Feb. 10, 1925. 1,525,857

F. L. EIDMANN

ELEVATING TRUCK

Filed Nov. 26, 1920 3 Sheets-Sheet 1

Fig. 1.

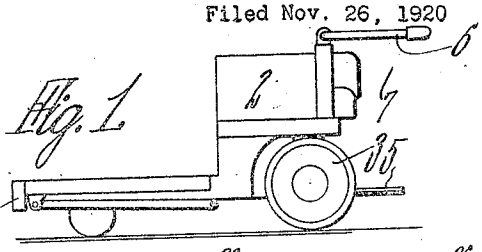


Fig. 2.

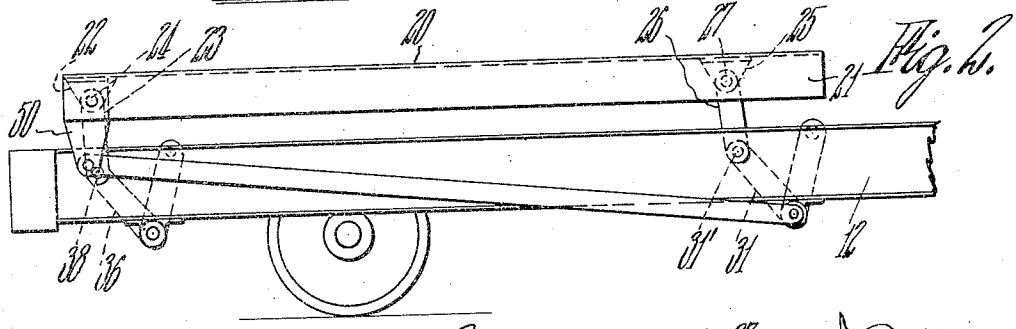


Fig. 3.

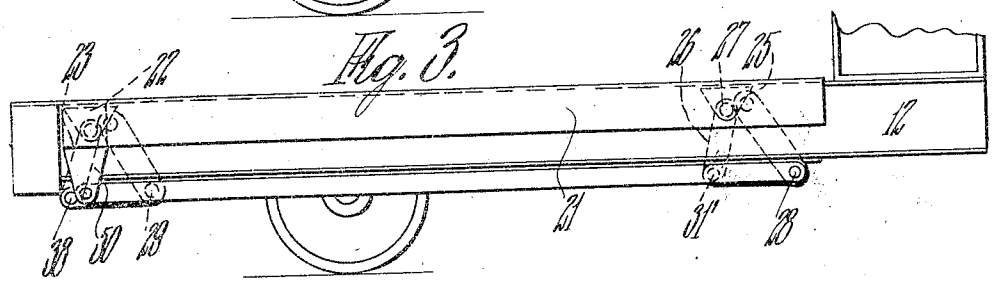
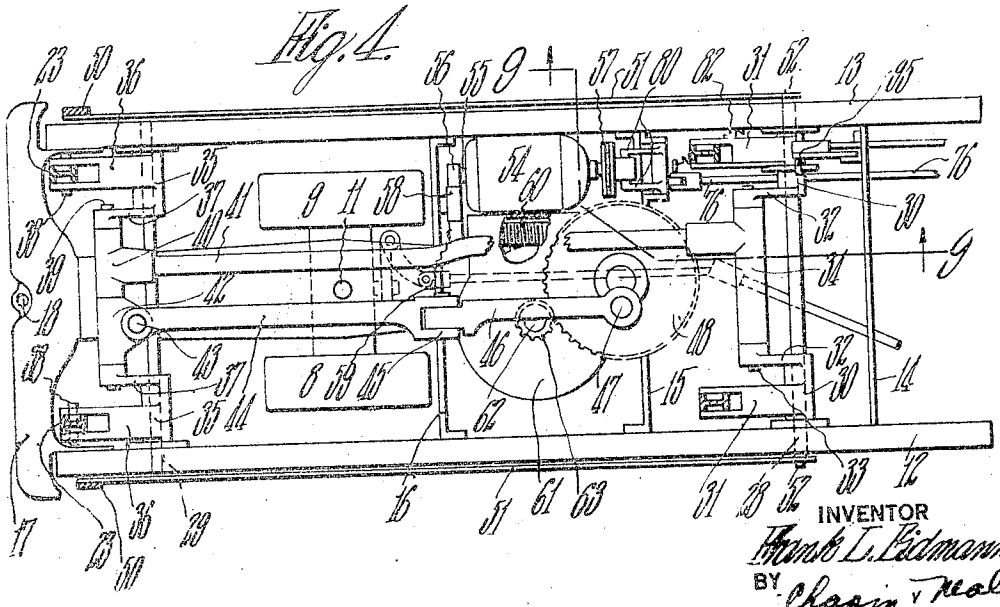


Fig. 4.



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BY Chapin & Neal

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F. L. EIDMANN

ELEVATING TRUCK

Filed Nov. 26, 1920 3 Sheets-Sheet 2

Fig. 5.

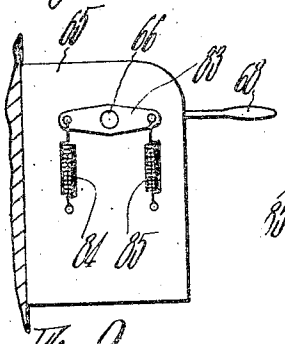


Fig. 6.

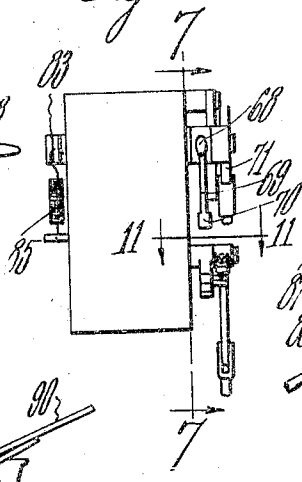


Fig. 7.

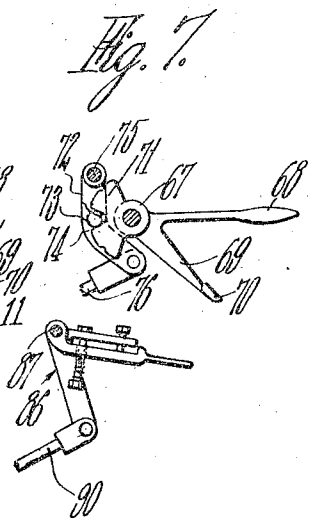
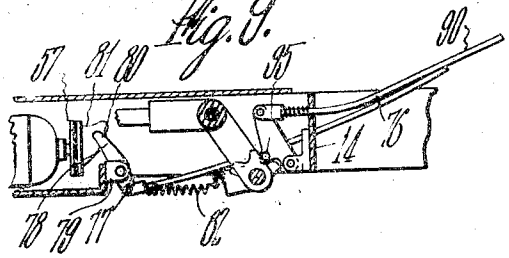


Fig. 9.



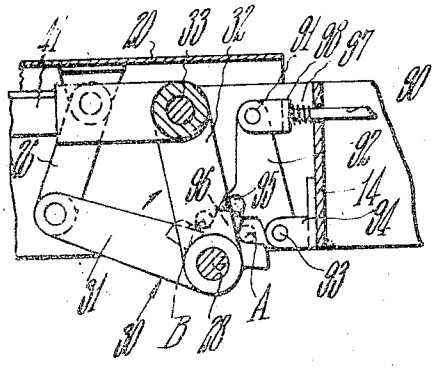


Fig. 10.

Fig. 8.

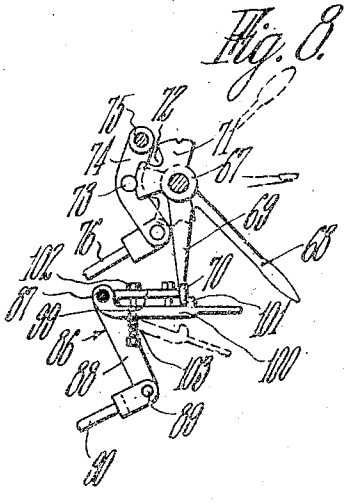
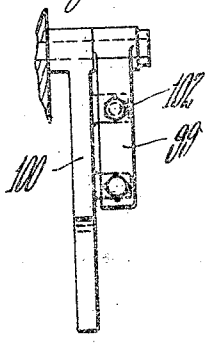


Fig. 11.



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F. L. EIDMANN

ELEVATING TRUCK

Filed Nov. 26, 1920 3 Sheets-Sheet 3

Fig. 16.

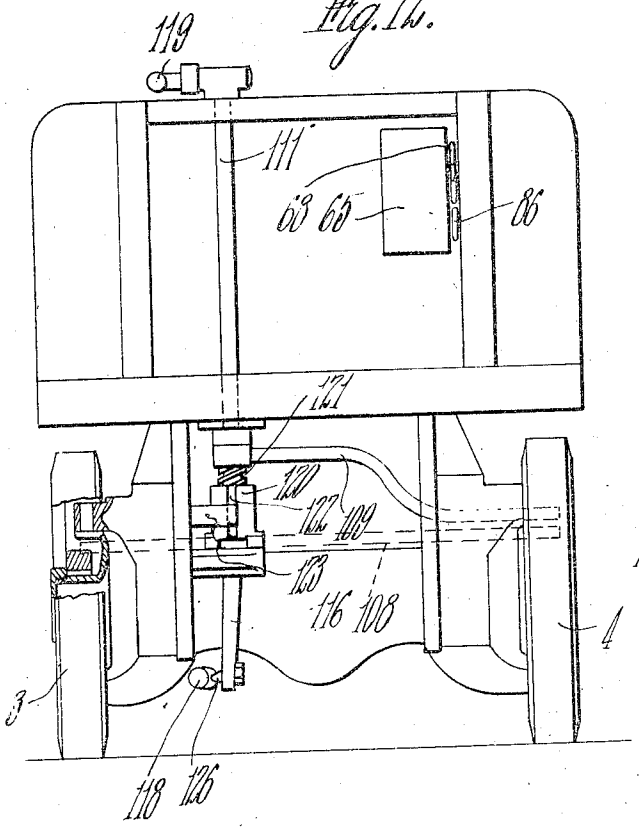


Fig. 14.

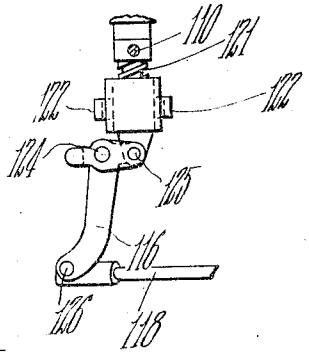
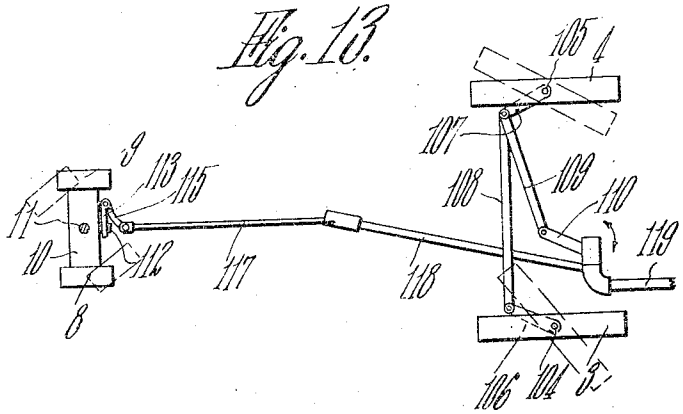


Fig. 13.



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ATTORNEYS.

Patented Feb. 10, 1925. 1,525,857

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. 426,584.

To all whom it may concern:

Be it known that I, FRANK L. EIDMANN, 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 improved elevating truck of the self-propelled type such as is shown and described in Patent 1,331,198 granted February 17, 1920 to D. E. Hennessy and John McGeorge.

One object of the invention is to provide in an elevating truck, improved mechanism for elevating and controlling the movement of the movable platform, whereby the platform is readily raised and lowered and at the same time the platform is maintained substantially horizontal during the raising and lowering movement, and to provide means for moving the platform longitudinally of the frame during the raising and lowering movement.

A further object of the invention is to provide improved control mechanism for controlling the movement of the platform and the actuating means therefor whereby the operation of the various mechanisms is easily controlled from a single point and the various control devices properly arranged and coordinated to simplify and render the operation of the mechanism largely automatic thus requiring less care and attention on the part of the operator and increasing the efficiency of the device.

Another object of the invention is to provide an efficiently operating and compactly arranged structure of the character described wherin the operating parts are so constructed and arranged as to form a simple and compact structure readily operable to effectively raise and lower heavy loads, as well as to support the same at any desired point within the limits of movement of the platform.

Another object of the invention is to provide a simple and efficient form of brake mechanism and to suitably arrange the operating means therefor for cooperation with the controller mechanism in such a manner as to render the brake mechanism effective at proper periods and hold the same against operation at suitable periods in the operation of the mechanism.

A further object of the invention is to locate the various operating mechanisms for raising and lowering the platform so that they will be arranged in substantially the same plane and positioned between the sides of the frame where they will be readily accessible upon removal of the platform and thus be readily replaceable when desired.

Another object of the invention is to provide improved steering and controlling mechanism for controlling the direction of travel of the truck.

Another object of the invention is to provide a novel arrangement of supporting and steering wheels whereby the truck structure may be suitably supported to permit the truck to be turned in a limited area.

A further object of the invention is to provide an improved steering mechanism whereby the rear axle may be readily turned by the steering member a degree sufficient to properly bring the axes of the several wheels into such position as to cause them to intersect at a common point for ideal steering in turning the truck and also to provide suitable shock-absorbing means whereby the transmission of shocks from the rear wheels to the steering member will be prevented.

Further objects of the invention relate to various 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 improved truck;

Fig. 2 is an enlarged side elevational view of the frame and platform showing the platform in raised position;

Fig. 3 is an enlarged side elevational view of the frame and platform showing the platform in its lowered position;

Fig. 4 is a top plan view of the truck operating mechanism showing the arrangement of the same and the manner in which it is carried by the frame;

Fig. 5 is a side elevational view of the controller box showing the mechanism em-

ployed for returning the controller to its inoperative position;

Fig. 6 is a front elevational view of the controller box;

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 6 showing the controller and holding means therefor disengaged;

Fig. 8 is a sectional view taken along the line 7—7 of Fig. 6 showing the controller and holding means therefor in engaged position; and also showing in dotted lines the position of the controller when the normal direction of the operation of the motor is reversed;

Fig. 9 is a sectional view taken along the line 9—9 of Fig. 4;

Fig. 10 is an enlarged sectional view of a portion of the mechanism shown in Fig. 9;

Fig. 11 is a detail sectional view taken along the line 11—11 of Fig. 6 of the holding mechanism shown in Figs. 7 and 8;

Fig. 12 is a front elevational view of the truck showing the position of the controller box and the arrangement of the steering mechanism;

Fig. 13 is a diagrammatic plan view showing the arrangement of the supporting wheels and the steering mechanism therefor; and

Fig. 14 is a detail view of the compensating mechanism for connecting the steering post with the pivoted axle.

In the embodiment of the invention illustrated herewith, the truck comprises a comparatively low horizontally extending frame 1 at the forward end of which is located a housing 2 within which may be enclosed certain of the operating mechanism such as the battery and mechanism for driving and controlling the truck. The truck is preferably electrically driven and is supported by a pair of combined driving and steering wheels 3 and 4 located substantially beneath the housing 2 and which may be of any suitable construction and driven in any well-known manner for driving wheels of this character, such for example, as in the construction shown and described in patent to Fairchilds #1,343,358 patented June 15, 1920 to which reference may be made for a more detailed illustration and description of the wheel structure and the manner of driving the same.

Projecting forwardly of the truck is a platform 5 for the operator so located as to enable the operator to have ready access both to the steering handle 119 and the controller lever 68. The power for driving the truck may be obtained from storage batteries supported within the housing 2 and may be applied to the wheels 3 and 4 through any suitable form of electric motor which may also be enclosed by the housing 2. A pair of rear supporting wheels 8 and 9 are rotatably mounted upon opposite ends of the axle 10 which is mounted to swing about a vertical axis 11 in a manner and for a purpose which will be more fully described hereinafter. The wheels 8 and 9 are located beneath the horizontally extending frame portion 1 and together with the front steering and driving wheels 3 and 4 serve to support the truck together with any load carried thereby.

The horizontally extending frame 1 comprises longitudinally extending side frame members 12 and 13 which are suitably spaced from each other and connected at intervals by transverse bars 14, 15, 16 and 17 as shown in Fig. 4 of the drawings. The rearwardly positioned transverse member 17 is provided with an eye 18 to which a trailer may be attached if desired.

An elevating platform 20 is supported by the horizontally extending frame portion 1 and may be provided with downwardly extending sides 21 spaced outwardly a sufficient distance from the side frame members 12 and 13 to permit them to overlap the side frame members when the platform is in its lowered position as shown in Fig. 3 of the drawings. Brackets 22 extend downwardly from the under surface of the platform being located at opposite sides thereof adjacent the rear end of the platform, to which links 23 are pivotally secured by means of pins 24. Similar brackets 25 extend downwardly from opposite sides of the platform adjacent the forward end thereof and links 26 are pivotally secured to these brackets by means of pins 27. Shafts 28 and 29 are rotatably supported by the horizontally extending frame 1 adjacent to the front and rear ends thereof respectively and these shafts are each provided with suitable means for engaging the links 23 and 26 to raise and lower the platform upon suitable rotation of the shafts. Keyed or otherwise suitably secured to the shaft 28 is a pair of elbow levers 30 of similar construction each of which is provided with divergent arms 31 and 32, the arm 31 of each elbow lever being pivotally connected to the lower end of the correspondingly positioned link 26 as at 31', while the arms 32 of the levers 30 are connected together for simultaneous movement by means of a bar 33. A sleeve 34 is rotatably supported by the bar 33 between the opposite arms 32. Elbow levers 35 are keyed or otherwise fixedly secured to the shaft 29 adjacent the opposite ends thereof which levers correspond substantially with the elbow-levers 30 previously described and are each provided with divergent arms 36 and 37. The arm 36 of each elbow lever 35 is pivotally connected to the lower end of the correspondingly positioned link 23 carried by the platform as at 38, while the arms 37 are connected together

for simultaneous movement by a transverse bar 39. A sleeve 40 is rotatably mounted upon the bar 39 and is connected with the sleeve 34 by a link 41 extending longitudinally of the machine. By this arrangement of the mechanism simultaneous and equal movement of each elbow lever is insured and equal movement is accordingly transmitted to each of the links 23 and 26 to move all parts of the platform equally upon actuation of the elbow levers. A second sleeve 42 is rotatably mounted on the bar 39 and is provided with a pin 43 passed through the end of a link 44 for pivotally connecting the link to the sleeve in such a manner as to permit movement of the link about the pivot pin 43 in a substantially horizontal plane, and the link 44 is pivotally connected as at 45 to one end of a link 46 the opposite end of the link 46 being sleeved upon a crank 47 carried by a gear 48 which gear is mounted to rotate in a substantially horizontal plane and is operated in a manner which will be more fully described hereinafter to draw the links 44 and 46 forwardly as shown in Fig. 4 and thus actuate the elbow levers 35 equally and simultaneously and at the same time actuate the elbow levers 30 through connections formed by the link 41 and the bar 33 connecting the elbow levers 30.

In order to insure proper movement of the platform 20 upon actuation of the elbow levers 30 and 35, downwardly extending brackets 50 are secured to opposite sides of the platform 20 adjacent the rear end thereof and outwardly of the longitudinally extending side frame members 12 and 13. Pivoted to the lower end of each bracket 50 is a forwardly extending connecting rod 51 the opposite end of each rod being pivotally mounted upon a reduced extension 52 of the transverse shaft 28. It will be seen upon inspection of Fig. 2 and Fig. 3 that as the links 23 are pivotally connected to the arms 36 of the elbow levers 35 and the links 26 are pivotally connected to the arms 31 of the elbow levers 30 proper raising and lowering of the platform would not with certainty result from actuation of the elbow levers 30 and 35 unless suitable means were provided for preventing undue pivotal movement of the links 23 and 26 relative to the platform and lever arms 31 and 36. The provision of the connecting rods 51 compels movement of the platform 20 in a fixed and definite path and, as will be seen from Figs. 2 and 3, of the drawnigs, causes the same to move bodily in the arc of a circle the radius of which is substantially equal to the length of the connecting rods, and also maintains the platform substantially horizontal during its raising and lowering movements and causes the platform to move forwardly longitudinally of the truck frame to a slight extent as the same is being raised to locate the center of gravity of the load raised more nearly above the center of the wheel base, thus tending to prevent tilting of the truck in raising the load.

The mechanism for actuating the platform raising and lowering means is preferably carried by the frame portion 1 and located between the side frame members 12 and 13, being so arranged as to have the various parts of the operating mechanism located substantially within the space formed by the horizontal projection of one of the side frame members and directly beneath the platform whereby the operating mechanism is readily accessible at all times for the purpose of removal or repair upon removal of the platform. This arrangement of the actuating mechanism also gives increased stability to the truck and provides a better distribution of the weight than in the case of the arrangement ordinarily used.

The motor 54 for actuating the elbow levers or cranks 30 and 35 is arranged at one side of the frame 1 being supported in any suitable or desired manner from the frame and provided with a shaft 55 projecting from opposite ends of the motor and provided at one end with a gear 56 firmly secured thereto and at its opposite end with a suitable friction disk 57. The gear 56 drives an idler gear 58 suitably supported in any desired manner as by the transverse frame member 16, the idler 58 meshing with and driving a gear 59 which rotates a worm 60 supported in suitable bearings carried by the frame and in its turn driving a worm gear 61 horizontally positioned relative to the frame and mounted for rotation upon a vertical shaft 62. The worm gear 61 is formed integral with or secured to a spur gear 63 of reduced size which meshes with and drives the gear 48 upon which the crank 47 is mounted for reciprocating the links 44 and 46 to actuate the raising and lowering mechanism. By means of the particular arrangement of driving mechanism provided, a considerable reduction in speed is obtained between the motor shaft 55 and the gear 48 thus preventing a too abrupt movement of the platform 20 in raising and lowering the same. As will be seen upon reference to Fig. 4 of the drawings the elbow levers or cranks 30 and 35 may be swung forwardly to raise the platform upon rotation of the gear 48 through 180 degrees in a counterclockwise direction and upon continued rotation of the gear 48 in a counterclockwise direction the platform may be lowered from the position shown in Fig. 2 to the position shown in Fig. 3 of the drawings. Thus, it will be seen that the direction of rotation of the motor shaft and gears actuated thereby is not ordinarily reversed in raising and lowering the platform but continued rota-

tion of the motor shaft in one direction will raise the platform to the limit of its upward movement and upon continued rotation of the motor shaft in the same direction the platform will be returned to its lowered position as shown in Fig. 3 of the drawings. However, if an obstruction is encountered in raising the platform or if for any other reason it is desired to lower the platform from its partially raised position without first raising the same to its upper limit, this may be accomplished by reversing the direction of rotation of the motor to lower the same. It will be apparent also that the gear 61 driven by the worm 60 is positively held against reverse movement by its meshing engagement with the worm thus providing a construction wherein the platform may be raised to any height within the limit of its movement and automatically locked against return to lowered position by reason of the meshing engagement between the gear 61 and the worm 60.

Moreover, by the arrangement and distribution of the operating mechanism just described the mechanism for raising and lowering the platform is located intermediate the shafts 28 and 29 at such a point as to most efficiently exert force upon the shafts to rotate the same, and the mechanism is so arranged as to have all the parts thereof readily accessible and to properly distribute the weight between the front and rear wheels of the truck.

Suitable control mechanism is provided to control the operation of the raising and lowering mechanism just described which control mechanism is preferably so arranged adjacent to the platform 5 as to be within easy reach of the operator. The control mechanism comprises a controller box 65 containing one of the conventional forms of motor control mechanism which is adapted to be actuated by a controller shaft 66 rotatably mounted in the controller box and adapted to be rotated by a controller 67 fixed to the shaft 66 in any suitable or desired manner. The controller 67 is provided with a handle portion 68 adapted to be grasped by the operator in actuating the controller mechanism through rotation of the shaft 66, and an arm 69 extends downwardly from the handle and is provided with a detent 70 for a purpose which will be more fully described hereinafter. A cam 71 is also carried by the controller and is provided with a peripheral notch 72 for engagement with a pin 73 carried by a pivoted link 74 when the controller is in neutral position as shown in Fig. 7.

The link 74 is pivotally mounted as at 75 and has a rod 76 pivoted to the lower end thereof and extending downward to a point adjacent the frame 1 where it is pivotally connected as at 77 to a lever 78 pivotally supported by a bracket 79 carried by a portion of the frame. The lever 78 is provided at the end opposite its point of pivotal connection to the rod 76 with a pair of forked arms 80 which support a suitable brake 81 adapted to engage the friction disk 57 to retard the rotation of the motor shaft 55. A coiled spring 82 connects the lower end of the lever 78 with a portion of the frame as shown in Fig. 9 of the drawings for constantly urging the brake 81 into engagement with the friction disk 57 carried by the motor shaft. The spring 82 is of sufficient strength to draw the lever into position to apply the brake to the motor shaft against the inertia of the lever and connecting rod but is positively held out of engagement with the disk by the cam 71 engaging the pin 73 and thus forcing the lower end of the lever rearwardly when the controller is in operative position, that is—in position to send a current through the motor whereby the motor shaft is positively rotated.

It will be seen therefore that when the controller is in the position illustrated in Fig. 7 which is its inoperative or neutral position or the position wherein no current is passed through the windings of the motor, the pin 73 can enter the peripheral slot 72 thus permitting the spring 82 to draw the lower end of the lever 78 forwardly and immediately apply the brake to prevent further turning of the motor shaft upon the cutting off of the current through the windings of the motor. In a similar manner when the controller is in either forward or reverse position, that is—to permit current to pass through the windings of the motor, as shown by dotted and full lines in Fig. 8,—the pin 73 will be forced out of the peripheral slot 72 and will be engaged by the cam to force the rod 76 rearwardly and hold the brake 81 away from the disk 57 against the resistance of the coiled spring 82 to permit free rotation of the motor shaft.

Secured to the end of the controller shaft 66 remote from the handle 68 is a cross head 83 keyed or otherwise firmly secured to the shaft, and a pair of coiled springs 84 and 85 connect opposite ends of the cross-head to a portion of the controller box to provide means for returning the controller to its inoperative or neutral position immediately upon the release of the mechanism designed to hold the controller in either forward or reverse position. As will be seen upon reference to Fig. 5, when the controller is in its inoperative position the cross-head 83 occupies a substantially horizontal position and the springs 84 and 85 are equally tensioned but when the controller is moved to operative position the springs 84 and 85 are unequally tensioned whereby the controller tends to return to its inoperative position under the force of the springs as soon as it is released.

The mechanism provided for holding the controller in operative position is automatic in its operation being controlled by movement of the platform 20 and comprises an elbow-lever 86 pivotally supported as at 87 from the side of the controller box and located beneath the controller 67 and in substantially the same vertical plane as the detent 70. The lower arm 88 of the elbow lever 86 is pivotally connected as at 89 with a downwardly and rearwardly extending rod 90 which passes through an opening formed in the transverse frame member 14 and is pivotally connected as at 91 with a lever 92 pivotally mounted as at 93 upon a bracket 94 carried by the transverse frame member 14. The lever 92 is provided with a laterally projecting pin 95 which engages a cam 96 fixedly secured to the shaft 28 whereby upon the raising or lowering of the platform 20 the pin 95 is caused to travel over the cam 96 to rock the lever 92 on its pivot and force the rod 90 forwardly of the truck and thus rock the elbow lever 86 about its pivot point 87 and into the position shown in Fig. 8. A coiled spring 97 surrounds the rod 90 and bears against the transverse frame member 14 and a shoulder 98 carried by the rod to tend to force the rod 90 rearwardly of the truck and thus hold the pin 95 in constant engagement with the cam 96.

The elbow lever 86 is provided with an arm 99 rigid with the arm 88 and movable therewith as the elbow lever pivots about the point 87. A member 100 is also pivoted at 87 and is provided with a lug 101 for engaging the detent 70 to hold the controller in operative position when in engagement therewith. The member 100 is resiliently supported from the arm 99 by means of a bolt 102 passed through the arm 99 and the member 100; and a coiled spring 103 surrounds the lower end of the bolt and normally holds the member 100 substantially parallel with the arm 99.

When the platform 20 is in its lowered position, the pin 95 occupies the position designated by the reference character A on Fig. 10 and the controller and associated mechanism is in the position shown in Fig. 7. In order to raise the platform, the operator grasps the handle 68 and presses it downwardly to throw the controller into forward position as illustrated in full lines in Fig. 8, whereupon the brake mechanism is operated in the manner previously described to release the brake 81 from the disk 57 and current is sent through the winding of the motor to operate the platform raising mechanism. As the platform 20 moves upwardly the shaft 28 is rotated in a clockwise direction as seen in Fig. 10 and the pin 95 is engaged by the cam 96 whereby the rod 90 is forced forwardly against the tension of the spring 97 causing the elbow lever 86 to be turned into the position shown in Fig. 8, wherein the lug 101 engages the detent 70 shortly after the platform begins its upward movement to hold the controller in forward position and thus prevent its accidental release while the platform is being raised to the limit of its upward movement and making it unnecessary for the operator to continue to hold the controller in operative position during the upward movement of the platform. When the platform 20 has reached the limit of its upward movement, the shaft 28 is turned sufficiently to permit the pin 95 to fall into position B as indicated on Fig. 10 whereupon the rod 90 is forced rearwardly by the spring 97 and the elbow lever 86 automatically turned into the position shown in Fig. 7 and the detent 70 released. Upon the release of the detent 70 the springs 84 and 85 immediately return the controller to its inoperative or neutral position as shown in Fig. 7, and the current through the windings of the motor is cut off and at the same time the brake 81 is applied to the disk 57 as previously described.

The platform 20 is held in its raised position by reason of the fact that the worm gear 61 cannot rotate the worm 60 under the influence of the load carried by the platform and this arrangement of gearing thus serves to lock the platform in its raised position until such time as it is desired to lower the same by actuation of the raising and lowering mechanism previously described.

When the operator desires to lower the platform 20, he again depresses the handle 68 to throw the controller into its forward position as shown in Fig. 8, whereupon current is again sent through the windings of the motor and the brake released to cause continued rotation of the motor shaft in the same direction as previously described, and which upon continued rotation of the gear 48 brings the crank 47 back to the position it occupied when the platform commenced its upward movement thus rotating the shafts 28 and 29 back to their original position to lower the platform.

When the shaft 28 begins its rotation in a counter-clockwise direction as seen in Fig. 10, the pin 95 occupies the position relative to the cam 96 designated by the reference character B and is immediately engaged by the cam 96 to again force the rod 90 forwardly against the tension of the spring 97 whereby the elbow lever 86 is again rotated into the position shown in Fig. 8 to engage the detent 70 and hold the controller in operative position until the platform has reached the limit of its lowered position and the pin again occupies a position at A, when the rod 90 is forced rearwardly by the spring 97 to permit the release of the de-

tent 70 and the controller is returned to its inoperative position and the brake applied in the manner previously described.

Should the operator desire to partially raise or lower the platform the controller may be manually released at any point in the raising or lowering of the same by pressing downwardly upon the member 100 to force the same into its dotted line position as shown in Fig. 8, against the resistance of the spring 103 whereupon the lug 101 will be carried out of engagement with the detent 70 and the controller will be returned to its inoperative position and the brake applied as in the manner previously described.

If, when the platform has been partially raised it is desirable for any reason to lower the platform without continuing to raise the same to its upper limit of movement, the controller may be manually released by pressing downwardly upon the member 100, whereupon the controller may be raised to its dotted line position as shown in Fig. 8, whereby the rotation of the motor shaft will be reversed and the platform returned to its lowered position. This means of lowering the platform is employed as the platform or the articles carried thereby sometimes strike an obstruction such as a permanent part of a building or other fixture which necessitates lowering the same without first raising it to its upper limit of movement.

From the above description, it will be seen that the operation of the control mechanism for actuating the raising and lowering mechanism is largely automatic and permits of a wide range of operations. The controller, brake mechanism and means for holding and releasing the controller are so coordinated as to positively compel the proper sequence of operation without any attention on the part of the operator other than depressing the handle 68 at the beginning of the raising or lowering operations.

The arrangement of the supporting wheels and the manner of controlling the position of the same will now be described with particular reference to the structure shown in Figs. 12, 13 and 14 of the drawings. The front wheels 3 and 4 are pivoted to the axle housing at 104 and 105, respectively, and are provided with rearwardly extending steering arms 106 and 107 connected for simultaneous steering movement by a connecting rod 108, as is common in devices of this character. A link 109 connects the steering arm 107 with an arm 110 fixed to the steering post 111 whereby the front wheels 3 and 4 may be oscillated upon their pivots 104 and 105 to assist in steering the truck.

The rear wheels 8 and 9 are carried upon opposite ends of a pivotally mounted rear axle [illegible] which is mounted to turn bodily about a vertical pivot 11 whereby the truck may be turned in a limited area with great readiness. Mechanism is provided for simultaneously turning the front wheels and rear axle upon their respective pivot points and comprises means for operatively connecting the rear axle with the steering post previously described. A plate 112 is formed integral with or is firmly secured to the rear axle and projects forwardly therefrom to which is suitably connected a link 113 in any suitable or desired manner to provide a loose connection between these parts as by having the plate 112 passed through a slot formed in the link and providing suitable means for holding these parts in engagement. A curved link 115 is pivoted to the end of the link 113 for movement in a horizontal plane and the opposite end of this link is pivotally connected to a depending arm 116 through links 117 and 118. There is preferably sufficient looseness in the connection between the plate 112 and the links 113 and 115 to allow a certain amount of play and thus permit a certain degree of freedom of movement on the part of the rear wheels. The rear axle together with the wheels carried thereby are turned in a direction opposite to that in which the front wheels are turned by the steering mechanism thus bringing the center of the curve about which the vehicle travels in turning near to this vehicle and permitting the vehicle to be turned in a small space.

The steering post 111 is turned by a steering handle 119 located within easy reach of the operator whereby the arm 110 is turned in a horizontal plane and the front wheels oscillated through the mechanism previously described. The mechanism for controlling the pivotal movement of the rear axle from the steering post comprises an internally threaded sleeve 120 carried by a threaded portion 21 of the steering post and provided with ears 122 which engage brackets 123 carried by the truck frame to prevent rotation of the sleeve during rotation of the post.

The sleeve being prevented from rotating as the steering post is turned must travel vertically on the threaded portion of the post and thus oscillates the member 116 which is pivotally supported upon the frame as at 124 and pivotally connected to the sleeve as at 125. The member 116 is pivotally connected to the link 118 at 126 whereby the rear axle is oscillated through the connections previously described upon movement of the member 116 about its pivot point 124.

The mechanism above described provides a simple and efficient form of turning and steering mechanism wherein the supporting wheels are mounted to be simultaneously turned to enable the truck to turn in a limited space and to so arrange the move-

ment of the front and rear wheels that they will at all times when turning, move in concentric circles. The mechanism for operatively connecting the steering post to the rear axle comprising the sleeve 120 and worm 121, forms an irreversible power transmitting mechanism which while permitting turning of the rear wheels from the steering post prevents transmission of shocks from the rear wheels to the steering post as the jar of any sudden forward or rearward movement of the connections 117 and 118 is transmitted to the steering post in a direction longitudinally thereof and consequently does not tend to rotate the steering handle 119 towards or from the operator.

While the embodiment of the invention illustrated in the accompanying drawings has been described with considerable particularity in order to make the construction and operation of the same clear to those skilled in the art, it is to be understood that the invention is not limited to the precise details of construction shown and described except as set forth in the following claims.

What I claim is:

1. In a power operated elevating truck, a wheel supported base frame, a platform mounted for up and down movement upon said base frame and in parallel relation thereto, an electric motor and elevating mechanism for effecting the raising and lowering of said platform, said elevating mechanism comprising platform raising members and a rotating crank member having gearing connections with said motor, said crank member being mounted to rotate in a horizontal plane and having a longitudinally movable link pivotally connected to one side of said crank member and to said platform raising members, said motor and elevating mechanism being mounted wholly beneath said platform.

2. In a power operated elevating truck, a wheel supported base frame, a platform mounted for up and down movement upon said base frame and in parallel relation thereto, an electric motor and elevating mechanism for effecting the raising and lowering of said platform, said elevating mechanism comprising rocking members connected between said platform and said base frame to effect up and down movement of said platform in a substantially vertical direction, and a rotating crank member having gearing connections with said motor, said crank member being mounted to rotate in a horizontal plane and having a longitudinally movable link pivotally connected to one side thereof and to said rocking members, said motor and elevating mechanism being mounted wholly beneath said platform.

3. In a power operated elevating truck, a wheel supported base frame, a platform mounted for up and down movement upon said base frame and in parallel relation thereto, an electric motor and elevating mechanism for effecting the raising of said platform, an electric controller for the operation of said motor, a movable handle for said controller having a stopping position for rendering said motor inoperative and a running position for the operation of said motor, means normally tending to hold said handle in its stopping position, a cam fixed to a moving part of said platform elevating mechanism so as to move synchronously with said platform, a follower coacting with said cam, and a latch connected to and actuated by said follower and adapted for engagement with said handle when the latter is in its running position, said latch being actuated through said cam and follower by the movement of said elevating mechanism to hold said controller handle in its running position when moved thereto for starting the motor and to release said controller handle when the elevating mechanism has completed the raising movement of said platform.

4. In a power operated elevating truck, a wheel supported base frame, a platform mounted for up and down movement upon said base frame and in parallel relation thereto, an electric motor and elevating mechanism for effecting the raising of said platform, an electric controller for the operation of said motor, a movable handle for said controller having a stopping position for rendering said motor inoperative and a running position for the operation of said motor, means normally tending to hold and return said handle to its stopping position, a cam fixed to a moving part of said platform elevating mechanism so as to move synchronously with said platform, a follower, coacting, with said cam, and a latch connected to and actuated by said follower, and adapted for engagement with said handle when the latter is in its running position, said latch being actuated through said cam and follower by the movement of said elevating mechanism to hold said controller handle in its running position when moved thereto for starting the motor and to release said controller handle when the elevating mechanism has completed the raising movement of said platform, and manually controlled means for actuating said latch to release said controller handle independently of said elevating mechanism.

In testimony whereof I have affixed my signature.

FRANK L. EIDMANN.