July 28, 1942. M. E. NORRIS 2,291,251

DRILL PIPE PROTECTOR REMOVER

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Fig. 1,

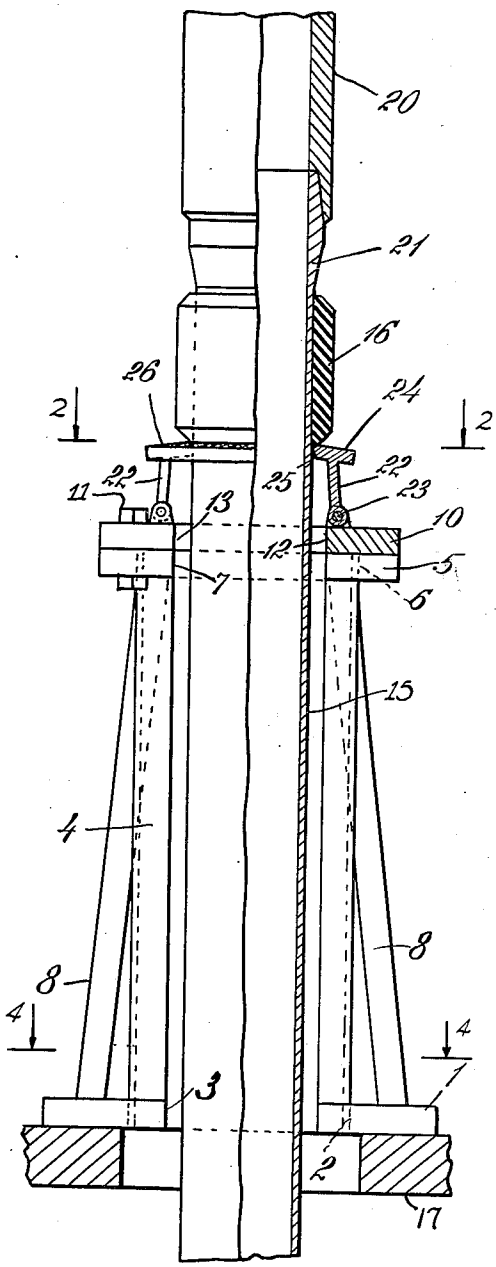


Fig. 2,

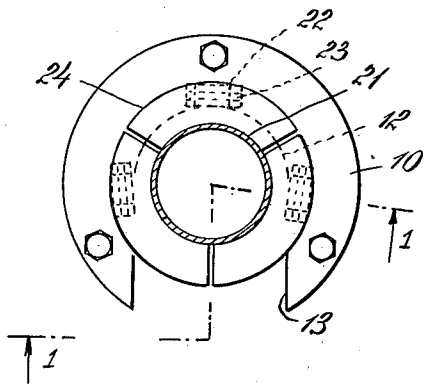


Fig. 5,

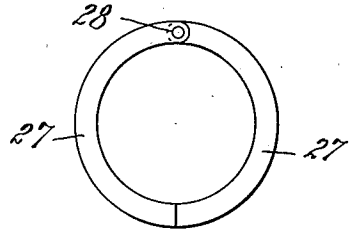
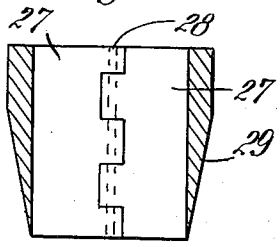


Fig. 6



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Fig. 3,

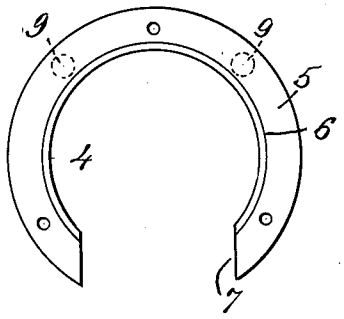
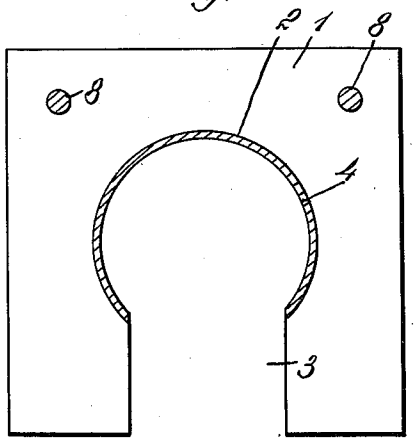


Fig. 4



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2,291,251

DRILL PIPE PROTECTOR REMOVER

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Application April 8, 1941, Serial No. 387,428

1 Claim. (Cl. 29—88.2)

This invention relates to well drilling equipment and more particularly to a drill pipe protector remover.

In drilling oil wells by the rotary method it is customary to employ a drill pipe protector, usually made of rubber, to prevent wear of the casing and drill pipe during the drilling operation. One or more of these protectors is placed on each section of the drill pipe to prevent metal to metal contact between the drilling string and the casing. These protectors are formed of rubber tubing which snugly fit the drill pipe and are difficult to remove, if removal of the protector becomes desirable.

In some instances protectors are removed from the drilling string after they have been in use for a very short time. For example where a change is made in the size of the drill pipe or where fishing operations are necessary the protectors may be removed before they have become worn. In these instances it is desirable to remove the protectors without damaging them so that they will be suitable for reuse upon another installation. Devices for the removal of drill pipe protectors are now available but they are not satisfactory because they damage the protector to an extent that it is not suitable for reuse.

The present invention is directed to a device for removing drill pipe protectors without injury to the protector to permit its reuse. The device comprises a frame or supporting member which may be mounted on a table and a protector remover engaging assembly attached to and supported by the supporting member. The engaging assembly consists of a plate having a plurality of dogs pivotally connected at their lower ends to the upper surface of the plate. The dogs have relatively wide arcuate segments at their upper ends that are adapted to engage a drill pipe protector and to extend substantially completely around a drill pipe from which a protector is to be removed. With a drill pipe protector disposed above these engaging arcuate segments, the protector may be moved off the section of drill pipe without injury by relative movement of the protector remover and the drill pipe.

In the accompanying drawings I have shown one form of the invention. In this showing:

Fig. 1 is a diagrammatic elevation, partly in section, of a drill pipe and derrick table showing one form of the invention, the section being substantially on line 1—1 of Fig. 2;

Fig. 2 is a horizontal, sectional view on line 2—2 of Fig. 1;

Fig. 3 is a plan view of the upper end of the supporting member;

Fig. 4 is a horizontal, sectional view on line 4—4 of Fig. 1;

Fig. 5 is a plan view of a hinged and tapered expander used on an internal upset drill pipe next to a tool joint; and

Fig. 6 is a vertical, sectional view thereof.

Referring to Figs. 1 to 4 of the drawings, the reference numeral 1 designates a base member which is preferably made of metal and which is provided with a central circular opening 2 of a diameter greater than that of the drill pipes with which it is to be used. The circular opening communicates with a slot 3 of a diameter equal to that of the outside diameter of the largest drill pipes on which the apparatus is to be used. A tube 4 of a diameter equal to the opening 2 is secured to the base member and extends upwardly. The upper end of the tube 4 is connected to a ring 5 the central opening 6 of which is equal in size to the opening 2. This ring is provided with a slot 7 arranged in alignment with the slot 3 for positioning of the apparatus around the drill pipe. A pair of legs or braces 8 are secured to the base member adjacent the rear edge thereof and extend upwardly at an angle as shown in Fig. 1 of the drawings and are connected at their upper ends to the ring as indicated at 9. The braces 8 may be secured to the base member and the ring 9 in any suitable manner as by welding.

A plate 10 is secured to the ring by bolts 11 or other suitable fastening means when the device is to be used for the removal of a drill pipe protector. Plate 10 has an opening 12 of a diameter at least as great and preferably greater than the outside diameter of the drill pipe. This plate is slotted at one side as at 13, the width of the slot being equal to the diameter of the circular opening 12 to permit the device to be assembled around the drill pipe. In Fig. 1 I have shown a tool joint 20 and a section 21 of external upset drill pipe. The plate 10 here shown is provided with a central opening 12 and a side opening or slot 13 of sufficient diameter and width to pass over the tool joint of the pipe from which the protector is to be moved. In order to grasp the bottom of the protector as heretofore described when it is passing over the portion of a section of drill pipe removed from the joint, I provide dogs 22 which are hinged to the upper surface of the plate as at 23. As shown the hinged dogs are in the form of segments surrounding the central opening and I have illus-

trated three dogs formed of substantially 120° segments. In some instances, especially with smaller size of pipe, two hinged dogs may be employed each of 180° segments. An engaging member 24 is carried on the upper end of each segment 22, the engaging member being substantially horizontal when in engagement with the protector 16. The inner face 25 of the engaging member, however, is tapered away from the outside wall of the pipe and the upper face 26 preferably extends slightly downwardly at an angle when in position as shown in Fig. 1. The inner portion of this top face 26 which bears against the drill pipe protector is knurled or roughened and the engaging edge of the faces 25 and 26 is slightly bevelled or rounded.

In Figs. 5 and 6 I have shown an expander consisting of two substantially semi-cylindrical sections 27 hinged to each other at 28. Throughout the greater portion the outer surface of these members is tapered as at 29. The expander shown in Figs. 5 and 6 may be placed around an internal upset drill pipe just below the tool joint to assist in expanding the protector and start it over the tool joint. It may also be employed with an external upset drill pipe to assist the rubber protector in starting over the tool joint.

When the device is to be used for removing protectors, it is employed as illustrated in Fig. 1. As there shown a drill pipe string 15 which may be formed of a plurality of separate sections of pipe is provided with protectors 16. As stated these protectors are in the form of rubber tubing and are snugly received on the sections of the drill pipe. The reference numeral 17 designates the table or platform of the well drilling equipment. When a protector 16 is to be removed, the drill pipe is pulled from the hole and stopped above the table a distance greater than the height of the protector remover. The protector remover is then put in position with the base member 1 on the platform or table and surrounding the drill pipe. When placing the protector remover around the drill pipe the dogs 22 are inclined outwardly so that the arcuate segments at their upper ends will clear a vertical projection of slot 13. When the drill protector is in place the dogs are inclined inwardly, the arrangement being such that the dogs 22 when inwardly inclined engage the bottom of the protector 16. The drill pipe is then lowered. The dogs 22 prevent the rubber protector from moving downwardly and therefore push it up the drill pipe as the drill pipe is lowered until it reaches the tool joint. The drill pipe is then raised a slight distance, slips are set in the table 17 and elevators are connected to the base 1 of the drill pipe protector remover. The elevators are then hoisted causing the drill pipe protector remover to push the protector over the tool joint and off the drill pipe. The arrangement of the dogs 22 is such that when they engage the bottom of the protector 16 the force applied to them moves them inwardly to snugly engage the drill pipe so that they will not slip over the protector. When passing a tool joint or upset these dogs swing outwardly on their pivot and the plate 10 having a sufficiently large opening is able to pass the tool joint or upset. The slots 3 and 7 in the base member and ring of the protector remover supporting member are made of a size to receive drill pipes up to a certain outside diameter. For drill pipes of larger diameter, devices having larger openings would be employed. If desired with each protector remover a plurality of rings 10 may be provided having central openings 12 and slots 13 not substantially greater than the diameter of the drill pipe.

I claim:

In a drill pipe protector remover the combination comprising a supporting member having a central opening larger in diameter than that of the drill pipe from which protectors are to be removed and a slot extending from the central opening to one side of the supporting member the width of said slot being at least as great as the diameter of said drill pipe, a plate attached to and supported by said supporting member said plate being provided with a central opening at least as large in diameter as the diameter of said drill pipe and a slot extending from said central opening to one side of the plate said last-mentioned slot being positioned to register with the slot in said supporting member, and a plurality of dogs pivotally connected at their lower ends to the upper surface of said plate, said dogs having their upper ends in the form of relatively wide arcuate segments adapted to engage a drill pipe protector and to extend substantially completely around a drill pipe disposed in the central opening of the plate when the dogs are inwardly inclined, the pivotal connections at the lower ends of said dogs being spaced to permit the upper ends of the dogs to clear a vertical projection of the slot in said plate when the dogs are inclined outwardly from their pivotal connections, whereby the assembly may be alternately removed from or placed around a drill pipe with the arcuate segments at the upper ends of said dogs substantially completely surrounding a drill pipe disposed in the central opening in the plate and in engagement with a protector to be removed from the drill pipe without removing the lower end of the drill pipe from a well.

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