

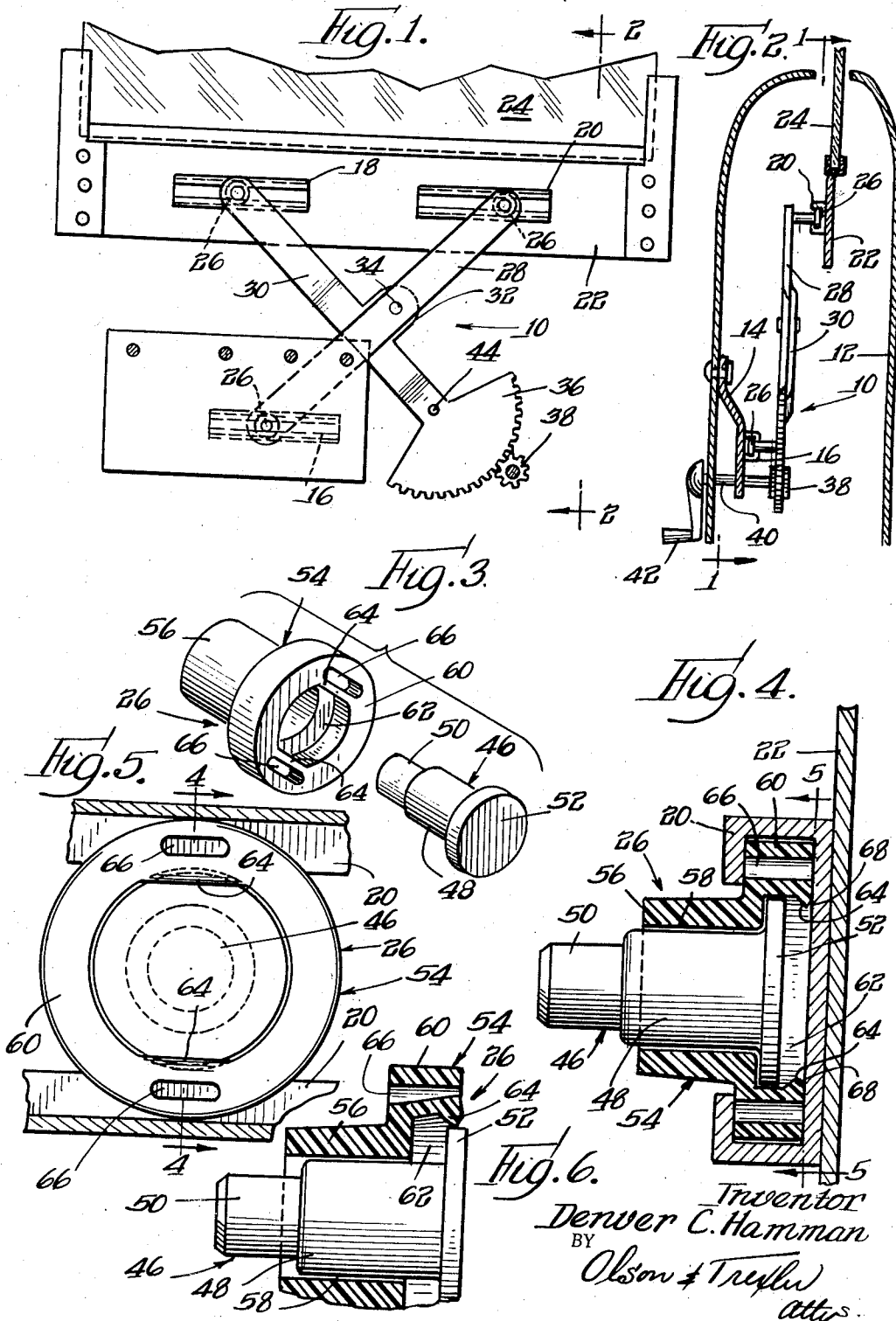
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ROLLER ASSEMBLY

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ROLLER ASSEMBLY

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This invention is concerned generally with an assembly of a plastic and a metal part, and more particularly with a roller assembly.

It is common practice to mount rollers of one sort or another on metal studs for use in the window lift system of an automobile, for example. The use of metal rollers is not entirely desirable in such systems, since a certain amount of looseness or play in the parts usually develops after a time, and rattling is apt to result. In accordance with this invention, a plastic, preferably nylon, roller is utilized for this purpose in connection with a steel stud. Furthermore, the plastic roller does not present the lubrication problems that a metal roller does.

Accordingly, it is an object of this invention to provide a plastic roller rotatably and permanently associated with a metal stud.

More particularly, it is an object of this invention to provide a roller assembly wherein a plastic roller is substantially permanently assembled with a metal stud by a simple axial telescoping movement.

More particularly, it is an object of this invention to provide an assembly wherein a plastic sleeve or roller is substantially permanently rotatably secured on a stud by means of resilient structure on said sleeve or roller snapping over a head on said stud.

Other and further objects and advantages of the present invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

Fig. 1 is a somewhat schematic side view showing the window lift mechanism of an automobile or the like incorporating a roller assembly in accordance with the principles of this invention, such view being taken substantially along the line 1—1 in Fig. 2;

Fig. 2 is a cross-sectional view taken along the line 2—2 in Fig. 1;

Fig. 3 is an exploded perspective view of the roller assembly;

Fig. 4 is a cross-sectional view through the roller assembly as installed, as taken substantially along the line 4—4 in Fig. 5;

Fig. 5 is a fragmentary sectional view of the installed roller assembly, as taken along the line 5—5 in Fig. 4; and

Fig. 6 is a longitudinal sectional view of the roller assembly showing the manner in which the parts resiliently snap together.

Referring now in greater particularity to the drawings, there will be seen a window lift mechanism designated generally by the numeral 10. This mechanism is mounted within the body or door 12 of an automobile, and includes a plate 14 having a horizontal channel 16 mounted thereon. Similar horizontal channels 18 and 20 are mounted on a number 22 fixed along the bottom edge of the window 24. Roller assemblies 26 are received in all of the channels 16, 18 and 20, and a straight strap or lever 28 extends between the roller assemblies asso-

ciated with the channels 16 and 20, the roller assemblies being mounted on this strap or lever. A transversely disposed strap or lever 30 mounts the roller 26 associated with the channel 18, and is provided with an ear or lug 32 which is pivotally connected at 34 to the strap or lever 28. The strap 30 is formed at its lower end with a gear segment 36, and a pinion 38 meshes therewith. The pinion is fixed on a rotatable shaft 40 having the usual window crank 42 fixed on the opposite end thereof.

Window lift mechanisms of the type just described are well known in the art, as is the operation thereof. Turning of the crank 42 causes the pinion 38 to rotate the segment 36 and the strap 30 about a fixed pivot 44. The roller 26 associated with the channel 18 forces this channel up or down, as the case may be, and simultaneously moves one direction or the other in the channel. Simultaneously, the strap or lever 28 is moved up or down. The channel 16 forms a horizontally fixed reaction base, and the lever 28 pivots about the pivot 34 as the roller 26 moves in the channel 16, the roller 26 at the opposite end thereof acting in the channel 20 to raise or lower the channel 20 simultaneously with the channel 18. Accordingly, the window is raised or lowered.

The precise structure of the roller assembly as disclosed herein is seen in connection with Figs. 3—6. The assembly 26, which is identical in each instance, includes a metal stud 46. The stud includes an intermediate bearing portion 48 of intermediate diameter, and a reduced diameter shank 50 is provided which is adapted to be inserted in an aperture in a cooperating work part, such as one of the straps or levers 28 or 30. The shank 50 may form a press fit with its associated part, or the end thereof may be peened over to secure it in place, or any other known or suitable means may be used for this purpose. The stud 46 is completed by a flat head 52 at the end opposite the shank. The head, like the remainder of the stud, is circular. The head is of relatively limited axial extent.

The roller assembly 26 also includes a roller 54. The roller 54 includes a boss or shank 56 having an axial bore 58 rotatably receiving the body 48 of the stud. The roller further includes an annular rim 60 having a countersunk recess 62 therein adapted to receive the head 52 of the stud. The diameter of the rim recess 62 is such as rotatably to receive the head 52, and generally is great enough to allow axial movement of the roller relative to the stud. However, the rim is provided with a pair of internal chordal projections 64. It will be understood that two projections are chosen by way of illustration, but that the number could vary. Preferably, such projections are symmetrically disposed about the rim. Chordal slots 66 are provided adjacent the projections 64. These slots conveniently extend completely through the rim 60, are parallel to the projections 64, and are arcuately substantially coterminous therewith, although preferably slightly shorter in arcuate extent.

The slots 66 impart a certain degree of elasticity or flexibility to the projections 64 and the adjacent portions of the rim 60. Accordingly, when it is desired to associate a roller with a stud, the stud is pushed axially through the roller, as in Fig. 6. The projections 64 and adjacent portions of the rim deflect and stretch outwardly, principally by virtue of the slots 66, and also by virtue of the inherent resiliency of the plastic, preferably nylon, of which the roller is made. Accordingly, the head 52 cams past the projections 64, the projections preferably being provided with bevelled outer edges or surfaces as at 68 to facilitate such camming action. The roller then is substantially permanently, but rotatably, associated with the stud. It will be observed that the roller could be removed by a reverse process, should the roller become

damaged, or should it be necessary to dissociate the parts for any other reason.

It will now be apparent that there has been disclosed an improved roller assembly of extreme simplicity to fabricate and assemble, one which is quiet in operation, and one which requires no lubrication or other maintenance during its service life. The specific example of the invention as herein shown and described will be understood as being for purposes of illustration only. Various changes in structure will no doubt occur to those skilled in the art, and are to be understood as forming a part of this invention insofar as they fall within the spirit and scope of the appended claims.

What is claimed is:

1. An assembly comprising a stud having a head thereon, and a roller of resilient material, said roller having a recess rotatably receiving said head with said stud projecting axially therefrom in one direction, said recess opening outwardly of said roller axially in the opposite direction and having an opening diameter at least as great as the diameter of said stud head, said roller having means projecting into said recess and inhibiting withdrawal of said stud, said roller having opening means therein adjacent said projecting means projecting uniformly through the adjacent part of the roller in an axial direction and imparting enhanced deformability to said roller in the vicinity of said projecting means, whereby to facilitate snapping of said head past said projecting means into said recess.

2. An assembly as set forth in claim 1 wherein the projecting means comprises a plurality of chordal projections.

3. An assembly as set forth in claim 2 wherein the projections are bevelled on their outer surfaces to facilitate entry of said head into said recess.

4. An assembly comprising a stud having a cylindrical body and a head projecting radially therefrom, and a roller of resilient material, said roller comprising a rim portion and a boss projecting axially therefrom, said roller having an axial bore therethrough rotatably received on said stud body and further having an enlarged counterbore receiving said head and opening oppositely of said boss, said recess opening outwardly of said roller axially in the direction opposite said boss and having an opening diameter at least as great as the diameter of said stud head, said roller having means projecting into said recess and inhibiting withdrawal of said stud, said roller having opening means therein adjacent said projecting means and imparting enhanced deformability to said roller in the vicinity of said projecting means, whereby to facilitate snapping of said head past said projecting means into said recess.

5. An assembly as set forth in claim 4 wherein the opening means comprises a plurality of elongated slots, said slots being elongated generally circumferentially of said roller and spaced radially outwardly of said projecting means.

6. An assembly as set forth in claim 5 wherein the projecting means comprises a plurality of chordal projections, the projections and slots being equal in number, and said slots being straight whereby to provide resilient sections of material of uniform size.

7. An assembly as set forth in claim 6 wherein the slots extend axially through said roller, opening axially thereof in both directions.

8. An assembly comprising a stud having a metal body, a metal head of larger diameter integral therewith, and a shank integral with said body and extending axially therefrom on the end opposite said head, and a roller of plastic material having a rim and having an axially projecting boss, said roller having a bore extending axially therethrough and rotatably receiving the body of said stud, said roller having an enlarged counterbore therein receiving said head and opening outwardly of said roller axially in the opposite direction from said boss and having an opening diameter at least as great as the diameter of said stud head, said roller having chordal means projecting into said recess substantially at the opening thereof and inhibiting withdrawal of said stud, said roller having opening means therein adjacent said projecting means and imparting enhanced deformability to said roller in the vicinity of said chordal projecting means, whereby to facilitate snapping of said head past said projecting means into said recess.

9. An assembly as set forth in claim 8 wherein the chordal projecting means comprises a plurality of chordal projections equally arcuately spaced about the opening of said recess, and wherein the opening means comprises a plurality of slots equal in number to said chordal projections and substantially aligned radially therewith, said slots being elongated generally circumferentially of said roller, being substantially coterminous with said chordal projections, and extending axially completely through the rim of said roller.

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