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(54) **METHODS AND APPARATUSES FOR PROCESSING A WEB OF WRAPPING MATERIAL USED TO MAKE SMOKING ARTICLES**

VERFAHREN UND APPARATE ZUR VERARBEITUNG EINER UMHÜLLUNGSMATERIALBAHN ZUR HERSTELLUNG VON RAUCHARTIKELN

PROCÉDÉS ET APPAREILS DE TRAITEMENT D'UNE BANDE DE MATÉRIAU D'ENVELOPPAGE UTILISÉE POUR FABRIQUER DES ARTICLES À FUMER

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(73) Proprietor: **G.D S.p.A.**
40133 Bologna (IT)

(72) Inventors:
- **GANDOLFI, Fabrizio**
  40133 Bologna (IT)
- **CHIARABAGLIO, Luca**
  40133 Bologna (IT)
- **GAMBERINI, Giuliano**
  40133 Bologna (IT)
- **FEDERICI, Luca**
  Deceased (IT)

(74) Representative: **Conti, Marco**
Bugnion S.p.A.
Via di Corticella, 87
40128 Bologna (IT)

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Description

Technical field

[0001] This invention relates to a method and an apparatus for processing a web of wrapping material used to make smoking articles. More specifically, this invention relates to a method and an apparatus for making rod-shaped smoking articles. The term "rod-shaped articles" is used herein to denote products such as, for example, cigarettes, cigars, cigarillos, electronic cigarettes and related semi-products but also semi-products (for example, filters and portions for releasing a substance to be inhaled).

Background art

[0002] The term "cigarette" is used to denote any rod-shaped article comprising at least a filter, a cigarette segment designed to release an inhalable substance, and a connecting strip disposed in such a way as to connect the filter and the cigarette segment to each other. The cigarette may be a traditional cigarette, where inhalation follows burning the free end of the cigarette segment, or it may be an electronic cigarette, where inhalation follows heating (without burning) the free end of the cigarette segment (specifically, with a carbon tip).

[0003] The cigarette segment may comprise traditional tobacco wrapped in paper or it may be an aerosol-generating element, that is,
a product containing tobacco of the type suitable for heating but not burning (heat-not-burn).

[0004] In this case, the tobacco may be, for example, pre-treated, reconstituted or homogenized tobacco.

[0005] Typically, rod-shaped articles of the type mentioned above comprise a wrapper - of paper, for example - in which the articles are wrapped.

[0006] The machines which make the rod-shaped articles, therefore, typically include rolls of wrapping material of various kinds which are unwound into continuous webs and then processed, if necessary, and used, for example, to make connecting strips for the cigarettes or coverings for the continuous rods of tobacco or filter material to make the filters or the cigarette segments.

[0007] To meet the wide range of needs of manufacturers of rod-shaped articles, the webs of paper are often further processed before being used to make the article. Web processing may comprise applying features such as a commercial logo (by embossing), knurling on the paper (also by embossing) and, in the case of electronic cigarettes (with carbon tip) an inner layer of metallic material.

[0008] These features are normally applied at very high speeds: a very high level of precision is therefore required of the machine for application to be carried out correctly, at the right position, and to meet acceptability criteria. In many cases, the station where the features are applied are nevertheless subject to faults and malfunctioning which may lead to interruptions or irregularity which reflect negatively on the integrity and/or quality of the article.

[0009] Different methods for making rod-shaped smoking articles are known.

[0010] For example, US6543457 discloses a cigarette making method in which a surface of a running paper web is provided with a pattern and a marker disposed near the pattern. The method comprises detecting the marker (which can be detected more easily than the pattern) using sensors, so as to adjust the conveying speed of the paper web through a cutting unit for cutting the paper web, based on the detections performed.

[0011] The method described has one drawback, however. More specifically, the method described has the drawback of using both the pattern and the marker as a reference; since the pattern on the surface of the web may be incorrectly positioned (due to errors when it is applied), adjusting the cutting operation based (also) on the pattern may have a negative effect on the cutter, making cutting imprecise.

[0012] US2016120214 discloses a method for making cigarettes comprising a wrapping material which in turn comprises an additive used to control cigarette burning. The method comprises detecting, with a sensor, one or more marks applied on the surface of the wrapping material which, after wrapping, is the surface that is visible to the user. The marks are used to synchronize the cutting of the tobacco segment with the concentration profile of the additive on the wrapping material. This method has several drawbacks: in particular, positioning errors may occur (during the step of applying the marks); these mark positioning errors lead to imprecise cutting of the tobacco segment and have a negative effect on subsequent processes.

[0013] Patent documents EP1161888, EP2727481, EP2465362 and EP2306853 provide further examples of methods for processing a web of wrapping material; however, also these methods are affected by the aforementioned drawbacks.

Aim of the invention

[0014] The aim of this invention is to provide a method and an apparatus for processing a web of wrapping material used to make smoking articles to overcome the above mentioned drawbacks of the prior art.

[0015] More specifically, this invention has for an aim to provide a method and an apparatus for processing a web of wrapping material where a mark can be positioned in a particularly precise and reliable manner using a manageably sized, easy to make system (which can be applied on newly made machines or retrofitted on existing machines). Further aims of the invention are to provide a web of wrapping material and a method and an apparatus for making smoking articles.

[0016] These aims are fully achieved by the method for processing a web of wrapping material forming the object

of this invention and as characterized in the appended claims.

[0017] According to the invention, the method comprises a step of feeding the web of wrapping material. In the step of feeding, the web advances by a predetermined quantity (i.e., length). The predetermined quantity corresponds to a length of a stretch of web used to make a single cigarette.

[0018] Preferably, the web is fed continuously.

[0019] According to the invention, the method comprises a step of making a feature (at least one) on the web.

[0020] According to the invention, the method comprises a step of applying a mark on a surface of the wrapping material. A mark may be, for example, a notch made on the wrapping material in order to control subsequent operations. In effect, in a line for the manufacturing of smoking articles, buffers may be provided which involve temporarily stopping the feeding of the articles; it is therefore necessary to detect each article as it enters the machine (or machines), or after it has entered, so as to be able to program the subsequent operations. And it is the marks made on the articles that are used for the purpose of detecting the articles.

[0021] The steps of feeding, of making a feature (at least one) on the web and of applying a mark are repeated cyclically with a predetermined periodicity.

[0022] According to the invention, the method comprises a step of generating a synchronization signal. The synchronization signal represents the periodicity.

[0023] In an embodiment, the synchronization signal is generated by a timer. In an embodiment, the synchronization signal is generated at regular intervals. Using the timer, the duration of the regular time intervals can be set as a function of the required periodicity (for example, based on the size of the smoking articles to be made).

[0024] According to the invention, the mark is applied by means of a shaft controlled by the synchronization signal. That way, each mark is spaced from the next by a predetermined distance. In effect, the marking shaft is configured to make each mark at a respective instant, determined by the synchronization signal; the time interval between the instants one mark and the next are made, governed by the synchronization signal, determines the distance (on the web) between that mark and the next.

[0025] The expression "controlled shaft" or "shaft" is used to mean an actuator (for example, an electric motor) controlled by the control unit and connected to a movable element to drive it; that way, a given movement is measured (for example by an encoder or another sensor) and controlled by the control unit through the actuator, in such a way that a tool can be positioned precisely at an arbitrary point along its stroke.

[0026] According to the invention, the (at least one) feature on the web is controlled by the synchronization signal. In effect, the processing shaft is configured to make each feature at a respective instant, determined by the synchronization signal; the time interval between the instants one feature and the next are made, governed by the synchronization signal, determines the distance (on the web) between that feature and the next. Further, if both the marking shaft and the processing shaft are controlled by the synchronization signal, that synchronization signal determines the distance (on the web) between each mark and each respective feature.

[0027] Thanks to the synchronization signal which controls the position of the mark, it is possible to position the mark repeatably with a very high degree of precision both relative to the preceding and the following marks and relative to the other features made on the web (and also controlled by the synchronization signal.

[0028] In an embodiment, the step of applying the mark is carried out on an inside surface of the wrapping material. By inside surface of the wrapping material is meant the surface which is intended to face the inside of the corresponding article when the article has been completed. The outside surface, on the other hand, is the surface opposite to the inside surface and intended to face the outside of the corresponding article when the article has been completed.

[0029] In an embodiment, the step of applying the mark comprises a step of engraving (the wrapping material). In an embodiment, the step of applying the mark comprises a step of printing (the wrapping material). In an embodiment, the step of applying the mark comprises a step of perforating (the wrapping material). In an embodiment, the step of applying the mark comprises a step of tearing (the wrapping material). In an embodiment, the step of applying the mark comprises a step of applying an additional material (on the wrapping material). Preferably, the mark is applied on the inside surface of the wrapping material.

[0030] In an embodiment, the step of applying the mark comprises a step of inkjet printing (on the wrapping material). In an embodiment, the step of applying the mark comprises a step of laser engraving (the wrapping material).

[0031] In an embodiment, the step of making a feature (at least one) includes (a sub-step of) applying a logo. The logo is applied on at least one surface of the wrapping material (preferably the outside surface). In an embodiment, the logo is applied by (a first step of) embossing the wrapping material. Each logo, thanks to the synchronization signal which governs its application, is spaced from the next by a predetermined distance.

[0032] In an embodiment, the step of making a feature (at least one) includes (a sub-step of) embossing a surface of the wrapping material to create a knurled portion. Hereinafter, by first step of embossing is meant the process by which the logo feature is applied, whilst by second step of embossing is meant the process by which the knurled portion is made. Preferably, the (second) step of embossing is carried out both on the inside surface and on the outside surface of the wrapping material. The knurled portion may have an aesthetic function; its function may also be to make it easier for the consumer to hold

the cigarette.

[0033] In an embodiment, the step of making a feature (at least one) includes (a sub-step of) applying a metallic element made of (or comprising) a metallic material (preferably aluminium) on a surface of the wrapping material. The metallic element made of (or comprising) a metallic material is applied preferably on the inside surface of the wrapping material. Each metallic element is spaced from the next by a predetermined distance (thanks to the synchronization signal which governs its application).

[0034] In an embodiment, the method comprises a step of controlling the step of processing the wrapping material and the step of applying the mark in such a way that the mark is at a predetermined position (that is, at a predetermined distance) from the logo. The control is preferably performed as a function of the synchronization signal.

[0035] Preferably, the method comprises the following steps (or sub-steps), in succession:

- applying the logo;
- applying the mark;
- embossing to make the knurled portion;
- applying the metallic element.

[0036] These steps are controlled by the synchronization signal. This allows achieving a high degree of precision in synchronizing (or timing) the steps (or sub-steps).

[0037] This invention also relates to an apparatus for processing a web of wrapping material used to make smoking articles.

[0038] According to the invention, the apparatus comprises a feeding device. The feeding device configured to feed the web of wrapping material (preferably continuously) to advance it by a predetermined quantity (that is, length) corresponding to a length of a stretch of web used to make a single article.

[0039] According to the invention, the apparatus comprises a processing shaft. The processing shaft is configured to create a feature (at least one) on the web.

[0040] According to the invention, the apparatus comprises a marking shaft. The marking shaft is configured to apply a mark on a surface of the wrapping material.

[0041] According to the invention, the apparatus comprises a device for generating a synchronization signal. The processing shaft and the marking shaft are controlled as a function of the synchronization signal. That way, the mark is positioned precisely relative to the (at least one) feature made by the processing shaft and relative to the other marks.

[0042] In an embodiment, the apparatus comprises a control unit connected to the device for generating the synchronization signal, to the processing shaft and to the marking shaft. The control unit is configured to drive (control) the processing shaft and the marking shaft as a function of the synchronization signal. The control unit is preferably a central control unit of the line which comprises the apparatus. In other embodiments, the control unit is dedicated to the single apparatus (or machine).

[0043] In an embodiment, the processing shaft comprises a first embossing device, configured to apply a logo on a surface of the wrapping material.

[0044] In an embodiment, the processing shaft comprises a second embossing device, configured to make a knurled portion on a surface of the wrapping material.

[0045] In an embodiment, the marking shaft comprises an inkjet printing device. In an embodiment, the marking shaft comprises a laser engraving device. In an embodiment, the apparatus comprises a carbon tip positioning shaft. The carbon tip is positioned as a function of the synchronization signal.

[0046] In an embodiment, the apparatus comprises an illuminator configured to illuminate the mark on the wrapping material. The illuminator may be coupled to a mark detecting device.

[0047] This disclosure also provides a web of wrapping material used to make smoking articles.

[0048] According to the invention, the web comprises a logo. The logo is positioned on the outside surface of the wrapping material.

[0049] The web comprises a mark. The mark is applied on the inside surface of the wrapping material.

[0050] The web comprises a knurled portion. The knurled portion is preferably made on the outside surface of the wrapping material.

[0051] The web comprises a metallic element, made of metallic material (or including a metallic material). The metallic material is preferably aluminium. This element is positioned on the inside surface of the wrapping material.

[0052] This disclosure also provides a method for making smoking articles.

[0053] According to the invention, the method for making smoking articles comprises a step of feeding a web of wrapping material to a first machine. The web is advanced by a predetermined quantity corresponding to a length of a stretch of web used to make an article.

[0054] The method for making smoking articles comprises a step of making a feature (at least one) on the web of wrapping material. The feature is made by the first machine, specifically by a processing shaft of the first machine. The feature may be of the type described above with reference to the method for processing a web of wrapping material.

[0055] The method for making smoking articles comprises a step of applying a mark on a surface of the wrapping material (preferably the inside surface). The mark is applied by the first machine, specifically by a marking shaft of the first machine. The mark may be applied, for example, by inkjet printing or by laser engraving.

[0056] The method comprises a step of transferring the wrapping material from the first machine to a second machine.

[0057] The method comprises a step of cutting the

web. By cutting, the web is divided into a plurality of connecting strips.

[0058] The method comprises a step of rolling each connecting strip of the plurality around a respective group of segments of the tobacco industry in such a way as to make a (continuous) rod. The step of rolling is preferably performed in the second machine. Each group of segments comprises at least one filter segment and one tobacco segment. Each group of segments may also comprise a carbon tip. The step of rolling is performed in such a way that the surface of the strip with the mark on it faces the inside of the rod.

[0059] The method comprises a step of cutting the web to divide it into a plurality of smoking articles. The step of cutting is preferably performed by a cutting tool disposed in the second machine.

[0060] The method comprises a step of detecting a position of the mark in the second machine. The step of detecting is preferably performed by an optical sensor (for example, a photocell).

[0061] Preferably, the step of detecting the mark is performed before the web is cut into connecting strips..

[0062] The steps of rolling and cutting are controlled as a function of the position of the mark detected.

[0063] In an embodiment, the method preferably comprises a plurality of steps of detecting the position of the mark in the second machine (at respective points in the second machine). The steps of rolling and cutting are controlled as a function of the position of the mark detected in one or more of the plurality of steps of detecting.

[0064] In an embodiment, one step of detecting of the plurality of steps of detecting is performed before the step of cutting the web. The step of cutting the web is controlled as a function of the position of the mark detected. In an embodiment, the step of cutting the web is performed by the second machine (that is, by a cutting device of the second machine).

[0065] For example, a first step of detecting the mark controls the step of cutting the web, a second step of detecting the mark controls the step of rolling and a third step of detecting the mark controls the step of cutting the rod.

[0066] The steps of feeding, of making a feature and of applying the mark are repeated cyclically with periodicity. In an embodiment, the method further comprises a step of generating a synchronization signal representing the periodicity. The mark is applied by means of a shaft (a marking shaft) controlled by the synchronization signal. In an embodiment, the process by which the feature is made on the web in the first machine is controlled by the synchronization signal.

[0067] In an embodiment, the step of cutting the web is performed by the first machine (that is, by a cutting device of the first machine) as a function of the synchronization signal.

[0068] According to the invention, the method comprises a step of temporarily storing a stretch of the web of wrapping material in a buffer. The buffer is preferably disposed downstream of the first machine and upstream of the second machine. In an embodiment, the step of transferring from the first machine to the second machine comprises the step of storing in the buffer.

[0069] According to the invention, the length of the stretch of web of wrapping material present in the buffer is variable over time.

[0070] This disclosure also provides a line for making smoking articles.

[0071] The line comprises at least a first machine and a second machine.

[0072] The line also comprises a buffer (between the first and the second machine).

[0073] In an embodiment, the first machine is an apparatus for processing a web of wrapping material according to one or more aspects of this disclosure. In an embodiment, the second machine comprises a cutting device for cutting the web of wrapping material and configured to divide the web into a plurality of connecting strips.

[0074] In an alternative embodiment, the cutting device for cutting the web of wrapping material, configured to divide the web into a plurality of connecting strips, might be built into the first machine or at an intermediate position, between the first ad the second machine.

[0075] In an embodiment, the second machine comprises a rolling device for rolling the connecting strips. The rolling device is configured to roll each connecting strip around a respective group of segments of the tobacco industry in order to make a rod. The connecting strips are rolled in such a way that the surface of each strip with the mark on it faces the inside of the rod.

[0076] In an embodiment, the second machine comprises a cutting device for cutting the rod and configured to divide the rod into a plurality of smoking articles.

[0077] The second machine further comprises at least one device for detecting the position of the mark. The detecting device is preferably an optical detector (for example, a photocell). The web cutting device, the rolling device and the rod cutting device are controlled as a function of the position of the mark.

Brief description of the drawings

[0078] The features of the invention will become more apparent from the following description of preferred, non-limiting embodiments of it, illustrated by way of example in the accompanying drawings, in which:

- Figure 1 schematically illustrates a line for making smoking articles according to this disclosure;
- Figure 2 illustrates an inside surface of a web of wrapping material according to this disclosure;
- Figure 3 illustrates an outside surface of a web of wrapping material according to this disclosure;
- Figure 4 illustrates a smoking article according to this disclosure.

Detailed description of preferred embodiments of the invention

[0079] With reference to the accompanying drawings, the numeral 100 denotes a line for making smoking articles 1.

[0080] The line 100 comprises a feeding device 103 configured to feed a web of wrapping material 2. Preferably, the feeding device 103 feeds the web 2 by unwinding it from a roll 3.

[0081] The line 100 comprises a processing shaft 104 configured to create at least one feature on the web 2.

[0082] The at least one feature on the web 2 may comprise a logo 3 on an outside surface 2B of the web of wrapping material 2.

[0083] The at least one feature on the web 2 may comprise a metallic element 4 applied on an inside surface 2A of the web of wrapping material 2 (the surface intended to face the inside of the respective smoking article 1). The metallic element is applied preferably longitudinally relative to a direction of feeding and advancing the web 2. In an embodiment, the metallic element is applied transversely to a direction of feeding and advancing the web 2. The at least one feature on the web 2 may comprise embossing a surface of the web of wrapping material 2 to make a knurled portion 11.

[0084] The line 100 comprises a marking shaft 107 configured to apply a mark 6 on a surface of the wrapping material 2. Preferably, the mark 6 is applied on the inside surface 2A of the wrapping material.

[0085] In an embodiment, the line 100 comprises a first detecting device 105, located downstream of the processing shaft 103. In an embodiment, the detecting device 105 is configured to detect that the at least one feature made by the processing shaft 103 is applied correctly. In an embodiment, the detecting device 105 is configured to detect at least one property of the at least one feature.

[0086] In an embodiment, the line 100 comprises a control unit 106, configured to generate a synchronization signal (representing a periodicity, or cyclicity of the processes by which the features and marks are made). The control unit 106 drives the marking shaft 107 and the at least one processing shaft 104 as a function of the synchronization signal. In an embodiment, the web 2 is fed continuously while the mark 6 is being applied, and application is controlled by the synchronization signal as a function of the feeding of the web 2.

[0087] In an embodiment, the control unit 106 is also configured to determine whether the feature meets at least one criterion of acceptability.

[0088] In an embodiment, the feeding device 103, the processing shaft 104, the marking shaft 107 and the first processing device 105 form part of a first machine (also referred to as apparatus for processing a web of wrapping material).

[0089] In an embodiment, the line 100 comprises a buffer B. The buffer B is of the "pendulum" or movable roller type.

[0090] The line 100 comprises conveyors 101, 102 configured to feed a succession of groups. Each group comprises a filter segment 8 and a cigarette segment 9. Each group may also comprise a carbon tip 10. The groups are conveyed transversely to the web 2.

[0091] The line 100 comprises a cutting device 108. The cutting device 108 is located downstream of the marking shaft 107. The cutting device 108 is configured to cut the web 2 into a plurality of connecting strips 7.

[0092] The line 100 comprises a rolling bed 109 configured to receive the succession of groups and the plurality of connecting strips 7 and to roll the plurality of connecting strips 7 round the respective groups to make a rod. The line 100 comprises a second detecting device 110, connected to the control unit 106, and disposed downstream of the rolling bed 109. The second detecting device 110 is configured to identify the articles 1 which are defective and to activate a procedure for these articles 1.

[0093] In an embodiment, the line 100 comprises a rejection device 111 configured to reject the defective articles 1.

[0094] In a possible embodiment not illustrated, the mark 6 is applied before the at least one feature is created on the web 2. More specifically, the wrapping material 2 unwound continuously from the roll 3 already has the marks 6 on it.

Claims

1. A method for processing a web of wrapping material (2) to make smoking articles (1), comprising the following steps, repeated cyclically with periodicity:

   - feeding the web of wrapping material (2) to advance it by a predetermined quantity corresponding to a length of a stretch of web used to make an article (1);
   - creating a feature on the web of wrapping material (2);
   - applying a mark (6) on a surface of the web of wrapping material (2);
   - generating a synchronization signal representing the periodicity, wherein the mark is applied by means of a shaft controlled by the synchronization signal, and wherein the step of creating the feature on the web of wrapping material (2) is controlled by the synchronization signal,

   characterized in that the method comprises a step of temporarily storing a stretch of the web of wrapping material (2) in a buffer (B), the length of the stretch of the web of wrapping material (2) in the buffer (B) being variable over time.

2. The method according to claim 1, wherein the step of applying the mark (6) is performed on an inside surface (2A) of the web of wrapping material (2)

which is intended to face the inside of the corresponding article (1) when the article (1) is finished, by inkjet printing or laser engraving.

3. The method according to any one of the preceding claims, wherein the step of creating a feature includes applying a logo (3) to a surface of the web of wrapping material (2).

4. The method according to any one of the preceding claims, wherein the step of creating a feature includes applying a metallic element (4) to a surface of the web of wrapping material (2).

5. The method according to any one of the preceding claims, wherein the step of creating a feature includes embossing a surface of the web of wrapping material (2) to create a knurled portion (11).

6. The method according to any one of the preceding claims, wherein the step of creating a feature includes the following sub-steps:

- applying a logo (3) to a surface of the web of wrapping material (2);
- embossing a surface of the web of wrapping material (2) to create a knurled portion (11);
- applying a metallic element (4) to a surface of the web of wrapping material (2).

7. The method according to claim 6, wherein the step of applying the mark (6) follows the sub-step of applying the logo (3) and precedes the sub-step of embossing (11), the sub-step of embossing (11) preceding the sub-step of applying the metallic element (4).

8. An apparatus for processing a web of wrapping material (2) to make smoking articles (1), the apparatus comprising:

- a feeding device (103) configured to feed the web of wrapping material (2) to advance it by a predetermined quantity corresponding to a length of a stretch of web (2) used to make a single article (1);
- a processing shaft (104) configured to create at least one feature on the web (2);
- a marking shaft (107) configured to apply a mark (6) on a surface of the wrapping material (2);
- a device for generating a synchronization signal, wherein the processing shaft and the marking shaft are controlled as a function of the synchronization signal,

characterized in that it further comprises a buffer (B), configured for temporarily storing a stretch of the web of wrapping material (2), the length of the stretch of the web of wrapping material (2) in the buffer (B) being variable over time.

9. A web of wrapping material (2) to make smoking articles (1) comprising:

- a logo (3) applied on an outside surface of the wrapping material (2) intended to face the outside of the corresponding article (1);
- a mark (6) applied on an inside surface of the wrapping material (2), opposite to the outside surface and intended to face the inside of the corresponding article (1);
- a knurled portion (11);
- at least one element (4) comprising, or made of, metallic material, the at least one element (4) being disposed on the inside surface of the wrapping material (2).

10. A method for making smoking articles (1), comprising the following steps:

- feeding to a first machine a web of wrapping material (2) in order to advance it by a predetermined quantity corresponding to a length of a stretch of web used to make an article (1);
- creating at least one feature on the web of wrapping material (2) using the first machine;
- applying a mark (6) on a surface of the wrapping material (2) using the first machine;
- transferring the wrapping material (2) from the first machine to a second machine;
- cutting the web into a plurality of connecting strips (7);
- using the second machine, rolling each connecting strip (7) of the plurality around a respective group of segments of the tobacco industry to make a rod in such a way that the surface of the strip (7) with the mark (6) on it faces the inside of the rod;
- using the second machine, cutting the rod into a plurality of smoking articles (1);
- detecting a position of the mark in the second machine, where the steps of rolling and cutting are controlled as a function of the position of the mark detected,

characterized in that it further comprises a step of temporarily storing a stretch of the web of wrapping material (2) in a buffer (B), the length of the stretch of the web of wrapping material (2) in the buffer (B) being variable over time.

11. The method according to claim 10, comprising a plurality of steps of detecting the position of the mark in the second machine, where the steps of rolling and cutting the rod are controlled as a function of the

position of the mark detected in one or more of the plurality of steps of detecting.

12. The method according to claim 10 or 11, wherein the step of cutting the web is performed by the second machine and is controlled as a function of the position of the mark detected.

13. The method according to any one of claims 10 to 12, wherein the steps of feeding, creating a feature and applying the mark are repeated cyclically with periodicity and wherein the method further comprises a step of generating a synchronization signal representing the periodicity, wherein the mark is applied by means of a marking shaft controlled by the synchronization signal, and wherein the step of creating the feature on the web in the first machine is controlled by the synchronization signal.

14. The method according to any one of claims 10 to 13, wherein the step of applying the mark (6) follows the sub-step of applying the logo (3) and precedes the sub-step of embossing (11), the sub-step of embossing (11) preceding the sub-step of applying the metallic element (4).

15. A line (100) for making smoking articles (1), the line comprising:

a first machine, which comprises:

- a feeding device (103) configured to feed a web of wrapping material (2) to advance it by a predetermined quantity corresponding to a length of a stretch of web used to make a single article (1);
- a processing shaft (104) configured to create at least one feature on the web (2);
- a marking shaft (107) configured to apply a mark (6) on a surface of the web of wrapping material (2),

and a second machine, which comprises:

- a cutting device (108) for cutting the web of wrapping material (2) and configured to divide the web into a plurality of connecting strips (7);
- a rolling bed (109) configured to roll each connecting strips (7) around a respective group of segments of the tobacco industry to make a rod in such a way that the surface of the strip (7) with the mark (6) on it faces the inside of the rod;
- a cutting device for cutting the rod and configured to divide the rod into a plurality of smoking articles (1),

wherein the second machine further comprises at least one device for detecting the position of the mark, wherein the web cutting device, the rolling device and the rod cutting device are controlled as a function of the position of the mark,

characterized in that the line comprises a buffer between the first and the second machine for temporarily storing a stretch of the web of wrapping material, wherein the length of the stretch of web of wrapping material present in the buffer is variable over time.

Patentansprüche

1. Verfahren zur Verarbeitung einer Umhüllungsmaterialbahn (2) zur Herstellung von Rauchartikeln (1), umfassend die folgenden Schritte, die regelmäßig zyklisch wiederholt werden:

- Zuführen der Umhüllungsmaterialbahn (2), um diese um eine vorbestimmte Menge entsprechend einer Länge eines zur Herstellung eines Artikels (1) verwendeten Bahnteilstücks vorzuschieben;
- Erzeugen eines Merkmals auf der Umhüllungsmaterialbahn (2) ;
- Anbringen einer Markierung (6) auf einer Oberfläche der Umhüllungsmaterialbahn (2);
- Generieren eines Synchronisierungssignals, das die Regelmäßigkeit darstellt, wobei die Markierung mittels einer durch das Synchronisierungssignal gesteuerten Welle angebracht wird und wobei der Schritt zum Erzeugen des Merkmals auf der Umhüllungsmaterialbahn (2) durch das Synchronisierungssignal gesteuert wird,

dadurch gekennzeichnet, dass das Verfahren einen Schritt zum vorübergehenden Speichern eines Teilstücks der Umhüllungsmaterialbahn (2) in einem Pufferspeicher (B) umfasst, wobei die Länge des Teilstücks der Umhüllungsmaterialbahn (2) im Pufferspeicher (B) im Lauf der Zeit variabel ist.

2. Verfahren nach Anspruch 1, wobei der Schritt zum Anbringen der Markierung (6) auf einer innenseitigen Oberfläche (2A) der Umhüllungsmaterialbahn (2), die dazu bestimmt ist, der Innenseite des entsprechenden Artikels (1) zugewandt zu sein, wenn der Artikel (1) fertiggestellt ist, durch Tintenstrahldrucken oder Lasergravur erfolgt.

3. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Schritt zum Erzeugen eines Merkmals das Anbringen eines Logos (3) an einer Oberfläche der Umhüllungsmaterialbahn (2) einschließt.

4. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Schritt zum Erzeugen eines Merkmals das Anbringen eines Metallelements (4) an einer Oberfläche der Umhüllungsmaterialbahn (2) einschließt.

5. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Schritt zum Erzeugen eines Merkmals das Prägen einer Oberfläche der Umhüllungsmaterialbahn (2) einschließt, um einen gerändelten Abschnitt (11) zu erzeugen.

6. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Schritt zum Erzeugen eines Merkmals die folgenden Unterschritte einschließt:

- Anbringen eines Logos (3) an einer Oberfläche der Umhüllungsmaterialbahn (2);
- Prägen einer Oberfläche der Umhüllungsmaterialbahn (2), um einen gerändelten Abschnitt (11) zu erzeugen;
- Anbringen eines Metallelements (4) an einer Oberfläche der Umhüllungsmaterialbahn (2).

7. Verfahren nach Anspruch 6, wobei der Schritt zum Anbringen der Markierung (6) nach dem Unterschritt zum Anbringen des Logos (3) und vor dem Unterschritt zum Prägen (11) erfolgt, wobei der Unterschritt zum Prägen (11) vor dem Unterschritt zum Anbringen des Metallelements (4) erfolgt.

8. Apparat zur Verarbeitung einer Umhüllungsmaterialbahn (2) zur Herstellung von Rauchartikeln (1), wobei der Apparat Folgendes umfasst:

- eine Zuführungsvorrichtung (103), die ausgelegt ist, um die Umhüllungsmaterialbahn (2) zuzuführen, sodass diese um eine vorbestimmte Menge entsprechend einer Länge eines zur Herstellung eines einzelnen Artikels (1) verwendeten Teilstücks der Bahn (2) vorgeschoben wird;
- eine Verarbeitungswelle (104), die ausgelegt ist, um mindestens ein Merkmal auf der Bahn (2) zu erzeugen;
- eine Markierungswelle (107), die ausgelegt ist, um eine Markierung (6) auf einer Oberfläche des Umhüllungsmaterials (2) anzubringen;
- eine Vorrichtung zum Generieren eines Synchronisierungssignals, wobei die Verarbeitungswelle und die Markierungswelle abhängig vom Synchronisierungssignal gesteuert werden,

dadurch gekennzeichnet, dass er zudem einen Pufferspeicher (B) umfasst, der ausgelegt ist, um ein Teilstück der Umhüllungsmaterialbahn (2) vorübergehend zu speichern, wobei die Länge des Teilstücks der Umhüllungsmaterialbahn (2) im Pufferspeicher (B) im Lauf der Zeit variabel ist.

9. Umhüllungsmaterialbahn (2) zur Herstellung von Rauchartikeln (1), umfassend:

- ein Logo (3), das auf einer außenseitigen Oberfläche des Umhüllungsmaterials (2) angebracht und dazu bestimmt ist, der Außenseite des entsprechenden Artikels (1) zugewandt zu sein;
- eine Markierung (6), die auf einer innenseitigen Oberfläche des Umhüllungsmaterials (2) gegenständig zur außenseitigen Oberfläche angebracht und dazu bestimmt ist, der Innenseite des entsprechenden Artikels (1) zugewandt zu sein;
- einen gerändelten Abschnitt (11);
- mindestens ein Element (4), das Metallmaterial umfasst oder daraus besteht, wobei das mindestens eine Element (4) auf der innenseitigen Oberfläche des Umhüllungsmaterials (2) angeordnet ist.

10. Verfahren zur Herstellung von Rauchartikeln (1), umfassend die folgenden Schritte:

- Beschicken einer ersten Maschine mit einer Umhüllungsmaterialbahn (2), damit diese um eine vorbestimmte Menge entsprechend einer Länge eines zur Herstellung eines Artikels (1) verwendeten Bahnteilstücks vorgeschoben wird;
- Erzeugen von mindestens einem Merkmal auf der Umhüllungsmaterialbahn (2) unter Nutzung der ersten Maschine;
- Anbringen einer Markierung (6) auf einer Oberfläche des Umhüllungsmaterials (2) unter Nutzung der ersten Maschine;
- Transferieren des Umhüllungsmaterials (2) von der ersten Maschine zu einer zweiten Maschine;
- Schneiden der Bahn in eine Vielzahl von Verbindungsstreifen (7);
- Nutzen der zweiten Maschine, wobei ein jeder Verbindungsstreifen (7) der Vielzahl um eine jeweilige Gruppe von Segmenten der Tabakindustrie gerollt wird, um einen Stab herzustellen, sodass die Oberfläche des Streifens (7) mit der Markierung (6) darauf der Innenseite des Stabs zugewandt ist;
- Nutzen der zweiten Maschine, wobei der Stab in eine Vielzahl von Rauchartikeln (1) geschnitten wird;
- Erkennen einer Position der Markierung in der zweiten Maschine, wobei die Schritte zum Rollen und Schneiden abhängig von der Position der erkannten Markierung gesteuert werden,

dadurch gekennzeichnet, dass es zudem einen

Schritt zum vorübergehenden Speichern eines Teilstücks der Umhüllungsmaterialbahn (2) in einem Pufferspeicher (B) umfasst, wobei die Länge des Teilstücks der Umhüllungsmaterialbahn (2) im Pufferspeicher (B) im Lauf der Zeit variabel ist.

11. Verfahren nach Anspruch 10, umfassend eine Vielzahl von Schritten zum Erkennen der Position der Markierung in der zweiten Maschine, wobei die Schritte zum Rollen und Schneiden des Stabs abhängig von der Position der in einem oder mehreren der Vielzahl von Schritten zum Erkennen erkannten Markierung gesteuert werden.

12. Verfahren nach Anspruch 10 oder 11, wobei der Schritt zum Schneiden der Bahn von der zweiten Maschine durchgeführt und abhängig von der Position der erkannten Markierung gesteuert wird.

13. Verfahren nach einem der Ansprüche 10 bis 12, wobei die Schritte zum Beschicken, zum Erzeugen eines Merkmals und zum Anbringen der Markierung regelmäßig zyklisch wiederholt werden, und wobei das Verfahren zudem einen Schritt zum Generieren eines Synchronisierungssignals, das die Regelmäßigkeit darstellt, umfasst, wobei die Markierung mittels einer durch das Synchronisierungssignal gesteuerten Markierungswelle angebracht wird, und wobei der Schritt zum Erzeugen des Merkmals auf der Bahn in der ersten Maschine durch das Synchronisierungssignal gesteuert wird.

14. Verfahren nach einem der Ansprüche 10 bis 13, wobei der Schritt zum Anbringen der Markierung (6) nach dem Unterschritt zum Anbringen des Logos (3) und vor dem Unterschritt zum Prägen (11) erfolgt, wobei der Unterschritt zum Prägen (11) vor dem Unterschritt zum Anbringen des Metallelements (4) erfolgt.

15. Anlage (100) zur Herstellung von Rauchartikeln (1), wobei die Anlage Folgendes umfasst:

eine erste Maschine, die Folgendes umfasst:

- eine Zuführungsvorrichtung (103), die ausgelegt ist, um eine Umhüllungsmaterialbahn (2) zuzuführen, sodass diese um eine vorbestimmte Menge entsprechend einer Länge eines zur Herstellung eines einzelnen Artikels (1) verwendeten Bahnteilstücks vorgeschoben wird;
- eine Verarbeitungswelle (104), die ausgelegt ist, um mindestens ein Merkmal auf der Bahn (2) zu erzeugen;
- eine Markierungswelle (107), die ausgelegt ist, um eine Markierung (6) auf einer Oberfläche der Umhüllungsmaterialbahn (2) anzubringen,

und eine zweite Maschine, die Folgendes umfasst:

- eine Schneidvorrichtung (108), um die Umhüllungsmaterialbahn (2) zu schneiden, und die ausgelegt ist, um die Bahn in eine Vielzahl von Verbindungsstreifen (7) zu teilen;
- ein Rollbett (109), das ausgelegt ist, um einen jeden Verbindungsstreifen (7) rund um eine jeweilige Gruppe von Segmenten der Tabakindustrie zu rollen, um einen Stab herzustellen, sodass die Oberfläche des Streifens (7) mit der Markierung (6) darauf der Innenseite des Stabs zugewandt ist;
- eine Schneidvorrichtung zum Schneiden des Stabs, die ausgelegt ist, um den Stab in eine Vielzahl von Rauchartikeln (1) zu teilen,

wobei die zweite Maschine zudem mindestens eine Vorrichtung zum Erkennen der Position der Markierung umfasst, wobei die Bahnschneidevorrichtung, die Rollvorrichtung und die Stabschneidevorrichtung abhängig von der Position der Markierung gesteuert werden,
dadurch gekennzeichnet, dass die Anlage einen Pufferspeicher zwischen der ersten und der zweiten Maschine umfasst, um ein Teilstück der Umhüllungsmaterialbahn vorübergehend zu speichern, wobei die Länge des im Pufferspeicher enthaltenen Teilstücks der Umhüllungsmaterialbahn im Lauf der Zeit variabel ist.

Revendications

1. Procédé de traitement d'une bande de matériau d'enveloppage (2) pour fabriquer des articles à fumer (1), comprenant les étapes suivantes, répétées cycliquement avec périodicité :

- alimenter la bande de matériau d'enveloppage (2) pour l'avancer d'une quantité prédéterminée correspondant à une longueur d'une partie de bande utilisée pour fabriquer un article (1) ;
- créer une caractéristique sur la bande de matériau d'enveloppage (2) ;
- appliquer une marque (6) sur une surface de la bande de matériau d'enveloppage (2) ;
- générer un signal de synchronisation représentant la périodicité, où la marque est appliquée au moyen d'un arbre commandé par le signal de synchronisation, et où l'étape consistant à créer la caractéristique sur la bande de matériau d'enveloppage (2) est commandée par

le signal de synchronisation,

caractérisé en ce que le procédé comprend une étape consistant à stocker temporairement une partie de la bande de matériau d'enveloppage (2) dans un tampon (B), la longueur de la partie de la bande de matériau d'enveloppage (2) dans le tampon (B) étant variable dans le temps.

2. Procédé selon la revendication 1, dans lequel l'étape consistant à appliquer la marque (6) est effectuée sur une surface intérieure (2A) de la bande de matériau d'enveloppage (2) qui est destinée à faire face à l'intérieur de l'article correspondant (1) lorsque l'article (1) est fini, par impression à jet d'encre ou gravure au laser.

3. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'étape consistant à créer une caractéristique inclut l'application d'un logo (3) sur une surface de la bande de matériau d'enveloppage (2).

4. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'étape consistant à créer une caractéristique inclut l'application d'un élément métallique (4) sur une surface de la bande de matériau d'enveloppage (2).

5. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'étape consistant à créer une caractéristique inclut gaufrer une surface de la bande de matériau d'enveloppage (2) pour créer une portion moletée (11).

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'étape consistant à créer une caractéristique inclut les sous-étapes suivantes :

- appliquer un logo (3) sur une surface de la bande de matériau d'enveloppage (2) ;
- gaufrer une surface de la bande de matériau d'enveloppage (2) pour créer une portion moletée (11) ;
- appliquer un élément métallique (4) sur une surface de la bande de matériau d'enveloppage (2).

7. Procédé selon la revendication 6, dans lequel l'étape consistant à appliquer la marque (6) suit la sous-étape consistant à appliquer le logo (3) et précède la sous-étape consistant à gaufrer (11), la sous-étape consistant à gaufrer (11) précédant la sous-étape consistant à appliquer l'élément métallique (4).

8. Appareil pour traiter une bande de matériau d'enveloppage (2) pour fabriquer des articles à fumer (1), l'appareil comprenant :

- un dispositif d'alimentation (103) configuré pour alimenter la bande de matériau d'enveloppage (2) pour l'avancer d'une quantité prédéterminée correspondant à une longueur d'une partie de bande (2) utilisée pour fabriquer un seul article (1) ;
- un arbre de traitement (104) configuré pour créer au moins une caractéristique sur la bande (2) ;
- un arbre de marquage (107) configuré pour appliquer une marque (6) sur une surface du matériau d'enveloppage (2) ;
- un dispositif pour générer un signal de synchronisation, où l'arbre de traitement et l'arbre de marquage sont commandés en fonction du signal de synchronisation,

caractérisé en ce qu'il comprend en outre un tampon (B), configuré pour stocker temporairement une partie de la bande de matériau d'enveloppage (2), la longueur de la partie de la bande de matériau d'enveloppage (2) dans le tampon (B) étant variable dans le temps.

9. Bande de matériau d'enveloppage (2) pour fabriquer des articles à fumer (1) comprenant :

- un logo (3) appliqué sur une surface extérieure du matériau d'enveloppage (2) destiné à faire face à l'extérieur de l'article correspondant (1) ;
- une marque (6) appliquée sur une surface intérieure du matériau d'enveloppage (2), opposée à la surface extérieure et destinée à faire face à l'intérieur de l'article correspondant (1) ;
- une portion moletée (11) ;
- au moins un élément (4) comprenant, ou fait de, un matériau métallique, l'au moins un élément (4) étant disposé sur la surface intérieure du matériau d'enveloppage (2).

10. Procédé de fabrication d'articles à fumer (1), comprenant les étapes suivantes :

- alimenter une première machine avec une bande de matériau d'enveloppage (2) afin de l'avancer d'une quantité prédéterminée correspondant à une longueur d'une partie de bande utilisée pour fabriquer un article (1) ;
- créer au moins une caractéristique sur la bande de matériau d'enveloppage (2) en utilisant la première machine ;
- appliquer une marque (6) sur une surface du matériau d'enveloppage (2) en utilisant la première machine ;
- transférer le matériau d'enveloppage (2) de la première machine vers une seconde machine ;
- couper la bande en une pluralité de bandelettes de liaison (7) ;

- en utilisant la seconde machine, rouler chaque bandelette de liaison (7) de la pluralité autour d'un groupe respectif de segments de l'industrie du tabac pour fabriquer une tige de telle sorte que la surface de la bandelette (7) portant la marque (6) soit tournée vers l'intérieur de la tige ;
- en utilisant la seconde machine, couper la tige en une pluralité d'articles à fumer (1) ;
- détecter une position de la marque dans la seconde machine, où les étapes consistant à rouler et à couper sont commandées en fonction de la position de la marque détectée,

caractérisé en ce qu'il comprend en outre une étape consistant à stocker temporairement une partie de la bande de matériau d'enveloppage (2) dans un tampon (B), la longueur de la partie de la bande de matériau d'enveloppage (2) dans le tampon (B) étant variable dans le temps.

11. Procédé selon la revendication 10, comprenant une pluralité d'étapes consistant à détecter la position de la marque dans la seconde machine, où les étapes consistant à rouler et à couper la tige sont commandées en fonction de la position de la marque détectée dans une ou plusieurs de la pluralité d'étapes de détection.

12. Procédé selon la revendication 10 ou 11, dans lequel l'étape consistant à couper la bande est effectuée par la seconde machine et est commandée en fonction de la position de la marque détectée.

13. Procédé selon l'une quelconque des revendications 10 à 12, dans lequel les étapes consistant à alimenter, à créer une caractéristique et à appliquer la marque sont répétées cycliquement avec une périodicité et dans lequel le procédé comprend en outre une étape consistant à générer un signal de synchronisation représentant la périodicité, dans lequel la marque est appliquée au moyen d'un arbre de marquage commandé par le signal de synchronisation, et dans lequel l'étape consistant à créer la caractéristique sur la bande dans la première machine est commandée par le signal de synchronisation.

14. Procédé selon l'une quelconque des revendications 10 à 13, dans lequel l'étape consistant à appliquer la marque (6) suit la sous-étape consistant à appliquer le logo (3) et précède la sous-étape consistant à gaufrer (11), la sous-étape consistant à gaufrer (11) précédant la sous-étape consistant à appliquer l'élément métallique (4).

15. Ligne (100) pour fabriquer des articles à fumer (1), la ligne comprenant :

une première machine, qui comprend :

- un dispositif d'alimentation (103) configuré pour alimenter une bande de matériau d'enveloppage (2) pour l'avancer d'une quantité prédéterminée correspondant à une longueur d'une partie de bande utilisée pour fabriquer un seul article (1) ;
- un arbre de traitement (104) configuré pour créer au moins une caractéristique sur la bande (2) ;
- un arbre de marquage (107) configuré pour appliquer une marque (6) sur une surface de la bande de matériau d'enveloppage (2),

et une seconde machine, qui comprend :

- un dispositif de coupe (108) pour couper la bande de matériau d'enveloppage (2) et configuré pour diviser la bande en une pluralité de bandelettes de liaison (7) ;
- un train de rouleaux (109) configuré pour rouler chaque bandelette de liaison (7) autour d'un groupe respectif de segments de l'industrie du tabac pour fabriquer une tige de telle sorte que la surface de la bandelette (7) portant la marque (6) soit tournée vers l'intérieur de la tige ;
- un dispositif de coupe pour couper la tige et configuré pour diviser la tige en une pluralité d'articles à fumer (1),

dans laquelle la seconde machine comprend en outre au moins un dispositif pour détecter la position de la marque, où le dispositif de coupe de la bande, le dispositif de roulement et le dispositif de coupe de la tige sont commandés en fonction de la position de la marque,
caractérisée en ce que la ligne comprend un tampon entre la première et la seconde machine pour stocker temporairement une partie de la bande de matériau d'enveloppage, dans lequel la longueur de la partie de la bande de matériau d'enveloppage présente dans le tampon est variable dans le temps.

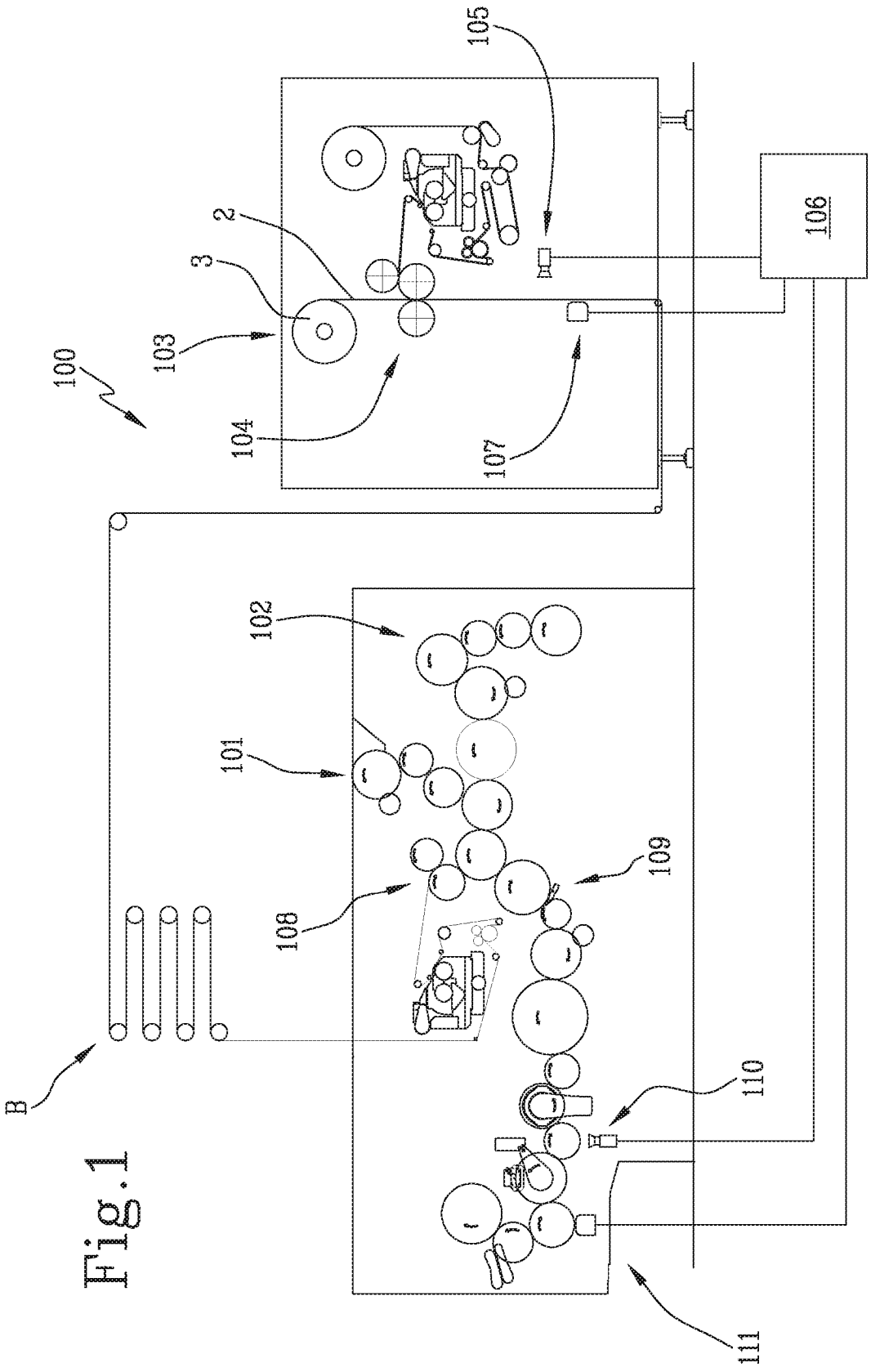


Fig.1

Fig.2

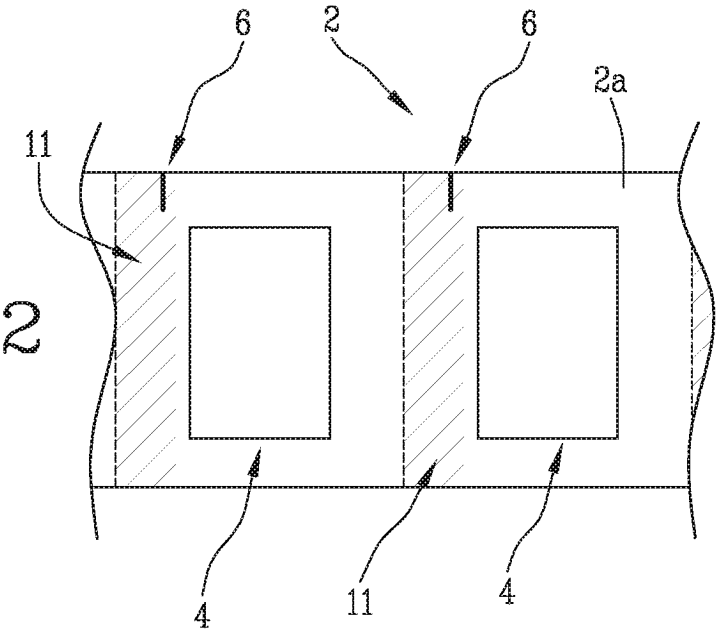


Fig.3

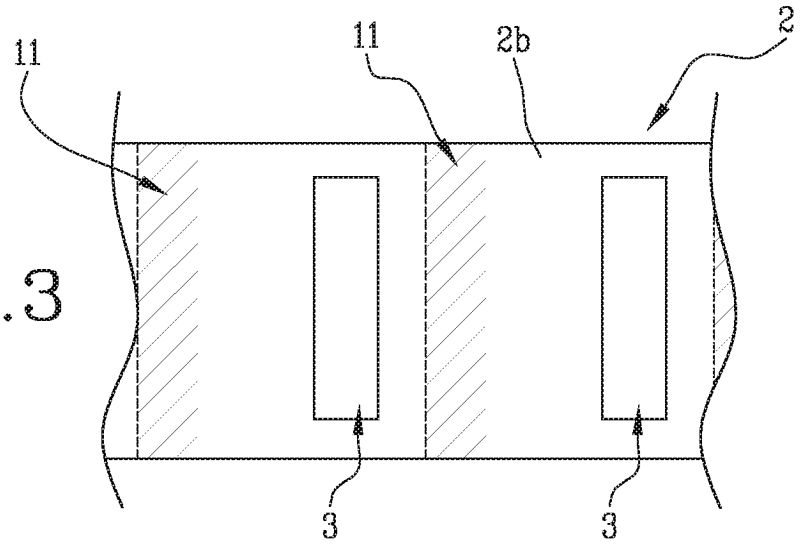
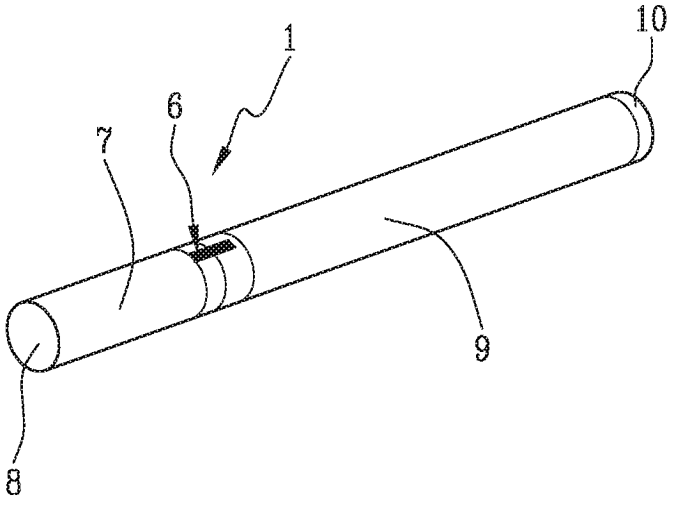


Fig.4



REFERENCES CITED IN THE DESCRIPTION

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