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POWER UNIT

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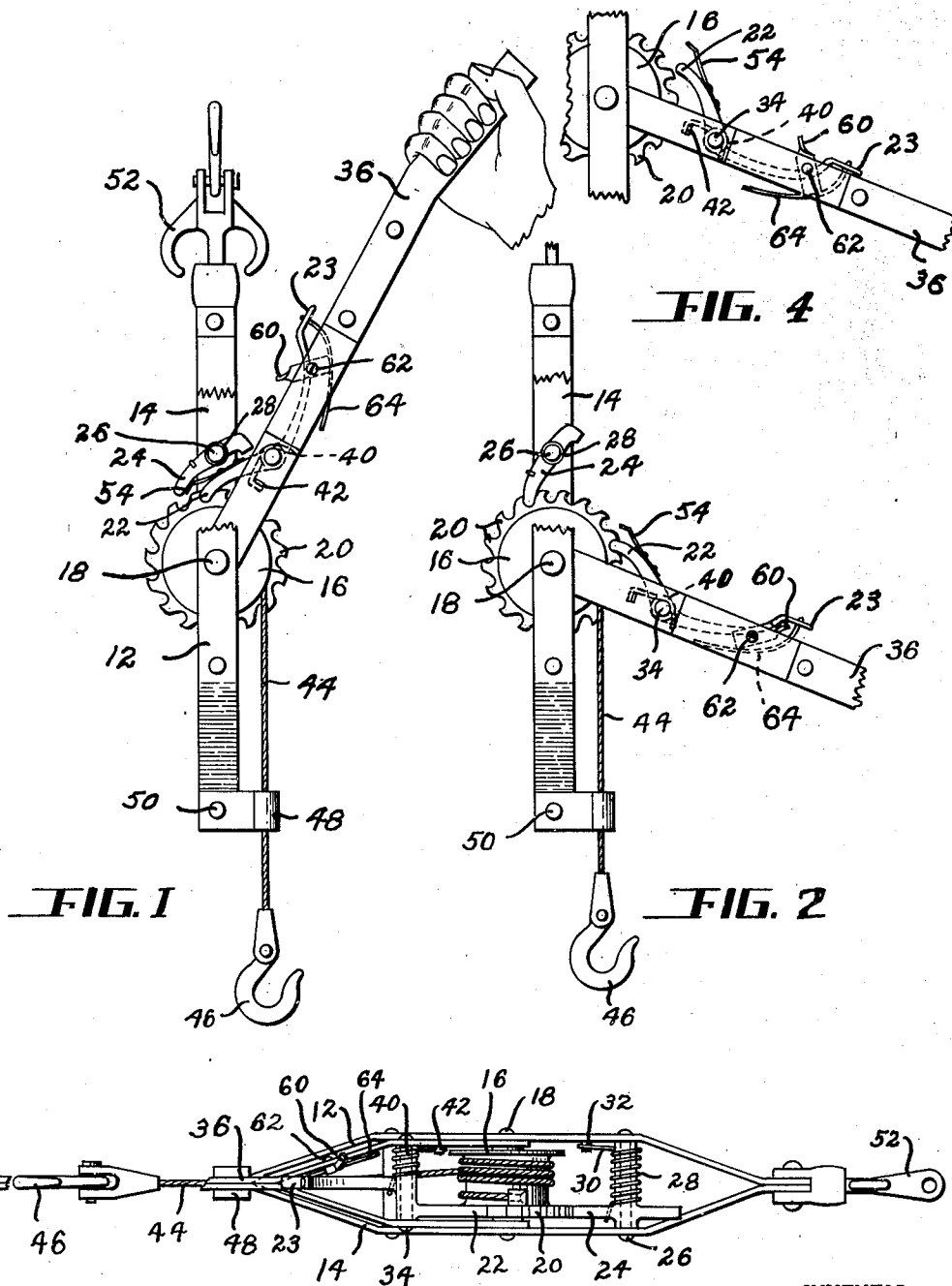


FIG. 3

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POWER UNIT

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This invention relates to a power unit and more particularly to a reversible hand operated unit of the windlass type in which rotary motion is imparted to a cable winding drum through pawl and ratchet mechanisms, the latter being operated by an oscillatory lever.

It is an object of this invention to provide an improved, inexpensive, trouble-free power unit.

Another object of this invention is to provide an inexpensive, light weight power unit which may be used for a multiplicity of purposes either around the home, the farm, or the shop.

Another object of this invention is to provide a power unit which may be used as a hoist or the like and in which a simple means is provided for reversing the operation of the cable winding drum.

Another object of this invention is to provide a manually operated power unit which is easy to operate without danger of injuring one's fingers.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

In the drawings:

Figure 1 is an elevational view with parts broken away showing the power unit set for lowering the load carried thereby;

Figure 2 is a view similar to Figure 1 showing the power unit as used for hoisting or pulling;

Figure 3 is a plan view of the device shown in Figures 1 and 2; and

Figure 4 is a fragmentary plan view showing the arrangement of parts for reverse operation.

For convenience of description only, the power unit shown herein will be described as a hoist, whereas it has many other uses and is capable of exerting a pull in any direction.

Referring now to the drawings wherein I have shown a preferred embodiment of my invention, reference numerals 12 and 14 designate a pair of frame members which are spaced from one another intermediate the ends thereof and come together and contact one another at each end, as best shown in Figure 3. The frame members 12 and 14 serve to support a drum 16 which is rotatably mounted on a stationary shaft 18 supported between the frame members 12 and 14. The one flange of the drum 16 is provided with a series of ratchet teeth 20 which are adapted to be engaged by the feed or operating lever pawl 22 and the retainer or stop pawl 24.

The retainer or stop pawl is pivotally supported on a stationary pin 26 which in turn is supported between the frame elements 12 and 14, as shown. A torsion spring 28 has its one end

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30 anchored to a projecting ear 32 formed as an integral part of the frame element 14 and has its other end hooked over the retainer pawl 24 so as to bias the retainer pawl into engagement with the teeth 20 at all times. The body of the spring 28 surrounds the axially extending bearing portion of the retainer pawl 24, as best shown in Figure 3.

The lever pawl 22 is pivotally supported on a pin or shaft 34 which in turn is supported between the arms of the Y-shaped operating handle or lever 36. The arms of the Y-shaped lever 36 straddle the cable drum 16 and are pivotally supported on the shaft 18 which serves to support the drum 16. The pawl 22 is normally biased into engagement with the teeth 20 by means of the torsion spring 40 which has its one end anchored to the projecting ear 42 which is formed as an integral part of the operating handle and which has its other end hooked onto the pawl in such a manner as to bias the pawl into engagement with the teeth 20.

A flexible cable or rope 44, which has its one end anchored to the drum 16, is adapted to be wrapped around the drum as the operating lever is rotated counterclockwise, as viewed in Figure 2 of the drawings. As the cable 44 wraps around the drum, the free end of the cable serves to exert a pull on the load.

For purposes of illustrating my invention, I have shown a hook 46 attached to the free end of the cable, whereas any type of load engaging or anchor mechanism, such as a wire clamp or the like, may be attached to the free end of the cable.

A cable guide clamp 48 is provided, as shown, and is riveted or otherwise secured to the one end of the frame elements 12 and 14. For purposes of illustration, I have shown a rivet 50 which serves the multiple purpose of attaching the cable guide clamp 48 to the main frame and also serves to hold the ends of the main frame in assembled relationship. Any suitable means, such as the combination chain and hook assembly 52, may be used for fastening the other end of the power unit to some suitable object. The chain and hook assembly 52 is normally fastened to some stationary object, but either or both ends of the power unit may be fastened to some object which is to be moved or stretched.

It very frequently happens that it is necessary to allow the cable to unwind from the drum 16, such as when it is desired to lower a load by means of the hoisting mechanism. It also frequently happens that it is necessary for the operator to use both hands while operating the hoist and

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for that reason it is desirable to provide some simple arrangement whereby the load may be lowered without the need for manually holding the retainer pawl out of engagement with the teeth 20.

In the device shown, I have provided a retainer pawl operating spring 54 which is attached to the upper face of the pawl 22, as shown, so as to be movable into engagement with the retainer pawl when the operating handle is moved into the position into which it is shown in Figure 1 of the drawings. The spring 54 is strong enough to overcome the torsional effect of the retainer pawl biasing spring 28 and is arranged to hold the retainer pawl in the lifted position while the ratchet wheel 20 is moved in the reverse direction one notch at a time. In order to cause rotation in the reverse direction, it is necessary to hold the pawl 22 out of engagement with the ratchet teeth 20 until the pawl 22 moves under the retainer pawl 24, at which time it is forced into engagement with the ratchet teeth 20.

Since there may be times when the operator cannot conveniently use any of his fingers for operating the feed pawl 22, I have provided a spring mechanism for biasing the feed pawl out of ratchet engaging position.

This mechanism comprises a lever 60 which is pivotally secured to the operating handle 36 at point 62 for engaging a spring 54 which has its one end rigidly fixed to the lever projection 23. When the lever 60 occupies the position in which it is shown in Figure 2 of the drawing, it does not exert enough pressure on the spring 54 to hold the feed pawl out of engagement with the teeth on the ratchet 20, but when the lever 60 is moved into the position in which it is shown in Figures 1 and 4 of the drawing, it exerts sufficient pressure on the free end of the spring 54 so that the feed pawl lever 22 will normally ride over the teeth 20 without engaging the same until the spring 54 contacts the retainer pawl 24, at which time the feed pawl 22 will be forced into engagement with the notch next to the notch in which the retainer pawl 24 is engaged. Due to the load on the cable and the shape of the ratchet teeth, the force of the spring 54 moving against the retainer pawl 24 will not cause the retainer pawl 24 to move out of engagement with the teeth of the ratchet until after the feed pawl 22 has rotated the ratchet 20 far enough to allow the retainer pawl to move out of engagement with the ratchet teeth. The arrangement of the spring 54 is such that after the retainer pawl has been lifted from engagement with a tooth on the ratchet 20, the ratchet may be rotated in the clockwise direction, as viewed in Figure 1, far enough so as to lower the load one notch before the spring 54 permits the retainer pawl to re-engage the ratchet 20.

The term "cable" as used herein is intended to include any flexible means capable of being wound around the drum 16 and is not intended to be used in its more limited sense.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. In a power device, a support, a drum, means

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for rotatably mounting said drum on said support, a ratchet drivingly connected to said drum, flexible means having one end thereof secured to said drum, an operating handle pivotally mounted on said support, a feed pawl pivotally supported on said handle and arranged to engage said ratchet, first spring means for biasing said feed pawl into engagement with said ratchet, second spring means arranged for overcoming the biasing effect of said first spring means so as to hold said feed pawl out of engagement with said ratchet, retainer pawl means, means for supporting said retainer pawl means in cooperative relationship with said ratchet, spring means for biasing said retainer pawl means into engagement with said ratchet, and resilient means operable during movement of said operating handle through a given range of movement for holding said retainer pawl means out of engagement with said ratchet.

2. In a power device; a support; a ratchet rotatably mounted on said support; an operating handle pivotally mounted on said support; a feed pawl pivotally supported on said handle and arranged to engage said ratchet; first spring means for biasing said feed pawl into engagement with said ratchet; retainer pawl; means for supporting said retainer pawl in cooperative relationship with said ratchet, spring means for biasing said retainer pawl into engagement with said ratchet so as to prevent reverse rotation of said ratchet; and means for operating the ratchet in reverse comprising, second spring means arranged for overcoming the biasing effect of said first spring means so as to move said feed pawl out of engagement with said ratchet until said feed pawl moves under said retainer pawl, and resilient means operable during movement of said handle through a given range for holding said retainer pawl out of engagement with said ratchet, said last named means comprising a spring carried by said feed pawl.

3. In a power device; a support; a ratchet rotatably mounted on said support; an operating handle pivotally mounted on said support; a feed pawl pivotally supported on said handle and arranged to engage said ratchet; first spring means for biasing said feed pawl into engagement with said ratchet; retainer pawl; means for supporting said retainer pawl in cooperative relationship with said ratchet; spring means for biasing said retainer pawl into engagement with said ratchet so as to prevent reverse rotation of said ratchet; and means for operating the ratchet in reverse comprising, second spring means arranged for overcoming the biasing effect of said first spring means so as to move said feed pawl out of engagement with said ratchet until said feed pawl moves under said retainer pawl, and resilient means operable during movement of said handle through a given range for holding said retainer pawl out of engagement with said ratchet, said last named means comprising a spring carried by said feed pawl on its upper side for movement under said retainer pawl so as to lift said retainer pawl.

4. In a power device, a support, a cable winding drum, means for rotatably mounting said drum on said support, a ratchet drivingly connected to said drum, an operating handle pivotally mounted on said support, a feed pawl pivotally supported on said handle and arranged to engage said ratchet, first spring means for biasing said feed pawl into engagement with said ratchet, second spring means arranged for overcoming the biasing effect of said first spring

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means so as to hold said pawl out of engagement with said ratchet, retainer pawl means, means for supporting said retainer pawl means in cooperative relationship with said ratchet, spring means for biasing said retainer pawl means into engagement with said ratchet, and resilient means operated in response to movement of said handle for holding said retainer pawl means out of engagement with said ratchet, said last named means comprising a spring carried on the upper surface of said feed pawl and arranged to engage beneath said retainer pawl means.

5. A windlass comprising a frame, a cable carrying drum rotatably mounted on said frame, said drum being provided with peripheral ratchet teeth, an oscillating lever pivoted to said frame, a feed pawl carried by said lever for engagement with said ratchet teeth, a retainer pawl pivotally mounted on said frame for cooperating with said ratchet teeth, first spring means for biasing the retainer pawl into engagement with said ratchet teeth, second spring means for biasing said feed pawl into engagement with said ratchet teeth, third spring means carried by said feed pawl for engaging said retainer pawl as the feed pawl moves beneath said retainer pawl, fourth spring means including a spring member having one end secured to said feed pawl, and means carried by said lever for engaging said spring member so as to cause said spring member to bias said feed pawl out of engagement with said ratchet teeth.

6. A power unit comprising a frame, a mem-

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ber mounted for movement relative to said frame, said member being provided with ratchet teeth, an oscillating lever pivoted to said frame, a feed pawl carried by said lever for engagement with said ratchet teeth, a retainer pawl pivotally mounted on said frame for cooperating with said ratchet teeth, first spring means for biasing the retainer pawl into engagement with said ratchet teeth, second spring means for biasing said feed pawl into engagement with said ratchet teeth, third spring means carried by said feed pawl for engaging said retainer pawl as the feed pawl moves beneath said retainer pawl, fourth spring means including a spring member having one end secured to said feed pawl, and means carried by said lever for engaging said spring member so as to cause said spring member to bias said feed pawl out of engagement with said ratchet teeth.

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