Sept. 26, 1944. J. A. FOX 2,359,211

BULL WHEEL FLANGE

Original Filed Jan. 17, 1941

Fig. 1.

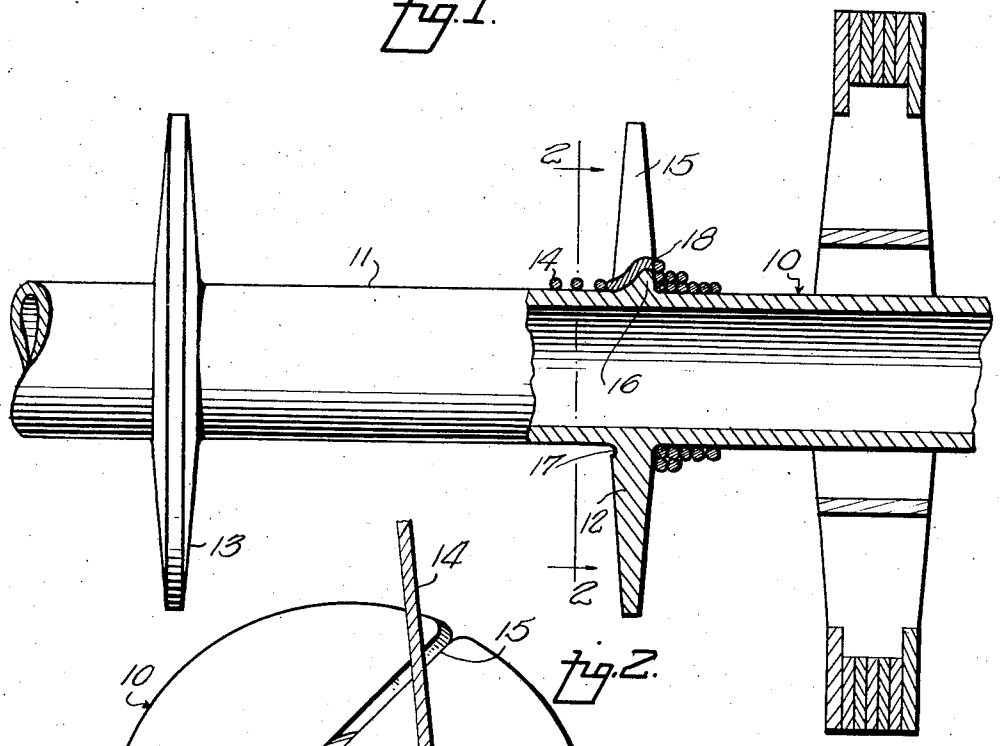


Fig. 2.

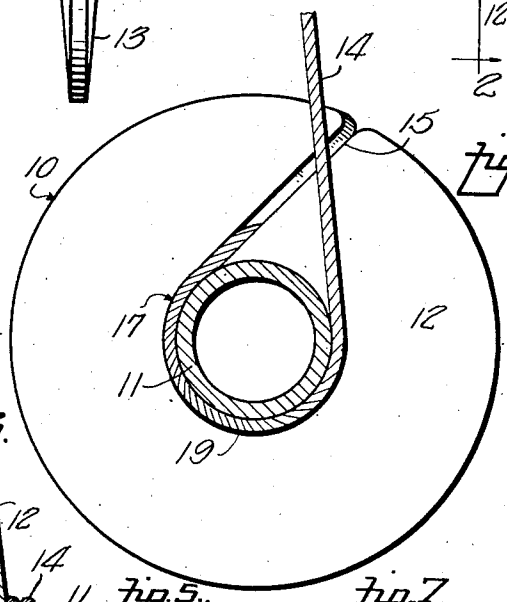


Fig. 3.

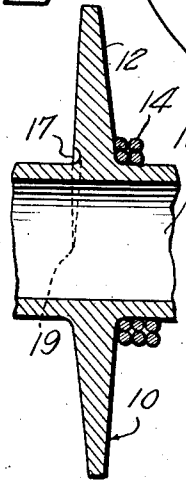


Fig. 4.

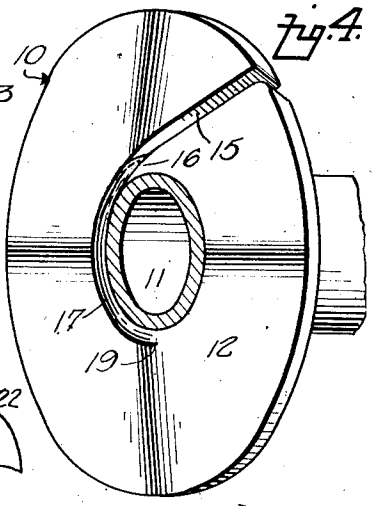


Fig. 5.

Fig. 7.

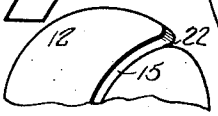
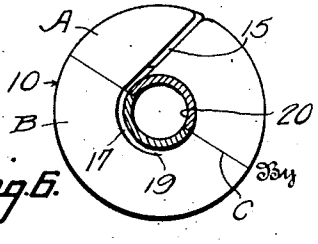


Fig. 6.



Inventor,
JAMES A. FOX,

Attorney,

Patented Sept. 26, 1944 2,359,211

UNITED STATES PATENT OFFICE

2,359,211

BULL WHEEL FLANGE

James A. Fox, Washington, Pa.

Substituted for abandoned application Serial No. 374,934, January 17, 1941. This application May 8, 1944, Serial No. 534,640

3 Claims. (Cl. 242—117)

This application is a substitute for application No. 374,934, filed Jan. 17, 1941.

This invention relates to a spool construction and while applicable to such an article employed for various uses and in different relations, especially concerns that flange of a bull wheel used in oil and gas well drilling, which is located between the major and reserve portions of the line.

It is a prime object of the invention to so construct the said flange that it may greatly reduce wear on the line, especially overcoming the bending, kinking, undue tensioning and mashing thereof, as results from the passage of reserve line through the flange, notwithstanding the severe drop required of the line in passing from the outside to the inside of the spool and formation of the line in rolls or layers on said spool in deep well drilling, even to depths greater than 8,000 feet.

Another object is to provide a construction of spool or bull wheel wherein the line may pass through the flange to and from the reserve portion, guided to approximately follow the path of a coil or helix.

More specifically, I aim to provide in the inner face of the flange a novel groove extending partly around and close to the bull wheel shaft and thence communicating with a tangential slot through the flange, having side walls oblique to said face, which flange also has a relatively low portion at the base of the slot outwardly of the periphery of the bull shaft or hub which is chamfered or curved to coact with the groove, slot and line to attain the ends stated.

Various additional objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawing illustrating an operative embodiment, by way of example.

In the drawing:

Figure 1 is a view partly in elevation and partly in central longitudinal section showing a bull wheel equipped with my improvements;

Figure 2 is a vertical section taken on the plane of line 2—2 of Figure 1;

Figure 3 is a sectional view taken on the plane of line 3—3 of Figure 2;

Figure 4 is a view partly in section but primarily showing my improved flange in perspective; and,

Figures 5, 6 and 7 are end elevations of modified forms.

Referring specifically to the drawing, wherein like reference characters designate like or corresponding parts throughout the different views, 10 generally designates a spool or bull wheel construction, that shown, by way of example, being adapted for use in deep oil and gas well drilling. The shaft or hub of said structure 10 is shown at 11 and is adapted to be driven or rotated by any usual or approved means. Shaft 11 is shown as metallic and has flanges 12 and 13 thereon, preferably metallic and cast integral therewith. The main portion of the drill line, designated 14, which is usually of steel, is coiled in layers about the shaft 11 between flanges 12 and 13, while a reserve portion is coiled in layers about such shaft outside of the flanges, with such drill line travelling or feeding from the reserve portion to the main portion and vice versa, in opposite directions according to drilling operations and requirements, through the flange 12, which feature broadly is usual and well understood in the art.

The present invention particularly concerns the construction of flange 12 so that the objects of the invention will be attained. To this end, a slot 15 extends inwardly and obliquely from the periphery of the flange 12, as best shown in Figures 2 and 4, terminating at the shaft or hub 11 at the inner side of said flange but terminating short of the shaft or hub at the other side of the flange for an abrupt drop of the line resulting in the provision of a web 16 integral with the shaft and flange which functions dually in reinforcing the flange at the base of the slot and in the guidance of the line 14. Said slot 15 is somewhat wider than the diameter of the line so that there will be ample clearance for the travel of the latter.

As best seen in Figure 4, the side walls of slot 15 are preferably parallel to each other and oblique to the side surfaces of the flange so that the line 14 will pass through the slot approximately in the path of a coil. In addition, a groove 17 is provided in the inner face of flange 12 concentric with the axis of shaft 11. This groove extends approximately 180° around shaft 11 and the wall therein is transversely arcuate and of a size fitted by line 14 and merges with the periphery of shaft 11. In addition, the apex of web 16 is convex at 18, longitudinally of the shaft but its upper surface throughout its length is transversely concave to fit the line and the groove 17 continues from the slot, and progressively decreases in depth in the direction away from the slot 15 to merge into the inner surface of flange 12, as at 19, as best shown in Figure 3. The length of groove 17 is governed somewhat by the diameter of the line.

Due to the construction described, the line 14 during drilling operations travels or passes through the flange from one side to the other, in either direction of travel, approximately in the path of a coil or a helix, avoiding specifically the usual bending, kinking, undue tensioning and mashing of the line, and thus with minimum wear on the line so that the life of a line is greatly enhanced.

Various changes may be resorted to, provided they fall within the spirit and scope of the invention as defined by the appended claims.

While the flanges 12 and 13 and shaft 11 are shown as integral, it is clear that they may be made up in sections, if desired, and, for instance, as in the two part structure of Figure 6, in which the parts or sections designated A and B are detachably fastened together and to a rotatable shaft 20, in any suitable manner, and which sections meet in a plane C passing longitudinally and diametrically through said flanges 12 and 13 and shaft 11. In such a construction, the tightening of the line also tightens the two sections on the shaft.

Especially, when a taut line is used, as in connection with a sand reel, the open end of slot 11 may be suitably widened or enlarged to facilitate the introduction of the line, as suggested at 21 in Fig. 5 and 22 in Figure 7.

I claim:

1. A spool adapted for rotation having a hub, an outwardly extending flange on said hub, said flange having an oblique slot therethrough for passage of a line, said flange having an arcuate groove of substantially more than 90° to be occupied by the line and located relatively close to the hub and approximately concentric with the axis of rotation, said groove at one end communicating with said slot and at the other end merging into said face, a line-guiding web within said slot, said groove progressively decreasing in depth in a direction away from said slot, and said line-guiding web presenting a surface across the base of the slot which merges into the wall of the groove and increases in height in approximately a helical path in a direction away from the groove.

2. A spool adapted for rotation having a hub, an outwardly extending flange on said hub, said flange having a slot therethrough for passage of a line, said slot following an approximately uninterrupted path non-radially from the hub, said flange having an arcuate groove of substantially more than 90° to be occupied by the line and located relatively close to the hub and approximately concentric with the axis of rotation, said groove at one end communicating with said slot and at the other end merging into said face, a line-guiding means within said slot, said groove progressively decreasing in depth in a direction away from said slot, and said line-guiding means presenting a surface across the base of the slot which merges into the wall of the groove and increases in height in approximately a helical path in a direction away from the groove.

3. A spool adapted for rotation having a hub, an outwardly extending flange on said hub, said flange having a slot therethrough oblique to one face of the flange and oblique across the periphery of the flange for passage of a line, said flange having an arcuate groove of substantially more than 90° to be occupied by the line and located relatively close to the hub and approximately concentric with the axis of rotation, said groove at one end communicating with said slot and at the other end merging into said face, a line-guiding web within said slot, said groove progressively decreasing in depth in a direction away from said slot, and said line-guiding web having an abrupt drop at the side opposite to the groove and presenting a surface across the base of the slot which merges into the wall of the groove and increases in height in approximately a helical path in a direction away from the groove.

JAMES A. FOX.