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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Hinges

I, HANS WOLF, citizen of Germany, of Jobstrasse 12, Deggendorf/Donau, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention concerns a snap-hinge and the object of the invention is to provide a snap-hinge of simple and efficient form.

According to the invention, there is provided a snap-hinge having two hinge plates connected together for pivotal movement relative to one another about a pivot axis by means of thin strips of material, each hinge plate having an arm extending from it in a general direction towards the pivot axis, one arm being shorter and thicker than the other and being resilient and the adjacent ends of the two arms being connected together by a further thin strip of material along a line parallel to but displaced from the pivot axis, the arrangement being such that on folding the hinge from a fully extended position the end of the shorter arm nearer the pivot axis is first deflected slightly towards the pivot axis and subsequently during the folding movement is allowed to spring away from the pivot axis due to its resilience with the result that near the fully extended position the hinge is biased by the resilience of the shorter arm towards the extended position whereas near the closed position the hinge is biased by the resilience of the shorter arm to the closed position.

The hinge plates, arms, thin strips of material and the said further thin strip of material are advantageously formed in one piece and are preferably made of polypropylene.

An embodiment of the invention will be described by way of example, with reference to the accompanying drawings in which:—

Figure 1 is a side view of a hinge in an open position and is intended only to illustrate the principle of the present invention;

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Figure 2. is a view of the hinge of Figure 1. in a half closed position;

Figure 3. is a view of the hinge of Figure 1 in a position between the half closed and fully closed positions.

Fig. 4 is a sectional view of a hinge according to the invention, in the open position, and

Fig. 5 is a plan view of the hinge of Fig. 4.

A hinge of the type shown in the Figs. 1 to 3 consists of two hinge plates 1 and 2 which are pivotally connected by a pin 3, in such a manner that the hinge plates 1 and 2 may be moved from an open position shown in Fig. 1 to a closed position (not shown) in which the plates 1 and 2 lie in abutment. Pivotaly attached to the hinge plate 1 is a short, relatively thick, arm 4 and pivotaly attached to the hinge plate 2 is a longer and thinner arm 5. The arms 4 and 5 are respectively attached to the plates 1 and 2 by pivot pins 6 and 7 and the free ends of the arms are pivotaly connected together by a pivot pin 8. By virtue of the difference in length of the arms 4 and 5 the pivot pin 8 is offset, relative to the pin 3, towards the pivot pin 6 of the shorter arm 4 by the distance 9.

A leaf spring 10 is firmly secured at 11 and 12 to the hinge plate 1. The leaf spring 10 is so formed that when the hinge is opened its free end is angularly directed away from the hinge plates 1 and 2. The free end of the spring 10 engages under a hook 13 on the arm 4.

When the hinge is in the position shown in Fig. 1 the spring is not under tension.

Assuming the hinge plate 1 to be firmly held then as the hinge plate 2 is pivoted in the direction of the arrow 14 through substantially 90°, as shown in Fig. 2, the hook 13 of the shorter and stronger arm 4 carries with it the free end of the leaf spring 10 which, during this movement, tends to return into the position shown in Fig. 1. When the hinge plate 2 has reached the position shown in Fig. 2 however, the spring 10 cannot exert a torque

which will be effective to return the hinge plate 2 to the position of Fig. 1 by virtue of the relative positions of the hinge pins 3 and 8 and thus the spring becomes effective to cause further movement of the hinge plate 2 in the direction of the arrow 15 (see Fig. 3).

As the hinge plate 2 moves in the direction of the arrow 15 the leaf spring 10 commences a return movement to the position illustrated in Fig. 1 and thus the hinge plate 2 is caused to move, by virtue of the pull exerted by the arm 5 towards the hinge plate 1 until it has moved to the limit of movement allowed by the hinge construction.

Referring now to Figs. 4 and 5 there is illustrated a hinge according to the invention. This hinge is produced as a single member having in effect the hinge plates, arms and thin strips of material constituting pivot axes formed as a unitary structure. In this arrangement the leaf spring 10 and the arm 4 are replaced by an angularly disposed projection or limb 16. The ends 17 and 18 of a larger, thinner limb 19 constitute thin strips of material serving the same purpose as the pivot pins 7 and 8 respectively of the arm 5.

The hinge pin 3 is replaced by the provision of thin strips of material 20, 21 connecting the hinge plates 1 and 2. It will be seen that the arms 16 and 19 are connected together along a line parallel to but displaced from the pivot axis of the hinge.

Clearly, a hinge of the kind proposed above can only be produced from a material which has the required amount of inherent flexibility, for example polypropylene. A hinge of the kind proposed may be produced without waste of material, by injection moulding. It will be appreciated that along the pivot lines considerable stresses will be imposed and consequently at these lines there will be a tendency in use for the material to become fatigued before the other, thicker parts. It will also be possible that, during the moulding process, the thinner parts of the hinge will tend to cure more quickly than the thicker parts and to obviate this tendency it is desirable to use moulding apparatus in which a feed channel is provided along the outer edge of each hinge plate, with the result that the thin strips of material constituting the pivot points of the hinge and joining the two arms

are formed by injection of the material injected across them. In this way, hinges are produced in one piece which best fulfil all required conditions. By using a material which is of partially crystalline structure long life for the hinge can be achieved.

WHAT I CLAIM IS:—

1. A snap hinge having two hinge plates connected together for pivotal movement relative to one another about a pivot axis by means of thin strips of material, each hinge plate having an arm extending from it in a general direction towards the pivot axis, one arm being shorter and thicker than the other and being resilient and the adjacent ends of the two arms being connected together by a further thin strip of material along a line parallel to but displaced from the pivot axis, the arrangement being such that on folding the hinge from a fully extended position the end of the shorter arm nearer the pivot axis is first deflected slightly towards the pivot axis and subsequently during the folding movement is allowed to spring away from the pivot axis due to its resilience with the result that near the fully extended position the hinge is biased by the resilience of the shorter arm towards the extended position whereas near the closed position the hinge is biased by the resilience of the shorter arm to the closed position.

2. A snap hinge according to claim 1 in which the hinge plates, arms, thin strips of material and the said further thin strip of material are formed in one piece.

3. A snap hinge according to claim 2 made entirely of polypropylene.

4. A snap hinge according to claim 3 which is formed by an injection moulding process the material forming the said thin strips of material and the said further thin strip of material being injected across the thin strips.

5. A snap hinge substantially as hereinbefore described with reference to and as shown in Figures 4 and 5 of the accompanying drawings.

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