June 21, 1949. H. D. FREELAND 2,474,045

LIFTING JACK

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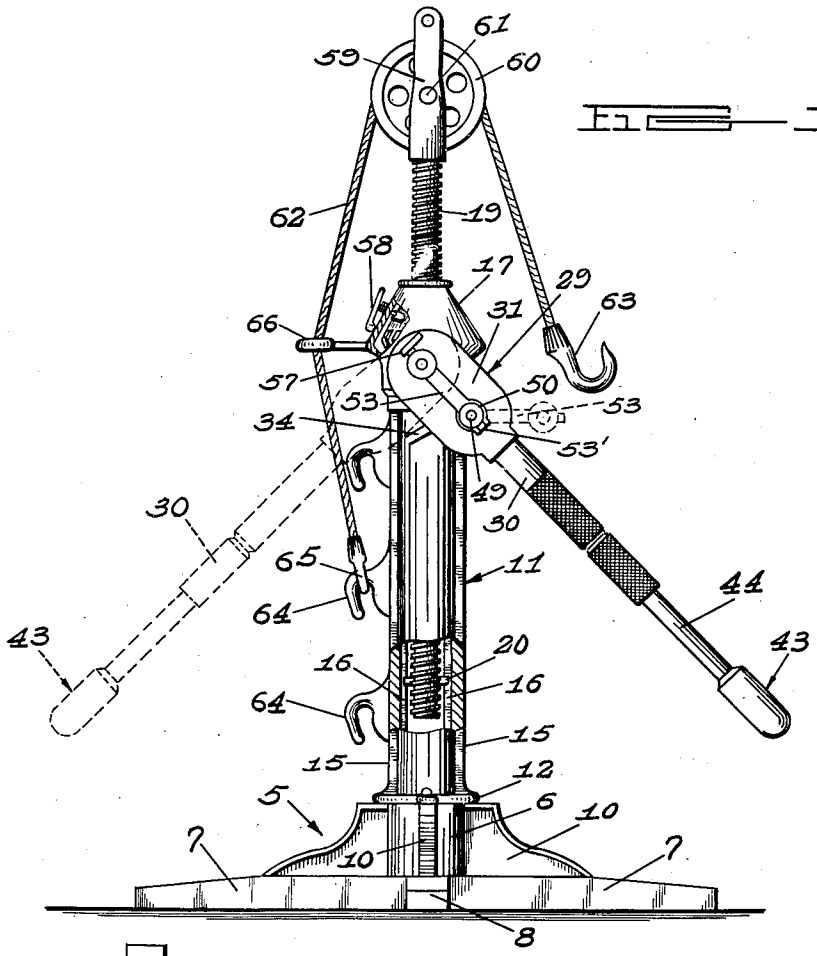


FIG. 1

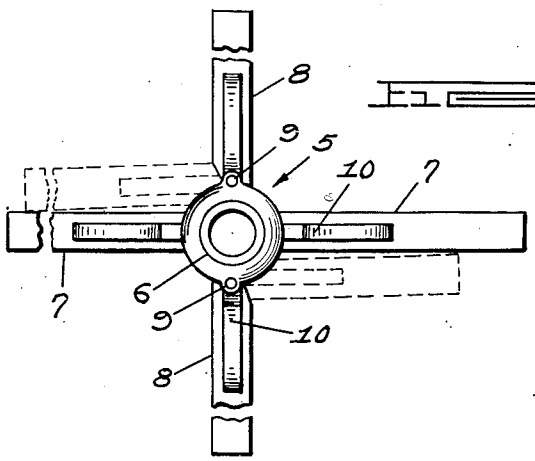


FIG. 2

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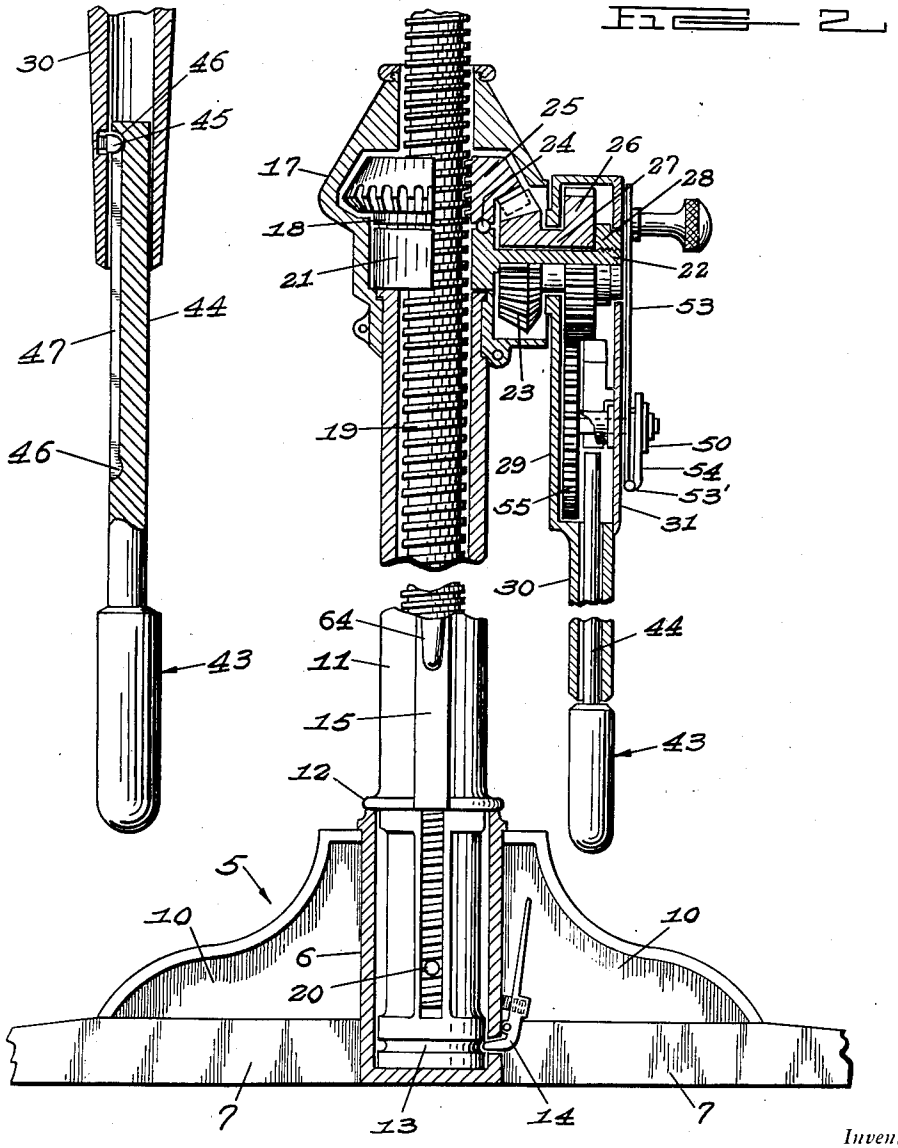
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Fig. 2



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Fig. 4

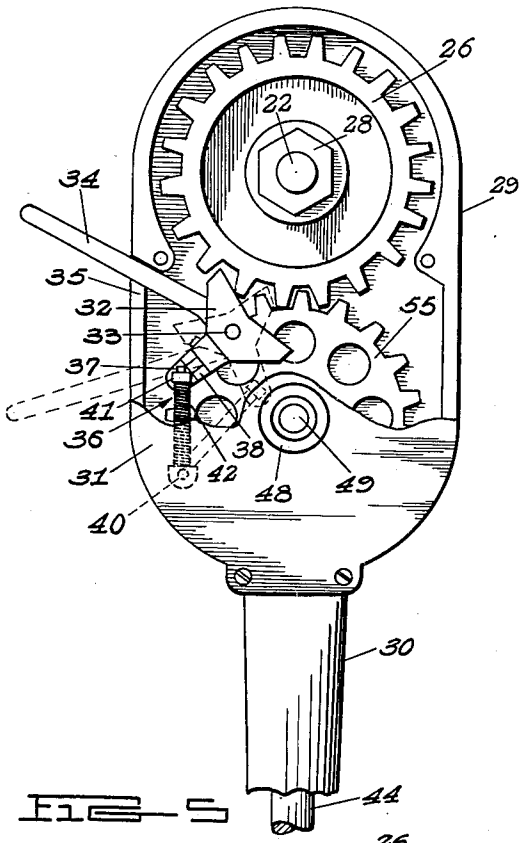


Fig. 6

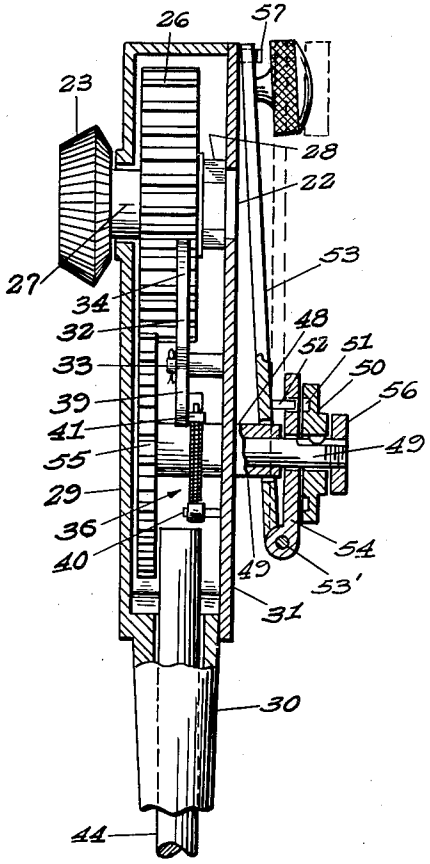


Fig. 5

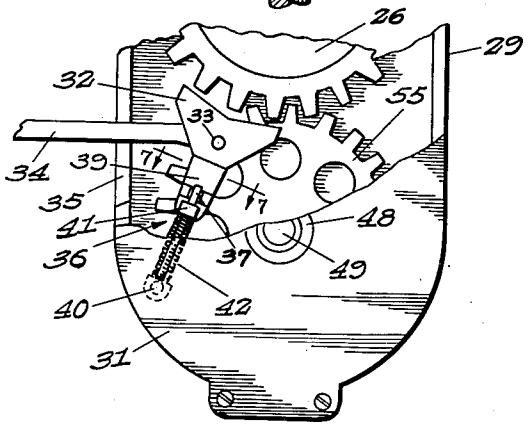
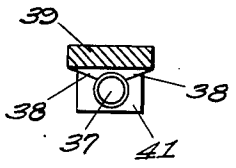


Fig. 7



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UNITED STATES PATENT OFFICE

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LIFTING JACK

Harry D. Freeland, Waynesburg, Pa.

Application February 21, 1946, Serial No. 649,187

3 Claims. (Cl. 254—139)

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This invention relates to lifting jacks such as are used to raise one end of an automobile for various purposes.

An important object of the present invention is to provide a lifting jack of the above kind whereby the end of the automobile is hoisted rather than being pushed upwardly from beneath, thereby obviating tendency of the automobile to shift and cause upsetting or tilting of the jack.

Another important object of the invention is to provide a jack of the above kind by means of which a relatively heavy load may be lifted with comparative ease.

Still another object of the invention is to provide a jack of the above kind embodying a lifting screw, a rotatable nut operable for elevating the lifting screw, means including a ratchet lever for rotating the nut when lifting a comparatively heavy load, and means carried by the ratchet lever and including a crank operated train of gearing for more rapidly rotating the nut and elevating the lifting screw when lifting comparatively lighter loads.

A further object of the invention is to provide a lifting jack of the above kind embodying a pulley rotatably mounted on the upper end of the lifting screw, and a cable passing over the pulley and anchored at one end to the jack standard, the other end of the cable having a hook engageable with the bumper or other part of the automobile so that, when the lifting screw is elevated for any given distance, the end of the automobile is elevated a somewhat greater distance so as to provide for an expeditious jacking operation.

Yet another object of the invention is to provide a lifting jack embodying a collapsible base, and a hollow standard for the lifting screw removably mounted in the base, so that the jack may be knocked down and compactly folded for convenient storage when not in use.

The present invention further contemplates removable mounting of the standard in the base so as to swivel in the latter about a vertical axis, thereby facilitating proper relationship of the parts of the jack carried by the standard with respect to the automobile, regardless of the position in which the base is placed upon the ground. The invention further contemplates provision

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of a lifting jack which is comparatively simple in construction, compact, durable, and highly efficient in use.

More specific objects and features of the invention will become apparent from the following description when considered in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view, partly broken away and in section, of a lifting jack constructed in accordance with the present invention, the ratchet lever being swung to an abnormal position in order to reveal certain details of construction.

Figure 2 is an enlarged fragmentary view, partly in rear elevation, partly broken away, and partly in vertical section, of the jack shown in Figure 1.

Figure 3 is a fragmentary view of the ratchet lever, partly in elevation and partly in longitudinal section, and showing details of the extension handle for the ratchet lever.

Figure 4 is an enlarged detailed view of the pivoted end portion of the ratchet lever, the cover plate of this end portion of the ratchet lever being partly broken away to reveal details of the operating means for the nut which actuates the lifting screw.

Figure 5 is a view somewhat similar to Figure 4 with the pawl of the ratchet mechanism in neutral or inoperative position.

Figure 6 is a view of the construction shown in Figure 4, partly in edge elevation and partly in vertical section.

Figure 7 is an enlarged section through the pawl, taken on line 7—7 of Figure 5.

Figure 8 is a top plan view, partly broken away, of the base of the jack shown in Figure 1.

Referring in detail to the drawings, 5 indicates a base which includes a central vertical socket member 6 having fixed elongated horizontal feet 7 projecting from opposite sides of the lower portion thereof, and oppositely disposed corresponding folding feet 8 hinged thereto as at 9 at points intermediate the feet 7. The arrangement is such that the folding feet 8 may be swung to radial operative positions as shown by full lines or to folded position respectively parallel with and beside the respective feet 7 as indicated by dotted lines in Figure 8. Each of the

feet is connected at its inner end with the socket member 6 by a bracing web 10.

An upright hollow standard 11 has its lower end portion swivelled and removably secured in the socket member 6. As shown, the standard 11 preferably has an annular flange 12 which rests upon the upper edge of socket member 6 and is provided near its lower end with an annular groove 13 normally engaged by a spring pressed hinged latch 14 mounted on the socket member 6. The latch 14 may be readily manually released from the groove 13 so as to permit separation of the standard and the base. When these parts are so separated, the base may be folded so that the jack can be conveniently stored when not in use. At opposite sides, the standard 11 is formed with longitudinal ribs 15, and internal longitudinal grooves 16 are formed in the standard 11 coincident with these ribs. A hollow head 17 is securely bolted on the upper end of the standard 11 and preferably consists of vertical half sections that are bolted together to facilitate assembly of the head with respect to the standard. A rotatable nut 18 is mounted within the head 17 and receives the lifting screw 19 which normally extends into the hollow standard 11 and is provided with a transverse pin 20 slidably engaging the vertical or longitudinal grooves 16 of the standard to prevent rotation of the lifting screw. A collar 21, through which the lifting screw 19 freely extends, is mounted within the head 17 below the nut 18 and upon the upper end of standard 11. This collar 21 is provided with a horizontal spindle 22 that projects through a side of the head 8 and has a bevel pinion 23 journaled thereon. Ball bearings 24 are provided between the nut 18 and collar 21 to receive the thrust of the lifting screw. The nut 18 has a bevelled gear 25 formed thereon and meshing with the pinion 23.

A cog wheel 26 is integrally connected with the pinion 23 by a short tubular shaft 27 and is retained on the spindle 22 by a nut 28. A ratchet lever is provided which includes a large hollow end portion 29 and a tubular hand grip 30. The cog wheel 26 is arranged within the hollow portion 29 of the ratchet lever, and opposed walls of the portion 29 have apertures to receive the shaft 27 and a reduced portion of nut 28, whereby the ratchet lever is journaled on these parts for swinging movement in a vertical plane. The ratchet lever may be longitudinally divided to facilitate assembly thereof with respect to the associated parts, and it preferably has a removable cover plate 31 at its outer side. A double or reversible pawl 32 is pivoted at 33 on the inner side of cover plate 31 in posiition to engage the teeth of cog wheel 26, and this pawl is provided with a handle 34 that projects outwardly through a slot provided at 35 in an edge of the portion 29 of the ratchet lever. The pawl 32 is of a generally well known type having the usual spring past-center device 36 associated therewith. As usual, the purpose of this device is to releasably hold the pawl 32 in the desired one of its three positions and to permit yielding thereof in the ratcheting operation. With the pawl set as shown in Figure 4, the ratchet lever is operable to turn the gear 26 in a clockwise direction as viewed in Figure 4. By reversing the position of the pawl as indicated by dotted lines in this same figure, the ratchet lever is operable to turn the gear 26 in an anti-clockwise direction, and the obvious purpose of this reversible arrangement is to enable use of the ratchet lever for turning the nut 18 in either desired direction and to thereby either raise or lower the lifting screw 19. The pawl is also positionable in neutral or released position as shown in Figure 5 to render the ratchet lever inoperative. At this time, the pin 37 of the device 36 is adapted to engage between cam lugs 38 provided on one face of the arm 39 of the pawl so as to latch the pawl in released position. The device 36 consists of the pin 37 pivoted at one end to the cover plate 31 as at 40 and loosely sliding through a swivelled guide block 41 carried by the arm 39, a helical compression spring 42 being disposed on the pin 37 between the block 41 and the pivoted end of pin 37. It will thus be seen that by oscillating the ratchet lever, a step by step rotation may be imparted to cog wheel 26 and pinion 23 so as to rotate nut 18 in the desired direction for raising or lowering the lifting screw 19. The ratchet lever is used in this way when lifting relatively heavy loads, and additional leverage may be obtained by the use of an extension handle 43 for the ratchet lever. As shown, this extension handle includes a hand grip provided with a shank 44 frictionally slidable in the hand grip 30 of the ratchet lever and adapted to be latched in collapsed or extended position by means of a spring pressed detent 45 carried by the hand grip 30 and adapted to seat in recesses 46 provided at the opposite ends of a longitudinal groove 47 provided in the shank 44 of the extension handle.

Provision is made for operating the pinion 23 at relatively high speed when lifting relatively light loads. For this purpose, the portion 29 of the ratchet lever is provided with a tubular bearing 48 in which is journaled a shaft 49 that projects outwardly beyond the bearing 48 and has a disk 50 keyed on the projecting end thereof. The bearing 48 is carried by a cover plate 31 as shown clearly in Figure 6, and the disk 50 is provided in its inner face with a circular series of sockets 51 adapted to selectively receive a pin 52 rigid with a crank handle 53 through which the bearing 48 freely extends and one end of which is hinged at 53 to a member 54 rotatably disposed on the shaft 49 between the disk 50 and the adjacent end of bearing 48. Member 54 has an opening in which the pin 52 is disposed, and the arrangement is such that when crank handle 53 is swung inwardly against the cover plate 31, pin 52 is disengaged from the registered socket 51 of disk 50, thereby freeing the crank handle 53 from the disk 50. The arrangement is also such that when the crank handle 53 is swung outwardly from cover plate 31, pin 52 is entered in a socket 51 of the disk 50 that may be registered therewith, thereby affording a driving connection between the crank handle and shaft 49. Shaft 49 is provided at its inner end with a spur gear 55 that meshes with the cog wheel 26, and it will thus be seen that when crank handle 53 is disposed to drive shaft 49 as explained above, gear 55 will be rotated so as to drive cog wheel 26 and rapidly rotate the nut 18 through the medium of pinion 23 and gear 25. When crank handle 53 is rotated for this purpose, movement of the lifting screw is effected at high speed, the ratchet lever being held stationary. Disk 50 and member 54 are retained on shaft 49 by a nut 56, and it will be apparent that crank handle 53 may be turned in either direction so as to either raise or lower the lifting screw. A suitable spring clip 57 is provided on the cover plate 31 behind which the crank handle 53 may be engaged so as to retain the latter against movement when in in-

operative position. A suitable finger operative friction brake is provided at 58 for the gear 25, its purpose being to prevent backward rotation of gear 25 each time the ratchet lever is swung to the start of its operating stroke and until the lifting screw is subjected to the load to be lifted.

The lifting screw 19 is provided at its upper end with a fork 59 having a pulley 60 journaled therein upon a horizontal axis 61. A cable 62 is anchored at one end to the upright or standard 11 and passes over the pulley 60, said cable being provided at its other end with a hook 63 engageable with the bumper or other suitable part of the vehicle to be lifted. By means of this construction, elevation of the lifting screw 19 causes the cable 62 to hoist the end of the automobile rather than pushing upwardly thereon from beneath. As a result of this, tendency of the automobile to shift while being lifted is minimized. It is also to be particularly noted that the arrangement provides for elevation of the hook 63 at a greater speed and at a greater distance than the lifting screw, thereby providing a maximum lifting range for the jack. The amount of movement of hook 63 and the amount which said movement exceeds the movement of the lifting screw 19 depends upon the diameter of the pulley 60. It will be noted that pulley 60 is disposed in a plane parallel with the plane of movement of the ratchet lever so that cable 62 is not disposed so as to interfere with the operation of said ratchet lever. The connection of cable 62 to standard 11 is preferably effected by providing said standard with a vertical series of spaced hooks 64 for selective engagement by a ring or eye member 65 provided on the end of cable 62. This provides for adjustment of the cable so that the hook 63 may be disposed at a desired elevation when the lifting screw is fully retracted or lowered, thus adapting the jack for most efficient use in connection with automobiles whose bumpers are located at different distances above the ground. At a point between the hooks 64 and the pulley 60, the jack is preferably provided with a rearwardly projecting guide 66 through which the cable 62 extends to prevent it from contacting and rubbing against the head 17 and other parts of the jack. Due to the fact that the standard 11 is swivelled in the base 5, the jack may be indiscriminately placed upon the ground without regard to the disposition of the base, and the standard can then be turned so as to face the jack in the proper direction for ready engagement of the hook 63 with the automobile bumper or like part. Of course, in use, the ratchet lever will be swung backwardly from the full line position of Figure 1 so that it may be oscillated from the back of the jack as indicated by dotted lines, the ratchet lever being simply swung to the right of Figure 1 in order to reveal the hooks 64 and the manner in which the cable 62 is engageable therewith.

In use, the eye member 65 is engaged with the desired one of the hooks 64, and the ratchet lever is operated to fully lower the lifting screw 19. The hook 63 is then engaged with the bumper or like part of the automobile. Assuming that a heavy load is to be lifted, the ratchet lever is oscillated to cause elevation of the lifting screw, pawl 32 being set in the proper position to rotate nut 18 in the correct direction to cause elevation of the lifting screw. As the lifting screw rises, hook 63 is raised for a relatively greater distance and the end of the automobile is thus quickly elevated. A reversal of this operation will of course lower the lifting screw and allow the end of the automobile to lower, it being simply necessary to reverse the position of the pawl 32.

When lifting relatively light loads, the ratchet lever may be held stationary and the nut 18 may be driven by use of the crank handle 53. This is accomplished by simply disengaging the crank handle from the clasp 57 and swinging it outwardly to the position wherein a driving connection is established between the crank handle and shaft 49 by engagement of pin 52 in a socket of disk 50. When this is done, shaft 49 is rotated by means of crank handle 53, thereby driving gear 55 and causing rotation of nut 18 through the gearing described. At this time, the pawl 32 will of course be placed in released or neutral position as shown in Figure 5. When additional leverage is required while using the ratchet lever, the handle extension 43 may be extended as shown in Figures 1 and 3. Due to the elongated form of the feet 7 and 8, lateral tilting and upsetting of the jack is rendered unlikely.

From the foregoing description, it is believed that the construction, operation and advantages of the present invention will be readily understood and appreciated by those skilled in the art. The invention is of course susceptible of modification and changes in details of construction, such as fairly fall within the scope of the invention as claimed.

What I claim is:

1. A portable lifting jack including a base adapted to flatly rest on the ground, a hollow standard rising from the base, a lifting member vertically movable in and projecting above the standard, manually operable means carried by the standard and operatively connected to the lifting member to raise and lower the latter, a pulley on the upper end of said lifting member, a cable passing over said pulley, quick-detachable means to selectively anchor one end of the cable to the standard at any desired one of a plurality of vertically spaced points, and a lifting element on the other end of said cable engageable with the load to be lifted.

2. The construction defined in claim 1, wherein said base includes a vertical socket, in combination with means removably swivelling the lower end of said standard in said socket for turning movement about its vertical axis.

3. In a jack having a lifting screw movable in a standard, and a rotatable nut operable to raise and lower the lifting screw, means to operate the nut comprising a horizontal spindle supported by the standard, a tubular shaft operatively connected to the nut and journalled on the spindle, an element retaining the tubular shaft on the spindle, a lever having a hollow end portion and journalled on the tubular shaft and said element, a cog wheel fixed on the tubular shaft and arranged within the hollow end portion of said lever, a tubular bearing fixed to one side of said hollow end portion, a second shaft journalled in said bearing and projecting at one side of said hollow end portion, a gear fixed on said second shaft within said hollow end portion and meshing with said cog wheel, a plate member rotatably disposed on the projecting portion of said second shaft and having an opening, a crank handle hinged to said plate member and through which said bearing freely extends, a disk keyed on said second shaft and provided with a circular series of sockets in its inner face, and a pin rigid with said crank handle and disposed in the opening of said plate member, said crank handle being

swingable toward and from said plate member to engage the pin in and disengage the same from any socket of said disk registered therewith.

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