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(54) LABELLING MODULE AND METHOD FOR APPLYING LABELS ONTO ARTICLES ADAPTED TO CONTAIN A POURABLE PRODUCT

(57) There is described a labelling module (8) for applying labels (2) obtained from a web (3) of labelling material onto articles (4) adapted to contain a pourable product, the labelling module (8) comprises: a feed system (10) for feeding the web (3) along a feeding path; a cutting unit (11) for repeatedly cutting the web (3) at a cutting station (C) thereby obtaining a sequence of labels (2) therefrom; and a transfer unit (12) for receiving the sequence of labels (2) and for transferring them to an application station (A) for the application thereof onto respective articles (4); the cutting unit (11) defines a plurality of cutting pairs, each cutting pair comprises one first cutting member (14a; 15a) and one second cutting member (15a, 15b, 15c, 15d; 14a, 14b, 14c, 14d) which are configured for cooperating with one another to cut the web (3); the cutting unit (11) is configured to cyclically convey the cutting pairs through the cutting station (C); each cutting pair is selectively controllable in an activated configuration, for cyclically cutting the web (3) at the cutting station (C) thereby causing the separation of the labels (2) from the web (3), and in a deactivated configuration, in which the cutting pair is spaced from the web (3) at the cutting station (C).

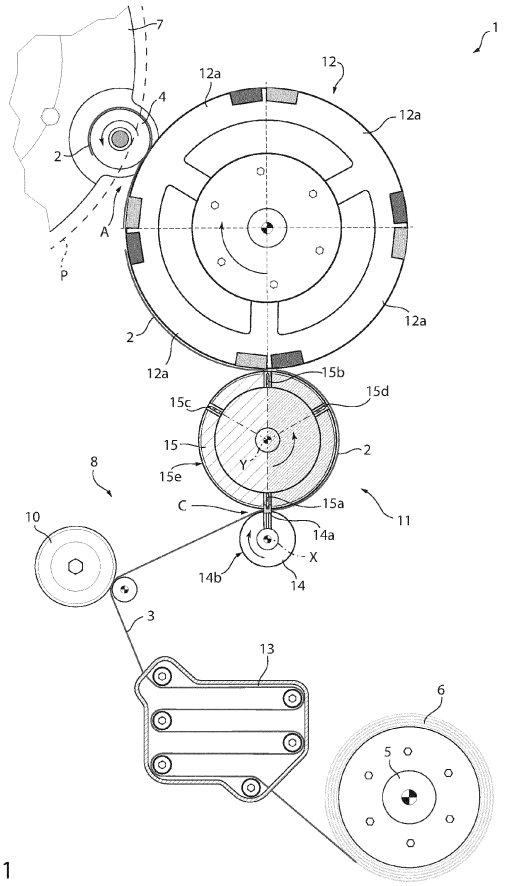

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a labelling module for applying labels onto articles, such as bottles, jars or containers of such sort, adapted to contain a pourable product, preferably a pourable food product.

[0002] The present invention also relates to a method for applying labels onto articles, such as bottles, jars or containers of such sort, adapted to contain a pourable product, preferably a pourable food product.

BACKGROUND ART

[0003] Labelling machines are known, which are commonly used to prepare, transport and apply labels onto articles, such as bottles, jars, flacons, containers, or the like adapted to be filled with a pourable product, in particular a pourable food product.

[0004] Particularly widespread are labels of the tubular kind known as "sleeve labels", which are obtained starting from a web of heat-shrinking film initially wound around one or more storage reels; the sleeve labels are applied with a certain clearance on the respective articles and then heated in an oven to obtain their shrinking and perfect adhesion to the lateral surfaces of the articles.

[0005] These type of labels do not require the use of glue.

[0006] Also particularly widespread is the use of glued labels, i.e. portions of a labelling material that are cut at appropriate lengths from a web of labelling material initially wound around one or more storage reels and then sprinkled with glue.

[0007] In detail, the web of labelling material is unwound off the relative reel and then sequentially cut in successive labels of equal length, upon which glue is applied by gluing means, such as a gluing roller, spray or injector systems or the like.

[0008] Eventually, the labels so obtained are conveyed and applied onto the respective articles to be labelled.

[0009] Regardless of the type of label used, a known labelling machine typically comprises:

- a rotary carousel, rotatable around a central axis, usually vertical, and configured to convey a plurality of articles along an horizontal, arc-shaped labelling path;
- an input station, at which the articles to be labelled are received by the carousel;
- an output station, at which the labelled articles exit the carousel; and
- a labelling module, peripherally arranged relatively to the carousel and configured to feed a plurality of labels to the carousel itself at an application station, in order to apply such labels to respective articles.

[0010] Typically, the labelling module comprises:

- one or more storage units, for example reels or spools around which the web of labelling material is initially wound;
- a plurality of unwinding rollers, which support, in use, the web progressively unwound from the reel and guide it, in use, along a feeding path; and
- a label transfer device, for example a known vacuum drum configured to receive, retain and advance each label and to feed each label to the carousel, at the application station.

[0011] In detail, the vacuum drum is configured to receive a succession of labels at a receiving station and to retain them by means of suction applied through known vacuum ports on the outer lateral surface thereof. Then, after a rotation of a certain angle about its axis, the vacuum drum releases the labels at the application station, so that such labels can be applied onto respective articles advanced by the carousel.

[0012] Typically, the labelling module further comprises a cutting device configured to cut (i.e. to separate), in particular to sequentially cut, the web of labelling material at a cutting station, so as to separate a sequence of labels from the web which is unwound, in use, from the reel.

[0013] According to a well-known configuration, rotary-type cutting devices are used, which comprise:

- a first rotary element, usually a blade roller, rotatably mounted about a vertical axis, carrying a blade member and configured to convey the blade member cyclically through the cutting station, along a circular cutting path around the axis; and
- a second rotary element, usually a counterblade roller, rotatably mounted about an axis usually parallel to the axis of the first rotary element, arranged peripherally to the first rotary element, so as to be substantially tangential to the cutting path, carrying a counterblade member and configured to convey the counterblade member cyclically through the cutting station along a circular path.

[0014] In other words, the blade member and the counterblade member are both cyclically conveyed, in a synchronous manner, through the cutting station, to interact with one another and perform the cutting of the web thereby separating the sequence of labels therefrom.

[0015] More precisely, the web is interposed, in use and at the cutting station, between the blade roller and the counterblade roller, with the counterblade member cyclically acting as an abutment member for the blade member during the cutting.

[0016] In the case in which glued labels are used, the labelling module further comprises gluing means, for example a gluing roller arranged peripherally to the vacuum drum, configured to spread the glue on at least the end portions of each individual label, after the cutting and prior to their application to the relative articles.

[0017] In another known solution, gluing means com-

prise a spray nozzle arranged peripherally to the vacuum drum.

[0018] The need for spacing the labels from one another, after the cutting and prior to the application onto the articles, is known in the field, so as to match the step or cadence or pitch of the articles advanced by the carousel.

[0019] To this end, the vacuum drum is configured to impart a transfer step or pitch to the labels received and fed to the carousel.

[0020] In fact, the labels are initially joined to one another in form of said web, and only after spaced by means of the vacuum drum.

[0021] Accordingly, the vacuum drum can be conceptually divided in a plurality of receiving sectors, each sector being configured to receive and retain one label at a time from the cutting device and having a linear extension correlated to the length of the label. In particular, the linear extension is greater than the length of the label to allow the spacing of the labels.

[0022] Also, the linear distance followed by the blade roller and/or by the counter blade roller for each cutting, that is the linear distance followed by the blade roller and/or the counter blade roller between two subsequent cuts, is correlated to the length of the label.

[0023] Therefore, in case of label length variation, a first solution for varying said linear distance is to change the blade roller and/or the counter blade roller.

[0024] This first solution is cumbersome and requires the user to have several alternative rollers for the various label formats. This renders the labelling machine not very flexible or adaptive.

[0025] An alternative known solution entails an adaptive control of the rotational velocity of the blade roller and counterblade roller, in order to match the new label pitch on the vacuum drum, due to the new label format.

[0026] Alternatively, a transmission ratio between the blade roller and the counterblade roller can be varied, so as to define a new interval between two successive cuts of the web, and therefore a new label length.

[0027] However, also these solutions are cumbersome and complicated, as they require a complicated control of the motors of the rollers, and complicated and delicate mechanisms in order to obtain the desired transmission ratio.

DISCLOSURE OF INVENTION

[0028] It is therefore an object of the present invention to provide a labelling module and a method for applying labels onto articles which are designed to overcome at least one of the above-mentioned drawbacks in a straightforward and low-cost manner.

[0029] This object is achieved by a labelling module and a method for applying labels onto articles as claimed in the appended independent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] Non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic top view, with parts removed for clarity, of a labelling module according to a first embodiment of the present invention, in a first possible situation during a production mode of the module;

Figure 2 is a larger scale, schematic top view of a detail of the labelling module of Figure 1, in a second possible situation during a production mode of the module;

Figure 3 is a larger scale, schematic top view of a detail of the labelling module of Figure 1, in a third possible situation;

Figure 4 is a larger scale, schematic top view of a detail of the labelling module of Figure 1, in a fourth possible situation;

Figure 5 is a schematic top view, with parts removed for clarity, of a detail of a labelling module according to a second embodiment of the present invention, in a first possible situation;

Figure 6 is a top schematic view, with parts removed for clarity, of a detail of the labelling module of Figure 5, in a second possible situation;

Figure 7 is a perspective view, with parts removed for clarity, of a cutting device of the labelling module of Figure 5, in a third possible situation; and

Figure 8 is a perspective view, with parts removed for clarity, of a cutting device of a labelling machine according to a third embodiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0031] With reference to Figure 1, number 1 indicates as a whole a labelling machine for applying labels 2 obtained from a web 3 of labelling material onto articles 4, such as bottles, jars or containers of such sort, adapted to contain a pourable product, preferably a pourable food product.

[0032] In detail, labelling machine 1 is configured to prepare, transport and apply a sequence of labels 2 onto articles 4.

[0033] According to this preferred and non-limiting embodiment, labels 2 are glued labels, i.e. strips of labelling material that are cut at appropriate lengths from a web of labelling material initially wound around one or more storage reels and then sprinkled with glue.

[0034] Preferably, web 3 of labelling material is initially wound around one or more spools 5 in the form of a reel 6, and is progressively unwound, in use, off reel 6.

[0035] As visible in Figure 1, labelling machine 1 essentially comprises:

- a conveyor device, preferably a rotary carousel 7 rotatable around a fixed axis (not shown), in particular vertical, and configured to advance a plurality of articles 4 (only one of which is shown) along a labelling path P, in the example shown an arc-shaped, horizontal path;
- an input station (not shown), at which articles 4 to be labelled are fed to carousel 7;
- an output station (not shown), at which labelled articles 4 exit from carousel 7; and
- a labelling module 8 (only partially and schematically shown), arranged peripherally relatively to carousel 7 and configured to prepare and feed a plurality of labels 2 to the carousel 7 itself at an application station A, in order to apply labels 2 onto respective articles 4.

[0036] In detail, labelling module 8 comprises:

- at least one aforementioned spool 5 for rotatably supporting a reel 6 of web 3;
- a plurality of unwinding rollers 10, which support, in use, the web 3 progressively unwound from the reel 6 and guide it along a feeding path, thereby defining a feed system;
- a cutting unit 11 for repeatedly cutting the web 3 at a cutting station C thereby obtaining a sequence of labels 2 therefrom; and
- a transfer unit 12 for receiving the sequence of labels 2 and for transferring them to the application station A for the application thereof onto the respective articles 4.

[0037] Preferably, transfer unit includes a transfer drum, in particular a known vacuum drum 12 rotatable about a central axis, preferably vertical, and configured for retaining the labels 2 by means of suction applied through known vacuum ports (not shown) which are selectively connectable to a known vacuum source. Then, after a rotation of a certain angle about its axis, the vacuum drum 12 releases the labels 2 at the application station A, so that such labels 2 can be applied onto respective articles 4 advanced by the carousel 7.

[0038] Conveniently, labelling module 8 further comprises:

- a gluing unit, for example a gluing roller (not shown) for sprinkling the labels 2 with glue while they are being transferred by the vacuum drum 12, upstream of application station A; and
- a buffer device 13, known per se and not described in detail, for accumulating the web 3, in particular to regulate the tension of the web.

[0039] It is known the need for spacing the labels 2 from one another, after the cutting and prior to the application onto the articles 4, so as to match the step or cadence or pitch of the articles 4 advanced by the carousel 7.

[0040] To this end, vacuum drum 12 is configured to impart a transfer step or pitch to the labels 2 received and fed to the carousel 7.

[0041] Accordingly, vacuum drum 12 can be conceptually divided in a plurality of receiving sectors 12a, each sector being configured to receive and retain one label 2 at a time from the cutting unit 11.

[0042] In Figure 1, it is shown a vacuum drum 12 divided into four sectors 12a, adapted to transfer labels 2 the length of which is correlated to the linear extension of each sector 12a, measured on the outer lateral surface of the vacuum drum 12 (the length is the linear extension minus a certain sliding extension).

[0043] If a label format change is due, for example if shorter labels 2 are needed to be produced and applied, a vacuum drum 12 with a different number of sectors 12a must be provided, because it is convenient that the diameter of the vacuum drum 12 is maintained constant.

[0044] For example, as shown in Figures 3 and 4, a vacuum drum 12 with six sectors 12a, each one smaller than each of the four sectors 12a of Figure 1, has to be provided.

[0045] The cutting unit 11 comprises a first roller 14 carrying at least one first cutting member 14a, and a second roller 15 carrying a plurality of second cutting member 15a, 15b, 15c, 15d. Each of the first roller 14 and the second roller 15 defines a respective longitudinal axis X or Y. The second cutting members are angularly distributed around the longitudinal axis Y of the second roller 15.

[0046] The first roller 14 and the second roller 15 defines between them a cutting station C.

[0047] The cutting unit 11 defines a plurality of cutting pairs. Each cutting pair comprises a respective combination of one first cutting member and one second cutting member, which are configured for cooperating with one another to cut the web 3 at the cutting station C.

[0048] A first possible pair comprises for example first cutting member 14a and second cutting member 15a. A second pair comprises for example first cutting member 14a and second cutting member 15b. A third pair comprises for example first cutting member 14a and second cutting member 15c. A fourth pair comprises for example first cutting member 14a and fourth cutting member 15d.

[0049] The cutting unit 11 is configured, by rotating the first roller 14 and the second roller 15 around the respective longitudinal axes X and Y, for conveying sequentially the cutting pairs through the cutting station C.

[0050] For example, by rotating the first roller 14 and the second roller 15 around the respective longitudinal axes X and Y, the cutting unit 11 is configured for sequentially conveying through the cutting station C the first pair, the second pair, the third pair, and the fourth pair.

[0051] The cutting unit 11 is configured so that each cutting pair can adopt an active condition and a not active condition. The cutting unit is configured so that the conveying of an active pair through the cutting station C corresponds to the cutting of the web. The cutting unit 11 is

configured so that the conveying of a not active pair through the cutting station C does not correspond to the cutting of the web.

[0052] In particular, the linear distance followed by the first roller 14 and/or by the second roller 15 for each cutting must vary upon a variation of the label length. Said linear distance, in fact, must be equal or at least must be correlated to the linear extension of the vacuum drum sector. Therefore, by varying the conditions of the pairs, the linear distance can be varied in a simple way, and the cutting unit 11 and/or the labelling module 8 can be more simply and/or more quickly adapted to a variation of the label length.

[0053] In the first embodiment of Figures 1-4 and in the third embodiment of Figure 8, each first cutting member 14a is a counterblade member. In the first embodiment of Figures 1-4 and in the third embodiment of Figure 8, each second cutting member 15a or 15b or 15c or 15d is a blade member.

[0054] In the second embodiment of Figures 5-7, each first cutting member 14a is a blade member. In the second embodiment of Figures 5-7, each second cutting member 15a or 15b or 15c or 15d is a counterblade member.

[0055] In the first embodiment of Figures 1-4, in the second embodiment of Figures 5-7, and in the third embodiment of Figure 8, the first roller 14 is carrying for example only one first cutting member 14a.

[0056] Figure 1 corresponds to the conveying through the cutting station C of the pair comprising the first cutting member 14a and the second cutting element 15a, in a situation in which the pair 14a-15a is active. Figure 2 corresponds to the conveying through the cutting station C of the pair comprising the first cutting member 14a and the second cutting element 15b, in a situation in which the pair 14a-15b is active. Figure 3 corresponds to the conveying through the cutting station C of the pair comprising the first cutting member 14a and the second cutting element 15d, in a situation in which the pair 14a-15d is active. Figure 4 corresponds to the conveying through the cutting station C of the pair comprising the first cutting member 14a and the second cutting element 15b, in a situation in which the pair 14a-15b is not active.

[0057] Figure 5 corresponds to the conveying through the cutting station C of the pair comprising the first cutting member 14a and the second cutting element 15d, in a situation in which the pair 14a-15d is active. Figure 7 corresponds to the conveying through the cutting station C of the pair comprising the first cutting member 14a and the second cutting element 15b, in a situation in which the pair 14a-15b is active.

[0058] Each of the first roller 14 and the second roller 15 has a respective external lateral surface 14b or 15e, which is located around the respective longitudinal axis X or Y. The cutting station C is defined between the lateral surface 14b of the first roller 14 and the lateral surface 15e of the second roller 15.

[0059] Each first cutting member 14a or each second cutting member 15a or 15b or 15c or 15d, is radially movable, with respect to the longitudinal axis X or Y of the respective roller 14 or 15, to adopt a first position in which the radially movable cutting member is retracted in the lateral surface 14b or 15e of the respective roller 14 or 15, and a second position in which the radially movable cutting member protrudes from said lateral surface 14b or 15e.

[0060] In the first embodiment of Figures 1-4, each first cutting member 14a is radially movable. In the second embodiment of Figures 5-7 and in the third embodiment of Figure 8, each second cutting member 15a or 15b or 15c or 15d is radially movable.

[0061] The cutting unit 11 is configured so that the conveying of an active pair through the cutting station C corresponds to the respective radially movable cutting member being positioned in the second position, so that the web is cut. This is shown for example in Figures 1, 2, 3, 5 and 7.

[0062] The labelling module 8 is configured so that the conveying of a not active pair through the cutting station C corresponds to the respective radially movable cutting member being positioned in the first position, so that the web is not cut. This is shown for example in Figure 4.

[0063] The cutting unit 11 comprises an actuator for moving each radially movable cutting member between the first position and the second position.

[0064] In particular, as the condition of each pair is correlated to the movable cutting element being in the second position or in the first position when the pair is conveyed through the cutting station C, and the first position and the second position differ from each other mainly only with respect to a radial direction, the structural configuration of the actuator can be more simple.

[0065] The actuator can be a magnetic actuator, an electromagnetic actuator, a mechanical contact actuator, a hydraulic actuator, an electric actuator, a pneumatic actuator, or the like, or a combination thereof.

[0066] The module is configured for operating in a production mode, according to which the first roller 14 and the second roller 15 rotate around the respective axes X or Y, so that said pairs are sequentially conveyed through the cutting station C.

[0067] The labelling module 8 is configured for operating in a setup mode, when is not operating in the production mode. The module 8 is configured so that, in the setup mode, a user can preliminary vary and/or set the condition of each pair, by acting on or modifying the actuator.

[0068] In first embodiment of Figures 1-4 and in second embodiment of Figures 5-7, the cutting unit 11 is configured so that, in the production mode, the actuator automatically and cyclically moves each movable cutting member of each active pair from the first position to the second position, so that the movable cutting member adopts the second position when the active pair is conveyed through the cutting station C. In first embodiment of Figures 1-4 and in second embodiment of Figures 5-7, the cutting unit 11 is configured so that the actuator, for

each not active pair and in the production mode, does not move the radially movable cutting member from the first position to the second position, so that the respective radially movable cutting member remains in the first position when the not active pair is conveyed through the cutting station C.

[0069] In this way, each movable cutting member of each active pair is in the retracted position for at least a part of, or for all the transferring phase, during which the label is transferred from the cutting unit 11 to the vacuum drum 12. In this way, the precision of the module 8 is improved.

[0070] In second embodiment of Figures 5-7 and in the third embodiment of Figure 8, the plurality of second cutting members comprises a primary second cutting member 15a, a secondary second cutting member 15b, a tertiary second cutting member 15c, and a quaternary second cutting member 15d. Actuator comprises a first cam 16 and a second cam 17. Each cam 16 or 17 can adopt a not operative condition and an operative condition. Each cam 16 or 17 is faced towards the cutting station C. Actuator comprises, for the primary second cutting member 15a, a respective first cam follower 18 and a respective second cam follower 19, which are mechanically connected to the primary second cutting member 15a. Actuator comprises, for the secondary second cutting member 15b, a respective first cam follower 18, which is mechanically connected to the secondary second cutting member 15b. Actuator comprises, for each of tertiary second cutting member 15c and quaternary second cutting member 15d, a respective second cam follower 19, which is mechanically connected to the respective second cutting member. Cutting unit 11 is configured so that, with the first cam 16 in the operative condition, for each of the primary second cutting member 15a and secondary second cutting member 15b, the conveying of the second cutting member through the cutting station C, corresponds to the interaction between the respective first cam follower 18 and the first cam 16. Cutting unit 11 is configured so that, with the first cam 16 in the operative condition, for each of the primary second cutting member 15a and secondary second cutting member 15b, the interaction between the respective first cam follower 18 and the first cam 16 causes the movement of the respective second cutting member from the first position to the second position, so that the respective second cutting member 15a or 15b adopts the second position at the cutting station C.

[0071] Cutting unit 11 is configured so that, with the second cam 17 in the operative condition, for each of the primary second cutting member 15a, tertiary second cutting member 15c, and quaternary second cutting member 15d, the conveying of the second cutting member through the cutting station C, corresponds to the interaction between the respective second cam follower 19 and the second cam 17. Cutting unit 11 is configured so that, with the second cam 17 in the operative condition, for each of the primary second cutting member 15a, tertiary second cutting member 15c, and quaternary second cutting member 15d, the interaction between the respective second cam follower 19 and the second cam 17 causes the movement of the respective second cutting member from the first position to the second position, so that the respective second cutting member 15a or 15c or 15d adopts the second position at the cutting station C.

[0072] The module 8 can be configured so that, in the setup mode, the user can preliminary vary and/or set the condition of each cam 16 or 17. Therefore, the user can preliminary vary and/or set the condition of each pair by preliminary varying and/or setting the condition of each cam 16 or 17. In this way the configuration of the module 8 can be simply and quickly set depending on the label length. In particular and for example, the module 8 can be very quickly switched between a first configuration, wherein the length of the label has a first value and the number of sectors of vacuum drum 12 correspond to four, and a second configuration, wherein the length of the label has a second value and the number of sectors of vacuum drum 12 correspond to six. Without referring to other features, but only to show the difference in the number of sectors, Figure 1 shows a situation in which vacuum drum has four sectors, while Figure 3 shows a situation in which vacuum drum has six sectors.

[0073] For example, the following can be the angular positions of second cutting members around axis Y of the second roller 15: primary second cutting member 15a, 0°; secondary second cutting member 15b, 180°; tertiary second cutting member 15c, 120°; quaternary second cutting member 15d, 240°. The cutting unit 11 can be configured so that, in the first configuration, only pairs 14a-15a and 14a-15b are active. The cutting unit 11 can be configured so that, in the second configuration, only pairs 14a-15a, 14a-15c, and 14a-15d are active.

[0074] In the third embodiment of Figure 8, the module 8 is configured so that, in the setup mode, a user can move each second cutting member so that the second cutting member is permanently in the second position during the production mode. On this way the wear can be reduced, as there is less motion of the components of the cutting unit 11, when the module 8 operates in the production mode.

[0075] In this case, the actuator comprises, for each second cutting member, a respective knob 21 which is mechanically connected with the second cutting member. In particular, the cutting unit 11 is configured so that a rotation of the knob corresponds to the radial movement of the second cutting member between the first position and the second position.

[0076] The cutting unit 11 can be configured so that each second cutting member can be mounted to or dismounted with respect to the second roller 15. The cutting unit 11, in this case, is configured so that each pair comprising a dismounted second cutting member is not active, and each pair comprising a mounted second cutting member is active. In this case, each second cutting member is preferably a blade member.

[0077] In this case, the switching between the configurations can be obtained by mounting or dismounting each second cutting member.

[0078] Thanks to the above configuration, labelling module 8 is controllable at least in a first configuration for preparing and applying labels 2 of a first format, and in a second configuration for preparing and applying labels 2 of a second format, by selective activation and deactivation of different cutting pairs.

[0079] Therefore, there is no need for replacing one or more rollers 14, 15 of cutting unit 11 in case of label format change. Hence, there is no need for having several alternative rollers for the various label formats.

[0080] Moreover, there is no need for any complicated control of the motors of the rollers or for complicated and delicate mechanisms in order to change the transmission ratio between the rollers.

[0081] Hence, due to the selective control of the activation and deactivation of the cutting pairs, labelling module 8, and therefore labelling machine 1, is very adaptive and the flexibility thereof is improved.

[0082] The advantages of labelling module 8 according to the present invention will be clear from the foregoing description.

[0083] In particular, thanks to the presence of the plurality of cutting pairs and to their selectable activation or deactivation, labelling module 8 is controllable in at least two configurations for preparing and applying labels 2 of different formats, without the need for replacing any components (such as blade or counterblade rollers), without the need for a complicated control of the motors of these latter, and without the need for complicated mechanisms for changing the transmission ratio between the two rollers.

[0084] Clearly, changes may be made to labelling module 8 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. Labelling module (8) for applying labels (2) obtained from a web (3) of labelling material onto articles (4) adapted to contain a pourable product, the labelling module (8) comprising:

- a feed system (10) for feeding the web (3) along a feeding path;
- a cutting unit (11) for repeatedly cutting the web (3) at a cutting station (C), thereby obtaining a sequence of labels (2) therefrom; and
- a transfer unit (12) for receiving the sequence of labels (2) from the cutting unit (11), and for transferring them to an application station (A), to apply the labels onto respective articles (4);

wherein the cutting unit (11) comprises a first roller (14) for carrying at least one first cutting member (14a), and a second roller (15) for carrying a plurality of second cutting members (15a, 15b, 15c, 15d), the first roller (14) and the second roller (15) defining between them the cutting station (C), each roller (14; 15) defining a respective longitudinal axis (X; Y), the second roller (15) being configured so that the second cutting members can be carried while being angularly distributed around the longitudinal axis (Y) of the second roller (15) ;

wherein the cutting unit (11) defines a plurality of cutting pairs, each cutting pair comprising a respective combination of one first cutting member (14a; 15a) and one second cutting member (15a, 15b, 15c, 15d; 14a, 14b, 14c, 14d) which are configured for cooperating with one another to cut the web (3) at the cutting station (C);

wherein the cutting unit (11) is configured for conveying sequentially the cutting pairs through the cutting station (C), by rotating the first roller (14) and the second roller (15) around the respective longitudinal axes (X; Y); wherein the cutting unit (11) is configured so that:

- each cutting pair can adopt an active condition and a not active condition;
- the conveying of an active pair through the cutting station (C) corresponds to the cutting of the web;
- the conveying of a not active pair through the cutting station (C) does not correspond to the cutting of the web.

2. Labelling module (8) according to Claim 1, wherein:

- each of the first roller (14) and the second roller (15) has a respective external lateral surface (14b; 15e), which is located around the respective axis (X; Y), the cutting station (C) being defined between the lateral surface (14b) of the first roller (14) and the lateral surface (15e) of the second roller (15);
- the cutting unit (11) is configured so that each first cutting member (14a) or each second cutting member (15a; 15b; 15c; 15d) is radially movable, with respect to the axis (X; Y) of the respective roller (14; 15), to adopt a first position in which the radially movable cutting member (14a; 15a; 15b; 15c; 15d) is retracted in the lateral surface (14b; 15e) of the respective roller (14; 15), and a second position in which the radially movable cutting member protrudes from said lateral surface (14b; 15e);
- the cutting unit (11) is configured so that the conveying of an active pair through the cutting station (C) corresponds to the respective radially movable cutting member being positioned in the second position, so that the web is cut;

- the cutting unit (11) is configured so that the conveying of a not active pair through the cutting station (C) corresponds to the respective radially movable cutting member being positioned in the first position, so that the web is not cut;
- the cutting unit (11) comprises an actuator for moving each radially movable cutting member between the first position and the second position.

3. Labelling module (8) according to Claim 2, wherein the module (8) is configured for operating in a production mode, according to which the first roller (14) and the second roller (15) rotate around the respective axes (X; Y), so that said pairs are sequentially conveyed through the cutting station (C).

4. Labelling module (8) according to Claim 3, wherein the labelling module (8) is configured for operating in a setup mode, when the module (8) is not operating in the production mode, the module (8) being configured so that, in the setup mode, a user can vary and/or set the condition of each pair by acting on or modifying the actuator.

5. Labelling module (8) according tom Claim 3 or 4, wherein the cutting unit (11) is configured so that, in the production mode:

- the actuator automatically and cyclically moves each movable cutting member of each active pair from the first position to the second position, so that the movable cutting member adopts the second position when the active pair is conveyed through the cutting station (C);
- the actuator, for each not active pair, does not move the radially movable cutting member from the first position to the second position, so that the radially movable cutting member remains in the first position when the not active pair is conveyed through the cutting station (C).

6. Labelling module (8) according to Claim 5, wherein:

- each second cutting member is radially movable between the first position and the second position;
- the plurality of second cutting members comprises a primary second cutting member (15a), a secondary second cutting member (15b), a tertiary second cutting member (15c), and a quaternary second cutting member (15d);
- the actuator comprises a first cam (16) and a second cam (17), each cam (16) being able to adopt an operative condition and a not operative condition, and being faced towards the cutting station (C);
- the actuator comprises, for the primary second cutting member (15a), a respective first cam follower (18) and a respective second cam follower (19), which are mechanically connected to the primary second cutting member (15a);
- the actuator comprises, for the secondary second cutting member (15b), a respective first cam follower (18), which is mechanically connected to the secondary second cutting member (15b);
- the actuator comprises, for each of tertiary second cutting member (15c) and quaternary second cutting member (15d), a respective second cam follower (19), which is mechanically connected to the respective second cutting member;
- the cutting unit (11) is configured so that, with the first cam (16) in the operative condition, for each of the primary second cutting member (15a) and secondary second cutting member (15b), the conveying of the second cutting member through the cutting station (C), corresponds to the interaction between the respective first cam follower (18) and the first cam (16);
- cutting unit (11) is configured so that, with the first cam (16) in the operative condition, for each of the primary second cutting member (15a) and secondary second cutting member (15b), the interaction between the respective first cam follower (18) and the first cam (16) causes the movement of the respective second cutting member from the first position to the second position, so that the respective second cutting member (15a; 15b) adopts the second position at the cutting station (C);
- cutting unit (11) is configured so that, with the second cam (17) in the operative condition, for each of the primary second cutting member (15a), tertiary cutting member (15c), and quaternary cutting member (15d), the conveying of the second cutting member through the cutting station (C), corresponds to the interaction between the respective second cam follower (19) and the second cam (17) ;
- cutting unit (11) is configured so that, with the second cam (17) in the operative condition, for each of the primary second cutting member (15a), tertiary cutting member (15c), and quaternary cutting member (15d), the interaction between the respective second cam follower (19) and the second cam (17) causes the movement of the respective second cutting member from the first position to the second position, so that the respective second cutting member (15a; 15c; 15d) adopts the second position at the cutting station (C).

7. Labelling module (8) according to Claims 4 and 6, wherein the module (8) is configured so that, in the setup mode, the user can preliminary vary and/or set

the condition of each cam (16, 17), to select the configuration of the module (8) depending on the label length.

8. Labelling module (8) according to Claims 3 and 4, wherein:

- each second cutting member is radially movable between the first position and the second position;
- the module (8) is configured so that, in the setup mode, a user can move each second cutting member so that the second cutting member is permanently in the second position during the production mode.

9. Labelling module (8) according to Claim 8, wherein the actuator comprises, for each second cutting member, a respective knob (21) which is mechanically connected with the second cutting member.

10. Labelling module (8) according to Claim 9, the cutting unit (11) being configured so that a rotation of the knob corresponds to the movement of the second cutting member between the first position and the second position.

11. Labelling module (8) according to any of the previous claims, wherein:

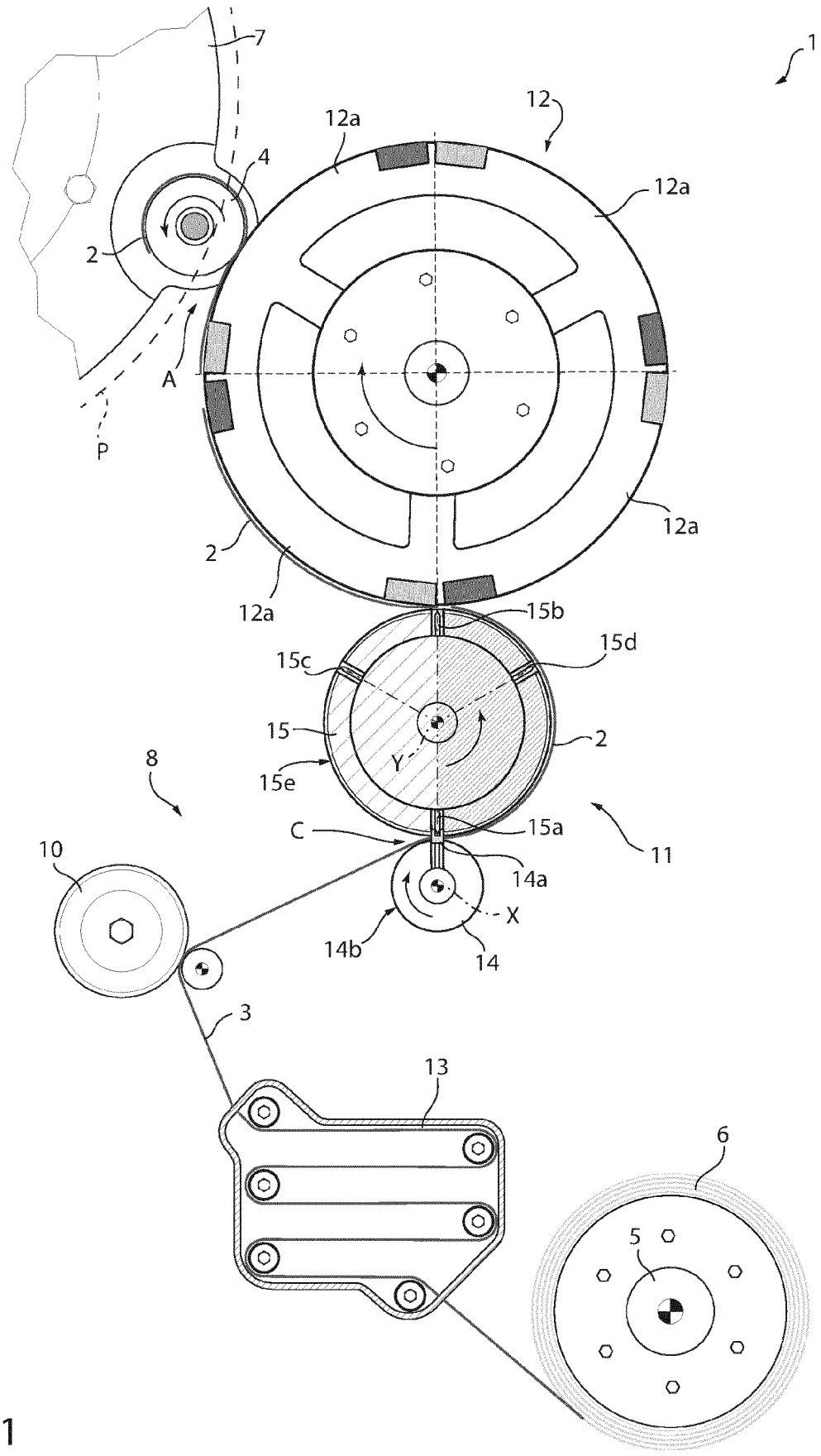
- the cutting unit (11) is configured so that each second cutting member can be mounted to or dismounted with respect to the second roller (15);
- the cutting unit (11) is configured so that each pair comprising a dismounted second cutting member is not active, and each pair comprising a mounted second cutting member is active.

12. Labelling module (8) according to any of the previous Claims, wherein:

- the first roller (14) carries the at least one first cutting member (14a);
- the second roller (15) carries the second cutting members;
- the second cutting members are angularly distributed around the longitudinal axis (Y) of the second roller (15).

13. Labelling module (8) according to any of the previous Claims, wherein:

- each first cutting member is a blade member and each second cutting member is a counter-blade member; or
- each second cutting member is a blade member and each first cutting member is a counter-blade member.


1
7
12
12a
4
12a
2
Y
A
P
12a
2
12a
15b
15d
15c
15
2
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15e
C
15a
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10
14a
X
14b
14
3
13
6
5

FIG. 1

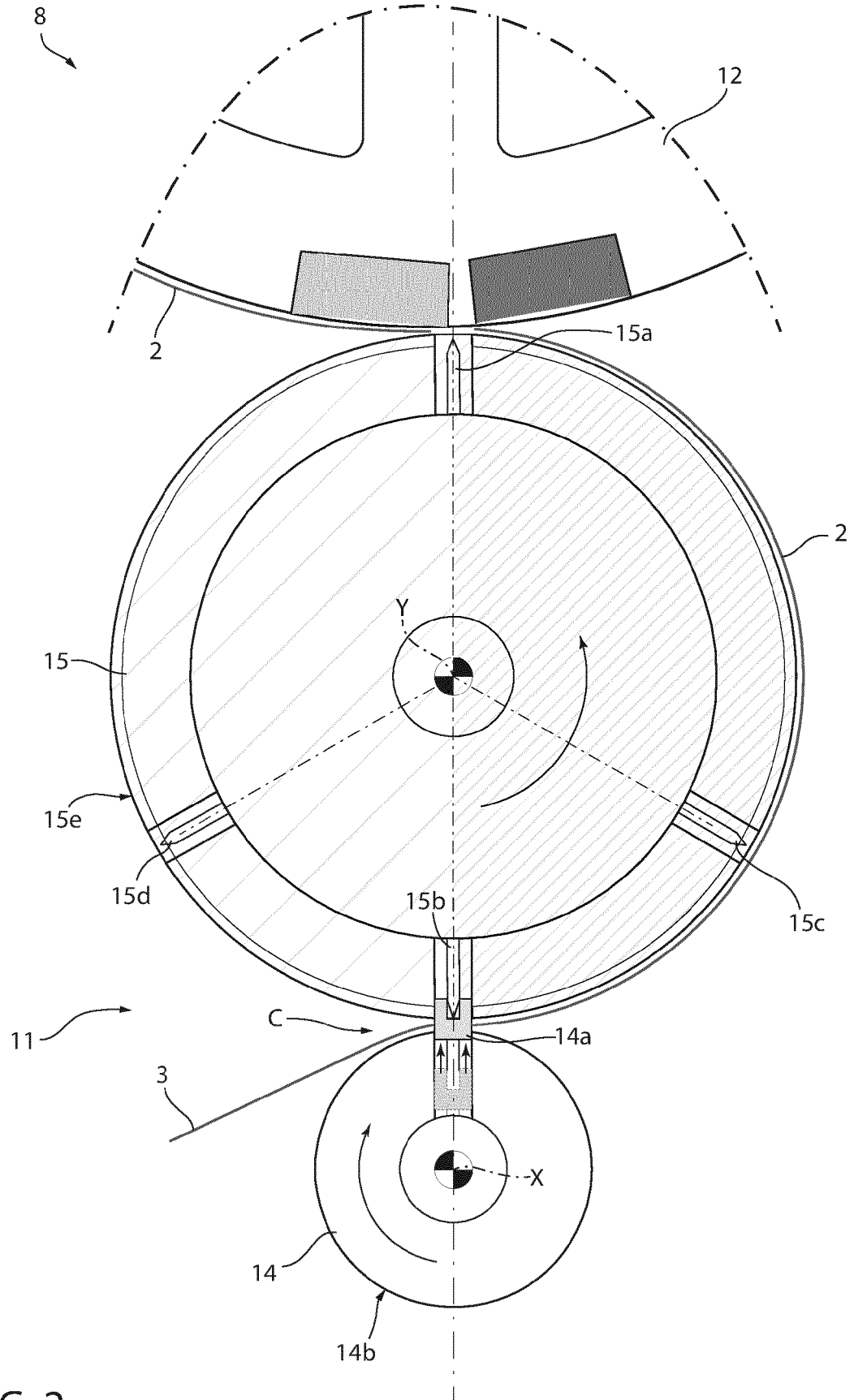


FIG. 2

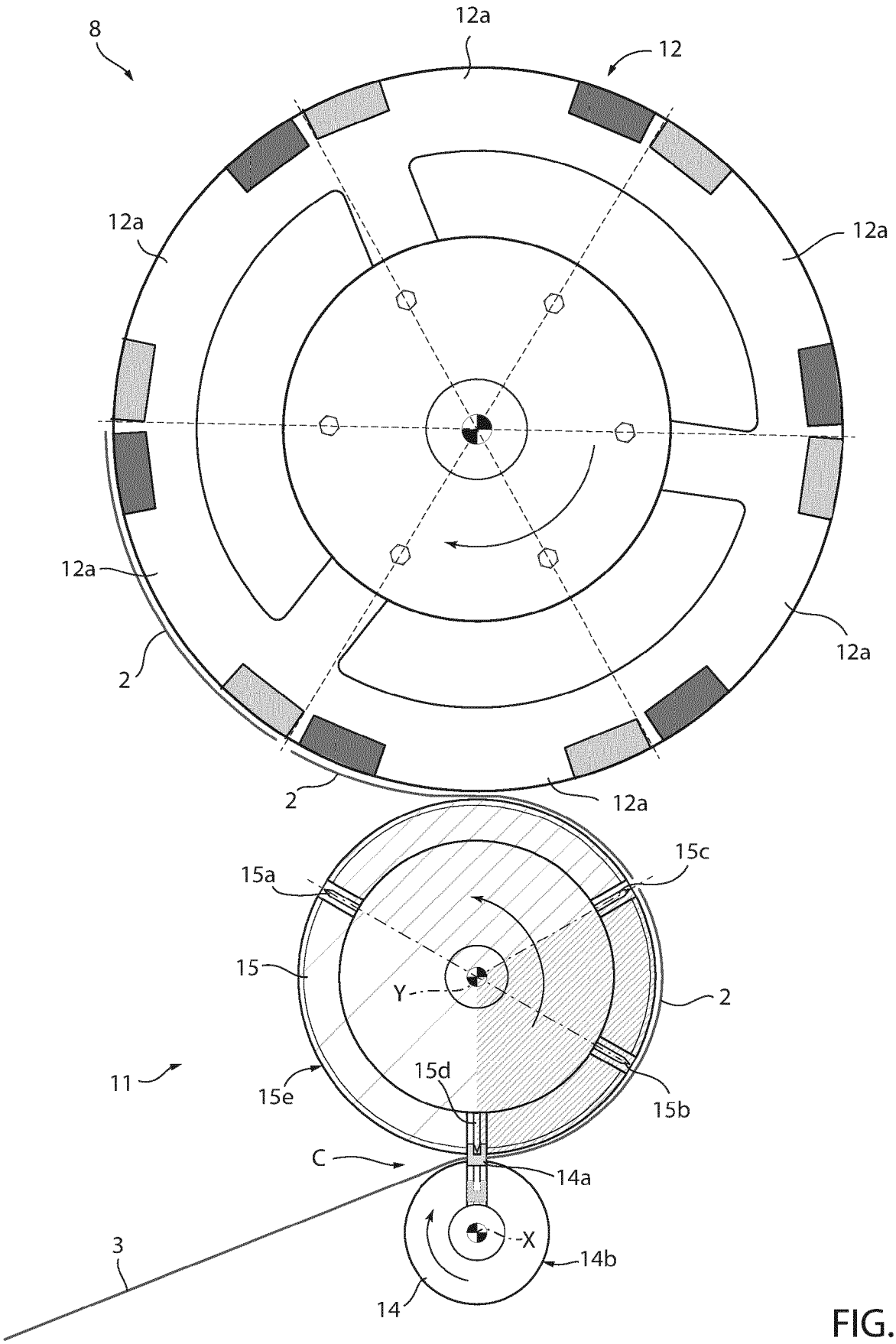
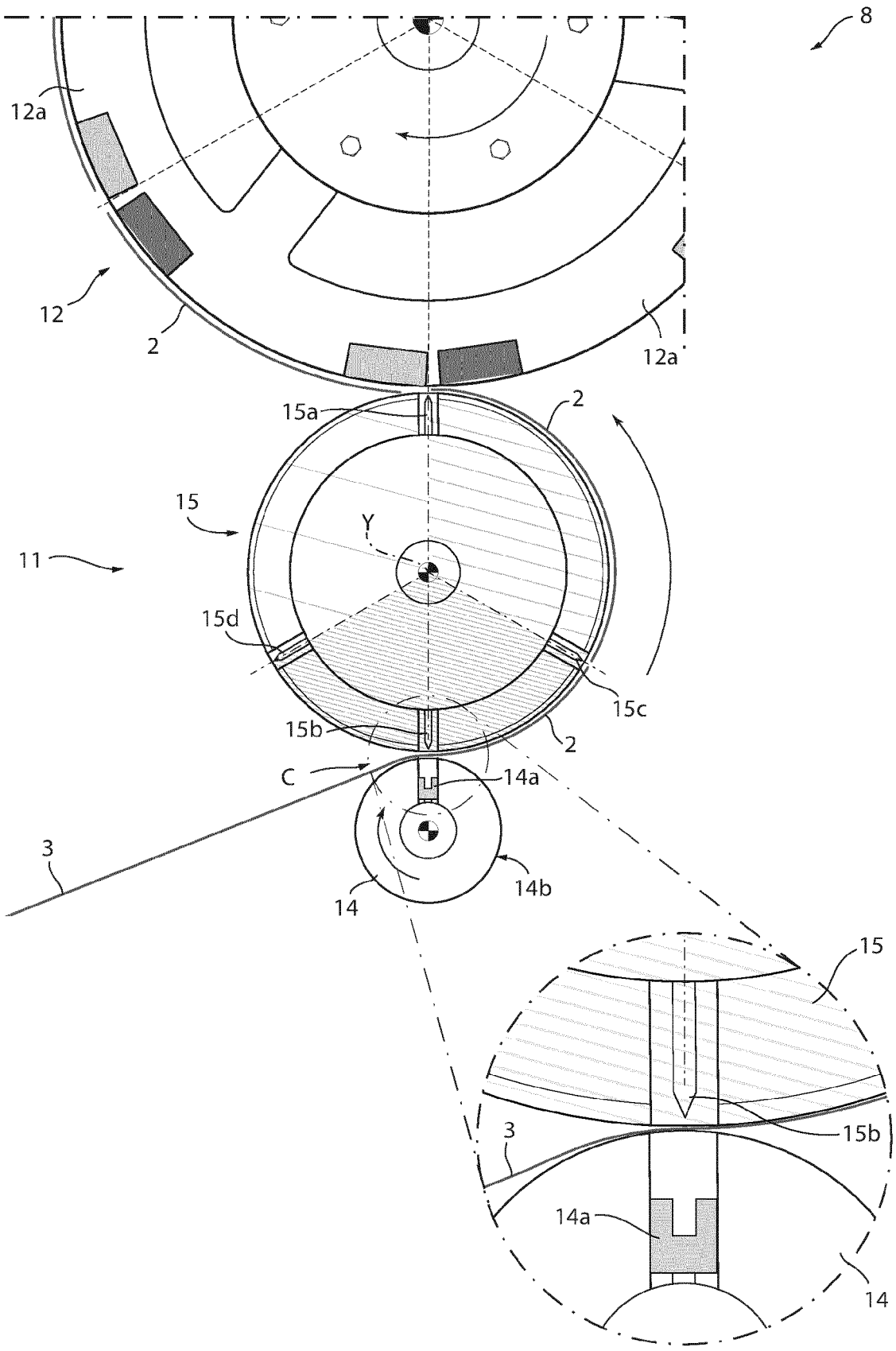

8
12a
12
12a
12a
12a
12a
2
2
12a
12a
15c
15a
15
Y
2
11
15e
15d
15b
C
14a
3
X
14b
14

FIG. 3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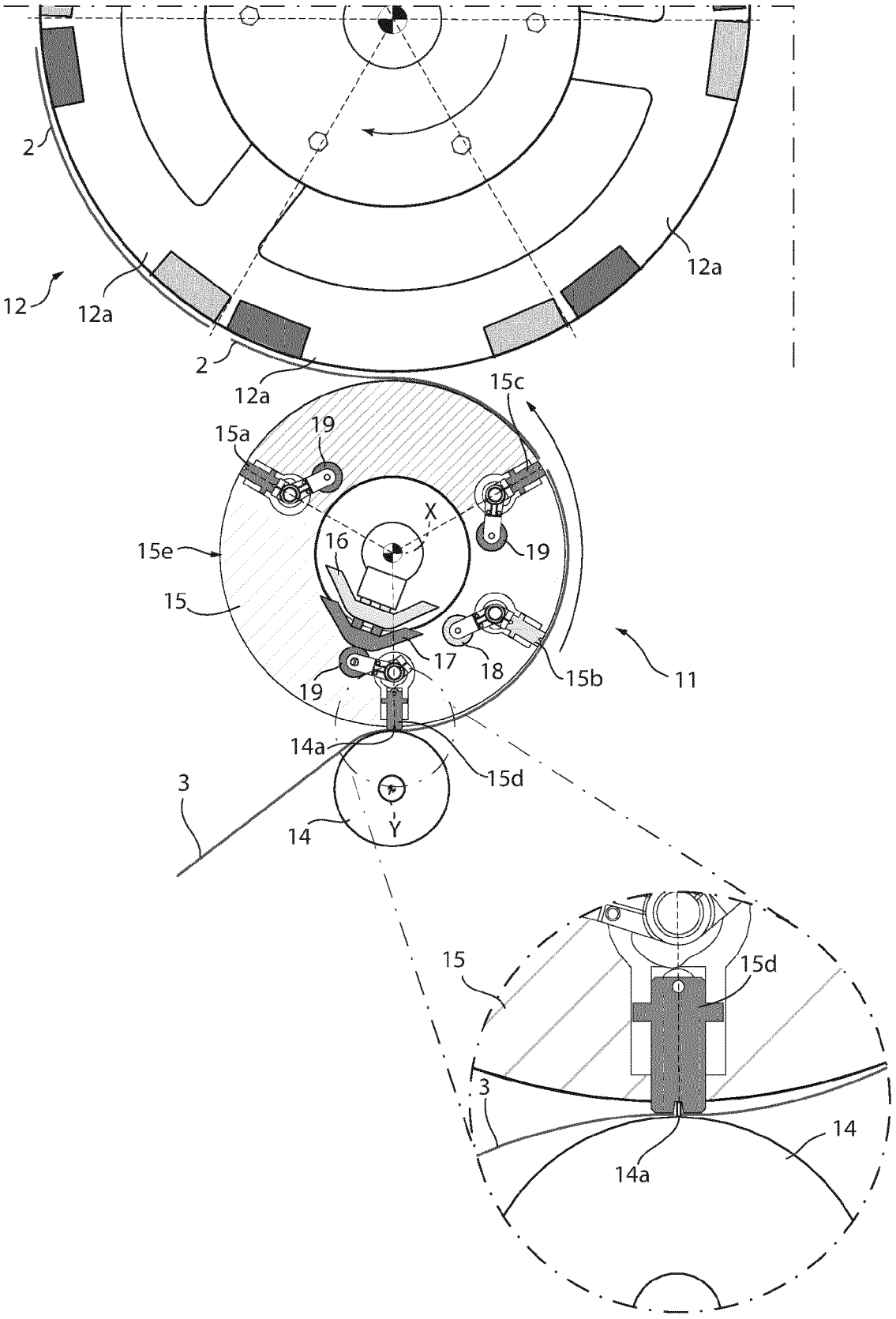
12a
15a
2
15
Y
11
15d
15c
15b
2
C
14a
3
14b
14
15
3
15b
14a
14

FIG. 4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12
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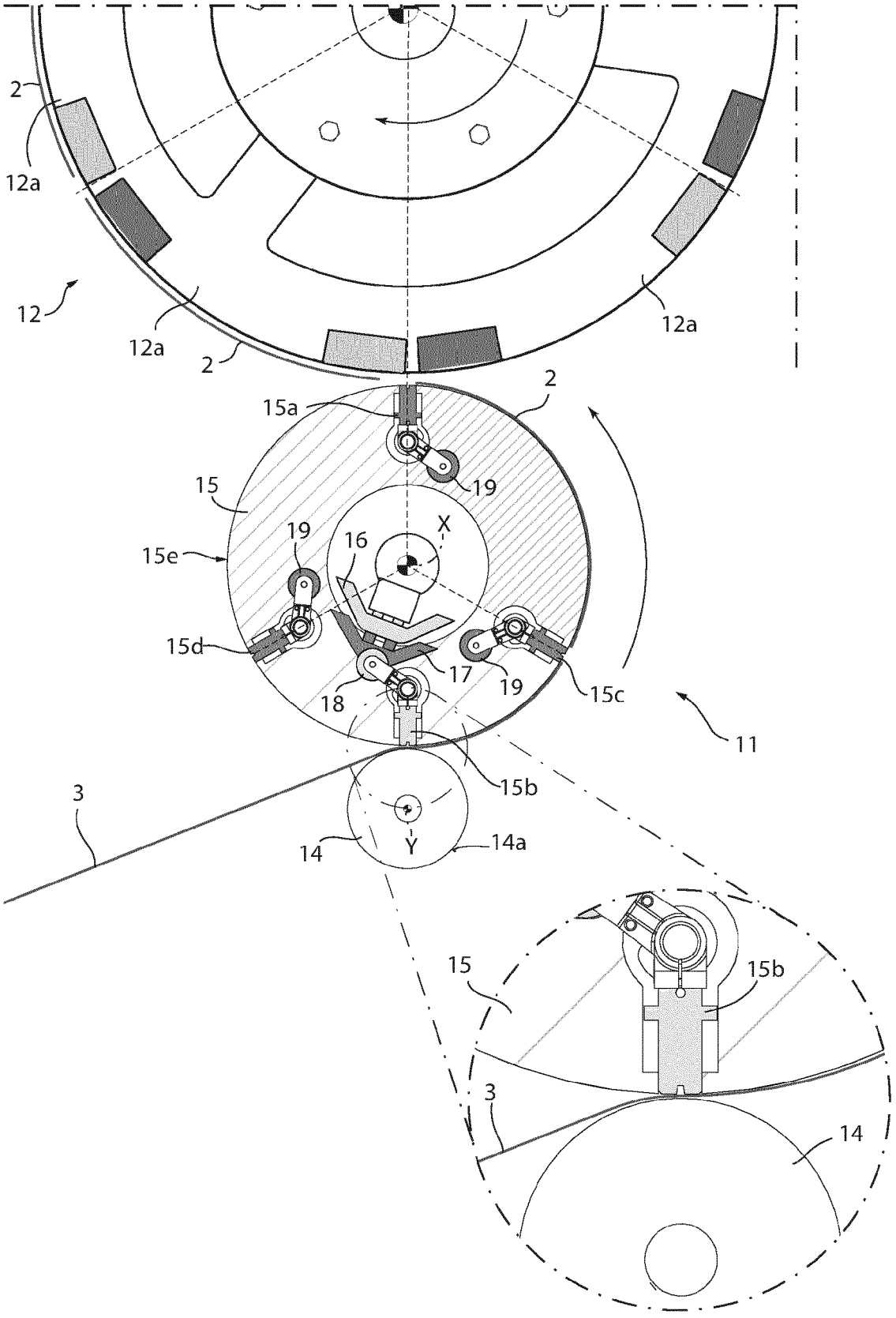
12a
2
12a
12a
15c
15a
19
X
15e
16
19
15
17
18
15b
11
19
14a
15d
3
14
Y
15
15d
3
14
14a

FIG. 5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15
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X
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14
Y
14a
15
15b
3
14

FIG. 6

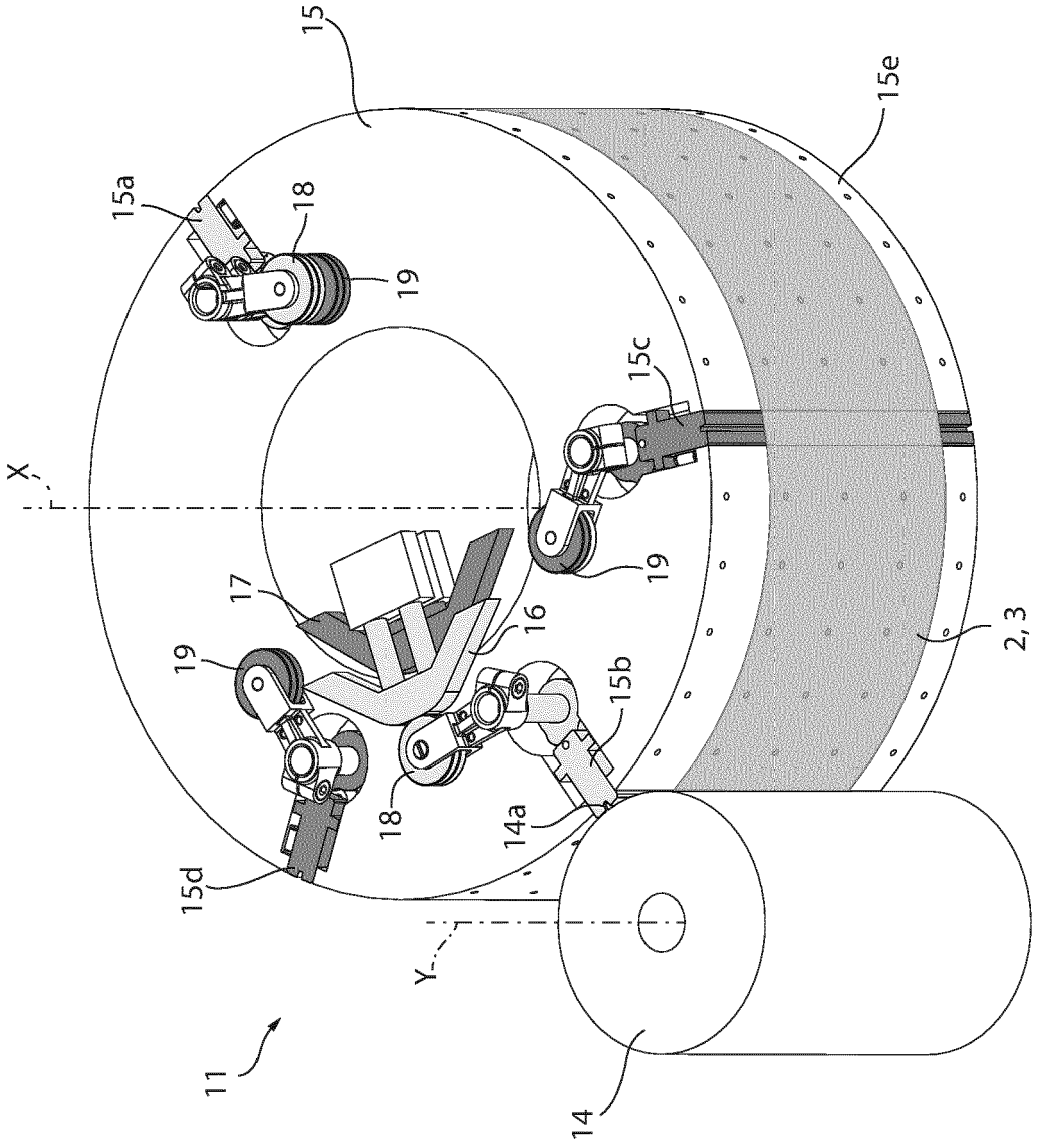

FIG. 7

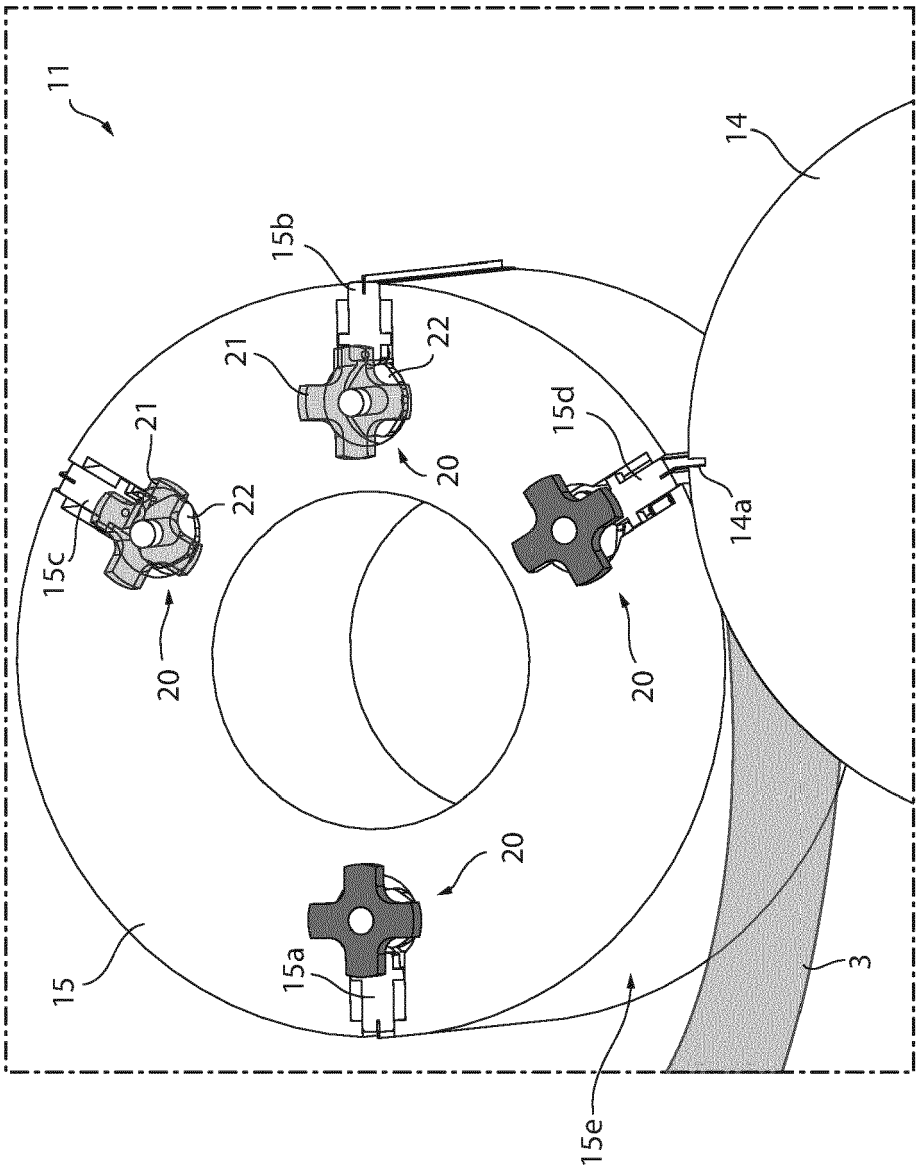

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 21 21 1867

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2007 009484 A1 (KHS AG [DE]) 7 August 2008 (2008-08-07)	1,11-13	INV. B65C9/18
A	* paragraph [0012] - paragraph [0016]; figures 2,3 * * paragraphs [0019], [0027] *	2-10	
A	DE 21 24 317 A1 (SCHÄFER-ETIKETTEN) 30 November 1972 (1972-11-30) * page 15; figure 3 *	1-13	
A	WO 2021/110271 A1 (SIDEL PARTICIPATIONS [FR]) 10 June 2021 (2021-06-10) * page 13, line 7 - line 12; figure 2A *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	25 April 2022	Delval, Stéphane

CATEGORY OF CITED DOCUMENTS

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25-04-2022

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DE 2124317 A1	30-11-1972	NONE	
WO 2021110271 A1	10-06-2021	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82