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LINER SETTING TOOL

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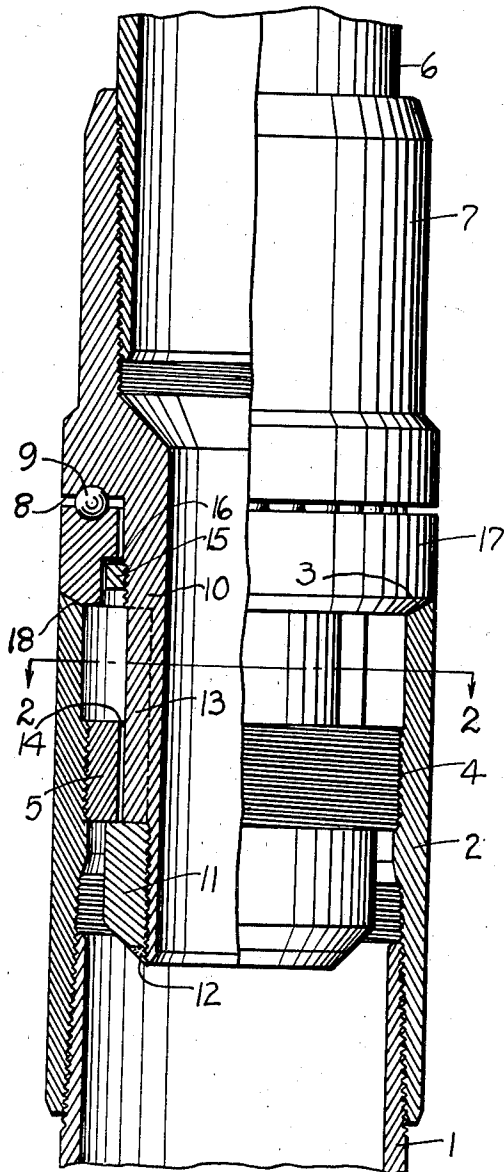


Fig. 1.

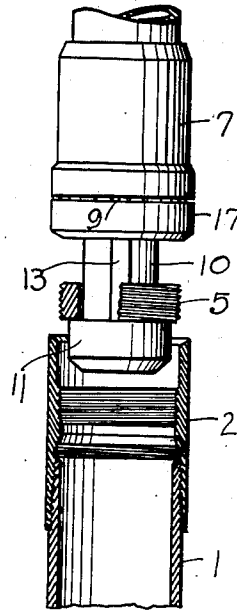


Fig. 3.

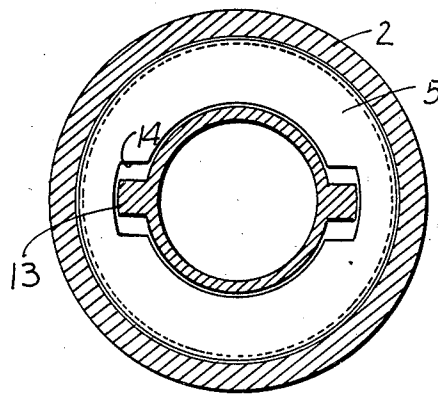


Fig. 2.

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LINER SETTING TOOL

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2 Claims. (Cl. 166—1)

My invention relates to setting tools for use in lowering liners and similar apparatus into the well and depositing the same at the bottom of the well.

5 It is an object of the invention to provide a setting device of this character which will maintain a rigid hold upon the liner or casing while it is being set in position but which is easily and positively released from the liner when the setting operation has been completed.

10 I desire to provide between the setting tool and the liner or casing a threaded connection which will hold the parts rigidly together but which may be unscrewed and released without exerting any longitudinal pressure upon the threaded connection and thus permit of an easy unscrewing and releasing operation when desired.

15 I also desire to provide a support upon the liner for the setting tool which would take the weight off the threaded connection so that the release may be accomplished.

20 In the drawing herewith, Fig. 1 is a side view partly in elevation and partly in central longitudinal section illustrating the operative end of the setting tool engaged with the liner for setting in the well.

Fig. 2 is a transverse section on the plane 2—2 of Fig. 1.

30 Fig. 3 is a side elevation of the setting tool showing the casing or liner adjacent thereto, said casing being in longitudinal section.

While my device is adapted particularly for setting liner in the well it is to be understood that any pipe or screen or similar tubular structure may be lowered and placed in position in the well by the use of my device. In the drawing the upper end of the liner or other pipe 1 is shown as having a special collar 2 at its upper end, said collar being threaded at its lower end for engagement with the liner and having its upper end beveled off, as shown at 3, to form a downwardly tapered seat for the setting tool. Spaced downwardly from the tapered seat the collar is threaded at 4 with a lefthand thread for engagement with an externally threaded collar 5.

50 The setting tool is secured at the lower end of a setting string 6 which may be of drill pipe or tubing or similar pipe. It is connected to the upper end of the setting nipple 7. Said setting nipple has its external diameter reduced abruptly at 8 to form a shoulder, on the lower face of which is a groove or raceway to receive a row of balls 9, which form an anti-friction bearing as will be later noted. Below the shoulder the set-

ting nipple is formed with a mandrel 10, which is extended downwardly below the collar 5 and has threaded on its lower end a tubular nut 11. Said nut when screwed in position on the lower end of the mandrel may be welded in place, as shown at 12, to assure that said nut may not become unscrewed in operation.

Above the nut 11 the outer face of the mandrel is formed with projecting keys or ridges 13, shown best in Fig. 2. These keys 13 are adapted to engage within keyways 14 in the inner wall of the collar 5. It will thus be seen that the collar 5 may be slidable longitudinally of the mandrel but that the rotation of said mandrel will tend to screw up or unscrew the collar from its position relative to the liner.

20 The keys 13 on the mandrel extend short of the shoulder 8 and the outer surface of the mandrel is threaded at that point to engage with a threaded ring 15, which projects outwardly therefrom to engage below a shoulder 16 on a bearing ring 17.

The bearing ring 17 fits loosely around the upper end of the mandrel and has on its upper end a groove or raceway to receive the row of balls 9 previously referred to. The lower end of the bearing ring 17 has a downwardly tapered surface 18 adapted to seat upon the beveled upper end 3 of the collar 2.

30 In assembling the setting tool to connect with the liner the parts are connected together by rotating the setting tool and the collar 4 in a lefthand direction so as to screw the connecting collar 5 downwardly into position as shown in Fig. 1. When this has been screwed up tightly the lower end of the bearing ring 17 will seat in the upper end of the collar 4 and a rigid connection will be made. The liner may then be lowered into the well in the usual manner, the setting string acting as a means for lowering the liner to position. When the said liner has been properly set on the well bottom the setting tool may be released by lowering the weight of the setting string upon the antifriction bearing formed by the balls 9, the setting string being then rotated in a righthand direction, will screw the threaded collar 5 upwardly out of connection with the collar 2 and the parts will then be disconnected and the setting string may be removed from the well as shown in Fig. 3.

50 The advantages of this device lie in the positive and rigid connection which is made between the setting string and the liner while it is being lowered into the well. There will be no danger of the parts becoming disconnected dur-

ing this operation. It will also be seen that when the liner has been set and the setting tool is released there will be nothing to prevent the ready unscrewing of the locking nut or collar 5 for the reason that no weight is supported thereon, the weight of the setting string being supported entirely by the bearing ring 17 engaging upon the upper end of the liner. The difficulty often experienced of making the release due to the weight upon the threaded connection will be entirely avoided. It will be apparent that the device will operate positively and with no danger of failure to unscrewing the connection between the setting tool and the liner.

What is claimed as new is:

1. A device for setting pipe in wells including a sleeve at the upper end of said pipe, a seat on said sleeve, a locking collar having a lefthand threaded engagement on the interior of said sleeve, a setting nipple, a mandrel thereon in said

sleeve, a ring on said mandrel engaging in said seat, a shoulder on said mandrel below said collar, and means on said mandrel to slidably engage said locking collar and by rotation screw it up away from engagement with said sleeve while said ring is engaging said seat and supporting said nipple thereon.

2. A device for setting pipe in wells including a sleeve at the upper end of said pipe, a seat on said sleeve, a locking collar having a lefthand threaded engagement on the interior of said sleeve, a setting nipple, a mandrel thereon in said sleeve, a shoulder on said nipple, an anti-friction bearing for said shoulder on said seat, means on said nipple engaging below said locking collar to rigidly clamp said bearing on said seat and secure said pipe to said nipple, and means on said nipple to rotate said locking collar.

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