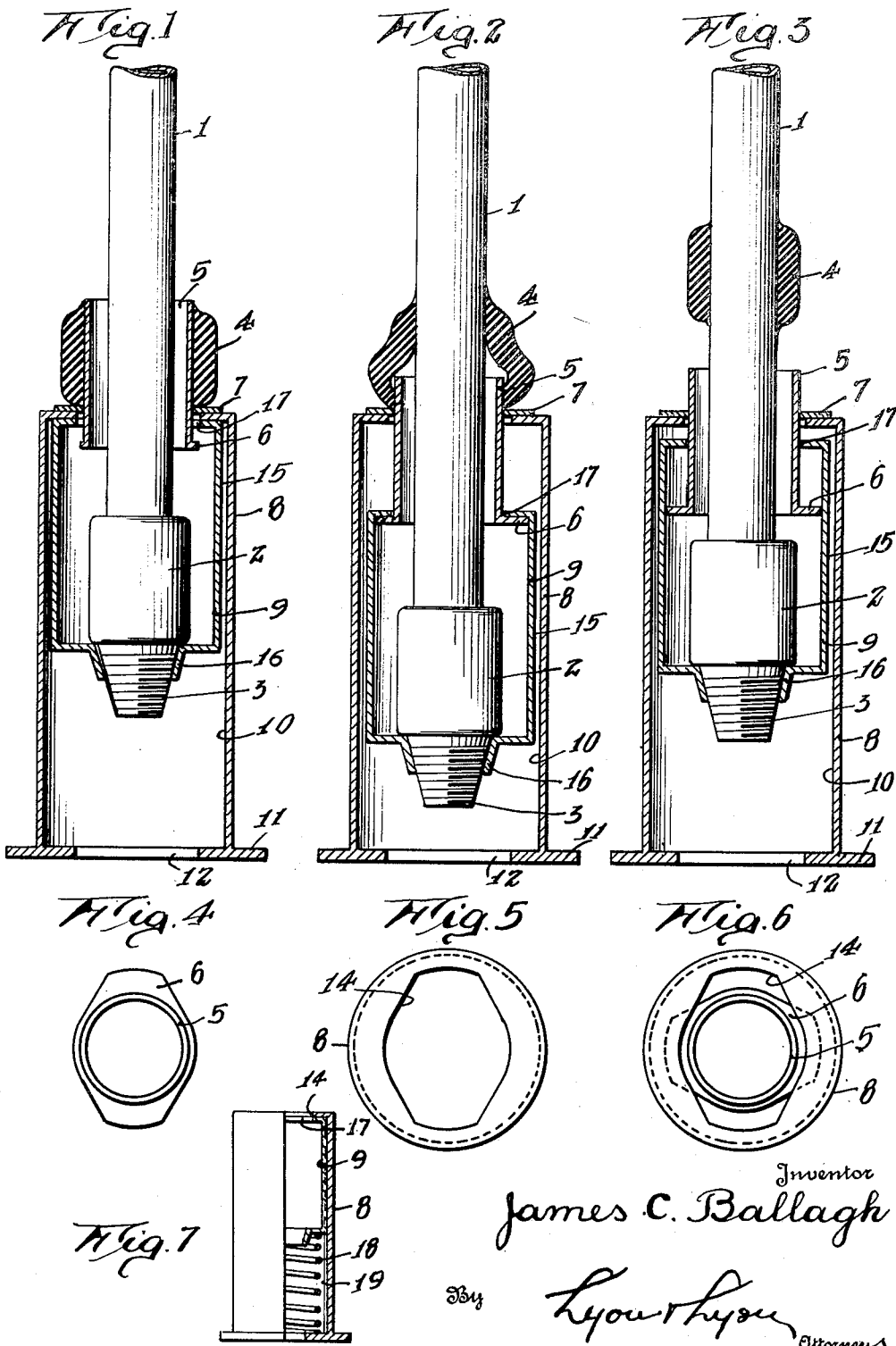


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 APPARATUS FOR INSTALLING CASING
 PROTECTORS ON DRILL PIPES
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APPARATUS FOR INSTALLING CASING
PROTECTORS ON DRILL PIPES

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This invention relates to apparatus for installing casing protectors of natural or synthetic rubber on drill pipes of the type used in the rotary method of drilling oil wells.

In the rotary method of drilling oil wells, casing protectors are used to prevent contact between the drill collars and casing. The casing protectors are sleeves of natural or synthetic rubber of sufficient thickness to protrude beyond the collars and thereby prevent contact between the collars and the inside of the well casing. In installing the casing protectors on drill pipes, they must be stretched over the drill pipe and the collars on the drill pipe, an operation which has heretofore involved great difficulty. It has been suggested, in order to facilitate the installation of the protectors on drill pipes, that they be pre-stretched by the manufacturer onto a sleeve of a diameter greater than that of the drill pipe. The sleeve bearing the pre-stretched casing protector is transported to the well, slipped over the drill pipe, and the casing protector forced off the sleeve either by hydraulic pressure or force in order to position the protector on the drill pipe.

The present invention is concerned with apparatus for removing the casing protectors from the sleeve and installing the same on the drill pipe.

It is the general object of the present invention to provide apparatus in which the necessary pressure for forcing the protector from the sleeve may be supplied solely from the weight of the drill pipe on which the sleeve is to be mounted.

The apparatus of the present invention will be fully understood from the following description of a preferred form or example of the invention. The description is given in connection with the accompanying drawing, in which:

Figure 1 is an elevation mainly in section of the apparatus of the present invention in the assembled position, illustrating the first step of the operation of the apparatus.

Figure 2 is a similar view illustrating a subsequent step of the operation of the apparatus.

Figure 3 is a similar view of the apparatus on completion of the operation of the apparatus.

Figure 4 is a top view of the sleeve upon which the casing protector is mounted.

Figure 5 is a top view of the cages.

Figure 6 is a top view of the cages with the sleeve 5 therein and turned to the non-registered position.

Figure 7 is a modified form of the apparatus showing suitable means for automatically returning the lower cage and preventing rotation between the inner and outer cages.

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Referring to the drawings, 1 generally indicates a drill pipe of the type employed in the rotary method of drilling wells. Each drill pipe is provided at its lower end with a collar 2 of larger diameter than the remainder of the pipe and with a tool joint 3. 4 indicates the casing protector which is normally formed of natural or synthetic rubber and as initially produced has an internal diameter smaller than that of the body of the drill pipe 1 so that when mounted on the drill pipe 1 in the position indicated in Fig. 3, the elasticity of the sleeve will provide a gripping force for holding the sleeve in position. The walls of the sleeve 4 should be of sufficient thickness so that the external diameter of the sleeve when mounted in the position indicated in Fig. 3 is larger than that of the collar 2.

In accordance with the present invention, the casing protector 4 is stretched over sleeve 5, the internal diameter of which permits the sleeve 5 to pass over the collar 2 of the drill pipe 1. The sleeve 5 is provided with a flange 6 at its lower end, which flange 6, as indicated in Fig. 4, is of oval shape. There is also mounted on the sleeve 5 between the flange 6 and the casing protector 4 an annular ring 7 having an outside diameter somewhat larger than the minimum diameter of the oval-shaped flange 6.

The sleeve 5, ring 7 and casing protector 4, assembled together as indicated in Fig. 1, are transported to the well where the casing protector is to be installed upon the drill pipe and the sleeve 5 then slipped over the drill pipe in the manner indicated in Fig. 1. The drill pipe is then lowered to the stripping apparatus which consists of an outer cage 8 and an inner cage 9. The outer cage 8 is provided with cylindrical side walls 10 joined to a supporting flange 11 at its lower end, the lower end of the cage 8 being open, as indicated at 12.

In the operation of the apparatus of the present invention, the outer cage member 8 is intended to be removably positioned. The upper end of the outer cage 8 is provided with an oval opening 14 (as shown in Fig. 5) of sufficient size to permit the oval flange 6 on the sleeve 5 to pass therethrough.

The inner cage member 9 is provided with cylindrical side walls 15 having a running fit with the walls 10 of the outer cage member 8. The side walls 15 of inner cage member 9 are of less length than the length of the walls 10, usually about half the length of the walls 10, but the length exceeds that of the collar on the drill pipe by an amount sufficient, as later hereafter pointed out, to position the protector 4 on the

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drill pipe, but spaced from the collar 2 sufficiently to leave proper room therebetween for the use of tongs in subsequent handling of the drill pipe. The lower end of the inner cage member 9 is provided with a tapered seat 16 to fit the threaded joint 3 of the drill pipe. The upper end of the inner cage member 9 is provided with an oval shaped opening 17 complementary to the oval opening 14 of the outer cage member 8.

The operation of the apparatus of the present invention is as follows: The sleeve 5, with the protector 4 and the ring 7 thereon, is first placed over the drill pipe but when the drill pipe 1 is elevated and clear of the cages 8 and 9, it is lowered into the position indicated in Fig. 1 and the oval flange 6 on the sleeve 5 is turned to pass through the oval openings in the cages 8 and 9 until the sleeve reaches the position indicated in Fig. 1 where the ring 7, by contacting the upper end of the outer cage, arrests further lowering of said ring and the casing protector 4 mounted thereabove. The sleeve 5 is then rotated into the position shown in Fig. 6 and the weight of the drill pipe 1, or a portion thereof, is then allowed to be exerted against the seat 16 of the inner cage member, forcing the casing member downwardly. The top of the inner cage member engages the flange 6 of the sleeve 5, causing the sleeve to follow the downward movement of the cage member 9. Simultaneous movement of the ring 7 is arrested by the top of the other cage member with the result that, as indicated in Fig. 2, the casing protector is progressively crowded off the sleeve 5 until the protector clears the sleeve and assumes the position indicated in Fig. 3. The drill pipe 1, with the protector 4 now in proper position, may be elevated from the cages, the drill pipe now being in position to be set back on the rack or to be lowered into the wellhole, as the occasion may require. The sleeve 5 is then turned to register its flanges with the openings of the cages and to be removed from the cages, whereupon the apparatus is in position for the method to be repeated.

Preferably, as indicated in Fig. 7, suitable means are provided for urging or returning the inner cage 9 to the upper end of the outer cage such, for example, as the spring 18, and it is also preferable to provide means for preventing relative rotation between the inner and outer cage, such as a key 19.

While the particular form of the invention herein described is well adapted for carrying out the objects of the present invention, it is to be understood that various modifications and changes may be made, and this invention is of the scope set forth in the appended claims.

I claim:

1. Apparatus for installing a casing protector upon a drill pipe from a transfer sleeve originally mounting said protector in pre-stretched condition and adapted to pass over said drill pipe, comprising: an upstanding outer cage member supported upon a base formed at its bottom portion and having an inwardly extending flange formed at its upper portion, said flange being of such configuration as to be adapted to admit the bottom portion of said sleeve but restrain said protector against downward movement; and an inner cage member of shorter length than the outer cage member disposed within said outer cage member for vertical sliding movement therewithin, said inner cage member being

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formed at its upper portion with inwardly extending connection elements engageable with cooperating connection elements formed on the bottom portion of said sleeve, and being formed at its bottom portion with a surface spaced from said inwardly extending connection elements and adapted to be engaged by the lower portion of the drill pipe so that upon downward movement of said drill pipe said inner cage member and said sleeve will move downwardly in unison, whereby said sleeve will be withdrawn downwardly from said protector.

2. Apparatus for installing casing protectors on drill pipe comprising: a sleeve adapted to pass over the drill pipe and to carry a protector in a pre-stretched condition; an upstanding outer cage member supported upon a base formed at its bottom portion and having an inwardly extending flange formed at its upper portion, said flange being of such configuration as to be adapted to admit the bottom portion of said sleeve but restrain said protector against downward movement; and an inner cage member of shorter length than the outer cage member disposed within said outer cage member for vertical sliding movement therewithin, said inner cage member being formed at its upper portion with inwardly extending connection elements engageable with cooperating connection elements formed on the bottom portion of said sleeve, and being formed at its bottom portion with a surface spaced from said inwardly extending connection elements and adapted to be engaged by the lower portion of the drill pipe, so that upon downward movement of said drill pipe said inner cage member and said sleeve will move downwardly in unison, whereby said sleeve will be withdrawn downwardly from said protector.

3. Apparatus as set forth in claim 2 wherein the transfer sleeve is formed with an outwardly extending oval flange at its bottom portion and the inner cage member is formed at its upper portion with an inwardly extending flange defining an oval-shaped aperture, said aperture being slightly larger than the oval flange of said sleeve whereby said oval flange will pass through said aperture in one relative position thereof and will be restrained against passage therethrough in other positions.

4. Apparatus as set forth in claim 1 wherein a spring is provided within said outer cage member having its one extremity abutting the base thereof, and having its other extremity abutting said inner cage member whereby to normally urge said inner cage member upwardly.

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