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(54) PACKAGING IN FOIL WITH PREDEFINED SUBSECTIONS

(57) A packaging apparatus (101) creates foil packages (309) by wrapping objects (301, 311) in foil (100) from a first roll of foil (103). The foil (100) has a number of predefined subsections (S1, S2, S3, S4) along its length. Sub rollers (106, 108, 110) guide the foil (100) between the first roll of foil (103) to a second roll (105) via a foil path (107). Packaging means (109) along the foil path (107) wrap the objects (301, 311) in a subpart of the foil (100) present along said foil path (107). The sub rollers (106, 108, 110) have adjustable accumulation means (111) for accumulating an adjustable amount of foil (100) along the foil path (107) for ensuring that the subpart for wrapping corresponds to one of the predefined subsections (S1, S2, S3, S4). Thereby, foil (100) is accumulated in the foil path (107) to ensure that one complete subsection of foil (100) is present in the foil path (107) for wrapping an object (301, 311) in one subsection of foil (100) and ensuring that the final package (309) has the graphical print of an entire subsection.

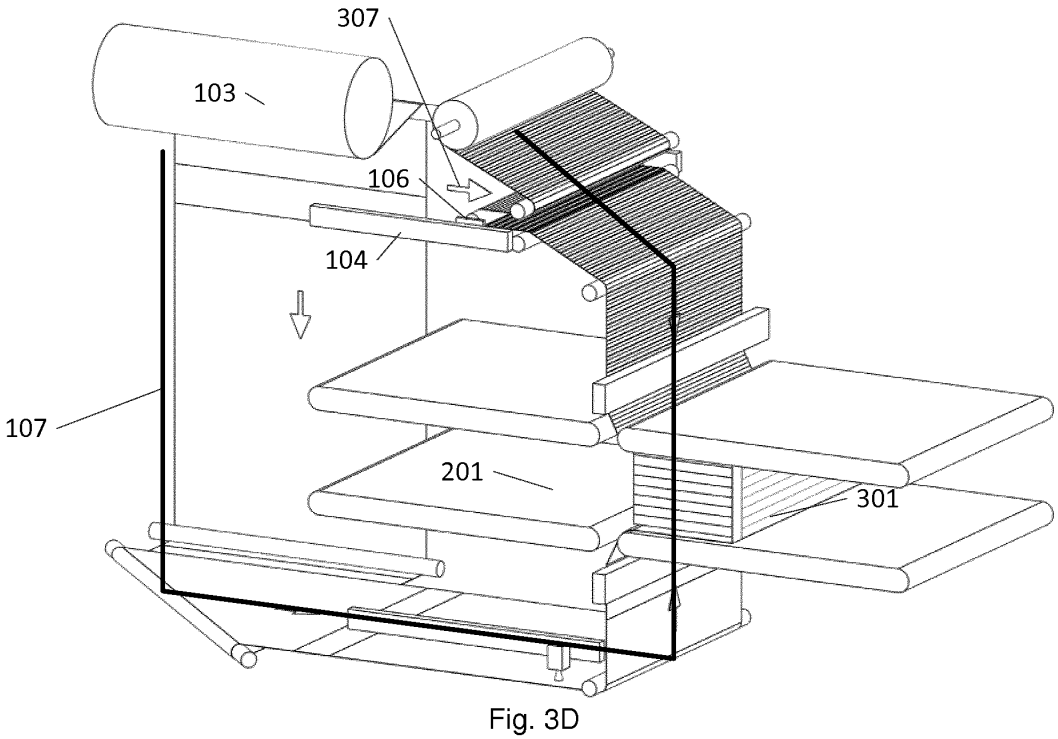

Fig. 3D

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a packaging apparatus for creating foil packages, by wrapping objects in foil. The present invention further relates to a method of creating foil packages by wrapping objects in foil.

BACKGROUND

[0002] Packaging and wrapping of objects or products using foil is widely used in many industries. Such packed or wrapped products could be for the building industry and range from building materials such as plaster plates to glass or mineral wool. Naturally, one of the primary requirements for the packaging of such products is that the material wrapped around the products serves to protect the products until it is purposely broken.

[0003] When wrapping insulation materials, such as glass or mineral wool, the foil is often also used as a means for maintaining a compression of normally a stack of insulation objects. The insulation objects are compressed and then wrapped in un-stretched or stretched foil which is joined by welding.

[0004] Wrapping of objects in foil could be an open foil curtain, wherein the foil is from a foil length rolled on a foil roll, where the foil is supplied from the foil roll and to a packaging machine for wrapping an object in foil.

[0005] In a number of situations, it is of interest to be able to make a package where the package has a specific print, such as the name and/or a design of the manufacturer of the object in the package or a specific design relating to the package distributor. The foil on the foil roll is preprinted in predefined subsections, where each subsection corresponds to the subsection to be used for wrapping one object and creating one package. It is important that a complete subsection is used for packaging to ensure that the right design of the final package is obtained, where the print appears in a correct manner. Further, when the foil length in the subsection is closed at one side, and each end of the subsection is connected, it is also of interest that the graphic at each side of the connection corresponds to each other, whereby the correct final impression of the graphic on the package is obtained. A package, which is wrapped in two half-neighboring subsections of foil, would provide a wrong visual impression.

SUMMARY

[0006] In one aspect, the invention pertains to a packaging apparatus for creating foil packages by wrapping objects in foil from a first roll of foil, said foil comprising a number of predefined subsections along its length, said packaging apparatus comprising sub rollers for guiding said foil between said first roll of foil to a second roll via a foil path, said packaging apparatus further comprising packaging means along said foil path for performing said wrapping of said objects in a subpart of said foil present along said foil path. The sub rollers comprise adjustable accumulation means for accumulating an adjustable amount of foil along said foil path for ensuring that said subpart for wrapping corresponds to one of said predefined subsections.

[0007] Thereby, it is possible to accumulate foil in the foil path and thereby ensure that one complete subsection of foil is present in the foil path for wrapping an object in one subsection of foil ensuring that the final package has the graphical print of an entire subsection. It is further important that it is one subsection of foil that is used for a package since the welding of the foil ensures when wrapped around the package that the ends of a subsections are interconnected, whereby the print on the foil ends has a smooth transition from one end of a subsection of foil to the other. After wrapping, the foil is connected end to end and then cut from the remaining foil. If cut and connected according to the actual dimensions of the subsection, one subsection has been printed with a print which ensures a print of interest.

[0008] In an embodiment, said packaging means comprises roller paths on each side of said foil in said foil path for transporting objects from one side of said foil path to the opposite side of said foil path, and wherein this transporting results in that the object is partly surrounded by said foil.

[0009] Thereby, the package can easily be transported into the foil path and at least partly wrapped in foil in an automatic manner.

[0010] In an embodiment, said packaging means further comprises closing means, welding means and cutting means, wherein

- said closing means are adapted for closing foil together at overlapping foil layers to completely surround the partly surrounded object in foil after the object has been transported from one side of the foil path to the opposite side via said rollers,
- said welding means are for welding the overlapping foil layers and
- said cutting means are for cutting the foil at a cutting line relative to the welding of said overlapping layers in a manner whereby foil is welded on both sides of the cutting line,

and wherein the welding means and cutting means are adapted to weld and cut in a manner where the ends of foil around the object is welded together and whereby foil from respectively the first and second roll of foil are welded together for maintaining a connection between the foil along said foil path between said first and said second roll of foil.

[0011] Thereby, the foil wrapped around the package can be closed and due to the welding on both sides of the cut, the foil path is maintained between the first and second roll, and the apparatus is immediately ready for

creating a second foil package.

[0012] In an embodiment, the accumulation means comprises at least three sub rollers, wherein one of said sub rollers is the accumulation roller which is displaceable relative to the other sub rollers of said accumulation means to accumulate foil.

[0013] Thereby, the accumulation can be made in an easy manner by displacing the accumulation roller, and the amount of accumulation is determined by the length of the displacement. Further, since rollers are used for the accumulation means, it is ensured that foil can be rolled from the first roll to the second roll.

[0014] In an embodiment, said accumulation roller is displaceable along displacement rails. Thereby, a motor could control the displacement along the rail, and a very controllable and precise displacement is possible.

[0015] In an embodiment, said accumulation means is adapted to accumulate an amount of foil corresponding to the length of the upper surface of said object to be wrapped. Thereby, by measuring the length of the upper surface of the object, e.g. via as sensor, and by displacing the accumulation roller accordingly. the apparatus is automatically adjusted to the actual size of a package and the corresponding length of a foil subsection.

[0016] In an embodiment, said subsections are separated by a separation marker, and the apparatus comprises a sensor for detecting said separation marker. Thereby, it can be determined when a complete sensor is present along the foil path, and e.g. the accumulation of foil in the foil path can be initiated. It is ensured that a complete subsection of foil is present in the foil path.

[0017] In an embodiment, the separation marker and the sub rollers are fixed relative to each other, whereby the length of foil in the foil path between the sensor and the accumulation roller corresponds to the length of a subsection of said foil.

[0018] This is to further ensure that a complete subsection of foil is present along the foil path and that it is present at the subsection of the foil path at the foil part being used for wrapping.

[0019] The invention further relates to a method of creating foil packages by wrapping objects in foil from a first roll of foil, said foil comprising a number of predefined subsections along its length.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Various embodiments of the invention are explained in detail below with reference to the drawings, in which

Fig. 1 illustrates a length of foil with predefined subsections,

Figs. 2A - D illustrate a packaging apparatus according to one embodiment of the present invention,

Figs. 3A-G illustrate a method of wrapping according to one embodiment of the present invention,

Fig. 4 illustrates the packaging machine wrapping an object with a different dimension in accordance with one embodiment.

DETAILED DESCRIPTION

[0021] Fig. 1 illustrates a length of foil 100 with predefined subsections (S1, S2, S3, S4), where the foil is for wrapping objects in foil with a packaging machine according to the present invention.

[0022] The foil is a foil length typically rolled on a foil roll, and where prints (not shown) have been provided on a foil surface in each subsection (S1, S2, S3, S4). The print in each subsection determines the graphical look of the final package being the object wrapped in the foil. In Fig. 1, a subpart of a foil length is illustrated, where four subparts are present (S1, S2, S3, S4), and where each subpart is separated by a separation marker 113. The separation marker 113 is for indicating that a new subsection starts thereafter and that the present subsection has ended. This marker can be detected by a sensor in the packaging apparatus. The length of the separation marker should be sufficient for detection by the sensor, but not too long since this would result in a waste of foil since only the actual subsections should be used for wrapping.

[0023] Figs. 2A - D illustrate a packaging apparatus according to the present invention.

[0024] In Fig. 2A the packaging apparatus 101 is illustrated. In the packaging machine, the first roll of foil 103 is mounted together with a second roll 105. The foil 100 with subsections separated by separation markers 113 is connected between the first roll 103 and the second roll 105 for rolling onto either of the rolls 103, 105 depending on the rotation direction of the rolls 103, 105. Via a number of sub rollers 106, 108, 110, the foil path 107 between the first roll 103 and the second roll 105 is guiding the foil between the first roll 103 of foil to the second roll 105 via the foil path 107. The packaging apparatus further comprises a sensor 115 for detecting a separation marker 113.

[0025] As indicated on Fig. 2B the packaging apparatus 101 further comprises packaging means 109 along the foil path 107 for performing wrapping of objects in a subpart of foil. In Fig. 2B it is further illustrated that the sub rollers comprise adjustable accumulation means 111 for accumulating the adjustable amount of foil along the foil path 107 for ensuring that the subpart for wrapping corresponds to a predefined subsection of foil (S1, S2, S3, S4) separated by separation markers 113.

[0026] In Fig. 2C, a cut of Fig. 2B is shown to illustrate the elements of the packaging means 109. The packaging means comprises roller paths 201 on each side of the foil 100 in the foil path and these roller paths 201 are used for transporting the object through the foil path and thereby ensuring that the package is partly wrapped in

foil from the foil path. In the example, two sets of roller paths are positioned above each other and thereby and by transporting the package between the roller paths, the object can be compressed and the compression can be maintained during transporting.

[0027] Further, in Fig. 2C, elements 203 for closing, welding and cutting the foil are illustrated, wherein the elements 203 can moved together and thereby close foil together at overlapping foil layers to completely surround the partly wrapped object in foil after the object has been transported from one side of the foil path to the opposite side via said rollers. On the surface of the elements 203, welding and cutting means are present (not shown), whereby the welding of the overlapping foil layers is performed when the elements have been moved together, e.g. by welding the layers together via heating elements. Further, cutting means are also present on the surface of the elements 203 for cutting the foil at a cutting line relative to the welding of the overlapping layers in a manner whereby foil is welded on both sides of the cutting line. The welding means and cutting means are adapted to weld and cut in a manner, where the ends of foil around the package is welded together and whereby foil from the first roll of foil and the second roll of foil respectively, is welded together for maintaining a connection between the foil along said foil path between said first and said second rolls of foil. The welding and cutting means could e.g. correspond to the welding and cutting means described in US2011/0114709.

[0028] Fig. 2D illustrates the accumulation means according to the present invention, wherein the accumulation means 111 comprises at least three sub rollers 106, 108, wherein one of said sub rollers is the accumulation roller 106 which is displaceable relative to the other sub rollers 108 of the accumulation means to accumulate foil, and wherein the accumulation roller 106 is displaceable along displacement rails 104.

[0029] Figs. 3A-G illustrate a method of packaging according to the present invention, where a foil path 107 is present between two rolls 103, 105 of foil, and where the path is via sub rollers 110 and the accumulation means 111 and passes the packaging means 109. An object 301 is transported between roller paths 201 and is compressed between the roller paths 201. In the example, the object is sheets of insulation material e.g. glass wool.

[0030] In Fig. 3B, arrows illustrate the foil being rolled from one roll 103, and it can further be seen that compared to Fig. 3A, the separation marker 113 moves in the direction of the arrows. Further, the accumulation roller 106 has been moved in the direction of the arrow along the displacement rail 104 to accumulate foil along the foil path.

[0031] In Fig. 3C, foil has been accumulated in the accumulation means, and foil is rolled from the first roll 103 to the second roll 105 via the accumulation means. This is carried out until the sensor 115 detects the presence of a separation marker 113, whereby the rolling in the direction illustrated by the arrow 305 is stopped, and the object 301 is transported towards the foil in the foil path by the roller paths. The rolling is stopped since the foil of a subsection is now available in the subpart of the foil path for wrapping the object, and this is ensured by calibrating the system based on the sensor position and relative to the length of the foil path, the length of a subsection and finally the position of the packaging means along the foil path.

[0032] In Fig. 3D, the object 301 is moved through the foil path 107 from one side of the foil path 107 to the opposite side via the roll paths 201 and by doing that, the object 301 is partly wrapped in foil present in the foil path 107. During the process, the foil, which has been accumulated in the accumulation means, is released by rotating the first roll 103 and by moving the accumulation roller 106, respectively, the accumulation roller 106 being moved back to its original position via the displacement rails 104 in the direction of the arrow 307. The release of foil from the accumulation means could correspond to the foil needed for covering the top side of the object 301, and the release would thus be performed with a speed corresponding to the speed with which the object 301 moves along the roller paths 201.

[0033] In Figs. 3E and 3F, the elements 203 with elements for welding and cutting are moved towards each other e.g. by moving the lower element towards the upper element and thereby completely enclosing all four sides of the object 301 in foil. During the process, the first roll 103 rotates to feed further foil to the packaging means. When layers of foil overlap between the means 203, the welding and cutting means (not shown) first welds the foil layers together and then cut the foil in a manner so that the packages are closed at the side and whereby the foil along the foil path is still connected. This could e.g. be via two welding lines, where the cutting element is positioned between the welding lines. Such system is e.g. described in US2011/0114709. In Fig. 3G, it is illustrated that the foil package 309 has been created, and that the foil 100 along the foil path has been reconnected.

[0034] In Fig. 4, the apparatus is illustrated to be used for packaging an object 311 with various dimensions. In such situation, the foil length with predefined subsections would be different, and the subsections would have a different length. Therefore, also the amount of foil to be accumulated would be different. This could e.g. be via a measurement of the length of the package and correspondingly changing the accumulation amount and timing in the packaging process.

Claims

1. A packaging apparatus (101) for creating foil packages by wrapping objects in foil (100) from a first roll of foil (103), said foil (100) comprising a number of predefined subsections (S1, S2, S3....) along its length,
said packaging apparatus (101) comprising sub roll-

ers (106, 108, 110) for guiding said foil between said first roll of foil to a second roll (105) via a foil path (107),
said packaging apparatus (101) further comprising packaging means (109) along said foil path for performing said wrapping of said objects in a subpart of said foil present along said foil path,
wherein
said sub rollers comprise adjustable accumulation means (111) for accumulating an adjustable amount of foil along said foil path for ensuring that said subpart for wrapping corresponds to one of said predefined subsections.

2. A packaging apparatus according to claim 1, wherein said packaging means (109) comprises roller paths (201) on each side of said foil (100) in said foil path for transporting objects from one side of said foil path to the opposite side of said foil path, and wherein this transporting results in that the object is partly surrounded by said foil.

3. A packaging apparatus according to claim 2, wherein said packaging means further comprises closing means, welding means and cutting means (203), wherein

- said closing means are adapted for closing foil together at overlapping foil layers to completely surround the partly surrounded object in foil after the object has been transported from one side of the foil path to the opposite side via said rollers,
- said welding means are for welding the overlapping foil layers and
- said cutting means are for cutting the foil at a cutting line relative to the welding of said overlapping layers in a manner whereby foil is welded on both sides of the cutting line,

and wherein the welding means and cutting means are adapted to weld and cut in a manner, where the ends of foil around the package is welded together and whereby foil from respectively the first and second roll of foil are welded together for maintaining a connection between the foil along said foil path between said first and said second roll of foil.

4. A packaging apparatus according to claim 1, wherein the accumulation means (111) comprises at least three sub rollers (106, 108), wherein one of said sub rollers is the accumulation roller (106) which is displaceable relative to the other sub rollers (108) of said accumulation means to accumulate foil.

5. A packaging apparatus according to claim 4, wherein said accumulation roller is displaceable along displacement rails (104).

6. A packaging apparatus according to claim 1, wherein said accumulation means is adapted to accumulate an amount of foil corresponding to the length of the upper surface of said object to be wrapped.

7. A packaging apparatus according to claim 1, wherein said subsections are separated by a separation marker (113) and wherein the apparatus comprises a sensor (115) for detecting said separation marker.

8. A packaging apparatus according to claim 7, wherein the separation marker and the sub rollers are fixed relative to each other, whereby the length of foil in the foil path between the sensor (115) and the accumulation roller (106) corresponds to the length of a subsection of said foil.

9. A method of creating foil packages by wrapping objects in foil (100) from a first roll of foil (103), said foil (100) comprising a number of predefined subsections (S1, S2, S3....) along its length, said method comprising:

- guiding said foil along sub rollers between said first roll and a second roll (105) via a foil path (107);
- wrapping said object in foil along said foil path using packaging means; and
- accumulating an adjustable amount of foil along said foil path for ensuring that said subpart for wrapping corresponds to one of said predefined subsections.

10. A method according to claim 9, wherein said wrapping is performed by transporting objects from one side of said foil to the opposite of said foil, and wherein this transporting results in that the object is partly surrounded by said foil.

11. A method according to claim 10, wherein said wrapping further comprises the steps of:

- closing foil together at overlapping foil layers to completely surround the partly surrounded object in foil after the object has been transported from one side of the foil path to the opposite side via said rollers,
- connecting the overlapping foil layers and
- cutting the foil at a cutting line relative to a connection point of said overlapping layers in a manner whereby foil is welded on both sides of the cutting line,

and wherein the connecting and cutting is performed in a manner, where the ends of foil around the package are connected, and whereby foil from the first and second rolls of foil, respectively, are welded together for maintaining a connection between the foil

along said foil path between said first and said second rolls of foil.

12. A method according to claim 10, wherein accumulation of foil is performed by accumulation means comprising at least three sub rollers (106, 108), wherein accumulation is achieved by displacing one of said sub rollers relative to the other sub rollers (108).

13. A method according to claim 10, wherein an amount of foil corresponding to the length of the upper surface of said object to be packaged is accumulated.

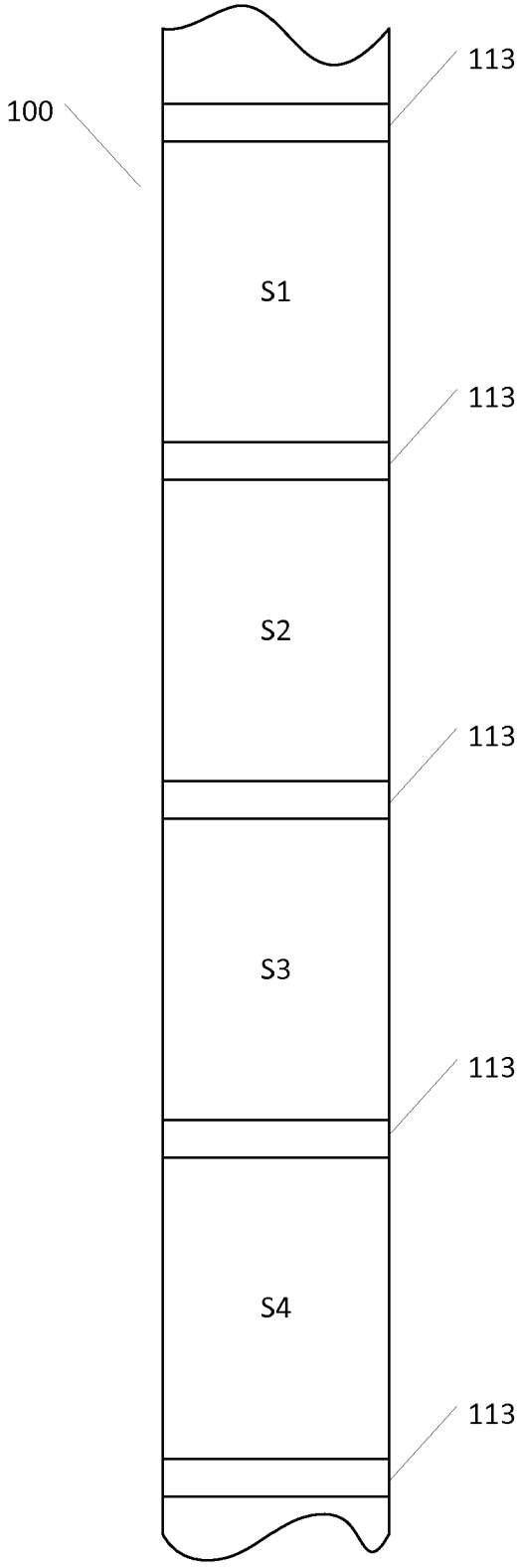

Fig. 1

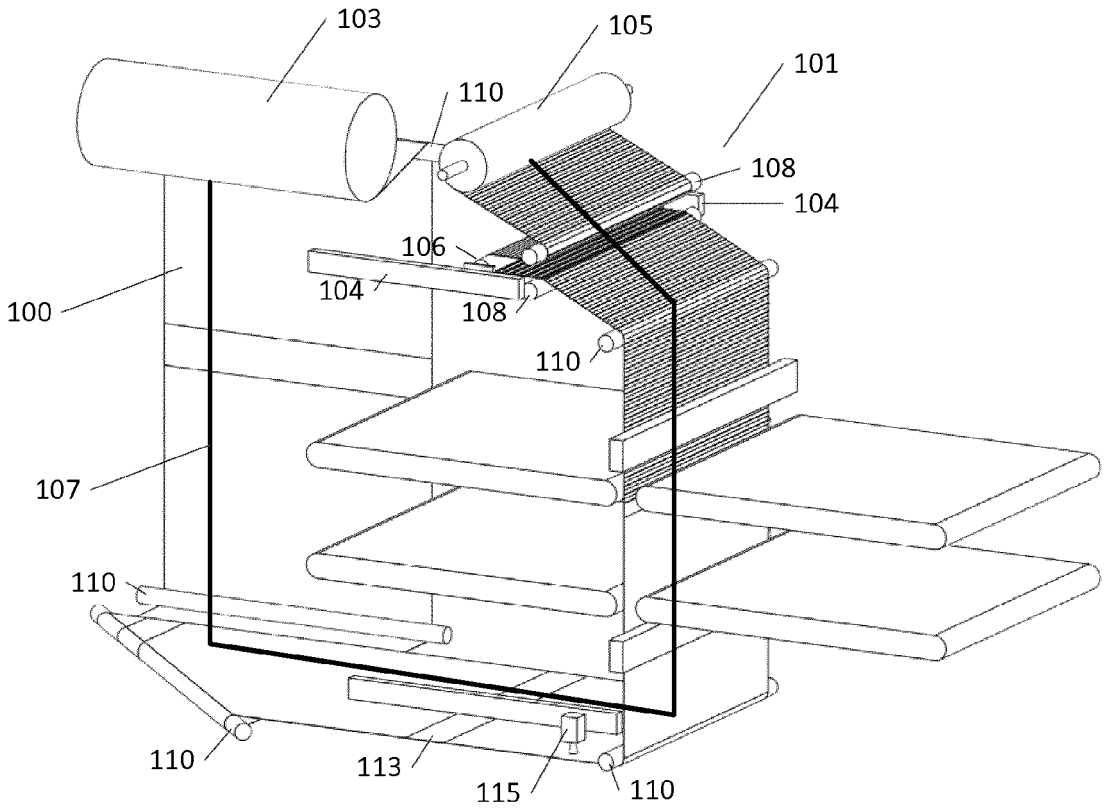
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Fig. 2A

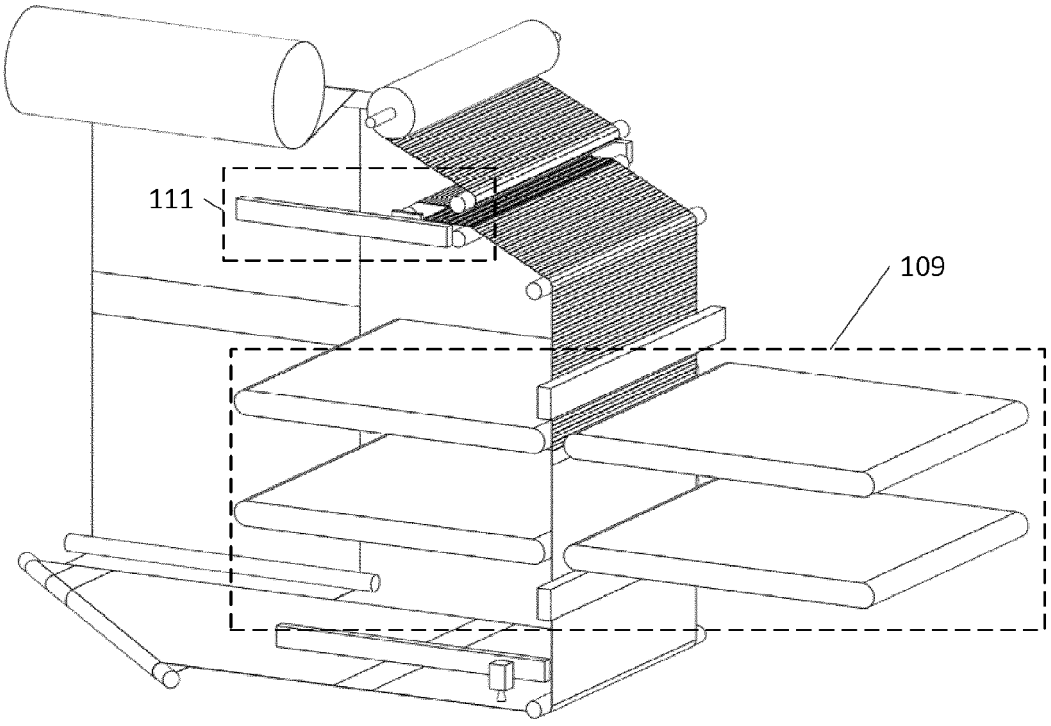
111
109

Fig. 2B

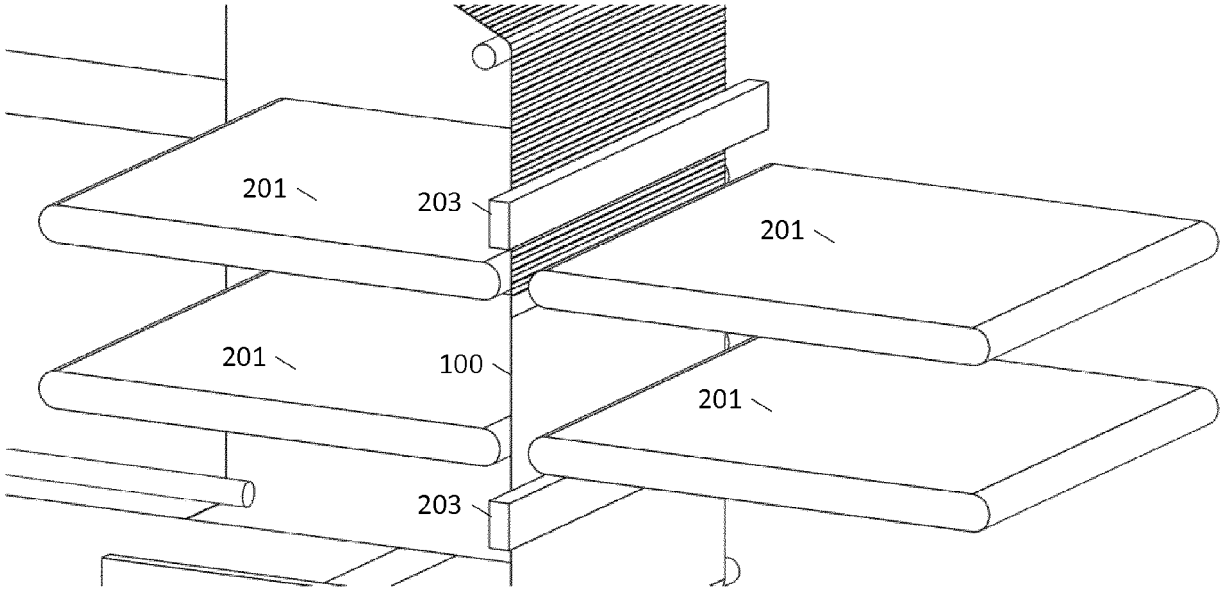

Fig. 2C

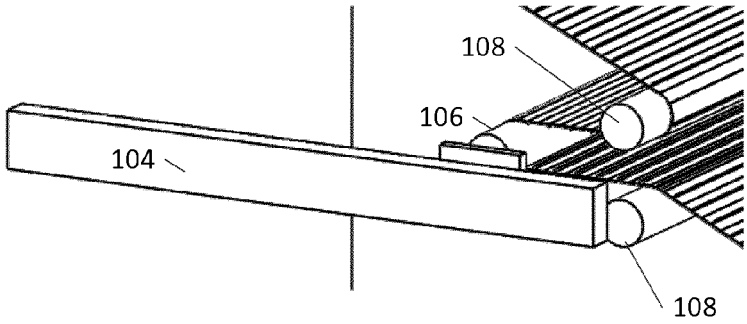

Fig. 2D

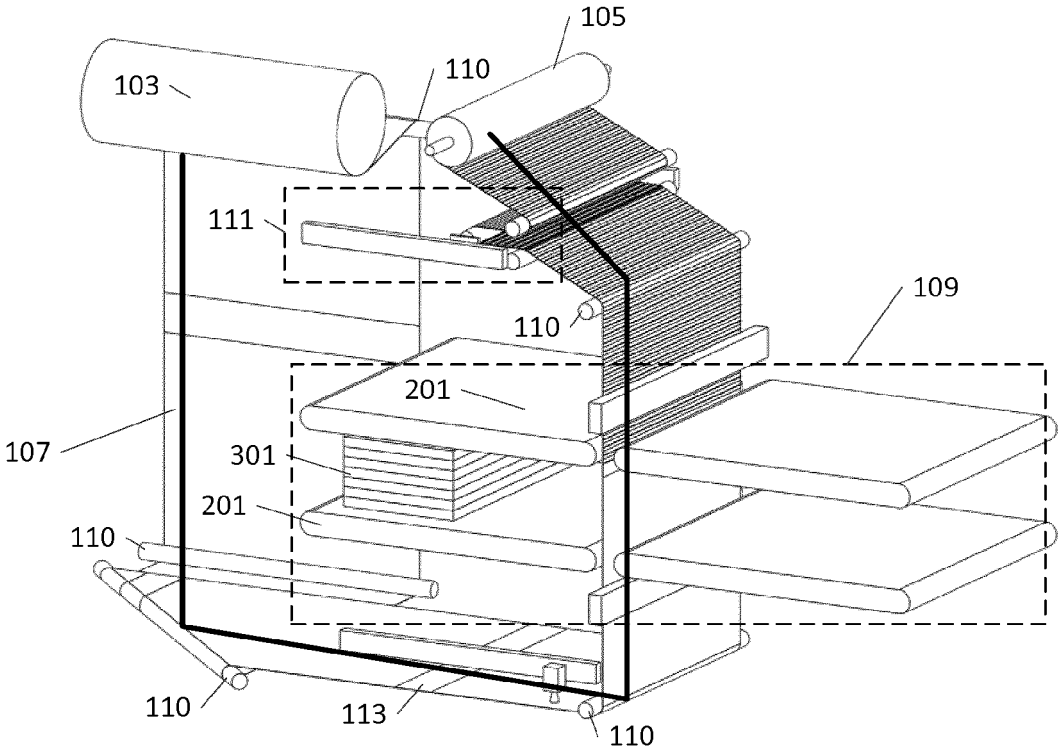
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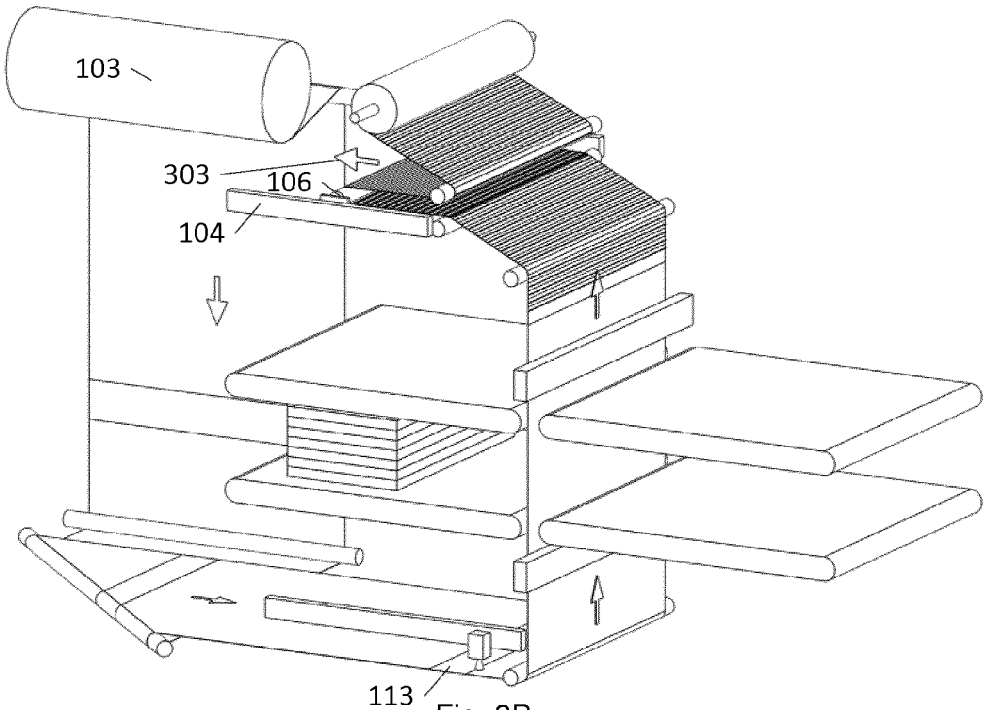
Fig. 3A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303
106
104
113

Fig. 3B

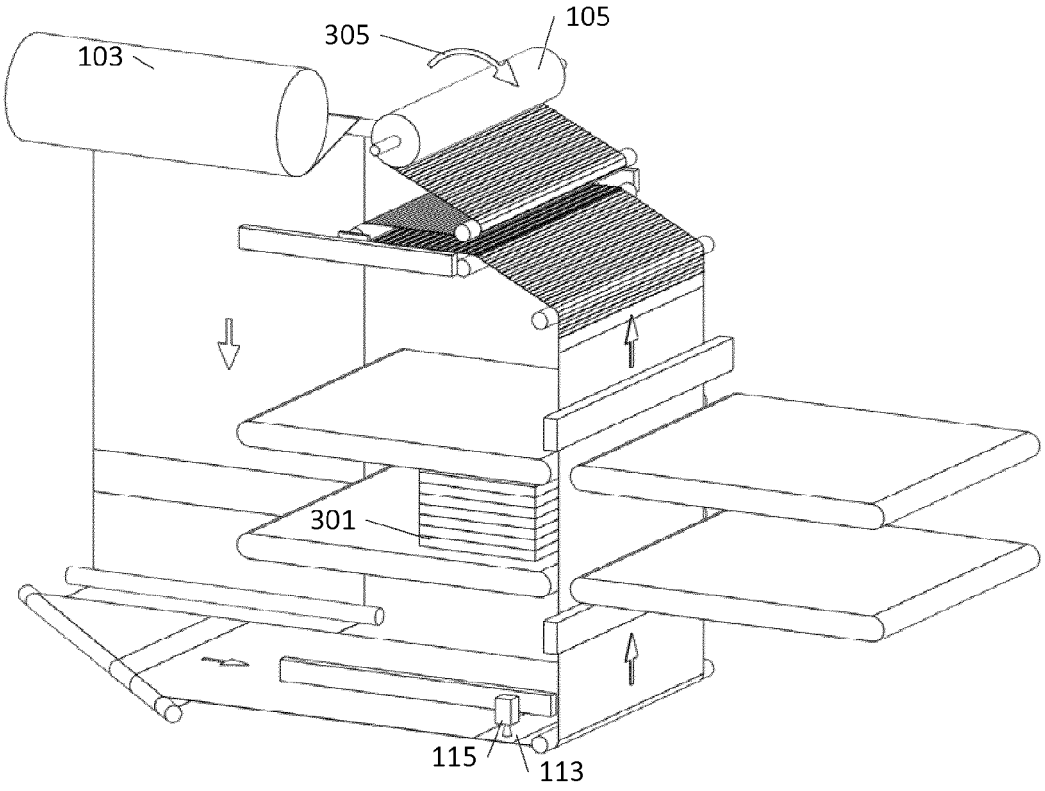

Fig. 3C

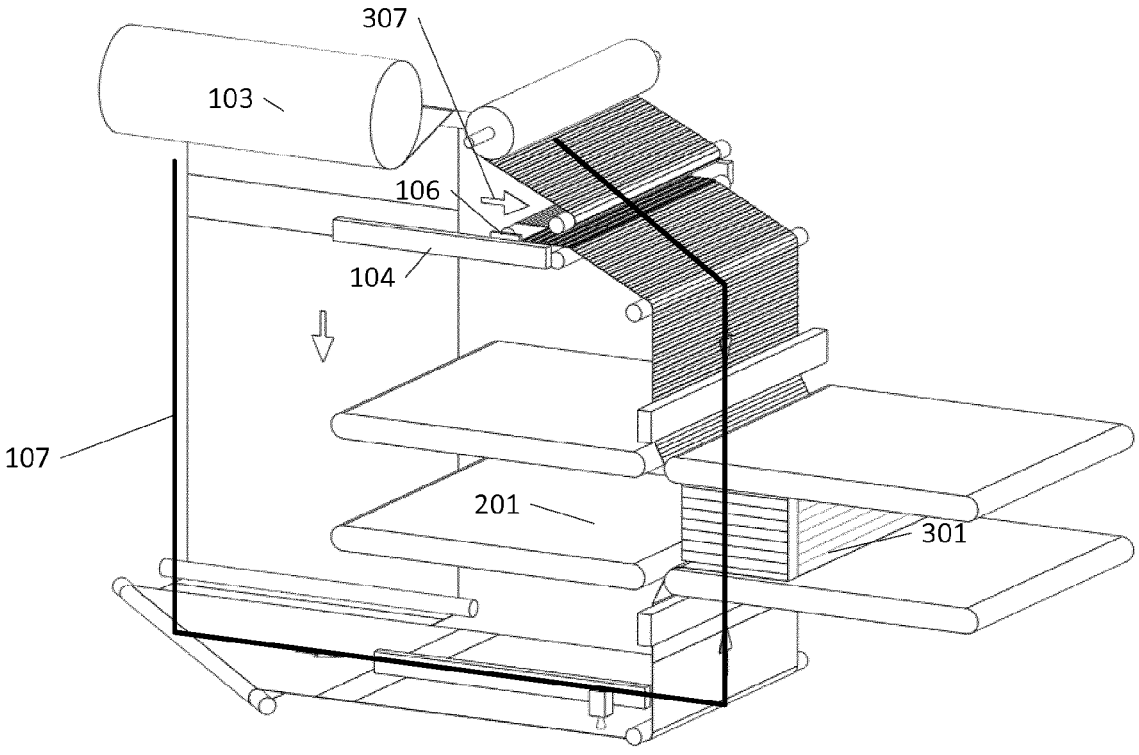

Fig. 3D

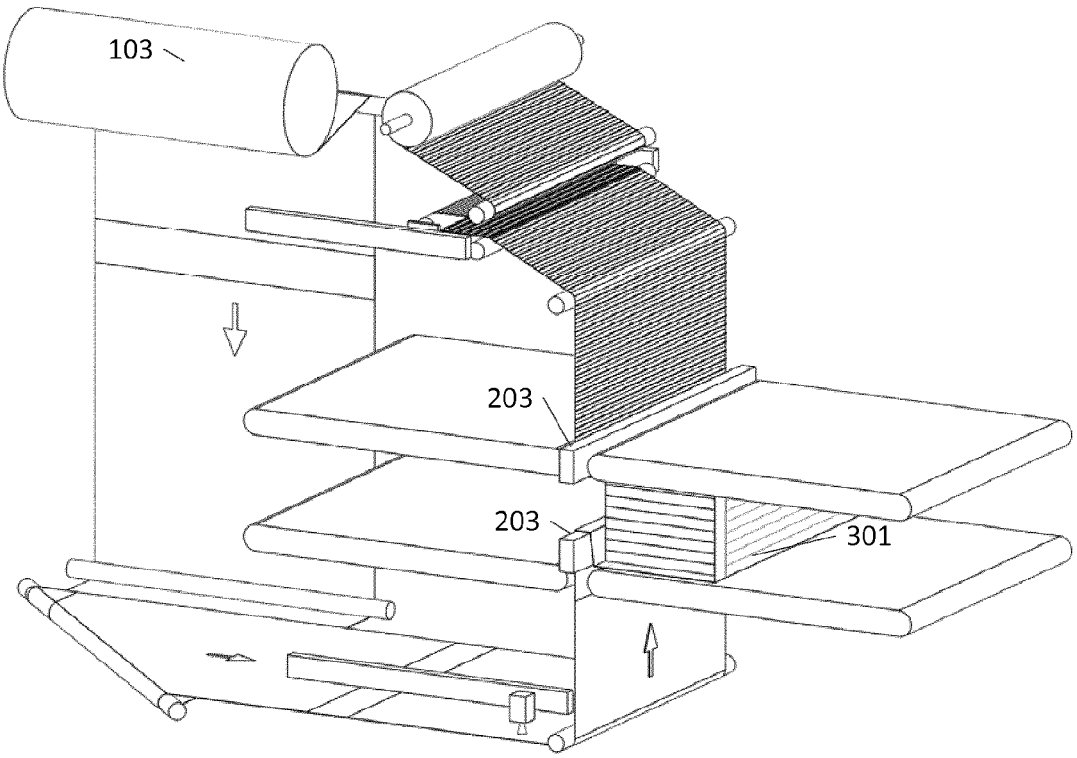

Fig. 3E

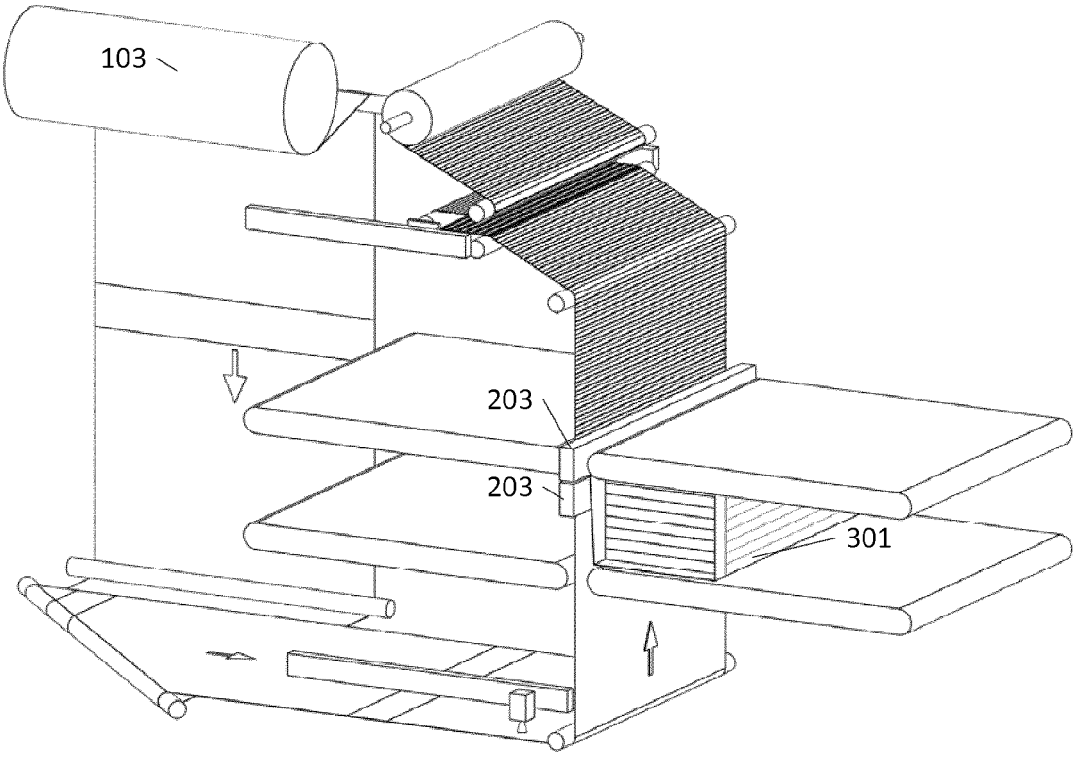

Fig. 3F

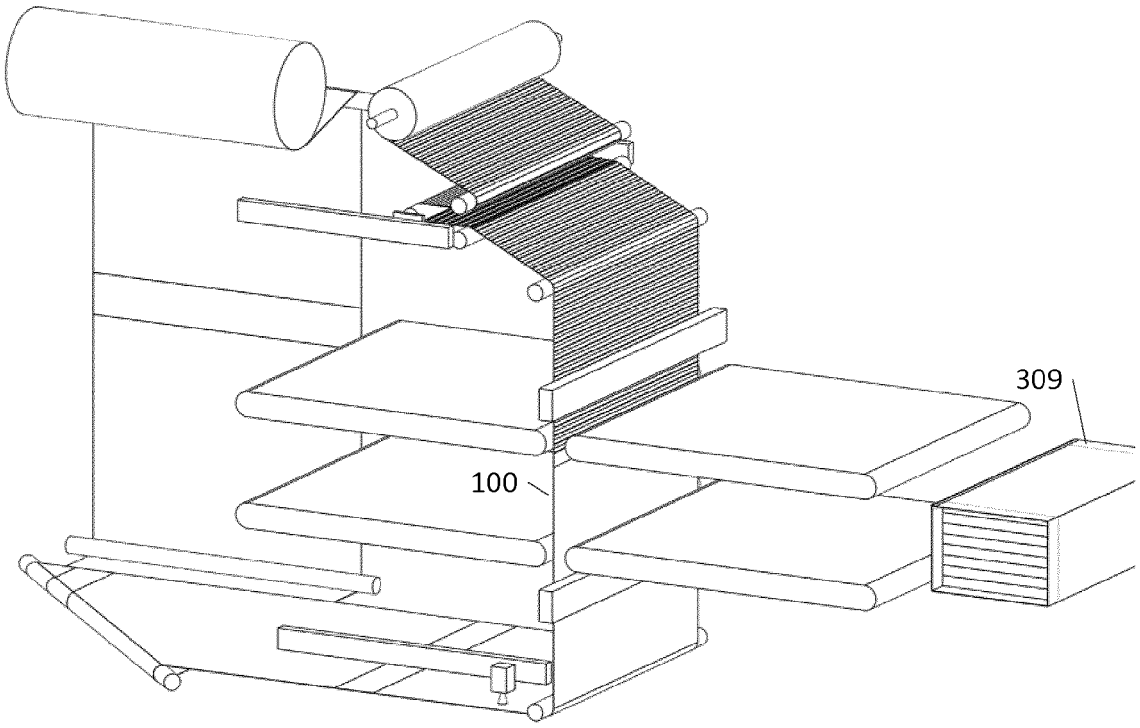

Fig. 3G

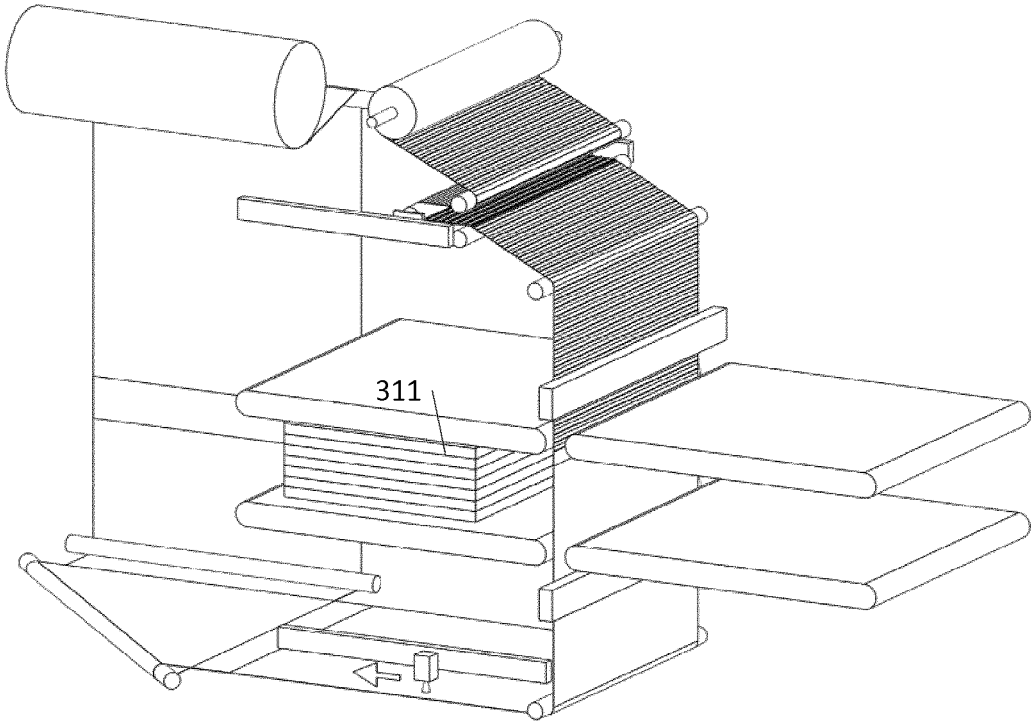

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 9676

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 Y	US 2003/136093 A1 (CHIU SHAO YI [TW]) 24 July 2003 (2003-07-24) * paragraphs [0030], [0033] - [0035]; figures 3,9-14 *	1-12 13	INV. B65B11/48 B65B41/16 B65B41/18 B65B51/30
X Y	GB 1 134 810 A (FORGROVE MACH) 27 November 1968 (1968-11-27) * the whole document *	1-13 13	B65B59/02 B65B9/02
A	US 4 319 443 A (WATTS JR RIDLEY) 16 March 1982 (1982-03-16) * the whole document *	1-13	
A	GB 2 382 341 A (IND AUTOMATION SYSTEMS LTD [GB]) 28 May 2003 (2003-05-28) * page 4, line 14 - page 13, line 13; figure 1 *	1-13	
A	US 5 187 922 A (MAST MONTE N [US]) 23 February 1993 (1993-02-23) * the whole document *	1-13	

TECHNICAL FIELDS SEARCHED (IPC)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 July 2016	Cardoso, Victor

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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29-07-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003136093 A1	24-07-2003	NONE	
GB 1134810 A	27-11-1968	NONE	
US 4319443 A	16-03-1982	AU 6140880 A	02-04-1981
		DE 3036572 A1	09-04-1981
		FR 2466397 A1	10-04-1981
		GB 2065025 A	24-06-1981
		JP S5657612 A	20-05-1981
		US 4319443 A	16-03-1982
GB 2382341 A	28-05-2003	NONE	
US 5187922 A	23-02-1993	NONE	

EPO FORM P0459

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20110114709 A **[0027] [0033]**