Jan. 21, 1964 B. E. VIOLA 3,118,652

TRUCK LIFT SAFETY SHUT-OFF

Filed April 21, 1961 2 Sheets-Sheet 1

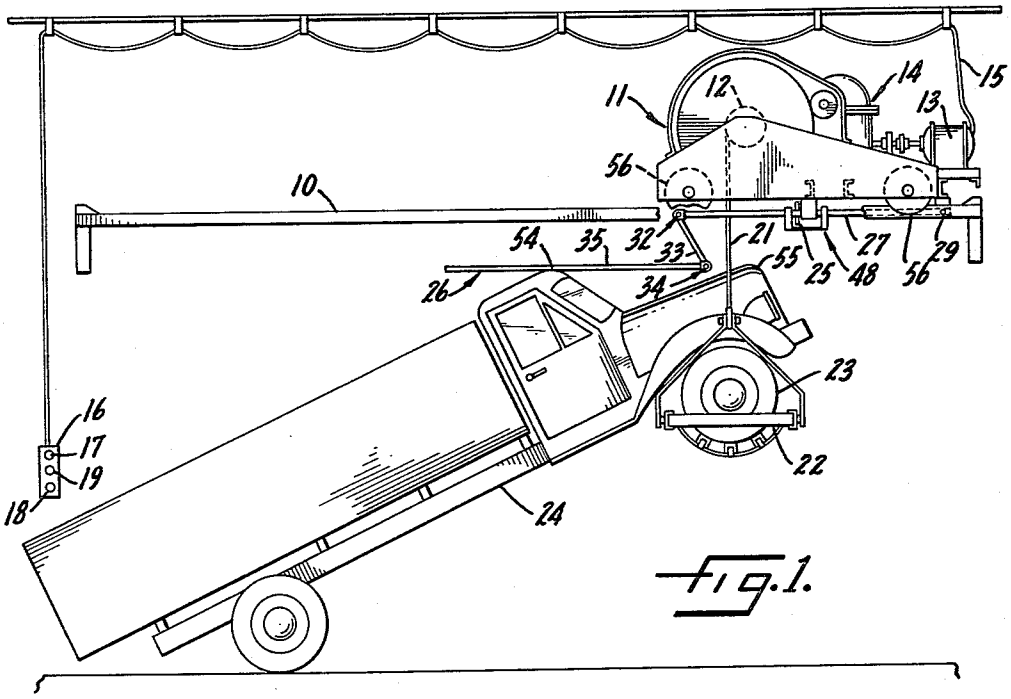

Fig. 1.

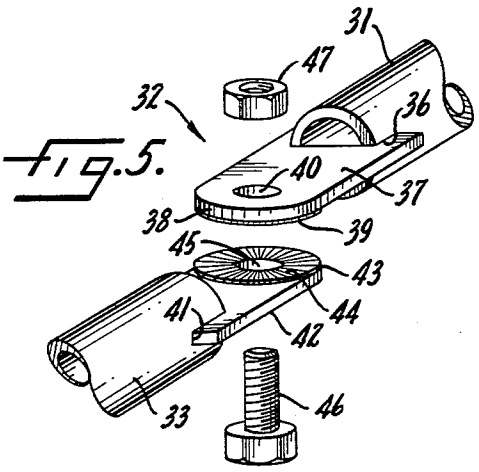

Fig. 5.

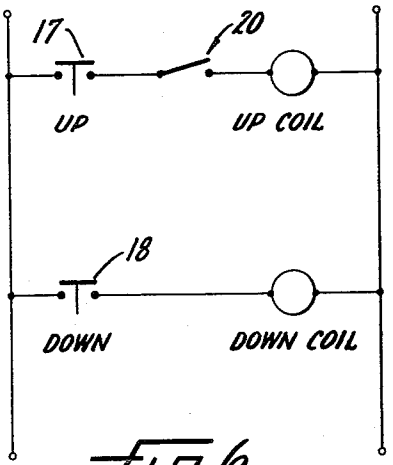

Fig. 6.

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TRUCK LIFT SAFETY SHUT-OFF

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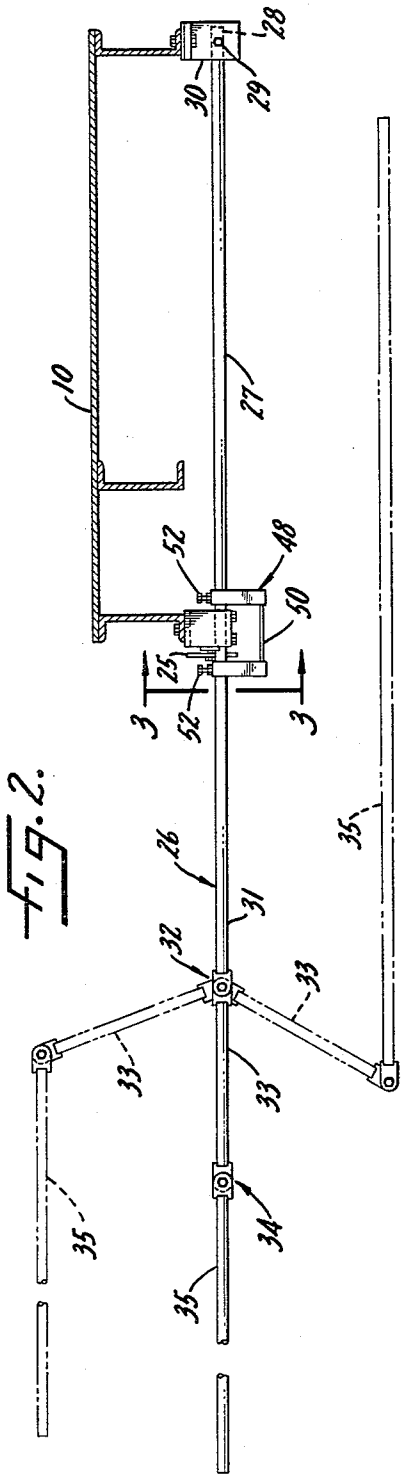

FIG. 2.

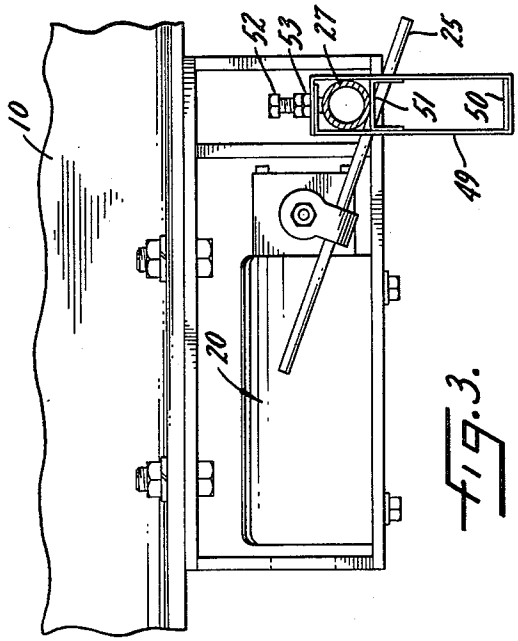

FIG. 3.

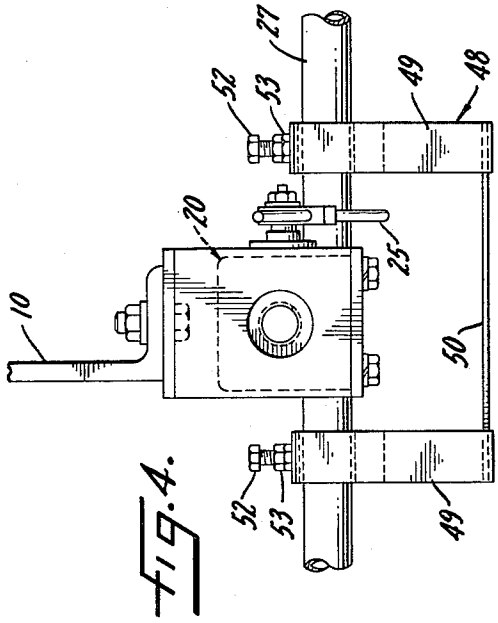

FIG. 4.

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TRUCK LIFT SAFETY SHUT-OFF

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The present invention relates to a safety shut-off for a truck lift and is primarily concerned with the provision of means to guard against the possibility of damage to the lift or to its load by accidental contact of the load with the lift mechanism or frame.

One well known form of means for facilitating the dumping of discrete material from trucks comprises a power driven winch mounted on an elevated frame, a cradle adapted to receive the front wheels of a truck, and cable means wound on the winch and operatively connected to the cradle for lifting the cradle to tilt the truck to a position in which the load will slip by gravity from the truck body. Manual control means for the winch drive may be actuated to cause winding or unwinding operation of the winch and to stop the winch; but there is a possibility that carelessness on the part of an operator may result in excessive winding operation of the winch to lift some part of the truck into contact with the lift assembly or its frame, whereby the truck or the frame may be damaged or, in extreme cases, the cable or some part of the lift mechanism may be broken.

The primary object of the present invention is to provide means positioned in the rising path of a load on the cradle of such a mechanism and operable, upon engagement by the load, to stop lifting operation of the winch.

A further object of the invention is to provide such a device which is capable of adjustment to locate a portion of a guard element in any one of several positions of adjustment, relative to the lift device, whereby the safety feature shall be effective with varying types, shapes and sizes of loads.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

FIG. 1 is a somewhat diagrammatic illustration of a truck operatively associated with a conventional truck lift, and in lifted position, with a portion of the truck just engaging the safety shut-off device of the present disclosure;

FIG. 2 is an enlarged illustration of the safety shut-off device, showing the parts thereof in various positions of adjustment;

FIG. 3 is an enlarged section taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is an elevation, drawn to the scale of FIG. 3, and looking from the left side of FIG. 3;

FIG. 5 is an enlarged and exploded perspective view of a joint construction used in the preferred form of the present invention; and

FIG. 6 is a simplified wiring diagram.

Referring more particularly to the drawings, it will be seen that I have illustrated an elevated frame 10 which may preferably take the form of parallel rails with suitable supports and cross braces, a conventional lift device, indicated generally by the reference numeral 11, being supported on said frame.

The lift device comprises a winch spool 12 and a reversible electric motor 13 connected, through a suitable drive

train indicated generally by the reference numeral 14, to drive the winch; the whole assembly preferably being mounted on a carriage supported by wheels 56 running on suitable rails embodied in the frame 10. Electrical conductor means 15 joins the motor 13 with a control panel 16 which, in the illustrated embodiment of the invention, comprises an "Up" button 17, a "Down" button 18 and a "Stop" button 19. Alternatively, the control may be a so-called "constant pressure system" in which the motor will be engaged in one direction or the other only so long as the "Up" button or the "Down" button is manually held depressed, in which case, of course, the panel will not include a "Stop" button. The construction thus far described is conventional.

As is suggested by the wiring diagram of FIG. 6, the buttons 17 and 18 respectively control the up and down coils for a conventional magnetic starter; and a normally-open switch 20 is series connected in the circuit controlled by the button 17.

Cable means 21 is wound on the winch spool 12 and supports a cradle 22 adapted to receive and hold the front wheels 23, for instance, of a truck 24. It will be obvious that, when the motor 13 is energized to drive the winch 12 in a reeling-in direction, the cradle 22 will be lifted, when the motor 13 is energized to drive the winch in the opposite direction, the cradle 22 will be lowered, and when the motor is deenergized, the cradle will stand in any position to which it has been moved, suitable brake means being incorporated in the lift device in accordance with conventional practice.

As is most clearly illustrated in FIGS. 2, 3 and 4, the switch 20 includes an actuator 25 which is yieldably biased by conventional spring means (not shown) within the unit 20, to switch-open position. The guard element of the present invention is indicated generally by the reference numeral 26 and comprises a lever 27 one end 28 of which is pivoted as at 29 to a bracket 30 secured to the frame 10. As is clearly illustrated, the lever 27 is mounted for swinging movement in a vertical plane about a horizontal pivotal axis, and said lever extends from its fulcrum point 29 into and beyond cooperative engagement with the actuator 25 of the switch 20. As is most clearly to be seen in FIG. 3, a mid-portion of the lever 27 overlies and rests upon the actuator 25, thus tending, by gravity, to move said actuator in a clockwise direction as viewed in FIG. 3 to a switch-closed, stop position. So long as the lever 27 rests on the actuator 25, the switch 20 will be held closed; but when the weight of the lever is removed from said actuator, the bias built into the switch will move the actuator in a counter-clockwise direction to open the switch 20.

At the distal end 31 of the lever 27, one end of an arm 33 is pivotally connected to said lever by a joint indicated generally by the reference numeral 32. A further joint 34, which may be identical with the joint 32, connects a second arm 35 to the opposite end of the arm 33.

In FIG. 5, I have illustrated one suitable form of joint for connecting the arm 33 to the lever end 31 and for connecting the arm 35 to the arm 33. As shown, the distal end 31 of the lever 27 is diametrically slotted as at 36 to receive one end of a plate 37 which may be welded in place. The other end 38 of said plate is preferably rounded as shown, and one face of the plate end is circularly knurled or serrated as at 39. A perforation 40, concentric with the knurled surface 39 and the rounded end 38, penetrates the plate 37.

Similarly, the proximal end of the arm 33 is slotted as at 41 for the reception of one end of a mating plate 42, the opposite end of said plate being rounded as at 43 and formed with a knurled or serrated circular surface 44 for mating cooperation with the surface 39 of the plate 37. The plate 42 is similarly formed with a concentric

perforation 45, adapted to register with the perforation 40; and a bolt 46 is adapted to penetrate the ports 45 and 40 and to receive a nut 47.

Obviously, this construction provides a pivotal joint between the elements 31 and 33, and means for securing the arm 33 in any selected position of adjustment, relative to the lever 27, about the axis of the bolt 46. As is most clearly to be seen in FIGS. 1 and 2, the axes of the bolts 46 of the joints 32 and 34 are horizontal and parallel to the pivotal axis 29 of the lever 27.

Thus, the guard element 26 may be set in any desired position of adjustment, either lineal as indicated in solid lines in FIG. 2 or with the arm 35 above or below the lever 27 to any desired degree within the range of the length of the arm 33, and extending beyond the distal end 31 of the lever or returning toward the pivoted end of said lever.

Additional guard means for the switch 20 is preferably provided. It will be seen that, with the device 26 set in the solid line position or in the upper broken line position of FIG. 2, it might be possible for some portion of a truck on the cradle 22 to strike the mounting bracket for the switch 20 before the arm 35 is engaged by any portion of the load; and to guard against that remote possibility, I prefer to provide an auxiliary guard device indicated generally by the reference numeral 48. Such device comprises a pair of U-shaped brackets 49 whose lower ends are joined by a rigid plate 50. Each such bracket straddles the lever 27 and depends therefrom, one bracket on one side of the switch 20 and the other bracket on the other side thereof. A cross brace 51 built into each bracket is adapted to be drawn into solid engagement with the lower surface of the lever 27 by means of a set screw 52 passing through the upper end of the bracket and bearing on the upper surface of the lever 27, lock nuts 53 preferably being provided to secure the set screws against loosening. Any pressure exerted against the plate 50 will, of course, swing the lever 27 upwardly about its axis 29 to permit the actuator 25 to move to switch-open position.

In normal operation of the disclosed system, the joints 32 and 34 are manipulated to position the arm 35 in a desired location. Now, remembering that the lever 27 is holding the switch 20 in closed position by gravity, when the button 17 is pressed, the motor 13 will be energized to drive the winch 12 in a winding direction. Thus, the cradle 22 will be lifted, carrying with it the front end of the truck 24. The arm 35 will be engaged by, for instance, the cab 54 of the truck; and further upward movement of the cradle will swing the lever 27 in a clockwise direction to permit the actuator 25 to move to switch-open position, thereby breaking the energizing circuit for the motor and bringing the assembly to a stop. If, for instance, an ornament on the hood 55 of the truck should be so constructed as to engage the guard 48 before the cab

engages the arm 35, the guard 48 will similarly move the lever 27 to permit the switch 20 to open.

While the guard 26 will usually be set substantially in the condition of FIG. 1, it will be appreciated that, in order to accommodate other shapes and sizes of trucks, it may sometimes be desirable to readjust the guard 26 to one of the conditions suggested in FIG. 2 or to some different condition.

I claim as my invention:

1. In combination with a lift comprising support means, power means for lifting said support means, a control element movable between a first position in which said power means is actuated to lift said support means and a second position in which said power means is rendered ineffective to lift said support means; a lever pivoted at one end near said control element for movement about a horizontal axis and extending into and beyond engagement with said control element, an arm pivotally connected to said lever beyond said control element for adjustment relative thereto about a horizontal axis, means for securing said arm in any selected position of adjustment about its pivotal axis, a second arm pivotally connected to said first-named arm for adjustment about another horizontal axis, and means for securing said second arm in any selected position of adjustment about its pivotal axis.

2. In combination, an elevated frame, a winch supported on said frame, cable means suspended from said winch, cradle means supported by said cable means, an electric motor supported on said frame and operatively connected to drive said winch, an energizing circuit for said motor effective, when closed, to activate said motor to drive said winch in a direction to reel in said cable to lift said cradle means, a switch in said circuit, a control element for said switch biased to switch-open position, a lever pivoted at one end on said frame to swing in a vertical plane, an intermediate portion of said lever being supported on said control element to hold the same by gravity in switch-closed position, an arm pivotally connected to the other end of said lever, means for securing said arm in any selected position of adjustment relative to said lever, a second arm pivotally connected to said first-named arm, and means for securing said second arm in any selected position of adjustment relative to said first-named arm.

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