

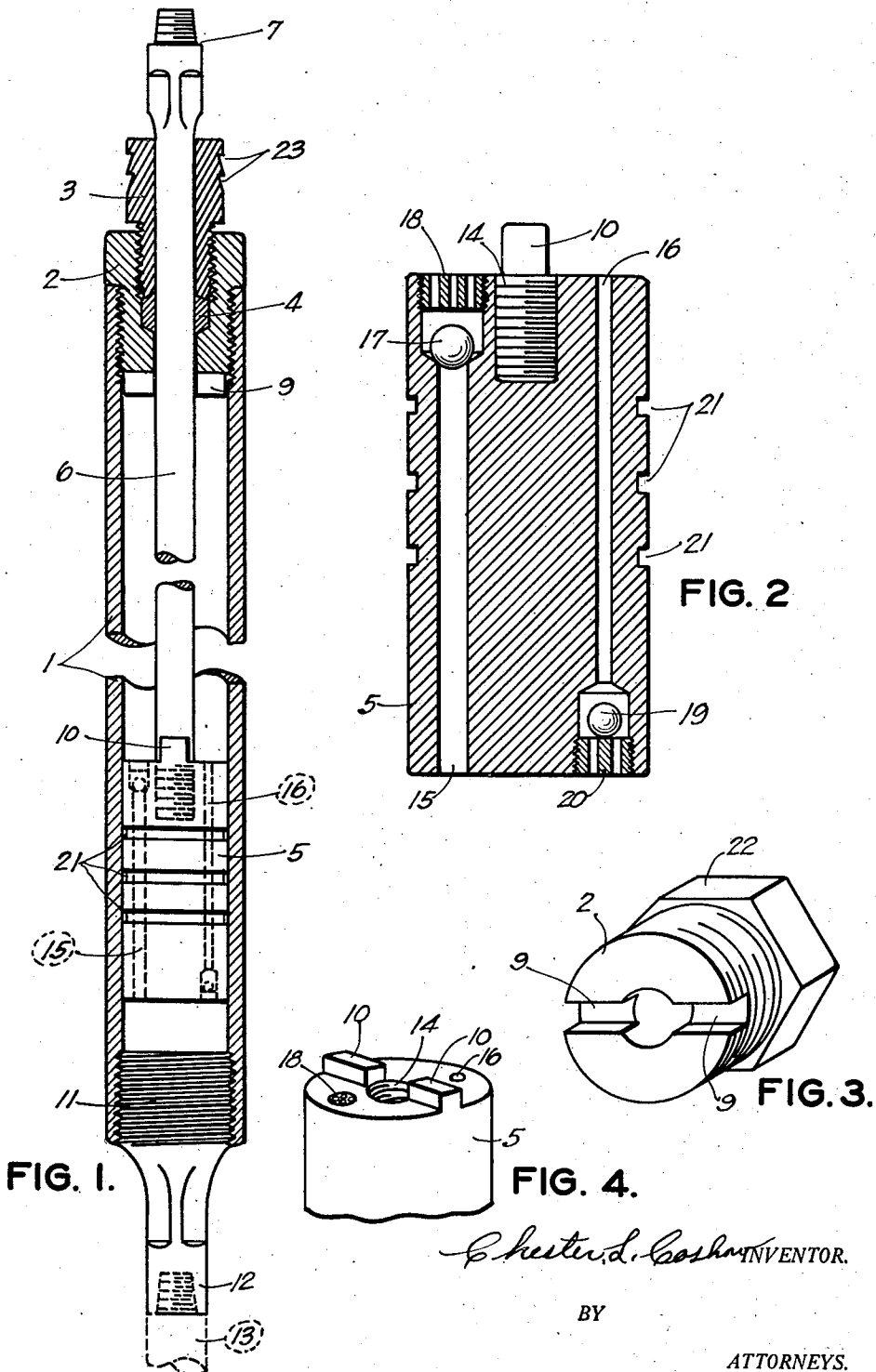
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SUCKER ROD STABILIZER

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SUCKER ROD STABILIZER

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1 Claim. (Cl. 255—27)

My invention relates to improvements in sucker rod stabilizer especially adapted to prevent pump rods from breaking while pumping oil and the like from deep wells.

The principal objects of my invention are to provide a device of this character which is positive in action, simple and inexpensive in construction; new, novel, and easily operated; which is strong, durable, reliable, and of evident utility; which cannot easily get out of order and is efficient for the purposes for which it is intended; to provide a device which may be inserted as a section of a sucker rod in one or more places in its length and become an integral part thereof; to provide a barrel or cylinder having a piston and piston rod, the latter passing through a stuffing box at the upper end of said cylinder and connecting directly to the sucker rod; to provide a closing member for the lower end of the cylinder to connect with the sucker rod below the said cylinder; to provide valved fluid passages vertically through the said piston; to provide means on the members within the said cylinder for locking the parts so that the cylinder will turn with the sucker rod in screwing sections of the said rod together.

With these and other objects in view my invention consists of the construction, novel features and combination of parts hereinafter more fully described, illustrated in the accompanying one-sheet drawing and pointed out in the claim hereto appended. Various changes in the form, proportion, size, shape, weight and minor details of construction, within the scope of my invention may be resorted to without departing from the spirit or broad principle of my invention or yielding any of its benefits.

In the accompanying drawing, Figure 1 is a fragmentary vertical section of the assembled device; Fig. 2 is a section of the piston; Fig. 3 is a perspective view of the stuffing box member for the upper end of the cylinder; and Fig. 4 is a fragmentary perspective view of the upper end of the piston.

In the following description like reference numbers designate like parts in all the figures, and it is to be understood that the drawing is to be interpreted as being illustrative and not restrictive.

In the recovery of oil by pumping from deep horizons difficulties are encountered which are not found in shallow production. The pump cylinder is located at the bottom of the well, and when this is at a depth of some 6500 feet the sucker rod to actuate the pump cylinder must be

about one and one-fourth miles long. The casing and oil string to this great depth is not perfectly straight and perpendicular but sinuous and perhaps slanting. When the sucker rod is reciprocated to actuate the cylinder, the side sway within the oil string of pipe, the sinuosity and possible inclination of the pipe together with what is analogous to backlash, introduces such a great tensile strain in the said rod that it breaks. My improved device in actual practice has proved successful in eliminating this breaking of sucker rods, has saved time now wasted in fishing for broken rods, and has thus increased production.

One embodiment of my invention is shown as follows: The cylinder or barrel 1 is partly closed at the upper end by stuffing box 2 provided with wrench hex 22. Gland 3 is threaded into stuffing box 2 and has an enlarged upper extension with fishing rings 23. Packing ring 4 prevents the escape of the light fluid with which the cylinder 1 is filled. Piston 5, within the cylinder 1, is immersed in the said light fluid or oil and is reciprocated by piston rod 6, provided with a pin 7 for connecting with the sucker rod. Threads 8, on the lower end of rod 6, register in the tapped hole 14 of piston 5 for assembling the members 1, 2, 3, 4, and 5. The slots 9, on the inner lower face of stuffing box 2, are adapted to register with lugs 10 on the upper face of piston 5 in order to rigidly secure piston rod 6 while sucker rods are being screwed on or tightened above or below the stabilizer. The lower opening of cylinder 1 is closed by plug member 11 terminating down in box 12 to which is attached sucker rod 13.

Piston 5 has two longitudinal ports or passages for the light fluid or oil, each with a ball check valve, but the said valves are in opposite faces of the piston. While only two ports are shown, it is understood that more than two ports may be used if deemed necessary. Port 15 is the larger of the two, having ball check 17 and perforated plug 18 at its upper end. Said port 15 allows the fluid to pass upward more freely through piston 5 as the said piston moves downward within cylinder 1. The fluid passes through the perforations in plug 18 until some portion or all of the fluid is above the said piston 5. During this cycle the smaller port 16 is closed against the upward passage of fluid by ball check 19, held in place by perforated plug 20. When the reciprocation of rod 6 reverses, port 16 is opened for the passage of fluid downward through piston 5, while port 15 is closed. The action, as just described, can be readily understood by consulting Figures 1 and 2. Piston 5, as illustrated, is provided with piston

ring grooves 21 for inserting piston rings if it is found necessary to use them, but no rings are shown in the drawing.

Sucker rods of the great length needed to connect the pumping engine at the mouth of the well with the pumping cylinder at the bottom of the hole will have a dead weight of several tons. The weight of the oil being raised, plus the frictional stresses and back lashing, vibration or whipping of the sucker rod within the oil string in overcoming inertia, together with the said dead weight of the rod is more than even high tension steel rods can withstand. In the reciprocation of the sucker rod, gravity pull lowers the rod, but when the reversal of motion takes place the shock causes the rod to snap off. My improved stabilizer with several quarts of light fluid or oil in the cylinder acts as a shock absorber and prevents breaking the rod. On the down stroke, oil passes upward through the larger port until a part or all of the oil is above the piston. On the upstroke, the oil flows down through the smaller port and absorbs the shock of the sudden reversal of direction of the rod. The dimensions of the two ports may be adjusted to the speed of the pumping engine. One or more of the stabilizers may be coupled into the line of sucker rods, depending on the depth of the hole or other factors.

While these specifications are directed to the use of my device in pumping oil, it is to be understood I do not limit myself to this use only, as it may be applied to sucker rods and the like wherever difficulty is encountered with broken rods.

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

In a device of the class described, in combination with a sucker rod, a cylinder, a plug for closing the lower end of said cylinder having a downward extension with a box for connecting with a sucker rod, a stuffing box closure for the upper end of said cylinder having slots on its lower face, a gland member for said stuffing box having an upward extension provided with fishing rings, a piston rod for reciprocating through said stuffing box, a pin formed on the upper end of said piston rod for connecting with a sucker rod, a piston secured to the lower end of said piston rod for reciprocation within the said cylinder, lugs formed on the upper face of said piston for registering in said slots of said stuffing box for locking said piston rod and piston against turning with reference to said cylinder, said piston having longitudinal ports formed therein for the passage of fluid therethrough, ball checks for said ports, perforated plugs for said balls, one of said ports being larger than the other, having the ball check and perforated plug at the top to allow the fluid within said cylinder to flow upward through said larger port and the other and smaller of said ports having the ball check and perforated plug at the bottom of said cylinder to allow the fluid to flow downward through said smaller of said ports.

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