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JEAN-CLAUDE SAVOIR  
SEPARABLE FASTENING DEVICE

3,387,345

Filed March 23, 1967

FIG. 1

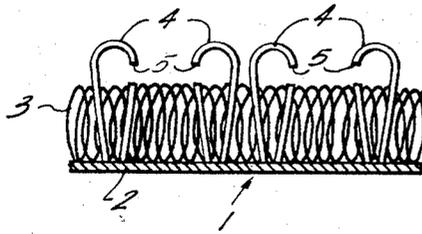


FIG. 2

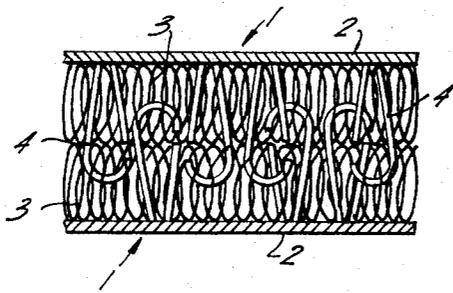
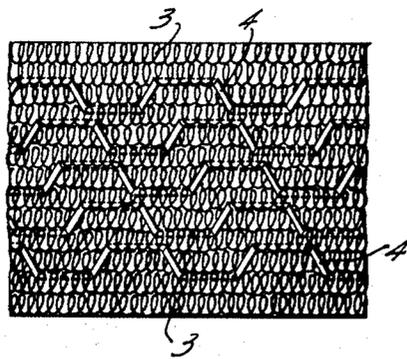


FIG. 3



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**SEPARABLE FASTENING DEVICE**

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5 Claims. (Cl. 24-204)

**ABSTRACT OF THE DISCLOSURE**

Separable fastener comprising two flexible tapes of the hook and loop type, at least one of the tapes having on one surface of the base sheet thereof both hooks and loops with the active portions of the hooks extending from the base sheet for a greater distance than the loops.

*Field and background of the invention*

Various separable fastening devices of the hook and loop type are already known. One well-known type sold under the registered trademark "Velcro" is manufactured in accordance with U.S. Patent 3,009,235 to De Mestral. In a commercial version of the Velcro fastener one of the tapes forming the device is exclusively provided with loops, whereas the other tape is exclusively provided with hooks. It has also been suggested in U.S. Patent 3,130,111 to Izumi, for example, to manufacture such fastening devices by providing each tape with loops and hooks executed by the same production principle. The first devices indicated above, in which the loops and the hooks are arranged each on its respective tape, provide for a regular and efficacious fastening of the two tapes. To the contrary, the second devices which comprise loops as well as hooks of same height, do not provide a fastening effect as favourable, since the surface of the loop ensemble creates an obstacle to the penetration of the hooks into the loops.

*Brief description of the invention*

The object of the present invention is to remedy the above trouble and to obtain, with a fastening device of the type described above, a stronger adherence of the two tapes, one to the other, requiring however the manufacture of only one tape comprising loops and hooks. The fastening device according to the invention is characterized by the fact that each tape comprises a multitude of loops forming a carpet of determined thickness and a multitude of hooks protruding from the loop carpet.

Such a fastening device thus provides for doubling the hooking effect, compared to those devices of the type presently commercially sold under the trademark "Velcro," since in the case where a same number of hooks is arranged on each tape per square centimeter, the fact of applying two identical tapes one against the other creates a doubled amount of hooking points between both tapes.

*Brief description of the drawings*

FIG. 1 is a diagrammatic vertical sectional view, at large scale, of a tape embodying the present invention;

FIG. 2 shows the engagement of the hooks and loops of two tapes such as shown in FIG. 1 applied one against the other; and

FIG. 3 is a plan view of the tape of FIG. 1.

*Description of the preferred embodiments*

With reference to the drawings, this fastening device of two elements comprises two tapes 1 each comprising a base sheet 2, woven, molded or laminated, on one face

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of which a multitude of loops 3 are arranged and forming a homogeneous carpet. The loops 3 are preferably made of multifilament yarns in the same way as for an astrakhan fabric and preferably of synthetic material such as polyamides, including nylon, or other heat-settable or other thermoplastic materials. Amongst the carpet formed by the multitude of loops 3, the base 2 also comprises hooks 4, preferably made of monofilament yarn, for instance, of synthetic material. Such hooks 4 may be made out of monofilament loops of synthetic material, e.g. polyamides such as nylon or other heat-settable or thermoplastic material, which might be stabilized by thermal treatment for their final shape, these loops being cut afterwards on one of their sides to form hooks 4 having a bent over end 5. As shown on FIG. 1, the hooks 4 protrude from the loop carpet 3. It is even desirable that the hooks protrude by a sufficient height above the loop carpet 3 so their end 5 bent over towards the loop carpet 3 be located above the latter. When two tapes 1 are placed one opposite the other and pressed together, as shown on FIG. 2, the monofilament hooks 4 having a higher stiffness compared to the loops 3 easily penetrate into the opposite loop carpet 3 to be hooked with the loops. For this reason, the number of hooking points between the two tapes 1 is doubled per surface unit with respect to the one that would be obtained if a tape provided only with hooks 4 of same density was combined with a tape only provided with loops 3. When the base sheet 2 is woven the manufacture of the tape may be in accordance with the disclosure of U.S. Patent 3,009,235 to De Mestral except that the loop pile as well as the hook pile is woven into the same base sheet with the hook pile extending higher with respect to the base sheet.

FIG. 3 shows the aspect in plan view of such tape 1, the general surface of which is covered with loops 3 forming a continuous carpet out of which the hooks 4 protrude. According to the manufacturing process used for forming these hooks 4 on base 2, they may be arranged in chevrons as shown on FIG. 3. Such arrangement is generally obtained when the hooks 4 are formed during weaving of base 2, by arranging the monofilament yarns intended for the hooks 4 on lancets, to pass back and forth over the same, in the course of weaving.

Numerous means of embodiment of such fastening device may be employed due to the numerous applicable processes enabling the design of a tape 1 made of a base 2 carrying a loop carpet 3 and hooks 4 protruding from same.

In general, for domestic and even for industrial uses, these tapes 1 are provided with threads being preferably made of synthetic material. However, for certain particular uses, the hooks 4 of these tapes could be metallic rather than synthetic.

What is claimed is:

1. Adhesive fastening device comprising two flexible tapes (1), having base sheet (2) at least one of the tapes having on one surface of the base sheet thereof hooking means in the form of loops (3) and hooks (4), the hooks (4) of said one tape (1) being adapted to engage in loops of another tape when in fastening position, characterized by the fact that at least said one tape (1) comprises a multitude of loops (3) forming a carpet of determined thickness and a multitude of hooks (4) protruding from the carpet of loops (3).

2. Device according to claim 1 characterized by the fact that the hooks (4) protrude from the carpet level of the loops (3) by a sufficient height in order for their ends (5), bent over towards the carpet of loops (3), to be located above the level of the tops of loops (3).

3. Device according to claim 1 characterized by the fact that the loops (3) are made of multifilament yarns,

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and the hooks (4) are made of monofilament yarns.

4. Device according to claim 3 characterized by the fact that the loops (3) and the hooks (4) are made of synthetic material.

5. Device according to claim 4 characterized by the fact that the hooks (4) are formed from loops which have been stabilized in their forms and then have been cut part way down the length of one of their legs.

**4****References Cited**

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