



(11) **EP 4 094 638 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.11.2022 Bulletin 2022/48

(51) International Patent Classification (IPC):
A47C 31/08 (2006.01) D05B 11/00 (2006.01)

(21) Application number: **22174838.7**

(52) Cooperative Patent Classification (CPC):
A47C 31/08; D05B 11/005

(22) Date of filing: **23.05.2022**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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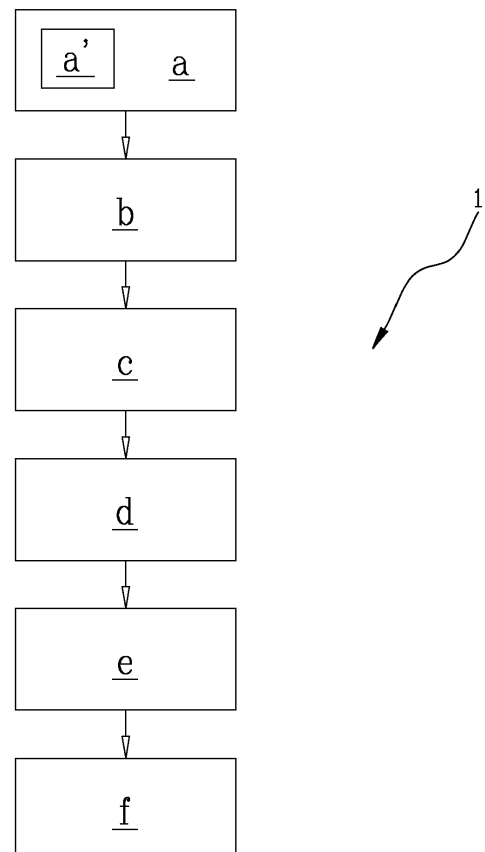
(30) Priority: **24.05.2021 IT 202100013349**

(54) **METHOD AND MACHINE FOR MAKING SIDE STRIPS WITH HANDLES FOR MATTRESSES**

(57) A method (1) for making a strip (F) with handles designed for the perimeter covering of a mattress (M) comprising the steps of:

- providing a first continuous web (N1) of fabric;
- providing a second continuous web (N2) of fabric;
- superposing the second web (N2) of fabric on the first web (N1) of fabric along a main feed direction (L) of the webs (N1, N2);
- making a plurality of gripping portions (P) as a function of a production configuration by sewing the first web (N1) and the second web (N2) according to a certain sequence of stitches parallel and transverse to the main direction of feed (L) of the webs (N1, N2).

Fig.1



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Description

[0001] This invention relates to a method and a machine for making a strip with handles designed for the perimeter covering of a mattress.

[0002] As is known, the perimeter strips are typically used to ensure uniform support for the peripheral portions of the mattress.

[0003] In other words, the perimeter portions are used to improve the structure of the mattress and to prevent local sagging and distortion caused by wear and tear.

[0004] As is also known, the perimeter strip may also be provided with a plurality of handles configured to facilitate flipping and rotating the mattress in order to ensure uniform wear over time.

[0005] These gripping handles are typically made according to one of two different methods.

[0006] In a first method, a web of fabric is sewn without interruption in such a way as to make a plurality of handles without taking into account the spacing between them or whether they are centred in relation to the perimetric band. This method is, for example, described and illustrated in document US2014130263A1, where a perimetric band is made in such a way as to provide it with a plurality of handles made one after the other by respective seams transverse to the longitudinal direction of extension of the perimeter band.

[0007] Using this method, it follows that when the mattress is covered, there will be a risk of having to close the perimeter band by joining the leading end with the trailing end at the centre of a pocket, thus adversely affecting its symmetry and aesthetic appearance.

[0008] Moreover, according to this method, where the length of the pocket to be made is a parameter, the number of pockets is given by the perimeter of the mattress divided by the length of the pocket, without any possibility of changing it.

[0009] In another method, discrete portions of fabric are sewn onto the perimeter strip at predetermined intervals and positions so as to form handles by which to hold the mattress.

[0010] This method, however, has the disadvantage of being highly time consuming.

[0011] To overcome this drawback, document US2015313373A1 describes a further method of making a perimeter band in which a ribbon strip is sewn onto a support taking advantage of the longitudinal stitch lines of the quilting process and the handles are formed of unstitched strip portions along the length of the strip.

[0012] Although this method fully overcomes the drawbacks of applying discrete handles to the support, it also has one all but negligible drawback, which is the possibility that the ribbon strip will tear when used since there is no reinforcement stitching transverse to the length of the strip.

[0013] In this context, the technical purpose which forms the basis of this invention is to propose a method and a machine for making a strip with handles designed

for the perimeter covering of a mattress to overcome at least some of the above-mentioned disadvantages of the prior art.

[0014] More specifically, the aim of this invention is to provide a method and a machine for making a strip with handles designed for the perimeter covering of a mattress, capable of optimizing operations in terms of time and reliability.

[0015] A further aim of this invention is to provide a method and a machine for making a strip with handles designed for the perimeter covering of a mattress, that is at once aesthetically pleasing, highly versatile and robust. The technical purpose and aims specified are substantially achieved by a method for making a strip with handles designed for the perimeter covering of a mattress as described in the independent claim 1.

[0016] This invention also relates to a machine for making a strip with handles designed for the perimeter covering of a mattress as described in claim 7. Further features and advantages of this invention are more apparent in the exemplary, non-limiting description below, with reference to a preferred, but non-exclusive embodiment of a method and a machine for making a strip with handles designed for the perimeter covering of a mattress.

[0017] The description is set out below with reference to the accompanying drawings which are provided solely for purposes of illustration without restricting the scope of the invention and in which:

- Figure 1 shows a schematic view of a preferred embodiment of a method for making a strip with handles designed for the perimeter covering of a mattress according to this invention;
- Figure 2 shows a schematic view of a preferred embodiment of a machine for making a strip with handles designed for the perimeter covering of a mattress according to this invention;
- Figure 3 shows a perspective view of a mattress covered with a strip with handles made using the method of Figure 1.

[0018] With reference to the accompanying drawings, the reference numeral 1 denotes in its entirety a method for making a strip F with handles designed for the perimeter covering of a mattress M according to this invention. The method 1 comprises a step a of providing a first continuous web N1 of fabric.

[0019] The first web N1 is substantially ribbon shaped. In other words, the first web N1 has a longitudinal dimension and a transverse dimension that are much greater than the thickness of the web N1. More specifically, the transverse dimension of the first web N1 substantially corresponds to the thickness of the mattress.

[0020] In a preferred embodiment, the method 1 may comprise a step a' in which a plurality of raw materials are assembled and sewn to obtain the first web N1 of fabric.

[0021] In this description, the term "raw materials" is

used to mean a plurality of ribbon-shaped webs of fabric, which are assembled to form the above-mentioned first web N1, as well as the sewing thread and/or the adhesives used for assembling them.

[0022] The method 1 also comprises a step b of providing a second continuous web N2 of fabric.

[0023] Preferably, the second web N2 has a transverse dimension that is smaller than the transverse dimension of the first web N1. More specifically, the transverse dimension of the second web N2 is such as to make the web substantially suitable to be gripped by a user.

[0024] The method 1 then comprises a step c in which the second web N2 of fabric is superposed on the first web N1 of fabric along a main feed direction L of the webs N1, N2. The feed direction L of the webs N1, N2 is substantially parallel to their longitudinal dimension.

[0025] The method 1 comprises a step d of sewing the second web N2 onto the first web N1 in the main feed direction of the webs N1, N2.

[0026] In a preferred embodiment, there is a step of sewing an accessory element to a portion of the first web N1 along the feed direction L of the webs N1, N2, in particular, this accessory element being in the form of a hinge.

[0027] The step of sewing the accessory element is carried out during the above-mentioned step a' of assembling the raw materials.

[0028] The method 1 then comprises a step e of defining a production configuration for making gripping portions P on the strip F with handles at least as a function of the perimeter dimensions of the mattress M to be covered.

[0029] In this description, the expression "perimeter dimensions of the mattress" is used to mean a length and a width of the mattress M to be covered. Furthermore, the step e comprises defining a production configuration based on the length of the gripping portion P to be made.

[0030] Preferably, the step e is automated, as will become clearer as this description continues.

[0031] In other words, the positions of the gripping portions P along the strip F with handles are determined automatically as a function of the production configuration for making the gripping portions P.

[0032] After completing the step e of selecting the production configuration, the method comprises a step f of making a plurality of gripping portions P as a function of a production configuration by sewing the first web N1 and the second web N2 in such a way as to obtain the strip F with handles.

[0033] In other words, the first web N1 acts as load-bearing structure of the strip F with handles, while the second web N2, sewn onto the first web N1, is suitable for making the gripping portions P.

[0034] More specifically, the step f of making the gripping portions is accomplished by sewing the first web N1 and the second web N2 as the webs N1, N2 move along the main feed direction L.

[0035] The second web N2 is sewn onto the first web

N1 by a sequence of stitches C parallel and transverse to the main feed direction L.

[0036] More specifically, in the method according to this invention, to make a gripping portion P as a function of the production configuration selected, the step of sewing the second web N2 to the first web N1 along the main feed direction L of the webs N1, N2 is interrupted and followed by a step of sewing the second web N2 of fabric onto the first web N1 of fabric along a direction transverse to the main feed direction L of the webs N1, N2, after which the step of sewing the second web N2 to the first web N1 along the main feed direction L of the webs N1, N2 is resumed.

[0037] The step of sewing the second web N2 of fabric onto the first web N1 of fabric along a direction transverse to the main feed direction L of the webs N1, N2 comprises making the transverse stitches in at least two distinct zones of the second web N2 spaced from each other along the main feed direction L of the webs N1, N2 so as to obtain a respective gripping portion P of the strip F with handles between the transverse stitch zones.

[0038] It should be borne in mind that during the step of sewing the second web N2 of fabric onto the first web N1 of fabric along a direction transverse to the main feed direction L, sewing the second web N2 of fabric to the first web N1 of fabric along the main feed direction L is interrupted.

[0039] The gripping portions P are each defined by the transverse stitch zones C disposed at a first and a second end of each gripping portion P, respectively. Preferably, as illustrated by way of non-limiting example in Figure 3, there may be one or more additional transverse stitch zones C1 so as to reinforce the connection between the first web N1 and the second web N2 in proximity to the gripping portions P.

[0040] Preferably, the method 1 may comprise a step of printing one or more images, logos, alphanumeric characters and/or special characters on the second web N2 as a function of the operating parameters.

[0041] As illustrated in Figure 3, this step is preferably performed by printing one or more images, logos, alphanumeric characters and/or special characters on the second web N2 in proximity to the gripping portions P.

[0042] Preferably, this step may be performed concurrently with the step c of providing the second web N2.

[0043] Preferably, the method 1 may comprise a step of cutting the strip F with handles as a function of the operating parameters, specifically the selected length of the strip F with handles and/or the perimeter dimensions of the mattress M to be covered.

[0044] This invention also has for an object a sewing machine 100 for making a strip F with handles designed for the perimeter covering of a mattress M, and which implements the method 1.

[0045] A preferred embodiment of the machine 100 is illustrated by way of non-limiting example in Figure 2.

[0046] The machine comprises a fixed frame 101 designed to support a sliding plane for feeding ribbon-like

material along the main feed direction L.

[0047] Preferably, the sliding plane is configured for feeding the first and second webs N1, N2 of fabric. For this purpose, the frame is provided with means for moving and retaining the first and second webs N1, N2 of fabric along the above-mentioned feed direction L.

[0048] The machine 100 also comprises a first module 102 for feeding the first continuous web "N1" of fabric on the sliding plane along the feed direction "L". In a preferred embodiment, the first feed module 102 is suitable, in the method 1, for carrying out the step a of providing a first continuous web N1 of fabric.

[0049] Preferably, the first feed module 102 may also comprise an assembly unit 102b and/or a sewing unit 102a for the first web N1 starting from a plurality of raw materials.

[0050] In a preferred embodiment, the assembly and sewing unit 102a is suitable for carrying out the step a' of the method 1.

[0051] More specifically, the assembly unit 102b may comprise a sewing machine configured to make the first web N1 from a plurality of raw materials. Preferably, this sewing machine is a multi-needle sewing machine.

[0052] The sewing unit 102a may also comprise at least one additional sewing machine configured to make further, straight, wavy or zig-zag stitches on the first web N1 so as to reinforce the first web N1 and/or create patterns of a substantially aesthetic nature.

[0053] Preferably, the additional sewing machine is constrained to a respective guide which makes it movable relative to the feed direction L.

[0054] Preferably, the additional sewing machine is movable in a direction substantially transverse to the feed direction L.

[0055] Furthermore, the sewing unit 102a preferably comprises two additional sewing machines.

[0056] The machine 100 also comprises a second feed module 103 for feeding the second continuous web N2 of fabric on the sliding plane along the feed direction L in such a way that the second web N2 of fabric is superposed over the first web N1 of fabric. In a preferred embodiment, the second feed module 103 is suitable, in the method 1, for carrying out the step b of providing a second continuous web N2 of fabric.

[0057] More specifically, the second feed module 103 is operatively positioned parallel with the first feed module 102 along the feed direction L. Preferably, but not necessarily, the machine 100 comprises a printing module 105, operatively disposed downstream of the second feed module 103 and configured to print images, logos, alphanumeric characters and/or special characters on the second web N2 at the above-mentioned gripping portions P. In a preferred embodiment, the printing module 105 is suitable, in the method 1, for performing the step of printing images, logos, alphanumeric characters and/or special characters on the second web N2 as a function of the operating parameters.

[0058] In an embodiment, the printing module 105 may

be integrated in the second feed module 103.

[0059] The machine 100 comprises a stitching module 104, positioned downstream of the first and second feed modules 102, 103 along the feed direction L, configured to sew the second web N2 on the first web N1, while also forming a plurality of gripping portions P using the first and the second web N1, N2 in such a way as to obtain the strip F with handles. In a preferred embodiment, the stitching module 104 is suitable for performing the step f of making a plurality of gripping portions P as a function of a respective production configuration by sewing the first web N1 and the second web N2 in such a way as to obtain the strip F with handles.

[0060] At structural level, the stitching module 104 preferably comprises at least two stitching units which are movably constrained to the frame 101 in such a way as to perform at least one controlled translation along a direction transverse to the main feed direction L.

[0061] Preferably, the two stitching units are spaced from each other by a quantity equal to the length of the handle P.

[0062] At functional level, the stitching performed by the stitching module 104 changes direction at the gripping portion P to be made. More specifically, the stitching is longitudinal and parallel to the feed direction L in the portions of the strip F with handles, where the second web N2 is sewn to the first web N1. Also, the stitching is transverse to the feed direction L in proximity to the gripping portions P, so as to define portions where the second web N2 is not sewn to the first web N1 to define the gripping portions P themselves.

[0063] In other words, the stitching module makes the stitching C transverse to the main feed direction L to define the gripping portions P.

[0064] It should be borne in mind that the stitching module 104 for sewing the second web N2 to the first web N1 does not interfere with the accessory elements, if any, such as the hinge, already assembled to the first web N1. As described in more detail below, the change in the direction of sewing the second web N2 to the first web N1 from the direction parallel to the main feed direction L to the direction transverse to the main feed direction L of the webs (and vice versa) is controlled by a control unit U.

[0065] According to an aspect of this invention, the machine 100 comprises a control unit U configured to send control signals to the stitching module 104 to make a specific strip F with handles.

[0066] The control unit is configured to control the sewing of the second web N2 to the first web N1 along the feed direction L of the webs N1, N2 and to control the sewing along a direction transverse to the main feed direction of the webs N1, N2 while interrupting the sewing of the second web N2 to the first web N1 along the feed direction L of the webs N1, N2.

[0067] In other words, the control unit U is configured for commanding the change of direction of sewing the second web N2 to the first web N1 from the direction

parallel to the main feed direction L of the webs N1, N2 to the direction transverse to the main feed direction L of the webs N1, N2, and vice versa.

[0068] Preferably, the machine 100 also comprises a user interface unit I configured for entering at least the perimeter dimensions of the mattress M to be covered.

[0069] A calculator unit C is configured for defining the number and positions of the gripping portions P at least based on the perimeter dimensions of the mattress M to be covered and the longitudinal dimension of the gripping portion P.

[0070] The control unit U commands the change of direction of sewing the second web N2 to the first web N1 based on the positions and number of the gripping portions P as determined by the calculator unit.

[0071] According to another aspect, the machine 100 may comprise a cutting module 106 configured to cut the first web N1 and the second web N2 as a function of the selected value of the predetermined operating parameters selected. More specifically, the cutting module 106 may be configured to work automatically as a function of the predetermined operating parameters selected.

[0072] The invention achieves the preset aims and overcomes the drawbacks of the prior art.

[0073] In effect, a method and a machine according to this invention are capable of optimizing operations in terms of time and reliability. In effect, thanks to the automated step of defining the production configuration, hence the positions of the gripping portions along the strip with handles, it is possible to increase the overall speed of the operations and to make them extremely precise.

[0074] Also, for the same reason, the method and the machine according to this invention are extremely versatile and capable of producing strips with handles that are qualitatively satisfactory in terms of aesthetic design and functionality.

Claims

1. A method (1) for making a strip (F) with handles designed for the perimeter covering of a mattress (M) comprising the steps of:

- a) providing a first continuous web (N1) of fabric;
- b) providing a second continuous web (N2) of fabric;
- c) superposing said second web (N2) of fabric on said first web (N1) of fabric along a main feed direction (L) of said webs (N1, N2);
- d) sewing the second web (N2) to the first web (N1) at least in a direction parallel to the main feed direction (L) of the webs (N1, N2);
- e) defining a production configuration for making gripping portions (P) on the strip (F) with handles at least as a function of the perimeter di-

mensions of the mattress (M) to be covered;

- f) making a gripping portion (P) as a function of the production configuration by changing the sewing direction from the direction parallel to the main feed direction (L) of the webs (N1, N2) to a direction transverse to the main feed direction (L) of the webs (N1, N2), and vice versa;

the step (f) comprises making at least two distinct stitch zones (c, c1) along a direction transverse to the main feed direction (L) of the webs (N1, N2) spaced from each other along a direction parallel to the main feed direction (L) of the webs (N1, N2) so as to obtain a respective gripping portion (P) of the strip (F) with handles.

2. The method (1) according to claim 1, wherein said step (e) is a function of the perimeter dimensions of the mattress (M) to be covered and at least of the longitudinal dimension of a gripping portion (P).

3. The method (1) according to any one of the preceding claims, comprising a step of printing on said second web (N2) one or more images, logos, alphanumeric characters and/or special characters as a function of said operating parameters.

4. The method (1) according to any one of the preceding claims, wherein said step (a) of providing the first web (N1) comprises a previous step (a') of assembling and stitching a plurality of raw materials in such a way as to obtain said first web (N1).

5. The method (1) according to one or more of the preceding claims, wherein the step (e) comprises making a double transverse stitch per zone.

6. The method (1) according to one or more of the preceding claims, wherein the step (a') comprises a step of sewing an accessory element to a portion of the first web (N1) along the feed direction (L) of the webs (N1, N2), in particular, this accessory element being in the form of a hinge.

7. A sewing machine (100) for making a strip (F) with handles designed for the perimeter covering of a mattress (M), comprising:

- a fixed frame (101) designed to support a sliding plane for feeding ribbon-like material along a feed direction (L);
- a first module (102) for feeding said first continuous web (N1) of fabric on said sliding plane along said feed direction (L);
- a second module (103) for feeding said second continuous web (N2) of fabric on said sliding plane along said feed direction (L) in such a way that said second web (N2) of fabric is super-

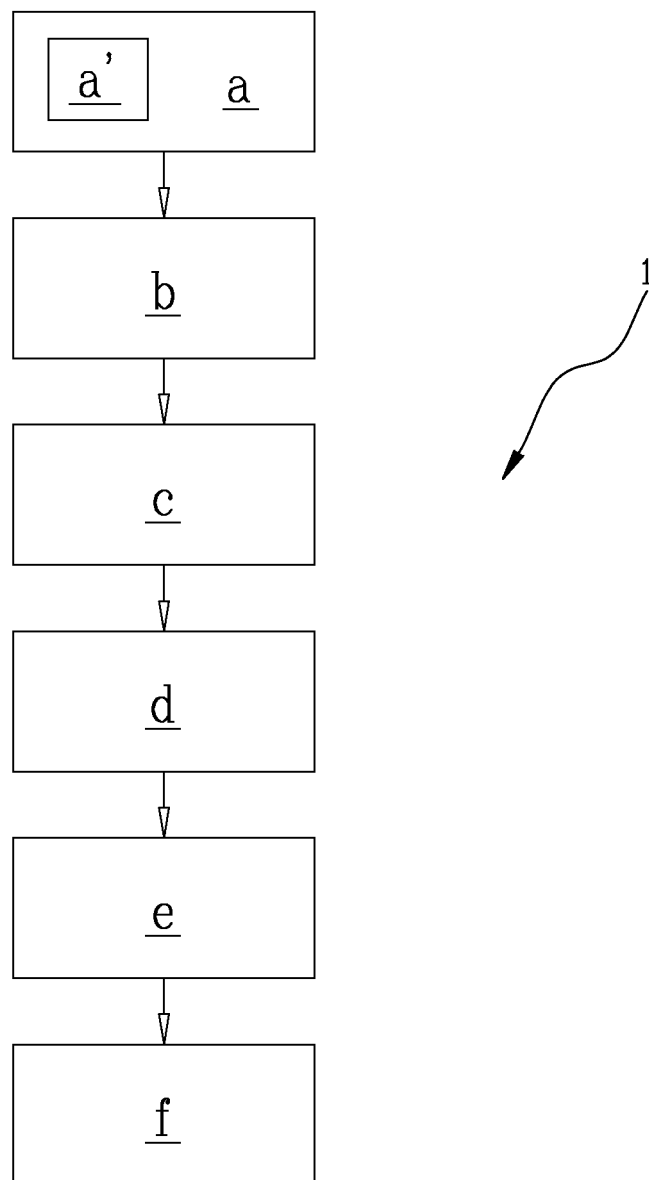
posed over said first web (N1) of fabric; said second feed module (103) being operatively positioned parallel with said first feed module (102) along said feed direction (L);

- a stitching module (104), positioned downstream of said first and second feed modules (102, 103) along said feed direction (L), configured to sew said second web (N2) on said first web (N1), while also forming a plurality of gripping portions (P) using said first and said second web (N1, N2) in such a way as to obtain said strip (F) with handles;
- a control unit (U) configured for implementing a method according to one or more of the preceding claims, in such a way as to send control signals to said stitching module (104) for making gripping portions (P) of a strip (F) with handles;

the control unit (U) is configured for commanding the change of direction of sewing the second web (N2) to the first web (N1) from the direction parallel to the main feed direction (L) of the webs (N1, N2) to the direction transverse to the main feed direction (L) of the webs (N1, N2), and vice versa.

8. The machine (100) according to claim 7, comprising a user interface unit (I) configured for receiving at least the perimeter dimensions of the mattress (M) to be covered; a calculator unit (C) configured for defining the number and positions of the gripping portions (P) at least based on the perimeter dimensions of the mattress (M) to be covered and the longitudinal dimension of the gripping portion (P); the control unit (U) commands the change of direction of sewing the second web (N2) to the first web (N1) based on the positions and number of the gripping portions (P) as determined by the calculator unit.
9. The machine (100) according to claim 7 or 8, comprising a printing module (105) operatively positioned downstream of said second feed module (103) or integral with said second feed module (103) and configured for printing on said second web (N2) images, logos, alphanumeric characters and/or special characters at said gripping positions (P).
10. The machine (100) according to any one of claims 7 to 9, comprising a cutting module (106) configured for cutting said first and second webs (N1, N2).
11. The machine (100) according to any one of claims 7 to 10, wherein said first feed module (102) comprises an assembly unit (102b) and/or a sewing unit (102a) for said first web (N1) starting from a plurality of raw materials.
12. A mattress comprising a strip (F) with handles made according to a method according to any one of claims

Fig.1



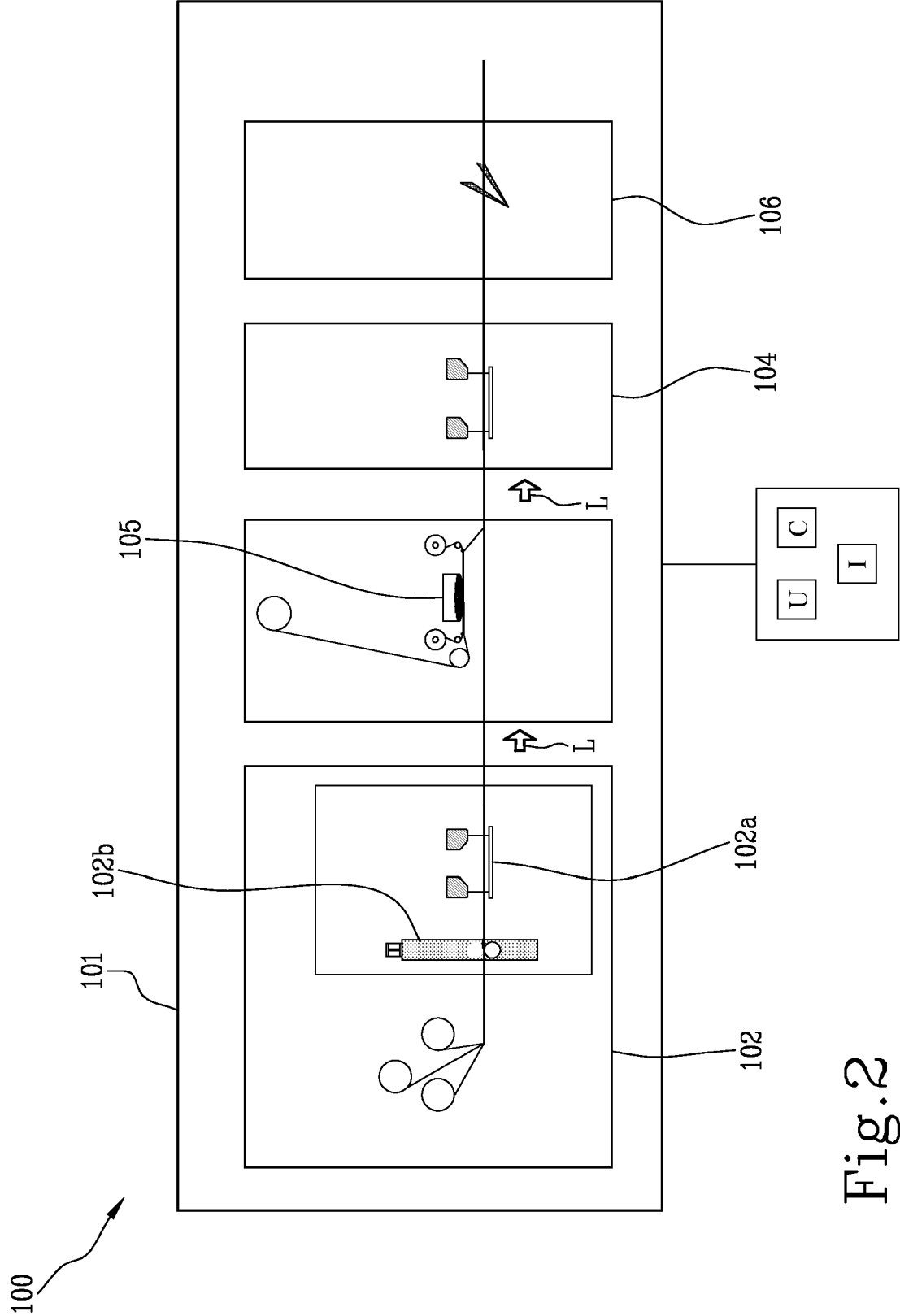
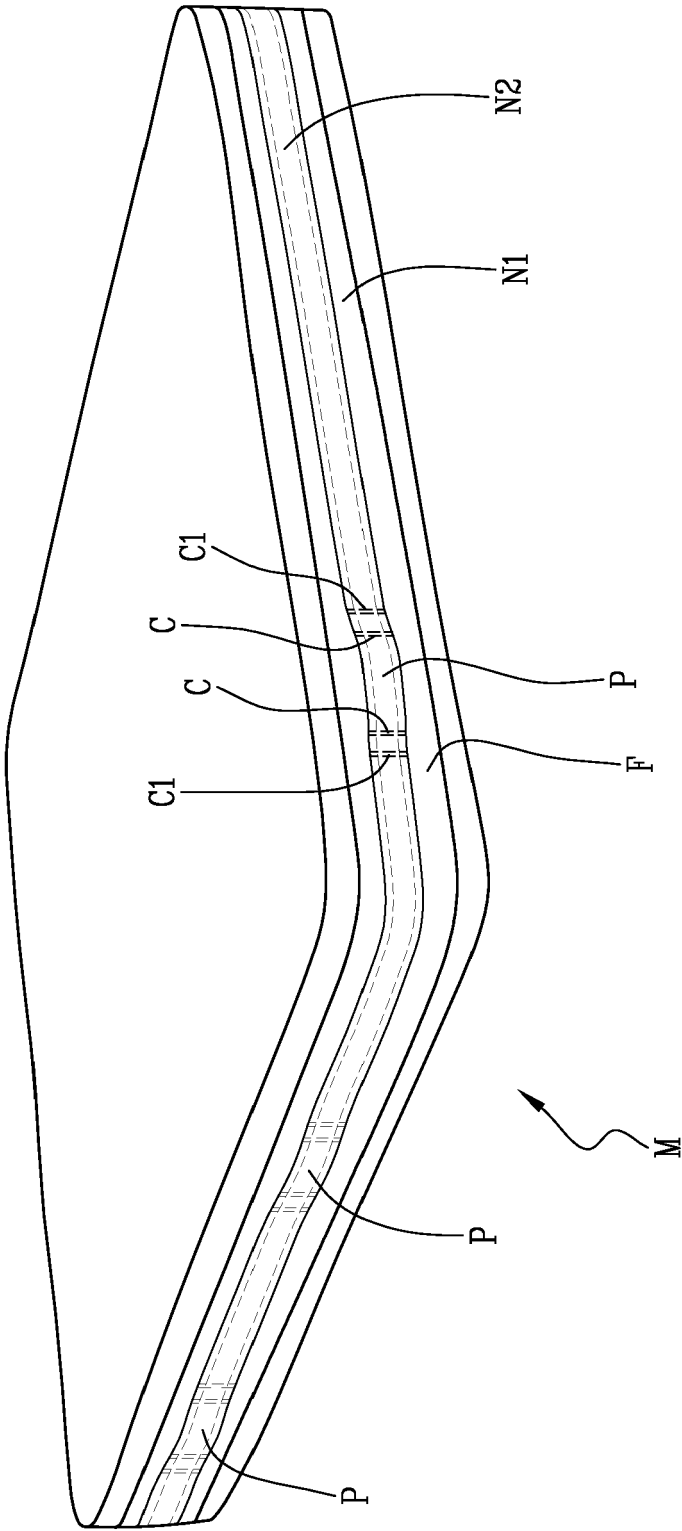


Fig.2

Fig.3





EUROPEAN SEARCH REPORT

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EPO FORM 1503 03.82 (P04C01)

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	US 2014/130263 A1 (RESTA PAOLO [IT] ET AL) 15 May 2014 (2014-05-15)	7-12	INV. A47C31/08 D05B11/00
A	* paragraphs [0040], [0044], [0065]; figures 1, 2, 2a-2b *	1-6	
X	US 2015/313373 A1 (MYERS TERRANCE L [US] ET AL) 5 November 2015 (2015-11-05) * figures 2a-2c, 3 *	7	
A	US 2012/159715 A1 (JUNG JEEWON [US] ET AL) 28 June 2012 (2012-06-28) * figures 1-6 *	1-12	
A	FR 3 027 219 A1 (GOTTI THIERRY [FR]) 22 April 2016 (2016-04-22) * figures 5-6 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 September 2022	Examiner Melo Sousa, Filipe
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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27-09-2022

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014130263 A1	15-05-2014	EP 2524625 A2	21-11-2012
		US 2014130263 A1	15-05-2014
US 2015313373 A1	05-11-2015	BR 112013029956 A2	31-01-2017
		CN 103890257 A	25-06-2014
		EP 2714978 A1	09-04-2014
		ES 2617213 T3	15-06-2017
		US 2012297547 A1	29-11-2012
		US 2014196647 A1	17-07-2014
		US 2015313373 A1	05-11-2015
		WO 2012162300 A1	29-11-2012
US 2012159715 A1	28-06-2012	US 2012159715 A1	28-06-2012
		WO 2012088224 A1	28-06-2012
FR 3027219 A1	22-04-2016	NONE	

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EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2014130263 A1 [0006]
- US 2015313373 A1 [0011]