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APPARATUS FOR INSTALLING PROTECTORS ON DRILL PIPE

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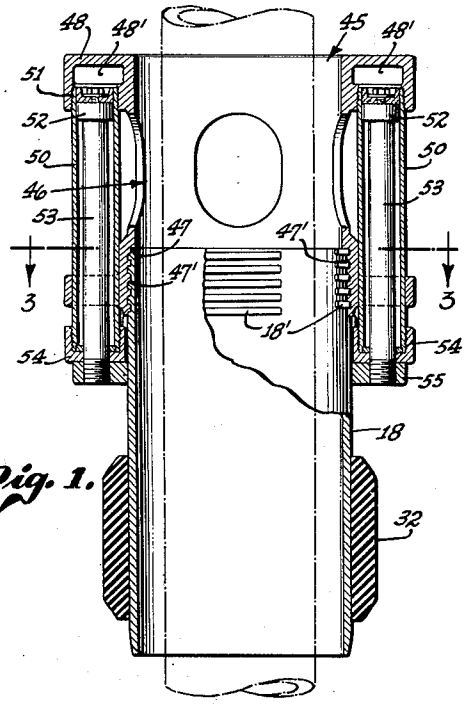


Fig. 1.

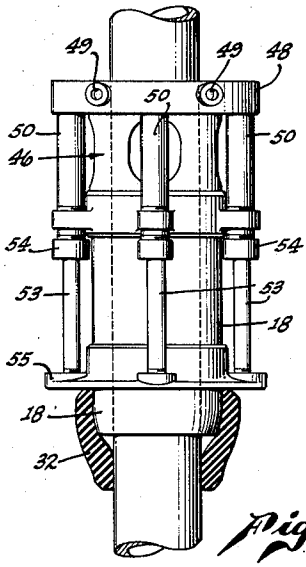


Fig. 2.

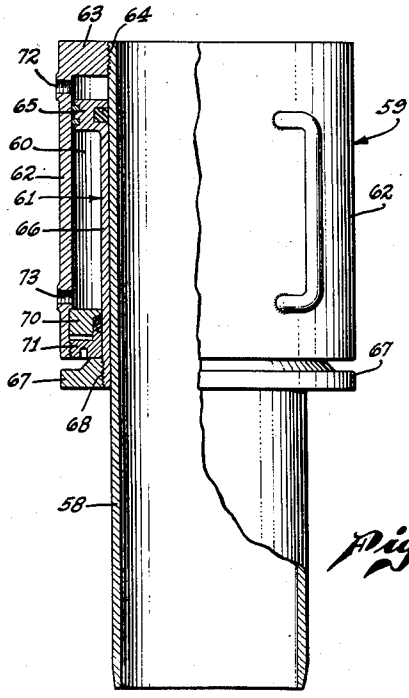


Fig. 4.

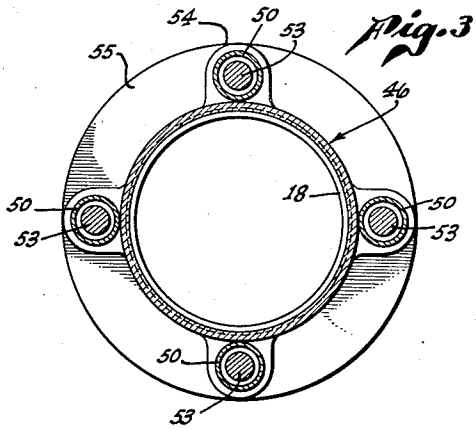


Fig. 3.

Inventor
BYRON H. BARNES,
BURT S. MINOR,

By Thurman Rutherford

Attorney

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APPARATUS FOR INSTALLING PROTECTORS ON DRILL PIPE

Byron H. Barnes, San Marino, and Burt S. Minor, Whittier, Calif., assignors to B. H. Barnes and Harriet C. Barnes, both of San Marino, Calif.

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3 Claims. (Cl. 29—88.2)

This invention relates to transfer sleeves which are designed to receive an expanded protector or collar and adapted to be moved over the pipe to which the collar is to be applied and then operated in a manner to release or effect the removal of the collar from the sleeve on to the drill pipe, such as are shown in our co-pending application, Serial No. 286,410, filed July 25, 1939, for Method and means for positioning expansible collars on pipes or the like.

It is an object of this invention to provide means whereby rubber collars or protectors may be quickly installed upon drill pipe or the like either when the pipe is disposed vertically in the oil well derrick or when it is lying horizontal, as on racks. In this connection it is a particular object to provide means whereby a plurality of collars may be expanded upon what will be called transfer sleeves and to provide a single means for use in conjunction with the sleeves for removing the protectors from the sleeves, the transfer sleeves being detachably connected to such means.

It is also an object of this invention to provide a new and improved type of apparatus for use in causing relative movement between the transfer sleeve and an expanded rubber collar thereon and also to provide a new and improved transfer sleeve embodying such means.

These and other objects will be apparent from the drawing and the following description thereof. Referring to the drawing which is for illustrative purposes only;

Fig. 1 is an enlarged sectional elevation of means for removing a collar from a transfer sleeve shown in conjunction with a transfer sleeve;

Fig. 2 is an elevation of the apparatus of Fig. 1 shown in operative position;

Fig. 3 is a sectional plan view on line 3—3 of Fig. 1; and

Fig. 4 is an elevation partly in section of a transfer sleeve embodying another form of the invention.

The invention contemplates the utilization of what will be termed transfer sleeves for receiving an expanded collar. These transfer sleeves, indicated by numeral 18 in Figs. 1–3, are of sufficient diameter so that they may be moved over a drill pipe to any desired position and used in conjunction with other apparatus for removing the protector from the sleeve. Referring to Figs. 1 to 3, it is apparent that one end of the transfer sleeve is provided with interrupted screw threads 18' so that the transfer sleeve may be quickly connected to a means generally indicated by numeral 45 for causing relative movement between the protector and the sleeve. The means 45 includes what will be termed an annular housing 46 provided with a recessed end 47 having interrupted screw threads 47' therein to receive the threads 18' of the sleeve.

The housing 46 is provided at one end with wall means 48 forming an annular chamber 48'. This chamber may be provided with fluid under pressure by means of openings 49. The wall means 48 is tapped at intervals to accommodate a plurality of cylinders 50. In the form of the invention shown four such cylinders are shown threadably mounted in the holes 51. Each cylinder is provided with a piston 52 and piston rod 53. The rods extend through cap or end closure elements 54 at the opposite ends of the cylinders and terminate in a collar engaging ring 55. This ring is of sufficient diameter to accommodate the sleeve 18.

When pressure fluid is admitted to the chamber 48' and consequently to the various cylinders the pistons 52 are effective to move the ring 55 downwardly to engage an end of an expanded protector 32 which had previously been expanded and mounted in expanded condition on the sleeve and to force the same off of the sleeve as shown in Fig. 5. The sleeve 18 has been shown longer than is essential for the accommodation of the ordinary drill pipe protector in order that the sleeves may be long enough to accommodate what are known as drill pipe stabilizers which are similar to protectors but are longer than protectors and of greater wall thickness.

It is apparent that it is possible to expand the protectors on to the sleeves 18 at any suitable place. A plurality of sleeves 18 may be utilized and transported with the expanded protectors thereon to the location of the drill pipe. The sleeves may then be quickly consecutively attached to the means 45 shown in Figs. 1 to 3 which is effective for removing the protector from the sleeve on to the pipe. If desired of course an apparatus can be provided wherein the sleeve 18 and means 45 are integral.

Referring to Fig. 4 there is illustrated a transfer sleeve embodying another form of the invention. This device comprises an elongate tubular member or main sleeve 58 upon which is mounted a housing means 59 forming an annular chamber 60 provided with what will be termed a piston element 61.

The housing means 59 includes an outer tubular wall 62 which is provided with an inwardly

extending flange 63 by means of which the member may be secured to the sleeve 58 in any suitable manner as by the screw threads 64. Slidably mounted in the chamber 60 is the aforementioned piston element 61 which comprises a piston head 65, a sleeve 66, and a protector or collar engaging ring 67 secured to the end of the member 66 by screw threads 68 or in any other manner. The piston head 65 is provided with suitable packing rings as shown. The sleeve 66 extends outwardly of the chamber 60 which is closed at its lower end by a ring 70 and packing gland 71.

In the operation of the device pressure fluid may be admitted through an opening 72 to move the piston element 61 relative to the sleeve 58 whereby the ring 67 may engage an end of a collar positioned on the sleeve and force the same off of the sleeve. The piston element may be returned to its original position by admitting a pressure fluid through an opening 73 in the member 62 and by permitting release of the pressure fluid through opening 72.

It is contemplated that various changes and modifications may be made without departing from the scope of the invention thus, for example, the portion of the sleeve 58 extending beyond the housing means 59 might be made detachable from the remainder of the apparatus in the manner similar to the apparatus shown in Fig. 1, and it is therefore intended to cover such modifications as come within the claims.

We claim as our invention:

1. Means for removing an expanded collar from a sleeve on to a drill pipe or the like which includes an annular housing having an unobstructed bore of sufficient diameter to permit the housing being passed over the drill pipe to any point, said housing forming an annular chamber at one end having axially extending openings therein; cylinders mounted in said openings; pistons in said cylinders; an annular collar engaging member externally of said pistons; piston rods connecting said pistons with said collar engaging member; means for supplying a pressure fluid to the annular chamber in said housing; and means in said housing for attaching the end of a sleeve adapted to accommodate an expanded collar thereon to the end of the housing opposite the end having the annular chamber in position whereby said collar engaging means may be moved axially over said sleeve to cause relative movement between said sleeve and a collar thereon.

2. Means for removing a drill pipe protector collar from a sleeve upon which it is mounted in expanded condition on to a drill pipe, comprising: an annular housing having an unobstructed bore of sufficient diameter to allow the housing to be passed over the drill pipe to any point, said housing extending a substantial distance axially of the bore; a plurality of cylinders mounted on said housing and extending substantially parallel to the axis thereof; pistons in said cylinders; an ejector ring at one end of said cylinders; means connecting the pistons with said ring; and means for attaching the end of a sleeve adapted to accommodate an expanded collar thereon to the end of said housing at which said ring is located, said means and said housing being designed to allow of such attachment with only limited telescopic relation of the parts at the ends to be attached whereby the parts may be attached when an expanded collar is on said sleeve without disturbing the collar; said ejector ring having a sufficient bore to pass over a sleeve attached to said housing and being movable by said pistons to engage an expanded collar on the sleeve.

3. In means for applying an expansible protector collar to a member of greater external diameter than the normal bore of the collar, an open-ended sleeve having an unobstructed bore of substantially uniform diameter extending from end to end of the sleeve and being of greater internal diameter than the diameter of the member to which the collar is to be applied so as to completely slip over said member, said sleeve being adapted to receive an expanded rubber collar, an annular housing having a sleeve like inner wall defining an unobstructed bore of substantially the same diameter as said sleeve, one end of said bore being enlarged to receive an end of said sleeve for a limited distance; interengaging means at one end of said sleeve and at the end of said housing having the enlarged bore for detachably connecting said parts, said member being substantially longer than the combined length of the sleeve and housing, and said sleeve and housing being movable as a unit to any position on the member; a collar engaging member mounted on said housing and adapted for movement over said sleeve axially thereof when said sleeve and housing are attached for engagement with an end of a protector collar on said sleeve; means forming a cylinder on said housing; a piston in said cylinder including a part extending beyond the end of the cylinder and connected to said collar engaging member; and means for admitting a pressure fluid to said cylinder to move said piston and associated collar engaging member into engagement with the collar on the sleeve for causing relative movement between the collar and sleeve whereby the collar is removed from the sleeve.

BYRON H. BARNES.
BURT S. MINOR.