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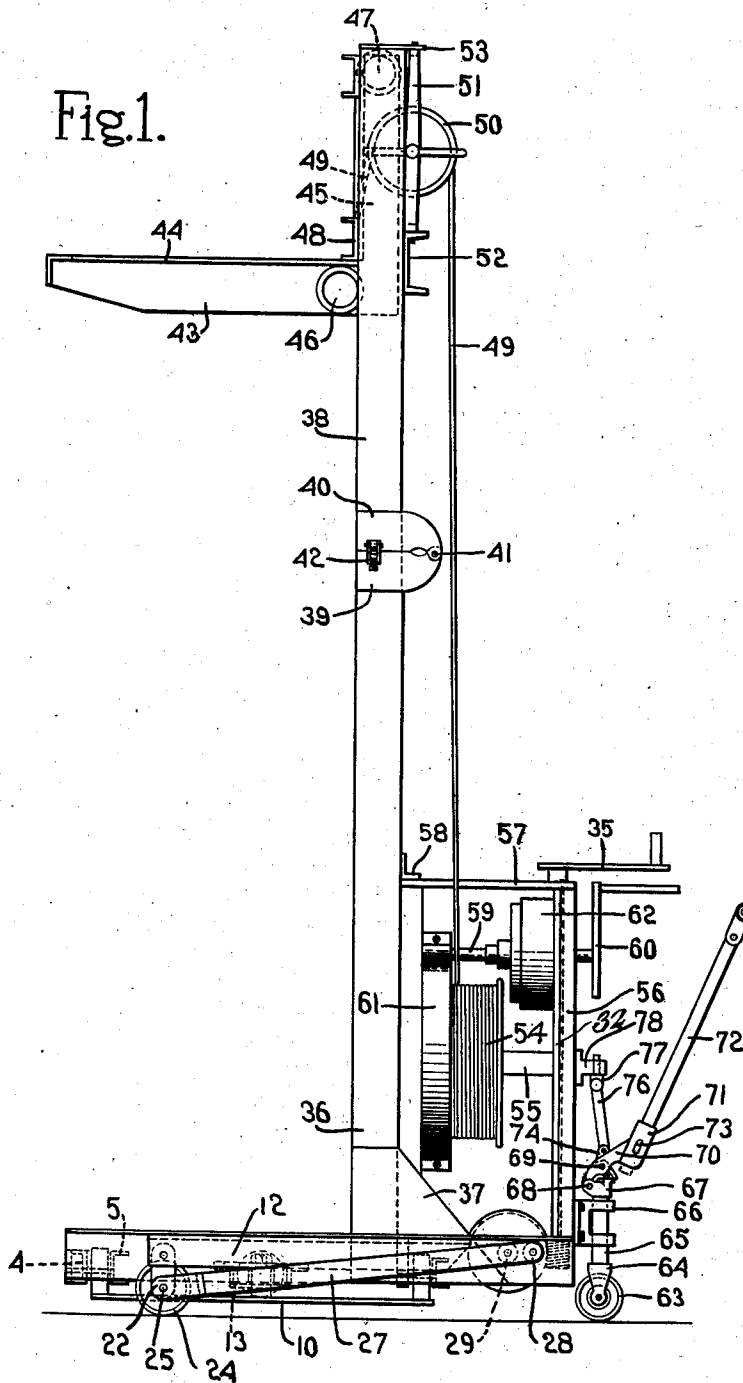
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1,997,327

REVOLVING HOISTING MACHINE OR STACKER

Filed July 14, 1930

2 Sheets-Sheet 1



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Fig. 2.

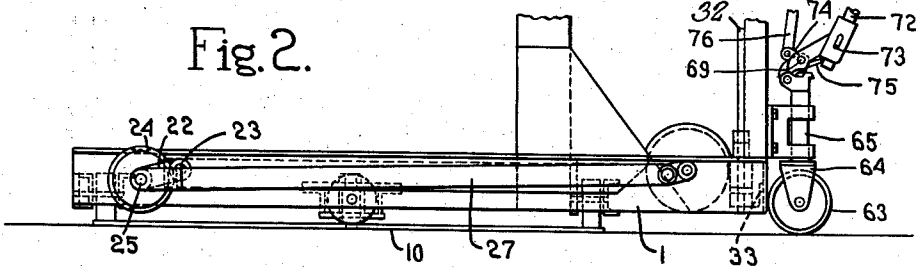
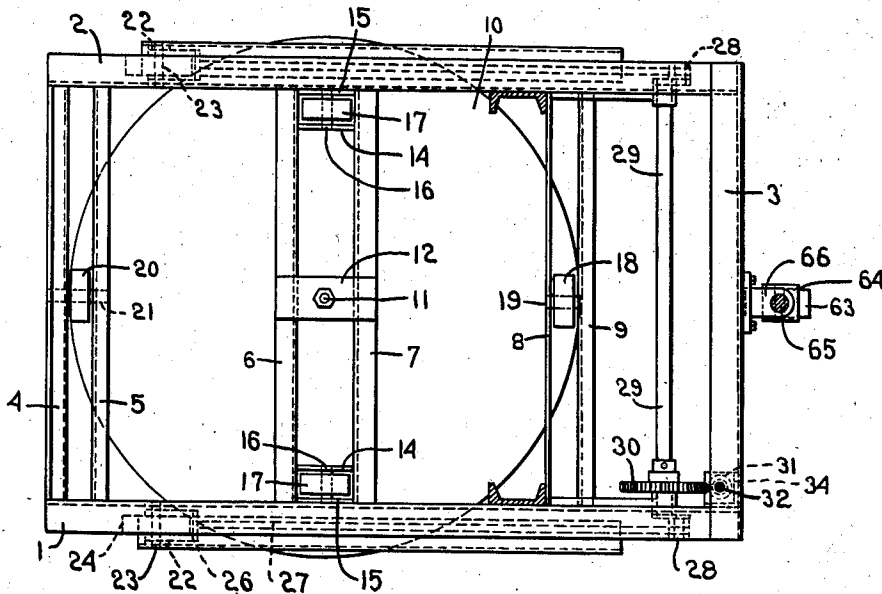


Fig. 3.



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UNITED STATES PATENT OFFICE

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REVOLVING HOISTING MACHINE OR
STACKER

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4 Claims. (Cl. 280—46)

This invention relates to improvements in hoisting machines and preferably portable hoisting machines having a wheel-supported base, standards rising from said base, load supporting means mounted upon said standards, and means for actuating the load supporting means to raise the same to a desired height from which the load may be transferred to a suitable support, or by which boxes and the like may be superposed or stacked upon each other.

In the use of such portable hoisting machines it is frequently necessary to transport the loads through narrow alleys of insufficient width to permit the turning of the hoisting machine in such manner as to permit the load to be conveniently delivered from the load supporting means. In other instances it is found that where the load supporting means, with the load thereupon, is raised to a desired height that in transferring the load from the load supporting means the machine will be moved away from the support or stack during transfer, thereby making it inconvenient to transfer the load, or some times resulting in the dropping of the load.

A further object of the invention is to provide means for preventing movement of the machine when positioned for the unloading operation. This is accomplished in the present invention by providing a base having supporting members to engage the floor and alternative floor-engaging means so connected to the base as to permit rotation of said base about a vertical axis, but to prevent horizontal movement of said base relatively to the floor.

Another object of the invention is to provide a hoisting machine of the character above described of rigid construction and in which the base preferably is of integral construction with standards integrally secured at their lower ends to the base.

These and 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.

Preferred embodiments of the invention are illustrated in the accompanying drawings, in which,

Fig. 1 is a side elevation of a portable hoisting machine with the supporting wheels positioned to permit transportation of the machine;

Fig. 2 is a similar view of the lower portion of the machine showing the frame supported in such a manner as to prevent horizontal move-

ment thereof, but to permit rotative movement about a vertical axis;

Fig. 3 is a plan view of the base frame and parts therebeneath, the vertical standards being shown in section and the hoisting mechanism omitted.

The base of the hoisting machine illustrated herein comprises side bars 1 and 2 of structural steel, preferably in the form of angle bars with their horizontal flanges extending outwardly, the vertical flanges being connected by a front girder 3, preferably of angle iron, having its vertical flange welded to the ends of the vertical flanges of the side bars 1 and 2 and its horizontal flange resting upon and welded to the horizontal flanges of the side girder, and a rear girder or preferably a pair of girders 4 and 5, preferably of channel iron, having their ends abutting and welded to the vertical flanges of the respective side girders with their vertical webs spaced apart, and the horizontal flanges of the respective girders extending in opposite directions.

The base is also provided with a central girder desirably formed of two channel bars 6 and 7 welded at their ends to the vertical flanges of the side bars 1 and 2 and having their respective flanges extending from the vertical webs in opposite directions. Other transverse girders 8 and 9 are located intermediate of the center girder and the front girder and at a distance from the vertical central plane of the central girder and distances equal to that of the girders 4 and 5 respectively. A floor-engaging track, adapted to support the base of the machine, is located intermediate of the base and floor, and means are provided for causing relative vertical movement between the base and the floor to permit the machine to be selectively supported upon the track, or to be supported upon wheels for transportation in a manner hereinafter to be described.

In the preferred construction the track is in the form of a circular plate 10 pivotally mounted upon a central stud 11 which is secured to plates 12 and 13, preferably welded to the central girder members 6 and 7, centrally of their length. Vertical plates or brackets 14 and 15, located between the ends of the vertical flanges of the cross girder members 6 and 7, are welded thereto in spaced relation and provide supports for the shafts 16 of anti-friction wheels 17 adapted to engage the upper surface of the circular plate or track 10.

A similar anti-friction wheel 18 is mounted upon a shaft 19 having its ends secured in the vertical webs of the members 8 and 9 and another anti-friction wheel 20 is mounted upon a shaft

21 in the vertical flanges of the rear cross girder members 4 and 5. The anti-friction wheels 17, 18, and 20 desirably are located ninety degrees from each other and when the plate 10 is upon the floor and these anti-friction wheels are in engagement therewith, permit the frame to be rotated about the vertical axis of the central shaft 11 of the floor-engaging plate or track 10. Thus when the track 10 is resting upon the ground and the base supported therefrom the machine is prevented from horizontal movement, but the base is rotatable about a vertical axis.

In order to provide for transportation of the machine base lifting members having wheels are provided which are movable relatively to the frame in such a manner that the supporting plate 10 may be raised from the floor and suitable means are provided for so actuating the wheels as to permit the frame and plate 10 to be lowered into engagement with the floor. Obviously means might be provided for moving the plate 10 relatively to the frame to accomplish the same purpose.

In the preferred construction rear pairs of links 22 are pivotally connected by shafts 23 to the rear portions of the frame and wheels 24 are rotatably secured upon axles 25 in the lower ends of the links 22. Yokes 26, spanning the wheels 24, are pivotally connected at their ends to the shafts of the wheels and are connected to links 27 extending longitudinally of the side bars and pivotally connected at their front ends to eccentric portions preferably in the form of cranks 28 of a transverse shaft 29 which is mounted in suitable bearings in the vertical flanges of the side bars 1 and 2.

Suitable means are provided for rotating the shaft 29 to cause longitudinal movement of the links 27 for the purpose of swinging the links 22 of the rear wheels longitudinally of the frame, and thereby causing vertical relative movement between the axles 25 of the wheels and the frame, so that when the rear wheels engage the floor the base will be lifted from the floor, as illustrated in Fig. 1.

A preferred means for rotating the shaft 29 comprises a worm wheel 30 which is fixedly secured to the shaft and is engaged by a worm 31 secured at the lower end of a vertical shaft 32 extending through the front girder 3 and journaled at its lower end in a suitable bracket 33 which desirably is welded to the side bars and to the front girder 3. The upper end portion of the shaft 34 is journaled in a winch-supporting frame hereinafter to be described and is provided with an actuating crank 35.

In the preferred construction the base is provided with vertical standards 36 extending upwardly from the front portions of said girders and which desirably are welded at their lower ends to the vertical flanges of the side bars and are re-enforced by gusset plates 37 which are welded to the side frames and to the vertical standards.

The vertical standards desirably are formed in pivotally connected sections, the upper sections 33 being normally in axial alinement with the lower sections. Plates 39 and 40, preferably connected by welding to the lower and upper sections 36 and 38 of the standards, extend forwardly therefrom and are provided with overlapping end portions which are connected by pivotal studs 41. Suitable detachable locking means 42 are provided for holding the upper and lower sections 36 and 38 in axial alinement.

The vertical standard sections 36 and 38 desirably are of channel form and an L-shaped load supporting means or platform is mounted to slide vertically upon the standards. The load supporting means or platform desirably comprises horizontal side bars 43 preferably of angle iron connected by suitable girders (not shown) and by a floor or plate 44, and vertical plates or channel bars 45 rigidly secured, preferably by welding, to the ends of the horizontal side bars 43. The platform extends rearwardly from said standards across the vertical axis of the circular track or plate so that the weight of the load upon the platform will usually be supported in approximate alignment with said vertical axis. The anti-friction rollers 46 and 47, pivotally mounted upon the vertical members 45 of the load supporting means, engage respectively the outer and inner faces of the rear flanges of the vertical standard sections 36 and 38 and guide the load supporting means in its vertical movement.

The load supporting means desirably also comprises a transverse channel bar 48 which is welded to the side bars 43 and the vertical members 45 of the load supporting means at their junction or elbow, and a cable 49, which is secured to the channel bar 48, passes over a sheave 50 mounted in suitable bearings in a frame 51 which rests at its lower end upon and is secured to the transverse channel bar 52 which is welded to the upper section 38 of the standard a short distance below its upper end and is also connected to a transverse plate 53 which preferably is welded to the upper ends of the upper sections 38 of the standard.

The cable 49 is mounted at its lower end upon a winch 54, the shaft 55 of which is journaled in a supplemental frame comprising a vertical standard 56 mounted at its lower end upon the front cross girder 1 and connected by a plate 57 to a horizontal cross girder 58 which preferably is welded to the lower section 36 of the standards. Suitable means are provided for actuating the winch, such as a large gear (not shown) connected to the winch shaft 55 meshing with a relatively small pinion upon a shaft 59 journaled in the standards 56 and provided with a crank 60, said gears being enclosed in a casing 61. A suitable brake contained in a casing 62 and operated by the crank 60 may also be provided for controlling the descent of the load supporting means.

The winch mechanism and the brake mechanism desirably may be of the character disclosed in my prior Patent No. 1,741,215 granted December 31, 1929, or the patent to Shepard and Warshaw No. 1,672,173 granted June 5, 1928, and need not be further described.

Any suitable means may be provided for raising the front end of the base relatively to the floor. In the preferred construction the mechanism for accomplishing this purpose comprises a steering wheel or wheels 63 mounted in a yoke 64 having a vertical steering post 65 rotatably and slidably journaled in arms of a bracket 66 rigidly connected to the vertical frame member 56 and having a tongue connected thereto operable to rotate the steering post for steering purposes, or to move the steering post vertically relatively to said bracket.

The mechanism for raising the front end of the base, which is illustrated herein, is substantially identical with that disclosed in Patent No. 1,702,698, granted to Ralph M. Lovejoy on February 19, 1929.

In this construction a split collar 67, which is clamped upon the upper end of the steering post, by a bolt 68, is provided with a pair of upwardly extending ears in which is mounted a transverse shaft 69 forming a pivot for a bifurcated tongue extension. The tongue extension 70 is provided with a tubular portion 71 in which the tongue 72 is slidably mounted, but limited in its movement by a pin 73 extending through slots in the diametrically opposite sides of the tubular member 71. A bell crank lever 74, which is mounted upon the shaft 69 intermediate of the ears on the collar 67, has an extension 75 adapted to be releasably engaged between the lower end of the tubular tongue member and the end of the tongue when the latter is thrust inwardly through the tubular member. The bell crank lever 74 is pivotally connected to the lower end of a strut 76, the upper end of which is pivotally connected to a swivel 77 having a stem rotatably mounted in a bracket 78 secured to the frame member 56.

The bell crank arm 74 and the strut 76 form in effect a toggle which may be straightened to force the steering post downwardly and thereby raise the front end of the platform, as illustrated in Fig. 1, or broken as illustrated in Fig. 2, to permit upward movement of the steering post, thereby lowering the base toward the floor.

The pivot 69, upon which the bell crank lever is mounted, and the pivotal connection of the arm 74 of the bell crank lever, and the lever 76, is such that the bell crank lever may be rotated to position the pivotal connection between the arm 74 and the strut 76 upon either side of the vertical axis of the steering post, so that when the frame is in elevated position and the toggle straightened, it will be automatically held in extended position, while when rotated in the opposite direction across the axis of the steering post the toggle will be shortened, thereby permitting the base to descend toward the floor so that it will be supported by the circular plate or track as aforesaid.

When in the operation of the device it is desired to transport the hoisting machine from one position to another the handle 35 is rotated in a proper direction to cause the rotation of the shaft 29 to move the crank arms 28 in a direction to draw the link 27 forwardly, thereby swinging the rear links 22 upon which the wheels 24 are mounted forwardly to a vertical position, thus raising the rear end of the base frame.

The tongue 72 is then moved downwardly in the socket 71 until the end of the tongue, extending therethrough, engages the arm 75 of the bell crank lever, so that it holds it against the lower end of the tubular portion of the tongue extension.

Downward swinging movement of the tongue will then depress the arm 75 of the bell crank lever and straighten the toggle, thereby causing relative movement between the steering post and the bracket 78 which is fixed to the frame, thus raising the front end of the base. When the bell crank lever is in this straightened position, the arm 75 of the bell crank lever will engage the steering post, thereby locking the toggle in its straightened position as the pivotal connection between the toggle and strut 76 will be in front of the vertical axis of the steering post. When in this position the tongue may be moved outwardly, thus withdrawing its end from engagement with the arm 75 and the tongue thus freed to steer the machine.

In usual operations of the hoisting machine

the winch is then operated to lower the load supporting means approximately to the level of the upper face of the base. The load is then placed upon the platform and the hoisting machine then drawn by its tongue to the desired destination. If it is desired to transfer the load from the load supporting means to a floor or to a stack at right angles, or at any other angle to the position of the frame of the truck, the rear end of the base may be lowered by rotating the crank 35 in a direction to swing the rear links 24 rearwardly sufficiently to permit the plate or track to engage the floor and to remove the weight of the truck and its load from the rear wheels.

The steering tongue 72 may then be forced downwardly to engage the end 75 of the bell crank lever. Upward movement of the tongue will thereupon swing the bell crank lever about its pivot, thus breaking the toggle and permitting the front end of the base to be lowered, so that the base will be entirely supported by the circular plate or track 10.

Inasmuch as the base is pivotally mounted centrally upon the plate or track 10, and the plate or track 10 engaged by the anti-friction rollers 17, 18 and 20 the base of the truck may then be rotated about a vertical central axis such distance as may be required to present the rear end of the load supporting means to the floor, shelf, or pile upon which the load is to be deposited. The winch may then be actuated to raise the load supporting means to the desired height, so that the load may be conveniently transferred from the load supporting means to the desired position.

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

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

1. A hoisting machine comprising a base frame having a circular base-supporting plate of a diameter approximating the width of said frame adapted to rest upon the floor and pivotally connected axially to said frame, anti-friction members mounted on said base frame to engage said plate in proximity to the periphery thereof and at equally spaced intervals, links pivotally mounted upon the rear end of said frame having floor-engaging wheels, a shaft extending across said base frame provided with eccentrically disposed portions, links connecting the eccentrically disposed portions of said shaft with the respective rear links, a worm gear rigidly connected to said shaft, a worm having a shaft mounted in said base frame engaging said worm gear operable to swing said links about their pivots to raise and lower the rear end of said frame, a front steering wheel, and means for causing relative vertical movement between said steering wheel and said base to raise the front end thereof.

2. A hoisting machine comprising a base having side bars formed of structural steel, end girders and central girders of structural steel welded at their ends to said side girders to form an integral base, vertical standards mounted upon the front portions of said side girders and welded thereto, a circular plate of a diameter approximating the width of said frame pivotally

- mounted to rotate about a vertical axis centrally of said central girders, rear links pivotally mounted in said side girders having wheels mounted upon their free ends, a transverse shaft mounted in the front portion of said side girders provided at its ends with downwardly extending cranks, links connecting the axles of said rear wheels to said cranks, a worm gear upon said shaft, means including a worm engaging said gear operable to swing said pivotally mounted links and thereby to raise the rear end of said frame, steering mechanism mounted on the front end of said frame, and means for causing relative movement between said base and said steering mechanism to raise the front end of said base.
3. A hoisting machine comprising a base having side bars of structural steel, a transverse central girder of structural steel welded to said side bars, other transverse girders of structural steel welded to said side bars at substantially equal distances from said central girder, a circular plate of a diameter approximating the width of said frame pivotally mounted upon the center of said central girder, anti-friction rollers mounted on said central girder in proximity to the respective side bars to engage said plate near its periphery, anti-friction rollers mounted upon the other transverse girders in the longitudinal axis of the frame to engage said plate near its periphery, rear wheels connected to said frame, means

for raising and lowering said rear wheels relatively to said frame, a front steering mechanism connected to said frame, and means for raising and lowering said steering mechanism relatively to said frame.

4. A hoisting machine comprising a base having side bars of structural steel, a central transverse girder formed of structural bars narrowly spaced apart and welded at their ends to said side bars, other transverse girders located at substantially equal distances from said central girder and comprising narrowly spaced parallel bars of structural steel welded at their ends to said side bars, upper and lower plates extending longitudinally of the axis of said frame and welded to the members of said central girder, a circular plate of a diameter approximating the width of said frame pivotally mounted in said upper and lower plates, anti-friction rollers mounted between the members of said central girder in proximity to the respective side bars to engage said circular plate near its periphery, other anti-friction rollers mounted between the members of said other transverse girders in the longitudinal axis of the frame to engage said plate, rear wheels connected to said frame, means for raising and lowering said wheels relatively to said frame, a front steering mechanism connected to said frame, and means for raising and lowering said steering mechanism relatively to said frame.

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