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(54) **CUTTING DEVICE FOR A LABELLING MACHINE CONFIGURED TO APPLY LABELS ONTO ARTICLES ADAPTED TO CONTAIN A POURABLE PRODUCT**

(57) There is described a cutting device (10, 10') for a labelling machine (1) configured to apply labels (2) obtained from a web (4) of labelling material onto articles (3) adapted to contain a pourable product, the cutting device (10, 10') comprises a cutting roller (12) rotatable about a longitudinal axis (Y), carrying a blade member (13), which radially protrudes from an outer lateral surface (14) of the cutting roller (12), and conveying, in use, the blade member (13) along a circular cutting path around the longitudinal axis (Y); the blade member (13) is configured to sequentially cut the web (4) at a cutting station (T) arranged the staid cutting path, in a position adjacent to the cutting roller (12), so as to obtain a sequence of labels (2); the cutting roller (12) comprises a plurality of rolling elements (16, 16') which are arranged at the outer lateral surface (14) and radially protrude therefrom, the rolling elements (16, 16') are mounted to the cutting roller (12) in a rolling manner with respect to the outer lateral surface (14).

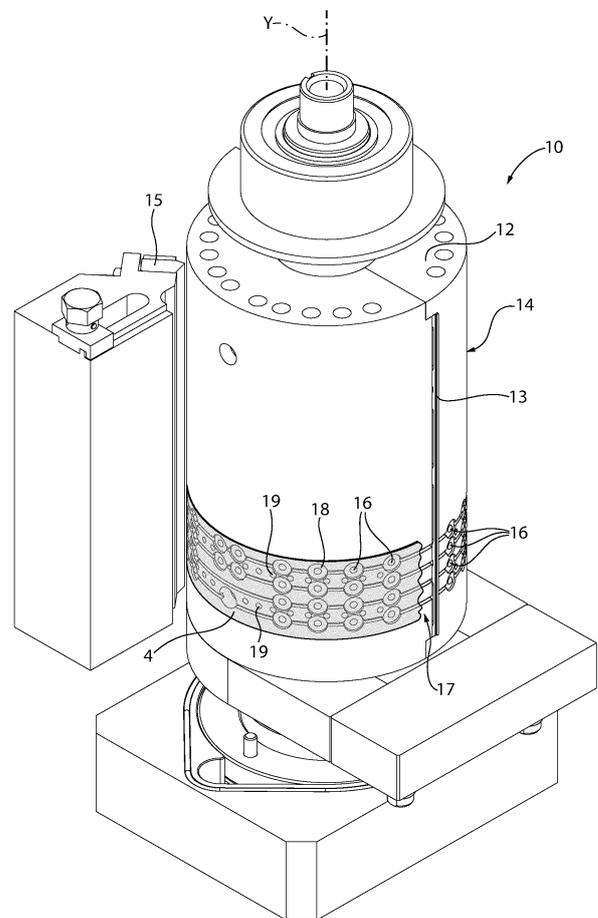


FIG. 2A

**Description**TECHNICAL FIELD

**[0001]** The present invention relates to cutting device for a labelling machine configured to apply labels obtained from a web of labelling material onto articles, such as bottles, containers or the like, adapted to contain a pourable product, preferably a pourable food product.

BACKGROUND ART

**[0002]** Labelling machines are known, which are commonly used to prepare, transport and apply labels onto articles, such as bottles, containers, or the like destined to be filled with a pourable product, preferably a pourable food product.

**[0003]** 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 reels and then sprinkled with glue.

**[0004]** 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.

**[0005]** Eventually, the labels so obtained are conveyed and applied onto the respective articles to be labelled.

**[0006]** Particularly widespread are also labels of the tubular kind, known as "sleeve labels" and obtained starting from a web of heat-shrinking film 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 themselves. These type of labels do not require the use of glue.

**[0007]** Regardless of the type of label used, a known labelling machine typically comprises:

- a rotary carousel, rotatable around a vertical axis and configured to convey a plurality of articles along an horizontal, arc-shaped transfer 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.

**[0008]** According to a well-known configuration, a labelling module typically 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;
- a cutting device configured to cut (i.e. to separate), in particular to sequentially cut, the labels from the web of labelling material; and
- a label transfer device, for example a known vacuum drum configured to receive, retain and advance each label previously cut to feed it to the carousel, at the application station.

**[0009]** Normally, the vacuum drum has an approximately cylindrical or toroidal lobed configuration and is mounted, in a rotatable manner about its axis, on a stationary distributor member of the labelling module.

**[0010]** According to a well-known manner, the vacuum drum is configured to receive a succession of labels at a receiving station, to and retain such labels by means of suction and, after a rotation of a certain angle about its axis, to release the labels at the application station, so that such labels can be applied onto respective articles advanced by the carousel.

**[0011]** Typically, the label cutting device comprises a blade member, for example a knife, configured to cut, at a cutting station, a sequence of individual labels having the same length from the web of labelling material.

**[0012]** According to a well-known configuration, rotary-type cutting devices are used, which comprise:

- a rotary element, usually a blade member support roller ("blade roller"), rotatably mounted about a vertical axis, carrying the blade member and configured to convey the blade member along a circular cutting path around the above-mentioned axis; and
- a fixed element defining, in use, a fixed counterblade member for the blade member and arranged peripherally to the blade roller, so as to be substantially tangential to the cutting path, and configured to define an abutment surface for the blade member when this latter cuts the web of labelling material.

**[0013]** In practice, the cutting station is defined between the counterblade member and the blade member when this latter is facing the counterblade member.

**[0014]** In other words, the web is interposed, in use and at the cutting station, between the blade roller and the counterblade member, the latter acting as an abutment surface for the blade member during the cutting.

**[0015]** By the interaction of the blade member and the counterblade member at the cutting station, the web is cut and a new label is obtained.

**[0016]** In the case in which labels that envisage the use of glue 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 comprise a spray nozzle arranged peripherally to the vacuum drum.

**[0018]** A further type of commonly used labels entails the presence of pre-applied adhesive bands on one side of the labels, i.e. on the side which faces the outer lateral surface of the respective article the label is applied onto, that is the inner side of the label. In particular, labels of this kind are typically provided with two bands of adhesive material, for example glue or thermally activatable glue, pre-applied on the inner side at the trailing ends and leading ends thereof.

**[0019]** Accordingly, in this case there is no need for a gluing device downstream of the cutting device.

**[0020]** When labels of the latter type are used, during the labelling process the web is fed along the feeding path so that labels are received and retained by the vacuum drum necessarily with their inner side facing outwards, in order to allow their transfer on the respective articles at the application station.

**[0021]** Thus, the web reaches the cutting station with the inner side, i.e. the side which adhesive is pre-applied onto, facing the outer lateral surface of the blade roller.

**[0022]** In other words, the blade roller receives and handles the web cooperating in contact with the inner side of the web itself.

**[0023]** It is known that, in use, the linear (or peripheral) velocity of the blade roller is higher than the linear velocity of the web fed to the cutting station.

**[0024]** Hence, a sliding of the web onto the outer lateral surface of the blade roller occurs, during the labelling process. Such sliding is even more accentuated as soon as the leading end of one label is received by the vacuum drum while the trailing end of the same label is still attached to the web, since normally the linear (or peripheral) velocity of the vacuum drum is even higher than the linear velocity of the blade roller.

**[0025]** In some cases, this sliding can result, over time, in an accumulation of adhesive material, i.e. of glue, onto the outer lateral surface of the blade roller and onto the blade member.

**[0026]** When the accumulation of adhesive material reaches a predefined level, it is necessary to stop the labelling machine and clean the blade roller and the blade member.

**[0027]** Although the known cutting devices, and in particular the known blade rollers, work satisfyingly well, a need is felt in the industry to further improve such cutting devices, in particular as to minimize the necessary maintenance stops and as to improve the overall efficiency of the labelling process.

#### DISCLOSURE OF INVENTION

**[0028]** It is therefore an object of the present invention to provide a cutting device which is designed to meet at least one of the above-mentioned needs in a straightforward and low-cost manner.

**[0029]** This object is achieved by a cutting device as claimed in claim 1.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0030]** Two 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 machine comprising a cutting device according to the present invention;

Figure 2a is an enlarged-scale, perspective view, with parts removed for clarity, of the cutting device of figure 1 according to a first embodiment of the present invention;

Figure 2b is a schematic top view, with parts removed for clarity, of the cutting device of Figure 2a;

Figure 3a is an enlarged-scale, perspective view, with parts removed for clarity, of the cutting device of figure 1 according to a second embodiment of the present invention; and

Figure 3b is a schematic, partially sectioned top view, with parts removed for clarity, of the cutting device of Figure 3a.

#### BEST MODE FOR CARRYING OUT THE INVENTION

**[0031]** With reference to Figure 1, number 1 indicates as a whole a labelling machine configured to apply labels 2 onto articles 3, such as bottles, receptacles, or the like, destined to contain a pourable product, preferably a pourable food product, such as still or sparkling water, juice, milk, soft drinks, beer, wine, or the like.

**[0032]** According to this non-limiting embodiment shown, labels 2 applied by labelling machine 1 are defined by strips of labelling material that are cut at predetermined lengths from a web 4 of labelling material, and to which an adhesive substance, for example a known glue or thermally activatable glue, is pre-applied.

**[0033]** In detail, each label 2 can be provided with at least two bands (not shown) of glue pre-applied on the inner side of the label 2, i.e. the side which faces the outer lateral surface of the respective article 3 the label 2 will be applied to.

**[0034]** In greater detail, "pre-applied" means that each label 2 is provided with such adhesive bands even before cutting thereof, i.e. web 4 is provided with such adhesive bands.

**[0035]** More precisely, each label 2 is provided with at least one adhesive band at the leading end thereof and with at least one adhesive band at the trailing end thereof.

**[0036]** In one embodiment, each label 2 is provided with a single adhesive band, conveniently arranged either at the leading end or at the trailing end thereof.

**[0037]** In light of the above, web 4, which is defined by a series of labels 2 initially joined to one another, is initially provided with adhesive bands.

**[0038]** Preferably, web 4 of labelling material is initially wound around one or more storage units, such as reels 5 (only one reel is shown in Figure 1), and is progressively unwound, in use, off reel 5.

**[0039]** As visible in Figure 1, labelling machine 1 essentially comprises:

- a conveyor device, preferably a rotary carousel 6 rotatable around a fixed axis, in particular a vertical axis Z, and configured to advance a plurality of articles 3 along a conveying path P, in the example shown an arc-shaped, horizontal path; and
- an input station I, at which articles 3 to be labelled are fed to carousel 6;
- an output station O, at which labelled articles 3 exit from carousel 6; and
- a labelling module 7 (only partially and schematically shown), arranged peripherally relatively to carousel 6 and configured to feed a plurality of labels 2 to the carousel 6 itself at an application station A, in order to apply labels 2 to respective articles 3.

**[0040]** In detail, labelling module 7 comprises:

- at least one of the above-mentioned reels 5 for storing web 4;
- a conveying system 8 configured to advance web 4 along a feeding path, from a storage station defined by reel 5 towards a cutting station T at which web 4 is sequentially cut, and comprising a plurality of unwinding rollers which support, in use, web 4 progressively unwound, in use, from reel 5 and guide it along the feeding path;
- a cutting device 10 according to the present invention, configured to cut a sequence of single labels 2 from web 4, in the form of strips having equal length, the labels 2 being initially joined together to form web 4; and
- a label transfer device comprising a rotary vacuum drum 11 rotatable around a fixed axis, preferably a vertical axis X, arranged peripherally to carousel 6 and configured to sequentially receive, on an outer lateral surface 11a thereof, labels 2 cut by the cutting device 10, to retain such labels 2 onto outer lateral surface 11a by means of vacuum suction, and to transfer such labels 2 to carousel 6.

**[0041]** As visible in Figure 1, vacuum drum 11 sequentially receives, in use and at a receiving station R, a free end portion of web 4 defining a leading end portion of each label 2, retaining the same onto outer lateral surface 11a.

**[0042]** Preferably, vacuum drum 11 has a substantially cylindrical configuration. Accordingly, outer lateral surface 11a has a substantially cylindrical shape and labels 2 are conveyed circumferentially from receiving station R to application station A, along a direction of rotation of

vacuum drum 11.

**[0043]** Furthermore, vacuum drum 11 is rotatably mounted around axis X onto a stationary distributor element (not shown) carried by labelling module 7.

**[0044]** In detail, the distributor element comprises first air passages (not shown) connected to a vacuum source (not shown). Vacuum drum 11 is, in turn, provided with second air passages 11b, which are configured to selectively communicate with the first air passages at certain angular positions assumed by vacuum drum 11, as this latter rotates about axis X, and end into a plurality of vacuum ports 11c formed through outer lateral surface 11a.

**[0045]** In practice, depending on the angular position relative to axis X assumed by vacuum drum 11, vacuum ports 11c are put in fluid communication, by means of the first air passages and second air passages 11b, with the vacuum source. When this happens, a vacuum suction is applied on each label 2, which retains this latter onto outer lateral surface 11a.

**[0046]** In light of the above, vacuum drum 11 retains, in use, labels 2 onto outer lateral surface 11a by means of vacuum suction.

**[0047]** At stated above, each label 2 is provided with pre-applied adhesive bands at the leading end and at the trailing end thereof, so that label 2 can be glued to the respective article 3 to be labelled at application station A.

**[0048]** As visible in Figures 2a and 2b, cutting device 10 comprises a rotary element, preferably a blade roller or cutting roller 12 rotatable about a longitudinal axis, preferably a vertical axis Y, carrying a blade member 13 and conveying, in use blade member 13 along a circular cutting path around axis Y.

**[0049]** Conveniently, blade member 13 radially protrudes from an outer lateral surface 14 of cutting roller 12 and is configured to sequentially cut web 4 at a cutting station T arranged along the cutting path, in a position adjacent, i.e. peripheral, to the cutting roller 12, so as to obtain a sequence of labels 2.

**[0050]** To this end, cutting device 10 further comprises a fixed element, in particular a counterblade member 15, arranged in a fixed position peripherally to cutting roller 12 so as to be substantially tangential to the cutting path, and defining an abutment counterblade surface for blade member 13 when this latter cuts web 4.

**[0051]** In practice, cutting station T is defined between counterblade member 15 and blade member 13 when this latter is facing the counterblade member 15.

**[0052]** In other words, web 4 is interposed, in use and at cutting station T, between cutting roller 12 and counterblade member 15, the latter acting as an abutment surface for blade member 13 during cutting of web 4.

**[0053]** In use, during the labelling process, web 4 is fed along the feeding path so that labels 2 are received and retained by vacuum drum 11 with their inner side facing outwards, in order to allow the correct transfer thereof on the respective articles 3 at application station A.

**[0054]** Thus, web 4 reaches cutting station T with the inner side, i.e. the side which adhesive is pre-applied onto, facing outer lateral surface 14 of cutting roller 12.

**[0055]** In other words, cutting roller 12 receives and handles web 4 necessarily cooperating in contact with the inner side of the web 4 itself.

**[0056]** It is known that, in use, the linear (or peripheral) velocity of cutting roller 12 is higher than the linear velocity of web 4 fed towards cutting station T.

**[0057]** Hence, during the labelling process and especially at the start thereof, a sliding of web 4 onto outer lateral surface 14 of cutting roller 12 occurs. Such sliding is even more accentuated as soon as the leading end of one label 2 is received by vacuum drum 11 while the trailing end of the same label 2 is still attached to web 4, since the linear (or peripheral) velocity of vacuum drum 11 is even higher than the linear velocity of cutting roller 12, for known reasons linked to the pitch of the articles 3 to be labelled.

**[0058]** This can result, over time, in an accumulation of adhesive material, i.e. of glue, onto outer lateral surface 14 and onto blade member 13.

**[0059]** When the accumulation of adhesive material reaches a predefined level, it is necessary to stop labelling machine 1 and clean cutting roller 12 and blade member 13.

**[0060]** According to an aspect of the present invention, cutting roller 12 comprises a plurality of rolling elements 16 which are arranged at outer lateral surface 14 and radially protrude therefrom; furthermore, rolling elements 16 are mounted to cutting roller 12 in a rolling manner with respect to outer lateral surface 14.

**[0061]** More specifically, rolling elements 16 are arranged in a free-rolling or free-turning manner with respect to outer lateral surface 14.

**[0062]** According to the preferred and non-limiting embodiment shown in Figures 2a and 2b, each rolling element 16 is defined by a sphere, i.e. a rolling sphere, mounted in a rolling manner to cutting roller 12 and in a respective fixed position onto outer lateral surface 14.

**[0063]** In particular, rolling elements 16 are arranged at least at a receiving portion 17 of outer lateral surface 14 configured to receive and support web 4. In this way, the sliding friction between web 4 and cutting roller 12 can be minimized, and/or the contact surface between cutting roller 12 and web 4 can be minimized, to reduce the wear of the web 4. Moreover, this can reduce the level of a possible deposition of adhesive or glue on the cutting roller 12, in case the web 4 was already provided with glue or adhesive when it is supported by the receiving portion 17.

**[0064]** It is to be noted that the present invention can be used also with a web which is not already provided with adhesive or glue when it is supported by the receiving portion 17. In this case the labelling machine 1 comprises a gluing station downstream of the cutting device.

**[0065]** Conveniently, each rolling element 16 radially protrudes from receiving portion 17 of a radial length less

than the radial length the blade member 13 protrudes of from outer lateral surface 14, so that rolling elements 16 do not come into contact with counterblade member 15 during rotation of cutting roller 12, in use. Therefore, the reduction of the contact surface and/or of the sliding friction between web 4 and the cutting roller 12 is reduced without generating any other source of wear.

**[0066]** Accordingly, each rolling element or sphere 16 is rotatable in a rolling manner with respect to receiving portion 17.

**[0067]** More specifically, cutting roller 12 comprises a plurality of seats 18, having according to this preferred embodiment a hemispheric shape, obtained on outer lateral surface 14, in particular on receiving portion 17.

**[0068]** Accordingly, each rolling element 16, i.e. each sphere, is fitted idle at one respective seat 18 in a rolling manner, so that sliding friction between web 4 and cutting roller 12 is reduced and rolling friction between web 4 and cutting roller 12 is increased, in use.

**[0069]** In practice, each rolling element 16 is cold-fitted within the respective seat 18 in a way that permits a free rolling (or free turning) of the rolling element 16 within that seat 18. Therefore, the sliding of web 4 onto receiving portion 17 due to the higher linear velocity of cutting roller 12 is reduced, thanks to the rolling configuration of rolling elements 16. This results in a smaller accumulation of glue onto outer lateral surface 14 and onto blade member 13, thereby reducing the necessity to stop labelling machine 1 for maintenance.

**[0070]** Preferably, the spheres defining rolling elements 16 are arranged in a plurality of longitudinal rows 16a along respective longitudinal directions parallel to axis Y. The Applicant has observed that such arrangement is the most effective in terms of sliding friction reduction and of rolling friction increase, for this application.

**[0071]** Preferably, cutting roller 12 comprises a plurality of vacuum ports 19 arranged on outer lateral surface 14, in particular at least on receiving portion 17, and fluidly connectable to a vacuum source (known per se and not shown) configured to generate vacuum, in order to apply vacuum, in use, to web 4 and retain and support web 4 on the receiving portion 17 itself.

**[0072]** According to this specific embodiment shown, vacuum ports 19 are positioned at portions of outer lateral surface 14 arranged between rolling elements 16.

**[0073]** In detail, vacuum ports 19 are arranged in longitudinal rows which are arranged between the longitudinal rows of spheres 16, with respect to the circumferential direction relative to axis Y, as shown in Figure 2a.

**[0074]** According to an alternative embodiment not shown, vacuum ports 19 may be arranged at spheres 16, each sphere 16 comprising a plurality of vacuum ports 19 connectable to the vacuum source.

**[0075]** In this last case, each sphere 16 has a plurality of vacuum ports 19 arranged in fluid communication with one another and with the vacuum source so that, in use, at least one vacuum port 19 of each sphere 16 cooperates with web 4 by applying suction thereon while at least

another vacuum port 19 is in fluid communication with the vacuum source.

**[0076]** More precisely, each sphere 16 comprises at least one vacuum channel obtained therein, and cutting roller 12 comprises a vacuum collector channel (not shown) fluidly connectable to the vacuum source and to the vacuum channel of each sphere 16 and configured to arrange the respective vacuum ports 19 in fluid communication with the vacuum source.

**[0077]** The operation of labelling machine 1 is described hereinafter with reference to a starting condition in which a section of web 4 has been received onto outer lateral surface 14 of cutting roller 12 and is approaching cutting station T to be cut by interaction of blade member 13 and counterblade member 15.

**[0078]** In this condition, web 4 cooperates in contact with spheres 16 which are distributed, as explained above, onto receiving portion 17.

**[0079]** Accordingly, the sliding friction of web 4 onto cutting roller 12 is reduced (preferably eliminated), whereas rolling friction is increased.

**[0080]** Thus, web 4 mostly rolls, and almost does not slide (preferably does not slide at all), onto outer lateral surface 14, thereby at least minimizing, preferably annulling) the quantity of glue left thereon and on blade member 13.

**[0081]** With reference to Figures 3a and 3b, number 10' indicates as a whole a cutting device according to a second embodiment of the present invention, adapted to be implemented in labelling machine 1.

**[0082]** Since cutting device 10' is functionally and structurally similar to cutting device 10, only the differentiating features between these latter will be described in the following, using the same reference numbers for equivalent or corresponding parts.

**[0083]** In particular, cutting device 10' differs from cutting device 10 in that cutting roller 12 of cutting device 10' comprises a plurality of rolling elements 16', each rolling element 16' being defined by a cylinder arranged with its longitudinal axis parallel to axis Y.

**[0084]** It is stated that, apart from their shape and disposition, rolling elements 16' are functionally identical to rolling elements 16 of cutting device 10.

**[0085]** Accordingly, in this case the seats 18 have a barrel vault or semi-cylindrical shape.

**[0086]** According to this preferred embodiment, vacuum ports 19 are arranged at rolling elements, i.e. at cylinders 16', each cylinder 16' comprising a plurality of vacuum ports 19 connectable to the vacuum source.

**[0087]** In particular, each cylinder 16' has a plurality of vacuum ports 19 arranged in fluid communication with one another and with the vacuum source so that, in use, at least one vacuum port 19 of each cylinder 16' cooperates with web 4 by applying suction thereon while at least another vacuum port 19 is in fluid communication with the vacuum source.

**[0088]** In this way the precision of supporting the web 4 by the cutting roller 12 is increased as the suction action

applied on the web 4 can be more precisely distributed by means of suction points obtained on the same elements, which are the cylinders 16', that come into contact with the web 4.

5 **[0089]** More precisely, each cylinder 16' comprises at least one vacuum channel 20 arranged therein.

**[0090]** Accordingly, cutting roller 12 comprises a vacuum collector channel 21 fluidly connectable to the vacuum source and to vacuum channel 20 of each cylinder 16' and configured to arrange the respective vacuum ports 19 in fluid communication with the vacuum source.

10 **[0091]** According to an alternative embodiment not shown, vacuum ports 19 are positioned on portions of the outer lateral surface 14 between the cylinders 16'.

15 **[0092]** The operation of cutting device 10' corresponds, mutatis mutandis to the one of cutting device 10.

**[0093]** The advantages of cutting device 10, 10' according to the present invention will be clear from the foregoing description.

20 **[0094]** Thanks to the presence of rolling elements 16, 16', the amount of glue accumulated onto outer lateral surface 14 and blade member 13 is reduced, due to the fact that the sliding friction between web 4 and cutting roller 12 is reduced and, in particular, "transformed" into rolling friction between web 4 and rolling elements 16, 16'.

25 **[0095]** This is possible thanks to the free-rolling or free-turning arrangement of rolling elements 16, 16' on cutting roller 12, with respect to outer lateral surface 14, in particular to receiving portion 17.

30 **[0096]** This results in a minimization of the necessary maintenance stops and in an improvement of the overall efficiency of the labelling process.

35 **[0097]** Moreover, especially in the case in which vacuum ports 19 are provided at rolling elements 16, 16', there is almost no contact, preferably no contact at all, between outer lateral surface 14 and web 4, due to the fact that web 4 is only supported by rolling elements 16, 16'.

40 **[0098]** This results in a further reduction of glue accumulation onto cutting roller 12 and, thus, in a longer maintenance time interval.

45 **[0099]** Clearly, changes may be made to cutting device 10, 10' as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

50 **[0100]** In particular, cutting device 10, 10' could also be implemented and used in a labelling machine which entails the use of known "glue labels" or "sleeve labels" or other type of labels, i.e. not only labels 2 provided with pre-applied adhesive bands.

## Claims

- 55 1. Cutting device (10, 10') for a labelling machine (1) configured to apply labels (2) obtained from a web (4) of labelling material onto articles (3) adapted to contain a pourable product, said cutting device (10,

- 10') comprising a cutting roller (12) rotatable about a longitudinal axis (Y), carrying a blade member (13), which radially protrudes from an outer lateral surface (14) of the cutting roller (12), and conveying, in use, the blade member (13) along a circular cutting path around said axis (Y);  
the blade member (13) being configured to sequentially cut said web (4) at a cutting station (T) arranged along said cutting path, in a position adjacent to the cutting roller (12), so as to obtain a sequence of said labels (2);  
**characterized in that** the cutting roller (12) comprises a plurality of rolling elements (16, 16') which are arranged at said outer lateral surface (14) and radially protrude from said outer lateral surface (14), and **in that** the rolling elements (16, 16') are mounted to the cutting roller (12) in a rolling manner with respect to the outer lateral surface (14).
2. Cutting device as claimed in claim 1, wherein the rolling elements (16, 16') are arranged at least at a receiving portion (17) of said outer lateral surface (14) configured to receive and support said web (4), wherein each rolling element (16, 16') radially protrudes from the receiving portion (17) of a radial length less than the radial length the blade member (13) protrudes of from the outer lateral surface (14), and wherein each rolling element (16, 16') is rotatable in a rolling manner with respect to the receiving portion (17).
  3. Cutting device as claimed in claim 1 or 2, wherein the rolling elements (16, 16') are mounted to the cutting roller (12) in respective fixed positions on the outer lateral surface (14).
  4. Cutting device as claimed in claim 3, wherein the cutting roller (12) comprises a plurality of seats (18) obtained on the outer lateral surface (14) thereof; and wherein each rolling element (16, 16') is fitted idle at one respective seat (18) in a rolling manner, so that, in use, sliding friction between the web (4) and the cutting roller (12) is reduced and rolling friction between the web (4) and the cutting roller (12) is increased.
  5. Cutting device (10) as claimed in any one of the foregoing claims, wherein each rolling element is defined by a sphere (16).
  6. Cutting device as claimed in claim 5 when depending on claim 4, wherein each seat (18) has a hemispheric shape.
  7. Cutting device as claimed in claim 5 or 6, wherein the spheres (16) are arranged in a plurality of longitudinal rows along respective longitudinal directions parallel to said longitudinal axis (Y).
  8. Cutting device (10') as claimed in any one of the claims 1 to 4, wherein each rolling element is defined by a cylinder (16') arranged with its longitudinal axis parallel to the longitudinal axis (Y) of the cutting roller (12).
  9. Cutting device as claimed in claim 8 when depending on claim 4, wherein each seat (18) has a barrel vault or semi-cylindrical shape.
  10. Cutting device as claimed in any one of the foregoing claims, wherein the cutting roller (12) comprises a plurality of vacuum ports (19) arranged on the outer lateral surface (14) thereof and fluidly connectable to a vacuum source configured to generate vacuum, in order to apply vacuum on the web (4) and retain and support the web (4) on the outer lateral surface (14).
  11. Cutting device as claimed in claim 10, wherein the vacuum ports (19) are positioned at portions of the outer lateral surface (14) arranged between the rolling elements (16, 16').
  12. Cutting device as claimed in claim 10, wherein the vacuum ports (19) are arranged at the rolling elements (16, 16'), each rolling element (16, 16') comprising a plurality of vacuum ports (19) connectable to the vacuum source.
  13. Cutting device as claimed in claim 12, wherein each rolling element (16, 16') has a plurality of vacuum ports (19) arranged in fluid communication with one another and with the vacuum source so that, in use, at least one vacuum port (19) of each rolling element (16, 16') cooperates with the web (4) by applying suction thereon while at least another vacuum port (19) is in fluid communication with the vacuum source.
  14. Cutting device as claimed in claim 13, wherein each rolling element (16, 16') comprises at least one vacuum channel (20) arranged therein; and wherein the cutting roller (12) comprises a vacuum collector channel (21) fluidly connectable to the vacuum source and to the vacuum channel (20) of each rolling element (16, 16') and configured to arrange the respective vacuum ports (19) in fluid communication with the vacuum source.
  15. Labelling machine (1) configured to apply labels (2) obtained from a web (4) of labelling material onto articles (3) adapted to contain a pourable product, the labelling machine (1) comprising:
    - a conveyor device (6) configured to advance the articles (3) to be labelled along a labelling path (P);

- a storage unit (5) for initially storing the web;
- a plurality of unwinding rollers (8) configured to support the web (4) unwound from the storage unit (5) and to feed the web (4) along a feeding path;
- a cutting device (10, 10') as claimed in any one of the foregoing claims; and
- a label transfer device (11) configured to receive each label (2) previously cut, to retain such label (2) and to feed such label (2) to the conveyor device (6) for the application onto one respective article (3).

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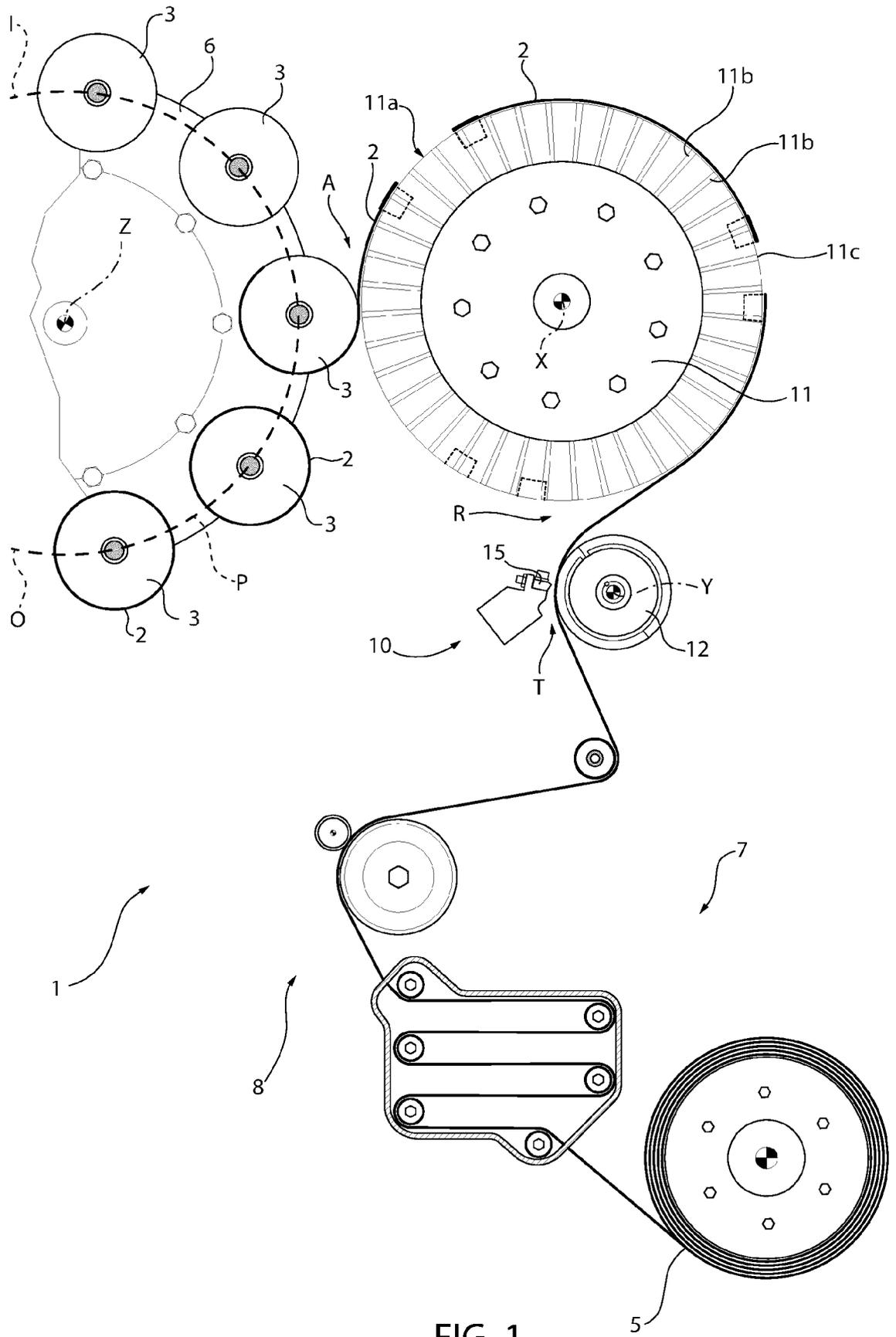


FIG. 1

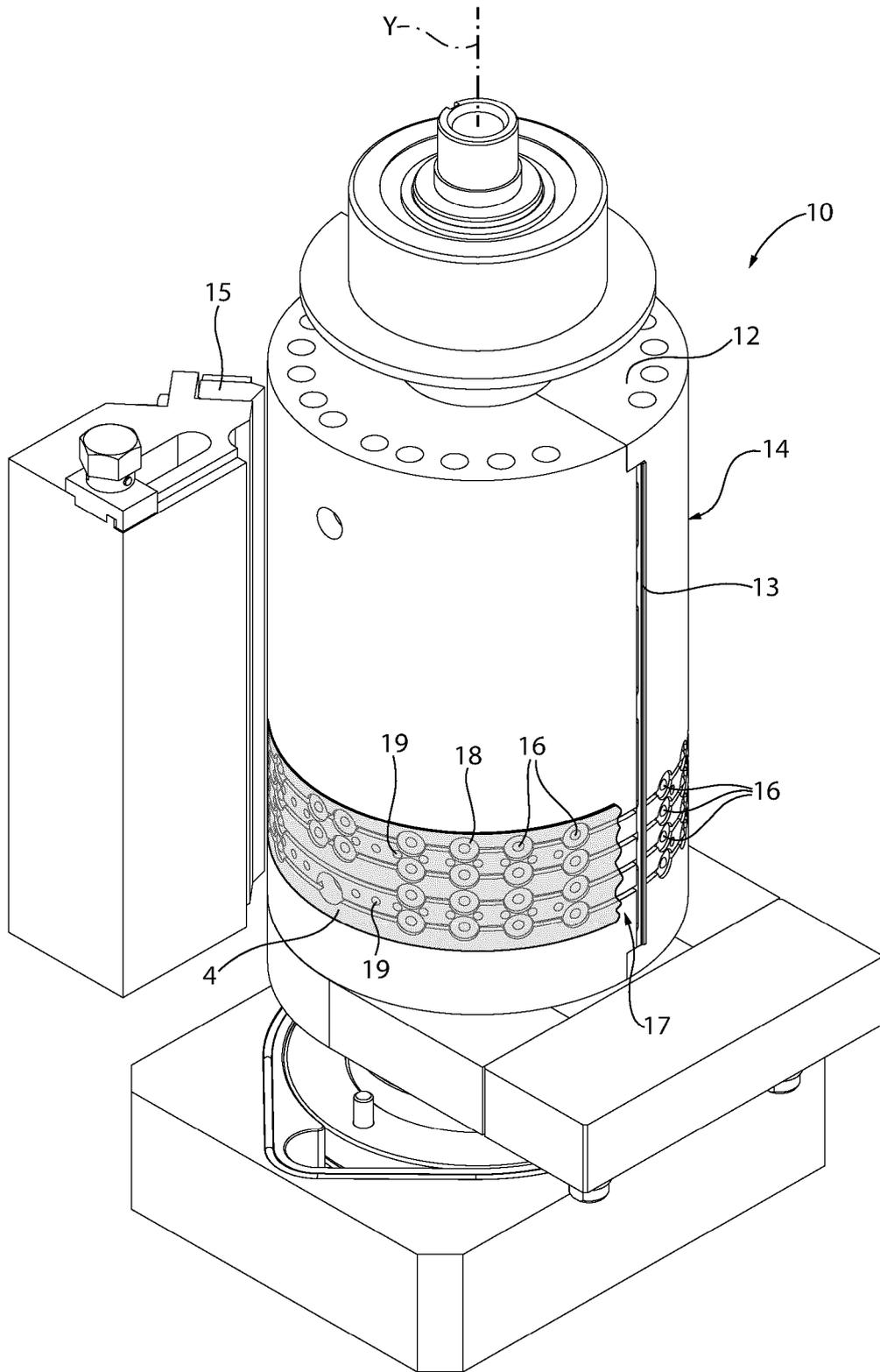


FIG. 2A

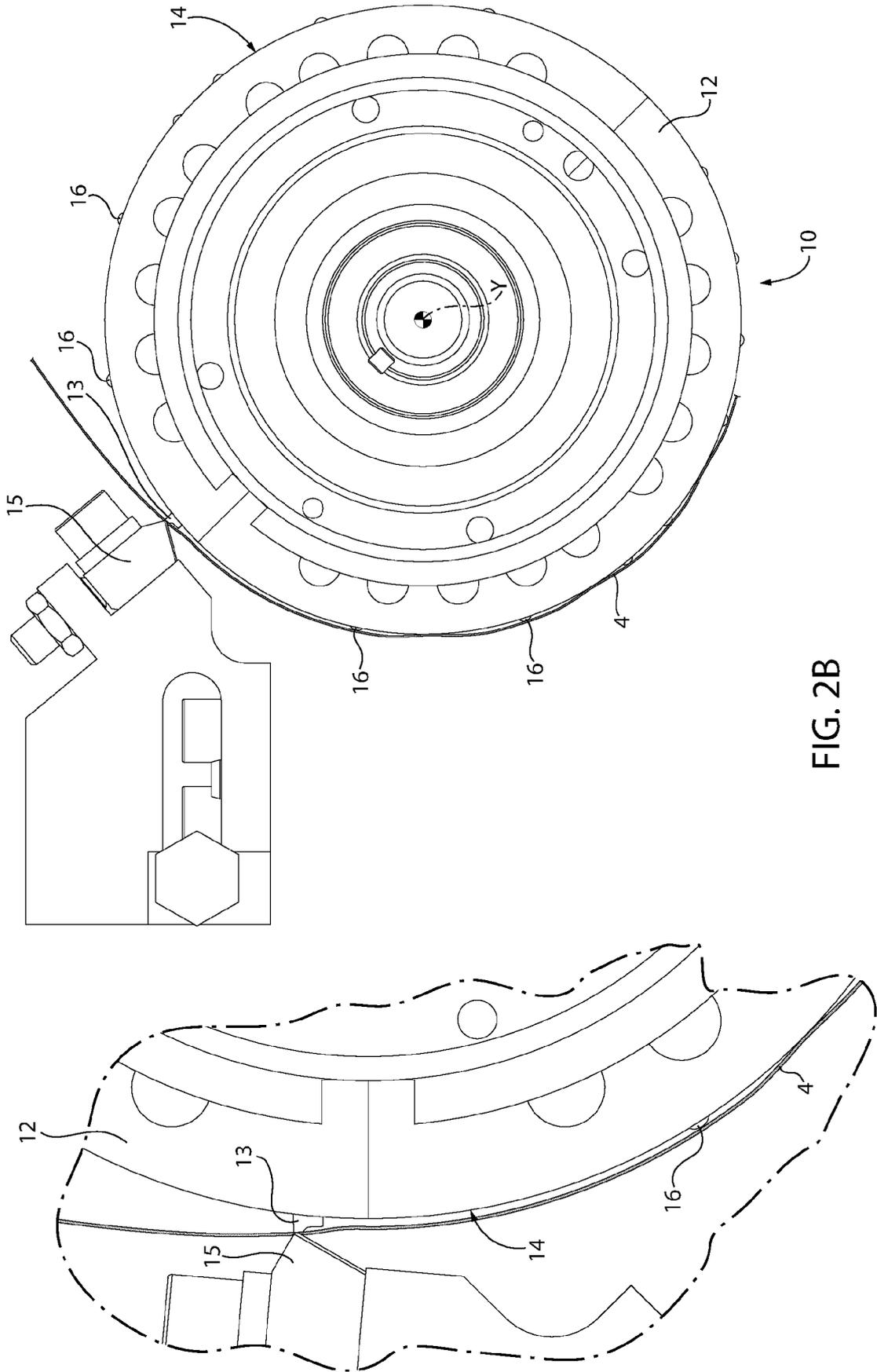


FIG. 2B

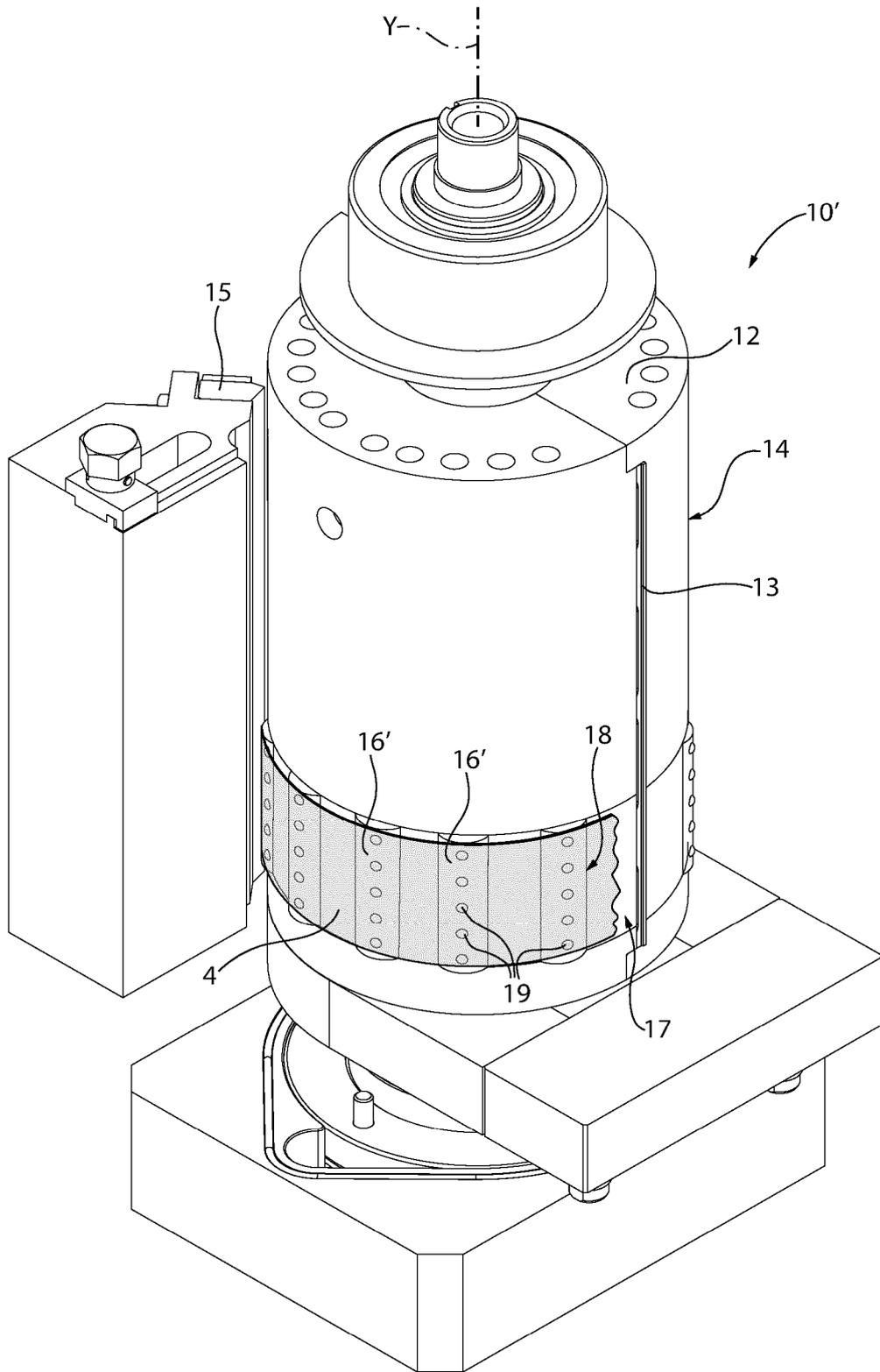


FIG. 3A





EUROPEAN SEARCH REPORT

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A	US 2017/369197 A1 (CARMICHAEL JAMES [IT] ET AL) 28 December 2017 (2017-12-28) * paragraph [0040] - paragraph [0067]; figures 3,4 *  -----	1-15	INV. B65C9/18
			TECHNICAL FIELDS SEARCHED (IPC)
			B65C
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>27 May 2021</b>	Examiner <b>Wehr, Wolfhard</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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27-05-2021

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