June 10, 1952 H. SMITH 2,600,276

LIFTING JACK

Filed Dec. 16, 1947 2 SHEETS—SHEET 1

FIG. 8.

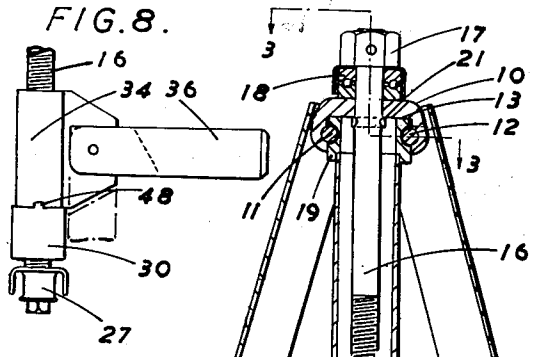


FIG. 1.

INVENTOR
HARRY SMITH
By Young, Tawney & Thompson
Attys.

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FIG. 3.

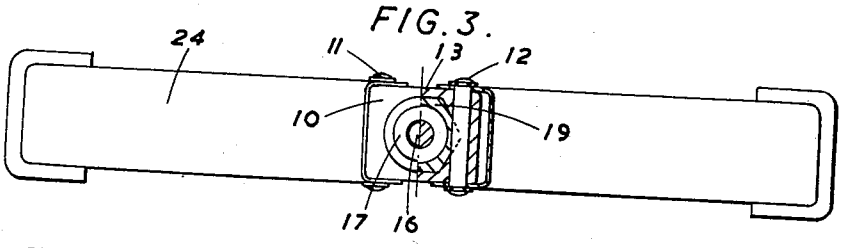


FIG. 2.

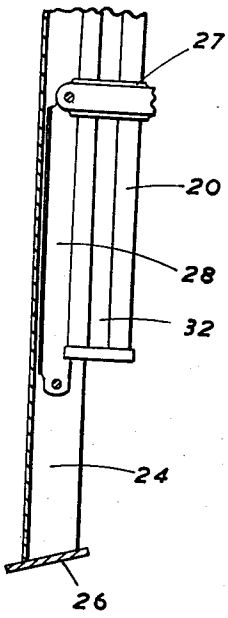
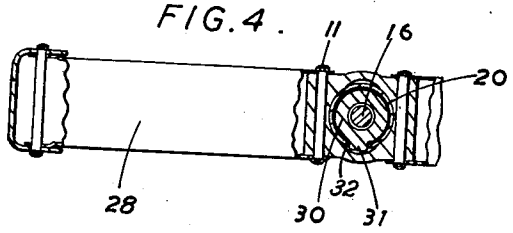


FIG. 4.



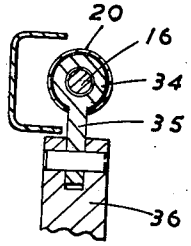


FIG. 5.

FIG. 6.

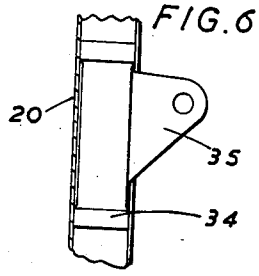
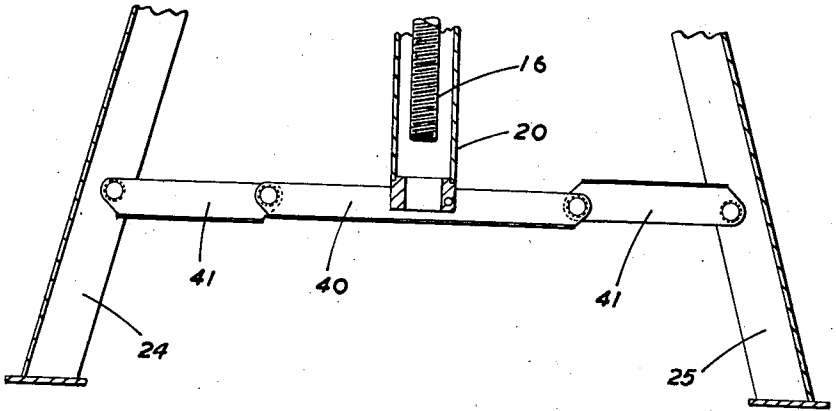


FIG. 7.



INVENTOR
HARRY SMITH
By Young, Emery & Thompson
Attys.

Patented June 10, 1952

2,600,276

UNITED STATES PATENT OFFICE

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LIFTING JACK

Harry Smith, London, England, assignor to Smith's Jacking Systems Limited, London, England, a British company

Application December 16, 1947, Serial No. 791,975
In Great Britain August 1, 1947

7 Claims. (Cl. 254—99)

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This invention relates to lifting jacks especially those of the kind which are either portable and generally stored in a motor-car tool box or which are permanently attached to a motor-car; this type being thus distinguished from a garage or trolley type of jack.

This type of jack has a single point of contact with the ground and the loose jack is applied under the motor-car axle, or is temporarily attached to the bumper or has a spigot for insertion into a socket on the motor-car, whilst the permanent jack is associated with means for normally holding it in an inoperative position but allowing it to be moved into the ground engaging position. The jack is sometimes arranged for lifting one side of the motor-car or one wheel, and in either case difficulty is not infrequently experienced owing to the instability of the motor-car on this single point jack support especially on a gradient, for example, due to the camber of a road or when jacking on a hill. Stiff chassis and independent springing also involves tendency to lift both front wheels or both back wheels when the jack is applied with the intention of lifting one wheel only and this increases the instability of the jacked vehicle. The provision of very wide base plates do not offer a satisfactory solution to this problem. Moreover jacks commonly require to have a long load bearing member (e. g. the screw of a screw type jack) the load bearing part of which increases in length as the load is lifted which necessitates a member of strong and heavy construction.

According to the present invention a lifting jack comprises a load engaging element, an operative assembly adapted to effect lifting and lowering of the said element, and including a load bearing member at least as long as the lifting stroke, two ground engaging struts pivotally attached to the upper end of the assembly and adapted to be moved apart at their lower ends, and means for limiting this movement apart, the load engaging element being movable only within the compass of the triangle formed by the open struts and the load bearing member being in tension under the load whereas the struts are in compression.

The extensible elements may consist of a screw and nut hydraulically operable telescopic tubes, ratchet elements or other means.

According to a preferred constructional form of the invention the jack comprises a pair of load supporting struts pivotally attached at their upper ends to a load supporting device and

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adapted to be moved apart at their lower ends, means to limit this movement apart, a rotatable screw constituting a load bearing member mounted at its upper end on said device so as to depend therefrom between the struts, and a nut mounted on the screw and carrying a load engaging element the nut being held against rotation during the lifting operation, whereby the part of the screw which carries the load in tension is of diminishing length as the load is lifted, whilst the struts which carry the load in compression remain of constant length during operation and the load engaging element is in all positions within the compass of the triangle formed by the opened legs.

The supporting of the load always within the compass of the triangle formed by a pair of pivoted struts provides a firm support against tilting and at the same time enables the part of the elongated load bearing member or screw which carries the load not only to be in tension so that a member of small dimensions is suitable but as the load is raised this load bearing part becomes shorter whilst the load bearing parts of the struts and other parts that are in compression do not vary in length.

A constructional form of the invention will now be described by way of example with reference to the accompanying diagrammatic drawings wherein:

Figure 1 is a vertical sectional view of a lifting jack made in accordance with the invention showing the struts spaced apart;

Figure 2 is a fragmentary view showing certain parts in the closed positions;

Figures 3, 4 and 5, are sectional views on the lines 3—3, 4—4 and 5—5, respectively on Figure 1, Figure 5 however indicating only one strut in closed position;

Figure 6 is a detail showing the load engaging member;

Figure 7 is a view of the lower part of a modified form of the jack; and

Figure 8 is a view showing a further modification.

A load carrying device or block 10 carries two pivot pins 11, 12, which break into a hexagonal recess 13 formed in the underside of the block. The block has a central vertical aperture through which passes the upper plain end of a long load bearing member in the form of a rotatable screw 16 which is longer than the lifting stroke. This plain end carries a hexagonal nut 17 engageable by a brace or the like whereby the screw is rotatable for extending and collapsing

the jack. This hexagonal nut seats on a ball bearing 18 which in turn seats on the block 10.

Disposed within the recess 13 is a hexagonal collar 19 having recesses engaged by the pivot pins 11, 12, which collar carries a downwardly extending tube 20 which is therefore non-rotatable.

Thus the screw and tube and parts carried thereby, together forming a lifting assembly, are suspended on the block 10. The screw and tube are disposed in the same vertical plane as the struts.

A pin 21 prevents upward displacement of the screw in the block.

The two struts 24, 25, which are longer than the tube, are engaged by the pivot pins 11, 12 which are riveted over at their ends so that the struts are pivotally attached to the block 10 and thus to the lifting assembly.

The struts are of channel section with their closed sides facing outwardly whereby the struts can be brought closely together surrounding the tube. Ground engaging plates 26 are provided at the lower ends of the struts.

Surrounding the tube is a ring 27 which is connected by two links 28, 29 to the struts so that when the struts are closed the links fold within them as shown in Figure 2 and when the struts are opened the links limit the opening movement.

A nut 30 engages the screw and is located within the tube and the nut has a projection 31 extending through a slot 32 along a generatrix of the tube. Seated on the nut and freely surrounding the screw is a collar 34 having a lug 35 which projects through the slot 32 and a load engaging element 36 is pivotally attached to the lug and as shown is in the form of a spigot, adapted to engage a socket arranged at a convenient part of a motor-car.

The engagement of the projection 31 in the slot prevents rotation of the nut so that rotation of the screw lifts the nut which in turn raises the collar 34 and the load engaging element. The full stroke of this element is within the compass of the triangle formed by the opened struts whereby great stability is achieved with comparatively short struts.

In the modification shown in Figure 7, a link or bar 40 is pivoted to the lower end of the tube and extends in the operative position horizontally equally on both sides of the tube and has each end attached by a pivoted link 41 to the adjacent strut at a short distance from its lower end. The links are of channel form and are narrower than the struts so that these parts can fold together when the jack is not in use with the struts more or less enclosing the tube, lever and links.

In the modification shown in Figure 8, there is no tube such as 20 and in order to prevent rotation of the nut 30 during the lifting operation it has an upstanding dog 48 which engages in a correspondingly shaped slot in the underside of the sleeve 34. In operation, the jack is opened and its feet 26 placed on the ground; the sleeve 34 is raised until the spigot 36 enters the socket provided on the motor-car or other load; the nut is then rotated until the dog 48 engages its slot; and the screw is then rotated to effect lifting.

I claim:

1. A lifting jack comprising a load supporting device, a pair of load supporting struts pivotally attached at their upper ends to said load supporting device, and adapted to be moved apart at their lower ends, means to limit this movement apart, a rotatable screw constituting a load bearing member mounted at its upper end on said device so as to depend therefrom between the struts, a nut mounted on the screw and carrying a load engaging element, and means holding the nut against rotation during the lifting operation, whereby the part of the screw which carries the load in tension is of diminishing length as the load is lifted, while the struts which carry the load in compression remain of constant length during operation and the load engaging element is in all positions within the compass of the angle formed by the opened struts.

2. A lifting jack as claimed in claim 1 wherein a tube is attached at its upper end non-rotatably to the load supporting device and surrounds the screw, and a projection on the nut extends into a vertical slot in the tube through which slot also passes the load engaging member.

3. A lifting jack as claimed in claim 1 wherein the loading engaging member is carried by a sleeve that slidably embraces the screw, the sleeve and nut have engageable parts whereby the nut is prevented from rotating when the load engaging member is engaged in a socket or the like carried by the load.

4. A lifting jack as claimed in claim 1 wherein the struts are of channel shape and of constant cross-section with their closed sides located outwards so that the struts can be brought closely together surrounding the lifting assembly and the means which limit the movement of the struts apart include pivotal members which fold into the channel shaped struts when the latter are brought together.

5. A lifting jack as claimed in claim 1 wherein the load supporting device is in the form of a block, pivot pins attaching the upper ends of the struts to said block, the upper end of said screw passing through the block and supported on a bearing disposed on the block and a hexagonal nut carried by the upper end of said screw for, engagement by an operating tool.

6. A lifting jack comprising a vertically movable load engaging element, a jacking device operatively connected with said load engaging element to impart a lifting stroke to said element, said jacking device including a load bearing member which supports the load-engaging element and is at least as long as the lifting stroke, a manually operated actuating member for said jacking device and means operatively connected to said actuating member for raising said load engaging element upon operation of the actuating member, two upwardly converging ground engaging struts attached to the upper end of the load bearing member so as to support it against tilting, said struts being in the same plane as said load bearing member, means connected to the struts and to the lower end of the load bearing member so as to locate said lower end centrally between the struts, said load-engaging element being movable only within the compass of the triangle formed by the open struts and the ground.

7. A lifting jack as claimed in claim 1 wherein the load supporting device is in the form of a hollow block, pivot pins attaching the upper ends of the struts to said block, a tube surrounding said screw, a collar carried by the upper end of the tube and having tangential recesses in the periphery thereof, said collar being positioned within said hollow block and the pivot pins ly-

ing in said tangential recesses to retain the collar within said block.

HARRY SMITH.

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