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2,847,260

ROD STABILIZER DEVICE FOR WELLS

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3 Sheets-Sheet 1

FIG. 1.

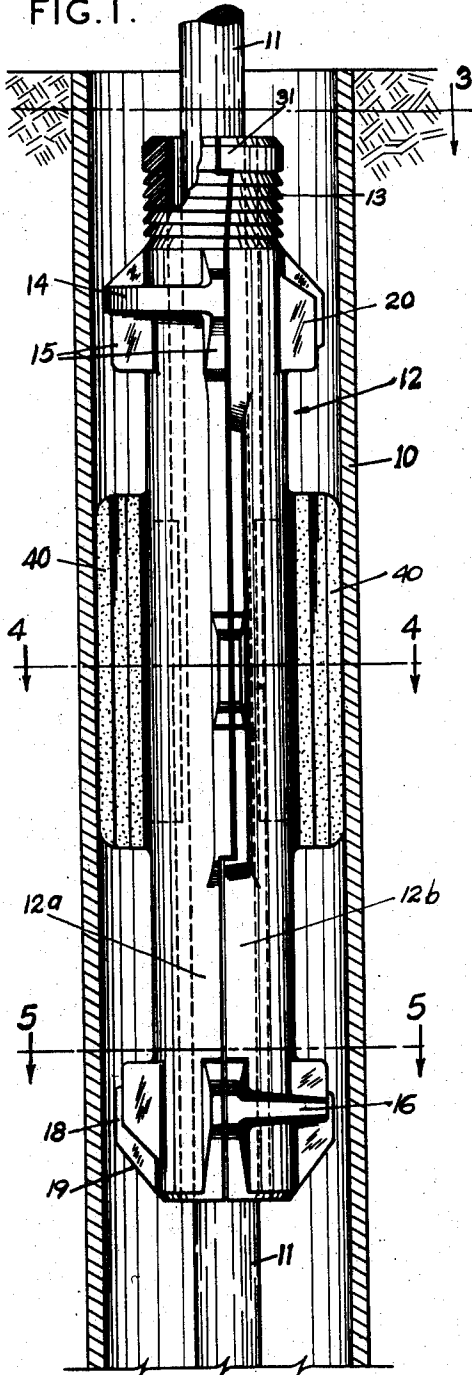
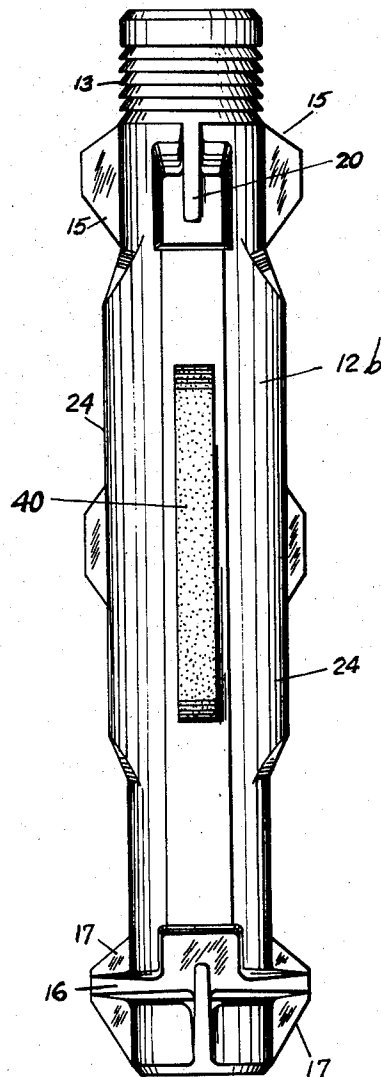


FIG. 2.



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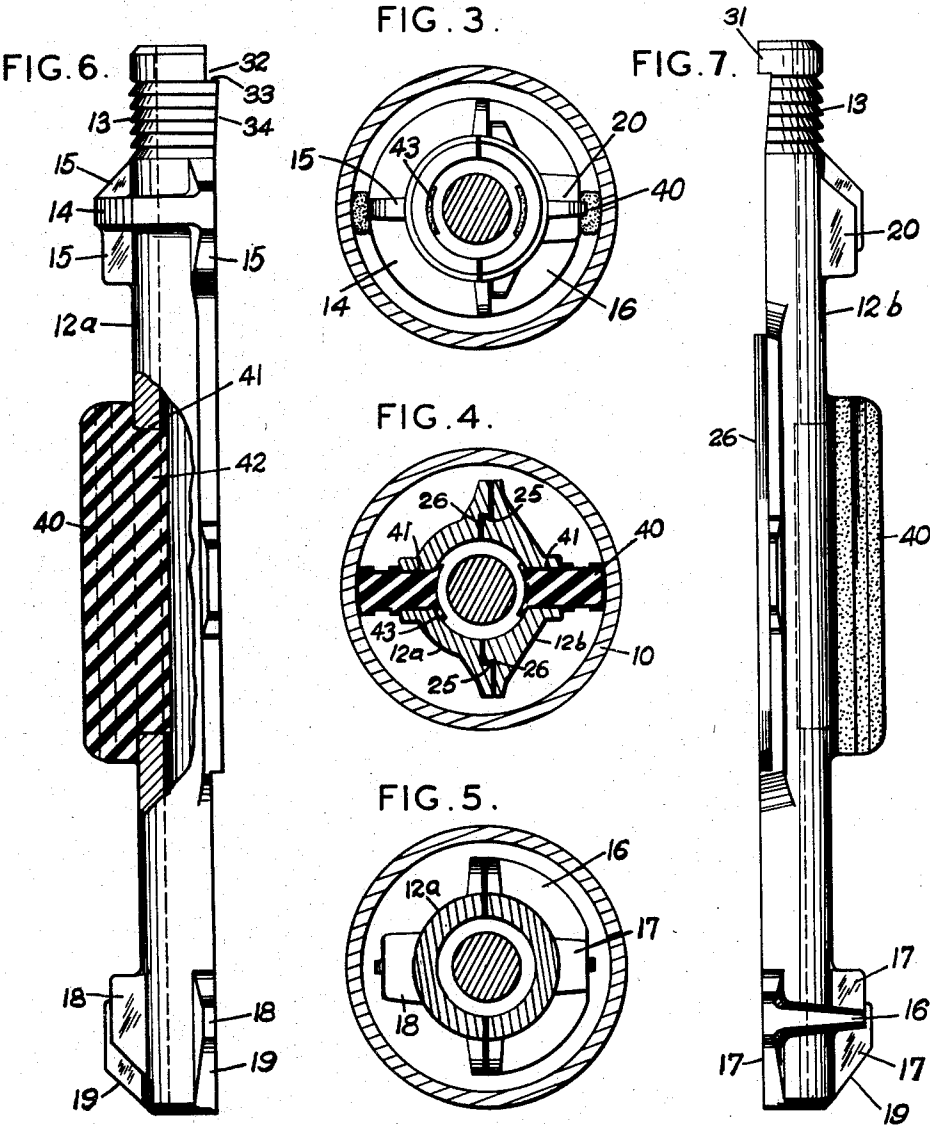
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3 Sheets-Sheet 2



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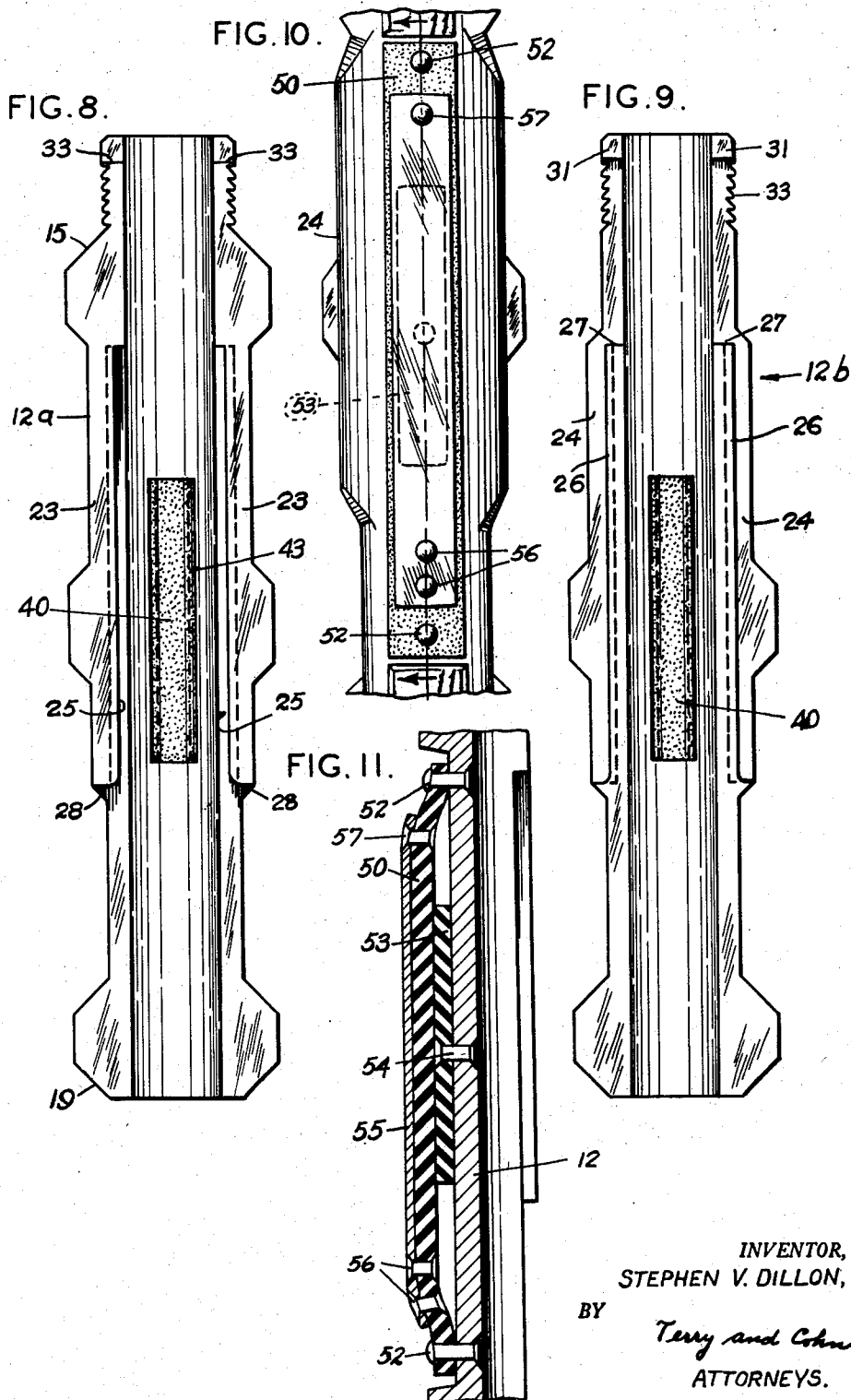
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## ROD STABILIZER DEVICE FOR WELLS

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6 Claims. (Cl. 308—4)

The present invention relates generally to deep wells and has particular reference to improvements in sucker-rod guide and stabilizer devices of the type described and illustrated in my Patent No. 1,752,154 of March 25, 1930.

Stabilizer devices of the kind to which the present invention pertains have their chief function in maintaining the reciprocating rod string in a generally central position within the well tubing whereby to reduce wear on the tubing and rod and to obtain smoother, more efficient operation of the pumping equipment.

The rod stabilizers of the type herein concerned generally consist of a sleeve member through which the rod slidingly extends, and means for frictionally retaining the member in a pre-set location within the well tube. The body member of the stabilizer device is customarily divided longitudinally to facilitate installation on any portion of the string of sucker rods. The paired body sections are provided with means for connecting them together, such as by bolts as in the case of my earlier device disclosed in the patent above referred to. Hinges and locking pins have heretofore been employed to unite the several sections of the stabilizer device. Such means have not proven entirely satisfactory, especially from the standpoint of their ability to withstand the vibrations and severe treatment to which they are normally subjected in use.

An object of the present invention is to provide an improved, longitudinally sectionalized device of the character described, of extremely rugged construction and provided with improved means for uniting the sections and maintaining them securely in assembly, without the use of special and separate securing elements.

A further object of the invention resides in the provision of a stabilizer unit of the character described having improved means for frictionally retaining the unit in a preset location in the well tubing or casing.

Yet another object is directed to the provision of a rod guide and stabilizer of the character described embodying special means that function to remove incrustations of paraffin and other substances from the inner surface of the tubing or casing when the rod string is pulled from the well, and yet which does not interfere with the free flow of well fluid past the said device.

With the foregoing and other objects in view, all of which will more fully appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevational view of the stabilizer device of the present invention shown located within a well tubing shown in section;

Fig. 2 is an elevational view of the device shown in Fig. 1, but viewed from a different quarter;

Figs. 3, 4 and 5 are transverse sectional views of the

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assembly illustrated in Fig. 1, taken at line 3—3, 4—4 and 5—5 on that figure;

Figure 6 is an elevational view of one of the sections of the device with a portion broken away to illustrate the friction retaining block thereof;

Fig. 7 is an elevational view of the companion section of the device;

Fig. 8 is a view showing the inner side of the section illustrated in Fig. 6;

Fig. 9 is a view showing the inner side of the section illustrated in Fig. 7;

Fig. 10 is a fragmentary view of a stabilizer device having an alternate type of friction retaining means, and

Fig. 11 is a longitudinal sectional view taken at line 11—11 of Fig. 10.

Referring now by characters of reference to the drawings, in Fig. 1 reference numeral 10 designates a section of well tubing through which extends the sucker rod indicated at 11. The rod guide or stabilizer device, indicated generally at 12, constituting the subject matter of the present invention serves to maintain the sucker rod in a generally centralized position within the tubing.

The device 12 is an elongated member, generally tubular in shape and composed of a pair of complementary, semi-tubular sections illustrated in Figs. 6 and 7 and designated 12a and 12b respectively. They are desirably formed by casting of metal, such as malleable or ductile iron, which is tough and yieldable in some degree without breaking. The sections 12a and 12b are not identical but have corresponding features. At their upper ends the semi-tubular sections 12a and 12b are provided with series of circumferential ribs 13 which, in assembly, combine to form annular lips that present a toothed surface to facilitate engagement by a suitable recovery tool, used in the event of breakage of the rod string. Spaced a short distance below the lips 13 on section 12a is an outstanding semi-annular flange 14, braced above and below by radially projecting gussets 15.

The companion section 12b is similarly provided with a semi-annular outstanding flange 16 having reinforcing gussets 17 located near the lower end of this section. The lower end of section 12a is provided with short, longitudinal extending ribs 18, for strengthening and guiding purposes, these ribs presenting sloping lower end surfaces 19 that prevent the said ribs from catching on any internal projection of the well tubing when the device is lowered into place. The section 12b is provided with outstanding ribs 20, at the upper end thereof, which correspond in shape and purpose to the ribs 18 of member 12a.

Describing now the improved means for locking the two sections together in assembly, which means constitute important features and advantages of the present invention, it will best appear from Figs. 8 and 9 that central portions of sections 12a and 12b are widened in the regions of their mating edges 23 and 24 to accommodate the said locking means. Undercut grooves 25 (see Fig. 4) are provided in member 12a, which grooves extend throughout the widened middle one-third of the said section. Adapted to coact with the grooves 25 are longitudinal tongues 26 integrally formed on member 12b, these tongues likewise extending throughout the middle third of member 12b. Figure 4, a cross sectional view, shows the members 12a and 12b in assembled relation with the tongues 26 interfitting within and between the undercut grooves 25 of member 12a. The operation of connecting the parts is accomplished by initially arranging them in staggered relation with the upper ends 27 of the tongues 26 inserted into the mouth portions 28 at the lower ends of grooves 25. The parts

are then forced longitudinally toward each other to slide the tongues completely into the grooves.

Means for preventing longitudinal relative displacement and disassembly of the paired sections is provided in the form of lug portions 31 on the end of section 12b (Fig. 7) which is adapted to enter the recesses 32 on section 12a and engage shoulders 33 of that member. Shoulders 33 face toward the upper end of section 12a and jut outwardly beyond the parting plane. Surface 34 immediately below the shoulder extends slopingly to the outer corner of the shoulder 33. The above described locking means requires that the lug portion 31 of section 12b slide along the ramp surface 34 of section 12a when the parts are being united, until portion 31 rides over and engages the protruding shoulder 33. To permit of the interfitting of the locking parts in the manner described, slight yielding of the metal in the region of the described tongue and groove portions is necessary to allow the lugs 31 to ride over the protruding edges of the ramps 34. When the parts have obtained in interlocked relationship, as shown in Fig. 1, they may be disassembled only by wedging the sections apart until lug portions 31 are clear of the shoulders 33.

The device as thus far described is provided with friction shoes by which it is adapted to be retained in a pre-set position within the well tubing. In one form of the invention the said friction shoes consist of blocks of rubber-like material designated 40 and illustrated in Figs. 1 to 9 inclusive. The material used in the formation of these friction blocks is preferably one having the properties of rubber but which is not adversely affected by oil and grease. Material known under the trademark Duprene is suitable for the purpose. In the molding of this material bits of fabric, cord or the like are embedded, to augment and enhance the ability of these members to frictionally grip the inner surfaces of the well tubing.

As best appears in Figs. 4, 6 and 7, the members 12a and 12b are provided with opposed elongated openings 41 through which extend the neck portions 42 of the friction blocks 40. Lateral flanges 43 on the inner ends of these neck portions serve to retain the friction blocks against outward displacement. It will be understood that these friction blocks are dimensioned so that their outer, gripping surfaces are normally spaced apart a distance somewhat greater than the internal diameter of the pipe in which they are to be installed. Consequently, when the device is forced downwardly into and through the tube the blocks become distorted to accommodate themselves to the tube, and react to exert strong frictional retaining forces against the inner surface of the tubing.

An alternate form of retaining shoe is illustrated in Figs. 10 and 11. When shoes of the pattern shown in these figures are employed, the sections 12a and 12b are not provided with the openings 41, but in other respects the said sections may be the same as those heretofore described. As shown in Figs. 10 and 11, each section is provided with a friction shoe consisting of a relatively thick strip 50 of rubber-like material, which material may have the same composition as that heretofore described in connection with the block 40. Strip 50 is secured at its ends by means of rivets 52. The strips 50 are held projected outwardly away from the sections by intermediate strips 53, shorter than the strips 51 and composed of a suitable resilient material. Strips 53 are held in place by a rivet such as that indicated at 54. It has been found desirable, for purposes of eliminating undue wear, to provide a metal facing strip 55 on the outer surface of the resilient strip 51. Such facing strip is preferably secured to strip 51 by two rivets 56 at its lower end and by a third rivet 57 at its upper end. In the event that the facing strip 54 wears through or otherwise becomes severed, the pair of rivets 56 prevent the lower sections from turning out of alignment

with the device and becoming caught in tube joints when the rods are being pulled.

It will be understood that the projecting flanges and ribs 15 through 20 inclusive, afford protection for the described friction shoes. The outstanding flanges 14 and 16 function to remove excessive wax and grease deposited on the inner surface of the tubing when the string of sucker rods is pulled. They do not however form an obstruction to the flow of fluid through the well tubing because of their relatively staggered relation on opposite sides of the device.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a device of the character described, complementary semi-tubular body sections, semi-annular scraper flanges arranged in staggered relation on said sections, longitudinally extending tongue and groove means on confronting side edges of said sections whereby said sections are adapted to be slidably connected together, one of said sections having an integral locking lug projecting therefrom and the other said section having a recess adapted to receive said lug to hold the sections against accidental slidable disconnecting movement.

2. In a device of the character described, complementary semi-tubular body sections each having outstanding longitudinal ribs near the ends thereof, said ribs being formed to provide sloping shoulders that face toward the adjacent end of the section, said sections having semi-circular scraper flanges projecting in staggered relation therefrom, longitudinal tongue and groove means in confronting side edges of said sections for slidably connecting the sections together, one of said sections having an integral locking lug and the other section having a recess to receive said lug and hold said sections against accidental slidable disconnecting movement.

3. A device of the character described in claim 2 wherein said sections are provided with elongate longitudinal extending members for frictionally holding the device in a pre-set position in a well tubing, said members being formed of resilient, rubber-like material and being situated substantially centrally between the ends of said sections.

4. In a device of the character described, complementary semi-tubular sections each having a plurality of longitudinal ribs outstanding near each end thereof, said ribs being formed to provide sloping shoulders that face toward the adjacent end of the section, said sections having semi-annular scraper flanges arranged in staggered relation near the ends of the sections; longitudinal tongue and groove means formed on confronting side edges of said sections for slidably connecting the sections together, one of said sections having an integral locking lug projecting therefrom and the other section having a cooperating recess adapted to receive said lug and hold the sections against accidental slidable disconnecting movement; longitudinal friction shoes formed of resilient rubber-like material projecting from the sections between said ribs and said flanges.

5. In a device of the character described, a pair of channel-shaped sections having confronting edge portions adapted to be connected together to form a tubular body, connecting means including a laterally undercut groove extending longitudinally of an edge portion of one section and a longitudinal tongue on the other section adapted to fit slidably in said groove, one of said members having a locking lug projecting from its said edge portion and the opposite member having a recess adapted to receive said lug and to hold the sections in assembled relation, each of said sections being provided with resilient means projecting laterally therefrom for frictionally holding the device in a pre-set position in a well passage.

6. In a device of the character described, a pair of channel-shaped sections having confronting edge portions adapted to be connected together to form a tubular

body, connecting means including a laterally undercut groove extending longitudinally of an edge portion of one section and a longitudinal tongue on the other section adapted to fit slidably in said groove, one of said members having a locking lug projecting from its said edge portion and the opposite member having a recess adapted to receive said lug and to hold the sections in assembled relation, and friction shoes formed of rubber-like material projecting from each section for holding the device in a pre-set position in a well passage.

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