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3,384,348

SPRING COMPRESSING DEVICES
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 Filed Oct. 13, 1966, Ser. No. 586,415
 4 Claims. (Cl. 254—10.5)

ABSTRACT OF THE DISCLOSURE

A device for compressing and extending a coil spring including a threaded rod which extends through the loops of a coil spring, a pair of coil engaging plates each adapted to engage a loop of a coil spring and a pair of removable nuts adapted to thread along the threaded rod. Each nut has a ball portion adapted to fit in a ball socket portion formed in a coil engaging plate. The coil engaging plates each have a slot leading from the periphery thereof to the ball socket to enable the plates to be slipped onto the threaded rod anywhere along its length.

This invention relates to improvements in spring compressing devices and more particularly to improvements in devices for compressing the front wheel springs of an automobile.

It is the primary object of my invention to provide an improved spring compressing device which is adapted to compressing a coil spring of any size or shape by means of plates or an adapter which may be tilted, pivoted or rotated relative to a threaded rod.

Another object of my invention is to provide a versatile device which is not only readily adaptable to engaging a coil spring but is also readily adaptable to engaging the frame of an automobile.

Another object of my invention is to provide an improved device with plates each having an aperture allowing the plates to be quickly and easily engaged with or removed from a threaded rod.

Another object is to provide a device with a pair of plates or an adapter and a pair of nuts which engage each other in a ball-and-socket type joint allowing the compressing plates or adapter to rotate or tilt in any direction.

Another object is to provide a device which is constructed and designed for convenience, versatility and speed of assembly and is adapted to use with a variety of turning tools or wrenches.

Other objects will appear from time to time in the ensuing specification and drawings in which:

FIGURE 1 is an elevation view of the spring compressing device;

FIGURE 2 is a top sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a partial sectional view of my invention;

FIGURE 4 is an elevation view of my device showing an adapter in use with my invention, and

FIGURE 5 is a partial sectional view of a portion of my invention showing the adapter in use.

Referring more particularly to the drawings in which like numerals refer to like parts it will be seen that my spring compressing device 10 consists of four basic parts: an externally threaded rod 11, a pair of internally threaded nuts 12 and 13, a pair of compressing plates 14 and 15, and an adapter 16 interchangeable with either of the plates. The externally threaded rod 11 is adapted to extend axially through the loops or coils of a spring 17 while the two compressing plates 14 and 15 engage the

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spring in slidable relation with the threaded rod. The two internally threaded nuts 12 and 13 engage the threaded rod 11 and compress the spring 17 by moving the two compressing plates 14 and 15 toward each other. The adapter 16 may be interchanged with either plate 14 and/or 15 and will be used most often when compressing a spring toward a generally stationary object such as the A-frame of an automobile.

The externally threaded rod 11 is best seen in FIGURES 1 and 4 and may vary both in length and diameter. The length of the rod 11 will depend in part on the length of the coil spring 17 while the diameter may vary with the internal diameter of the two nuts 12 and 13 and the size or shape of the loops in the spring.

The externally threaded rod 11 is substantially straight so that the internally threaded nuts 12 and 13 may advance up or down the entire length of the rod. The rod is shown in the figures as a solid member but it may be hollow or tubular.

My spring compressing device 10 includes a pair of removable nuts 12 and 13. Each nut is internally threaded in such a manner as to threadably engage the externally threaded rod 11 thereby allowing the nuts to be advanced up or down the rod as desired. Each nut 12 and 13 has a shank portion 18 and a rounded portion 19.

The shank portion 18 is shown in the figures as hexagonal in cross section; however, this is only one preferable shape. The important feature of the shank portion 18 is that it is adapted to engage a turning tool or wrench. For this reason, the shank portion 18 preferably has at least one flat outer surface to facilitate gripping by a turning tool or wrench. In other words, the size and shape of the shank portion 18 may vary with the type of turning tool or wrench used to advance the nuts 12 and 13 up or down the rod 11.

As mentioned, both nuts 12 and 13 have a rounded portion 19 adapted to engage the tapered face 22 of either plate. When in a working position, the rounded portion 19 will seat or rest on the tapered face 22 of the plate, as shown in FIGURE 3. The rounded portion 19 acts like the ball portion of a ball-and-socket joint permitting the plates 14 and 15 to tilt, pivot or rotate relative to the threaded rod 11. The size and shape of the rounded portion 19 should conform with the size and shape of the tapered face 22 which it seats or rests in thereby allowing free movement of the plates 14 and 15.

Two coil engaging members or compressing plates 14 and 15 are shown in FIGURE 1. These two plates 14 and 15 are shown as identical in size and shape, however, in some situations it might be preferable to use one large and one small plate. One such situation would be when the spring to be compressed was tapered with large loops at one end and small loops at the other. Then it would be advantageous to use the large plate where the loops were large and the small plate on the tapered end of the spring.

Both plates 14 and 15 should have at least one surface adapted to engage a loop or coil of the spring 17. If both surfaces are adapted to engage a loop or coil then my device may be used both for compressing and expanding a spring without having to invert the plates 14 and 15. It may be desirable for at least one surface of the plates 14 and 15 to have a generally planar central portion to facilitate attachment to the spring 17.

Both plates 14 and 15 have an aperture or opening 20 with a neck or sleeve portion 21. The aperture 20 must

be slightly larger than the diameter of the rod 11 so that the plates 14 and 15 may be properly positioned, as shown in FIGURE 1. The neck or sleeve 21 may have two tapered faces 22 and 23, as shown in FIGURE 3, where it will be noted that one of the faces engages the rounded portion 19 of the nut 12 in movable relation. It is important that the neck 21 have at least one tapered face 22 which allows the plates 14 and 15 to tilt, pivot or rotate relative to the threaded rod 11. As shown in FIGURE 3, the tapered face 22 acts like the socket of a ball-and-socket joint when engaged with the rounded portion 19 of the nut 12.

In addition, both plates 14 and 15 may have an upstanding collar 24. This collar 24 increases the surface area of the neck 21 thereby facilitating the forming of the proper angle of taper. It is important that the angle of taper be such that the rounded portion 19 of either nut 12 and/or 13 ride or seat in its respective tapered neck 21 in such a manner as to allow the plates 14 and 15 to be tilted, pivoted or rotated relative to the threaded rod 11. The angle of taper may vary with the size and shape of the rounded portion 19 of the nuts 12 and 13, however, it is still important that the tapered neck 21 and nuts 12 and 13 engage each other in movable relation.

The opposite edge portions of the plates 14 and 15 may be curved or contoured to form a curved edge or rim 25 to facilitate attachment to a coil or loop of the spring 17. The curved edge or rim 25 makes it possible to apply large amounts of pressure, as when compressing a spring, without having the spring laterally slip or skew on the plates 14 and 15.

Another coil engaging member or adapter 16 may be interchanged with either of the plates 14 and 15 and is used to advantage when compressing a spring toward a stationary object such as the A-frame of an automobile. The adapter 16 is shown in FIGURE 4 engaging a stationary object 26 such as the A-frame of an automobile. The adapter 16 preferably has a generally central opening which is somewhat larger than the threaded rod 11 so that the adapter may fit over the rod allowing it to move freely up and down the rod.

As shown in FIGURE 5, the opening has a tapered face 27 adapted to engage the rounded portion 19 of either nut 12 and/or 13 in such a manner as to allow the adapter to rotate, tilt or pivot in relation to the threaded rod 11. As shown in this figure, the rounded portion 19 of the nut 12 seats or rests on the tapered face 27 of the adapter 16 forming a ball-and-socket type joint.

The use, operation and function of my device is as follows:

As mentioned, my device includes a threaded rod 11, a pair of removable nuts 12 and 13, a pair of compressing plates 14 and 15 and an adapter 16 interchangeable with either plate. All these elements or parts may be made from any strong, rigid material. One suitable material is steel, however, many other strong, rigid materials may be used. It is particularly important that the two plates 14 and 15 be made from a strong rigid material as they must resist the recoiling action of the spring 17.

One of the many advantages of my device 10 is that it may be quickly and easily assembled for use and then with equal speed and facility disassembled after the job is completed.

The first step in assembling my invention is preferably to draw or screw the nuts 12 and 13 onto the threaded rod 11. Then the threaded rod 11 is inserted within the loops or coils of the spring 17. The internally threaded nuts 12 and 13 are then positioned at the ends of the portion of the spring 17 to be compressed. Next the plates 14 and 15 are situated so that the tapered face 22 of the neck 21 engages the rounded portion 19 of each nut 12 and 13. When situated in such a manner, the plates 14 and 15 will engage a loop or coil of the spring 17. My invention is

now ready to compress the spring 17 and is shown in this position in FIGURE 1.

To compress the spring 17, a turning tool or wrench engages the shank portion 18 of either or both nuts 12 and 13 and the nut or nuts are turned toward each other thereby compressing the spring. When the mechanic has completed his work, the spring 17 may be returned to its normal position by returning the nut or nuts 12 and 13 to their original position. The plates 14 and 15 and threaded rod 11 may then be removed from the spring 17 and my device is ready for another job. The nuts 12 and 13 may remain engaged with the threaded rod 11 as they are small and will not obstruct the rod 11 when placing it within or removing it from the loops of the spring 17.

It is important to note that the aperture 20 in each plate 14 and 15 allows my device to be quickly and easily assembled and disassembled. The slot portion of the aperture 20 must be slightly wider than the width or diameter of the threaded rod 11 making it possible to readily position the plates 14 and 15 in relation to the rod. In addition, the plates 14 and 15 engage the rod 11 in free, slidable relation so that they may move up and down in relation to the threaded rod while compressing or expanding a spring. In my device, the neck or sleeve opening which encircles the rod 11 is larger than the rod and acts as a guide for the plates 14 and 15 while moving up and down the rod 11. In other words, the plates 14 and 15 only contact the rod 11 when they are tilted at a substantial angle to the perpendicular of the rod.

When compressing a spring toward a stationary object, such as the A-frame of an automobile, an adapter 16 is used in place of one of the plates 14 and 15. The adapter 16 may be positioned in much the same manner as the plates 14 and 15, however, one surface of the adapter is in contact with the stationary object. The rounded portion 19 of one nut 12 seats or rests in the tapered face 27 of the adapter 16 and allows the adapter to rotate, tilt or pivot in relation to the threaded rod 11. To compress the spring 17, a turning tool or wrench engages the shank portion 18 of the other nut 13 and the spring is compressed toward the stationary object.

It is also important to note that my invention may be used to expand a spring. This may be done by screwing the shank portion 18 of both nuts 12 and 13 onto the rod 11 first thereby positioning the nuts 12 and 13 on the rod 11. The plates 14 and 15 are positioned in a similar manner as when compressing a spring. A turning tool or wrench then moves the nuts 12 and 13 away from each other thereby expanding the spring 17.

It is understood that my invention is not confined to the particular construction and arrangement of parts herein illustrated and described, but embraces all such modified forms thereof as may come within the scope of the following claims.

I claim:

1. A device for compressing and extending a coil spring and the like including:

a threaded rod adapted to extend through the loops of a coil spring,

at least one coil engaging member having at least one surface adapted to engage a loop of a coil spring, each coil engaging member having an opening to freely receive said threaded rod with said opening being at least partially surrounded by a seating surface,

at least one nut having screw threads adapted to engage said threaded rod and to be moved along the length of said rod,

each nut having a shank portion to receive a turning tool and a seating surface complementary in shape to the seating surface of said coil engaging member, one of said seating surfaces being frusto-conical and the other being frusto-concave so that said coil engaging member may tilt, pivot or rotate with respect to said threaded rod to position itself in contacting relationship with a coil portion of a coil spring.

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2. The structure of claim 1 further characterized in that said coil engaging member has a slot extending from the periphery thereof to the opening formed therein to facilitate placement of the coil engaging member relative to the threaded rod.

3. The structure of claim 1 further characterized in that said coil engaging member is of flat, rectangular shape with two of its opposite edges curved to form a rim outwardly of the coil of a coil spring.

4. The structure of claim 1 further characterized in that the opening through said coil engaging plate has

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a frusto-conical surface on the opposite side of the opening from the seating surface.

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