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(54) **Method and device for automatic sorting and/or re-packing of elongate products**

(57) The present invention provides a method and apparatus for sorting and/or automatically packing vulnerable, elongate products such as cucumbers, comprising the following steps of:

- individualizing the products;
- orienting the individualized products;

- transporting the products in transport means;
- transferring the products in an oriented position to at least one conveyor; and
- releasing the products on the conveyor into at least one packing container or a compartment thereof, wherein the at least one packing container is placed in the transport means outside the feed path of the products.

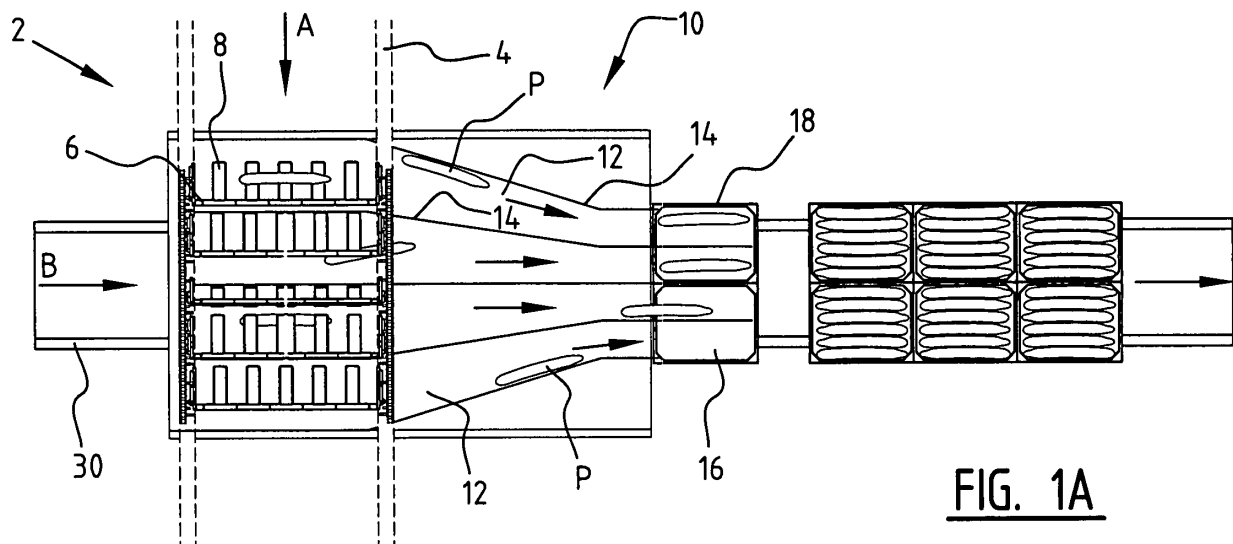


FIG. 1A

Description

[0001] The present invention relates to a method and apparatus for automatic sorting and/or re-packing of elongate products such as cucumbers.

[0002] In a known method employed in practice sorted products are released onto so-called packing tables, where manual processing of these products takes place. This method limits the speed of processing and, in addition, the sorting accuracy. The extra operations which are performed here with these sensitive products can further have an adverse effect on the quality of the products.

[0003] NL 1 028 147 describes an apparatus for sorting and/or automatically packing vulnerable, elongate products such as cucumbers, provided with transport means comprising transport containers for individualized transport of the products, and releasing means for releasing the products from the transport means into a packing container. In this apparatus the packing container is placed in the transport path of the products. This limits the accessibility and dimensions of the packing container in relation to the apparatus. Limits are hereby also imposed on the speed of processing of the supplied products.

[0004] The present invention has for its object to provide an improved method and apparatus whereby the speed of processing of the supplied products is maximal, damage to product is prevented, accessibility of the apparatus is increased and the amount of equipment and/or manpower is limited.

[0005] The present invention provides a method for sorting and/or automatically packing vulnerable, elongate products such as cucumbers, comprising the following steps of:

- individualizing the products;
- orienting the individualized products;
- transporting the products in transport means;
- transferring the products in an oriented position to at least one conveyor; and
- releasing the products on the conveyor into at least one packing container or a compartment thereof, wherein the at least one packing container is placed in the transport means outside the feed path of the products.

[0006] Placing of the at least one packing container outside the feed path of the products achieves that the packing container is accessible in simple manner. This shortens standstill times because malfunctions can be remedied more quickly. An additional advantage is that it is possible to switch to another type of packing container with different dimensions in relatively simple manner without the whole apparatus having to be modified. A further advantage is that, owing to the better accessibility, a packing container can be exchanged more readily and quickly.

[0007] In a preferred embodiment according to the invention the conveyor is placed substantially transversely of the supply direction of the products.

[0008] Placing of the conveyor in transverse direction of the feed path of the products achieves that these substantially elongate products do not have to be rotated in order to prevent damage to the product. An additional advantage of this orientation of the conveyor is that the supply and discharge of the packing containers can be performed in relatively simple manner.

[0009] In a preferred embodiment according to the invention the products are transferred to the at least one packing container or compartment thereof by means of a plurality of parallel tracks formed by one or more conveyor belts or other conveyors.

[0010] The use of a plurality of parallel tracks or a plurality of parallel conveyors makes it possible to release products simultaneously from the transporting device. This results in an increased processing speed of the products. A further advantage is that, by means of a classification process carried out in the transporting device or in preceding process steps, products can be released into a track corresponding with their class and can subsequently be placed in the correct packing container or compartment thereof. The effect of the plurality of parallel tracks can be realized in alternative manner by relative movement of the outer end of the conveyor relative to the at least one packing container. Although the processing speed is hereby decreased compared to the use of a plurality of parallel tracks, an optional classification of the products is however hereby possible, as is complete and controlled filling of the transport containers or compartments thereof.

[0011] In a further preferred embodiment according to the invention the products released from the transporting device are discharged alternately on both sides of the feed path of the products.

[0012] By means of the alternate discharge of the products released from the transporting device, the exchange of filled packing containers is made possible in that, while the packing containers are being exchanged on one side of the apparatus, the products are at that moment being released on the other side.

[0013] In a further preferred embodiment according to the invention the products are carried in aligned position into a packing container or a compartment thereof.

[0014] This alignment achieves that the products are not only packaged more neatly, but also that further processing thereof is simpler.

[0015] The present invention also relates to an apparatus for sorting and/or automatically packing vulnerable, elongate products such as cucumbers, comprising:

- transport means comprising transport containers for individualized transport of the products; and
- releasing means for releasing the products in oriented and/or aligned manner from the transport means into at least one packing container, wherein the at

least one packing container is provided outside a feed path of the products in the transport means; and

a conveyor is provided for transporting the products from the transport means to the packing container or compartment thereof.

[0016] Placing of a packing container outside the feed path of the products achieves the advantages of the increased accessibility of the apparatus.

[0017] In a further preferred embodiment according to the invention the conveyor is movable on the release side or it is provided with movable guide means for releasing the product into the desired packing container or compartment thereof.

[0018] Through the use of the movable guide means in particular the products are released from the conveyor into the correct packing container or compartment thereof. Through movement of the guide means only it is not necessary to move the whole conveyor in alternative manner. In a further alternative manner the packing container could move relative to the release position of the conveyor in order to achieve the same effect. A further alternative would be to provide the at least one conveyor with a number of tracks equal to the overall number of compartments in the at least one packing container. A greater processing speed is hereby achieved and no movement of the release position of the conveyor is necessary relative to the packing container.

[0019] In a further preferred embodiment according to the invention the conveyor extends on either side of the feed path of the products in the transport means and releases the products subject to the direction of rotation on one of the two sides thereof.

[0020] The use of a conveyor which can rotate in two directions achieves that, while wholly or partially filled packing containers are being exchanged on one side of the apparatus, the products can still be discharged on the other side of the apparatus. An advantage hereof is not only that the processing speed of the products is increased, but that release can in addition take place on both sides of the apparatus with the same conveyor, and the complexity of the apparatus as a whole hereby remains limited.

[0021] In a further preferred embodiment according to the invention one or more conveyors are provided for manually or automatically supplying and/or discharging the packing container to and/or from the desired release position of the products. Use is preferably made here of a placing system which is provided for placing the at least one packing container in the correct position.

[0022] The number of manual operations is limited by the use of conveyors for the purpose of supply and/or discharge of packing containers. This number of manual operations is further limited by the placing system with which for instance empty packing containers are lifted from the feed belt by means of for instance a lifting platform, and are placed thereby close to the release position of the products from the conveyor. Re-placing the filled

packing containers onto the discharge belt by means of the same or another lifting platform not only limits the number of manual operations, but this process can also be further automated. The apparatus is preferably provided with a braking means for braking the products during release thereof into the at least one packing container. This braking means or braking flap prevents products being thrown from the conveyor and over the packing container, which, in addition to product loss, can also result in malfunction of the apparatus. An additional advantage of such a braking means or flap is that products are aligned in the packing container.

[0023] The invention is now elucidated on the basis of a number of examples, wherein reference is made to the accompanying drawings, in which:

- figure 1A shows a top view of an embodiment according to the invention;
- figure 1B shows a side view of the embodiment of figure 1A;
- figure 2 shows an alternative embodiment according to the invention;
- figure 3A is a top view of a further alternative embodiment according to the invention;
- figure 3B is a top view of the embodiment of figure 3A in another position;
- figure 4A shows a top view of a further alternative embodiment according to the invention;
- figure 4B shows a top view of the embodiment of figure 4A in another position;
- figure 5A is a top view of a further alternative embodiment according to the invention;
- figure 5B is a top view of the embodiment of figure 5A in another position; and
- figure 6 shows an alternative arrangement according to the invention.

[0024] Figure 1A shows an apparatus 2 in which products P are supplied in the transport direction, indicated in the figure with arrow A, by means of transport means 4. The products are herein placed in transport containers 6, which comprise a number of fingers 8 on which the product is located. Transport container 6 tilts by means of a release mechanism and the product is released onto a conveyor belt 10. This conveyor belt 10 consists of a plurality of tracks 12 separated by guide plates 14, whereby products from different release positions can be placed in a desired compartment 16 of a packing container 18. This packing container 18 is supplied and/or discharged in the direction of arrow B using one or more conveyor belts 30 as shown in the figure. As shown in figure 1B, for the supply of empty packing containers 18 in the direction of arrow B, this conveyor belt 30 places packing container 18 on a positioning system 32 in the form of a lifting platform 34 with which one or more packing containers 18 are carried from conveyor belt 30 to the release position close to the outer end of conveyor belt 10. In order to prevent the products shooting over

packing container 18 from conveyor belt 10 there is provided a braking flap 36 which holds back these products and simultaneously provides for their alignment. After filling of packing containers 18, positioning system 32 places the filled packing containers 18 back onto conveyor belt 30, with which they are discharged in the direction of arrow C.

[0025] Figure 2 shows an alternative embodiment of apparatus 2 in which the direction of movement of conveyor belt 40 is reversible. In the shown view products are released into packing container 18 on one side of the feed path from the direction shown with arrow A, whereafter the filled packing containers 18 are discharged in the direction of arrow C via conveyor belt 30. During the exchange of for instance a packing container, or in the case of a disruption on this side, the direction of conveyor belt 40 can be reversed, whereby the products are released into a packing container 18 on the other side of apparatus 2.

[0026] Figure 3A shows an alternative embodiment in which products are supplied via transport means 4 in the direction of arrow A and are released onto their conveyor belt 50. Conveyor belt 50 can be provided with guide plates 52 for releasing the products into the correct compartment 16 of packing container 18. In order to fill packing container 18 in correct manner, this packing container 18 can be displaced in the direction of arrow D relative to the release position at the end of conveyor belt 50. The situation in which one of the compartments 16 of packing container 18 has been filled and the products are at that moment being released into a second compartment 16 is shown in figure 3B.

[0027] An alternative embodiment of apparatus 2 is shown in figure 4A. The products are here once again supplied in the direction of arrow A and released onto conveyor belt 60 from transport means 4, whereafter the products are placed in the correct compartment 16 of packing container 18 by positioning of the movable guide plates 62. Guide plates 62 can herein be moved in the direction of arrow D. Figure 4B shows the situation in which one compartment 16 has been fully filled and the second compartment is being filled at that moment after placing of plates 62.

[0028] Figure 5A shows an alternative embodiment, in which the products are supplied in the direction of arrow A and are released onto conveyor belt 70 provided with guide plates 72. Conveyor belt 70 is integrally rotatable relative to packing container 18 such that the products can be released into the desired compartment 16 of packing container 18. The situation in which a first compartment 16 is completely filled and release into a second compartment is taking place is shown in figure 5B, wherein belt 70 is rotated slightly.

[0029] Figure 6 shows an alternative arrangement in which the cucumbers are rotated 90° relative to the embodiments shown in figures 1-5. The products herein lie transversely of the transport direction of conveyor belt 80 and are released into a compartment 16 of packing

container 18. Another compartment 16 can be filled by displacing packing container 18 in the direction of movement of the products on belt 80. Using placing system 32 a filled packing container 18 is placed on belt 30 for discharge of filled container 18.

[0030] The present invention is in no way limited to the above described preferred embodiments; the rights sought, within the scope of which many modifications can be envisaged, are defined by the following claims.

Claims

1. Method for sorting and/or automatically packing vulnerable, elongate products such as cucumbers, comprising the following steps of:
 - individualizing the products;
 - orienting the individualized products;
 - transporting the products in transport means;
 - transferring the products in an oriented position to at least one conveyor; and
 - releasing the products on the conveyor into at least one packing container or a compartment thereof, wherein the at least one packing container is placed in the transport means outside the feed path of the products.
2. Method as claimed in claim 1, wherein the conveyor is placed substantially transversely of the feed path of the products.
3. Method as claimed in claim 1 or 2, wherein the products are transferred to the at least one packing container or compartment thereof by means of a plurality of parallel tracks formed by one or more conveyors.
4. Method as claimed in claim 1, 2 or 3, wherein the outer end of the conveyor is moved relative to the at least one packing container in a direction substantially transversely of the conveyor for release of the product into a desired packing container or compartment thereof.
5. Method as claimed in one or more of the claims 1-4, wherein the products are released alternately on both sides of the feed path thereof for the purpose of exchanging filled packing containers.
6. Method as claimed in one or more of the claims 1-5, wherein the products are carried in an aligned position into a packing container or a compartment thereof.
7. Apparatus for sorting and/or automatically packing vulnerable, elongate products such as cucumbers, comprising:

- transport means comprising transport containers for individualized transport of the products; and

- releasing means for releasing the products in oriented and/or aligned manner from the transport means into at least one packing container, wherein the at least one packing container is provided outside a feed path of the products in the transport means; and

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one or more conveyors for transporting the products from the transport means to the packing container or compartment thereof.

8. Apparatus as claimed in claim 7, wherein the conveyor is movable on the release side or is provided with movable guide means for releasing the product into a desired packing container or compartment thereof.

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9. Apparatus as claimed in claim 7 or 8, wherein a positioning member is provided on which the at least one packing container is placed for positioning the desired packing container or compartment thereof relative to the release position of the conveyor.

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10. Apparatus as claimed in claim 7, 8 or 9, wherein the at least one conveyor is provided with a number of tracks equal to the number of compartments in the at least one packing container.

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11. Apparatus as claimed in one or more of the claims 7-10, wherein the conveyor extends on either side of the feed path of the products and releases the products on one side subject to the direction of rotation.

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12. Apparatus as claimed in one or more of the claims 7-11, provided with one or more conveyors for manually or automatically supplying and/or discharging the packing container to and/or from the desired release position of the products.

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13. Apparatus as claimed in one or more of the claims 7-12, wherein a placing system is provided for placing the at least one packing container in correct position.

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14. Apparatus as claimed in one or more of the claims 7-13, wherein the placing system is provided with a lifting platform.

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15. Apparatus as claimed in one or more of the claims 7-14, wherein a braking means is provided for braking the products during release of the products into the at least one packing container.

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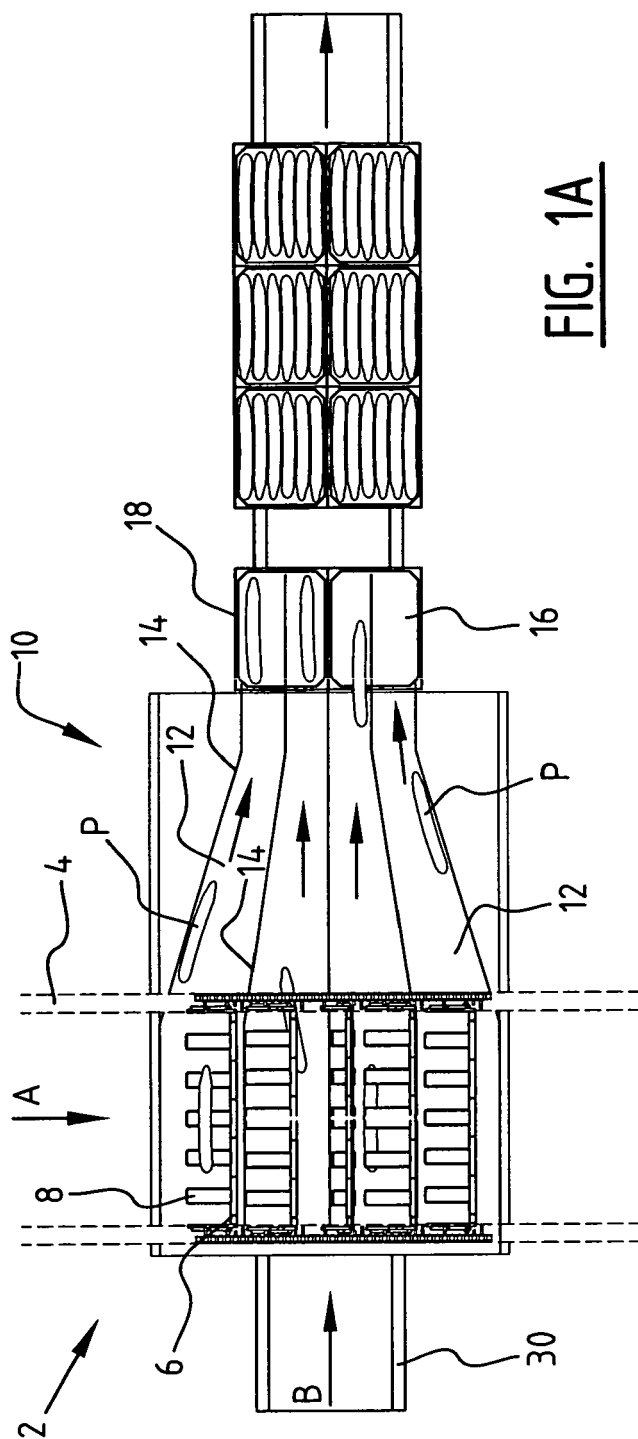


FIG. 1A

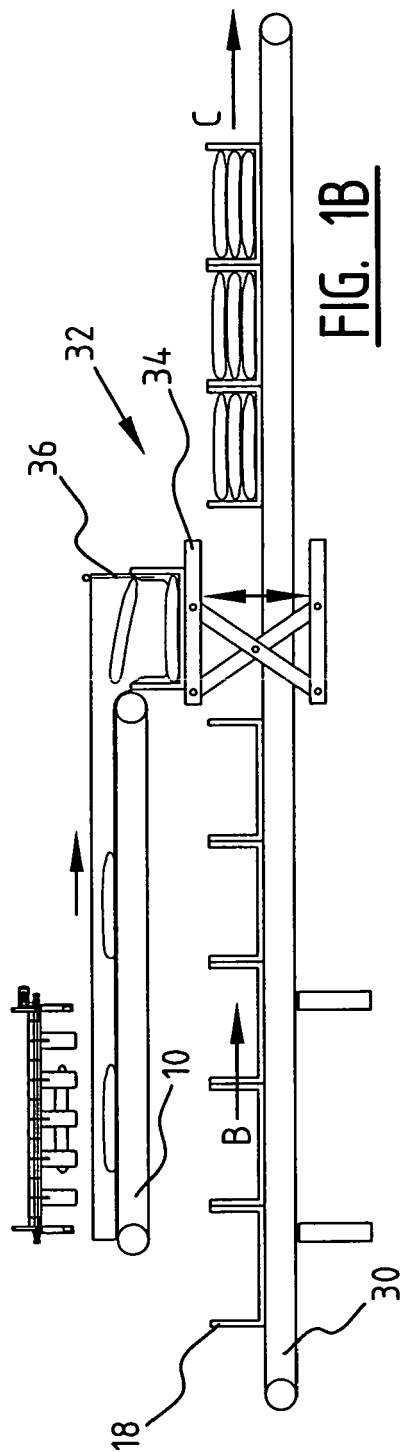
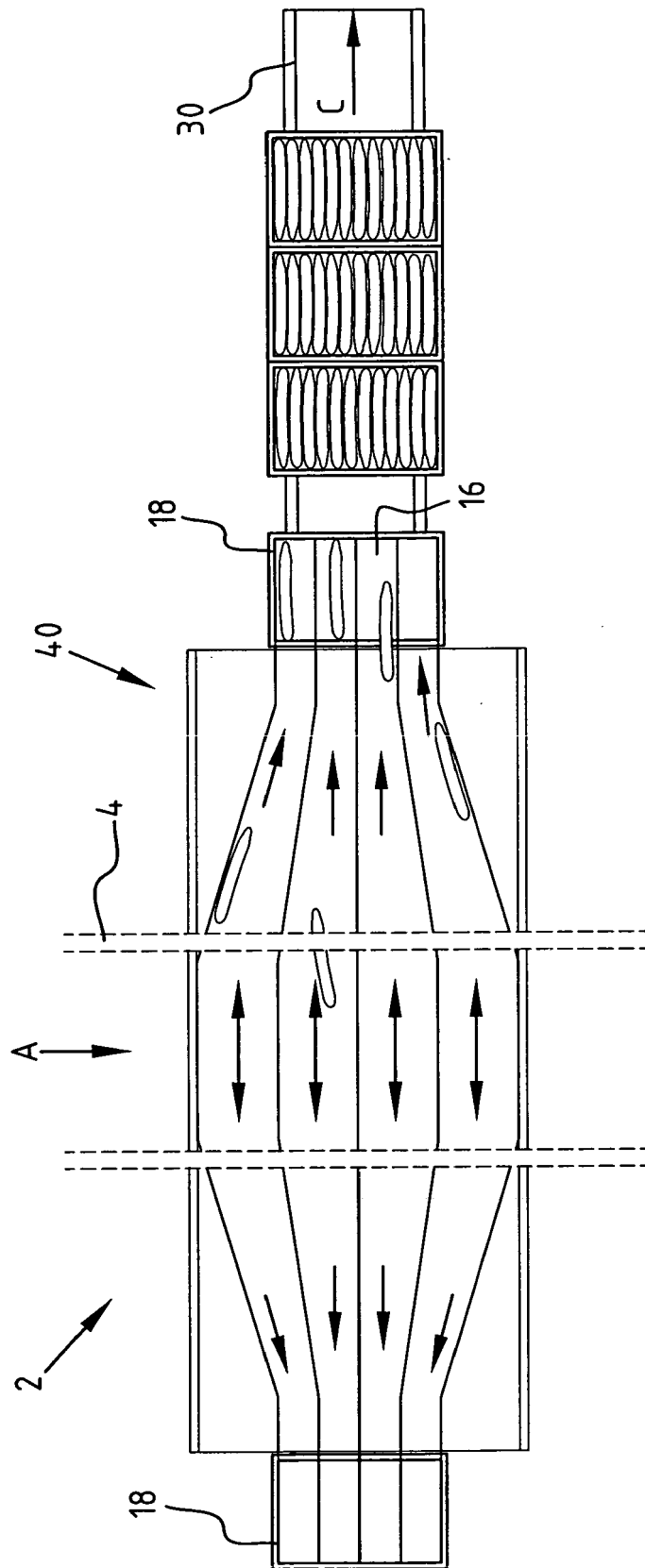


FIG. 1B



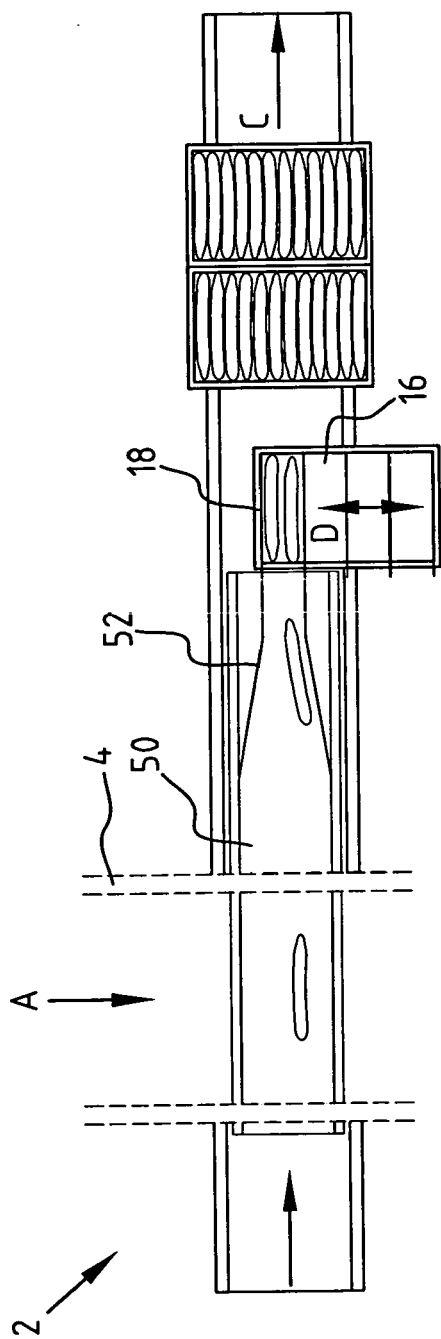


FIG. 3A

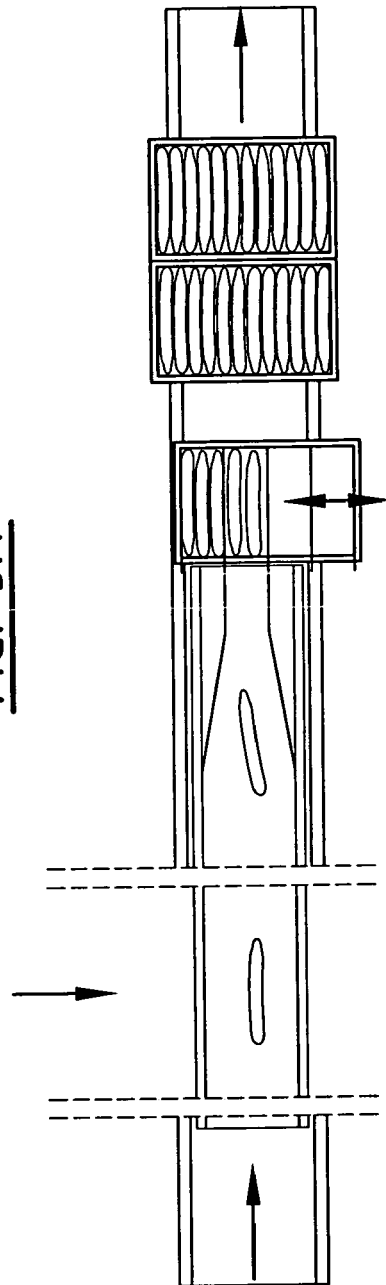


FIG. 3B

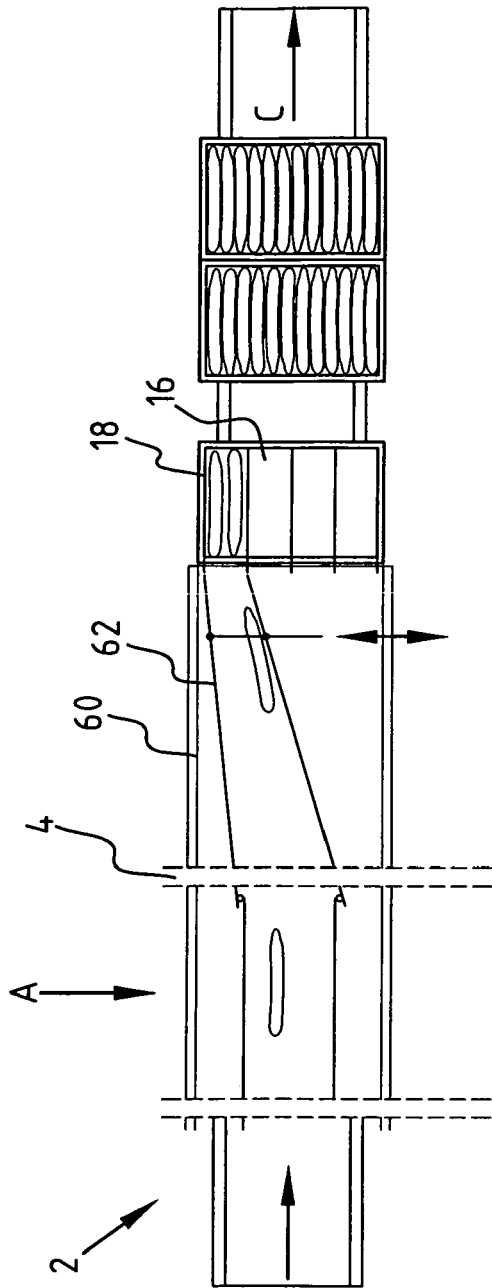


FIG. 4A

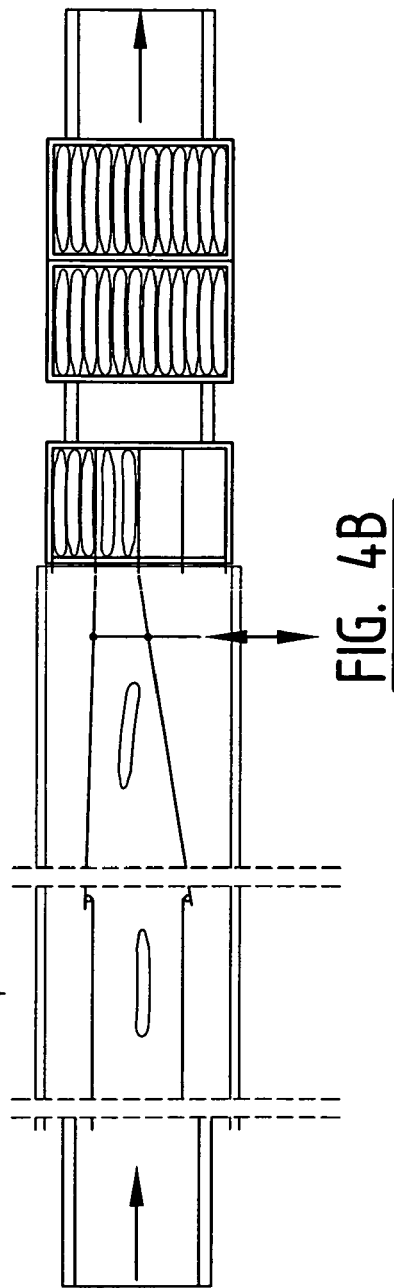


FIG. 4B

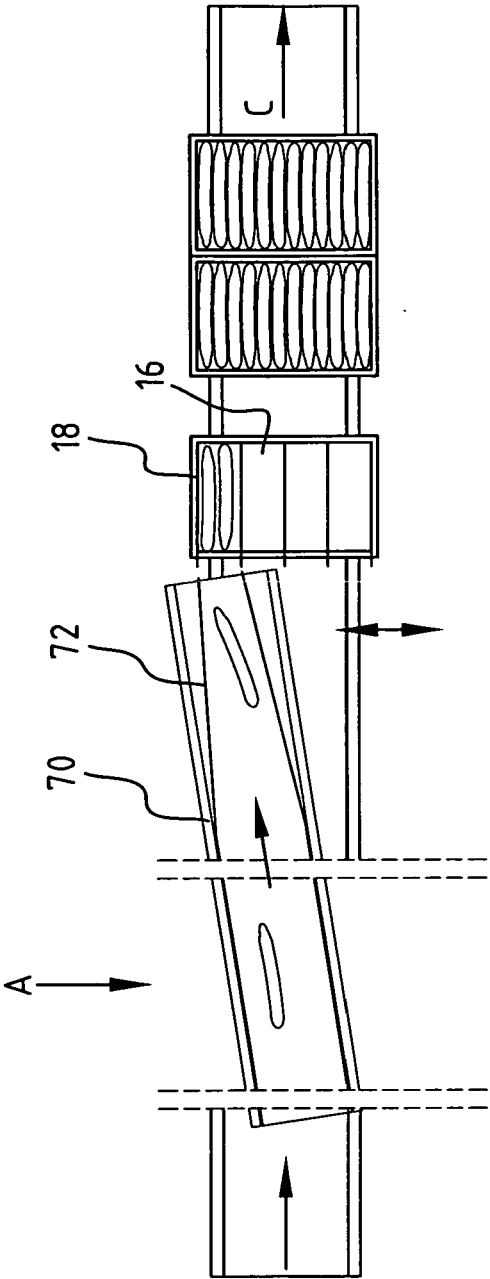


FIG. 5A

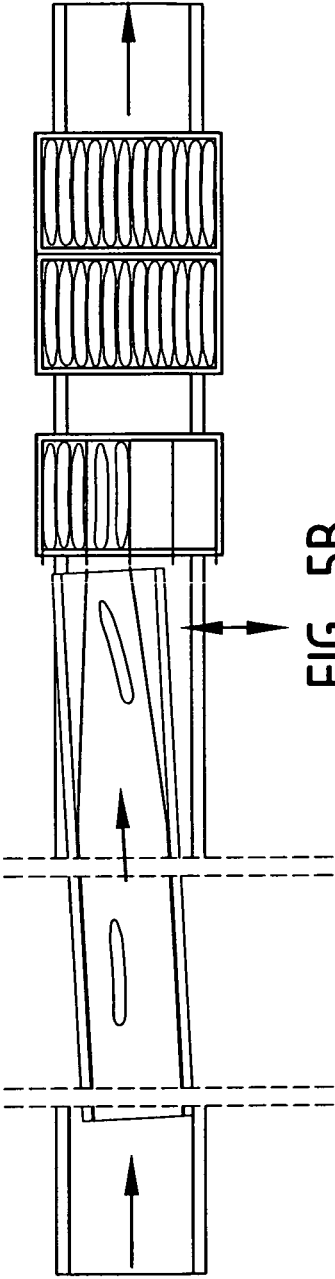


FIG. 5B

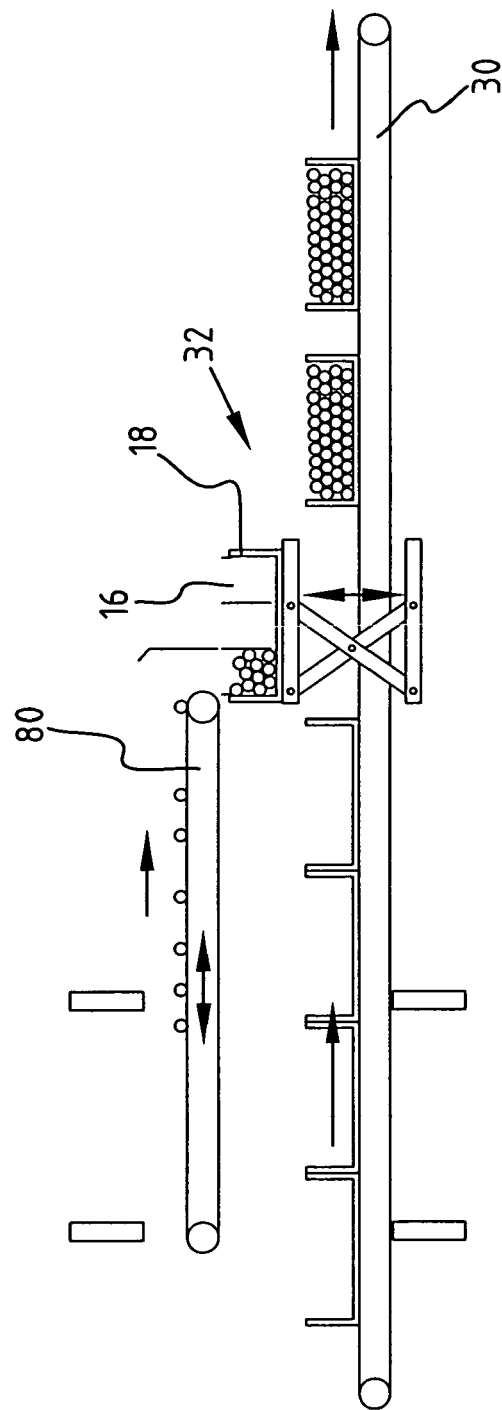


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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