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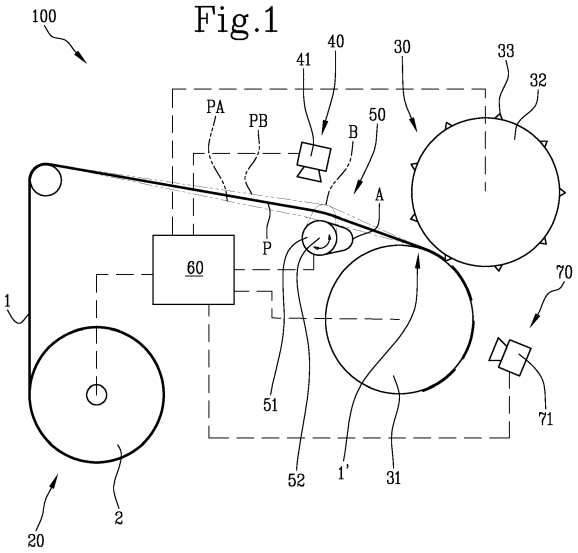
(54) MACHINE AND METHOD FOR MAKING PLUG WRAPS FOR THE TOBACCO INDUSTRY

(57) This invention relates to a machine (100) for making plug wraps (4) for the tobacco industry, comprising:

- an unwinding station (20) configured to unwind a continuous web (1) of wrapping material for the tobacco industry from a roll (2) along a feed path (P), wherein the continuous web (1) has on one side (1a) a succession of equispaced additional elements (3);
- a cutting station (20) disposed along the feed path (P) and configured to transversely cut the continuous web (1) by making a succession of cuts at a predetermined position to obtain a succession of plug wraps (4), each comprising at least one additional element (3);
- a detecting device (40) disposed upstream of the cutting station (30) and configured to detect the position of the additional elements (3) along the feed path (P);
- adjustment means (50) for adjusting the feed path (P) of the continuous web (1), disposed upstream of the cutting station (30) and configured to modify the geometry of the feed path (P) of the continuous web (1) in such a way as to adjust the position of the continuous web (1), hence of the additional elements (3), along the feed path (P); and
- a control unit (60) connected to the detecting device (40) and to the adjustment means (50) and acting on the adjustment means (50) to set a variation in the feed path (P) of the continuous web (1) as a function of the position of each additional element (3) detected by the detecting device (40).

Fig.1



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Description

[0001] This invention relates to a machine and a method for making plug wraps for the tobacco industry.

[0002] The invention addresses the production of plug wraps, also known as connecting strips or patches, from a continuous web.

[0003] The invention can be advantageously applied in machines for making articles for the tobacco industry and, in particular, in "filter tip attachment" machines, to make plug wraps from a continuous web, to connect the filter to the active portion of each article.

[0004] The term "articles for the tobacco industry" is used generally to denote rod-shaped articles comprising an active portion which releases a substance to be inhaled, a filter and a plug wrap used to join the active portion and the filter to each other.

[0005] The article may be a traditional cigarette which can be smoked by burning the end of the active portion, or it may be an electronic cigarette which may be inhaled by heating but not burning the active portion.

[0006] In effect, the active portion may comprise at least one tobacco segment of traditional type or it may be an aerosol-generating element, that is, a product containing a heat-not-burn type tobacco. In this case, the tobacco may be, for example, pre-treated, reconstituted, homogenised or cast-leaf tobacco.

[0007] In machines for making articles for the tobacco industry, it is usual practice to combine segments of different kinds to obtain articles capable of meeting a variety of production needs.

[0008] To connect the segments to each other, the connecting strip is wrapped at least partly around the segments according to known rolling methods.

[0009] In a known method, for example, pairs of segments, whether single or multisegmented, are disposed in axially aligned fashion and a double length filter is interposed between them; the set thus formed is connected by a previously gummed plug wrap and then cut in half to make two articles.

[0010] Typically, the plug wraps are obtained from a continuous web of gummed material which is fed along a predetermined feed path to a cutting device which divides the continuous web into plug wraps or strips of predetermined length.

[0011] The cutting device may, for example, comprise two counter-rotating, tangent rollers whose axes of rotation are parallel and one of which is a suction roller adapted to entrain the continuous web. Also, at least one of the rollers is provided with blades which are angularly equispaced on its peripheral surface in order to cut the web into individual plug wraps.

[0012] After cutting, the suction roller also holds the plug wraps on its surface so they can be transferred, one after the other, to the point where they meet the aforementioned sets consisting of the double filters and pairs of segments.

[0013] In order to meet different production needs, it is also possible to use continuous webs provided with specific inserts, prints, brands or labels so that the plug wraps or strips placed round the segments comprise these additional elements.

[0014] The webs used may thus be provided with additional elements located at a predetermined spacing along the length of the webs themselves. The Applicant has, however, found some critical aspects in the production of plug wraps comprising such elements.

[0015] In effect, in prior art systems, it is difficult to precisely cut a web which comprises these equispaced additional elements while the web is being unwound continuously from a roll.

[0016] Indeed, in many cases, the plug wraps obtained are not cut uniformly and the additional elements are not centred/correctly disposed on the surface of each plug wrap (or they may even be incomplete because they have been truncated) and this may give rise to difficulties in the subsequent step of rolling the plug wraps round the segments.

[0017] The Applicant has found that in order to obtain plug wraps of excellent quality which can be correctly rolled, each transverse cut made on the web must be repeated as precisely as possible at the same position between every pair of consecutive additional elements.

[0018] This, however, calls for very complex synchronisation between the web feeding and cutting systems, which is often impossible to achieve in machines of the tobacco industry.

[0019] In effect, the Applicant has found that it is extremely complicated to obtain identical plug wraps comprising the additional elements, where the additional elements have to meet certain specifications as to their position on the plug wraps after being cut from the web.

[0020] The Applicant has observed that cutting errors are the result of the web moving along the feed path being inevitably displaced mainly on account of micro-vibrations of machine components and/or variations in the tension of the web as it moves along the feed path.

[0021] In this context, the technical purpose which forms the basis of this invention is to propose a machine and a method for making plug wraps for the tobacco industry to overcome one or more of the above mentioned drawbacks of the prior art.

[0022] More specifically, this invention has for an aim to provide a machine for making plug wraps for the tobacco industry capable of cutting a continuous web into individual plug wraps in a precise and effective manner.

[0023] Another aim of this invention is to provide a method for making plug wraps for the tobacco industry which allows efficiently synchronising the continuous feeding of the web along its feed path with the instant each plug wrap is cut from the web.

[0024] This invention also has for an aim to improve the efficiency of the plug wrap production process to guarantee a high quality of the articles comprising plug wraps made using this machine and/or this method. The technical purpose indicated and the aims specified are sub-

stantially achieved by a machine and a method for making plug wraps for the tobacco industry, comprising the technical features described in one or more of the appended claims.

[0025] In particular, this invention provides a machine for making plug wraps for the tobacco industry, comprising:

- an unwinding station configured to unwind a continuous web of wrapping material for the tobacco industry from a roll along a feed path, wherein the continuous web has on one side a succession of equispaced additional elements; and
- a cutting station disposed along the feed path and configured to transversely cut the continuous web by making a succession of cuts at a predetermined position to obtain a succession of plug wraps, each comprising at least one additional element.

[0026] Advantageously, the machine also comprises:

- a detecting device disposed upstream of the cutting station and configured to detect the position of the additional elements along the feed path;
- adjustment means for adjusting the feed path of the continuous web, disposed upstream of the cutting station and configured to modify the geometry of the feed path of the continuous web in such a way as to adjust the position of the continuous web, hence of the additional elements, along the feed path; and

- a control unit connected to the detecting device and to the adjustment means and acting on the adjustment means to set a variation in the feed path of the continuous web as a function of the position of each additional element detected by the detecting device. Advantageously, thanks to the detecting device, the adjustment means and the control unit, it is possible to guarantee that the plug wraps are always cut at a correct, predetermined position.

[0027] More specifically, cutting can occur between two consecutive additional elements, and any variations in the position of the web, hence of the additional elements, along the feed path are prevented from causing the cut to be made incorrectly - in particular so that the cut is not made at an incorrect distance from the additional element. The invention also provides a method for making plug wraps for the tobacco industry, comprising the steps of:

- unwinding a continuous web of wrapping material for the tobacco industry from a roll along a feed path, where the continuous web has on one side of it a succession of equispaced additional elements; and
- transversely cutting the continuous web along the feed path to obtain a succession of plug wraps, each comprising at least one additional element, wherein each cut is made at a predetermined position.

[0028] Advantageously, the method also comprises the following steps:

- before the step of cutting, detecting the position of the additional elements along the feed path; and
- setting a variation in the feed path of the continuous web as a function of the position of each additional element detected in the step of detecting, in such a way as to adjust the position of the continuous web, hence of the additional elements, along the feed path.

[0029] In particular, it should be noted that the plug wraps can be cut at an intermediate position between consecutive additional elements.

[0030] Thanks to the method this invention, it is thus possible to modify the web feed path in order to correct the position of the web so it is correctly aligned with the step of cutting to make high quality plug wraps that meet the required reference standards.

[0031] The dependent claims, which are incorporated herein by reference, correspond to different embodiments of the invention.

[0032] Further features and advantages of this invention are more apparent in the following non-limiting description of a machine for making plug wraps for the tobacco industry, as illustrated in the accompanying drawings, in which:

- Figure 1 is a schematic side view of a machine for making plug wraps for the tobacco industry according to this invention; and
- Figure 2 is a pattern for cutting a portion of web into plug wraps according to this invention.

[0033] With reference to the accompanying drawings, the numeral 100 denotes in its entirety a machine for making plug wraps for the tobacco industry, hereinafter referred to simply as machine 100.

[0034] The term "plug wrap" as used herein denotes a length of paper web adapted to be wrapped at least partly around at least two rod-shaped segments of material for the tobacco industry in order to connect the rod-shaped segments to each other.

[0035] More specifically, wrapping the plug wrap in order to join the segments to make an article for the tobacco industry is carried out at a rolling station, not illustrated in the accompanying drawings, downstream of the machine 1 according to this invention, using a rolling process of known type.

[0036] With reference to Figure 1, the machine 100 comprises an unwinding station 20 configured to unwind a continuous web 1 of wrapping material for the tobacco industry from a roll 2 along a feed path P. The continuous web 1 has on one side 1a a succession of equispaced additional elements 3.

[0037] In the embodiment of the web 1 illustrated in Figure 2, the web 1 is provided, in particular, with a succession of pairs of rectangular additional elements 3 placed side by side at an equal spacing H along the longitudinal extension of the web 1.

[0038] Preferably, the additional elements 3 may be defined by one or more of the following: features made on the web 1 (for example, printing, embossing, spray-on substances, perforations, slits) or applications of labels, patches, tear tapes or stickers.

[0039] The machine 1 also comprises a cutting station 30 disposed along the feed path P and configured to transversely cut the continuous web 1 by making a succession of cuts (along a cutting line T) at a predetermined position.

[0040] More specifically, the plug wraps can be cut at a predetermined intermediate position between consecutive additional elements 3. Cutting allows making a succession of plug wraps 4, each comprising at least one additional element 3.

[0041] Preferably, each plug wrap 4 comprises two additional elements 3 placed side by side along a direction perpendicular to the cutting line T, according to the embodiment illustrated in Figure 2, so as to define a double plug wrap for rolling double filters interposed between pairs of axially juxtaposed segments.

[0042] More specifically, with reference to Figure 2, the cutting line T is suitably interposed between consecutive additional elements 3 at a distance D from the front edge 3a of each additional element 3, so as to make plug wraps 4 comprising pairs of additional elements 3 placed side by side and disposed at a distance D' from the front edge 4a of the plug wrap 4.

[0043] To enable the plug wrap 4 to be correctly rolled, it is essential for the distance D' to fall within a certain range of reference values, preferably between 0 mm and 2 mm.

[0044] Preferably, the cutting station 30 comprises a suction drum 31 configured to rotate about a respective axis and, during rotation, to hold down a front portion 1' of the continuous web 1 by air suction. Preferably, the cutting station 30 also comprises a cutting roller 32 operating in conjunction with the suction drum 31 to make the succession of cuts on the front portion 1' of the continuous web 1 held on the suction drum 31.

[0045] The cutting drum 32 and the suction drum 31 are preferably configured to separate the plug wraps 4 from the continuous web 1 by impact cutting.

[0046] More specifically, the cutting roller 32 comprises a plurality of blades 33 disposed at an equal spacing along the peripheral mantle of the cutting roller 32.

[0047] In particular, the rotation speed of the suction drum 31 is such that its tangential speed is greater than the unwinding speed of the continuous web 1 so as to automatically space the plug wraps 4. Advantageously, the machine 100 comprises a detecting device 40 disposed upstream of the cutting station 30 and configured to detect the position of the additional elements 3 of the continuous web 1 along the feed path P.

[0048] Preferably, the detecting device 40 comprises a sensor 41, for example an optical sensor.

[0049] More specifically, the sensor 41 may be configured to directly detect the position of the front edge 3a of the additional element 3 (for example by analysing the change in contrast of the continuous web 1) or to capture images of the web 1 with a photo camera or a video camera and to obtain from the images information regarding the position of the additional element 3.

[0050] In a further possible embodiment, the sensor 41 may be configured to detect the change in the electromagnetic properties of the continuous web 1 to detect the position of additional elements 3 made of metallic material.

[0051] Advantageously, the machine 100 also comprises adjustment means 50 for adjusting the feed path P of the continuous web 1, disposed upstream of the cutting station 30 and configured to modify the geometry of the feed path P of the continuous web 1 in such a way as to adjust the position of the continuous web 1, hence of the additional elements 3, along the feed path P.

[0052] In other words, the adjustment means 50 allow varying the feed path P of the continuous web 1 in order to adjust the position of the continuous web 1 before it reaches the cutting station 30. Advantageously, the machine 100 also comprises a control unit 60 connected to the detecting device 40 and to the adjustment means 50 and acting on the adjustment means 50 to set a variation in the feed path P of the continuous web 1 as a function of the position of each additional element 3 detected by the detecting device 40.

[0053] This invention thus makes it possible to instantaneously adjust the position of the web 1 by acting on its feed path P to ensure that the additional elements 3 are at a predetermined position when they reach the cutting station 30 so that the cutting lines T are made at the predetermined distance D.

[0054] In effect, if the detecting device 40 detects unacceptable displacement in the positions of the additional elements 3 at a given instant when detection occurs, the control unit 60 sends a command to activate the adjustment means 50, which then suitably vary the feed path P to alter the position of the web 1 in such a way that the feeding and cutting of the web 1 are substantially re-synchronised relative to each other.

[0055] That way, the plug wraps 4 obtained can be made to meet the required dimensional criteria at all times by operating on the feed path P of the continuous web 1 to compensate for any positioning errors that may have arisen between the unwinding station 20 and the detecting device 40.

[0056] In this regard, it is noted that the closer the detecting device 40 is to the cutting station 30 along the feed path P, the greater is the reliability of the data captured and the precision in recalibrating the position of the web 1.

[0057] Preferably, the adjustment means 50 for adjust-

ing the feed path P of the continuous web 1 are interposed between the detecting device 40 and the cutting station 30 so that adjustment is carried out just before cutting.

[0058] With reference to the embodiment illustrated in Figure 1, the adjustment means 50 preferably comprise a diverter 51 acting on the continuous web 1 to modify the feed path P of the continuous web 1 in such a way as to vary the length of the feed path P.

[0059] In other words, the diverter 51 is configured to lengthen or shorten the feed path P in such a way as to vary the position of the continuous web 1.

[0060] Still more preferably, the diverter 51 comprises an eccentric or cam element, engaged in contact relation with a surface of the continuous web 1 - for example, the underside surface, opposite to the side 1a on which the additional elements 3 are located - and rotatable or oscillating about a respective axis of rotation 52.

[0061] More specifically, the eccentric or cam element may be engaged in sliding contact relation with a surface of the web 1.

[0062] Preferably, also, the diverter 51 is associated with a respective actuator, not illustrated in the accompanying drawings, to set a variation in the geometry of the continuous web 1, where the actuator is driven in a regulated manner by the control unit 60 as a function of the position of each additional element 3 detected by the detecting device 40.

[0063] Advantageously, therefore, the diverter 51 can press the continuous web 1 to shift the feed path P as a function of the position detected by the detecting device 40, for example by oscillating between a position A and a position B, as illustrated in Figure 1, in such a way as to modify the feed path P between a position PA and position PB.

[0064] For example, if the detecting device 40 has detected that the continuous web 1 is located at a position such that the distance D, during cutting, would be greater than a given, predetermined reference value, or outside a given predetermined range of reference values, the diverter 51 can act on the continuous web 1 by oscillating towards the position B to alter the path P and determine a longer path PB which decreases the distance D on the continuous web 1 that will be fed to the cutting station 30.

[0065] In an alternative embodiment, not illustrated in the accompanying drawings, the diverter 51 may, instead, be associated with a linear actuator with a stem that is transverse, preferably perpendicular, to the feed path P.

[0066] The machine 100 according to this invention may also comprise an inspecting device 70, preferably an optical sensor 71, disposed downstream of the cutting station 30 and configured to detect the position of the additional elements 3 on the individual plug wraps 4.

[0067] In other words, the inspecting device 70 advantageously monitors the quality of the plug wraps 4 that have been cut from the continuous web 1 in the cutting station 30.

[0068] Advantageously, also, the inspecting device 70 is connected to the control unit 60, which may be configured to set a further variation in the feed path P of the continuous web 1 as a function of the position of each additional element 3 detected by the inspecting device 70. That way, besides checking whether the cutting lines T have been made correctly, it is possible to obtain feedback regarding the feed path P if the previous adjustment has not had the desired effect or the plug wraps 4 obtained are progressively drifting towards an unacceptable value of the distance D'.

[0069] More specifically, the inspecting device 70 is positioned in such a way as to optically inspect the plug wraps 4 preferably while they are being transported on the suction drum 31.

[0070] In a further embodiment, the machine 100 according to this invention may comprise only the inspecting device 70 disposed downstream of the cutting station 30 and configured to detect the position of the additional elements 3 on the plug wraps 4.

[0071] In other words, the machine 100 may be without the detecting device 40 disposed upstream of the cutting station 30.

[0072] In this case, too, the inspecting device 70 is preferably an optical sensor 71.

[0073] The inspecting device 70 may perform inspection of the plug wraps 4 on a sample basis - that is, by inspecting only some of the plug wraps 4 that move past in front of it - or it may inspect all the plug wraps 4 one by one.

[0074] Whatever the case, the inspecting device 70 advantageously monitors the quality of the plug wraps 4 that have been cut from the continuous web 1 in the cutting station 30.

[0075] In this case, too, the inspecting device 70 can advantageously be connected to the control unit 60, which may be configured to set a further variation in the feed path P of the continuous web 1 as a function of the position of each additional element 3 detected by the inspecting device 70.

[0076] That way, besides checking whether the cutting lines T have been made correctly, it is possible to obtain feedback regarding the feed path P if the previous adjustment has not had the desired effect or the plug wraps 4 obtained are progressively drifting towards an unacceptable value of the distance D'.

[0077] It should be noted that even in the specific case of this further embodiment, the inspecting device 70 is positioned in such a way as to optically inspect the plug wraps 4 preferably while they are being transported on the suction drum 31.

[0078] Moreover, in both of these embodiments of the invention, the control unit 60 is connected to the unwinding station 20 to vary the unwinding speed of the continuous web 1 as a function of the position of the additional elements 3 detected by the detecting device 40 so as to correct the position, preferably uninterruptedly, of the additional elements at the cutting station 30.

[0079] Advantageously, it is thus possible to obtain

feedback control also of the unwinding of the continuous web 1. This feedback control is particularly useful when the value of the distance D detected by the detecting device 40 is very different from the predetermined reference value or range of acceptable reference values, meaning that acting only on the adjustment means 50 might be insufficient to recover the correct position of the web 1 along the feed path P, that is to say, to reset the distance D to an acceptable value.

[0080] According to a further aspect of it, this invention also provides a method for making plug wraps 4 for the tobacco industry, comprising the steps of:

- unwinding a continuous web 1 of wrapping material for the tobacco industry from a roll 2 along a feed path P, where the continuous web 1 has on one side 1a a succession of equispaced additional elements 3; and
- transversely cutting the continuous web 1 along the feed path P to obtain a succession of plug wraps 4, each comprising at least one additional element 3, wherein each cut is made at a predetermined position, intermediate between consecutive additional elements 3. Advantageously, the method also comprises the following steps, before the step of cutting:
- detecting the position of the additional elements 3 along the feed path P; and
- setting a variation in the feed path P of the continuous web 1 as a function of the position of each additional element 3 detected in the step of detecting, in such a way as to adjust the position of the continuous web 1, hence of the additional elements 3, along the feed path P.

[0081] Thanks to this method, therefore, detecting the position of the additional elements 3 makes it possible to adjust the position of the continuous web 1 as a function of the position of the additional elements 3 detected in such a way that the step of cutting is synchronised at all times with the feeding of the continuous web 1, allowing the continuous web 1 to be cut correctly to obtain plug wraps 4 of excellent quality.

[0082] Still more preferably, the step of detecting is carried out by an optical sensor 41 to capture the absolute position of each additional element 3 at least along the feed path P.

[0083] Advantageously, therefore, based on the speed of the continuous web 1 and the geometry of the feed path P, it is possible to predict whether the cut will be made at a correct distance D from the additional element 3; if the distance is not correct, the control unit 60 applies a variation to the feed path P to lengthen/shorten the feed path P up to the cutting point, thereby compensating for the imprecision.

[0084] Preferably, the step of detecting can be carried out by detecting the front edge 3a of each additional element 3 so as to constantly check whether the distance D of the next cutting line T to be made is acceptable.

[0085] Further, the step of detecting may comprise a sub-step of comparing the position of each additional element 3 detected with a reference position and the method may thus comprise a step of activating the step of adjusting if the position detected does not meet predetermined acceptability criteria.

[0086] Preferably, the step of varying the feed path P of the continuous web 1 is carried out by pressing the continuous web 1 with a diverter 51 transversely to the direction of extension of the continuous web 1 in such a way as to vary the length of the feed path P.

[0087] Preferably, the diverter 51 is associated with a respective actuator, not illustrated in the accompanying drawings, and the step of varying the feed path P is carried out by acting on the actuator as a function of the detected position of each additional element 3.

[0088] Preferably, after the step of cutting, the method also comprises a step of inspecting the position of the additional elements 3 on the individual plug wraps 4, more preferably by means of an optical sensor 71. The step of inspecting may be followed by a step of setting a further variation in the feed path P of the continuous web 1 as a function of the position of each additional element 3 detected on the plug wraps 4 in the step of detecting, in such a way as to further adjust the position of the continuous web 1, hence of the additional elements 3, along the feed path P.

[0089] Preferably, the step of detecting comprises a sub-step of comparing the position of each additional element 3 detected with a reference position and the method thus comprises a step of activating the step of adjusting if the position detected does not meet predetermined acceptability criteria.

[0090] Lastly, in the method of this invention, the step of adjusting comprises a sub-step of varying the unwinding speed of the continuous web 1 as a function of the detected position of the additional elements 3, so as to correct the position of the additional elements 3, preferably uninterruptedly, during the step of cutting.

[0091] This invention achieves the aims, overcoming the disadvantages of the prior art, by providing the user with a machine and a method for making plug wraps, capable of improving the efficiency of the production process by proposing operating solutions ensuring that the continuous web 1 will be cut correctly in order to obtain plug wraps 4 that meet production needs.

[0092] The invention allows preventing the quality of the plug wraps 4 made from being negatively affected by the unsteadiness which the continuous web 1 is potentially, and often inevitably, subjected to between the unwinding station 20 and the cutting station 30, also on account of the very nature of the material the web 1 is made of.

Claims

1. A machine (100) for making plug wraps (4) for the

tobacco industry, comprising:

- an unwinding station (20) configured to unwind a continuous web (1) of wrapping material for the tobacco industry from a roll (2) along a feed path (P), the continuous web (1) having on one side (1a) a succession of equispaced additional elements (3);
- a cutting station (20) disposed along the feed path (P) and configured to transversely cut the continuous web (1) by making a succession of cuts at a predetermined position to obtain a succession of plug wraps (4), each comprising at least one additional element (3); **characterized in that** it comprises:
- a detecting device (40) disposed upstream of the cutting station (30) and configured to detect the position of the additional elements (3) along the feed path (P);
- adjustment means (50) for adjusting the feed path (P) of the continuous web (1), disposed upstream of the cutting station (30) and configured to modify the geometry of the feed path (P) of the continuous web (1) in such a way as to adjust the position of the continuous web (1), hence of the additional elements (3), along the feed path (P); and
- a control unit (60) connected to the detecting device (40) and to the adjustment means (50) and acting on the adjustment means (50) to set a variation in the feed path (P) of the continuous web (1) as a function of the position of each additional element (3) detected by the detecting device (40).

2. A machine (100) for making plug wraps (4) for the tobacco industry, comprising:

- an unwinding station (20) configured to unwind a continuous web (1) of wrapping material for the tobacco industry from a roll (2) along a feed path (P), the continuous web (1) having on one side (1a) a succession of equispaced additional elements (3);
- a cutting station (20) disposed along the feed path (P) and configured to transversely cut the continuous web (1) by making a succession of cuts at a predetermined position to obtain a succession of plug wraps (4), each comprising at least one additional element (3); **characterized in that** it comprises:
- an inspecting device (70) disposed downstream of the cutting station (30) and configured to detect the position of the additional elements (3) on the plug wraps (4);
- adjustment means (50) for adjusting the feed path (P) of the continuous web (1), disposed upstream of the cutting station (30) and configured to modify the geometry of the feed path (P) of the continuous web (1) in such a way as to adjust the position of the continuous web (1), hence of the additional elements (3), along the feed path (P); and
- a control unit (60) connected to the inspecting device (70) and to the adjustment means (50) and acting on the adjustment means (50) to set a variation in the feed path (P) of the continuous web (1) as a function of the position of each additional element (3) detected by the inspecting device (70).

3. The machine (100) according to claim 1, wherein the adjustment means (50) for adjusting the feed path (P) of the continuous web (1) are interposed between the detecting device (40) and the cutting station (30).

4. The machine (100) according to claim 1 or 2, wherein the adjustment means (50) comprise a diverter (51) acting on the continuous web (1) to modify the feed path (P) of the continuous web (1) in such a way as to vary the length of the feed path (P).

5. The machine (100) according to claim 4, wherein the diverter (51) comprises an eccentric or cam element, engaged in contact relation with a surface of the continuous web (1) and rotatable or oscillating about a respective axis of rotation (52).

6. The machine (100) according to one or more of claims 1 to 5, wherein the diverter (51) is associated with a respective actuator to set a variation in the geometry of the continuous web (1), the actuator being driven in a regulated manner by the control unit (60) as a function of the position of each additional element (3) detected by the detecting device (40) or detected by the inspecting device (70).

7. The machine (100) according to one or more of the preceding claims, wherein the detecting device (40) comprises a sensor (41), for example an optical sensor.

8. The machine (100) according to one or more of the preceding claims, comprising an inspecting device (70), preferably an optical sensor (71), disposed downstream of the cutting station (30) and configured to detect the position of the additional elements (3) on the individual plug wraps (4).

9. The machine (100) according to claim 8, wherein the inspecting device (70) is connected to the control unit (60, the control unit (70) being configured to set a variation in the feed path (P) of the continuous web (1) as a function of the position of each additional element (3) detected by the inspecting device (70).

10. The machine (100) according to one or more of the preceding claims, wherein the control unit (60) is connected to the unwinding station (20) to vary the unwinding speed of the continuous web (1) as a function of the position of the additional elements (3) detected by the detecting device (40) so as to correct the position, preferably uninterruptedly, of the additional elements (3) at the cutting station (30).

11. The machine (100) according to one or more of the preceding claims, wherein the cutting station (30) comprises a suction drum (31) configured to rotate about a respective axis and, during rotation, to hold down a front portion (1') of the continuous web (1) by air suction, and a cutting roller (32) operating in conjunction with the suction drum (31) to make the succession of cuts on the front portion (1') of the continuous web (1) held on the suction drum (31), the cutting drum (32) and the suction drum (31) being preferably configured to separate the plug wraps (4) from the continuous web (1) by impact cutting.

12. The machine (100) according to claim 11, when dependent on claim 2 or 7, wherein the inspecting device (70) is positioned in such a way as to optically inspect the plug wraps (4) while they are being transported on the suction drum (31).

13. A method for making plug wraps (4) for the tobacco industry, comprising the steps of:

- unwinding a continuous web (1) of wrapping material for the tobacco industry from a roll (2) along a feed path (P), the continuous web (1) having on one side (1a) a succession of equispaced additional elements (3);
- transversely cutting the continuous web (1) along the feed path (P) to obtain a succession of plug wraps (4), each comprising at least one additional element (3), wherein each cut is made at a predetermined position;

characterized in that it comprises the following steps:

- before the step of cutting, detecting the position of the additional elements (3) along the feed path (P);
- before the step of cutting, setting a variation in the feed path (P) of the continuous web (1) as a function of the position of each additional element (3) detected in the step of detecting, in such a way as to adjust the position of the continuous web (1), hence of the additional elements (3), along the feed path (P).

14. A method for making plug wraps (4) for the tobacco industry, comprising the steps of:

- unwinding a continuous web (1) of wrapping material for the tobacco industry from a roll (2) along a feed path (P), the continuous web (1) having on one side (1a) a succession of equispaced additional elements (3);
- transversely cutting the continuous web (1) along the feed path (P) to obtain a succession of plug wraps (4), each comprising at least one additional element (3), wherein each cut is made at a predetermined position;

characterized in that it comprises the following steps:

- after the step of cutting, detecting the position of the additional elements (3) on the plug wraps (4);
- before the step of cutting, setting a variation in the feed path (P) of the continuous web (1) as a function of the position of each additional element (3) detected in the step of detecting, in such a way as to adjust the position of the continuous web (1), hence of the additional elements (3), along the feed path (P).

15. The method according to claim 13, wherein the step of detecting is carried out preferably by an optical sensor (41), detecting the absolute position of each additional element (3) at least along the feed path (P).

16. The method according to claim 13, 14 or 15, wherein the step of detecting is carried out by detecting a front edge (3a) of each additional element (3).

17. The method according to one or more of claims 13 to 16, wherein the step of varying the feed path (P) of the continuous web (1) is carried out by pressing the continuous web (1) with a diverter (51) transversely to the direction of extension of the continuous web (1) in such a way as to vary the length of the feed path (P).

18. The method according to claim 17, wherein the diverter (51) is associated with a respective actuator and wherein the step of varying the feed path (P) is carried out by acting on the actuator as a function of the detected position of each additional element (3).

19. The method according to one or more of claims 14 to 18, comprising a step of inspecting the position of the additional elements (3) on the individual plug wraps (4), preferably by means of an optical sensor (71) after the step of cutting.

20. The method according to claim 19, comprising, after the step of inspecting, a step of setting a further variation in the feed path (P) of the continuous web (1)

as a function of the position of each additional element (3) detected on the plug wraps (4) in the step of detecting, in such a way as to further adjust the position of the continuous web (1), hence of the additional elements (3), along the feed path (P).

21. The method according to one or more of claims 13 to 20, wherein the step of adjusting comprises a sub-step of varying the unwinding speed of the continuous web (1) as a function of the detected position of the additional elements (3), so as to correct the position of the additional elements (3), preferably uninterruptedly, during the step of cutting.

22. The method according to one or more of claims 13 to 21, wherein the step of detecting or inspecting comprises a sub-step of comparing the detected position of each additional element (3) with a reference position and wherein the method comprises a step of activating the step of adjusting if the detected position does not meet predetermined acceptability criteria.

Fig.2

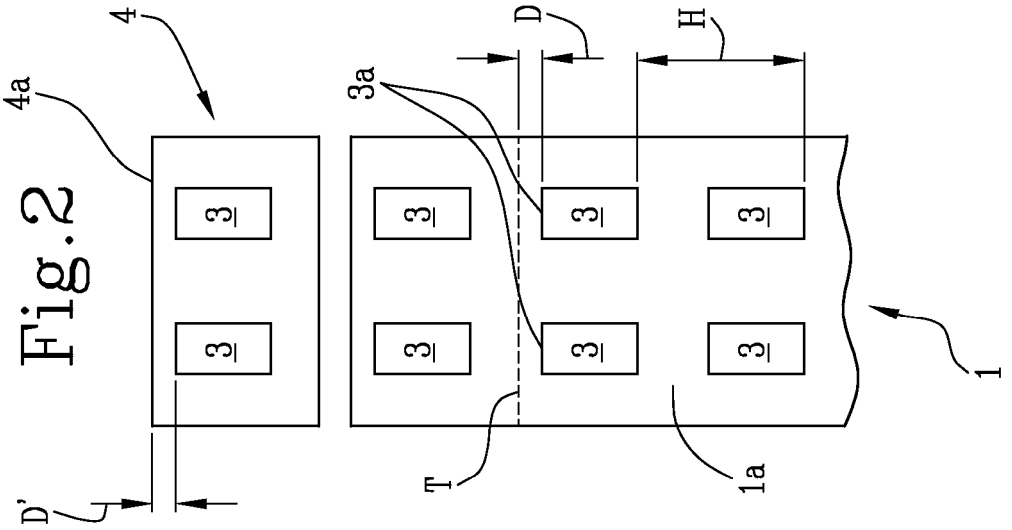
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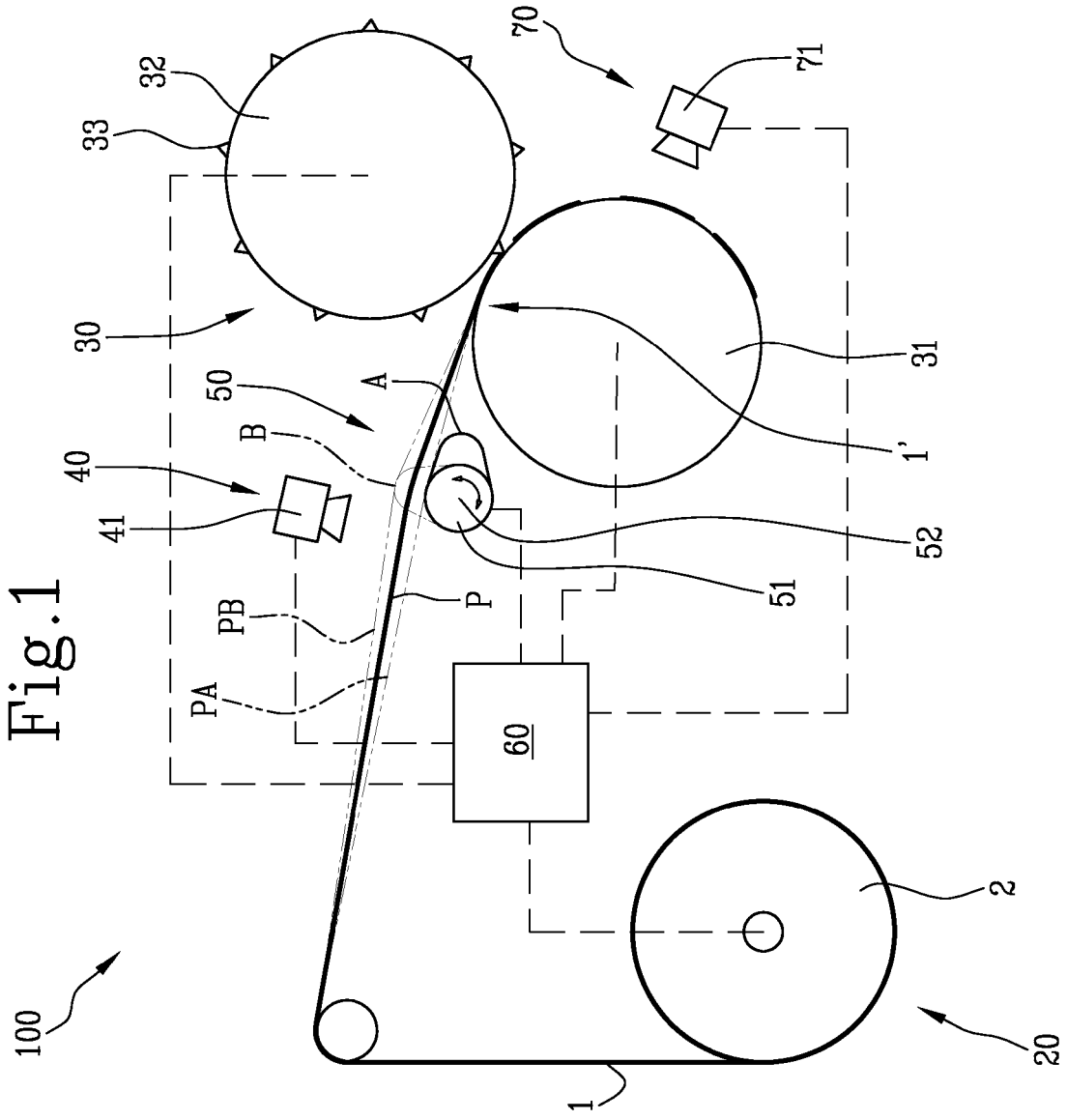
Fig.1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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 4257

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 June 2019	Marzano Monterosso

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