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(54) **Door handle return spring arrangement**

(57) The arrangement according to the invention comprises a sheet (2) of elastic material that has a hole. There is a circular collar part (4) as an extension to the hole, located crosswise in relation to the surface of the sheet. The outer circumference of the collar in relation to the plane of the sheet (2) comprises a widening section (6). The arrangement also comprises a bushing (7) with a hole for the spindle. The bushing (7) is fixed to the widening section of the collar so that the sheet (2) and the bushing (7) constitute an integral piece. The sheet (2) also has mounting holes (3) for fasteners.

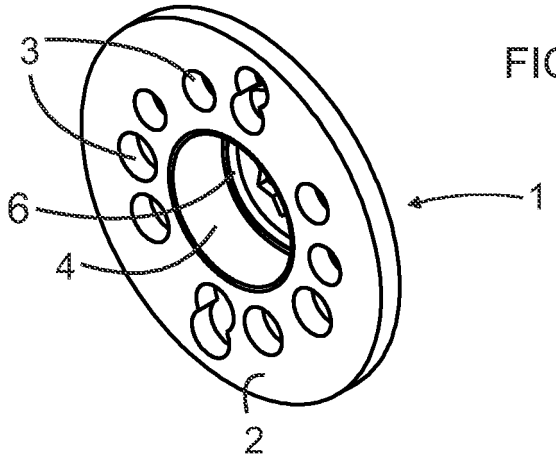

FIG. 1

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Description

Field of technology

[0001] The present invention relates to door handle return spring arrangements that return the door handle to the normal position after it has been turned. The invention particularly relates to return spring arrangements external to the lock body.

Prior art

[0002] It is well known that return spring arrangements are used in connection with door handles for the purpose of returning the door handle to its normal position after the door handle has been turned. The normal position is the position of the handle at rest - that is, when the handle is not turned. The normal position of the handle is usually the horizontal position of its grip part. After the handle has been turned to open or close the door, the return spring system returns the handle to the normal position. The return spring arrangement is typically inside the lock body.

[0003] A potential implementation is a return spring arrangement located outside the lock body. In this case, the return spring arrangement is placed in connection with the spindle of the handle outside the lock body. There are also return spring arrangements external to the lock body that are installed immediately beneath the spindle cover plate so that there is contact between the spring arrangement and the cover plate. A return spring arrangement external to the lock body is typically an optional accessory ensuring that the handle returns to the horizontal position. The most common return spring arrangement solution is to use a metal spring.

[0004] Patent publication GB 962771 presents a known return spring arrangement that comprises a rubber sheet. The rubber sheet is fitted beneath the cover plate, and there is an oval hole in the middle of the sheet in which a correspondingly shaped bushing is fitted. The bushing has a hole for the spindle of the handle. When the handle is turned, the bushing transmits the turning force to the rubber sheet. The rubber sheet is subject to compression, elongation, as well as torsion in the planar direction of the sheet. When the handle is released, the compressed rubber sheet returns the handle to the normal position. Thus the return force comes from the compressed rubber sheet. The rubber sheet is rectangular and engages the inner surface of the cover plate. Thus the return spring arrangement presented in the publication is not suitable for use with round cover plates or other cover plates that cannot provide support for the rubber plate.

Short description of invention

[0005] The objective of the invention is to provide a return spring arrangement external to the lock body that is to be fitted in connection with the spindle, contains rubber or similar elastic material and is suitable for use in connection with round cover plates, with the rubber material operating as a return spring. The objective will be achieved as described in the independent claim. The dependent claims describe various embodiments of the invention.

[0006] The arrangement according to the invention comprises a sheet 2 of elastic material that has a hole. There is a circular collar part 4 as an extension to the hole, located crosswise in relation to the surface of the sheet. The outer circumference of the collar in relation to the plane of the sheet 2 comprises a widening section 6. The arrangement also comprises a bushing 7 with a hole for the spindle. The bushing 7 is fixed to the widening section of the collar so that the sheet 2 and the bushing 7 constitute an integral piece. The sheet 2 also has mounting holes 3 for fasteners. The elastic material of the sheet is arranged to be rotationally flexible mainly at the collar part and at the necks of material between the holes in the sheet when the return spring arrangement is installed and the handle is turned.

List of figures

[0007] In the following, the invention is described in more detail by reference to the enclosed drawings, where

- Figure 1 illustrates an example of a return spring arrangement according to the invention,
- Figure 2 illustrates the example of Figure 1 from another angle, and
- Figure 3 illustrates a cross-section of the example of Figure 1 and a handle.

Description of the invention

[0008] Figures 1 and 2 illustrate an embodiment 1 of the invention viewed from different angles. Figure 3 illustrates a cross-section of the embodiment 1 and a handle. The return spring arrangement 1 according to the invention comprises a sheet 2 of elastic material that has a hole. The sheet has a circular collar part 4 as an extension to the hole, located crosswise in relation to the surface of the sheet. The outer circumference of the collar in relation to the plane of the sheet 2 comprises a widening section 6. The embodiment 1 also comprises a bushing 7 with a hole 8 for the spindle. The bushing 7 is fixed to the widening section of the collar so that the sheet 2 and the bushing 7 constitute an integral piece. The sheet 2 has mounting holes 3 for fasteners.

[0009] Figure 3 illustrates the fitting of the handle spring arrangement 1 and the handle 9 in relation to each other. The spindle 10 of the handle can be fitted through the hole in the bushing. The collar 4 and the bushing 7 form a recess 5 in which the neck 11 of the handle can be fitted. Figure 3 does not illustrate the cover plate but it is fitted between the handle and the return spring ar-

rangement.

[0010] The elastic material of the sheet is arranged to be rotationally flexible mainly at the collar part and at the necks of material between the holes in the sheet when the return spring arrangement is installed and the handle is turned. Thus the force that returns the handle to the normal position is energy stored in the twisting of elastic material that will be released when the handle is released after being turned. The installed return spring arrangement is supported by fasteners fitted through the mounting holes. The fasteners are usually screws. Thus the sheet 2 is not supported by the cover plate for returning the handle to the normal position. Therefore the cover plate can be of any shape, for example round. The sheet 2 can also be round. The hole and collar in the sheet can be located in the middle of the sheet or in another position depending on the embodiment.

[0011] Rotation of the collar part 4 reduces stress on the necks between the holes, which makes the sheet more durable in use. Furthermore, the desired flexibility characteristic is achieved with better accuracy. Because the collar part 4 is dimensioned to rotate, its wall thickness is not necessarily sufficient for reliably fastening the bushing on the collar part. Therefore it is more secure and most preferred that there is a widening section 6 at the end of the collar part. It is better to direct the widening section inwards, towards the central axis of the collar, because this provides more space for the mounting holes and the fasteners. It is preferable to fasten the bushing 7 on the widening section of the collar as illustrated in Figure 3. Another fastening method is to fasten the bushing at the inner edge of the widening section inside the collar.

[0012] It is also recommended that the sheet 2 is arranged for installation beneath the cover plate so that the sheet is tight between the cover plate and the mounting base (such as the door surface) and retains its tightness in spite of deformations in the mounting base. When the sheet is tight between the cover plate and the mounting base, it is slightly compressed. This way, tightness is retained - that is, the sheet retains surface contact with both the cover plate and the mounting base - even in case of slight deformations in the mounting base due to variations in humidity and temperature. Tightness prevents slight movements of the cover plate due to deformations in the mounting base, as well as scratching of the surface of the mounting base due to such movement. In practice, tightness is achieved when the sheet is slightly thicker than the depth of the inside of the edge of the cover plate.

[0013] It is preferred to manufacture the sheet 2 of rubber and the bushing 7 of metal. The joint between the rubber sheet and the metal bushing is accomplished by putting the bushing in place in molten rubber material. This way the rubber will make a tight joint with the metal when hardened. Other attachment methods, such as strong adhesive, can also be used. Instead of rubber, some other elastic material suitable for the purpose can be used. Some other sufficiently rigid material can also be used in place of metal.

[0014] It is evident from the description and examples presented above that an embodiment of the invention can be created using a variety of different solutions. It is evident that the invention is not limited to the examples mentioned in this text but can be implemented in many other different embodiments.

[0015] Therefore any inventive embodiment can be implemented within the scope of the inventive idea.

Claims

1. A door handle return spring arrangement external to a lock body for installation on a spindle of the door handle, said arrangement comprising a sheet (2) of elastic material having a hole, and a bushing (7) having a hole for the spindle, **characterised in that** the sheet (2) has mounting holes (3) for fasteners, and the sheet has a circular collar part (4) located crosswise in relation to the surface of the sheet that constitutes an extension to the hole in the sheet, the outer circumference of said collar in relation to the plane of the sheet (2) comprising a widening section (6), the bushing (7) being fixed to the widening section so that the sheet (2) and the bushing (7) constitute an integral piece,
the elastic material of said sheet being arranged to be rotationally flexible mainly at the collar part and at the necks of material between the holes in the sheet (2) when the return spring arrangement is installed and the handle is turned.

2. An arrangement according to Claim 1, **characterised in that** the sheet (2) is round.

3. An arrangement according to Claim 1 or 2, **characterised in that** the hole and collar of the sheet are in the middle of the sheet.

4. An arrangement according to Claim 1, 2 or 3, **characterised in that** the widening section (6) of the collar faces inwards towards the central axis of the collar.

5. An arrangement according to any of the Claims 1 to 4, **characterised in that** the sheet (2) is arranged for installation beneath a cover plate so that the sheet is tight between the cover plate and the mounting base, retaining its tightness in spite of deformations in the mounting base.

6. An arrangement according to any of the Claims 1 to 5, **characterised in that** the sheet is rubber.

7. An arrangement according to any of the Claims 1 to 6, **characterised in that** the bushing is metal.

FIG. 1

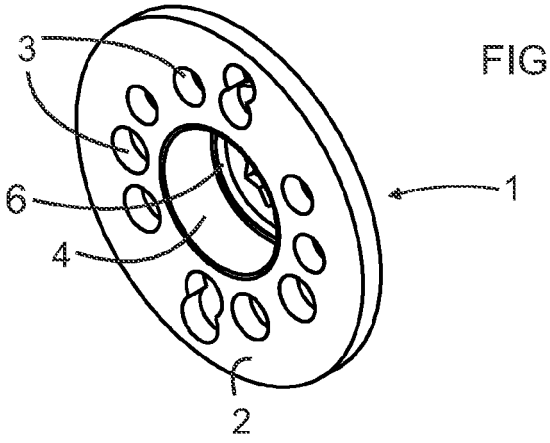


FIG. 2

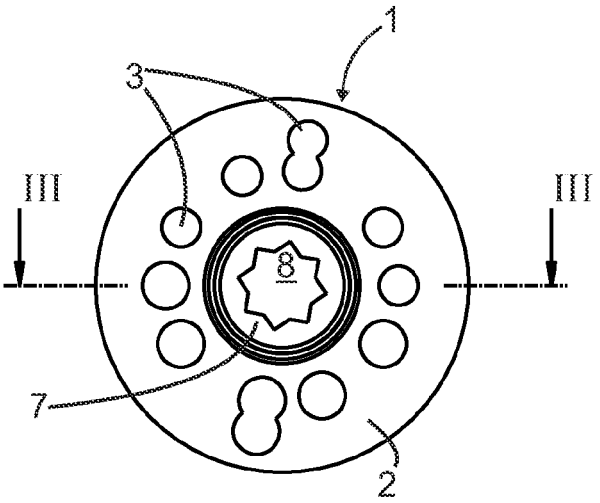
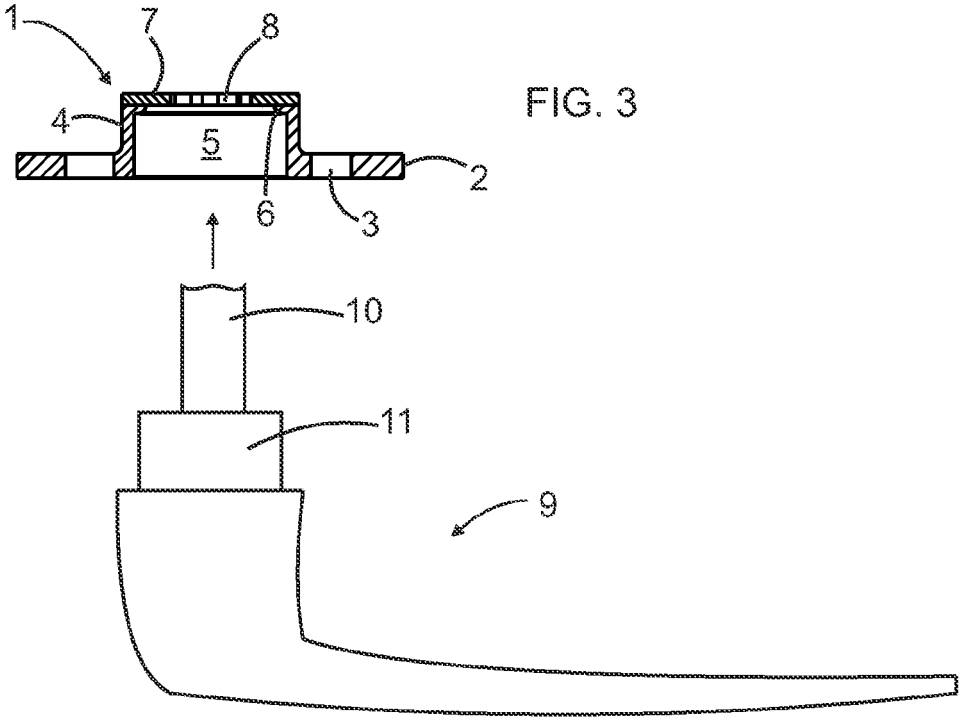


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 962771 A **[0004]**