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G. G. HARRINGTON

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APPARATUS FOR LOWERING PIPES IN WELLS

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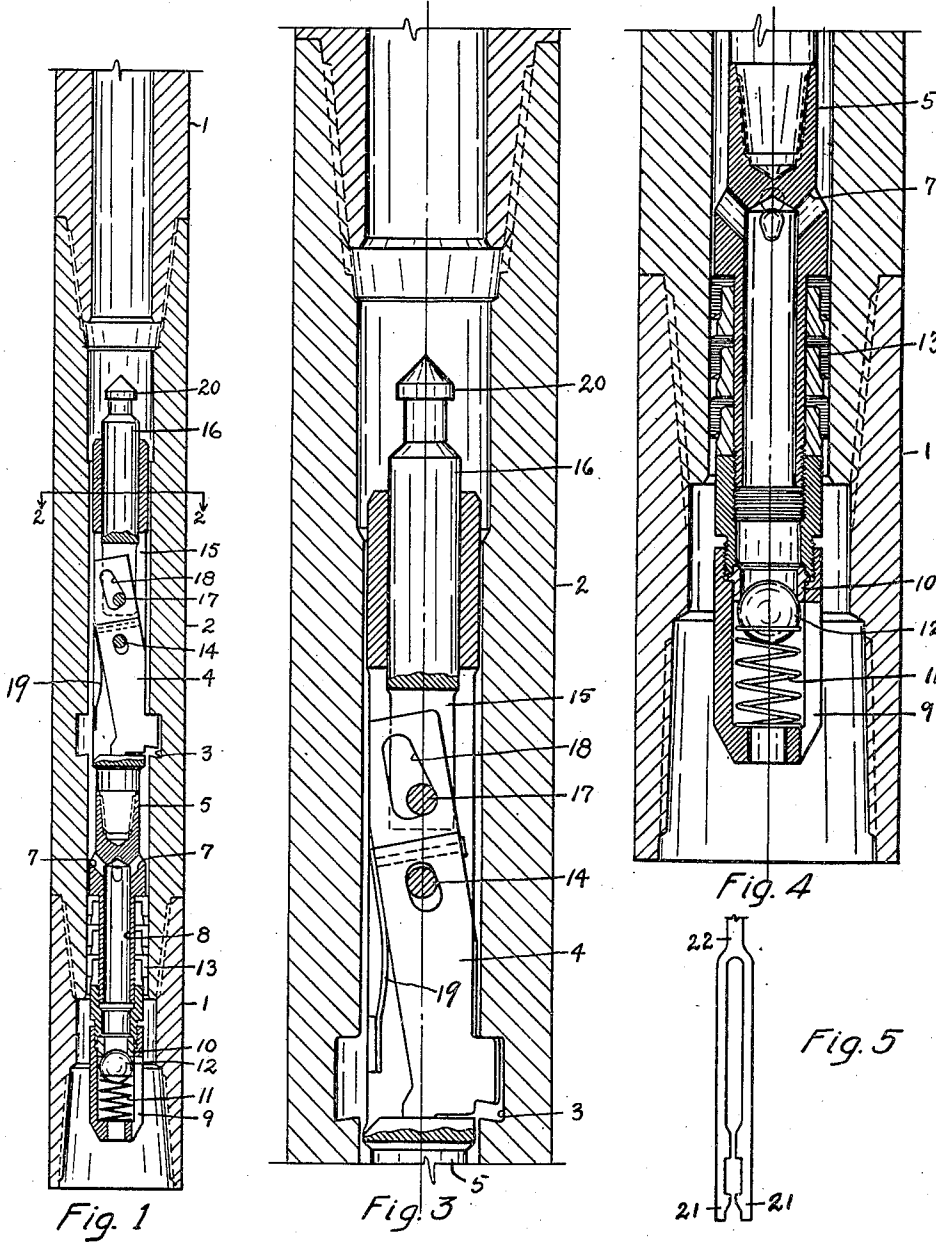


Fig. 1

Fig. 3

Fig. 4

Fig. 5

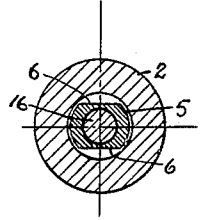


Fig. 2

George G. Harrington
INVENTOR.

BY

J. Vincent Martin
ATTORNEY.

UNITED STATES PATENT OFFICE

GEORGE G. HARRINGTON, OF HOUSTON, TEXAS, ASSIGNOR TO REED ROLLER BIT COMPANY, OF HOUSTON, TEXAS, A CORPORATION OF TEXAS

APPARATUS FOR LOWERING PIPES IN WELLS

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This invention relates to apparatuses for lowering pipes in wells.

The rotary drill stem employed in deep well drilling comprises a pipe made in sections and having on its lower end a drill bit. When the drill pipe is long, and its length sometimes exceeds a mile, it is very heavy. For reasons well known to those skilled in the art, it must be removed from and then again lowered into the well as the drilling proceeds. To reduce the strain on the hoisting apparatus when the drill pipe is lowered into the hole, a float valve is now mounted in the drill pipe to prevent the passage of the water in the well upwardly therethrough. A portion of the weight of the pipe is thereby placed upon the water in the well. But although the conventional float valve performs a good service while the pipe is being lowered, it is not removable from the pipe while the pipe is in the well, and this is objectionable for several reasons. One conventional drill bit is adapted to be lowered through the drill pipe and to automatically assume a cutting position on the lower end of the pipe; and to be removed through the pipe when worn to be replaced by a new bit—all while the pipe is in the well. It will be obvious that this bit cannot be used when the conventional float valve is used because the float valve obstructs the passage through the pipe.

This invention has for its principal object the provision of a new and improved float valve that can be removed from the drill pipe while the pipe is in the well so that such drill bits may then be lowered into place through the drill pipe.

The invention will also be found useful in lowering into a well casings, linings, tubings, and other pipes; because, while the float valve may be used advantageously while the pipe is being lowered, it may be removed after the pipe is in place so that the passage through the pipe is unobstructed.

Other objects will hereinafter appear.

The preferred embodiment of the invention is illustrated by the accompanying drawing, of which Fig. 1 is a sectional elevation of the valve carrier in a pipe; Fig. 2, a horizontal section on the line 2—2 of Fig. 1; Figs. 3 and

4, enlarged sectional elevations of the upper and lower parts of the carrier, respectively; and Fig. 5, an elevation of an overshot that may be employed in removing the carrier from the pipe.

In the drawing, the drill, casing, tubing or other pipe is shown fragmentarily at 1. For this pipe, I provide a section 2 having an internal annular groove 3 to form shoulders to be engaged by the dog 4 of the valve carrier 5.

The carrier 5 is substantially cylindrical to fit within the section 2, but its upper portion has flattened sides 6 (Fig. 2) to form with the pipe fluid passageways that communicate with the transverse passageways 7 and axial passageway 8. Movable in a cage 9 on the lower end of the valve carrier and urged upwardly against the seat 10 by the spring 11 is a float valve 12. Surrounding the carrier are a plurality of packing rings 13 to seal the space between the carrier and the pipe section.

The dog 4 is pivoted at 14 in the transverse slot 15 of the carrier and is connected to a reciprocable plunger 16 by the pin 17 fitting in elongated slot 18. The dog 4 is urged into the groove 3 by the spring 19.

The plunger 16 has a head 20 adapted to be engaged by the fingers 21 (Fig. 5) of the overshot 22.

The float valve may be used as follows:

The carrier 5 may be inserted in the pipe section 2 until the dog 4 reaches and is forced into the groove 3 by the spring 19. The dog 4 will then serve to prevent movement of the carrier in the pipe section.

The pipe section 2 may then be connected to form a section of the pipe 1 at the desired point.

The pipe 1 may then be lowered into the well. The valve 12 will prevent the passage of water or other fluid in the well upwardly through the carrier, so that there will be no fluid in the pipe 1 above the carrier. A portion of the weight of the pipe is thereby placed upon the fluid in the well.

When the pipe has been lowered to a predetermined point, water may then be pumped into the pipe 1 above the carrier. The water will pass downwardly through the passageways 7 and 8 of the carrier and will open the

valve 12. The pressure of the fluid on both sides of the valve will then be substantially equalized so that the dog 4 will not be held against either end wall of the groove 3 and may readily be removed therefrom. Then the overshot 22, attached to the conventional wire line, not shown, may be lowered until its fingers 21 engage the head 20 of the plunger 16. When the overshot is elevated, the plunger 16 will be moved upwardly in the carrier 5, the pin 17 moving upwardly in the slot 18 to withdraw the dog 4 from the groove 3, against the resistance of the spring 19. Then the carrier will be moved upwardly through and out of the pipe 1.

The invention is not limited to the preferred embodiment herein disclosed. Various changes may be made within the scope of the following claims:

I claim:

1. A well pipe valve carrier having a fluid passageway therethrough, a float valve in said passageway, a pipe engaging carrier holding dog movable into active and inactive positions, and means to move said dog into its inactive position.

2. A well pipe valve carrier having a fluid passageway therethrough, a float valve in said passageway, a packing surrounding said carrier, a carrier holding pipe engaging dog mounted on said carrier so that it is movable into active and inactive positions, and a

plunger slidable in said carrier and connected to said dog to move said dog into its inactive position.

3. The combination with a well pipe having an internal shoulder, of a valve carrier having a movable holding dog, a spring to urge said dog into engagement with said shoulder to hold said carrier in said pipe, a plunger to move said dog out of engagement with said shoulder, a fluid passageway, a float valve in said passageway, and a packing to seal the space between said carrier and said pipe, said carrier being removable through said pipe.

4. The combination with a well pipe having an internal shoulder, of a valve carrier and a float valve in said carrier, said carrier having a movable holding dog to engage said shoulder, a plunger, said dog being moved by said plunger out of engagement with said shoulder when said plunger is pulled upwardly, whereupon said carrier may be removed upwardly through said pipe.

5. The combination with a well pipe, of a valve carrier and a float valve in said carrier, said carrier having holding means to engage said pipe and prevent upward movement of said carrier in said pipe, said holding means being releasable from said pipe by an upward pull, whereupon said carrier may be removed upwardly through said pipe.

GEORGE G. HARRINGTON.

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