Jan. 23, 1940. E. TATALOVICH 2,187,845

CLEAN-OUT TOOL

Filed Aug. 14, 1939

FIG. 1.

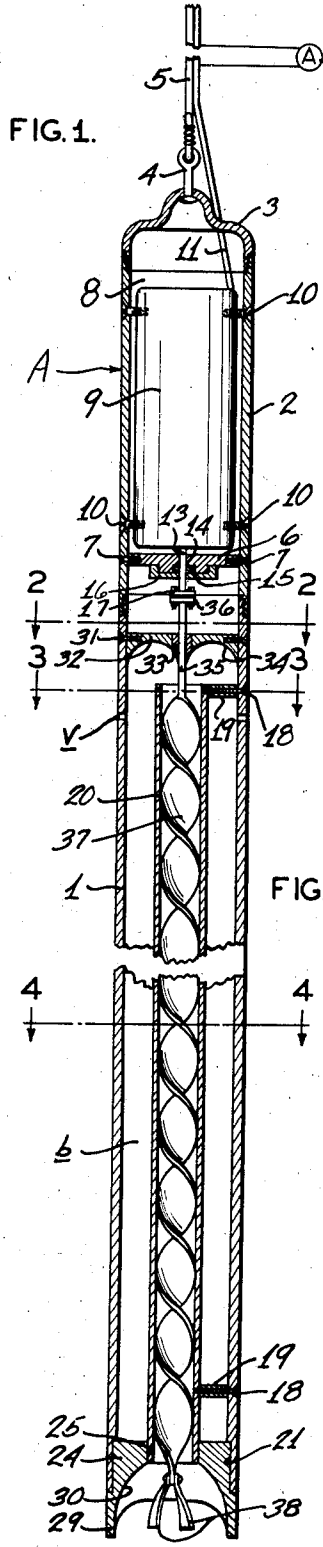


FIG. 2.

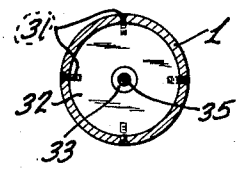
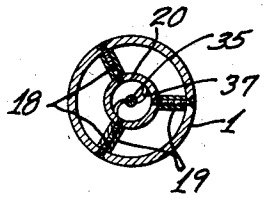


FIG. 3.



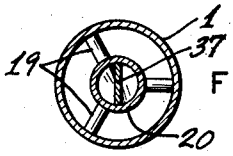
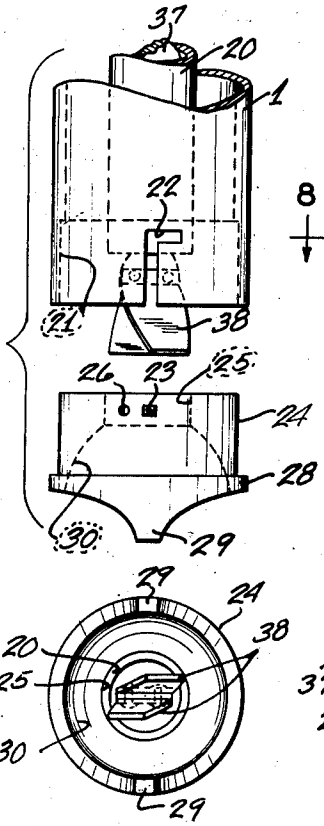


FIG. 4.

FIG. 5.



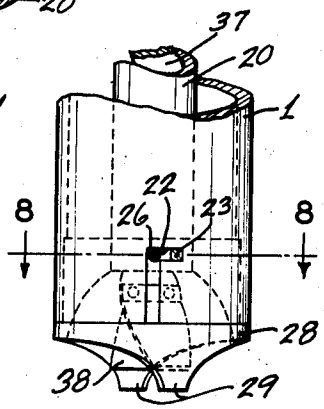


FIG. 6.

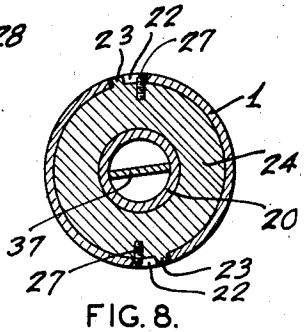


FIG. 8.

FIG. 7.

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CLEAN-OUT TOOL

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4 Claims. (Cl. 166—19)

This invention relates generally to oil-well operating equipment and, more particularly, to a certain new and useful improvement in such equipment of the type commonly known as clean-out tools for removing from the well sludge, sand, mud, slime, and the like.

My invention has for its primary objects the provision of a tool of the type and for the purposes stated which is self-contained, compact, and durable, which is easily and conveniently usable, which is economical in operation and maintenance, which is capable of effecting the removal speedily and efficiently of relatively large quantities of sludge, sand, mud, and the like from the depths of a well, which automatically provides a signal for visual indication of full loading of the tool, which may be simply and quickly discharged or unloaded, and which is highly efficient in the performance of its stated and intended functions.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawing—

Figure 1 is a longitudinal sectional view of a clean-out tool constructed in accordance with and embodying my present invention;

Figures 2, 3, and 4 are transverse sectional views of the tool, taken approximately along the lines 2—2, 3—3, and 4—4, respectively, Figure 1;

Figures 5 and 6 are enlarged fragmentary side elevational views of the discharge end of the tool, illustrating in detail the manner in which the sludge-retaining plug is removably engaged with and detached from the body of the tool;

Figure 7 is an inverted plan view of the lower or working end of the tool; and

Figure 8 is a transverse sectional view of the tool, taken approximately along the line 8—8, Figure 6.

Referring now in more detail and by reference characters to the drawing, which illustrates a preferred embodiment of my present invention, the tool, generally designated as A, comprises an elongated cylindrical tube 1 threadedly or otherwise detachably connected to which at its upper end is a relatively short tubular extension 2, in turn, at its upper end threadedly provided with a closed end cap 3 having a projecting eye 4 for receiving a tool supporting cable 5.

At its lower end, the tubular extension 2 is provided with a transversely disposed partition 6 fixed in place by means of a screw or the like 7, and disposed in the tubular extension 2 above the partition 6, is a hermetically sealed gas, water, and oilproof chamber or compartment 8 for housing an electric motor 9, the casing of which is preferably fixed to the container 8 and shell 2 by suitable screws or the like 10, and which is connected through a conventional electrical conduit 11 hermetically sealed in, and extending through, the cap 3 to a suitable source of power (not shown) located at the surface of the well, the conduit 11 being conventionally lashed to the supporting cable 5 and connected at surface in series with a conventional ammeter 12, all as best seen in Figure 1 and for purposes presently fully appearing.

The motor 9 is equipped with a drive-shaft 13 extending axially downwardly through a centrally disposed opening 14 in the partition 6 and through also a conventional packing ring 15 and stuffing box 16 mounted on the under side of the partition 6, the shaft 13 being provided at its outer or free end with a conventional coupling flange 17.

Fixed within the tube or shell 1 by means of upper and lower sets of radially disposed bolts 18 and spacers or bushings 19, is a co-axially extending inner tube 20 of substantially smaller diametral size than the tube 1 and terminating at its upper and lower ends, respectively, a short distance inwardly from the upper and lower ends of the tube 1.

At its lower end, the tube 1 is counter-bored in the provision of a recess 21 and provided with a pair of diametrally opposite bayonet slots 22 for retentively receiving the radially outwardly presented lugs 23 of a closure plug 24 provided with a central bore or aperture 25 of snug-fitting embracing engagement around the lower end of the inner tube 20.

On its outer face, the plug 24 is provided also with a pair of internally threaded recesses 26 for receiving locking screws 27 when the plug 24 is in place to prevent accidental or unauthorized removal thereof.

At its lower end, the plug 24 is provided with a diametrally enlarged stop or limiting flange 28 for endwise abutting engagement with the lower margin of the tube 1, the plug 24 being also provided with a pair of diametrally opposed downwardly extending anti-rotation prongs 29 and being internally routed-out in the provision of an enlarged funnel-shaped mouth or intake orifice 30, all as best seen in Figures 1 and 5 and for purposes presently fully appearing.

Suitably fixed, as by means of screws or the like 31 in, and extending transversely across the upper end of, the tube or shell 1 a short distance upwardly from the upper end of the inner tube 20, is a second partition 32 transversely provided centrally with an anti-friction bearing-sleeve 33 and formed on its under face with an annular deflection channel 34 preferably of suitable arcuate cross-section.

Having a shank 35 engaged with the flange 17 by a flexible coupling 36 and rotatable in the

bearing 33 and extending co-axially through the inner tube 20, is a helical or screw material conveyor 37 projecting at its lower end a short distance downwardly below the lower end of the inner tube 20 and into the intake orifice 30 of the plug member 24, the conveyor 37 being provided on its lower end with a pair of partially convoluted cutter blades 38 terminating, in turn, a short distance above the lower extremity of the anti-rotation prongs 29, all as best seen in Figures 1 and 6.

In use and operation, the tool A is lowered by means of the cable 5 into the particular well casing until the tool comes to rest at the bottom or foot of the well, when, the cable 5 being relaxed, the anti-rotation prongs 29, under the weight of the entire structure, will become embedded in the mud and slime at the casing bottom. Thereupon, the motor 9 being energized and the material conveyor 37 set in rotation, the cutter blades 38 will dig into the mud and silt at the casing bottom and propel the same upwardly through the intake orifice 30 and inner tube 20 into the deflection channel 34, from which the silt and the like will be directed outwardly and downwardly into the outer or so-called bucket chamber *b* of the shell 1. As the bucket chamber *b* fills, the entrained air and gases will be exhausted through vent apertures *v*, preventing the tool A from becoming gas locked. As soon as the bucket chamber *b* has been completely filled, the load on the material conveyor 37 will increase sharply, effecting a corresponding increase in the amperage consumed by the motor 9. Such increased amperage consumption will result in a marked deflection of the ammeter 12, thereby visually indicating to the operator that the tool has become filled to capacity. The operator thereupon shuts off the current to the motor 9 and elevates the tool A out of the well casing.

Upon removal from the casing, the loaded tool A may be swung over a suitable discharge pit and the locking screws 27 removed from the plug member 24. Thereupon, the plug member 24 may be reversely rotated in the bayonet slots 22 and detached, permiting the excavated material to discharge downwardly from, and thereby empty out of, the bucket chamber *b*. When the bucket chamber *b* is entirely empty, the plug member 24 may be readily reinserted and locked in position by the locking screws 27 and the tool A again lowered into the well casing for a successive excavating operation, it being, of course, obvious that such operations may be successively repeated any number of times, depending upon the amount of mud, sludge, and silt which has collected in the casing bottom.

It will be evident that, by my invention, I provide a clean-out tool which is not only simple and economical in construction, but which is also speedy and efficient in operation and extremely rugged and durable. It will be further noted that the motor and motor bearings are securely protected against damage by water, oil, or gas, and that the tool automatically provides a signal indicating to the operator that the tool is filled to capacity and should be withdrawn.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the tool may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

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

1. A clean-out tool of oil wells and the like comprising an elongated shell, a tube disposed co-axially within the shell in the provision intermediate the shell and tube of an annular bucket chamber, means including a screw-conveyor rotatable in the tube for propelling a stream of excavated material upwardly through the tube, means mounted transversely within the shell in spaced relation to the upper end of the tube and having an arcuately shaped annular channel for deflecting the stream of excavated material from the tube into the bucket chamber, and a closure removably mounted on the shell at the bottom of the bucket chamber.

2. A clean-out tool for oil wells and the like comprising an elongated shell having a compartment in one end thereof, a tube disposed co-axially within the shell in the provision intermediate the shell and tube of an annular bucket chamber, means including a prime mover located in said compartment and a screw-conveyor rotatable in the tube and driven by said prime mover for propelling a stream of excavated material upwardly through the tube, means disposed transversely within the shell in spaced relation to the upper end of the tube and having an arcuately shaped annular channel for deflecting the stream of excavated material from the tube into the bucket chamber, and a closure removably mounted on the shell at the bottom of the bucket chamber.

3. A clean-out tool for oil wells and the like comprising an elongated shell having a compartment in one end thereof, a tube disposed co-axially within the shell in the provision intermediate the shell and tube of an annular bucket chamber, means including a prime mover located in said compartment and a screw-conveyor rotatable in the tube and driven by said prime mover for propelling a stream of excavated material upwardly through the tube, means disposed transversely within the shell in spaced relation to the upper end of the tube and having an arcuately shaped annular channel for deflecting the stream of excavated material from the tube into the bucket chamber, and a closure removably mounted on the shell at the bottom of the bucket chamber, said closure having an enlarged intake orifice opening into the lower end of the tube.

4. A clean-out tool for oil wells and the like comprising an elongated shell having a compartment in one end thereof, a tube disposed co-axially within the shell in the provision intermediate the shell and tube of an annular bucket chamber, means including a prime mover located in said compartment and a screw-conveyor rotatable in the tube and driven by said prime mover for propelling a stream of excavated material upwardly through the tube, means disposed transversely within the shell in spaced relation to the upper end of the tube and having an arcuately shaped annular channel for deflecting the stream of excavated material from the tube into the bucket chamber, and a closure removably mounted on the shell at the bottom of the bucket chamber, said closure having an enlarged intake orifice opening into the lower end of the tube and being provided with a plurality of downwardly projecting prongs for well engagement for preventing rotation of the shell.

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