

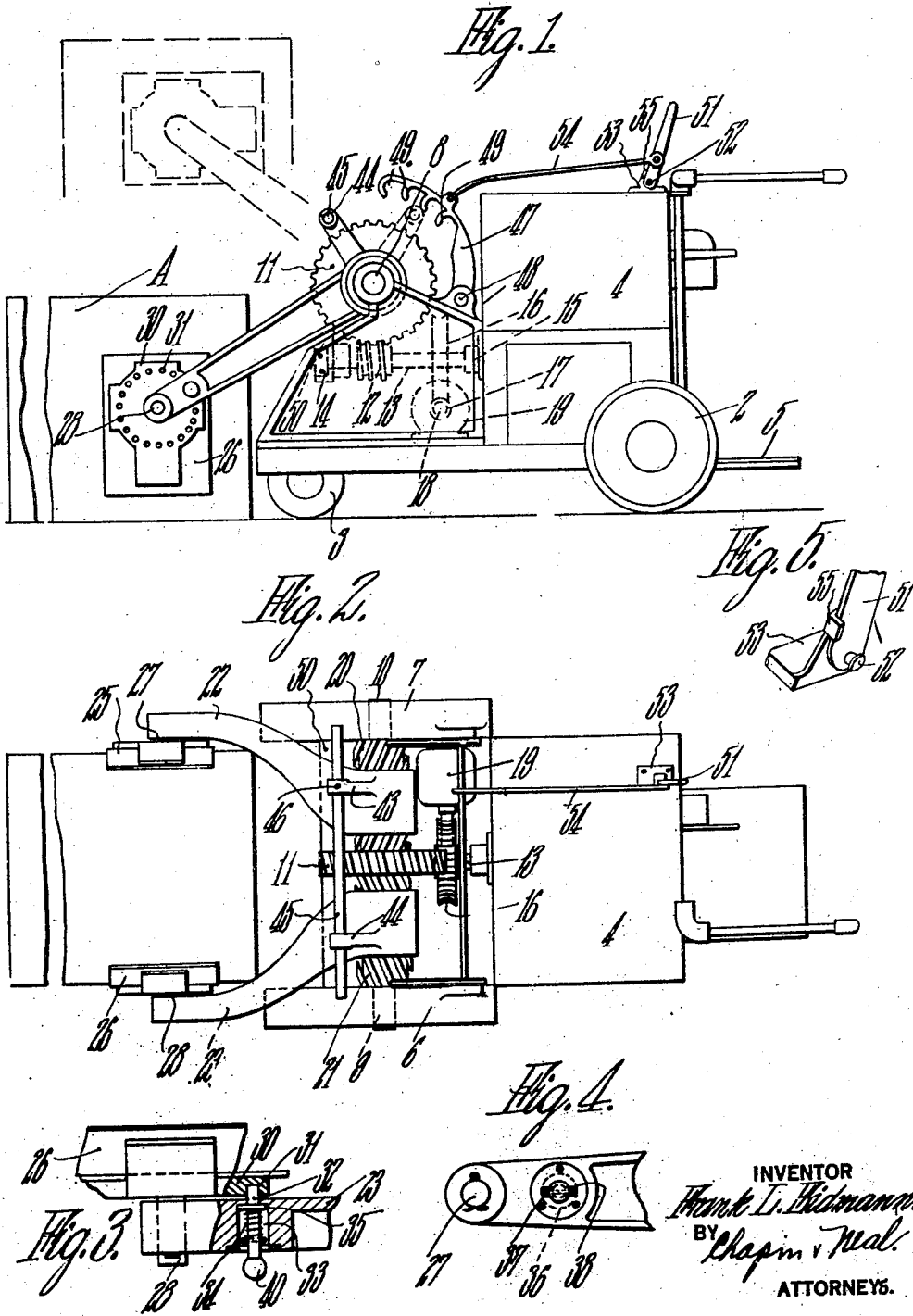
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F. L. EIDMANN

ELEVATING TRUCK

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UNITED STATES PATENT OFFICE.

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ELEVATING TRUCK.

Application filed November 26, 1920. Serial No. 426,582.

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 an elevating truck of an improved type, wherein a pair of 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 means for controlling the position of the gripping jaws relative to the arms, whereby the jaws may each be held in a variety of adjusted positions relative to the arms to facilitate the operation of the mechanism and adapt the same to a wide range of usefulness.

Another object of the invention is to provide improved controlling means for the swinging arms, whereby the arms may be readily controlled and retained in any one of a variety of elevated positions during such times in the operation of the mechanism as is desirable to prevent the arms from falling to their lowered position.

Other objects of the invention relate to certain improved details of construction and new 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 position of the elevating arms when grasping an article to be raised, and in dotted lines the position of the arms as the article is held in raised position;

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

Fig. 3 is a detail view, partially in section, showing the mechanism for locking the gripping jaws to the arms;

Fig. 4 is a side view of one of the arms, showing the position of the locking mechanism relative thereto; and

Fig. 5 is a detail view of the mounting for the holding lever.

In the operation of devices of this character, it is frequently desirable to retain one or both of the gripping jaws in a certain fixed relation to its corresponding arm, for the purpose of properly grasping articles

of various shapes and holding such articles against turning while they are being raised or lowered, whereby they may be deposited in the same position as that which they originally occupied. Moreover, in using the device for raising and lowering articles of certain shape it is desirable to so position the gripping jaws that they occupy positions at an angle to their normal positions so that they may engage opposite sides of the articles and properly fit thereagainst for gripping the same. In order to thus adapt the mechanism for use in a variety of different relations and in connection with a variety of different objects, it is desirable to provide suitable means for holding the jaws against rotation upon the trunnions by which they are supported in the arms, whereby either or both of said jaws may be locked against rotation relative to its corresponding arm, or turned into any desired angular position and there secured against rotation relative to its supporting arm.

In raising and lowering heavy articles, it frequently happens that it is desirable to raise such articles from a floor and deposit the same upon a platform, wagon, car, or other structure, raised a greater or less distance above the level of the truck, and in such cases it is desirable to provide suitable means for preventing the gripping arms from suddenly falling into their lowered position when they have been actuated to release the jaws from the article and the truck moved rearwardly to such position that the arms are no longer supported by the platform, wagon, etc., upon which the article has been placed. It will be readily understood that by reason of the weight of the arms, considerable jar to the mechanism might be caused by the sudden fall of the same into lowered position as well as danger of breaking or damaging the arms. To prevent such possible injury to the mechanism, suitable means is provided for engaging the arms and holding them elevated until such time as the mechanism may be set in operation to slowly lower the arms to their lowermost position.

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 counter-balance 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 13 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 respec-

tively, 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 stated above, pivotally mounted upon the rearwardly-extending end portions of the elevating arms, and suitable means is provided for locking the gripping jaws to the elevating arms in any one of a variety of angular positions in order to prevent free rotation of the gripping jaws relative to the elevating arms, and thus enable the mechanism to be employed for raising or lowering articles such as the roll of paper previously described and depositing the same in like position even when the position of the truck is such that the gripping jaws do not engage the article at points adjacent its center of gravity.

Similar mechanism is employed for thus maintaining each of the jaws in position relative to its corresponding arm, and therefore this mechanism will be described only in connection with one of the arms, it being understood that similar mechanism is employed in connection with the other arm. A segmental plate 30 is secured to or formed integral with the jaw 26 and is provided with a plurality of depressions 31 arranged concentric with the axis of rotation of the gripping jaw. A pin 32 is slidably supported by the arm 23 in position to engage any one of the depressions 31 formed in the corresponding plate 30, the pin 32 being mounted in a recess 33 formed in the arm and normally urged into engaging position with one of the depressions 31 by means of a coiled spring 34 positioned within the recess 33 and surrounding the pin 32 to bear against a plate 35 secured to the pin 32 and against a cover-plate 36 secured to the arm 23 and substantially covering the recess 33. A key 37 projects through the pin 32 adjacent the outer end thereof and is adapted to pass through cut-away portions 38 formed in the cover-plate 36 when the pin 32 is rotated into such position as to enable the key to register with the oppositely-positioned slots or cut-away portions. The pin 32 is provided with an enlarged end 40 by which the pin may be withdrawn from engagement with one of the depressions 31 against the tension exerted by the spring 34, and when thus withdrawn, the pin 32 may be rotated to such an extent

as to cause the key 37 to engage with the plate 36 and thus prevent the pin 32 from engaging with one of the depressions 31. In this position of the parts the jaw 26 will rotate freely relative to the elevating arm 23, and if at any time it is found desirable to hold the jaw 26 against rotation relative to the arm, the operator may place the jaw in the desired position, and by rotating the pin 32 a sufficient amount to enable the key 37 to pass through the oppositely-positioned slots 38 formed in the plate 36, the pin 32 will be immediately forced into engagement with the nearest depression 31, and thus the jaw will be securely held in position relative to the corresponding elevating arm until such time as it is desired to release the pin.

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 counterclockwise 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 counterclockwise 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. Suitable means may be employed for controlling the operating mechanism of the truck such for example as is shown and described in my copending application, Serial No. 426,583 filed Nov. 26, 1920.

It will be readily understood from the above description that the structure described herein is capable of being used in the handling of a variety of different articles the movement of which from place to place is ordinarily accompanied with considerable difficulty on account of the great weight of the articles and the trouble encountered in raising the same any considerable distance. As an illustration of one of the various different uses in which this mechanism may be advantageously employed, it will be seen that in the lifting movement of cylindrical articles of great weight the mechanism previously described for preventing the rotation of the jaws relative to the elevating arms enables the truck to be used in gripping a cylindrical object when lying upon the floor as shown in Fig. 1, and by placing the pins 32 in engagement with the corresponding registering depressions 31 the article may be lifted in its horizontal position and placed in that position upon the platform or wagon upon which it is to be located; or, if desired, after placing the article upon the platform or wagon, the pins 32 may be drawn outwardly from engagement with the depressions 31 to permit free rotation of the jaws relative to the arms, whereupon by continued rotation of the elevating arms the cylindrical object may be placed upon one end upon the wagon or platform. If desired, however, this mechanism permits of first raising the cylindrical object and placing it upon one end upon the floor, and then by placing the pins 32 in engagement with the corresponding depressions 31 the cylindrical object may be raised and placed in its up-ended position upon the platform or wagon upon which it is to be located.

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 prac-

tical 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, a pair of swingingly-mounted elevating arms movable towards and from each other, each of which is provided with a gripping jaw, said jaws being mounted for angular movement relative to the arms and being adapted to engage opposite sides of an article to be raised, and means for locking the jaws in any one of a plurality of angular positions relative to the arms.

2. In an elevating truck, a pair of elevating arms mounted for simultaneous swinging movement and adapted to move towards and from each other, oppositely-positioned jaws pivotally supported by the arms, and means for locking each jaw to its supporting arm in any one of a plurality of angular positions.

3. In an elevating truck, a pair of arms movable towards and from each other, oppositely-positioned gripping jaws pivotally supported by the arms, a segmental plate carried by each arm, and means for securing each jaw to its corresponding plate in any one of a variety of angular positions.

4. In an elevating truck, a pair of elevating arms mounted for vertical swinging movement, oppositely-positioned gripping jaws pivotally supported by the arms, a segmental plate carried by each arm, and means for securing each jaw to its corresponding plate in any one of a variety of angular positions.

5. In an elevating truck, a pair of elevating arms mounted for swinging movement to adapt them for raising or lowering an article located between them, said arms being movable toward and from each other to enable the article to be gripped between said arms or released, means for raising and lowering said arms, and means for holding said arms in any one of a variety of elevated positions.

6. In an elevating truck, a pair of elevating arms mounted for swinging movement to adapt them for raising or lowering an article gripped between them, article gripping jaws carried by said arms, and means for holding said arms in any one of a variety of elevated positions.

7. In a truck, a pair of arms mounted for swinging movement about a common axis to enable them to raise or lower an article supported thereby, a pivoted member having a plurality of hooked portions thereon, means connected with said arms for cooperating with said hooked portions for holding said arms in any one of a plurality of elevated positions, said member being con-

structed and arranged so that said hooked portions may be moved into holding position by swinging said member about its pivot, and means normally holding said member in inoperative position and capable of being actuated to swing said member into operative position.

8. In an elevating truck, a frame, a pair of elevating arms mounted for swinging movement about a common axis to adapt them for raising or lowering an article supported thereby, means for swinging said arms, cooperating devices on said frame and arms for holding said arms in any one of a variety of raised positions, and actuating means connected with one of said devices normally operative to maintain the latter disengaged.

9. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common axis, means for actuating said arms to grip an article therebetween and raise the same, and means for holding the arms in any one of a variety of raised positions while the first-named means is actuated to move the arms from each other and release the article raised.

10. In an elevating truck, a shaft provided with oppositely threaded portions, gripping and elevating arms mounted upon the threaded portions of said shaft and movable towards and from each other upon rotation of the shaft and rotatable with the shaft when restrained from longitudinal movement relative thereto, and means for holding the arms in any one of a plurality of raised positions.

11. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common axis and movable bodily towards and from each other, means for actuating the arms to grip an article therebetween and raise the same, and means for holding the arms in any one of a variety of raised positions.

12. In an elevating truck, gripping and elevating arms mounted for swinging movement about a common axis and movable bodily towards and from each other, means for limiting the movement of the arms towards each other whereby the arms may be raised,

and means for holding the arms in any one of a plurality of raised positions.

13. In an elevating truck, a pair of elevating arms mounted for swinging movement about a common horizontal axis to adapt them for raising or lowering an article gripped between them, a cross-bar connecting said arms to prevent relative swinging movement thereof, means for swinging said arms, and a member pivoted upon the truck for vertical swinging movement and adapted to cooperate with said cross-bar for holding said arms in any one of a variety of elevated positions.

14. In an elevating truck, a pair of elevating arms mounted for swinging movement about a common horizontal axis to adapt them for raising or lowering an article gripped between them, a cross-bar connecting said arms to prevent relative swinging movement thereof, means for swinging said arms, and a member pivoted upon the truck for vertical swinging movement and having a plurality of hooks thereon for engaging with said cross-bar to hold said arms in a variety of elevated positions, and means for holding said member in inoperative position.

15. In an elevating truck, a pair of elevating arms mounted for swinging movement about a common horizontal axis to adapt them for raising or lowering an article gripped between them, a cross-bar connecting said arms to prevent relative swinging movement thereof, means for swinging said arms, and a member pivoted upon the truck for vertical swinging movement and having a plurality of hooks thereon for engaging with said cross-bar to hold said arms in a variety of elevated positions, and means for supporting said member in inoperative position and for moving it into operative position, said hooks being arranged upon said member so that when the latter is operatively positioned all the hooks will be disposed in the path travelled by said bar as said arms are swung about their common axis.

In testimony whereof I have affixed my signature.

FRANK L. EIDMANN.