Oct. 3, 1933. F. L. SHIRE 1,929,262

AUTOMOBILE JACK

Filed Oct. 10, 1930

FIG. 2.

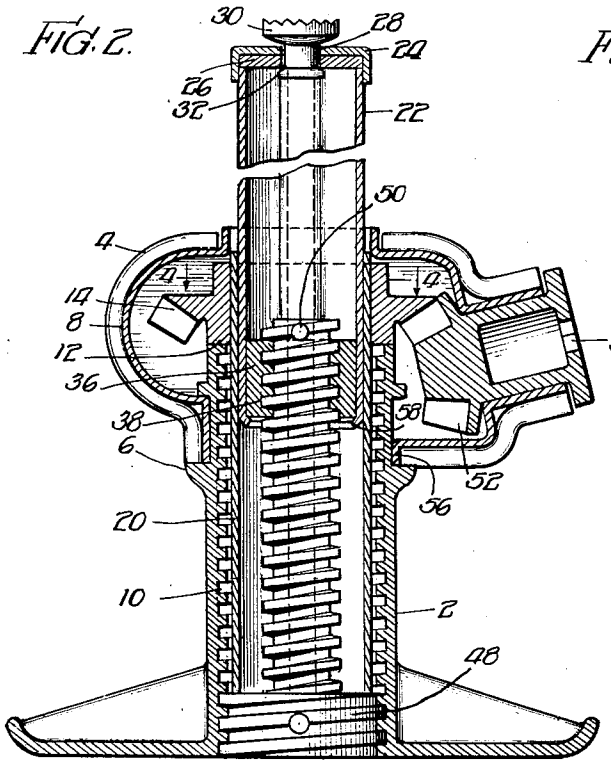


FIG. 4.

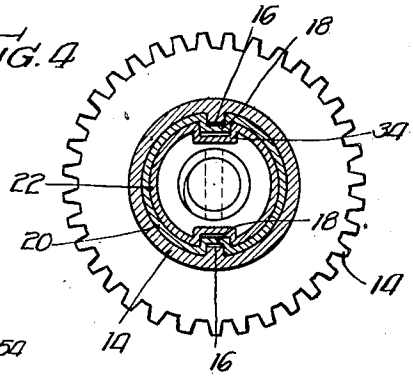


FIG. 3.

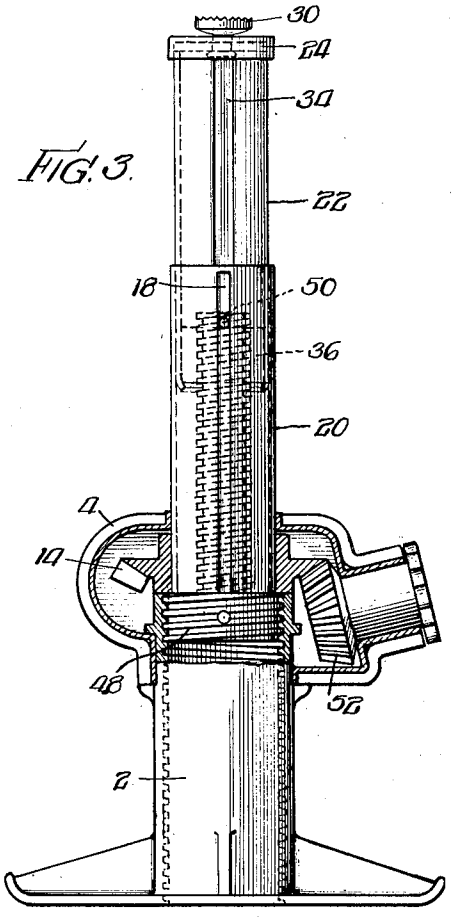
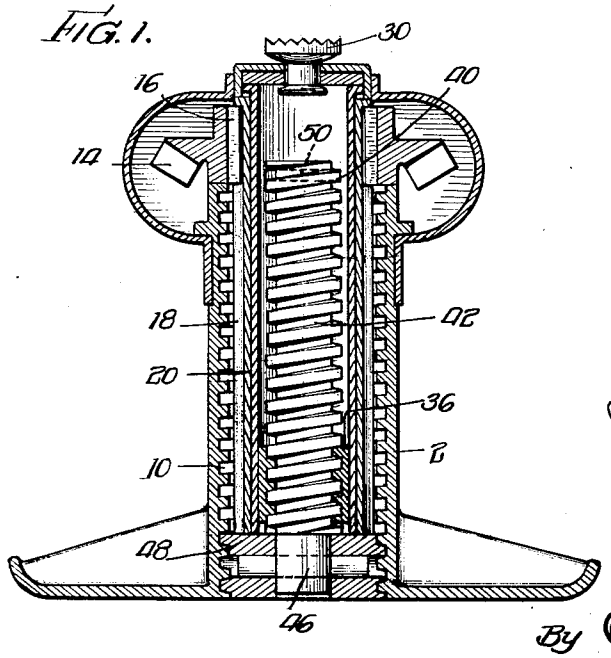


FIG. 1.



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AUTOMOBILE JACK

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Application October 10, 1930. Serial No. 487,736

11 Claims. (Cl. 254—102)

My invention relates to automobile jacks having a plurality of threaded lifting members telescopically arranged.

One of the objects of my invention is to provide a jack of the above character which can be made to sell at a very low cost, which is simple in construction and arrangement and in operation of parts; in which the operating parts are substantially dirt and water proof; and wherein the load-carrying member is automatically projected and collapsed solely by the rotation of the driving means, and without the intervention of the load or other means, so that the load-carrying member can be positively raised to its full height or collapsed therefrom without the necessity of contacting with the load or holding the load-carrying member by the hand.

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

Figure 1 is a view of my jack in collapsible position;

Figure 2 is a corresponding view of the jack with the load lifting member partly elevated;

Figure 3 is a view of both lifting members elevated, and

Figure 4 is a section on line 4—4 of Figure 1.

Referring now to the drawing in detail, my jack comprises a housing 2 of preferably cylindrical construction upstanding from a base 4, which forms a relatively broad support for the jack. The housing 2, at a point considerably above the base, is provided with an outstanding cylindrical flange or lip 6, adapted to receive an upper housing 8 enclosing the driving gear, as will be hereinafter described. The inner portion of the housing is of tubular formation, and the inner wall of the housing 2 is provided with a continuous thread 10 extending approximately from the base 4 of the housing to the top wall 12 thereof. Rotatably mounted on the top wall 12 of this housing is a driving member in the form of a bevel gear 14, which, as shown in Figure 1, is provided with a key 16 slidably fitting in a groove 18 of a cylindrical sleeve 20, thereby providing a sliding spline so that the bevel gear 14, in rotating, will also rotate the sleeve 20, but will permit the sleeve to slide vertically through the bevel gear 14.

Slidingly mounted within the sleeve 20 is a second sleeve 22, which at its upper end is provided with a flanged closing cap 24 and a spacing washer 26. The cap 24 is provided with an aperture 28, in which is swivelly mounted the load carrying head 30, so that this head 30 is free to turn with respect to the cap 24. The head 30 is provided with a neck passing through the aperture 28, and on its lower portion this neck is formed with an enlarged shoulder 32, so as to hold the load-carrying head in position on the cap 24. This sleeve 22 constitutes the lifting member, which directly contacts and carries the load.

Sleeve 22 is formed with a longitudinal spline 34 in the form of an inwardly bent wall, which snugly nests with the spline portion 18 of the sleeve 20. Both the spline portions 34 and 18 are formed as inwardly bent portions of these tubular sleeves, and as shown in Figure 4, are preferably formed on diametrically opposite portions of the sleeves. By means of these splines the bevel gear 14 is adapted to also rotate the sleeve 22, while permitting the sleeve 20 to slide through the bevel gear 14, and the spline between the sleeve 20 and the sleeve 22 permits the latter sleeve 22 to be driven or rotated, while permitting such sleeve 22 to slide vertically with respect to the sleeve 20.

The bottom portion of sleeve 22 is provided on its inner wall with a hollow, cylindrical nut 36, which is rigidly and integrally fastened within the sleeve 22, and this nut 36 is provided with interior threads 38, which are adapted to mesh into correspondingly formed threads 40 on a combined screw and nut, which is formed as a relatively long threaded screw bar 42 having at its bottom a nut portion 48 of larger diameter. The nut 44 is fixed to the screw 42 by means of the fastening pin 46 or other means, so that nut 44 and screw 42 are virtually one piece and move together. The threads 40 of the screw portion 42 are identically arranged with respect to the threads on the nut portion 48. In other words, the threads 40 of the screw portion 42 are right-hand threads, and the threads of the nut portion 48 are right-hand threads also.

The outer periphery of nut 44 is provided with screw threads 48, which engage the screw threads 10 on the inner wall of the housing 2. The upper end of the screw bar 42 is provided with a stop pin 50 which strikes the upper edge of the nut 36 of the hollow sleeve 22 to thereby limit the upward travel of said sleeve.

The top and bottom portions of sleeve 20 are formed with suitable stops to engage the upper and lower edges of the bevel gear 14, whereby to limit the upper and lower travel positions of this sleeve 20.

Suitable means is provided for driving the bevel gear 14, and this comprises the smaller bevel gear 52, mounted in a lateral bearing formed in the upper housing 8. The outer end of this bevel

gear 52 is provided with a suitable opening 54 for receiving a turning instrument such as a crank. The housing 8 may be of pressed or sheet steel or cast metal, and may be formed in two halves to fit about the upper portion of the housing 2 and the bevel gear 14, and such halves may be suitably moulded or welded together to form an enclosing housing about the bevel gears 14 and 52. The upper portions of the housing 8 are open so that the sleeves 20 and 22 may slide vertically therethrough. The lower portions of the housing 8 are provided with flanges 56 which rest on the outstanding lip 6 formed in the housing 2. The bottom of the housing 2 is preferably closed by a plate to exclude dust and dirt, and this plate in some instances may be arranged as an integral part of the base, and has the function of a stop member to limit the downward movement of the nut 44.

It will be noted that the screw 42, the lifting sleeve 22, the connecting sleeve 20, and the threaded housing 2 are all arranged to mutually telescope, and are provided with threaded and splined connections to permit the projection of the three lifting members 20, 22 and 42 out of the housing 2, the members 22 and 42 being arranged to project the load-carrying head 30 to an elevation substantially three times the height of the housing 2.

It will be also apparent that by forming the sleeve 22 as a cylindrical member, and by providing the sleeve 20 as a cylindrical member and the housing 2 as an enclosing housing, the operating portions of the jack are wholly enclosed, and prevent the ingress of dust, dirt, and water.

It will be apparent also that the sleeve 20 performs a further function as a splined connection between the bevel gear 14, which rotates but cannot be elevated, and the lifting sleeve 22, which must be lifted to a height considerably above the top of the housing 2. By reason of the splined connection between the bevel gear 14, the sleeve 20, and the lifting sleeve 22, and by reason of the threaded connections between the housing 2, the nut 48, and between the lifting sleeve 22 and the screw 42, and the splined connection between the lifting sleeve 22 and the spline sleeve 20, it will also be apparent that the lifting elements are positively projected and retracted upon the operation of the jack, so that the raising and lowering of the load-carrying head 30 is at all times under the direct and positive control of the operator, that is to say, the load carrying head 30 may be projected to its maximum projection simply by rotating the member 50.

In the operation of my jack, upon the rotation of the bevel gear 14 the sleeve 20 will likewise be rotated, and also the sleeve 22 will be rotated, and by reason of the threaded engagement of the nut portion of the sleeve 22 with the screw bar 42, and by reason of the engagement of the threads on the nut portion 44 of the screw bar 42 with the internal threads 10 of the housing, the sleeve 22 will be projected first. This is due to the fact that the frictional resistance between the nut 36 and the threads of the screw bar 42 is less than the frictional resistance between the threads 48 and the threads 10 of the housing.

When the sleeve 22 has gone so far that the upper surface of the nut 36 hits the stop 50, then the sleeve 22 will be no further elevated with respect to the said screw bar 42. At this time continued rotation of the bevel gear 14 will then serve to cause the nut 44 to move along the threads 10 of the housing so that the nut 44 and screw bar 42 will be raised, carrying with it the sleeve 22. When the nut 44 leaves the top of the threads 10 of the housing, it will contact against the bottom of the bevel gear 14, thus limiting the elevation of the lifting members of the jack. On the reverse operation of the jack, the sleeve 22 will first be lowered until the inwardly peened portions 58 of the sleeve 22 strike the upper edge of the nut 44, at which time the nut 44 and the screw bar 42 will then begin to descend until the jack has reached the collapsed position shown in Figure 1.

From the foregoing it will be evident that I have produced a very compactly arranged and economically constructed jack, in which, by reason of the splined connections between the rotatable driving member, the sliding sleeves, the threaded members and the base, a positive elevation and depression of the two lifting members is automatically accomplished.

Furthermore, by reason of the sleeve-like construction of the lifting members and the splined sleeve 20, and by reason of the enclosing metal of the base and the housing member 4 enclosing the gears, the dust, dirt and moisture is excluded from the operating parts of the jack.

It will also be apparent that by reason of the tube-like arrangement of the lifting members, that they can be made of said tubes economically constructed, so that a jack of light weight, greater durability and economy of construction is produced.

Another important feature of my invention resides in the fact that I have provided a so-called top drive jack, wherein the lifting elements have their threaded surfaces enclosed and excluded from dirt, grease, moisture, and the like.

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

1. A lifting jack for automobiles and the like, comprising a vertically disposed base, a driving member rotatably supported upon the base, a plurality of sleeves nested within the driving member and splined thereto for rotation with the driving member, but capable of sliding movement through the driving member, a load-carrying-head on one of said sleeves, and a threaded element having a portion threadedly connected with one of said tubes and an externally threaded portion threaded with the base, whereby, on rotation of the driving member, said load-carrying head will be projected from the base.

2. A jack for automobiles comprising a hollow, internally threaded supporting base, a rotatable driving member associated with said base, two threadedly interconnected projectable lifting members nested within said driving member and capable of movement therethrough, one of said members being a bar and the other being a sleeve, a load-supporting head carried by one of said members, and splined connections between at least one of said lifting members and said driving member and threaded connections between said internally threaded base and one of said lifting members, whereby said members are automatically and successively elevated, one at a time, when the driving member is continuously rotated in one direction, and means for rotating said driving member.

3. A lifting jack comprising a hollow internally threaded standard, a driving member rotatably associated with said standard, a pair of screw threaded lifting members telescopically

associated with respect to each other and within said driving member, one of said lifting members having a load-carrying head, and splined connections between said driving member and one of said lifting members, there being threaded connections between the other lifting member and said hollow, internally threaded base, whereby to cause the automatic projection of said lifting members upon the operation of said driving member.

4. A lifting jack comprising a hollow standard, a driving member rotatably associated with said standard, a pair of telescopically associated, threaded members, said members being telescopically associated with respect to said driving member, one of said threaded members having a load-carrying head at its upper end and the other having an externally threaded portion at its lower end, splined connections between said driving member and the load carrying member, and a threaded connection between said base and the externally threaded portion of the other lifting member, and means for rotating said driving member.

5. In a lifting jack, the combination of a hollow base, a rotatable driving member associated therewith, two lifting members telescopically associated with each other and within said driving member, one of said lifting members having a load-carrying lead, means associated with the driving member for rotating one of said lifting members, the other lifting member being operatively associated with the first lifting member and having an externally threaded portion operatively associated with the base for causing the automatic and successive projection of said lifting members on rotation of the driving member.

6. In a lifting jack, a hollow standard having internal screw threads, a lifting member mounted in a standard and having external threads engaging the threads of the said standard, said member having an elongated, externally threaded portion, a load carrying member having threaded engagement with the threads of the elongated portion, and a driving member rotatably associated with the standard and connection between said driving member and said load-carrying member to rotate the latter for causing the successive projection of the lifting members on rotation of the driving member.

7. In a lifting jack, a hollow standard having internal threads, a lifting member having external threads engaging those of the standard, said lifting member having an elongated, threaded portion, a load-carrying member having threads engaging the elongated threaded portion, and means carried by the standard for rotating the load-carrying member while permitting it to shift axially with respect to the standard.

8. In a jack, the combination of three threadedly interconnected members, two of said members being constructed and arranged to collapse within the third member and to be projected from the third member and from each other, one of said members having a load-carrying head, another member having a portion of enlarged diameter threaded with the base and an upwardly extending portion of lesser diameter threading with the load carrying member, a rotatable driving member and a splined connection from said driving member to the load-carrying member.

9. An automobile jack comprising the combination of a hollow, upstanding housing having a threaded bore, a rotatable driving member mounted on the top of said housing, a sleeve having a sliding splined connection with said rotatable driving member, a second sleeve having a sliding splined connection with said first sleeve, said second sleeve having a load-carrying member at its top, and having an internally threaded nut at its bottom, and a screw member having an enlarged head at its bottom portion, with the thread of the enlarged head having the same direction as the threads of the screw, the thread of the screw engaging the thread of the nut of the second sleeve member, and the thread of the enlarged portion of the screw engaging the thread of the housing, and means for rotating the driving member for causing the automatic projection of the load-carrying member.

10. In a lifting jack, a hollow standard providing an internally threaded cylindrical channel, a lifting member comprising a disk of relatively large diameter and having external threads engaging the internal threads of the standard and an elongated threaded member mounted on and extending upwardly of the disk, said elongated member being of lesser diameter than the disk, a load carrying member telescoping with and threadedly connected to said elongated member, and means carried by the upper end of the standard for rotating the load-carrying member while permitting it to be shifted axially with respect to the standard.

11. In a lifting jack, a hollow standard providing an internally threaded cylindrical channel, a lifting member comprising a disk of relatively large diameter and having external threads engaging the internal threads of the standard, and an externally threaded shaft mounted on and extending upwardly of the disk, said externally threaded shaft being of lesser diameter than the disk, a load-carrying member telescoping with and threadedly connected to said externally threaded shaft and means carried by the upper end of the standard for rotation with the load-carrying member while permitting it to shift axially with respect to the standard.

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