

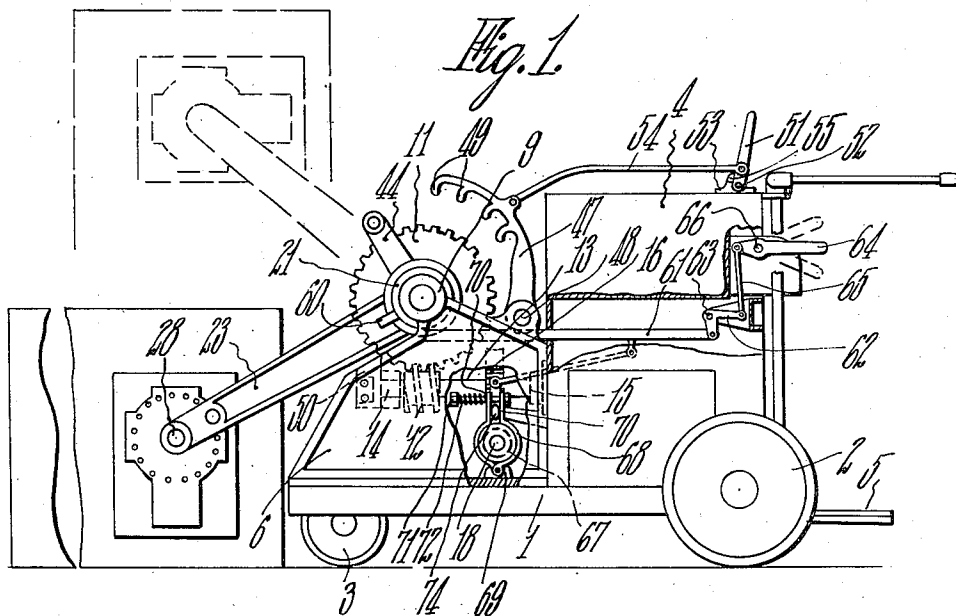
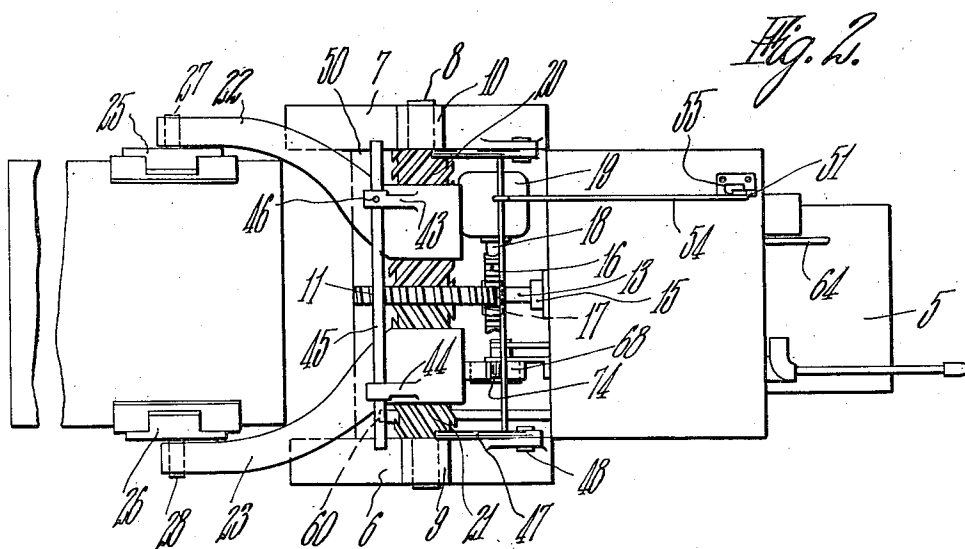
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1,491,384

F. L. EIDMANN

ELEVATING TRUCK

Filed Nov. 26, 1920



INVENTOR

Frank L. Eidmann.

BY *Chapin & Neal*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

FRANK L. EIDMANN, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR TO EDWARD N. WHITE, J. LEWIS WYCKOFF, AND JAMES M. EATON, ALL OF HOLYOKE, MASSACHUSETTS, TRUSTEES, DOING BUSINESS AS COWAN TRUCK COMPANY.

ELEVATING TRUCK.

Application filed November 26, 1920. Serial No. 426,583.

To all whom it may concern:

Be it known that I, FRANK L. EIDMANN, a citizen of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Elevating Trucks, of which the following is a specification.

This invention relates to improvements in elevating trucks of the type wherein suitably arranged gripping and elevating arms are employed to raise or lower articles of considerable weight.

One object of the invention is to provide improved controlling mechanism to limit the movement of the elevating arms away from each other and thus insure proper operation of the mechanism and prevent injury to the same.

Another object of the invention is to provide suitable positively-actuated mechanism for controlling the operation of the motor from one of the moving parts of the mechanism, while at the same time permitting such manual control of the motor as may be desirable for the further operation of the mechanism.

Another object of the invention is to provide suitable automatically-controlled brake-operating mechanism and adapt the same to be applied to the motor-shaft coincident with the cutting off of the current through the windings of the motor.

Further objects of the invention relate to certain improved details of construction and improved methods of operation as will be more fully set forth in the detailed description to follow.

Referring to the drawings:

Fig. 1 is a side elevational view of the truck, showing the elevating arms in raised and lowered position, certain of the parts being broken away to better illustrate certain control mechanism for controlling the movement of the arm; and

Fig. 2 is a top plan view of the structure.

In the operation of the devices of this character where swingingly-mounted elevating arms movable towards and from each other are employed in lifting and transporting articles of considerable weight, it is desirable to provide proper control mechanism for preventing excessive movement of the arms outwardly from each other which

might otherwise cause injury to the mechanism. In providing such control mechanism it has also been found desirable to provide means for preventing accidental operation of the mechanism by the operator to cause excessive outward movement of the arms, and also to suitably coordinate the control mechanism with means for positively preventing further rotation of the motor-shaft when the arms have reached the limit of their outward movement.

In the embodiment of the invention illustrated herewith, the truck is shown as comprising any suitable form of supporting frame 1, mounted to travel upon properly arranged front wheels 2 and rear wheels 3, certain of which wheels may be steered by any suitable arrangement of steering mechanism, and certain of said wheels being preferably adapted to be driven for the purpose of moving the truck from place to place and transport the articles, as may be found desirable. A casing 4 is positioned upon the forward end of the frame 1 and is adapted to enclose the usual steering, driving and control mechanism for moving the truck from place to place. An operator's platform 5 projects forwardly of the truck and is so located that the operator may have ready access to the steering handle and the other control mechanism for operating the elevating arms. Trucks of this type are designed for moving articles of considerable weight and are consequently so constructed as to withstand considerable strain, besides being of massive construction to successfully counterbalance such heavy articles as may be raised and lowered by the truck.

Supported upon opposite sides of the rear end portion of the frame 1 is a pair of similar castings 6 and 7 adapted to support certain of the operating mechanism for actuating the elevating arms. A horizontal shaft 8 extends transversely of the frame 1 and is rotatably supported by suitable bearings 9 and 10 formed in the castings 6 and 7, respectively. A large worm-gear 11 is secured to or formed integral with the shaft 8, being located substantially centrally thereof and arranged to mesh with and be driven by a worm 12 carried by a counter-shaft 13 suitably supported in bearings 14 and 15 from the frame. A worm-gear 16 is keyed or otherwise suitably secured to the shaft

15 in meshing engagement with a worm 17 carried by the shaft 18 of the motor 19. The motor 19 and the motor-shaft 18 are suitably supported from the frame to enable the same to successfully withstand the various strains to which they may be subjected in moving the elevating arms together with the articles which they are adapted to handle.

The shaft 8 has an enlarged portion 20 formed upon one side of the central gear 11 and provided upon its exterior surface with a right-hand thread, while a similar enlarged portion 21, located upon the opposite side of the gear 11 is provided with a left-hand thread upon its exterior surface. A pair of swingingly-mounted elevating arms 22 and 23, of symmetrical construction, are each provided with an internally-threaded opening adjacent one end thereof, whereby the internally-threaded end portions of the arms may be threaded upon the portions 20 and 21, respectively, of the shaft 8. The vertically-swinging arms 22 and 23 are each provided with a gripping jaw 25 and 26 respectively, for gripping the articles to be raised or lowered, said jaws being rotatably supported by trunnions, 27 and 28 respectively, mounted in the rearwardly-projecting ends of the swingingly-mounted arms. The jaws 25 and 26 are of symmetrical form and are each pivotally supported from the corresponding swinging arm at a point somewhat off center so that the weight of the jaws normally causes them to assume the position as shown in Fig. 1 of the drawings. In the present embodiment of the invention, the interior surfaces of the gripping jaws are somewhat concave, for the purpose of enabling them to more readily engage a cylindrical object A, such as a roll of paper, for raising or lowering the same or conveying it from place to place. The gripping jaws are, as above stated, pivotally mounted upon the rearwardly-extending end portions of the elevating arms and suitable means may be provided for locking the gripping jaws to the corresponding elevating arms in any one of a variety of angular positions, such for example, as that shown and described in my copending application Serial No. 426,582 filed Nov. 26, 1920.

The motor 19 is adapted to operate with equal readiness in either a forward or reverse direction, whereby the gear 11 and the shaft 8 by which the same is carried may be rotated either in a clockwise or counter-clockwise direction as seen in Fig. 1 of the drawings. When the device is to be used for the purpose of raising an object such as that designated by the reference character A in the embodiment illustrated herewith, the truck is placed in position and the elevating arms, which normally occupy the lowered position as shown in full lines in Fig. 1 of the drawings—in which position

they are supported by means of a transverse bar 50 extending across the rear portion of the frame—are brought into position upon opposite sides of the article and the shaft 8 is rotated in a clockwise direction, whereupon the arms 22 and 23 are first moved inwardly toward each other by reason of the right- and left-handed threaded portions 20 and 21 of the shaft 8 traveling in the internally-threaded portion of the arms until the gripping jaws 25 and 26 are tightly clamped against opposite sides of the article, whereupon the internally-threaded portions of the elevating arms, being incapable of further travel towards each other, become locked upon the externally-threaded portions 20 and 21 of the shaft 8 and move with the shaft upon continued rotation of the same, to assume the position indicated in dotted lines upon Fig. 1 of the drawings wherein the article is elevated, and the truck may then be moved to any desired location and the article deposited upon a platform, wagon, or other raised surface, as may be desired. Immediately upon the depositing of the article in the desired position, the motor 19 is caused to rotate in a reverse direction, thus rotating the shaft 8 in a counter-clockwise direction as viewed in Fig. 1, whereupon the arms 22 and 23 are caused to move away from each other until such time as the gripping jaws are released from the article which has been transported. When the gripping jaws have been released from the article, the truck may be moved forwardly out of engagement therewith, mechanism which will be hereinafter described being provided for preventing sudden fall of the elevating arms into the lowered position which they normally occupy after they are moved out of engagement with the platform, wagon, or other surface upon which the article has been deposited.

The elevating arms 22 and 23 are provided with correspondingly-located upwardly-extending bosses 43 and 44, respectively, in which is mounted a transverse bar 45, the bar being secured against sliding movement relative to the boss 43 by means of a suitable pin 46, but being mounted to permit the bar to slide relative to the boss 44. It will be seen upon reference to Fig. 1, that when the elevating arms are moved to their raised position, as indicated in dotted lines in that figure, the bar 45 will move rearwardly about the shaft 8 as an axis and may be engaged by a holding member 47 pivotally supported by the frame, as indicated at 48, to prevent sudden downward movement of the elevating arms after they have been released from engagement with the article raised. The holding member 47 is provided with a plurality of lugs 49 so positioned as to be adapted to engage the bar 45 in any one of a

plurality of angular positions, whereby the elevating arms may be held in different raised positions, depending upon the different heights to which it may be found desirable to elevate the articles. An operating lever 51, is mounted upon a pivot 52 carried by a bracket 53, which is, in turn, supported upon the housing 4, and a link 54 pivotally connects the lever 51 with the holding member 47, whereby the holding member may be held out of engagement with the rod 45 during the elevating movement of the swinging arms and be moved into engaging position with the rod 45 when the swinging arms have reached the upper limit of their movement. A lug 55 is carried by the bracket 53 and is suitably located to normally hold the lever 51 in such position as to keep the member 47 out of engagement with the bar 45, while at the same time the operator by sliding the lever 51 laterally upon the pivot 52 may lower the holding member 47 into engagement with the rod 45.

When the elevating arms have reached the upper limit of their movement, the operator may manipulate the lever 51 to cause the holding member to be lowered into such position that one of the lugs 49 engages the bar 45, whereby the elevating arms are held in raised position and prevented from being suddenly dropped into their normal lowered position as the truck is moved away from the platform upon which the article has been deposited. When the truck has been moved away from the platform, the motor 19 may be operated to rotate the shaft 8 in a clockwise direction as seen in Fig. 1, thus causing the arms 22 and 23 to travel inwardly towards each other until the inner portions thereof engage opposite side faces of the worm-gear 11, when the arms will be held against downward movement independently of the shaft 8, and thereupon the motor 19 may be reversed to slowly lower the arms into their normal lowered position in such a manner as to prevent breakage or injury of the arms as they are being lowered.

As will be understood from the preceding description, the elevating arms, when their movement is unobstructed, may move inwardly upon clockwise rotation of the shaft 8 until the inner surfaces of the forward end portions engage opposite sides of the gear 11, whereupon they will be locked against further inward movement towards each other and will then be rotated with the shaft 8 as the shaft is moved in a clockwise direction as seen in Fig. 1. In a similar manner, the operation of the motor to rotate the shaft 8 in a counterclockwise direction, as seen in Fig. 1, will cause the elevating arms, if in lowered position, to move outwardly away from each other until they reach the limit of their outward movement, and if the motor continues to operate after the arms have reached the limit of their outward movement further outward movement of the arms might cause injury to the frame or arms by further forcing them outwardly. In order to automatically prevent excessive outward movement of the arms as thus described and provide means for stopping counterclockwise rotation of the shaft 8 without necessitating any action on the part of the operator, suitable control mechanism is provided together with means for actuating the same from the shaft 8.

A lug 60, suitably positioned upon the shaft 8, is adapted to strike the end of a slidably-supported bar 61 when the shaft 8 is rotated a sufficient extent in a counterclockwise direction to bring the arms to the limit of their outward movement, whereby the bar 61 is moved forwardly of the truck to operate the controller for stopping the operation of the motor. The forward end of the bar 61 is pivotally connected to one arm of an elbow-lever 62 which is pivotally supported, as at 63, upon the housing, the other arm of said elbow-lever being pivotally connected to the controller 64 by means of a link 65. The controller 64 is mounted to rotate a controller-shaft 66 to forward, reverse, or neutral positions, the controller being shown in Fig. 1 as in neutral position, the forward and reverse positions of the same being indicated in dotted lines. When the operator draws the forwardly-projecting portion of the controller upwardly, current is sent through the motor windings to cause the motor to actuate the shaft 8 to rotate the same in a counterclockwise direction, and when the lug 60 strikes the end of the bar 61 the bar is forced forwardly to bring the controller into neutral position, as shown in full lines upon Fig. 1 of the drawings.

The motor-shaft 18 is provided with a drum 67 secured thereto, and a pair of brake-bands 68 are pivotally supported by a bracket 69 and positioned to engage opposite sides of the drum for stopping rotation of the motor-shaft when current is cut off from the windings of the motor. The bands 68 are each provided with an upwardly-extending ear 70, the ears being arranged substantially parallel with each other, and a bolt 71 passes through the ears and has a coiled spring 72 positioned therearound for normally forcing the brake-bands together. A cam 74 is pivotally supported in any suitable manner and projects between the ears 70 for separating the ears against the tension of the spring 72, and a link 75 connects the cam 74 with the bar 61 for controlling the operation of the cam from the bar 61 to move the bands away from opposite sides of the drum when the controller is in either forward or reverse position and permits the bands to be clamped against the sides of the

drum when the controller is in neutral position, whereby rotation of the motor-shaft may be immediately stopped when the controller is moved to neutral position from either forward or reverse positions.

From the above description it will be seen that a simple and efficient form of control mechanism is provided for automatically stopping excessive rotation of the shaft 8 in a counterclockwise direction as seen in Fig. 1, which is effective to not only move the controller from reverse to neutral position, but at the same time renders effective a brake-mechanism to stop rotation of the motor-shaft. The control mechanism is at such time in position to permit manual operation of the controller to operate the motor in a forward direction by further depressing the forwardly-extending portion of the controller 64 and thus at the same time moving the bar 61 further forwardly to release the brake from the motor-shaft when the forward operation of the motor is commenced. When the controller is moved to neutral position, the cam 74 is rotated to allow the brake-bands 68 to be forced against opposite sides of the drum 67 by the spring 72 for immediately stopping rotation of the motor-shaft after each operation of the motor.

While the invention illustrated herewith has been described with considerable particularity in order to make clear to those skilled in the art the various structural details which may be employed in a practical utilization of the same, it is to be understood that the invention is not limited to the precise details of construction illustrated and described except as they are included in the following claims.

What I claim is—

1. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common shaft, means for rotating said shaft to actuate the arms, a stop carried by said shaft, and means actuated by said stop for rendering said first-named means inoperative upon rotation of the shaft to a predetermined extent in one direction.

2. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common shaft and movable towards and from each other, and stop mechanism operative to limit the movement of the arms away from each other.

3. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common axis and movable towards and away from each other, a rotatable shaft actuatable to move said arms towards and away from each other and to swing the same, and means for limiting the extent of rotation of the shaft in one direction.

4. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common axis and movable towards and away from each other, a rotatable shaft actuatable to move the arms towards and from each other, and stop mechanism operative to limit the movement of the arms away from each other.

5. In an elevating truck, a motor, an operating shaft adapted to be actuated by the motor, a stop carried by said shaft, a controller for the motor, and means operable at a predetermined point in the rotation of the shaft by said stop to move the controller to neutral position.

6. In an elevating truck, a motor, an operating shaft adapted to be actuated by the motor, a stop carried by said shaft, a controller for the motor, a brake for the motor-shaft, and means operable at a predetermined point in the rotation of the shaft by said stop to move the controller to neutral position and apply the brake to the motor-shaft.

7. In an elevating truck, a motor, an operating shaft adapted to be driven from the motor, a controller for the motor movable to forward, reverse and neutral positions, and means operable at a point in the rotation of the shaft to move the controller from reverse to neutral position and hold it against being moved to reverse position while permitting it to be moved to forward position.

8. In an elevating truck, gripping and elevating arms mounted for swinging movement and movable towards and from each other, a rotatable shaft for moving the arms, a motor for operating said shaft, a controller, and means actuatable by said shaft at a predetermined point in its rotation to move the controller to neutral position.

9. In a truck, an elevating mechanism, means for actuating the elevating mechanism comprising a motor, an operating shaft and a stop carried by said shaft, a controller for the motor, and means operated by the stop for moving the controller to neutral position.

10. In a truck, an elevating mechanism, means for actuating the elevating mechanism comprising a motor and motor-shaft, an operating shaft and a stop carried by said shaft, a controller for the motor, and means operated by the stop for moving the controller to neutral position and applying a brake to the motor-shaft.

11. In a truck, an elevating mechanism comprising gripping and elevating arms mounted to swing in a vertical plane and movable horizontally towards and from each other, motor-operated means for swinging the arms and moving the same towards and from each other, a controller

for the motor, and means actuated by the motor-operated means at a predetermined point in its movement for moving the controller to neutral position.

5 12. In a truck, an elevating mechanism comprising gripping and elevating arms mounted to swing in a vertical plane and movable horizontally towards and from each other, motor-operated means for swinging 10 the arms and moving the same towards and from each other, a controller for the motor having forward, reverse, and neutral positions of movement, and means actuated by the motor-operated means at a predetermined 15 point in its movement to move the controller from reverse to neutral position while permitting movement of the controller to its forward position.

13. In an elevating truck, a shaft provided 20 with oppositely threaded portions, gripping and elevating arms mounted upon the oppositely threaded portions of said shaft and adapted for movement towards and from each other longitudinally of said shaft and 25 movable with said shaft when restrained from travel longitudinally thereof, and means for limiting the rotation of said shaft in one direction.

14. In an elevating truck, a motor, an operating shaft adapted to be actuated by the 30 motor and provided with oppositely threaded portions, gripping and elevating arms mounted upon the oppositely threaded portions of said shaft and movable towards 35 and from each other and movable with said shaft when restrained from travel longitudinally thereof, a controller for the motor, and means operable at a point in rotation of the shaft to move the controller to neutral 40 position.

15. In an elevating truck, a motor, an op-

erating shaft adapted to be actuated by the motor and provided with right- and left-handed threaded portions, gripping and elevating arms mounted upon the right- and 45 left-handed threaded portions of said shaft and adapted for movement towards and from each other, a controller for the motor movable to forward, reverse and neutral positions, and means operable at a point in the 50 rotation of the shaft to move the controller from reverse to neutral position and hold it against being moved to reverse position while permitting it to be moved to forward position.

16. In an elevating truck, a motor, an operating shaft adapted to be actuated by the motor and provided with right- and left-handed threaded portions, gripping and elevating arms mounted upon the right- and 60 left-handed threaded portions of said shaft and adapted for movement towards and from each other, a controller for the motor, and means operable at a point in the rotation of said shaft to move the controller to 65 neutral position.

17. In a truck, a shaft provided with oppositely threaded portions, an elevating mechanism comprising gripping and elevating 70 arms mounted upon the oppositely threaded portions of said shaft to swing in a vertical plane and movable horizontally towards and from each other, motor operated means for swinging the arms and moving the same towards and from each other, a 75 controller for the motor, and means actuated by said shaft at a predetermined point in its movement for moving the controller to neutral position.

In testimony whereof I have affixed my 80 signature.

FRANK L. EIDMANN.