Nov. 15, 1938. D. D. MYERS 2,136,750

AUTOMOBILE LIFT

Filed Sept. 10, 1935 2 Sheets-Sheet 1

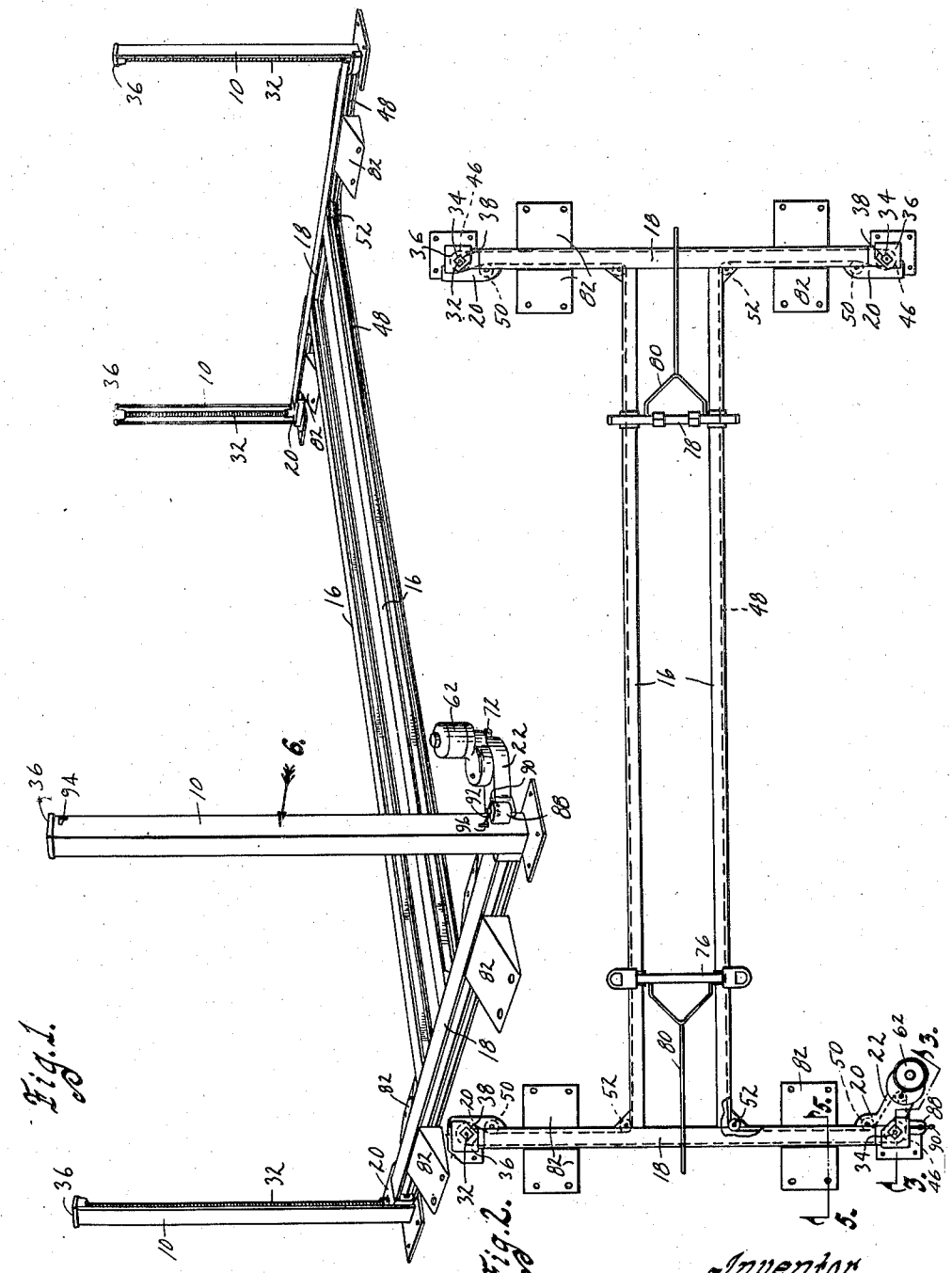


Fig. 1.

Fig. 2.

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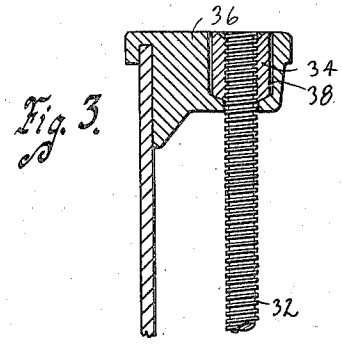
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Fig. 3.



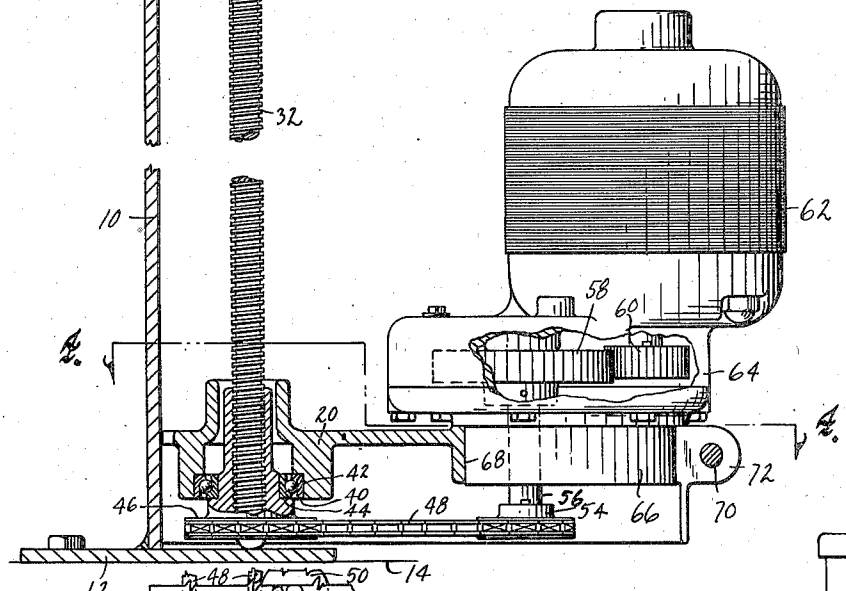


Fig. 4.

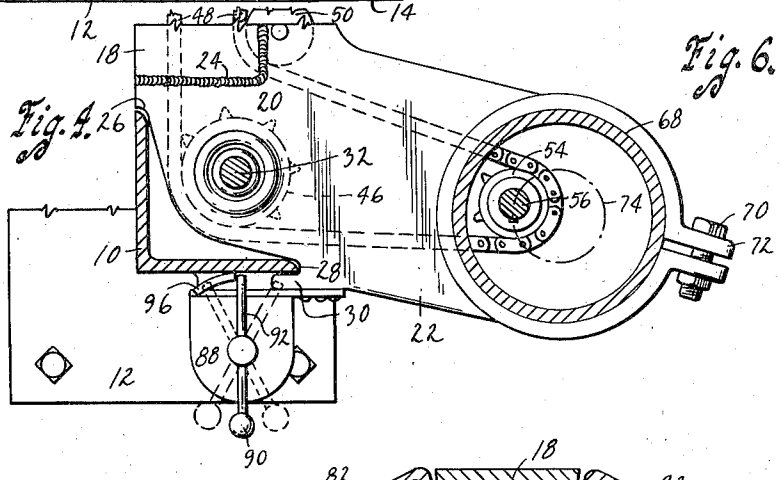


Fig. 5.

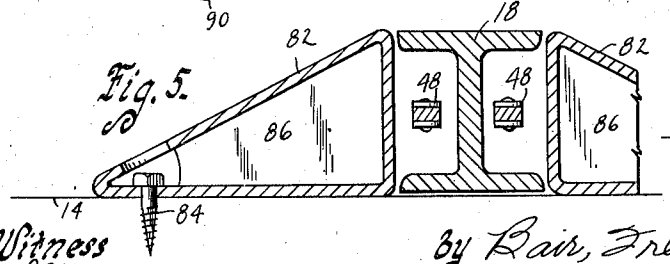
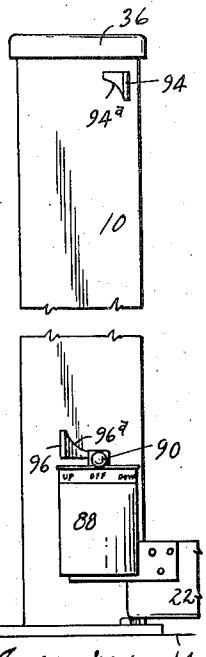


Fig. 6.



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AUTOMOBILE LIFT

Don D. Myers, Toledo, Ohio, assignor to Modern Equipment Corporation, Defiance, Ohio, a corporation of Ohio

Application September 10, 1935, Serial No. 39,939

8 Claims. (Cl. 254—92)

An object of my invention is to provide a lift structure for automobiles or other vehicles of "four post type" in which four posts are mounted on a garage floor or the like, and an automobile engaging frame is vertically movable relative to the posts, this structure being comparatively simple and inexpensive to manufacture and also durable.

A further object is to provide posts with stationary screw threaded shafts and a carriage vertically movable relative to the shafts and guided by the posts.

Another object is to provide means for so moving the carriage and comprising nuts mounted on the shafts and adapted upon rotation to move vertically relative thereto and carry with them the carriage frame.

A further object is to provide simple means for rotating the nuts comprising a reversible motor and a continuous chain extending around the sprockets on each of the nuts.

Another object is to provide simple control means for the motor consisting of a reversing switch which can be manually positioned for either raising or lowering the carriage frame, automatic stopping means being provided in the form of an abutment at the top and bottom of one of the posts to throw the switch to inoperative position when either the top or bottom limit of movement is reached.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of an automobile lift embodying my invention.

Figure 2 is a plan view of the same showing in addition to Figure 1 a pair of axle supports.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 2, showing the drive means for the lift.

Figure 4 is a plan view partly in section on the line 4—4 of Figure 3, showing details of structure.

Figure 5 is a sectional view on the line 5—5 of Figure 2 showing a ramp used in connection with the lift; and

Figure 6 is a side elevation of one of the corner posts looking in the direction of the arrow 6 adjacent Figure 1, and showing the control mechanism for the lift.

On the accompanying drawings I have used the reference numeral 10 to indicate a post of angular cross section. As illustrated, two pairs of the posts 10 are provided and each post has a plate-like foot 12 thereon adapted to rest or be bolted against a garage floor or the like 14 (see Fig. 3). A greater number of pairs of posts may be used however, if the lift is designed for exceptionally long automobiles, such as busses and the like, which would require long carriage frames and make support intermediate the ends thereof desirable. The posts 10 are unconnected except by a carriage frame comprising longitudinal rails 16 and transverse rails 18 secured to the ends of the rails 16. Each end of each rail 18 is provided with a guide casting 20. These castings are similar with the exception of the one at the near corner in Figure 1, having an extension 22. The castings 20 may be secured as by welding 24 to the ends of the beams 18. Each of the castings 20, as best shown in Figure 4, has a pair of grooves 26 and 28 adapted to be guided by the edges of the flanges of the angle like posts 10, one of the grooves preferably terminating in a hook-like flange 30.

In each post 10 I provide a stationary screw threaded shaft 32, the upper end of which is welded in and suspended by a nut 34 and the lower end of which is movable laterally. The nut 34 is in turn carried by a cap member 36 on the post, having an angular socket 38 to supportingly and non-rotatably receive the nut 34. The nut serves merely as a suspending and connecting means between the threaded shaft 32 and the upper end of the post 10.

On each shaft 32 I provide a rotatable sprocket nut 46, which obviously upon rotation will travel either up or down longitudinally of the shaft, depending on its direction of rotation. The nuts 46 through thrust ball bearings 40 support the castings 20, the bearings being received in sockets 42 thereof and resting on shoulders 44 of the nuts 46.

The sprocket of each nut 46 is actuated by a chain 48 passing around the sprockets. The chain 48 is continuous, extending around each sprocket, as shown in Figure 2, and over idlers 50 carried by the castings 20, and other idlers 52 located at the junctions of the carriage beams 16 and 18.

The chain 48 also extends around a drive sprocket 54 mounted on a shaft 56. The shaft 56 is driven as through a gear 58 and a pinion 60 by a reversible electric motor 62.

The motor 62 is supported on a housing 64 for the gears 58 and 60. The housing 64 has a cylindrical projection 66 fitting snugly in a bore 68

of the casting extension 22. The shaft 56 is located eccentrically relative to the cylinder 66 whereby the cylinder may be rotated for tightening the chain 48 as it becomes worn. The adjustment may be retained by a clamping bolt 70 extending through perforated split ears 72 of the casting extension 22. Upon loosening this bolt, the entire motor and gear casing 64 can be rotated to secure the chain adjustment. The arc of adjustment is indicated at 74 in Figure 4, the minimum tightness of adjustment being illustrated in this figure.

The rails 16 are adapted to either engage the axles of an automobile directly, or transverse axle engaging elements 76 and 78 can be mounted thereon for sliding movement longitudinally of the beams 16. For convenience in sliding the axle supports 76 and 78, Y-shaped rods 80 are connected therewith and extend to a convenient operating position beyond the ends of the beams 16. By means of the rods 80, the axle supports 76 and 78 can be adjusted beneath an automobile to a position in alignment with the axles thereof.

Ramps 82 are provided and secured to the floor 14 by lag screws or the like 84. The ramps may be made of heavy sheet metal and formed in triangular shape, as shown in Figure 5, and reinforced with vertical webs 86 if desired.

The ramps incline from the floor 14 upwardly to the tops of the rails 18, so that the wheels of an automobile can readily pass over the bars when positioning the automobile between the posts of the lift.

For controlling the motor 62 I provide a switch 88 having a control handle 90. As shown in Figure 4, when this handle is swung toward the left, the motor 62 rotates in the proper direction for raising the lift. When swung toward the right, the motor rotates in the reverse direction, while when the lever is in the central full-line position, the motor is de-energized.

The handle 90 has an extension 92 adapted to co-operate with actuating lugs 94 and 96 at the top and bottom the nearest post in Figure 1. The lugs 94 and 96 have inclined or cam shaped lower and upper faces respectively, as shown at 94*a* and 96*a* in Figure 6. When the lever 90 is swung toward the left for causing the lift to raise, the extension 92 will swing toward the right into the path of the lug 94*a*. Adjacent the upper limit of movement of the lift, the extension 92 will engage the cam surface 94*a*, thus automatically swinging the lever 90 to the central or off position. Likewise, at the lower limit of movement the cam surface 96*a* swings the lever to the central or off position. Thus a simple means is provided for automatically stopping the lift at either limit of its movement.

The posts 10, it will be noted, are entirely independent of each other, except that they are connected by the threaded shafts and castings 20. Thus it is unnecessary to provide any connecting frame at the tops of the posts which would be an inconvenient obstruction, inasmuch as the carriage frame, as it rises, serves as a means to retain the posts 10 in proper position relative to each other and in a rigid supporting position for the carriage frame.

The motor and all operating parts for the lift are carried by the carriage frame, and the control switch is likewise carried by the carriage frame. This considerably simplifies the construction of the machine without sacrificing any mechanical advantages inherent in a lift of the kind in which the motor is mounted stationary relative to the posts. Since screw threaded shafts are provided, the chain 48 can operate at a considerable speed without producing excessive lifting speed of the lift itself. The use of screw threaded shafts also makes the lift self-locking in any position it is stopped. Also the threaded shafts serve as a substantial support for the lift in any of its positions.

It is obvious also from the foregoing that numerous changes might be made in the construction, arrangement and operation of the parts, and it is my purpose to cover by my claims any modifications in structure or use of mechanical equivalents, which may reasonably come within the scope of my invention and of the claims.

I claim as my invention:

1. In a lift structure, a plurality of upright posts independently mounted and each having a socket in its upper end, a screw threaded shaft carried by each post, a head on the upper end of each screw threaded shaft, said heads being received non-rotatably in said sockets, a carriage frame vertically movable relative to said posts, nuts supporting said carriage frame and rotatable relative thereto and relative to said screw threaded shafts, and means carried by said carriage frame for rotating said nuts.

2. In a lift structure, a plurality of upright posts, a screw threaded shaft carried by each post, and having an angular head received in a socket in the upper end of said post and non-rotatively suspended thereby, a carriage frame vertically movable relative to said posts, nuts supporting said carriage frame and rotatable relative thereto and relative to said screw threaded shafts, and means carried by said carriage frame for rotating said nuts.

3. In a lift structure, a plurality of upright posts, a screw threaded shaft carried by each post, a carriage frame vertically movable relative to said posts and comprising transverse and longitudinal beams, nuts supporting said carraige frame and rotatable relative thereto and relative to said screw threaded shafts, and means carried by said carriage frame for rotating said nuts, said means comprising a motor, a sprocket on each nut and a chain extending around the sprockets and driven by the motor, the stretches of said chain extending adjacent said transverse and longitudinal beams from one sprocket to another, said means including a cylindrical member, rotatably mounted means for locking it against rotation and a drive sprocket carried thereby and located off center relative thereto whereby upon being unlocked said cylindrical member may be rotated to adjust the tension of said chain.

4. In a lift structure, a plurality of upright posts each having a socket in its upper end, a screw threaded shaft carried by each post, and having a head non-rotatably received in the socket thereof and suspended thereby, a carriage frame vertically movable relative to said posts, nuts supporting said carriage frame and rotatable relative thereto and relative to said screw threaded shafts, and means carried by said carriage frame for rotating said nuts, said carriage frame comprising longitudinal vehicle supporting beams and transverse beams connected therewith for supporting said longitudinal beams.

5. In a lift structure, a plurality of upright posts, a carriage frame guided thereby for vertical movement, a screw threaded shaft and nut means

for imparting vertical movement to said carriage frame, a chain for driving said nuts, means for driving said chain comprising a drive sprocket and means for mounting said sprocket so that the tension of said chain can be adjusted comprising an annular member, said sprocket being journaled eccentrically relative thereto, a mounting ring receiving said annular member and means for locking said annular member relative to said mounting ring.

6. In a lift structure, a plurality of upright angular shaped posts, a screw threaded shaft non-rotatably suspended from the upper end of each post and having their lower ends movable laterally relative to said posts, a carriage frame vertically movable relative to said shafts and guided by said posts, nuts threaded on said shafts and rotatable relative to said carriage frame, said nuts supporting the frame relative to said shafts, and motive means carried by the frame for rotating said nuts simultaneously.

7. A lift having laterally spaced, vertical posts, a vertically disposed screw held against axial and rotative movement by each one of said posts, the lower part of each of said screws being movable laterally, a rotatable nut threaded onto the laterally movable part of the corresponding screw and being laterally movable relative to the corresponding post, a horizontal platform moved vertically by and supported directly on all of said nuts, and means for simultaneously rotating all of said nuts to move said platform vertically.

8. A lift having laterally, vertical posts, a screw within each of said posts, the upper end of each of said screws being non-rotatably supported on the corresponding of said posts to swing relative thereto and the lower end of each of said screws being free to move laterally relative thereto.

DON D. MYERS.