July 11, 1933. E. E. FAIRBANKS 1,917,640

CABLE OR STRAND GUIDING MECHANISM

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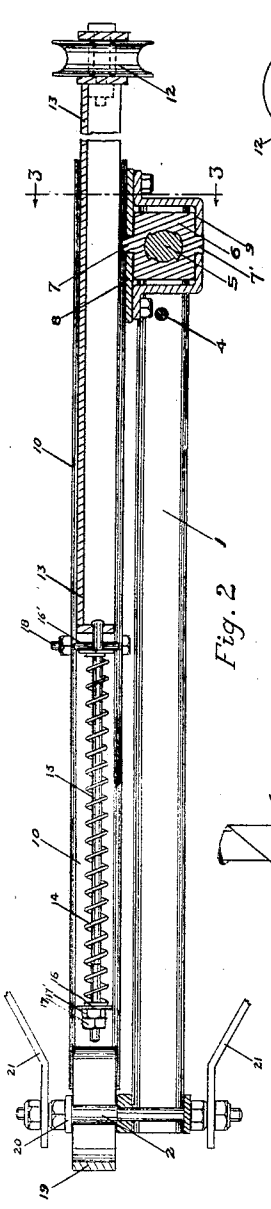


Fig. 2

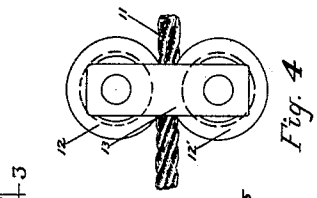


Fig. 4

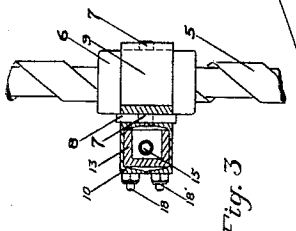


Fig. 3

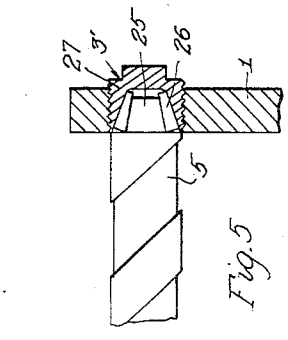


Fig. 5



Fig. 1

WITNESS:

George M. Bauwens

Estella M. McNamara

INVENTOR.

E. E. Fairbanks

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# UNITED STATES PATENT OFFICE

ELBERT E. FAIRBANKS, OF LONG BEACH, CALIFORNIA

## CABLE OR STRAND GUIDING MECHANISM

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This invention relates to cable or strand guiding mechanisms, and an object of the invention, in general, is the improvement of this class of mechanism.

This invention is very useful in connection with the drums of drawworks, used in connection with the drilling operation of oil wells. The cable that is fed to the drawworks drum extends to the top of a derrick and is severely vibrated or caused to whip, and it is an important object of this invention to effect guiding of the cable onto the drum without the vibrating of the cable interfering with the reeling-up of the cable evenly, with the turns of the cable laid close together and without successive turns piling up in an uneven manner.

It will be apparent that violent whipping of the cable, in case of a spring being employed to oppose the whipping action, will not be overcome by said spring as the spring will be caused to compress and expand in harmony with the vibrations of the cable. Instead of such spring, I employ a rotatably mounted screw shaft which is caused to turn by the friction of a nut on said shaft, the nut receiving a thrust from the cable as said cable is wound upon the drum.

Another important object is ease with which the mechanism may be mounted in position for guiding the cable onto the drum.

Other objects and advantages will appear in the subjoined detailed description.

The accompanying drawing illustrates the invention:

Figure 1 is a plan view of a cable or strand guiding mechanism constructed in accordance with the provisions of this invention, the swinging arm being broken to contract the view, and the braces being omitted.

Figure 2 is a vertical section on the line indicated by 2—2, Fig. 1, fragments of the braces also being shown.

Figure 3 is a view, partly in section, from the line indicated by 3—3, Fig. 2.

Figure 4 is a view of the rolling and their supporting bracket viewed from the right of Fig. 1.

Figure 5 is a detailed cross sectional view of a bearing on the end of shaft 5 in Figure 1.

There is provided a suitable frame, indicated at 1, and, in this instance, substantially V-shaped. The smaller end of the frame 1 carries a pivot 2 on which is swingingly mounted an arm 10. One end of the arm 10 is provided with a slot 19 through which the pivot 2 extends, thus permitting endwise movement of said arm 10.

The arm 10 is preferably provided with an extensible portion 13 which carries at its outer end a bracket 13. Mounted in the bracket 13 is a pair of grooved rollers or sheaves 12, between which passes the cable or strand, indicated at 11, that is to be guided onto a drum, not shown.

The arm member 13 is mounted to slide in and out of the main portion of the arm so that as the arm 10 oscillates the center line of the cable where it passes between the rollers 12 will be maintained in vertical alignment with the axis of the drum upon which the cable is wound.

The extensible arm member 13 is yieldingly held against outward movement by a coil spring 14 which surrounds a rod 15 that is connected with or constitutes a portion of the member 13. The spring 14 is interposed between a shoulder 16 on the rod 15 and an abutment 16′ through which the rod 15 passes. The abutment 16′ is held against pressure of the spring 14 by any suitable means as, for example, by a pair of bolts 18, 18′ which pass through the main part of the arm 10. The rod 15 passes between the bolts 18, 18′.

The tension of the spring 14 may be adjusted by nuts 17, 17′ which are screwed onto the rod 15 back of the shoulder 16, which shoulder is in the form of a washer that thus can be held in different positions on the rod by the nuts.

Intermediate of its ends, the arm 10 is provided with a suitable bracket which comprises a member or plate 8 and a U-shaped member 9. In the bracket are mounted the pivots or gudgeons 7 of a swivel nut 6 that engages the thread of a screw shaft 5 that extends between the opposite arms of the

frame 1 at the wider end of said frame. The nut 6 is held against turning by the bracket 8, 9 and, consequently, when the arm 10 is oscillated the nut causes the shaft to rotate. More or less friction may be produced to slow up rotation of the shaft 5 and, in this instance, this is effected by suitable roller bearings 3, 3′ mounted in the frame 1 and engaged by the opposite ends of the shaft 5. Thus as shown in Figure 5, the bearing 3′ at the right end of shaft 5 comprises a tapered face 25 on the end of shaft 5, tapered rollers 26, and a cup 27 which is externally threaded and screws into a threaded passage formed in the end of plate 1. The bearing at the left end of shaft 5 may be identical with that illustrated in Figure 5. These bearings may be adjusted to any desired degree of tightness by screwing the cup members 27 into the plates 1. These roller bearings, as described, may be of the Timken type in which type, as is well-known, the rollers are tapered and extend aslant toward one another.

The arms of the frame 1 are connected by a tie-rod 4 which may be adjusted to move the arms of the frame toward or from one another so as to secure the desired adjustment of the roller bearings 3, 3′.

To properly support the frame 1 upon a derrick, or other support, there are provided a pair of braces 21, 21′, only fragments of which are shown in Fig. 2 of the drawing. In this instance the pivot 2 is in the form of a bolt and the braces 21, 21′ are engaged by the upwardly and downwardly projecting ends of said bolt in a manner easily understood. To install the invention, assuming that it is to be used in connection with a drawworks, the frame 1 will be positioned so that the outer end of the frame 1 is outside of the derrick of a well and so that the wider end of the frame 1 projects sufficiently far into the derrick to position the rollers 12, vertically over the turning axis of the drum. The braces 21, 21′ will be connected to the derrick so as to properly support the outer end of the frame 1.

The invention operates as follows: The cable 11 that is to be guided will be placed between the rollers 12 and, upon operation of the drum of the drawworks in a direction to wind-up the cable 11, the cable will be reeled onto the drum and, as successive turns of the cable are produced on the drum, the pressure of the cable against one of the rollers 12 will force the nut 6 along the shaft 5, thus turning said shaft. If the cable vibrates or whips, it cannot interfere with the correct winding of the cable on the drum in successive turns that fit close together without piling up on one another. It will be seen that the screw and nut will allow of but a comparatively slow oscillation of the arm 10, as is produced by steady pressure of the cable against one of the rollers as winding of the cable on the drum progresses, and that the nut is virtually locked on the shaft 5 against comparatively rapid oscillation as would be produced by whipping of the cable. As the nut 6 moves from the middle of the shaft toward either end thereof, the arm 10 will be shifted forwardly on the frame by the pull of the cable as it is being wound from the center of the drum toward one end thereof, thus to compensate for the increasing distance between the nut 6 and the pivot 2.

The form and pitch of the thread of the screw shaft 5 is such as to permit the nut to turn the shaft when lateral pressure of the cable comes against either of the rollers 12, but the friction between the nut and screw thread together with whatever friction is produced in the roller bearings, functions to retard turning of the shaft sufficiently to force the cable to lay layer against layer on the drum, not shown.

The extensible or sliding member 13 of the arm 10 allows the rollers that hold the cable to move parallel to the turning axis of the drum, and whipping or slapping of the cable in a plane coinciding with the longitudinal axis of the arm 10, is approximately eliminated by tension of the spring 14. The desired tension on the cable or strand 11 is produced by the spring 14 and this tension can be adjusted by screwing the nuts 17, 17′ in one direction or the other on the rod 15.

A washer 20 is shown on the pivot 2 below the lowermost of the upper pair of nuts on said pivot.

What is claimed:

1. A mechanism of the character described comprising a rotatably mounted screw shaft, a nut on said shaft, an arm provided with an extensible member and connected with the nut, a spring yieldingly holding the extensible member retracted, and cable guide members connected with the extensible member.

2. A mechanism of the character described comprising a rotatably mounted screw shaft, a nut on said shaft, an arm pivotally and slidably supported at one end, means pivotally connecting the nut and arm, and cable guide members connected with said arm.

3. A mechanism of the character described comprising a rotatably mounted screw shaft, a nut on said shaft, an arm pivotally and slidably supported at one end and provided with an extensible member, a spring yieldingly holding the extensible member retracted, means pivotally connecting the nut and arm, and cable guide members connected with the extensible member.

4. A mechanism of the character described comprising an arm pivotally supported at one end, cable guide means connected with the other end of said arm, and means oper-

able by swinging of the arm to limit the speed of said swinging, said last mentioned means including a rotary member.

5. A mechanism of the character described comprising an arm pivotally supported at one end, cable guide means connected with the other end of said arm, and means operable by swinging of the arm to limit the speed of said swinging, said last mentioned means including a rotary member and including adjustable means for frictionally retarding rotation of the rotary member.

6. A mechanism of the character described comprising roller bearings, a screw shaft mounted to turn in said bearings, means to adjust the bearings to increase or decrease the amount of friction in said bearings, a nut on said shaft, and cable guide means connected with the nut.

ELBERT E. FAIRBANKS.