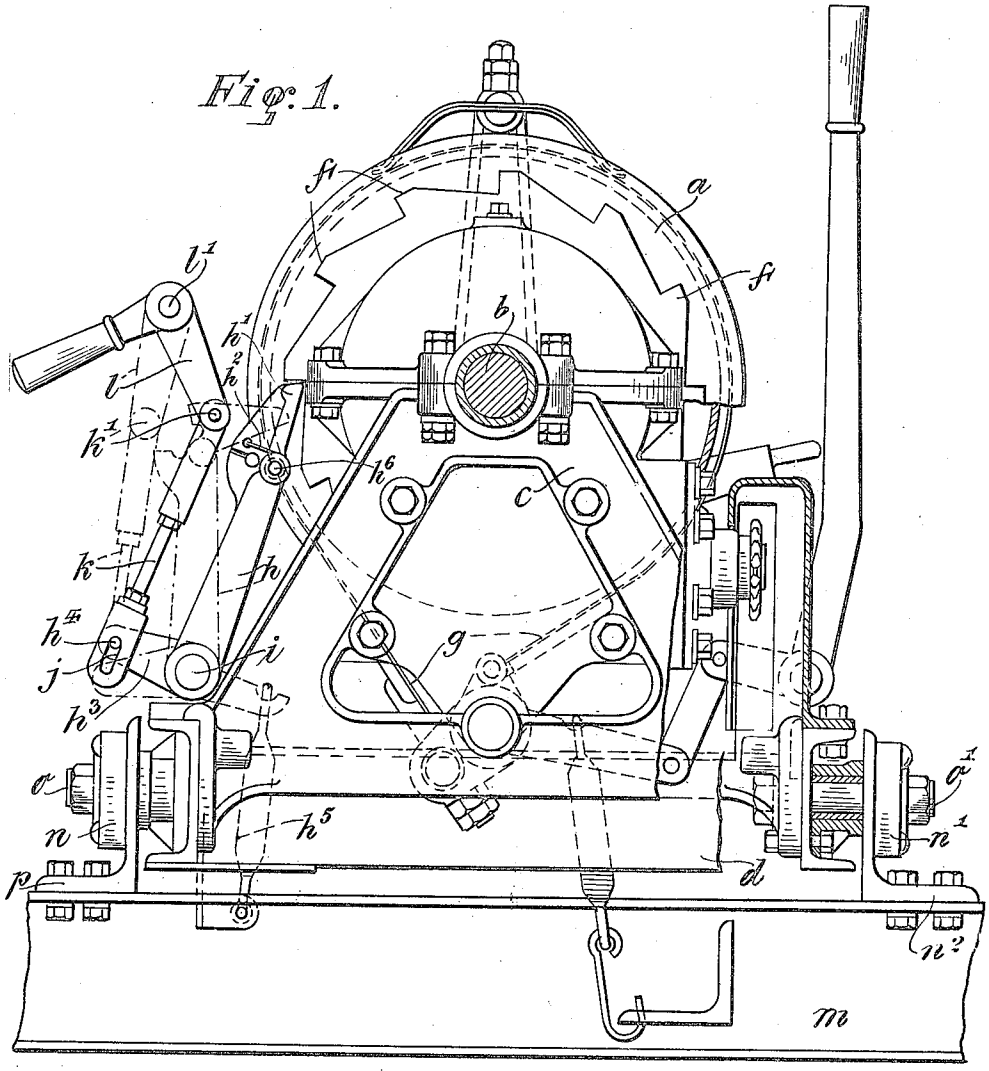
R. S. BOLGER.

WINCH.

APPLICATION FILED MAR. 24, 1921.

1,425,233. Patented Aug. 8, 1922.

Fig. 1.



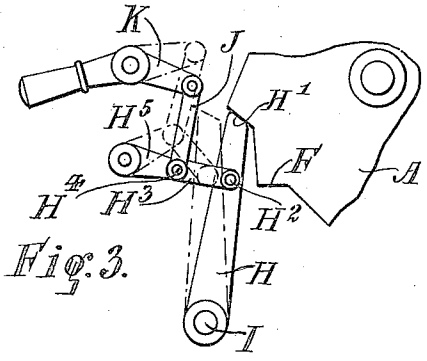


Fig. 3.

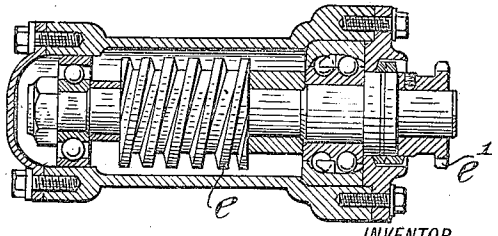


Fig. 2.

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WINCH.

1,425,233. Specification of Letters Patent. Patented Aug. 8, 1922.

Original application filed August 14, 1920, Serial No. 403,443. Divided and this application filed March 24, 1921. Serial No. 455,351.

To all whom it may concern:

Be it known that I, ROBERT S. BOLGER, a citizen of the United States, residing in the borough of Manhattan of the city of New York, in the State of New York, have invented certain new and useful Improvements in Winches, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

This case is a division of applicant's copending application Ser. No. 403,443, filed August 14th, 1920. The invention relates to winches operating through the power derived from the prime mover of a self-propelled vehicle and has for its object to improve the construction thereof in certain respects. Heretofore, it has been the practise to hold winch drums against movement by means of pawls or the like which, when once engaged with the drum are releasable only with the greatest difficulty since the direct thrust of the drum has been impressed on such holding elements. In accordance with the present invention, holding devices for the drum are provided, which are of such a character as to permit them to be disengaged from the drum when the latter is under load and without requiring the stresses impressed upon the holding devices to be relieved.

The improvements are shown in the accompanying drawing as applied to a winch of simple construction, although it will be evident as the description proceeds that such improvements are equally applicable to winches of other constructions.

In the drawing—

Figure 1 is a view in end elevation of a winch construction embodying the improvements, parts being broken away in the interest of clearness.

Figure 2 is a detailed view in section of the driving worm for the winch illustrated.

Figure 3 is a view, somewhat conventional, showing a modified form of holding pawl.

The winch drum a is supported loosely on a drive shaft b which is journaled in standards c which are supported on a rectangular frame d, the latter being mounted on the chassis in any suitable manner. The invention is not to be limited to the particular character of the winch or its drive, the preferred means for driving the shaft being shown as a worm e meshing with a worm gear (not shown) under shaft b, the worm being rotated from a sprocket e' to which power is delivered from the prime mover in any suitable manner. The drum a has formed thereon at one end, or carries, ratchet teeth f. The drum can be held against rotation by means of a suitable brake band g co-operating with a brake drum, formed therewith.

When the hoisting drum is under load it is the usual practise to hold it in desired position by means of some holding element such as a pawl h engaged with the ratchet teeth f. This affords a positive stop for the drum and relieves the brake g of the strains incidental to arresting the movement of the drum. However, it has been the usual practise to construct the holding element h in such form and mount it in such relation to the drum a as to make it practically impossible for the operator to disengage the holding element from the drum when the latter is under load. In accordance with the present invention, the holding element h is made in such form as to permit it to be disengaged from the drum readily so that the latter may immediately be released without first making it necessary to give it a hitch forward. In the embodiment shown in Figure 1 the pawl h has a pivoted nose h' which is normally held in prolongation of the body h of the pawl by means of a spring such as h^2. The pawl h may be formed as a bell crank lever pivoted at i, and with one arm h^3 engaged through a pin h^4 and the slot j with a link k which is pivoted at k' to an operating bell crank l pivoted as to l'. The supporting shaft i for the pawl h may be connected operatively to a spring such as h^5 for the purpose of holding the pawl h normally in engagement with the ratchet teeth f.

In operating the link k it will be evident that the bell crank h^3, h will be rocked in a counter-clockwise direction breaking the joint where the pawl nose h' is pivoted to the pawl h. This pivotal point is indicated at h^6. When the pawl is engaged with the ratchet teeth f the pivotal point h^6 lies beyond the line of thrust transmitted from the nose h' to the pawl shaft i thus forming a toggle joint and a positive lock to hold the pawl against accidental breaking. Accordingly, it appears that when the pawl h is moved in a counter-clockwise direction the pivotal pin h^6 is carried through the line of thrust, against the action of the spring h^2

and the toggle formed with the nose h' is broken (as indicated in dotted lines) thereby releasing the drum. As soon as the nose h' is disengaged entirely from the ratchet teeth f the spring h^2 will snap it back into prolongation with the pawl body h. The pawl will then function like the usual one-piece pawl. The connection of the pin h^4 to the link k through the slot j permits the pawl h to rock freely as it trips over the teeth f during rotation of the drum a in hoisting.

In the modified embodiment shown in Figure 3, provision is made for enabling the operator to release the holding pawl H. Suitable ratchet teeth F are indicated on the drum A and these ratchet teeth, may be inclined slightly, as may also the end H′ of the pawl. The pawl is pivoted at I and has connected to it at the point H^2 a toggle arm H^3 pivoted at H^4 to a second toggle arm H^5. To the pivot H^4 may be secured a full link J which in turn is pivoted to an operating bell crank lever K.

When the pawl H is engaged in holding relation with a tooth F of the drum A the pivot point H^2 is beyond the line of thrust extending along the pawl from the end H′ to the pivot pin I. The pawl, by reason of its inclined end H′ and the inclined face of each tooth F has acting thereon a component of force set up by the drum and tending to swing the pawl H out of engagement with the tooth F. This action is resisted by the positive toggle lock made up of the levers H^3, H^5. As shown in Figure 3 when the pawl H is locked, the pivot point H^4 of the toggle is thrust beyond the line of centers extending from the pivot pin H^2 to the supporting pivot pin H^6 for the arm H^5. With this relation of parts the pawl H is locked against release. However, the operator by rocking the bell crank lever K can pull the link J so as to break the toggle H^3, H^5, whereupon the component of force set up on the inclined end H′ of the pawl by the loaded drum will force the pawl in a counter-clockwise direction to the position indicated in dotted lines. This improved construction enables the operator to release the drum readily no matter what the character of the load.

The improved winch is mounted on a chassis frame in such manner as to eliminate wear and binding during distortion or weaving of the frame. The frame d on which the winch and its associated parts are mounted is generally rectangular in form and extends across the side frame member of the vehicle chassis. This rectangular frame d is supported on the chassis at three points, two of the points indicated at n and n' being shown. The support n is near the center of the side of the rectangular frame d and consists of a trunnion pin o which passes through one member of the frame d and through a transverse angle bar p which extends between the frame members m, m, and is secured thereto. The point of support n' may be formed as brackets n^2 bolted to the side of one of the frame members m, at approximately their ends, and carrying a trunnion pin o' which extends through the frame d. The third point of support, not illustrated, is mounted at the end of the other side frame member, and corresponds to the point n'. From this description, it will be seen that the three points of support are arranged in somewhat triangular relation and maintain the supporting frame d for the winch out of direct engagement with the vehicle chassis m and yet afford a stable foundation for it. Distortion or weaving of the frame members m, m will be compensated for automatically through the three point suspension and the winch and its associated parts will be free from injurious or binding stresses which might injure it or lessen its efficiency.

As pointed out hereinbefore the improvements described are susceptible of association with winches of other types than that illustrated herein although all of the said improvements have for their general purpose an increased facility of control for a winch and increased efficiency in operation.

I claim as my invention:

In a winch construction, a drum, ratchet teeth carried therewith, a pawl formed as a bell crank lever and having a nose formed as a separate piece and hinged to its long arm, a pin carried by the short arm of the pawl, and an independent link loosely engaging said pin, said link being pivotally secured to an independent bell crank which is adapted to move the pawl.

This specification signed this 22nd day of March A. D. 1921.

ROBERT S. BOLGER.