Feb. 28, 1950 C. R. NALLE 2,499,277

CASTER STRUCTURE

Filed Oct. 18, 1945

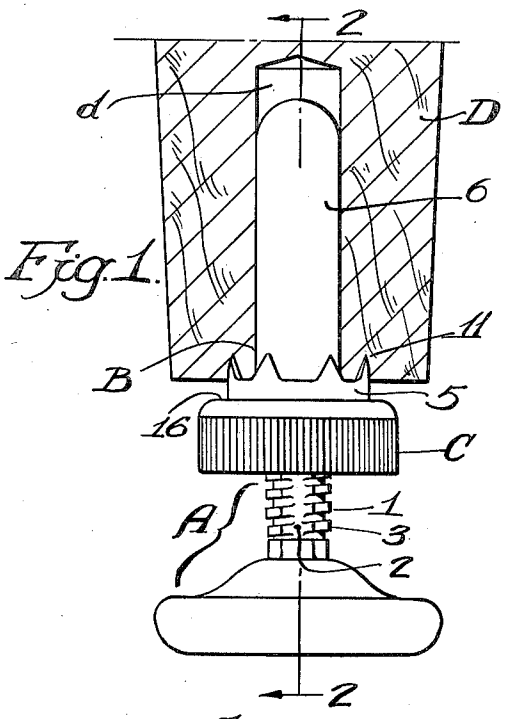


Fig. 1.

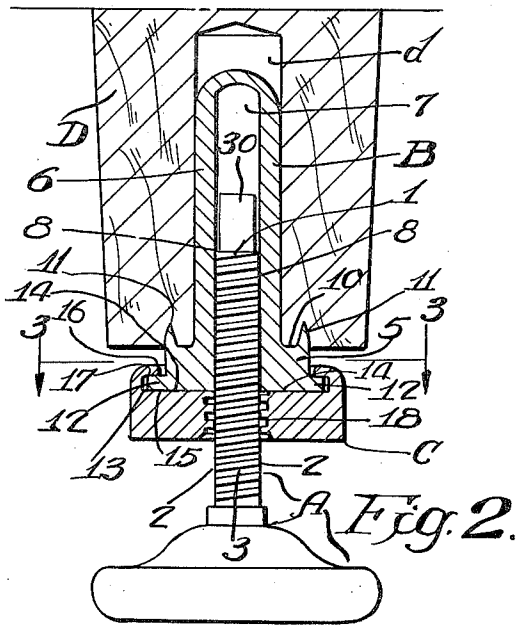


Fig. 2.

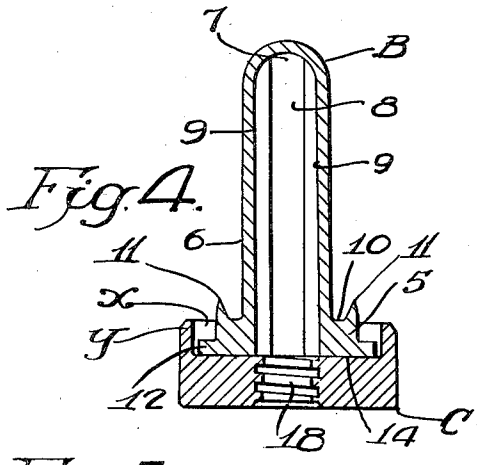


Fig. 4.

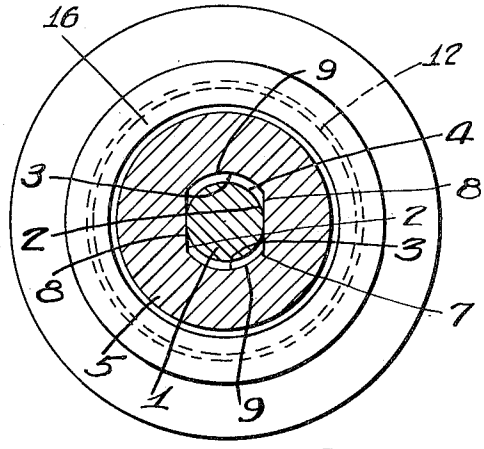
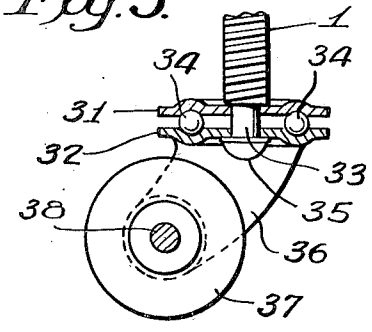


Fig. 3.

Fig. 5.



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UNITED STATES PATENT OFFICE

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CASTER STRUCTURE

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Application October 18, 1945, Serial No. 623,030

4 Claims. (Cl. 16—19)

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This invention relates to adjustable caster structures for articles of furniture and the like, for preventing rocking or distortion of such articles, or for correcting distortion thereof, as may arise from unevenness of the floor or other surface on which an article of said kind may be standing.

The adjustable caster structures or devices of the prior art, including those procurable on the open market, are normally of a complicated nature involving many parts, which increases the cost of manufacture, and consequently the cost to the ultimate consumer, materially.

The principal object of the present invention is to reduce the number of parts of an adjustable caster structure to a minimum, for example, three relatively movable members, and to construct these elements in a manner whereby they may be manufactured and assembled at a minimum of cost, whereby the devices may be sold to the ultimate consumer at a very low retail price.

In the accompanying drawings:

Fig. 1 illustrates the preferred form of the device of the present invention in side elevation, as installed in a table leg, etc. which latter is shown in vertical sectional elevation;

Fig. 2 is a vertical sectional elevation as taken on the line 2—2, Fig. 1;

Fig. 3 is a sectional plan view as taken on the line 3—3, Fig. 2;

Fig. 4 is a sectional elevation of two of the three relatively movable parts of which the device of the present invention is composed and as shown in Figs. 1 and 2, said two parts being illustrated as being in the course of assembling; and

Fig. 5 shows a wheel type caster which may be employed with the present invention.

In the preferred form of the invention as shown in Figs. 1 to 4 inclusive, two of the elements of the device of the present invention are preferably composed of die castings.

The device, as shown in Figs. 1 to 4 inclusive, is composed of a floor-engaging element such as a conventional caster wheel, or a ball or button type glide A, a ferrule or socket B, and a captive nut C.

The floor-engaging element A includes an externally threaded stem 1, with diametrically opposite side portions thereof flattened and disposed parallel to each other, as indicated at 2, 2; and with diametrically opposite side portions 3,3, lying intermediate and alternating with the flat faces 2, 2, being of a segmental or arcuate nature, with square or V-shaped threads formed therein, the root circle 4 of said threads being substantially tangent to the flat faces 2, 2 of said stem.

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The ferrule or socket B includes a circular disc-like head 5 and an axially extending elongated neck 6 integral with one end thereof, said neck being adapted to be inserted in a circular bore *d* formed in the lower end of a table or bed leg D etc.

The neck 6 is provided with an axial cavity 7 of the same cross section as the stem 1, with opposite parallel flat internal side faces 8, 8 adjacent and in snugly sliding contact with the flat side faces 2, 2 of the stem 1, and with intermediate arcuate internal side faces 9, 9 adjacent and in snugly sliding contact with the arcuate faces 3, 3 of the stem 1 which constitute the outer surface of the interrupted or mutilated screw threads formed on the stem 1.

The head disc 5 is provided on an upper annular surface 10 thereof, which surrounds the neck 6, with a plurality of circumferentially spaced, axially extending prongs 11, 11, which are adapted to be driven into or otherwise anchored in the lower end of the leg D to prevent rotation of the ferrule B within the leg cavity *d*, and to prevent accidential withdrawal of the neck 6 from said leg cavity.

The head disc 5 of the socket B is also provided with a circumferential annular or peripheral edge flange 12 which fits within an internal annular groove 13 formed in the captive nut C.

The under surface 14 of the head disc 5 is flat and smooth and is adapted to bear on a similar smooth flat bearing surface 15 formed in the captive nut C.

The captive nut C is held against axial movement in one direction relative to the ferrule B by contact of the annular surface 15 of the nut C with the bearing surface 14 of the ferrule B; and in the opposite direction by an annular inturned flange or lip 16 formed on the upper end of said nut and overlying the upper annular surface 17 of the circumferential flange 12 of the ferrule head 5.

The captive nut C is axially bored and internally threaded, as indicated at 18, for cooperation with the segmental thread portions 3, 3 on the stem 1; whereby, as the nut C is rotated clockwise or counter-clockwise, the stem 1 is moved axially to shorten or lengthen the leg D.

As previously noted, the nut C and ferrule B are preferably made of die castings with the annular lip or flange 16 of the nut C originally extending axially in open ended cylindrical form, as shown at *y* in Fig. 4, from one end of the threaded base portion of the nut, to form a cen-

tral concentric cavity x in said one end thereof.

The nut C and ferrule B are assembled, as clearly shown in Fig. 4, by inserting the circumferentially flanged head 5 of the ferrule in the cylindrical cavity x of the nut C, after which the axially extending flange y of the nut C is swaged radially inward over the top surface 17 of the annular peripheral flange 12 on the head disc 5, to form the inturned flange or lip 16 and thereby forming the annular groove 13 in the captive nut C by which the nut C is retained in rotatable but axially non-slidable rotation to the ferrule B.

The caster structure of my present invention is applied to an article of furniture or the like by first forming a hole, like the bore d aforesaid, therein to receive the neck 6 of the ferrule or socket B. The stem 1 of the floor-engaging element A is first removed from the captive nut C, and the neck of the ferrule is inserted in the said hole in the article to be supported until the ends of the prongs 11 engage the surface of the article surrounding said hole, whereupon a sharp blow directed against the exposed lower face of the nut C will cause the prongs 11 to become anchored in the article. The stem 1 of the floor-engaging element is then reentered into the captive nut C, until the cooperating threads thereof are engaged, whereupon, turning of the nut or hand wheel C will move the stem axially into the cavity 7 of the head 5 and neck 6, until the floor-engaging element A is in a desired initial position with respect to the article.

Normally it would be difficult to align the flat sides 2, 2 of the stem 1 with the flat sides 8, 8 of the head 5 at the lower end of the socket or ferrule B after the threads of the stem had caught with the threads in the nut C, and to assist in this operation, in the present instance, the free end of the stem 1 is reduced in diameter at least to the root diameter of the threads and is devoid of threads for a distance greater than the length of the threaded bore of the nut C, as illustrated at 30.

This plain end 30 functions as a lead in advance of the threaded section 3 of the stem 1 to pass uninterruptedly through the threaded bore of the nut C and to enter between the flat faces 8 supra, whereby a person assembling the floor-engaging element initially with the ferrule or socket B may feel his way in, it being understood that the plain end of the stem will enter the open end of the flat sided opening in the ferrule head 5 before the threads on the stem 1 engage with the threads in the bore of the nut C and thereby will guide the end of the stem into said opening, then by slight circular manipulation between the stem and the nut the flat sides of the stem can be readily aligned with the flat sides of the opening in the head 5, after which the stem may be readily moved in the ferrule by rotation of the nut C.

While the floor-engaging element A is shown as being of the flat button type of glide, it will be readily understood that this glide may be replaced on the end of the stem 1 by any conventional type of roller or wheel such for example as the ball-bearing type as shown diagrammatically in Fig. 5, wherein a pair of ball races 31 and 32 are mounted on a reduced lower end 33 of the stem 1 with a series of anti-friction balls 34 therebetween, and wherein this assemblage is held on the lower end of the stem by riveting the lower end of the stem over a washer thereon, as indicated at 35.

The lower race 32 carries a pair of spaced parallel arms 36 with a roller 37 rotatably mounted on an axle 38 supported at its opposite ends in the arms 36. Any other type or form of roller caster may be substituted for that shown in Fig. 5 to rotate about the lower end of the non-rotatable stem 1 without departing from the spirit of the present invention.

I claim:

1. A caster structure composed solely of a floor-engaging element including an externally threaded axial stem having at least one axial flat extending along the threaded portion thereof, a ferrule including an elongated neck having an axial bore adapted to receive said stem, at least one axial flat extending along said bore adapted to cooperate with the flat on the stem preventing relative rotation but permitting relative axial movement between the stem and ferrule, a disc-like head rigidly connected to one end of said neck, a captive nut adjacent and axially aligned with said head and having an internally threaded bore adapted to cooperate with the threads on said stem for effecting relative axial movement between said stem and said ferrule, and a peripheral flange on said head operating in a circumferential groove in said nut to allow relative rotation and to prevent relative axial movement between said nut and said ferrule.

2. A caster structure composed solely of a floor-engaging element including an externally threaded stem having a pair of opposite axial flats cut therein, said flats being tangent to the root diameter of the stem, a ferrule including an elongated neck having a bore adapted to receive said stem, a pair of opposite axial flats extending along said bore adapted to cooperate with the flats on the stem and preventing relative rotation but permitting relative axial movement between the stem and ferrule, a captive nut rotatably mounted on one end of said ferrule and provided with a central internally threaded bore for cooperation with the threads on said stem for effecting said relative axial movement between said floor-engaging element and said ferrule, a disc-like head forming part of said ferrule and rigidly connected to one end of said neck, and a series of circumferentially spaced prongs surrounding and spaced radially from the axis of said neck and extending in a direction parallel to said axis for securing said ferrule against rotation relative to an article of furniture and the like to which said caster structure is applied.

3. A caster structure composed solely of a floor engaging element including an externally threaded axial stem having at least one axial flat extending along the threaded portion thereof, a ferrule including an elongated neck having an axial bore adapted to receive said stem, at least one axial flat extending along said bore adapted to cooperate with the flat on the stem preventing relative rotation by permitting relative axial movement between the stem and ferrule, and a captive nut rotatably mounted on one end of said ferrule and provided with a central internally threaded bore for cooperation with the threads on said stem for effecting said relative axial movement between said floor-engaging element and said ferrule.

4. A caster structure composed solely of a floor-engaging element including an externally threaded stem having a pair of opposite axial flats cut therein, said flats being tangent to the root diameter of the stem, a ferrule including an elongated neck having a bore adapted to receive said stem, a pair of opposite axial flats extend-

ing along said bore adapted to cooperate with the flats on the stem and preventing relative rotation but permitting relative axial movement between the stem and ferrule, and a captive nut rotatably mounted on one end of said ferrule and provided with a central internally threaded bore for cooperation with the threads on said stem for effecting said relative axial movement between said floor-engaging element and said ferrule.

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Certificate of Correction

Patent No. 2,499,277 February 28, 1950

CHARLES R. NALLE

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 3, line 12, for the word "rotation" read *relation*; column 4, line 61, for "by permitting" read *but permitting*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of May, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.