Feb. 7, 1933. R. McD. PYLES 1,896,415

LINE TIGHTENER

Filed Nov. 24, 1931

Fig. 1

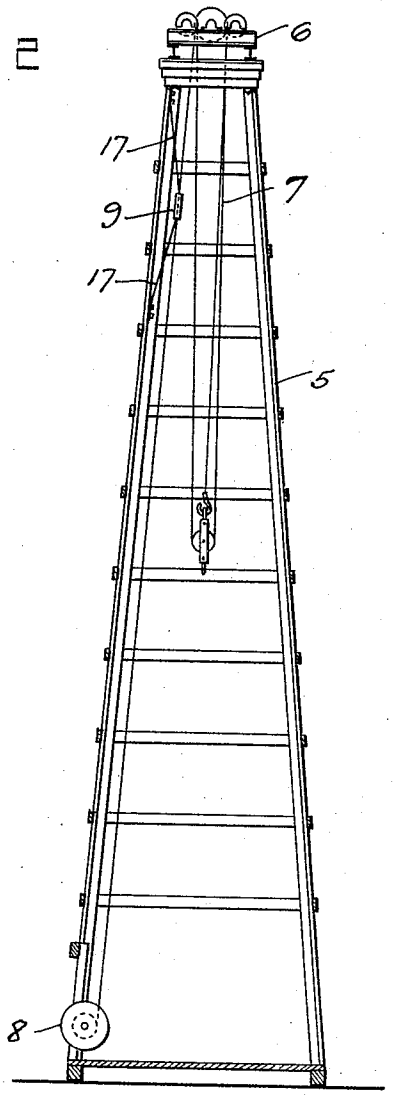



Fig. 2

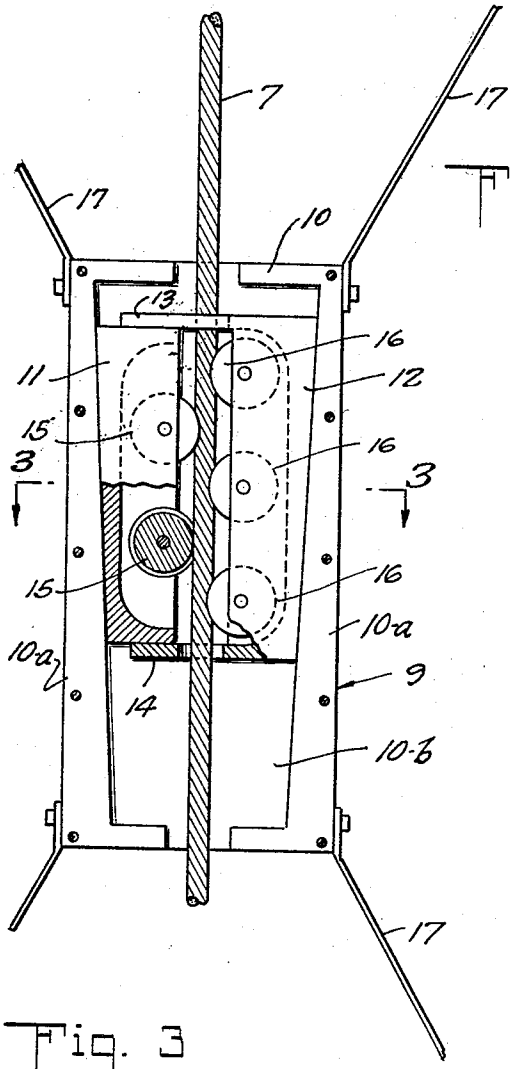
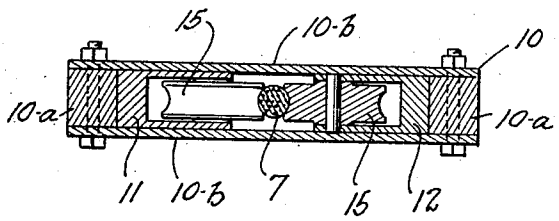



Fig. 3




INVENTOR
Robert McDonald Pyles
BY
Ernest L. Wallace
ATTORNEY

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# UNITED STATES PATENT OFFICE

ROBERT McDONALD PYLES, OF BAKERSFIELD, CALIFORNIA, ASSIGNOR OF ONE-HALF TO JAMES A. KAMMERDINER, OF LOS ANGELES, CALIFORNIA

## LINE TIGHTENER

Application filed November 24, 1931. Serial No. 577,012.

This invention relates to a device for tightening lines which are being wound upon drums or reels. It has utility in such apparatus wherein a heavy load is placed on the line in unwinding and a light load on winding, the line being alternately wound and unwound on the drum. Under such conditions, the line when wound on the drum will be loose and with a plurality of layers of line, the feeding end of the line under load in many instances may squeeze itself between the underlying convolutions and cause kinking, rasping, flattening or abrading of the line. Although the invention may be applied to drums and lines in various mechanisms and for numerous purposes, the utility of the present invention as applied to oil well drilling outfits will illustrate its advantages. Rotary drilling outfits include a drum or reel structure known in the art as a draw works. This structure includes a drum upon which a cable is wound. The cable is passed over a crown block and through a traveling block. Drill pipe and the like are lowered and pulled from the well hole by aid of the draw works and cable. The cable usually supports an elevator by means of which the drill pipe string is grasped. The drill pipe string may be several thousand feet long and is of great weight. This string is elevated by reeling the cable on the drum. When a stand of pipe consisting of a number of sections of pipe has been drawn out of the well hole, the string is supported in the hole by independent means such as slips mounted on the rotary table. The stand of pipe is unscrewed from the string and disposed in a suitable place in the derrick. Next, the elevator is lowered and the operation repeated until the desired length of drill pipe has been withdrawn from the hole. At each lowering of the cable, the load thereon is relieved of the weight of the drill pipe string and at each raising of the cable the load of the entire string is placed on the cable. The result is that the cable spools loosely on the drum in winding, and in unwinding excessive wear and injury to the cable occurs due to the cable squeezing between convolutions.

The object of this invention is to provide a line tightener automatically operated by the line to place a load thereon when winding up and to release when unwinding. A more specific object of this invention is to provide a tightener of the character described which may be mounted in a stationary position and comprises a slipper through which the line is passed, the slipper having jaws which are collapsed upon the line by travel of the slipper.

These objects, together with other objects and corresponding accomplishments, are attained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is an elevation of a derrick with the essential elements of the structure applying to the invention as shown; Fig. 2 is a face view, partly in section, of the line tightener; Fig. 3 is a section as seen on the line 3—3 of Fig. 2.

Referring particularly to the drawing, a conventional type of derrick is indicated by 5 and is provided with a crown block 6 over which a cable 7 is passed. This cable is wound upon a drum 8. The construction just described is that of the rotary oil well drilling outfit commonly employed. Mounted on the derrick posts and between adjacent posts is the line tightener 9.

The line tightener comprises a frame 10 having slip members 10*a* of like construction and side plates 10*b* bolted thereto. There is a cable opening extending longitudinally through the frame. The slip members 10*a* have slide faces which are inclined downwardly toward one another. Mounted in the frame is a slipper comprising a jaw 11 and an opposing jaw 12. There is an overhanging projection 13 on the jaw 12 and an underhanging projection 14 with the jaw slidably mounted between the projections for lateral movement. The jaws are recessed on their opposing faces, and mounted in the recess on the jaw 11 are rollers 15 having grooved rims to receive the cable 7. The jaw 12 has in its recess rollers 16 which are staggered longitudinally with respect to the rollers 15. The construction is such that when

the slipper is at the top of the frame the jaws are in expanded relation and the cable may pass between the rollers without interference. When the slipper is at the bottom of the frame, the jaws will be contracted or collapsed and the rollers will bear against the cable so that the latter must weave therebetween. Since the cable is commonly a wire cable and has stiffness, this causes impedance to the movement of the cable. The frame is supported by tie rods 17 on the corner posts of the derrick and near the crown block, so that there is relatively small side movement as the line passes from one end of the drum 8 to the other in reeling and unreeling.

In operation of the device, the load is placed on the cable as it unreels and the slipper would be carried or urged to the top of the frame by the action of the cable on the jaw rollers. Gravity tends to move the slipper downwardly, and in reeling up the cable the slipper would be dragged downwardly and collapsed so as to firmly grip the cable and place an effective load thereon. Thus, the action is automatic.

What I claim is:

1. A line tightener for a line spooling drum wherein the load on the line is relieved in winding of the line thereon: said tightener comprising a frame, a slipper slidable longitudinally in said frame, said slipper including opposed jaws for grasping, pressing and permitting travel of the line therebetween in both directions and having means coacting with said frame to collapse said jaws at one end of said frame and to enable opening of said jaws at the other end, projecting means on said jaws to define a sinuous path for said line, said slipper being urged toward the collapsing end of said frame by said line when moving in load relieved direction and toward the jaw opening end when moving in the opposite direction.

2. A line tightener for a line spooling drum wherein the load on the line is relieved in winding of the line thereon: said tightener comprising a frame, a slipper slidable longitudinally in said frame, said slipper including opposed jaws having means coacting with said frame to collapse said jaws at one end of said frame and to enable opening of said jaws at the other end, rollers journalled on said jaws and disposed in staggered relation to grasp, press and hold the line in weaving position therebetween, said slipper being urged toward the collapsing end of said frame by said line when moving in load relieved direction and toward the jaw opening end when moving in the opposite direction.

3. A line tightener for a line spooling drum wherein the load on the line is relieved in winding of the line thereon: said tightener comprising a frame having opposed slipper ways inclined toward each other, a slipper slidable longitudinally in said ways, said slipper including opposed jaws for grasping, pressing and permitting travel of the line therebetween in both directions and coacting with said frame to collapse said jaws at one end of said frame and to enable opening of said jaws at the other end, projecting means on said jaw to define a sinuous path for said line, said slipper being urged toward the collapsing end of said frame by said line when moving in load relieved direction and toward the jaw opening end when moving in the opposite direction.

4. A line tightener for a line spooling drum wherein the load on the line is relieved in winding of the line thereon: said tightener comprising a frame having opposed slipper ways inclined longitudinally toward one another, a slipper slidable in said ways, said slipper including opposed jaws having means coacting with said frame to collapse said jaws at one end of said frame and to enable opening of said jaws at the other end, rollers journalled on said jaws and disposed in staggered relation to grasp, press and hold the line in weaving position therebetween, said slipper being urged toward the collapsing end of said frame by said line when moving in load relieved direction and toward the jaw opening end when moving in the opposite direction.

5. A line tightener for a line spooling drum wherein the load on the line is relieved in winding of the line thereon: said tightener comprising a frame having opposed slipper ways inclined longitudinally toward one another, a slipper slidably longitudinally in said frame, said slipper including opposed jaws for grasping, pressing, and permitting travel of the line therebetween in both directions, one jaw riding on one way and the other on the opposed way, means coupling said jaws for longitudinal movement together whereby to collapse said jaws in position at one end of said frame and to enable opening of said jaws in position at the other end, projecting means on said jaws to define a sinuous path for said line, said slipper being urged toward the collapsing end of said frame by said line when moving in load relieved direction and toward the jaw opening end when moving in the opposite direction.

In witness that I claim the foregoing I have hereunto subscribed my name this 16th day of November, 1931.

ROBERT McDONALD PYLES.