April 23, 1940. T. R. COWAN 2,197,778

TUBING PROTECTOR

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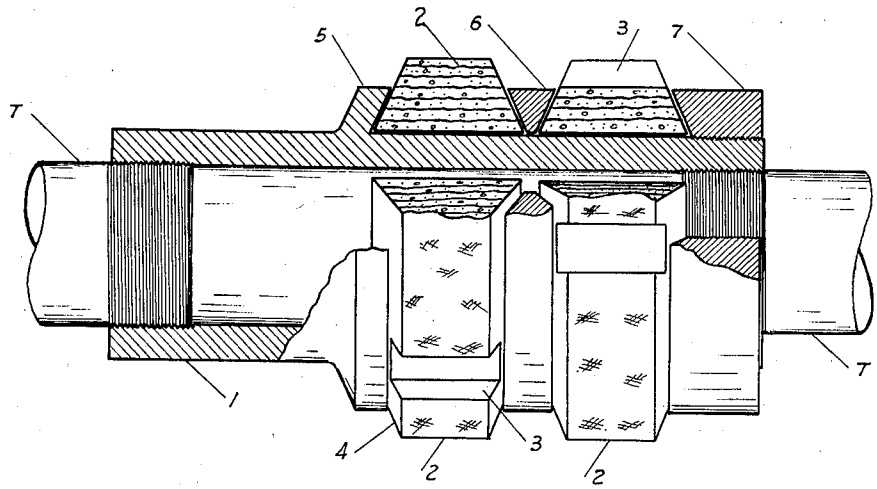


FIG. 2

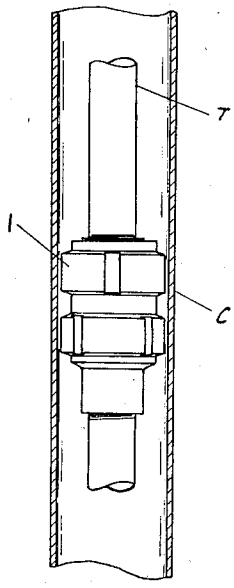


FIG. 1

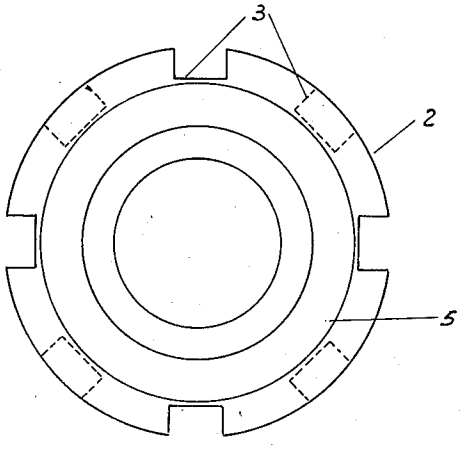


FIG. 3

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TUBING PROTECTOR

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Application May 20, 1938, Serial No. 208,988

1 Claim. (Cl. 308—4)

My invention relates to couplings and more particularly to a coupling for use in connection with oil well tubing or the like.

Due to the variation in the strata encountered in drilling oil and gas wells and such, it is practically impossible to maintain a well which is relatively perpendicular. Generally the drilled holes have irregularities in the form of curves and contours, which cause the tubing that operates within the casing to engage the walls of the casing at various points, with the result that the friction there between brought about by the repeated stretching of the tubing has a tendency to wear holes in the casing and tubing. Sometimes the old style couplings are worn in two and whole strings of casing are dropped in a well, necessitating expensive fishing operations and sometimes the well has to be junked. It is a well known fact that the strings of tubing in very deep wells stretch and contract as much as eighteen or more inches each pulsation of the oil lifting pump. This repeated stretching and contracting and consequent rubbing of the tubing wears out the casing tubing and couplings.

I conceived of an invention to overcome the difficulties outlined above and have embodied it in the structure of an improved coupling.

An object of my invention is to provide a coupling for uses in connection with oil well tubing, or the like, which will serve as a connection between lengths of tubing and as a means of spacing a string of tubing from the side of the well casing, or the like, to prevent the tubing from ever coming in contact with the casing.

Another object of my invention is to provide a coupling for use in connection with oil well tubing or the like which will greatly lessen the wear on the casing during periods of the pumping operation.

Another object of my invention is to provide a safety device for use in connection with oil well tubing or the like designed to check the fall of tubing or the like when dropped in a well.

Other objects and advantages of my invention will appear from an inspection of the drawing and the reading of the accompanying description.

Figure 1 is a vertical view in part cross section of an oil well showing lengths of tubing connected by my improved coupling.

Figure 2 is a broken plan view of my improved coupling showing how the various parts of my coupling are assembled and,

Figure 3 is an end view of my coupling viewed from the left of Figure 2.

In the drawing referring particularly to Figure 1, c designates a section of conventional well casing, T designates oil well tubing or the like, and numeral 1 designates, generally, my spacing, protecting coupling.

In Figures 2 and 3 showing more in detail the feature of my coupling 1, numeral 2 designates spacer rings. The spacer rings 2 have slots 3 provided in their outer surfaces to allow for the passage of oil or the like fluid. The spacer rings 2 are designed to turn when not clamped so that slots 3 of the respective spacer rings 2 may be aligned if desired. However, in practice, better results have been obtained by staggering the slots of one spacer ring 2 with the other and it is this arrangement that is disclosed for purposes of illustration.

In the working out of my invention I found that by making my spacer rings 2 with slanting sides 4, as shown by Figure 3 wherein the cross sections of the spacer rings 2 show as trapezoids, it was possible to clamp the same to the body of the coupling 1. I accomplished this clamping by placing a slant side 4 of one spacer ring 2 under a peripheral slanting flange 5 adapted to receive and fit it. Next against the other slanting side 4 of the same spacer ring 2, I placed what I call clamping ring 6, having also a slanting side to fit over the slant sides 4 of the spacer rings 2 which it separates. The last element of the clamping means is the clamping collar 7 which is also provided with a slanting surface designed to fit on the last slanting side 4 of the second spacer ring 2. The collar 7 may be forced down against the second spacer ring 2 because of its threaded engagement with the outer surface of an end of the coupling 1. The pressure applied to the second spacer ring 2 by the clamping action of the collar 7 is transmitted to the other spacing ring 2 because the clamping ring 6 is loose on the body of the coupling 1. If more than two spacer rings are wanted, additional clamping rings 6 will be needed.

Attention is here called to the fact that even though the rings should become cracked through into a number of small pieces, each piece would be still firmly held against the body of the coupling 1 because of the wedging action of the flange 5, clamping ring 6 and clamping collar 7 on the slant sides 4 of the spacer rings 2.

To further guard against the evils of cracking of the spacer rings 2, I make them out of a composition of "Dupreeme" reinforced with cotton

fabric and wire mesh. Any other material such as rubber and rubber compositions that has like qualities to it, may be used instead of the above described material, without departing from this invention. These types of material resist wear due to the fact that the oil and water present in wells lubricate them. This lubrication characteristic of the ring material not only saves the spacer rings 2 from wearing out but save the casing c which they contact.

In practice, varying sizes of spacer rings 2 are installed on the couplings 1, dependent upon the size of the casing c they are to go into. In practice, it has been found that the allowance of a cleanance space of three sixteenths of an inch between the spacer ring 2 and the casing c has given very good results. However, some conditions will warrant a variation from the above outlines practice and I have contemplated such changes in my concept of this invention.

My improved coupling 1 with spacer rings 2 installed in practice fits so close to the sides of the casing c that during its travel up and down in the casing c it acts like a piston. To permit the free passage of oil past my piston like coupling, I provide the slots 3 in the outer surface of the spacer rings 2. By staggering the slots 3 I compel the fluid that passes my improved coupling 1 to travel in a circuitous passage, that is through one set of slots then a part of the circumference around the coupling 1 and then again through the other set of slots 3.

In thinking of the use of my improved coupling, it must be borne in mind that the lower portion of the tubing in pumping operation is always submerged in the oil.

In understanding the third purpose of my invention, the provision of a safety device the fact must be kept in mind that a large part of the length of the tubing T is submerged in oil and that the lower end of the tubing T may be several hundred or more feet above the bottom of the well, and it must be remembered that such a string of tubing may weigh several tons. Formerly, under these conditions, when a string of tubing accidentally dropped in a well gravity pulled it down to the bottom at a rapid rate of speed, resulting, generally, in the tubing becoming hopelessly jammed and the casing c crumpled and ruined. Such an accident as above described can not happen when my piston-like couplings 1 are used, because they hold the casing back and only let it down as fast as the oil can pass a number of the piston like couplings 1 on the tubing T. The safety feature of my invention alone will result in the saving of many thousands of dollars being lost in the oil industry because of accidental dropping of tubing.

It is to be understood that various changes in the shape and size of my improved coupling may be resorted to without departing from the scope of this invention.

Having thus described my invention, I claim:

In a device of the class described, a coupling adapted to join oil well tubing or the like provided with a peripheral slanting flange extending outwardly from its outer surface, a spacing ring provided with a peripheral slanting surface adapted to fit under the said flange, a separating ring loosely mounted on the said coupling designed to contact the aforesaid spacing ring, a second spacing ring loosely mounted on said coupling adapted to contact the aforesaid spacing ring, said second spacing ring being provided with an inwardly slanting peripheral surface and a clamping collar mounted on said coupling provided with a slanting peripheral surface adapted to fit over the said slanting surface of the second spacing ring, said clamping collar being adapted to urge one ring toward another and hold the rings to the body of the coupling.

THOMAS R. COWAN.