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(54) **Mattress and mattress production method**

(57) A mattress (1) comprising an essentially rectangular mattress spring unit (2), in which pocket springs (3, 4) are arranged, and a frame (5) at least one side portion (8), confining the walls of said mattress spring unit (1), wherein the mattress spring unit (1) is attached to the side portions (8) of the frame by means of fasteners (11) arranged through said side portions (8) of the frame (5) and extending through a peripheral wall (4) of the mattress spring unit (2).

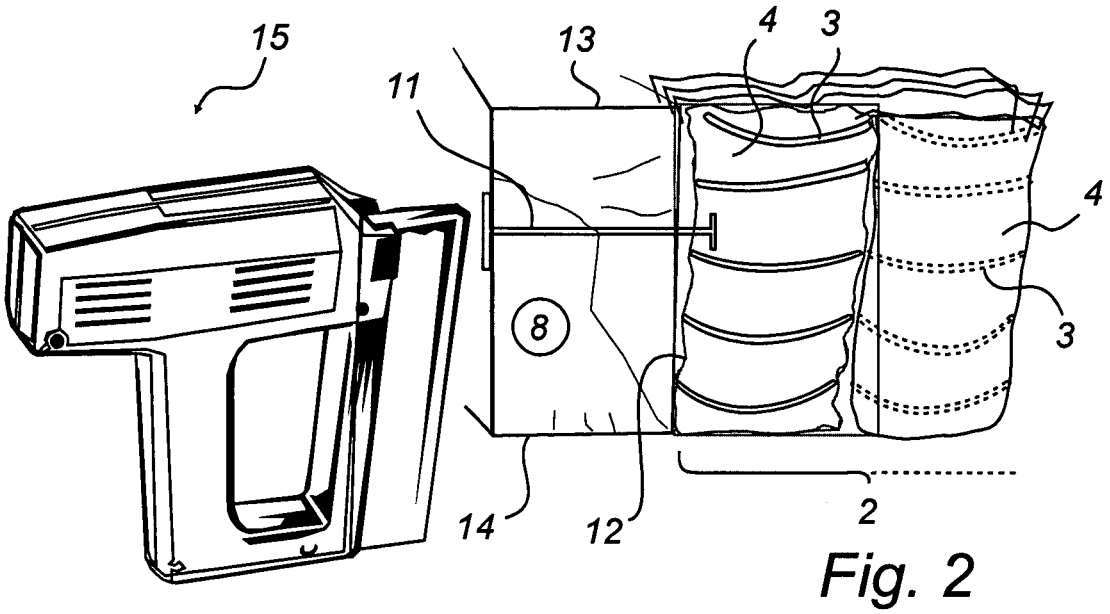

Fig. 2

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Description

Technical Field of the Invention

[0001] The present invention relates to a mattress according to the preamble to claim 1, as well as a method for producing a mattress according to claim 10.

Background of the Invention

[0002] Articulated bed mattresses have been used for quite a while, especially within the area of health care, where it is a desired feature to adjust the shape and inclination of a bed mattress. In many cases such bed mattresses use foam or polyether upholstery, but spring mattresses are also available for this field of application. The use of a spring mattress has the advantage of making it possible to produce a mattress which is very comfortable and also capable of breathing, that is, permitting passage of air, especially moist air. The interest in articulated or adjustable beds for residential market has increased in the last couple of years and at this date there are several systems available.

[0003] If a mattress spring unit is to be used for a bed in general, and an adjustable bed in particular, the spring unit, comprising several pocket springs (coil springs that are individually enclosed in fabric), needs to be confined in some way in order for the mattress spring unit to maintain its shape. If not, the side portions of the unit tend to bulge inwardly or outwardly. With a very high density of springs this bulging tendency would be inhibited. However, this solution would be too expensive to use in most cases. Thus, for beds in the medium price range bulging is a problem and several ways of avoiding the effect are known in the art. For non-adjustable beds a wooden frame is a common way to provide stability to the bed. A common approach for articulated beds is to arrange a thin metal frame in the form of a strip or a wire around the spring unit, thus preserving its shape. This metal frame obviously needs to be flexible enough to conform to the articulation of the mattress and in general comprises two metal bands, one at the top and one at the bottom of the mattress spring unit, attached to each spring or every other spring. The metal frame can also comprise a single wire arranged around the vertical waist of the spring unit. Though flexible enough to bend, each metal band will act somewhat like a bowstring as the mattress spring unit bends and inhibit the movement of said mattress. Further, this method is relatively expensive and complicated in that an extra element, not adding to the comfort of the mattress, has to be supplied and arranged.

[0004] Another approach is to glue the spring unit to the inside of the upper portion of a surrounding box of polyether material or to a nonwoven. The polyether material provides flexibility and weight distributing properties, and in this way this is a more convenient solution than the former. The solution does, however, have the drawback of introducing stress into the system during adjustment and use of the bed, leading to unwanted noise, emanating from the loosening and reattachment of the adhesive. An inherent negative effect is also that the gluing of the polyether or nonwoven will interconnect the individually pocketed springs, thus removing one of the positive effects of having individually pocketed springs. Further, as the bed is adjusted to a non-linear position the mattress spring unit is bent, and the resulting tension from the upper portion of the surrounding box will bias the springs and have a negative effect on the spring properties.

[0005] An example of securing a layer of foam rubber onto the cushioning material of a mattress is shown in WO 2005/027 689.

Summary of the Invention

[0006] The present invention intends to overcome the above-mentioned drawbacks of prior art by means of a mattress comprising a mattress spring unit, in which pocket springs are arranged, and a frame having at least one side portion, confining said mattress spring unit, characterised in that the mattress spring unit is attached to said at least one side portion of the frame by means of at least one fastener arranged through said at least one side portion of the frame and extending through a peripheral wall of the spring unit.

[0007] The use of fasteners arranged through a side portion of the frame ensures a stable and secure attachment of the mattress spring unit, which prevents it from bulging, inwardly or outwardly, during use. Further it is a cost-efficient solution and does not give rise to any fumes that potentially could affect the health and wellbeing of the person handling the attachment of the side portions and, consequently, it does not require the same type of protective equipment. The use of separate points of attachment in the side portion provides a flexible connection that with ease adjusts to the movements of the adjustable bed, without unnecessary tension or noise. The fasteners can be attached to the spring unit by penetration through a cover, wrapping the spring unit, though in a preferred embodiment they penetrate a wall of an individual pocket, making the use of an additional cover redundant.

[0008] The individual pockets are preferably interconnected laterally by means of an adhesive or stitching.

[0009] The fastener can be an H-shaped plastic fastener providing a flexible, cost-efficient and age-resistant fastener. The fasteners are preferably arranged in series along the side portions, at a suitable distance between adjacent fasteners, the distance being dependent on the properties of the spring mattress. A suitable distance would be in the order of 5-60 cm, preferably 10-30 cm.

[0010] The frame can also comprise a top side and a bottom side, which when applied to the frame provide a box-like shape, in which the spring unit is arranged. The arrangement of a top and a bottom side adds to the stability of the assembly consisting of the frame and the

spring unit. Further, when the bottom side has been fastened to the frame it helps in preserving the appropriate shape and simplifies the arrangement of the spring unit.

[0011] The frame can preferably comprise a polyether foam material, which is widely used in this field of application, having the suitable properties, though other equally reliable materials such as polyester, latex, coir fibre etc could also be used.

[0012] The described mattress is particularly suitable for an adjustable bed, since it eliminates drawbacks mentioned above of prior art combinations of spring mattresses and adjustable beds.

[0013] A method for production of a mattress according to the invention comprises the steps of:

- arranging a mattress spring unit, comprising pocket springs, in a frame, having at least one side portion,
- attaching said spring unit to said at least one side portion of the frame by means of fasteners provided through said at least one side portion of the frame and extending through a peripheral wall of the spring unit. This also gives the above advantages.

[0014] In a more detailed embodiment the method can comprise the steps of:

- arranging a mattress spring unit, comprising a pocket spring arrangement, in a frame,
- conveying the assembly of said frame and mattress to a pair of opposed tools for insertion of fasteners,
- stopping the conveyance of said assembly and inserting the fasteners through a side portion of the frame into the spring unit by means of the opposed tools,
- conveying said assembly approximately 10-30 cm and repeating the last two steps for the entire length of the assembly.

[0015] This embodiment provides a method suitable for production on an industrial scale, with efficient use of time, space and material.

Brief Description of the Drawings

[0016]

Fig. 1 is an exploded view of a bed according to a first embodiment of the invention.

Fig. 2 is a detailed view of the fastening of a spring mattress unit to a frame according to the embodiment of Fig. 1.

Fig. 3 is a schematic sectional view showing the bed of Fig. 1 in an adjusted/articulated position.

Detailed Description of a Preferred Embodiment

[0017] The mattress 1 of Fig. 1 comprises a mattress spring unit 2 comprising a number of metal coil springs 3, individually packed, pocketed, in nonwoven pockets 4. The individual pockets 4 are glued or stitched together to a suitable loosely rectangular shape. The mattress spring unit 2 is arranged in a polyether frame 5, defining the outer boundaries of the final mattress 1. The frame 5 has a head portion 6, a foot portion 7 and two opposing side portions 8, forming an essentially rectangular frame. The polyether frame 5 is provided with a top side 9 and a bottom side 10, where at least the top side 9 can comprise a breathable material for increased comfort. The top and bottom sides 9 and 10, respectively, are fastened to the frame 5 in proper alignment therewith, by means of a suitable adhesive. In the preferred embodiment the bottom side 10 is preattached to the frame 5, or constitutes an integral part thereof, thus providing a box-like structure in which the mattress spring unit 2 can be placed. Plastic fasteners 11 extend through the frame wall and into an individual coil spring pocket 4, thus holding the peripheral wall 12 of the pocket 4 to the inner wall of the frame 5. The plastic fasteners are arranged between the upper and lower rim 13 and 14, respectively, of the frame at a distance from each rim and in series along the side portions 8 of the frame. The plastic fastener 11 is preferably in the form of an H-shaped heavy duty fastener of the type commercialised by Avery Dennison Corporation as a part of the Extra Heavy Duty T-end™ system.

[0018] The mattress is at a later stage arranged in an adjustable bed frame, or in a frame for a regular bed, of a well-known type, the former preferably being provided with a motor for comfortable adjustment of position.

[0019] In use the plastic fasteners 11 will hold the mattress in position in the adjustable bed frame and provide secure and comfortable adjustment. When the adjustable bed is adjusted, for instance to a position as shown in Fig. 3, the point-wise fastening will allow the spring unit to move relatively freely. The arrangement along the vertical waist, between, and at a distance from, the rims 13, 14 results in only a small degree of tension being introduced into the system, which consequently results in a smooth articulation/adjustment of the bed.

[0020] The production of the bed is straight forward and at least the last assembly steps can be performed on a conveyor-line. The frame 5, to which the bottom portion 10 is attached, is placed on a conveyor and the mattress spring unit 2 is arranged in the frame 5. The top portion 9 is aligned with, and attached to, the frame 5. The assembly consisting of the frame 5 with top and bottom portions 9 and 10, respectively, is conveyed to a pinning machine. The pinning machine basically consists of two opposed tools 15 for arrangement of the pins and position sensors. The tools 15 are of a type commercially available from Avery Dennison Corporation, compatible with the previously mentioned pins. As an end of the mattress 1 enters the space between the opposed tools 15, the conveyor will stop and the tools 15 will address the side portions 8 of the frame 5 and insert a pair of pins 11. Then the mattress 1 will be conveyed further 10-30

cm before its stops for insertion of another pair of pins 11. This is repeated until the mattress 1 has left the space between the opposing tools 15 and the mattress 1 is ready for optional further steps in the production. The conveyed distance between adjacent pins depends on the properties of the mattress spring unit 2, such as distance between adjacent pocket springs 3, 4, and on the required quality of the fastening.

[0021] It is obvious that the above preferred embodiment is described as an example only. The invention as defined in the claims is not limited to this specific embodiment. For example, the fastening means may well be of another type, providing the same qualities, and the pockets for the springs can comprise other materials than a nonwoven, such as another fabric material. Other materials than polyether foam could be used for the frame and the top and bottom sheets, respectively, such as latex, polyester, coir fibre etc. The method can be performed by hand instead of with the aid of a conveyor belt and a pinning machine and the order in which the steps of the process are performed is not essential, except that the mattress spring unit needs to be arranged in the frame prior to the attachment between the two. For residential users a rectangular bed is likely to be the most common alternative, but the invention could equally well be applied to beds that are custom-made into circular shapes, triangular shapes, oval shapes etc, limited only by the wishes of a customer or by the limitations of the future arrangement of the bed, on a ship, airplane and so forth.

Claims

1. A mattress (1) comprising a mattress spring unit (2), in which pocket springs (3, 4) are arranged, and a frame (5) having at least one side portion (8), confining said mattress spring unit (1), **characterised in that** the mattress spring unit (1) is attached to said at least one side portion (8) of the frame by means of at least one fastener (11) arranged through said side portion (8) of the frame (5) and extending through a peripheral wall (4) of the mattress spring unit (2).

2. A mattress according to claim 1, wherein said at least one fastener (11) extends through a peripheral wall (4) of at least one individual pocket spring.

3. A mattress according to claim 1 or 2, wherein the pocket springs (3, 4) are joined laterally by means of an adhesive.

4. A mattress according to claim 1 or 2, wherein the pocket springs (3, 4) are joined laterally by means of stitching.

5. A mattress according to any one of the preceding claims, wherein the fasteners are H-shaped plastic fasteners (11).

6. A mattress according to any one of the preceding claims, wherein the fasteners (11) are arranged in series with approximately 10-30 cm between adjacent fasteners.

7. A mattress according to any one of the preceding claims, wherein the frame (5) is provided with a bottom side (10) and a top side (9).

8. A mattress according to any one of the preceding claims, wherein the frame (5) comprise a material selected from the group consisting of polyether foam, polyester, latex, coir fibre.

9. An adjustable bed comprising a mattress according to any one of the preceding claims.

10. A method for production of a mattress, comprising the steps of

    - arranging a mattress spring unit (2), comprising pocket springs (3, 4), in a frame (5) having at least one side portion (8),
    - attaching said spring unit (2) to said at least one side portion (8) of the frame (5) by means of fasteners (11) arranged through said side portions (8) of the frame (5) and extending through a peripheral wall (4) of the spring unit (2).

11. A method for production of a mattress according to any one of the preceding claims, comprising the steps of:

    - arranging a mattress spring unit (2), comprising a pocket spring (3, 4) arrangement, in a frame (5),
    - conveying the assembly of said frame (5) and spring unit (2) to a pair of opposed tools (15) for insertion of fasteners (11),
    - stopping the conveyance of said assembly and arranging the fasteners (11) through a side portion (8) of the frame (5) into the spring unit (2) by means of the opposed tools (13),
    - conveying said assembly approximately 10-30 cm and repeating the last two steps for the entire length of the assembly.

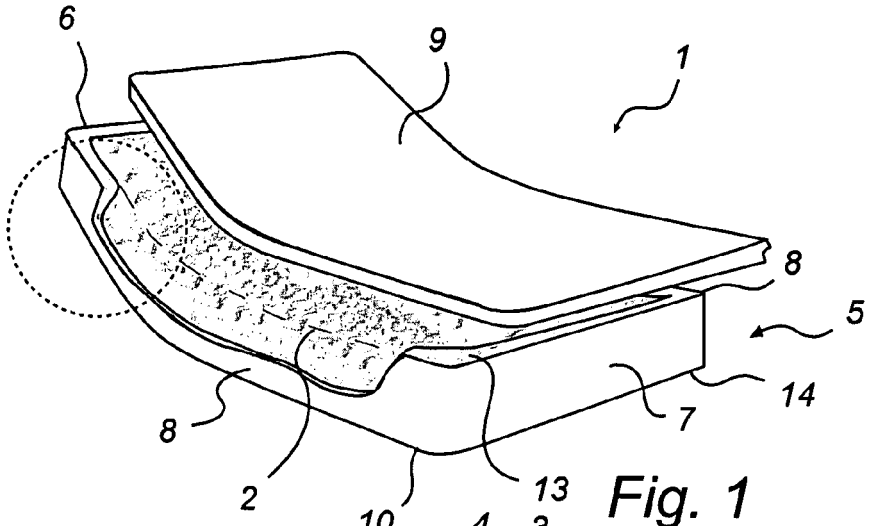

Fig. 1

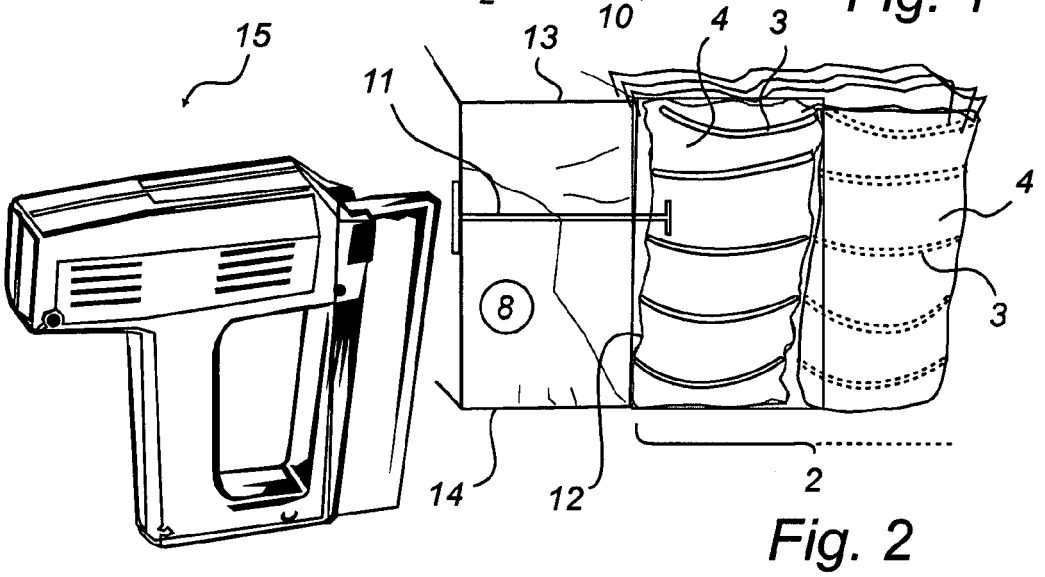

Fig. 2

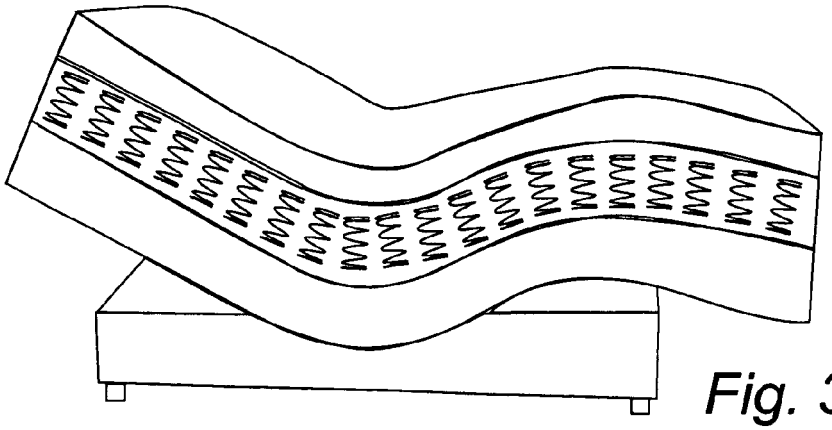

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 05 01 4015

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TECHNICAL FIELDS SEARCHED (IPC)
B68G
A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 December 2005	Kus, S

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

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