

PATENT SPECIFICATION (11)

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- (21) Application No. 56012/72 (22) Filed 5 Dec. 1972 (19)
(31) Convention Application No. 7342/71 (32) Filed 10 Dec. 1971 in
(33) Australia (AU)
(44) Complete Specification published 24 Sept. 1975
(51) INT. CL.² A44B 13/00
(52) Index at acceptance
E2S 4A 4B



(54) CONNECTING MEANS ON FLEXIBLE SHEET MATERIAL

(71) We, GEORGE NORMAN & CO. PTY. LTD., a company incorporated under the laws of the State of Victoria, of 410 Wellington Street, Clifton Hill, in the State of Victoria, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to releasable connecting means, and is particularly concerned with such means for connecting a flexible sheet member to a support member or structure. By way of example, the invention is suitable for providing the connection between a flexible sheet material headrest or backrest cover and a seat or chair, and it will be convenient to hereinafter describe the invention in relation to that example application.

Flexible sheet material head rest covers find wide use in passenger vehicles such as aircraft, buses and trains, and because of soiling it is desirable to change such covers at frequent intervals. As a result it is necessary to have attachment or connecting means which is convenient to secure and release, but is not susceptible to inadvertent release during normal use of the associated cover. Many different types of connectors have been proposed in the past, and one that has achieved some measure of success employs "VELCRO" (Registered Trade Mark) patches on both the cover sheet and the seat to which that cover is attachable.

Each of the aforementioned "VELCRO" patches comprises a sheet material base such as a length of nylon tape, carrying a large number of hook-like elements which project from one surface of the tape. Usually, the hooks are each formed from a thread or loop of nylon or other suitable material, and they are generally arranged in rows. In use, the hooks of one patch inter-mingle and catch with hooks of the other patch to form the releasable connection, and the hooks can be distorted to result in disengagement by pulling one patch outwardly away from the other.

A disadvantage of the "VELCRO" arrangement is that each patch is relatively expensive and must be secured to its respective member by further attaching means. That is, each patch must be stitched, adhered, or otherwise secured to its respective member, and that attachment must be stronger than the holding power of the connected "VELCRO" patches. In addition, each patch must be accurately positioned on its respective member so that a correct relationship exists between the two members when connected. The result is that the "VELCRO" arrangement is relatively expensive and there is a very real need for a cheaper acceptable alternative, particularly for disposable seat covers.

It is a principal object of the present invention to provide a releasable connecting means that is inexpensive and has substantial holding power. It is a further object of the invention to provide a seat cover member having said connecting means provided thereon.

As will be appreciated from the foregoing, connecting means of the kind under consideration are two-part structures. In its basic form, the present invention relates to one part only of such a structure in that the other cooperable part is of a known form. In particular, the connector part according to the invention is adapted for cooperation with a "VELCRO" pad or an equivalent or similar structure formed from a textile or synthetic material.

According to the invention there is provided a flexible sheet member having connecting means which is cooperable with a connector of the kind comprising a series of flexible hook-like elements projecting from a base surface; said connecting means including, a thread attached to said sheet member so that sections thereof are exposed at one surface of said sheet member and are arranged to tangle with said hook-like elements to releasably retain said sheet member in association with said connector, a fold or tuck in said sheet member defining a valley, and said thread sections extending

transversely across the valley, whereby said hook-like elements are able to project into said valley for engagement with said thread sections.

5 Considering the invention in relation to seat covers, a great many transport companies and organizations have "VELCRO" pads on their existing vehicle seats, and such pads retain their holding power over a considerable period of time. Thus, the expense factor in "VELCRO" constructions results mainly from the need to provide a new pad with each cover, and in the case of disposable covers that means a new pad with each cover change. The present invention however, permits the holding power feature of the "VELCRO" fastener to be retained whilst reducing the expense of that part of the connector provided on the disposable cover.

20 The following description refers in more detail to these essential features and further optional features of the invention. To facilitate an understanding of the invention, reference is made to the accompanying drawings where these features are illustrated in preferred form. It is to be understood however, that the essential and optional features of the invention are not limited to the specific forms of these features as shown in the drawings.

In the drawings:—

Figure 1 is a plan view of a known seat headrest cover described hereinafter purely for facilitating understanding of the invention;

Figure 2 is an enlarged view of an edge portion of the headrest cover shown in Figure 1;

40 Figure 3 is a sectional view taken along line III—III of Figure 2;

Figure 4 is a plan view of portion of a typical "VELCRO"-type pad;

45 Figure 5 is a sectional view taken along line V—V of Figure 3 and showing a "VELCRO" hook engaging the connector thread of the headrest cover;

Figure 6 is a view similar to Figure 2 but showing an embodiment of the present invention;

Figure 7 is an enlarged sectional view taken along line VII—VII of Figure 6;

Figure 8 is a view similar to Figure 5 but showing the "VELCRO" hook cooperating with the embodiment of Figure 6; and

55 Figure 9 shows a variation of the Figure 6 embodiment of the invention.

60 Figures 1 to 3 show connecting means applied to a flexible sheet material, seat cover, and that connecting means includes at least one thread 2 of a textile or synthetic material looped through (i.e., threaded through) the sheet material 3 so that sections 4 thereof are exposed on a back or under surface 5 of the sheet material, which is the surface

arranged to lie adjacent the seat surface to be protected (not shown). Figure 4 shows a portion of a tape 6 or similar backing member having a plurality of rows of hook-like elements 7 projecting upwardly therefrom, and in that respect the figure roughly represents part of a "VELCRO" pad. In practice, the "VELCRO" hooks 7 tend to grab or tangle with the exposed thread sections 4 as shown in Figure 5, and that tendency will generally vary in accordance with the texture of the thread sections. That is, if the thread 2 is formed of a "fluffy" or fibrous material there is usually an increased tendency for the "VELCRO" hooks 7 to tangle with the thread sections 4.

Another factor influencing the strength of the connection is the disposition of each thread section 4 relative to the surface 5 over which it extends. If the thread 2 is loosely interwoven with the sheet material 3 as shown in Figure 3, each thread section 4 will be adapted to move clear of the underlying material surface 5, and even a small amount of separation between the thread sections 4 and that surface will improve the ability of the "VELCRO" hooks 7 to pass around the thread 2 or around fibres of the thread.

95 In the arrangement according to the invention shown in Figures 6 to 8, a tuck or fold is formed in the sheet material 3 beneath the thread sections 4, and the thread itself may be arranged to retain that tuck or fold in the material. That is, each thread section 4 extends across a valley or space 8 into which "VELCRO" hooks 7 can project and locate around the thread sections 4 or fibres thereof as shown in Figure 8.

105 It will be appreciated that the tuck or fold need not be particularly deep, and its width will depend upon requirements. If desired, a plurality of folds may be formed side by side so as to extend the effective area of the connecting means.

110 The connecting means thread 2 may be applied to the base sheet material 3 as shown in Figure 6, or in a stitch pattern such that two laterally spaced lines of stitching 9 are formed with transverse interconnecting sections 11 disposed in substantially zig-zag fashion as shown in Figure 9. In the Figure 6 embodiment, the thread 2 is not passed through the sheet material 3, but is secured thereto by two lines of further thread 12 stitched to the sheet material 3. The valley 8 is formed beneath the transverse sections 4 of the thread 2 by a tuck or fold 13 as previously described, and it is further preferred that the thread 2 is formed of a relatively loose or fluffy fibrous material such as rayon. If the thread 2 is applied to a flat surface of the base sheet material 3 as shown in the known arrangement of Figures 2 and 3, it is usually

under less tension and therefore looser or fluffier than if extended across a tuck or fold as shown in Figure 6. Nevertheless, it is generally found that the latter arrangement has the greatest resistance to separation.

The tuck or fold type of arrangement can be further improved by providing two separate sets of stitching across the tuck or fold 13 as shown in Figures 7 and 8. One set, comprising thread 14, is arranged to take the tension resulting from the tendency of the valley 8 to widen or flatten, and the other set, comprising thread 2, is relatively loosely arranged so as to have maximum fluffiness and consequently maximum susceptibility to entangle with the "VELCRO" hooks 7. The threads 2 and 14 need not be on opposite sides of the sheet material 3 as shown in the drawings, but that arrangement is preferred. Both threads 2 and 14 can be retained by the holding thread 12, and thread 14 can be arranged in zig-zag fashion, or in any other desired pattern. The threads 2, 12 and 14, can be all applied to the sheet material 3 in a single operation.

It will be appreciated that a great many stitch patterns are available for use with this invention. Generally however, the pattern of thread 2 should be such that a space is defined between adjacent thread sections 4 so as to facilitate insertion of "VELCRO" hooks 7 therebetween to effect a relatively high degree of entanglement. In addition, several rows of threads may be provided, and they can be arranged in side by side relationship, in intersecting relationship or in a combination of those relationships.

When the invention is applied to a head-rest cover, an example of which is shown in Figure 1, the thread 2 is preferably located at or adjacent the edge 15 of the cover sheet 3 that is normally uppermost when in use, and it will generally extend transverse to the up and down axis of the cover as that corresponds to the normal positioning of "VELCRO" pads on aircraft and other vehicle seats. The length of the stitching may be determined according to requirements and may extend the full width of the cover sheet 3 (as shown) if desired, but it need not be substantially longer than the "VELCRO" pad to which it is to be attached so that the mounted position of the cover is held within reasonable tolerance. In some cases, the cover may be attached to two or more laterally spaced "VELCRO" pads in which event the stitching preferably extends the full width of the cover, although separate sections of stitching may be provided for each pad if desired.

The connecting means of the present invention may be also used on a cover having attaching means according to British Patent Specification No. 1,354,308, so that such a cover can be applied to the seats

having any one of several different types of cooperable connectors.

It will be appreciated from the foregoing description that the present invention provides a simple yet effective connecting means, and in one form provides an improved disposable seat cover having such connecting means applied thereto. One particular feature of the invention is that the connecting means is in effect "self-attaching" to the base sheet material, so that extraneous attaching means such as adhesive is not required and manufacture is simplified.

Finally, it is to be understood that various alterations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the ambit of the invention as defined by the appended claims.

WHAT WE CLAIM IS:—

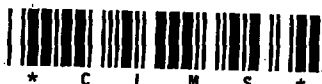
1. A flexible sheet member having connecting means which is cooperable with a connector of the kind comprising a series of flexible hook-like elements projecting from a base surface; said connecting means including, a thread attached to said sheet member so that sections thereof are exposed at one surface of said sheet member and are arranged to tangle with said hook-like elements to releasably retain said sheet member in association with said connector, a fold or tuck in said sheet member defining a valley, and said thread sections extending transversely across the valley, whereby said hook-like elements are able to project into said valley for engagement with said thread sections.

2. A flexible sheet member according to claim 1, wherein a further thread retains the sides of said fold or tuck against substantial separation, and said thread sections extend relatively loosely across said valley.

3. A flexible sheet member according to claim 1 or 2 in releasable combination with a support, a series of flexible hook-like elements projecting from a base member attached to said support, and at least some of said hook-like elements locating around at least part of said thread sections so as to releasably attach said sheet-like member to said support.

4. A flexible sheet member having connecting means, substantially as herein described with reference to any one of the embodiments illustrated in Figures 6 to 9 of the accompanying drawings.

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2. A flexible sheet member according to claim 1, wherein a further thread retains the sides of said fold or tuck against substantial separation, and said thread sections extend relatively loosely across said valley.

3. A flexible sheet member according to claim 1 or 2 in releasable combination with a support, a series of flexible hook-like elements projecting from a base member attached to said support, and at least some of said hook-like elements locating around at least part of said thread sections so as to releasably attach said sheet-like member to said support.

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