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

(57) There is described a labelling machine (1) for applying labels (2) obtained from a web (4) of labelling material onto articles (3) adapted to contain a pourable product, the labelling machine (1) comprises: a conveyor device (6) configured to advance a plurality of articles (3) along a conveying path (P); a cutting device (10) configured to cut a sequence of single labels (2) from the web (4) of labelling material, the labels (2) being initially joined together to form said web (4); a transfer device (11) configured to sequentially receive and retain the labels (2) cut by the cutting device (10) and to transfer them to the conveyor device (6); and a gluing device (12, 12') arranged operatively downstream of the cutting device (10) and configured to apply glue onto at least one portion (2a) of each label (2); the gluing device (12, 12') is configured to sequentially apply glue to the portion (2a) of each label (2) prior to the cutting of the same label (2) off the web (4) of labelling material by means of the cutting device (10).

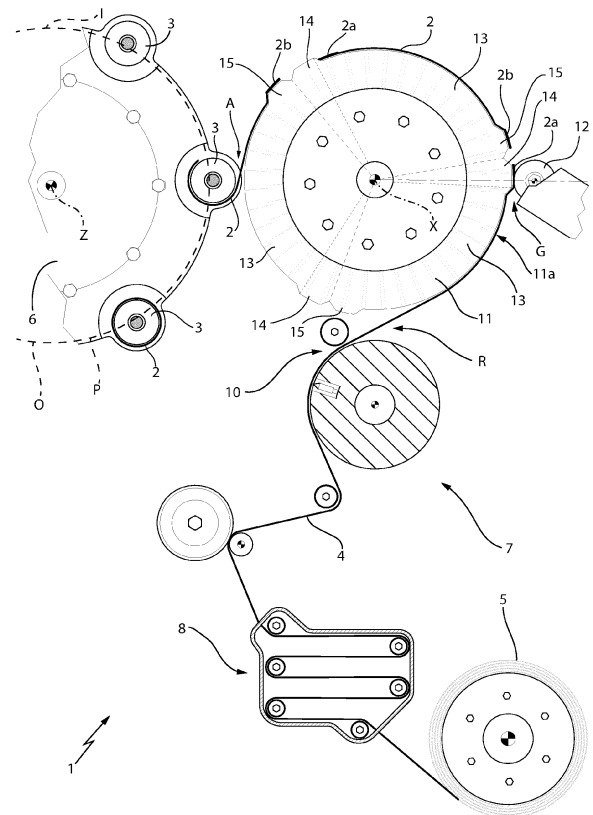


FIG. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a labelling machine for applying label onto articles, such as bottles, containers or the like, 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, containers or the like, 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, containers, or the like destined to be filled with a pourable product, in particular a pourable food product.

[0004] 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.

[0005] 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.

[0006] Eventually, the labels so obtained are conveyed and applied onto the respective articles to be labelled.

[0007] 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] Generally, 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;
- a cutting device, for example a knife, configured to cut a sequence of single labels having equal length from the web of labelling material; and
- a vacuum drum configured to receive, retain and ad-

vance each label previously cut by the cutting device and to feed each label to the carousel, at the application station.

[0009] Typically, the labelling module further comprises at least one transfer roller, configured to receive the web from the unwinding rollers and to transfer a plurality of labels obtained from such web to the vacuum drum. Generally, the cutting device is arranged peripherally to such transfer roller. Hence, the transfer roller is also known as the "cutter roller".

[0010] In the labelling machines contemplating the use of glue labels, the labelling module further comprises gluing means configured to apply a predetermined amount of glue at least onto the end portions, i.e. the leading end portion and the trailing end portion, of the successive labels previously cut and advanced sequentially by the vacuum drum.

[0011] According to a known solution, the gluing means comprise a gluing roller arranged peripherally to the vacuum drum, in particular substantially tangent to raised portions of the vacuum drum, in a position operatively downstream the cutter roller.

[0012] In another known solution, gluing means comprise a spray nozzle arranged peripherally to the vacuum drum, in a position operatively downstream the cutter roller.

[0013] 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.

[0014] In detail, the vacuum drum is configured to receive and retain a succession of labels at a receiving station 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.

[0015] According to some configurations known in the art, the stationary distributor member has first air passages connected to a vacuum source; the vacuum drum is in turn provided with second air passages, which are configured to communicate with the first air passages at certain angular positions of the drum as it rotates about its axis, and end into a plurality of vacuum ports formed through an outer lateral surface of the drum for receiving the labels.

[0016] More precisely, the vacuum ports are formed in a plurality of damping pads (leading damping pads and trailing damping pads) and intermediate sections which, together, define the outer lateral surface of the vacuum drum.

[0017] In detail, the pads are organized in pairs, each pair including a leading pad, a trailing pad and an intermediate section between these latter.

[0018] In practice, when being retained by the vacuum drum, a label shall typically have the leading end held on one leading pad, the trailing end held on one trailing pad and the remaining (intermediate) part held on a section

of the outer lateral surface comprised between the two mentioned pads (i.e., the corresponding intermediate section).

[0019] In the case in which gluing means comprise a gluing roller, the pads define the above-mentioned raised portions of the vacuum drum and the gluing roller is arranged to be tangent to the outer lateral surfaces of the pads.

[0020] In light of the above, the vacuum drum can be ideally divided into receiving and transferring sectors, each one of which comprises a retaining portion, delimited by the angular length comprised between one pair of pads, i.e. between a leading pad and a trailing pad, and a sliding portion, along which the leading end of each labels initially slides, as soon as it is grasped by the vacuum action of the vacuum drum, i.e. when the label is still attached to the web of labelling material.

[0021] In practice, each receiving sector is defined by a retaining portion and the immediately adjacent sliding portion.

[0022] The sliding is well-known in the industry and is due to the fact that the web and the vacuum drum necessarily have different peripheral velocities, namely the web is slower than the vacuum drum.

[0023] This causes an initial sliding of the label being received by the vacuum drum onto the outer lateral surface of the vacuum drum, thereby defining the aforementioned sliding portion of each receiving sector the vacuum drum is divided into.

[0024] The sliding of the label stops as soon as the label is cut at its trailing edge, thereby being fully transferred onto the vacuum drum.

[0025] The above condition implies that the effective available angular length for each label on the vacuum drum is less than the angular length of the relative receiving sector: in detail, the effective available angular length is equal to the length of the receiving sector minus the length of the sliding portion, i.e. equal to the retaining portion.

[0026] From the above, it follows that the maximum length of a label to be handled by the vacuum drum is equal to the effective angular length, at maximum. The maximum angular length of the receiving sector is in turn limited by the relative angular position around the vacuum drum between the gluing means and the cutter roller.

[0027] It is known in the field that, in order to handle labels with increased length, the only solution to increase the effective available angular length on the vacuum drum is to physically change the position of the gluing means (e.g. the gluing roller) relative to the cutter roller, so as to increase the angular distance between these latter.

[0028] Although the known labelling machines, and in particular the known labelling modules, work satisfyingly well, a need is felt in the industry to further improve such labelling machines, in particular as to increase their flexibility and adaptability.

DISCLOSURE OF INVENTION

[0029] It is therefore an object of the present invention to provide a labelling machine which is designed to meet at least one of the above-mentioned needs in a straightforward and low-cost manner.

[0030] This object is achieved by a labelling machine as claimed in claim 1.

[0031] It is a further object of the present invention to provide a method for applying labels onto articles which is designed to meet at least one of the above-mentioned needs in a straightforward and low-cost manner.

[0032] This object is achieved by a method for applying labels onto articles as claimed in claim 12.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] 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 according to the present invention;

Figures 2-4 are enlarged-scale, schematic top views of a particular of the labelling machine of Figure 1 during three different and successive operative conditions; and

Figure 5 is an enlarged-scale, schematic top view of a particular of a further embodiment of the labelling machine according to the present invention during a given operative condition.

BEST MODE FOR CARRYING OUT THE INVENTION

[0034] 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, in particular a pourable food product, such as still or sparkling water, juice, milk, soft drinks, beer, wine, or the like.

[0035] In particular, labels 2 applied by labelling machine 1 are glued labels, i.e. strips of labelling material that are cut at predetermined lengths, from a web 4 of labelling material, and to which glue is applied according to a manner that will be described in the following.

[0036] Preferably, web 4 of labelling material is 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.

[0037] 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;

- 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.

[0038] In detail, labelling module 7 comprises:

- at least one of the above-mentioned reels 5 for storing web 4;
- a plurality of unwinding rollers 8 which support, in use, the web 4 progressively unwound, in use, from the reel 5 and guide it along a feeding path;
- a cutting device 10, preferably a knife of the rotary type known and not described in detail, configured to cut a sequence of single labels 2 from web 4, in the form of strips having equal length;
- a transfer device, in particular a transfer drum, even more in particular a rotary vacuum drum 11 rotatable around a fixed axis, preferably a vertical axis X, arranged peripherally to carousel 6 and configured to receive, retain and transfer labels 2 previously cut by cutting device 10 and to feed labels 2 to carousel 6, at application station A; and
- a gluing device 12 arranged peripherally to vacuum drum 11 operatively downstream of cutting device 10 and configured to apply a predetermined amount of glue onto at least one portion of each label 2, sequentially.

[0039] In greater detail, vacuum drum 11 sequentially receives, in use, a free end portion of web 4 defining a leading end portion 2a of each label 2 at a receiving station R and retains labels 2 onto an outer lateral surface 11a thereof.

[0040] Preferably, vacuum drum 11 has a substantially cylindrical lobed configuration. Accordingly, outer lateral surface 11a has a substantially cylindrical lobed shape and labels 2 are conveyed circumferentially from receiving station R to application station A, along an advancement direction, in this specific example a direction of rotation of vacuum drum 11.

[0041] Furthermore, vacuum drum 11 is rotatably mounted around axis X onto a stationary distributor element (not shown) carried by labelling module 7.

[0042] 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 (also not shown), 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 (schematically shown in Figure 1) formed through outer lateral surface 11a.

[0043] In practice, depending on the angular position relative to axis X assumed by vacuum drum 11, the vacuum ports are put in fluid communication, by means of the first and second air passages, with the vacuum source. When this happens, a suction is applied on each label 2, which retains this latter onto outer lateral surface 11a.

[0044] More precisely, the vacuum ports are distributed onto receiving sectors 13 of outer lateral surface 11a, each one of which angularly extends along outer lateral surface 11a relatively to axis X and is configured to receive and retain one label 2 at a time from its leading end portion 2a to a trailing end portion 2b thereof opposite to the respective leading end portion 2a, so that such label 2 is superimposed, in use, onto the corresponding receiving sector 13.

[0045] In the preferred and non-limitative example shown, vacuum drum 11 has three receiving sectors 13 of equal angular extensions, i.e. outer lateral surface 11a can be ideally divided into three receiving sectors 13 of equal angular length.

[0046] As visible in the appended Figures, cutting device 10 is arranged peripherally to vacuum drum 11 at receiving station R and is configured to cut web 4 sequentially at the trailing end portion 2b of each label 2, so as to produce labels 2 which extend from the leading end portion 2a to trailing end portion 2b.

[0047] According to this embodiment shown, gluing device is defined by a gluing roller 12 configured to apply glue to each label 2 at a gluing station G, arranged peripherally to vacuum drum 11 and positioned on labelling module 7 at a non-zero angular distance from cutting device 10 relative to axis X.

[0048] In the example shown, gluing roller 12 is positioned at substantially 90° from cutting device 10, relative to axis X. Hence, gluing station G is located at 90° from receiving station R, relative to axis X.

[0049] Gluing roller 12 is configured to apply glue to the leading end portion 2a and to the trailing end portion 2b of each label 2, sequentially, when such portions 2a, 2b pass (i.e. are located) at gluing station G.

[0050] To this end, each receiving sector 13 comprises at least a leading pad 14 and a trailing pad 15 both radially protruding from outer lateral surface 11a and configured to interact with gluing roller 12, at gluing station G, to cause the application of glue to leading end portion 2a and trailing end portion 2b of each label 2, respectively.

[0051] More precisely, leading pad 14 and trailing pad 15 are defined by radial protrusions of vacuum drum 11 protruding from the outer lateral surface 11a thereof, leading pad 14 being configured to retain leading end portion 2a of each label 2 for the application of glue thereof and trailing pad 15 being configured to retain trailing end portion 2b of each label 2 for the application of glue thereof.

[0052] Accordingly, gluing roller 12 is positioned so as to be tangent to the leading pad 14 and trailing pad 15 when these latter pass at gluing station G, thereby caus-

ing the application of glue to the leading end portion 2a and to the trailing end portion 2b of each label 2, respectively.

[0053] According to an aspect of the present invention, gluing device, in particular gluing roller 12, is configured to sequentially apply glue to the leading end portion 2a of each label prior to the cutting of the same label 2 off web 4 by means of cutting device 10, in particular prior to the cutting of the same label 2 at the respective trailing end portion 2b thereof.

[0054] As visible in Figures 2 to 4, vacuum drum 11 is provided with retaining portions 16 and sliding portions 17 distributed along outer lateral surface 11a in an alternating manner, each retaining portion 16 being configured to sequentially receive and retain one label 2 at a time from its leading end portion 2a to its trailing end portion 2b and to transfer said label 2 to carousel 6 after glue has been applied to it.

[0055] In more detail, each receiving sector 13 comprises one retaining portion 16 and one sliding portion 17, each sliding portion 17 being operatively adjacent to the respective retaining portion 16 of the same receiving sector 13.

[0056] In practice, each receiving sector 13 is defined by or comprises one respective retaining portion 16 and one respective and immediately adjacent sliding portion 17.

[0057] In use, the leading end portion 2a of each label 2 is configured to slide onto (i.e. along or over) the respective sliding portion 17 of the receiving sector 13 that has received such label 2 (or, better, that has received the leading end portion 2a of such label 2), while the trailing end portion 2b of the same label 2 is still joined to web 4 of labelling material, i.e. while the same label 2 has not yet been cut off web 4 by cutting device 10.

[0058] The sliding of leading end portion 2a along a portion of outer lateral surface 11a, i.e. sliding portion 17, is well-known in the industry and is due to the fact that web 4 and vacuum drum 11 necessarily have different linear velocities, namely web 4 is slower than vacuum drum 11.

[0059] This is necessary in order to provide for a pitch of labels 2 to be transferred by vacuum drum 11 that matches the pitches of articles 3 being advanced by carousel 6.

[0060] Necessarily, such pitch has to be greater than the pitch of the labels 2 still joined and forming web 4. Therefore there must be a difference between linear velocity of web 4, which is defined by unwinding rollers 8 and other feeding rollers of labelling module 7, and the peripheral velocity of vacuum drum 11.

[0061] Such difference in velocities causes the initial sliding of the free end portion of web 4, in particular the leading end portion 2a of the newly received label 2, onto outer lateral surface 11a. The sliding angle around axis X defines the angular extension around axis X of the respective sliding portion 17. Substantially, the sliding angle defines the sliding portion 17.

[0062] In light of the above, vacuum drum 11 is configured to space the labels 2 received onto its outer lateral surface 11a by making the leading end portion 2a of each received label 2 to slide over the respective sliding portion 17.

[0063] According to a further aspect of the present invention, gluing device, in the example shown gluing roller 12, is configured to sequentially apply glue onto the leading end portion 2a of each label 2 while such leading end portion 2a of the same label 2 is sliding onto the respective sliding portion 17, i.e. along the sliding portion 17 of the receiving sector 13 that has received such label 2 (or, better, that has received the leading end portion 2a of such label 2).

[0064] In practice, glue is applied onto one leading end portion 2a while such leading end portion 2a is still sliding onto sliding portion 17 and prior to the cutting of the trailing end portion 2b of the same label 2 off web 4.

[0065] In other words, each leading end portion 2a passes at gluing station G while it is still sliding along sliding portion 17 and while the relative trailing end portion 2b has not yet been cut off web 4.

[0066] With reference to a single label 2, the leading end portion 2a of such label 2 has already slid a certain distance along the respective sliding portion 17 when it reaches gluing station G, as visible in Figure 2.

[0067] In light of the above, each receiving sector 13 has an angular extension, relative to axis X, greater than the non-zero angular distance between gluing roller 12 and cutting device 10.

[0068] Conveniently, for each receiving sector 13, leading pad 14 is positioned at sliding portion 17 and trailing pad 15 is positioned at retaining portion 16.

[0069] Preferably, the entirety of sliding portion 17 is occupied by the angular extension of leading pad 14, for each receiving sector 13.

[0070] This configuration ensures that each leading end portion 2a is properly fed with glue by glue roller 12.

[0071] According to an alternative embodiment shown, vacuum drum 11 comprises, for each receiving sector 13, at least one further leading pad (not shown) located along the respective retaining portion 16 in a position corresponding to the position at which the respective leading end portion 2a has concluded the sliding, in particular in a position immediately downstream the relative sliding portion 17.

[0072] In this way, a proper glue application onto each leading end portion 2a is ensured, thereby avoiding a possible sub-optimal application of glue thereon during sliding of the leading end portion 2a itself.

[0073] The operation of labelling machine 1 is described hereinafter with reference to a single label 2 to be treated/handled and starting from a condition in which a free end portion of web 4 defining the leading end portion 2a of the label 2 to be treated/handled has been received onto outer lateral surface 11a at receiving station R.

[0074] In this condition, leading end portion 2a is re-

ceived at the beginning of one receiving sector 13, i.e. at approximately the beginning of the relative sliding portion 17.

[0075] Then, leading end portion 2a is carried by vacuum drum 11 around axis X while sliding along sliding portion 17, due to the above-mentioned difference in velocities between web 4 and vacuum drum 11.

[0076] Once reaching gluing station G, leading end portion 2a is sprinkled with glue by gluing roller 12. According to the invention, this conveniently happens prior to the cutting of label 2, at the trailing end portion 2b thereof, off web 4 by means of cutting device 10 and while leading end portion 2a is still sliding along the respective sliding portion 17 (Figure 2).

[0077] After the application of glue is completed, i.e. as soon as leading pad 14 travels past gluing station G and as soon as leading end portion 2a has completed sliding and travels from sliding portion 17 to retaining portion 16, cutting device 10 cuts web 4 at trailing end portion 2b, thereby defining the trailing end portion 2b itself (Figure 3).

[0078] Trailing end portion 2b is then received onto the trailing pad 15 of the same receiving sector 13, i.e. of the same retaining portion 16 and, once reaches gluing station G is sprinkled with glue in the same manner as leading end portion 2a (Figure 4).

[0079] Then, label 2 is retained onto retaining portion 16 until the application thereof onto one respective article 3 at application station A.

[0080] The process is repeated for each label 2 to be handled/treated and to be applied onto articles 3.

[0081] Figure 5 illustrates part of a labelling module 7 according to a second alternative preferred embodiment of the present invention.

[0082] Since such labelling module 7 is similar to the labelling module 7 described above in connection with the first embodiment, only the differentiating parts/components/functional features will be described hereinafter, using the same reference numbers for equivalent parts.

[0083] In particular, labelling module 7 according to this second embodiment includes a gluing device 12' which differs from gluing device 12 in that it comprises a spraying member 12' configured to sequentially spray a predetermined amount of glue at the leading end portion 2a and at the trailing end portion 2b of each label 2, when such portions 2a, 2b pass (i.e. are located) at gluing station G.

[0084] As in the first embodiment, spraying member 12' is configured to spray glue onto each leading end portion 2a prior to the cutting of the trailing end portion 2b of the same label 2 off the web 4 of labelling material by means of the cutting device 10 and/or while such leading end portion 2a is sliding onto the respective sliding portion 17.

[0085] Accordingly, vacuum drum 11 is not provided with any pads 14, 15, since they are not needed when a gluing device of the spraying type is used.

[0086] In both the embodiments, the labelling machine

1 or the labelling module 7 is configured so that the gluing device sequentially applies glue onto at least one portion of each label 2 prior to the cutting of the same label 2 off the web 4 of labelling material by means of the cutting device 10. The latter at least one portion corresponds to the leading portion 2a.

[0087] In both the embodiments, the labelling machine 1 is for labelling, by means of respective labels 2, a plurality of containers 3 adapted to contain a pourable product. The machine 1 comprises a conveyor device 6 which is configured to advance said plurality of containers 3 along a conveying path P. The machine comprises a cutting device 10 configured for cutting sequentially the web 4 of labelling material to obtain sequentially a plurality of labels 2 not joined to each other, the labels 2 being initially joined together to form said web 4. The machine 1 comprises a transfer device 11 configured for sequentially receiving the labels 2 from the cutting device 10. The transfer device 11 is configured for transferring the received labels 2 to apply them onto respective conveyed containers 3. The machine 1 comprises a gluing device 12 or 12'. The gluing device 12 or 12' is arranged operatively downstream of the cutting device 10 according to an advancement direction of the web 4. The gluing device 12 or 12' is configured to apply glue sequentially onto respective first portions 2a of the labels 2. The machine 1 is configured so that the gluing device 12 or 12', for each label 2, applies glue onto the first portion 2a of the label 2 prior to the cutting of the same label 2 off the web 4 of labelling material, which cutting occurs by means of the cutting device 10. In this way, the machine 1 can be configured so that the gluing device 12 or 12', for each label 2, applies glue onto the first portion 2a of the label 2 while the transfer device 11 is still receiving the label 2.

[0088] The transfer device 11 is configured for sequentially receiving and transferring the labels 2 by means of the transfer device 11 rotating on itself and around an axis X of the transfer device 11. To this end, the transfer device 11 comprises a plurality of receiving and transferring sectors 13 angularly distributed around said axis X. The machine 1 is configured so that, for each label 2, the transfer device 11, by means of a respective sector 13, receives the label 2 and transfers the label 2 to apply the same label 2 on a respective container 3. The transfer device 11, to receive, transfer and apply the labels 2, comprises a vacuum system acting on the sectors 13. The transfer device 11 can be a vacuum drum.

[0089] Each sector 13 comprises a respective label sliding portion 17 and a respective label retaining portion 16. The transfer device 11 is configured so that the retaining portions 16 are interleaved or intercalated around the axis X with respect to the sliding portions 17. The machine 1 is configured so that, for each label 2, the label 2 is received onto the sector 13 by sliding of the first portion 2a of the label 2, while the label 2 is still joined to the web 4, onto the sliding portion 17 of the sector 13. The machine 1 is configured so that, for each label 2, the gluing device 12 or 12' applies the glue onto the first

portion 2a of the label 2 while the first portion 2a of the label 2 is sliding onto the sliding portion 17 of the sector 13.

[0090] The machine 1 is configured so that, for each label 2, the label 2 is transferred by being retained onto the retaining portion 16 of the sector 13. Each sector 13 comprises a respective first pad 14 which is located on and is part of the sliding portion 17. The first pad 14 protrudes from a lateral surface 11a of the transfer device 11. The lateral surface 11a angularly extends around said axis X and is to be considered ideally faced radially away from the axis X.

[0091] In the first embodiment, the machine 1 is configured so that the gluing device 12, for each label 2, applies glue onto the first portion 2a of the label 2 by mechanically interacting with the first pad 14 of the sector 13 which is receiving the label 2.

[0092] In the second embodiment, the machine 1 is configured so that the gluing device 12', for each label 2, applies glue onto the first portion 2a of the label 2 by sprinkling glue.

[0093] This latter kind of sprinkling gluing device 12' can improve the applying of the glue during the sliding of the label 2 onto the transfer device 11. Moreover this kind of gluing device 12' allows a reduction of the mechanical complexity of the transfer device 11, because in the second embodiment the presence of the first pad 14 is less strictly necessary. At least in the second embodiment, it can be that there is no first pad 14.

[0094] Each sector 13 has an angular extension around said axis X. The gluing device 12 or 12' and the cutting device 10 are arranged in respective positions radially peripheral to said transfer device 11 at a non-zero angular distance from one another relative to said axis X. Thanks to the gluing device 12 or 12' being able to apply glue on the respective first portions 2a of labels 2 while they are still sliding onto the respective sliding portions 17 of the respective sectors 13, the maximum length of the label 2 along the advancement direction can be increased by increasing the angular extension of each sector 13 and without having to change the positions of the gluing device 12 or 12' and/or of the cutting device 10. In particular, the angular extension around the axis X of each sector 13, can be greater than said non-zero angular distance between the gluing device 12 or 12' and the cutting device 10.

[0095] Each label 2 comprises, according to the advancement direction, a leading end portion 2a and a trailing end portion. Leading end portion 2a corresponds to the respective first portion 2a of the label 2. Trailing end portion corresponds to a respective second portion 2b of the label 2. The machine 1 is configured so that the gluing device 12 or 12' applies glue sequentially onto respective first and second portions 2a and 2b of the labels 2. The machine 1 is configured so that the gluing device 12 or 12', for each label 2, applies glue onto the second portion 2b of the label 2 after the cutting of the same label 2 off the web 4 of labelling material by means of the cutting

device 10.

[0096] The machine 1 is configured so that the gluing device 12 or 12', for each label 2, applies glue onto the second portion 2b of the label 2 while the transfer device 11 is transferring the label 2 by retaining the label 2 onto the retaining portion 16 of the sector 13.

[0097] The machine 1 is configured so that, for each label 2, the gluing device 12 or 12' applies the glue onto the second portion 2b of the label 2 while the label 2 is being retained onto the retaining portion 16 of the sector 13.

[0098] Each sector 13 comprises a respective second pad 15 which is located on and is part of the respective retaining portion 16. Second pad 15 protrudes radially from said lateral surface 11a.

[0099] In the first embodiment, the machine 1 is configured so that the gluing device 12, for each label 2, applies glue onto the second portion 2b of the label 2 by mechanically interacting with the second pad 15 of the sector 13 receiving the label 12.

[0100] In the second embodiment, the machine 1 is configured so that the gluing device 12', for each label 2, applies glue onto the second portion 2b of the label 2 by sprinkling glue. At least in the second embodiment, it can be that there is no second pad 15.

[0101] The transfer device 11 is configured to angularly space the received labels 2 around said axis X by making the leading end portion 2a of each received label 2 to slide over the sliding portion 17 of the sector 13 by means of which the label 2 is received. In this way the transfer device 11 changes the pitch of the labels 2 from the pitch value that labels 2 have when the same labels 2 are joined to each other to form the web 6, to the pitch that they must have to be correctly applied on the respective containers 6.

[0102] The advantages of labelling machine 1 according to the present invention will be clear from the foregoing description.

[0103] Thanks to the above configuration, it is possible to handle labels 2 of an increased length without any cumbersome change in design and/or structure of labelling module 7 or machine 1. In fact, the maximum length of each label 2 is not limited by the relative position of gluing device 12, 12' with respect to cutting device 10 and by the angular extension, relative to axis X, of the sliding portions 17. Instead, by using the angular space of the sliding portions 17, it is possible to increase the available space for labels 2 onto receiving sectors 13, thereby allowing for handling labels 2 of increased length without displacing gluing device 12, 12' and/or cutting device 10 from one another, which can be cumbersome, difficult and time consuming.

[0104] In light of the above, flexibility and adaptability to format changes (i.e. to labels of different and increased lengths) of labelling machine 1 can be improved and increased.

[0105] Clearly, changes may be made to labelling machine 1 as described herein without, however, departing

from the scope of protection as defined in the accompanying claims.

Claims

1. A labelling machine (1) for labelling, by means of respective labels (2), a plurality of containers (3) adapted to contain a pourable product, said labelling machine (1) comprising:

- a conveyor device (6) configured to advance said plurality of containers (3) along a conveying path (P);
- a cutting device (10) configured for cutting sequentially a web (4) of labelling material to obtain sequentially a plurality of labels (2) not joined to each other, the labels (2) being initially joined together to form said web (4);
- a transfer device (11) configured for sequentially receiving the labels (2) from the cutting device (10) and for transferring the received labels (2) to apply them onto respective conveyed containers (3); and
- a gluing device (12, 12') located operatively downstream of the cutting device (10) according to an advancement direction of the web (4), and configured to apply glue sequentially onto respective first portions (2a) of the labels (2);

characterized in that the machine (1) is configured so that, for each label (2), the gluing device (12, 12') applies glue onto the first portion (2a) of the label (2) prior to the cutting of the same label (2) off the web (4) by means of the cutting device (10).

2. Labelling machine as claimed in claim 1, wherein the machine (1) is configured so that, for each label (2), the gluing device (12, 12') applies glue onto the first portion (2a) of the label (2) while the transfer device (11) is still receiving the label (2).

3. Labelling machine as claimed in claim 1 or 2, wherein:

- the transfer device (11) is configured for sequentially receiving and transferring the labels (2) by means of the transfer device (11) rotating on itself and around an axis (X) of the transfer device (11);
- the transfer device (11) comprises a plurality of receiving and transferring sectors (13) angularly distributed around said axis (X), the machine (1) being configured so that for each label (2), the transfer device (11), by means of a respective sector (13), receives the label (2) and transfers the label (2) to apply the label (2) on a respective container (3).

4. Labelling machine as claimed in claim 3, wherein:

- each sector (13) comprises a respective label sliding portion (17) and a respective label retaining portion (16), the transfer device (11) being configured so that the retaining portions (16) are interleaved or intercalated around the axis (X) with respect to the sliding portions (17);

the machine (1) is configured so that, for each label (2), the label (2) is received onto the sector (13) by sliding of the first portion (2a) of the label (2), while the label (2) is still joined to the web (4), onto the sliding portion (17) of the sector (13);

wherein the machine (1) is configured so that, for each label (2), the gluing device (12, 12') applies the glue onto the first portion (2a) of the label (2) while the first portion (2a) is sliding onto the sliding portion (17) of the sector (13);

the machine (1) is configured so that, for each label (2), the label (2) is transferred by being retained onto the retaining portion (16) of the sector (13).

5. Labelling machine according to claim 4, wherein:

- each sector (13) comprises a respective first pad (14) which is located on the respective sliding portion (17) and protrudes from a lateral surface (11a) of the transfer device (11), said lateral surface angularly extending around said axis (X);
- the machine (1) is configured so that the gluing device (12), for each label (2), applies glue onto the first portion (2a) of the label (2) by mechanically interacting with the first pad (14) of the sector (13) receiving the label (12).

6. Labelling machine as claimed in any of the previous claims 3 to 5,

wherein said gluing device (12, 12') and said cutting device (10) are arranged in respective positions radially peripheral to said transfer device (11) at a non-zero angular distance from one another relative to said axis (X);

and wherein, for each sector (13), the sector (13) has an angular extension, around said axis (X), greater than said non-zero angular distance between the gluing device (12, 12') and the cutting device (10).

7. Labelling machine as claimed in any of the previous claims, wherein:

- each label (2), according to the advancement direction, comprises a leading end portion (2a) corresponding to the respective first portion (2a) of the label (2), and a trailing end portion (2b), corresponding to a respective second portion

(2b) of the label (2);

- the machine is configured so that the gluing device (12, 12') applies glue sequentially onto respective first and second portions (2a, 2b) of the labels (2);

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and wherein the machine (1) is configured so that, for each label (2), the gluing device (12, 12') applies glue onto the second portion (2b) of the label (2) after the cutting of the same label (2) off the web (4) by means of the cutting device (10).

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8. Labelling machine as claimed in claim 7, wherein the machine (1) is configured so that, for each label (2), the gluing device (12, 12') applies glue onto the second portion (2b) of the label (2) while the transfer device (11) is transferring the label (2).

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9. Labelling machine as claimed in claim 7 or 8 when dependent on claim 4, wherein the machine (1) is configured so that, for each label (2), the gluing device (12, 12') applies glue onto the second portion (2b) while the label (2) is being retained onto the retaining portion (16).

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10. Labelling machine according to claims 5 and 9, wherein:

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each sector (13) comprises a respective second pad (15) which is located on the respective retaining portion (16) and protrudes radially from said lateral surface (11a);

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the machine (1) is configured so that the gluing device (12), for each label (2), applies glue onto the second portion (2b) by mechanically interacting with the second pad (15) of the sector (13) receiving the label (2).

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11. Labelling machine as claimed in any of claims 7 to 10 when dependent on claim 4, wherein the transfer device (11) is configured to angularly space the received labels (2) around said axis (X) by making the leading end portion (2a) of each received label (2) to slide over the sliding portion (17) of the sector (13) receiving the label (2).

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12. A labelling method (1) for labelling, by means of respective labels (2), a plurality of containers (3) adapted to contain a pourable product, said method (1) comprising:

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- by means of a conveyor device (6), advancing said plurality of containers (3) along a conveying path (P);

- by means of a cutting device (10), cutting sequentially a web (4) of labelling material to obtain sequentially a plurality of labels (2) not joined to each other, the labels (2) being initially joined

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together to form said web (4);

- by means of a transfer device (11), sequentially receiving the labels (2) from the cutting device (10), and transferring the received labels (2) to apply them onto respective conveyed containers (3); and

- by means of a gluing device (12, 12') located operatively downstream of the cutting device (10) according to an advancement direction of the web (4), applying glue sequentially onto respective first portions (2a) of the labels (2);

characterized in that, for each label (2), glue is applied onto the first portion (2a) of the label (2) prior to the cutting of the same label (2) off the web (4) of labelling material.

13. Method according to claim 12, wherein, for each label (2), glue is applied onto the first portion (2a) while the transfer device (11) is still receiving the label (2).

14. Method according to claim 12 or 13, wherein:

sequentially receiving and transferring the labels (2) is carried out by means of the transfer device (11) rotating on itself and around an axis (X) of the transfer device (11);

the transfer device (11) comprises a plurality of receiving and transferring sectors (13) angularly distributed around said axis (X);

each label (2) is received and transferred by means of a respective sector (13);

each sector (13) comprises a respective label sliding portion (17) and a respective label retaining portion (16), the transfer device (11) being configured so that the retaining portions (16) are interleaved or intercalated around the axis (X) with respect to the sliding portions (17);

each label (2) is received onto the respective sector (13) by sliding of the first portion (2a) of the label (2), while the label (2) is still joined to the web (4), onto the sliding portion (17) of the sector (13);

for each label (2), glue is applied onto the first portion (2a) of the label (2) while the first portion (2a) is sliding onto the sliding portion (17) of the sector (13);

each label (2) is transferred by being retained onto the respective retaining portion (16) of the sector (13).

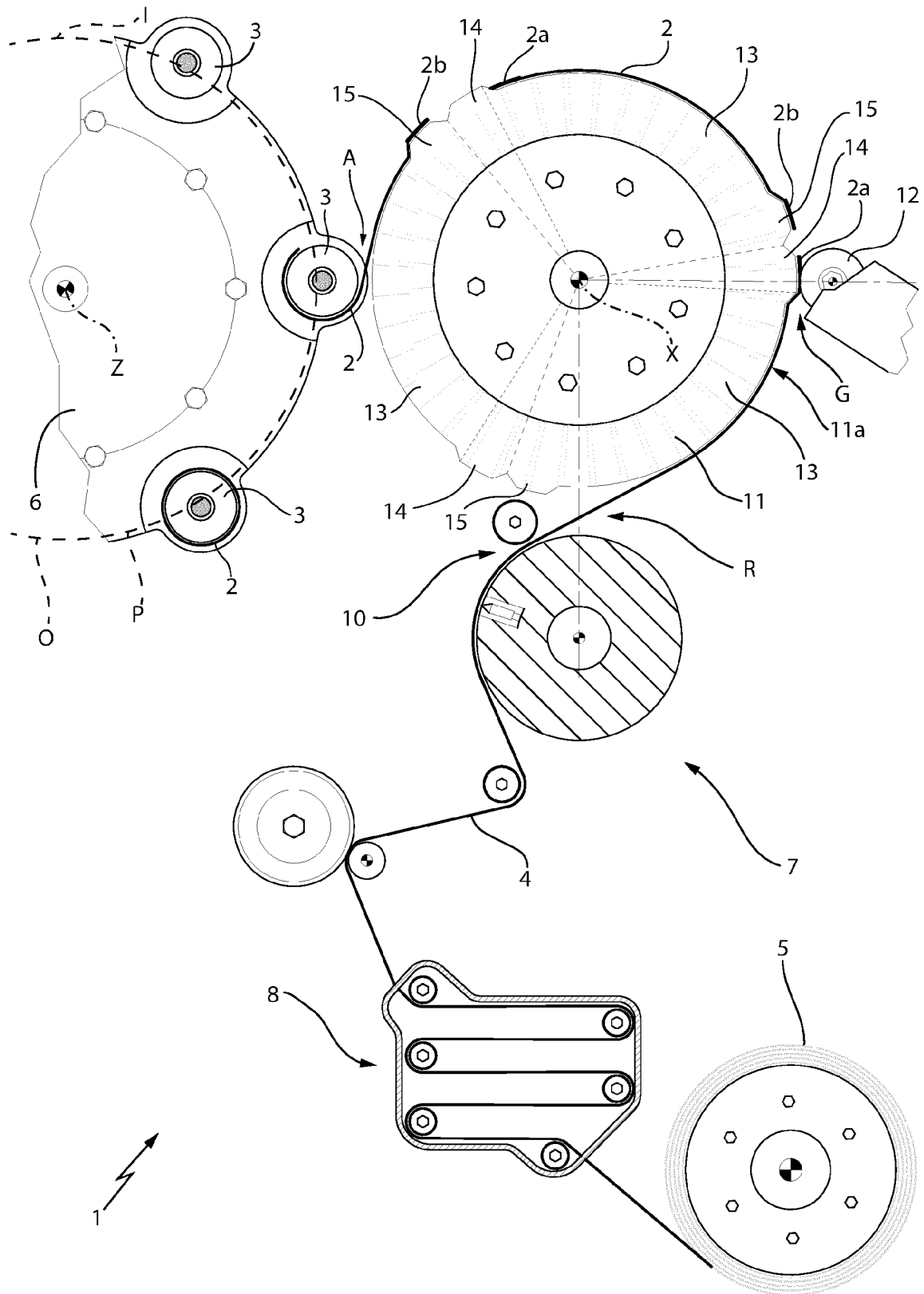


FIG. 1

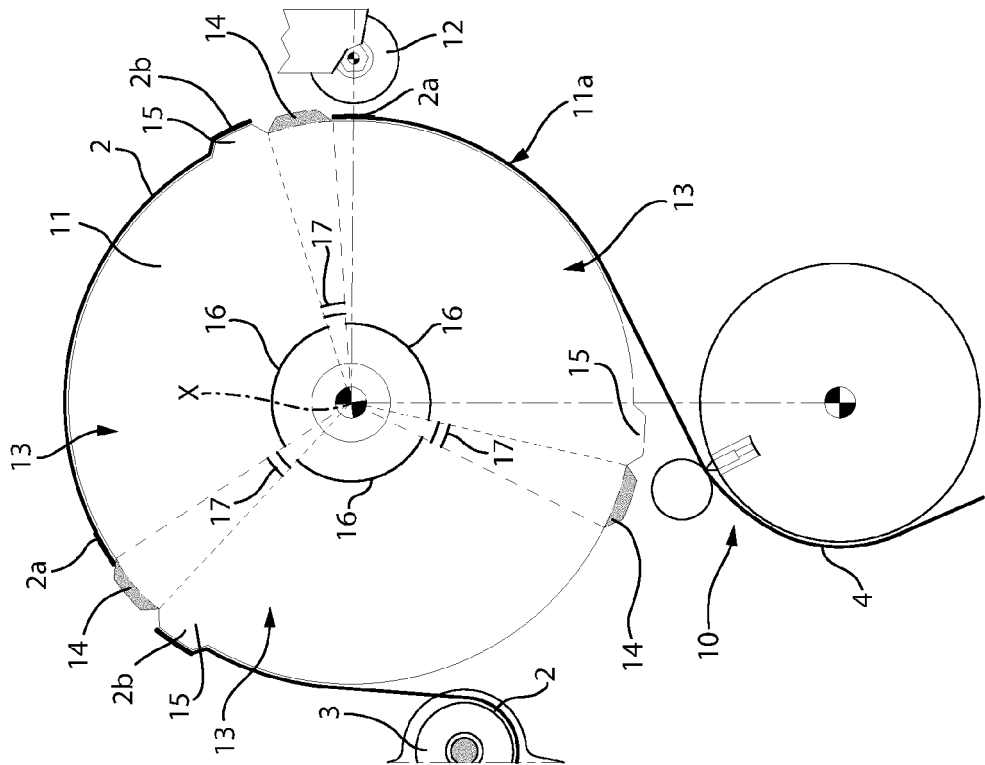


FIG. 2

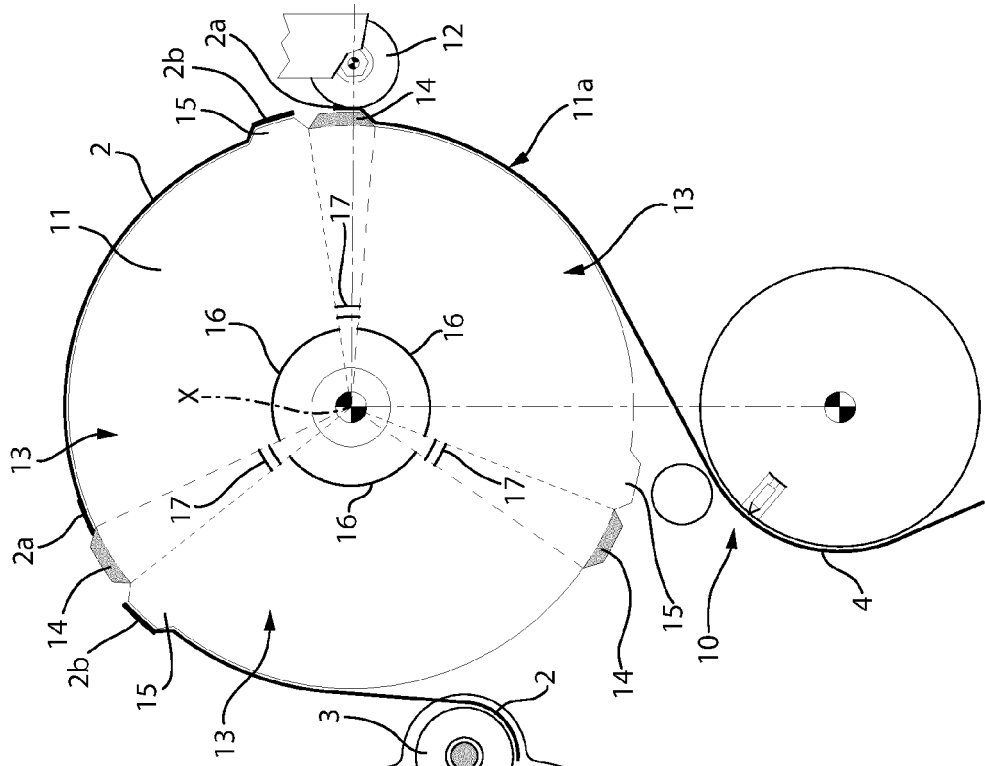


FIG. 3

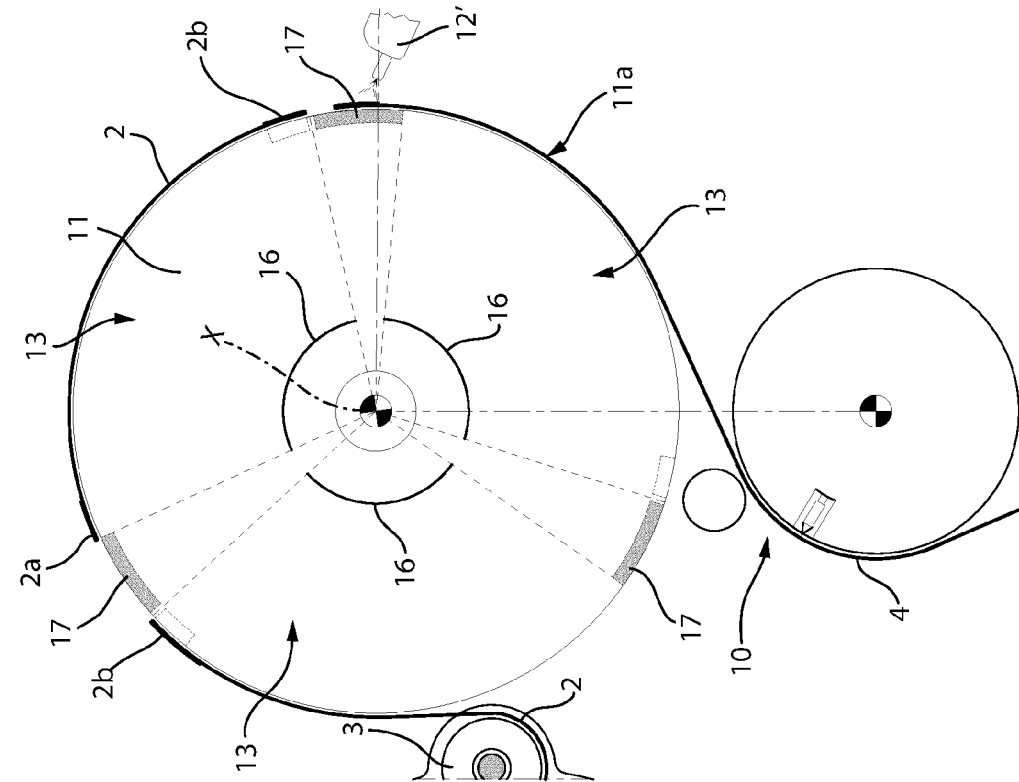


FIG. 4

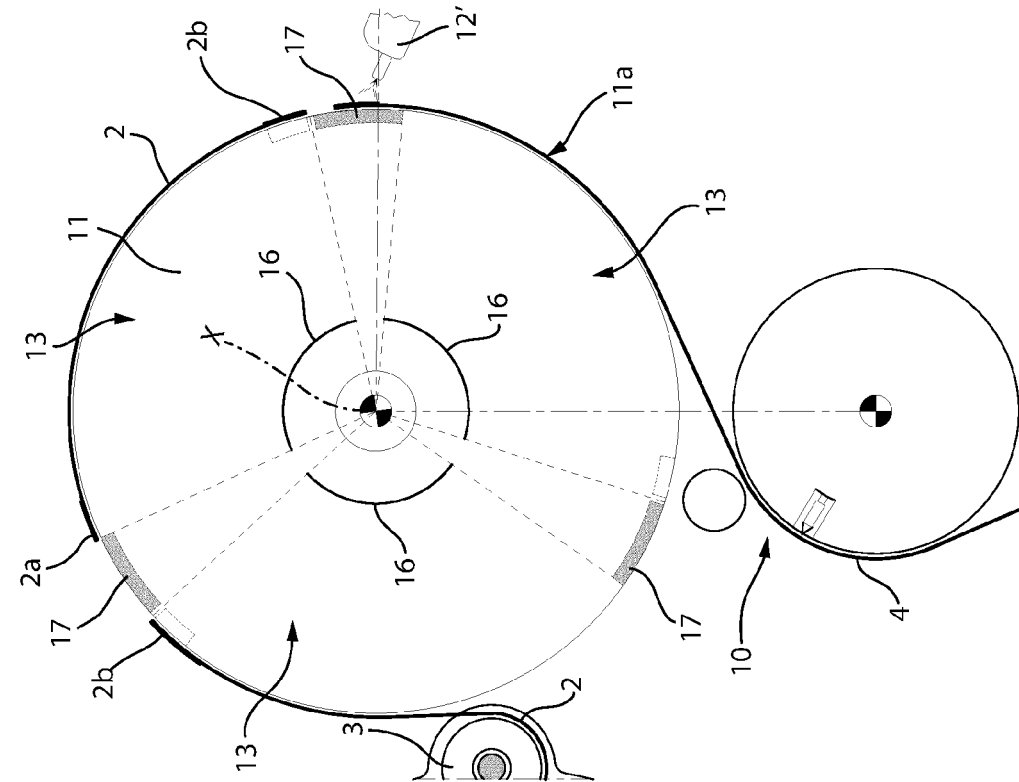


FIG. 5



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Application Number
EP 20 20 2700

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 March 2021	Examiner Mendão, João
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