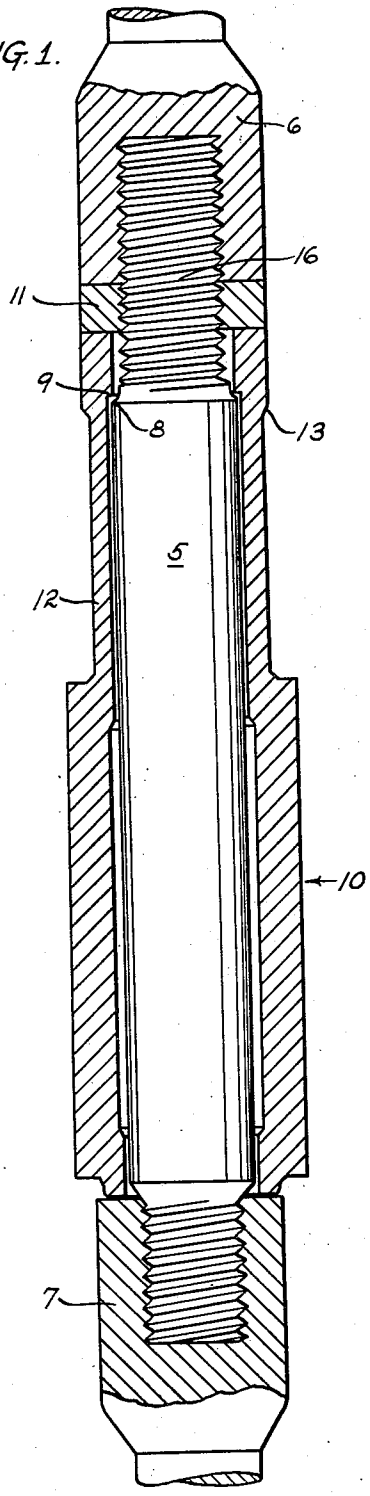
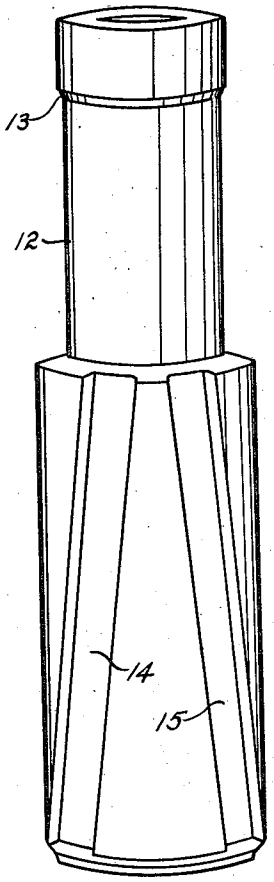


FIG. 2.



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Patented Jan. 5, 1943

2,307,688

UNITED STATES PATENT OFFICE

2,307,688

COMBINATION SUCKER ROD GUIDE AND PARAFFIN SCRAPER

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Application August 8, 1941, Serial No. 406,022

4 Claims. (Cl. 166—18)

The present invention is a structure which, when secured in position between the joints of a sucker rod string in a pumping oil well, will not only afford free passage for fluid through the production tubing, but will serve as a guide to prevent excessive wear on the joints of the rod string, and will also serve as a scraper to scrape paraffin from the interior surface of the production tubing as the sucker rod string is reciprocated therein, or as it is pulled from the well.

Devices previously designed to fulfill these functions have had numerous inherent disadvantages in practical use, the main disadvantage being the difficulty in fishing for the lower part of the sucker rod string either when a guide in the string breaks in two, or, when a rod breaks immediately adjacent the upper end of one of the sucker rod guides, leaving none or very little of the rod projecting above the guide to be grasped by a fishing tool. In a large majority of such cases the upper end of the guide or the broken part of the guide is of such size and shape that it cannot be grasped by a fishing tool, and it therefore becomes necessary to pull the entire string of production tubing, with a very costly loss of production time.

It is the chief object of my invention, therefore, to provide a combination sucker rod guide and paraffin scraper which is so designed that in case of breakage of one of the sucker rods at any point intermediate of or adjacent to the ends of the guide, a fishing tool can easily grasp the upper end of the separated portion of the sucker rod string and remove it.

A second important object of the invention is to provide a sucker rod guide which is so constructed that in case it breaks intermediate its ends, the part of the guide remaining on the upper end of the broken string will aid in the fishing job instead of serving as a hindrance.

Another object of the invention is to provide a device of this class which is so constructed that the part of the guide which actually contacts the wall of the production tubing and receives the greatest wear, is separable from the remainder of the guide and may therefore be made of a different type metal, if desired, and may also be easily and quickly replaced without the expense of replacing the entire guide.

Another object of the invention is to provide a device of this class, the paraffin scraping portion of which is so constructed that the performance of the scraping function products no torque strain either on the guide proper or on the sucker rod string.

The details in the construction of a preferred form of the invention, together with other objects attending its production, will be better understood from the following description when read in connection with the accmpanying drawing, which are chosen for illustrative purposes only, and in which

Figure 1 is a central longitudinal section through a relatively short portion of a sucker rod string with a preferred form of the invention inserted therein; and

Fig. 2 is a perspective view of the guiding and scraping sleeve, which is a part of the invention illustrated in Fig. 1.

As will be seen from Fig. 1, the invention includes a relatively short rod **5** threaded at its upper end for connection to a sucker rod box **6**, and either threaded at its lower end, as shown, for connection to another sucker rod box **7**, or else fitted with an integral sucker rod box adapted to receive the threaded end of another sucker rod section.

Near its upper end, this rod **5** is provided with an annular shoulder **8** which is slightly larger in diameter than an internal shoulder **9** formed near the upper end of a guiding and paraffin scraping sleeve **10**. As a means for rigidly and securely holding the sleeve **10** in position on the rod **5**, a nut **11** is screwed down tight on the upper end of the sleeve **10**, thus holding the shoulders **8** and **9** firmly in contact with each other. As an additional holding means, the lower end of the sleeve **10** is impinged by the upper end of the box **7**. The box **6** is in turn screwed down tightly on the nut **11**, thus preventing the nut from backing off.

The sleeve **10** has an external upper portion **12** of reduced diameter, and an exterior annular downwardly facing shoulder **13** near its upper end, which shoulder serves as a fishing ring to facilitate the grasp of the sleeve by a fishing tool. The lower portion of the sleeve is of enlarged diameter, and has a plurality of pairs of spaced superficial grooves **14** and **15** milled or cast into its exterior surface. These grooves extend longitudinally of the sleeve, but are preferably upwardly convergent, as illustrated, the outer side walls of the grooves thus serving to scrape paraffin with a cutting action on the down stroke, while their inner or adjacent side walls scrape with a cutting action on the upstroke.

With a plurality of these guides inserted between various joints of a rod string, if breakage

occurs at the usual point, designated by the numeral 16, the nut 11 will still hold the sleeve 10 securely in position on the rod 5, and a fishing tool may easily be slipped over the reduced upper end of the guide and grasp it at the fishing ring or shoulder 13. This, naturally, would require only one lowering of the fishing string into the well to bring out the entire remaining portion of the rod string.

Should the string break at a point intermediate the ends of the rod 5, for instance within the reduced portion 12 of the sleeve 10, withdrawal of the upper portion of the string will, because of shoulders 8 and 9, act to remove the sleeve 10, thus leaving a portion of the rod 5 exposed so that it may easily be grasped by a fishing tool. Since there is slight space between the inner surface of the sleeve 10 and the outer surface of the rod 5, there is little or no strain placed upon the sleeve 10 during the pumping operation. The rod 5 carries the load of the production fluid while the sleeve 10 is subjected only to the strain exerted thereon by its action of cutting through the paraffin. For this reason there will be no likelihood of the sleeve 10 ever becoming fatigued or crystallized to the point of separation.

Should the rod 5 become fatigued and break at or adjacent the upper end of the box 7, then the box 7 will be left standing in the well so that a fishing tool may easily be passed thereover.

From the above description it may readily be seen that in the event of a break in the string any where intermediate the ends of the rod 5, one of two things will occur, either no portion of the sleeve 10 will be left in the well, or it will all be left therein. In either event, the fishing job may be accomplished with a single trip into the well. This is because there will be left remaining an upstanding portion of the "fish" which does not completely fill the bore of the production tubing, and therefore there will be ample annular space to operate a sucker rod socket or overshot to engage either the upstanding rod 5, the shoulder 13, or beneath the box 7.

While I have described and illustrated only a single specific embodiment of my invention, I am aware that it may be embodied in other forms, and I do not wish to be limited save by the prior art and by the scope of the appended claims.

I claim:

1. A combination sucker rod guide and paraffin scraper assembly, including: a rod section having its ends threaded for installation within a sucker rod string; an upwardly facing external shoulder on the rod section; a tubular sleeve around the section; a downwardly facing shoulder in the sleeve and riding the shoulder on the rod section; means for rigidly positioning the sleeve against longitudinal movement with relation to the rod section; an external downwardly facing shoulder carried by the sleeve for fishing tool engagement; and radially spaced longitudinally extending paraffin scraping ribs carried by and projecting outwardly from the exterior surface of said sleeve, the outer surfaces of said ribs being arcuate and describing a greater circumference than that of the last mentioned shoulder.

2. Organization as described in claim 1, in which the ribs converge upwardly.

3. Organization as described in claim 1, in which the positioning means includes at least one box of a sucker rod string section.

4. Organization as described in claim 1, in which the major portion of the bore of said tubular sleeve is greater in diameter than the external diameter of the rod section, whereby the rod section carries the pumping load and fatigue of the sleeve is eliminated.

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