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(72) Inventors:
• **FIDANZA, Virginio Abbondio**
I-25028 Verolanuova, BRESCIA (IT)
• **VENTURA, Emanuele**
I-25028 Verolanuova, BRESCIA (IT)

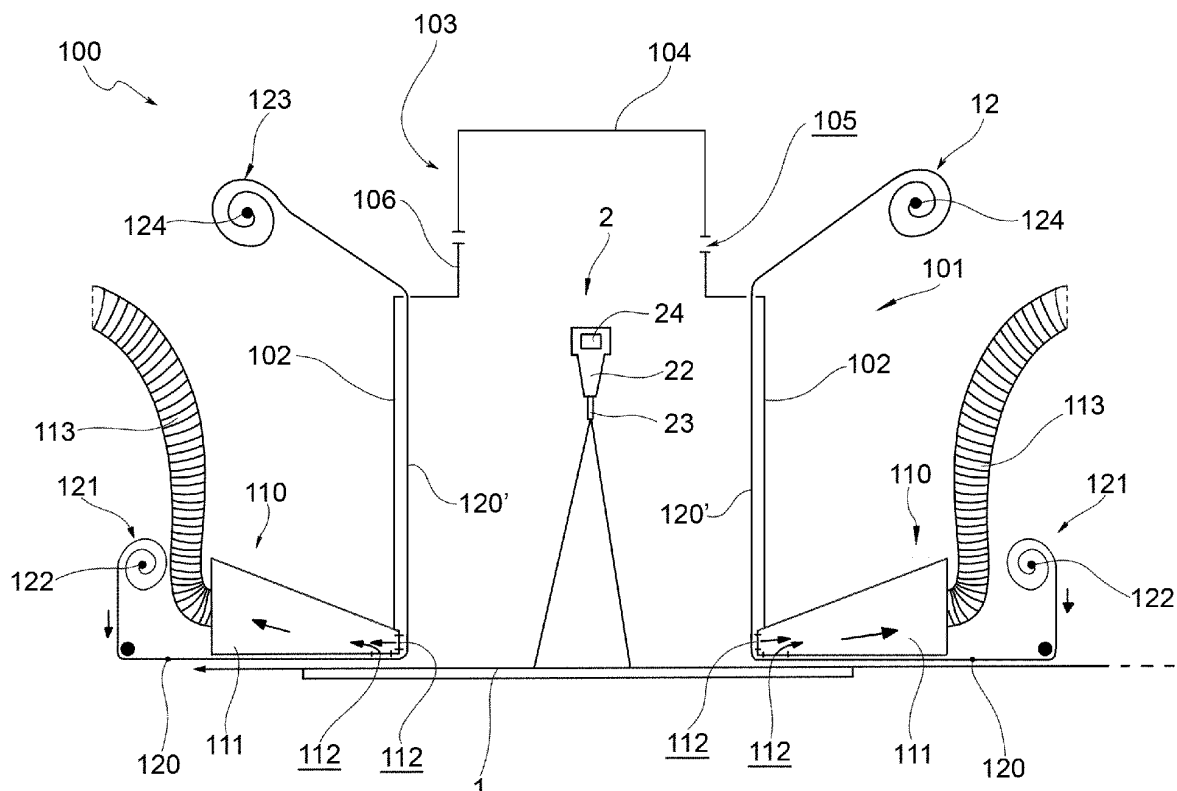
(74) Representative: **Gualeni, Nadia**
Jacobacci & Partners S.p.A.
Piazza della Vittoria, 11
25122 Brescia (IT)

(71) Applicant: **CONDOR TRADE S.R.L.**
25028 Verolanuova (BS) (IT)

(54) **ASPIRATION BOOTH FOR A PLANT FOR THE PRODUCTION BY SPRAYING OF ARTIFICIAL LEATHER**

(57) Aspiration booth (100) for the production by spraying of artificial leather, comprising a box-shaped cover (101), at least one aspiration means (110) with an

aspiration port (112) and one capture medium (120) in the form of a filter sliding in front of the aspiration port (112).

**FIG.4****EP 4 575 002 A1**

Description

[0001] The subject matter of the present invention is an aspiration booth employable in a plant for the production by spraying of artificial leather.

[0002] Imitation or artificial leather is a synthetic leather that may have a similar aspect to natural leather or hide, or else it may be made with a certain texture that is also different from that of leather, for example with technical designs and the like.

[0003] Known within the sector are artificial leather production methods that include the use of polyurethane which requires mechanical leveling using a blade. It is evident that the contact between the blade and the solidifying polyurethane material results, within a short period of time, in an accumulation of residual solidified material below the blade that leads to the complete obstruction of the passage space for the sliding of the material that is still being reacted. This results in continuous periods of machinery downtime in order to allow for the cleaning or replacement of said blade. Such aspect is particularly disadvantageous and is common to all polyurethane application methods using mechanical leveling.

[0004] Also known within the sector are artificial leather production methods that include the use of polyurethane which is applied by means of spraying. Such method, despite being extremely efficient in the distribution of polyurethane, results in a series of critical issues in relation to the spraying step. It is, in fact, essential to scrupulously check the spray distribution area in order to prevent part of the polyurethane from being deposited in undesired areas. Nebulized and dispersed polyurethane furthermore causes, within a short period of time, those intake systems that are indeed purposefully arranged for removing excess nebulized material to clog.

[0005] The object of the present invention is therefore to resolve those problems that are associated with the deposition by spraying of polymeric material for the production of artificial leather.

[0006] The object of the present invention is therefore to construct an aspiration booth for a plant for the production by spraying of artificial leather that is free of the risk of clogging the filters, so as to allow for continuous production without periods of machinery downtime for the cleaning or replacement of the aspiration filters.

[0007] A further object of the present invention is to construct an aspiration booth for a plant for the production by spraying of artificial leather that makes it possible to precisely control the deposition area of the polymeric material.

[0008] A further object of the present invention is to construct an aspiration booth for a plant for the production by spraying of artificial leather that also makes it possible to recuperate the waste polymeric material from spraying, i.e., the material that was sprayed but that was not deposited onto the base.

[0009] Such object is achieved by an aspiration booth for a plant for the production by spraying of artificial

leather according to claim 1, and by a plant for the production by spraying of artificial leather according to claim 12. The dependent claims describe preferred embodiments of the invention.

[0010] The features and advantages of the booth and of the plant according to the present invention will appear more clearly from the following description, made by way of indicative and non-limiting example with reference to the accompanying figures, wherein:

- Fig. 1 shows, schematically, a plant for the production by spraying of artificial leather, provided with an aspiration cabin according to the present invention;
- Fig. 2 shows, schematically, a front view of the spraying deposition in a plant and according to the method in accordance with the present invention, in one embodiment;
- Fig. 3 shows, schematically, an axonometric view of the spraying deposition in a plant and according to the method in accordance with the present invention, in a further embodiment;
- Fig. 4 shows, schematically, a side view of an aspiration booth arranged to protect the spraying deposition area in a plant and according to the method in accordance with the present invention.

[0011] With reference to Fig. 1, an aspiration booth inserted into a plant for the production by spraying of artificial leather is indicated with the reference numeral 100. In such a plant a substrate for artificial leather is obtained that is free of dimethylformamide (DMF) or other solvents or water.

[0012] It should be noted that the term "distribution by spraying" or "spraying" means the deposition of a polymer layer in the form of minute or very minute droplets or particles. Such definition includes nebulization, atomization, vaporization, spraying and pulverization. Such definition includes distribution using either a pressurized thrust of air or compressed air or distribution without air. Such spraying may be performed using guns or nozzles or other distributors that are capable of performing distribution by spraying.

[0013] In a preferred but non-exclusive example, the substrate for artificial leather is a polyurethane base, i.e., the polymeric material is a bi-component polyurethane homogeneously applied to a base. For example, the bi-component polyurethane is obtained from the synthesis of two components: component A and component B. Component A is an isocyanate, preferably diphenylmethane diisocyanate (MDI) that is partially reacted with polyesters or polyethers. Component B is a polyether- or polyester-based polyol. The reaction between the components A and B occurs at high or low pressure.

[0014] Fig. 1 shows, schematically an example of an artificial leather production method. The method of Fig. 1 includes the following steps:

- preparation of a base 1, said base being a release

paper or a nonstick conveyor belt;

- uniform sprayed distribution, by means of a spraying system 2, of a layer of polymeric material 11, for example polyurethane, onto the base 1.

[0015] During the execution of the method described above, the base 1 slides towards the work stations.

[0016] Preferably, the spraying assembly comprises a Cartesian robot 25 whereupon a mobile spray system is attached (i.e. a spray gun or other mobile spray nozzle). Therefore, in such example, the Cartesian robot allows for the translation of the spraying system along a frame 24 for the entire width of the base, which slides at a constant velocity therebelow.

[0017] The spraying system 2 is contained within an aspiration booth 100, which is the subject matter of the present invention.

[0018] The aspiration booth 100 comprises a box-shaped cover 101 formed of side walls 102 and an upper wall 103. The side walls and the upper wall may be made from various materials.

[0019] Preferably, the upper wall 103 comprises a raised portion 106 extending substantially vertically, above which an upper portion 104 extends substantially transversely. Advantageously, between the raised portion 106 and the upper portion 104 there is an air intake 105. Preferably, the air intake 105 is an aperture, or a plurality of apertures, arranged along the perimeter of the raised portion 106. Preferably, the air intake 105 has a constant height, which is to say that it is regular in height along a perimeter of the raised portion 106.

[0020] The aspiration booth 100 houses at least one aspiration means 110 for the nebulized polymeric material that is not deposited onto the sliding base 1. The aspiration means 100 is arranged in proximity to the base 1, preferably just above the sliding base, in order to avoid aspirating the polymeric material that has been freshly nebulized by the spraying system 2 and that is still to be deposited on the sliding base. It should be noted that the form of the aspiration means 110, as depicted in the drawings, is indicative and non-limiting.

[0021] The aspiration means 110 comprises an aspirator body 111, partially housed inside the booth, provided with at least one aspiration port 112 arranged inside the booth, as well as an aspiration duct 113 that is generally arranged outside the booth.

[0022] Preferably, the aspiration means 110 comprises a front aspiration port. Preferably, but not in a limiting manner, the front aspiration port is arranged substantially vertically, i.e., orthogonally in relation to the sliding base 1 and turned towards the spraying system 2. Preferably, the aspiration means 110 also comprises a lower aspiration port. Preferably, but not in a limiting manner, the lower aspiration port is arranged substantially horizontally and turned downwards and therefore facing the sliding base 1. The form of the aspiration means, as depicted in Fig. 4, is purely indicative and non-limiting.

[0023] As shown in Fig. 4, the aspiration booth 100

houses an inlet aspiration means 110, namely at the inlet area of the sliding base inside the booth, and an outlet aspiration means 110, namely at the outlet area of the sliding base of the booth. Preferably, in order to prevent the sliding base from dragging nebulized polymeric material towards the outside of the booth 100, the outlet aspiration means 110 comprises both a front aspiration port and a lower aspiration port. The inlet aspiration means 110 comprises at least one front aspiration port insofar as the base, in sliding towards the inside of the booth, is unlikely to allow polymeric material to escape from the inlet area.

[0024] As shown in Fig. 4, the aspiration booth 100 houses at least one nebulized polymeric material capture medium 120, suitable for collecting said material before it enters inside the aspiration means 100, thus avoiding any risk of clogging said aspiration means. Such capture medium 120 is arranged so as to cover the aspiration port 112 of the aspiration means 110. Preferably, the aspiration booth 100 houses a capture medium 120 arranged so as to cover the aspiration port 112 of the inlet aspiration means 110, and a capture medium 120 arranged so as to cover the aspiration port 112 of the outlet aspiration means 110.

[0025] The capture medium 120 comprises a suitable filter for capturing solid particles of polymeric material and for allowing the passage of air. For example, the capture medium 120 comprises a strip of woven fabric, or non-woven fabric, made of natural or synthetic material or of another filter material. Advantageously therefore, the air that is loaded with nebulized polymeric material is aspirated by the aspiration means 110 towards the aspiration port 112; the capture medium 120, arranged so as to cover the port 112, being porous, captures solid particles of polymeric material, trapping them between the fibers thereof, effectively preventing them from entering the inside of the aspirator body 111.

[0026] The capture medium 120 is slidable. Advantageously, by virtue of such technical feature, the aspiration port 112 is always covered by a clean portion of the capture medium 120, i.e., it is not clogged with polymeric material. The capture medium 120 is initially wound so as to form a coil 121 which is retained by a support 122.

[0027] The booth 100 therefore comprises a support 122 for the coil 121, and a collection support 124 whereupon the impregnated capture medium 120' is wound so as to form a waste material 123. The collection support 124 is preferably motorized and determines the sliding of the capture medium 120 at the front of the aspiration port 112. Advantageously, the waste material 123 (a coil of filter material, for example felt, that is impregnated with polymeric material) may be used for other purposes, for example as an insulating material or, if shredded, as a filler material, for example for a shoe sole. Such solution is therefore eco-friendly.

[0028] As shown in Fig. 2 and 3, the aspiration booth 100 houses at least one screening means 130 of the sliding base 1, suitable for at least partially protecting the

base 1, thereby preventing the polymeric material from settling upon a portion thereof, thus making it possible to precisely control the deposition area of the polymeric material. Such screening means 130 is arranged so as to cover the lateral portions 11 of the sliding base 1.

[0029] The screening means 130 is slidable. Advantageously, by virtue of such technical feature, the lateral portions 11 of the sliding base 1 are always covered by a clean portion of the screening means 130, i.e., they are not covered in polymeric material. This makes it possible to collect and recycle the polymeric material that has not been deposited and that is therefore in excess.

[0030] In one exemplary embodiment, shown in Fig. 3, the screening means 130 is a material 131 that continuously slides on a non-stick mat. Therefore, in such case, the excess polymeric material is detached, for example by means of a brush 132, from the mat 131 and collected in a special container 133 whilst the mat returns to the start position to be continuously reused in the production cycle.

[0031] In an alternative exemplary embodiment, shown in Fig. 2, the screening means 130 is a band 131 supported by a platform 133. Preferably, the band 131 is initially wrapped in a coil 121, for example made of a woven fabric, or a non-woven fabric made of natural or synthetic material or of another filter material, or else a spun or drawn or blown plastic material. The booth 100 therefore comprises a support 122 for the coil 121, and a collection support 124 whereupon the impregnated band 131' of polymeric material is wound so as to form a waste material 123. Preferably, the collection support 124 is motorized and determines the sliding of the band 131. Advantageously, the waste material 123 may be used for other processes.

[0032] The screening means 130 may also be adjusted transversely in relation to the sliding base 1, in such a way as to determine the width of the lateral portions 11 of the base 1 to be covered according to specific requirements. Such solution makes it possible to keep the lateral edges of the base 1 clean and is advantageous in the case wherein a release paper is used, which, once the support is removed, may be continuously reused in the production cycle. Such solution is therefore eco-friendly.

[0033] Preferably, the inner walls of the box-shaped cover 101 of the aspiration booth 100 are non-stick so as to make it possible to easily detach the accumulated polymeric material therefrom, and to enable the reuse thereof. Such solution is therefore eco-friendly.

[0034] Innovatively, an aspiration booth according to the present invention, by virtue of the capture medium 120 of the nebulized polymeric material arranged so as to cover the aspiration ports 112, is suitable for a plant for the production by spraying of artificial leather and enables continuous production, without machinery downtime for cleaning or replacing the aspiration filters.

[0035] Advantageously, an aspiration booth according to the present invention, by virtue of the screening means 130 protecting the lateral edges of the sliding base,

makes it possible to precisely control the deposition zone of the polymeric material.

[0036] Advantageously, an aspiration booth according to the present invention, by virtue of the numerous technical features (the use of a sliding filter, a sliding band and non-stick surfaces) enables the collection and recovery of the waste polymeric material from the spraying, i.e., that which has been nebulized but not deposited on the base.

Claims

1. Aspiration booth (100) for a plant for the production by spraying of artificial leather, comprising:
 - a box-shaped cover (101), formed of side walls (102) and an upper wall (103);
 - at least one aspiration means (110) provided with an aspirator body (111) with at least one aspiration port (112) housed inside the box-shaped cover (101);
 - at least one capture medium (120) arranged so as to cover the at least one aspiration port (112), said capture medium (120) being a filter and being slidable in front of said at least one aspiration port (112).
2. Aspiration booth (100) according to claim 1, wherein said capture medium (120) is a band of woven fabric or non-woven fabric.
3. Aspiration booth (100) according to any one of the preceding claims, wherein the port (112) is a front aspiration port and/or a lower aspiration port.
4. Aspiration booth (100) according to any one of the preceding claims, comprising an inlet aspiration means (110), intended to be positioned within an inlet area of a sliding base inside the booth, provided with at least one front aspiration port.
5. Aspiration booth (100) according to any one of the preceding claims, comprising an outlet aspiration means (110), intended to be positioned within an outlet area of a sliding base inside the booth, provided with at least one front aspiration port and one lower aspiration port.
6. Aspiration booth (100) according to any one of the preceding claims, comprising at least one screening means (130) for the lateral portions of a sliding base inside the booth.
7. Aspiration booth (100) according to claim 6, wherein said at least one screening means (130) is slidable.
8. Aspiration booth (100) according to claim 6 or 7,

wherein said at least one screening means (130) is a band of woven fabric or non-woven fabric.

9. Aspiration booth (100) according to any one of the preceding claims, wherein said upper wall (103) of the box-shaped cover (101) comprises: 5

- a raised portion (106), that extends substantially vertically; 10
- an upper portion (104) that extends transversely above the raised portion (106);

wherein between the raised portion (106) and the upper portion (104) there is an air intake (105). 15

10. Aspiration booth (100) according to any one of the preceding claims, wherein said air intake (105) is arranged along a perimeter of the raised portion (106) and/or has a constant height along a perimeter of the raised portion (106). 20

11. Aspiration booth (100) according to any one of the preceding claims, wherein the box-shaped cover (101) is at least partially provided with inner non-stick surfaces. 25

12. Plant for the production by spraying of artificial leather comprising at least:

- an aspiration booth (100) according to any one of the preceding claims; 30
- a mobile spraying system (2) suitable for spraying polymeric material onto a sliding base, said spraying system (2) being arranged inside said aspiration booth (100) . 35

13. Plant for the production by spraying of artificial leather according to claim 12, comprising a pair of screening means (130) for the lateral portions of the sliding base inside the aspiration booth (100), each screening means (130) being transversely adjustable in relation to said sliding base. 40

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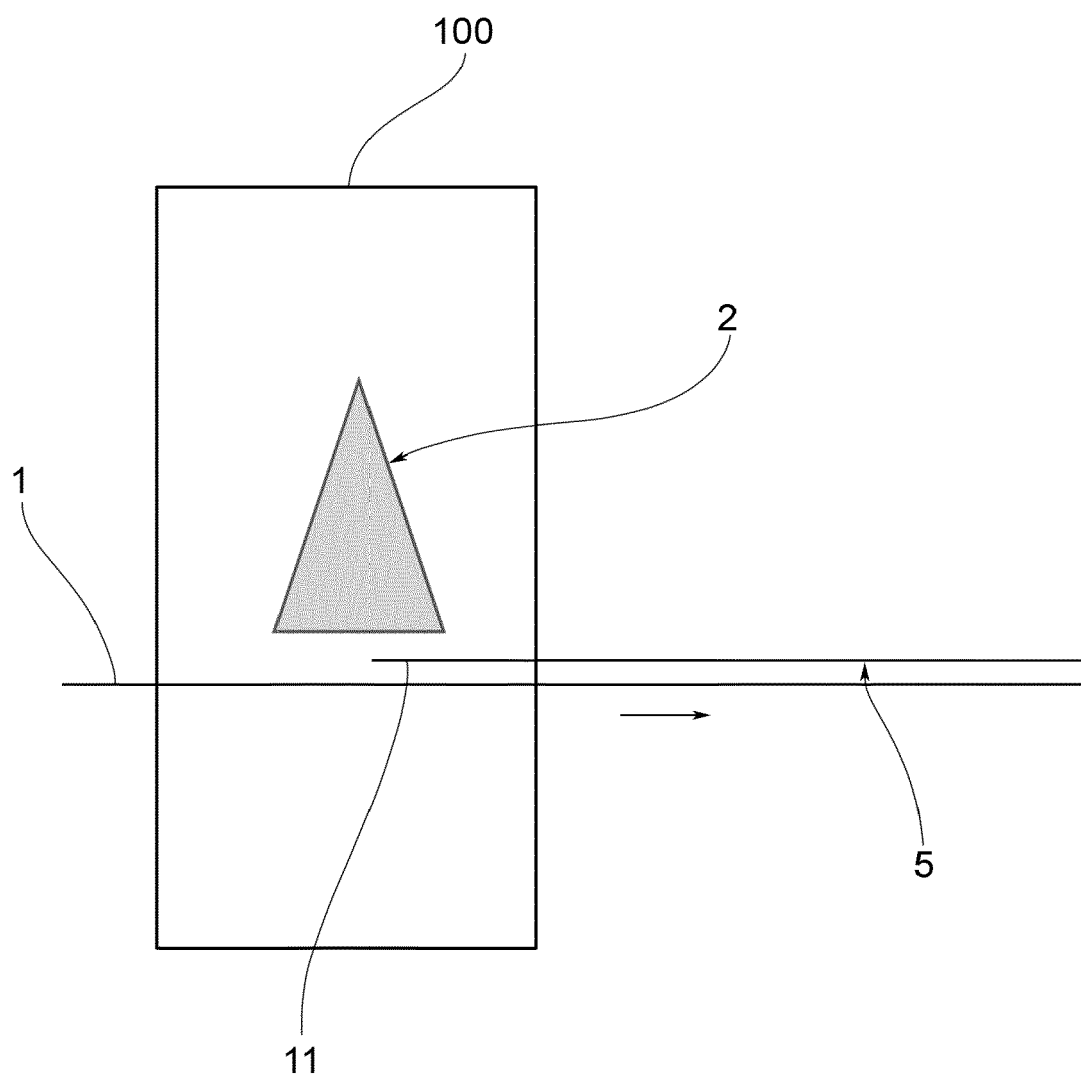


FIG.1

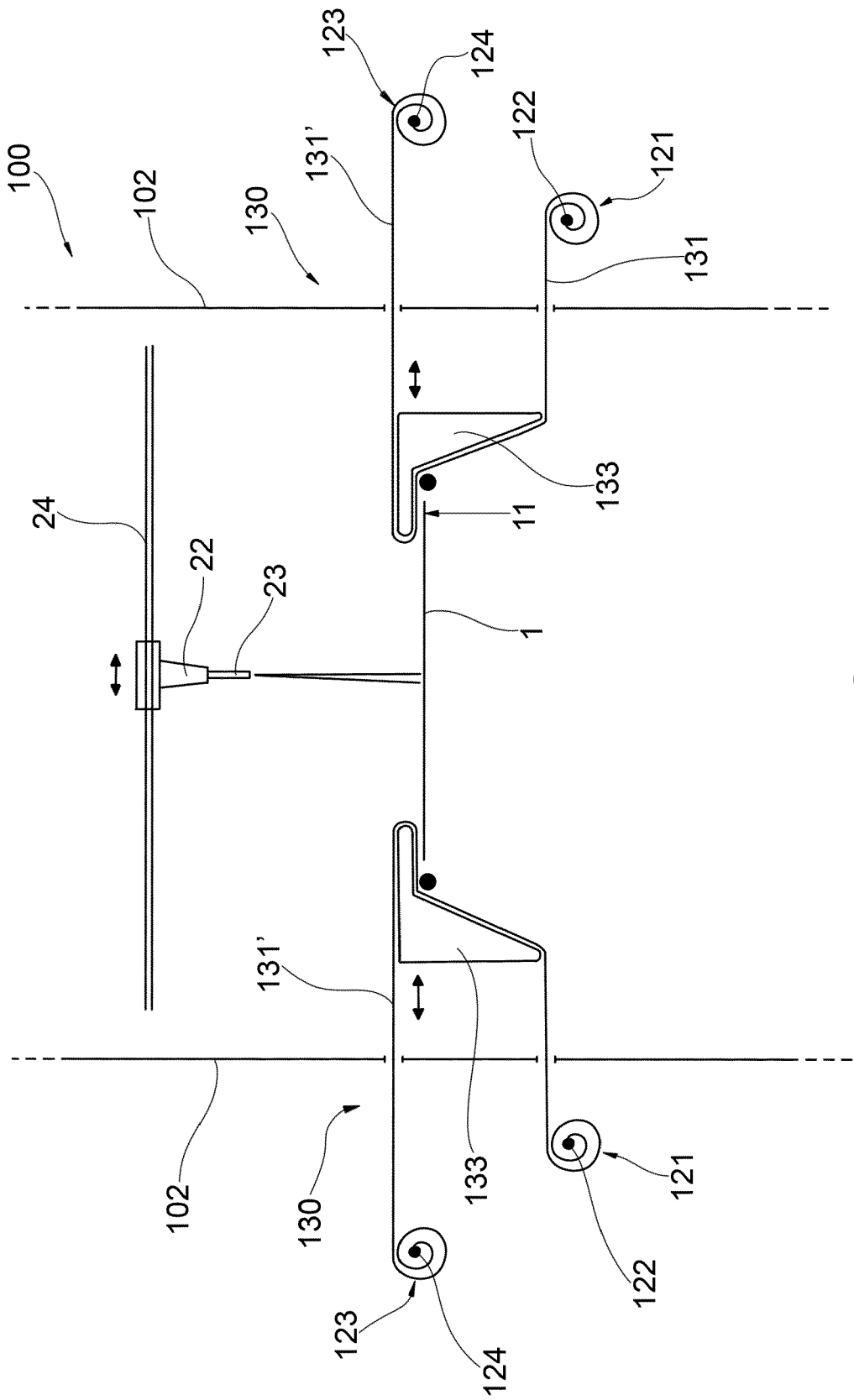


FIG.2

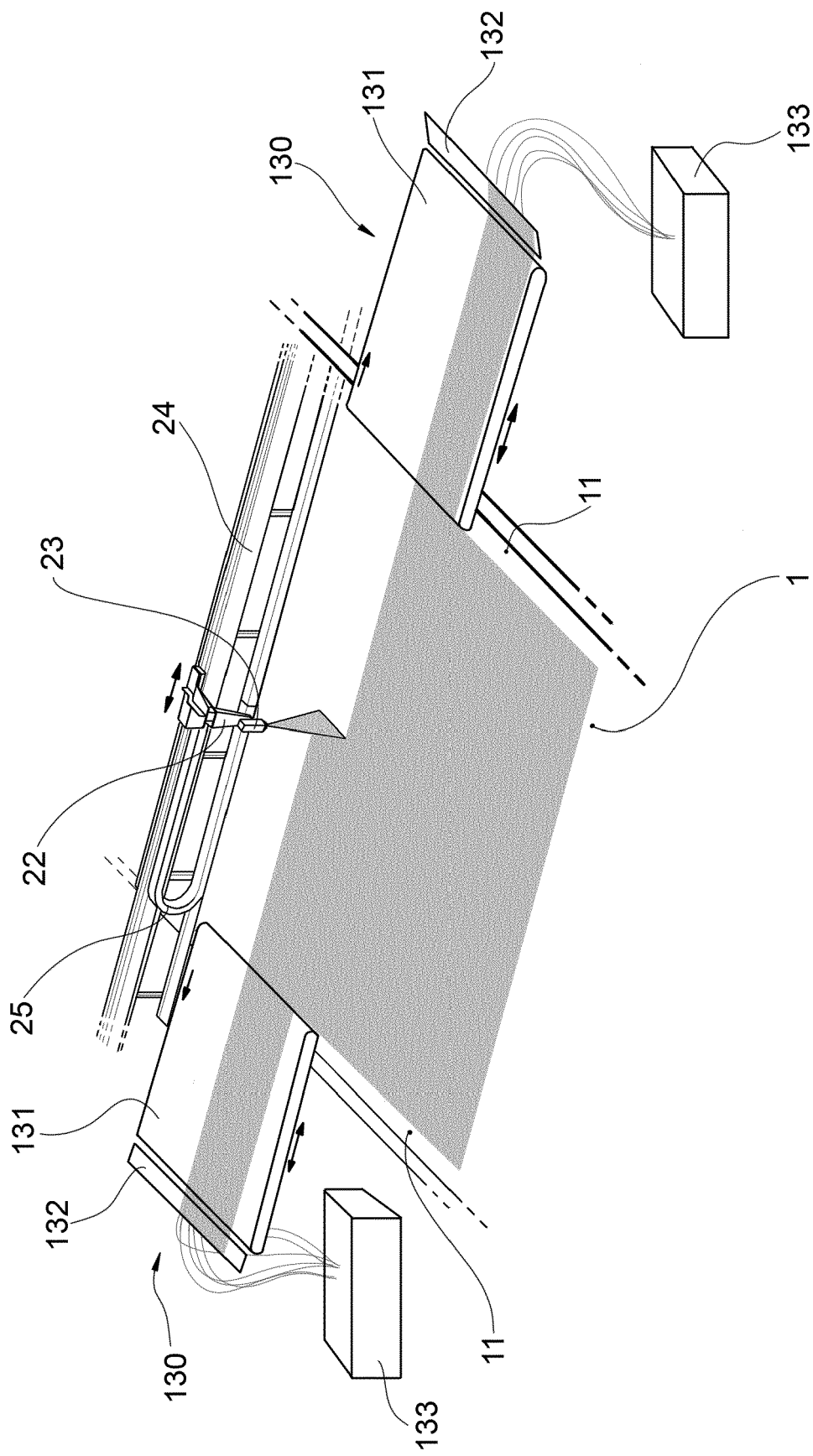


FIG.3

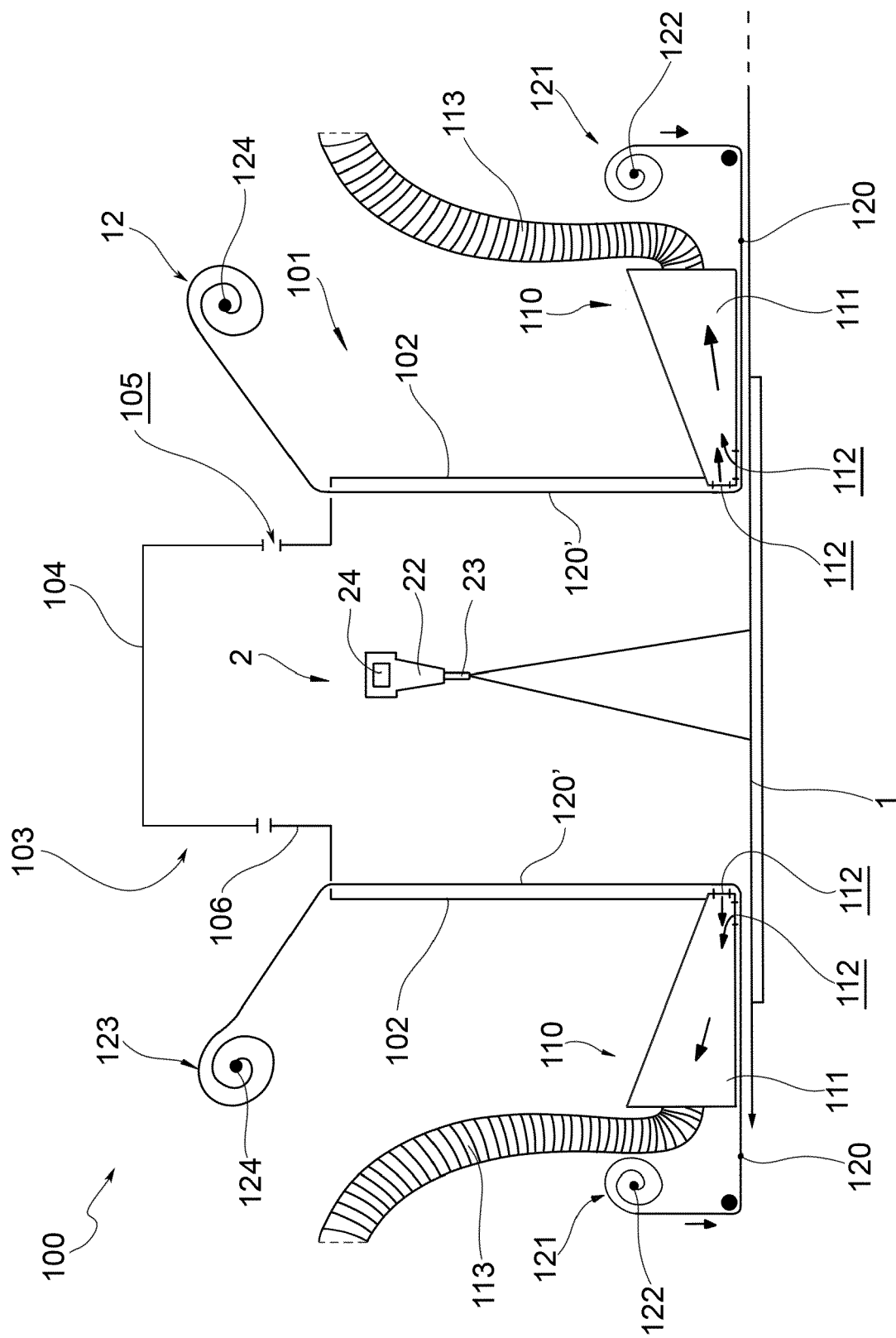


FIG. 4



EUROPEAN SEARCH REPORT

Application Number

EP 23 21 9080

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 4 181 093 A (TREDWELL GILMAN [US]) 1 January 1980 (1980-01-01)	1,4,9, 10,12	INV. C14B7/02
A	* column 1, lines 5-12; column 2, lines 18-65, column 3, lines 25-30; claims; figures *	3,5-8, 11,13	D06N3/00
X	US 5 720 811 A (EDER MICHAEL [AT]) 24 February 1998 (1998-02-24)	1-3	ADD. B05B13/00
A	* column 1, lines 5-27; column 3, lines 1-38; claims; figures *	4-13	
A	US 2021/131028 A1 (BRAMARDI MARCO [IT]) 6 May 2021 (2021-05-06) * paragraphs [0001] - [0006], [0029] - [0037]; claims; figures *	1-13	
A	US 2023/064200 A1 (FIDANZA VIRGINIO ABBONDIO [IT] ET AL) 2 March 2023 (2023-03-02) * the whole document *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			C14B B65D B05B D06N
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		24 May 2024	Clivio, Eugenio
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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EP 23 21 9080

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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
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4181093 A	01-01-1980	NONE	
US 5720811 A	24-02-1998	AT E194510 T1 CA 2170102 A1 DK 0728530 T3 EP 0728530 A1 ES 2150033 T3 US 5720811 A	15-07-2000 25-08-1996 11-12-2000 28-08-1996 16-11-2000 24-02-1998
US 2021131028 A1	06-05-2021	CN 112088232 A EP 3775363 A1 HU E061798 T2 JP 2021521354 A MA 52215 A PT 3775363 T RS 64030 B1 US 2021131028 A1 WO 2019198002 A1	15-12-2020 17-02-2021 28-08-2023 26-08-2021 17-02-2021 30-03-2023 31-03-2023 06-05-2021 17-10-2019
US 2023064200 A1	02-03-2023	BR 112022016356 A2 CN 115176053 A EP 4004272 A1 ES 2958395 T3 HR P20231105 T1 HU E063374 T2 IT 202000003401 A1 MA 56693 B1 MD 4004272 T2 PL 4004272 T3 RS 64590 B1 US 2023064200 A1 WO 2021165794 A1 ZA 202208850 B	04-10-2022 11-10-2022 01-06-2022 08-02-2024 22-12-2023 28-01-2024 19-08-2021 27-09-2023 31-10-2023 30-10-2023 31-10-2023 02-03-2023 26-08-2021 26-04-2023

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