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(71) Applicant: **Ecolatex S.r.l.**
20020 Misinto (IT)

(72) Inventors:
- **Caschetto, Giovanni**
  20052, MONZA (IT)
- **Nigro, Davide**
  20020, CERIANO LAGHETTO (IT)

(74) Representative: **Borsano, Corrado et al**
Notarbartolo & Gervasi S.p.A.
Corso di Porta Vittoria, 9
20122 Milano (IT)

(54) **Method for manufacturing mattresses or similar, expecially made of latex, by means of the reversible combination of component modules, and mattresses or similar thus obtained**

(57) The present invention relates to a method for manufacturing a mattress or the like, which comprises the following steps: realization or component modules of at least one part of the mattress, in said modules holes and slots being made; realization of elastic joints suitable for being inserted in said slots or holes; combination of said modules by the reversible insertion of the elastic joints in said slots or holes of the modules.

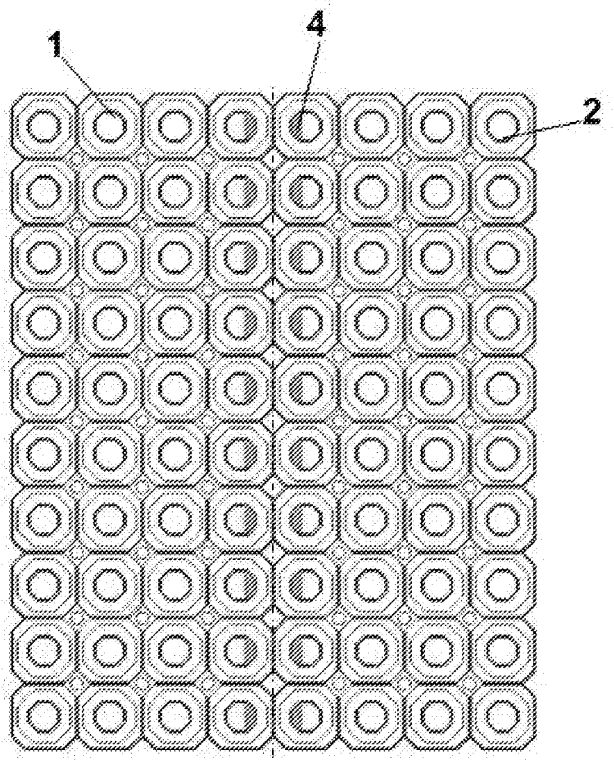

FIG.1.1

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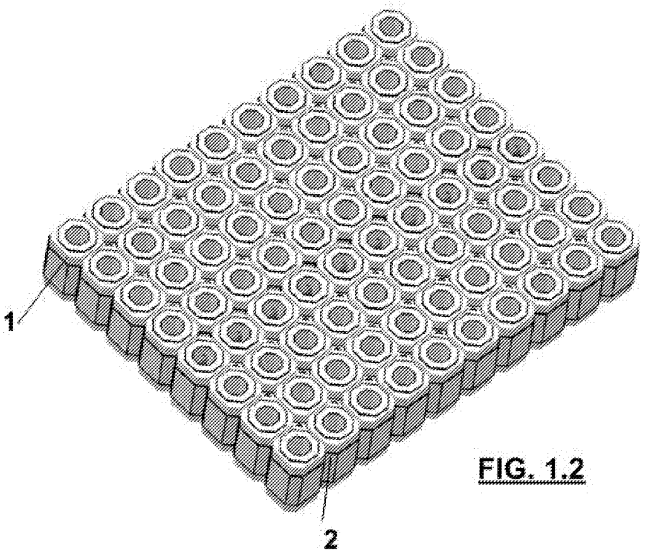

FIG. 1.2

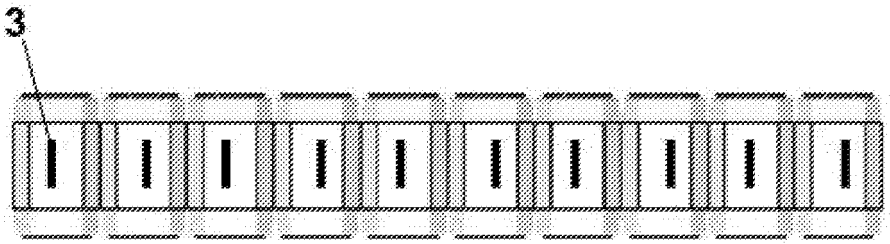

FIG. 1.3

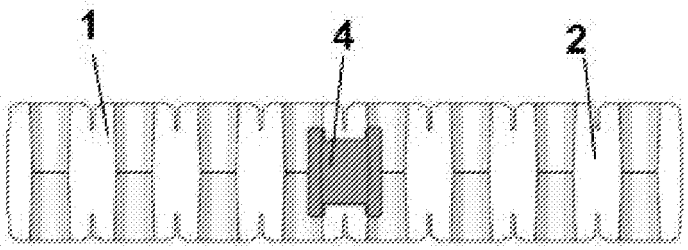

FIG. 1.4

Description

Application field of the invention

[0001] The present invention relates to a method for manufacturing mattresses or the like, especially made of latex, by means of the reversible combination of component modules, and mattresses or the like thus obtained.

Description of the prior art

[0002] The need for varying the performance properties of mattresses and the like, in order to comply with the human anatomy, is known in the art, by realizing different parts of them with different compliance, density or other. For example, it is useful that the mattress part corresponding to the area around the shoulder is more compliant, in order to allow a more comfortable position of the pelvis, by letting the shoulders sink deeply into the mattress, while the area corresponding to the pelvis receives should provide more support.

[0003] Latex mattresses have now been used for many years due to their high performance and durability.

[0004] The realization of mattresses using modular elements made of latex foam or other material, joined together by means of adhesives of various type, in order to vary the characteristics of the different parts of the mattress, is known in the art.

[0005] These realization methods, however, have a number of drawbacks. For example, the products obtained are not reversible, since the different parts are stuck together and cannot be separated anymore without ruining the product itself. The mattresses thus obtained are not suitable to comply with the need of flexible and dynamic products.

[0006] Moreover the employment of adhesives may cause problems of eco-compatibility and allergic reactions.

[0007] The European patent application EP-414586 describes a mattress formed by a plurality of elastically deformable modular elements, connected between each other by means of elongated elements which penetrate through the whole structure of the mattress, along perpendicular lines that do not intersect. The elongated elements laterally project from the edges of the mattress and either they laterally enlarge the lateral edges or they extend outwards until they join and form closed rings on the outside. This solutions has a number of drawbacks due to the different elastic behaviour of the elongated elements with respect to the mattress modules, which make its use uncomfortable, and the replacement of the modules difficult.

Summary of the invention

[0008] Therefore the aim of the present invention is to overcome all the drawbacks mentioned above and to provide a method for manufacturing mattresses or the like, preferably but not exclusively made of latex foam or of other compound material, being modular and having different shapes and dimensions, wherein the different modules are connected in a reversible way by means of joints made of latex foam themselves or of other material, in order to obtain products which are more comfortable, flexible, dynamic and assembled in a completely reversible way.

[0009] The subject of the present invention is a method for manufacturing a mattress or the like, characterized in that it comprises the following steps:

- manufacturing of the component modules of at least one part of the mattress, the configuration of said modules comprising hollow cells; the lateral surfaces of the modules, at least some of the sides that are in contact with each other, comprising holes or slots in correspondence of said hollow cells;
- realization of elastic joints suitable for being inserted in a corresponding slot or hole;
- union of said modules by means of the reversible insertion of the elastic joints in said corresponding slots or holes on the sides of the modules that are in contact with each other.

[0010] A further object of the present invention is a mattress, or a pillow, or an armchair, or a sofa with possibly a built-in bed, obtained by means of said method.

[0011] It is particular object of the present invention a method for manufacturing mattresses or the like, especially made of latex, by means of the reversible combination of component modules, and mattresses or the like thus obtained, as described more fully in the claims that are an integral part of the present description.

Brief description of the Figures

[0012] Further purposes and advantages of the present invention will become clear from the following detailed description of a preferred embodiment (and relative alternative embodiments) and the drawing that is attached hereto, which is merely illustrative and not limitative, in which:

figures 1.1 and 1.2 show a first embodiment of the present invention with modular elements horizontally connected in the direction of the length of the mattress by means of joints, respectively in a plan and in a perspective view;

figures 1.3 and 1.4 show side sections of the first embodiment;

figure 2 shows the joint applied to the embodiment in figure 1;

figures 3 and 4 show a second embodiment of the present invention with modular elements horizontally connected in the direction of the length of the mattress by means of joints, in a perspective view, with modular elements respectively assembled in a com-

plete mattress and separated with an enlarged view of a part comprising the joints;
figure 5 shows a plan view of two modular elements of the second embodiment, with an enlarged view of a part comprising a joint;
figure 6 shows a plan view of the assembled modular elements of the second embodiment, with a section view according to an A-A line, and an enlarged view of a part of the section comprising a joint;
figures 7.1 and 7.2 show a second embodiment of the present invention with modular elements vertically connected in the direction of the height of the mattress by means of joints, respectively in assembled position and in an exploded view; figure 8 shows the joint applied to the embodiment in figures 7.1 and 7.2;
figure 9 shows an embodiment of the mattress similar to that in fig. 3, with a different relative arrangement of big and small cells.

[0013] In the drawings the same reference numbers and letters identify the same elements or components.

Detailed description of preferred embodiments of the invention

[0014] The object of the present invention is a method for manufacturing mattresses obtained by horizontally and/or vertically combining modular elements made of latex foam or other material (in the following called modules), joined together by elastic joints made of latex foam or of other material of different dimension and geometries which, being inserted in appropriate slots made in the modules, realize the reversible combination and may perform in a different way according to the desired comfort characteristics.

[0015] Figures 1.1 and 1.2 show a first embodiment of at least one part of the mattress, by placing side by side two modules 1, 2 having a honeycomb configuration comprising hollow cells. The two modules are connected to each other along the broken line of figure 1.1.

[0016] The modules 1 and 2 may have different colors, mechanical properties, performance properties, dimensions. They are preferably made of latex or latex foam, with natural or synthetic compound.

[0017] On the lateral surface of the modules, on the sides that are in contact with each other, slots 3 (fig. 1.3) of the vertical cut type are made, one slot for each external cell of the module itself, having the same positions on the sides of the modules that will be matching in the mattress.

[0018] The connection between the modules (fig 1.4) is obtained by insertion, in the slots 3 matching between adjacent modules, of appropriate joints 4, one of them being shown in fig. 2. The joint 4 is made of a middle part having a regular elongated shape, to which two lateral ends 4.1 having an expanded section, larger than the one in the middle, are connected. When the joint is inserted, its middle part fills the slots of the corresponding matching cells of the two modules, while the lateral ends having a larger section expand in the cavities of the two matching cells, keeping them firmly connected (see section of fig. 1.4).

[0019] The joint itself may be made of latex or of other material preferably elastic.

[0020] Thus two modules may be placed side by side and connected in order to obtain structures of mattresses of different configuration and dimensions.

[0021] Joints are placed on sides of the modules that are internal to the mattress, and are hidden within it, while they are not present on the external edge of the mattress. This occurs also in case of mattresses combined into a double bed, considering the external edge as the edge of the assembled double bed.

[0022] The joints may be easily removed, for example in order to substitute a module, thus obtaining the reversibility of the connection.

[0023] Figures from 3 to 6 show a second embodiment of a latex mattress 30 according to the invention, comprising modules having a honeycomb configuration comprising hollow cells, wherein elastic joints are substantially realized as protrusions on some of the external sides of the modules, for example in correspondence of the middle part of the cells, and therefore they are no longer distinct elements, but they are part of the modules.

[0024] In particular, a joint comprises a part having a regular elongated shape 40 which projects as a protrusion from the middle of a cell of a side 41 of the module, and a lateral end 42 having an expanded section, larger than the one having a regular elongated shape 40.

[0025] Also in this case, on the lateral surface of the modules, on the sides that are in contact with each other, slots 3 (fig. 1.3) of the vertical cut type are made, one slot for each external cell of the module, placed in correspondence of the protrusion of the joints on the adjacent module, which therefore may be inserted in the corresponding slots in order to combine the modules with each other.

[0026] When the joint is inserted, its part having a regular elongated shape 40 fills the slots of the corresponding matching cell of the adjacent module, while the lateral end 42 having a larger section expand in the cavity of the two matching cells, keeping them firmly connected (see section of fig. 6).

[0027] In this case the joint is made of the same material as the module.

[0028] The mattress 30 is therefore formed by a number of modules, for example from 31 to 35 in the figures, some of them having only slots (32 and 34 in the figures), or having only joints (31, 33 and 35 in the figures).

[0029] Also in this case joints are placed on the sides of the modules that are internal to the mattress, and are hidden within it, while they are not present on the external edge of the mattress, which neither has any corresponding slot.

[0030] In both the alternative embodiments described above, a module may have a honeycomb shape comprising hollow cells having an octagonal structure and being connected with each other. The cells may have different dimensions, even within the same module. For example in the module 33 (fig. 5), both big cells 45 and small cells 46 (for example half of the dimensions of the big cells) can be seen.

[0031] Big and small cells may alternate in any way. See for example another embodiment of the mattress in fig. 9.

[0032] Figures 7.1 and 7.2 represent a third embodiment of at least one part of the mattress by means of the connection of modules 5 and 6 by means of a third embodiment of the joint 7. The modules 5 an 6 are vertically connected in the direction of the height of the mattress.

[0033] The joint 7 is formed by an enlarged middle part which may be shaped in different ways: for example in the figures it has a cylindrical shape, but for example it may also have a round shape. From the middle part of the joint two extensions 9, 10 branch off, suitable for being completely inserted in corresponding holes 8 made in the two modules in order to join them. The two modules embody two corresponding layers in the structure of the mattress.

[0034] As for the previous embodiments, the modules 5 and 6 may have different colors, mechanical properties, performance properties and dimensions, and are preferably made of latex or latex foam, having natural or synthetic compound. Also the joint 7 may be made of latex or of other material preferably elastic. The elastic joint thus positioned allows to obtain a rotational movement of the upper module with respect to the lower module, thus facilitating the adaptation of the mattress to the anatomic curves of the user.

[0035] Also in this case more modules may be placed side by side and connected in order to obtain structures of mattresses having different configuration and dimensions. Moreover the joints may be easily removed, for example in order to replace a module, thus obtaining a reversible connection.

[0036] Also in this third alternative embodiment it is possible to cross join more modules, by using for example the method described for the first and the second embodiment, namely by employing elastic joints in order to obtain an horizontal reversible connection of the modules.

[0037] Therefore it is generally possible to obtain a mattress, either partially or as a whole, by placing the modules side by side and by placing layers one on top of the other in horizontal and/or vertical direction, according to any of the configurations of the two alternative embodiments described above.

[0038] By means of the embodiments described above, it is possible to obtain different forms of reversible connection among component modules of a determined structure, for example a mattress: the combination of the modules may occur horizontally in order to obtain the same layer, in the direction of the length of the mattress, or vertically in order to obtain different layers, in the direction of the height of the mattress.

[0039] In the vertical case, the joint has also the function to space out the modules, and therefore has an impact on the performance, giving to the structure lightness and softness, because when the two modules are far from the joint, the relative part of the mattress has a certain rigidity, which may change when the two parts are in contact because they are pressed again each other so that the joint disappears between them. In this case the joint may also reciprocally orient the two parts, making them pivot.

[0040] The mattress thus obtained may more easily comply with the shape of elastic frames which are not flat, but wave-like, for example in order to create different positions, also for being sit, and to facilitate the adaptation to the anatomic curves of the person laying on it.

[0041] It is therefore possible to replace areas of the mattress which are damaged for different reasons, and change along time the areas of the mattress by replacing the modules, when the anatomic needs of the user change.

[0042] In all the embodiments described above, moulds of the appropriate forms are arranged in order to obtain the desired shapes of the modules and of the joints by using know techniques for the person skilled in the art. For example the technique used comprises the latex foam injection in the moulds and its subsequent volcanization for producing modules and joints.

[0043] The method for the manufacturing of mattresses according to a possible alternative embodiment of the invention comprises the following steps:

- Realization of the modules (semi-finished products) made of latex foam that will form the mattress, the module being obtained by the injection and the vulcanization of latex foams having determined composition and density; the module being realized with compounds of different composition and density to which specific colors are possibly added, in order to show by means of the color the different performance property, or to which additives are added in order to give particular performance property, such as the self extinguishing; the modules or part of them possibly being realized also in any other material.
- Realization of elastic joints made of latex foam or of any other material. This step is included in the previous one, in case of joints being part of the modules themselves, while it is independent in case of separate joints.
- Assembling of the modules by means of the insertion of the elastic joints in the appropriate housing in order to obtain the reversible connection.

[0044] This system for horizontally or vertically joining modules by means of joints may be applied for mattresses, pillows and in other products such as armchairs, so-

fas, or sofa beds.

[0045] Further alternative embodiments of the method described above are possible, for example by envisaging that the two embodiments of the method described above can be used in the opposite way, namely by realizing vertical connections with the first method and horizontal connections with the second one.

[0046] From the description set forth above it will be possible for the person skilled in the art to embody the invention with no need of describing further details.

[0047] In particular for the production of the semi-finished products it is possible to employ machines and devices of the type known.

Claims

1. Method for manufacturing a mattress or the like, **characterized in that** it comprises the following steps:

   - manufacturing of the component modules of at least one part of the mattress, the configuration of said modules (1, 2, 31-35) comprising hollow cells; the lateral surfaces of the modules, at least some of the sides that are in contact with each other, comprising holes or slots in correspondence of said hollow cells;
   - realization of elastic joints (4, 40, 42) suitable for being inserted in a corresponding slot or hole;
   - union of said modules by means of the reversible insertion of the elastic joints in said corresponding slots or holes on the sides of the modules that are in contact with each other.

2. Method for the manufacturing of a mattress or similar as in claim 1, wherein said modules (1, 2) are made with a honeycomb configuration comprising said hollow cells; in the lateral surface of said hollow cells, on the sides that are in contact with each other, said slots (3) of the vertical cut type being made.

3. Method for manufacturing a mattress or the like according to claim 2, wherein said elastic joints (40, 42) comprise a part having regular elongated shape (40) which projects as a protrusion connected to a side (41) of the module, and a lateral end (42) having an expanded section, larger than the part having a regular elongated shape (40), so that, when said elastic joints are inserted into the slots, said part in the middle fills the slot of the corresponding cell of the adjacent module, while said lateral end expands in the cavity of the matching cell, keeping it firmly connected.

4. Method for manufacturing a mattress or the like according to claim 2, wherein said elastic joints (4) comprise a middle part having regular elongated shape, to which two lateral ends having an expanded section are connected, so that, when said elastic joints are inserted into the slots, said part in the middle fills the slots of the corresponding matching cells of the modules, while the lateral ends expand in the cavities of the two matching cells, keeping them firmly connected.

5. Method for manufacturing a mattress or the like as in claim 1, wherein said elastic joints (7) comprise an enlarged part in the middle, from which two extensions (9, 10) branch off suitable for being completely inserted in said holes (8) in order to join the relative modules in a pivoting way.

6. Method for manufacturing a mattress or the like as in any of the previous claims, wherein said mattress or similar is obtained by means of any combination of said component modules, placing them side by side and/or one on top the other.

7. Mattress or the like, realized by means of the method of any of the previous claims.

8. Pillow obtained by means of the method of any of the claims from 1 to 6.

9. Armchair obtained by means of the method of any of the claims from 1 to 6.

10. Sofa or sofa-bed obtained by means of the method of any of the claims from 1 to 6.

11. Elastic joint for the reversible connection of component modules of a mattress or similar according to any of the previous claims.

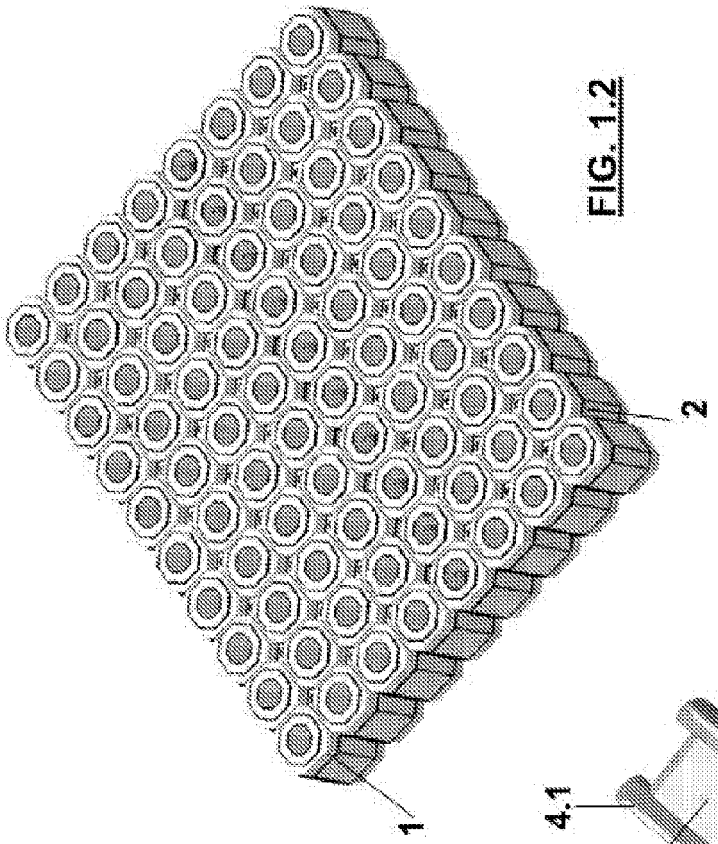

FIG. 1.2

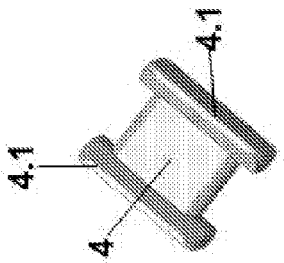

FIG. 2

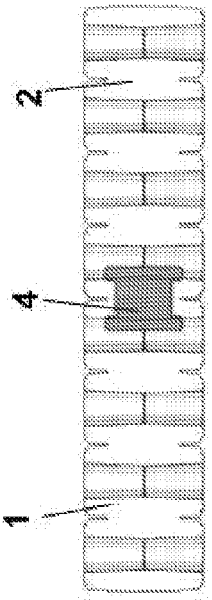

FIG. 1.4

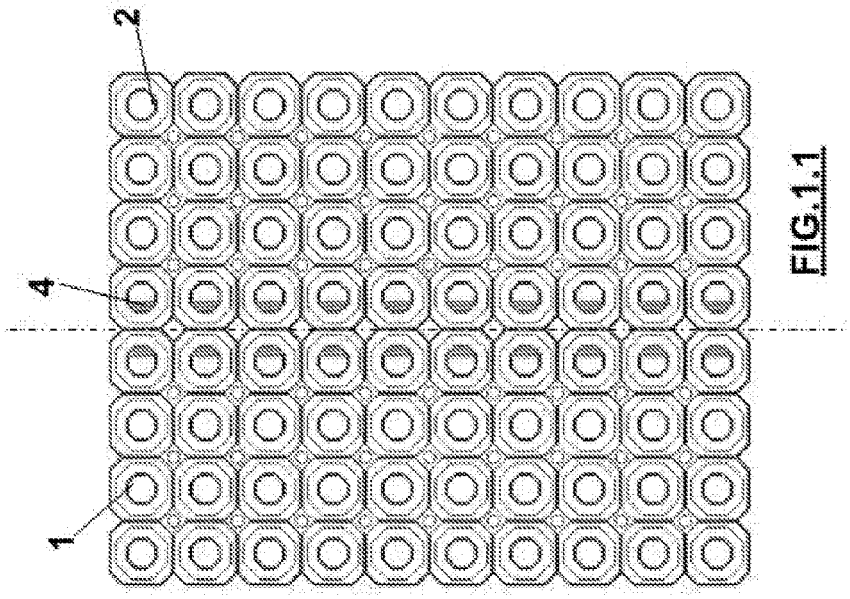

FIG.1.1

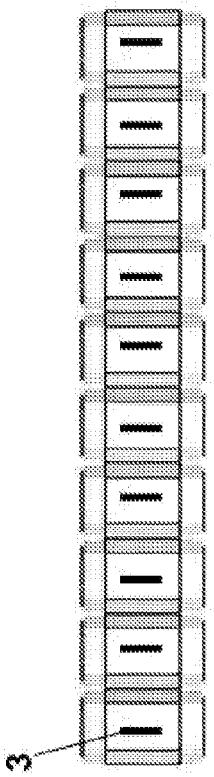

FIG. 1.3

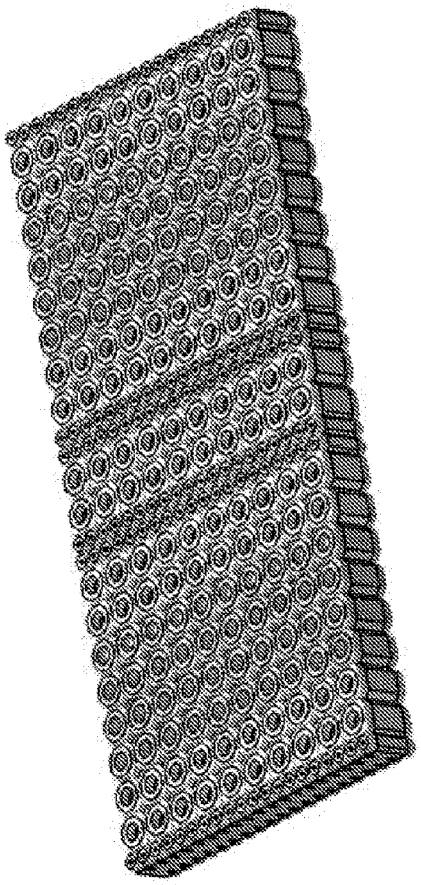

FIG. 3

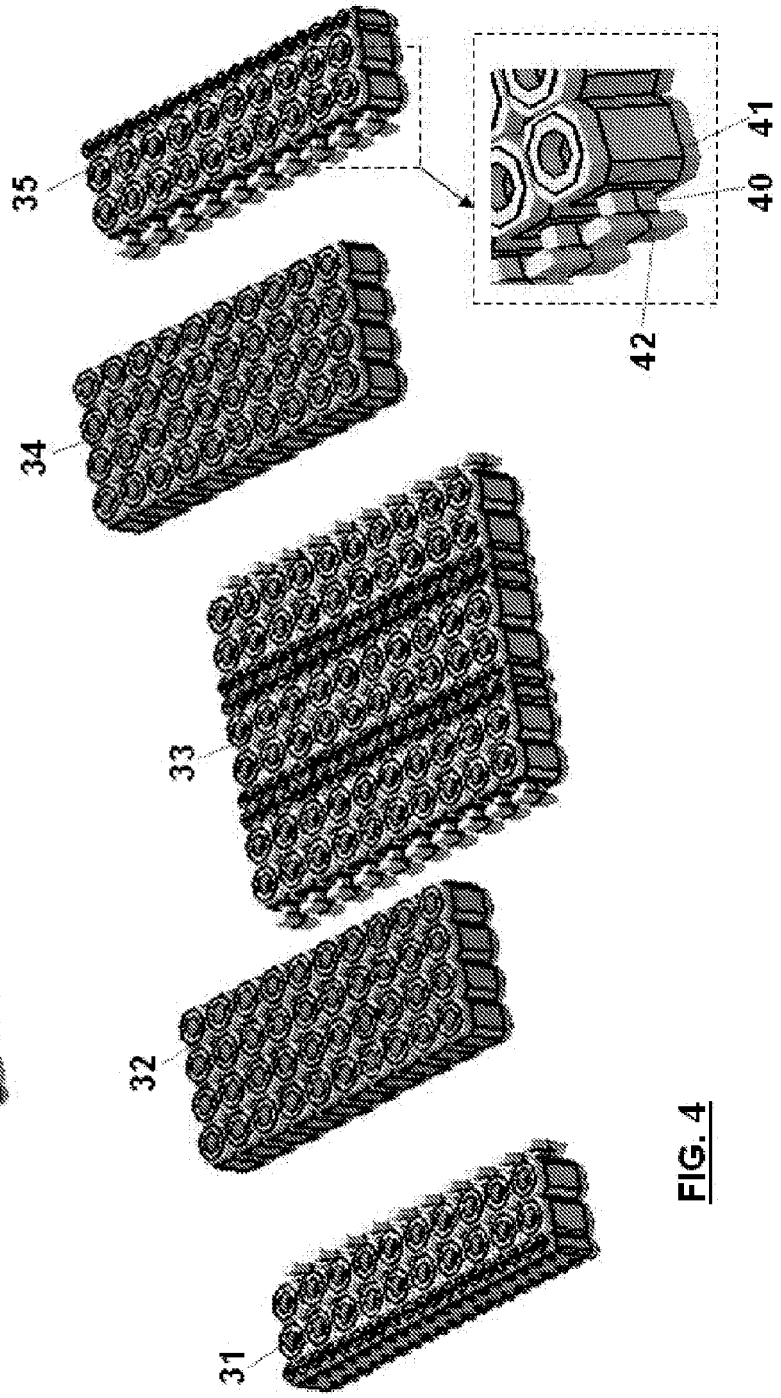

FIG. 4

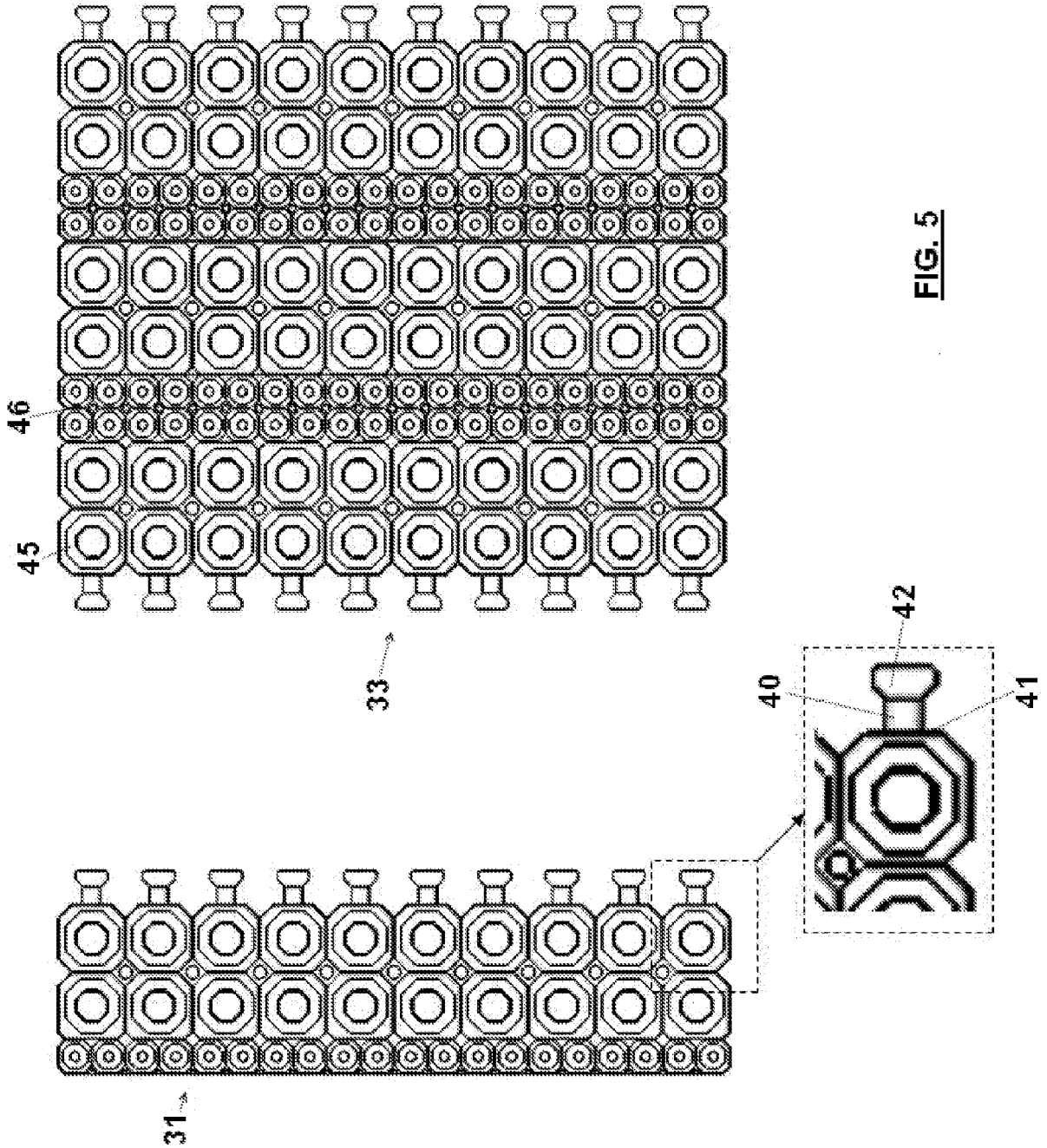

FIG. 5

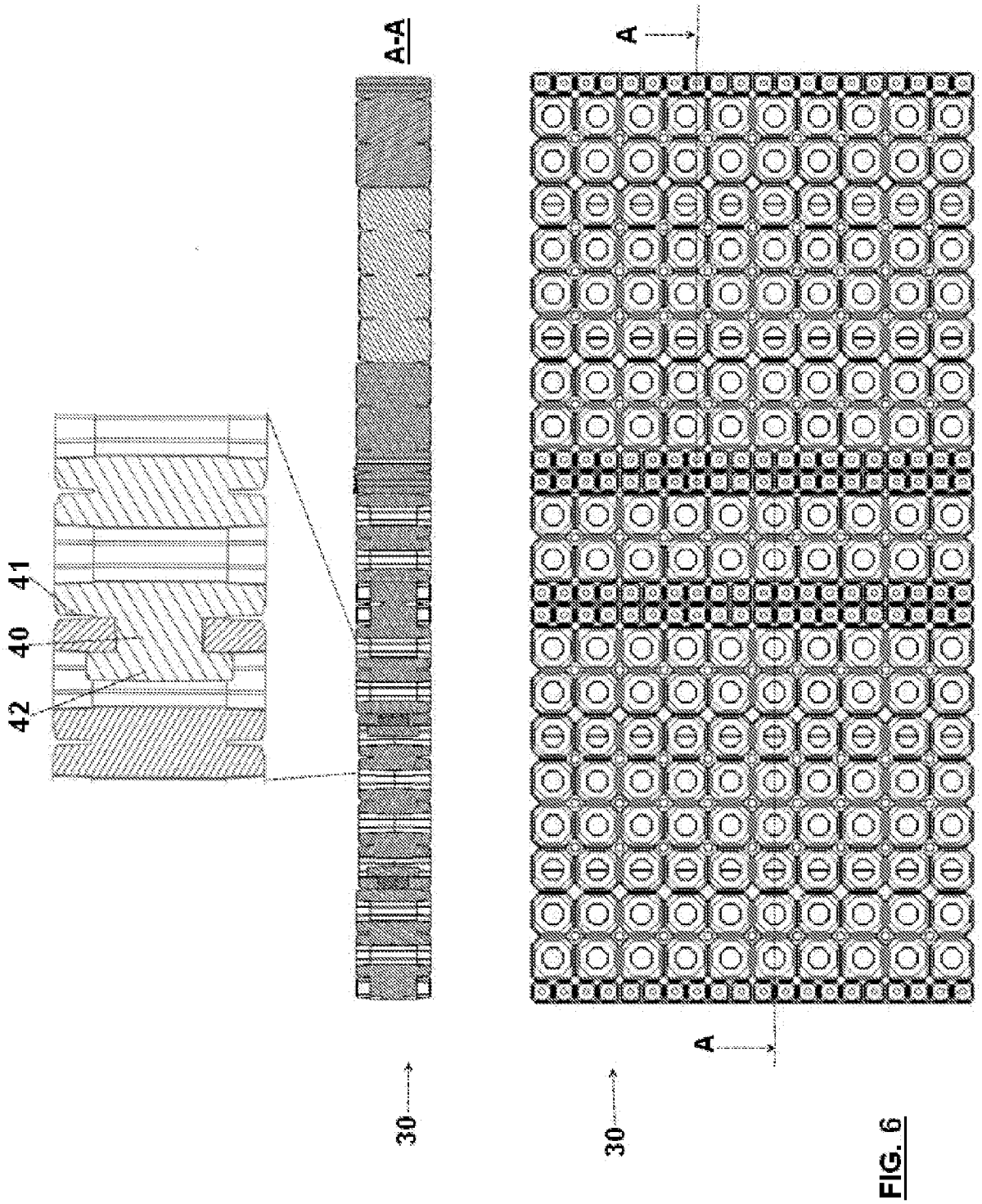

FIG. 6

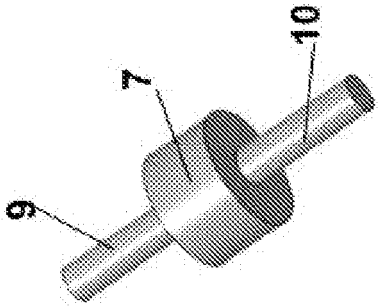

FIG. 8

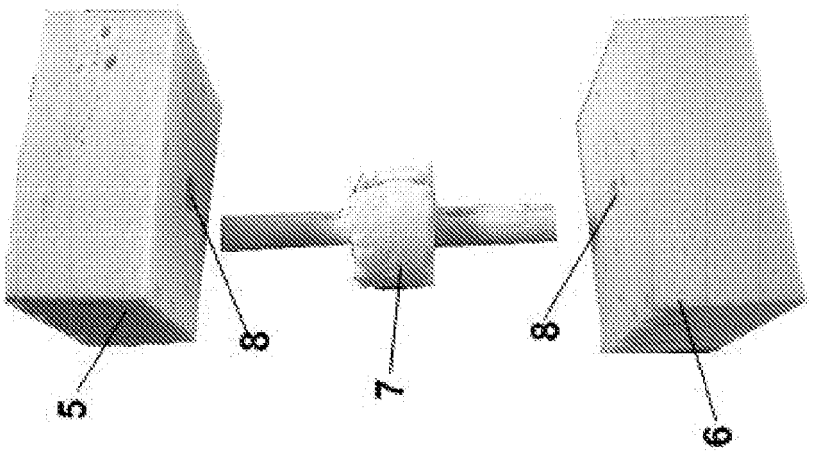

FIG. 7.2

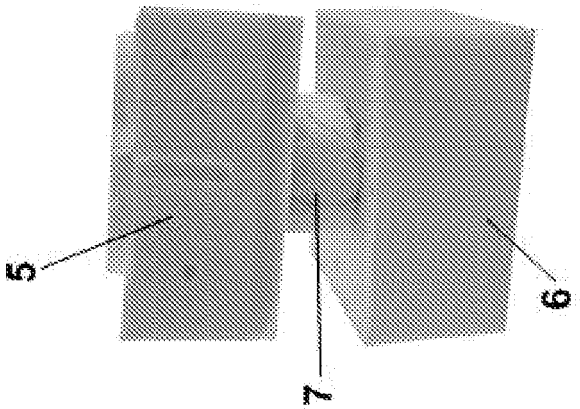

FIG. 7.1

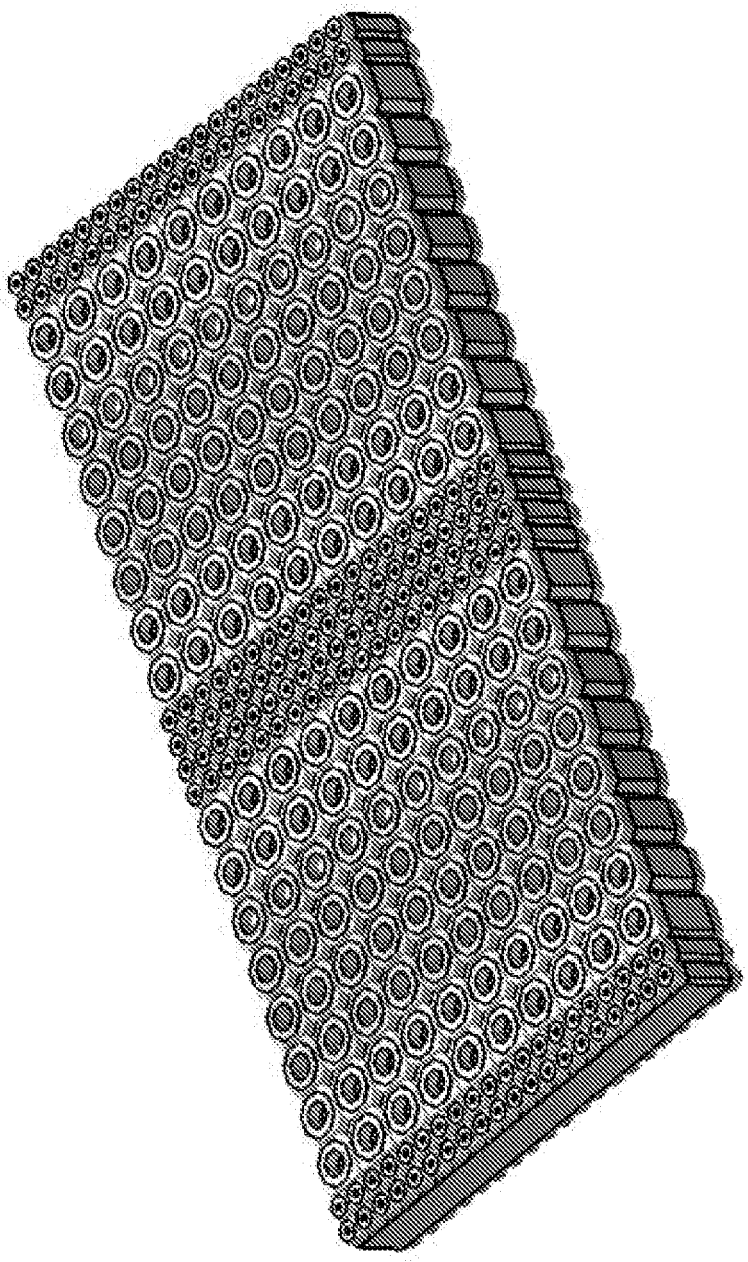

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 10 16 2278

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 878 363 A (FOSSATI VALENTINO [IT]) 16 January 2008 (2008-01-16) * abstract * * figures 1-4 *	1,6-8,11	INV. A47C27/00
X	WO 2008/102034 A (BLANCO MORENO SONIA [ES]; SALAS CASILLAS PATRICIA [ES]) 28 August 2008 (2008-08-28) * abstract; figures *	1,6-11	
X Y	EP 0 414 586 A (GEN FRANCAISE DE LITERIE SA [FR]) 27 February 1991 (1991-02-27) * abstract * * column 3, line 7 - column 3, line 13 * * column 10, line 19 - column 10, line 45 * * figures 4-6 *	1,6-11 2	
Y	US 2008/113143 A1 (TAYLOR DAVID STIRLING [GB]) 15 May 2008 (2008-05-15) * abstract * * figures 1,2 *	2	

TECHNICAL FIELDS SEARCHED (IPC)
A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 September 2010	MacCormick, Duncan

CATEGORY OF CITED DOCUMENTS

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1

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 16 2278

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27-09-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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