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(54) **METHOD AND DEVICE FOR TRANSFERRING BLISTER PACKS FROM A CUTTING STATION TO  
A BLISTER PACKS CONVEYING LINE**

VERFAHREN UND VORRICHTUNG ZUR ÜBERGABE VON BLISTER-VERPACKUNGEN VON  
EINER SCHNEIDESTATION ZU EINER FÖRDERLINIE

PROCEDE ET DISPOSITIF DE TRANSFERT DE PLAQUETTES ALVEOLAIRES D'UN POSTE DE  
DECOUPE A UNE LIGNE TRANSPORTEUSE DE PLAQUETTES ALVEOLAIRES

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**EP-A- 0 466 660** **WO-A-97/27108**

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**Description****FIELD OF THE INVENTION**

**[0001]** The present invention relates to packaging articles into portions of blister band, commonly known as blister packs.

**[0002]** More precisely, the invention relates to a method for transferring blister packs from a cutting station to a blister pack conveying line, and to a corresponding device which carries out this method.

**DESCRIPTION OF THE PRIOR ART**

**[0003]** Automatic machines have been heretofore provided for forming blisters in a continuous band of thermoformable material, in a suitable working station, and for filling the obtained blisters with relative articles, e.g. pharmaceutical products such as tablets, pills or capsules.

**[0004]** In another working station, a suitable film, usually of aluminum, is applied to the blister band, so as to close the blisters. Subsequently, the so closed blister band is cut in a cutting station, so as to obtain blister packs.

**[0005]** Usually, downstream of the blister pack producing machine is a blister packs conveying line operated in phase relation with the cutting station and aimed at feeding a packaging machine.

**[0006]** The blister packs are usually transferred from the cutting station to the conveying line by a device, basically including an oscillating arm, which is equipped with means for picking up the blister packs and which supported by driving means which rotate it about an axis perpendicular to the moving direction of the conveying line.

**[0007]** The arm oscillates between a pick up position, in the region of the cutting station, in which the picking up means pick up one blister pack, and a releasing position, in the region of the conveying line, in which the picking up means release the blister pack (see e.g. EP-A-0 466 660).

**[0008]** In this field, there is the problem of transferring pairs of blister packs from the cutting station of the blister pack producing machine to a single conveying line, which feeds the packaging machine.

**SUMMARY OF THE INVENTION**

**[0009]** The object of the present invention is to propose a method, which allows to transfer pairs of blister packs, arranged side by side, from the cutting of station to only one conveying line, in particular in a packaging machine.

**[0010]** Another object of the present invention is to propose a method, which ensures high productivity, reliability and practicality also when working with different sizes of blister packs.

**[0011]** A further object of the present invention is to propose a particularly strong, versatile and functional device, which carries out the above mentioned method.

**[0012]** Still another object of the present invention is to propose a cheap device obtained by a simple technical solution, which optimizes the transfer of pairs of blister packs picked up from the cutting station to the receiving station.

**[0013]** The above mentioned objects are obtained, in accordance with the contents of the claims, by means of a device for transferring blister packs from a cutting station to a blister pack conveying line, the device including:

at least two parallel rotary shafts, namely a first shaft and a second shaft, having different lengths, said first shaft and second shaft having respective rotation axes parallel and crosswise to the blister packs conveying line movement direction;

at least two transfer means, namely a first transfer means and a second transfer means, having different length, said first transfer means and second transfer means having both one end fastened to a respective said first and second shafts so that they rotate about said axes of said shafts, and one free end;

picking up means, first and second, fastened to said free ends of said first transfer means and second transfer means;

driving means for driving said shafts so that said transfer means are rotated simultaneously between a pick up position, in which said first picking up means and

second picking up means are located in said cutting station to pick up a pair of blister packs, and a release position, in which the picking up means are brought over said conveying line and release said pair of blister packs offset by an offset value one with respect to the other, onto said conveying line;

a merging station for merging each pair of blister packs in a single row along said conveying line.

**[0014]** The conveying line includes:

at least two conveyor means, namely a first conveyor means and a second conveyor means, for receiving said pair of blister packs, said first conveyor means and second conveyor means being arranged side by side and operated synchronously and stepwise;

the merging station, which is located downstream of said first and second conveyor means for moving

blister packs alternately from said first conveyor means and from said second conveyor means to a third conveyor means operated synchronously with said first and second conveyor means.

**[0015]** The device described above carries out a method for transferring blister packs from a cutting station to a blister packs conveying line including:

simultaneous picking up of a pair of blister packs, at said cutting station, by corresponding transfer means, namely a first transfer means and a second transfer means, having at one end a first picking up means and a second picking up means respectively, and having another end rotatably supported by corresponding shafts, namely a first shaft and a second shaft, so that said transfer means rotate about axes of said shafts, said axes being parallel and crosswise a blister packs conveying line movement direction;

transferring said blister packs, previously picked up from said cutting station by a synchronous oscillation of said first transfer means and second transfer means, to said conveying line;

releasing said blister packs onto first and second conveyors means of said conveying line, said blister packs being released offset one with respect to another by an offset value;

transferring said blister packs alternately from said first conveyor means and from said second conveyor means to a third conveyor means operated synchronously with said first and second conveyors means.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0016]** The characteristic features of the invention will be pointed out in the following description of a preferred, but not unique embodiment, with reference to the enclosed drawings, in which:

- Figure 1 is a schematic general plan view of the device which carries out the proposed method;
- Figure 2 is an enlarged, schematic fragmentary plan view of a region of the device of Figure 1 located near the cutting station;
- Figures 3, 4 are schematic lateral views of the proposed device during two, particularly important working steps.

## BEST MODES OF CARRYING OUT THE INVENTION

**[0017]** With reference to the above described figures,

reference numeral 1 indicates the proposed device, which allows to transfer pairs of blister packs 2 from a cutting station 3 of a blister pack producing machine to a conveying line 4 which takes the blister packs 2 and feeds them to e.g. a packaging machine 5.

**[0018]** The cutting station 3 defines a cutting surface  $\alpha$ , which, in the described case, is inclined with respect to the horizontal plane, in which the blister packs 2 are cut.

**[0019]** Likewise, the conveying line 4 defines a corresponding receiving surface  $\delta$ , substantially horizontal, on which the blister packs 2 are released.

**[0020]** The device 1 basically includes transfer means, respectively a first transfer means 11 and a second transfer means 12.

**[0021]** As shown in the figures, the transfer means 11, 12 includes two arms equipped with picking up means, respectively first picking up means 13 and second picking up means 14, in the region of respective ends.

**[0022]** The picking up means include e.g. suction cups connected in known way to a vacuum source, which is not shown (Figure 4).

**[0023]** The length of the first transfer means or arm 11 is different from the length of the second transfer means or arm 12.

**[0024]** At their extremities opposite to the respective picking up means 13, 14, the first transfer means 11 and the second transfer means 12 are carried respectively by a first shaft 15 and a second shaft 16.

**[0025]** The first shaft 15 and the second shaft 16 are parallel to each other and crosswise to a moving direction Z of the conveying line 4 (Figure 3).

**[0026]** The first shaft 15 and the second shaft 16 have different lengths and their axes 15b, 16b are positioned at different height levels.

**[0027]** More precisely, as shown in Figures 3 and 4, the axes 15b, 16b of the shafts 15, 16 lie in a plane  $\beta$ , which is inclined with respect to the cutting plane  $\alpha$  and with respect to the receiving plane  $\delta$  by the same angle  $\omega$ .

**[0028]** At their extremity opposite to the one carrying the picking up means 13, 14, the first shaft 15 and the second shaft 16 carry, keyed thereto, relative toothed wheels 15a, 16a, first and second respectively.

**[0029]** The toothed wheels 15a, 16a engage with a single toothed belt 17 operated by driving means 18 in known way (Figure 4). Tightening means 17a are provided, which act on the toothed belt 17.

**[0030]** The driving means 18 drive the first transfer means 11 and the second transfer means 12 into simultaneous oscillation between a pick up position W (Figure 3), in which the first picking up means 13 and the second picking up means 14 are located at the cutting station 3, so as to pick up a pair of blister packs 2, and a release position Y (Figure 4), in which the first picking up means 13 and the second picking up means 14 are located over the conveying line 4, so as to release the pair of blister

packs 2 onto the conveying line 4. The blister packs 2 are released offset with respect to each other.

**[0031]** It results that, during the transition from the pick up position W to the release position Y, the unity vector of the bisector of the common rotation angle described by the first and second transfer means 11, 12 is orthogonal to the surface  $\beta$ .

**[0032]** It is to be pointed out that during the oscillation step, the second transfer means 12, situated behind the first transfer means 11, considering the view arrow F of Figure 2, does not interfere with the first transfer means 11, which is shorter than the second transfer means 12 and which is operated by the first shaft 15, situated at a higher level with respect to the second shaft 16.

**[0033]** The above mentioned situation is facilitated by the fact that the first transfer means 11 as well as the second transfer means 12 are substantially L-like arms, suitably shaped, and are fastened to the respective shafts 15, 16 with e.g. the shorter side.

**[0034]** As shown in Figure 2, the conveying line 4 includes conveyors, first 41 and second 42, including e.g. pairs of side by side belts, which cooperate with the corresponding transfer means, first 11 and second 12, and a third conveyor 43 located downstream of the first and second conveyors.

**[0035]** The conveyors 41, 42, arranged one beside the other with their active run in the same surface  $\delta$ , are operated stepwise in the movement direction Z, according to a predetermined step.

**[0036]** In particular, the blister packs 2 of each pair of blister pack picked up from the cutting station are released on the first and second conveyors 41, 42, in such a that they are offset with respect to each other, by an offset value "f", considering the first and second conveyors 41, 42 movement direction Z.

**[0037]** The offset "f", together with the relative positioning of the blister packs 2 on the cutting surface  $\alpha$ , determines the longitudinal extension of the transfer means 11, 12.

**[0038]** The conveyors first 41 and second 42, respectively, are equipped with a plurality of corresponding lugs, first 41a and second 42a, respectively. The lugs are removably fastened to the belts forming each conveyor, so that the mutual distance between the subsequent lugs can be adjusted to define seats, which receive blister packs 2 having different size and orientation, i.e. positioned with the longitudinal symmetry axis parallel or perpendicular, as in the present case, with respect to the conveyors 41, 42 common movement direction Z.

**[0039]** As seen in Figure 2, the blister packs 2 held within the seats are guided, at their ends, by side panels 33, which are distant from each other by a distance " $d_4$ ".

**[0040]** The side panels 33 extend along the whole length of the first and second conveyors 41, 42.

**[0041]** It is to be pointed out that the transfer means 11, 12 are advantageously formed like a fork, so that the corresponding tines 11a 12a of each fork, substantially

parallel to each other, are distant from each other by a distance " $d_1$ ".

**[0042]** The distance " $d_1$ " is bigger than the crosswise dimension " $d_2$ " of the conveyors 41, 42 (Figure 2).

**[0043]** The maximum transversal dimension of the transfer means 11, 12, i.e. the distance " $d_3$ " between the outer edges of each tine 11a, 12a, must be smaller than the distance " $d_4$ " between the side panels 33.

**[0044]** The conveyors 41, 42 feed alternately the blister packs 2 to the third conveyor 43, which is likewise a belt conveyor and lies substantially on a same plane including the receiving surface  $\delta$ , on which the first and second conveyors 41, 42 lie.

**[0045]** The first, second and third belt conveyors 41, 42, 43 are operated synchronously.

**[0046]** Likewise, the conveyor 43 is equipped with lugs 43a, removably fastened to the belt, so that the mutual distance between subsequent lugs can be adjusted to define seats for blister packs 2.

**[0047]** The blister packs 2 are fed to the third conveyor 43 alternately by the first and second conveyor 41, 42 in a merging station 6 located at a connection point between the first and second conveyors 41, 42 and the third conveyor 43.

**[0048]** The merging station 6 is equipped with pushing means, first 61 and second 62, respectively, which act symmetrically crosswise to the respective first and second conveyors 41, 42, in opposite directions.

**[0049]** The principles of the blister packs transfer method carried out by the described device are easily understandable and fully explained in the following, beginning from a configuration, in which the transfer means 11, 12 are located at the cutting station 3.

**[0050]** The cutting surface  $\alpha$  of the cutting station 3 is preferably inclined with respect to the vertical plane by an angle ranging from  $0^\circ$  to  $90^\circ$ .

**[0051]** A pair of blister packs 2, are situated in the cutting station, arranged side by side and with the relative longitudinal symmetry axes e.g. orthogonal to the first and second conveyors 41, 42 movement direction Z.

**[0052]** The transfer means 11, 12, oscillate simultaneously about the axes 15b, 16b of the shafts 15, 16, in phase relation with the blister packs 2 cutting in the cutting station 3, and reach the pick up position W, in which the corresponding first and second picking up means 13, 14 locate in the cutting station 3 near the respective blister pack 2.

**[0053]** When the transfer means 11, 12 reach the pick up position W, the picking up means 13, 14 are connected to a vacuum source, so as to create vacuum condition in the area of contact with the blister packs 2 and thus to hold the respective blister packs 2 on the side opposite to the one having the blisters.

**[0054]** The transfer means 11, 12 oscillate clockwise (Figure 3), in phase relation with the connection to the vacuum source, until they reach the release position Y, in which the blister packs 2 contact the relative conveyors 41, 42.

**[0055]** When in the release position Y, the transfer means 11, 12 are situated substantially under the blister packs 2 receiving surface  $\delta$  with the relative tines 11a, 11b extending along the corresponding conveyor 41, 42 internally with respect to the side panels 33 (Figure 4).

**[0056]** The different levels of the shafts 15, 16 and the extension of the forks 11, 12, allow the forks 11, 12 to release the blister packs 2 of the pair of blister packs previously picked up from the cutting station onto the conveyors 41, 42, maintaining the offset "f".

**[0057]** The picking up means 13, 14 are disconnected from the vacuum source in phase relation with the transfer means 11, 12 reaching the release position Y, so as to release the blister packs 2 onto the respective conveyors 41, 42, within the seat defined by the lugs 41a, 42a.

**[0058]** The blister packs 2 longitudinal symmetry axes are normal with respect to the conveyors 41, 42 movement direction Z and the blisters 2a are turned upwards (Figure 2).

**[0059]** During the passage from the pick up position W to the release position Y, the blister packs 2 rotate clockwise by 90° to 180°, according to the inclination angle of the cutting surface  $\delta$  in the cutting station 3, thus making the blisters 2a of the blister packs 2 rotate from the position, in which they are turned downward and touch the cutting plane  $\delta$  to a position, in which they are turned upwards and blister packs are situated on the conveyors 41, 42.

**[0060]** The conveyors 41, 42, in phase relation with the disconnection from the vacuum source, and consequently, with the release of the blister packs 2, perform a predetermined number of steps of their sequence, e. g. one, so as to shift the released blister packs 2 with respect to the fork arms of the transfer means 11, 12 situated below, thus avoiding putting one blister pack on another.

**[0061]** The transfer means 11, 12, in phase relation with the blister packs 2 shifting, rotate counterclockwise, so as to pass from the release position Y to the pick up position W, thus beginning a new cycle of transferring blister packs 2 from the cutting station 3 to conveyors 41, 42.

**[0062]** Due to the synchronous movement of the conveyors 41, 42, blister packs 2 are fed to the merging station 6 alternately by the first conveyor 41 and the second conveyor 42.

**[0063]** Therefore, the blister packs 2 are fed to the third conveyor 43 alternately by the first conveyor 41 and the second conveyor 42 by the synchronous action of the respective pushing means, first 61 and second 62, so as to define one single row of products at the inlet of the packaging machine 5.

**[0064]** The described method and device obtain the object of transferring pairs of blister packs 2 arranged one beside the other from a cutting station 3 of a blister pack producing machine to a relative blister packs 2 conveying line 4, so as to feed a packaging machine 5.

**[0065]** It is to be pointed out that the objects are obtained by a very strong and functional device, working at high speed.

**[0066]** In case the blister packs 2 size is to be changed, it is enough to adjust the distance between the lugs 41a, 42a, 43a of the corresponding conveyors 41, 42, 43, so as to adapt the dimensions of the seats to the new blister packs 2 dimension.

**[0067]** In case the blister packs 2 size change is considerable, beside the adjustment of the distance between the lugs 41a, 42a, 43a, it is possible to substitute the whole transfer means 11, 12.

**[0068]** Likewise, in case the longitudinal symmetry axis of the blister packs 2 is parallel to the conveyors 41, 42, 43 common movement direction Z, it is enough adjust the distance between the lugs 41a, 42a, 43a of the corresponding conveyors 41, 42, 43.

**[0069]** It is to be pointed out that the particular shape of the transfer means 11, 12 avoids their mutual interference during movement, as well as interference with conveyors 41, 42, 43.

**[0070]** The offset of blister packs 2 on the conveyors 41, 42, 43 by an offset value "f", together with the positioning thereof in the cutting station 3 determines the forks extension and shape.

**[0071]** In the described example, the cutting station 3 feeds two blister packs 2 arranged one beside the other at the same time.

**[0072]** In case the cutting station 3 can feed more than two blister packs 2, it is sufficient to add a corresponding number of transfer means equipped with picking up means, with the necessary associated conveyors, onto which the blister packs 2 are released.

**[0073]** For instance, if the cutting station 3 feeds three blister packs 2 arranged one beside another, there are needed three transfer means, three corresponding conveyors and two additional conveyors, onto which the blister packs, suitably offset according to the previously described principles, are transferred by analogous merging stations 6.

**[0074]** All what has been said about the merging station 6 - third conveyor 43 - packaging machine 5 assembly is valid also for the two additional conveyors.

**[0075]** It is evident that the offset value "f" of each conveyor 41, 42, 43 depends on the number of blister packs 2 arranged side by side in the cutting station 3, i.e. depends on the number of conveyors.

**[0076]** It is also to be pointed out that the above described device is composed of few simple elements, what reduces the production costs.

**[0077]** It is understood that what above has been described as a pure, not limitative example, therefore possible structure variants remain within the protective scope of the present technical solution, as described above and claimed below.

## Claims

1. A device for transferring blister packs from a cutting station to a blister pack conveying line (4), said device comprising
  - at least two parallel rotary shafts, namely a first shaft (15) and a second shaft (16), having different lengths, said first shaft (15) and second shaft (16) having respective rotation axes (15b,16b) parallel and crosswise to the blister packs conveying line (4) movement direction (Z);
  - at least two transfer means, namely a first transfer means (11) and a second transfer means (12), having different length, said first transfer means (11) and second transfer means (12) having both one end fastened to a respective said first and second shafts (15,16) so that they rotate about said axes (15b,16b) of said shafts (15, 16), and one free end; picking up means, first (13) and second (14), fastened to said free ends of said first transfer means (11) and second transfer means (12);
  - driving means (18) for driving said shafts (15,16) so that said transfer means (11,12) are rotated simultaneously between a pick up position (W), in which said first picking up means (13) and second picking up means (14) are located in said cutting station (3) to pick up a pair of blister packs (2), and a release position (Y), in which the picking up means (13,14) are brought over said conveying line (4) and release said pair of blister packs (2) offset by an offset value ("f") one with respect to the other, onto said conveying line (4);
  - a merging station (6) for merging each pair of blister packs (2) in a single row along said conveying line (4).
2. A device, according to claim 1, wherein said axes (15b,16b) of said first and second shafts (15,16) lie in a working plane ( $\beta$ ), which is inclined with respect to a cutting plane ( $\alpha$ ) defined in said cutting station (3) and with respect to a receiving plane ( $\delta$ ) defined by said conveying line (4) by the same angle ( $\omega$ ).
3. A device, according to claim 1, wherein said axes (15b,16b) of said first and second shafts (15,16) are positioned at different height levels.
4. A device, according to claim 1, further including one first toothed wheel (15a), keyed to said first shaft (15), and one second toothed wheel (16a) keyed to said second shaft (16), said first and second toothed wheels (15a,16a) being both engaged by a unique toothed belt (17) operated by said driving means (18) and acted upon by tightening means (17a).
5. A device, according to claim 1, wherein said conveying line (4) includes:
  - at least two conveyors, namely a first conveyor (41) and a second conveyor (42), for receiving said pair of blister packs (2), said first conveyor (41) and second conveyor (42) being arranged side by side and operated synchronously and stepwise;
  - side panels (33) extending along said first conveyor (41) and second conveyor (42) for guiding said blister packs (2), with said first transfer means (11) and second transfer means (12) made with a fork-like shape, so that said first transfer means (11) and second transfer means (12), in said release position (Y), are situated substantially under a receiving surface ( $\delta$ ) defined by said first conveyor (41) and second conveyor (42), with tines (11a,12a) of said fork-like transfer means (11,12) being situated laterally with respect to said conveying line (4).
6. A device, according to claim 5, wherein the distance between the inner surfaces of said tines (11a,12a) is defined by a value ("d<sub>1</sub>") bigger than a value ("d<sub>2</sub>") defining said first and second conveyors (41,42) width, and the distance between the outer surfaces of said tines (11a,12a) is defined by a value ("d<sub>3</sub>"), which smaller than a value ("d<sub>4</sub>") defining the distance between said side panels (33).
7. A device, according to claim 5, wherein said merging station (6) is located downstream of said first and second conveyors (41,42) for moving said blister packs (2) alternately from said first conveyor (41) and from said second conveyor (42) to a third conveyor (43) operated synchronously with said first and second conveyors (41,42) and lying in the same receiving surface ( $\delta$ ), said merging station (6) including at least one pair of pushing means, namely a first pushing means (61) and a second pushing means (62) acting symmetrically and crosswise to said first and second conveyors (41,42).
8. A device, according to claim 7, wherein said third conveyor (43) includes a plurality of adjustable stops (43a), which define corresponding seats for receiving said blister packs (2).
9. A device, according to claims 5, wherein said first and second conveyors (41,42) include respective pluralities of adjustable stops (41a,42a) defining corresponding seats for receiving said blister packs (2).
10. A device, according to claim 1, wherein said first and second picking up means (13,14) include at least one pair of suction cups, connected alternately with a vacuum source, in phase relation with the oscillation of said first and second transfer means

(11,12).

11. A device, according to claim 1, wherein said first and second transfer means (11,12) include a first arm (11) and a second arm (12), with at least said second arm (12) substantially L-like, so as not to interfere with said first arm (11) during the passage from said pick up position (W) to said release position (Y).

12. A device, according to claim 11, wherein said first arm (11) and second arm (12) both have a L-like shape and are carried by said related first and second shafts (15,16) in the region of their shorter sides.

13. A device, according to claim 1, wherein said first and second transfer means (11,12) have a length corresponding to is defined by said offset value ("f") and by a positioning of said blister packs (2) on a cutting surface ( $\alpha$ ) define in said cutting station (3) with respect to a vertical longitudinal plane, parallel to said movement direction (Z).

14. A method for transferring blister packs (2) from a cutting station (3) to a blister packs conveying line (4) **characterized in that** it includes:

simultaneous picking up of a pair of blister packs (2), at said cutting station (3), by corresponding transfer means, namely a first transfer means (11) and a second transfer means (12), having at one end a first picking up means (13) and a second picking up means (14) respectively, and having another end rotatably supported by corresponding shafts, namely a first shaft (15) and a second shaft (16), so that said transfer means (11,12) rotate about axes (15b,16b) of said shafts (15, 16), said axes (15b,16b) being parallel and crosswise a blister packs (2) conveying line (4) movement direction (Z);

transferring said blister packs (2), previously picked up from said cutting station (3) by a synchronous oscillation of said first transfer means (11) and second transfer means (12), to said conveying line (4);

releasing said blister packs (2) onto said conveying line (4), said blister packs (2) being released offset one with respect to another by an offset value ("f");

merging said pair of blister packs (2) into one single row along said conveying line (4).

15. A method, according to claim 14, wherein said blister

pack (2) are first transferred to a pair of conveyors (41,42) of said conveying line (4) and then merged, at a merging station (6), onto a third conveyor of said conveying line (4).

## Patentansprüche

1. Vorrichtung zur Übertragung von Blisterverpackungen von einer Schneidestation auf ein Förderband (4) für Blisterverpackungen, wobei die Vorrichtung folgendes umfasst:

mindestens zwei parallele Drehwellen, nämlich eine erste Welle (15) und eine zweite Welle (16) von unterschiedlicher Länge, wobei die erste Welle (15) und die zweite Welle (16) jeweils Drehachsen (15b, 16b) parallel und quer zur Bewegungsrichtung (Z) des Förderbands (4) für Blisterverpackungen haben;

mindestens zwei Übertragungsmittel, nämlich ein erstes Übertragungsmittel (11) und ein zweites Übertragungsmittel (12) von unterschiedlicher Länge, wobei ein Ende jeweils des ersten Übertragungsmittel (11) und des zweiten Übertragungsmittels (12) an jeweils der ersten bzw. der zweiten Welle (15, 16) befestigt ist, so dass sie sich um die Achsen (15b, 16b) der Wellen (15, 16) drehen, und ein Ende frei ist;

Aufnehmermittel, nämlich ein erstes (13) und ein zweites (14) Aufnehmermittel, die an den freien Enden des ersten Übertragungsmittels (11) und des zweiten Übertragungsmittels (12) befestigt sind; Antriebsmittel (18) zum Antrieb der Wellen (15, 16), so dass die Übertragungsmittel (11, 12) gleichzeitig zwischen einer Aufnahmestellung (W), in der das erste Aufnehmermittel (13) und das zweite Aufnehmermittel (14) in der Schneidestation (3) angeordnet sind, um ein Paar von Blisterverpackungen (2) aufzunehmen, und einer Freigabestellung (Y), in der die Aufnehmermittel (13, 14) über das Förderband (4) geführt werden und das Paar von Blisterverpackungen (2) um einen Versetzungswert ("f") versetzt voneinander auf das Förderband (4) freigeben, gedreht werden; eine Zusammenschiebestation (6) zum Zusammenschieben eines jeden Paares von Blisterverpackungen (2) zu einer einzelnen Reihe entlang dem Förderband (4).

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Achsen (15b, 16b) der ersten und der zweiten Welle (15, 16) in einer Arbeitsebene ( $\beta$ ) liegen, die im gleichen Winkel ( $\omega$ ) zu einer in der Schneidestation (3) definierten Schnittebene ( $\alpha$ ) und zu einer durch das Förderband (4) definier-

ten Aufnahmeebene ( $\delta$ ) geneigt ist.

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Achsen (15b, 16b) der ersten und der zweiten Welle (15, 16) auf unterschiedlichen Höhenniveaus angeordnet sind. 5
4. Vorrichtung nach Anspruch 1, des weiteren umfassend ein erstes Zahnrad (15a), das mit der ersten Welle (15) verkeilt ist, und ein zweites Zahnrad (16a), das mit der zweiten Welle (16) verkeilt ist, wobei das erste und das zweite Zahnrad (15a, 16a) beide mit einem einzelnen Zahnriemen (17) in Eingriff gehen, der von den Antriebsmitteln (18) betrieben wird und auf den Spannmittel (17a) einwirken. 10 15
5. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** das Förderband (4) folgendes aufweist: 20
 

mindestens zwei Förderer, nämlich einen ersten Förderer (41) und einen zweiten Förderer (42), zur Aufnahme des Paares von Blisterverpackungen (2), wobei der erste Förderer (41) und der zweite Förderer (42) Seite an Seite angeordnet sind und synchron sowie schrittweise betrieben werden; 25

am ersten (41) und am zweiten Förderer (42) entlang verlaufende Seitenplatten (33) zur Führung der Blisterverpackungen (2), wobei das erste (11) und das zweite Übertragungsmittel (12) gabelartig geformt ausgebildet sind, so dass das erste (11) und das zweite Übertragungsmittel (12) in der Freigabestellung (Y) im wesentlichen unter einer Aufnahmefläche ( $\delta$ ) angeordnet ist, die durch den ersten (41) und den zweiten Förderer (42) definiert wird, wobei die Zinken (11a, 12a) der gabelartigen Übertragungsmittel (11, 12) seitlich zum Förderband (4) angeordnet sind. 30 35 40
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** der Abstand zwischen den Innenflächen der Zinken (11a, 12a) durch einen Wert (" $d_1$ ") definiert ist, welcher größer als ein Wert (" $d_2$ ") ist, der die Breite des ersten und des zweiten Förderers (41, 42) definiert, und der Abstand zwischen den Außenflächen der Zinken (11a, 12a) durch einen Wert (" $d_3$ ") definiert ist, der kleiner als ein Wert (" $d_4$ ") ist, welcher den Abstand zwischen den Seitenplatten (33) definiert. 45 50
7. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** sich die Zusammenschiebestation (6) stromabwärts vom ersten und zweiten Förderer (41, 42) befindet, um die Blisterverpackungen (2) abwechselnd vom ersten Förderer (41) und vom zweiten Förderer (42) an einen dritten Förderer (43) 55

zu bewegen, welcher synchron zum ersten und zweiten Förderer (41, 42) betrieben wird und in der selben Aufnahmefläche ( $\delta$ ) liegt, wobei die Zusammenschiebestation (6) mindestens ein Paar von Schiebemitteln, nämlich ein erstes Schiebemittel (61) und ein zweites Schiebemittel (62), aufweist, welche symmetrisch und quer zum ersten und zweiten Förderer (41, 42) wirken.

8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** der dritte Förderer (43) eine Vielzahl einstellbarer Anschläge (43a) aufweist, die entsprechende Sitze zur Aufnahme der Blisterverpackungen (2) definieren. 15
9. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** der erste und der zweite Förderer (41, 42) jeweils eine entsprechende Vielzahl einstellbarer Anschläge (41a, 42a) aufweisen, die entsprechende Sitze zur Aufnahme der Blisterverpackungen (2) bilden. 20
10. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste und das zweite Aufnahmermittel (13, 14) mindestens ein Paar Saugnapfe aufweisen, die abwechselnd mit einer Vakuumquelle verbunden sind, in Phasenrelation zu der Schwingung des ersten und des zweiten Übertragungsmittels (11, 12). 25 30
11. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste und das zweite Übertragungsmittel (11, 12) einen ersten Arm (11) und einen zweiten Arm (12) aufweisen, wobei mindestens der zweite Arm (12) im wesentlichen L-artig ausgebildet ist, um bei seinem Verlauf von der Aufnahmestellung (W) zur Freigabestellung (Y) nicht dem ersten Arm (11) in die Quere zu kommen. 35 40
12. Vorrichtung nach Anspruch 11, **dadurch gekennzeichnet, dass** der erste (11) und der zweite Arm (12) beide L-artig geformt sind und im Bereich ihrer kürzeren Seiten von der zugehörigen ersten und zweiten Welle (15, 16) getragen werden. 45
13. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Länge des ersten und des zweiten Übertragungsmittel (11, 12) dem entspricht, was durch den Versetzungswert (" $f$ ") und durch eine Positionierung der Blisterverpackungen (2) auf einer in der Schneidestation (3) definierten Schnittfläche ( $\alpha$ ) bezüglich einer vertikalen Längsebene, parallel zur Bewegungsrichtung (Z), definiert ist. 50 55
14. Verfahren zur Übertragung von Blisterverpackungen (2) von einer Schneidestation (3) auf ein Förderband (4) für Blisterverpackungen, **gekennzeichnet durch:**

das gleichzeitige Aufnehmen eines Paares von Blisterverpackungen (2) an der Schneidestation (3) **durch** entsprechende Übertragungsmittel, nämlich ein erstes (11) und ein zweites Übertragungsmittel (12), die an einem Ende ein erstes (13) bzw. ein zweites Aufnehmermittel (14) aufweisen, und an einem anderen Ende **durch** entsprechende Wellen, nämlich einer ersten Welle (15) und einer zweiten Welle (16), drehbar gelagert sind, so dass sich die Übertragungsmittel (11, 12) um Achsen (15b, 16b) der Wellen (15, 16) drehen, wobei diese Achsen (15b, 16b) parallel und quer zu einer Bewegungsrichtung (Z) eines Förderbands (4) für Blisterverpackungen (2) verlaufen; Übertragen der zuvor **durch** synchrone Schwingung des ersten (11) und des zweiten Übertragungsmittels (12) aus der Schneidestation (3) aufgenommenen Blisterverpackungen (2) auf das Förderband (4);  
Freigeben der Blisterverpackungen (2) auf das Förderband (4), wobei die Blisterverpackungen (2) um einen Versetzungswert ("f") versetzt voneinander freigegeben werden;  
Zusammenschieben des Paares von Blisterverpackungen (2) zu einer einzelnen Reihe entlang dem Förderband (4).

15. Verfahren nach Anspruch 14, **dadurch gekennzeichnet, dass** die Blisterverpackungen (2) zunächst auf ein Paar von Förderern (41, 42) des Förderbands (4) übertragen und dann an einer Zusammenschiebestation (6) auf einen dritten Förderer des Förderbands (4) zusammengeschoben werden.

## Revendications

1. Dispositif pour transférer des plaquettes alvéolaires d'une station de coupe à une ligne de transport de plaquettes alvéolaires, ledit dispositif comprenant :  
au moins deux arbres rotatifs parallèles, à savoir un premier arbre (15) et un second arbre (16) qui ont des longueurs différentes, lesdits premier arbre (15) et second arbre (16) ayant des axes de rotation respectifs (15b, 16b) parallèles et transversaux à la direction (Z) du mouvement de la ligne de transport (4) des plaquettes alvéolaires ;  
au moins deux moyens de transfert, à savoir un premier moyen de transfert (11) et un second moyen de transfert (12) ayant des longueurs différentes, lesdits premier moyen de transfert (11) et second moyen de transfert (12) ayant tous deux une extrémité fixée respectivement auxdits premier et second arbres (15, 16), de

sorte qu'ils tournent autour desdits axes (15b, 16b) desdits arbres (15, 16), et une extrémité libre ;  
des moyens d'enlèvement, un premier (13) et un second (14), fixés auxdites extrémités libres desdits premier moyen de transfert (11) et second moyen de transfert (12) ;  
des moyens d'entraînement (18) destinés à entraîner lesdits arbres (15, 16) de manière que lesdits moyens de transfert (11, 12) soient tournés simultanément entre une position d'enlèvement (W), dans laquelle lesdits premier moyen d'enlèvement (13) et second moyen d'enlèvement (14) sont placés dans ladite station de coupe (3) pour enlever une paire de plaquettes alvéolaires(2), et une position de déchargement (Y), dans laquelle les moyens d'enlèvement (13, 14) sont placés au-dessus de ladite ligne de transport (4) et déchargent ladite paire de plaquettes alvéolaires(2) sur ladite ligne de transport (4) en les décalant l'un par rapport à l'autre d'une valeur de décalage (« f ») ;  
une station de réunion (6) destinée à réunir chaque paire de plaquettes alvéolaires (2) en une rangée unique le long de ladite ligne de transport (4).

2. Dispositif selon la revendication 1, dans lequel lesdits axes (15b, 16b) desdits premier et second arbres (15, 16) se trouvent dans un plan de travail ( $\beta$ ) qui est incliné d'un même angle ( $\omega$ ) par rapport à un plan de coupe ( $\alpha$ ) défini dans ladite station de coupe (3) et par rapport à un plan de réception ( $\delta$ ) défini par ladite ligne de transport (4).
3. Dispositif selon la revendication 1, dans lequel lesdits axes (15b, 16b) desdits premier et second arbres (15, 16) sont positionnés à des niveaux différents.
4. Dispositif selon la revendication 1, comprenant en outre une première roue dentée (15a) clavetée sur ledit premier arbre (15) et une seconde roue dentée (16a) clavetée sur ledit second arbre (16), lesdites première et seconde roues dentées (15a, 16a) étant toutes deux attaquées par une unique courroie crantée (17) actionnée par lesdits moyens d'entraînement (18) et soumise à l'action de moyens de tension (17a).
5. Dispositif selon la revendication 1, dans lequel ladite ligne de transport (4) comprend :  
au moins deux transporteurs, à savoir un premier transporteur (41) et un second transporteur (42), destinés à recevoir ladite paire d'emballage sous blister (2), lesdits premier transporteur(41) et second transporteur (42) étant

disposés côte à côte et actionnés en synchronisme et par pas successifs ;

des panneaux latéraux (33) s'étendant le long desdits premier transporteur (41) et second transporteur (42) pour guider lesdites plaquettes alvéolaires(2), lesdits premier moyen de transfert (11) et second moyen de transfert (12) étant réalisés avec une forme de fourche, de sorte que, dans ladite position de déchargement (Y), lesdits premier moyen de transfert (11) et second moyen de transfert (12) sont situés sensiblement sous une surface réceptrice (δ) définie par lesdits premier transporteur (41) et second transporteur (42), avec les dents (11a, 12a) desdits moyens de transfert en forme de fourche (11, 12) situés latéralement par rapport à ladite ligne de transport (4).

6. Dispositif selon la revendication 5, dans lequel la distance entre les surfaces intérieures desdites dents (11a, 12a) définies par une valeur (« d<sub>1</sub> ») supérieure à une valeur (« d<sub>2</sub> ») qui définit la largeur desdits premier et second transporteurs (41, 42) et la distance entre les surfaces extérieures desdites dents (11a, 12a) est définie par une valeur (« d<sub>3</sub> ») qui est inférieure à une valeur (« d<sub>4</sub> ») définissant la distance entre lesdits panneaux latéraux (33).
7. Dispositif selon la revendication 5, dans lequel ladite station de réunion (6) est placée en aval desdits premier et second transporteurs (41, 42) pour amener lesdites plaquettes alvéolaires(2) alternativement dudit premier transporteur (41) et dudit second transporteur (42) à un troisième transporteur (43) qui est actionné en synchronisme avec lesdits premier et second transporteurs (41, 42) et qui se trouve dans la même surface de réception (δ), ladite station de réunion (6) comprenant au moins une paire de moyens poussoirs, à savoir un premier moyen poussoir (61) et un second moyen poussoir (62) qui agissent symétriquement et transversalement auxdits premier et second transporteurs (41, 42).
8. Dispositif selon la revendication 7, dans lequel ledit troisième transporteur (43) comprend une pluralité de butées réglables (43a) qui définissent des logements correspondants destinés à recevoir lesdites plaquettes alvéolaires(2).
9. Dispositif selon la revendication 5, dans lequel lesdits premier et second transporteurs (41, 42) comprennent des pluralités respectives de butées réglables (41a, 42a) qui définissent des logements correspondants pour recevoir lesdites plaquettes alvéolaires (2).
10. Dispositif selon la revendication 1, dans lequel les-

dispositif selon la revendication 1, dans lequel lesdits premier et second moyens de transfert (11, 12) comprennent au moins une paire de ventouses reliées alternativement à une source de vide, en phase avec l'oscillation desdits premier et second moyens de transfert (11, 12).

11. Dispositif selon la revendication 1, dans lequel lesdits premier et second moyens de transfert (11, 12) comprennent un premier bras (11) et un second bras (12), au moins ledit second bras (12) étant à peu près en forme de L de manière à ne pas se trouver sur la trajectoire dudit premier bras (11) pendant le passage de ladite position d'enlèvement (W) à ladite position de déchargement (Y).
12. Dispositif selon la revendication 11, dans lequel lesdits premier bras (11) et second bras (12) ont tous deux une forme de L et sont portés par leurs premier et second arbres (15, 16) dans la région de leurs petits côtés.
13. Dispositif selon la revendication 1, dans lequel lesdits premier et second moyen de transfert (11, 12) ont une longueur qui correspond à celle qui est définie par ladite valeur de décalage (« f ») et par un positionnement desdites plaquettes alvéolaires (2) sur une surface de coupe (a) définie dans ladite station de coupe (3) par rapport à un plan longitudinal vertical parallèle à ladite direction de mouvement (Z).
14. Procédé pour transférer des plaquettes alvéolaires (2) d'une station de coupe (3) à une ligne de transport de plaquettes alvéolaires(4), **caractérisé en ce qu'il** comprend les phases consistant à :  
  
enlever simultanément une paire de plaquettes alvéolaires(2) à ladite station de coupe (3) à l'aide de moyens de transfert correspondants, à savoir un premier moyen de transfert (11) et un second moyen de transfert (12), ayant à une extrémité un premier moyen d'enlèvement (13) et un second moyen d'enlèvement (14) respectivement, et ayant une autre extrémité supportée mobile en rotation par des arbres correspondants, à savoir un premier arbre (15) et un second arbre (16), de manière que lesdits moyens de transfert (11, 12) tournent autour d'axes (15b, 16b) desdits arbres (15, 16), lesdits axes (15b, 16b) étant parallèles et transversaux à une direction de mouvement (Z) d'une ligne de transport de plaquettes alvéolaires(2) ;  
transférer lesdites plaquettes alvéolaires(2), précédemment enlevées de ladite station de coupe (3) par une oscillation synchrone desdits premier moyen de transfert (11) et second moyen de transfert (12), à ladite ligne de trans-

fert (4) ;  
décharger lesdites plaquettes alvéolaires(2)  
sur ladite ligne de transport (4), lesdites pla-  
quettes alvéolaires étant déchargées de façon  
décalée l'une par rapport à l'autre d'une valeur 5  
de décalage (« f ») ;  
réunir ladite paire de plaquettes alvéolaires(2)  
en une unique rangée le long de ladite ligne de  
transport (4).

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15. Procédé selon la revendication 14, dans lequel les-  
dites plaquettes alvéolaires(2) sont initialement  
transférées à une paire de transporteurs (41, 42) de  
ladite ligne de transport (4), puis réunies, dans une  
station de réunion (6), sur un troisième transporteur 15  
de ladite ligne de transport (4).

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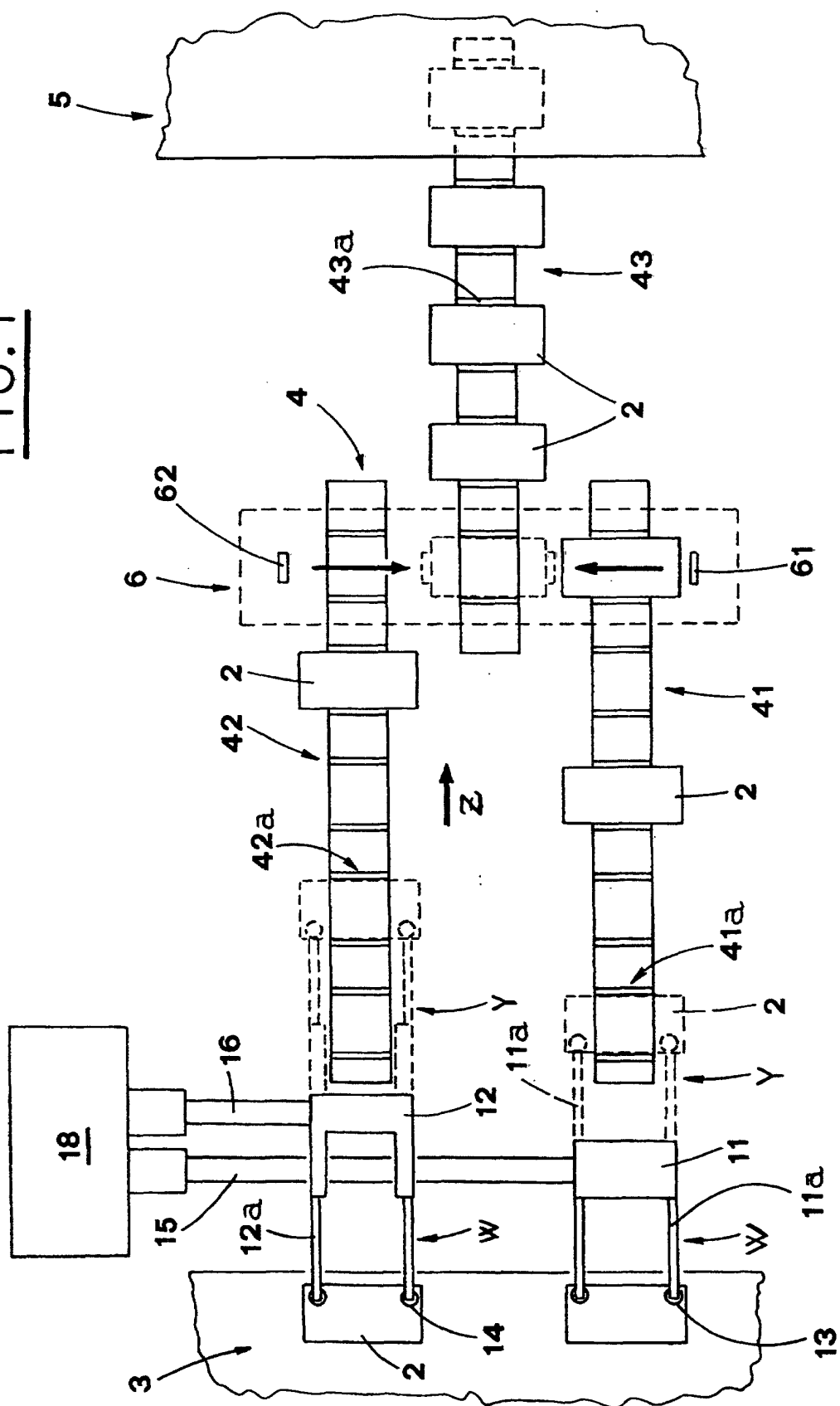
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FIG. 1



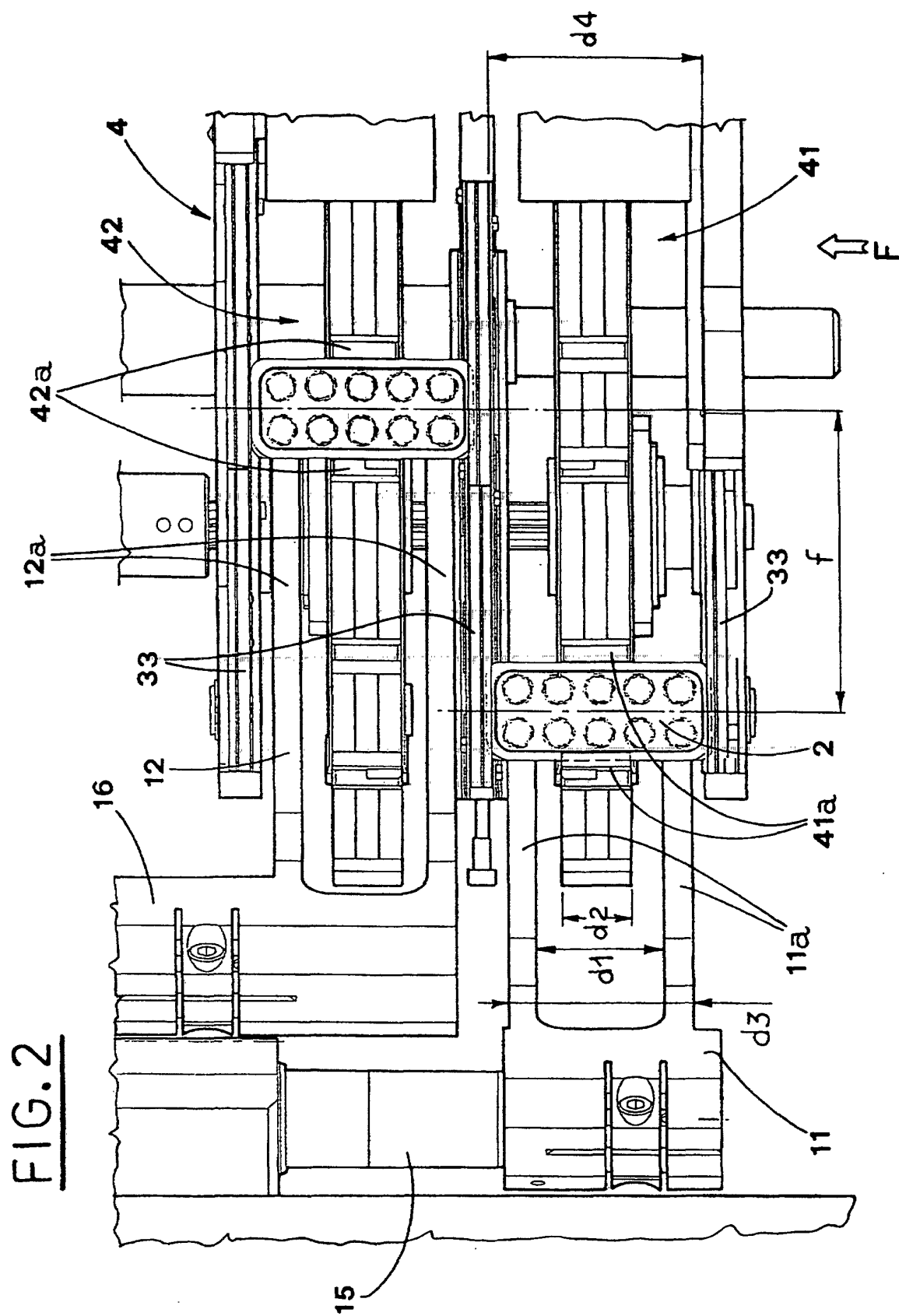


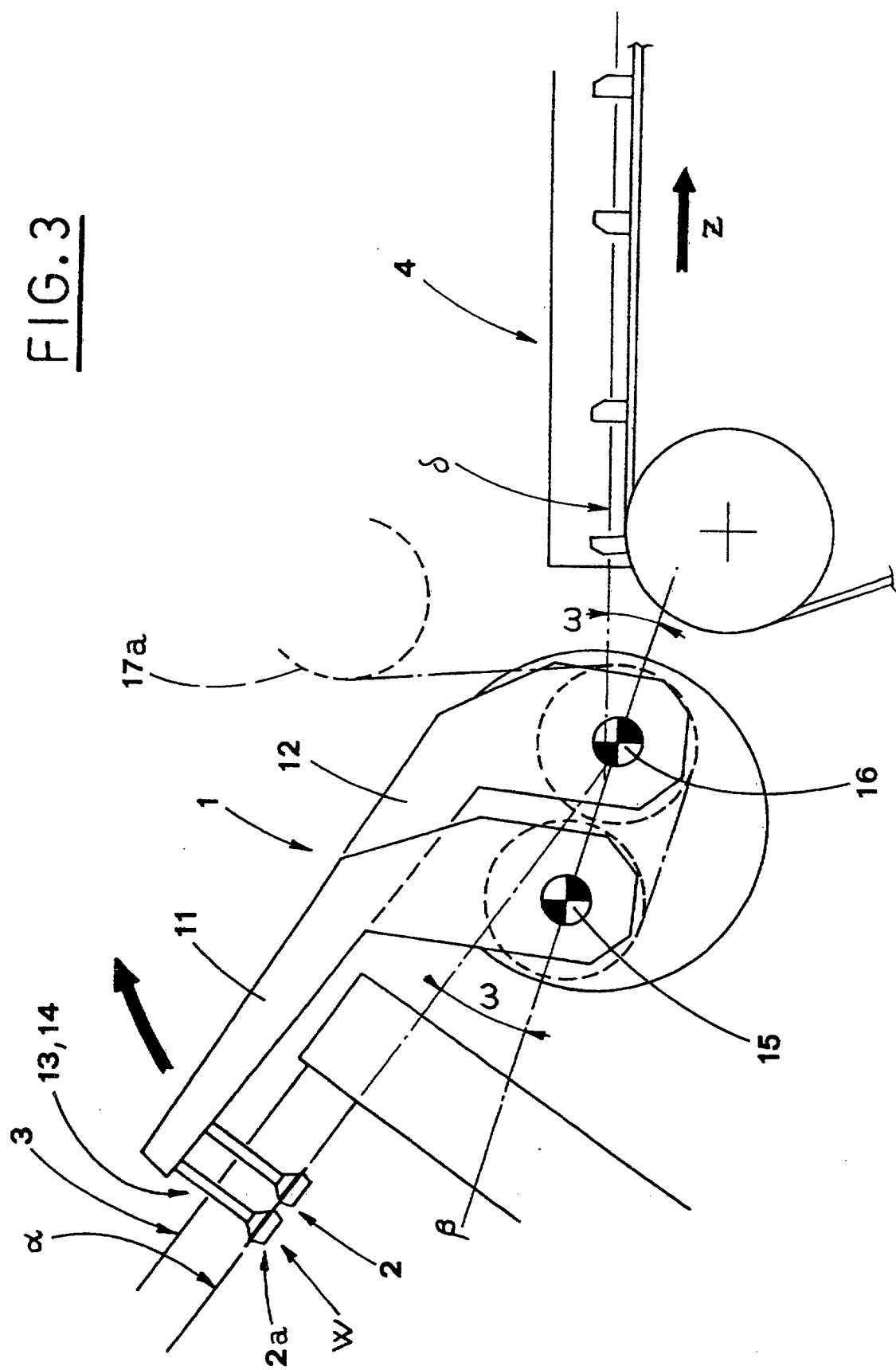
FIG. 3

FIG. 4