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(54) METHOD AND DEVICE FOR PACKAGING SANITARY ARTICLES

(57) The invention relates to a method and a device for packaging sanitary articles such as absorbent articles, like diapers, sanitary napkins, panty liners, incontinence pads or similar, wherein by means of at least one diverter (10) batches (A, B, C, D) of articles (5) are alternately directed towards M packaging arrangements (11, 12), each batch (A, B, C, D) comprising at least one article (5), and wherein the diverter (10) alternately directs batches (A, B, C, D) of articles (5) towards the packaging arrangements (11, 12) in a repeated series of MxN batches (A-C-B-D), with N>=2, wherein at least two of the N batches (A, B) of one series of MxN batches (A-C-B-D) directed towards the first packaging arrangement (11) differ in count.

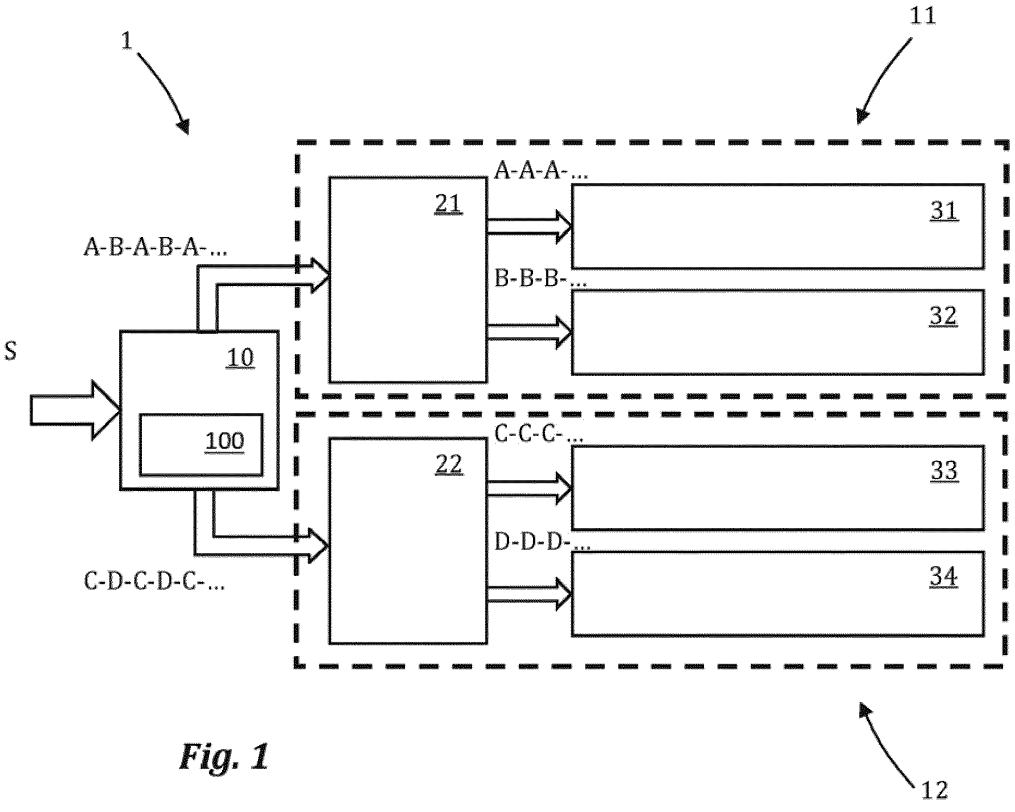

Fig. 1

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Description

TECHNICAL FIELD AND PRIOR ART

[0001] The invention relates to a method and a device for packaging sanitary articles such as absorbent articles, like diapers, sanitary napkins, panty liners, incontinence pads or similar. The sanitary articles are produced by production lines.

[0002] Known production lines for such articles have a high capacity allowing for a production of 1000 and more articles per minute. However, packaging devices, in particular for providing package units containing only a small number of articles, generally have a smaller capacity. It is therefore known to provide one or more diverter for diverting a stream of articles coming from a production line into two or more sub-streams directed to a dual lane packaging device or to two or more individual packaging devices.

[0003] US2010/071318 A1 discloses a method and an arrangement for handling nappies, wherein nappies coming from a production line are alternately transferred to a first grouping subassembly and a second grouping subassembly, and wherein one or more removal conveyors are assigned to the grouping subassemblies, via which groups of articles are fed to the packaging devices.

[0004] FR2798370 A1 discloses a diverter wherein a first batch and a second batch of articles comprising a first and a second number of articles, respectively, are alternately directed towards a first and a second grouping device.

[0005] WO 2013/038310 A1 discloses a diverter wherein a batch of articles and one individual article are alternately directed towards a first and a second grouping device.

[0006] With an increasing variety of package units differing in type or size there is an increasing need for a higher flexibility.

SUMMARY OF THE INVENTION

[0007] It is therefore the object of the invention to provide a device and a method for packaging sanitary articles with a high degree of flexibility.

[0008] This object is solved by the device and the method with the features of claims 1 and 7. Preferred embodiments are defined in the dependent claims.

[0009] According to a first aspect, a device for packaging sanitary articles comprising at least one diverter and M packaging arrangements arranged downstream of the diverter, with M>=2, is provided, wherein each packaging arrangement comprises a grouping device and at least one packaging device, and wherein by means of the at least one diverter batches of articles are alternately directed towards the packaging arrangements, each batch comprising at least one article, and wherein a control unit is provided by means of which the at least one diverter is controllable for alternately directing batches of articles towards the packaging arrangements in a repeated series of MxN batches, with N>=2, wherein at least two of the N batches of articles of one series of MxN batches directed towards the first packaging arrangement are settable to differ in count.

[0010] According to a second aspect, a method for packaging sanitary articles is provided, wherein by means of at least one diverter batches of articles are alternately directed towards M packaging arrangements, each batch comprising at least one article, and wherein the diverter alternately directs batches of articles towards the packaging arrangements in a repeated series of MxN batches, with N>=2, wherein at least two of the N batches of one series of MxN batches directed towards the first packaging arrangement differ in count.

[0011] In other words, the at least one diverter has at least two outlet lines, wherein in accordance with the invention by means the diverter at least two batches differing in count can be fed to at least one of the two outlet lines of the diverter.

[0012] In the context of the application, the words "first", "second", "third" etc. are simply used as a reference and are not to be understood as any designation of any hierarchy or structural arrangement.

[0013] Batches of articles of the product stream coming from a production line are alternately directed towards the packaging arrangements. In one embodiment, a packaging device of at least one of the first and the second packaging arrangement is adapted to packing two batches of articles differing in size into one common package or successive packages. In alternative or in addition, in one embodiment, at least a first packaging arrangement is provided with two or more packaging devices or one or more dual lane packaging device. When diverting the product stream into a repeated series of MxN batches of articles, with N>=2, each batch can be adapted to the associated packaging device or lane of the packaging device. For example, the device comprises a first and a second packaging arrangement, wherein the first packaging arrangement comprises two packaging devices to which first batches A of count a and second batches B of count b are fed, respectively, and the second packaging arrangement comprises one packaging device to which third batches C of count c are fed. In this case, the diverter can be controlled to feed a articles to the first packaging arrangement, c articles to the second packaging arrangement, b articles to the first packaging arrangement, c articles to the second packaging arrangement, and so on. In other words, the repeated series of four batches is A-C-B-C, wherein the counts a and b of the batches B can be chosen to be not equal.

[0014] The number of articles in each batch in one embodiment equals the number articles to be packaged in one packaging unit. In other embodiments, successive batches are grouped and a number of grouped batches are packaged together.

[0015] In one embodiment, the packaging arrangements each comprise at least two packaging devices or

at least one dual lane packaging device.

[0016] In alternative or in addition, in one embodiment the device comprises two packaging arrangements arranged downstream of one associated diverter. Such a diverter is simple in design. For a further division of the product stream, additional diverters could be provided. The diverter feeding a first and a second packaging arrangement can be controlled to feed a first count a of articles to the first packaging arrangement, a third count c of articles to the second packaging arrangement, a second count b of articles to the first packaging arrangement, and fourth count d of articles to the second packaging arrangement. In other words, the repeated series of four batches is A-C-B-D, wherein at least the two counts a and b are not equal. Counts c and d of the third batch C and the fourth batch D in one embodiment are chosen equal. In a further embodiment, the counts c and d are also set differently. The two counts a and b can be packaged together using a common packaging device or packaged using two packaging devices or a dual lane packaging device.

[0017] In one embodiment, the grouping device of at least one of the M packaging arrangements is a stacker comprising a conveyor with a number of pockets for receiving individual articles. A stacker is described for example in US 2007/0065270 A1 and/or US 7475771 B2 enclosed herewith by reference. The batches of articles are grouped in the stacker and groups of articles are offloaded or removed from the stacker for a subsequent packaging. In one embodiment, the conveyer is an open-loop conveyor, wherein pockets can be selectively added or removed from the conveyor. In other embodiments, the conveyor is a closed-loop circulation conveyor. In one embodiment, walls separating successive pockets are arranged fixed in position on the conveyor. In other embodiments, the walls are moveable within limits with respect to the conveyor allowing a pocket size to be decreased after receiving the article. This may be used for compressing the articles and/or calibrating the articles.

[0018] In one embodiment, the speed of the stacker is adapted to the speed of the diverter and the product stream such that successive batches are inserted without gaps into pockets of the stacker.

[0019] In an alternative embodiment, at the stacker successive batches of the same series of batches are separated by one or more empty pocket(s). In alternative or in addition, at the stacker successive batches of articles of the successive series of batches of articles are separated by one or more empty pocket(s). The empty pockets could be filed with additional articles of the same or different type to be packaged together with a batch of articles. In particular in case the walls between successive pockets are moveable with respect to the conveyor, the size of the empty pockets between successive batches can vary.

[0020] In an alternative embodiment, the grouping device of at least one of the M packaging arrangements is a stacker comprising a conveyor with a number of compartments for batches of articles. In one embodiment, the size of each compartment is adjustable for adjusting the size of the compartment to the size of the batch received. For an adjustment of the size, walls defining the compartment are moveable with respect to each other. In one embodiment, upon loading the compartment, a leading wall is moved faster than a trailing wall thereby increasing the size of the compartment. In alternative or in addition, in one embodiment, after loading the compartment, the trailing wall is moved towards the leading wall for compressing the articles in the compartment. In one embodiment, when moving the trailing wall towards the leading wall of the same compartment, a gap is formed between the trailing wall and a leading wall of a successive compartment. In other embodiments, the trailing wall of the successive compartment is coupled to the leading wall of the compartment and when moving the trailing wall towards the leading wall of the same compartment, the size of the successive compartment is increased. In still another embodiment, the movement of successive trailing walls and/or successive leading walls is coupled, wherein preferably the sizes of the compartments differ to match the size of the associated batches.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] In the following, an embodiment of the invention will be described in detail with reference to the drawings. Throughout the drawings, the same elements will be denoted by the same reference numerals.

Fig. 1: schematically shows a device for packaging sanitary articles comprising a diverter, a first packaging arrangement and a second packaging arrangement arranged downstream of the diverter,

Fig. 2: schematically shows a stacker of a packaging arrangement for a device of Fig. 1, and

Fig. 3 schematically shows an alternative embodiment of a stacker similar to Fig. 2.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0022] Fig. 1 schematically shows a device 1 for packaging sanitary articles (5, see Fig. 2) such as absorbent articles, like diapers, sanitary napkins, panty liners, incontinence pads or similar.

[0023] The device 1 shown in Fig. 1 comprises a diverter 10, a first packaging arrangement 11 and a second packaging arrangement 12 arranged downstream of the diverter 10. In the embodiment shown, the first packaging arrangement 11 comprises a first grouping device 21 and two packaging device 31, 32. The second packaging arrangement 12 comprises a second grouping device 22 and two packaging device 33, 34. A control unit 100 is

assigned to the diverter 10. The control unit 100 in one embodiment is part of a central control unit (not shown) provided for a monitoring and/or control of the device 1. In other embodiments, an individual control unit 100 is assigned to the diverter 10.

[0024] A product stream S coming from a production line (not shown) is fed to the diverter 10. The diverter 10 is controllable such that by means of the diverter 10 batches of articles A, B, C, D are alternately directed towards the first packaging arrangement 11 and the second packaging arrangement 12, wherein in the embodiment shown, a first batch A and a second batch B are fed to the first packaging arrangement 11 and a third batch C and a fourth batch D are fed to the second packaging arrangement 12. In the embodiment shown, at the first packaging arrangement 11, the first batch A is processed in the first packaging device 31 and the second batch B is processed in the second packaging device 32. Similar, at the second packaging arrangement 12, the third batch C is processed in the third packaging device 33 and the fourth batch D is processed in the fourth packaging device 34. It will be understood that the terms "first, "second", "third" and "fourth" are merely used to distinguish the batches and/or devices and not to be interpreted as defining any order of priority, hierarchy and/or structural arrangement.

[0025] By means of the control unit 100, the number of articles in each batch A, B, C, D, is individually settable, wherein each batch A, B, C; D comprises at least one article. The diverter 10 is controllable for alternately directing the batches of articles A, B, C, D towards the first packaging arrangement 11 and the second packaging arrangement 12 in a repeated series of four batches A-C-B-D. Of course, the number of articles in each batch A, B, C, D can be chosen identical. However, for a higher flexibility, at least the first batch A of articles and the second batch B of articles processed in the first packaging device 11 can also be chosen to differ in count. For the highest flexibility, the third batch C of articles and the fourth batch D of articles processed in the second packaging device 11 can also be chosen to differ in count. For setting the counts, in one embodiment, the control unit 100 comprises a man-machine-interface allowing user to individually set the count of each batch A, B, C, D.

[0026] It will be understood by the person skilled in the art, that further packaging devices could be added to one or both of the packaging arrangements 11, 12 and/or further packaging arrangements could be added downstream of the diverter 10. In this case, the number of batches per series could be increased such that the count of articles is adapted to each packaging device.

[0027] In the embodiment shown, two packaging devices 31, 32, 33, 34 are provided at each packaging arrangements 11, 12. In an alternative embodiment, at least at one of the packaging arrangements 11, 12 a dual-lane packaging device is provided instead of two packaging devices 31, 32, 33, 34. In still another embodiment, one packaging arrangement 11, 12 comprises only one packaging device.

[0028] The number of articles in each batch A, B, C; D in one embodiment equals the number articles to be packaged in one packaging unit at the four packaging devices 31, 32, 33, 34. In other embodiments, successive batches fed to one of the four packaging devices 31, 32, 33, 34 are grouped and a number of batches are packaged together at the respective packaging device 31, 32, 33, 34.

[0029] Fig. 2 schematically shows a grouping device 21 of the device 1 of Fig. 1, which in the embodiment shown is a stacker comprising a closed-loop circulating conveyor 210 with a number of pockets 212 for receiving individual articles 5. It will be understood that in preferred embodiments, pockets 212 are provided along the entire path of the conveyor 210, however, for the sake of clarity, only a number of pockets 212 is shown in Fig. 2.

[0030] As schematically shown, articles 5 are inserted into the pockets 212. In accordance with the invention, the articles 5 are supplied in two batches A, B that differ in count. In the embodiment shown, batch A comprises three articles 5 and batch B comprises four articles 5. Further, in the embodiment shown, one empty pocket 212 is provided in each case between successive batches A, B of the same series of batches A-C-B-D (see Fig. 1) as well as between successive batches B, A of successive series of batches A-C-B-D.

[0031] Fig. 3 schematically shows an alternative embodiment of a grouping device 21 of the device 1 of Fig. 1, which in the embodiment shown is a stacker comprising a closed-loop circulating conveyor 210 with a number of pockets compartments 213, 214, 215, 216, 217 for receiving batches A, B of articles 5. It will be understood that in preferred embodiments, compartments 213, 214, 215, 216, 217 are provided along the entire path of the conveyor 210, however, for the sake of clarity, only a number of compartments 213, 214, 215, 216, 217 is shown in Fig. 3. Each compartment 213, 214, 215, 216, 217 is limited by a leading wall and a trailing wall. In preferred embodiments, the leading wall and the trailing wall are moveable with respect to one another. In an alternative embodiment, one or more additional separation wall is provided between the leading wall and the trailing wall of one compartment, separating a batch of articles in two or more sub-batches. The sub-batches of one batch are subsequently supplied to a common packaging device. In still another embodiment, successive batches A, B that differ in count are inserted between a leading wall and a trailing wall of a common compartment and supplied to a common packaging device.

[0032] The embodiment shown in Fig. 3 allows minimizing unused parts along the conveyor path, in particular in case a thickness products 5 are smaller in size than the pockets 212 of the stacker shown in Fig. 2. In particular in case both the trailing wall and the leading wall of the compartments 213, 214, 215, 216, 217 are moveable with respect to the conveyor path, an optimized positioning of the batches A, B along the path is possible.

A clearance 218 between successive compartments 213, 214, 215, 216, 217 in one embodiment is chosen to equal a set size. In the embodiment shown, the clearance is variable. This allows to move two successive batches A, B close to one another for pushing both batches A, B into a common bag as well as to move successive batches A, B further apart in particular when filling two bags at least in part at the same or time.

Claims

1. Device for packaging sanitary articles (5) comprising at least one diverter (10) and M packaging arrangements (11, 12) arranged downstream of the diverter (10), with M>=2, wherein each packaging arrangement (11, 12) comprises a grouping device (21) and at least one packaging device (31, 32), and wherein by means of the at least one diverter (10) batches (A, B, C, D) of articles (5) are alternately directed towards the packaging arrangements (11, 12), each batch (A, B, C, D) comprising at least one article (5), **characterized in that**
a control unit (100) is provided by means of which the at least one diverter (10) is controllable for alternately directing batches (A, B, C, D) of articles towards the packaging arrangements (11, 12) in a repeated series of MxN batches (A-C-B-D), with N>=2, wherein at least two of the N batches (A, B) of articles (5) of one series of MxN batches (A-C-B-D) directed towards the first packaging arrangement (11) are settable to differ in count.

2. Device for packaging sanitary articles according to claim 1, **characterized in that** at least a first packaging arrangement (11) of the M packaging arrangements (11, 12) comprises at least two packaging devices (31, 32) or at least one dual lane packaging device, wherein preferably the M packaging arrangements (11, 12) each comprise at least two packaging devices (31, 32, 33, 34) or at least one dual lane packaging device.

3. Device for packaging sanitary articles according to claim 1 or 2, **characterized in that** the device (1) comprises two packaging arrangements (11, 12) arranged downstream of one associated diverter (10).

4. Device for packaging sanitary articles according to any one of claims 1, 2 or 3, **characterized in that** the grouping devices (21, 22) of at least one of the M packaging arrangements (11, 12) is a stacker comprising a conveyor with a number of pockets (212) for receiving individual articles (5), in a particular a closed-loop circulating conveyor (210).

5. Device for packaging sanitary articles according to claim 4, **characterized in that** at the stacker (21) successive batches of the same series of batches (A-C-B-D) are separated by one or more empty pocket(s) (212).

6. Device for packaging sanitary articles according to claim 4 or 5, **characterized in that** at the stacker (21) successive batches of the successive series of batches (A-C-B-D) are separated by one or more empty pocket(s) (212).

7. Device for packaging sanitary articles according to any one of claims 1 to 6, **characterized in that** the grouping devices (21, 22) of at least one of the M packaging arrangements (11, 12) is a stacker comprising a conveyor with a number of compartments (213, 214, 215, 216, 217) for batches (A, B; C, D) of articles.

8. Method for packaging sanitary articles, wherein by means of at least one diverter (10) batches (A, B, C, D) of articles (5) are alternately directed towards M packaging arrangements (11, 12), each batch (A, B, C, D) comprising at least one article (5), **characterized in that**
the diverter (10) alternately directs batches (A, B, C, D) of articles (5) towards the M packaging arrangements (11, 12) in a repeated series of MxN batches (A-C-B-D), with N>=2, wherein at least two of the N batches (A, B) of one series of MxN batches (A-C-B-D) directed towards the first packaging arrangement (11) differ in count.

9. Method for packaging sanitary articles according to claim 8, **characterized in that** at least at a first packaging arrangement (11) of the M packaging arrangements (11, 12) articles (5) are packaged using at least two packaging devices (31, 32, 33, 34) or at least one dual lane packaging device, wherein in particular at each of the M packaging arrangements (11, 12) articles (5) are packaged using at least two packaging devices (31, 32, 33, 34) or at least one dual lane packaging device.

10. Method for packaging sanitary articles according to claim 8 or 9, **characterized in that** at least two of the N batches of one series of MxN batches of articles directed towards different ones of the M packaging arrangements (11, 12) differ in count.

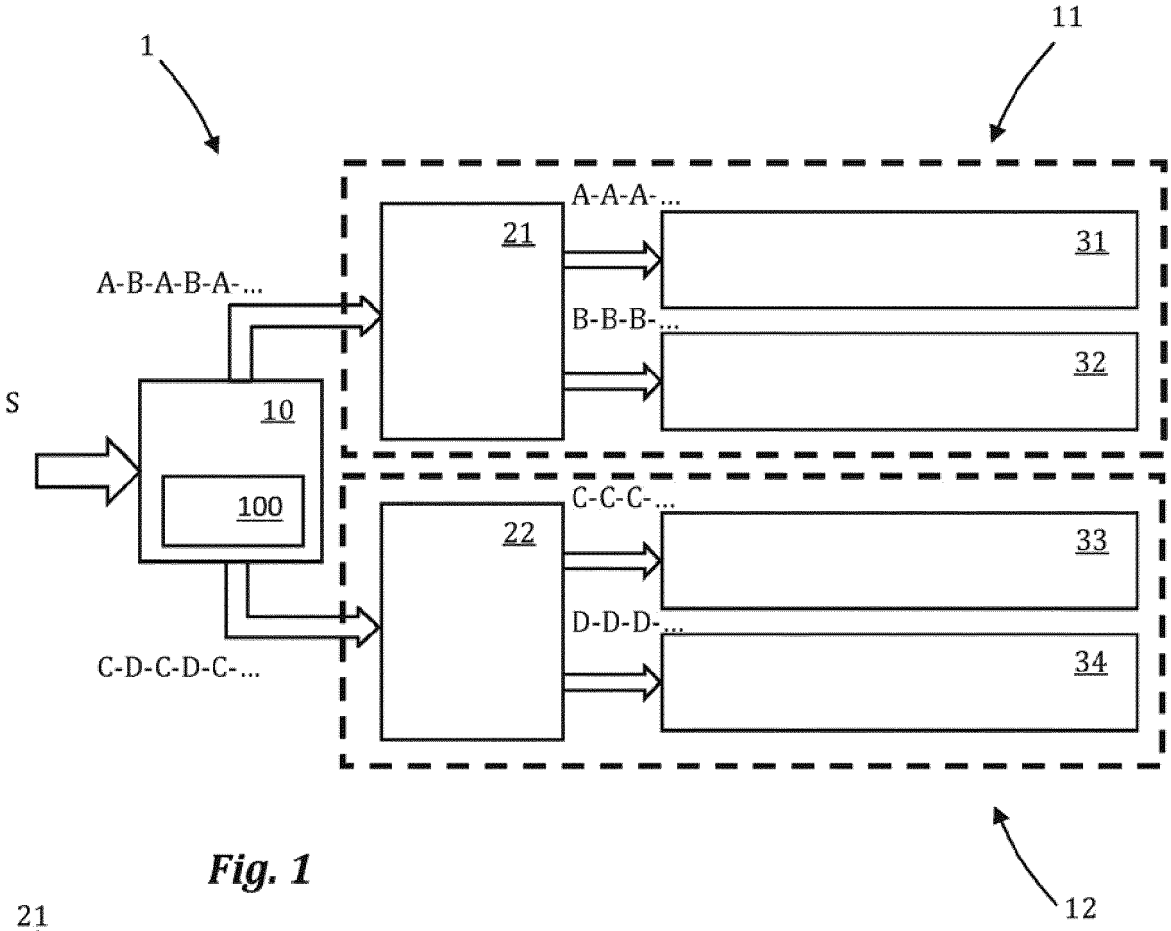
11. Method for packaging sanitary articles according to any one of claims 8, 9 or 10, **characterized in that** at least at one of the M packaging arrangements (11, 12) articles (5) are grouped by means of a stacker comprising a conveyor with a number of pockets (212) for receiving individual articles, in particular a closed-loop circulating conveyor (210).

12. Method for packaging sanitary articles according to

claim 11, **characterized in that** at the stacker successive batches (A, B) of the same series of batches (A-C-B-D) are separated by one or more empty pocket(s) (212).

13. Method for packaging sanitary articles according to claim 11 or 12, **characterized in that** at the stacker successive batches (A, B) of articles of successive series of batches (A-C-B-D) are separated by one or more empty pocket(s) (212).

14. Method for packaging sanitary articles according to any one of claims 8 to 12, **characterized in that** at least at one of the M packaging arrangements (11, 12) articles (5) are grouped by means of a stacker comprising a conveyor with a number of compartments (212) for receiving batches (A, B, C, D) of articles, in particular a closed-loop circulating conveyor (210).


1
11
A-A-A-...
21
31
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B-B-B-...
32
S
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100
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22
33
D-D-D-...
C-D-C-D-C-...
34
12

Fig. 1

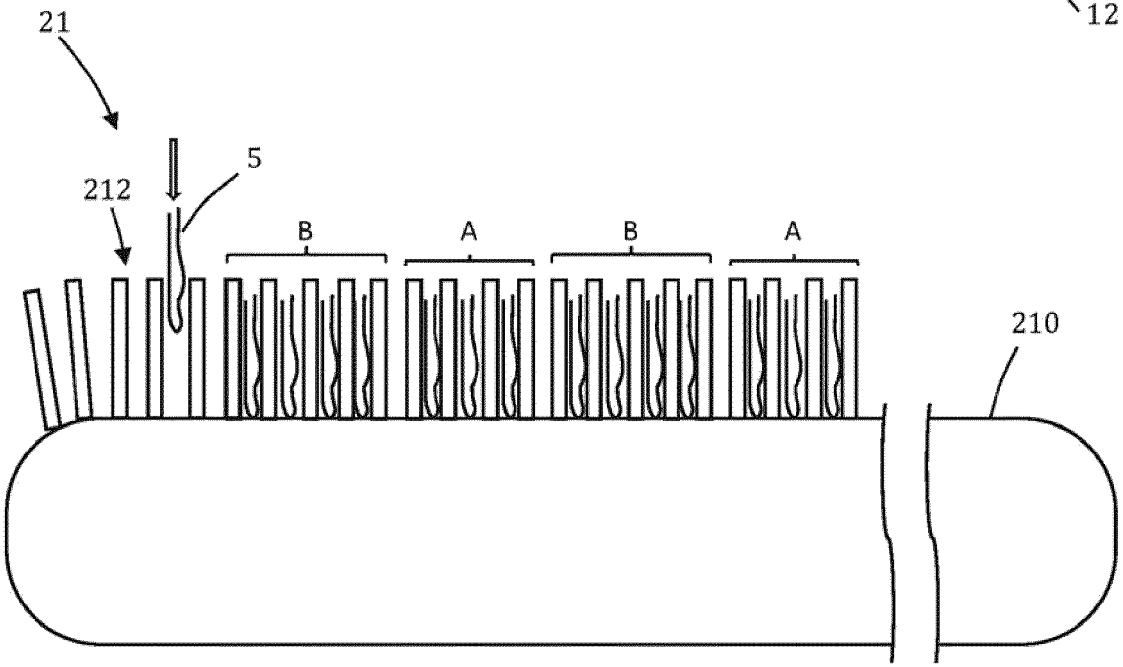
21
5
212
B
A
B
A
210

Fig. 2

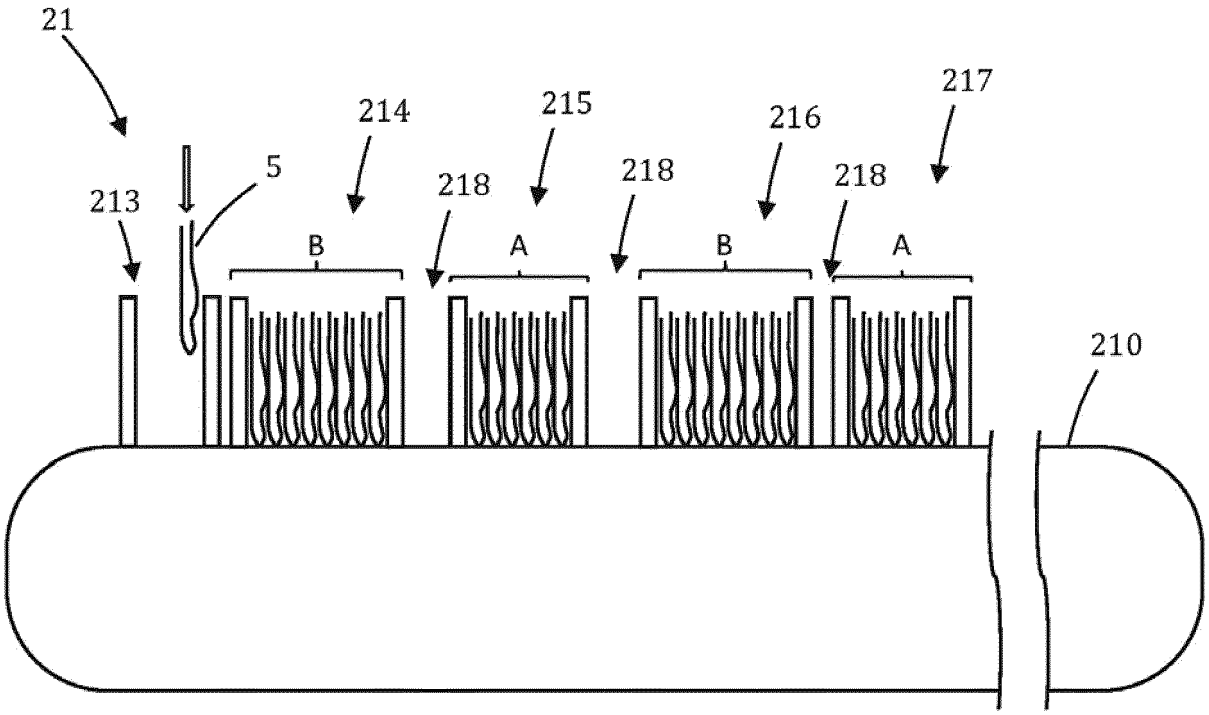

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 17 20 5678

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B65H
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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	11 April 2018	Cardoso, Victor

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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