

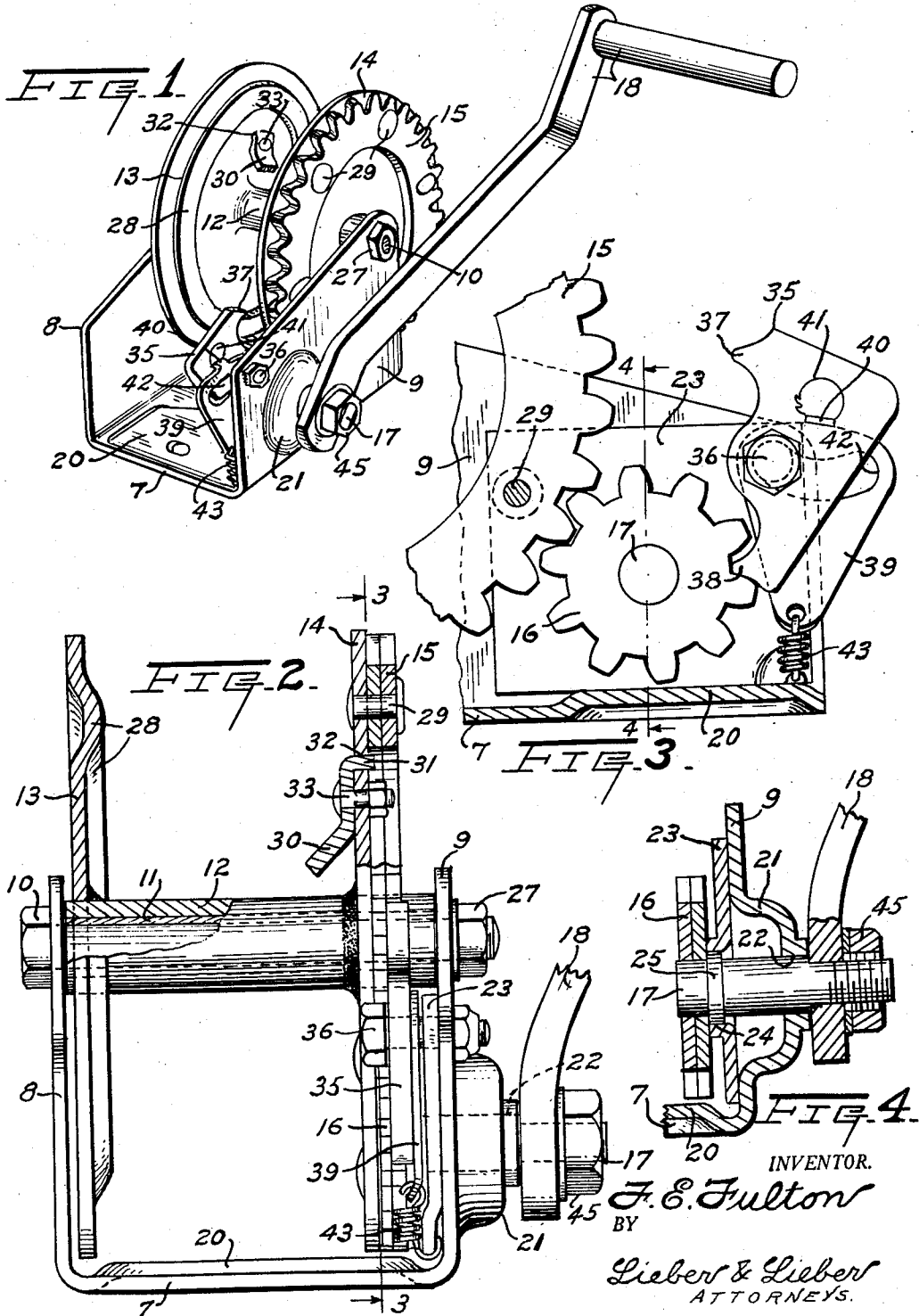
June 23, 1959

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2,891,824

SHEET METAL WINCH ASSEMBLAGE

Filed July 2, 1956



1

2,891,824

**SHEET METAL WINCH ASSEMBLAGE**

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Application July 2, 1956, Serial No. 595,271

1 Claim. (Cl. 308—22)

The present invention relates generally to improvements in devices for facilitating the displacement of relatively heavy loads, and relates more specifically to improvements in the construction and operation of winches especially adapted for raising and lowering or hauling portable articles such as boats and other vehicles.

The primary object of this invention is to provide an improved winch assemblage which is simple but durable in construction, and highly efficient in operation.

Some of the more important specific objects of the present invention are as follows:

To provide an improved winch constructed principally of sheet metal with the aid of punches and dies, but which is capable of moving extremely heavy loads without distortion of parts of the winch.

To provide a compact but sturdy winch structure, which may be readily installed and utilized for diverse purposes without endangering the user.

To provide an improved winch of the manually operable pinion and gear actuated type in which the various parts may be readily assembled or dismantled, and wherein ample bearings are provided in order to eliminate rapid and excessive wear.

To provide a rugged winch drum assembly which is amply reinforced to resist deflection, and wherein the load displacing rope or cable can be conveniently applied or removed.

To provide a durable winch frame assembly for carrying the drum and driving gearing in a most effective manner, and which may be readily firmly attached to a support.

To provide an improved reversible winch assemblage which may be manufactured at moderate cost, and effectively utilized to facilitate movement of various relatively heavy articles such as vehicles, boats or the like.

These and other more specific objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the features constituting the present improvement, and of the construction and functioning of a typical winch assemblage embodying the invention, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a perspective view of a commercial manually operable reversible winch assemblage embodying the present invention;

Fig. 2 is an enlarged part sectional front view of a winch similar to that of Fig. 1, but showing the rope or cable keeper applied to the opposite end disk of the winding drum, the section having been taken centrally through the upper portion of the drum;

Fig. 3 is a fragmentary transverse vertical section through the frame and winding drum of the winch, taken along the line 3—3 of Fig. 2; and

Fig. 4 is another fragmentary vertical section taken

2

longitudinally through the pinion bearing of the frame, along the line 4—4 of Fig. 3.

While the invention has been illustrated and described as having been embodied in a manually operable portable winch having a pinion coacting with an externally toothed ring gear secured to the adjacent end disk of the winding drum, some of the improved features may be advantageously embodied in other types of winch assemblages; and it is also contemplated that specific descriptive terms utilized herein be given the broadest possible interpretation consistent with the actual disclosure.

Referring to the drawing, the improved manually operable sheet metal winch shown therein, comprises in general, a main U-shaped frame having a base 7 and integral side walls 8, 9 firmly united remote from the base 7 by an axle bolt 10 coacting with a bearing sleeve 11 located between the walls 8, 9; a winding drum having a hub 12 journaled upon the sleeve 11 and provided at its opposite ends with disks 13, 14, of which the disk 14 has an externally toothed ring gear 15 firmly attached thereto; a pinion 16 having external peripheral teeth meshing with the ring gear teeth, and being secured to a drive shaft 17 journaled in a special bearing assemblage associated with the side wall 9 of the main frame; reversing latch mechanism coacting with the pinion 16 and being carried by the frame wall 9 and by the special pinion shaft bearing; and a hand crank 18 secured to the outer extremity of the drive shaft 17.

The main frame is preferably formed of a single unitary blank of relatively heavy sheet metal with the aid of punches and dies, and the frame base 7 is stiffened by means of a slightly elevated pad 20, while the side wall 9 is likewise stiffened by an outward bulge 21 forming part of the special pinion shaft bearing assemblage and providing an outer bearing surface 22 for the shaft 17 closely adjacent to the crank 18, see Figs. 2 and 4. The frame end wall 9 is further reinforced by a heavy sheet metal plate 23 also constituting a part of the special pinion shaft bearing assemblage and which is welded or otherwise firmly attached to the wall 9, and this plate 23 is provided with an inner bearing surface 24 for the shaft 17 disposed remote from but coaxially of the outer surface 22 and closely adjacent to the pinion 16. The surface 22 is of larger diameter than the surface 24 and coacts with an enlargement 25 on the shaft 17, thus providing a most effective support for this shaft as illustrated in Fig. 4.

The axle bolt 10 has a head coacting with the frame side wall 8 and a nut 27 coacting with its threaded end and with the opposite frame wall 9, to firmly clamp the bearing sleeve 11 which snugly embraces the bolt shank between the walls 8, 9. The hub 12 of the winding drum extends from one frame wall 8, 9 to the other thus providing a long bearing surface on the periphery of the sleeve 11, and the end disks 13, 14 are also formed of heavy sheet metal and may be welded to the hub 12 as shown in Figs. 1 and 2. The end disk 13 of the winding drum is preferably stiffened and reinforced against possible deflection by an annular bead 28 near its periphery as depicted in Figs. 1 and 2, and the ring gear 15 is rigidly attached to the opposite end disk 14 by rivets 29 or otherwise thereby also reinforcing this disk 14. In order to effect convenient and firm attachment of the end of a hauling rope or cable to the winding drum a keeper 30 formed of sheet metal and having an anchoring end 31 coacting with a slot 32 formed in either end disk 13, 14, and which is fastened to the adjacent disk by means of a stove bolt 33, may also be provided, as illustrated in Figs. 1 and 2.

The ring gear 15 and the pinion 16 coacting therewith, may both be formed of several laminations of heavy sheet metal riveted or spot welded together, and the

3

peripheral teeth of the gear 15 have slightly less diameter than that of the adjacent disk 14 so that this disk coacts with the plate 23 of the main frame to constantly maintain the teeth of the gear and pinion in proper meshing relation, see Fig. 2. The latch mechanism for holding the winch in any desired position and for effecting reverse operation thereof, comprises a latch 35 pivotally suspended from the plate 23 and frame wall 9 on a cap screw 36 and having opposite ends 37, 38 alternately cooperable with the teeth of the pinion 17; and a latch cam 39 having an end lug 40 cooperable with an opening 41 in the latch 35 and also having an arcuate slot 42 therein which is shiftable laterally of the cap screw 36 and is held in either of its end positions by a spring 43 interposed between the end of the cam 39 remote from the lug 40 and the plate 23. The latch 35 and the latch cam 39 cooperate to provide a reversing toggle for effecting actuation of the winch in opposite directions, and the spring 43 functions to hold the toggle in the selected actuating position.

The latch 35 and cam 39 may also be formed of durable sheet metal with the aid of punches and dies, and the hand crank 18 may be formed of rod stock but may be replaced by any other suitable means for rotating the pinion shaft 17. As shown, the outer end of the shaft 17 is flattened for snug coaction with an opening in the pivoted end of the crank 18 and the crank is secured to the shaft 17 by means of a nut 45 coacting with screw threads on this shaft. As will be apparent from Fig. 4, the pinion shaft 17 is prevented from moving longitudinally by the pinion 16 secured to the inner shaft end and by the crank 18 and nut 45 coacting with the outer shaft end, while the winding drum is held against axial displacement by the opposite side walls 8, 9 of the main frame.

It will thus be noted that most of the parts of the improved winch assemblage may be constructed of durable sheet metal with the aid of punches and dies, and when these parts have been properly formed and assembled, the operation of the winch is as follows. The end of a hauling rope or cable may be attached to the keeper 30 of the winding drum in an obvious manner, and the latch 35 and latch cam 39 should then be set for the desired direction of rotation of the drum and crank 18. Then by revolving the hand crank 18 in one direction the hauling rope will be wound upon the drum hub 12 while the holding latch 35 clicks over the teeth of the rotating pinion; but if rotation of the crank 18 ceases, then the latch end 37 or 38 which has been in clicking cooperation with the pinion teeth will positively engage the nearest tooth as in Fig. 3 and will thus hold the load. In order to subsequently release the load, it is only necessary to swing the latch 35 into mid-position with both of its ends 37, 38 out of the path of revolution of the pinion teeth, whereupon the winding drum will be free to rotate in the opposite direction.

4

By swinging the latch 35 beyond such mid-position, the direction of rotation of the winding drum while hauling a load, may be readily reversed; and since all of the elements of the reversing mechanism are mounted upon the plate 23 which also provides extensive bearing surface for the pinion shaft, a compact reversing unit which can be readily assembled and manipulated is obtained. The mounting plate 23 and the bulge 21 cooperate to reinforce the frame side wall 9 to which the operating force is applied, and the pad 20 likewise reinforces the frame base 7, while the side disks 13, 14 of the winding drum are stiffened by the bead 28 and ring gear 15 respectively. While the annular bead 28 serves to amply reinforce the end disk 28 against lateral deflection, it does not interfere with the winding and unwinding of the rope or cable and does not materially reduce the rope capacity of the winch. The entire winch assembly can be produced from sheet metal and other readily available materials, at very moderate cost, and the invention has gone into extensive and highly successful commercial use for diverse load lifting and hauling purposes.

It should be understood that it is not desired to limit this invention to the exact details of construction and operation of the specific winch assemblage herein shown and described, for various modifications within the scope of the appended claim may occur to persons skilled in the art.

I claim:

A bearing assemblage for a winch having a winding drum carried by spaced side walls of a sheet metal frame and adapted to be driven by a gear on the drum meshing with a pinion, said assemblage comprising, a shaft having the pinion secured to one end inwardly of one of the frame walls and having its opposite end formed for detachable reception of a driving member outwardly of said wall while its medial portion directly adjacent to said pinion has an enlarged diameter, an outward bulge formed integral with said sheet metal wall and having therein a central inner bearing surface coacting with said shaft directly adjacent to said driving member end, and a sheet metal reinforcing plate rigidly attached to the inner face of said frame wall and spanning said bulge, said plate having thereon an annular flange extending away from said bulge and which is provided with an enlarged inner bearing surface disposed coaxially of said bulge bearing surface and coacting with said enlarged shaft portion directly adjacent to the pinion remote from said frame bulge.

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