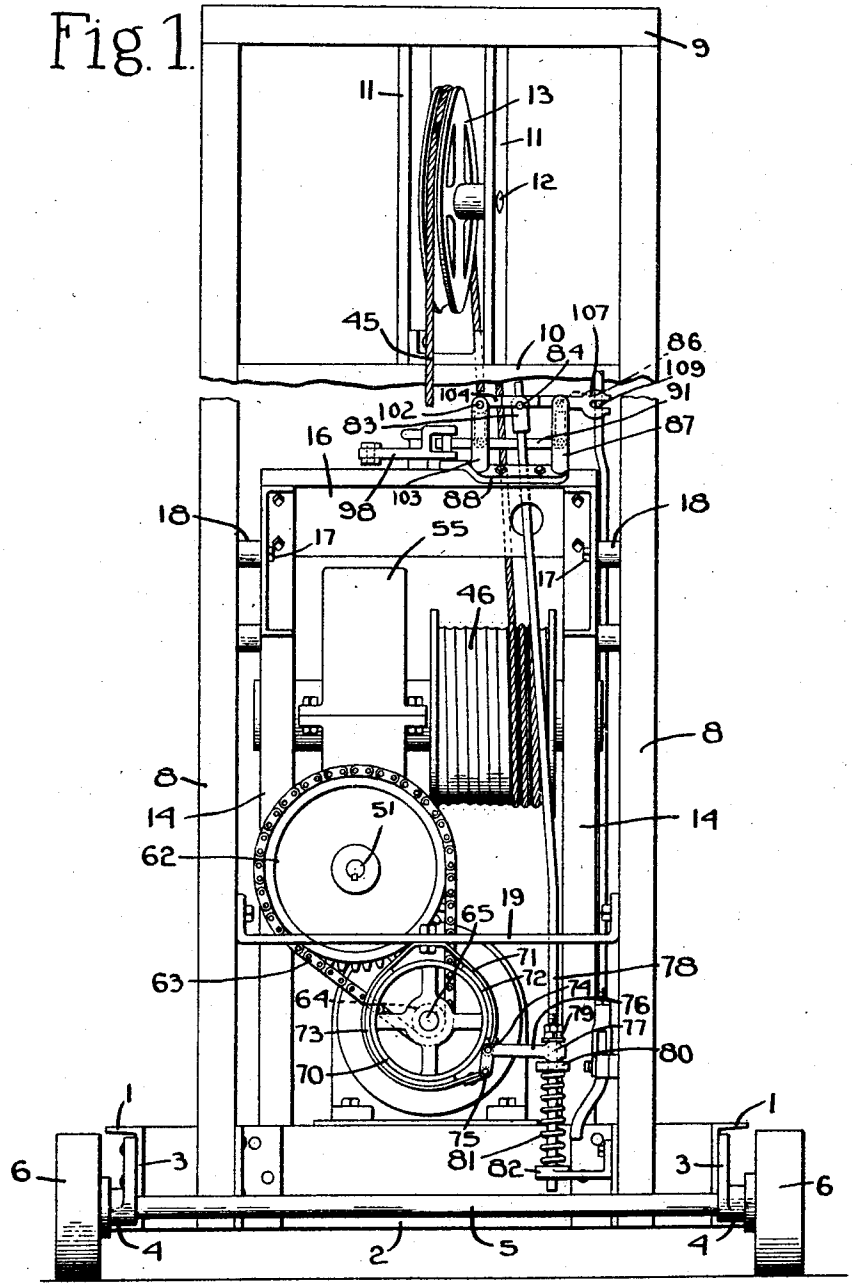
Oct. 5, 1926. 1,601,887

F. J. SHEPARD, JR ET AL

HOISTING OR TIERING MACHINE

Filed March 31, 1924 6 Sheets-Sheet 1

Fig. 1.



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HOISTING OR TIERING MACHINE

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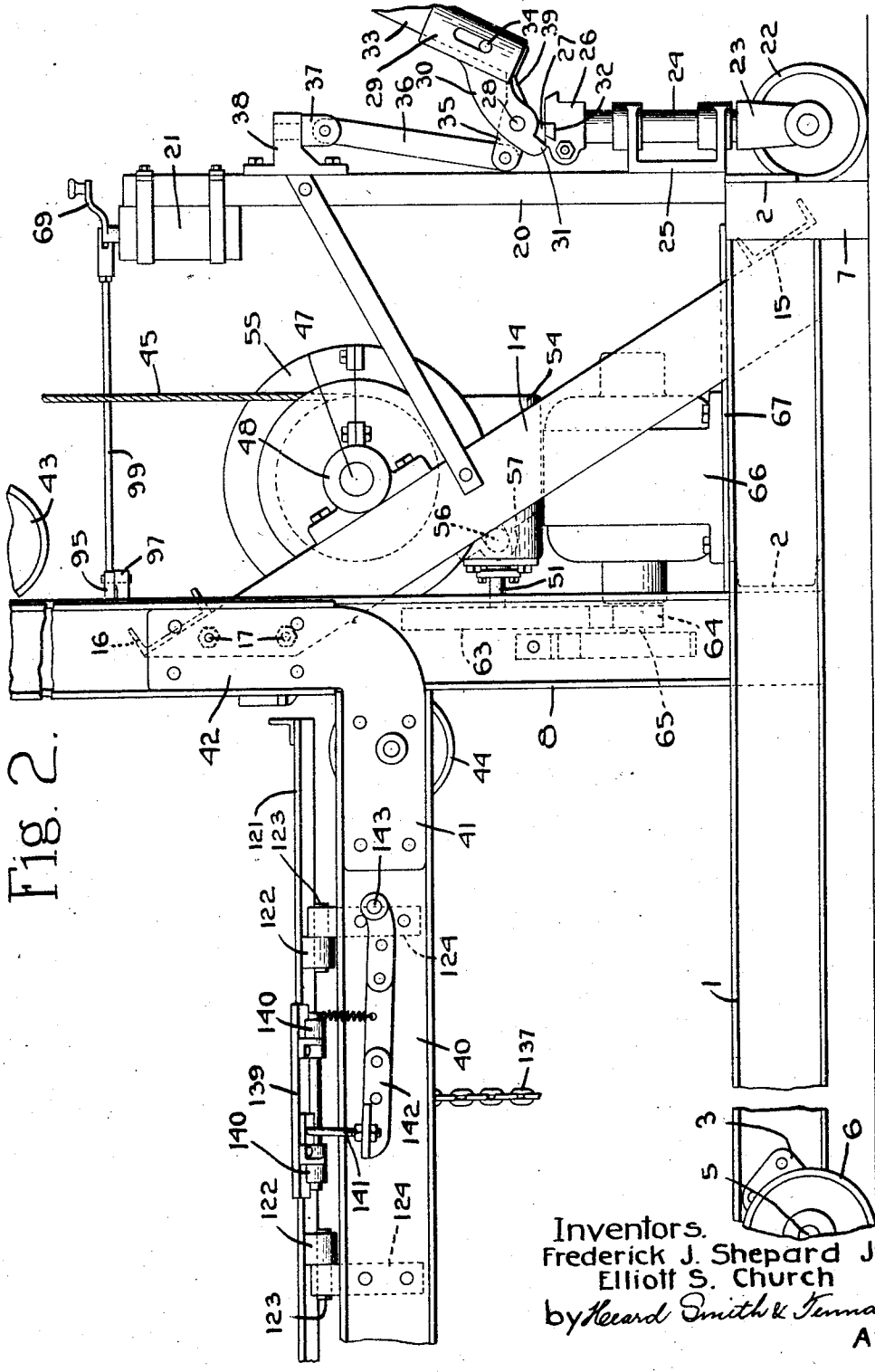


Fig. 2.

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HOISTING OR TIERING MACHINE

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Fig. 3.

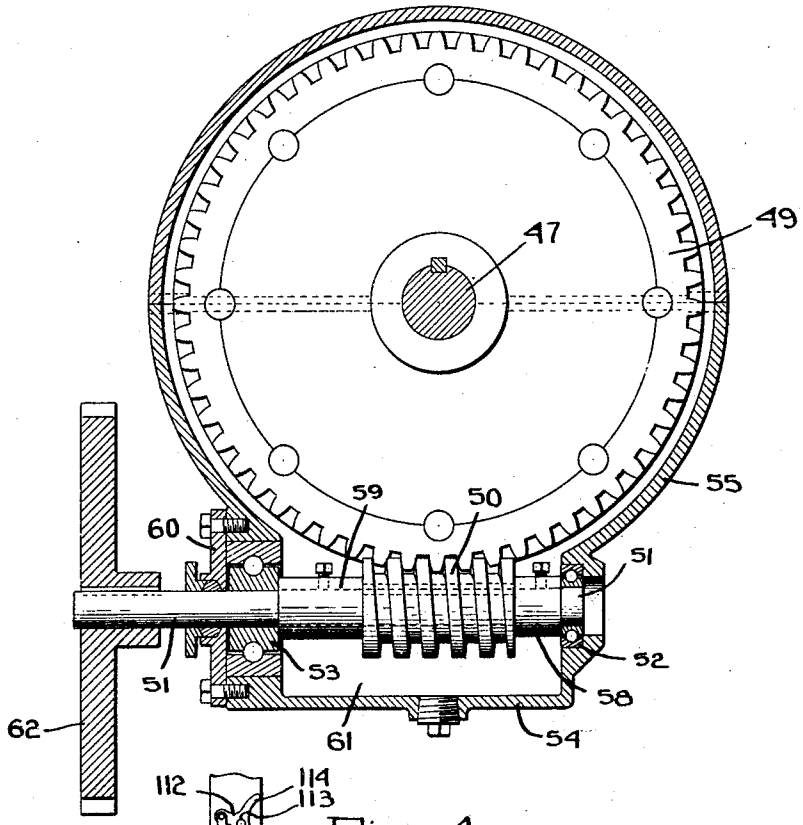
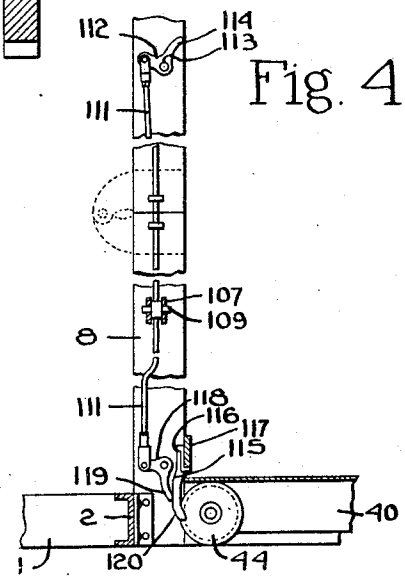


Fig. 4.



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HOISTING OR TIERING MACHINE

Filed March 31, 1924 6 Sheets-Sheet 4

Fig. 5.

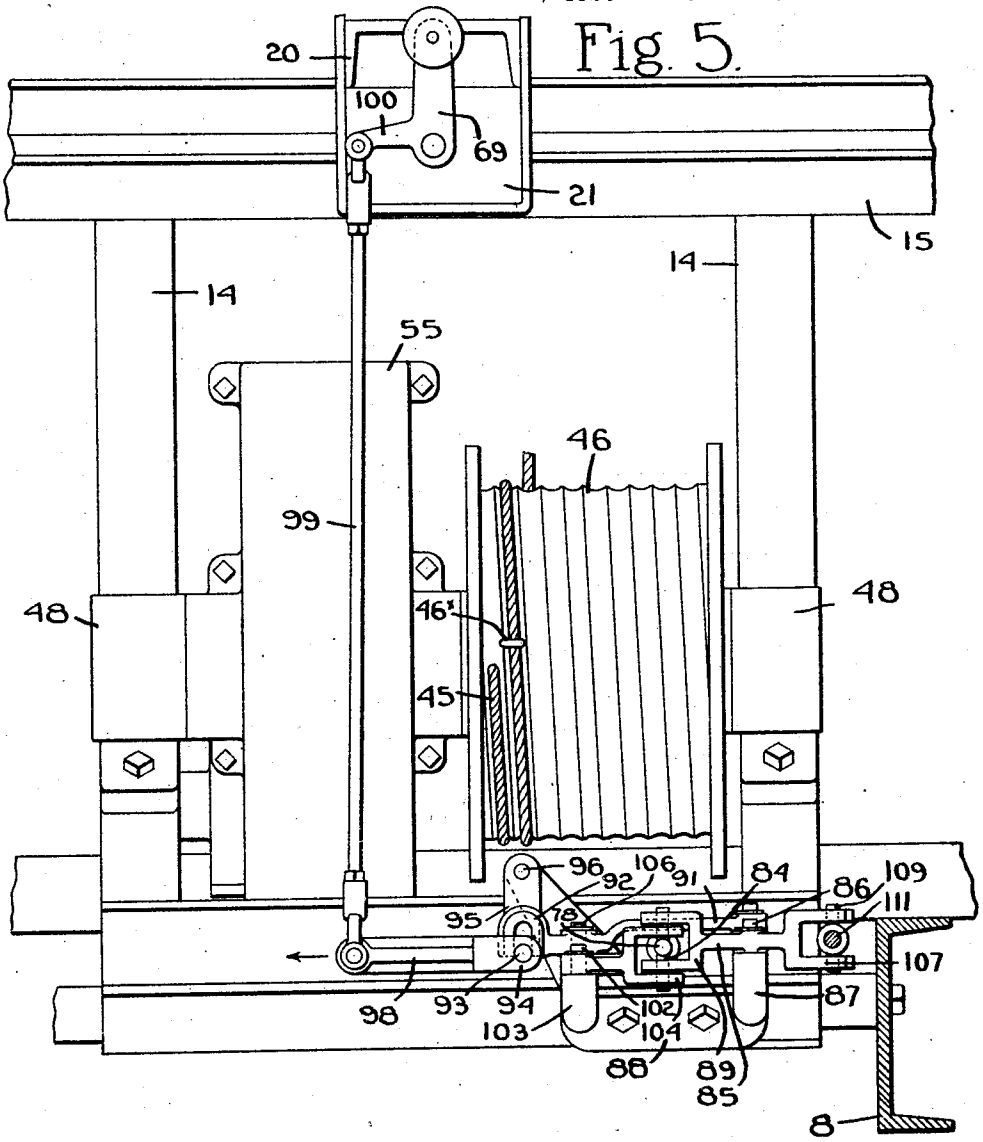
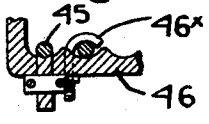


Fig. 9.



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HOISTING OR TIERING MACHINE

Filed March 31 1924 6 Sheets-Sheet 5

Fig. 6.

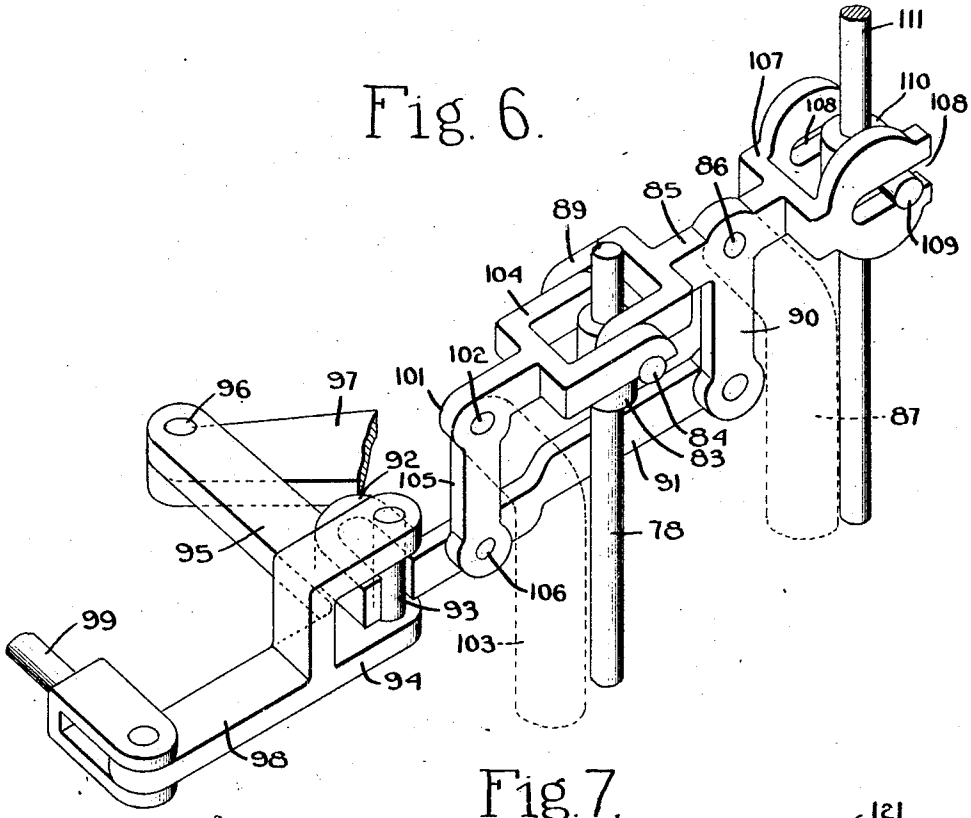
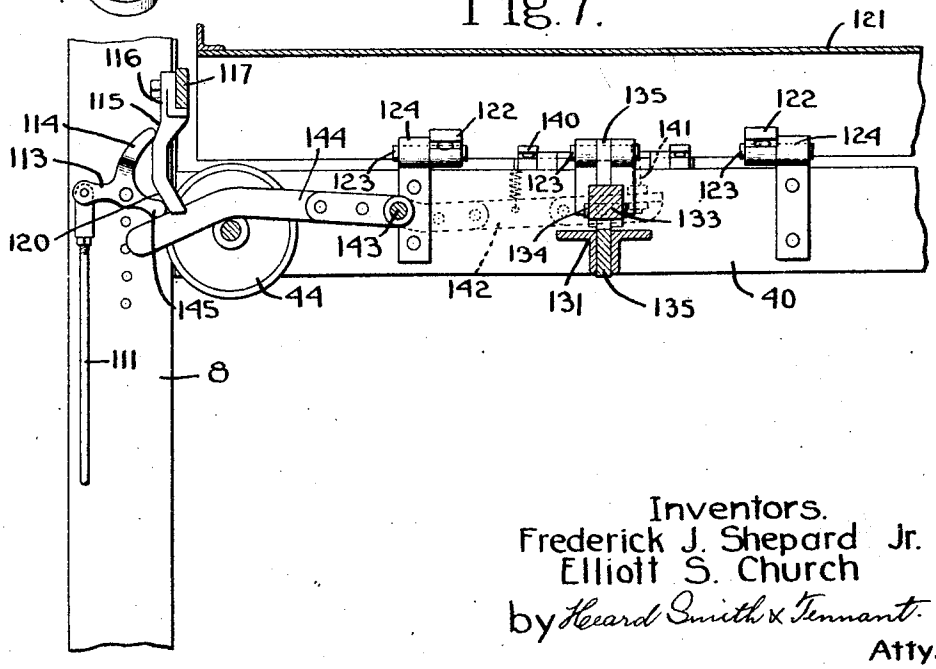


Fig. 7.



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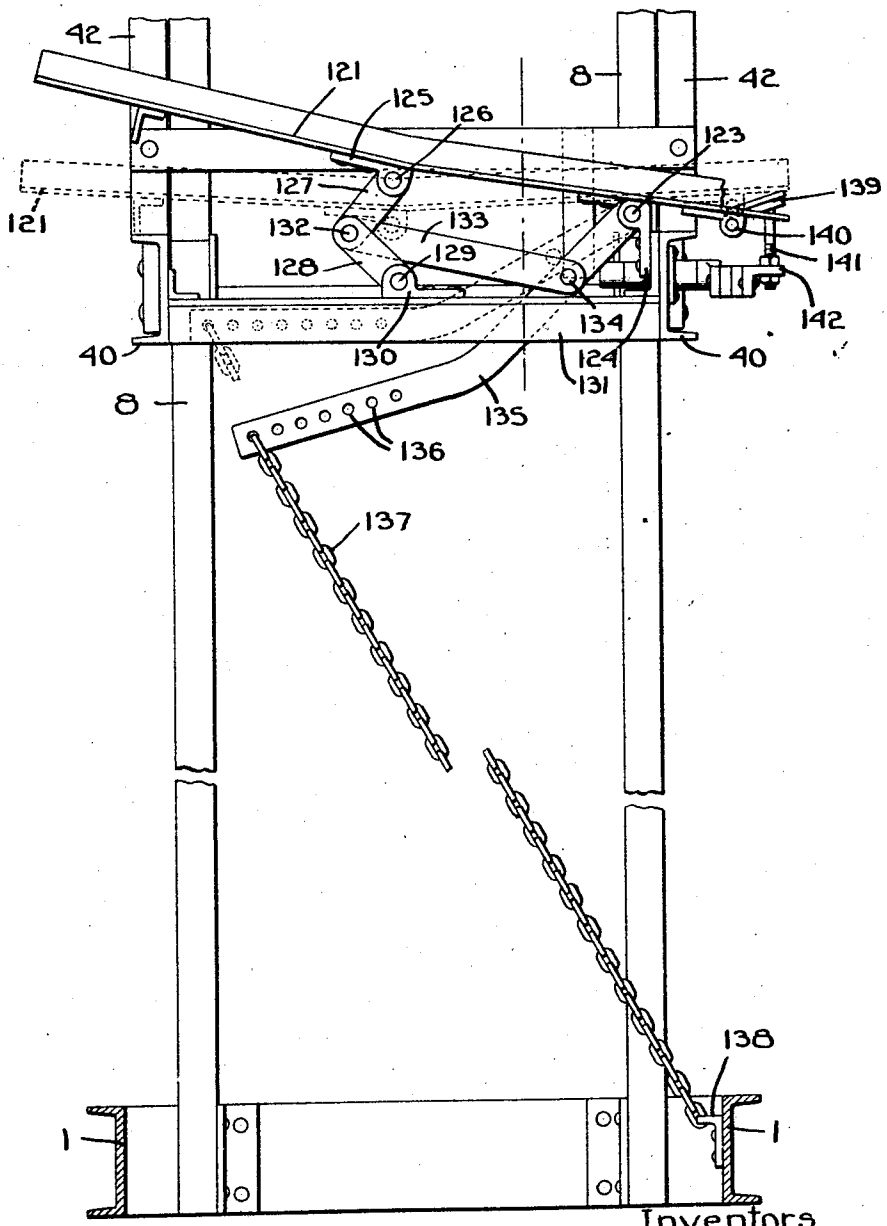
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HOISTING OR TIERING MACHINE

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Fig. 8.



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UNITED STATES PATENT OFFICE.

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HOISTING OR TIERING MACHINE.

Application filed March 31, 1924. Serial No. 703,043.

This invention relates to improvements in hoisting machines and more particularly to tiering machines by means of which articles such as barrels, boxes, and bales may be readily superimposed upon one another or lowered from a platform or pile.

The general object of the invention is to provide a tiering machine which is more effective and speedy in operation than those heretofore produced and also to provide a machine which will be more efficient generally and of longer life.

The invention will be particularly described herein as embodied in a hoisting machine having vertically movable load supporting means adapted to raise and lower various articles, but particularly designed for raising and lowering barrels and for automatically discharging the same from the load supporting means when the load supporting means has reached its desired elevation.

Hoisting machines of this type comprise a frame having a base which may be either stationary or portable with uprights or standards extending vertically therefrom along which the load supporting means or platform is elevated by a suitable mechanism, such as a rope-winch.

Very heavy strains are imposed upon the frames which are likely at times to distort the same. One of the objects of the invention is to provide means for supporting the winch and its actuating mechanism in such a manner that they will be unaffected by the lateral strains of distortion which affect the frame. This is accomplished in the preferred embodiment disclosed herein by suspending the gearing which drives the winch upon the shaft of the winch and transmitting motion to it through flexible means such as a chain sprocket drive.

A further feature of the invention consists in providing a casing for the winch actuating gearing with a lubricant reservoir so that the driving gearing will be constantly in a proper state of lubrication.

A further object of the invention is to provide a motor driven hoisting mechanism provided with a brake and with a controller for the motor so connected to the brake as to actuate the brake upon movement of the controller arm in either positive or reverse direction. Preferably the mechanism is so arranged that the brake is normally set when the controller arm is in neutral position, but is released when the controller arm is actuated either to raise or to lower the load supporting means.

A further feature of the invention consists in providing a single spring actuated mechanism normally tending to set the brake and also to maintain the controller arm in neutral position so that the release of the controller arm by the operator, when either raising or lowering the load, will result in immediately arresting the movement of the load supporting means.

A further object of the invention is to provide automatic means for actuating the controller arm to arrest the movement of the load supporting means when it has reached predetermined positions either in its upward or downward movement.

A further feature of the invention is to provide means for preventing such movement of the controller arm, after it has been restored to normal position, as will cause the motor to move the load supporting means in the direction of its arrested movement.

A further object of the invention is to provide means for automatically discharging the load such as a barrel when the load supporting means has reached and been arrested at a predetermined elevation.

A further object of the invention is to provide means for preventing the leverage system which actuates the controller arm from acquiring a dead center which would prevent the proper operation of the mechanism and particularly when the same is under automatic control.

A further object of the invention is to provide means to insure the coiling of the cable or rope upon the drum in progressively juxtaposed spirals.

Other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

A preferred embodiment of the invention is illustrated herein as applied to tiering machines generally, but particularly designed for hoisting and tiering barrels and for automatically discharging the barrels when the load supporting means reaches a predetermined elevation. It will, however,

be understood that the machine may be adapted for various other uses and that the particular mechanisms which are disclosed herein may be employed in other devices than hoisting machines of this character.

In the drawings:—

Fig. 1 is a broken rear elevation of a machine embodying the invention, the elevating platform being omitted in order to disclose more clearly the hoisting mechanism;

Fig. 2 is a side elevation of the lower portion of the frame, platform and elevating mechanism of the hoisting machine illustrated in Fig. 1;

Fig. 3 is a vertical sectional view of the driving mechanism for the hoisting winch:

Fig. 4 is a broken view upon a reduced scale showing a portion of a tripping mechanism which is automatically operable to arrest the load supporting means when the same has reached a predetermined elevation and also when it has descended to a predetermined position;

Fig. 5 is an enlarged detail plan view showing particularly the leverage system which is actuated by the manually operated controller arm or lever which controls the motor;

Fig. 6 is an enlarged perspective view of a portion of the leverage system showing in dotted lines the supporting posts or standards upon which the leverage system is mounted.

Fig. 7 is an enlarged view, partially in vertical section, of a portion of the load supporting means having a tilting platform mounted thereon operable to discharge barrels, and also illustrating the load supporting means in an elevated load discharging position; and,

Fig. 8 is a broken rear elevation showing in full lines the load supporting means with a tilting platform mounted thereon in load discharging position, and in dotted lines the tilting platform in normal hoisting position. The hoisting mechanism for raising the load supporting means is omitted from this figure in the interest of clearness; and

Fig. 9 is a detail view of a preferred means for locking one of the spirals of the cable to the drum.

The hoisting machine illustrated in the accompanying drawings is of a portable type comprising a frame having a base composed of side bars 1, preferably of channel bars, connected by a suitable number of transverse girders 2 to provide a rigid construction. Brackets 3, riveted to the rear ends of the side bars 1 and preferably projecting beyond the ends thereof, are provided with bosses 4 forming bearings for an axle 5 having at its ends wheels 6 for supporting the rear end of the base. Legs 7 are secured to the front ends of the side bars and are of a sufficient height to maintain the base of the frame horizontal when in normal position. A front steering wheel is, however, provided which may be actuated to raise the front end of the frame sufficiently to remove the legs 7 from engagement with the floor and permit the hoisting machine to be transported from place to place as will hereinafter be more fully described.

Vertical uprights or standards 8 are secured to the base, preferably to one or more of the intermediate transverse girders 2, and provide guideways for the vertically movable load supporting means. The upper ends of the standards 8 are connected by a transverse beam or girder 9 and another transverse girder 10 connects the standards 8 a short distance below the top girder 9. Vertical bars 11 extend between and are secured to the girders 9 and 10 and the shaft 12 of a sheave 13 for the hoisting rope is suitably journalled in the vertical bars 11. The vertical standards 8 are braced by an inclined supplemental frame comprising a pair of inclined channel bars 14 which are rigidly secured at their lower ends to a transverse bar 15 which extends across the lower portion of the base and is rigidly secured at its ends to the side bars 1. The upper ends of the inclined channel bars 14 are connected by a transverse channel bar or girder 16 and the inclined side bars 14 are also connected to the vertical standards 8 by bolts 17 which pass through the webs of the inclined channel bars 14 and also webs of the standards with spacing sleeves 18 interposed between said webs. Preferably one or more tie bars or plates 19 also connect the vertical standards 8.

By reason of this construction a very rigid frame is provided. The frame is also provided at its front end with a post 20 which may be of any suitable form upon which is mounted a controller box 21 for the motor which actuates the hoisting mechanism.

The steering mechanism also is preferably mounted upon the vertical post 20. As illustrated herein the steering mechanism comprises a steering wheel 22 the axle of which is mounted in suitable bearings in bosses of a yoke 23 having a steering post 24 which is rotatably and slidably journalled in suitable bearings in a bracket 25 which is secured to the post 20. The upper end of the steering post has a collar 26 rigidly secured to it provided with an upwardly extending ear or boss 27 carrying a transverse shaft 28 upon which the steering tongue and a member of the lifting mechanism for the frame is pivotally mounted. The steering tongue desirably is made in telescopically movable sections, one of which comprises a tubular member 29 having arms 30 which are pivotally mounted on the shaft 28. The arms 30 are provided with extensions presenting shoulders 31 so formed as to engage stop shoul-

ders 32 upon the collar 26 when the tongue is raised nearly to vertical position. The engagement of the shoulders 31 with the stops 32 prevents the steering tongue from swinging upwardly beyond a predetermined distance and also provides means for arresting the upward movement of the tongue in a position in which it can be used to push the machine rearwardly.

The handle section of the tongue 33 is slidably mounted within the tubular section 29 and is provided with a pin 34 which extends through oppositely disposed longitudinal slots in the tubular member 29 so that the handle section 33 may have a short longitudinal movement relatively to the tubular member 29 of the tongue, the purpose of the longitudinal movement being to provide means for releasably locking the vertical swinging tongue to the lifting mechanism when it is desired to raise or lower the front end of the frame.

The lifting mechanism for the front end of the frame comprises a toggle construction consisting of a lever 35, fulcrumed upon the shaft 28, the upper arm of which is pivotally connected to the lower end of a link 36 the upper end of which is pivoted to a swivel 37 which is rotatably mounted in a bracket 38 secured to the front post 20 of the frame. The axis of the swivel is preferably in alinement with the axis of the steering post 34. The lever 35 has a downwardly extending arm 39 which is so constructed and positioned as to engage a shoulder upon the lower end of the handle member 33 of the steering tongue and the handle member 33 of the steering tongue when forced downwardly or inwardly toward the truck engages beneath the end of the arm 39, thereby effectively locking the lever to the telescoping tongue members.

In the normal position of the hoisting machine, when the legs are resting upon the floor, the pivotal connection of the toggle mechanism, formed by the link 36 and lever arm 35, is swung to the left of the axial line of the steering post and swivel. When it is desired to raise the front end of the frame upon the steering mechanism and to lift the legs 7 from the floor so that the hoisting machine may be transported from place to place, the operator swings the tongue 33 downwardly thereby rocking the lever 35 about its pivot until the pivot, which connects the link 36 with the lever 35, swings across the axial line of the steering post and swivel and until the arm 39 of said lever rests upon one of the shoulders 32 upon the collar 26. This locks the toggle in its straightened position with the weight of the front end of the truck resting upon the steering wheel 22 so that the truck can be pulled from place to place. The handle section 33 of the tongue is then drawn forward and released from its engagement with the end 39 of the lifting lever. By reason of the fact that the axes of the steering post and swivel are in alinement the tongue can be swung in any steering direction. Furthermore by reason of this fact the front end of the machine may be raised when the tongue is in any steering position.

This lifting and steering mechanism may be and preferably is substantially indentical with that disclosed in the application of Ralph M. Lovejoy, filed July 12, 1922, Serial Number 574,517, for improvements in hoisting machines. Therefore, no claim is made herein to this particular type of lifting mechanism.

The load supporting means comprises a platform or support for the load having suitable members engaging the flanges of the channel bar uprights 8 which serve as guides for the load supporting means to direct it in its upward and downward movement. As illustrated herein the load supporting means comprises a pair of horizontal channel bars 40 to one end of which are secured L-shaped plates 41 the vertical portions 42 of which extend in parallelism with the uprights or standards 8 and are provided with rollers 43 engaging the front flanges of the uprights. Rollers 44, also mounted upon the L-shaped plates and front end portions of the side bars 40, engage the outer faces of the rear flanges of the uprights. A suitable cable 45, which is connected preferably centrally to the load supporting means, extends upwardly over the sheave 13 and downwardly to a preferably grooved winding drum 46 of a suitable winch. The end of the cable is secured to the drum adjacent one of its heads in any suitable manner, preferably being passed through an aperture in the drum and anchored therein.

One of the features of the invention consists in providing means for causing the cable to wind in juxtaposed spirals upon the drum even though it is slack before the winding operation is begun. This is accomplished by providing means, such as a hook-shaped clip 46× (see Fig. 9) for holding the initial spiral, or a substantial part thereof, fixedly in engagement with the drum in its proper position so that as the cable is tightened by the rotation of the drum the fixed spiral will act by its rigidity and by its position progressively to guide the cable in juxaposed spiral coils upon the drum and when the drum is grooved into the spiral grooves thereof.

The load supporting means may be provided with a suitable horizontal platform as is usual in hoisting machines of this character, or may be provided with a special device such as a barrel support as is illustrated herein and will be hereinafter more fully described.

The shaft 47 of the winding drum is mounted in bearings in brackets 48 which are secured to the inclined braces 14 which form a part of the supplemental frame and which also serve as braces to the uprights or standards 8. By reason of the heavy strains imposed upon the frame of usual types of hoisting machines, when lifting heavy loads, such distortion is sometimes occasioned as to interfere with the proper operation of the driving mechanism for the winding drum. One of the principal objects of the present invention is to provide a construction in which the drum-actuating mechanism will be unaffected by the strains thus imposed upon the frame. This is accomplished by pivotally supporting the mechanism which rotates the winding drum directly upon the shaft of the winding drum and providing means for preventing rotation of such mechanism about said shaft.

In the preferred construction disclosed herein the drum-actuating mechanism comprises a worm gear 49 which is secured to the shaft 47 of the winding drum in any suitable manner and engages a worm 50 which is slidably feathered upon a shaft 51 which is journalled in anti-friction bearing 52 and 53 in the vertical walls of a depending portion 54 of a casing 55 which encloses the gear and is pivotally supported by the winding drum shaft 47, so that it is capable of a swinging movement which will prevent distortional movement of the frame from effecting the winch-actuating mechanism. The lower portion of the casing is provided with a laterally extending stud 56 (see Fig. 2) which is engaged and retained by a U-shaped bracket 57 upon one of the inclined braces 14. Thus the casing is retained from rotation about the shaft 47.

The worm 50 preferably is, as above stated, slidably feathered upon the shaft 51, but is retained from end-wise movement thereupon by collars 58 and 59 interposed between the respective ends of the worm and the bearings 52 and 53, the collars 58 and 59 preferably being secured to the shaft by set screws. By reason of this construction the end-wise thrust of the worm is imposed directly upon the bearing 53 instead of being transmitted to the shaft.

The bearing 53 may be of any suitable type of anti-friction bearing capable of resisting end thrusts. A ball bearing is illustrated herein, the outer race of which fits within a cylindrical aperture in the end wall of the depending portion 54 of the casing and is held in place by a cap or cover 60 bolted to the casing, a suitable bushing being provided around the cap to prevent leakage of oil therethrough. The bearing 52 is mounted in a suitable recess in the opposite end wall of the depending portion 54 of the casing and the aperture through the wall at the end of the shaft closed by a suitable plug. The depending portion 54 of the gear casing provides a lubricant reservoir 61 so that the worm will always run in the lubricant and friction between it and the worm wheel be reduced to a minimum. The lower wall of the depending portion 54 of the casing may be provided with a plug to permit the oil to be withdrawn and the casing may also be provided with suitable means (not shown) to permit oil to be introduced into it.

In the construction shown the worm shaft 51 is provided with a sprocket wheel 62 which is driven by a chain 63 from a sprocket 64 upon a shaft 65 of an electric motor 66 which is mounted upon a suitable platform 67 carried by the side bars 1 of the base. By reason of the flexible connection between the sprocket wheels 63 and 64 any distortional movement of the frame, due to the strains imposed upon it, will not affect the driving mechanism for the winding drum.

The motor 66 may be an electric motor of a usual type supplied by a current from a suitable source and controlled through a usual controller 21 which may be conveniently mounted upon the upper portion of the front standard 20. The controller is provided with a usual handle or arm 69 and the connections within the controller are such that when the controller arm is swung in one direction the motor will be rotated in the proper direction to wind up the rope 45 upon the winding drum and when rotated in the opposite direction to control the unwinding of the rope so that the raising and lowering of the platform may be regulated at the will of the operator.

Another important feature of the present invention comprises a brake which may be conveniently, but not necessarily, applied directly to a drum upon the motor shaft and which is so connected to the controller arm that it will be actuated upon movement of the controller arm in either direction.

In the preferred construction the brake is normally under the influence of a spring which tends to set the brake when the controller lever is in neutral position so that when the operator, after having swung the controller arm in either direction, releases said controller arm it will be swung to neutral position and the brake applied.

In the particular construction shown the shaft 65 is provided with a brake drum 70, the co-operating brake consisting of a strap 71 which is secured by a bolt to the cross bar 19 of the frame. The strap 71 substantially surrounds the brake drum and is provided with suitable brake linings 72 and 73 which engage diametrically opposite portions of the brake drum. The ends of the

strap are connected to studs 74 and 75 upon the bell crank lever 76, the free end of which is provided with a rounded or spherical portion 77 having therethrough an aperture for an actuating rod 78. The actuating rod is provided with a collar 79 which engages the upper curved surface of the rounded end portion 77 of the bell crank lever and is adjustably held in place by suitable nuts upon the actuating rod 78. A collar 80, upon the rod 78, engages the curved under face of the rounded end portion of the bell crank lever 76 and is normally forced upwardly by a helical spring 81 surrounding the rod 78 and abutting at its lower end upon a boss 82 of a bracket suitably secured to the base portion of the frame and in which the lower end of the rod 78 is slidably mounted. The spring 81 acts normally to rock the bell crank lever in such a manner as to set the brake upon the drum.

The brake-releasing rod 78 is actuated through a system of levers from the controller arm in such a manner that when the controller arm is moved in either direction the brake will be released and the electric current simultaneously applied to the motor to cause the winding drum to be rotated either to wind up the rope 45 or to unwind it as the case may be.

In the preferred construction illustrated herein the upper end of the brake-releasing rod 78 is provided with a collar 83 (see Fig. 6) having laterally extending studs 84 which are engaged by the ends of two bell crank levers which are connected to the controller arm and which, when operated respectively by the controller arm as it is moved in opposite directions, forces the brake-releasing rod downwardly. One of these bell crank levers 85 is fulcrumed upon a pivot 86 upon a standard 87 which extends upwardly from a bracket 88 on the cross girder 16 of the supplemental frame, the lever 85 being provided with a yoke-shaped extension 89 which engages the studs 84. The downwardly extending arm 90 of this bell crank lever is pivoted to a movable connector, preferably in the form of a link 91 having a U-shaped end 92 which embraces a stud 93 mounted upon the elbow of an L-shaped lever 94, the arm 95 of which is fulcrumed upon a stud 96 upon an arm 97 which projects from the bracket 88 (see Figs. 1 and 5). The elbow portion of the L-shaped lever 94 desirably is formed as a yoke in the members of which the stud 93 is mounted. The other arm 98 of the bell crank lever 94 is connected by a link 99 to a lateral extension 100 of the controller lever or arm 69. When, therefore, the controller lever 69 is swung toward the left (see Figs. 5 and 6) the bell crank lever 94 swings about its pivot 96 and pushes the link 91 to the right, thereby rocking the bell crank lever 85 about its fulcrum 86 and depresses the end 89 which engages the stud 84 upon the brake-releasing rod, thus forcing the brake-releasing rod downwardly and rocking the bell crank lever 76 to release the brake.

The other bell crank lever 101 is fulcrumed upon a stud 102 upon the upper end of a post 103 which extends upwardly from the bracket 88 (see Figs. 1 and 5) and is provided with a yoke-shaped end portion 104 which also engages the studs 84 upon the brake-releasing rod 78. The other arm 105 of the bell crank lever is pivotally connected by a stud 106 to the link 91 so that when the controller lever or arm 69 is moved toward the right (see Fig. 5) the L-shaped lever 95 is swung about its pivot 96 toward the left, thus rocking the bell crank lever 101 about its pivot 102, depressing the yoke-shaped end portion 104 which engages the studs 84 upon the brake-releasing rod 78, thereby depressing said brake-releasing rod and releasing the brake. Whenever the brake-releasing rod, after having been moved either to the right or to the left, to supply current to the motor in a direction to cause it to wind up or unwind the drum as the case may be, the brake is released and upon return of the controller lever to neutral position the brake will be applied by the action of the spring 81 as heretofore described. The spring 81 will automatically return the controller lever or arm to neutral position and apply the brake when the controller arm is released by the operator after having been actuated either to raise or lower the load supporting means. In view of the fact that the pivot 96 is located well in front of the pivotal connection of the link 99 to the L-shaped lever 94 a lateral movement of this connection is produced which prevents alinement of the fulcrum of the controller lever and the pivotal connections of the link 99 to the controller and to the lever 94 respectively. Thus danger of accident will be positively prevented as the load supporting means is at all times either under the control of the operator or will be automatically stopped if the operator releases the controller arm.

Another important feature of the invention consists in providing automatic means for arresting the movement of the load supporting means at a predetermined elevation or at the downward limit of its movement. This is accomplished by providing automatic means for actuating the lever system and through it the brake-releasing rod and controller arm. In the preferred construction shown the bell crank lever 85 is provided with a yoke-shaped extension 107 provided with slots 108 which engage transverse studs 109 upon a collar 110 which is fixedly secured to a vertically disposed trip bar 111 which extends substantially in par-

allelism with one of the vertical standards 8 of the frame and is guided in suitable brackets or bosses extending from or secured to the standard. The upper end of the trip rod 111 is pivotally connected to one arm 112 (see Fig. 4) of a bell crank lever 113 which is pivotally mounted upon the side bar and is provided with another arm 114 which is positioned to be engaged by the inclined or cam face 115 upon a bracket 116 upon a transverse bar 117 of the load supporting means so that as the load supporting means is raised and approaches a predetermined position the arm 114 of the bell crank lever 113 will engage the inclined face 115 and will rock the bell crank lever 113 about its fulcrum, depressing the rod 111, thereby rocking the bell crank lever 85 about its pivot, thus raising the yoke-shaped end 89 of the arm of the bell crank lever and permitting the upward movement of the brake-releasing rod 78 under the influence of the spring 81, and causing the brake to be applied. At the same time the arm 90 of the bell crank lever forces the link 91 to the left thereby moving the bell crank lever 94 to the left and through it moving the controller arm to the right to neutral position, it being understood that in devices of this character the movement of the controller arm to the left completes the electric circuit which causes the elevation of the load supporting means. By thus restoring the controller arm to neutral position and simultaneously permitting the application of the brake the load supporting means is immediately arrested at the predetermined elevation.

The lower end of the trip rod 111 is likewise connected to one arm of a bell crank lever 118, the other arm 119 of which lies in the path of the inclined or cam-shaped end portion 120 of the bracket 116 upon the transverse member 117 of the load supporting means. Consequently when the end of the arm 119 of the bell crank lever 118 is engaged by the cam-shaped portion 120 of the bracket the lever 118 is swung about its pivot and raises the trip rod 111 thereby rocking the bell crank lever 85 about its pivot so that its downwardly extending arm 90 moves the link 91 to the right, thereby actuating the bell crank lever 101 to raise its forked end portion 104 and again permit the upward movement of the brake-releasing bar 78 and the application of the brake by the influence of the spring 81 as aforesaid. At the same time the link 91 moves the L-shaped lever 94 to the right about its fulcrum 96 and actuates the link 99 again to restore the controller lever 69 to neutral position.

When either the arm 114 or the arm 118 is in engagement with the bracket 120 on the load supporting means and the load supporting means arrested at the upper or lower limits of its travel the controller lever is automatically locked against such movement as would cause the motor to rotate in a direction to move the load supporting means in the direction of its arrested movement. Therefore, when the load supporting means is arrested at its upper limit of movement the controller can only be actuated to move it downwardly and when it is arrested at the lower limit of its movement the controller lever can be moved only in a direction to raise the load supporting means.

Suitable means may be provided for adjusting the position of the bell crank lever 113 so that the load supporting means may be arrested at any desired predetermined elevation. In Fig. 7 of the drawings a series of apertures are provided to receive the fulcrum stud of the lever 113, it being, of course, understood that the trip rod 111 may be lengthened or shortened correspondingly. Similar means may also be provided for adjusting the bell crank lever 118 so that the lower limit of movement of the load supporting means may be determined.

As heretofore stated the load supporting means may be provided with any suitable means to receive a load. In the particular embodiment of the invention disclosed herein a tilting platform is mounted upon the load supporting means to receive barrels or other cylindrical objects and means are also provided for automatically discharging the barrels from the load supporting means when the predetermined elevation has been reached. Also means are provided for automatically actuating the lever system to return the load supporting means to its lowest or loading position.

In the particular construction illustrated a barrel-supporting platform is shown having a bottom 121 which inclines toward the center so as to prevent the barrel from rolling off as the load supporting means is raised. The platform 121 is provided near one of its sides with brackets 122 having bosses which are pivotally mounted upon stud shafts 123 secured in the upper ends of brackets 124 upon one of the side bars 40 of the load supporting means so that the platform may be tilted about the shafts 123 as a fulcrum. Another bracket 125, which preferably is secured to the under face of the bottom of the platform about midway of its length, is provided with a shaft 126 which forms the pivot of one link 127 of a toggle, the other link 128 of which is pivoted at its lower end to a stud 129 upon a bracket 130 secured to a transverse member 131 of the load supporting means. The toggle links 127 and 128 are pivoted together upon a pin 132 to which is also connected one end of a link 133 the opposite end of which is pivotally mounted upon a stud 134 upon a lever 135

which is pivoted upon one of the shafts 123. The free end portion of the lever 135 is provided with a series of holes 136 any one of which may be engaged by a hook upon the upper end of a chain 137, the lower end of which is fixedly secured to a bracket 138 upon one of the side bars 1 of the base of the machine.

When the load supporting means is being raised and approaches a predetermined load discharging position the chain 137 is straightened and as the load supporting means continues to rise retains the free end of the lever 135 from upward movement thereby rocking it about its fulcrum 123 causing the link 133, which is attached to it, to straighten the toggle thereby lifting the barrel-supporting platform from its horizontal position which is shown in dotted lines in Fig. 8 to the inclined position shown in full lines, thus causing the barrel to roll off of the side of the platform. It may be mentioned that the effective length of the chain is so adjusted that the platform reaches its final tilting movement approximately at the time the upward movement of the load supporting means is arrested by the mechanism heretofore described so that the barrel automatically rolls from the platform upon an elevated support or floor or upon previously tiered barrels.

A further feature of the invention consists in providing means operated by the barrel as it rolls from the platform to automatically actuate the trip rod 111 and thereby cause the automatic descent of the platform.

In the preferred construction illustrated herein a trip plate 139 is pivotally mounted upon a bracket 140 carried by the platform and normally extends upwardly in the path of the discharging barrels. The under face of the trip plate 139 rests upon the upper end of an adjustable rod 141 which is secured to an arm 142 extending from a shaft 143 which is journalled in one of the side bars 40 of the load supporting means. The other arm 144 of the shaft 143 projects beneath an arm 145 of the bell crank lever 113 so that as the trip plate 139 is depressed by the discharging barrel the arm 142 is depressed thereby raising the arm 144 which in turn raises the arm 145 of the bell crank lever 113 thereby depressing the trip rod 111 and causing the bell crank lever 85 to be rocked about its pivot, thus moving the link 91 to the left, thereby actuating the bell crank 101 in such a manner as to depress its yoke-shaped end 104 and release the lever 78 and at the same time moving the bell crank lever 94 to the left which, through the link 99, swings the controller arm to the right from neutral position thereby energizing the motor to cause the descent of the platform. When the platform reaches its lowermost position the cam face 120 of the bracket engages the arm 119 of the bell crank lever 118 and swings the latter about its pivot and raises the trip rod 111 thus restoring the controller arm to neutral position and permitting the spring 81 to apply the brake in the manner heretofore described.

It will be understood that the particular embodiment of the invention disclosed herein is of an illustrative character and is not restrictive and that various modifications in form, construction and arrangement of parts may be made within the spirit and scope of the following claims.

It will also be understood that the mechanisms described and claimed herein may be and are of a wider application than to hoisting machines and that the following claims are intended to cover the invention whether used in this or analogous arts.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:—

1. A machine comprising a frame, a rotatable member having a shaft journalled in bearings on said frame, means for actuating said rotatable member pivotally supported by said shaft and means for preventing substantial swinging movement of said actuating means about said shaft whereby said actuating means will be unaffected by strains imposed upon said frame.

2. A machine comprising a frame, a rotatable member having a shaft journalled in bearings on said frame, gearing for rotating said rotatable member, gearing-supporting means pivotally supported on said shaft and means for preventing rotation of said gearing-supporting means about said shaft whereby said gearing will be unaffected by strains imposed upon said frame.

3. A machine comprising a frame, a rotatable member having a shaft journalled in bearings on said frame, a gear upon said shaft, a gear casing having a lubricant reservoir pivotally supported by said shaft and capable of rotation thereupon, means for transmitting rotation to said gear mounted in said casing and extending into said reservoir and means for preventing rotation of said gear casing about said shaft.

4. A hoisting machine comprising a base, a frame having uprights mounted on said base, a sheave carried by the upper portions of said uprights, a winding drum having a shaft journalled in bearings on said frame in proximity to said base, a flexible member connected at one end to said drum, passing over said sheave and having load-supporting means connected to its opposite end, means pivotally supported on said shaft for transmitting rotation to said drum and means for preventing substantial swinging movement of said transmitting means about said axle.

5. A hoisting machine comprising a base, a frame having uprights mounted on said base, a sheave carried by the upper portions of said uprights, a winding drum having a shaft journalled in bearings on said frame in proximity to said base, a flexible member connected at one end to said drum, passing over said sheave and having load-supporting means connected to its opposite end, a gear upon said axle, a gear casing pivotally supported by said axle and provided with a lubricant reservoir, complementary gearing supported by said casing extending into said reservoir and means for preventing substantial swinging movement of said gear casing about said axle.

6. A hoisting machine comprising a base, a frame having uprights mounted on said base, a sheave carried by the upper portions of said uprights, a winding drum having a shaft journalled in bearings on said frame in proximity to said base, a flexible member connected at one end to said drum, passing over said sheave and having load-supporting means connected to its opposite end, a worm gear upon said winding drum shaft, a gear casing pivotally supported by said shaft, a worm mounted in said casing, engaging said worm gear, means for actuating said worm and means for preventing substantial swinging movement of said casing about said axle.

7. A hoisting machine comprising a base, a frame having uprights mounted on said base, a sheave carried by the upper portions of said uprights, a winding drum having a shaft journalled in bearings on said frame in proximity to said base, a flexible member connected at one end to said drum, passing over said sheave and having load-supporting means connected to its opposite end, a gear upon said winding drum shaft, a gear casing pivotally supported by said shaft, complementary gearing mounted in said gear casing, means preventing substantial swinging movement of said gear casing about said winding drum shaft, a motor mounted on said base and endless driving mechanism operable by said motor to actuate said complementary gearing.

8. A hoisting machine comprising load supporting means, hoisting mechanism therefor, means for actuating said hoisting mechanism to move said load supporting means in opposite directions, a brake for controlling said hoisting mechanism, means for controlling said actuating means, a member which is movable in the same direction by said load supporting means when the load supporting means approaches predetermined limits of its movement in either direction to cause the application of the brake and thereby arrest the load supporting means and also to prevent further operation of said actuating means in the same direction as that producing the arrested movement of the load supporting means.

9. A hoisting machine comprising load supporting means and hoisting mechanism therefor, means including a motor for actuating said hoisting mechanism, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position respectively to cause the motor to actuate the hoisting mechanism in opposite directions, a brake controlling said hoisting mechanism, a member which is movable in the same direction by said load supporting means when the load supporting means approaches a predetermined limit of its movement in either direction to cause the brake-applying means to apply the brake and simultaneously to restore the controller arm to neutral position and also operable to prevent such actuation of the controller arm as will cause the motor to produce further movement of the load supporting means in the direction of its arrested movement.

10. A hoisting machine comprising load supporting means and hoisting mechanism therefor, means including a motor for actuating said hoisting mechanism, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position respectively to cause the motor to actuate the hoisting mechanism in opposite directions, a brake controlling said hoisting mechanism, means tending normally to apply said brake, a member which is movable in the same direction by the movement of said controller arm in either direction from neutral position to release said brake, means operable by said load supporting means when it approaches a predetermined limit of movement in either direction to permit the application of said brake and simultaneously to restore the controller arm to neutral position and also operable to prevent such actuation of the controller arm as would cause the motor to produce further movement of the load supporting means in the direction of its arrested movement.

11. A hoisting machine comprising load supporting means and hoisting mechanism therefor including a motor for actuating said hoisting mechanism, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position to cause said motor to actuate said hoisting mechanism in opposite directions, a brake controlling said hoisting mechanism, a brake-actuating member and a lever system connecting said controller arm to said brake-actuating member operable by the movement of said controller arm in either direction from neutral position to move said brake-actuating member in the same direction.

12. A hoisting machine comprising hoisting mechanism including load supporting means and a motor for actuating said hoist-

ing mechanism, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position to cause said motor to actuate said hoisting mechanism in opposite directions, a brake controlling said hoisting mechanism, a brake-actuating member, a lever system connecting said controller arm to said brake-actuating member operable by the movement of said controller arm in either direction from neutral position to move said brake-actuating member in the same direction and means automatically operable by said load supporting means at predetermined limits of its movements to actuate said lever system in reverse directions and thereby positively to restore said controller arm to neutral position.

13. A hoisting machine comprising hoisting mechanism, means including a motor for actuating said hoisting mechanism, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position to cause said motor to actuate said hoisting mechanism in opposite directions, a brake controlling said hoisting mechanism, a brake-actuating member, a lever system connecting said controller arm to said brake-actuating member including means for preventing said lever system from acquiring a dead center, said lever system being operable by the movement of said controller arm in either direction from neutral position to move said brake-actuating member in the same direction.

14. A hoisting machine comprising a base, a frame mounted thereon having uprights, vertically movable load supporting means mounted on said uprights, means including a motor for elevating said load supporting means, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position to cause said motor to raise and lower said supporting means, a brake controlling said load supporting means, a brake-actuating rod, a lever connected to said controller arm, a connector pivotally connected to said lever, a plurality of oppositely movable bell crank levers each pivotally connected to said connector and positioned to engage said brake-actuating rod and operable by the movement of said controller arm in either direction from normal position to move said rod in the same direction to actuate the brake.

15. A hoisting machine comprising a base, a frame mounted thereon having uprights, vertically movable load supporting means mounted on said uprights, means including a motor for elevating said load supporting means, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position to cause said motor to raise and lower said load supporting means, a brake controlling said load supporting means, a brake-actuating rod, resilient means normally tending to cause said rod to apply the brake, a lever connected to said controller arm, a connector pivotally connected to said lever, a plurality of oppositely movable bell crank levers each pivotally connected to said connector and positioned to engage said brake-actuating rod and operable by the movement of said controller arm in either direction from normal position to move said rod in a direction to release said brake.

16. A hoisting machine comprising a base, a frame mounted thereon having uprights, vertically movable load supporting means mounted on said uprights, means including a motor for elevating said load supporting means, a controller for said motor having a controller arm operable upon movement to opposite sides of neutral position to cause said motor to raise and lower said load supporting means, a brake controlling said load supporting means, a brake-actuating rod, resilient means normally tending to cause said rod to apply the brake, a lever connected to said controller arm, a connector pivotally connected to said lever, a plurality of oppositely movable bell crank levers connected to said connector and positioned to engage said brake-actuating rod and operable by the movement of said controller arm in either direction from normal position to move said rod in a direction to release said brake, an extension on one of said bell crank levers, a bar engaging said extension having an arm positioned to be engaged by said load supporting means when the latter reaches a predetermined elevation and operable thereby to cause the lever mechanism to restore said controller arm to neutral position and substantially simultaneously to permit the application of said brake.

17. A hoisting machine comprising a base, a frame having uprights mounted thereon, a vertically movable load-supporting means mounted on said uprights and provided with a load-discharging device, means for elevating said load-supporting means, automatically operable means for actuating said load-discharging device when the load-supporting means reaches a predetermined elevation and means automatically operable substantially simultaneously therewith to arrest the upward movement of said load-supporting means, and means automatically operable by the discharging movement of the load as it leaves the platform to cause said elevating means to lower said platform.

18. A hoisting machine comprising a base, a frame having uprights mounted thereon, a vertically movable load-supporting means mounted on said uprights and provided with a tilting platform, means for tilting said platform including a lever, a flexible member adjustably connected to said lever

and to said frame operable when the load-supporting means reaches a predetermined elevation to tilt said platform and means operable by the movement of said load-supporting means substantially simultaneously with the actuation of said lever to arrest the upward movement of the load-supporting means.

19. A hoisting machine comprising a base, a frame having uprights mounted thereon, a vertically movable load-supporting means mounted on said uprights and provided with a tilting platform, means for tilting said platform including a lever, a flexible member adjustably connected to said lever and to said frame operable when the load-supporting means reaches a predetermined elevation to tilt said platform, means operable by the movement of said load-supporting means substantially simultaneously with the actuation of said lever to arrest the upward movement of the load-supporting means and means automatically operable by the discharging movement of the load as it leaves the platform to cause said elevating means to lower said platform.

20. A hoisting machine comprising a base, a frame having uprights mounted thereon, vertically movable load-supporting means provided with a tilting platform, a toggle mechanism having links connected respectively to said load-supporting means and said platform and automatically operable means acting upon said links to straighten said toggle and thereby to tilt said platform when the load-supporting means approaches a predetermined elevation.

21. A hoisting machine comprising a base, a frame having uprights mounted thereon, vertically movable load-supporting means provided with a tilting platform, a toggle mechanism having members connected respectively to said load-supporting means and said platform and means including a flexible member adjustably secured to the frame operable to actuate said toggle to tilt said platform when the load supporting means approaches a selected predetermined elevation.

22. A hoisting machine comprising a base, a frame having uprights mounted thereon, vertically movable load supporting means provided with a tilting platform, a toggle mechanism having members connected respectively to said load supporting means and said platform, a lever mounted on said load supporting means, a link connecting said lever to the joint of said toggle and a flexible member adjustably connecting said lever to the frame operable to actuate said toggle to tilt the platform when the load supporting means approaches a predetermined elevation.

In testimony whereof, we have signed our names to this specification.

ELLIOTT SOUTHWORTH CHURCH.
FREDERICK J. SHEPARD, Jr.