DOOR HANDLE ASSEMBLY

1. Field of the Invention

The present invention relates to a door handle assembly, and more particularly to a door handle assembly that is designed to prevent fatigue in a torsion spring mounted inside the door handle assembly.

2. Description of Related Art

Door handles are very common articles that people use to open or close a door, and there are currently various kinds of the door handles available in the market. With reference to Fig. 8, a kind of conventional door handle assembly is shown and has a lever (70) having a cylinder (72) integrally extending from an end of the lever (70). A rose (80) firmly engaged to a door (not shown) is mounted at the end of the lever (70) and around the cylinder (72). A torsion spring (90) is disposed around the cylinder (72) and adjacent to the rose (80). A rotary member (92) is mounted around and coupled to the cylinder (72) in a position adjacent to the torsion spring (90) such that the torsion spring (90) is sandwiched between the rotary member (92) and the rose (80). A C-clip (76) is retained around the cylinder (72) and abutted to an outer side of the rotary member (92) so as to secure the rotary member (92), the torsion spring (90) and the rose (80) on the cylinder (72). Two abutting pieces (82) are formed on the rose (80) and respectively located at opposite sides of the cylinder (72). A driving piece (922) is integrally formed with the rotary member (92) and extending toward the rose (80). The torsion spring (90) has two feet (902) extending therefrom, and respectively abutted to one of the abutting pieces (82) and the driving piece (922).

When a user turns the lever (70) to open the door, the rotary member (92) rotates and the foot (902) abutted to the driving piece (922) of the rotary member (92) is pushed and moves with the driving piece (922). Due to that the rose (80) is immovably mounted on

the door, the other foot (902) abutted to the abutting piece (82) is stationary. The torsion spring (90) having one foot (902) moved and the other foot (902) secured is stretched and provides a resilience. Therefore, after the user releases the lever (70), the resilience urges the lever (70) to return to its original position.

It is noted that the torsion spring (90) will experience fatigue after a long-term use and gradually deforms from the original configuration shown in Fig. 9 to the deformed configuration shown in Fig. 10. Finally, the torsion spring (90) no longer can provide enough resilience required to return the lever (70) after each turning. At this point, the torsion spring (90) needs to be replaced and, therefore, the durability of the entire door handle assembly is defective.

To overcome the shortcomings, the present invention tends to provide an improved door handle assembly to mitigate or obviate the aforementioned problems.

The primary objective of the present invention is to provide a door handle assembly that is designed to prevent a torsion spring of the door handle assembly from fatigue after a long-term use in order to improve the durability of the door handle assembly.

Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

In accordance with an aspect of the invention, there is provided a door handle assembly comprising: a lever (10) having a cylinder (12) integrally formed therewith; a rose (20) mounted around the cylinder (12) and adapted to be securely mounted to a door, the rose (20) having at least one abutting piece (26) formed thereon; a torsion spring (30) mounted around the cylinder (12) and adjacent to the rose (20), wherein the torsion spring (30) has two feet (32) and one of the feet (32) abuts the at least one abutting piece (26) of the rose (20); and a rotary member (40) mounted around and coupled to the cylinder (12), the rotary member (40) having multiple inner pieces (406) extending out to abut an inner side of the torsion spring (30) and multiple outer pieces (408) extending out to abut an outer side of the torsion spring (30) so that deformation of the torsion spring (30) is restricted between the inner pieces (406) and the outer pieces (408).

In the drawings:

Fig. 1 is an exploded, perspective view of a door handle assembly in accordance with the present invention;

Fig. 2 is a perspective view of the door handle assembly;

Fig. 3 is a plane view of the door handle assembly before being turned;

Fig. 4 is a plane view of the door handle assembly after being turned;

Fig. 5 is a cross-sectional view of a torsion spring before disposed into the door handle assembly;

Fig. 6 is a cross-sectional view of the door handle assembly taken along line 6-6 in Fig. 3, wherein a torsion spring is at an original state;

Fig. 7 is a cross-sectional view of the door handle assembly taken along line 7-7 in Fig. 4, wherein the torsion spring is at a stretched state;

Fig. 8 is a perspective view of a conventional door handle assembly;

Fig. 9 is a cross-sectional view showing a torsion spring of the conventional door handle assembly before becoming fatigued; and

Fig. 10 is a cross-sectional view showing the torsion spring after becoming fatigued.

With reference to Figs. 1 and 2, the door handle assembly in accordance with the present invention includes a lever (10), a rose (20), a torsion spring (30), a rotary member (40) and a C-clip (50).

The lever (10) has an end integrally formed with a cylinder (12). A ring (13) is mounted around the cylinder (12) and adjacent to the end of the lever (10). A spindle (14) is securely connected with and extending from the cylinder (12). Two cutouts (122) are

defined in the cylinder (12) and located at opposite sides of the spindle (14). An annular groove (124) is defined in and around the cylinder (12).

The rose (20) has a through hole (22) centrally defined in the rose (20). The cylinder (12) extends through the through hole (22) so as to mount the rose (20) around the cylinder (12) and next to the ring (13). Two through bores (24) are defined in the rose (22) and respectively located at opposite sides with respect to the through hole (22). Two abutting pieces (26) are formed on the rose (22) and each located close to one of the through bores (24).

The torsion spring (30) is mounted around the cylinder (12) and next to the rose (20). Two feet (32) extends from the torsion spring (30), wherein one of the feet (32) abuts to one of the abutting piece (26).

The rotary member (40) is mounted around the cylinder (12) and has a ring-shaped body (402). Two securing pieces (404) integrally extend from an inner rim of the body (402) and are respectively received in the cutouts (122) defined in the cylinder (12) so as to couple the rotary member (40) with the cylinder (12). Two inner pieces (406) are integrally extending from the inner rim of the body (402) towards the rose (20). Four outer pieces (408) are integrally extending from an outer rim of the body (402) towards the rose (20). Furthermore, tips of the outer pieces (408) engage with the rose (20) so that the rotary member (40) stably attaches to the rose (20). The rotary member (40) is arranged such that the torsion spring (30) is located between the inner pieces (406) and the outer pieces (408). The other foot (32) of the torsion spring (30) not abutted to the abutting piece (26) engages with the one of the outer pieces (408). The C-clip (50) is securely received in the annular groove (124) defined in the cylinder (12) to secure the rose (20), the torsion spring (30) and the rotary member (40) on the cylinder (12).

The door handle assembly is securely mounted onto a door (not shown) by means

of threadingly extending screws (not shown) through the through bores (24) and into the door. With reference to Figs. 3 and 4, when a user turns the lever (10) to open the door, the cylinder (12) and the rotary member (40) which are coupled to the cylinder (12) rotate simultaneously. Due to that the torsion spring (30) has one foot (32) restricted by the immovable abutting piece (26) of the rose (20) and the other foot (32) being moved by the outer piece (408) of the rotary member (40), the torsion spring (30) is stretched and provides a resilience. Therefore, after the user releases the lever (10), the resilience urges the lever (10) to return to its original position.

With reference to Fig. 5, before being disposed onto the door handle assembly, the torsion spring (30) has a constant radius through out every coil of the torsion spring (30). With reference to Fig. 6, after being disposed onto the door handle assembly, the torsion spring (30) deforms slightly due to pre-stressing. At this time, the coil of the torsion spring (30) close to the body (402) of the rotary member (40) is larger than the coil close to the rose (20). With reference to Fig. 7, after a long-term use of the door handle assembly, the deformation gradually increases. However, due to the torsion spring (30) is disposed between the inner pieces (406) and the outer pieces (408), the deformation is restricted and enables the stress to be uniformly distributed throughout the entire torsion spring (30). Hence, the torsion spring (30) is prevented from easily becoming fatigued, and the durability of the door handle assembly is improved if compared with conventional devices of the like.

While this invention has been particularly shown and described with references to the preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

Claims

1. A door handle assembly comprising:

a lever (10) having a cylinder (12) integrally formed therewith;

a rose (20) mounted around the cylinder (12) and adapted to be securely mounted to a door, the rose (20) having at least one abutting piece (26) formed thereon;

a torsion spring (30) mounted around the cylinder (12) and adjacent to the rose (20), wherein the torsion spring (30) has two feet (32) and one of the feet (32) abuts the at least one abutting piece (26) of the rose (20); and

a rotary member (40) mounted around and coupled to the cylinder (12), the rotary member (40) having multiple inner pieces (406) extending out to abut an inner side of the torsion spring (30) and multiple outer pieces (408) extending out to abut an outer side of the torsion spring (30) so that deformation of the torsion spring (30) is restricted between the inner pieces (406) and the outer pieces (408).

2. The door handle assembly as claimed in claim 1, wherein the rotary member (40) has a ring-shaped body (402), and the inner pieces (406) extend from an inner rim of the ring-shaped body (402) and the outer pieces (408) extend from an outer rim of the ring-shaped body (402).

3. The door handle assembly as claimed in claim 2, wherein the cylinder (12) has multiple cutouts (122) defined therein, and the rotary member (40) has multiple securing pieces (404) extending therefrom and respectively received in the cutouts (122) to couple the rotary member (40) with the cylinder (12).

4. The door handle assembly as claimed in claim 3, wherein an annular groove (124) is defined in the cylinder (12) and a C-clip (50) is securely received in the annular groove (124) to secure the rose (20), the torsion spring (30) and the rotary member (40) on the cylinder (12).

5. The door handle assembly as claimed in claim 4, wherein multiple through bores (24) are defined in the rose (20) so that the rose (20) is able to be securely mounted onto the door by means of threadingly extending multiple screws through the multiple through bores (24) and into the door.