June 17, 1930. E. H. TAYLOR 1,763,871

SPOOLING DEVICE

Filed July 2, 1928

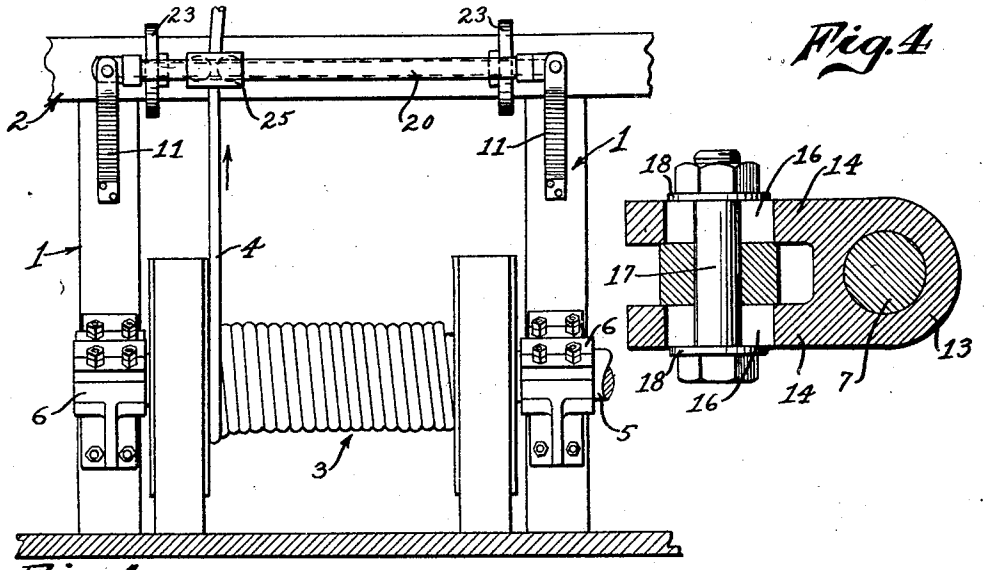


Fig. 4

Fig. 1.

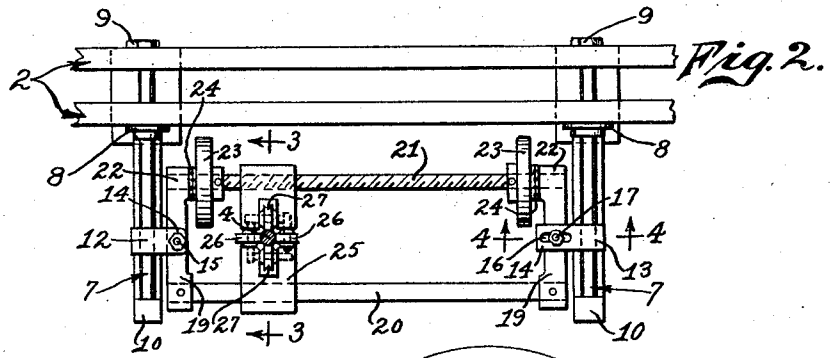


Fig. 2.

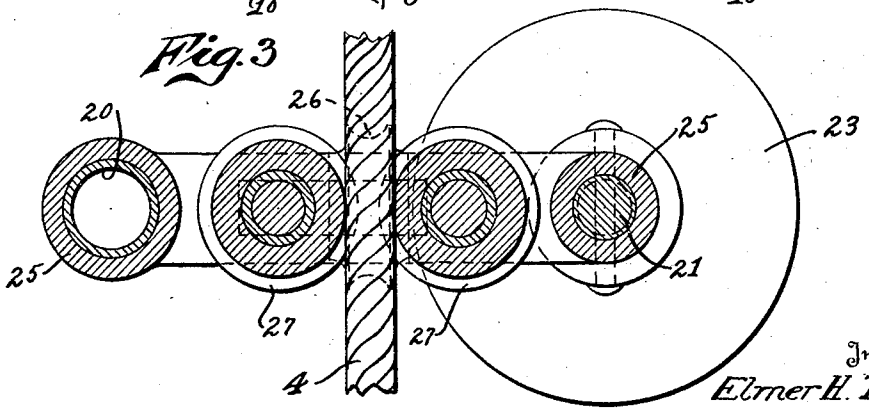


Fig. 3

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Patented June 17, 1930 1,763,871

UNITED STATES PATENT OFFICE

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SPOOLING DEVICE

Application filed July 2, 1928. Serial No. 289,701.

This invention relates to a spooling device, leader, traverse mechanism, guide, or rope laying device capable of regulating a cable or rope during winding or unwinding of the same on a spool or drum so that the rope or cable is uniformly and evenly wound thereon. The invention is particularly directed toward a spooling device or traverse mechanism for use on oil well derricks, said device being movable transversely and longitudinally so as to operate efficiently irrespective of the length of the cable being wound upon the drum.

Spooling or rope laying devices have been invented heretofore for the purposes of regulating the winding or unwinding of cables or ropes upon drums. None of these devices, however, have, to my knowledge, been entirely successful commercially. One of the disadvantages inherent to prior devices of this character is that they were power driven, that is, that portion of the traverse mechanism or guide which receives and guides the cables longitudinally of the drum or spool was mechanically driven, generally by means of gears mounted on or connected with the spool.

These prior constructions allowed the spooler to move longitudinally of the drum but no provision was made for moving the spooler transversely of the major axis of the drum. Furthermore, the rigid mechanical construction of the spoolers of the prior art rendered them incapable of absorbing the "whip" of the cable or rope being wound.

An object of this invention is to provide a traverse mechanism of simple and efficient construction.

Another object is to provide a traverse mechanism capable of moving longitudinally of a drum or spool and also transversely of said drum.

Another object is to provide a traverse mechanism capable of absorbing any "whip" or jerks in the cable or rope being wound upon a drum.

Another object is to provide an efficient cable spooling device actuated by the cable itself and by substantially no other extraneous means.

A still further object is to provide a spooling device capable of causing the cable or rope being wound to completely cover the drum entirely up to the shoulder of the drum with every lay of cable thereon.

Other objects, uses, advantages and characteristics of this invention will become apparent from the subsequent detailed description of one preferred form of the invention shown in the attached drawings, in which:

Figure 1 is a front elevation of the cable spooler mounted upon the side of a well derrick above a drum.

Figure 2 is a plan view of a cable spooler.

Figure 3 is a vertical section taken along line 3—3 of Figure 2 through one portion of the spooler.

Figure 4 is a vertical section taken through a portion of the spooler shown in Figure 2 along line 4—4.

Referring to the drawings, 1 represents vertical posts forming a part of a derrick structure of which 2 is a portion of a horizontal member customarily called the head board of a derrick structure. The drum 3 shown with a lay of cable 4 thereon is suitably mounted near the derrick upon a suitable foundation, the horizontal shaft 5 on which the drum 3 is mounted being journaled in suitable bearings 6. The shaft 5 extends to a clutch and power driven means not shown.

The spooler, traverse mechanism or guide embracing my invention mounted above the drum 3 comprises two horizontally spaced shafts 7 extending in a direction transverse to the shaft 5 on which the drum 3 is mounted. The shafts 7 may pass through the head boards 2 and be fastened thereto by any suitable means such as the nuts 8 and 9 or the shafts may be attached or fastened in any suitable manner to the girth above the head board The method of mounting the device will vary necessarily with the type of derrick structure and with other conditions which may be met in practice. The outer ends of the shafts 7 may be held in collars 10 which, in turn, are connected to supports 11, the other ends of the supports being firmly attached to the uprights 1 or to some other portion of the derrick so as to maintain the

shafts 7 in an immovable horizontal position. The ends of the shaft 7 may be threaded and the supports 11 connected thereto by means of suitable nuts.

Slidably mounted upon the shafts 7 are collars 12 and 13. The collar 13 is shown in vertical section in Figure 4. If desired, antifriction bearings or packing material, together with a suitable gland structure may be provided within the collars 12 and 13 so as to decrease or increase friction between the collars and the shafts 7. Both collars 12 and 13 are provided with horizontally extending lugs 14. The lugs extending from the collar 12 are provided with a single aperture through which a bolt 15 may pass. The lugs 14 extending from the collar 13 are provided with a larger aperture or slot 16 adapted to loosely receive a bolt 17, the washers 18 being of sufficient size to prevent the bolt from jamming in the aperture 16.

The bolts 15 and 17 passing through the lugs 14 extending from collars 12 and 13, respectively, pass through suitable openings in transverse members 19. One of each of the ends of the transverse members 19 is firmly joined together by means of a suitable guide member such as the cylindrical guide member 20 which may be a section of pipe. A threaded shaft 21 provided with smooth ends is journaled in the ends 22 of the transverse members 19. The shaft 21 is so journaled in the ends 22 of transverse members 19 as to prevent said shaft from moving longitudinally, although it may rotate freely. Small fly wheels 23 are mounted upon the shaft 21, bearings 24 being provided between the ends 22 and the fly wheels 23. By means of the above construction, it will be seen that the rectangular frame comprising members 19, guide 20, and shaft 21 together with fly wheels 23 mounted thereon constitutes a unitary member which may move transversely to the axis of the shaft 5 of the drum 3, upon transverse guides 7 by means of the collars 12 and 13. A certain amount of free play is obtained by means of the bolts 15 and 16 passing through the members 19 and the lugs 14 which form a part of the collars 12 and 13, it being understood that the bolts 15 and 17 are not made absolutely tight, but a rather loose fit obtained so that the entire framework comprising members 19, 20 and 21 may assume various positions varying somewhat from the perpendicular to the guides 7.

A carrier frame, cable frame or traverse guide 25 of any suitable structure or design is mounted upon the guide 20 and the threaded shaft 21. As shown in Figure 3 the frame 25 is slidably mounted upon the guide 20 and threaded upon the shaft 21. The frame 25 carries a plurality of sheaves, the sheaves 26 being mounted with their axes parallel to the members 19, while the sheaves 27 are mounted with their axes parallel to guide 20 and threaded shaft 21. These sheaves or pulleys 26 and 27 are mounted in close formation around a central opening through which the cable 4 is allowed to pass. The details of construction, that is, the method by means of which the sheaves 26 and 27 are freely journaled within the frame member 25 are not shown, as such details will be apparent to anyone skilled in the art.

By means of this construction, it will be evident that under the conditions shown in Figure 1, when the cable 4 is being pulled or unwound in the direction of the arrow the resulting force will be exerted upon the frame member 25 so as to cause the frame to travel in a horizontal direction from left to right. Such travel will cause the rotation of shaft 21 and the rotation of the fly wheels 23. After passing over the vertical center line drawn from the top sheave on the derrick structure over which the cable 4 passes centrally through the drum 3, the resulting force exerted upon the frame member 25 will be in the opposed direction, that is, the force would ordinarily tend to move the frame member 25 toward the left, but the momentum stored up in the fly wheels 23 is such as to cause the frame member 25 to travel to the extreme right hand limit of its travel and thereby cause the rope 4 to uniformly unwind throughout its entire lay.

At the completion of a lay the fly wheels 23 become momentarily stationary and then revolve in the opposite direction, enabling the guide or cable frame member to return to its original position.

When the cable 4 is being wound upon the drum 3, a similar operation takes place, the cable 4 causing the guide frame 25 to travel in the required direction and the momentum of the fly wheels 23 causing the frame 25 to complete its travel until the shoulder of the drum 3 is reached, thereby allowing the rope to wind uniformly and completely upon the drum.

By means of this invention every lay of rope or cable wound upon the drum 3 is completed, the inertia of the fly wheels 23 being sufficient to momentarily retain the rope or cable at the shoulders of the drum 3 so that a complete lay is obtained. Furthermore, any "whip" or snap in the cable or rope 4 is absorbed by the spooling device, namely, by means of the frame 25 and the members 20, 19, and 21. The loose coupling between the collar 13, lugs 14, aperture 16 and bolts 17 therein allow the frame 25 to adjust itself and absorb the inequalities in the line or any rapid variation in the angle at which the frame 25 receives the rope or cable 4. It will be understood that as the drum 3 is filled up with cable during a winding operation, the entire frame member 25 moves outwardly along the guides 7 so that at all times the opening between the sheaves 26 and 27 car-

ried by the frame 25 is substantially vertically above the outer lay of rope or cable on the drum 3.

Numerous changes and modifications may be made in details of construction, without departing from this invention, it being understood that all changes and modifications coming within the skill of the art are embraced by the following claims.

I claim:

1. A cable spooling device comprising, substantially horizontal fixed guides transverse to the main axis of a winding drum, a transversely movable carriage comprising a longitudinal guide, a longitudinal threaded shaft and transverse means connecting said longitudinal guide and shaft, means connecting the fixed transverse horizontal guides with said carriage adapted to offer a walking support for said carriage and a cable frame movably mounted on said carriage and in threaded engagement with said shaft, said frame being adapted to receive a cable and impart rotation to said shaft by longitudinal motion of said frame.

2. A cable spooling device comprising, substantially horizontal guides operably attached to a derrick structure above a winding drum, said guides being transverse to the main axis of the winding drum, a transversely movable carriage comprising a longitudinal guide, a longitudinal rotatable threaded shaft and transverse connecting means connecting said longitudinal guide and shaft, means connecting said carriage with the fixed transverse horizontal guides and adapted to offer a walking support for said carriage, a cable frame mounted upon the longitudinal guide and in threaded engagement with said shaft of said carriage and adapted to move longitudinally thereof, a cable receiving means carried by said frame said frame being adapted to rotate said shaft by longitudinal motion of said frame and fly wheels mounted on said longitudinally threaded shaft, said fly wheels being sufficiently heavy to carry the cable frame beyond the center of the drum by reason of their momentum but sufficiently light to be rotated by the force of a cable through the cable receiving means on said frame.

3. A cable spooling device comprising, fixed substantially horizontal guides transverse to the main axis of a winding drum, a winding drum positioned substantially below and between said fixed guides, a transversely movable carriage comprising a longitudinal guide means, a longitudinally threaded shaft and transverse members connecting said guide and shaft, said shaft being journaled in said transverse connecting means, means connecting the fixed transverse horizontal guides to said carriage and adapted to offer a walking support for said carriage, a cable frame adapted to receive a cable mounted upon the longitudinal guide and in threaded engagement with the shaft of said carriage and adapted to move longitudinally thereof, fly wheels mounted on said longitudinal threaded shaft and adapted to be rotated by the longitudinal motion of the frame along said guide and shaft, said fly wheel being sufficiently heavy to drive the frame beyond the center of the drum and to the end thereof by reason of their momentum but sufficiently light to be rotated by the pull of a cable through said frame.

4. A cable traverse mechanism comprising, substantially horizontal fixed guides extending transversely to the main axis of a winding drum, a movable carriage upon said fixed guides including a longitudinal guide, a longitudinal threaded shaft, and means connecting said guide and shaft, fly wheels mounted upon the longitudinal threaded shaft of said carriage, and a cable frame movably mounted on said carriage and in threaded engagement with said shaft, said frame being adapted to receive a cable and impart rotation to said shaft by longitudinal motion of said cable frame.

5. A cable traverse mechanism comprising a carriage movable transversely to a drum shaft, said carriage including a longitudinal guide, a rotatable longitudinal threaded shaft and means connecting said guide and shaft, transverse horizontal guides adapted to offer a walking support for said carriage, a cable frame mounted upon said carriage and in threaded engagement with said shaft and adapted to move longitudinally thereon, and means carried by said frame adapted to receive a cable and thereby impart motion to said frame.

6. A cable traverse mechanism comprising substantially horizontal fixed guides extending transversely to the main axis of a winding drum, a transversely movable carriage including a longitudinal threaded shaft, collars slidably mounted on said horizontal transverse guides and connected to said carriage so as to offer a walking support therefor, a cable frame in threaded engagement with said longitudinal shaft and adapted to move longitudinally thereon, said cable frame being adapted to receive a cable, and fly wheels mounted on said longitudinal threaded shaft, said fly wheels being sufficiently heavy to drive the cable frame beyond the center of the drum and to the end of said longitudinal shaft by reason of their momentum, but sufficiently light to be rotated by longitudinal motion of said cable frame imparted to said frame by the pull of a cable through said cable receiving means carried by said frame.

Signed at Los Angeles, Calif., this 25th day of June, 1928.

ELMER H. TAYLOR.