Oct. 31, 1933. M. B. LUCKER 1,932,745

TRIPLE LIFT JACK

Filed Jan. 7, 1932 2 Sheets-Sheet 1

FIG. 1.

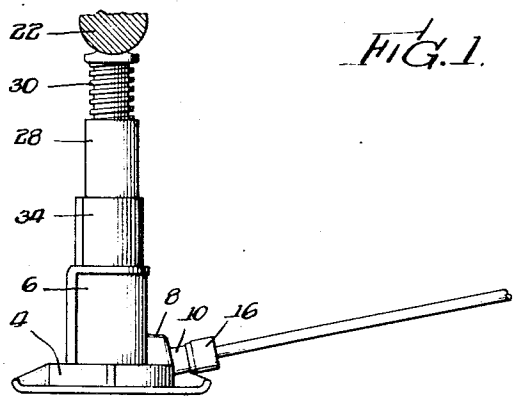


FIG. 2.

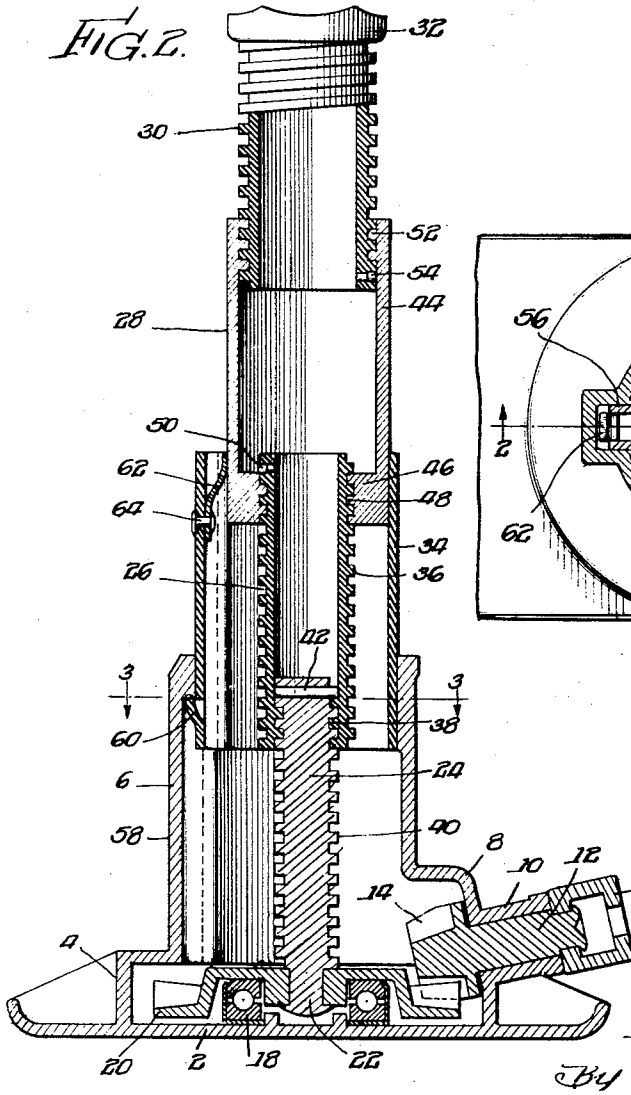
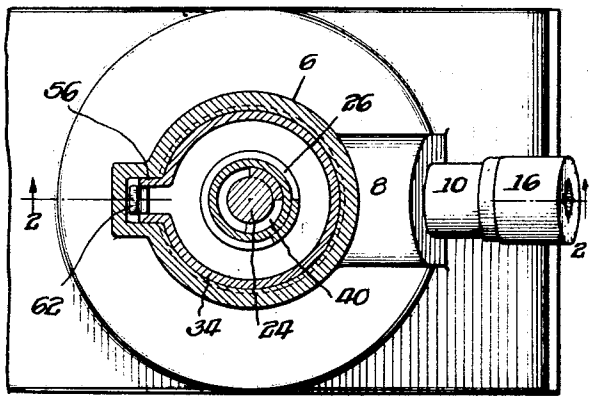


FIG. 3.



Inventor:
Millard B. Lucker,
By Cheever Cox & Moore
Attys

Oct. 31, 1933. M. B. LUCKER 1,932,745

TRIPLE LIFT JACK

Filed Jan. 7, 1932 2 Sheets-Sheet 2

FIG. 4.

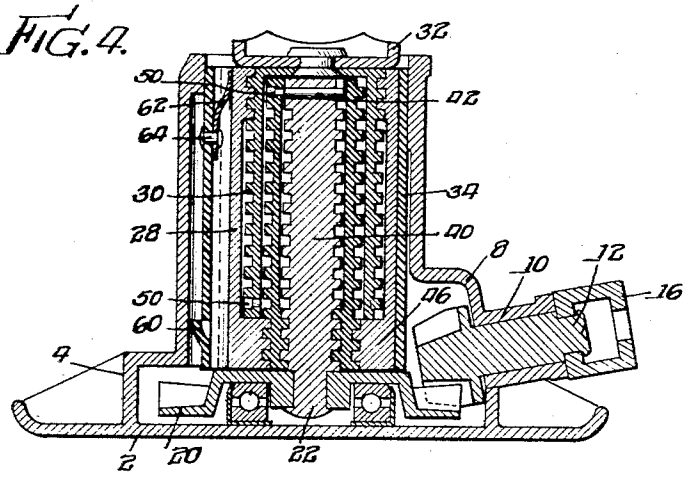


FIG. 6.

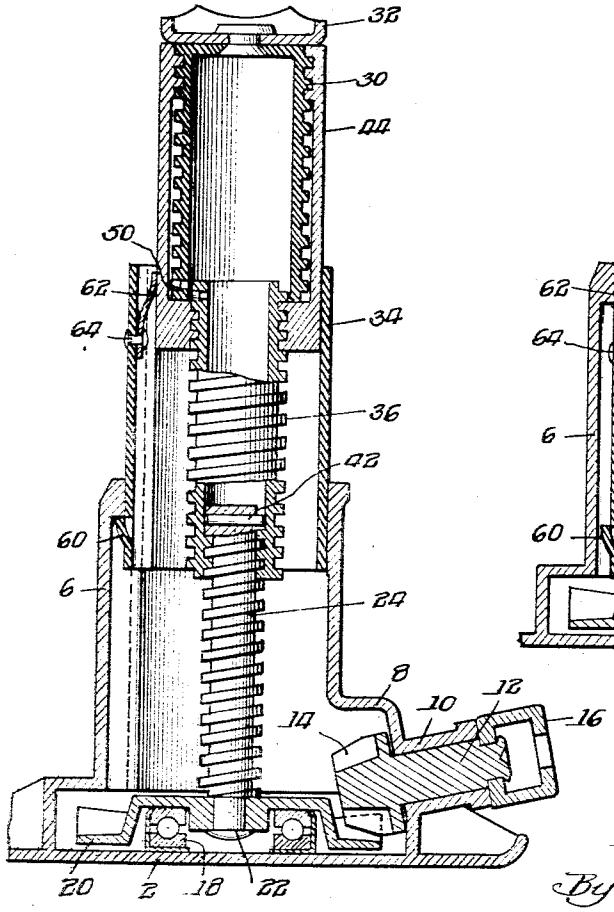
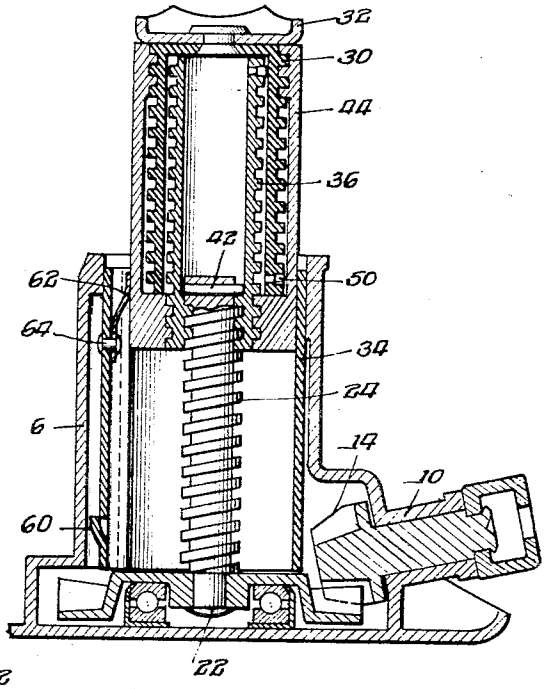


FIG. 5.



Inventor:-
Millard B. Lucker,
By Cheever, Cox & Moore
attys.

Patented Oct. 31, 1933 1,932,745

UNITED STATES PATENT OFFICE

1,932,745

TRIPLE LIFT JACK

Millard B. Lucker, Benton Harbor, Mich., assignor to Auto Specialties Manufacturing Co., San Francisco, Calif., a corporation of California

Application January 7, 1932. Serial No. 585,246

5 Claims. (Cl. 254—102)

My invention relates to multiple lift jacks.

One of the important objects of the invention is to provide an extension jack in which the ratio of extended height to collapsed height is much larger in the jack of my present invention than in jacks heretofore provided in order to accommodate the axles of vehicles provided with the new so-called "doughnut" or "superballoon" tires, that is to say, tires of reduced diameter and greatly enlarged tire section area.

Another object of my invention is to provide an extension screw jack having at least four threadingly interconnected members, three of which are adapted to be projected outside of the jack housing, the arrangement being such that the jack will collapse to a much lower position than jacks of the heretofore existing type in order to facilitate placement of the jack under the vehicle axle when the tire is deflated, and which, on the contrary, can be extended to height sufficient to clear the tire from the ground whereby the jacks are adaptable to automobile tires having relatively large tire sections and small diameters which, when deflated, permit the vehicle axle to sink down considerably closer to the ground than the older types of tires.

Yet another object of my invention resides in providing a jack of very low collapsibility and very high projection, to accommodate the new types of balloon tires which collapse to an unusually low degree when deflated, and which, because of their size, require a lifting device of unusually high degree of projection.

Yet another object of my invention resides in providing a jack having an unusually low housing and having at least three threaded lifting members adapted to be projected therefrom to an unusually high degree and wherein all three of said members are automatically projected by the jack-operating mechanism, and wherein means is provided for rigidly and ruggedly supporting the lifting members from the jack housing when in projected position.

These and other objects of my invention will be apparent from a perusal of the following specification when taken in connection with the following drawings wherein

Fig. 1 is a perspective view of my improved type of jack shown in projected position;

Fig. 2 is an enlarged sectional view thereof;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken of the jack in fully collapsed position;

Fig. 5 is a view showing the first stage of projection;

Fig. 6 is a view showing a succeeding stage of projection.

Certain of the recently designed tires, particularly balloon tires, are much larger in cross section, and the diameters of the rims of the tires are smaller. This construction makes the outside diameter of the tire about the same, but when the tire collapses it will deflate to a much lower position. This invention relates to an automobile jack, particularly of the screw-threaded type, which is constructed to accommodate the recently developed tires, particularly balloon tires in which the tire section is larger than heretofore, and in which the diameter of the tire rims is smaller.

Because of this new design, the tires, when deflated, collapse to a much lower level so that the heretofore existing types of screw jack have been found impractical for use in connection with the new tires.

The object of the present invention is constructed and arranged to provide a very low collapsed jack, and a very high projected jack, to accommodate this apparently new design of tire.

Referring to the drawings in detail, I have provided a jack base or housing of unusually low height. It comprises a supporting base 2 having an upstanding wall 4 and a hollow upstanding housing 6 open at its top to receive the projectable members. At one side of the housing there is provided an enlarged portion 8 having a laterally extending sleeve 10 in which is housed a rotatable shaft 12 carrying at its inner end a bevel pinion 14 and at its outer end a depending member 16 of any desired type. The base of the jack is provided with ball bearings 18 and a bevel gear 20 meshing with the teeth of the bevel pinion 14. The gear 20, which is horizontally disposed, is provided with a central aperture in which is rigidly mounted a narrowed end 22 of an upstanding screw-threaded shaft 24, the shaft being rigidly secured to the gear 20 in any desirable way, as by peening over the end. In this manner when the gear 20 is rotated, the rotatable screw-threaded shaft 24 will also be rotated. It will be noted that this shaft 24 is disposed centrally of the upstanding housing 6. The upper end of this shaft 24 is preferably well within the top of the housing 6.

A plurality of projectable screw-threaded members are provided for the jack to give an unusual amount of lifting projection for the top

rest of the jack. In the present instance I have shown the jack as a so-called portable lift jack. It preferably includes three projectable, threaded members. A first projectable threaded member 26, a second projectable threaded member 28, and a third projectable threaded member 30, the latter having a top rest 32 thereon. In addition there is also provided a tube 34 adapted not only to house and enclose the first threaded member 26 when this screw is in projected position, but also to provide an automatic friction brake connection between the stationary housing 6 and the second projectable screw 28 to permit said member 28 either to remain stationary or to permit it to revolve with the screw 26, and thereby constitute a driver to project the screw 30 when the latter engages the load.

Referring now to the threaded member 26, it will be seen that it is provided with an exterior thread 36 and with an interior thread 38 adapted to engage the exterior thread 40 of the screw 24. Screw 24 is provided at its top with a stop 42 adapted to engage a shoulder formed by the inwardly projecting thread 38 on the threaded member 36 whereby to limit the outer movement of the first screw 26 and also to compel this second screw 26 to rotate bodily with the driving screw shaft 24 when the screw 26 has been projected to its fullest extent. The second projectable threaded member 28 is in the form of a sleeve having an outer smooth surface 44 and a lower inwardly projecting flange 46 threaded on its inner walls at 48 and adapted to engage the exterior threads of the first projectable member 26. The outermost end of the exterior threaded surface of the first projectable member 26 is provided with a stop 50 which is adapted to engage the inner wall of the inwardly projecting flange 46 whereby to limit the projection of the second projected member 28 and to prevent it from disengaging from the first projected member 26. This stop, in addition, compels the second projectable member to rotate upwardly with the first projectable member 26 when the sleeve 28 and first projectable member 26 are in their outermost projected positions as shown in Fig. 2. The outermost end of sleeve 28, which is the second projectable member, is provided with an interior thread 52 located at a portion of its length only. This outermost thread 52 is adapted to engage with the exterior thread of the third projectable member 30. The lowermost portion of the third projectable member 30 is provided with the stop 54 which engages the inwardly projecting thread 52 on the sleeve 28 whereby to limit the upward movement of the third projectable member 30.

The tube 34 is provided with an outwardly upstanding, preferably angularly arranged spline 56 adapted to slide vertically in a correspondingly shaped key-way or guideway 58 formed on the base. The bottommost portion of this spline 56 of the tube 34 is provided with a stop 60 preferably formed by punching out the latter to provide a spring tongue, and this stop is adapted to engage the under side of the housing 6 which extends inwardly over the guideway 58, whereby to limit the upward movement of the sleeve or the tube 34. I preferably provide the upper portion of the tube 34 with a friction brake or any type of means for automatically, yieldably or releasably holding the second projectable member from rotation during a predetermined portion of the operation of the jack, and at other times, for permitting this second projectable member to rotate with the first projectable member 26 for effecting the projecting of the third projectable member 30. In the present instance this comprises preferably a leaf spring 62 riveted to the wall of the tube 34 as at 64, and arranged in the spline portion thereof so as to contact with the outer wall of the second projectable member 28. The inner end of this spring 62 presses resiliently against the outer surface of the second projectable member 28, and the spring is preferably at this point provided with a sufficiently broad surface so as to provide a relatively broad yielding grip upon the outer surface of the second projectable member 28.

It will be noted that in my disclosed construction, the housing provides a very low enclosing portion 6, and that the threaded members are aranged mutually and ruggedly to support each other when in projected position and that the tube 34 assists not only in this support, but also provides with the base 6 a complete housing for the working portions of the jack, and particularly threaded members 26 and 24 so that when the turning member 26 is operated, the jack members will be automatically projected and collapsed and at the same time they will be housed in a manner so as to exclude the dust and dirt from the interior parts of the jack. By referring particularly to Fig. 4 of the drawings, it will be seen that each of the projectable members, when in collapsed position, will telescope about the others and will collapse within the outer housing 6 and to a position such that the top rest will lie substantially in the plane of the top of the housing.

It will be noted that the exterior threads on the members 24, 26 and 30 are all right-hand threads. By right-hand threads I mean, for instance, that if a nut were placed upon the threads 40 of the screw 24 at the bottom portion thereof, and such nut were turned in a right-hand direction or clockwise rotation with regard to the bottommost end of the screw shaft 24, the nut would move along the screw toward the top of the jack.

By reason of the hereinbefore described construction and arrangement of the threads, the operation of the jack is such that when the driving member 16 is turned in a clockwise direction, the screw-threaded shaft 40 is likewise rotated whereby to cause the first projectable member 26 to move upwardly with relation to the stationary but rotatable screw-threaded shaft 24, and this movement will continue until the inside thread of said member 26 strikes the stop 42. During this projection of the exterior threaded sleeve 26, the second projectable member 28, with the third projectable member collapsed therein, is carried bodily with the first projectable member to the point shown in Fig. 5. This automatic projection of the jack is due to the fact that the threaded sleeve 26 is threadedly engaged by the interior threads 48 of the second projectable member 28 over a sufficiently wide area so as to provide enough frictional resistance between the threads to compel sleeve 28 to move with sleeve 26 while at the same time the frictional resistance afforded by the spring friction brake 62 against the outer surface of the sleeve 28 together with the fact that the sleeve 34 is held from rotating by reason of the spline connection 56—58 will hold the sleeve 28 and sleeve 26 from rotation thereby when the

threaded shaft 24 is rotated, the temporarily non-rotatable threadedly engaged sleeves 26 and 28 will move upwardly relatively to the shaft 24. In this manner these two sleeves 26 and 28 will move together to the position shown in Fig. 5. When this position has been reached, due to the stop 42 wedging against the interior thread 38 of the sleeve 26, sleeve 26 will then rotate with threaded shaft 24 and hence sleeve 26 will become a rotating driver. Under this condition, the fact that the friction brake 62 continues to hold against the exterior surface of the sleeve 28 will enable sleeve 28 to be projected outwardly and relative to the rotating sleeve 26 carrying bodily with it the third projectable member 30. This condition is shown in Fig. 6 of the drawings. When stop 50 on the end of the first projectable sleeve 26 contacts against the bottom of the second projectable member or sleeve 28, then sleeve 28 will rotate bodily with threaded shaft 24, threaded sleeve 26 so that the second projectable member or sleeve 28 will become a driver. This condition is shown in Fig. 2 of the drawings. At this time, under these conditions, the top rest will have already contacted with the load and thereby the top rest will become a stationary member, and since sleeve 28 is now rotating, the relative movement therebetween will cause the automatic projection of the third extensible member or sleeve 30 to cause it to be projected to extreme outward position such that the stop 54 will contact with the innermost thread 52 of the sleeve, to limit further outward movement. At this point it will be seen that the jack has reached its fully projected position shown in Figs. 1 and 2 of the drawings. On the reversed action of the jack, the reverse rotation of the driver 16 will reversely rotate the threaded shaft 34 so that the the first projectable member 26 will come down to the point where the bottom of the threaded sleeve 26 will strike the top of gear 20. This will cause the threaded sleeve 26 to revolve against the friction between the sleeve 28 and the tubular interconnection 34, and the screw sleeve 30 which is the third projectable member will be drawn downwardly or be collapsed until the load is free. If the third collapsible member 30 is still projecting from the top of the housing 6 when the projectable members have been fully collapsed, it will be necessary to screw this third member 30 around by hand until it reaches the position shown in Fig. 4.

By reason of my construction it will be apparent that I have provided a very simple type of automatically operating jack which provides a triple lift for the purpose intended and wherein the jack in its projected position is fully supported by the ruggedness of the sleevelike structure, and the further fact that each threaded sleeve mutually supports the sleeve above and the sleeve below, and by the further fact that the tubular interconnector 34 provides a further reinforcement and steadying support. In addition, by reason of the imperforate under sleeve 34 and the fact that the rest support is closed at the top, and major portion of dust and dirt and moisture are excluded from the innermost or working portions of the jack.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A lifting jack comprising a hollow upstanding housing providing a vertical guideway, a rotatable driving member mounted in said housing and having a threaded portion, a first extensible threaded member, a second extensible threaded member, and a third extensible threaded member, said third member having a top rest, said second extensible member having threaded portions engaging the third member and the first member, and said first member having threaded portions engaging the second member and the rotatable driving member, and a tubular sleeve operatively engaging the guideway of the housing for permitting the vertical movement of said sleeve and for restraining the sleeve from rotation, said sleeve having means yieldably engaging said second extensible member.

2. A jack having a hollow upstanding housing provided with a horizontally disposed beveled gear in its base, a screw shaft rigidly mounted to rotate with said gear centrally of the housing, said housing having a vertical guideway, an exteriorly threaded sleeve having an interior thread associated with the threaded shaft, a second sleeve having a smooth exterior surface and provided with interior threads at its opposite ends, one of said threads engaging the exterior threads of the first mentioned sleeve, an exteriorly threaded member carrying a top rest, the threads of said member engaging the interior threads at the opposite ends of said second sleeve, a tube having a guideway slidably but non-rotatably associated with the guideway of said housing, and a friction brake carried by said tube and yieldably engaging the exterior wall of said second mentioned sleeve.

3. A jack having a hollow substantially circular housing provided with a vertical guideway, driving means mounted in said housing and including an upstanding threaded member adapted to be rotated by said driving means, a first projectable member having threads engaging the upstanding rotatable threaded member, a second projectable member having a substantially smooth exterior surface and provided with interior threaded portions, one adapted to engage the threaded portion of the first projectable member, and a third projectable member provided with a top rest and having threads engaging the other threads of the second projectable member, a circular tube having a radially extending guideway adapted to slide vertically in the guideway of the housing, spring means carried by said tube and lying in the guideway thereof, said spring means adapted yieldingly to engage the outer surface of the second extensible member, and stop means carried by said extensible member, by said tube, and by said housing.

4. A lifting jack comprising a hollow upstanding housing providing a vertical channel, a rotatable driving member having a threaded portion mounted in said housing, a first extensible member having threaded engagement with the threaded portion of said driving member, a second extensible member having threaded engagement with said first extensible member, operating means normally preventing relative rotation between the second extensible member and the housing while permitting longitudinal movement of the second extensible member in the housing whereby to effect longitudinal movement of the second extensible member with respect to the housing, through the intermediary of the threadingly interconnected parts, in response to relative rotation between the driving member and the housing, a third extensible member having a load-engaging head and threaded means interconnecting said third member with said

second member, said operating means yielding to permit relative rotation between the second extensible member and the housing, when said second member is at a limit of its longitudinal travel with respect to the housing, whereby to cause relative longitudinal movement between the second and third extensible members when the third member is held against relative rotation with respect to the housing and the driving member and relative rotation between the driving member and the housing is continued after the second extensible member has reached the limit of its longitudinal movement.

5. A lifting jack comprising a hollow upstanding housing providing a vertical channel, a rotatable driving member having a threaded portion mounted in said housing, a first extensible member having threaded engagement with the threaded portion of said driving member, a second extensible member having threaded engagement with said first extensible member, operating means comprising a sleeve carried by said housing and cooperatively associated with said second extensible member to normally prevent relative rotation between the second extensible member and the housing while permitting longitudinal movement of the second extensible member in the housing whereby to effect longitudinal movement of the second extensible member with respect to the housing, through the intermediary of the threadingly interconnected parts, in response to relative rotation between the driving member and the housing, a third extensible member having a load-engaging head and threaded means interconnecting said third member with said second member, said operating means yielding to permit relative rotation between the second extensible member and the housing, when said second member is at a limit of its longitudinal travel with respect to the housing, whereby to cause relative longitudinal movement between the second and third extensible members when the third member is held against relative rotation with respect to the housing and the driving member and relative rotation between the driving member and the housing is continued after the second extensible member has reached the limit of its longitudinal movement.

MILLARD B. LUCKER.