Oct. 16, 1923. 1,471,105

R. E. COX

BALL BEARING SWIVEL SUCKER ROD JOINT

Filed Oct. 15, 1921

Fig. 1.

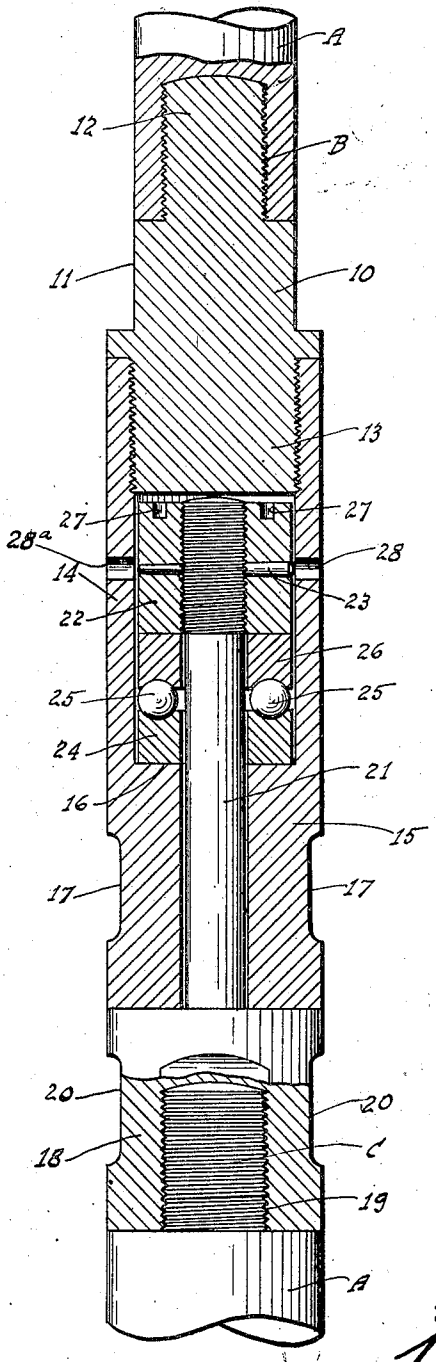
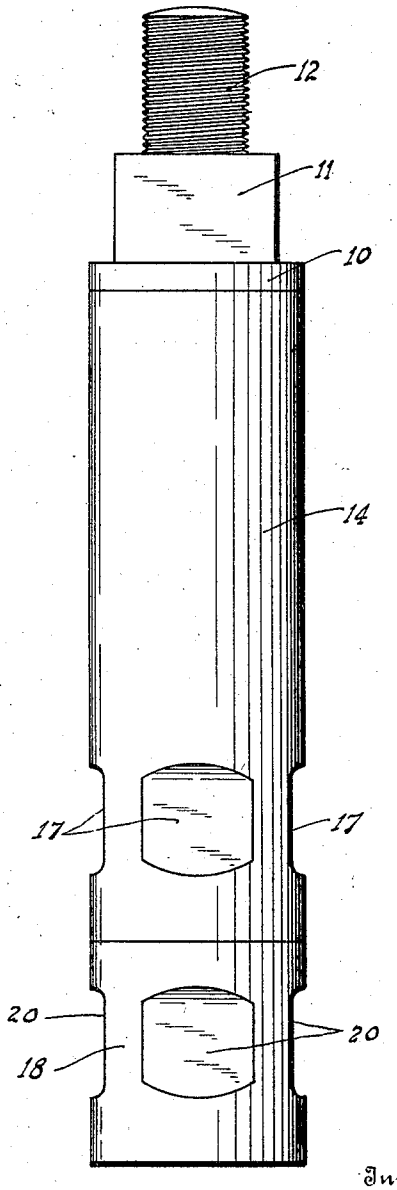


Fig. 2.



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Patented Oct. 16, 1923. 1,471,105

UNITED STATES PATENT OFFICE.

REGINALD E. COX, OF TORRANCE, CALIFORNIA.

BALL-BEARING SWIVEL SUCKER-ROD JOINT.

Application filed October 15, 1921. Serial No. 507,999.

To all whom it may concern:

Be it known that I, REGINALD E. COX, a citizen of the United States, residing at Torrance, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Ball-Bearing Swivel Sucker-Rod Joints, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to rod joints, particularly to joints for connecting sucker rods used in wells, and has for its object the provision of a ball bearing swivel sucker rod joint which will operate to prevent unscrewing of the various sucker rods in a string, any turning tendency of the rods being permitted by the swivel joint while unscrewing will be prevented.

It is well known in the art that since sucker rods have come into practical use for the purpose of pumping oil and water from wells, operators have experienced great difficulty owing to the fact that the rods separate, that is they become unscrewed or uncoupled while in pumping motion. A long string of sucker rods when subjected to the reciprocatory movement involved in pumping have a very great tendency to turn and being screwed together and the topmost rod being gripped securely by the pumping jack on the derrick floor, it is impossible for the rods to accommodate themselves to this turning tendency without becoming unscrewed. Ordinarily sucker rods are made in twenty and twenty-five foot lengths, each rod having on its upper end a male connection or threaded pin and having at its lower end a female connection or threaded box. In this manner a complete string of rods are necessarily secured together. Onto the topmost sucker rod is screwed a steel rod known as the "polished rod" having the same connection as the sucker rods and being tightly gripped by the pumping jack or pumping beam connection which provides the upward and downward strokes. There is, however, no provision made for allowing any of the rods to turn. Oil wells which are pumped usually range in depth from one thousand to thirty-five hundred feet. When strings of rods of such a great length are subjected to constant upward and downward movement, it is known that such motion creates a strong inclination to turn the rods. In case the rods become unscrewed it is necessary to use some suitable tool and fish for the dropped rods and this of course results in a great loss of production as the well cannot be pumped. The duration of time during which the loss occurs is determined by the length of time required to remove the fallen rods and again place the well in pumping position. The work involved of course also necessitates a considerable expenditure of time and labor, which is costly.

It is with the above facts in view that I have designed the present invention which contemplates the provision of a swivel joint interposed in the string of rods preferably near the upper end thereof whereby to permit turning action without danger of unscrewing.

An additional object is the provision of a swivel joint which will be simple and inexpensive in construction, easy to install, efficient and positive in action, durable in service and a general improvement in the art.

With the above and other objects and advantages in view, the invention consists in the details of construction to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view through my joint interposed between two sucker rods; and

Figure 2 is a side elevation.

Referring more particularly to the drawings, the letter A designates a pair of sucker rods to be connected and as is well known, the lower end of each sucker rod is formed with a threaded socket B while the upper end is formed with a threaded extension C. In carrying out my invention I provide an upper coupling member 10 which has a squared portion 11 adapted for engagement by a wrench or the like whereby it may be turned and which has its upper end formed with a reduced externally threaded extension 12 screwed into the socket B of a sucker rod. At its other end this body 10 is formed with an externally threaded reduced portion 13 which is designed to be engaged within the internally threaded upper end of a sleeve 14 which has its lower end provided with an inwardly extending portion 15 defining a retaining shoulder 16. The outer surface of the lower end of this sleeve is formed angular, as shown at 17, for engagement by a wrench.

The lower coupling member comprises a

body 18 which is formed at one end with a threaded socket 19 for receiving the threaded stem C of the next adjacent sucker rod, and this body 18 has its lower end formed with an angular portion 20 facilitating engagement by a wrench or other tool for effecting turning movement. Formed upon the top of the body 18 is an elongated extension 21 of a size to pass freely into the sleeve 14. The upper end of this extension 21 is threaded and engaged thereon is a cylindrical nut 22 held against turning movement by a transverse taper pin 23.

In order to provide means for insuring free and easy turning movement of the member 18 carrying the sucker rod and the members 14 and 10 associated with the sucker rod next above, I provide a ball race 24 seating upon the shoulder 16 and supporting a series of bearing balls 25 above which is disposed a second race 26 engaged by the lower end of a nut 22. It should be stated that the nut 22 is formed at its upper end with recesses 27 for engagement by a spanner wrench whereby the nut may be screwed into place or unscrewed as the case may be, and it should also be stated that the sleeve 14 is formed at one side with a hole 28 through which the taper pin may be passed prior to its disposition through the nut 22 and stem 21. The opposite side is formed with a hole 28[a] through which a pointed tool may be inserted for driving out the pin when desired.

When the device has been constructed and assembled as above described and as shown in the drawings, it will be apparent that the parts cannot separate longitudinally owing to the fact that the shoulder 16 supports the ball bearing structure which in turn supports the nut 22 which is immovable with respect to the swivel stem 21. In the use of the device it will be seen that when the rods have any tendency to turn in one direction or the other such turning movement is permitted while there will be no unscrewing of the rods at their threaded connection for the reason that much less effort is required to effect turning at the swivel joint than to effect unscrewing at the threaded joint. The interposition of my swivel structure is thus a safeguard against separation of the rods.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a simply constructed and consequently inexpensive as well as easily assembled sucker rod coupling which has a free and easy swiveling action so that all turning tendency of the rods during pumping movement will be taken care of and be permitted without any danger whatever of separation and consequent dropping of any of the rods into the well. It is therefore obvious that my structure should be highly satisfactory in use and should efficiently perform all the functions for which it is intended.

While I have shown and described the preferred embodiment of the invention it is of course to be readily understood that I reserve the right to make such changes in the form, construction and arrangement of parts as will not depart from the spirit of the invention or the scope of the sub-joined claim.

Having thus described my invention, I claim:

Means for coupling a pair of sucker rods, comprising an upper coupling member having threaded connection with the lower end of one sucker rod and formed with a reduced extension at its lower end, a lower coupling member having threaded connection with the other sucker rod and being formed with an upwardly extending reduced extension having a threaded end, a sleeve threaded upon said first named extension and formed at its lower end with an inwardly extending flange defining a retaining shoulder, said second named extension passing within said flange, a pair of ball races having a series of balls therebetween and seating upon said shoulder, and a nut rigidly secured upon the threaded end of the second named extension and seating upon the uppermost ball race.

In testimony whereof I hereunto affix my signature.

REGINALD E. COX.