March 17, 1925. 1,529,874

E. A. CULBERTSON

OIL WELL APPARATUS

Filed July 6, 1923

FIG. 1.

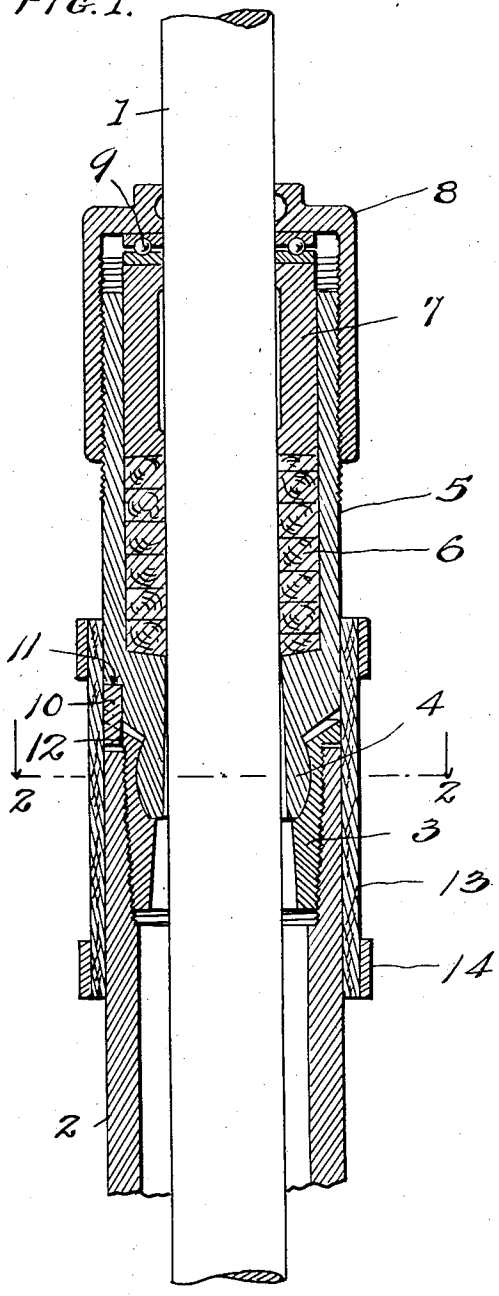


FIG. 2.

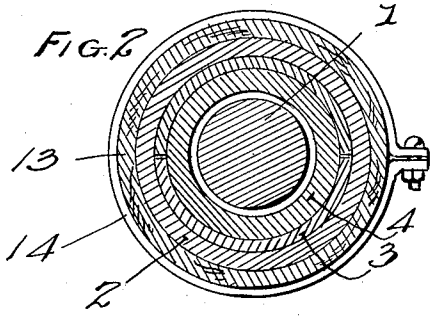


FIG. 3.

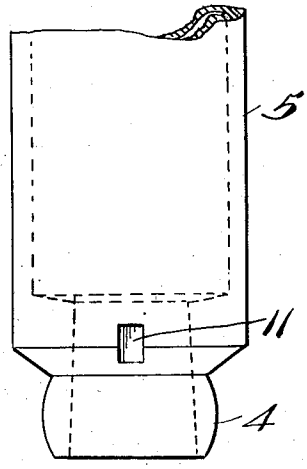
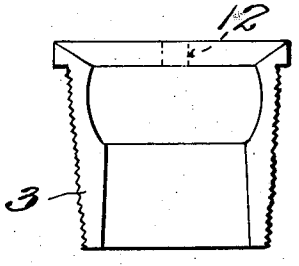


FIG. 4.



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UNITED STATES PATENT OFFICE.

EDWARD A. CULBERTSON, OF WICHITA, KANSAS.

OIL-WELL APPARATUS.

Application filed July 6, 1923. Serial No. 649,859.

To all whom it may concern:

Be it known that I, EDWARD A. CULBERTSON, a citizen of the United States, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented new and useful Improvements in Oil-Well Apparatus, of which the following is a specification.

It is good practice after a deep well is drilled to use the walking beam of the drill rig which drilled the well. Especially is this so where the well is a deep one. In the case of this kind the well tubing is provided with an extension and stuffing box through which the rod connecting the walking beam with the pump rod is attached. This connecting rod is locally known in some communities as the polished rod. In constructions of this kind this connecting rod is quite long and bends more or less due to the effect of the combined oscillatory movement or side sway of the reciprocating pivoted walking beam and the vertical reciprocating motion of the pump rod connection.

This bending of the rod generally takes place in or about the stuffing box, the side strains causing the packing therein to wear out quite quickly. In addition the metal parts of the stuffing box are subject to undue wear on opposite sides.

I have succeeded in overcoming this excessive wear on the box and its packing by employing a ball and socket pivot joint at one end of the stuffing box and forming virtually a part thereof. The function of my improved construction permits the stuffing box and packing to move with the side sway or bending of the connecting rod. As a result I obviate such friction between the box, the packing, and the rod.

One examplification in practice of my invention is shown in the accompanying drawings.

Figure 1 represents a longitudinal sectional view embodying my invention.

Figure 2 is a cross section on the line 2—2 of Fig. 1.

Figure 3 is an exterior view of one portion of the stuffing box and flexible joint.

Figure 4 is a vertical elevation of one of the halves of the lower element of the flexible ball and socket joint.

In the drawings 1 represents the connecting rod, sometimes termed the polished rod which connects the pump rod in the well tubing to the walking beam of the well frame or derrick. 2 is a tubular oil connection which is attached to the top of the well tube in the usual approved way and has at its upper end an internal thread. The top of the tube 2 carries one of the elements 3 of the ball and socket joint having exterior threads and adapted to be screwed home into the top of the tubing 2. The part 3 is made in halves, as will be later described, for the purpose of embracing the male head 4 of the upper portion of the ball and socket joint. This head 4 is preferably made integral with the stuffing box 5 and is formed on the lower end thereof. The box 5 is tubular in shape and provided with a cylindrical cavity which receives the connecting rod 1 and the packing 6. The upper part of the stuffing box 5 is closed by a gland 7 slidable in the end of the box opposite the socket head 4. A screw threaded cap 8 engaging the corresponding thread on the stuffing box serves to adjust the gland and the packing within the stuffing box so as to make a tight joint between the same.

Wherever desirable I may interpose a thrust ball bearing 9 between the cap 8 and the gland 7 for the purpose of more accurately and delicately adjusting the desired pressure upon the packing in the stuffing box.

In assembling the ball and socket joint the two halves 3 of the female socket are screwed into the top of the well tubing 2, the male end of the socket 4 of the stuffing box being previously inserted between the halved socket members 3. A key 10 fitting in a keyway 11 in the stuffing box and in a corresponding keyway 12 in one of the ball and socket members 3, locks the two sections of the ball and socket joint 3—4 into operative position, and permits the two halves 3 of the female socket to be screwed home tightly with the male socket 4 in proper flexible relation to the parts. After the parts have been properly adjusted the key 10 may be removed to prevent any leakage which may possibly pass through the flexible ball and socket joint. A flexible sleeve 13 is slipped over the lower end of the stuffing box and the upper end of the tube 2, thereby covering exteriorly the ball and socket joint. In this position suitable binding clamps 14 firmly bind the flexible sleeve to the parts.

A construction such as I have indicated permits the necessary flexure of the connect-

ing rod 1 due to such installation as I have above described. This side flexure of the connecting rod is taken care of by the ball and socket 3—4 and all strain upon the packing and stuffing box and the metal parts composing the same is entirely obviated.

My invention while especially adapted for use in oil wells is capable of other uses in the arts.

The franchise here sought is as broad and comprehensive as the claim which follows.

Claim:

In a drilling apparatus, the combination of a casing and a stuffing box thereon, a vertical reciprocating drill rod passing through the casing and stuffing box, a ball and socket connection between the stuffing box and casing, and an exterior flexible fluid tight sleeve housing surrounding the ball and socket connection.

EDWARD A. CULBERTSON.