



(11)

EP 4 043 630 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.08.2022 Bulletin 2022/33

(21) Application number: **21382117.6**

(22) Date of filing: **15.02.2021**

(51) International Patent Classification (IPC):
D06B 11/00 ^(2006.01) **B23K 26/02** ^(2014.01)
B41J 2/455 ^(2006.01) **D06C 23/00** ^(2006.01)
D06H 1/00 ^(2006.01)

(52) Cooperative Patent Classification (CPC):
D06H 1/00; B41M 5/24; D06B 11/0096;
D06C 23/00

(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

(71) Applicant: **Jeanología, S.L.**
46980 Paterna, Valencia (ES)

(72) Inventor: **SANS PERARNAU, Albert**
46980 Paterna (Valencia) (ES)

(74) Representative: **González Poveda, Sara**
INGENIAS
Creaciones, Signos e Invenciones S.L.
Avda. Diagonal 514, 1^o 4^a
08006 Barcelona (ES)

(54) **METHOD AND DEVICE FOR LASER MARKING OF TROUSERS**

(57) Method for the laser marking of trousers, comprising: folding the trousers by the crotch area such that the two halves (1a, 1b) of the trousers rest superimposed in a flat manner, arranging a first half of a first side of the trousers in a marking area of a laser module (2) in a position facing a laser equipment (21) for marking said first half (11a). This method comprises the automatic ro-

tation of the trousers and the arrangement of a second half (11b) of the first side in a position facing a laser equipment (21) that performs marking of predetermined areas (10b) of said second side (11b) of said first face. The invention also comprises a device for the laser marking of trousers according to said method.

EP 4 043 630 A1

Description

Technical Field

[0001] The present invention is applicable in the field dedicated to the decoration of garments and more specifically of trousers, by means of laser marking.

Background

[0002] Currently, it is usual practice to decorate garments and in particular trousers made of denim, by means of laser.

[0003] This technique consists of arranging the fabric surface to be decorated in the field of action of a laser module that projects a light beam thereon following a predetermined pattern in order to mark predetermined areas of the trousers.

[0004] Generally, this type of laser marking is carried out both on the front and the back of the trousers, using different techniques to handle and arrange the trousers in different positions within the laser marking areas.

[0005] A known method consists of arranging the trousers in a fully unfolded manner on a table or suitable support, such that the laser equipment conducts the marking of one of its sides, front or back, and then flipping the trousers to proceed with the marking of the opposite side, back or front.

[0006] Another known method consists of arranging the trousers in a folded manner, folded by the crotch area, so that the two legs of the trousers rest superimposed and the two halves of one of its sides, front or back, remain in a visible position, that is to say, oriented towards the outside; in this case, the laser marking of one of the two visible halves is carried out and then the trousers are manually flipped to conduct the marking of the other visible half of the same side, thus completing the marking of one of the sides of the trousers.

[0007] When marking of the other side of the trousers is desired, the trousers must be unfolded and folded back in the opposite direction, so that the two halves, left and right, of this second side remain in a visible position; performing the laser marking of one of said halves, then manually flipping the trousers and finally marking the other half of the same side.

[0008] This method, considered to be the closest to the invention, allows for the left and right halves of each of the front and back sides of the trousers to lie flat, which allows a correct laser marking of any area of the trousers and involves an advantage over the method wherein the marking is conducted on the trousers arranged on a fully unfolded manner which inevitability causes the formation of wrinkles in the crotch area of the trousers and impedes a correct marking of said area.

[0009] The drawback posed by the marking of the trousers arranged in a folded manner, by the crotch area, is that manually flipping and manually unfolding and folding the trousers excessively increase the total amount of time

used in handling and marking each trouser, limiting productivity and consequently increasing the operational costs.

[0010] Another method for laser marking trousers, further from the present invention, consists of arranging the trousers on a mannequin that simultaneously exposes the two halves of one of the sides of the trousers; however, this method requires more complex and expensive technology, and the interaction of the operator with the mannequin to place and remove the trousers, which also takes significant time.

Summary of the invention

[0011] This invention relates to a method for the laser marking of trousers and to a device for marking trousers according to said method; and has technical features aimed at marking the trousers arranged in a folded manner, by the crotch area, and significantly reducing handling time of the trousers, with the consequent increase in productivity and cost reduction.

[0012] The method for laser marking trousers, object of this intention, comprises some known initial steps, included in the preamble of the first claim and that include:

a) folding the trousers by the crotch area in a first direction, such that the two halves of the trousers, right and left, rest superimposed in a flat manner, and a first half and a second half of a first side of the trousers, front or back, remain in a visible position;

b) arranging said first half in a marking area of a laser module, in a position facing a laser marking equipment;

c) laser marking predetermined areas of said first half.

[0013] According to the invention, this method comprises, once said first half has been laser marked:

d) automatically rotating the trousers in a motorized rotation module and arranging said second half in a marking area of a laser module, in a position facing a laser equipment, and;

e) laser marking predetermined areas of said second half.

[0014] The automatic rotation of the trousers in a motorized rotation module avoids the intervention of an operator to carry out this operation manually and reduces the time needed to carry out this operation by approximately 25%.

[0015] In the event that the trousers are to be marked on both sides, front and back, this method includes, after marking the second half of the first side:

f) unfolding and folding the trousers by the crotch

area in a second direction, such that a third half and a fourth half of a second side of the trousers, back or front, remain in a visible position;

g) arranging said third half in a marking area of a laser module, in a position facing a laser equipment;

h) laser marking predetermined areas of said third half;

i) automatically rotating the trousers in a motorized rotation module and arranging said fourth half in a marking area of a laser module, in a position facing a laser equipment; and

j) laser marking predetermined areas of said fourth half.

[0016] Advantageously, unfolding the trousers and subsequently folding them by the crotch area in the opposite direction, in order to make the two halves of the second side of the trousers visible, is carried out automatically in an automatic unfolding and folding module.

[0017] When fully automatically unfolding and folding the trousers in a second direction of rotation, and subsequently rotating the trousers, also automatically, to perform the marking of the third and fourth half of the trousers, corresponding to its second side, in successive steps, the time necessary to carry out said operations is considerably reduced, being able to save up to 75% of the time used by an operator to carry them out manually.

[0018] It should be mentioned that this method can be used regardless of whether the trouser positioning areas in the laser module are arranged in a vertical plane or in a horizontal plane.

[0019] For the implementation of this method, a specific device has been devised that comprises at least:

- a module for receiving the trousers folded by the crotch area;
- a laser module provided with an area for marking the trousers flat-folded by the crotch area;
- a laser device facing the trouser marking area on the laser module;
- a motorized automatic rotation module for rotating the flat-folded trousers; and
- a programmable module for controlling the operation of the device.

[0020] In the event that the pattern is to be marked on both sides, front and back, the device advantageously comprises a module for automatically unfolding the trousers in one direction of rotation and for automatically folding the trousers in the opposite direction.

[0021] It has been envisaged that the device can comprise motorized transport means for moving the trousers through the different modules.

[0022] The marking area of the trousers in at least one laser module can be arranged in a vertical plane or in a horizontal plane.

Brief description of the of the drawings.

[0023] To complement the description that is being made and in order to facilitate understanding of the characteristics of the invention, the present specification is accompanied by a set of drawings in which, by way of illustration and not limitation, the following has been represented:

- Figure 1 shows a succession of images of a trouser in different positions during the laser marking of the two halves of a first side, specifically its front side, according to the method of the invention.
- Figure 2 shows a sequence of images in which the trousers of the previous figure can be observed in different positions, specifically during its unfolding and folding in the opposite direction, and the laser marking of the two halves of a second side, specifically of its back side.
- Figures 3a-3d show respective views of an embodiment of the module for rotating the trousers folded by the crotch area.
- Figure 4a shows a schematic perspective view of an exemplary embodiment of a module for automatically unfolding and folding the trousers in the opposite direction.
- Figures 4b-4d show respective profile views of the automatic unfolding and folding module of Figure 4a, in different operative positions.
- Figure 4e shows a perspective view of the automatic unfolding and folding module, and of the trousers once said automatic unfolding and folding operations have been carried out.

Detailed description of embodiments of the invention

[0024] As shown in Figure 1, starting from the trousers (1) in an unfolded position, the trousers are initially folded by the crotch area such that the two halves (1a, 1b) of the trousers rest superimposed, and that the first and the second half (11a, 11b), right and left, of one of its sides, in this case the front side, remain in a visible position, that is to say oriented towards the outside; then arranging the trousers in a marking area of a laser module (2), such that the first half (11a) of the front side faces a laser equipment (21) in charge of marking predetermined areas

(10a) stored in a control program of the laser equipment.

[0025] Once the marking of said first front half (11a) has been performed, the trousers are automatically rotated in a motorized automatic rotation module (3), such that the second front half (11b) of the trousers (1) remains in a visible position.

[0026] The trousers are arranged in this position in a marking area of a laser module (2), with said second front half (11b) facing a laser equipment (21) in charge of marking predetermined areas (10b) on said second half (11b).

[0027] It should be mentioned that the laser module (2) can be the same one used to mark the first front half (11a) of the trousers, or another mode arranged in a trouser processing line.

[0028] To mark the trousers on the second side, that is, on the back side, the trousers are automatically unfolded and automatically folded by the crotch area in a second direction, as shown schematically in Figure 2, such that a third half (12a) and a fourth half (12b) of the back side of the trousers (1) remain in a visible position and oriented towards the outside.

[0029] The trousers are then placed in the marking area of a laser module (2), so that the third back half (12a) faces a laser equipment (21) in charge of marking predetermined areas (10c) on said third half of the trousers.

[0030] The automatic rotation of the trousers (1) is then carried out in a motorized automatic rotation module (3), analogous to that shown in Figure 1, and which arranges the fourth half (12b) of the trousers in a visible position; the trousers being arranged in this position in a marking area of a laser module (2) provided with a laser equipment (21) in charge of marking predetermined areas (10d) on said fourth half (12b).

[0031] The device for the laser marking trousers according to the aforementioned method comprises, at least: a module (not shown) for receiving the trousers flat-folded by the crotch area and which can be constituted by a table or a conveyor belt; a laser module (2) provided with an area for marking and arranging the trousers flat-folded by the crotch area; a laser equipment (21) facing the marking area of the trousers in the laser module (2); a motorized automatic rotation module (3) for rotating the flat-folded trousers and a programmable module (not shown) for controlling the operation of the device.

[0032] In the exemplary embodiment shown in Figures 3a -3d, the motorized automatic rotation module (3) for rotating the trousers comprises two flat pieces (31, 32), like a grid, mounted on respective axes of rotation that can be actuated independently by means of respective motors (31a, 32a), such that said pieces (31, 32) can be arranged coplanarly as shown in Figures 3a and 3d, or superimposed as shown in Figures 3b and 3c. The assembly formed by the two pieces (31, 32) and their drive means is connected to a motor (33) that allows it to be rotated towards one or the other side.

[0033] Initially, as shown in Figure 3a, the trousers (1) are moved, for example, by means of a conveyor belt,

and positioned on the piece (31) of the motorized automatic rotation module (3). Next, as shown in Figure 3b, the piece (32) rotates by the action of the motor (32a) positioning itself on the piece (31), so that the trousers are held between the two pieces (31, 32) and, as shown in Figure 3c, the set of the two pieces (31, 32) rotate together by the action of the motor (33) and the first half (11a) of the trousers that occupied the top position happens to occupy the bottom position, with the second half (11b) of the same side of the trousers facing the top area.

[0034] Once the automatic rotation of the trousers has been performed, the piece (31) rotates by the action of the motor (31a), returning to the initial position shown in Figure 3a.

[0035] Figures 4a -4e show an exemplary embodiment of the automatic unfolding and folding module (4) for unfolding and folding the trousers in the opposite direction, used in the device to change the visible side, front or back, of the trousers (1).

[0036] As can be seen in Figure 4a, this automatic unfolding and folding module (4) comprises: two conveyor belts (41, 42) for the entry and exit of the trousers, arranged horizontally; two pairs of conveyor belts (43, 44), top and bottom, arranged vertically for the unfolding of the trousers and their folding in the opposite direction with the support of an unfolding guide (45) movable in a lateral direction and a rotatable folder (46).

[0037] As shown in Figure 4b, when the unfolding guide (44) is in an operative position and the trousers are moved by the entry belt (41) in a forward direction, the two halves (1a, 1b) of the trousers are deflected by the unfolding guide (45) in a vertical direction, and moved up and down by respective pairs of top and bottom conveyor belts (43, 44), until the trousers are fully extended, as shown in the Figure 4c; once this unfolded position of the trousers is reached, the unfolding guide (45) moves laterally towards an inoperative position.

[0038] Next, the pairs of conveyor belts (43, 44) reverse their direction of rotation as shown in Figure 4d, the folder (46) acting on the middle area of the trousers and causing it to fold in the opposite direction, while said trousers are moved by the exit belt (42) towards the position shown in Figure 4e.

[0039] It should be mentioned that the movements of the motorized automatic rotation module (3), of the automatic unfolding and folding module (4), and of the laser equipment (21) are controlled by an automaton or programmable control module (not represented).

[0040] Once the nature of the invention has been sufficiently described, as well as a preferred embodiment, it is stated for the appropriate purposes that the materials, shape, size and arrangement of the elements described may be modified, as long as this does not imply an alteration of the essential characteristics of the invention that are claimed below.

Claims

1. A method for the laser marking of trousers; comprising:

a) folding the trousers by the crotch area in a first direction, such that the two halves (1a, 1b) of the trousers, right and left, rest superimposed in a flat manner, and that a first half (11a) and a second half (11b) of a first side of the trousers, front or back, remain in a visible position;
 b) arranging said first half (11a) in a marking area of a laser module (2) in a position facing a marking laser equipment (21);
 c) laser marking predetermined areas (10a) of said first half (11a),
characterized by comprising:
 d) automatically rotating the trousers in a motorized automatic rotation module (3) and arranging said second half (11b) in a marking area of a laser module (2) in a position facing a laser equipment (21) and;
 e) laser marking predetermined areas (10b) of said second half (11b) of the first side.

2. The method according to claim 1, **characterized in that** it comprises, following the marking of the second half (11b) of the first side:

f) unfolding and folding the trousers by the crotch area in a second direction, such that a third half (12a) and a fourth half (12b) of a second side of the trousers, back or front, remain in a visible position;
 g) arranging the third half (12a) in a marking area of a laser module (2), in a position facing a laser equipment (21);
 h) laser marking predetermined areas (10c) of said third half (12a);
 i) automatically rotating the trousers in a motorized rotation module (3) and arranging said fourth half (12b) in a marking area of a laser module (2), in a position facing a laser equipment (21); and
 j) laser marking predetermined areas (10d) of said fourth half (12b).

3. The method according to claim 2, **characterized in that** the unfolding of the trousers in one direction of rotation and the folding of said trousers by the crotch area in the opposite direction, is carried out automatically in an automatic unfolding and folding module (4).

4. The method according to any one of claims 1 to 3, **characterized in** the trousers are arranged in a vertical plane in the marking areas of the laser module (2).

5. The method according to any one of claims 1 to 3, **characterized in that** the trousers are arranged in a horizontal plane **in that** in the marking areas of the laser module (2).

6. A device for the laser marking trousers according to the method of the preceding claims, **characterized in that** it comprises, at least:

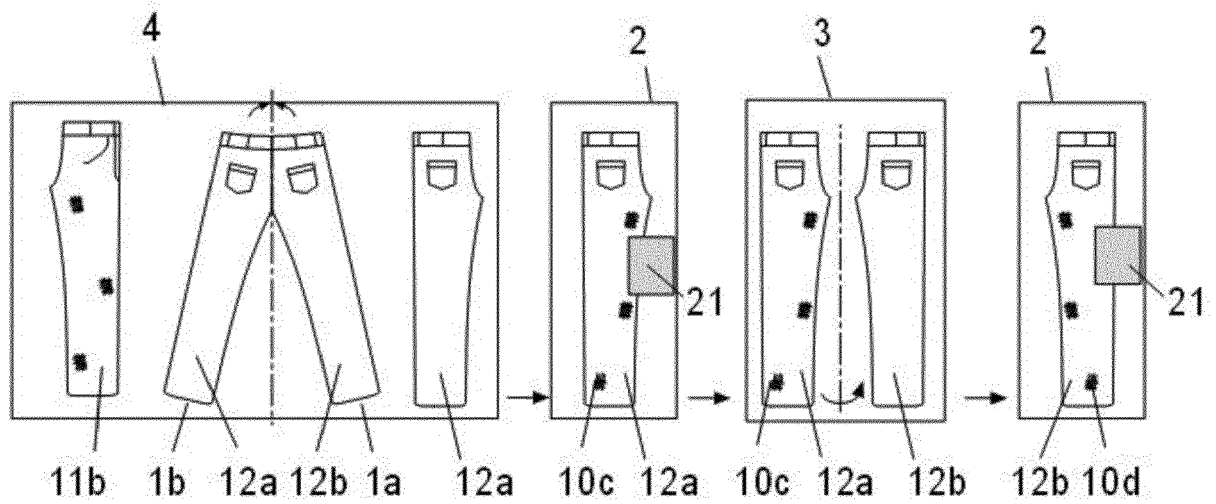
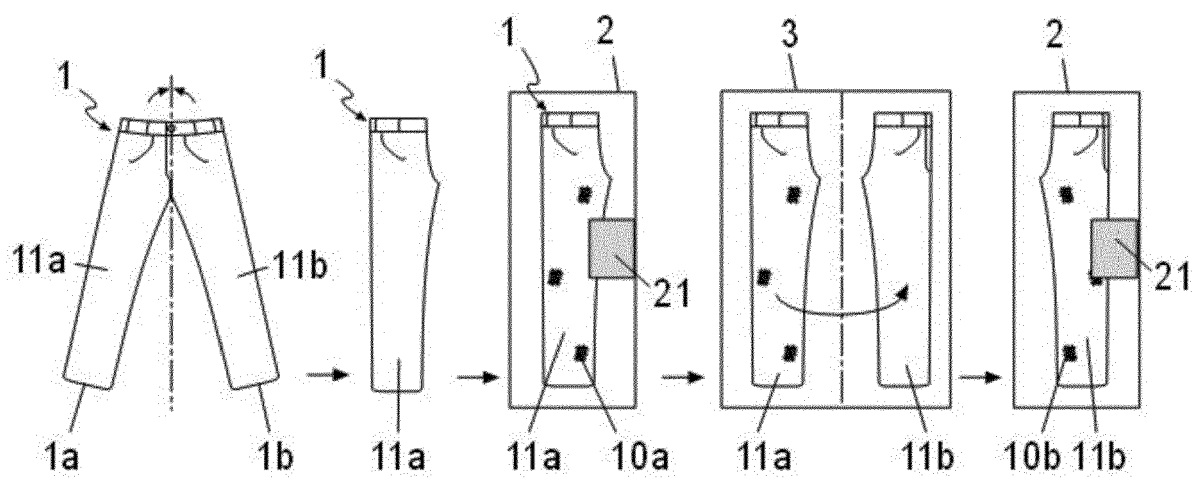
- a module for receiving the trousers flat-folded by the crotch area;
 - a laser module (2) provided with an area for marking and arranging the trousers flat-folded by the crotch area;
 - a laser equipment (21) facing the marking area of the trousers in the laser module (2);
 - a motorized automatic rotation module (3) for the automatic rotation of the flat-folded trousers; and
 - a programmable module for controlling the operation of the device.

7. The device according to claim 6, **characterized in that** it comprises an automatic unfolding and folding module (4) for automatically unfolding the trousers in one direction of rotation and for automatically folding the trousers in the opposite direction.

8. The device according to any of claims 6 and 7, **characterized in that** it comprises at least one motorized transport means for moving the trousers through the different modules (2, 3, 4).

9. The device according to any of claims 6 to 8, **characterized in that** the marking area of the trousers in at least one laser module (2) is arranged in a vertical plane.

10. The device according to any of claims 6 to 8, **characterized in that** the marking area of the trousers in at least one laser module (2) is arranged in a horizontal plane.



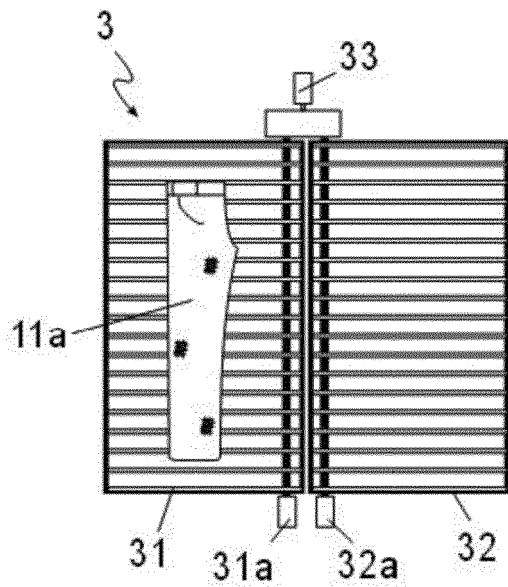


Fig. 3a

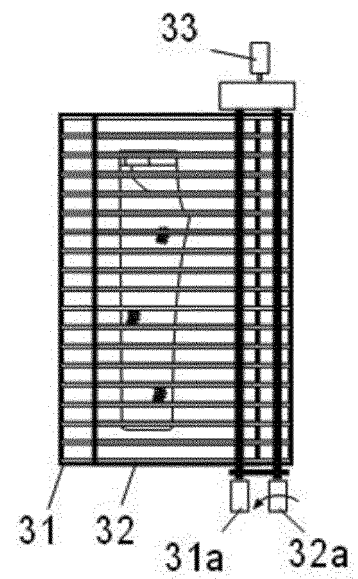


Fig. 3b

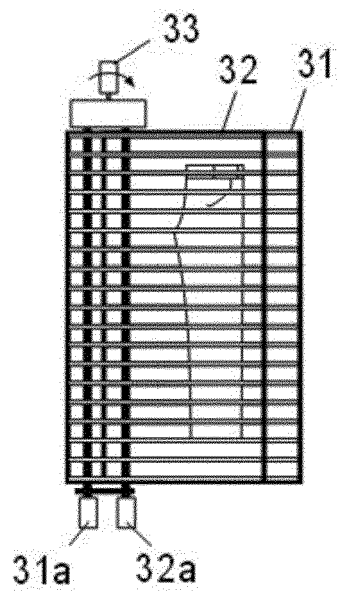


Fig. 3c

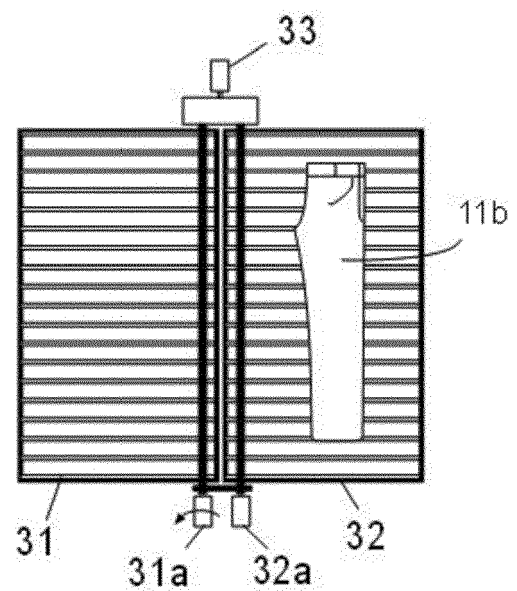
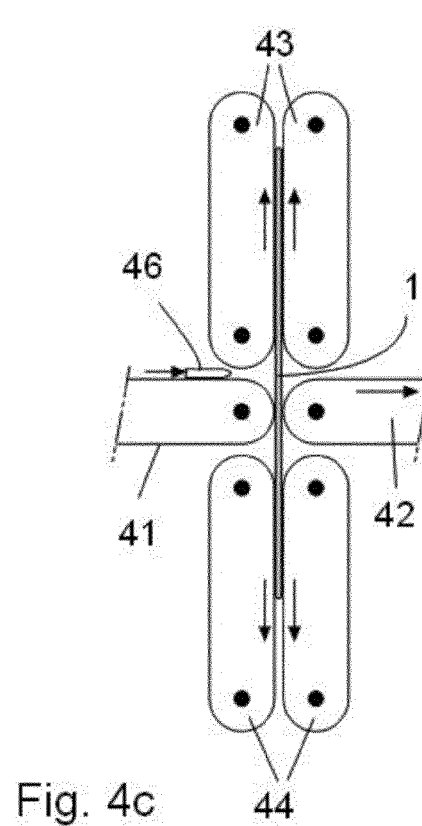
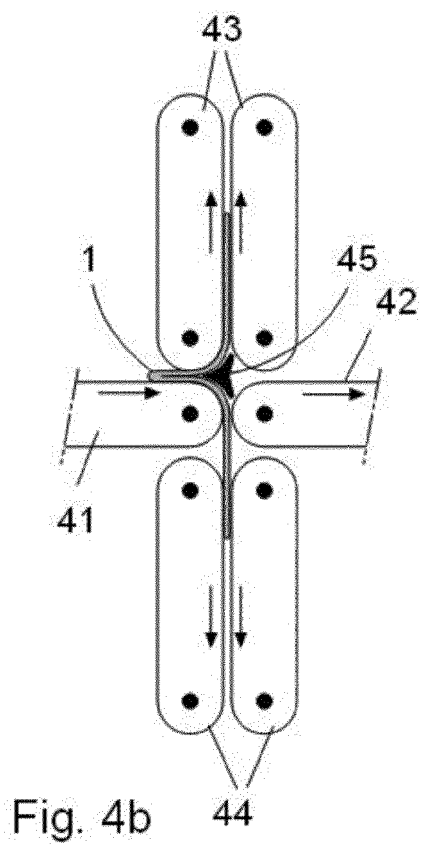
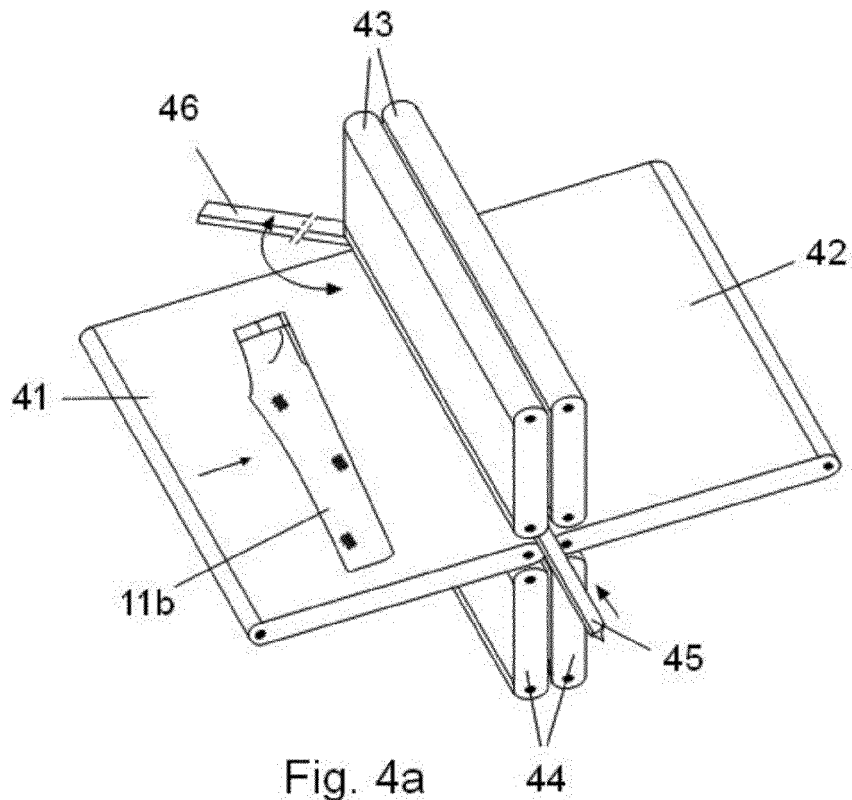
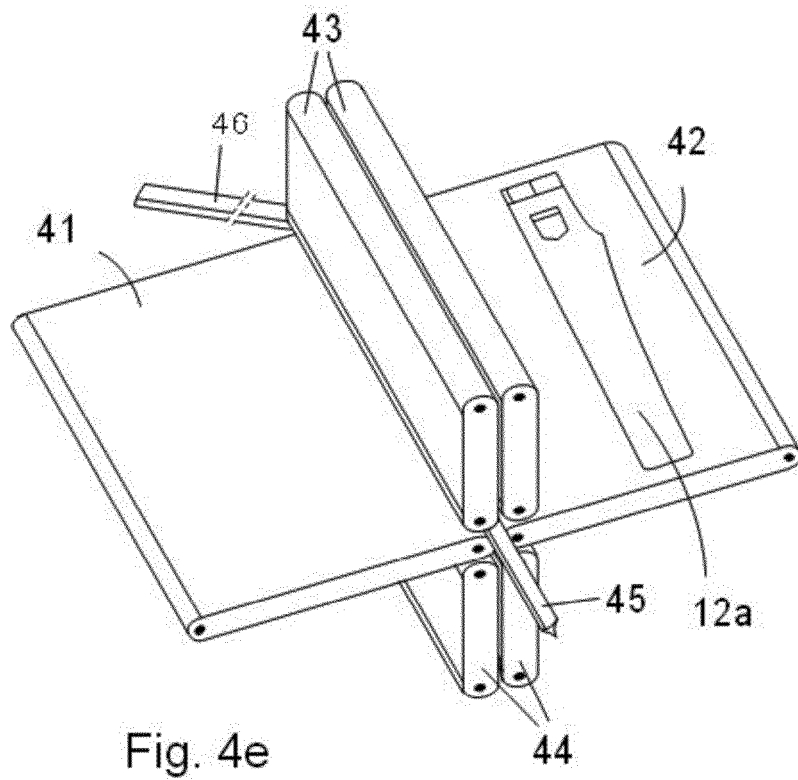
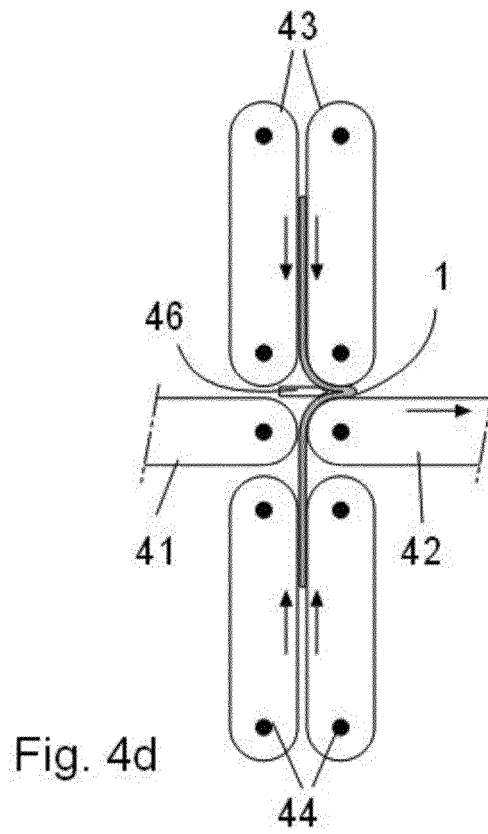


Fig. 3d







EUROPEAN SEARCH REPORT

Application Number
EP 21 38 2117

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2017/081346 A1 (MACSA ID SA [ES]) 18 May 2017 (2017-05-18) * figures 1-5 *	1-10	INV. D06B11/00 B23K26/02 B41J2/455 D06C23/00 D06H1/00
A	WO 03/029545 A1 (TONELLO SRL [IT]; TONELLO OSVALDO [IT]) 10 April 2003 (2003-04-10) * figures 2-9 *	1,6	
A	US 2003/000929 A1 (BOWKER ROLAND D [US] ET AL) 2 January 2003 (2003-01-02) * figures 1-12 *	1,6	
A	ES 1 138 631 U (CUADRADO ARROYO CARLOS [ES]) 22 April 2015 (2015-04-22) * figures 1-3 *	1,6	
			TECHNICAL FIELDS SEARCHED (IPC)
			D06B B23K B41J D06C D06H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 July 2021	Examiner Iamandi, Daniela
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	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 38 2117

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-07-2021

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2017081346 A1	18-05-2017	ES 1148087 U WO 2017081346 A1	22-12-2015 18-05-2017
-----	-----	-----	-----
WO 03029545 A1	10-04-2003	AU 2002344543 A1 WO 03029545 A1	14-04-2003 10-04-2003
-----	-----	-----	-----
US 2003000929 A1	02-01-2003	AU 2002256241 A1 US 2003000929 A1 US 2003146194 A1 WO 03002811 A2	03-03-2003 02-01-2003 07-08-2003 09-01-2003
-----	-----	-----	-----
ES 1138631 U	22-04-2015	NONE	
-----	-----	-----	-----