United States Patent

[11] 3,583,753

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[45] Patented **June 8, 1971**

[54] **REEL-LIFTING DEVICE**
7 Claims, 6 Drawing Figs.

[52] U.S. Cl. **294/86,** 294/90
[51] Int. Cl. **B66c 1/66**
[50] Field of Search ..... 294/78, 82, 86, 86.24, 86.25, 93, 95, 90, 97, 103 CG, 106, 110, 111, 112

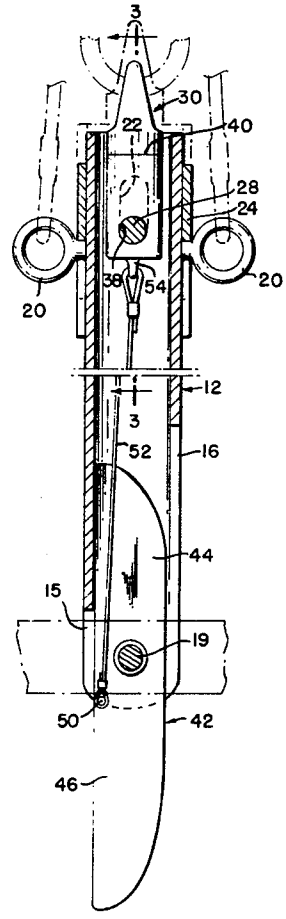
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Primary Examiner—Harvey C. Hornsby
Assistant Examiner—W. Scott Carson
Attorney—Graybeal, Cole & Bernard

ABSTRACT: A reel lifter having a swivel connection for allowing the reel to be rotated and an automatically actuated toggle that is moved from an inoperative position into an operative position wherein it extends transversely to be engaged against the inside surface of the reel flange. The toggle is pivotally mounted at the lower end of a tubular shaft which may be supported externally or may be supported by the mechanism which actuates the toggle. In one form no swivel is provided. In another form diametrically opposed slots are provided in a tubular member and the toggle-actuating mechanism is joined to the tubular shaft by a bolt extending through the slots. In still another form the slot is provided in the toggle-actuating mechanism.

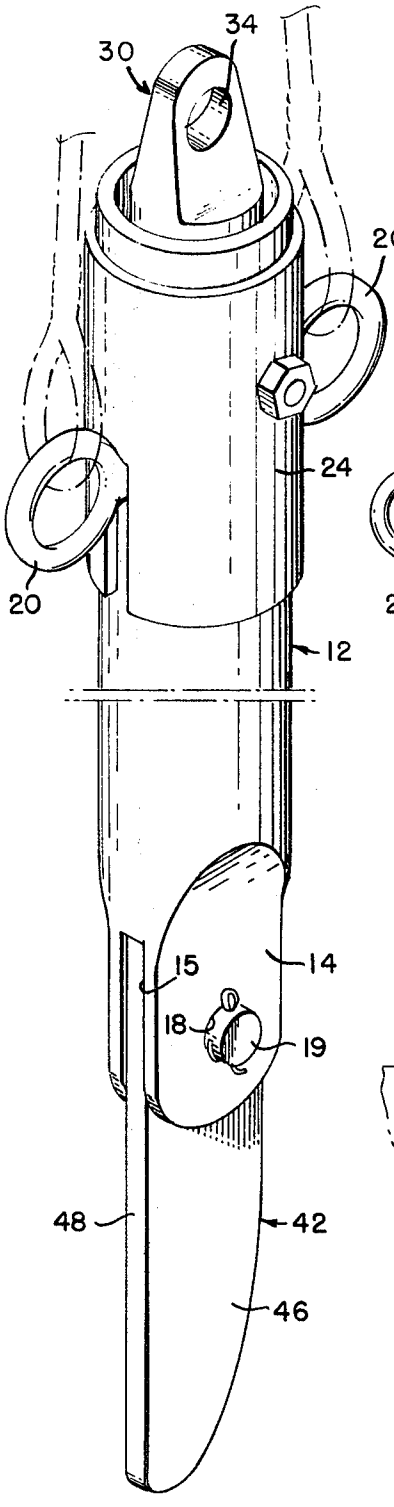


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SHEET 1 OF 2

FIG. 1



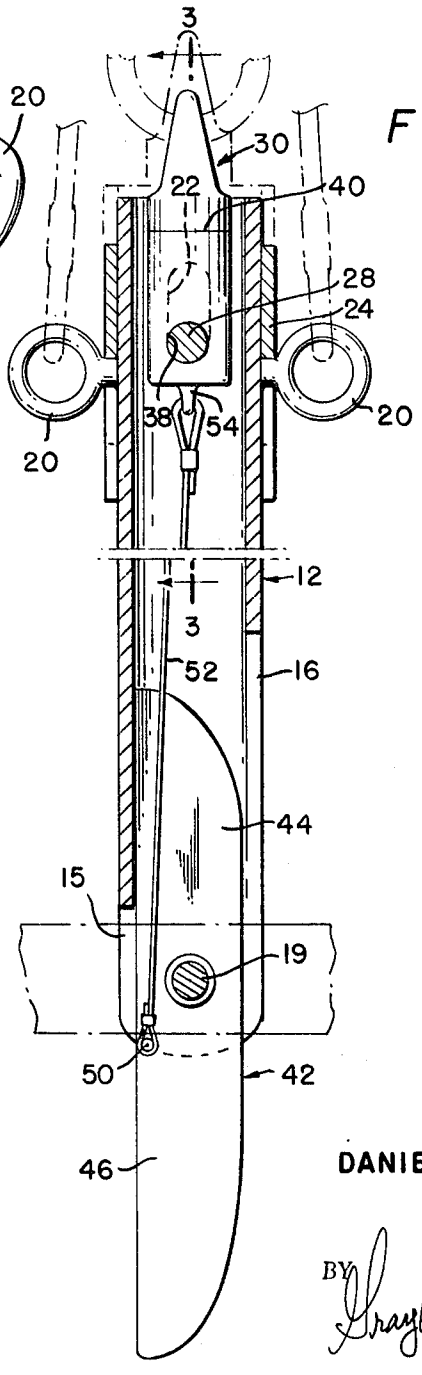
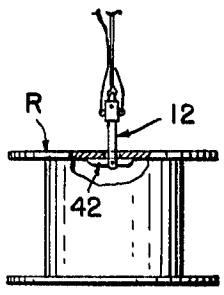


FIG. 2

FIG. 6



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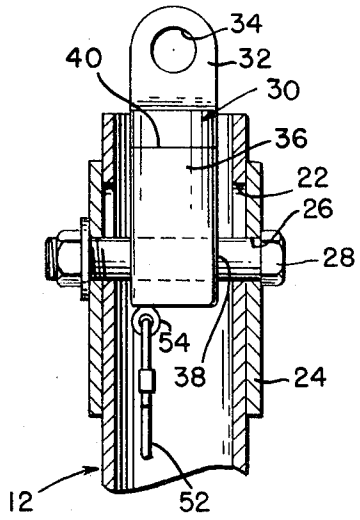


FIG. 3

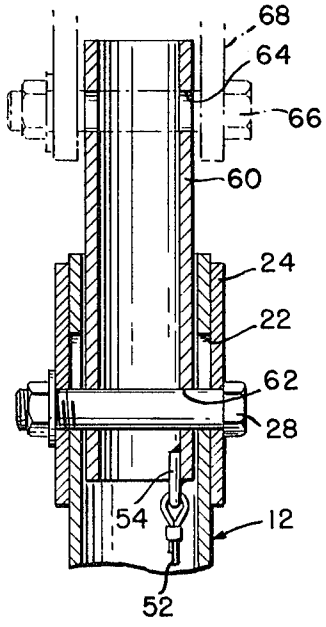


FIG. 4

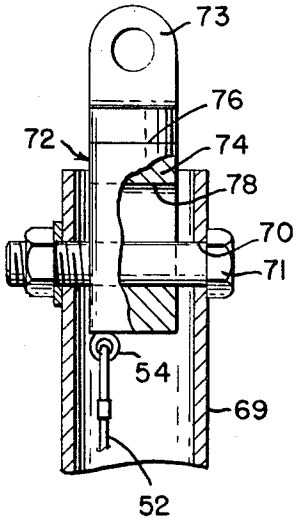


FIG. 5

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REEL-LIFTING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the invention

This invention relates to devices for lifting heavy objects and particularly objects that are to be rotated such as heavy reels of wire cable and the like.

2. DESCRIPTION OF THE PRIOR ART

Reels commonly used by power companies may contain wire or cable weighing over 2,000 pounds. Present methods for lifting these reels include using an L-shaped hook which engages the inner surface of one side of a flange. Another device which may be suitable for lifting a reel is shown in the U.S. Pat. to Russell et al. No. 3,307,871. In this patent a toggle is provided for insertion into an opening and then the toggle is moved into a position lying transversely of the axis of the opening by manually manipulating an actuator sleeve which moves and holds or locks the toggle in place. It is, of course, necessary in the patented device that this manual operation be performed by a workman while the lifting device is inserted into the opening of the object to be lifted. As a result the workman is placed in a position where he could suffer bodily injury. It is also time consuming for the operator of the lifting crane to stop his operation while the workman installs or removes the lifting device.

It is nearly always desirable to rotate the reel in order to remove the wire or cable. Past techniques have been to lift the reel and place it on rotatable mountings on jacks or put it on a trailer having a rotatable carriage or support shaft. In both instances the operation is awkward and unsafe. It is also time consuming, particularly where several reels of different size wire must be used. As a result of these disadvantages line crews will often take a precut amount of the wire to the job site leaving the reel in storage. In order to do this, however, the crew must overestimate the amount of wire needed so as not to run short at the job site and as a result substantial amounts of wire may be wasted.

SUMMARY OF THE INVENTION

This invention is directed to two basic purposes. The first is to provide a lifting device that will engage a reel or wire or cable and allow it to be rotated while suspended from the crane for removal of a required amount of wire. The second purpose is to provide a toggle that is automatically actuated so as to engage the flange of the reel without the need of manual labor. These purposes are accomplished by the provision of a swivel between the toggle and the lifting crane to allow rotation of the reel. Further the toggle is actuated by the same part of the lifting device as is secured to the lifting crane so that upon operation of the crane lifting cable the toggle is automatically placed in its operative, transverse position.

The device is therefore safe, easily operated, and provides for rapid, safe lifting of reels and convenient unwinding of the wire or cable thereon. The invention may be used in such a way that the wire or cable may be pulled off or the end may be anchored and a vehicle may move the reel to unwind the wire or cable. Furthermore, the invention can be used in warehouses and storage areas to move reels and other heavy objects.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an isometric view showing a lifting device suspended with its toggle in an inoperative position.

FIG. 2 is a longitudinal section of the lifting device of FIG. 1.

FIG. 3 is a fragmentary, longitudinal section of the lifting device shown in FIG. 1, taken in the direction of the arrows 3–3 of FIG. 2.

FIG. 4 is a fragmentary longitudinal section of a modified form of lifting device.

FIG. 5 is a longitudinal, fragmentary section of still another form of lifting device.

FIG. 6 is a schematic illustration of the lifting device shown in FIG. 1, operatively engaged against the inside surface of the flange of a reel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred form of the lifting device is best shown in FIGS. 1—3 and comprises a tubular support body or shaft 12 having a pair of depending spaced apart ears 14 defining a short end slot 15 and an elongated end slot 16. Each ear is provided with a central hole 18 in which is secured a freely pivotal pin 19. Adjacent the upper end of the tubular support shaft are a pair of diametrically opposed rings 20 suitable for manually manipulating the tubular support shaft or, preferably, for attaching the lifting device to the lines of a lifting crane. As best shown in FIG. 3 and in dotted lines in FIG. 2 the tubular support shaft is provided with a pair of diametrically opposed elongated slots 22.

A collar 24 circumscribes the tubular support shaft 12 and is provided with diametrically opposed openings 26 to receive a bolt 28 which passes through the slots 22. As is readily apparent both the bolt and collar may be slid vertically relative to the tubular support shaft with the extent of movement being limited by the terminal ends of the slots 22. While the collar thus acts as a bearing or guide for this movement its primary role is as a safety feature to cover the openings formed by the slots 22, thereby to protect the fingers of those who may be handling the device. It will be appreciated the device is operative without the collar.

A connector member 30 is disposed within said tubular support shaft 12 and includes an upper portion 32 having an eye 34. As is shown in phantom lines in FIG. 2 the lifting hook of a crane may easily be engaged in the eye 34 as is well known in the art. The connector 30 also includes a lower portion 36 having a generally transversely disposed central bore 38 in which is received the bolt 28. As is readily apparent the connector may be moved upwardly relative to the tubular support shaft 12 to the terminal limits of the slots 22.

For the purpose of permitting the lifting device to rotate, the upper and lower connector portions 32 and 36, respectively, are joined by conventional swivel means the details of which have not been illustrated. For the purpose of illustration the swivel connection is indicated by the line 40 so that upper and lower portions 32 and 36 rotate relative to each other.

Secured to the pin 19 is an elongated toggle 42 having a short end 44 and a long end 46. The toggle is in the form of a blade having a straight, flat longitudinal surface 48 that is adapted to be engaged against the inside surface of the flange of a reel R (FIG. 6). The ends of the toggle are not of equal length with the long end 46, because of its greater weight, causing the toggle to pivot into the inoperative position shown, for example, in FIG. 2, when not engaging the reel. Secured to a pin 50 extending laterally from the long end 46 of the toggle is a wire 52. The wire is secured at its upper end in a ring 54 formed on the bottom of the lower connector portion 36. As is best shown in FIG. 2 the pin 50 is offset from the central axis of the toggle so that the wire is at all times out of the way of the pivot pin 19. In like manner the ring 54 on the lower connector portion 36 is offset to the left, as viewed in FIG. 3, so as not to interfere with the short end 44 of the toggle. That is, the pin 50 and the ring 54 are disposed on the same side of the tubular support shaft 12 to avoid interference with the toggle.

The operation of the preferred form of lifting device is best illustrated in FIGS. 2 and 6. The lifting device is placed, preferably by cables secured to the rings 20, into the opening of the side flange of a reel R. While supported in this fashion the crane lifting cable secured to the upper connector portion 32 remains slack so that the short bar 30 is in its lowermost position relative to the tubular support shaft 12 and thus the toggle is free to rotate by gravity into the inoperative position shown in FIG. 2. The short bar is then raised by removing the slack from the crane lifting cable and, through the wire 52,

rotates the toggle into the operative position shown in FIG. 6 wherein the longitudinal edge 48 of the toggle engages the inside surfaces of the flange of the reel R. In this position the bolt 28 is at the terminal upper ends of the slots 22 such that further lifting by the crane lifting cable will also raise the tubular support shaft 12 and thus the reel R. Once the reel is raised from the vehicle, which preferably is placed on the flat bed of a truck along with a variety of wheels containing different size wire, the reel may be rotated freely so that the wire may be removed by pulling on the free end. When the desired amount of wire has been removed from the reel the reel is lowered back onto the bed of a truck until its use is required again. The lifting device is then disengaged from the reel by further lowering and allowing gravity to rotate the toggle back into the inoperative position. Since the toggle in its inoperative position does not extend radially beyond the tubular support shaft it is readily removed by again raising the lifting device out of the reel.

The modification shown in FIG. 4 is similar to the preferred embodiment shown in FIGS. 1—3 with the exception that the two piece swivel connector has been replaced with a single piece tubular shaft 60 that does not swivel. All other parts being substantially the same only the short tubular shaft 60 will be described. The ring 54 for securing the wire 52 is welded to the inside lower surface of the tubular shaft 60. As in the preferred embodiment the bolt 28 passes through the collar 24, the slots 22 in the tubular support shaft 12, and through openings 62 in the short tubular shaft. The short tubular shaft thus may be raised to the upper terminal limits of the slots 22 to actuate the toggle and by further lifting will raise the tubular support shaft 12. The upper end of the short tubular shaft 60 is provided with diametrically opposed openings 64 which suitably may receive a bolt 66, shown in phantom, of a clevis 68, also shown in phantom. Such a modification may be desired where the objects being picked up need not be rotated.

In the modification shown in FIG. 5 the tubular support shaft has been modified and has been identified by the reference numeral 69. In this modification the tubular support shaft is provided with diametrically opposed openings 70 in which is received a bolt 71. A short bar 72 having an upper connector portion 73 and a lower connector portion 74, joined by a conventional swivel indicated by the line 76, is disposed within the tubular support shaft 69. The lower connector portion is provided with the ring 54 which secures the wire 52 as in the preferred embodiment. Also provided in the lower connector portion is a vertically elongated slot 78 which receives the bolt 71. In this form of lifting device it is readily apparent that raising the short bar 72 until the pin 71 engages the lower terminal end of the slot 78, as shown in FIG. 5, will actuate the toggle placing it in the transverse operative position. Further lifting of the short bar 72 will raise the tubular support shaft 69. Suitable means, not shown, for remotely positioning this embodiment of the lifting device may be provided otherwise the lifting device may be positioned merely by grasping the tubular shaft 69 and lowering the device into the reel.

It will be noted in those embodiments having a swivel connector, i.e. FIGS. 1 to 3 and 5, that in order for the reel lifter to rotate on the swivel the placement cables connected to ears 20 will have to be unattached first. If placement cables are not used, then the device will have to be set in place by hand. If the cables remain on ears 20 the lifter can only be used to transfer reels. Additionally, the device may be provided with only one ear 20. If so, it should be located on the slot 15 side. If the single ear is left on the slot 16 side, the toggle 42 will tend to assume a vertical position thus moving short or upper end portion 44 partially out of slot 16 and impeding withdrawal of the device from a reel.

While the preferred form of the invention has been illustrated and described it is, of course, recognized that various other forms will be apparent to one skilled in the art and, therefore, the invention is not to be limited to the preferred embodiments.

What I claim is:

1. A lifting device comprising:
   a. an elongated tubular support member,
   b. toggle means pivotally secured to the lower end of said support means and being movable into an inoperative position wherein it is disposed longitudinally of said support means and an operative position wherein it is disposed transversely of said support means;
   c. lifting means located at and connected to the upper end of said support member and being longitudinally movable relative to the support member through a predetermined distance, said lifting means having a lower nonlifting position and an upper lifting position, said lifting means in its upper position coacting with said support means and said toggle means to perform lifting operations, said lifting means having an upper portion for fastening to a lifting cable; and
   said lifting means and toggle means so that when said lifting means is moved to its upper lifting position said toggle is pivoted to its operative position.

2. The lifting device according to claim 1 and wherein said lifting means and said support member are interconnected by slot means and a transversely disposed bolt which permit said support member and lifting means to move longitudinally with respect to each other.

3. The lifting device according to claim 2 and wherein said lifting means has a lower portion which swivels relative to said upper portion so that said lifting device also swivels.

4. The lifting device according to claim 2 and wherein said bolt is secured to said upper member and said slot means is in said lifting means to establish said relative movement.

5. The lifting device according to claim 2 and wherein said slot means are in said support member and said bolt is secured to said lifting means to establish said relative movement.

6. The lifting device according to claim 2 and wherein said support member has handle means secured thereto for holding and positioning said lifting device.

7. The lifting device according to claim 2 and wherein said lifting means is located within the tubular support member.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,583,753 Dated June 8, 1971

Inventor(s) Daniel B. McCrory

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, claim 1, line 16, after "and" and before line 17, add the following: -- (d) toggle actuator means interconnecting -- .

Signed and sealed this 10th day of October 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.