Nov. 18, 1930. A. LANG 1,782,358

WINCH DRUM

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Fig. 1.

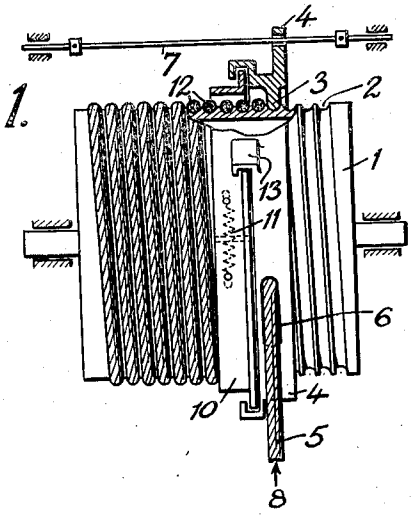


Fig. 3.

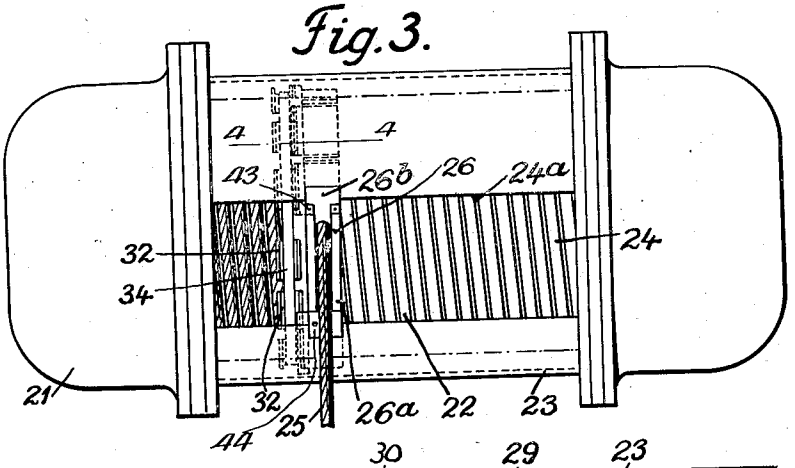
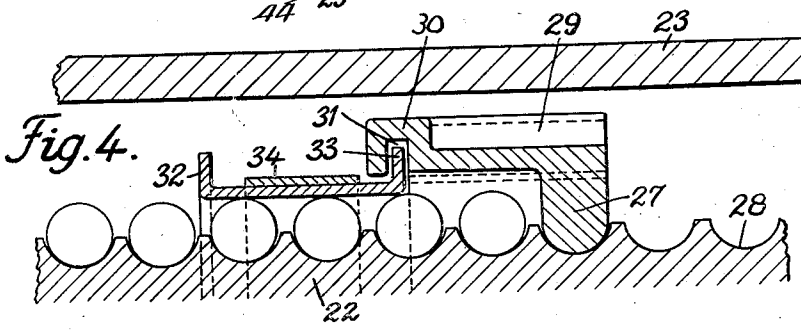


Fig. 4.



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FIG. 2.

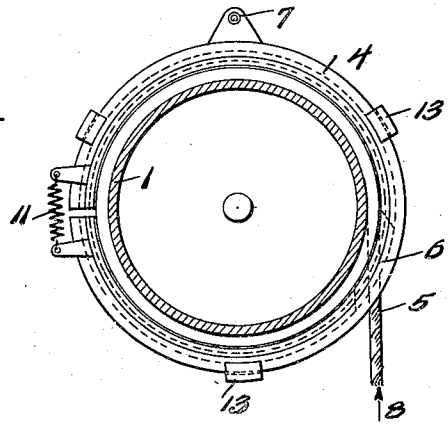


FIG. 5.

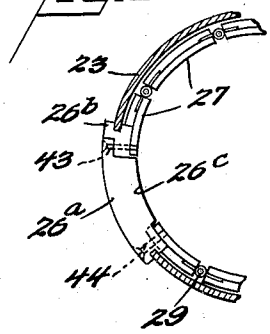


FIG. 6.

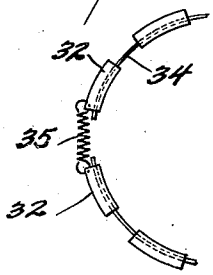


FIG. 8.

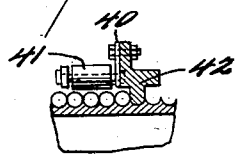
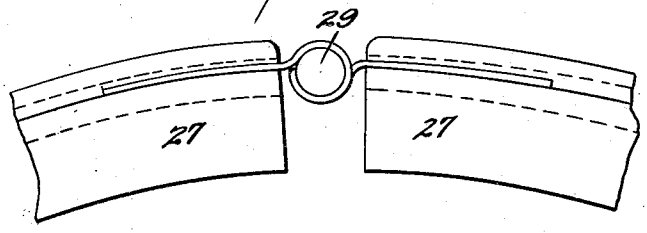


FIG. 7.



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UNITED STATES PATENT OFFICE

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WINCH DRUM

Application filed October 31, 1928, Serial No. 316,193, and in Germany December 30, 1926.

Application for this invention has been filed by the inventor in Germany, Serial No. L.67598, dated December 30th, 1926.

It is a well-known disadvantage with winch drums that when the rope is slack, by reason of its being unloaded, the turns of the rope around the drum open and rise out of the grooves in the drum and leave the drum. Experience has shown that this disadvantage cannot be overcome by surrounding the drum by a casing that reaches to the rope winding, because even then the rope chafes and binds between the drum and the outer casing.

The disadvantage above referred to is avoided according to the invention, by the use of a rope winder. According to the invention the turns of the rope are pressed by a gripping ring around the drum jacket, so that when the rope is slack the turns cannot rise away from the drum and out of the grooves, but remain tightly pressed against the drum. The gripping ring advantageously rotates with the drum and is moved for example, by a wander nut, to which it is coupled, in a direction that is axial relative to the drum. The gripping ring surrounds only the turns of rope that are immediately adjacent to the position at which the rope leaves the drum, and the ring terminates at this position, or is broken through or formed with a hole through it for the passage of the rope.

The invention consists further in a particular construction and operation of the gripping ring, and in its adaptation to the special conditions that arise in encased drums.

The invention is illustrated in the accompanying drawings, in which

Figure 1 shows in side elevation the drum provided with the rope winder.

Figure 2 is a corresponding end elevation.

Figure 3 shows the means for enclosing the winch.

Figure 4 is a partial longitudinal section on an enlarged scale, taken on the line 4—4 of Figure 3.

Figure 5 illustrates the guide ring.

Figure 6 shows the gripping ring for the rope winder illustrated in Figure 3.

Figure 7 shows in an enlarged view the connection illustrated in Figure 5, and

Figure 8 illustrates a modified construction according to the invention.

The rope drum 1 is provided with a turned or helical groove 2, in which engages an integral guide piece 3 of the moving rope guiding ring 4. The rope 5 is guided by the slot 6 in the ring 4, and is thus prevented from jumping laterally out of the groove 2 when the pull on the rope is oblique. The ring 4 is prevented from rotating by a guide rod 7. Thus the guiding of the rope has mainly for its purpose to avoid the effects of pulling obliquely on the rope, which effects are known. The rope winder hereinafter described differs therefrom, having for its object to avoid the undesirable effects which arise when the rope is unloaded or loaded with a small weight. If the unwinding rope becomes slack by reason of the load coming to rest on the ground or for any other reason, resistance is produced in the direction indicated by the arrow 8 when the drum is still further rotated. Moreover, as the rope, by reason of its elasticity, seeks to release itself from the drum, a few of the turns of the rope, and gradually all the turns, work loose, which produces the undesired results hereinbefore referred to.

In order to prevent the rope from rising, a gripping ring 10 is placed around the turns of the rope at the position where the rope leaves the drum, the ring tightly pressing the turns 12 of the rope, either by its own gripping power or by the action of a tension spring 11, around the drum 1 into the grooves. By this means such friction is produced between drum and rope that all resistance to the rope unwinding is overcome. The gripping ring 10 rotates with the drum 1, but it is connected to the rope guide ring 4 so as to move axially with it. This may be effected, for example, by means of blocks or lugs 13, which are provided laterally upon the guide ring 4 and which engage over the gripping ring 10.

It will be understood that the construction hereinbefore described can be quite well used for the desired purpose, but it cannot

be applied to an existing winch drum which is surrounded by a jacket. This is, however, possible by the use of the improved construction illustrated in Figures 3 to 7. These figures illustrate a pulley block hoist 21, the drum 22 of which is fitted within a casing 23. The casing has a lateral opening 24 for the passage of the rope 25, the drum 22 being visible through the opening. At the position where the rope leaves the drum there is provided the rope guide loop 26, through which passes the unwinding end of the rope, and by which the rope is guided in both directions.

The loop is formed by a fork 26^a (Figures 3 and 5), which is provided at its open end with a closing and locking member 26^b secured thereto by means of pins or screws 43. If the member 26^b is removed, the rope can be readily lifted out of the guide. The loop is prevented from rotating with the drum by the edges 24^a of the opening 24 with which it engages by means of transverse slots or channels formed respectively in the lower end of the fork and in the upper face of the closing or locking member, which slots or channels receive the edges 24^a, while movement along the drum is produced by means of inward extensions 26^c of the limbs of the fork 26^a (Figure 5) which are formed to engage in the rope groove. Such movement is, however, effected also by means now to be described.

The rope guide loop 26 is connected to guide links 27 (which are shown in cross-section in Figure 4 and in side elevation in Figures 5 and 7) by such means as pins or screws 43, 44, the pins or screws for the closing and locking member 26^b serving for this purpose at the upper end of the guide loop. The links 27 fit into the grooves 28 of the drum 22 and therefore move with it. The loop 26 prevents the links from rotating by reason of the engagement of its closing and locking member 26^b and its lower end with the edges 24^a of the opening 24 (Figure 5). The parts 27 are held together by hinges 29 (Figures 5 and 7) formed of bent strip metal inset into grooves or slots in the parts 27 and brazed or otherwise secured thereto. The links are of such length that they can be passed subsequently through the opening 24 in the case of existing drums which are already fitted in position in the casing. The length of the guide links 27, or of the parts 32 of the gripping ring, is greater than the space between the drum jacket 22 and the inner wall of the casing. This prevents these parts from jumping a groove or being caught while the winch is being operated.

The parts 27 are provided at the right hand side 30 with a groove 31 (Figure 4) in which the parts 32 of the resilient ring are guided by their turned or flanged end 33. The resilient ring is likewise divided, in order to enable the parts to be inserted into position between the drum and casing. The sections of the parts 32 are connected together by a thin leaf spring 34 as illustrated in Figure 6 and they are held under tension by a spring 35. The latter 35 is attached to the two end links 32 in any suitable manner, as by means of eyes at the ends of the spring, which are pinned by screws or the like, in seatings or recesses provided in the adjacent ends of the links 32.

While the drum is rotating the rope guide moves along the drum and takes with it the resilient ring. The latter can rotate in the groove 33 of the guide parts 27, so that it moves during the rotation of the drum from one turn of the rope to the next without, however, moving in the peripheral direction on the turns of the rope. During this time the resilient ring holds the turns of the rope which are adjacent to the rope guide pressed upon the drum and thus prevents the rope jumping a groove and rising, and also prevents loops from forming and the unloaded rope from being caught.

A modified form of gripping ring is illustrated in Figure 8. In this figure the gripping ring 40 is formed in the manner of a roller bearing provided all around it with a large number of pressure rollers 41 placed close together. The gripping ring is firmly attached to the guide ring 42. For the rest, this construction of device is similar to that hereinbefore described by reference to Figures 1 to 7 of the drawings.

I claim:—

1. The combination with a winch drum having a groove in its periphery, of a rope guide having a part engaging said groove, said guide being movable axially of the drum as the latter rotates, means for preventing said guide from rotating with the drum, and a gripping ring bearing upon the rope coils adjacent the guide and rotatable with the drum, said ring being interlocked with the guide so as to move therewith axially of the drum.

2. The combination with a winch drum having a groove in its periphery, of an annular rope guide composed of a series of hingedly connected sections having parts engaging said groove, said guide being movable axially of the drum as the latter rotates, means for preventing said guide from rotating with the drum, and a gripping ring bearing upon the rope coils adjacent the guide and rotatable with the drum, said ring composed of a series of flexibly connected sections interlocked with the rope guide so as to move therewith axially of the drum.

ANTON LANG.