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(54) **Adjustable stop.**

(57) A plastic, three-part adjustable stop comprising a carrier member (11) that can be mounted, for example, on a door frame, an axially adjustable stop member (16) carried in a bore (12) provided in the carrier member and a rotatable locking member (20) operable to lock the stop member (16) in a preferred position in the carrier member (11). To install the stop, the assembly is mounted in the door frame, the door is closed so that the stop member (16) is pushed into the carrier member (11) whereupon the stop member (16) is locked in the position by rotation of the locking member (20). The stop subsequently ensures that the door always closes to the same position.

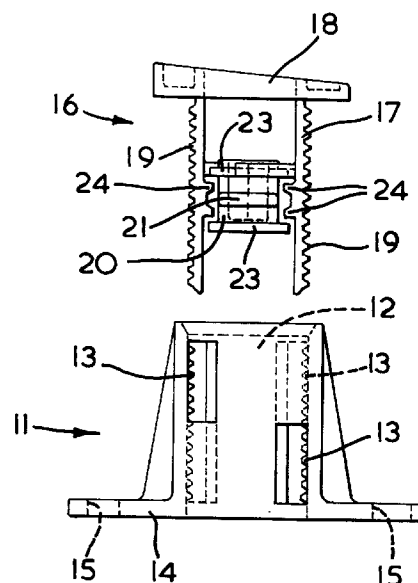


FIG. 1

The present invention relates to a bump stop used to cushion the impact of a moving element such as a door. Such stops may be found, for example, in motor vehicles, fastened to a car body to accommodate a limit of movement of a car door. It is desirable to fit such a stop to the car body and then to adjust it to fit the desired position of the car door.

It is an object of the present invention to provide an adjustable stop that can easily be adjusted and then secured in its correct position.

According to the present invention we provide a three-part adjustable stop assembly made of plastics material comprising a carrier member adapted to be fastened to a substrate and provided with a bore normal to the substrate, the inner surface of the bore having a series of closely-spaced peripheral ridges, a stop member having a resilient hollow stem having the same section and being adapted and arranged to fit within the bore of the carrier member and having an external surface formed with a series of closely-spaced peripheral ridges corresponding to the series of peripheral ridges in said bore and a rotatable locking member located in axial alignment within said hollow stem, said locking member having at least two cam flanges which, when the locking member is rotated through, say 90°, bind against the inner wall of the hollow stem so that the stem is expanded and locks together the series of peripheral ridges on the inner surface of the bore and the series of peripheral ridges on the external surface of the hollow stem.

The carrier member may have a base flange by which it can be screwed or, bolted to the substrate or secured by adhesive or it may be adapted to engage a fastener such as a weld stud fixed to the substrate.

The bore and hollow stem may be of round or rectangular section but are preferably of square section.

The series of peripheral ridges formed in the inner surface of the bore and the external surface of the hollow stem may be a series of annular ridges or, if the stem and bore are of round section may take the form of a tight helical thread.

A pair of cam flanges may be provided on diametrically opposite sides of the locking member or three or four cam flanges may be disposed, preferably symmetrically, round the locking member. The locking member is provided with turning means such as a hexagonal cavity or a slot whereby it can be turned using a tool such as an Allen key or a screwdriver.

The axes of the locking member, of the hollow stem and of the bore in the carrier member lie on a single line.

The stop member may comprise a profiled head carried on the hollow stem, the profiled head cooperating with the element (e.g. a car door) which the stop is intended to engage.

In order that the invention may be better understood, a preferred embodiment will now be described in greater detail by way of example with reference to

the accompanying drawings in which:-

Figure 1 is an exploded view showing in section the three parts of a bump stop for a car door;

Figure 2 shows the assembly of Figure 1;

Figure 3 shows a plan view of Figure 2;

Figure 4 shows the assembly of Figure 2 when the assembly is locked, and

Figure 5 is a plan/section view of the locked assembly on line V-V of Figure 4. (Head of stop not shown for clarity).

Referring to the drawings, carrier member (11) is formed with a square-section bore (12) which is provided with a series of annular ridges (13) around the inner wall of bore (12). Carrier member (11) has a mounting flange (14) provided with two holes (15) by means of which it can be mounted with screws or bolts to a substrate such as a car body (not shown), for example within a door frame.

Stop member (16) comprises a hollow stem (17) and a profiled head (18). The external surface of hollow stem (17) is provided with a series of annular ridges (19) which correspond to the annular ridges (13) in the bore (12) of the carrier member (11). In section, ridges (13) and ridges (19) exhibit a toothed appearance and when stem (17) is inserted in bore (12), ridges (13,19) cooperate to locate the position of stem (17) in bore (12). Because of the resilience of the plastics material, the stem (17) can be moved in bore (12) in both axial directions, only moderate pressure being necessary to displace ridges (13) and ridges (19) from this co-relationship.

Locking member (20) is located within hollow stem (17) by means of end projections (23) which are loosely restrained by a pair of spaced location flanges (24) projecting inwardly within stem (17). Locking member (20) has a pair of cam flanges (21) which project from opposite sides of stem (17) respectively. When in the first assembly position (Figure 2), cam flanges (21) are located within walls of the hollow stem (17). When locking member is rotated through 90° (Figures 4 and 5) by means of an Allen key engaging hexagonal cavity (22), the cam flanges (21) deflect the walls of the hollow stem so that the stem bulges outwards, thereby urging ridges (13) and ridges (19) into firm contact so that axial movement of stem (17) in bore (12) is no longer possible and stop member (16) is firmly locked in position in carrier member (11).

It is a feature of the design of the stop assembly according to the present invention that the stop member (16) and the locking member (20) are moulded at the same time by a so-called one-shot injection moulding process. The geometry of the moulding "tool" (die) is such that the moulding operation is carried out without the production of flash and without providing for webs connecting stop member (16) and locking member (20) which require subsequent removal.

In use, the assembly shown in Figure 2 is mounted, for example, within the open door frame of a car body by means of mounting flange (14). The door (25) is then closed so that stop member (16) is pressed by it into the bore (12) of carrier member (11). With the door open, locking member (20) is turned by an Allen key inserted in hexagon cavity (22) so that the stem (17) is locked within bore (12) as described above and the assembly is thereby automatically adjusted and locked with exactly the height required for a bump stop for the car door (25). The stop subsequently ensures that the door always closes to the same position. The profile of head (18) is chosen to conform to the shape of the door (25) which the stop assembly restrains.

Claims

1. A three-part adjustable stop assembly made of plastics material comprising a carrier member adapted to be fastened to a substrate and provided with a bore normal to the substrate, the inner surface of the bore having a series of closely-spaced peripheral ridges, a stop member having a hollow stem having the same section and being adapted and arranged to fit within the bore of the carrier member and having an external surface formed with a series of closely-spaced peripheral ridges corresponding to the series of peripheral ridges in said bore and a rotatable locking member located in axial alignment within said hollow stem, said locking member having at least two cam flanges which, when the locking barrel is rotated through 90° against the inner wall of the hollow stem so that the stem is expanded and locks together the series of peripheral ridges on the inner surface of the bore and the series of peripheral ridges on the external surface of the hollow stem.
2. An adjustable stop according to Claim 1, wherein the carrier member has a base flange by which it can be screwed or bolted to the substrate or secured by adhesive.
3. An adjustable stop according to Claim 1, wherein the carrier member is adapted to engage a fastener such as a weld stud fixed to the substrate.
4. An adjustable stop according to Claim 1, 2 or 3, wherein the bore in the carrier member and the hollow stem of the stop member are of rectangular, preferably square, section.
5. An adjustable stop according to Claim 1, 2 or 3, wherein the bore in the carrier member and the hollow stem of the stop member are round in sec-

tion.

6. An adjustable stop according to any one of Claims 1 to 5 wherein the series of peripheral ridges formed in the inner surface of the bore and the external surface of the hollow stem are a series of annular ridges.
7. An adjustable stop according to Claim 5, wherein the series of peripheral ridges formed in the inner surface of the bore and the external surface of the hollow stem take the form of a tight helical thread.
8. An adjustable stop according to any one of the preceding claims, wherein a pair of cam flanges are provided on diametrically opposite sides of the locking member.
9. An adjustable stop according to any one of the preceding claims, wherein three or four cam flanges are disposed, preferably symmetrically, round the locking member.
10. An adjustable stop according to any one of the preceding claims, wherein the hollow stem carries a profiled head.
11. An adjustable stop according to any one of the preceding claims, wherein the stop member and the locking member are moulded at the same time by a one-shot injection moulding process.
12. An adjustable stop according to claim 11, wherein the moulding operation is carried out without the production of flash and without providing for webs connecting stop member and the locking member which require subsequent removal.

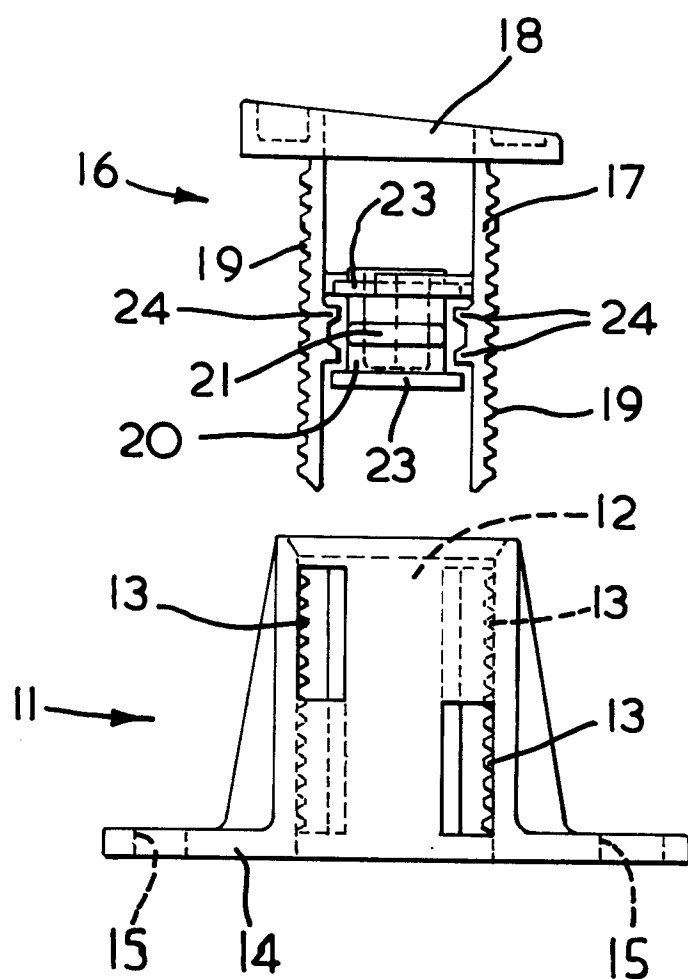


FIG. 1

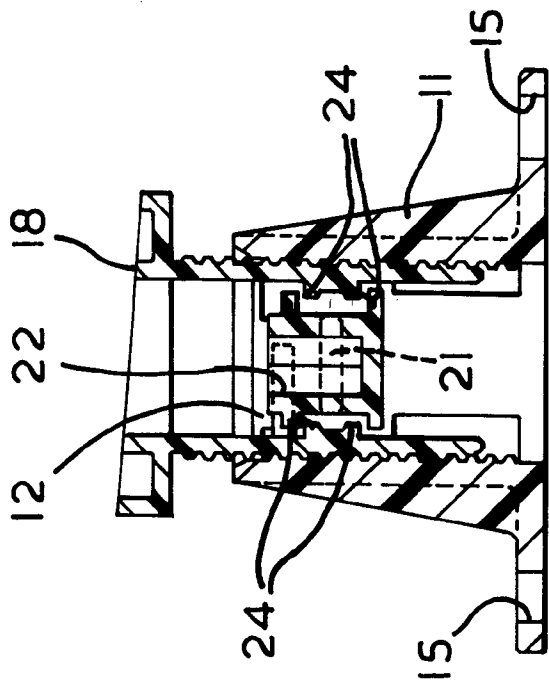


FIG. 2

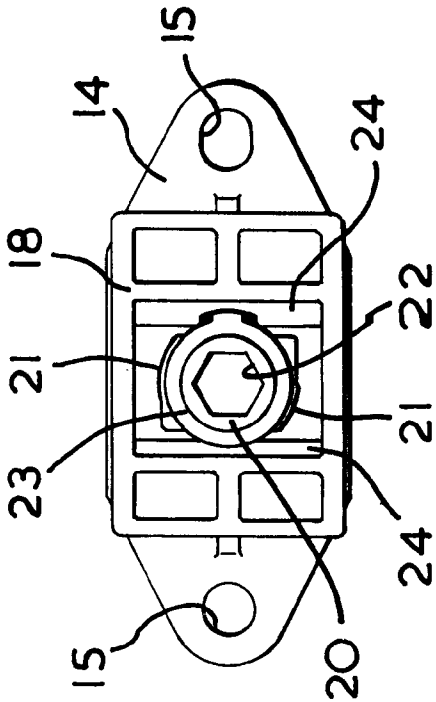


FIG. 3

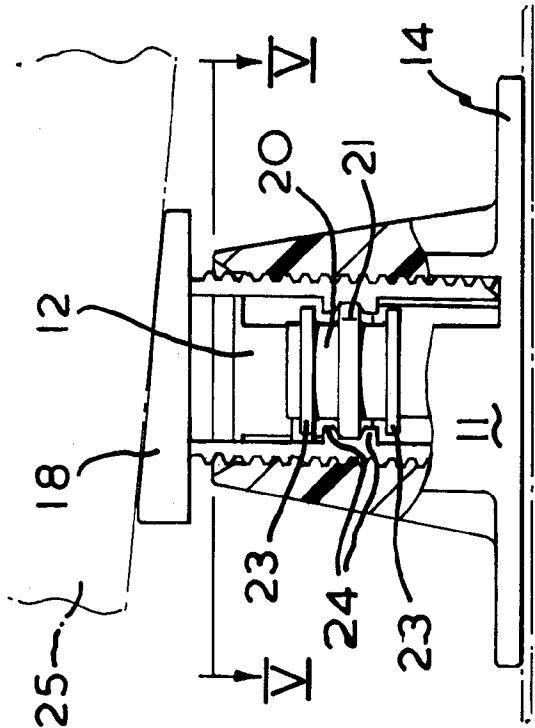


FIG. 4

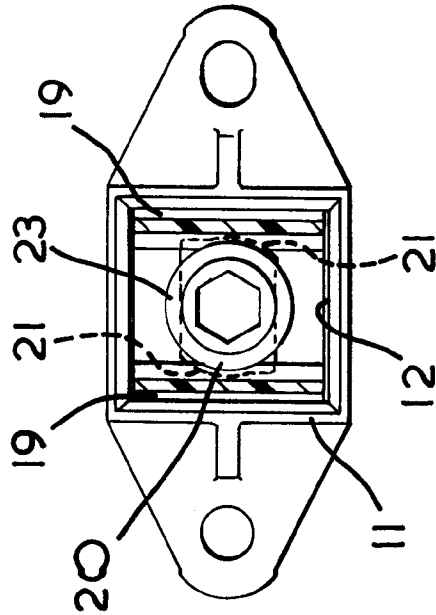


FIG. 5



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 1160

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	EP-A-0 336 833 (REGIE NATIONALE DES USINES RENAULT) * column 2, line 42 - column 6, line 13; figures 1-10 *	1,3-5,8,10	E05F5/06
A	DE-A-40 11 186 (VOLKSWAGEN) * column 1, line 56 - column 2, line 20; figure 1 *	1,2,4-6,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			E05F B60J B62D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 May 1994	Examiner Guillaume, G
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