United States Patent [19]

Zenon

[11] **3,887,985**

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[54] **DEVICE FOR MOUNTING AND DEMOUNTING GUIDES ON A CARRYING ROD**

[75] Inventor: **Raymond A. Zenon**, Abbeville, La.

[73] Assignee: **Atlantic Richfield Company**, Los Angeles, Calif.

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[52] **U.S. Cl.** **29/267**; 29/236

[51] **Int. Cl.** **B25b 27/02**

[58] **Field of Search** 29/236, 229, 244, 256, 29/257, 267, 268

[56] **References Cited**

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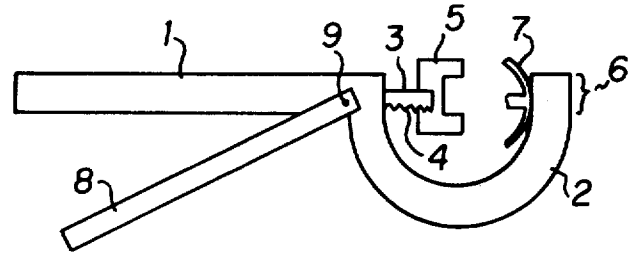
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Primary Examiner—Al Lawrence Smith
Assistant Examiner—Harold P. Smith, Jr.
Attorney, Agent, or Firm—Roderick W. MacDonald

[57] **ABSTRACT**

Apparatus is provided for mounting an object on a carrying rod or for removing an object from a carrying rod such as a guide means conventionally employed on sucker rod strings which are used in pumping an oil well. The apparatus employs a support means which supports the carrying rod with or without a guide means attached, and a separate press means for forcing the guide means onto or off of the carrying rod while the carrying rod is supported by the support means.

5 Claims, 10 Drawing Figures



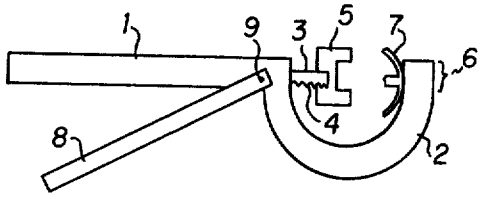


FIG. 1

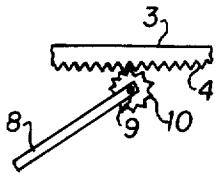


FIG. 2

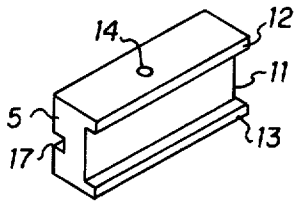


FIG. 3

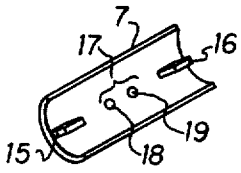


FIG. 4

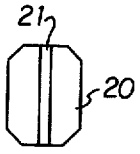


FIG. 5

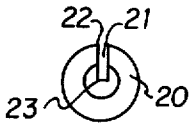


FIG. 6

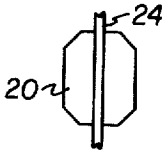


FIG. 7

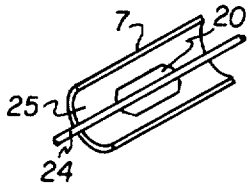


FIG. 8

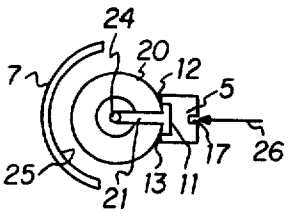


FIG. 9

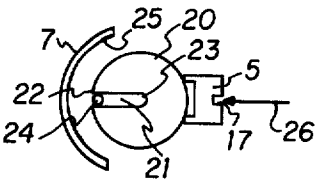


FIG. 10

DEVICE FOR MOUNTING AND DEMOUNTING GUIDES ON A CARRYING ROD

BACKGROUND OF THE INVENTION

Normally, in an oil field where pumping units are employed, the pumping units have a sucker rod string which extends between the surface pumping unit and the downhole pump in the well. There are employed on the sucker rod string guide means which are rubber, metal, or other type of devices which can be mounted on the sucker rod string at spaced apart points along the length thereof to keep the sucker rod string (rod coupling and rod body) from rubbing against the inner wall of the well tubing. Such rubbing can prematurely wear out the sucker rod coupling and body and cause failure of the sucker rod string thereby necessitating an expensive and time-consuming fishing job to retract the broken off part of the sucker rod string that fell down the wellbore.

Oftentimes, these guide means are mounted and demounted in the field because they wear out and have to be replaced when the need arises to help prevent excess wear on rod string and/or tubing. In such situations and where the guide means is the type designed to be forcibly slid onto the sucker rod string, the guide means are often simply beat off the sucker rod string with a hammer and the new guide means beat onto the sucker rod string with the same hammer. During such a process, the sucker rod string invariably undergoes a number of blows from the hammer itself which, although the sucker rod string is well-known to be made out of very good steel, can cause minute cracks in the metal of the sucker rod string. These very fine cracks, although not apparent to the naked eye, can, during the course of subsequent cyclic pumping operations, become enlarged and ultimately cause failure of the sucker rod string such as by separation of the string into two parts with the lower part free-falling down the wellbore. When this occurs, some parts of the pumping unit may have to be moved away from the wellhead, a workover rig moved in over the top of the wellhead, and a time-consuming and expensive fishing operation carried out until the part of the sucker rod string that has fallen down the wellbore is secured and pulled to the surface of the earth.

Thus, a few careless hammer blows when mounting and demonting guide means on the sucker rod string can cause considerable loss of oil production, time, and incur additional expense required in recovering a broken sucker rod string from the wellbore.

Heretofore, devices have been employed to press guide means onto a sucker rod but such devices were not also capable of removing the guide means from the sucker rod.

SUMMARY OF THE INVENTION

According to this invention apparatus is provided which allows a forceful but gradual pressure to be applied to an object such as a guide means relative to a carrying rod thereby to mount or demount the object without applying any impacting type force to the object or the carrying rod. This invention eliminates the risk of hairline cracks in the rod that can be formed by hammer blows.

Accordingly, it is an object of this invention to provide a new and improved apparatus for mounting and demounting an object on a carrying rod. It is another

object to provide a new and improved apparatus for mounting and demounting guide means on sucker rod strings.

Other aspects, objects and advantages of this invention will be apparent to those skilled in the art from this disclosure and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a device according to this invention.

FIG. 2 shows a gearing mechanism for making one member of the device of FIG. 1 reciprocatingly movable.

FIG. 3 shows one embodiment of a press means useful in this invention.

FIG. 4 shows one embodiment of a support means useful in this invention.

FIG. 5 shows a longitudinal view of a typical guide means that can be mounted or demounted by this invention.

FIG. 6 shows an end view of the guide means of FIG. 5.

FIG. 7 shows a guide means mounted on a carrying rod.

FIG. 8 shows a guide means mounted on a carrying rod and supported in the support means of FIG. 4.

FIG. 9 shows the application of a press means of this invention to a guide means carried on its carrying rod.

FIG. 10 shows the application of a press means of this invention to a guide means that is to be mounted on a carrying rod.

DETAILED DESCRIPTION OF THE INVENTION

This invention applies generally to the mounting and demounting of an object onto or off of a carrying rod by forceable sliding of the member in the rod relative to one another. This invention has particular application in the oil field art where guide means are conventionally forced onto and off of sucker rod strings. Therefore, although this invention will, for sake of clarity and brevity, be described relative to the oil field art, it should be recognized that the invention is not so limited in its scope.

FIG. 1 shows a tool having a fixed handle means 1 which carries a head means 2. Handle 1 is at least partially hollow so that an elongate movable first member 3 can extend a substantial distance into the length of handle 1. Movable first member 3 has teeth 4 for reasons described hereinafter, and, in FIG. 1, carries press means 5 which will also be described further hereinafter. The upright end 6 of head 2 provides a fixed second member which is spaced from and opposite to member 3 and press means 5. Second member 6 carries support means 7 which will be described in more detail hereinafter.

Fixed handle 1 also carries movable handle 8 which is hinged to handle 1 at 9 and is geared to member 3 so that movement of handle 8 is directly translated into linear movement of member 3 and press means 5 toward or away from support means 7 depending on the direction of movement of handle 8.

Any known means of connecting movable handle 8 to member 3 so that movement of handle 8 is translated into linear movement of member 3 can be employed. One embodiment is shown in FIG. 2 wherein handle 8 is fixed by way of element 9 to gear means 10 which gear means meshes with the teeth 4 of member 5 so that upward movement of handle 8 causes movement

of member 3 to the right in FIG. 2 and downward movement of handle 8 causes movement of member 3 to the left in FIG. 2.

FIG. 3 shows press means 5 to have a longitudinally extending indentation 11 which can be curved, rectangular, and the like, and which is sufficiently deep to allow longitudinally extending shoulders 12 and 13 on either side of indentation 11 to press against and force a guide means away from its carrying rod, the carrying rod passing into indentation 11 but not contacting press 5 at least until the guide means has been forced either completely off of its carrying rod or sufficiently off its carrying rod to allow easy hand removal. Press means 5 can be provided with a groove 17 to receive member 3 as shown in FIG. 1 and a bolt hole 14 for ease of attachment of press means 5 to member 3.

FIG. 4 shows support means 7 to be an elongate curvilinear member having at either end spaced apart upstanding sections 15 and 16. Sections 15 and 16 contact the carrying rod on opposite ends of the guide means. That is, to say, the guide means will be carried in between sections 15 and 16 in space 17, and when the carrying rod is resting on sections 15 and 16 the guide means in space 17 will be spaced away from support 7 so that the guide means can be forced off its carrying rod toward support 7 a sufficient distance at least to allow easy hand removal of the guide means from its support rod before the guide means contacts support 7. Support means 7 can carry one or more bolt holes 18 and 19 for ease of mounting on second member 6.

FIG. 5 shows a conventional rubber guide means 20 which has a longitudinally extending slot 21 extending to the center 23 (FIG. 6) thereof and also extending to the side surface 22 (FIG. 6) of the guide means.

FIG. 6 shows an end view of guide means 20 and from this FIG. it can be seen that groove 21 extends from the side surface 22 to approximately the center 23 of the guide means.

FIG. 7 shows guide means 20 with a carrying rod 24 forced into groove 21 down to the center 23. This is the normal mounted position for the guide means on the carrying rod.

FIG. 8 shows the carrying rod 24 with its mounted guide means 20 supported in support means 7 so that rod 24 rests on sections 15 and 16 with guide means 20 in between these sections and spaced from the back wall 25 of support means 7.

FIG. 9 shows an end view of the setup of FIG. 8 wherein guide means 20 is spaced from back wall 25 of support means 7, and press means 5 has been moved in the direction of arrow 26 until shoulders 12 and 13 contact guide means 20. By further movement of press 5 in the direction of arrow 26 guide means 20 is pushed away from carrying rod 24 and toward surface 25 along groove 21 until carrying rod 24 is at the end 22 of groove 21 or has passed grove end 22 and extends into indentation 11 of press 5, at either of which positions guide means 20 is either easily hand removable from rod 24 or has been completely removed from rod 24, respectively.

FIG. 10 shows the reverse operation, i.e., the mounting of guide means 20 onto rod 24. Rod 24, without any guide means thereon, can be set on sections 15 and 16. Groove 21 on guide means 20 is then aligned with that section of carrying rod 24 which is between sections 15 and 16. Thereafter, press means 5 is applied to the opposite side of guide means 20 from end 22 of groove 21 thereby forcibly sliding in the direction of arrow 26, guide means 20 onto rod 24 along groove 21 until rod 24 reaches center 23 at which time the guide means is mounted on rod 24.

It can thus be seen that by the apparatus of this invention a guide means can be forcibly slid on and off a carrying rod with the gradual and controlled application of pressure and without any impacting or dynamic type blows which could damage the guide means and/or the carrying rod.

Press means 5 and support means 7 can be mounted in the reverse manner shown in FIG. 1. That is to say support means 7 can be mounted on member 3 and press means 5 mounted on member 6 if desired, all that is required is that one be movable relative to the other so that the guide means and carrying rod can be moved relative to one another. Of course, if a mechanically more complicated device can be tolerated, this invention can be applied to a device where both press means 5 and support 7 move at the same time toward one another because the same result of relative movement of guide means and carrying rod can still be accomplished.

Reasonable variations and modifications are possible within the scope of this disclosure without departing from the spirit and scope of this invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a device for removing an object from a carrying rod, said object being adapted to be forcibly slide onto said carrying rod by way of a longitudinally extending groove therein, said device having means for forcing a first member thereof toward and away from a spaced apart opposing second member thereof, the improvement comprising a support means carried by one of said first and second members, said support means having spaced apart upstanding sections for supporting said carrying rod on opposite longitudinal ends of said object so that said object is spaced away from said support means, and a press means carried by the other of said first and second members opposite said support means, said press means for bearing against an object carried by said support means to press said object onto or off of its carrying rod, said press means having a longitudinally extending indentation therein for receiving said object, and shoulder means on both sides of said indentation for contacting said object on either side of said groove in said object.

2. A device according to claim 1 wherein said press means is carried by said movable first member and said support means is carried by said second member.

3. A device according to claim 1 wherein said press means is carried by said second member and said support means is carried by said movable first member.

4. A device according to claim 1 wherein said movable first member is toothed, and said device includes gear means meshed with the teeth of said first member, handle means fixed to said gear means, whereby movement of said handle means causes movement of said first member.

5. A device according to claim 4 wherein said first member carries said press means, said second member is fixed and carries said support means.

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