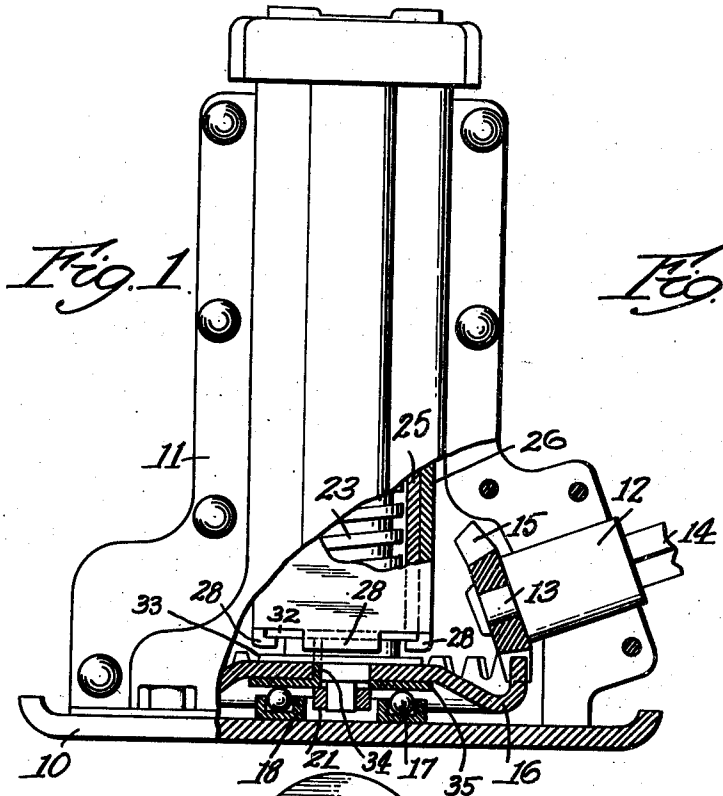
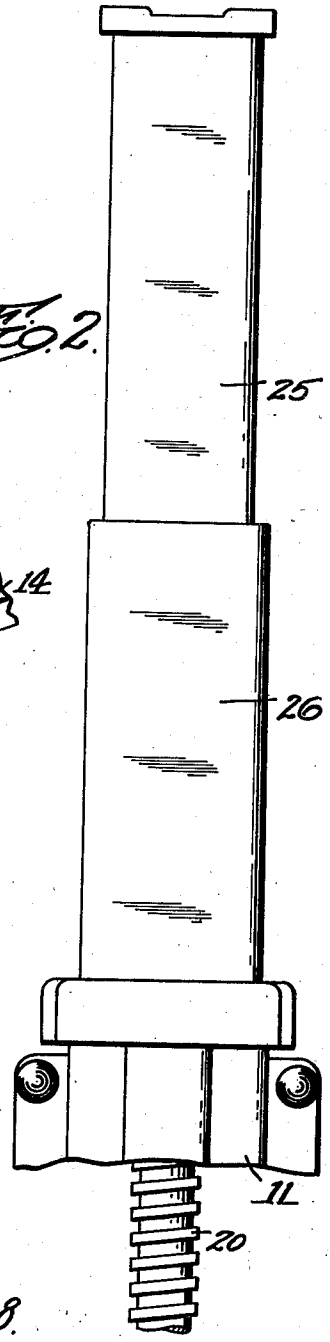
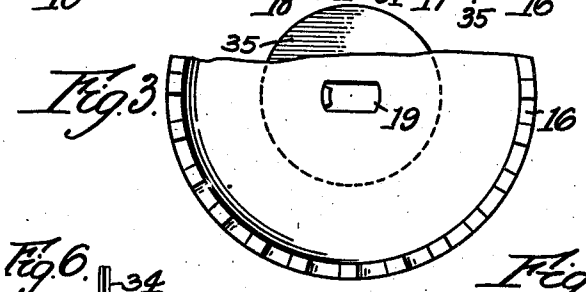
Aug. 31, 1937. A. L. JOHNSON 2,091,858

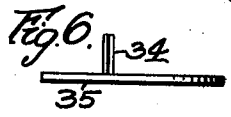
SCREW JACK

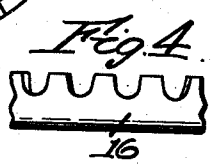
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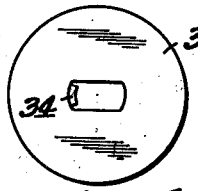


Fig. 5

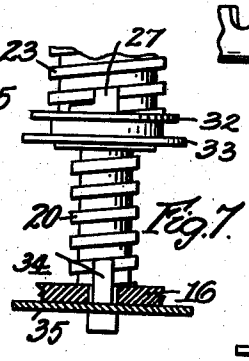


Fig. 7

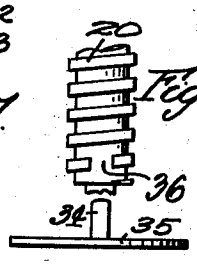


Fig. 8

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Fig. 12.

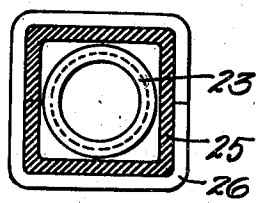


Fig. 17.

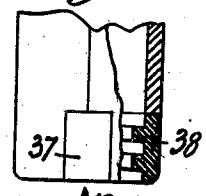


Fig. 11.

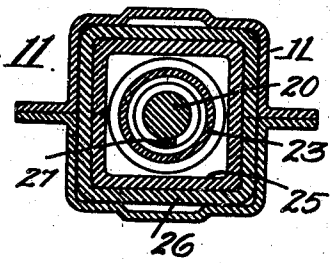
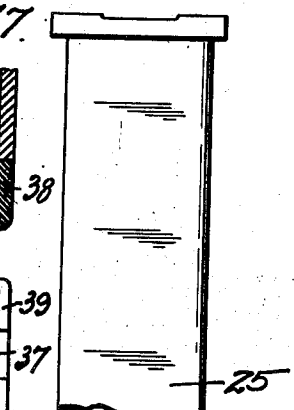




Fig. 18.



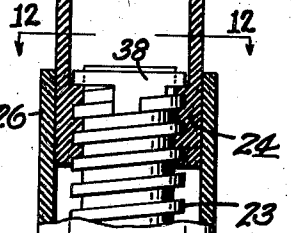
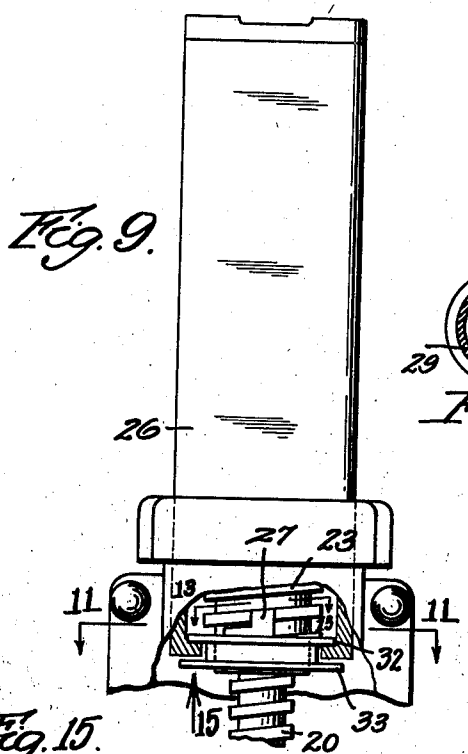


Fig. 9.



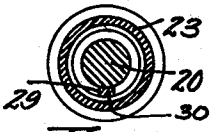


Fig. 16.

Fig. 10.

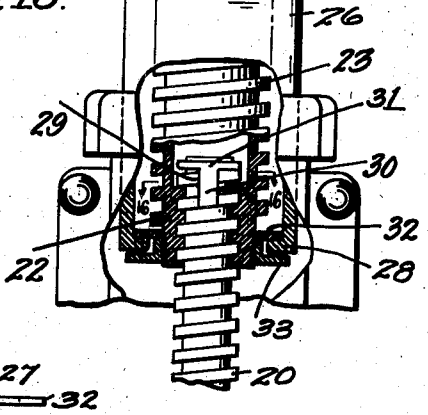


Fig. 15.

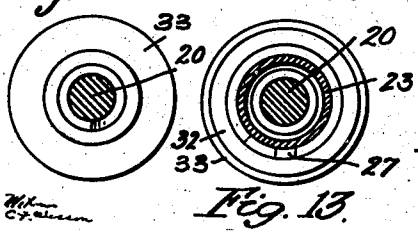


Fig. 13.

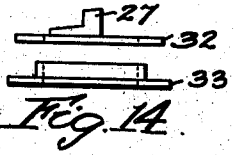


Fig. 14.

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Patented Aug. 31, 1937 2,091,858

UNITED STATES PATENT OFFICE

2,091,858

SCREW JACK

Alvin L. Johnson, Toledo, Ohio, assignor to The Logan Gear Company, Toledo, Ohio, a corporation of Ohio

Application September 1, 1936, Serial No. 98,912

12 Claims. (Cl. 254—102)

This invention relates to a jack principally for automobiles but capable of use for other purpose.

The principal objects of the invention are to so construct a three-element jack that the construction and assembling expense will be reduced to a minimum; to provide means for guiding some of the moving parts so that no long grooves and projections will be required, the latter feature also involving a reduction in expense; to provide a double lift jack in which no stop pins are required; to provide a jack which will produce a minimum of friction in operation, and to provide means for protecting the screws from dust and dirt and water.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a side view of a preferred form of the jack with the lower part cut away to show a diametrical sectional view of the lower part, shown in its retracted position;

Fig. 2 is a side view of the top of the jack extended;

Fig. 3 is a plan view of the operating gear;

Fig. 4 is a side view thereof;

Fig. 5 is a plan view of a disc;

Fig. 6 is an edge view thereof;

Fig. 7 is a view similar to Fig. 1 showing the jack extended;

Fig. 8 is a similar view showing the parts separated;

Fig. 9 is a side view partly extended showing in section the connection of the two lower screws;

Fig. 10 is a longitudinal sectional view showing the jack fully extended;

Fig. 11 is a transverse sectional view on the line 11—11 of Fig. 9;

Fig. 12 is a transverse sectional view on the line 12—12 of Fig. 10;

Fig. 13 is a transverse sectional view on the line 13—13 of Fig. 9;

Fig. 14 is a side view of the two part collar with parts separated;

Fig. 15 is a bottom plan view of said collar;

Fig. 16 is a transverse sectional view on the line 16—16 of Fig. 10;

Fig. 17 is a side view partly in section of a modified, but preferred, form of the nut, and

Fig. 18 is a bottom plan view thereof.

This jack is shown as embodied in a type comprising a base 10, a casing 11 which is square at the top and flaring out at the bottom on one side to provide space for the operating mechanism inside. This flaring lower part of the casing provides a bearing 12 for a shaft 13 which is adapted to be squared at some portion, as 14, for the reception of an operating handle. On this shaft 13 is fixed a gear 15 cooperating with a horizontal punched disc gear 16. This gear 16 rests on ball bearings 17 mounted in a case 18 on the base 10. This gear has an oblong central perforation 19 therethrough of suitable dimensions to snugly receive a reduced portion of the lower or bottom screw 20 and the tongue 34 of disc 35 as particularly shown in Figure 1 whereby the screw 20 and disc 35 would be turned by the gear 16. On the bottom of the screw projecting through the perforation 19 and a central opening formed on the disc 35 is a reduced end welded or otherwise secured to a disc 21.

The disc 35 lies on top of the bearing balls and has punched from its center a tongue 34 which projects through and above the gear 16. This tongue enters a bottom groove 36 in the screw extending through the first thread thereof. Thus the screw will turn with the gear 16 but is not fixed to it. This screw rotates always positively with the gear and extends up nearly to the top of the casing.

In threaded engagement with the screw 20 is a nut 22 integrally located at the bottom of an intermediate screw 23 which is threaded on the outside. The threads in the nut 22 are trimmed square so as to avoid the fin or die-out of the feathered edge. This constitutes a shoulder against which the projection 27 bears. The screw 23 is provided with a fixed disc 32. Just below the disc 32 is provided an internally flanged disc 33 driven on the bottom of the screw 23 with a driving fit. These two parts constitute a double flanged collar. On this disc 32 is the projection 27 entering a groove in the bottom of the screw 23 so that they will rotate together.

Heretofore all stops or driving members in jacks required welding or a pin inserted in the path of the thread. Projections 28 are headed over inwardly on the bottom of an outer tube 26 to secure this tube to the bottom of the screw 23. The external thread on the intermediate screw 23 meshes with a nut 24 integrally located on the inside and at the bottom of a tube 25, between the screw 23 and the outer tube 26.

In cross section, except for the externally threaded portion at the bottom, the tube 25 is square or otherwise non-circular. Outside the tube 25 is another tube 26 which is square or non-circular all the way from the top to the bottom and is provided with inwardly extending projections 28 at the bottom. At the top of the

screw 20 is a downwardly extending slot 29 in which sets a downward projection 30 on a stop disc 31 fixed to the screw 20. This constitutes a stop to prevent the detachment of the screw 23 when the jack is entirely extended. At the top of the screw 23 is a similar stop disc 38. The tube 26 protects the intermediate member 23 from the elements and keeps the top lifting element 25 from turning and from side motion. It does not bear any of the load.

Of course, if the friction between the screw 20 and the nut 22 happens to be greater, at any time during the first part of the operation described, than the friction between the external screw 23 and the nut 24, the top member 25 of the jack may move upwardly part of the time before the jack is entirely extended.

It will be noted that the upper lifting member 25 has its screw entirely inside and at the bottom. Thus the threads are absolutely protected from the elements. Also the tube 26 always covers the intermediate lifting member 23 and always fits over the lower end of the upper lifting member and fits the top of the casing. This prevents the entrance of dust, dirt, oil and water at both ends of the intermediate member.

In operation the rotation of the shaft 13 of course positively rotates the gear 16 and the screw 20. Normally the rotation of this screw rotates the screw 23 through the nut 22 until the nut 22 engages the bottom of the stop 31 and the screw 23 cannot be raised any further. The screw 20 can continue to rotate and as it does so the screw 23 rotates with it and carries up the third element of the lifting part of the jack, namely, the tube 25, until the nut 24 thereof engages the stop disc 38. At this time the jack is extended to its highest position. Of course, the contraction of the jack is carried out in the opposite manner turning the shaft 13 in the opposite direction.

This constitutes a comparatively simple construction in which the screw 25 is formed integral with its nut 38 and no stop pins have to be provided for the three operating elements or screws of the jack. The stops are all in the form of discs made and assembled in an inexpensive manner and the friction is reduced to a minimum.

It is preferred, however, to form the nut 24 as shown in Figs. 17 and 18. In this case the construction can be cheapened and the strength increased by cutting slots 37 in one or more of the four sides of the member 25 for receiving projections on a separate nut 38 and bending inwardly the bottom of the member 25 at 39 to hold the nut fixedly and rigidly in position.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. The combination of a rotatable screw having a slot formed at the end of its outer threaded portion, a hollow screw having an integral internal threaded portion meshing with the outer threads of the first screw, a stop means located at the end of the threaded portion of the first screw for engaging the integral internal threaded portion of the hollow screw for preventing the further rise of the hollow screw and causing it to turn with the first screw, said stop means including a disc having a longitudinal projection extending into the slot formed on the outer threads of said screw whereby rotative movement of the disc with respect to said screw is prevented.

2. The combination of a rotatable screw, an intermediate screw having an internal nut meshing with the outer threads of the first screw, a hollow member of a non-circular configuration having an internal nut at one end meshing with the threads of the intermediate screw, the intermediate screw having a slot, a disc carried at the end of said intermediate screw having a projection extending into said slot constituting a stop for the internal nut of said hollow member preventing its further rise with respect to said intermediate screw.

3. The combination of a rotatable bottom screw, an internal nut meshing therewith and adapted to be raised and lowered by the rotation of said screw, an external screw integral with said nut, a third member comprising a tube of non-circular cross section having an internal nut at the bottom meshing with said external screw threads, a member outside the last-named member having a corresponding cross section and fitting the same and provided with inward projections at the bottom, and a disc on the bottom of the second screw above said projection.

4. In a jack, the combination of a casing, three screw threaded lifting members therein, the bottom lifting member being solid, the intermediate lifting member being hollow to receive the bottom lifting member, the top lifting member having its screw thread on the inside and at the bottom only so that the dust will not enter it from the outside, and a tube carried by the bottom of the second lifting member, movable with it at all times and always enclosing at least the bottom of the top lifting member, to protect the second lifting member from the elements.

5. In a jack, the combination of a lower screw and a hollow upper screw having internal threads at the bottom constituting a nut which runs on the inner screw, and a disc on top of the inner screw having a downwardly extending tongue which enters the inner screw, said disc constituting a stop for said nut and outer screw.

6. In a jack, the combination of an externally threaded screw, a lifting element above it having an internal integral nut at the bottom fitting the threads of said screw, a tube outside the screw and spaced therefrom and having inwardly extended hooks, a collar near the bottom of the screw projecting above said hooks and a collar L-shaped in cross section projecting under said hooks.

7. In a jack, the combination of an externally threaded screw, a lifting element above it having an internal integral nut at the bottom fitting the threads of said screw, a tube outside the screw and spaced therefrom and having inwardly extended hooks, a disc near the bottom of the screw projecting under said hooks, said screw having a vertical groove extending upwardly from the bottom, said disc having a projection entering said groove, and a disc L-shaped in cross section projecting under said hooks.

8. In a jack, the combination of an externally threaded screw, a hollow lifting element above it having openings through its sides, and a nut in the bottom of said lifting element having arms extending into said openings, said lifting element having ears projecting inwardly at the bottom to hold the nut, said nut fitting the screw.

9. In a jack, the combination of an external screw, a collar at the end thereof, a longitudinal projection on the collar, and a groove trimmed square to fit the projection and provide a shoulder for the projection to drive against.

10. In a jack, the combination of a pair of telescopic members each having outer threaded portions, each having a vertical slot adjacent the end of their threaded portions, a disc carried by each screw on the end of their threaded portion, said disc having a tongue extending down in the slot to prevent rotary motion of the disc, a nut running on the threaded portion of each of said members and adapted to engage the disc whereby further rotative movement between said nuts and members is prevented.

11. In a jack, the combination of a gear, means for operating it, a screw affixed to said gear, a hollow screw member having an integral internal threaded portion meshing with the threads of said screw, a collar fixed to the lower portion of said hollow screw member, a hollow member surrounding said hollow screw member, said hollow member having an end portion located on said collar whereby said hollow member is positively moved longitudinally with said hollow screw member, and a load engaging member located between said hollow member and said hollow screw member, said load engaging member having a threaded connection with said hollow screw member.

12. In a jack, the combination of a gear, means for operating it, a screw affixed to said gear, a hollow screw member having an integral internal threaded portion meshing with the threads of said screw, a collar fixed to the lower portion of said hollow screw member, a hollow member surrounding said hollow screw member, said hollow member having an integral end flanged section located on said collar whereby said hollow member is positively moved longitudinally with said hollow screw member, and a hollow element located between said hollow member and said hollow screw member, said hollow element having a threaded connection with said hollow screw member.

ALVIN L. JOHNSON.