Sept. 3, 1940. A. L. JOHNSON 2,213,672

LIFTING JACK

Original Filed Sept. 1, 1937

FIG. 1.

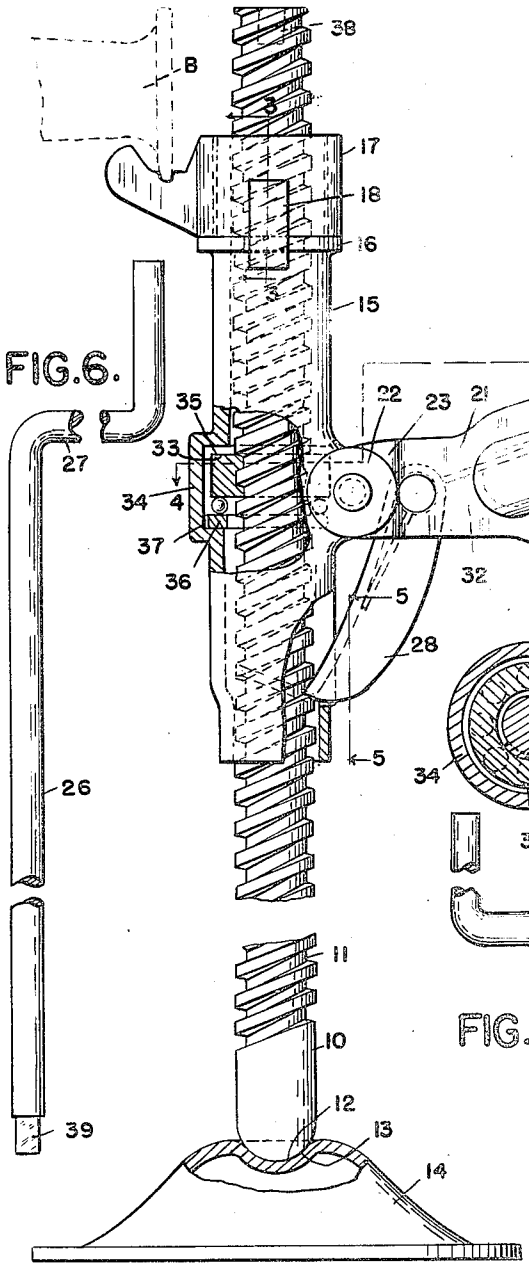


FIG. 2.

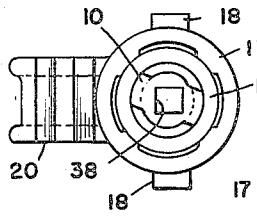


FIG. 3.

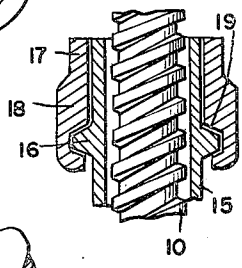


FIG. 6.

FIG. 4.

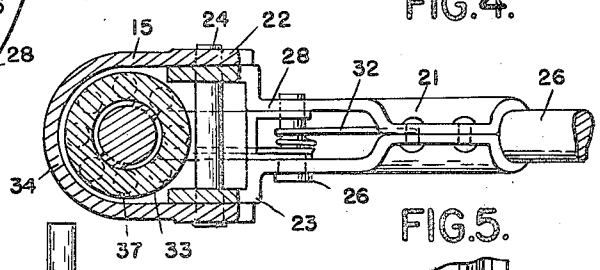


FIG. 5.

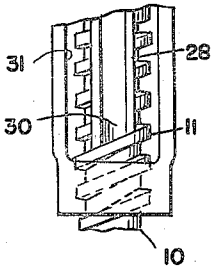
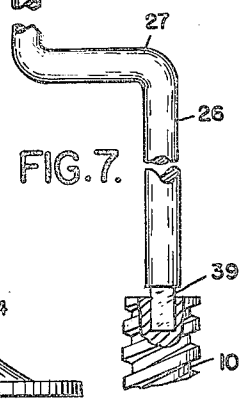


FIG. 7.



INVENTOR.

BY ALVIN L. JOHNSON

ATTORNEYS

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2,213,672

UNITED STATES PATENT OFFICE

2,213,672

LIFTING JACK

Alvin L. Johnson, Ottawa Hills, Ohio, assignor to The American Forging & Socket Company, Pontiac, Mich., a corporation of Michigan

Original application September 1, 1937, Serial No. 161,881, now Patent No. 2,205,691, dated June 25, 1940. Divided and this application November 20, 1939, Serial No. 305,272

6 Claims. (Cl. 254—108)

This invention relates to jacks, and more particularly to lifting jacks such, for example, as are adapted to engage and lift the bumpers of automobiles, thereby to raise the vehicle.

The present case is a division of my previously filed copending application Ser. No. 161,881, filed September 1, 1937, patented June 25, 1940 as Patent 2,205,691.

An object of this invention is to produce such a jack having a load-sustaining member which is movable along a bar or rod during the advancing or lifting movement and cooperates with the rod for supporting the load in the intervals between the advancing or lifting operations, such member being adapted to cooperate with the rod for effecting the retracting or lowering movement of the load upon relative rotation of the rod.

Another object is to produce a jack in which the load is raised or advanced by recurrent lever operations and is retracted or lowered by relative rotational movements of the parts.

A further object is to produce a vehicle bumper-engaging jack which embodies a screw-threaded rod with which lever means cooperates for recurrently lifting the bumper, the construction being such that rotation of the rod effects retracting or lowering movement of the bumper.

A still further object is to produce a jack for automobiles and other uses which is simple and sturdy in construction, reliable in operation, inexpensive to manufacture, easy to assemble, and contains the new and improved features of construction, arrangement and operation hereinafter described.

For purposes of illustration but not of limitation, an embodiment of the invention is shown in the accompanying drawing in which

Figure 1 is a side elevation, partly in section, of a lifting jack, the parts being shown in the position assumed during the advancing or raising step, some of the parts being broken away to show the load-sustaining nut and associated parts and the manner in which the lever-actuated pawl engages the threads on the rod;

Figure 2 is an upper end view of the jack;

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1;

Figure 4 is a transverse sectional view on the line 4—4 of Figure 1;

Figure 5 is a fragmentary side elevation of the pawl and screw-threaded rod in the region indicated by the line 5—5 of Figure 1;

Figure 6 is a side elevation of the operating handle, portions of the length being broken away;

Figure 7 is a side elevation showing the handle connected to the upper end of the screw-threaded rod in position to rotate the rod for lowering or retracting the jack.

The illustrated embodiment of the invention comprises a lifting jack having a vertically disposed rod 10 provided with helical screw threads 11 which extend substantially the entire length of the rod. Preferably double square threads are employed and for best results one and three-quarters (1¾) threads to the inch should be employed. The lower end 12 of the rod 10 is rounded or dome-shaped and fits loosely in a similarly shaped recess 13 in a mounting or supporting base 14. This mounting enables the rod 10 to be rotated freely and provides adequate support for the jack.

Mounted on the rod 10 is an elongated sleeve 15 which is adapted to slide longitudinally along the rod. Formed on the upper end is an annular flange 16 and fitting over the upper end of the sleeve and resting upon the flange 16 is a collar 17. Integral with opposite sides of the collar 17 and depending from the lower end are projections 18 formed with grooves 19, thereby providing a swivel connection between the collar 17 and sleeve 15. Projecting laterally from the collar 17 and integral therewith is an arm 20 which is recessed to engage the underside of an automobile bumper B.

For imparting lifting or advancing movement to the sleeve 15, a lever arm 21 is pivotally connected to lateral projections 22 on an intermediate portion of the sleeve 15, the arm 21 having a forked end 23 engaging a pin 24 extending through the forked end and lateral projections 22. The outer end portion of the arm 21 is formed with a socket 25 to receive an end portion of an operating handle 26. The handle 26 is of substantial length and is formed with a bend 27 to provide a crank for a purpose which will hereinafter appear.

Mounted between the sides of the lever arm 21 adjacent its inner end portion is a sheet metal pawl 28 which is pivotally mounted on a pin 29 secured to the arm 21. As shown, the pawl 28 is substantially U-shaped in cross section and its outer end 30 is inclined to correspond with the angularity of the screw threads 11. The side portion of the sleeve 15 is formed with an opening 31 through which the lower end portion of the pawl 28 extends. The pawl is yieldably urged into engagement with the screw threads by a spring 32 which encircles the pin 29 and has one end bearing against an intermediate portion of the pawl 28, the opposite end abutting against a

portion of the lever arm 21. It will be apparent that upon repeated swinging movement of the lever arm 21 by the handle 27 the sleeve 15 will be raised or advanced in a step by step manner, the pawl 28 cooperating with the screw threads 11 to effect such movement.

In order to sustain the load imposed through the collar 17 upon the sleeve 15 during the upward swinging movement of the lever arm 21, an annulus 33 having internal screw threads engaging the screw threads 11 on the rod 10, is housed within the sleeve 15, an enlargement 34 of the sleeve being provided for that purpose. The enlargement 34 has an upper shoulder 35 and a lower shoulder 36 and interposed between the lower shoulder 36 and the load-sustaining annulus 33 is an anti-friction unit 37 composed of an annular series of ball bearings.

It will be understood that when the lever arm 21 is swung downwardly with the pawl 28 engaging one of the threads on the rod 10, the anti-friction device 37 abuts against the underside of the load-sustaining annulus 33. Owing to the coarseness of the threads 11, as above described, the annulus is caused to rotate freely relative to the rod during the lifting or advancing movement of the sleeve 15 and thereby moves upwardly with the sleeve. When the lever arm 21 is swung upwardly so that the pawl 28 is released from the threads, the sleeve 15 moves slightly downwardly so that the shoulder 35 of the enlargement 34 rests upon the upper surface of the annulus 33, the latter thereby serving to sustain the load imposed upon the sleeve 15 or load-receiving member. The friction between the sleeve and annulus 33 prevents reverse rotation or retrograde movement thereof. It will be understood that the above described operation takes place recurrently during the step by step raising or advancing movement of the sleeve 15.

When it is desired to impart lowering or retracting movement to the sleeve 15, the handle 27 is first disengaged from the socket of the lever arm 21 and is engaged in the upper end portion of the rod 10. The upper end of the rod 10 has a squared socket 38 into which fits a similarly shaped end portion 39 on the handle 26. As above explained, the handle 26 also provides a crank due to the bend 27 and by turning the handle the rod 10 is rotated. As above explained, the frictional engagement between the shoulder 35 and the load-sustaining annulus 33 holds the latter against turning movements so that by rotation of the rod 10, the sleeve 15 and associated parts are caused to move downwardly because of the screw-threaded connection between the rod and annulus 33. Since the rod 10 is disposed outside of the bumper B, it is readily accessible for this purpose and lowering of the vehicle can be conveniently effected in this manner.

From the above description, it will be apparent that lifting or advancing movement of the rod is effected by lever actuated pawl means, the rod being sustained during the intervals when the pawl means is inoperative by the annulus 33. Lowering or retracting movement is effected by imparting relative rotation to the parts in an extremely simple construction, obviating expensive and laborious assembly operations and enabling the parts to be constructed without the use of costly tools and dies.

What I claim is:

1. A lifting jack comprising a screw-threaded rod, a cage slidable on said rod, a lever movably connected to said cage, pawl means operable by said lever and engageable with the threads on said rod, and means in screw-threaded engagement with said rod rotatable freely by force imparted through the cage when said cage is moved in one direction but held against turning movement in the opposite direction under the influence of force imparted through the cage.

2. A lifting jack comprising a screw-threaded rotatable rod, a load-receiving cage on said rod, an actuating lever, pawl means operable by said lever reacting against the threads on said rod for moving said cage in one direction, a member in screw-threaded engagement with said rod and rotatable independently of said cage, said member enabling pawl actuated movement of said cage in one direction and upon release of the pawl holding the cage against retrograde movement, and means for rotating said rod for actuating said member and thereby said cage in the opposite direction.

3. A lifting jack comprising a screw-threaded rotatable rod, a load-receiving cage on said rod, a lever actuated spring tensioned pawl engaging threads on said rod for moving said cage in one direction, a nut on said rod housed in said cage and having limited movement relative thereto longitudinally of said rod, whereby to enable pawl actuated movement of said cage and to support said cage upon release of said pawl, and means to rotate said rod for moving said nut and cage in the opposite direction.

4. A lifting jack comprising a rod having relatively coarse external threads, a load-receiving cage on said rod, a lever actuated spring tensioned pawl associated with said cage and engageable with said threads, a load-sustaining nut on said rod within said cage and having limited axial movement relative thereto, and a mounting for said rod enabling rotation thereof.

5. A lifting jack comprising a rod having relatively coarse external threads, a load-receiving cage on said rod, a lever actuated spring tensioned pawl associated with said cage and engageable with said threads, a load-sustaining nut on said rod within said cage and having limited axial movement relative to the latter, said nut being frictionally engaged on one side by said cage upon release of said pawl for sustaining the load, anti-friction means on the opposite side of said nut, and a mounting for said rod enabling rotation thereof.

6. A lifting jack comprising a rod having relatively coarse external threads, a load-receiving cage on said rod, an arm pivoted to said cage, a handle detachably connected to said arm, a spring-tensioned pawl on said arm engageable with threads on said rod, a load-sustaining nut on said rod within said cage and having limited axial movement relative thereto, and means on said rod for attachment of said handle for rotating said rod.

ALVIN L. JOHNSON.