(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 089 789**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: 83301324.6

(22) Date of filing: 10.03.83

(51) Int. Cl.³: B 68 G 9/00
A 47 C 27/06

(30) Priority: 17.03.82 IT 936182

(43) Date of publication of application:
28.09.83 Bulletin 83/39

(84) Designated Contracting States:
AT BE CH DE FR GB LI NL

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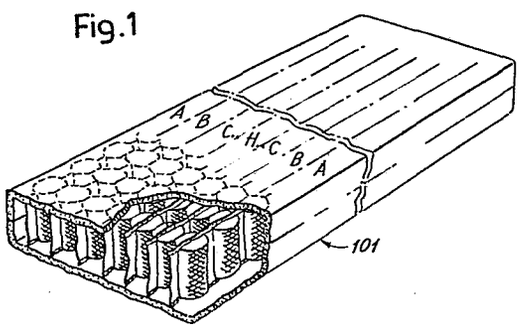
(54) Method of producing elastic articles and mattresses made therefrom.

(57) An elastic article (101) for use in the construction of a mattress is made up of a number of elongate strip elements (A,B,C,H) arranged side-by-side. Each element is made up of a series of closed pockets housing a spring. The spacing of the elements and/or the properties of said springs is such that the properties of elastic resilience of the article vary across its width so that it is most yielding at the centre.

Fig.1



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METHOD OF PRODUCING ELASTIC ARTICLES AND MATTRESSES MADE THEREFROM

The present invention relates to a method of producing elastic articles and also such elastic articles which are suitable for use in the manufacture of matresses or other similar upholstered articles.

Elastic articles may be produced from a plurality of elongate strip elements each of which includes a series of pockets in which a spring is received. The pockets are closed-off at their upper and lower ends.

The present invention provides a method of producing an elastic article from a plurality of elongate strip elements each defining a series of pockets having closed upper and lower ends, and having a spring received in each said pocket, characterized in that the method includes the steps of assembling said plurality of elongate strip elements in side-by-side configuration, adhering a respective flexible layer to the upper and lower ends of said assembled elements to hold them together, and dividing said assembled elements transverse to said elongate direction to produce said elastic articles, wherein the property of elastic resilience and/or the transverse separation of the elements is such that the property of elastic resilience

varies across the article transverse of said elongate direction with the lowest yielding quality towards the centre of the article.

The invention also provides a method of producing an elastic article from a plurality of part articles, each part article being produced from a plurality of elongate strip elements each defining a series of pockets having closed upper and lower ends, and having a spring received in each said pocket, characterized in that the method includes the steps of assembling said plurality of elongate strip elements in side-by-side configuration, adhering a respective flexible layer to the upper and lower ends of said assembled elements to hold them together, and dividing said assembled elements transverse to said elongate direction to produce substantially rectangular elastic part articles, and assembling a plurality of said part articles in coplanar arrangement such that the adjacent part articles in at least one direction have different properties of elastic resilience.

The invention also includes a mattress formed from an elastic article produced by a method as defined above.

Some embodiments of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, in which:

Fig. 1 shows a construction of an elastic article with rows of elongate strip elements, which rows are parallel and have elasticity characteristics which vary in a gradual manner;

Fig. 2 shows an elastic article made up of several part articles;

Figs. 3 and 4 show a two-layer construction of an elastic article made up of part articles;

FIgs. 5 and 6 show an alternative two-layer construction;

Fig. 7 shows two diagrams of characteristics of the components of the article of Figs. 5 and 6;

Fig. 8 shows two diagrams similar to those of Fig. 7, but relating to the construction of Figs. 3 and 4;

Fig. 9 shows a piece of an elongate strip element as used as the elastic articles of Figures 1 to 5;

Figs 10, 11 and 12 show in two perspective and a plan view with cut-away portions, the structure of an elastic article; and

Fig. 13 shows a perspective view to illustrate the

manufacture of elastic articles in a continuous manner.

Referring initially to Figs. 9 to 12, a continuous elongate strip element is used a a starting article to produce the mattress structures. The strip element includes a mainly woven portion which defines pockets 1, inside which helical springs 3 are inserted. The springs are then held in the pockets 1 by closing - by sewing or otherwise - the longitudinal flaps 5 of the pockets until something in the manner of an upper flexible rib is constituted. Thus the pockets are closed at both upper and lower ends.

These elements are already in use for the formation of pillow or like structures, with hand stitching or other equivalent joining, whereby a section of such a continuous strip element is arranged in zig-zag fashion to constitute the surface of the pillow, The body of the actual pillow is formed from adjacent reversed sections of the element.

To enable automation, an elastic structure is made up of a plurality of pieces of the above-mentioned element, denoted by 7 in Figs. 10 to 12, placed side-by-side and joined at the top and bottom by two continuous flexible

layers 9 and 10, which are glued to the upper and lower ends of the pockets 1, to provide a continuous connection. Layers 9 and 10 may be of any material and design, to afford flexibility and resistance. In particular these layers 9 and 10 may be made of fabrics of varying degrees of thickness e.g., netting, knitted fabrics, non-woven fabrics (i.e. of layers of fibres which are not arranged in particular order or spun, which are made to adhere together by felting with, if required, dressing and sizing), or of other suitable materials, which may have varying consistency and elasticity.

To obtain springy structures or elastic articles for use in producing mattresses, a continuous method is adopted. In this method a desired number of continuous elongate strip elements of the type shown in Fig. 9 are fed so that they lie side-by-side in a plane in which the pockets 1 and therefore the springs 3 of the various elements are aligned perpendicular to the plane. As is shown in particular by reference 17 in Fig. 13, these continuous elements 17 are guided in this side-by-side configuration until they are placed in between two strips of the material intended to form layers 9 and 10, which strips are denoted by 19 and 20 and are shown as originating from reels A19 and A20. The strips of material 19 and 20 are provided with adhesive on the surface to be brought alongside the

elements 17 in such a manner that, when the two strips of material 19 and 20 are placed adjacent the opposite ends of the assembled elongate strip elements 17 they adhere and become joined to said elements 17, forming a continuous article. Elastic articles may be produced from this continuous article by means of successive transverse cuts.

Referring to Fig. 1, a manufactured elastic article 101 for use in producing a mattress is made up of parallel rows of elongate strip elements with incorporated springs which extend over the entire length or at any rate for the entirety of one of the two principal dimensions of the manufactured article. The springs in each strip element possess the same characteristics of elasticity, dimensioning and separation. The strip elements of the various rows are denoted by the letters A, B, C,...H with an arrangement symmetrical about the centre line in the direction of the rows. The two elements A are the two outer ones and the element H is the central one. The outermost elements starting at least from B, are more yielding than the inner ones and the most central ones may have the same characteristics for a strip comprising a predetermined number of rows. The elements making up the central rows have characteristics of greater resistance to compression and deformation relative to the outer ones.

A mattress must normally be more resistant to compression in the central area than in the peripheral area, considered in plan. A variation may be produced also by means of a variation in the transverse separation between adjacent rows. The variation of characteristics may be continuous for the various elements A, B, C, ...H, ...C, B, A, or such a variation may be discontinous, by providing groups of rows of strip elements side-by-side, the various elements of which each have the same elasticity characterisics, and the groups in a progressively outward movement from the centre having characteristics of greater yielding.

Fig. 2 shows an elastic article in which the concepts set out above may be implemented, but with the addition of variation of the elastic characteristics in a longitudinal direction in addition to a transverse direction. In Fig. 2 the elongate strip elements with their incorporated springs extend in the direction indicated by the double arrow f102, and the article is made up of several part articles 103 to 119. The part article 103 may be constructed in such a manner as to have maximum resistance to compression deformation; two articles 105 and 107 situated alongside 103 in a transverse direction may have a suppleness greater than that of article 103; the part articles 111, 113, and 117 and 119 at the corners may have even greater suppleness, i.e,. maximum supplness;

part articles 109 and 115 may have intermediate suppleness which may correspond, for example, to that of articles 105 and 107.

It is also possible for part articles 105, 103 and 107 to have the same characteristics of elasticity of lesser suppleness relative to that of the other articles which may have, relative to one another the same or different degrees of suppleness.

In Figs. 3 and 4 an elastic article construction is shown which is formed of two layers, each of which is made up of three part articles. 201, 203, and 205 denote three part articles in which the elongate strip elements may extend perpendicular or parallel to the adjacent edges of the side-by-side part articles. In either case the part article 203 has a resilient suppleness smaller than that of the part articles 201 and 205. A second layer of part articles is constituted by three longitudinal part articles 207, 209 and 211, the adjacent edges of which are perpendicular to those of the adjacent edges of part articles 201, 203, 205. Part articles 207 may have a suppleness smaller than that of elements 209 and 211. The rows of elongate strip elements in these part articles are parallel to their adjacent edges. Thus, with only six elements, there is obtained an arrangement which is functionally similar to that of the article

of Fig. 2, which is made up of nine elements.

In every case the connection of the adjacent part articles may be achieved with connection layers extending throughout the area of the article, or partly, along adjacent areas. At the end, the adjacent part articles may be joined with the same connection layers provided for the adjacent strip elements which constitute the various part articles.

Fig. 5 and 6 show an article of mattress type which is made up of two part articles, one of which 301 has the strip elements extending in the direction of the arrow f301, while the other part article 305 has the strip elements extending in the direction of the arrow f305, i.e., perpendicular to the direction of the elements of the part article 301. Each of the two part articles 301, 305 may be made up with elongate strip elements with incorporated springs which have continuously or discontinuously varying characteristics between the centre area and the peripheral areas. This variation is obtainable in part by variations of distance between centre lines of the elements. In this way there is obtained a variation of characteristics between the centre of the article and each of the sides.

Figure 7 shows by means of two diagrams the approximate variation of rigidity in the longitudinal and transverse direction for the article of Figures 5 and 6, which variation is seen to be continuous.

Fig. 8 shows a double diagram which shows discontinuous variations, such as may be obtained in an article like that of Fig. 3. The two diagrams of Figure 8 refer to the variation of rigidity along two perpendicular sections, longitudinal and transverse.

To obtain a certain peripheral stability of the mattress, it is preferable that the elongate strip elements which are arranged along the edges of the article, should have springs less yielding than those of the adjacent members, as shown in the diagrams of Figs, 7 and 8.

CLAIMS

1. A method of producing an elastic article (101,301, 305) from a plurality of elongate strip elements (17,A,B, C,H) each defining a series of pockets (1) having closed upper and lower ends, and having a spring (3) received in each said pocket (1),
characterised in that
the method includes the steps of assembling said plurality of elongate strip elements (17,A,B,C,H) in side-by-side configuration, adhering a respective flexible layer (9,10, 19,20) to the upper and lower ends of said assembled elements to hold them together, and dividing said assembled elements transverse to said elongate direction to produce said elastic articles (101,301,305), wherein the property of elastic resilience and/or the transverse separation of the elements is such that the property of elastic resilience varies across the article (101,301, 305) transverse to said elongate direction with the lowest yielding quality towards the centre of the article.

2. A method of producing an elastic article from a plurality of part articles (103,105,107,109,111,113,115, 117,119,201,203,205,207,209,211), each part article being produced from a plurality of elongate strip elements (17) each defining a series of pockets (1) having closed upper

and lower ends, and having a spring (3) received in each said pocket (1),

characterised in that

the method includes the steps of assembling said plurality of elongate strip elements (17) in side-by-side configuration, adhering a respective flexible layer (9,10,19,20) to the upper and lower ends of said assembled elements (17) to hold them together, and dividing said assembled elements (17) transverse to said elongate direction to produce substantially rectangular elastic part articles, and assembling a plurality of said part articles (103,105,107,109,111,113,115,117,119,201,203,205, 207,209,211) in coplanar arrangement, such that the adjacent part articles in at least one direction have different properties of elastic resilience.

3. A method of producing an elastic article characterised by further including the step of arranging two elastic articles (201,203,205; 207,209,211) produced by a method according to claim 2, one above the other such that the strip elements (17) of one said elastic article (201,203,205) extend in a direction perpendicular to that of the strip elements of the other elastic article (207,209,211).

4. A method according to claim 3, characterised in that each of said two elastic articles comprises at least three part articles (201,203,205; 207,209,211), the property of elastic resilience of the central part article (203,207) being such that this central part article (203,207) is less deformable than the adjacent part articles (201,205;209,211).

5. A method as claimed in any one of the preceding claims, characterised in that the elastic resilience of the strip elements (17) extending along the edges of the article (301,305) are such that these elements are less yielding than adjacent elements (Fig.7 and 8).

6. A method of producing an elastic article characterised by including the step of arranging two elastic articles (301,305) produced by a method according to claim 1, one above the other such that the strip elements (17) of one said elastic article (301) extend in a direction (F301) perpendicular to that (F305) of the strip elements (17) of the other elastic article (305).

7. A mattress characterised in that it includes an elastic article produced by a method as claimed in any

one of the preceding claims.

8. An elastic mattress element (101; 103,105,107,109 111,113;201,203,205; 207,209,211; 301; 305) including a plurality of elongate strip elements (17,A,B,C,H) each defining a series of pockets (1) having closed upper and lower ends, and having a spring (3) received in each said pocket (1),
characterised in that
said strip elements (17,A,B,C,H) are arranged side-by-side, the side-wise spacing between adjacent strip elements (17,A,B,C,H) and/or the properties of said springs (3) in said adjacent strip elements (17,A,B,C,H) being such that the properties of elastic resilience of the mattress element vary at least from side to side so that the mattress element has its lowest yielding quality towards the centre.

9. A mattress element including two mattress elements (201,203,205; 207,209,211; 301,305) according to claim 8, arranged one above the other with the strip elements (17) of one mattress element (201,203,205; 301) extending substantially perpendicular to those of the other said mattress element (207,209,211; 305).

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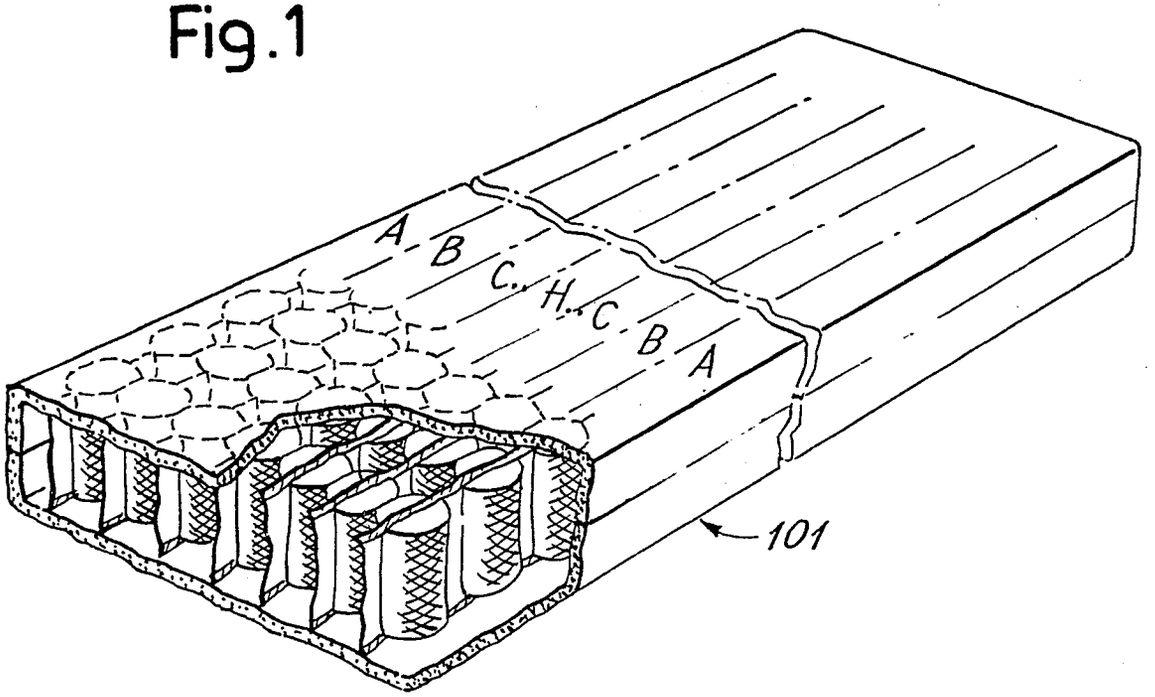
Fig.1



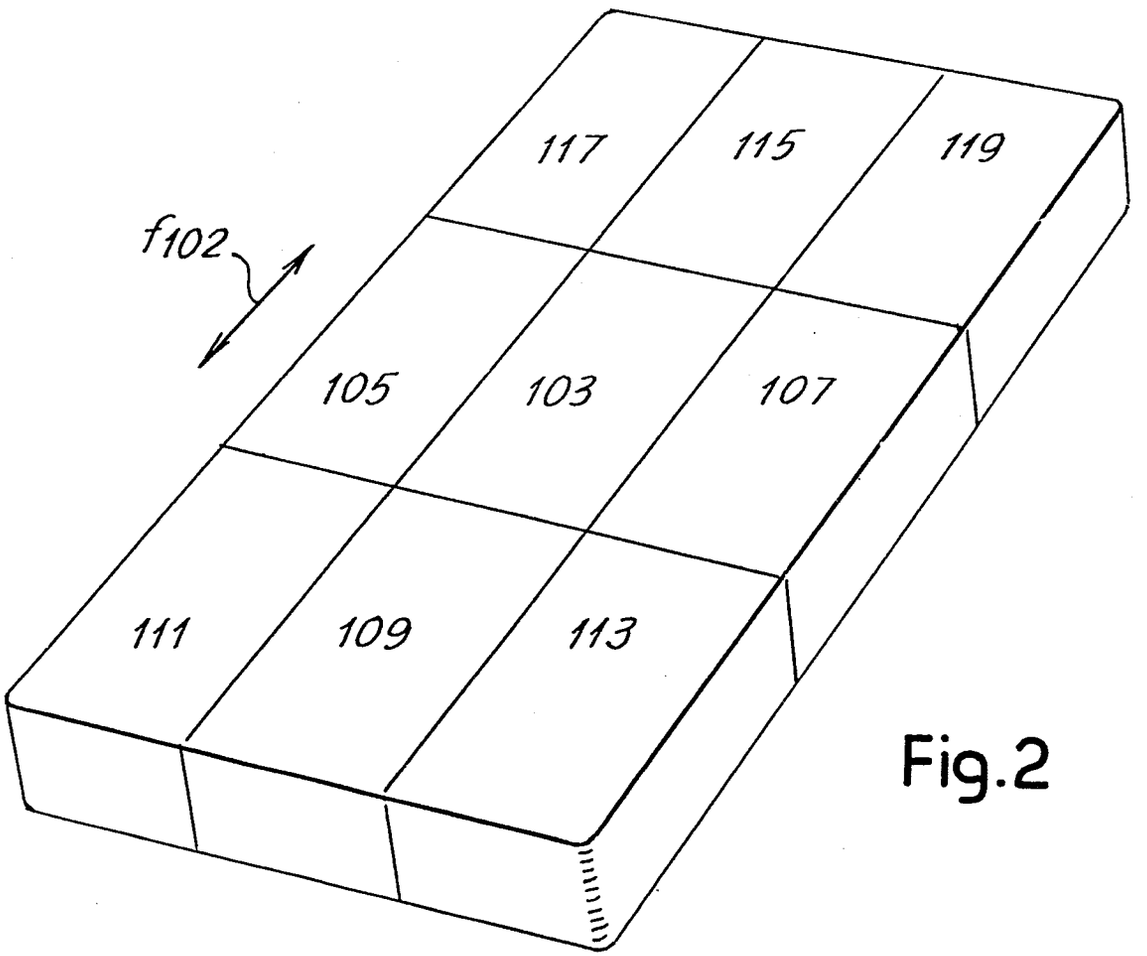


Fig.2

Fig.3

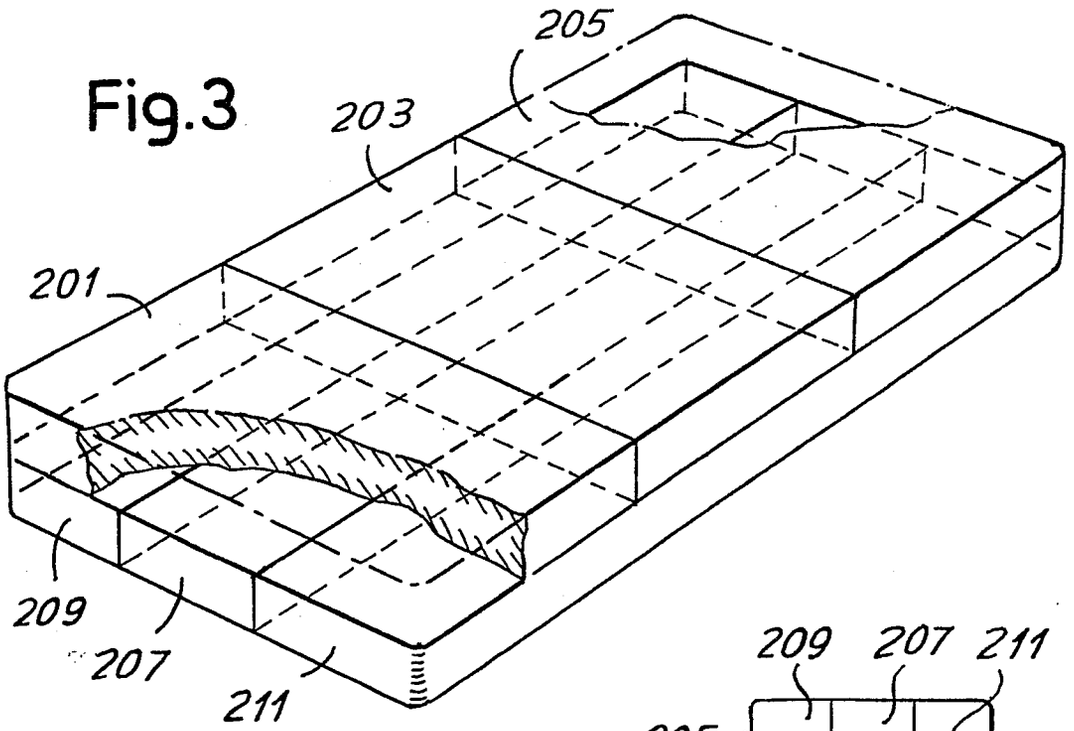


Fig.4

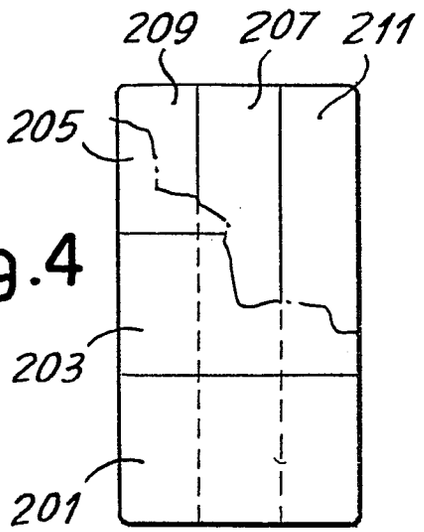


Fig.5

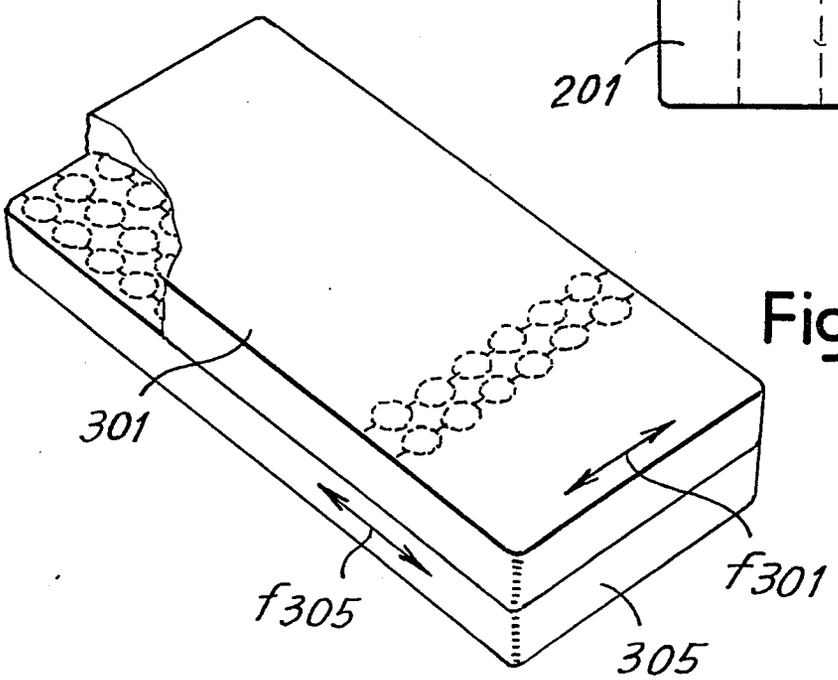


Fig.6

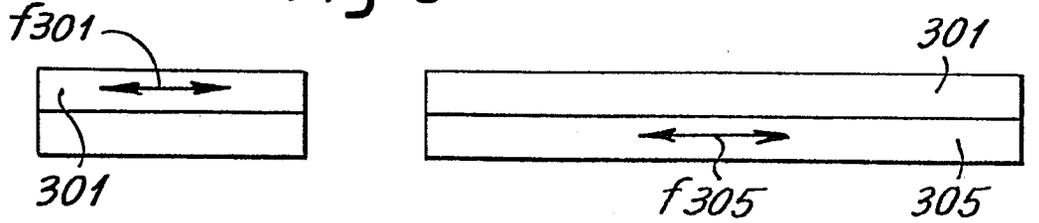


Fig.7

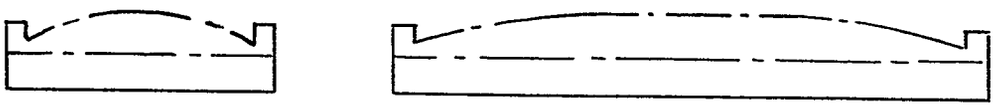
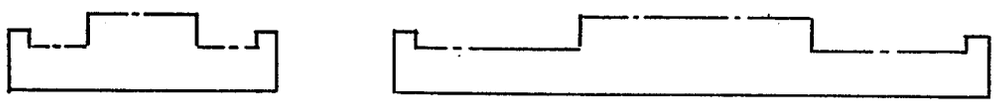


Fig.8



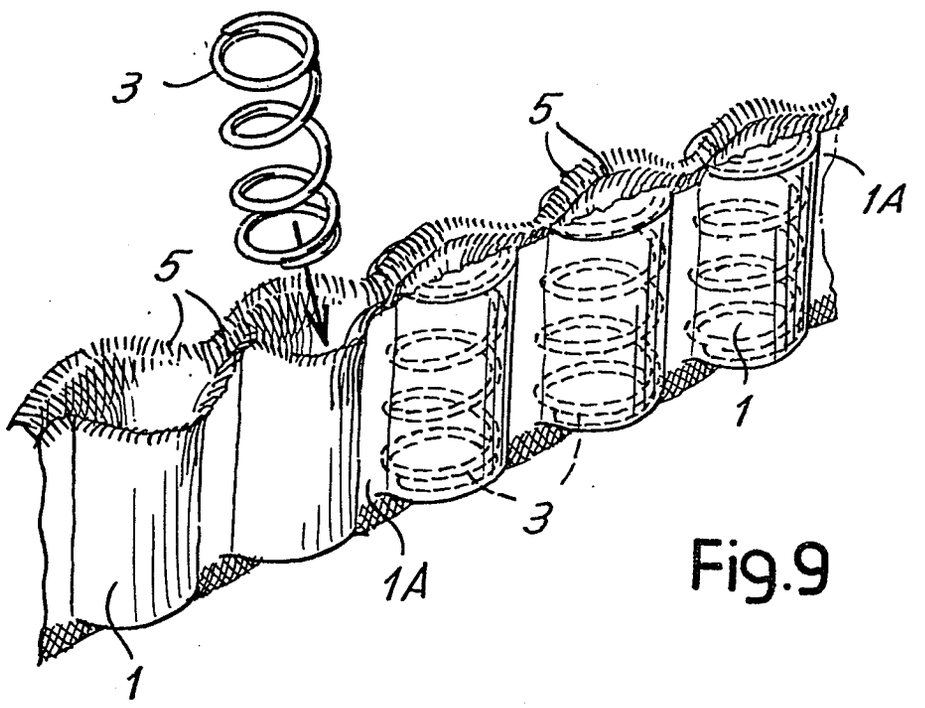


Fig.9

Fig.10

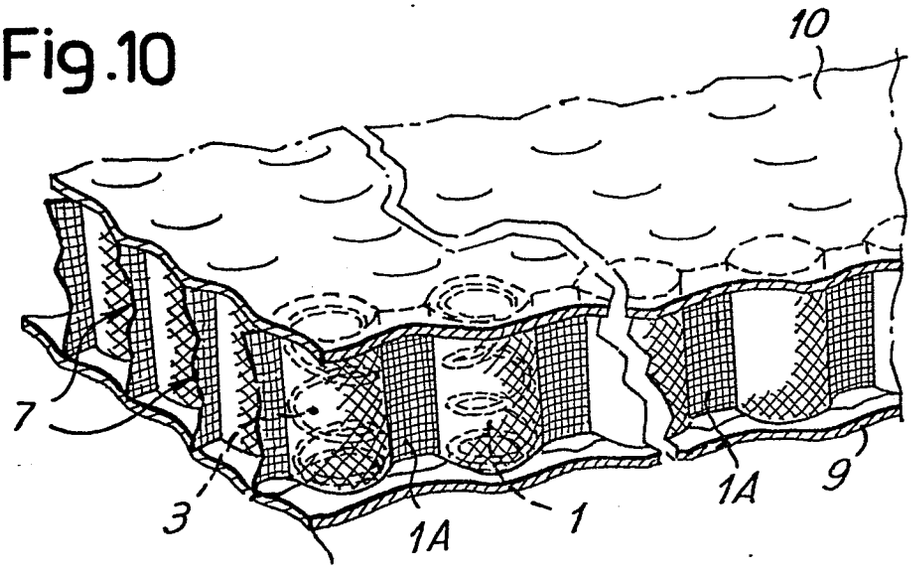


Fig.11

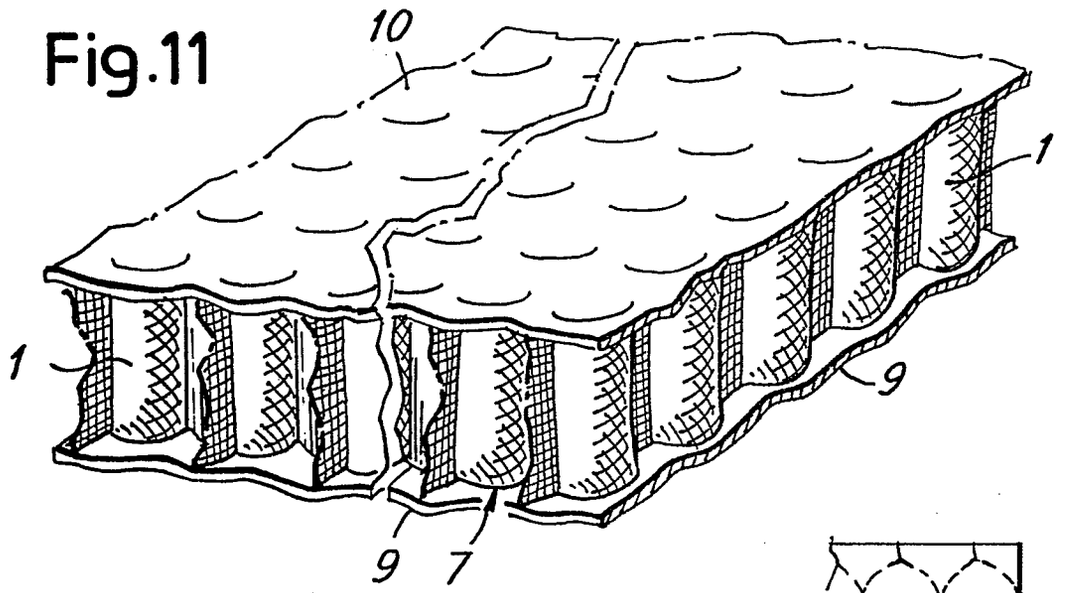
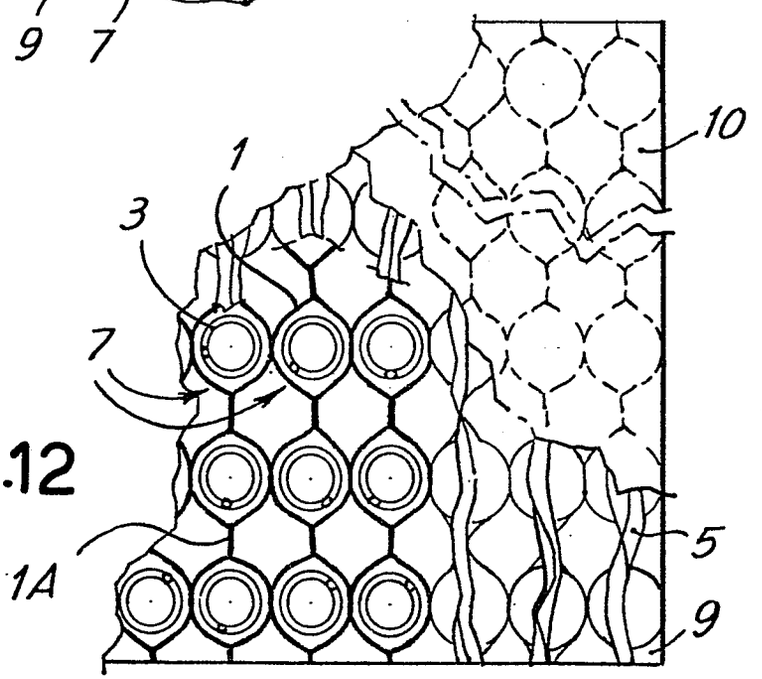


Fig.12



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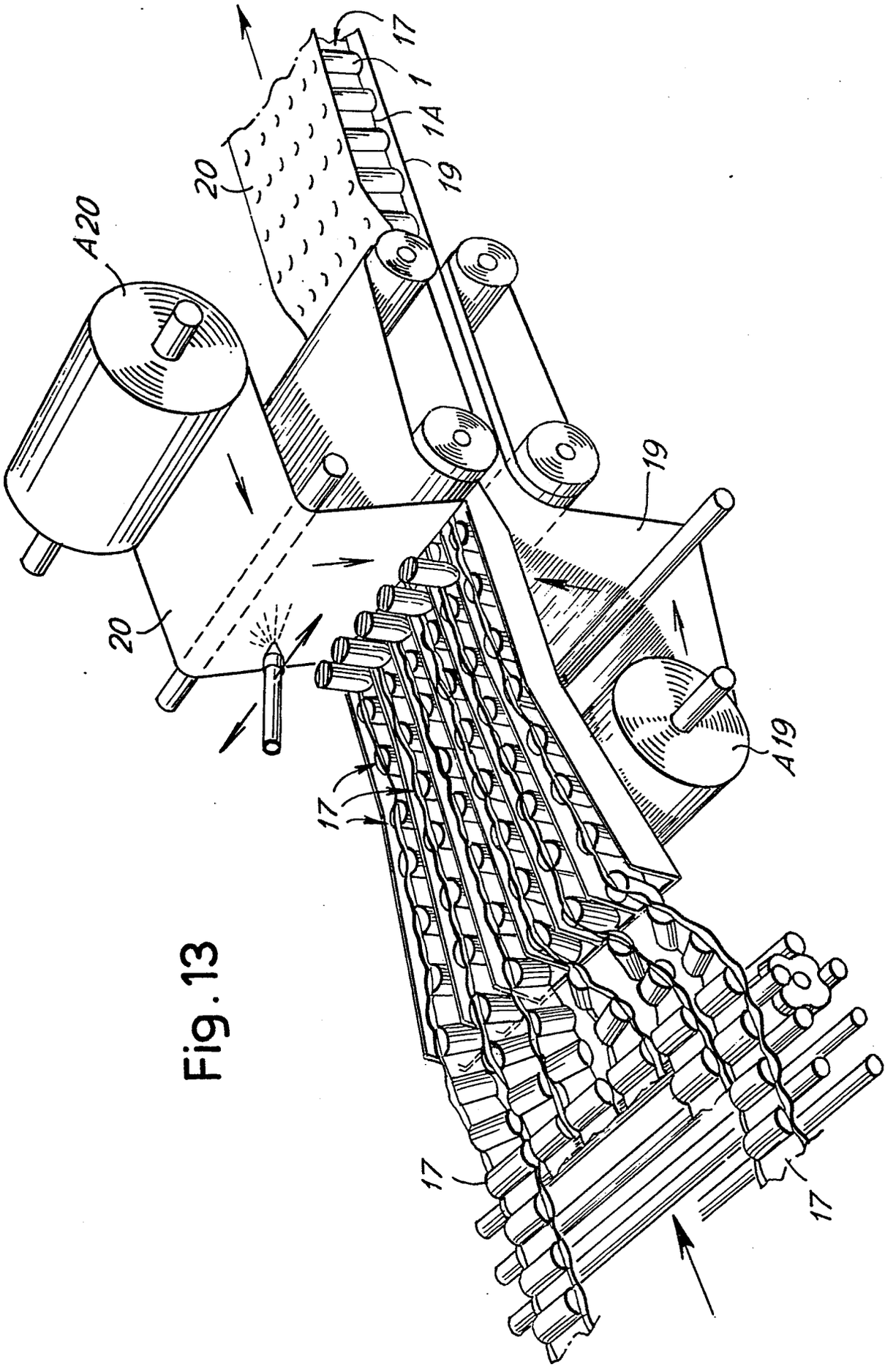

Fig. 13

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EUROPEAN SEARCH REPORT

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Application number

EP 83 30 1324

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	US-A-1 747 374 (McINERNEY) * Whole document *	1,2,7,8	B 68 G 9/00 A 47 C 27/06
A	WO-A-8 102 384 (JOURDAN) * Whole document *	1,2,5,7	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

B 68 G
A 47 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28-06-1983	MARTIN A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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