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Packaging device for round articles such as eggs

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A packaging device for packaging substantially round articles into a dimpled package having an array of pockets to receive the round articles. The packaging device comprising a supply conveyor for the articles and a package conveyor located below the supply conveyor for conveying the packages. A filling buffer is located between the supply conveyor and the package conveyor having multiple sub-buffers. The device furthermore comprises a collector for receiving articles from the buffer, and a setter wherein, in use, the setter reciprocates between an upper position to a lower position, wherein in the upper position the articles can be received from the collector and in the lower position the articles can be discharged into the pockets of the package. The collector comprises a plurality of collector rows, wherein the collector is configured and arranged to move each one of the plurality of collector rows back and forth underneath the filling buffer to a position under any one of the sub-buffers for receiving articles from the lowest row thereof, and to move back and forth with filled pockets to a position above the setter to discharge the articles into the setter.

Title: Packaging device for round articles such as eggs

5 The present invention relates to a packaging device for packaging substantially round articles, such as eggs or fruit, into a dimpled package. Such a dimpled package typically has an array of pockets, comprising rows and columns, to receive the round articles.

EP 1310429 discloses a packaging device comprising a supply conveyor for conveying the
10 articles, in this case eggs, in a first direction and a package conveyor located below the supply conveyor for conveying the packages in a second direction substantially perpendicular to the first direction. A filling buffer is located between the supply conveyor and the package conveyor, wherein the filling buffer in use is filled from above with articles by the supply conveyor and fills the packages on the package conveyor located below the
15 buffer with said articles. A collector comprising a row of releasable pockets is arranged to receive the articles from the filling buffer. A setter comprising a row of releasable pockets is arranged to receive articles from the collector and is movable up and down in a third direction perpendicular to the first direction and second direction. The setter reciprocates between an upper position to a lower position, wherein in the upper position the articles can
20 be received from the collector and in the lower position the articles can be discharged into the pockets of the package.

The present invention seeks to provide a packaging device as mentioned at the outset which has a higher capacity in terms of number of articles to be handled.

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This is achieved by a packaging device according to claim 1.

According to the invention the collector comprises a plurality of collector rows. The collector can move each one of the plurality of collector rows back and forth in the second direction
30 (Y) underneath the filling buffer to a position under any one of the sub-buffers. Thus each one of the collector rows can be moved selectively to align with any one of the sub-buffers, such that it can receive articles from the lowest row of the selected sub-buffer. When articles are received in at least one of the collector rows of the collector, this row can be moved back and forth in the second direction (Y) with filled pockets to a position above the setter to
35 discharge the articles into the setter.

In a possible embodiment the collector rows of said plurality of collector rows are moveable independently from each other. In this embodiment the collector rows are moved selectively and independent from each other to a sub-buffer with a full lower row. In this embodiment the device can have a separate driving mechanism for each collector row or a common
5 driving mechanism with a selective driving transmission. If for example the collector has two collector rows, one of the collector rows can hold articles and be moved towards the setter while the other collector row is empty because it discharged articles just before. Thus, while the one collector row is moved to discharge the articles in the setter, the other can in the meantime be moved towards a sub-buffer with a filled lower row. This increases the rate at
10 which the articles can be packed, and thus the throughput time of the packages. This results in an increase of capacity.

It is envisaged that the independently moveable collector rows move in the same plane. Therefore an embodiment is envisaged in which a controller, that controls the movement of
15 the collector rows, is configured such that it prevents the rows from colliding.

In another possible embodiment the collector rows of said plurality of collector rows are coupled to each other so as to move together. This coupling can be mechanical coupling, e.g. by a connecting member interconnecting the collector rows. In this embodiment only
20 one driving mechanism is needed to move the collector rows. If for example the collector has two collector rows, one of the collector rows can hold articles and moved towards the setter while the other collector row is empty because it discharged articles just before. Thus, while the one collector row is moving empty, the other moves to discharge the articles in the setter. If the empty row passes a full buffer row, it can receive the articles form said buffer
25 row and then move on to discharge the articles of the other row into the setter. In another situation the filled row can discharge the articles first in the setter, but the other row is then nearer to another row from which articles can be received, which reduces the throughput time of the packages. This will result in a higher capacity.

30 In a possible embodiment of the packaging device the setter has a single setter row. Thus one row of one package can be filled at a time.

In an alternative embodiment of the packaging device the setter has a plurality of setter rows. Thus a plurality of rows of the package can be filled with articles simultaneously.
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The setter rows of said plurality of setter rows may be movable up and down independently. In such an embodiment the rows of one package but also the rows of different packages

placed on consecutive positions on the package conveyor can be filled independently by different setter rows.

In another embodiment the setter rows of said plurality of said rows are coupled to each other so as to move together. In this embodiment the pitch between the setter rows is preferably the same as the pitch of the rows in the package, such that multiple package rows can be filled simultaneously.

The invention also relates to a packaging device according to claim 8.

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According to this aspect of the invention an intermediate transfer device is arranged between the collector and the setter. The intermediate transfer device comprises at least one transfer row of releasable pockets. The intermediate transfer device is configured and arranged to move the transfer row back and forth from a position under the at least one collector row for receiving articles to a position above the setter row to discharge the articles into the setter.

In a preferred embodiment the collector comprises at least two collector rows. These collector rows may be coupled so as to move in the second direction (Y) together, or alternatively, may be movable in the second direction (Y) independently from each other.

In a possible embodiment the transfer device comprises at least one pair of transfer rows wherein the transfer device is configured and arranged to move each one of the transfer rows of the pair back and forth from a position under said at least one collector row for receiving articles therefrom, to a position above the setter row to discharge the articles into the setter.

In a possible embodiment the transfer rows of said pair of transfer rows are each arranged on a corresponding swivelling arm whereby the movement of the transfer rows is a swivelling movement, which is composed of a movement in the second direction (Y) and the third direction (Z).

In a possible embodiment the pitch between the pockets of the at least one transfer row is variable in the first direction (X) such that it can be adapted to the pitch of the at least one collector row for receiving the articles and to the pitch of the setter row for discharging the articles. Preferably the pitch is varied during the movement from the position under the collector to the position above the setter and vice versa.

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If the supply conveyor (egg chain) only has two rows, and thus the filling buffer only has two sub-buffers, a collector may be omitted. In a packaging device according to this aspect the eggs (or other articles) can be released directly from the lowest row of the sub-buffers into the releasable pockets of the transfer rows of the transfer device. Such a packaging device
5 is defined in independent claim 17.

In a further simplified packaging device it is also possible to omit the setter, such that the transfer device discharges the articles directly in the pocket rows of the package. Such a packaging device is defined in independent claim 22.

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Preferred embodiments of the packaging devices of claim 18 and 22, respectively are laid down in the dependent claims 18-21 and 23 -26, respectively.

The invention will be elucidated further in the following description with reference to the
15 drawings, in which:

Fig. 1 shows a schematic view of a first embodiment of a packaging device according to the invention,

20 Fig. 2 shows a schematic view of a second embodiment of a packaging device according to the invention,

Fig. 3 shows a schematic view of a third embodiment of a packaging device according to the invention,

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Fig. 4 shows a schematic view of a fourth embodiment of a packaging device according to the invention,

Fig. 5 shows a schematic view of a fifth embodiment of a packaging device according to the
30 invention,

Fig. 6 shows a schematic view of a sixth embodiment of a packaging device according to the invention,

35 Fig. 7 shows a schematic view of a seventh embodiment of a packaging device according to the invention,

Fig. 8 shows a schematic view of an eighth embodiment of a packaging device according to the invention,

Fig. 9 shows a schematic view of an embodiment of yet another aspect of the invention,

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Fig. 10 shows a schematic view of another embodiment of this aspect of the invention,

Fig. 11 shows a schematic view of an embodiment of another aspect of the invention, and

10 Fig. 12 shows in more detail a part of the third embodiment of Fig. 3.

Fig. 1 shows a schematic front view of a first embodiment of a packaging device 1 for packaging articles, in this case eggs, in a package 100. The package 100 in this example is an egg carton with a dimpled structure 101 defining pockets 102 to receive the eggs, and an integrally formed lid 103 to close the box 100. The lid is connected to the dimpled structure by a hinge 104. The dimpled structure 101 defines an array of pockets having rows extending in an X-direction and columns extending in an Y-direction. In the shown example, the egg carton has two rows of pockets and may have multiple columns; in common egg cartons the number of columns is five (normal carton for ten eggs) or three (a small carton). The package may also have another form, for example an egg tray which has more rows and columns than an egg carton.

It must be noted that there is mentioned an egg carton or a tray is often made of papier-mâché, but that the package may also be made of another material, such as plastic. This is not relevant for the invention.

The packaging device 1 comprises a supply conveyor 2. The supply conveyor 2 includes article holders 3 for releasably holding the eggs. The supply conveyor 2 comprises multiple rows of article holders which are mounted to a chain or another endless element. In the egg handling industry the supply conveyor 2 is often referred to as "egg chain". In the example of Fig. 1 the supply conveyor 2 includes eight parallel rows which extend in the X-direction. The eggs are conveyed by the supply conveyor in the X-direction.

The article holders may be suspended from the chain and have moveable fingers that grip around an article such as an egg. The fingers may be moved to a spread state in which the article is released and falls down.

Below the supply conveyor 2 a filling buffer 4 is arranged. The filling buffer 4 is filled from above with articles by the supply conveyor 2. The filling buffer 4 comprises a plurality of parallel sub-buffers 5 positioned next to each other seen in the Y-direction. Each sub-buffer 5 has a plurality of stacked sub-buffer rows 6 of releasable buffer pockets 7. The sub-buffer rows 6 extend in the X-direction and each have a number of buffer pockets corresponding to the maximum number of pockets in a package row extending in the X-direction. In the example in Fig. 1 the filling buffer 4 has eight sub-buffers 5, and each sub-buffer 5 has four stacked sub-buffer rows 6a-6d. In case of packaging eggs, each sub-buffer row 6a-6d may for example have five buffer pockets 7, when for example an egg carton 100 with five columns has to be filled. It is also possible that the sub-buffer row has for example six buffer pockets, but that the software that controls the filling of the sub-buffers only fills five of the buffer pockets if the package has only five columns. In that case the filling buffer can universally be used for filling packages with a different amount of columns, with a maximum of six in the current example.

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The filling buffer 4 is stationary. It receives articles, for example eggs, in its upper rows 6a from the rows of the supply conveyor 2 which move along it (in the X-direction) and release the article from the respective article holders 3, when the respective article holders 3 are located above an empty pocket 7 of the upper row 6a of the corresponding sub-buffer 5.

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The articles are passed on from the upper row 6a of the sub-buffer 5 to the row 6b below it by opening the pockets 7 and releasing the article to a pocket 7 in the row 6b directly below it. In the same manner the articles are passed on to the subsequent rows 6c below until the article arrives in the lowest row 6d of the sub-buffer 5. The buffer 4 is controlled such that an article is only released from a pocket 7 to a pocket 7 below it if the latter is empty and is able receive the article.

Below the buffer 4 a collector 8 is arranged. The collector 8 comprises plurality of collector rows 9 of releasable pockets 10. In the specific embodiment of Fig. 1 the collector 8 has two collector rows 9 which are mechanically coupled by one or more coupling members 11.

Below the collector 8 a setter 12 is arranged. The setter 12 in the specific embodiment of Fig.1 comprises a single row 13 of releasable pockets 14 defining a setter row 13. The setter row 13 is movable up and down in a Z-direction perpendicular to the X-direction and Y-direction.

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Below the setter 12 a package conveyor 15 is located. This may be an endless conveyor such as a belt conveyor on which packages 100 are placed and conveyed in the Y-direction past the setter 12. The packages 100 are oriented on the package conveyor 15 such that the rows of the package 100 extend in the X-direction and the columns of the package 100 extend in the Y-direction.

In use, the setter 12 reciprocates between an upper position to a lower position, wherein in the upper position the articles can be received from the collector 8 and in the lower position the articles can be discharged into the pockets 102 of the package 100 that is positioned by the package conveyor 15 with one package row below the setter row 13.

The collector 8 can move each one of the plurality of collector rows 9 back and forth in the Y-direction underneath the filling buffer 4 to a position under any one of the sub-buffers 5. Thus each one of the collector rows 9 can be moved selectively to align with any one of the sub-buffers 5, such that it can receive articles from the lowest row 6 of the selected sub-buffer 5. When articles are received in at least one of the collector rows 9 of the collector 8, this row 9 can be moved back and forth in the Y-direction with filled pockets 10 to a position above the setter 12 to discharge the articles into the setter 12.

In the first embodiment only one driving mechanism is needed to move the collector rows 9, since these rows are mechanically coupled by coupling member 11. If, like in the example of Fig.1, the collector 8 has two coupled collector rows 9, one of the collector rows 9 can hold articles and moved towards the setter 12 while the other collector row 9 is empty because it discharged articles just before. Thus while the one collector row 9 is moving empty the other moves to discharge the articles in the setter 12. If the empty row 9 passes a full sub-buffer row 6, it can receive the articles form said buffer row 6 and then move on to discharge the articles of the other collector row 9 into the setter 12. In another situation the filled collector row 9 can discharge the articles first in the setter 12, but the other collector row 9 is then nearer to another sub-buffer row 6 from which articles can be received, which reduces the throughput time of the packages 100.

Fig. 2 shows a schematic front view of a second embodiment of a packaging device 21 for packaging articles, in this case eggs, in a package 100. This packaging device 21 has the same components as the packaging device of the first embodiment. The only difference is in the specific embodiment of the collector, which will be described below. The other components are the same and are indicated with the same reference numerals as in the first

embodiment. For a description of those same components is referred to the above description of the first embodiment.

The collector of the second embodiment is indicated with reference numeral 28. Contrary to
5 the collector 8 of the first embodiment, the collector 28 of the second embodiment has multiple rows 29, which are moveable in the Y-direction independently from each other. In particular in the embodiment of Fig. 2 the collector has two independently moveable rows 29.

In this second embodiment the collector rows 29 are moved selectively and independent
10 from each other to a sub-buffer 5 with a full lower row 6d. In this embodiment the device 21 can have a separate driving mechanism for each collector row 29 or a common driving mechanism with a selective driving transmission. If for example the collector 28 has two collector rows, as is shown in the example of Fig. 2, one of the collector rows 29 can hold articles and be moved towards the setter 12 while the other collector row 29 is empty
15 because it discharged articles just before. Thus while the one collector row 29 is moved to discharge the articles in the setter 12 the other collector row 29 can in the meantime be moved towards a sub-buffer 5 with a filled lower row 6d. This increases the rate at which the articles can be packed, and thus the throughput time of the packages 100.

20 It is envisaged that the independently moveable collector rows 29 move in the same plane. Therefore an embodiment is envisaged in which a controller, that controls the movement of the collector rows 29, is configured such that it prevents the rows 29 from colliding.

Fig. 3 shows a schematic front view of a third embodiment of a packaging device for
25 packaging articles, in this case eggs, in a package 100. This packaging device 31 has the same components as the packaging device 21 of the second embodiment. The only difference is in the specific embodiment of the setter, which will be described below. The other components are the same and are indicated with the same reference numerals as in the second embodiment. For a description of those same components is referred to the above
30 description of the first embodiment and second embodiment.

The setter of the third embodiment is indicated with reference numeral 32. Contrary to the setter 12 of the second embodiment, the setter 32 of the third embodiment has multiple rows 33, which are moveable in the Z-direction independently from each other.

By this third embodiment the rows of one package 100 but also the rows of different packages 100 placed on consecutive positions on the package conveyor 12 can be filled independently by the different setter rows 33.

- 5 In Fig. 12 more detail of the third embodiment is shown. From the buffer 4 only the lowest row 6d is shown. Most important of this figure is that is shown that the collector rows 29 each have their own drive assembly comprising a belt 291 and 292 respectively and a drive motor 293 and 294 respectively.
- 10 The collector rows 29 can be moved independently from each other in the same plane by their associated drive motor 293, 294. A controller 295 is connected to the drive motors 293, 294 and controls the movement of the collector rows 29. The controller 295 is configured such that it prevents the collector rows 29 from colliding.
- 15 Fig. 4 shows a schematic front view of a fourth embodiment of a packaging device for packaging articles, in this case eggs, in a package 100. This packaging device 41 has the same components as the packaging device 31 of the third embodiment. The only difference is in the specific embodiment of the setter, which will be described below. The other components are the same and are indicated with the same reference numerals as in the
- 20 third embodiment. For a description of those same components is referred to the above description of the first embodiment to the third embodiment.

The setter in the fourth embodiment is indicated by reference numeral 42. This setter has a plurality of setter rows 43, in the specific embodiment shown in Fig. 4 two setter rows 43.

- 25 The rows 43 of said plurality of said rows are coupled to each other so as to move together. In this embodiment the pitch between the setter rows 43 is preferably the same as the pitch of the rows in the package 100, such that multiple package rows can be filled simultaneously.

- 30 Fig. 5 shows a schematic front view of a fifth embodiment of a packaging device for packaging articles, in this case eggs, in a package 100. This packaging device 51 has the same components as the packaging device 41 of the fourth embodiment. The only difference is in the specific embodiment of the setter, which will be described below. The other components are the same and are indicated with the same reference numerals as in the
- 35 third embodiment. For a description of those same components is referred to the above description of the first embodiment to the fourth embodiment.

The setter in the fifth embodiment is indicated by reference numeral 52. This setter 52 has a plurality of sets 54 of coupled setter rows 53, in the specific embodiment shown in Fig. 5 two pairs 54 of coupled setter rows 53. The rows 53 of said plurality of said rows are coupled to each other so as to move together. In this embodiment the pitch between the setter rows 53 of each pair the same as the pitch of the rows in the package 100, such that multiple package rows can be filled simultaneously by one pair 54 of coupled setter rows 53. Because there are multiple sets 54 (in Fig. 5 pairs) that are moveable independently from each other, different packages 100 can be filled simultaneously or consecutively.

10 Fig. 6 shows a schematic front view of a sixth embodiment of a packaging device for packaging articles, in this case eggs, in a package 100. This packaging device 61 has the same components as the packaging device 1 of the first embodiment. The only difference is in the specific embodiment of the setter, which will be described below. The other components are the same and are indicated with the same reference numerals as in the first
15 embodiment. For a description of those same components is referred to the above description of the first embodiment.

The setter in the sixth embodiment, like the setter of the third embodiment, is indicated with reference numeral 32. Contrary to the setter 12 of the first embodiment, the setter 32 of the
20 sixth embodiment has multiple rows 33, which are moveable in the Z-direction independently from each other.

By this sixth embodiment the rows of one package 100 but also the rows of different packages 100 placed on consecutive positions on the package conveyor 12 can be filled
25 independently by the different setter rows 33.

Fig. 7 shows a schematic front view of a seventh embodiment of a packaging device for packaging articles, in this case eggs, in a package 100. This packaging device 81 has the same components as the packaging device 21 of the second embodiment. The only
30 difference is in the specific embodiment of the collector, which will be described below. The other components are the same and are indicated with the same reference numerals as in the second embodiment. For a description of those same components is referred to the above description of the first embodiment and second embodiment.

35 The collector of the seventh embodiment is indicated with reference numeral 88. Contrary to the collector 28 of the second embodiment, the collector 88 of the seventh embodiment has multiple sets 87 of rows 89, which sets 87 are moveable in the Y-direction independently

from each other. In the particular embodiment shown in Fig. 7 the collector 88 has two pairs 87 of rows. The rows 89 of each set 87 of rows are coupled to each other so as to move together.

5 The setter 12, just like in the second embodiment, has a single row 13 of pockets 14.

Fig. 8 shows a schematic front view of an eighth embodiment of a packaging device for packaging articles, in this case eggs, in a package 100. This packaging device 91 has the same components as the packaging device 81 of the seventh embodiment. The only
10 difference is in the specific embodiment of the setter 32, which is the same as the setter 32 of the third embodiment, i.e. it has multiple rows, in particular two rows of pockets, which rows are movable in the Z-direction independently from each other.

Fig. 9 shows a packaging device 110 according to yet another aspect of the invention. This
15 packaging device comprises a buffer 4, a collector 8 and a setter 12 which are comparable to the same parts in the packaging device shown in Fig. 1.

The packaging device 110 also comprises a supply conveyor, a so called "egg chain" which is not shown in Fig. 10, but is the same as the supply conveyor 2 shown in Fig.1 The supply
20 conveyor 2 includes multiple rows of article holders 3 for releasably holding the eggs.

Below the supply conveyor 2 the filling buffer 4 is arranged. In Fig. 9 only the lowest two rows 6c and 6d of the filling buffer 4 are shown. The filling buffer 4 is filled from above with articles by the supply conveyor 2. The filling buffer 4 comprises a plurality of parallel sub-buffers 5 positioned next to each other seen in the Y-direction. Each sub-buffer 5 has a
25 plurality of stacked sub-buffer rows 6 of releasable buffer pockets 7. The sub-buffer rows 6 extend in the X-direction and each have a number of buffer pockets corresponding to the number of pockets in a package row extending in the X-direction. Alternatively each sub-buffer row 6 may have more buffer pockets than the number of pockets in a package row, which sub-buffer row is then partly used, i.e. not entirely filled with articles (eggs) by the
30 control software. In the example in Fig. 9 the filling buffer 4 has six sub-buffers 5, and each sub-buffer 5 may have four stacked sub buffer rows 6a-6d, of which only the lowest two rows 6c and 6d are shown. In case of packaging eggs, each sub-buffer row 6a-6d may for example have five buffer pockets 7, when for example an egg carton 100 with five columns has to be filled.

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The filling buffer 4 is stationary. It receives articles, for example eggs, in its upper rows 6a from the rows of the supply conveyor 2 which move along it (in the X-direction) and release

the article from the respective article holders 3, when the respective article holders 3 are located above an empty pocket 7 of the upper row 6a of the corresponding sub-buffer 5.

5 The articles are passed on from the upper row 6a of the sub-buffer 5 to the row 6b below it by opening the pockets 7 and releasing the article to a pocket 7 in the row 6b directly below it (see Fig. 1). In the same manner the articles are passed on to the subsequent rows 6c below until the article arrives in the lowest row 6d of the sub-buffer 5. The buffer 4 is controlled such that an article is only released from a pocket 7 to a pocket 7 below it if the latter is empty and is able receive the article.

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Below the buffer 4 a collector 8 is arranged. The collector 8 comprises a plurality of collector rows 9 of releasable pockets 10. In the specific embodiment of Fig. 9 the collector 8 has two collector rows 9 which are mechanically coupled, for example by one or more coupling members 11 (not shown in Fig. 9, but for example shown in Fig. 1).

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Below the collector 8 an intermediate transfer device 90 is arranged.

20 Below the intermediate transfer device 90 a setter 12 is arranged. The setter 12 in the specific embodiment of Fig.9 comprises a single row 13 of releasable pockets 14 defining a setter row 13. The setter row 13 is movable up and down in a Z-direction perpendicular to the X-direction and Y-direction.

25 The intermediate transfer device 90 comprises in the embodiment shown in Fig. 9 two transfer rows 91 of releasable pockets 92. The transfer rows 91 are each arranged on a corresponding swivelling arm 93 whereby the movement of the transfer rows 91 is a swivelling movement. The swivelling movement is composed of a movement in the second direction (Y) and the third direction (Z).

30 It should be noted here, that also another guiding mechanism than a swivelling arm may be used to establish a composed movement in the second direction (Y) and third direction (Z) of the transfer rows.

35 The intermediate transfer device 90 is configured and arranged to move the transfer rows 91 back and forth from a position under the collector, for receiving articles from the collector, to a position above the setter row 13 to discharge the articles into the setter 12. The transfer rows 91 of the intermediate transfer device 90 thus alternately fill the setter row 13, but it is also possible that the same transfer row 91 fills the setter row 13 multiple times in

succession. The collector rows 9 can each fill any of the transfer rows 91 of the intermediate transfer device 90.

Below the setter 12 a package conveyor 15 is located. This may be an endless conveyor
5 such as a belt conveyor on which packages 100 are placed and conveyed in the Y-direction past the setter 12. The packages 100 are oriented on the package conveyor 15 such that the rows of the package 100 extend in the X-direction and the columns of the package 100 extend in the Y-direction.

10 In use, the setter 12 reciprocates between an upper position to a lower position, wherein in the upper position the articles can be received from the transfer rows 91 and in the lower position the articles can be discharged into the pockets 102 of the package 100 that is positioned by the package conveyor 15 with one package row below the setter row 13.

15 In Fig. 10 another embodiment of a packaging device including a transfer device is shown. This packaging device 120 comprises basically the same components as the packaging device 110 shown in Fig. 9. The difference is that the collector 28, contrary to the collector 8 of the embodiment of Fig. 9, has multiple rows 29, which are moveable in the Y-direction independently from each other. In particular in the embodiment of Fig. 10 the collector has
20 two independently moveable rows 29. It is thus comparable to the collector of Fig. 2.

In this embodiment the collector rows 29 are moved selectively and independent from each other to a sub-buffer 5 with a full lower row 6d. In this embodiment the device 21 can have a separate driving mechanism for each collector row 29 or a common driving mechanism with
25 a selective driving transmission. If for example the collector 28 has two collector rows, as is shown in the example of Fig. 10, one of the collector rows 29 can hold articles and be moved towards one of the transfer rows 91 of the transfer device, while the other collector row 29 is empty because it discharged articles just before. Thus while the one collector row 29 is moved to discharge the articles in one of the transfer rows 91 the other collector row
30 29 can in the meantime be moved towards a sub-buffer 5 with a filled lower row 6d. This increases the rate at which the articles can be packed, and thus the throughput time of the packages 100.

It is envisaged that the independently moveable collector rows 29 move in the same plane.
35 Therefore an embodiment is envisaged in which a controller, that controls the movement of the collector rows 29, is configured such that it prevents the rows 29 from colliding.

Fig. 11 shows part of an embodiment of a packaging device for articles, such as eggs, according to another aspect of the invention.

Using the reference numerals from the embodiment of Fig. 1 for the same components the packaging device according to this aspect comprises a supply conveyor 2 (not shown in Fig. 11) for conveying the articles in a first direction (X) and having object holders 3 for releasably holding the articles, which are, in the specific example shown, eggs.

A package conveyor 15 is located below the supply conveyor for conveying the packages 100 in a second direction (Y) substantially perpendicular to the first direction (X), the packages 100 being oriented on the package conveyor such that the rows of the package 100 extend in the first direction (X) and the columns of the package 100 extend in the second direction (Y).

A filling buffer 4 is located between the supply conveyor 2 and the package conveyor 15. The filling buffer 4 in use is filled from above with articles by the supply conveyor 2 and fills the packages 100 on the package conveyor 15 located below the buffer 4 with said articles (eggs) indirectly via an intermediate mechanism.

The filling buffer 4 comprises a plurality of parallel sub-buffers 5 positioned next to each other seen in the second direction (Y). Each sub-buffer 5 has a plurality of stacked sub-buffer rows 6a-6d of releasable buffer pockets 7. The sub-buffer rows 6a- 6d extend in the first direction (X). Each sub buffer row 6a-6d has a number of buffer pockets 7 corresponding to the number of pockets 102 in a package row extending in the first direction (X). As mentioned before it is also possible that each sub buffer row has a number of buffer pockets 7 that exceeds to the number of pockets 102 in a package row extending in the first direction (X), which sub buffer row is then only partly filled, in accordance with the size of the package, by the control software.

Referring now to Fig.11, the packaging device according to this aspect is based on the notion that if the egg chain 2 (see Fig. 1) only has two rows, and thus the filling buffer 4 only has two sub-buffers 5, a collector 8, 28 as is shown in the embodiments of Figs 9 and 10 can be omitted. In a packaging device according to this aspect the eggs (or other articles) can be released directly from the lowest row 6d of the sub-buffers 5 into the releasable pockets 91 of the transfer rows 92 of the transfer device 90.

A setter 12 comprising a row of releasable pockets 14 defining a setter row 13 which is movable up and down in a third direction (Z) perpendicular to the first direction (X) and second direction (Y), is located below the transfer device 90. In use, the setter 12 reciprocates between an upper position to a lower position, wherein in the upper position the articles can be received from the transfer device 90 and in the lower position the articles can be discharged into the pockets 102 of the package 100.

The setter 12 comprises a setter row 13 associated with said pair of transfer rows 91. The transfer device 90 is configured and arranged to move each one of the transfer rows 91 of the pair back and forth from a position under a sub-buffer 5 associated with said transfer row 91 for receiving articles from the lowest row 6d of said sub-buffer 5, to a position above the setter row 13 to discharge the articles into the setter 12.

In the specific embodiment shown, the transfer rows 91 of said pair are each arranged on a corresponding swivelling arm 93 whereby the movement of the transfer rows 91 is a swivelling movement. The swivelling movement is composed of a movement in the second direction (Y) and the third direction (Z).

It must be noted here, that also another guiding mechanism than a swivelling arm can be used to establish a composed movement in the second direction (Y) and third direction (Z) of the transfer rows.

As mentioned the transfer mechanism 90 is configured and arranged to move the transfer rows 91 back and forth from a position under the associated sub-buffer 5, for receiving articles from the lowest row 6d thereof, to a position above the setter row 13 to discharge the articles into the setter 12. The transfer rows 91 of the pair can thus alternately fill the setter row 13, but it is also possible that the same transfer row 91 fills the setter row 13 multiple times in succession.

In an alternative embodiment, which is not shown in the figures, the packaging device of Fig. 11 is modified by omitting the setter 12. In this embodiment the transfer rows can move back and forth, in the manner as described in the above, between the lowest row of the sub-buffer 5 for receiving articles to a position above a package row to discharge the articles directly into the pockets 102 of the package 100.

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In the embodiments shown in the figures the collector may have independently moveable collector rows or coupled collector rows. Also the setter may have independently moveable

setter rows or coupled setter rows, or even a single setter row. It must be understood that within the scope of the invention there are more combinations of coupled, independent or single setter rows with coupled or independent collector rows than are now shown in the figures. The embodiments in the figures are thus to be considered as non-limiting examples.

CONCLUSIES

1. Verpakkingsinrichting voor het verpakken van in hoofdzaak ronde artikelen, zoals eieren of fruit, in een kuiltjesverpakking met een matrix van pockets om de ronde artikelen op te nemen, waarbij de genoemde matrix rijen en kolommen omvat, waarbij de verpakkingsinrichting omvat:

- een toevoertransporteur voor het transporteren van de artikelen in een eerste richting (X) en met artikelhouders om de artikelen losbaar vast te houden;

- een verpakkingstransporteur die zich bevindt onder de toevoertransporteur voor het transporteren van de verpakkingen in een tweede richting (Y) in hoofdzaak loodrecht op de eerste richting (X), waarbij de verpakkingen op de verpakkingstransporteur een zodanige oriëntatie hebben, dat de rijen van de verpakking zich in de eerste richting (X) uitstrekken en de kolommen van de verpakking zich in de tweede richting (Y) uitstrekken;

- een vulbuffer die zich bevindt tussen de toevoertransporteur en de verpakkingstransporteur, waarbij de vulbuffer in gebruik van bovenaf met artikelen door de toevoertransporteur wordt gevuld, en de verpakkingen op de verpakkingstransporteur onder de buffer met genoemde artikelen vult,

waarbij de vulbuffer een aantal parallelle sub-buffers omvat die gezien in de tweede richting (Y) naast elkaar zijn geplaatst,

waarbij elke sub-buffer een aantal gestapelde sub-bufferrijen heeft van losbare bufferpockets, waarbij de sub-bufferrijen zich uitstrekken in de eerste richting (X) en elk een aantal bufferpockets hebben dat gelijk of groter is dan het aantal pockets in een verpakkingsrij die zich in de eerste richting (X) uitstrekt;

- een collector omvattende een rij losbare pockets die een collectorrij definiëren die beweegbaar is in de tweede richting (Y); en

- een zetter omvattende een rij losbare pockets die een zetterrij definiëren die in een derde richting (Z) loodrecht op de eerste richting (X) en tweede richting (Y) beweegbaar is, waarbij de zetter in gebruik heen en weer beweegt tussen een bovenste positie naar een onderste positie, waarbij in de bovenste positie de artikelen uit de collector kunnen worden opgenomen en in de onderste positie de artikelen in de pockets van de verpakking kunnen worden afgegeven;

met het kenmerk, dat

de collector een aantal collectorrijen omvat, waarbij de collector is geconfigureerd en ingericht om elk van de meerdere collectorrijen heen en weer te bewegen in de tweede richting (Y) onder de vulbuffer naar een positie onder elk van de sub-buffers voor het opnemen van artikelen uit de onderste rij daarvan, en om heen en weer te bewegen in de tweede richting (Y) met gevulde pockets naar een positie boven de zetter om de artikelen aan de zetter af te geven.

2. Verpakkingsinrichting volgens conclusie 1, waarbij de collectorrijen van de meerdere collectorrijen onafhankelijk van elkaar beweegbaar zijn.

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3. Verpakkingsinrichting volgens conclusie 1, waarbij de collectorrijen van de meerdere collectorrijen met elkaar zijn gekoppeld om samen te bewegen.

4. Verpakkingsinrichting volgens een der voorgaande conclusies, waarbij de zetter een enkele zetterrij heeft.

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5. Verpakkingsinrichting volgens een van de conclusies 1-3, waarbij de zetter meerdere zetterrijen heeft.

6. Verpakkingsinrichting volgens conclusie 5, waarbij de zetterrijen van de genoemde meerdere zetterrijen onafhankelijk van elkaar verplaatsbaar zijn.

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7. Verpakkingsinrichting volgens conclusie 5, waarbij de zetterrijen van de genoemde meerdere rijen met elkaar zijn gekoppeld om samen te bewegen.

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8. Verpakkingsinrichting voor het verpakken van in hoofdzaak ronde artikelen, zoals eieren of fruit, in een kuiltjesverpakking met een matrix van pockets om de ronde artikelen op te nemen, waarbij de genoemde matrix rijen en kolommen omvat, waarbij de verpakkingsinrichting omvat:

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- een toevoertransporteur voor het transporteren van de artikelen in een eerste richting (X) en met artikelhouders om de artikelen losbaar vast te houden;

- een verpakkingstransporteur die zich bevindt onder de toevoertransporteur voor het transporteren van de verpakkingen in een tweede richting (Y) in hoofdzaak loodrecht op de

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eerste richting (X), waarbij de verpakkingen op de verpakkingstransporteur een zodanige oriëntatie hebben, dat de rijen van de verpakking zich in de eerste richting (X) uitstrekken en de kolommen van de verpakking zich in de tweede richting (Y) uitstrekken;

- een vulbuffer die zich bevindt tussen de toevoertransporteur en de verpakkingstransporteur, waarbij de vulbuffer in gebruik van bovenaf met artikelen door de toevoertransporteur wordt gevuld en de verpakkingen op de verpakkingstransporteur onder de buffer met genoemde artikelen vult,

5 waarbij de vulbuffer een aantal parallelle sub-buffers omvat die gezien in de tweede richting (Y) naast elkaar zijn geplaatst,

 waarbij elke sub-buffer een aantal gestapelde sub-bufferrijen heeft van losbare bufferpockets, waarbij de sub-bufferrijen zich uitstrekken in de eerste richting (X) en elk een aantal bufferpockets hebben dat gelijk of groter is dan het aantal pockets in een

10 verpakkingsrij die zich in de eerste richting (X) uitstrekt;

- een collector omvattende een rij losbare pockets die een collectorrij definiëren die beweegbaar is in de tweede richting (Y); en

15 - een zetter omvattende een rij losbare pockets die een zetterrij definiëren die in een derde richting (Z) loodrecht op de eerste richting (X) en tweede richting (Y) beweegbaar is, waarbij de zetter in gebruik heen en weer beweegt tussen een bovenste positie naar een onderste positie, waarbij in de bovenste positie de artikelen uit de collector kunnen worden opgenomen en in de onderste positie de artikelen in de pockets van de verpakking kunnen worden

20 afgegeven;

met het kenmerk, dat

 een tussengelegen overdrachtsinrichting is aangebracht tussen de collector en de zetter,

25 waarbij de tussengelegen overdrachtsinrichting ten minste één overdrachtsrij van losbare pockets omvat, waarbij de tussengelegen overdrachtsinrichting is geconfigureerd en ingericht om de overdrachtsrijen heen en weer te verplaatsen vanuit een positie onder de ten minste ene collectorrij voor het opnemen van artikelen, naar een positie boven de zetterrij om de artikelen aan de zetter af te geven.

30

9. Verpakkingsinrichting volgens conclusie 8, waarbij de overdrachtsinrichting ten minste één paar overdrachtsrijen omvat waarin de overdrachtsinrichting is geconfigureerd en ingericht om elk van de overdrachtsrijen van het paar heen en weer te bewegen vanuit een positie onder de ten minste ene collectorrij voor het opnemen van artikelen daaruit, naar een

35 positie boven de zetterrij om de artikelen aan de zetter af te geven.

10. Verpakkingsinrichting volgens conclusie 9, waarbij de collector ten minste twee collectorrijen omvat.

11. Verpakkingsinrichting volgens conclusie 10, waarbij de collectorrijen zijn gekoppeld om samen in de tweede richting (Y) te bewegen.

12. Verpakkingsinrichting volgens conclusie 10, waarbij de collectorrijen onafhankelijk van
5 elkaar beweegbaar zijn in de tweede richting (Y).

13. Verpakkingsinrichting volgens een van de conclusies 8-12, waarbij de overdrachtsrijen van het paar elk op een bijbehorend geleidingsmechanisme zijn aangebracht, waarbij de beweging van de overdrachtsrijen een gecombineerde beweging is die bestaat uit een
10 beweging in de tweede richting (Y) en de derde richting (Z).

14. Verpakkingsinrichting volgens conclusie 13, waarbij het geleidingsmechanisme een zwenkarm omvat.

15 15. Verpakkingsinrichting volgens een van de conclusies 8 - 14, waarbij de steek tussen de pockets van de ten minste ene overdrachtsrij in de eerste richting (X) variabel is, zodat deze kan worden aangepast aan de steek van de ten minste ene collectorrij voor het opnemen van de artikelen en aan de steek van de zetterrij om de artikelen af te geven.

20 16. Verpakkingsinrichting volgens conclusie 15, waarbij de steek wordt gevarieerd tijdens de beweging van de positie onder de collector naar de positie boven de zetter en omgekeerd.

17. Verpakkingsinrichting voor het verpakken van in hoofdzaak ronde artikelen, zoals eieren of fruit, in een kuiltjesverpakking met een matrix van pockets om de ronde artikelen op
25 te nemen, waarbij de genoemde matrix rijen en kolommen omvat, waarbij de verpakkingsinrichting omvat:

- een toevoertransporteur voor het transporteren van de artikelen in een eerste richting (X) en met artikelhouders om de artikelen losbaar vast te houden;

30

- een verpakkingstransporteur die zich bevindt onder de toevoertransporteur voor het transporteren van de verpakkingen in een tweede richting (Y) in hoofdzaak loodrecht op de eerste richting (X), waarbij de verpakkingen op de verpakkingstransporteur een zodanige oriëntatie hebben, dat de rijen van de verpakking zich in de eerste richting (X) uitstrekken en
35 de kolommen van de verpakking zich in de tweede richting (Y) uitstrekken;

- een vulbuffer die zich bevindt tussen de toevoertransporteur en de verpakkingstransporteur, waarbij de vulbuffer in gebruik van bovenaf met artikelen door de toevoertransporteur wordt

gevuld en de verpakkingen op de verpakkingstransporteur onder de buffer met genoemde artikelen vult,

waarbij de vulbuffer een aantal parallelle sub-buffers omvat die gezien in de tweede richting (Y) naast elkaar zijn geplaatst,

5 waarbij elke sub-buffer een aantal gestapelde sub-bufferrijen heeft van losbare bufferpockets, waarbij de sub-bufferrijen zich uitstrekken in de eerste richting (X) en elk een aantal bufferpockets hebben dat gelijk of groter is dan het aantal pockets in een verpakkingsrij die zich in de eerste richting (X) uitstrekt;

10 - een zetter omvattende een rij losbare pockets die een zetterrij definiëren die in een derde richting (Z) loodrecht op de eerste richting (X) en tweede richting (Y) beweegbaar is, waarbij de zetter, in gebruik, heen en weer beweegt tussen een bovenste positie en een onderste positie, waarbij in de bovenste positie de artikelen kunnen worden opgenomen en in de onderste positie de artikelen in de pockets van de verpakking kunnen worden afgegeven;

15

met het kenmerk, dat

de verpakkingsinrichting verder een overdrachtsinrichting omvat die ten minste een paar overdrachtsrijen omvat en de zetter een zetterrij omvat behorend bij het genoemde paar
20 overdrachtsrijen, waarbij de overdrachtsinrichting is geconfigureerd en ingericht om elk van de overdrachtsrijen van het paar heen en weer bewegen van een positie onder een sub-buffer die behoort bij de genoemde overdrachtsrij voor het opnemen van artikelen uit de onderste rij van de genoemde sub-buffer, naar een positie boven de zetterrij om de artikelen aan de zetter af te geven.

25

18. Verpakkingsinrichting volgens conclusie 17, waarbij de overdrachtsrijen van het paar elk op een bijbehorend geleidingsmechanisme zijn aangebracht, waardoor de beweging van de rijen een gecombineerde beweging is die bestaat uit een beweging in de tweede richting (Y) en de derde richting (Z).

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19. Verpakkingsinrichting volgens conclusie 18, waarbij het geleidingsmechanisme een zwenkarm omvat.

20. Verpakkingsinrichting volgens een van de conclusies 17-19, waarbij de steek tussen
35 de pockets van de ten minste ene overdrachtsrij in de eerste richting (X) variabel is, zodat deze kan worden aangepast aan de steek van de overeenkomstige sub-buffer van de vulbuffer voor het opnemen van de artikelen en naar de steek van de zetterrij voor het afgeven van de artikelen.

21. Verpakkingsinrichting volgens conclusie 20, waarbij de steek wordt gevarieerd tijdens de beweging van de positie onder de sub-buffer naar de positie boven de zetter en omgekeerd.

5 22. Verpakkingsinrichting voor het verpakken van in hoofdzaak ronde artikelen, zoals eieren of fruit, in een kuiltjesverpakking met een matrix van pockets om de ronde artikelen op te nemen, waarbij de genoemde matrix rijen en kolommen omvat, waarbij de verpakkingsinrichting omvat:

10 - een toevoertransporteur voor het transporteren van de artikelen in een eerste richting (X) en met artikelhouders om de artikelen losbaar vast te houden;

- een verpakkingstransporteur die zich bevindt onder de toevoertransporteur voor het transporteren van de verpakkingen in een tweede richting (Y) in hoofdzaak loodrecht op de eerste richting (X), waarbij de verpakkingen op de verpakkingstransporteur een zodanige oriëntatie hebben, dat de rijen van de verpakking zich in de eerste richting (X) uitstrekken en de kolommen van de verpakking zich in de tweede richting (Y) uitstrekken;

15 - een vulbuffer die zich bevindt tussen de toevoertransporteur en de verpakkingstransporteur, waarbij de vulbuffer in gebruik van bovenaf met artikelen door de toevoertransporteur wordt gevuld en de verpakkingen op de verpakkingstransporteur onder de buffer met genoemde artikelen vult,

20 waarbij de vulbuffer een aantal parallelle sub-buffers omvat die gezien in de tweede richting (Y) naast elkaar zijn geplaatst,

25 waarbij elke sub-buffer een aantal gestapelde sub-bufferrijen heeft van losbare bufferpockets, waarbij de sub-bufferrijen zich uitstrekken in de eerste richting (X) en elk een aantal bufferpockets hebben dat gelijk of groter is dan het aantal pockets in een verpakkingsrij die zich in de eerste richting (X) uitstrekt;

30 **met het kenmerk, dat**

de verpakkingsinrichting verder een overdrachtsinrichting omvat die ten minste één paar overdrachtsrijen omvat, en de verpakking een verpakkingsrij behorend bij het genoemde paar overdrachtsrijen omvat, waarbij de overdrachtsinrichting is geconfigureerd en ingericht om elk van de overdrachtsrijen van het paar heen en weer te bewegen van een positie onder een sub-buffer behorend bij de genoemde overdrachtsrij voor het opnemen van artikelen van de onderste rij van de sub-buffer naar een positie boven de verpakkingsrij om de artikelen aan de verpakking af te geven.

23. Verpakkingsinrichting volgens conclusie 22, waarbij de overdrachtsrijen van het paar elk op een bijbehorend geleidingsmechanisme zijn aangebracht, waardoor de beweging van de rijen een gecombineerde beweging is die bestaat uit een beweging in de tweede richting (Y) en de derde richting (Z).

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24. Verpakkingsinrichting volgens conclusie 23, waarbij het geleidingsmechanisme een zwenkarm omvat.

10 25. Verpakkingsinrichting volgens een van de conclusies 22-24, waarbij de steek tussen de pockets van de ten minste ene overdrachtsrij variabel is in de eerste richting (X), zodat deze kan worden aangepast aan de steek van de overeenkomstige sub-buffer van de vulbuffer voor het opnemen van de artikelen en aan de steek van de verpakkingsrij voor het afgeven van de artikelen.

15 26. Verpakkingsinrichting volgens conclusie 25, waarbij de steek wordt gevarieerd tijdens de beweging van de positie onder de sub-buffer naar de positie boven de verpakkingsrij en vice versa.

Fig. 1

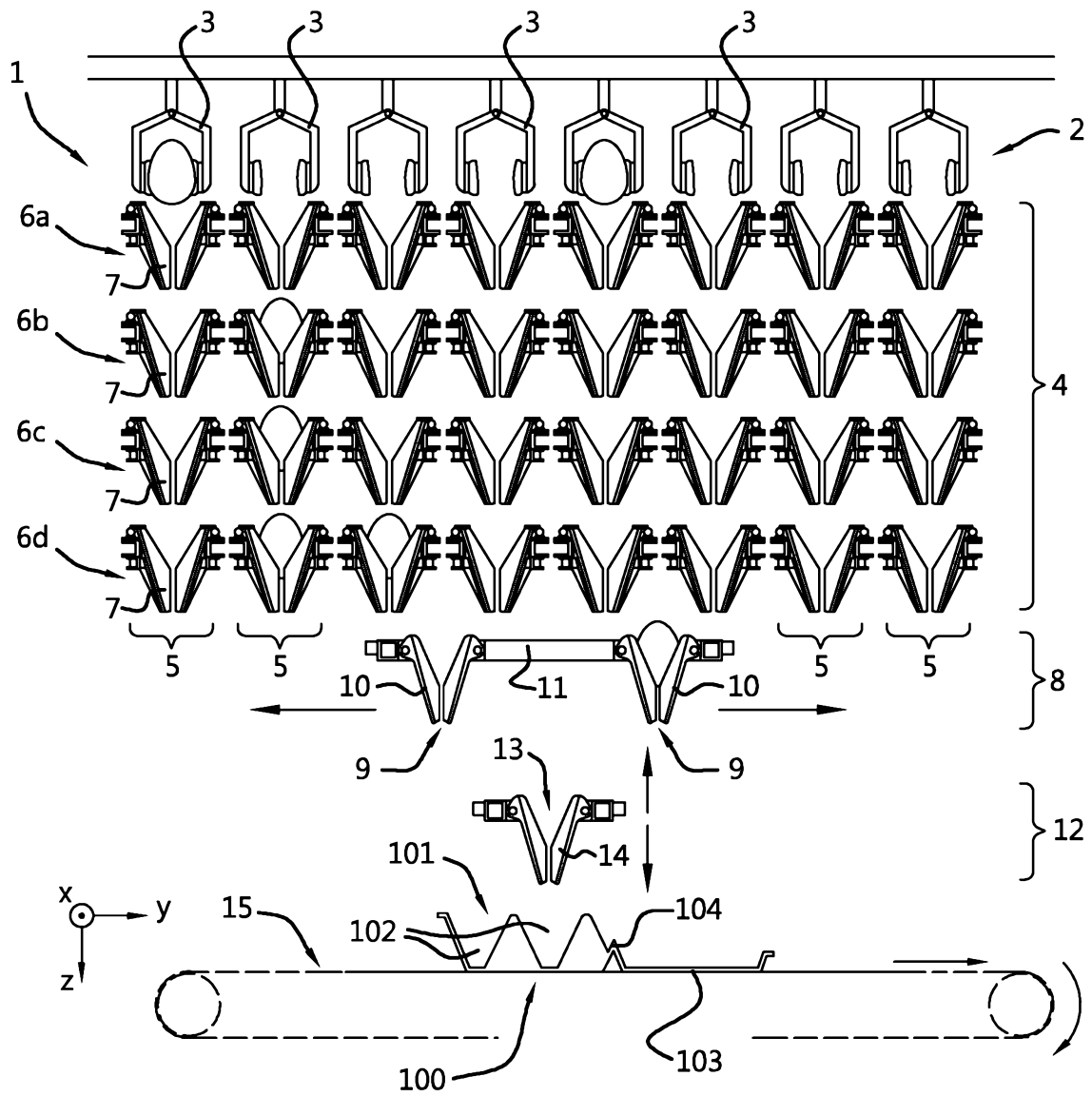


Fig. 2

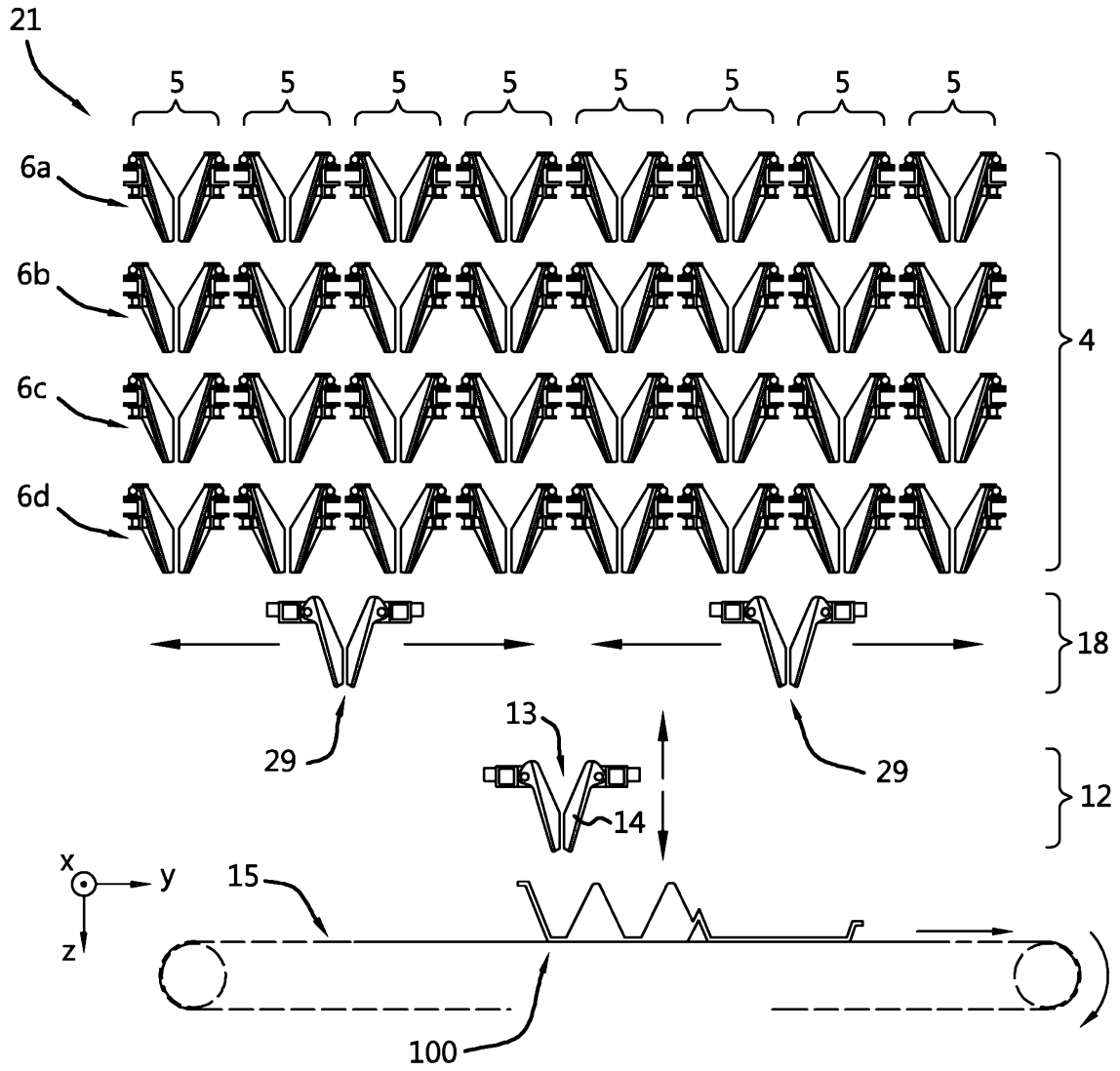


Fig. 3

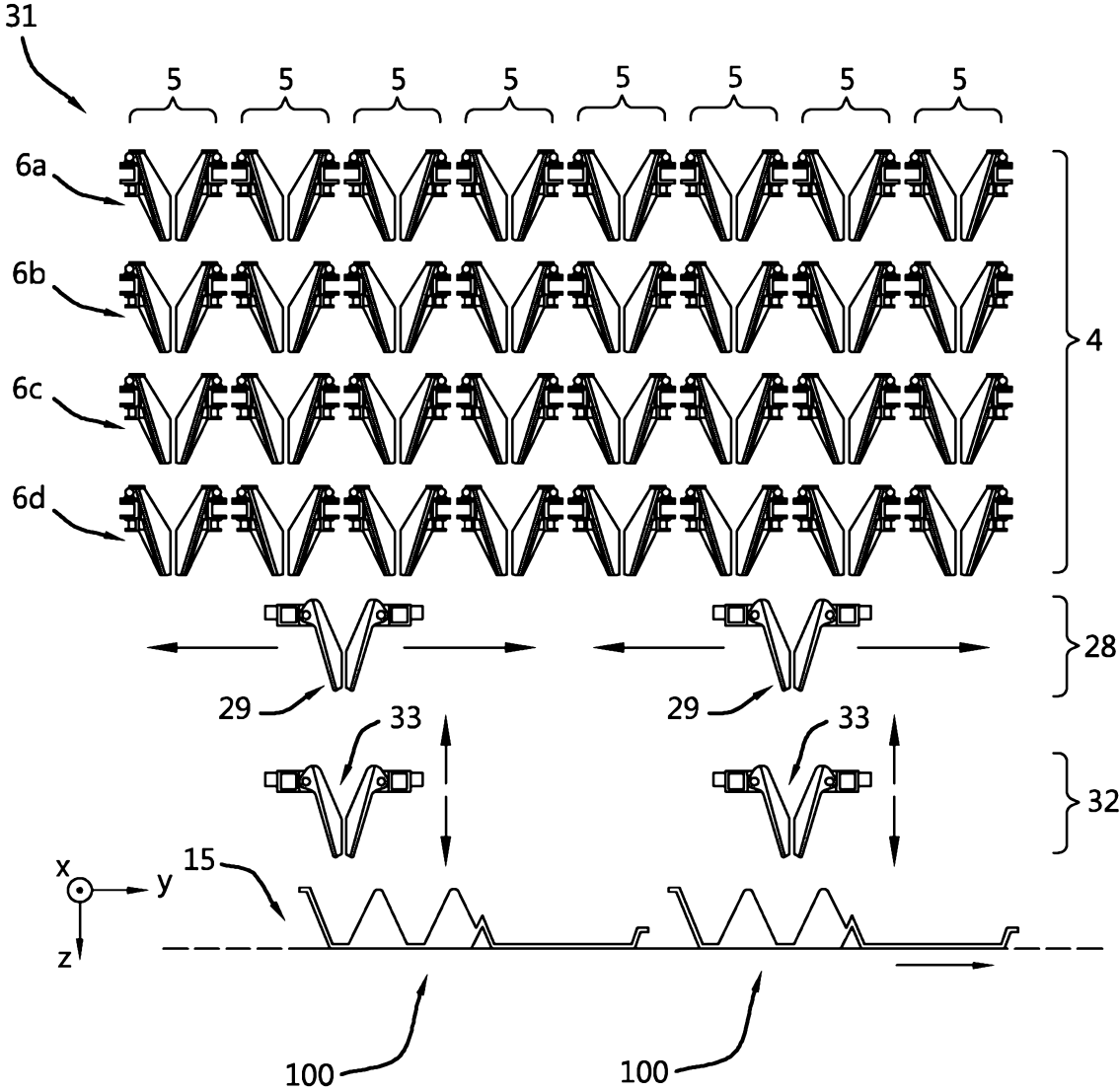


Fig. 4

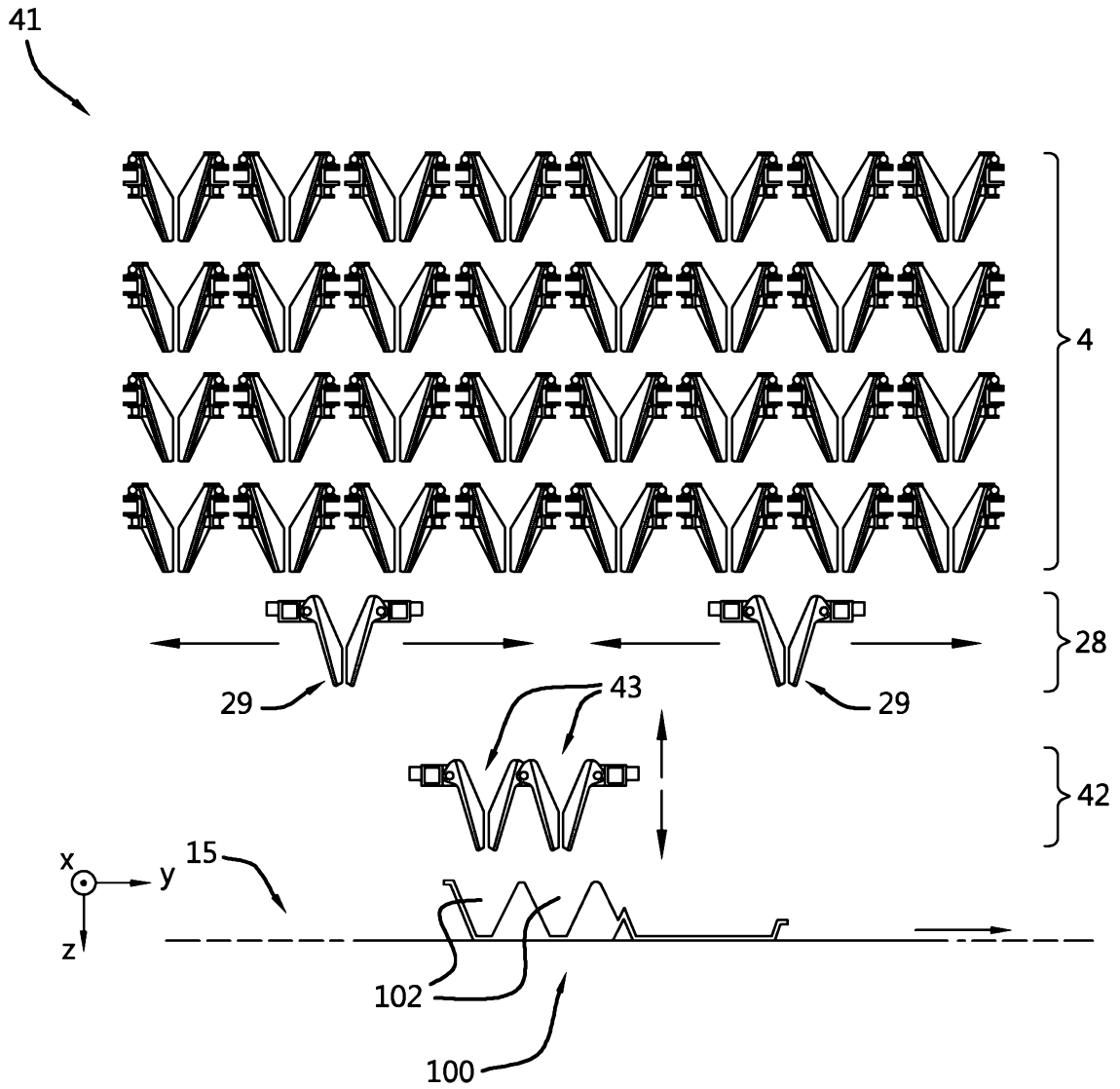


Fig. 5

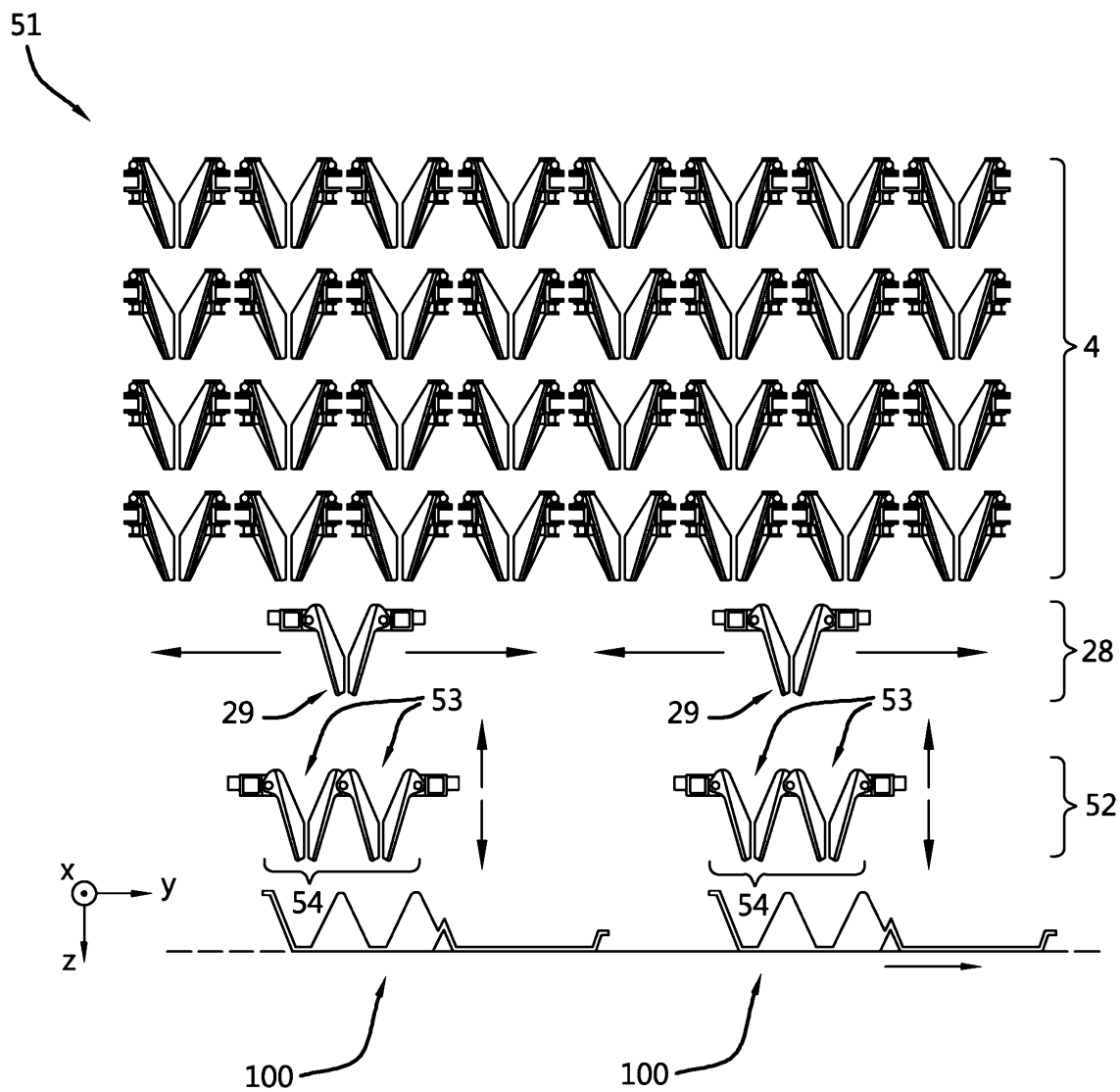


Fig. 6

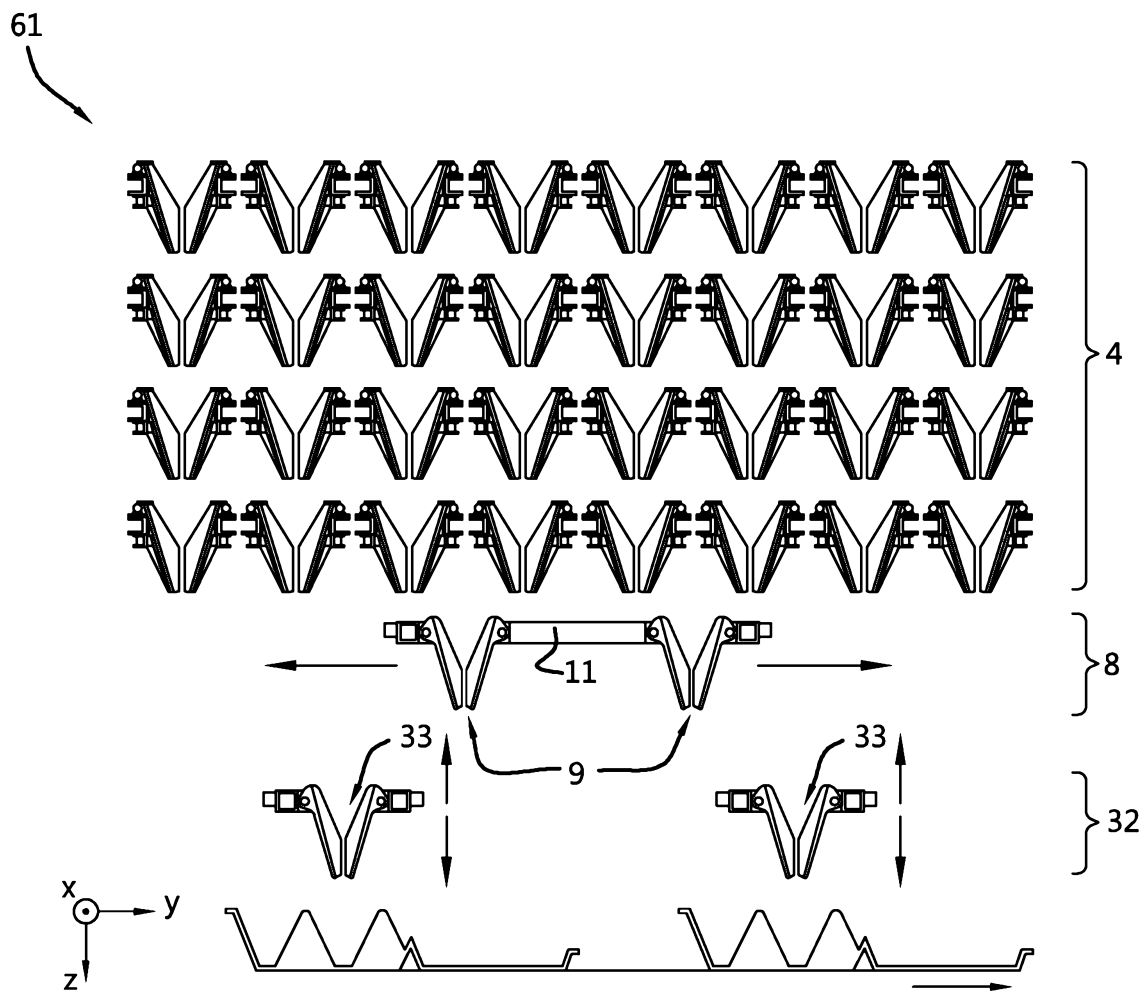


Fig. 7

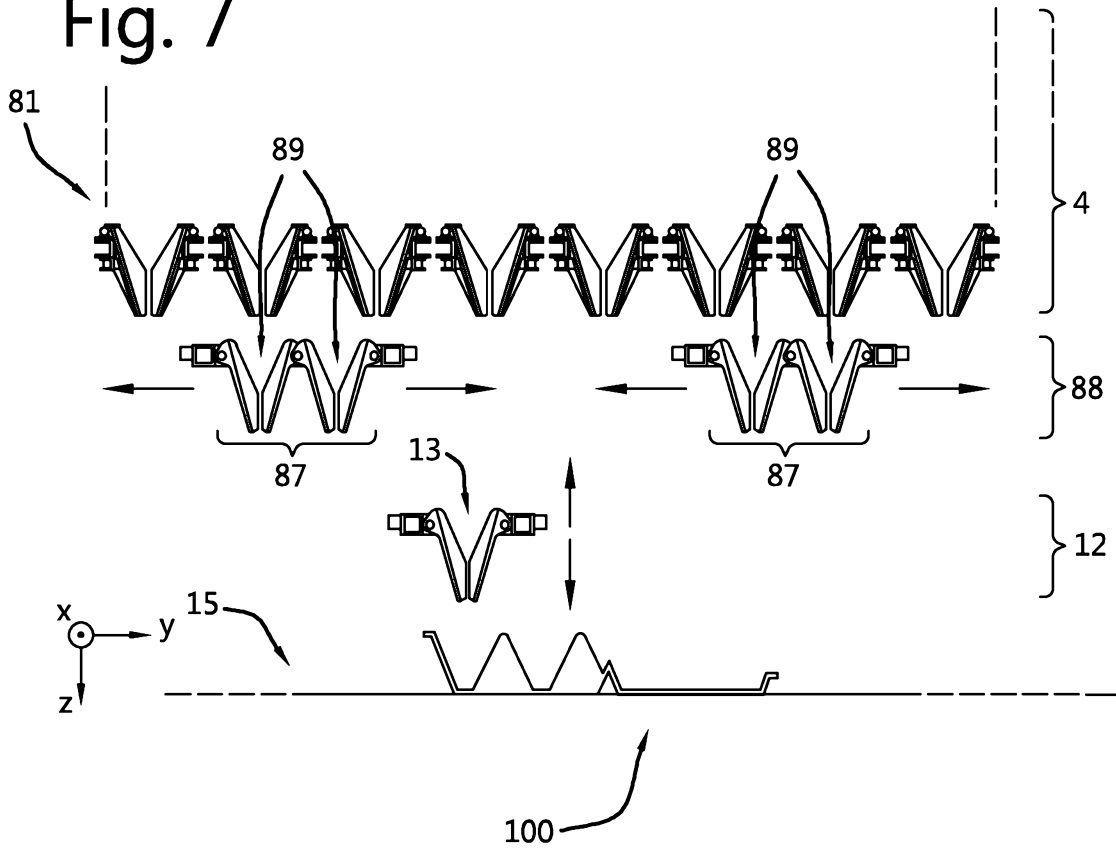


Fig. 8

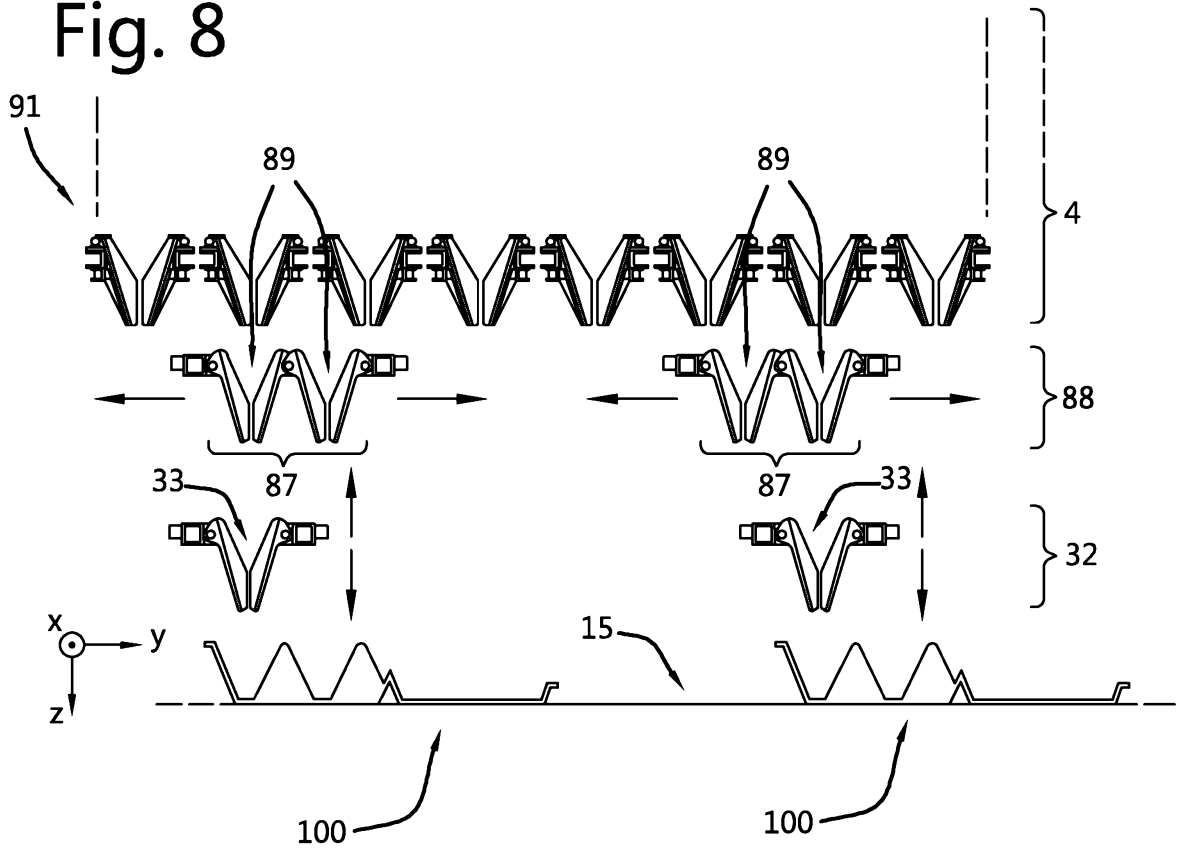


Fig. 9

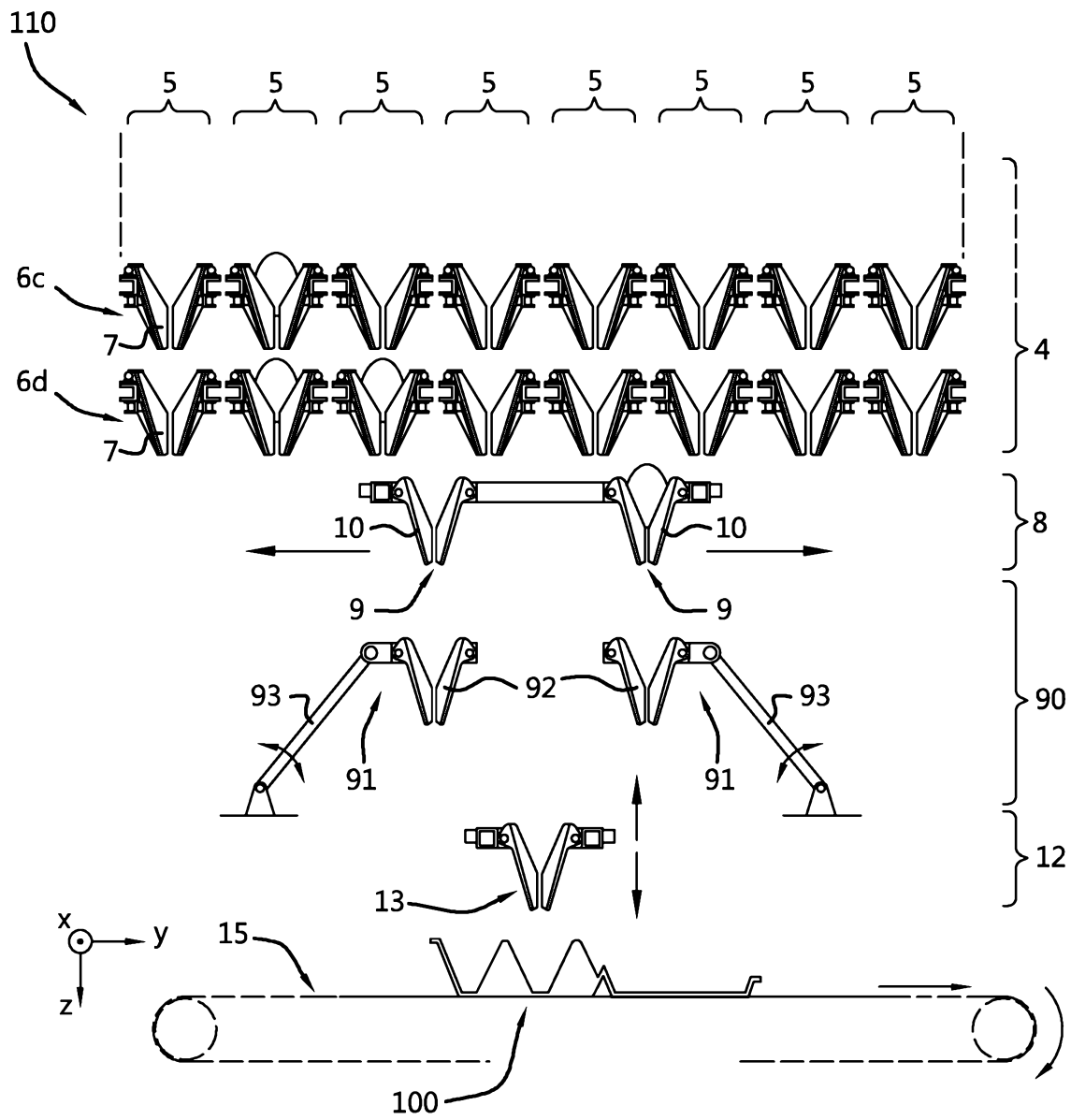


Fig. 10

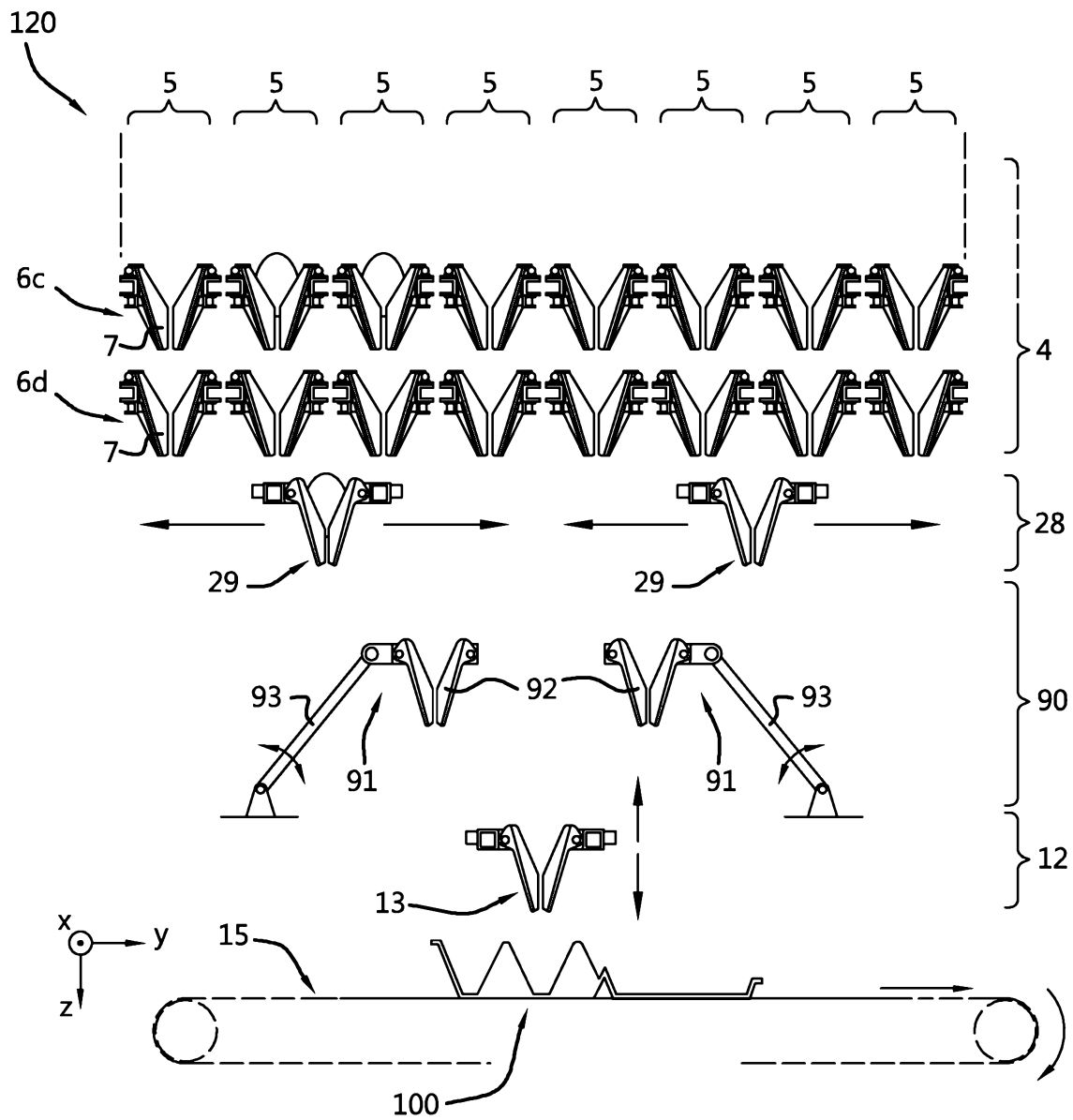


Fig. 11

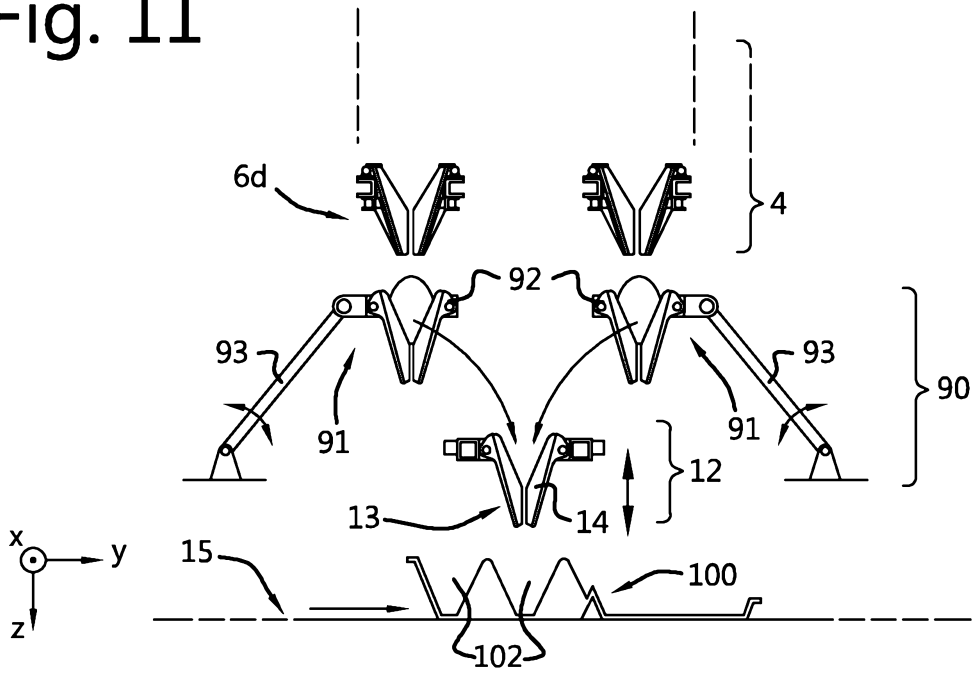
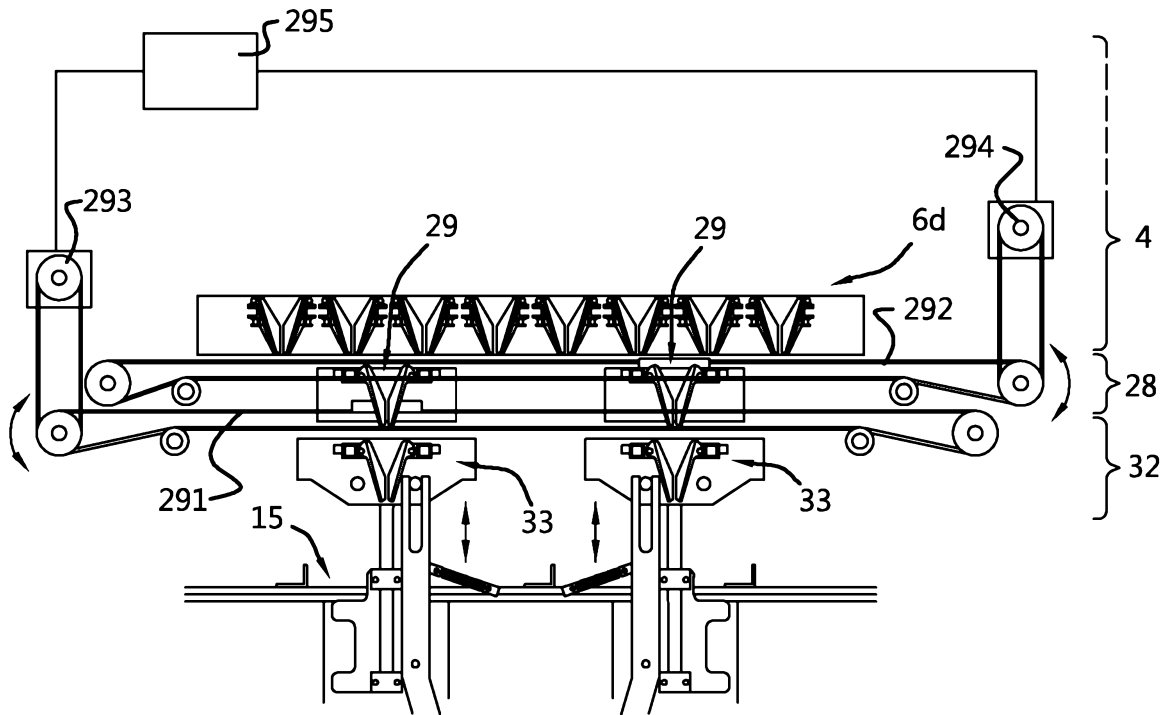


Fig. 12



ABSTRACT

A packaging device for packaging substantially round articles into a dimpled package having an array of pockets to receive the round articles. The packaging device comprising a supply conveyor for the articles and a package conveyor located below the supply conveyor for conveying the packages. A filling buffer is located between the supply conveyor and the package conveyor having multiple sub-buffers. The device furthermore comprises a collector for receiving articles from the buffer, and a setter wherein, in use, the setter reciprocates between an upper position to a lower position, wherein in the upper position the articles can be received from the collector and in the lower position the articles can be discharged into the pockets of the package. The collector comprises a plurality of collector rows, wherein the collector is configured and arranged to move each one of the plurality of collector rows back and forth underneath the filling buffer to a position under any one of the sub-buffers for receiving articles from the lowest row thereof, and to move back and forth with filled pockets to a position above the setter to discharge the articles into the setter.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE P32970NL00/CHO
Nederlands aanvraag nr. 2019010	Indieningsdatum 01-06-2017
	Ingeroepen voorrangdatum
Aanvrager (Naam) Sanovo Technology Netherlands B.V.	
Datum van het verzoek voor een onderzoek van internationaal type 01-07-2017	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. SN69207
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)	
Volgens de internationale classificatie (IPC) B65B23/06	
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC	B65B
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen	
III.	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)
IV.	GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2019010

<p>A. CLASSIFICATIE VAN HET ONDERWERP INV. B65B23/06 ADD.</p>		
<p>Volgens de internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.</p>		
<p>B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK</p> <p>Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen) B65B</p>		
<p>Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen</p>		
<p>Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)</p> <p>EPO-internal, WPI Data</p>		
<p>C. VAN BELANG GEACHTE DOCUMENTEN</p>		
Categorie ¹⁾	Gepubliceerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X,D	EP 1 310 429 A1 (NABEL CO LTD [JP]) 14 mei 2003 (2003-05-14) in de aanvraag genoemd	1,3-11, 13,17,18
A	* alinea's [0041] - [0073]; figuren 1-6 *	2,12, 14-16, 19-26
X	EP 1 201 542 A1 (NABEL CO LTD [JP]) 2 mei 2002 (2002-05-02)	22
A	* alinea's [0124] - [0149]; figuren 9-10 *	1-21, 23-26
A	US 5 232 080 A (VAN ESSEN HENK [NL] ET AL) 3 augustus 1993 (1993-08-03)	1-26
	* kolom 10, regels 6-38; figuren 3,6 *	
	-/--	
<p><input checked="" type="checkbox"/> Verdere documenten worden vermeld in het vervolg van vak C. <input checked="" type="checkbox"/> Leden van dezelfde octrooifamilie zijn vermeld in een bijlage</p>		
<p>¹⁾ Speciale categorieën van aangehaalde documenten</p> <p>"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft</p> <p>"D" in de octrooiaanvraag vermeld</p> <p>"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven</p> <p>"L" om andere redenen vermelde literatuur</p> <p>"O" niet-schriftelijke stand van de techniek</p> <p>"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur</p> <p>"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding</p> <p>"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur</p> <p>"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere gepubliceerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht</p> <p>"Z" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie</p>		
<p>Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid</p> <p>10 januari 2018</p>		<p>Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type</p>
<p>Naam en adres van de instantie</p> <p>European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016</p>		<p>De bevoegde ambtenaar</p> <p>Leijten, René</p>

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2019010

C. (Vervolg). VAN BELANG GEACHTE DOCUMENTEN		
Categorie	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	EP 0 390 241 A (FPS FOOD PROCESSING SYSTEMS BV) 3 oktober 1990 (1990-10-03) * kolom 3, regel 22 - kolom 4, regel 30; figuren 1,2,4 * -----	1-26

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2019010

In het rapport genoemd octrooigeeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
EP 1310429	A1	14-05-2003	GEEN
EP 1201542	A1	02-05-2002	DE 60104798 D1 16-09-2004 EP 1201542 A1 02-05-2002 JP 2002205707 A 23-07-2002
US 5232080	A	03-08-1993	EP 0560458 A1 15-09-1993 JP 3437854 B2 18-08-2003 JP H06211213 A 02-08-1994 US 5232080 A 03-08-1993
EP 0390241	A	03-10-1990	

WRITTEN OPINION

File No. SN69207	Filing date (day/month/year) 01.06.2017	Priority date (day/month/year)	Application No. NL2019010
International Patent Classification (IPC) INV. B65B23/06			
Applicant Sanovo Technology Netherlands B.V.			

This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the application
- Box No. VIII Certain observations on the application

Examiner Leijten, René

WRITTEN OPINION

Application number
NL2019010

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - on paper
 - in electronic form
 - c. time of filing/furnishing:
 - contained in the application as filed.
 - filed together with the application in electronic form.
 - furnished subsequently for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	1-16, 19-26
	No: Claims	17, 18
Inventive step	Yes: Claims	2, 12, 14-16, 19-21, 23-26
	No: Claims	1, 3-11, 13, 17, 18, 22
Industrial applicability	Yes: Claims	1-26
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number
NL2019010

Box No. VII Certain defects in the application

see separate sheet

Re Item V

1 Reference is made to the following documents:

D1 EP 1 310 429 A1

D2 EP 1 201 542 A1

D3 US 5 232 080 A

2 INDEPENDENT CLAIM 1

The present application does not meet the criteria of patentability, because the subject-matter of claim 1 does not involve an inventive step.

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and discloses a packaging device according to the preamble of claim 1. (D1: fig.5 shows the supply conveyor, the buffer, the collector 41 and the setter 43, wherein the collector 41 is movable in the (Y) direction to be positioned under the sub-buffer pockets 35a and 36a and above the setter 43).

The subject-matter of claim 1 differs from this known D1 in that:

de collector een aantal collectorrijen omvat, waarbij de collector is geconfigureerd en ingericht om elk van de meerdere collectorrijen heen en weer te bewegen in de tweede richting (Y) onder de vulbuffer naar een positie onder elk van de sub-buffers voor het opnemen van artikelen uit de onderste rij daarvan, en om heen en weer te bewegen in de tweede richting (Y) met gevulde pockets naar een positie boven de zetter om de artikelen aan de zetter af te geven.

The subject-matter of claim 1 is therefore new.

The problem to be solved by the present invention may therefore be regarded as: How to improve the capacity of the packaging device.

The collector 41 of the packaging device shown in fig. 5 of D1 only comprises one row of pockets 41a and it is obvious for the skilled person that having only one row of pockets is limiting the capacity of the packaging device. A second row of pockets would increase the capacity, because the first row could deliver the eggs to the setter while the other row is filled by the sub-buffer or is at least close to the position to be filled.

It is considered to be obvious to add a second collector row, because it is general common knowledge that a capacity of a packaging device can be increased by providing additional means to convey, collect, transfer and/or buffer articles.

Furthermore, D3 (col. 10, lines 6-38; fig. 3 and 6) explicitly teaches to use two sets of holders 85 to increase the capacity of the receiving and packing station.

Therefore, the solution proposed in claim 1 of the present application cannot be considered as involving an inventive step.

3 **DEPENDENT CLAIMS 3-7**

Dependent claims 3-7 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step.

4 **DEPENDENT CLAIM 2**

Dependent claim seems to meet the requirements in respect of novelty and inventive step, because it is considered not to be obvious to provide an additional collector row which can move independently from the first row.

5 **INDEPENDENT CLAIM 8**

The present application does not meet the criteria of patentability, because the subject-matter of claim 8 does not involve an inventive step.

The document D1 is regarded as being the closest prior art to the subject-matter of claim 8 and discloses a packaging device according to the preamble of claim 1. (D1: fig.5 shows the supply conveyor, the buffer, the collector 41 and the setter 43, wherein the collector 41 is movable in the (Y) direction to be positioned under the sub-buffer pockets 35a and 36a and above the setter 43).

The subject-matter of claim 8 differs from this known D1 in that:

een tussengelegen overdrachtsinrichting is aangebracht tussen de collector en de zetter, waarbij de tussengelegen overdrachtsinrichting ten minste één overdrachtsrij van losbare pockets omvat, waarbij de tussengelegen overdrachtsinrichting is geconfigureerd en ingericht om de overdrachtsrijen heen en weer te verplaatsen vanuit een positie onder de ten minste ene collectorrij voor het opnemen van artikelen, naar een positie boven de zetterrij om de artikelen aan de zetter af te geven.

The subject-matter of claim 8 is therefore new.

The problem to be solved by the present invention may therefore be regarded as: How to improve the capacity (eggs processed per hour) of the packaging device.

The collector 41 of the packaging device shown in fig. 5 of D1 supplies the eggs directly to the setter 43. In case there is a problem with the sub-buffers, or with the collector or the setter, the complete process will come to a hold which reduces the overall capacity of the device. It belongs to the general common knowledge of the skilled person to provide buffering means to avoid unnecessary machine stops. It would therefore be obvious to provide an additional transfer device which acts as a buffer, such as the rotating transfer device 42 shown in figure 6 of D1 and the rotating transfer device 25 shown in figure 10 of D2. By using such a transfer device the packaging device has an increased buffering capacity and the risk that the complete process comes to a hold is reduced.

Therefore, the solution proposed in claim 8 of the present application cannot be considered as involving an inventive step.

6 **DEPENDENT CLAIMS 9-11 and 13**

Dependent claims 9-11 and 13 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step.

7 **DEPENDENT CLAIMS 12 and 14-16**

Dependent claims 12 and 14-16 seem to meet the requirements in respect of novelty and inventive step, because it is considered not to be obvious to provide an additional collector row which can move independently from the first row (claim 12), to provide a swivelling arm (claim 14) or to provide a variable pitch (claims 15-16).

8 **INDEPENDENT CLAIM 17**

The present application does not meet the criteria of patentability, because the subject-matter of claim 17 is not new.

The document D1 discloses packaging device (see fig. 1 and 6) having a supply conveyor (22), a buffer (5, 7) and a setter (43), wherein the collector 42 could be considered to be a transfer device according to the characterising portion of claim 17.

The subject-matter of claim 17 is therefore not new.

9 **DEPENDENT CLAIM 18**

Dependent claim 18 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of novelty.

10 DEPENDENT CLAIMS 19-21

Dependent claims 19-21 seem to meet the requirements in respect of novelty and inventive step, because it is considered not to be obvious to provide a swivelling arm (claim 19) or to provide a variable pitch (claims 20-21).

11 INDEPENDENT CLAIM 22

The document D2 (see fig. 9) is regarded as being the closest prior art to the subject-matter of claim 22, and shows a packaging device according to the preamble of claim 22.

The subject-matter of claim 22 differs from this known D2 in that:

de verpakkingsinrichting een overdrachtsinrichting omvat die ten minste één paar overdrachtsrijen omvat, en de verpakking een verpakkingsrij behorend bij het genoemde paar overdrachtsrijen omvat, waarbij de overdrachtsinrichting is geconfigureerd en ingericht om elk van de overdrachtsrijen van het paar heen en weer te bewegen van een positie onder een sub-buffer behorende bij de genoemde overdrachtsrij voor het opnemen van artikelen van de onderste rij van de sub-buffer naar een positie boven de verpakkingsrij om de artikelen aan de verpakking af te geven.

The subject-matter of claim 22 is therefore new, because the transfer device 14 in figure 9 of D2 only has one transfer row 15.

The problem to be solved by the present invention may therefore be regarded as: How to improve the capacity of the packaging device.

The transfer device 14 of the packaging device shown in fig. 9 of D2 only comprises one row of pockets 15 and it is obvious for the skilled person that having only one row of pockets is limiting the capacity of the packaging device. A second row of pockets would increase the capacity, because the first row could deliver the eggs to the package while the other row is filled by the sub-buffer or is at least close to the position to be filled.

It is considered to be obvious to add a second transfer row, because it is general common knowledge that a capacity of a packaging device can be increased by providing additional means to convey, collect, transfer and/or buffer articles.

Furthermore, D3 (col. 10, lines 6-38; fig. 3 and 6) explicitly teaches to use two sets of holders 85 to increase the capacity of the receiving and packing station.

Therefore, the solution proposed in claim 22 of the present application cannot be considered as involving an inventive step.

12 **DEPENDENT CLAIMS 13-26**

Dependent claims 23-26 seem to meet the requirements in respect of novelty and inventive step, because it is considered not to be obvious to provide a guiding means to move the transfer rows in a combine second (Y) and third (Z) direction (claims 23-24) or to provide a variable pitch (claims 25-26).

Re Item VII

- 1 The relevant background art disclosed in documents D2 and D3 is not mentioned in the description, nor are these documents identified therein.

- 2 The features of the claims are not provided with reference signs placed in parentheses.

- 3 The following seem to be incorrect:
 "18" in figure 2 should be "28" (according to page 8, line 4);
 "Fig. 10" on page 11, line 19 should be "Fig. 9".