July 29, 1947. C. R. KONKLE 2,424,760

CABLE-GRIPPING MECHANISM

Filed July 10, 1945 2 Sheets-Sheet 1

Fig. 1.

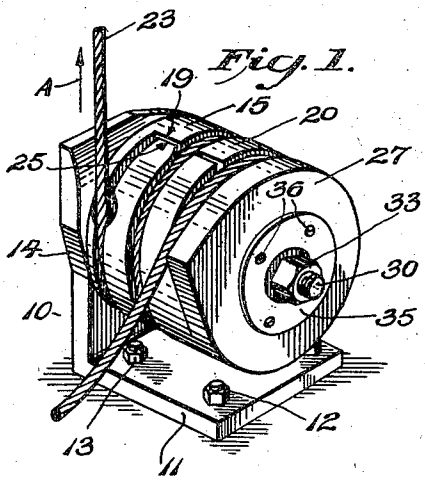


Fig. 2.

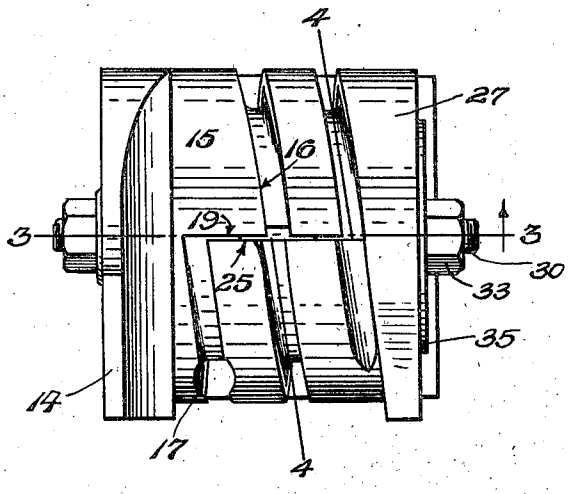


Fig. 3.

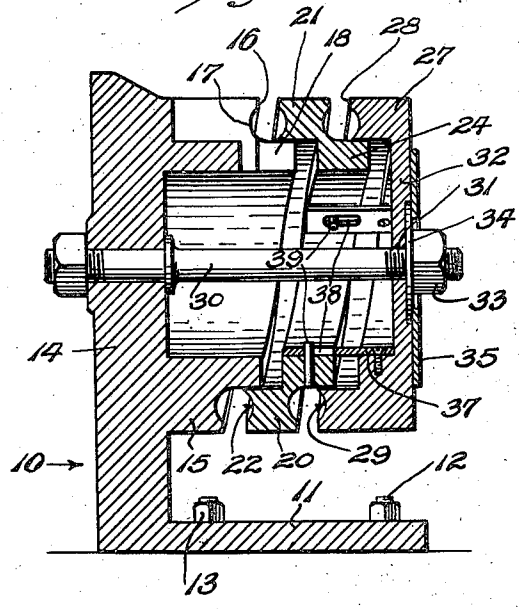
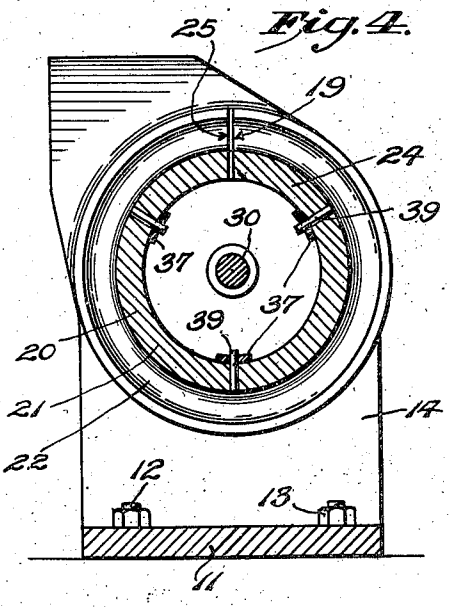


Fig. 4.



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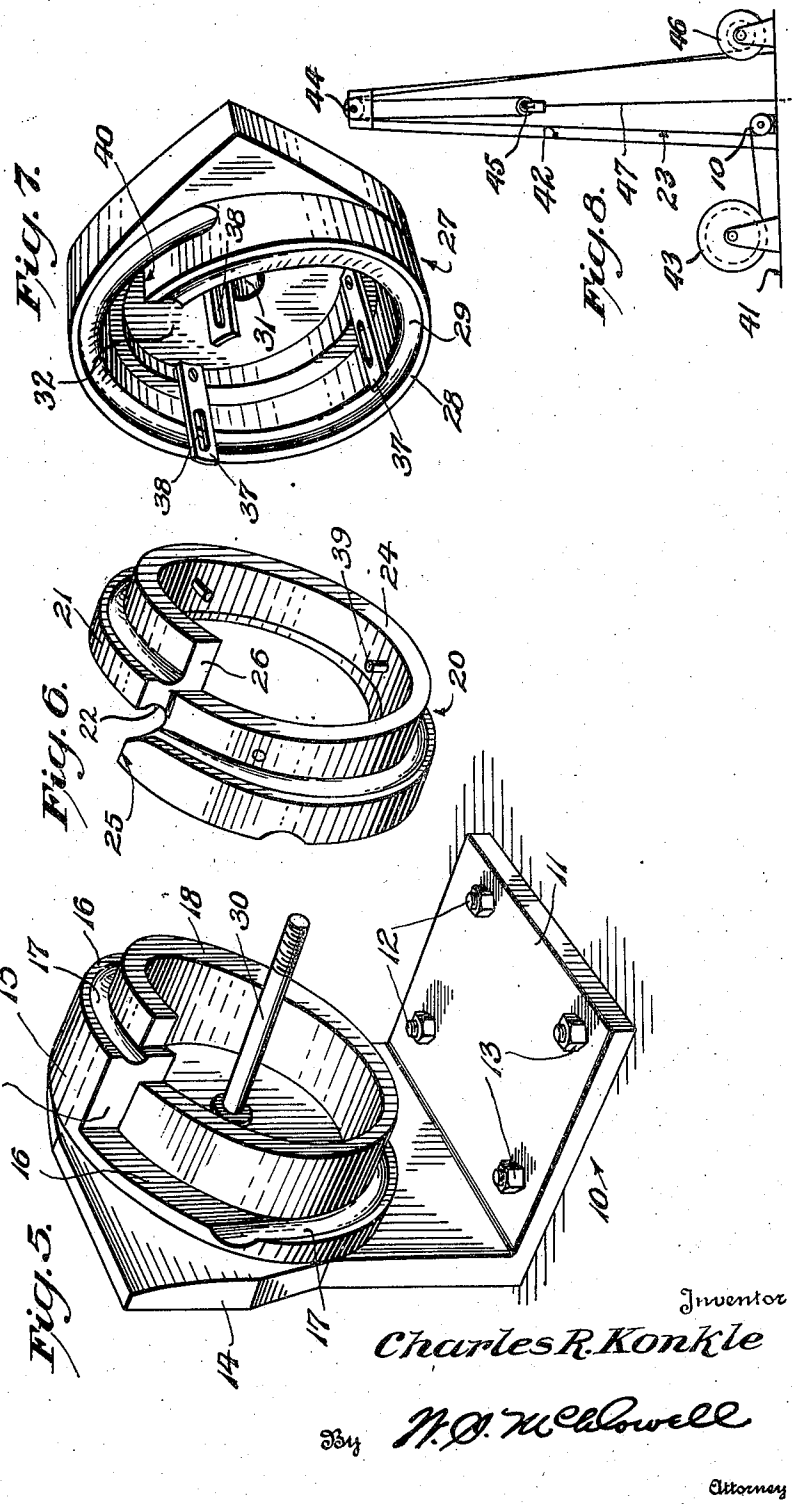
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CABLE-GRIPPING MECHANISM

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CABLE-GRIPPING MECHANISM

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Application July 10, 1945, Serial No. 604,140

6 Claims. (Cl. 24—135)

1

This invention relates to cable gripping and anchoring appliances, and has for an object to provide for an improved frictional device for gripping a cable passed thereabout for the purpose of holding the cable in connection with a stationary base.

In the operation of oil well apparatus, for example, rope and wire cables are employed in the raising and lowering of heavy loads. The cable, quite often, is wound on a spool and is passed around suitable guides so that it is trained over the crown block sheaves disposed at the top of a derrick, thence over the sheaves of a fall block and has one end thereof secured to and wrapped around a power driven rotating drum. Between the spool and the lower end of the derrick, the cable is clamped or anchored so that as the power driven drum is rotated, the change in the effective length of the cable, between its position of anchoring and the power drum, will produce raising and lowering movement of the fall block and apparatus associated therewith. Through use, the effective length of the cable becomes worn and the worn portions of the cable are severed from the balance of the cable contained on the spool. Usually the severing of the worn portion of the cable requires rethreading of its fresh unused portions through the guides and sheaves of the derrick and involves a time-consuming and laborious operation, particularly when the line tends to become snarled.

Therefore, it is a main object of the present invention to provide a cable grip or anchor through which the cable line may be drawn as needed in replacing worn portions of the line with fresh unused portions and wherein the construction of the anchor is such as to positively grip and hold the line during normal use of its operating regions.

It is another object of the present invention to provide an improved cable anchor in which is employed a plurality of longitudinally separable coaxially arranged rings, the latter having helical cable-receiving grooves formed between their adjoining surfaces, and wherein means are provided for moving the rings into and out of frictional engagement with the cable between said rings.

In connection with the above objects, I have also worked out certain novel structural details which will be developed hereinafter. For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view of the improved cable anchor comprising the present invention;

Fig. 2 is an enlarged top plan view thereof;

Fig. 3 is a vertical longitudinal sectional view taken on the plane disclosed by the line 3—3 of Fig. 2;

2

Fig. 4 is a vertical transverse sectional view on the line 4—4 of Fig. 2;

Fig. 5 is a detail perspective view of the supporting base and its associated stationary clamping ring;

Fig. 6 is a similar view of the intermediate cable-clamping ring;

Fig. 7 is a detail perspective view of the outer ring;

Fig. 8 is a diagrammatic view disclosing the use of the cable anchor in connection with a well derrick.

Referring more particularly to the drawings, my improved cable-clamping and snubbing device in the specific embodiment thereof herein selected to exemplify the same, has been shown as comprising a stationary base member 10, the same being shown as provided with a floor-engaging web 11 having openings formed therein for the reception of securing bolts 12 equipped with fastening nuts 13. The web 11 terminates at one end in an upstanding vertical wall 14 with which, in this instance, is formed an integral stationary cable-clamping ring or collar extension 15. It will be understood, however, that said ring or collar extension may be formed separately from the base member and suitably fastened thereto, or the said ring may be fastened to any other stationary support.

The base ring is provided with an outer helical face 16 in which is formed a helical cable-receiving groove 17. Also, the ring includes an integral, annular and forwardly extending seating flange or extension 18 and a vertical, longitudinally extending stop shoulder 19.

Mounted on the seating flange or extension 18 for longitudinal movement thereon and rotation in one direction is an intermediate cable-clamping ring 20 which, generally, is of helical configuration. The ring 20 includes an annular body 21 which is arranged on and surrounds the flange 18 of the base ring, and the opposite vertical side surfaces of the body region 21 of the intermediate ring are helically grooved as at 22 for cooperation with the groove 17 of the base ring in providing a helical guide for the cable disclosed at 23.

Also, integrally formed with the body 21 of the intermediate ring is a seating flange or extension 24, the latter being disposed in longitudinal registration with the flange 18 of the stationary ring. The body 21 of the intermediate ring terminates in a transverse shoulder 25, which is adapted for engagement with the shoulder 19 of the base ring, in order to preclude rotation in a clockwise direction of the intermediate ring on the base ring. The opposite end of the helical body 21 terminates in a second shoulder 26, which is longitudinally aligned with the shoulder 25.

Slidably positioned on the forwardly project-

ing seating flange or extension 24 of the intermediate ring is an outer clamping ring or member 27 having a helical inner face 28 which is grooved as at 29 for the reception of the cable 23, the grooves 17, 22 and 29 formed between the meeting or adjacent faces of the base, intermediate and outer rings functioning as an uninterrupted helical guide for the passage of the cable 23 between said rings. It will be apparent that as the rings are moved longitudinally and inwardly toward the base ring, the same will exert a frictional binding or clamping action on the helical windings of the cable, and the degree of clamping may be governed to either snub the cable as it passes through the guides or to grip the same with sufficient force to arrest its movement and provide a stationary anchor.

To provide for such relative longitudinal movement on the part of the rings, the wall 14 of the base member 10 may be provided with a stationary bolt 30 which extends longitudinally and axially through said rings, and through an opening 31 provided in the outer vertical wall 32 of the clamping ring or member 27.

The outer threaded end of the bolt 30 is equipped with a nut 33 having a flanged inner end 34 of increased diameter with respect to the body of the nut which engages with the outer surface of the wall 32. The nut may be rotatably retained in connection with the wall 32 by providing the latter with a ring-like retaining plate 35, which is removably fastened to the wall 32 by means of stud bolts 36. Sliding movement of the outer clamping ring 27 on the intermediate ring 20 may be further regulated by providing the ring 27 with spaced longitudinally disposed and inwardly positioned bars 37. These bars are formed with slots 38 which receive movement-limiting pins 39 which project inwardly from the seating flange 24 of the intermediate clamping ring. The helical body of the outer clamping ring terminates at one end in a shoulder 40 which is cooperative with the shoulder 26 of the intermediate ring and prevents clockwise rotation of the outer clamping ring when a cable is being drawn through the apparatus in the direction indicated by the arrow A in Fig. 1.

In one of its preferred uses, my improved cable anchor or clamp, as indicated in Fig. 8, is mounted on the base 41 for an upright well derrick 42. The cable 23 is received on a spool 43 and from said spool is passed around the anchor 10 and gripped thereby. From the anchor 10, the cable 23 is trained over the sheaves of a crown block 44 disposed at the top of the derrick 42 and also over the sheaves of a depending fall block 45. After passing around sheaves of the blocks 44 and 45, the cable 23 is trained downwardly and is connected with a power rotated drum 46. Reversible rotation of the drum 46 causes the block 45 to be raised or lowered, thus raising and lowering the operating line 47 extending to the well bore. When the effective portion of the line 23, located between the anchor 10 and the drum 46, becomes worn and requires replacement, then the anchor or clamp 10 is loosened to permit fresh portions of the line 23 to be unspooled from the element 43 and wound on the drum 46. The used or worn portions of the line 23 may then be severed and the derrick is then ready for further service. While this is one of the uses to which my improved anchor may be placed, it will be understood that I am not limited thereto.

In loosening a cable, the nut 33 is moved outwardly on the threads of the bolt 30 to provide

for the desired separation of the adjoining grooved faces of the clamping rings, in order that the cable 23 may be positioned between said rings and in the grooves disclosed at 17, 22 and 29. Then if it is desired to snub or clamp the cable, the nut is moved inwardly on the threaded outer end of the bolt 30, thereby moving the clamping rings at desired frictional engagement with the helical windings of the cable. This engagement may be such as to provide for slippage of the cable and a controlled rate of movement thereof through the apparatus, or the frictional forces may be such as to firmly grip and clamp the cable, thereby anchoring the same to the apparatus. By these means, complete and ready control of the operation of the cable is attainable.

It will be evident that through the employment of the multiple clamping rings, considerable surface area of the cable is engaged within comparatively small dimensional limits. Such surface area, however, may be increased, if desired, by the utilization of an additional intermediate ring or rings. Where the loads are not heavy, it is, of course, possible to dispense with the employment of the intermediate ring. Therefore, I reserve the right to employ all such modifications or variations of my invention that may be said to fall fairly within the scope of the following claims.

I claim:

1. A cable clamp comprising coaxially aligned juxtaposed base, intermediate and outer clamping rings, said rings having helical adjoining side surfaces formed with registering cable-receiving grooves, and means for moving said rings longitudinally with respect to each other to regulate the frictional clamping engagement exercised thereby on a cable positioned therebetween and occupying said grooves.

2. A cable clamp comprising coaxially aligned juxtaposed base, intermediate and outer clamping rings, said rings having helical adjoining side surfaces formed with registering cable-receiving grooves, means for moving said rings longitudinally with respect to each other to regulate the frictional clamping engagement exercised thereby on a cable positioned therebetween and occupying said grooves, and interengaging shoulder means formed on said rings for precluding relative rotation therebetween in one direction.

3. A cable clamp comprising a plurality of clamping rings disposed in longitudinally aligned coaxial order, said rings being formed with helical adjacent surfaces having cable-receiving grooves formed therein, and means for adjusting said rings longitudinally with respect to each other to bring the same into and out of frictional clamping engagement with a cable occupying said grooves.

4. A cable-clamping appliance comprising a stationary base ring having a helical face and formed with a seating extension, a complemental clamping ring longitudinally movable on said seating extension, said complemental ring being formed with a helical face adapted for registration with that of the base ring, said faces being provided with registering cable-receiving grooves, and means extending axially through said rings for moving the latter longitudinally with respect to each other, whereby to cause the same to exert frictional clamping forces on a cable positioned therebetween and occupying said grooves.

5. A cable-clamping snubbing device comprising a stationary base ring having a helical outer face which terminates in a longitudinal shoulder,

said ring being formed with a seating flange projecting longitudinally from said face, a second clamping ring formed with a helical face mating with that of said stationary ring, the helical face of said second ring terminating in a longitudinal shoulder adapted for engagement with that of said stationary ring to preclude rotation of the second ring on said stationary ring in one direction, the helical faces of said rings being formed with registering cable-receiving grooves, and means extending axially of said rings for adjusting the latter longitudinally relative to each other, whereby to impart clamping forces to a cable positioned between the helical faces of said rings and occupying said grooves.

6. A cable-clamping and snubbing device comprising a stationarily supported base ring having a seating extension, an intermediate ring slidably supported on said seating extension, said intermediate ring being formed with a seating extension, an outer clamping ring slidably supported on the seating extension of said intermediate ring, said rings having helical adjoining surfaces constituting grooves for the reception of the helical windings of an associated cable, and means passing axially through said rings for effecting relative longitudinal movement therebetween, whereby to bring the same into and out of clamping engagement with the cable windings confined therebetween.

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