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(54) WRAPPING ASSEMBLY

(57) A wrapping assembly (1) comprising at least one first line (4) for supplying food products (2) and at least one second line (5) for supplying wrapping sheets (3);
- at the at least one common area (6) for delivery of the products (2) and of the sheets (3) on the part of the respective lines (4, 5), at least one forming hopper (7) for the U-shaped folding of at least one sheet (3) on at least one product (2),
- downstream of the at least one hopper (7), at least one respective first carousel with a vertical axis (8) which is provided with elements (9) for picking up at least one product (2) partially covered by a respective sheet (3) that is folded in a U-shape onto it and for the stable coupling of the respective flaps (3a, 3b), the pick-up elements (9) being movable for the rotation of the partially covered product (2) in order to change its orientation at an output area (10),
- facing the output area (10) of the first carousel with a vertical axis (8), a unit (11) for gripping and translating the partially covered product (2), the rectilinear trajectory of translation passing through folding devices (12) for the juxtaposition, against the heads (2a) of the product (2), of the protruding ends (3c) of the sheet (3) with respect to them,
- substantially at the endpoint of the rectilinear trajectory, and at least partially superimposed on the first carousel (8) and the unit (11), a second carousel with a horizontal axis (13), which forms a sequence of stations (14) for folding, superimposing and coupling the flaps of the sheet (3) on the product (2), at least one end station (14a) of the second carousel (13) comprising at least one dispenser (15) of an adhesive substance on a localized area of the surface of the sheet (3) wrapped around the product (2), in order to lock a terminal closure flap of the sheet (3), which is forced onto the area by a respective folding band (16).

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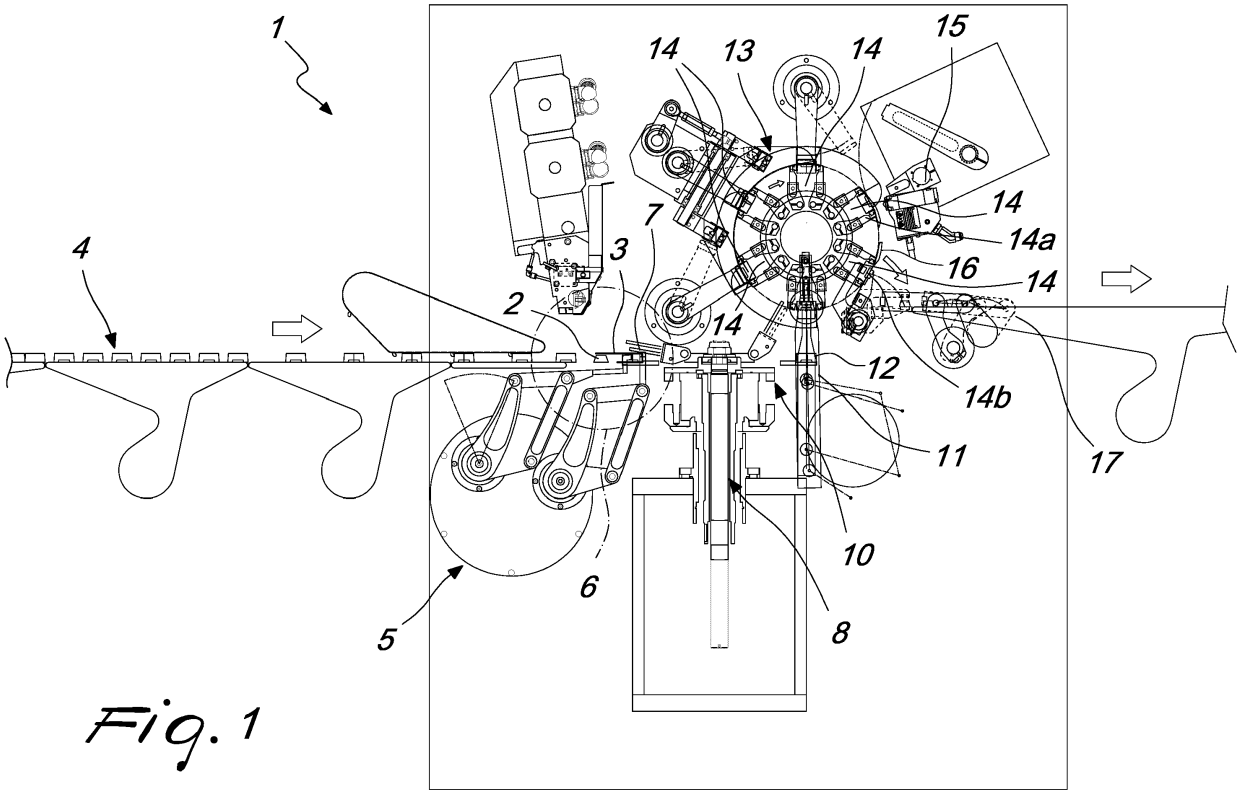


Fig. 1

Description

[0001] The present invention relates to a wrapping assembly particularly for food products, such as candy, chocolates, biscuits, small cakes, snacks and the like.

[0002] It is known to resort to the individual wrapping of each food product in order to protect it from the external environment.

[0003] This requirement is particularly felt owing to the need to prevent the product from being contaminated.

[0004] Packages that only wrap the product with a wrapping sheet, however, do not allow adequate protection of the product itself, since it is sufficient to pry one flap of the wrapping sheet to uncover a portion of product and expose it to the outside environment.

[0005] In order to avoid this drawback, it is known to use wrappings in which the flaps are mutually sealed and/or glued so as to ensure the segregation of the product covered by them until they are broken.

[0006] Of course, the machines capable of performing a wrapping with a stable hermetic coupling of the flaps of the sheet are particularly complex.

[0007] A wrapping assembly, suitable for packaging a food product by means of a hermetically sealed covering sheet, is known from EP2688805.

[0008] This patent describes an assembly provided with two carousels having a horizontal axis which are arranged in series and perform the operations for folding and sealing the covering sheet onto the product.

[0009] This assembly has some technical problems.

[0010] In particular, the machine architecture that is used entails large space occupations, with the consequent need to have large spaces available in order to install the machine that accommodates said assembly.

[0011] Furthermore, it should be noted that some folding steps are particularly complex and their correct execution along a curved path (along the circumference traced by the wrapping carousels cited earlier) is very complex. The study and design of the folding elements and their calibration are extremely complex and, during maintenance and/or performance changing operations, require subsequent complex adjustment interventions to restore the ideal operating conditions.

[0012] It is noted, therefore, that machines provided according to the teachings of the cited prior patent are therefore particularly complex and require several activities for adjustment and calibration.

[0013] In the machines provided according to the teachings of EP2688805, the last flap of the wrapping sheet to be closed onto the product that is already partially wrapped is coupled to the wrapping portion that faces it by means of an appropriate adhesive.

[0014] In these machines, the deposition of the adhesive occurs upstream, prior to the first contact between the wrapping sheet and the food product.

[0015] This constructive choice causes several disadvantages.

[0016] First of all, it is necessary to resort to an adhesive with high viscosity, in order to prevent it from being able to move with respect to the position in which it was deposited initially, due to the intense accelerations to which the wrapping sheet is subjected during said wrapping process.

[0017] Secondarily, it should be noted that in case of a machine downtime all the wrapping sheets on which the adhesive is deposited become unusable within a short time due to the hardening of the adhesive, causing the need to reject them (and the products associated with them).

[0018] The aim of the present invention is to solve the problems described above, providing a wrapping assembly which has a modest space occupation and a more compact shape than assemblies of the known type.

[0019] Within this aim, an object of the invention is to propose a wrapping assembly that has greatly limited dimensions with respect to assemblies of the known type.

[0020] Another object of the present invention is to propose a wrapping assembly that has a simplified structure and is simple to adjust and calibrate.

[0021] Another object of the present invention is to propose a wrapping assembly in which the adhesive cannot migrate along the surface of the wrapping sheet due to the accelerations undergone during the folding and transfer operations.

[0022] Another object of the present invention is to propose a wrapping assembly in which a machine downtime does not cause the need to reject all the partially finished products that are present in the assembly.

[0023] A further object of the present invention is to provide a wrapping assembly that has modest costs, is relatively simple to provide in practice and is safe in application.

[0024] This aim and these and other objects which will become better apparent hereinafter are achieved by a wrapping assembly of the type comprising at least one first line for supplying food products and at least one second line for supplying wrapping sheets, characterized in that it comprises

- at the at least one common area for delivery of said products and of said sheets on the part of the respective lines, at least one forming hopper for the U-shaped folding of at least one said sheet on at least one said product,
- downstream of said at least one hopper, at least one respective first carousel with a vertical axis which is provided with elements for picking up at least one product partially covered by a respective sheet that is folded in a U-shape onto it and for the stable coupling of the respective flaps, said pick-up elements being movable for the rotation of said partially covered product in order to change its orientation at an output area,
- facing said output area of said first carousel with a vertical axis, a unit for gripping and translating said partially covered product, the rectilinear trajectory of

said translation passing through folding devices for the juxtaposition, against the heads of the product, of the protruding ends of said sheet with respect to them,

- substantially at the endpoint of said rectilinear trajectory, and at least partially superimposed on said first carousel and said unit, a second carousel with a horizontal axis, which forms a sequence of stations for folding, superimposing and coupling the flaps of said sheet on said product, at least one end station of said second carousel comprising at least one dispenser of an adhesive substance on a localized area of the surface of the sheet wrapped around said product, in order to lock a terminal closure flap of said sheet, which is forced onto said area by a respective folding band.

[0025] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the wrapping assembly according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a schematic side view of a wrapping assembly according to the invention;
Figure 2 is a schematic front view of the assembly of Figure 1;
Figure 3 is a schematic top view of the assembly of Figure 1;
Figures 4, 5, 6, 7, 8 are schematic perspective views of the steps of the wrapping of a product performed by the wrapping assembly according to the invention;
Figure 9 is a view of the wrapping scheme performed by the wrapping assembly according to the invention.

[0026] With particular reference to the figures, the reference numeral 1 designates generally an assembly for wrapping a product 2 by means of a sheet 3.

[0027] The wrapping assembly 1 comprises at least one first line 4 for supplying food products 2 and at least one second line 5 for supplying covering sheets 3.

[0028] At the at least one common area 6 for delivery of the products 2 (on the part of the first line 4) and of the sheets 3 (on the part of the second line 5), the assembly 1 comprises at least one forming hopper 7 for the U-shaped folding of at least one sheet 3 onto a respective product 2.

[0029] It is specified further that in the assembly 1 according to the invention, downstream of the at least one hopper 7, there is at least one respective first carousel with a vertical axis 8 which is provided with pick-up elements 9, each is suitable for the temporary retention of at least one product 2 which is partially covered by a respective sheet 3 which is folded in a U-shape onto it (by juxtaposing at least partially the flaps 3a and 3b, which can also have a different length, and defining a stable coupling thereof at a step of halting of the rotation of the first carousel 8).

[0030] The pick-up elements 9 are movable for the rotation of the partially covered product 2 in order to change the corresponding orientation at an area 10 for exit from the first carousel 8.

[0031] It is noted, further, that a unit 11 for gripping and translating the partially covered product 2 is arranged so as to face the output area 10 of the first carousel 8 with a vertical axis.

[0032] On the unit 11, the partially covered product 2 traces a rectilinear translational trajectory, passing through appropriate folding devices 12 for the juxtaposition against the heads 2a of the product 2 of the protruding ends 3c of the sheet 2 with respect to the heads 2a.

[0033] It should also be noted that the assembly 1 according to the invention comprises, substantially at the endpoint of the rectilinear trajectory traced by the product 2 partially covered by virtue of the action of the unit 11, a second carousel 13 with a horizontal axis, which forms a sequence of stations 14 for folding, superimposing and coupling (for example by sealing and/or adhesive bonding of the protruding flaps of the sheet 3 with respect to the product 2) of additional flaps of the sheet 3 on the product 2 for the complete covering thereof.

[0034] It should be noted that at least one end station 14 of the second carousel 13 comprises at least one dispenser 15 for dispensing an adhesive substance onto a localized area of the surface of the sheet 3 that is wrapped around the product 2, in order to lock the terminal closure flap of the sheet 3 (constituted by the superimposition of the coupled flaps 3a and 3b) by forcing it onto a corresponding area of the covered product 2 that is performed by means of a respective folding band 16. The second carousel 13 is located substantially above the first carousel 8 and the unit 11: this superimposition entails a reduction of the longitudinal space occupation of the assembly 1 with respect to those of the known type; this characteristic is a great advantage of the assembly 1 with respect to those of the known type, since it renders it more versatile and easier to install in any type of environment.

[0035] In order to ensure that the product 2 is correctly segregated within the respective wrapping performed with the sheet 3, it is noted that at at least one of the superimposed portions of the sheet 3 that is wrapped around the product 2 (such as for example the pair of flaps 3a and 3c or the protruding ends 3c), the juxtaposed flaps of the sheet 3 are coupled stably and hermetically along portions of adhesive bonding, sealing and the like.

[0036] The stable joining of these superimposed (and juxtaposed) portions of the sheet 3 allows to seal the product 2 inside it, therefore preventing it from being contaminated by the outside environment (a circumstance which is harmful for products 2 for food use) in subsequent steps of transport, display and sale.

[0037] It is specified that the sheet 3 can comprise advantageously, at at least one of the portions designed for superimposition on other portions on the wrapped prod-

uct 2, at least one layer of a material that is chosen preferably from glue, a polymeric derivative (for example a thermoplastic polymer) for cold sealing, adhesive tape and the like, for easy hermetic coupling with the sheet portion 3 that is complementary thereto.

[0038] It is specified that the polymers adopted for cold sealing allow the coupling of portions of material simply as a consequence of their juxtaposition (optionally clamping), without requiring the addition of heat energy.

[0039] In any case, the heating of the pressers that provide the cold sealing of flaps of sheet 3, in order to improve the quality and tightness of said cold seal, is not excluded.

[0040] According to a particular constructive solution, of unquestionable interest in practice and in application, downstream of the at least one end station 14a of the second carousel 13 (end station 14a provided with the at least one dispenser of an adhesive substance) there is a station 14b for delivery to a line 17 for picking up the wrapped products 2.

[0041] The assembly 1 according to the invention is further advantageous because the pick-up elements 9 of the at least one first carousel 8 comprise actual grip clamps for the flaps 3a and 3b of the sheet 3 folded into a U-shape that protrude with respect to the product 2. These grip clamps are therefore suitable to ensure the adhesive bonding of the flaps 3a and 3b and/or their sealing (cold and/or hot).

[0042] The adhesive bonding and/or the sealing of the flaps 3a and 3b can be performed advantageously in a holding area of the carousel 8 (which is formed simply by means of a particular rule of motion of the carousel 8 or by providing for the temporary delivery of the product 2 partially wrapped by the sheet 3 (which is U-shaped) to a dedicated apparatus 9a.

[0043] Furthermore, attention is also called to the effectiveness of a constructive version in which at least one between the first flap 3 a and the second flap 3b of the sheet 3 folded into a U-shape, or the ends 3c that protrude with respect to the heads 2a of the product 2 that are clamped between the clamps, comprises at least one layer of a material preferably chosen from glue, a thermoplastic polymer for cold sealing, adhesive tape and the like, for easy hermetic coupling with the sheet portion 3 that is complementary thereto.

[0044] According to a constructive solution of unquestionable practical interest, which corresponds to the standards of embodiment of the Applicant, the assembly 1 can conveniently comprise four pick-up elements 9 in the at least one first carousel 8, each one comprising a respective grip clamp for the flaps 3a, 3c of the sheet 3 folded into a U-shape which protrude with respect to the product 2 (and optionally also intended for the corresponding stable coupling by sealing, adhesive bonding and the like).

[0045] Within the scope of a particularly efficient constructive solution, the unit 11 for gripping and translating the product 2 partially covered with the sheet 3 (suitable to translate it along a rectilinear trajectory) can be usefully constituted by a lifting unit which operates between two limiting configurations.

[0046] One lower-height limiting configuration is aligned with the first carousel 8 and a greater-height configuration is aligned with a pick-up station 14 for the partially covered product 2 that belongs to the second carousel 13.

[0047] With particular reference to an embodiment of unquestionable interest in application, which corresponds to the standards of embodiment of the Applicant, the second carousel 13 can usefully comprise a sequence of six stations 14 for folding and superimposing the flaps of the sheet 3 onto the product 2.

[0048] Each station 14 is provided with respective grip and movement clamps for a respective product 2 which is at least partially covered by a sheet 3 and is affected by respective tabs for folding flaps and portions of the sheet 3 onto themselves and onto the product 2 in order to complete their packaging (wrapping): the coupling of flaps and portions of the sheet 3 can be obtained by means of a simple pressure (the two surfaces in contact bond adhesively by virtue of the presence of appropriate adhesives or adhesive tapes) or as a consequence of the application of heat energy (forming a true heat-sealing process). Hybrid versions (which are indeed particularly interesting in terms of embodiment) are not excluded in which a mechanical pressure is applied to the flaps and to the portions of the sheet 3 by means of heated elements (which therefore are suitable to transfer heat energy).

[0049] The fact that the folding band 16 of the end station 14a can be movable along the trajectory of the partially covered product 2 is particularly advantageous.

[0050] In this case the folding band 16 is movable in the same direction as the product 2 on the second carousel 13 until the covered product 2 is transferred to the subsequent station 14b for delivery to a pick-up line 17 of the wrapped products 2.

[0051] Advantageously, the present invention solves the problems described earlier, proposing a wrapping assembly 1 that has modest space occupations: the space occupation reduction is obtained by the superimposing, in terms of height, of the carousels 8 and 13 (which have oblique and perpendicular axes), differently from what is provided in assemblies of the known type, in which the carousels are arranged in series one behind the other (with parallel axes).

[0052] Validly, the wrapping assembly 1 according to the invention has a simplified structure with respect to assemblies of the known type and is simple to adjust and calibrate. The number of components involved is in fact modest and in particular many of the folds of the sheet 3 are performed on fixed folding devices during rectilinear trajectories which ensure results of higher quality.

[0053] Conveniently, in the wrapping assembly 1 the adhesive cannot migrate along the surface of the wrapping sheet 3 due to the accelerations undergone during

the folding and transfer operations: it is in fact deposited on the sheet 3 only just before the closure flap is pressed onto it.

[0054] Usefully, in the wrapping assembly 1 a machine downtime does not cause the need to reject all the partially finished products that are present in the assembly 1, since the adhesive is deposited on the sheet 3 only when the last fold is to be performed and therefore there is no risk that said adhesive might dry during the machine downtime.

[0055] Usefully, the wrapping assembly 1 is relatively simple to provide in practice, even bearing modest costs for said provision: these characteristics make the assembly 1 an assuredly applicable innovation.

[0056] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0057] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0058] In practice, the materials used, as well as the dimensions, may be any according to the requirements and the state of the art.

[0059] The disclosures in Italian Patent Application No. 102016000082723 (UA2016A005890) from which this application claims priority are incorporated herein by reference.

[0060] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A wrapping assembly of the type comprising at least one first line (4) for supplying food products (2) and at least one second line (5) for supplying wrapping sheets (3), **characterized in that** it comprises

   - at the at least one common area (6) for delivery of said products (2) and of said sheets (3) on the part of the respective lines (4, 5), at least one forming hopper (7) for the U-shaped folding of at least one said sheet (3) on at least one said product (2),
   - downstream of said at least one hopper (7), at least one respective first carousel with a vertical axis (8) which is provided with elements (9) for picking up at least one product (2) partially covered by a respective sheet (3) that is folded in a U-shape onto it and for the stable coupling of the respective flaps (3a, 3b), said pick-up elements (9) being movable for the rotation of said partially covered product (2) in order to change its orientation at an output area (10),
   - facing said output area (10) of said first carousel with a vertical axis (8), a unit (11) for gripping and translating said partially covered product (2), the rectilinear trajectory of said translation passing through folding devices (12) for the juxtaposition, against the heads (2a) of the product (2), of the protruding ends (3c) of said sheet (3) with respect to them,
   - substantially at the endpoint of said rectilinear trajectory, and at least partially superimposed on said first carousel (8) and said unit (11), a second carousel with a horizontal axis (13), which forms a sequence of stations (14) for folding, superimposing and coupling the flaps of said sheet (3) on said product (2), at least one end station (14a) of said second carousel (13) comprising at least one dispenser (15) of an adhesive substance on a localized area of the surface of the sheet (3) wrapped around said product (2), in order to lock a terminal closure flap of said sheet (3), which is forced onto said area by a respective folding band (16).

2. The wrapping assembly according to claim 1, **characterized in that** the juxtaposed flaps of said sheet (3) are coupled stably and hermetically along segments of adhesive bonding, heat sealing and the like at at least one of the superimposed portions of said sheet (3) wrapped around said product (2).

3. The wrapping assembly according to claim 2, **characterized in that** said sheet (3) comprises, at at least one of the portions designed for superimposition on other portions on the wrapped product (2), at least one layer of a material preferably chosen among glue, a polymeric derivative for cold sealing, adhesive tape and the like for easy hermetic coupling with the sheet portion (3) that is complementary thereto.

4. The wrapping assembly according to claim 1, **characterized in that** downstream of said at least one end station (14a) of said second carousel (13), which comprises said at least one dispenser (15) of an adhesive substance, there is a station (16) for delivering the wrapped products (2) to a pick-up line (17).

5. The wrapping assembly according to claim 1, **characterized in that** the pick-up elements (9) of said at least one first carousel (8) comprise grip clamps for the flaps (3a, 3b) of said sheet (3) folded in a U-shape, which protrude with respect to said product (2).

6. The wrapping assembly according to one or more of

the preceding claims, **characterized in that** at least one among said first flap (3a), said second flap (3b) of said sheet (3) folded in a U-shape, and said at least one of the ends (3c) that protrude with respect to said product (2) and are gripped between said clamps comprises at least one layer of a material chosen among glue, a polymeric derivative for cold sealing, adhesive tape and the like for easy hermetic coupling with the sheet portion (3) that is complementary thereto.

7. The wrapping assembly according to claim 5, **characterized in that** it comprises four pick-up elements (9) of said at least one first carousel (8), each comprising a respective grip and stable coupling clamp for the flaps (3a, 3b) of said sheet (3) folded in a U-shape that protrude with respect to said product (2).

8. The wrapping assembly according to claim 1, **characterized in that** said unit (11) for gripping and translating said partially covered product (2) along a rectilinear trajectory is constituted by a lifting unit which operates between two limiting configurations, a lower-height configuration aligned with said first carousel (8) and a greater-height configuration which is aligned with a station (14) for picking up the partially covered product (2) of said second carousel (13).

9. The wrapping assembly according to one or more of the preceding claims, **characterized in that** said second carousel (13) comprises a sequence of six stations (14) for the folding, superimposing and coupling of the flaps of said sheet (3) on said product (2), each station being provided with respective grip and movement clamps for said product (2) at least partially covered by said sheet (3) and being affected by respective tabs for folding flaps and portions of said sheet (3) onto themselves and onto said product (2).

10. The wrapping assembly according to one or more of the preceding claims, **characterized in that** said folding band (16) of said end station (14a) can move along the trajectory of said partially covered product (2), said folding band (16) being movable in the same direction as said product (2) on said second carousel (13) until said covered product (2) is transferred, at the next delivery station (14b), to a line (17) for picking up the wrapped products (2).

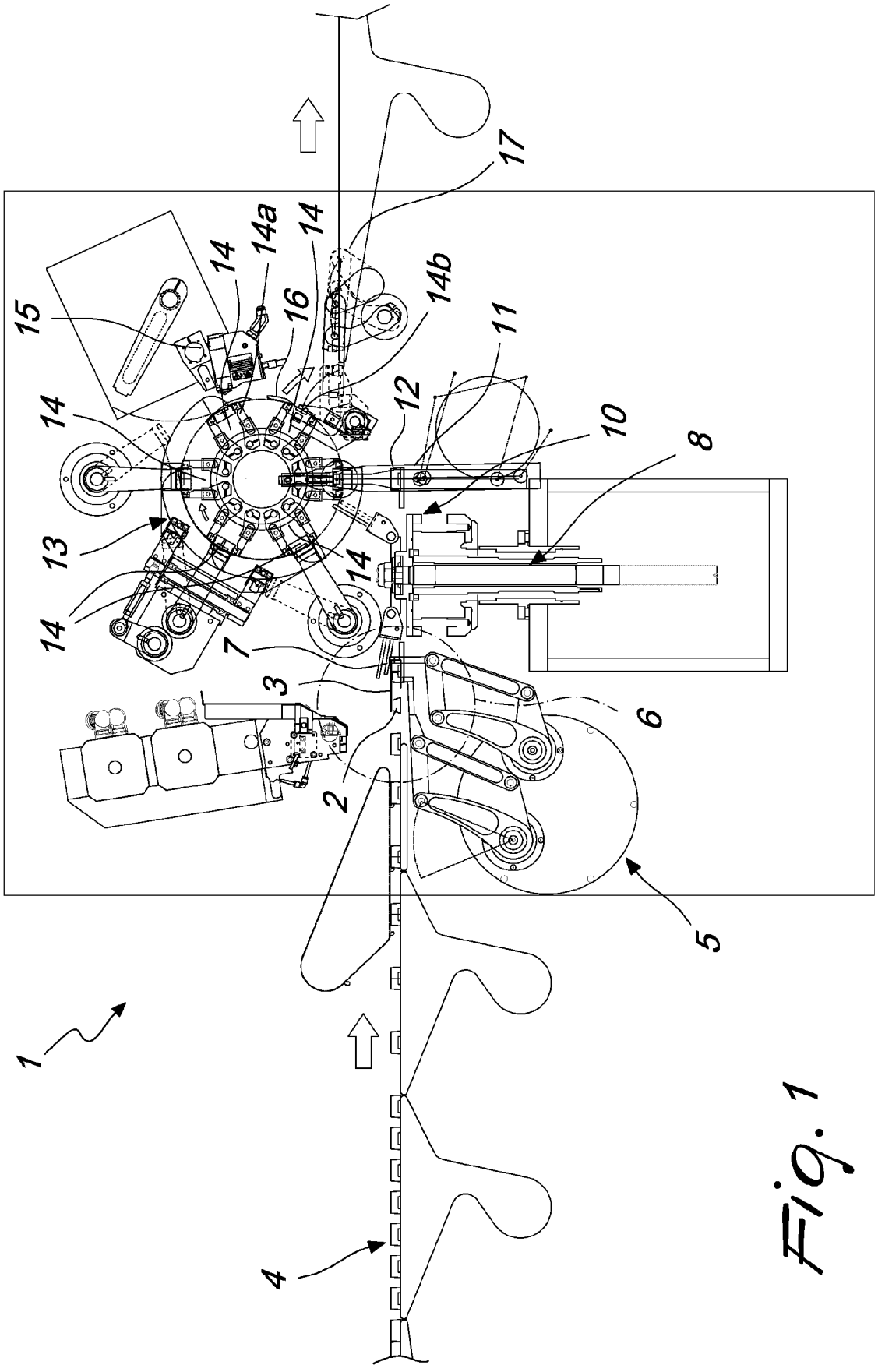


Fig. 1

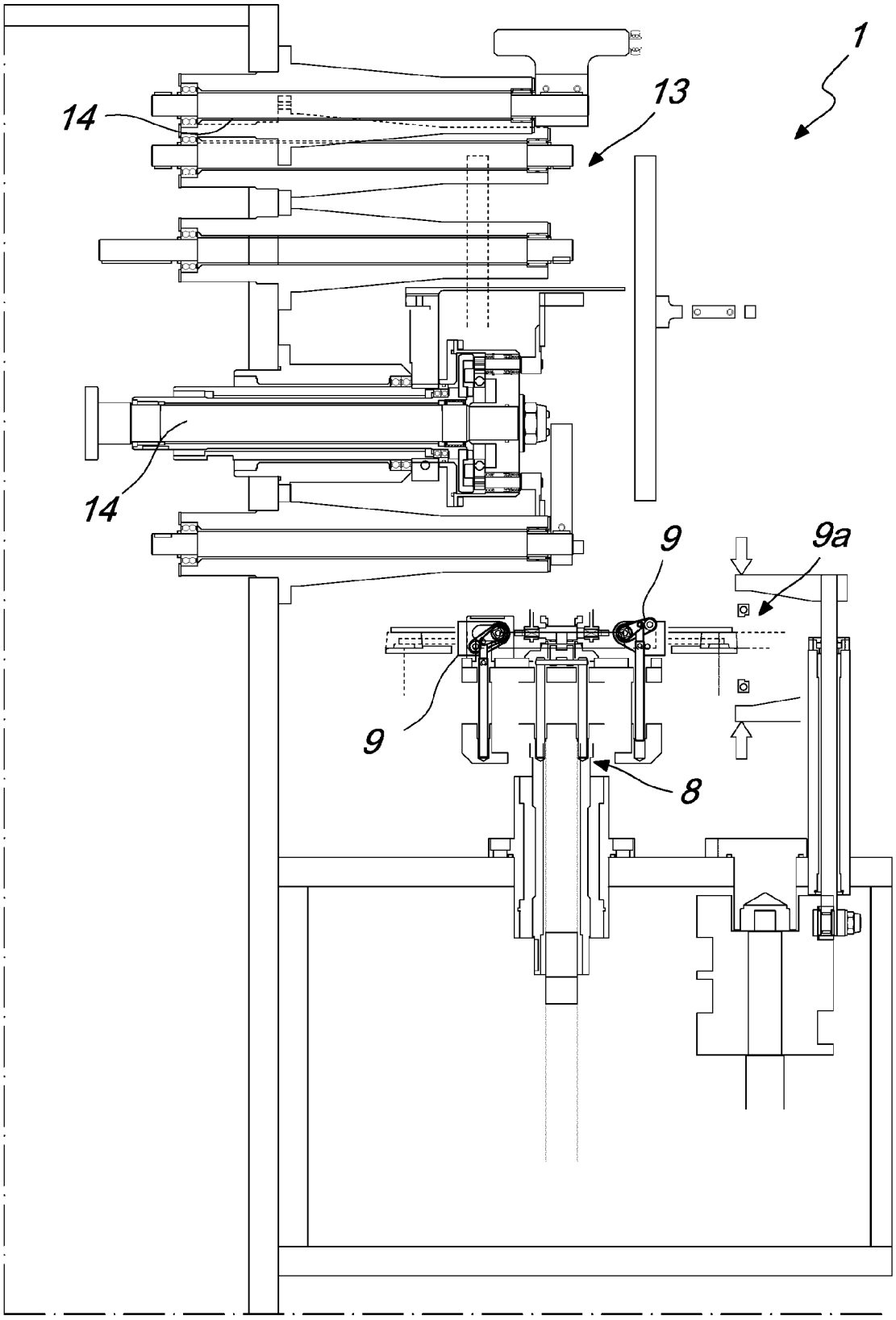


Fig. 2

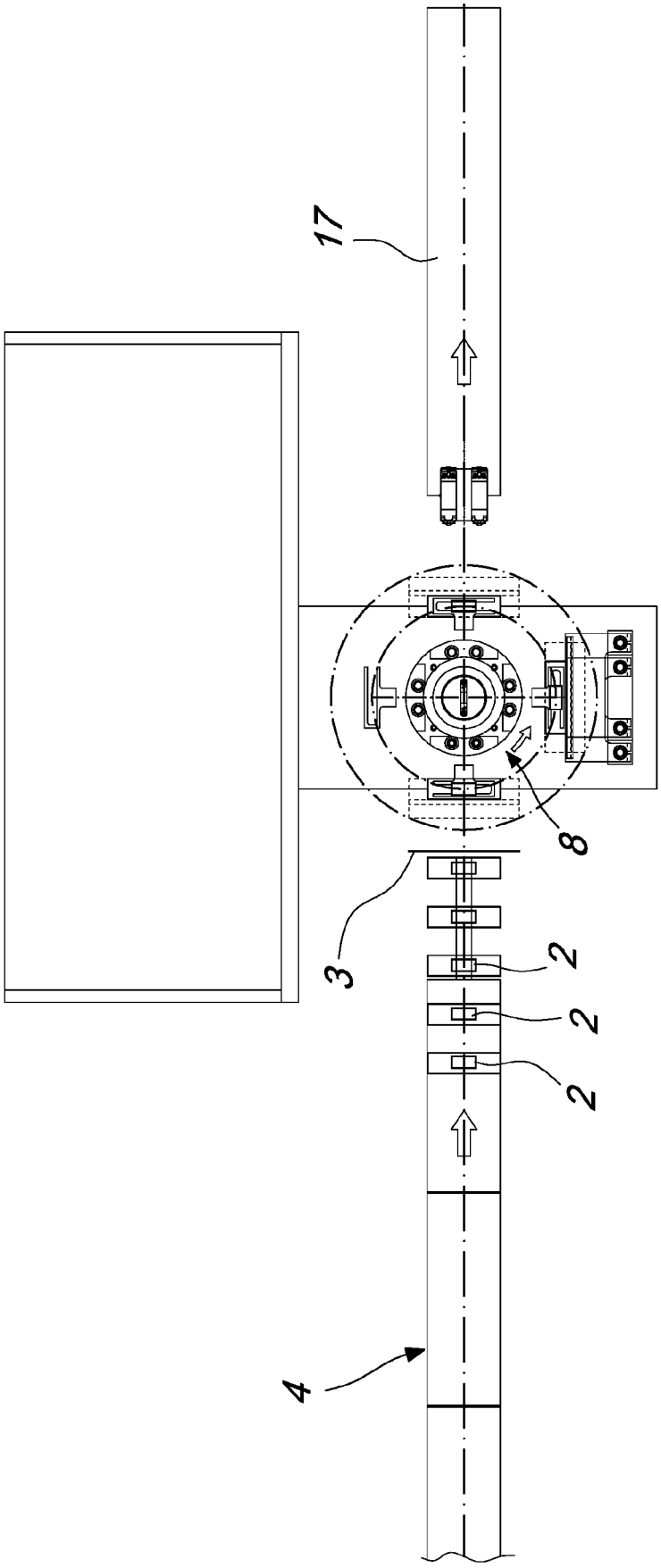


Fig. 3

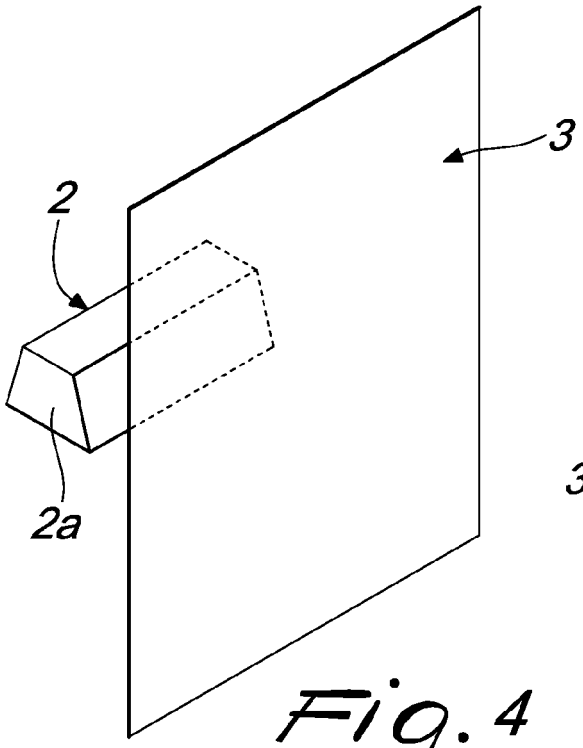


Fig. 4

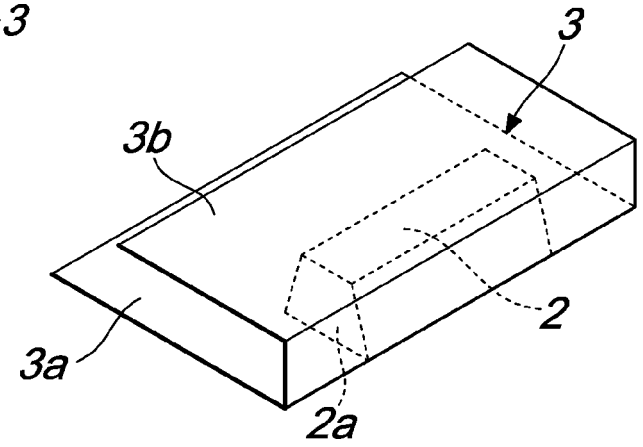


Fig. 5

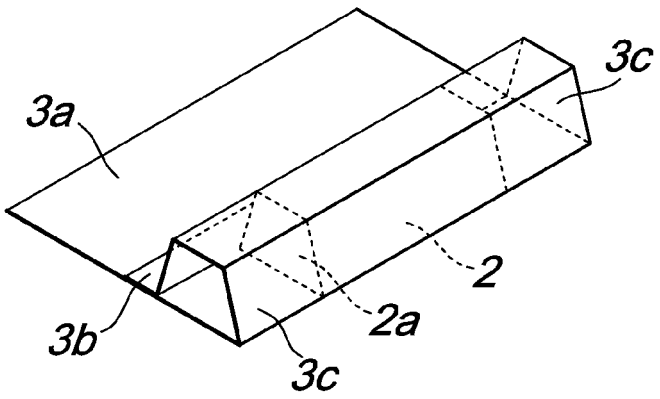


Fig. 6

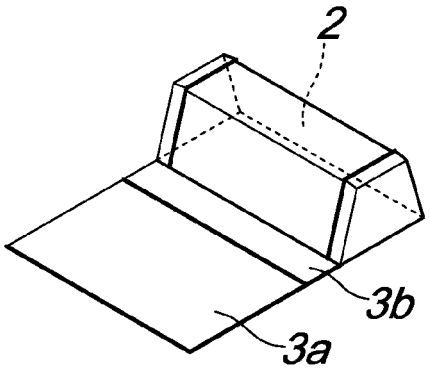


Fig. 7

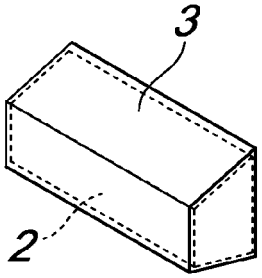


Fig. 8

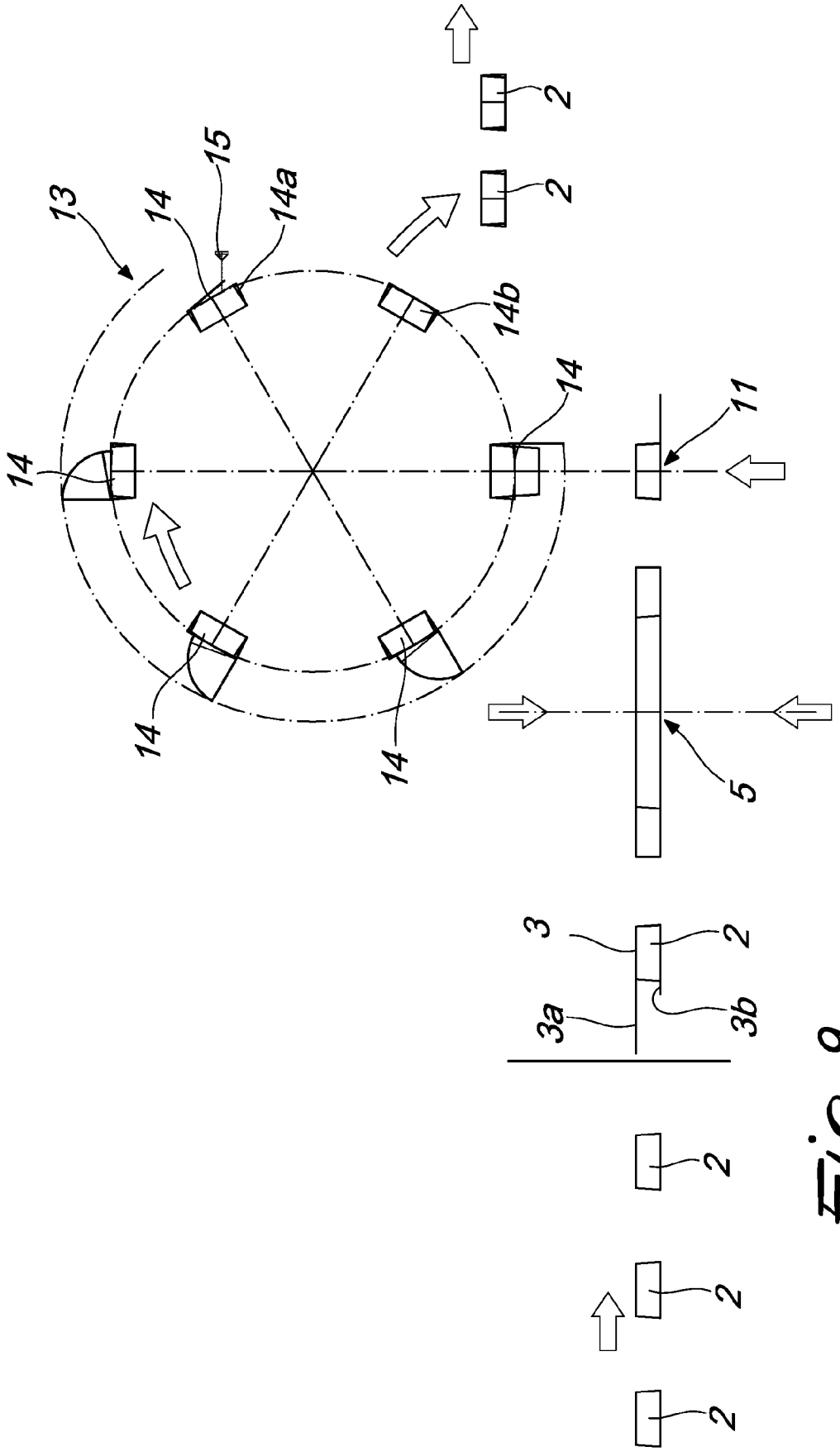


Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 17 16 9077

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,D	EP 2 688 805 A1 (BOSCH GMBH ROBERT [DE]) 29 January 2014 (2014-01-29) * the whole document *	1	INV. B65B11/06 B65B25/00 B65B49/00
A	EP 2 942 294 A1 (AZIONARIA COSTRUZIONI ACMA SPA [IT]) 11 November 2015 (2015-11-11) * the whole document *	1	
A	EP 0 913 327 A1 (A M S S R L [IT]) 6 May 1999 (1999-05-06) * the whole document *	1	
A	GB 2 053 835 A (HAENSEL OTTO GMBH) 11 February 1981 (1981-02-11) * the whole document *	1	

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 August 2017	Ungureanu, Mirela

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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29-08-2017

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