April 29, 1952 T. C. JOHNSTON 2,594,443

SPRING JACK

Filed Oct. 29, 1947 2 SHEETS—SHEET 1

FIG. 1.

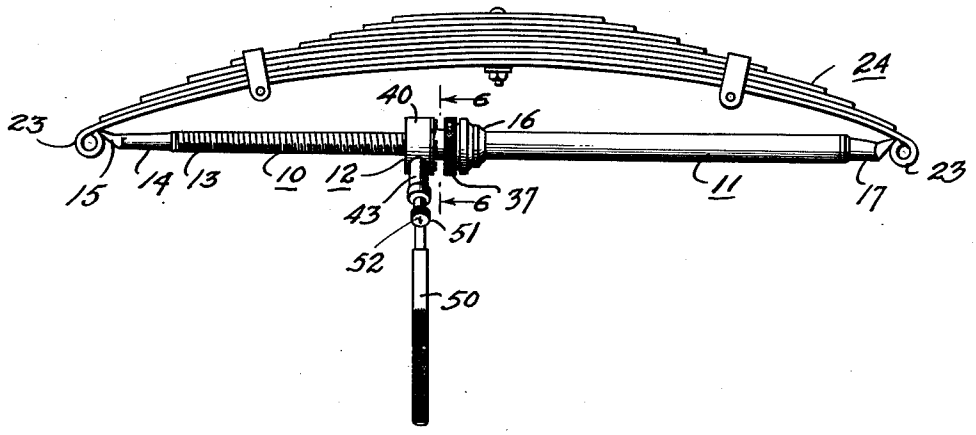

FIG. 2.

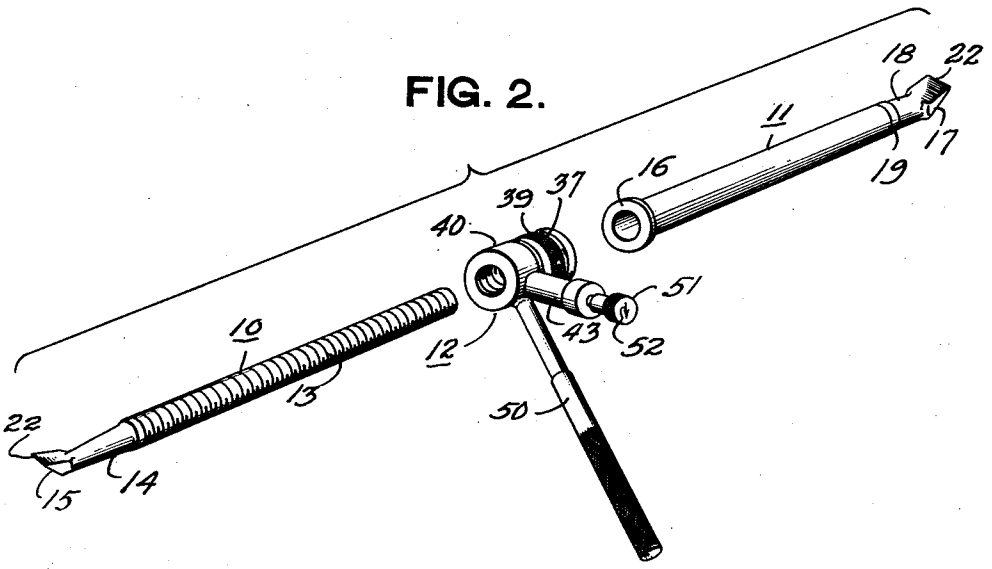

FIG. 8.

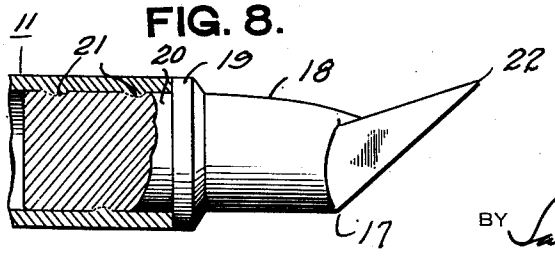

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FIG. 3.

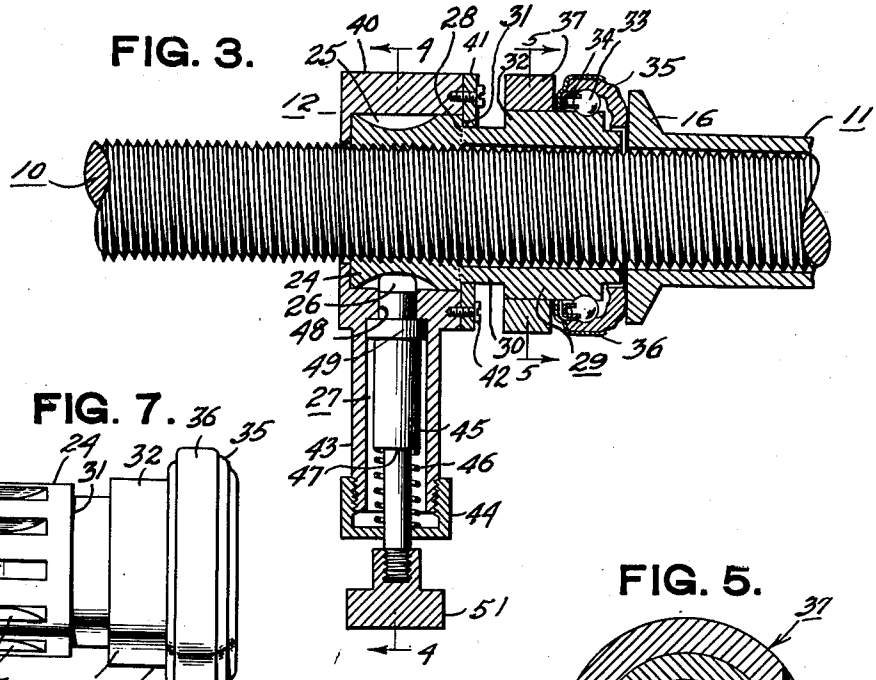


FIG. 7.

FIG. 5.

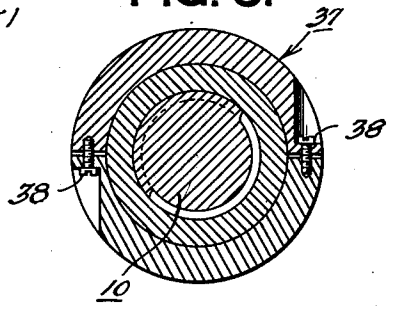


FIG. 4.

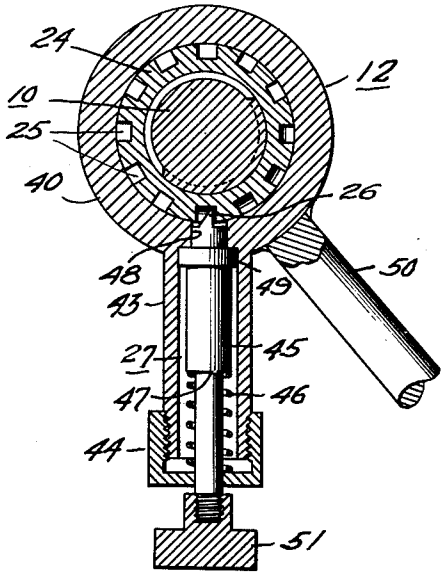
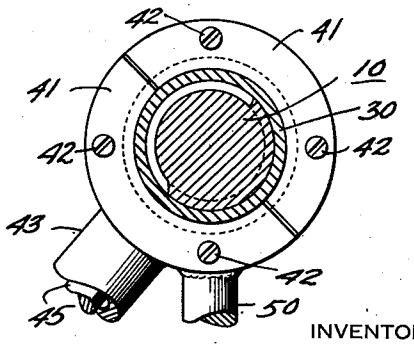


FIG. 6.



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Patented Apr. 29, 1952

2,594,443

UNITED STATES PATENT OFFICE

2,594,443

SPRING JACK

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Application October 29, 1947, Serial No. 782,932

2 Claims. (Cl. 74—142)

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This invention relates to improvements in a jack, more particularly to a type of jack for expanding half-elliptic springs such as are used in front and rear suspensions of automobile frames.

In spring jacks which have been used for expanding front and rear springs, particularly for passenger cars, it has been necessary to employ a tool having as many as eight to ten main parts which are selected to correspond to the length of the particular spring job, the length of the front and rear springs being different and the size and length of the springs ever increasing from year to year as the size and weight of the car models have increased. Under such conditions the jack parts are easily misplaced or lost necessitating loss of time in locating them. In such spring jacks it has been the custom to use a large wrench on a hexagonal nut threaded on a shaft of the jack or employ other cumbersome equipment which is slow or difficult to operate. Offset ends of such tools have been excessive due to requirements of the jack operating members and are unsatisfactory as they are apt to get out of alignment and release the spring making conditions hazardous to the mechaniscs.

The principal object of the present invention is to overcome such difficulties as have occurred in the past and provide a simple and substantial jack of relatively few parts, such as three main parts, which are rugged in construction and with a minimum offset of the spring engaging elements so that the toughest spring jobs are performed with ease and safety.

In order to accomplish this the three main parts, a threaded shaft and a tube in telescopic relationship therewith, each provided with very small offsets at their ends (such as an inch and a half as compared with three to five inches in many of the spring jacks heretofore employed, which are sufficient to take care of both front and rear springs of different lengths), and an improved compact ball bearing ratchet head drive which is sturdy, simple to operate, and fast, for operating the shaft and telescopic tube members. The head drive being compact, can be used on springs of automobiles without engaging other parts thereof which normally interfere with the use of large wrenches or other operating members, and the head drive being compact, the jack can be made without using larger offsets of the spring engaging end members previously described.

Further objects and advantages of my improved spring jack will be set forth in detail in

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the following detailed description, reference being had to the accompanying drawings illustrating a form of my spring jack which has proven highly satisfactory, and in which drawings:

Fig. 1 is a side view of a spring jack in accordance with my invention illustrating the manner of applying it to a half-elliptic automobile spring.

Fig. 2 is a perspective view of the three main parts of the spring jack in separated positions.

Fig. 3 is a fragmentary enlarged side view of one of the parts, with the other parts shown assembled thereon, and shown in longitudinal section.

Figs. 4 and 5 are transverse sectional detail views taken on lines 4—4 and 5—5, respectively of Fig. 3.

Fig. 6 is a transverse sectional detail view taken on line 6—6 of Fig. 1.

Fig. 7 is an elevation view of the nut and ball bearing element of the ratchet head.

Fig. 8 is a fragmentary elevation view with parts in longitudinal section of the outer end of the telescopic tube part of the spring jack.

As illustrated in the drawings my improved spring jack comprises a threaded shaft 10, a tube 11 in telescopic relationship therewith and a ball bearing head drive 12 which provides an intermediate drive for the shaft 10 and telescopic tube 11 for lengthening or contracting the jack.

The shaft part 10 preferably comprises a solid steel rod member with relatively coarse threads 13 extending from its inner end throughout the major portion of its length, beyond which threads the shaft is preferably tapered at 14 and formed into a spring engaging end piece 15. The telescopic tube part 11 likewise may be formed of steel with an internal diameter slightly greater than that of threads 13 so that shaft part 10 may telescopically slide thereinto. The inner end of tube 11 is formed with or has a collar 16 welded and machined thereon for thrust engagement with drive head 12. A spring engaging forged steel end piece 17 has a tapered shank portion 18 corresponding with tapered portion 14 of shaft part 10, a collar 19 for engagement with tube 11 and a cylindrical portion 20 fitting within the end of tube 11 and integrally fastened thereon by means of a plurality of rosette welds 21.

It will be seen that end pieces 15 and 17 are wedge shaped with relatively long transverse edges 22 offset from the axis of the shaft and tube parts 10 and 11, the sloping and tapering of these end pieces being such that the edges 22 will engage the space back of the spring eyes 25

of spring 24 as shown in Fig. 1 with the axis of the shaft 10 and tube 11 substantially in line with the centers of the spring eyes, providing ample space for my improved ball bearing head drive 12 so that the spring may be expanded the required maximum amount without coming into engagement with the head drive due to its compactness.

The improved head drive 12 includes a cylindrical nut 24 interiorly threaded for engagement with threads 13 of shaft 10 and having equally spaced elongated slots 25 extending axially of the nut for engagement with a reversible pawl 26 of a ratchet mechanism 27.

Nut 24 is formed or integrally connected by welding 28 or the like to an inner race member 30 of an antifriction thrust bearing 29 through which the thrust is transmitted to collar 16 on the telescopic tube part 11. The bearing 29 may be of a type shown in the Pearson Patent 2,228,016 of January 7, 1941, modified for integral attachment to nut 24 by welding or the nut and thrust bearing inner race member 30 may be integrally fabricated instead of employing and modifying such a "stock" part. As the type of thrust bearing is described in detail in said patent it is not necessary to describe it herein in detail.

The inner race member 30 essentially has a reduced portion integrally connected with nut 24 providing a shoulder 31 with the nut at the point of connection. The other end 32 of body member 30 is of an increased diameter and provided with a race for thrust balls 33 adjacent to its outer end. A cage 34 and outer race member 35 are mounted on the balls 33, said member 35 extending beyond the outer end of the member 30, as shown in Fig. 3, providing the contacting member of the thrust bearing for engagement with collar 16 of telescopic tube part 11. The outer race member 35 has its inner end enclosed by a shield 36.

As best shown in Figs. 1, 2, 3 and 5, a split ring 37 is mounted on an enlarged portion of member 30 of the thrust bearing 29, a pair of screws 38 holding it in tight non-rotatable engagement therewith. The outer surface 39 is knurled to provide a hand grip so that the body member 30 and nut 24 threaded on shaft 10 may be turned by hand thereon for a quick adjustment of the jack in either direction for increasing or reducing the length thereof.

Such manual adjustment is impossible when the end pieces 15 and 17 of the jack are brought into engagement with a spring for expanding it or in removing the jack when the spring is in an expanded condition. For this purpose ratchet mechanism 27 is provided.

Ratchet mechanism 27 includes a compact cylindrical housing 40 enclosing the outer end of cylindrical nut 24 and the cylindrical periphery thereof. This housing is secured in place by a pair of split ring members 41 engaging the other end of nut 24 and abutting the shoulder 31, a pair of screws 42 in each member of the split ring securing it to housing 40.

Housing 40 has a radial tube 43 extending therefrom with an apertured cap 44 threaded on its end. This provides a housing for an operating rod 45 and a spring 46 which bears against cap 44 and a shoulder 47 on rod 45, for biasing the rod and its pawl 27 through an aperture 48 in housing 40 so that pawl 26 will normally engage the walls of the milled slots 25 in nut 24 for turning the same. A collar 49 slidingly fitting in tube 43 engages the outer wall of housing 40 as a limit to the inward movement of pawl tooth 26

so that it is effective in driving nut 24 and parts connected therewith in one direction and permits a ratcheting action when the housing is moved in the other direction. A handle 50, integrally secured to housing 40 by welding or the like, extends radially therefrom and provides adequate manual operating means for reciprocating the ratchet mechanism in turning nut 24.

Pawl operating rod 45 extends through apertured cap 44 and has a knurled finger piece 51 threaded or otherwise secured thereon for turning rod 45 and pawl 26. As shown in Figs. 1 and 2 this finger piece has an arrow 52 inscribed thereon in a manner such that when it points longitudinally of jack members 10 and 11 pawl 26 is positioned for driving nut 24 in the direction indicated by the arrow. That is, when it points to the left the nut will be moved to the left, to contract the jack and when it points to the right, the nut will be correspondingly moved to expand the jack. When the nut is moved from one position to another pawl 26 is withdrawn from notches in nut 24 by pulling rod 45 to compress spring 46 so that it may be readily turned, and when turned to point crosswise of the jack members 10 and 11 as indicated in Figs. 1 and 2 pawl 26 is crosswise of the slots 25 and will not seat therein, the pawl being wider than the width of any one of the notches as may be observed by a comparison of Figs. 3 and 7, thus permitting the quick hand turning of nut 24 and corresponding ball bearing parts by means of knurled split ring 38.

In operation the ratchet pawl is set to a neutral position, as indicated in Figs. 1 and 2. Then the jack members 10 and 11 are extended, by turning split ring 37 until the edges 22 of end members 15 and 17 engage in the spring, behind the eyes thereof. Then the split ring and nut 24 are further turned until the members have a tight fit. Thereafter the pawl is turned by the finger piece 51 so that the arrow 52 points toward the left and the turning of nut 24 is continued by manipulating handle 50, oscillating it back and forth until the jack members 10 and 11 are moved to expand the spring the required extent. Releasing of the spring jack is accomplished by reversing finger piece 51 so that arrow 52 points in the reverse direction, whereupon oscillating of ratchet handle 50 will effect a release of the jack from the spring.

When storing the jack, nut 24 may be turned along threads 13 to the fullest extent bringing nut 24 and thrust bearing 29 adjacent to the end member 14 so that the jack tube member 11 may be telescoped onto shaft member 10 the fullest extent and thereby the three parts are in as compact an assemblage as possible, or preferably for packing in a tool case or the like the three parts may be disassembled from each other as shown in Fig. 2.

I claim:

1. In a jack of the class wherein a threaded shaft has telescopic relationship with a tube for increasing and diminishing the over-all length of the jack, the improvement which comprises, a cylindrical nut in screw threaded engagement with the shaft, said nut provided with elongated slots open to its periphery, equally spaced apart circumferentially thereof and extending axially of the nut, an antifriction thrust bearing including an inner race member and an outer race member, said inner race member freely encircling said threaded shaft and integrally connected to one side of said nut and said outer race member extending beyond the outer end of the inner race member for abutting relation with said tube, a

housing encasing said nut and movable circumferentially thereof and a ratchet pawl rotatably carried by said housing and spring biased to engage in any one of said slots for imparting circumferential movement to said nut upon rotation of said housing, said pawl being of a width greater than the width of any one of said slots whereby upon being retracted and turned crosswise of the said slots, the nut may be rotated independently of said housing and pawl by rotation manually imparted to the inner race of said antifriction bearing.

2. In a jack of the class wherein a threaded shaft has telescopic relationship with a tube for increasing and diminishing the over-all length of the jack, the improvement which comprises, a cylindrical nut in screw threaded engagement with the shaft, said nut provided with slots open to its periphery and equally spaced apart circumferentially thereof, an antifriction thrust bearing including an inner race member and an outer race member, said inner race member freely encircling said threaded shaft and integrally connected to one side of said nut by a reduced portion presenting a lateral shoulder at said side of the nut, and the outer race member extending beyond the outer end of the inner race member for abutting relation with said tube, a housing encasing the cylindrical portion of said nut and the side thereof opposite the connection of said inner race member therewith, a split ring member removably secured to said housing and engaging said

shoulder of the nut at the said reduced portion of the inner race member, a ratchet pawl carried by said housing spring biased to extend into said slots of the nut, one at a time, and means for retracting said pawl, whereby the nut may be rotated through engagement of said pawl in said slots, by oscillation manually imparted to said casing or by circumferential movement imparted manually to said inner race member, when said pawl is retracted.

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