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(54) **Volumetric loader for stacked food products such as biscuits or similar**

(57) A volumetric loader for the volumetric portioning of stacked products comprising a machine (10) which makes stacks of a preset length of biscuits, crackers or similar products ready for packing later in a closed wrapper along a packing line for such products, where the machine (10) comprises a feed conveyor (11) which feeds product towards a portioning unit which has one or more portioning stations (12), where the outfeed conveyor (21), comprising a double chain (22) whose links face the opposite side of the conveyor (21) and which

are connected by bars (25), has a conveyor belt (24) located between the respective actuating rollers, designed to move at an adjustable speed and actuated by an independent motor in such a way that increasing or decreasing the speed of the belt governed by its independent motor, thrusts or stops the biscuits against the bars (23), that is, the belt pushes the "slug" of loose biscuits against the front bar of the chain line (22) or brakes the "slug" of biscuits against the rear bar of the chain line (22), so as to perfectly straighten each "slug" of biscuits especially those which may be out of line.

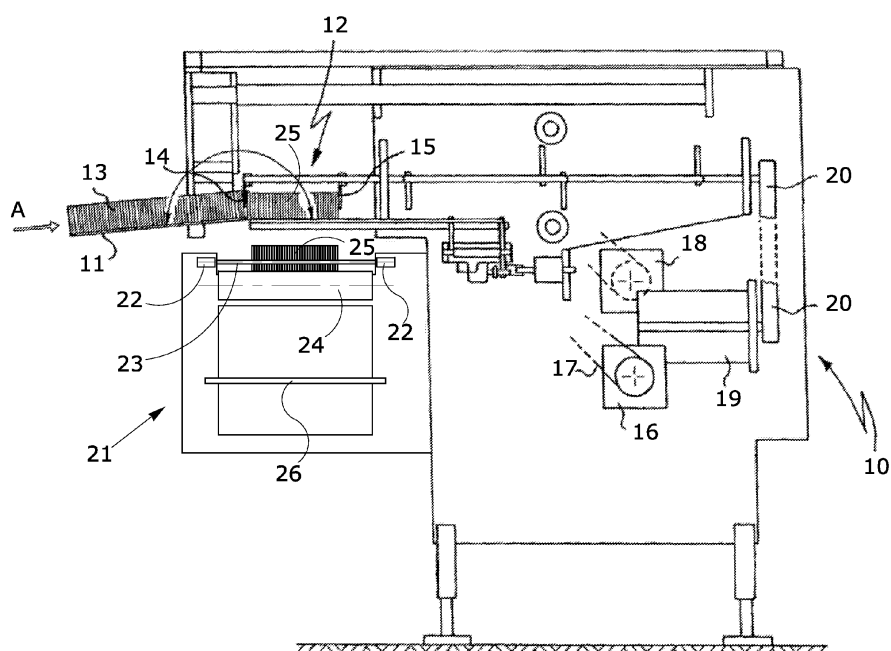


Fig. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a volumetric loader for the volumetric portioning of stacked products, that is, a machine which makes stacks or "slugs" of a preset length of biscuits, crackers or similar products ready for packing later in a closed wrapper along a packing line for such products.

[0002] The invention derives from European patent EP 1.304.303 in the name of the same applicant and in the same way applies to packing machinery for food products such as biscuits, crackers or similar products. In this type of machinery, the products leaving a preparation station, for example an oven, are positioned facing each other in a substantially vertical position and rest with a side edge on a feed conveyor so as to form one or more continuous rows of products.

[0003] Products positioned in this way, also known as "products on edge" because of the way they are positioned, are fed to a portioning unit which forms stacks all of which have substantially the same length or volume.

[0004] In particular the present invention refers to a device which has the aim, comparable to that of the patent from which it derives, of providing a machine and a method which enables a particularly rapid way of portioning products in stacks of a preset length and which has, in addition, some major advantages such as, a reduction in bouncing and impacting of the product as it falls. A further major advantage with respect to the patent from which it derives is that of the possibility of being able to align the pack of biscuits at the front or the back of the feed line as a result of the difference between the forward speed of the bar chain and the speed of the conveyor.

BACKGROUND ART

[0005] It is known that machinery for packing food products such as biscuits or similar products where the products leaving a preparation station, such as an oven, are positioned facing each other in a substantially vertical position (forming what is known technically as a "slug", that is, a stack of contiguous pieces) and resting with one side edge on a feed conveyor so as to form one or more continuous rows of product. The products positioned "on edge" in this way are fed to a portioning unit which forms stacks of substantially the same length or volume.

[0006] Examples of known machines include those where biscuits are fed in rows from a conveyor which is slightly angled downwards. Each row rests against a mobile rest element which is retracted to a preset position when it is assumed that a stack has reached the length required.

[0007] In front of the tray there are mobile stop elements which are inserted in the row when the mobile support element reaches the end of its stroke thereby creating a separation between the row of product and

the stack of a preset length. At this point the feed conveyor is stopped and the stack present on the tray is released onto the feed conveyor underneath; the rest element returns to the start of the row to receive a new row of product which now feeds forward.

[0008] This type of machine has various drawbacks including the long time it takes to form each stack; for each stack formed by the machine the rest element must be returned to its initial position to enable the forming of a new stack. For this reason, this machine of the known type is not suitable for use on high-productivity packing lines.

[0009] A further drawback is that the separation of the stack from the row of product is performed in effect by forcing the stop elements between the product at the head of the row and the product at the bottom of the stack. This can damage the product and lead to the production of defective product packs.

[0010] In the patent EP 1304303, the same applicant proposed a machine and a method designed to enable the particularly rapid portioning of products in stacks having a preset length and which in particular enable the portioning of products without damaging the products; the machine is particularly versatile for the volumetric portioning of products.

[0011] During the use of this machine some shortcomings were found and it is the purpose of the present invention to remedy these.

[0012] When the rows of biscuits drop onto a dead plate located on the bottom surface, they become misaligned and are subject to a certain impact. This causes the formation of a considerable amount of crumbs and the possibility that some pieces might even break, with all the negative consequences this might entail.

[0013] Furthermore, the main drawback found was that dropping the "slug" of biscuits onto the lower dead surface caused the misalignment of the product, with some parts shifted forward in relation to others while others were shifted backwards. The "slug" of product to be packed was therefore positioned badly when fed onto the packing unit in a faulty manner with the result that this caused considerable difficulties for the operator who had to align the products perfectly so that it could be packed correctly.

DESCRIPTION OF THE INVENTION

[0014] The present invention provides a volumetric loader for the volumetric portioning of stacked products which is able to eliminate or at least reduce the shortcomings described above.

[0015] The present invention furthermore provides a volumetric loader for the volumetric portioning of stacked food products such as biscuits or similar, which has some important advantages with respect to previous solutions. Such advantages include the reduction of bouncing of the product and impact to same as it drops down and above all the possibility of aligning the "slug" of biscuits

in front of or behind the feed line.

[0016] This is achieved by a volumetric loader for the volumetric portioning of stacked food products whose characteristics are described in the main claim.

[0017] The dependent claims describe advantageous embodiments of the invention.

[0018] The main advantages of this solution, in addition to those which derive from the simplicity of its construction, concern the fact that it solves the problem of misalignment, it solves the problem of the impact to the biscuits when they drop onto the lower surface and it solves the problem of misalignment when batches of product drop onto the lower belt of the feed line. This is achieved by using a conveyor belt or moving band so that the product falls onto a soft, moving surface.

[0019] This conveyor belt is fed forward at a speed which is different to the speed of the product feed chain so that the product to be packed is presented to the packing unit in the correct way.

[0020] The device according to the present invention substantially comprises a conveyor belt which substitutes the conventional rigid dead surface and where this conveyor belt is located at the line which conveys the packs of loose biscuits towards the packing line fitted with a drive bar chain, and where the conveyor belt is driven by an independent motor designed to drive the belt at a greater speed or a different speed to that of the drive chain.

[0021] The result of this difference in speed between the conveyor belt and the bar chain is the perfect alignment of the packs of loose biscuits. This is because the biscuits are first pushed forwards towards the front bars and then backwards towards the rear bars of the chain so that they are perfectly aligned on a single line thus achieving the pack configuration of the previous cycle phase, that is, with the product still loose.

[0022] It should be noted that the conveyor belt is in continuous motion and this combined with the fact that the belt is made from a suitably soft and thick material prevents the traditional impact shock to the various biscuit "slugs", thus eliminating the traditional excessive formation of crumbs and thus also preventing the breakage of single biscuits.

[0023] The conveyor belt is also kept clean by a scraper element which keeps the belt clean for successive product conveying cycles.

DESCRIPTION OF THE DRAWINGS

[0024] Further features and advantages of the invention will become apparent from the description of an embodiment which follows with reference to the annexed drawings, given purely by way of a non-limiting example, in which:

- Figure 1 shows a side view of a machine for portioning product, fitted with the alignment device according to the present invention;

- Figure 2 is a detail view of a conveyor belt carrying "slugs" of loose biscuits held on the chain line towards the packing zone;
- Figures 3 to 5 are plan views showing the three phases for aligning the biscuit "slug" on the conveyor belt.

DESCRIPTION OF ONE EMBODIMENT OF THE INVENTION

[0025] With reference to the annexed drawings, Figure 1 shows the machine 10 according to the present invention which forms portions of products, such as biscuits or similar products, into stacks of a preset length.

[0026] The products are fed by a feed conveyor 11 and a portioning unit which has one or more portioning stations 12. In one embodiment, the machine comprises seven portioning stations but it is understood that the number of stations in each portioning unit can be varied to meet specific production requirements without departing from the scope of the present invention.

[0027] Figure 1 clearly shows that the products on the feed conveyor 11 are fed in the direction of the arrow A. On the feed conveyor 11, the products are positioned facing each other in a substantially vertical position and resting with one side edge on the feed conveyor so as to form continuous rows 13. Each row 13 is guided towards a corresponding portioning station 12 which forms stacks of a preset length, that is, portions which substantially have the same product volume.

[0028] Each portioning station 12 has at least one first support element 14 and at least one second support element 15 driven by a first electric motor 16 which drives a gear/rack coupling by means of a belt 17.

[0029] A second electric motor 18, operating independently from the electric motor 16, in turn drives the second support elements 15.

[0030] The rotation of the support elements 14 is controlled independently from the rotation of the support elements 15 in all the portioning stations. The rotary movement is driven by the motors 19 and is transmitted by the belts 20.

[0031] According to the present invention, at the outfeed conveyor 21, shown in Figure 1, located under the portioning stations 12, and usually comprising a fixed, rigid surface on the feed line with a bar 23 chain 22, there is at least one conveyor belt 24 located between the drive rollers, which is positioned on the outfeed conveyor 21 at right angles to the direction of feed indicated by the arrow A. This conveyor is driven by an independent motor and can be driven at a different speed from the speed of the bar 23 chain 22 which remains constant.

[0032] The chain 22 comprises two sets of links which face the opposite sides of the conveyor belt 24 where the links are connected by bars 25; groups of biscuits side-by-side or product "slugs" drop down between the bars 25.

[0033] The double chain 24 is positioned at the conveyor unit 21 which sends packs of loose biscuits towards

the packing line.

[0034] The conveyor belt 24 is driven by an independent motor at a speed designed to drive the belt at a greater speed or a different speed to that of the chain 22 which travels forwards at a constant speed towards the packing zone.

[0035] This difference in speed between the conveyor belt 24 and the chain 23 bar 22 enables the performance of two operations:

- a) the "slug" of loose biscuits is pushed against the front bar of the chain line;
- b) the "slug" of loose biscuits is braked against the rear bar of the chain line.

[0036] This action enables the perfect alignment of the packs of loose biscuits, the "slugs", which are first pushed forward and then, where necessary, backwards, so as to straighten the "slugs" on a single line, thus achieving the pack configuration of the previous cycle phase, that is, with the product still loose.

[0037] According to the present invention the conveyor belt 24 is made from a suitably soft material of a required thickness. This characteristic in combination with the fact that the belt is in continuous movement, at an adjustable speed, ensures that the product "slug" 25 drops down onto a soft, moving surface thereby preventing, as the various stacks of biscuits drop down, the traditional excessive formation of crumbs and thus also preventing the breakage of single biscuits.

[0038] In one embodiment of the present invention the conveyor belt 24 is driven on the lower part of the machine by a series of rollers, not shown here because they are of the known type, and that the belt travels through a zone fitted with a scraper device 26, which constantly cleans the belt of any residues or crumbs.

[0039] During operation the support elements 14 and 15 travel reciprocally carrying each "slug" 25 into the correct outfeed position above the outfeed conveyor 21, that is, depositing the parts on the moving conveyor belt 24 and precisely between the bars 23 positioned at regular intervals on the chain 22.

[0040] When each "slug" is positioned in its sector inside the bars 23 on the conveyor belt 24, the higher or lower speed of the conveyor belt driven by an independent motor causes the pushing or the stopping of all the biscuits against the bars 23 thereby enabling one of the two actions described above. In other words, the belt pushes the "slug" of loose biscuits against the front bar of the chain line or brakes the "slug" of loose biscuits against the rear bar of the chain line. This action perfectly straightens each biscuit "slug", which is especially important if the "slugs" are out of line.

[0041] The mechanical design of the invention also provides for the inversion of the direction of travel of the speed adjusting devices which can be applied on the chain rather than on the conveyor belt or on both thus permitting full versatility.

[0042] The invention as described above refers to a preferred embodiment. Naturally, while the principle of the invention remains the same, the details of construction and the embodiments may widely vary with respect to what has been described and illustrated purely by way of the example, without departing from the scope of the present invention.

10 Claims

1. A volumetric loader for the volumetric portioning of stacked products comprising a machine (10) which makes stacks of a preset length of biscuits, crackers or similar products ready for packing later in a closed wrapper along a packing line for such products, where the machine (10) comprises a feed conveyor (11) which feeds product towards a portioning unit which has one or more portioning stations (12), where the loader is **characterised in that** the outfeed conveyor (21), comprising a double chain (22) whose links face the opposite side of the conveyor (21) and which are connected by bars (25), has a conveyor belt (24) located between the respective actuating rollers, designed to move at an adjustable speed and actuated by an independent motor in such a way that increasing or decreasing the speed of the belt governed by its independent motor, thrusts or stops the biscuits against the bars (23), that is, the belt pushes the "slug" of loose biscuits against the front bar of the chain line (22) or brakes the "slug" of biscuits against the rear bar of the chain line (22), so as to perfectly straighten each "slug" of biscuits especially those which may be out of line.
2. The volumetric loader for the volumetric portioning of stacked products according to the previous claim, **characterised in that** the conveyor belt (24) is made from a material which is sufficiently soft and thick enough, and this characteristic in combination with the fact that the belt is in continuous movement, at an adjustable speed, ensures that the product "slug" (25) drops down onto a soft surface in movement thereby also ensuring that it remains undamaged.
3. The volumetric loader for the volumetric portioning of stacked products according to one of the foregoing claims, **characterised in that** the conveyor belt (24), located under the portioning stations (12) is actuated by independent motors with the possibility of varying the travel speed in relation to the actuating speed of the chain (22) of bars (23) which travels forward at a constant speed towards the packing zone.
4. The volumetric loader for the volumetric portioning of stacked products according to one of the foregoing claims, **characterised in that** the conveyor belt (24) is driven on the lower part of the machine by a series

of rollers and that the belt travels through a zone fitted with a scraper device (26) which ensures that the belt is kept constantly clean on the successive work cycles.

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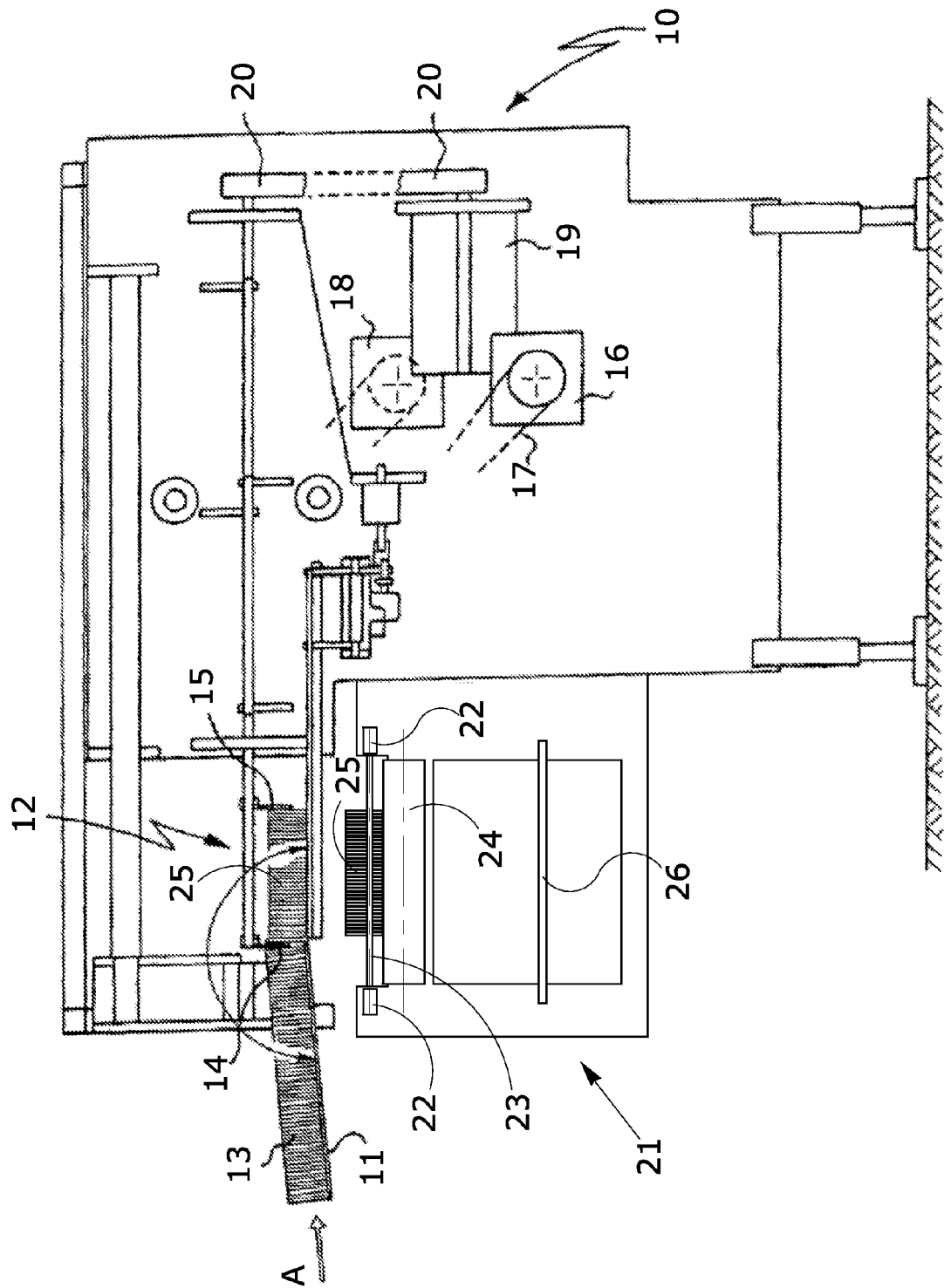
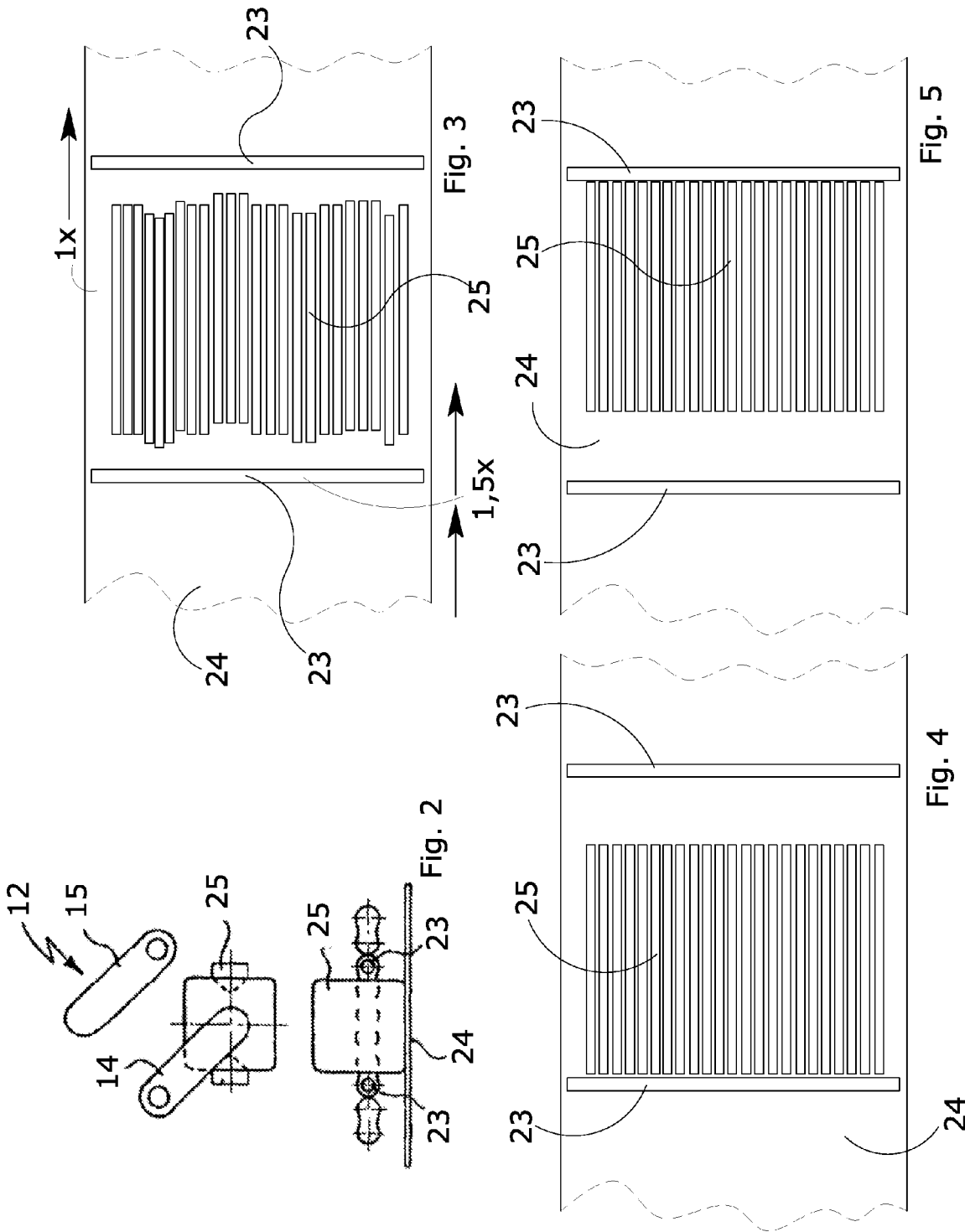


Fig. 1





EUROPEAN SEARCH REPORT

Application Number
EP 11 16 6487

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Place of search Munich		Date of completion of the search 24 October 2011	Examiner Rodriguez Gombau, F
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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