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(54) A METHOD AND SYSTEM FOR PACKAGING ARTICLES

(57) A method for packaging articles, wherein a single-line flow (40) of articles (A) at the output of a manufacturing machine (12) is converted into a dual-line flow by rotating the articles (A) so that the articles of each pair of adjacent articles (A) are spaced apart from each other in a transverse direction (Y) orthogonal to the moving direction (X).

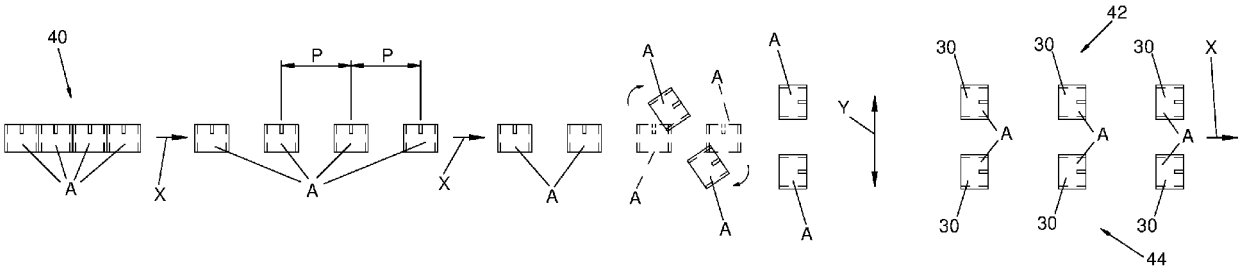

Fig.4

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Description

Field of the invention

[0001] The present invention relates in general to packaging of consumer products.

[0002] The invention was developed in particular in view of packaging sanitary article, in particular absorbent sanitary articles, such as: diapers, training pants, absorbent sanitary products for incontinent adults, sanitary napkins, panty liners, etc.

[0003] In the following, reference will be made to this specific field without however losing generality.

Prior art

[0004] Sanitary articles are usually packaged in boxes or flexible bags containing a fixed number of articles, usually grouped in one or stacks. The sanitary articles may be packaged individually in envelope-shaped wrappers formed by sheets of paper or plastic material.

[0005] Modern machines for manufacturing sanitary articles have extremely high production speeds, in the order of 800-1200 pieces/1'. At the exit of the manufacturing machines, the sanitary articles are output in a single line.

[0006] In many cases, there is the need to split the single-line flow of sanitary articles exiting a manufacturing machine into two separate flows of articles directed to two packaging machines, for instance when one single packaging machine does not have the capacity to handle the whole flow of articles output by the manufacturing machine or when there is the need to form packages with different formats.

[0007] In the prior art, stationary flow dividers are provided when there is the need to split a single-line flow of articles into a dual-line flow.

[0008] The main problems of the prior art stationary flow dividers are the large footprint and the poor flexibility in case of change of packaging format.

Object and summary of the invention

[0009] The object of the present invention is to provide a method and a system for packaging articles which overcomes the problems of the prior art.

[0010] According to the invention, this object is achieved by a method and system for packaging articles having the features of claims 1 and 9.

[0011] The claims form an integral part of the technical disclosure provided here in relation to the invention.

Brief description of the drawings

[0012] The present invention will now be described with reference to the attached drawings, provided purely by way of non-limiting example, wherein:

- Figure 1 is schematic side view of a system for packaging articles according to an embodiment of the present invention,
- Figure 2 is a schematic perspective view showing a detail of a first embodiment of a spacing wheel indicated by the arrow II in figure 1,
- Figure 3 is a schematic perspective view showing a detail of a second embodiment of the spacing wheel indicated by the arrow II in figure 1,
- Figure 4 is a schematic view showing a first embodiment of a method for splitting a flow of moving articles, and
- Figure 5 is a schematic view showing a second embodiment of a method for splitting a flow of moving articles.

[0013] It should be appreciated that the attached drawings are schematic and not to scale with respect to real products and that various figures may not be represented in the same scale. Also, in various figures some elements may not be shown to better show other elements.

Detailed description

[0014] With reference to Figure 1, numeral 10 indicates a system for packaging articles.

[0015] The system 10 receives from a manufacturing machine 12 a single-line flow of articles A aligned to each other in a direction X and moving in the same direction. As it will be disclosed in the following, the system 10 is configured for splitting the single-line flow of moving articles A into a dual-line flow made of articles A moving along two transversely spaced lines. The system 10 comprises two packaging machines 14 which are feed by the dual-line flow of articles A.

[0016] The system 10 comprises a first conveyor 16 which receives the single-line flow of moving articles A from the manufacturing machine 12. The first conveyor 16 may be configured to accelerate the articles A in the direction X, so as to space from each other the articles A in the moving direction X.

[0017] The apparatus 10 comprises a rotation unit 17 configured for rotating the articles A so that two articles of each pair of adjacent articles A are spaced apart from each other in a transverse direction Y orthogonal to the moving direction X.

[0018] The rotation unit 17 comprises a spacing wheel 18 rotating about an axis of rotation 20. The spacing wheel 18 comprises a plurality of gripping pads 22 configured for gripping the articles A. The gripping pads 22 may be provided with holes pneumatically connected to a source of sub-atmospheric pressure to retain the articles A by suction.

[0019] The gripping pads 22 rotate about respective axes oriented radially with respect to the axis of rotation 20 of the spacing wheel 18 so as to space from each other the articles A of each pair of adjacent articles A in a direction parallel to the axis of rotation 20 of the spacing

wheel 18.

[0020] With reference to figure 2, in a possible embodiment each gripping pad 22 is configured to grip a pair of adjacent articles A aligned to each other in the moving direction X. Each gripping pad 22 rotates 90° about a respective radial axis B, so as to distance the two articles A in a direction Y transverse to the moving direction X. After the 90° rotation of the gripping pads 22, the articles A are arranged in a dual line flow of articles A moving in the direction X. The pair of articles A of the dual line flow are aligned to each other in the transverse direction Y.

[0021] With reference to figure 3, in a possible embodiment each gripping pad 22 is configured to grip a single article A. The gripping pads 22 adjacent to each other rotate 180° in the same direction about respective radial axes placed on opposite sides of a central plane, so as to distance each pair of adjacent articles A in a direction Y transverse to the moving direction X. After the 180° rotation of the gripping pads 22, the articles A are arranged in a dual line flow moving in the direction X. The pair of articles A of the dual line flow may be aligned to each other in the transverse direction Y.

[0022] The apparatus 10 may comprise a transfer wheel 24 configured for taking the articles A from the first conveyor 16 and for transferring the articles A to the spacing wheel 18. The spacing wheel 18 receives the articles A from the transfer wheel 24 in a single-line flow.

[0023] The apparatus 10 may comprise a second conveyor 26 which receives the articles A from the spacing wheel 18 in a dual-line flow. The second conveyor 26 may comprise two opposite conveyor belts which retain between them the moving articles A. Alternatively, the second conveyor 26 may be provided with holes pneumatically connected to a source of sub-atmospheric pressure, to retain the articles A by suction.

[0024] The apparatus 10 may comprise a group forming device 28 configured for forming groups of articles 30 for each of the dual-lines of moving articles A. The group forming device 28 may comprise a transfer wheel 32 which receives the dual-line flow of articles A from the second conveyor 26 and transfers the articles A to a group-forming wheel 34. The group-forming wheel 34 may comprise a plurality of compartments 36 in which the articles A coming from the transfer wheel 32 are stacked to form groups of articles 30, each containing a predetermined number of articles A. The group-forming wheel 34 forms a dual-line flow of groups of articles 30, which are then transferred to an output conveyor 38 which feeds the dual line flow of groups of articles 30 to the two packaging machines 14.

[0025] Figure 4 shows a possible embodiment of a method for packaging articles A. The articles A at the output of a manufacturing machine move in a direction X aligned to each other in a single line 40. In a first step the articles A may be spaced apart from each other in the moving direction X. After the spacing, the articles A may be longitudinally spaced from each other by a pitch P.

[0026] Then, the articles A of each pair of adjacent articles A are rotated jointly by 90°, so that the two articles of each pair are spaced apart from each other in a transverse direction Y orthogonal to the moving direction X. The transverse spacing P between the two articles of each pair is equal to the longitudinal spacing P between adjacent articles moving in the single line 40. After the rotation, the articles A move in the direction X along two parallel lines 42, 44.

[0027] In a possible embodiment, after the rotation the articles A may be stacked in groups of products 30 moving along the two parallel lines 42, 44. The groups of products 30 of each of the parallel lines 42, 44 may be transversally aligned to the groups of products 30 of the other of the parallel lines 42, 44.

[0028] Figure 5 shows another possible embodiment of a method for packaging articles A. The elements corresponding to those previously disclosed are indicated by the same reference numbers. Also, in this embodiment, the articles A at the output of a manufacturing machine move in a direction X aligned to each other in a single line 40. In a first step the articles A may be spaced apart from each other in the moving direction X by a pitch P.

[0029] Then, each article A is rotated individually by 180°. The articles A adjacent to each other rotate by 180° about respective axes placed on opposite sides of a central plane, so as to distance the articles of each pair of adjacent articles A in a direction Y transverse to the moving direction X. The transverse spacing P between the two articles of each pair may be equal to or different from the longitudinal spacing P between adjacent articles moving in the single line 40. After the rotation, the articles A move in the direction X along two parallel lines 42, 44.

[0030] Also, in this embodiment, after the rotation the articles A may be stacked in groups of products 30 moving along the two parallel lines 42, 44. The groups of products 30 of each of the parallel lines 42, 44 may be transversally aligned to the groups of products 30 of the other of the parallel lines 42, 44.

[0031] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments can be varied, even significantly, with respect to those illustrated here without departing from the scope of the invention as defined by the following claims.

Claims

1. A method for packaging articles, comprising:

   - providing a single-line flow (40) of articles (A) at the output of a manufacturing machine (12) moving aligned to each other in a direction (X),
   - rotating said articles (A) so that the two articles of each pair of adjacent articles (A) are spaced apart from each other in a transverse direction (Y) orthogonal to the moving direction (X),

- forming a dual-line flow made of articles (A) moving along two transversely spaced parallel lines (42, 44), and
- feeding said dual-line flow of articles (A) to respective packaging machines (14).

2. The method of claim 1, comprising rotating jointly by 90° the articles (A) of each pair of adjacent articles (A).

3. The method of claim 1, comprising rotating individually by 180° the articles (A) of each pair of adjacent articles (A) about respective axes (B) placed on opposite sides of a central plane, so as to distance the articles (A) of each pair of adjacent articles (A) in a direction (Y) transverse to the moving direction (X) .

4. The method of claim 3, comprising rotating each of said articles (A) by 180°in the same direction.

5. The method of any of the preceding claims, comprising spacing apart from each other said articles in the moving direction (X) before rotating said articles (A) .

6. The method of any of the preceding claims, wherein the articles (A) in said two transversely spaced parallel lines (42, 44) are spaced apart from each other in the transverse direction by a distance (P) equal to the spacing in the moving direction (X) between adjacent articles (A) moving in said single line (40).

7. The method of any of the preceding claims, comprising stacking the articles (A) moving along said two parallel lines (42, 44) in groups of products (30).

8. The method of claim 7, wherein the groups of products (30) of each of said parallel lines (42, 44) are transversally aligned to the groups of products (30) of the other of said parallel lines (42, 44).

9. A packaging system comprising:

- a first conveyor (16) configured for moving articles (A) aligned to each other in a single line (40) in a direction (X) at the output of a manufacturing machine (12),
- a rotation unit (17) configured for rotating said articles (A) so that the articles of each pair of adjacent articles (A) are spaced apart from each other in a transverse direction (Y) orthogonal to the moving direction (X),
- a second conveyor (26) configured for receiving from the rotation unit a dual-line flow made of articles (A) moving along two transversely spaced parallel lines (42, 44), and
- two packaging machines (14) each configured for receiving one of said two transversely spaced parallel lines (42, 44).

10. The packaging system of claim 9, wherein said rotation unit (17) comprises a spacing wheel (18) rotating about an axis of rotation (20) and comprising a plurality of gripping pads (22) configured for gripping said articles (A) and rotating about respective axes (B) oriented radially with respect to the axis of rotation (20) of the spacing wheel (18).

11. The packaging system of claim 9 or claim 10, wherein each of said gripping pads (22) is configured to grip a pair of adjacent articles (A) aligned to each other in the moving direction (X), each gripping pad (22) rotating 90° about a respective radial axis (B).

12. The packaging system of claim 9 or claim 10, wherein each of said gripping pads (22) is configured to grip a single article (A), wherein gripping pads (22) adjacent to each other rotate 180° about respective radial axes placed on opposite sides of a central plane.

13. The packaging system of any of claims 9 to 12, wherein said first conveyor (16) is configured to accelerate the articles (A), so as to space from each other the moving articles (A) in said moving direction (X) .

14. The packaging system of any of claims 10 to 13, comprising a second conveyor (26) which receives the articles (A) from said spacing wheel (18) in a dual-line flow.

15. The packaging system of any of claims 9 to 14, comprising a group forming device (28) configured for forming groups of articles (30) for each of said dual-lines (42, 44) of moving articles (A).

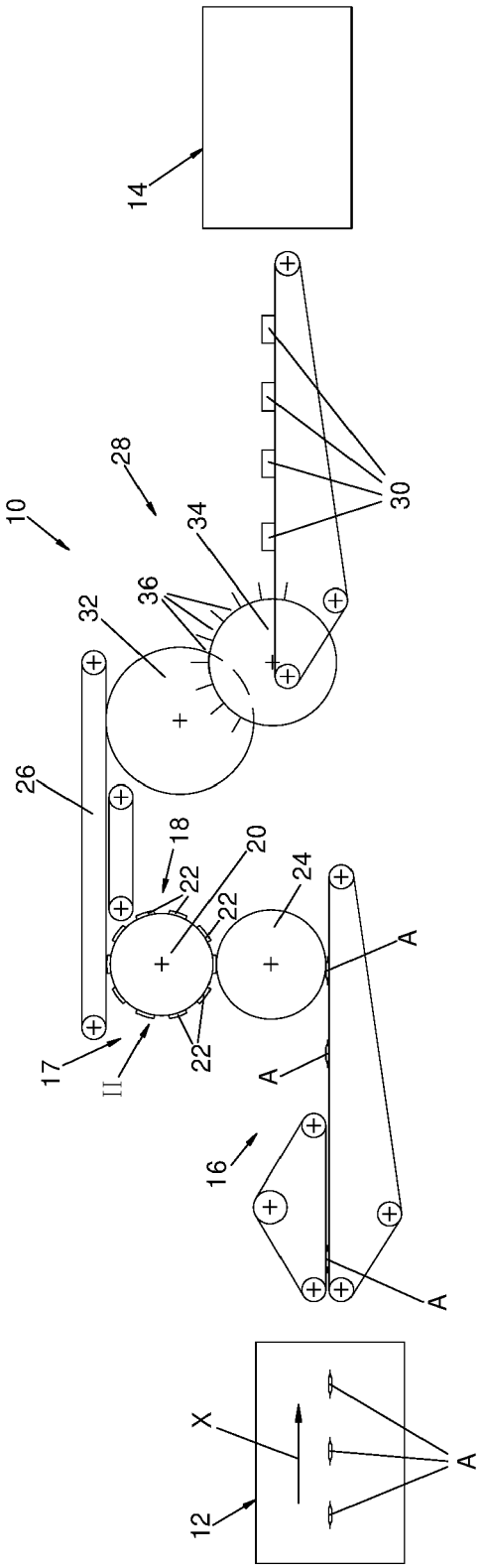

Fig.1

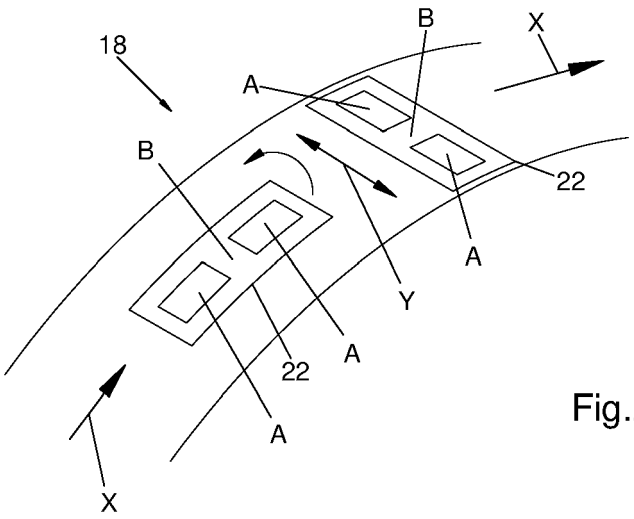

Fig.2

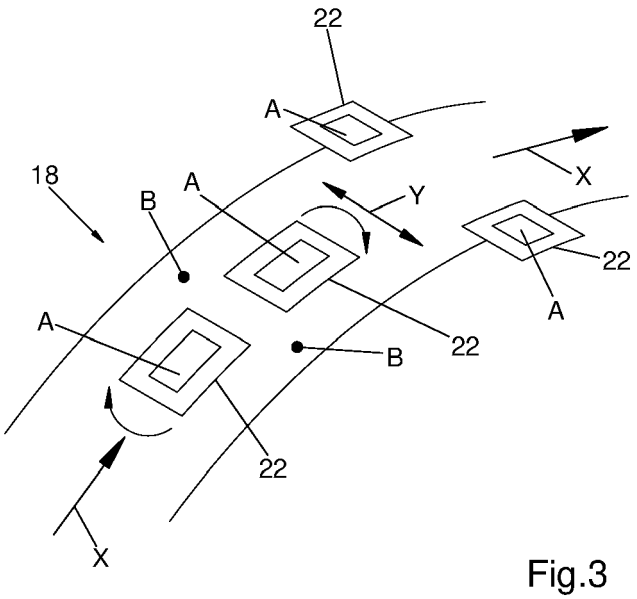

Fig.3

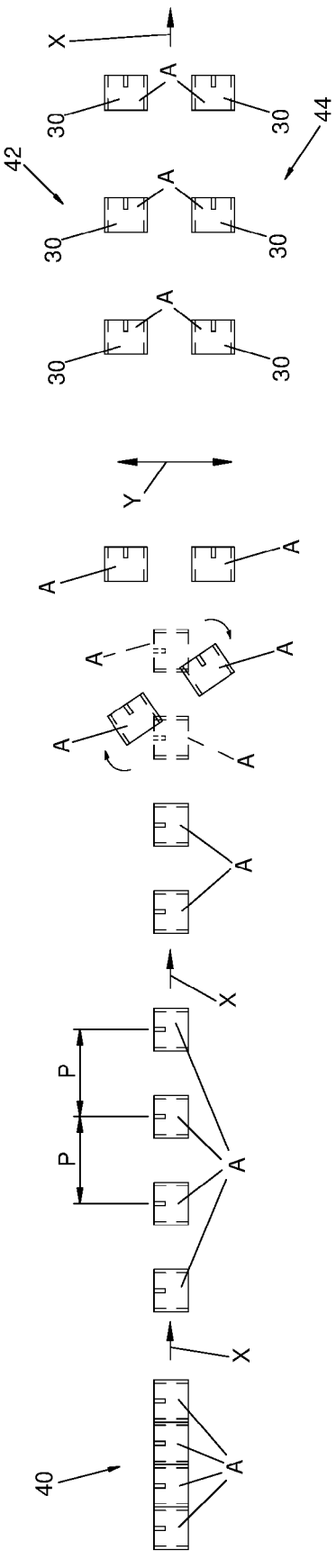
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Fig.4

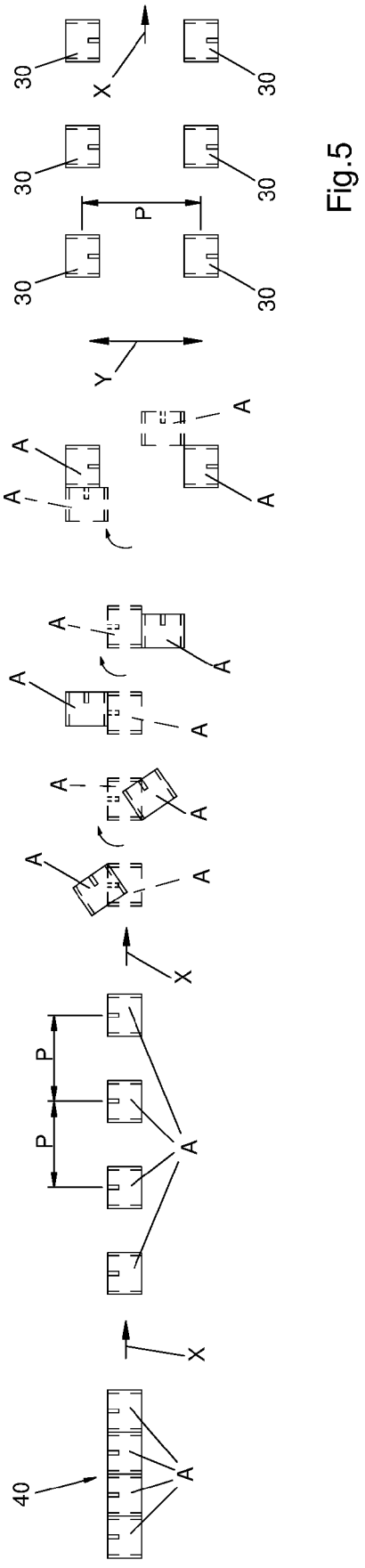
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Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 21 20 7767

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 May 2022	Cardoso, Victor

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X : particularly relevant if taken alone
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