

CERTIFICATE

I, CHARLOTTE ELIZABETH ANNE COUCHMAN, B.A., Dip. Voc. Tech., AITI, of 5 Bellwood Road, Nunhead, London, SE15 3DE, do hereby certify that I am conversant with the English and German languages and am a competent translator thereof, and I further certify that to the best of my knowledge and belief the following translation is a true and correct translation made by me of the Text for Grant of European Patent (U.K.) No. 0236668 (Application No. 87100114.5) in the German language prepared in pursuance of The Patent (Amendment) Rules 1987.

Signed this 18th day of October 1989

(Signature)

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The invention relates to a padding structure according to the precharacterizing clause of the main claim.

The padding structures belonging to the prior art and using a foamed material core have, since circa 1960, been layered with wadding fabric, which usually consists of polyester fibres and is manufactured and used in the weight classes of from approximately 40 to approximately 1000 g/m². The fields of use of the wadding fabric are mainly the bedding sector, the upholstered furniture and mattress industries, the clothing industry and the toy sector, for example for toy animals.

The wadding fabric fulfils its function where padding structures provided therewith are not subject to pressure stress and dampness. In sectors where these stresses are present, such as, for example, cushions, mattresses etc., they do not fulfil their function satisfactorily. These bulked wadding fabrics made of polyester fibres serve as a rule to cover foamed material cores and give the padding structure a better appearance and prevent direct contact between the actual covering material, i.e. the jacket, and the foamed material core.

Over the many years that such wadding fabrics have been in use, many complaints have arisen regarding seat and lounge cushions, as, under the influence of pressure and body warmth as well as the perspiration occurring and the dampness introduced thereby into the wadding fabric, the wadding fabric becomes compressed and reduced to less than 1/3 of its original volume. This leads, on the one hand, to a shabby appearance and complaints because of the way the folds then fall and, on the other hand, the wadding fabric no longer fulfils its allotted task.

Even the processing of stronger wadding fabrics did not succeed, since the foamed material cores arranged inside the wadding fabric do not have the smooth appearance of natural material despite their possible flexibility, but rather lead under stress to a degree of compression which excludes any padding effect.

A foamed material structure forming the precharacterizing clause is known from DE-A-20 19 488, which has at least two slit systems passing through it at an angle to one another, each slit belonging to one system being crossed by at least one slit belonging to another system. This measure overcomes the stiffness of the rigid foam and there are created small plugs on the surface and a network of small rods inside, which are

intended to bend resiliently when stressed and move back when said stress ceases. Such a structure has not proven itself in practice, however, since on the one hand the manufacturing process is too expensive and on the other hand the slits crossing each other so diminish the rigidity of the foamed material core that no usual padding effect can any longer be achieved.

The problem on which the invention is based, starting with the padding structures belonging to the prior art, is that of so constructing a padding structure from a foamed material core that the padding structure retains its padding and ventilation properties even under heavy stress, but still provides a pleasant padding effect.

The problem on which the invention is based is solved by the teaching of the main claim.

Advantageous embodiments are described in the subclaims.

By means of the padding structure according to the invention, the characteristic typical per se of such a sheet of flexible foamed material is altered by punching in such a way that the product is flexible and the punched sheet aids ventilation. By the punch cutting it is further achieved that the user sits in the foamed material core and not thereon, as has hitherto been the case with foamed material sheets.

The only localised provision of the covering connection, said covering consisting for example of woven, knitted or non-woven material, leads to the creation of air pockets between the covering and the punched foamed material core - especially when the padding structure is in use - which makes the padding structure thus formed more pleasant and firmer. In addition to the so-called mature character, a better padding effect is achieved and the "sail cloth effect" of the covering which has occurred hitherto is avoided by the stretchability of the covering.

Adaptation to different uses may be carried out by using different materials for the covering on the two sides of the foamed material core.

The proposal according to the invention thus results in a padding structure which can be used in the most varied of fields, exhibits good ventilation effects, has flexible and smooth behaviour and, in combination with other padding means for example as filling pockets for bar- and/or ball-shaped padding structures, results in ideal padding effects.

The padding structure may be used especially for covering cushion cores or mattress blanks, for which a flexibly moulding surface is required. It preferably consists of a 20 mm thick core of extremely flexible, high quality foamed material, which is provided

repeatedly with punch cuts in such a way that the surface tension of the foam can be totally broken. The resilient properties of the foam core are altered thereby into slow-acting resilient properties and the seating properties typical hitherto change into those of self-moulding seating. The top and bottom may be covered with a spun material. The top is preferably particularly flexible. The arrangement of the covering with more or less intermittent fastening results in no contours being visible even with the most closely connecting covering materials or even leather, such that an absolutely smooth cushion surface can thus be achieved.

The arrangement according to the invention results in a health-promoting seat, by means of body-suited shaping with a high degree of pressure relief. In the edge area of the foamed material core and thus of the padding structure, depending on the use, it is possible to provide fewer punch cuts than in the central area or even to provide no punch cuts at all.

One exemplary embodiment of the invention is described below with the aid of the drawings, in which:

Fig. 1 shows a padding structure consisting of a foamed material core, a covering and a jacket, and

Figs. 2 to 8 show different punch patterns for the padding core.

Fig. 1 shows a padding structure designated 1 comprising a jacket 2, a foamed material core 3 and a covering 4 and 5 arranged either side of the foamed material core 3. The foamed material core 3 consists of individual foamed material sheets.

Each foamed material sheet 3 is provided with punch cuts 6, which may be arranged in an appropriate pattern, as shown in Figs. 2 to 8.

The covering 4 and 5 is connected locally with the foamed material core 3 in the edge areas by stitching or quilting or adhesively in the remaining area, for example by gluing, welding etc., it being possible, for example, to provide dot-shaped adhesion points in a grid the dimensions of which are such that between the individual adhesive connection points there are sufficient free spaces and thus possibilities for movement between the covering 4 and 5 and the foamed material core 3. The connections between the coverings 4 and 5 and the foamed material core 3 may be dot-shaped, line-shaped or the like.

The coverings 4 and 5 may consist of a non-woven fabric, a woven fabric, a knitted fabric or a film material and can be constructed differently on the two sides of the foamed material core 3.

The punch cuts 6 can be of straight-line, angular or curved construction. The resilient behaviour of the foamed material core can be influenced by the type of punch cuts.

If two foamed material sheets with punch cuts passing right through them in the longitudinal and transverse directions are provided, at the same time both the two foamed material sheets are connected together on the inside and the material covering the foamed material sheets, e.g. woven fabric, is connected together by adhesion points or selectively wavy lines of adhesion, i.e.:

1. the bottom of the upper covering 4 is connected to the top of the first punched foamed material sheet 3;
2. the bottom of this foamed material sheet 3 is connected to the top of the second punched foamed material sheet 3;
3. the bottom of the second punched foamed material sheet 3 is connected to the top of the lower covering 5.

The composite material thus consists of three adhesive sides.

The foamed material sheets may vary in thickness, the maximum being approximately 80 mm. The thickness of the thickest sheet is approximately 40 mm and that of the thinnest approximately 2 mm.

The punch cuts passing right through are repeated in the longitudinal and transverse directions and so arranged that the remaining material connections will stand up to a relatively high number of washing processes. Covering fabrics which come into consideration are woven fabrics, knitted fabrics, non-woven fabrics, films etc.

With this method it is made possible to produce a range of new products, especially for automobile seat upholstery and nursing supports for preventing decubitus. The special effect lies in the fact that the material combination can be constructed in a sandwich structure, the materials covering the filling being applied levelly not by quilting - which always leaves marks where the quilt seams are - but by the above-described manner of connection. The incomplete lamination results in the prevention of the "sail-cloth effect", the spring deflection and thus the cushion properties of the internal punched foamed material sheets being fully maintained. These cushion properties, which rather exhibit a bulky resilience before the punch cuts are made, exhibit after punch-cutting a flexible, tension-free and thus appropriate and supporting resilience.



CLAIMS

1. A padding structure made of flexible foam for the bedding sector, the mattress industry, furniture and car seats, cushions, toys or clothing with at least one sheet of foamed material provided with spaced-apart straight-line punch cuts (6) extending completely through the sheet of foamed material, i.e. from the top to the bottom thereof, the punch cuts (6) being arranged at right angles to each other and being perpendicular to the surface of the sheet of foamed material, characterized in that

- a) a covering (4, 5) is provided which covers on both sides the foamed material core (3) formed of one or more sheets of foam material and which is formed of a sheet of woven, knitted, nonwoven fabric and/or film material,
- b) the covering (4, 5) is connected with the foamed material core (3) by dot-shaped or line-shaped adhesive connecting points, and
- c) when several sheets of foamed material are used they are connected together by dot-shaped or line-shaped adhesive connecting points.

2. A padding structure according to claim 1, characterized in that the covering (4, 5) is constructed differently on the two sides of the foamed material core (3).

3. A padding structure according at least to claim 1, characterized in that the covering (4, 5) is connected with the foamed material core (3) in the edge areas by stitching, quilting or the like.

4. A padding structure according at least to claim 1, characterized in that in the edge areas of the foamed material core (3) there are provided no punch cuts (6) or fewer punch cuts (6) than in the central area of the foamed material core (3).