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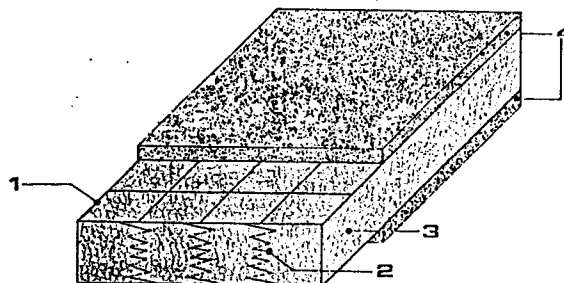
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(54) **Items composed of a steel frame with steel springs, behaving as elastic support, for the manufacturing of mattresses and cushions.**

(57) Items composed of a steel frame 1 with steel springs 2, behaving as elastic support, for manufacturing of mattresses and cushions with the peculiarity that the frame and the springs are completely embedded in a flexible polyurethane foam 3. The polymeric resin is polymerized and foamed directly in the structure placed in a special mould under controlled process conditions in order to obtain a polymeric foam with desired apparent density in relation to the applications. Eventually external coverings 4 in natural or synthetic material, can be added behaving as cover and/or padding.



Description

Items composed of a steel frame with steel springs, behaving as elastic support, for the manufacturing of mattresses and cushions.

The invention regards items composed of a steel frame with steel springs, behaving as elastic support, for the manufacturing of mattresses and cushions with the peculiarity that the frame and the springs are completely embedded in a polyurethane foam.

Mattresses and cushions are essentially of two kinds: the first, exclusively made of synthetic foam with density, quality and elasticity depending on the use they are intended for, in which the foamed polymer acts also as carrying structure; the second one is made of a metallic frame with internal steel springs; in a variable quantity, acting as elastic support. In the second case, and sometimes also in the first one, the whole frame is subsequently covered with one or more layers of padding materials (e.g. wool, cotton, polyurethane foam). Up to now, the manufacturing of an orthopaedic mattress has been obtained by increasing the number of springs per unit area and/or increasing the diameter of the wire of which the spring is made, in order to achieve greater stiffness. It often happens that in this way it is not possible to achieve satisfying results from both the sanitary and the economic points of view, causing also higher weights and manufacturing costs. Polyurethane foam is used as thermal insulator and stuffing material for the covering of the upper and lower surfaces only of spring mattresses. Sometimes polyurethane foam is also used as covering of side surfaces to improve lateral stuffing and as elastic support of external covering. This technique concerns the mounting of previously preformed parts on the steel frame; these parts, however, do not belong to the mattress structure.

This invention regards the construction of a spring mattress or spring cushions (e.g. divans, arm-chairs, saddlery for motor vehicles, etc.) with the peculiarity that the frame and the springs are completely embedded in a polymeric foam, e.g. polyurethane; the polymer is foamed inside the frame which is placed in a special mould.

Items obtained according to the invention are characterized by uniform elasticity on the whole exposed surface and especially on the edges. Items obtained according to the invention are characterized by a good comfort together with good orthopaedic quality; in fact they show uniform stiffness and elasticity on the whole exposed surface avoiding the formation of subsidences, which can be found in traditional mattress, in correspondence with the intervals between springs belonging to the frame. These subsidences are not found in items obtained according to the invention, because the springs are completely embedded in the polymeric foam and so non axial deformation is not allowed under stress. Another advantage deriving from embedding frame and springs in a polymeric resin, is the fact that the presence of a polymeric foam in interstices between springs and frame, completely

eliminates squeaking caused by metallic parts under stress. It is also possible to achieve the waterproofing of one or more surfaces of items obtained according to the invention, as a non restrictive example, by depositing, for instance by spraying, or forming a suitable impermeable layer on the exposed surface or on a part of it. Items obtained according to the invention are therefore characterized by a longer life maintaining their properties as a consequence of the previously mentioned features.

The invention is here showed in details in fig.1, which represents a possible construction of an item according to the invention. In fig.1 steel springs 2 are hooked to steel frame 1; the whole structure is completely embedded in a polyurethane foam 3. Eventually external coverings 4, in natural or synthetic material, can be added to behave as a cover and/or stuffing. Items, according to the invention, can be obtained by placing the frame with inner-springs in an adjustable mould in which a polyurethane resin is polymerized and foamed under controlled process conditions in order to obtain a polymeric foam with the desired apparent density in relation to each application (range of apparent density: 15-60 kg/cubic meter).

Claims

1. Items composed of a steel frame with steel springs, behaving as elastic support, for the manufacturing of mattresses and cushions with the peculiarity that the frame and the springs are completely embedded in polyurethane foam which is polymerized and foamed in the structure placed in a mould.

2. Items according to claim 1 in which one or more surfaces can be waterproofed by depositing or forming a suitable impermeable layer on the exposed surface or on a part of it.

3. Items according to one or more of the preceding claims in which the polymeric resin is made self-extinguishing.

4. Items according to one or more of the preceding claims in which springs are in a variable quantity and made in any dimension and shape.

5. Items according to one or more of the preceding claims in which external coverings in natural or synthetic material can be added, behaving as cover and/or stuffing.

6. Items according to one or more of the preceding claims for the construction of springs mattresses, divans, arm-chairs, saddlery for motor vehicles.

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