Jan. 6, 1953 C. R. MURPHY 2,624,610

EXPANSIBLE ELEVATOR PLUG

Filed Feb. 23, 1950

Fig. 1

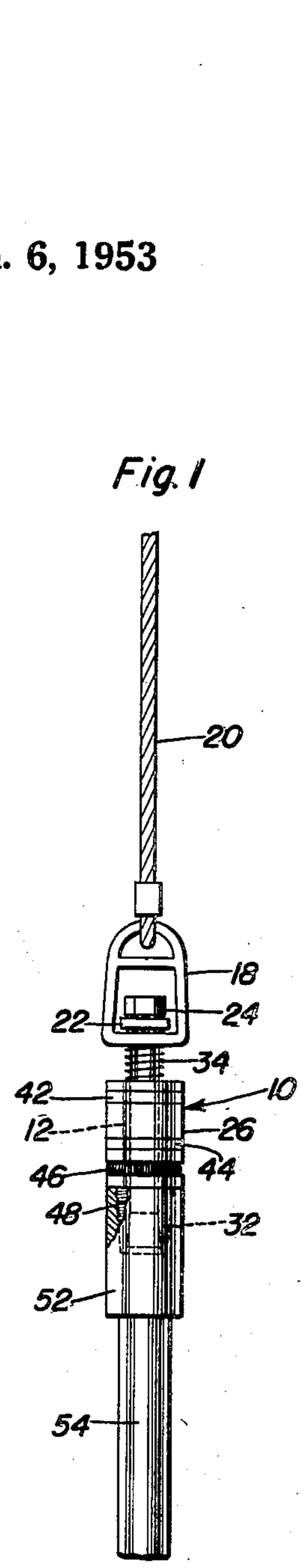
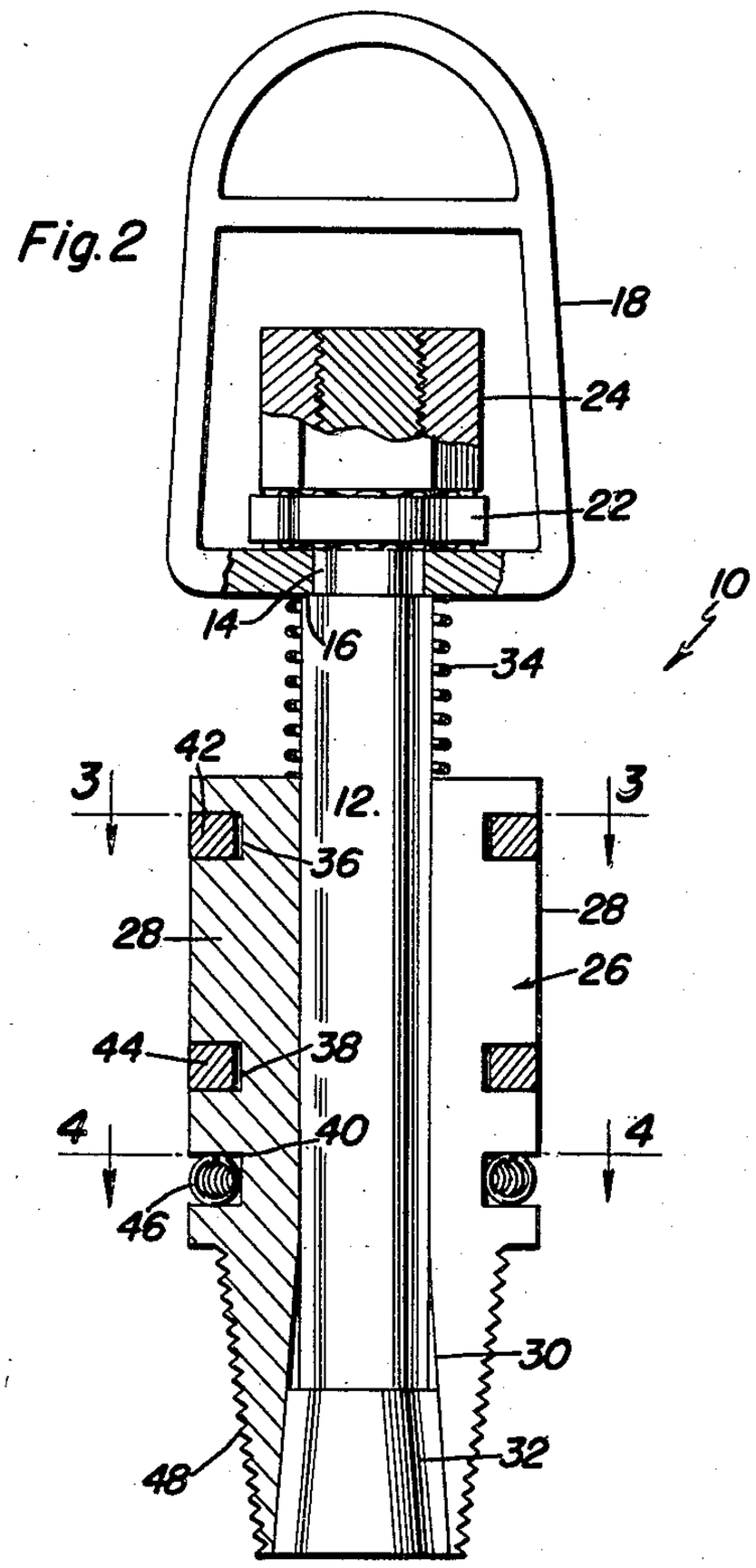


Fig. 2



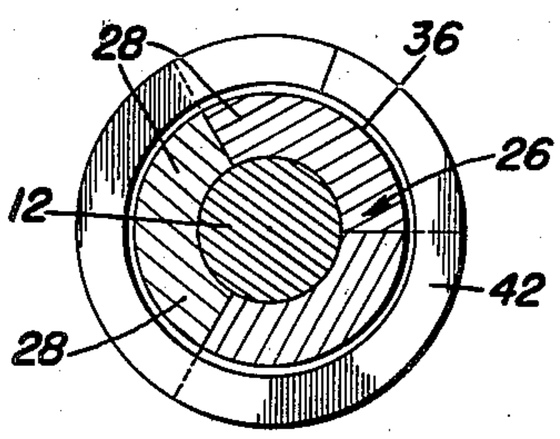


Fig. 3

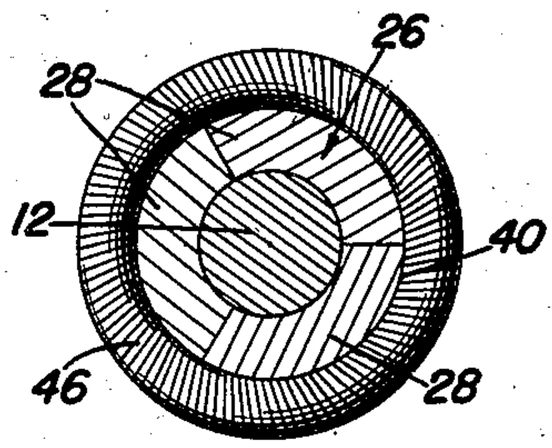


Fig. 4

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EXPANSIBLE ELEVATOR PLUG

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1 Claim. (Cl. 294—96)

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This invention relates to new and useful improvements and structural refinements in elevator plugs, and the principal object of the invention is to facilitate convenient and expeditious lifting and lowering of sections of drill pipe.

This object is achieved by the provision of the instant plug which is adapted to be connected to an actuating line and which includes an expansible and contractable body having an externally screw threaded lower end portion to engage the screw threads of a tool box or joint, an important feature of the invention residing in the provision of means for rotatably connecting the plug to the actuating line so that the latter may rotate without subjecting the plug to twisting or rotation such as would cause the screw threaded lower portion of its body to become disengaged from the tool joint.

Some of the advantages of the invention reside in its simplicity of construction, in its convenient and expeditious operation as aforesaid, and in its ability to pull drill pipes without damaging the screw thread of the tool joint.

With the above more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of the invention.

Figure 2 is a vertical sectional view of the invention per se.

Figure 3 is a transverse sectional view, taken substantially in the plane of the line 3—3 in Figure 2, and

Figure 4 is a transverse sectional view, taken substantially in the plane of the line 4—4 in Figure 2.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention consists of an expansible elevator plug designated generally by the reference character 10, the same embodying in its construction a vertically disposed stem 12 which is provided at its upper end with a diametrically reduced portion 14 affording a shoulder 16 to abut the lower surface of a yoke 18 connected to a suitable actuating line 20.

An end thrust bearing 22 is positioned on the diametrically reduced portion 14 of the stem 12,

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and the portion 14 also carries a keeper nut 24 which engages the bearing 22 and thereby permits the yoke 18 to rotate without rotating the stem, while reducing the friction of rotation to a minimum.

A substantially tubular, expansible and contractable body 26 is slidably positioned on the stem 12 and consists of a plurality of longitudinal sections 28, this body affording an axial bore which has a downwardly divergent lower end portion 30, as illustrated in Figure 2.

The lower end portion of the stem 12 is camsurfaced as at 32 and is operatively positioned in the divergent portion 30 of the bore of the body 26, so that when the stem 12 is slid upwardly in the body, the sections 28 of the body are expanded. Moreover, a compression spring 34 is positioned on the stem 12 between the body 26 and the yoke 18, so as to assist the stem 12 in urging the body to its expanded position.

The several body sections 28 are provided with recesses which define a plurality of annular grooves 36, 38, 40 in the outer surface of the body 26, the grooves 36, 38 accommodating a pair of keeper rings 42, 44 respectively, which loosely embrace the body and thereby prevent the sections thereof from excessive spreading. The rings 42, 44, however, themselves are not expansible.

The groove 40 accommodates an annular spring 46 which is substantially stronger than the spring 34 and thereby overcomes the resiliency of the latter spring and urges the sections 28 of the body 26 to their contracted positions, and finally, it is to be noted that the lower end portion of the outer surface of the body 26 is provided with screw threads 48 for gripping purposes, as will be presently explained.

When the invention is placed in use, the plug 10 is lowered by means of the actuating line 20 until the screw threaded portion 48 of the body 26 is received in an internally screw threaded joint or box 52 of a drill rod 54 which is to be elevated or lowered.

The body 26 is sufficiently heavy so that when the line 20 is pulled upwardly the body will tend to remain at rest, while the cam surfaced portion 32 of the stem 12 will expand the sections 28 of the body 26 in frictional engagement with the joint 52 and, consequently, as upward pulling force is exerted upon the line 20, the entire plug together with the drill rod 54 will be drawn upwardly.

Needless to say, the gripping action between the plug and the joint 52 of the drill rod 54

is substantially enhanced by the provision of the screw threads **48** on the body **26**, which screw threads engage the screw threads of the tool joint **52** and, without mutilating the tool joint, afford a positive connection between the plug and the drill rod or pipe **54**.

It is believed that the advantages and use of the invention will be clearly understood from the foregoing disclosure and accordingly, further description thereof at this point is deemed unnecessary.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

An elevator plug comprising an upright stem having a diametrically reduced and screw-threaded shank at its upper end, a frusto-conical cam member provided at the lower end of said stem, a suspension yoke rotatably mounted on said shank, a thrust bearing provided on the shank within said yoke, a keeper nut on the shank above said bearing, a substantially tubular expansible and contractible body provided with an axial bore having said stem slidable therein, said bore including a frusto-conical lower end portion operatively engaged by said cam member, a yieldable element positioned on said stem between the upper end of said body and said yoke, said body being provided in its lateral surface with upper and lower annular grooves, an annular spring positioned in the lower groove for contracting the body, and a rigid keeper ring positioned in the upper groove for limiting the expansion of the body, the inside diameter of said ring being greater than the diameter of the body in the plane of the upper groove when the body is in its contracted position.

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