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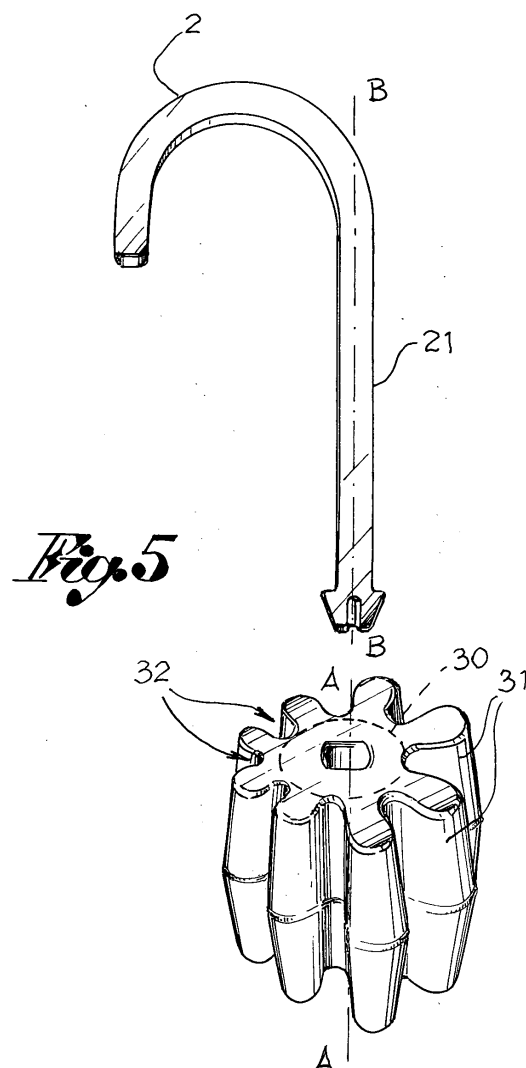
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(54) **Device for restricting and cushioning door movement**

(57) A device uncommonly capable of restricting and cushioning the movement of doors, comprising a prism-shaped stop (3) and a hook (2) connected to it. Said stop (3) is prism-shaped and has a poly-lobed concave section with at least three lobes (31').



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Description

[0001] This invention regards a device to cushion and restrict the opening and closing, especially accidental, of doors, windows, shutters, wardrobe doors and the like.

[0002] With the sole aim of simplifying the presentation of this invention, reference will be made to a door leaf in the following description.

[0003] It is a well-known fact that it is often preferable to leave doors and windows ajar to allow entry of clean air or natural light into a room and sometimes in order to allow sound to travel from.

[0004] It is also common knowledge that the accidental opening and, perhaps more importantly, closing of a door is often noisy and violent, so much so as to subject the structure and frame of the door to considerable stress.

[0005] Therefore, there is a pressing need for a device which enables the restriction of the movement of the door when closing and, potentially speaking, opening.

[0006] The use of wedge-shaped devices slotted between the floor and the lower edge of the door has been proposed to satisfy this need. During insertion or removal, these devices can ruin the lower edge of the door and their practicality depends largely on the surface of the floor.

[0007] There are other devices which comprise a hook and a stop. These devices must be fitted to one of the hinges of the door. The door rests against the stop fitted between the door and the jamb, and presses it against the jamb. In this way the presence of the stop restricts the movement of the door.

[0008] Attention should be drawn to the fact that the abovementioned devices are destined for more or less static use and are therefore considerably inconvenient when applied to a door which moves accidentally. The main inconvenience lies in the fact that they subject the door hinges and the hinge fastenings to the door on one side and the jamb on the other to considerable stress. Despite being made of deformable materials (such as thermoplastic polymers or elastomers), the sturdy shape of the stop means that, as soon as contact is made, the extent of the forces involved increases sharply and only in the presence of these considerable forces is it possible to obtain a deformation sufficient to prevent the movement of the door. It has been found that the extent of these forces is such as to subject the hinges or their fastenings to the door and jamb to dangerous levels of stress and even breakage.

[0009] The problem at the base of this invention is that of conceiving and constructing a device to restrict and cushion the opening and closing, especially accidental, of doors, windows, shutters, wardrobe doors and the like, which has structural and functional features such as to satisfy the abovementioned requirements and, at the same time, overcome the problems mentioned with regard to currently available devices.

[0010] This problem is solved by a device to restrict and cushion the movement of doors in accordance with claim 1.

[0011] Further characteristics and advantages of the invented device will be listed in the following description of several preferred examples of construction, given by way of non-restrictive example, with reference to the annexed figures, in which:

- figure 1 represents a prospective view of a first form of construction of the invention;
- figure 2 represents a prospective view of a second form of construction of the invention;
- figure 3 represents a prospective view of a third form of construction of the invention;
- figure 4 represents a prospective view of a fourth form of construction of the invention;
- figure 5 represents a blow-up view of a fifth form of construction of the invention;
- figure 6 represents a plan of the form of construction shown in figure 5;

[0012] With reference to the annexed figures, number 1 is used to indicate the complete device, comprising a hook 2 and a prism-shaped stop 3. The hook 2 comprises a first branch 21 which is locked into a seat 23 in the stop 3. The joint between the first branch 21 of the hook 2 and the seat 23 in the stop 3 can be constructed in any way known as long as it is suited to the specific circumstances. The joint can be fixed or dismountable and both versions fall within the context of the invention.

[0013] The stop 3 extends along a longitudinal axis AA. This longitudinal axis AA is parallel with axis BB of the first branch 21 of the hook 2 and, in some preferred forms of construction, coincides with it. In some forms of construction, those in figures 1 to 5 for example, the stop 3 is made up of a straight prism, while in others, such as that in figure 5, it is achieved by overlapping two conical trunks of prism with the same AA axis. In any case, the section of these prisms is a poly-lobed concave figure with a heart 30' around which the lobes 31' develop in a more or less radial arrangement. An explanatory example of this poly-lobed concave figure can be seen in the plan in figure 6. There are at least three lobes 31', as in the form of construction shown in figure 4, but there should preferably be more. This means that the stop 3 comprises blades 31, set around a nucleus 30 and separated by channels 32 arranged parallel to axis AA.

[0014] The stop 3 is made of a material capable of supporting considerable deformations without breaking or suffering permanent deformation. The stop 3 can therefore be made, for example, of a thermoplastic polymer, an elastomer or of a combination of the two kinds of material.

[0015] The expert will see immediately how a device of this kind applied to a door will act as a stop without generating forces of such extent as to subject the hinges

or their fastenings to the door and jamb to dangerous levels of stress and even breakage. This result is obtained thanks to the particular blade 31 and channel 32 shape of the stop 3. Particular success has been achieved by combining this shape with a highly deformable material to make the stop 3. After ensuring that there is contact with the door on one side and the jamb on the other, the stops acts with the blades 31 which, loaded like shelves, flex gradually, occupying the adjacent channels 32. only upon completion of this phenomenon does the nucleus 30, which works in the traditional way by compression, react.

[0016] In this way it is obvious how the invented device is capable of reacting to deformation with gradually increasing reaction forces. The movement of the door is restricted and the stopping action is cushioned without subjecting the hinges or their fastenings to the door and jamb to dangerous levels of stress.

[0017] As can be appreciated from that stated above, the invented device enables satisfaction of the above-mentioned requirements and also avoids the inconveniences referred to in the introduction to the description. It is also possible to appreciate the simplicity of the device in the preferred form illustrated in the figures.

Claims

1. Device to restrict and cushion the movement of doors, comprising a prism-shaped stop (3) and a hook (2) connected to it, **characterised by** the fact that said prism-shaped stop (3) has a poly-lobed concave section with at least three lobes (31'). 30
2. Device according to claim 1 in which said prism shape comprises a nucleus (30) and blades (31) alternated with channels (32). 35
3. Device according to claim 1 in which said prism shape of said stop 3) is a simple prism with a longitudinal axis (AA). 40
4. Device according to claim 1 in which said prism shape of said stop (3) is created by overlapping two trunks of prism with the same longitudinal axis (AA). 45
5. Device according to claim 3 or 4 in which said blades are arranged parallel to said longitudinal axis (AA). 50
6. Device according to claim 3 or 4 in which said hook (2) comprises a first branch (21) with an axis. 55
7. Device according to claim 6 in which said longitudinal axis (AA) is parallel to said axis of said first branch (21).
8. Device according to claim 6 in which said longitudinal

axis (AA) coincides with said axis of said first branch (21).

9. Device according to claim 1 in which said stop (3) comprises a seat (23) for the creation of a joint with said hook (2).
10. Device according to claim 9 in which said joint is fixed.
11. Device according to claim 9 in which said joint is dismountable.
12. Device according to claim 1 in which said stop (3) is made of a thermoplastic polymer.
13. Device according to claim 1 in which said stop (3) is made of an elastomer.
14. Device according to claim 1 in which said stop (3) is made of a combination of a thermoplastic polymer and an elastomer.
15. Door or window comprising hinges and a device according to any of claims 1 to 14 hung from one of said hinges.

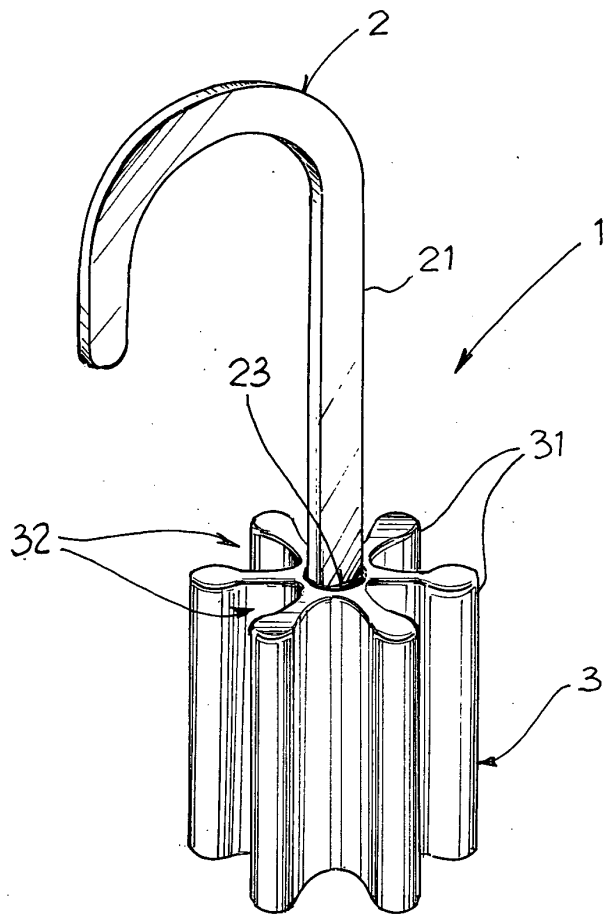


Fig. 1

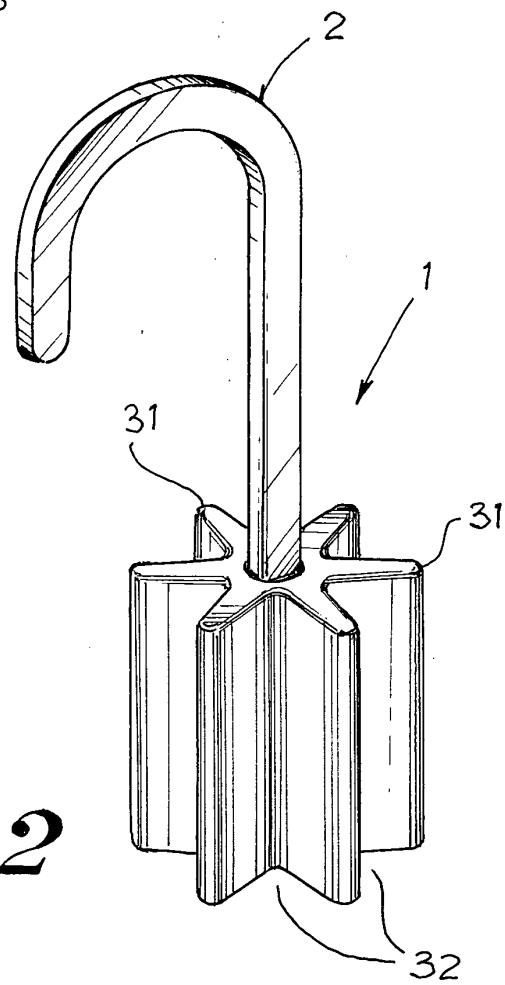


Fig. 2

