



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.10.2014 Bulletin 2014/43

(51) Int Cl.:
B05C 1/08 (2006.01)

(21) Application number: **14163746.2**

(22) Date of filing: **07.04.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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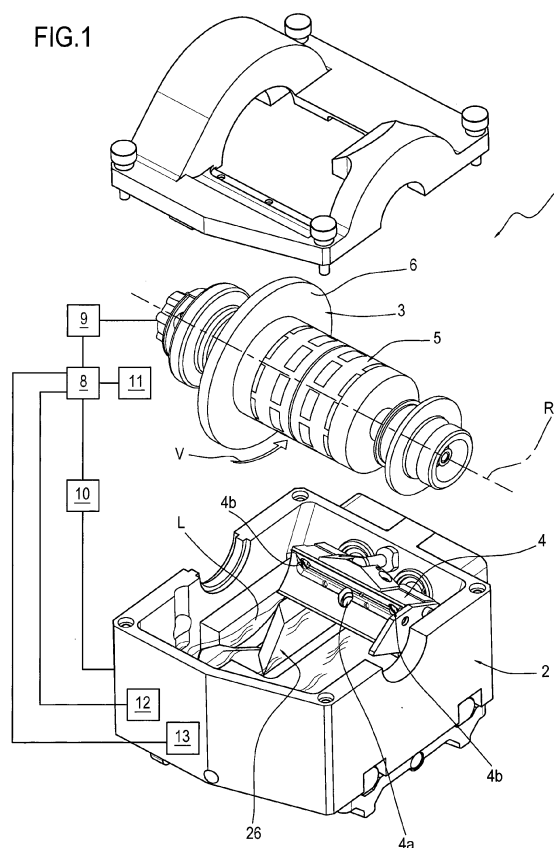
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(54) **Adhesive applicator device**

(57) An adhesive applicator device (1) for applying adhesive to a continuous web of paper comprises: a tank (2) for the adhesive; a collecting disc (3) for collecting a quantity of adhesive from the tank (2); an adhesive distributor (4), associated with the collecting disc (3) and comprising a scraper and a pickup surface for picking up from the collecting disc (3) a portion of the quantity of adhesive collected; the applicator device (1) comprises an adhesive applicator roller (5) coaxial with the collecting disc (3) and associated with the distributor (4) to receive at least part of the adhesive present in the distributor (4) which comprises a distributing system for spreading the adhesive on the applicator roller (5); the applicator device (1) comprises a regulator system (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5).

FIG.1



Description

[0001] This invention relates to an adhesive applicator device designed in particular for cigarette making machines.

[0002] More specifically, this invention relates to an adhesive applicator or "gumming" device, preferably used in a machine of the type known as "filter tip attachment" machine for applying an adhesive substance on a continuous web of paper which is subsequently cut into pieces or patches used to connect filter tips to respective cigarette sticks. An adhesive applicator device of known type is described in document EP0534664.

[0003] The known device comprises an applicator roller for applying the adhesive to the paper and associated with a corresponding distributor which spreads the adhesive on the applicator roller.

[0004] The applicator device also comprises a tank or container for supplying the adhesive to the distributor and located under the applicator roller.

[0005] The distributor comprises a scraper and a reservoir for the adhesive supplied by a collecting disc by which the adhesive is picked up from the tank.

[0006] More specifically, the collecting disc is mounted so it is coaxial and integral with the applicator roller and is larger in diameter than the applicator roller in such a way as to pick up the adhesive from the tank without the roller being directly in contact with the adhesive in the tank.

[0007] The distributor is associated with the collecting disc from which it scrapes the adhesive and transfers a part of it to its reservoir from where the adhesive is then distributed to the applicator roller.

[0008] Since the volume of adhesive collected by the disc is a function of the disc rotation speed, the quantity or volume of adhesive picked up by the distributor is fixed and, in short, is set on the basis of the shape of the distributor and of the disc and their relative position. Generally speaking, upstream of the distributor according to the direction of rotation of the collecting disc and of the applicator roller, this known applicator device comprises a fixed scraper which determines the thickness of the layer of adhesive which reaches the distributor.

[0009] More specifically, the volume of adhesive transferred to the reservoir of the distributor depends on the set gap between the collecting disc and the distributor itself, that is to say, on the thickness of the adhesive scraped off the disc itself.

[0010] One disadvantage of an applicator device made in this way is due to the fact that the applicator roller and the collecting disc are integral with each other and therefore rotate at the same speed, which is a function of the machine the device is mounted on.

[0011] A cigarette making machine, for example, operates at relatively very high speeds which it reaches after an acceleration ramp.

[0012] A corresponding adhesive applicator device therefore settles to steady-state rotation at a predeter-

mined speed which it too reaches after an acceleration ramp.

[0013] The collecting disc rotating in the adhesive tank at different speeds depending on whether the machine is in a steady state or acceleration transient condition thus collects different quantities of adhesive.

[0014] The Applicant has noticed, in particular, that during the acceleration ramp, the collecting disc picks up less adhesive than it does in the steady-state condition.

[0015] In some cases, at relatively low speeds, the collecting disc picks up less adhesive than expected based on the position of the fixed scraper and, consequently, less adhesive reaches the paper.

[0016] As a result, especially during the acceleration ramp, large numbers of cigarettes are rejected because they do not meet specified quality standards.

[0017] In this context, the main technical purpose of this invention is to propose an adhesive applicator device which is free of the above mentioned disadvantages.

[0018] This invention has for an aim to propose an adhesive applicator device for applying adhesive to a roller which spreads a constant quantity of adhesive irrespective of the speed of rotation of the roller itself.

[0019] Another aim of the invention is to propose a "filter tip attachment" machine where less cigarettes are rejected than in prior art solutions. The technical purpose and aims specified are substantially achieved by an adhesive applicator roller according to claim 1 and a "filter tip attachment" machine according to claim 13.

[0020] Further features and advantages of the invention are more apparent in the non-limiting description below, with reference to a preferred but non-exclusive embodiment of an adhesive applicator device and a "filter tip attachment" machine as illustrated in the accompanying drawings, in which:

- Figure 1 illustrates an adhesive applicator device according to this invention, for applying adhesive to a continuous paper web in a schematic exploded perspective view, partly in blocks and with some parts cut away for greater clarity;
- Figure 2 illustrates a detail of the applicator device of Figure 1 in a different perspective view, with some parts cut away for greater clarity;
- Figure 3 illustrates another detail of the applicator device of Figure 1 in a different perspective view, with some parts cut away for greater clarity;
- Figures 4, 5 and 6 are schematic diagrams indicating the quantity of adhesive picked up by a collecting disc forming part of the applicator device of Figure 1;
- Figure 7 illustrates a second embodiment of an adhesive applicator device according to this invention in a schematic exploded perspective view, partly in blocks and with some parts cut away for greater clarity;
- Figure 8 illustrates a detail of the applicator device of Figure 7 in a schematic perspective view, with

some parts cut away for greater clarity;

- Figure 9 illustrates a detail of a further embodiment of the adhesive applicator device according to this invention in a schematic side view with some parts cut away for greater clarity;
- Figure 10 illustrates a detail of a further embodiment of the adhesive applicator device according to this invention in a schematic side view with some parts cut away for greater clarity;
- Figure 11 illustrates a further embodiment of an adhesive applicator device according to this invention in a schematic exploded perspective view, partly in blocks and with some parts cut away for greater clarity;
- Figure 12 is a diagram indicating the quantity of adhesive picked up by a distributor forming part of the applicator device according to the invention;
- Figure 13 illustrates a filter tip attachment machine according to this invention in a schematic front view, partly in blocks and with some parts cut away for greater clarity.

[0021] With reference to the accompanying drawings, the numeral 1 denotes an adhesive applicator device according to this invention for applying adhesive to a "gumming" roller or device.

[0022] As clarified below, the gumming device 1 is preferably used in a tobacco industry machine of the type known as "filter tip attachment" machine for applying a layer of adhesive substance on a continuous paper web W, illustrated for example in Figure 14, which is subsequently cut into pieces or patches used to connect filter tips to respective cigarette sticks.

[0023] With reference to Figure 1 in particular, it may be noticed that the device 1 is of the single roller type and comprises a container 2 for the adhesive, preferably a tank, and a disc 3, having an axis of rotation R and rotatable in a direction V, for collecting a quantity of adhesive from the container 2.

[0024] The adhesive, for example vinyl glue, to which express reference is made but without limiting the scope of the invention, is present in the container 2 which it fills up to a level L.

[0025] The device 1 comprises a distributor 4 associated with the disc 3 equipped with pickup means for picking up from the disc 3 a portion of the quantity of adhesive present on the disc 3 itself.

[0026] In substantially known manner, described in more detail with regard to the parts necessary to understand this invention, the distributor 4 scrapes part of the adhesive from the disc 3 and picks up a portion of the adhesive, for example to be applied to the paper web W.

[0027] In effect, the distributor 4 comprises pickup means for picking up the portion of adhesive from the disc 3.

[0028] The device 1 comprises an adhesive applicator roller 5 mounted coaxially with the collecting disc 3 and preferably integral therewith. The applicator roller 5 is

associated with the distributor 4 which comprises a distributing system for spreading the adhesive on the roller 5 so that the roller 5 itself can receive at least part of the adhesive present in the distributor 4.

[0029] The adhesive distributing system, of substantially known type, comprises a diffuser 4a for delivering the adhesive intended for the applicator roller 5 and a pair of outlets 4b for the excess adhesive distributed on the roller 5.

[0030] The diffuser 4a and the outlets 4b, as is known, identify corresponding adhesive application zones on the web W.

[0031] The collecting disc 3 is positioned above the container 2 and picks up the above mentioned quantity of adhesive from the container 2.

[0032] In one embodiment, the disc 3 has a front face 6, preferably flat, for collecting the adhesive.

[0033] The adhesive in the container 2 adheres to the face 6 during rotation of the disc 3.

[0034] The above mentioned level L of the adhesive in the tank 2 determines the height h, measured along a radius of the disc 3, of a circular crown 7 of adhesive, illustrated only partly for example in Figures 2 and 3, collected by the face 6 during one rotation of the disc 3.

[0035] The quantity of adhesive collected by the disc 3 is determined by the volume of the circular crown 7.

[0036] The device 1 according to the invention comprises regulator means for regulating the volumetric flow rate of adhesive to the distributor 4 as a function of the rotation speed of the roller about the axis R.

[0037] In other words, the device 1 comprises regulator means for regulating the flow rate of adhesive to the roller 5 by regulating the flow rate of adhesive which reaches the distributor 4 based on the speed of the roller 5 itself.

[0038] In a preferred application, the rotation speed of the applicator roller 5 is linked to the operating speed of the filter tip attachment machine which it is preferably mounted in.

[0039] The following embodiments are described only as regards the parts necessary to understand them, whereas the parts whose descriptions are not repeated are considered identical to each other. Further, all the embodiments can be combined with each other. Advantageously, the device 1 comprises a computerized control unit 8 equipped with an acquisition system 9 for acquiring a parameter expressing the rotation speed of the roller 5.

[0040] The device 1 also comprises an acquisition system, schematically represented as a block 10, for acquiring a parameter expressing the level L of the adhesive in the container 2.

[0041] The computerized unit 8 is in communication with the above mentioned regulator means for regulating the volumetric flow rate of the adhesive to the distributor 4 and is configured to drive the regulator means as a function of the speed of the roller 5 and of the level L of adhesive in the container 2.

[0042] That way, the device 1 is controlled as a function

of the rotation speed of the roller 5, especially as regards the quantity of adhesive applied to the roller 5.

[0043] Advantageously, the computerized unit 8 is configured to drive the device 1 in such a way as to pick up larger quantities of adhesive at lower rotation speeds of the applicator roller 5.

[0044] In other words, the device 1 is driven in such a way that the quantity of adhesive picked up is inversely proportional to the rotation speed of the roller 5.

[0045] That way, the continuous paper web W is provided with the optimum quantity of adhesive for each rotation speed of the roller 5, that is, for each operating speed of the filter tip attachment machine which connects the filter tips to respective cigarette sticks.

[0046] Alternatively, or in combination, the computerized unit 8 comprises a memory unit, schematically represented as a block 11, containing stored therein a predetermined curve of the volumetric flow rate of adhesive to the distributor as a function of the speed of the applicator roller 5.

[0047] The computerized control unit 8 is configured to drive the regulator means for regulating the volumetric flow rate of the adhesive to the distributor as a function of the aforementioned predetermined curve. In that case, the optimum flow rate curve entails supplying to the distributor 4 a quantity of adhesive which is inversely proportional to the rotation speed of the roller 5, that is, to the operating speed of the filter tip attachment machine.

[0048] Preferably, the regulator means for regulating the volumetric flow rate of adhesive to the distributor 4 as a function of the rotation speed of the roller 5 comprise regulator means for regulating the quantity of adhesive collected by the disc 3.

[0049] In practice, in a preferred embodiment, the volume of adhesive which reaches the distributor 4 is regulated by acting on the quantity of adhesive collected by the collecting disc 3.

[0050] As illustrated for example in Figure 1, the regulating means for regulating the quantity of adhesive collected by the disc 3 comprise regulator means for regulating the level L of the adhesive in the container 2.

[0051] The regulator means for regulating the level L comprise the above mentioned adhesive level acquisition system 10 and the computerized unit 8.

[0052] The regulator means for regulating the level L comprise a valve 12 for charging the adhesive into the container 2 and which is in communication with and driven by the computerized unit 8.

[0053] The regulator means for regulating the level L comprise a valve 13 for discharging the adhesive from the container 2 and which is in communication with and driven by the computerized unit 8.

[0054] The level L is regulated by the computerized unit 8 between a minimum value L_{min} and a maximum value L_{max} as a function of the rotation speed of the applicator roller 5 by means of the valves 12 and 13.

[0055] The level L of the adhesive in the container 2 determines the radial dimension or height h of the circular

crown 7 of adhesive collected by the disc 3.

[0056] Varying the radial dimension h of the circular crown 7, with the same thickness S of the circular crown 7, measured along a direction parallel to the axis of rotation R, varies the volume of adhesive collected by the disc 3.

[0057] Generally speaking, according to the invention, as will become clearer below, the regulator means for regulating the volumetric flow rate of the adhesive to the distributor as a function of the speed of rotation of the roller about the axis R comprise regulator means for regulating the height h of the adhesive collected, measured along a radius of the disc 3 in combination with, or alternatively to, regulator means for regulating the thickness S of the adhesive collected, measured along a direction parallel to the axis of rotation R.

[0058] In order to collect a larger quantity of adhesive at low speeds, whether measured or stored, the computerized unit 8 keeps the adhesive level L at a high value, whereas at high speeds it keeps the adhesive level L at a lower value than it does for low speeds.

[0059] Figure 4 schematically shows the circular crown 7 collected with a first level of adhesive, while Figure 5 schematically shows the circular crown 7 collected with a second level of adhesive, higher than the first level.

[0060] It should be noted that the circular crown 7 accordingly has a first value of height h1 for the first value of level and a second value of height h2 for the second value of level: the first value of height h1 is lower than the second value of height h2.

[0061] In a preferred embodiment, illustrated for example in Figure 3, the distributor 4 comprises a pickup surface 14 substantially parallel to the plane of rotation of the collecting disc 3.

[0062] The pickup surface 14 comprises a doctor blade 15 which scrapes the circular crown 7 for its entire radial height h, while the pickup surface 14 accordingly picks up the excess part of the adhesive scraped off.

[0063] In practice, the thickness of the adhesive of the circular crown 7 scraped off the disc 3 and not transferred to the distributor 4 corresponds to the gap between the distributor 4 and the disc 3 and, in particular, between the doctor blade 15 and the disc 3.

[0064] In one embodiment, the gap is fixed and remains constant during the operation of the applicator device 1.

[0065] Figure 6 shows a graph representing the curve of the volume of adhesive collected by the disc 3 with variation of the level L of the adhesive in the tank 2.

[0066] More specifically, the volume curve is expressed in g/revolution as a function of the level L, considering the specific weight of the adhesive as being fixed.

[0067] As illustrated, the volume of the adhesive transferred increases with increases in the level L of the adhesive in the tank 2 and hence with increases in the height h of the circular crown.

[0068] In an embodiment illustrated by way of example

in Figures 7 and 8, the regulator means for regulating the quantity of adhesive collected by the disc 3 based on a variation in the level of the adhesive in the container 2 comprise a second collecting disc 17 coaxial with the first disc 3.

[0069] The disc 17 is smaller in diameter than the disc 3 and both are positioned, relative to the container 2, in such a way as to pick up the adhesive from the container 2, each by means of a respective substantially cylindrical lateral face 18, 19.

[0070] Preferably, the first and second discs 3, 17 are integral with each other.

[0071] Preferably, as illustrated, the first and second discs 3, 17 are made in a single piece.

[0072] In the configuration illustrated, the pickup means for picking up the adhesive from the collecting discs, and in particular the distributor 4, only partly illustrated, comprise a collector 20 for feeding the adhesive to the distribution system by which the adhesive is spread on the roller 5.

[0073] The collector 20 is in fluid communication with the lateral face 18 of the disc 3 and with the lateral face 19 of the disc 17, that is to say, it is shaped in such a way as to receive the adhesive both from the disc 3 and from the disc 17.

[0074] The regulator means for regulating the level L regulate the level of adhesive in the container 2 between a first value and a second value. The first adhesive level value causes the adhesive to be picked up by the lateral face 18 of the first disc 3 because the disc 3, which is the larger in diameter, is the only one of the two to be dipped into the adhesive in the container 2.

[0075] The second adhesive level value, greater than the first value of adhesive in the container 2, causes the adhesive to be picked up also by the lateral face 19 of the second disc 17 because both of the discs 3, 17 are dipped into the adhesive in the container 2. Advantageously, increasing the level of the adhesive in the container 2 until the disc 17 is also dipped in it increases the quantity of adhesive supplied to the distributor 4.

[0076] The total volume of adhesive supplied to the distributor 4 is determined, in the case of a tank 2 filled to the second height value, by the part of adhesive picked up by the first disc 3 plus the part of adhesive picked up by the second disc 17.

[0077] In one embodiment, the above mentioned regulator means for regulating the volumetric flow rate of adhesive to the distributor 4 as a function of the rotation speed of the roller 5 comprise regulator means for regulating the portion of adhesive received by the distributor 4 itself.

[0078] In practice, in order to regulate the volumetric flow rate of adhesive to the distributor 4 regulator means are provided for regulating the quantity of adhesive which is transferred from the disc 3 to the distributor 4.

[0079] In other words, once the volume of adhesive picked up by the collecting disc 3 has been set, the adhesive requirement as a function of the speed of the ap-

plicator roller 5 is regulated by varying the part of adhesive which passes from the disc 3 to the distributor 4. In one embodiment, illustrated by way of example in 9, the regulator means for regulating the quantity of adhesive which is transferred from the disc 3 to the distributor 4 comprise the above mentioned regulator means for regulating the level L.

[0080] In this embodiment, the regulator means for regulating the quantity of adhesive collected by the disc 3 comprise a substantially frusto-conical collecting surface 22 associated with the disc 3. Advantageously, the collecting surface 22 is coaxial with the collecting disc 3 and is in the form of a bevel in the profile of the selfsame disc 3.

[0081] The disc 3 is positioned, relative to the container 2, in such a way that the quantity of adhesive collected by the disc 3 is advantageously collected by the frusto-conical collecting surface 22. The pickup means for picking up the portion of adhesive from the quantity collected by the disc, more specifically, the distributor 4, comprise a pickup surface or face 23 which is inclined relative to the frusto-conical collecting surface 22.

[0082] In the preferred embodiment, the pickup surface 23 faces the disc 3 at the frusto-conical surface 22 and extends parallel to the plane of rotation of the disc 3.

[0083] A scraper 24 is coupled to the surface 23 in order to scrape the adhesive collected by the frusto-conical surface 22.

[0084] The scraper 24 extends parallel to the plane of rotation of the disc and determines the portion of adhesive which sticks to the disc 3 during rotation and the part which is transferred to the distributor 4, in particular to the surface 23.

[0085] Advantageously, owing to the shape and mutual position of the pickup surface 23 and of the frusto-conical collecting surface 22, the higher the level L of the adhesive in the tank 2 is, the larger the quantity of adhesive collected by the disc 3 and, consequently, the portion of that quantity which is transferred to the distributor 4.

[0086] With reference in particular to Figure 9, a level L1 of adhesive corresponds to a quantity Q1 collected by the disc 3 and a quantity Q1', which is a portion of the quantity Q1, received by the distributor 4.

[0087] A level L2 of adhesive corresponds to a quantity Q2 collected by the disc 3 and a quantity Q2', which is a portion of the quantity Q2, received by the distributor 4.

[0088] The volume of adhesive transferred into the distributor 4 thus has a triangular cross section.

[0089] Also, varying the level L of adhesive in the tank varies not only the height h of the circular crown but also the thickness S of the circular crown 7 which reaches the distributor 4.

[0090] As mentioned, since more adhesive has to be collected at the lower speeds, the profile of the collecting surface 22 is such that raising the level L of the adhesive in the tank 2 also increases the portion of the thickness S of the circular crown 7 which reaches the distributor 4.

[0091] In one embodiment of the invention, illustrated in Figure 10 and described only with reference to the

features which differentiate it from the other embodiments, the regulator means for regulating the volumetric flow rate of adhesive to the distributor 4 as a function of the rotation speed of the roller 5 comprise regulator means for regulating the quantity of adhesive collected by the disc 3.

[0092] The front face 6 of the disc 3 which collects the adhesive is substantially flat and preferably at right angles to the axis of rotation R of the disc 3 itself and of the roller 5.

[0093] As mentioned, the level L of the adhesive in the tank 2 determines the height h, measured along a radius of the disc 3, of the circular crown 7 of adhesive collected by the front face 6 during one rotation of the disc 3.

[0094] The pickup means, and more specifically, the distributor 4, comprise a pickup surface or face 25 which is inclined relative to the front face 6 of the disc 3.

[0095] The inclined surface 25 is obtained, for example, by bevelling the distributor 4, in particular at the scraper 24.

[0096] Advantageously, owing to the shape and mutual position of the pickup surface 25 and of the collecting surface 6, the higher the level L of the adhesive in the tank 2 is, the larger the quantity of adhesive collected by the disc and the portion of that quantity which is transferred to the distributor 4.

[0097] The volume of adhesive transferred into the distributor 4 thus has a triangular cross section.

[0098] Also, varying the level L of adhesive in the tank varies not only the height h of the circular crown but also the thickness S of the circular crown 7 which reaches the distributor 4.

[0099] As mentioned, since more adhesive has to be collected at the lower speeds, the profile of the collecting surface 25 is such that raising the level L of the adhesive in the tank 2 also increases the thickness S of the circular crown 7.

[0100] In one embodiment, illustrated by way of example in Figure 11, the regulator means for regulating the volumetric flow rate of adhesive to the distributor 4 of the device 1 as a function of the rotation speed of the roller 5 comprise regulator means for regulating the portion of adhesive received by the distributor 4.

[0101] The regulator means for regulating the portion of adhesive received by the distributor 4 comprise movement means by which the pickup means are moved between a position close to and a position away from the collecting disc 3 as a function of the rotation speed of the roller 5.

[0102] As mentioned, the distributor 4 scrapes a part of adhesive from the disc 3 and picks up the portion of adhesive which it has to receive.

[0103] In a way similar to the embodiment of Figure 4, the distributor 4 comprises a pickup surface 114 substantially parallel to the plane of rotation of the collecting disc 3.

[0104] The pickup surface 114 comprises a doctor blade 115 which scrapes the circular crown 7 for its entire

radial height, while the pickup surface 114 accordingly picks up the excess part of the adhesive scraped off.

[0105] The movement means allow moving the distributor 4 towards and away from the disc 3 and thus, with the same thickness S of the circular crown 7 of adhesive collected, regulating the part of adhesive scraped from the disc 3 and the part transferred to the distributor 4. In other words, the movement means by which the pickup means are moved and which are also driven as a function of the rotation speed of the roller 5, vary the gap between the distributor 4 and the disc 3 so that the roller 5 always has the right quantity of adhesive on it at all operating speeds of the roller 5 itself.

[0106] Varying the gap between the disc 3 and the distributor 4 allows varying the flow rate of adhesive fed to the distributor 4.

[0107] Moving the distributor 4 closer to the disc 3 causes a larger volume of adhesive to be transferred to the distributor 4, whilst moving it away causes a smaller thickness to be transferred.

[0108] One embodiment of the invention, not illustrated, comprises a system for regulating the height h of the circular crown 7 of adhesive collected by the disc 3, that is, for regulating the level L of adhesive in the tank 2, of a type substantially as described previously and a system for regulating the gap between the disc 3 and the distributor 4 of a type substantially as described previously.

[0109] Figure 12 shows the curve of the volume of glue supplied to the distributor 4 with variations both of the thickness of the adhesive transferred to the distributor and of the height h of the circular crown 7.

[0110] More specifically, the volume curve is expressed in g/revolution as a function of the level L, considering the specific weight of the adhesive as being fixed and considering the thickness of the adhesive transferred to the distributor as increasing from left to right.

[0111] In practice, combining the system of collection by variable height h with the system of collection by variable gap improves the effect of feeding more adhesive at low speeds and reducing the flow rate at high speeds.

[0112] Advantageously, for each of the embodiments described, the device 1 preferably comprises a fixed scraper 26, located upstream of the distributor 4 in the rotation direction V.

[0113] The scraper 26 is positioned, relative to the disc 3, in such a way that the adhesive collected is scraped down to a predetermined thickness S1 which then reaches the distributor 4.

[0114] In practice, the thickness S of adhesive collected by the disc 3 does not all reach the distributor 4 but only a quantity having a predetermined thickness S1.

[0115] A preferred value of S1 is 0.6 mm.

[0116] Preferably, the pickup means are movable in a direction parallel to the axis of rotation R of the collecting disc 3.

[0117] In the preferred embodiment illustrated, the movement means are in the form of an electromechanical actuator and comprise an eccentric 27 rotatable about

an axis R1.

[0118] The distributor 4 has a slot 28 for the eccentric 27. The eccentric 27 and the slot 28 are shaped relative to each other in such a way that a rotation about the axis R1 of the eccentric 27 causes the distributor 4 to translate parallel to the axis of rotation R of the disc 3 and of the roller 5.

[0119] The movement means comprise an electric motor 29, for example a stepping motor, connected to the eccentric 27 to drive it in rotation about R1.

[0120] The motor 29 is in communication with the computerized unit 8 and is driven by it as a function of the rotation speed of the roller 5 as described previously.

[0121] The applicator device 1 as described is based on glue feed by adhesion to the collecting disc 3. The glue in the container 2 adheres to the front or lateral face of the disc 3. The basic concept of the invention is to change the quantity of glue transferred into the distributor 4 as a function of the speed of the applicator roller 5. The volume of glue transferred depends, amongst other things, on the level L of adhesive in the tank and on the thickness S of adhesive collected.

[0122] Advantageously, the device 1 allows the applicator roller 5 to be provided, for each operating speed of the filter tip attachment machine, with the optimum quantity of glue for the paper web W used to make the patches by which the filter tip are joined to corresponding cigarette sticks.

[0123] With reference to Figure 13, the numeral 200 denotes a filter tip attachment machine according to this invention.

[0124] The machine 200 is of a substantially known type and is described and illustrated only insofar as necessary for understanding this invention.

[0125] The machine 200 comprises an adhesive applicator device 1 as described above for applying a layer of adhesive on the continuous paper web W.

[0126] More specifically, the machine 200 comprises a station 201 for cutting and feeding the web W to apply the adhesive to the web W, cut the paper web W into pieces or patches 202 and feed the patches 202.

[0127] The station 201 comprises the adhesive applicator device 1 and a cutting system, schematically represented as a block 300, to cut the web W into patches 202. The station 201 comprises a roller 203, partly illustrated, for feeding the patches 202 to a roller 204 for applying the patches 202 and located downstream of the station 201 in the direction of feeding the patches 202.

[0128] As mentioned, the patches 202 are used to connect filter tips to respective cigarette sticks to form smokeable articles.

[0129] With reference in particular to Figure 14, looking in more detail at the station 201, it should be noted that the station 201 comprises a system 301 for feeding the web W and operating between the device 1 and the cutting system 300.

[0130] The system 301 feeds the web W, with the adhesive on it, in a direction of feed V1 towards the cutting

system 300.

[0131] In the example illustrated, the system 301, of substantially known type and not described in detail, comprises a first and a second roller 302, 303, the first roller 302 being equipped with a clutch, and a tensioning roller 304.

[0132] As illustrated in particular in Figure 13, the machine 200 comprises a line 205, schematically represented as a pair of rollers, for feeding double filter plugs 206, and a line 207, schematically represented as a single roller, for feeding cigarette sticks 208.

[0133] The line 205 and the line 207 feed the double filter plugs 206 and the cigarette sticks 208, respectively, to a forming roller 209 provided with flutes 210 which, in use, are sequentially occupied by double filter plugs 206 and respective cigarette sticks 208 positioned coaxially to form, on the selfsame roller 209, groups 211 consisting of two cigarette sticks 208 separated by a double filter plug 206.

[0134] The roller 209 feeds the groups 211 to a roller 212 tangent to the roller 204 from which it receives the patches 202 for connecting the filters 206 to the cigarette sticks 208.

[0135] The groups 211 provided with the patches 202 are fed on a rolling roller 213 and then to a cutting station 214 from which the individual cigarettes 215, suitably ordered, are fed towards an outfeed conveyor 216.

[0136] In one embodiment, the filter tip attachment machine 200 comprises an inspection system, schematically represented as a block 217, for checking the quality of the cigarettes.

[0137] The inspection system 217 is configured to acquire from the cigarettes 215 an item of information expressing the quantity of glue on the patch 202.

[0138] More precisely, the item of information expresses a lack of glue which causes the finished product to be rejected.

[0139] The inspection system 217 is in communication with the computerized unit 8 of the device 1 to supply the aforementioned item of information.

[0140] The computerized unit 8 is configured to drive the device 1 as a function of that item of information which is, in particular, linked to the rotation speed of the roller 5.

[0141] In a preferred embodiment, the computerized unit 8 is configured to check the duration of the period in which rejection occurs, in particular based on the above mentioned criteria and, if the duration exceeds a predetermined value, drives the regulator means for regulating the volumetric flow rate of adhesive to the distributor. Advantageously, the machine 1 in the configuration described, is capable of regulating the glue spread on the paper web W, and thus on the patches 202, based on the satisfaction of specified quality criteria for the finished cigarettes 215.

[0142] In one embodiment, the machine 1 comprises an inspection system, schematically represented as a block 305, to check for the presence of the adhesive on the web W fed by the system 301.

[0143] The inspection system 305 preferably checks the distribution of the adhesive applied to the web W.

[0144] The distribution of the adhesive is in the form of a map 306 and, preferably, the system 305 is configured to check for the presence of the adhesive in a pre-determined zone 306a of the map 306.

[0145] More specifically, the system 305 checks the map 306 for the presence of the adhesive in the zones of the web W at the above mentioned outlets 4b.

[0146] The portion of web W at the outlets 4b is the portion of web W which, once the web W has been divided into patches 202, will connect the filters 206 to the corresponding cigarette sticks 208.

[0147] A lack of adhesive on the web W at the outlets 4b will cause the corresponding finished product 215 to be rejected.

[0148] The inspection system 305 is configured to acquire from the web W an item of information expressing the quantity of adhesive present on the web W in particular at the outlets 4b.

[0149] The inspection system 305 is in communication with the computerized unit 8 of the device 1 to supply the aforementioned item of information.

[0150] The computerized unit 8 is configured to drive the device 1 as a function of that item of information which is, in particular, linked to the rotation speed of the roller 5 because, as mentioned several times, the rotation speed of the roller 5 determines the quantity of adhesive on the roller 5 itself.

Claims

1. An adhesive applicator device for applying adhesive to a continuous web of paper for the tobacco processing industry, the applicator device (1) comprising a container (2) for the adhesive; a collecting disc (3) for collecting a quantity of adhesive from the container (2); an adhesive distributor (4), associated with the collecting disc (3) and comprising pickup means (14, 15, 20, 21, 23, 24, 25, 114, 115) for picking up from the collecting disc (3) a portion of the quantity of adhesive, the applicator device (1) comprising an adhesive applicator roller (5) coaxial with the collecting disc (3) and associated with the distributor (4) to receive at least part of the adhesive present in the distributor (4), the distributor (4) comprising a distributing system for spreading the adhesive on the applicator roller (5), the applicator device (1) being **characterized in that** it further comprises regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5).
2. The applicator device according to claim 1, **characterized in that** the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric

flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) comprise regulator means (8, 12, 13, 17, 19) for regulating the quantity of adhesive collected by the collecting disc (3).

3. The applicator device according to claim 2, **characterized in that** the regulator means (8, 12, 13, 17, 19) for regulating the quantity of adhesive collected by the collecting disc (3) comprise regulator means (8, 12, 13) for regulating the level (L) of the adhesive in the container (2) between a minimum value (Lmin) and a maximum value (Lmax) as a function of the rotation speed of the applicator roller (5).
4. The applicator device according to claim 3, **characterized in that** the regulator means (8, 12, 13, 17, 19) for regulating the quantity of adhesive collected by the collecting disc (3) comprise at least a second collecting disc (17) coaxial with the first collecting disc (3) and being smaller in diameter than the first collecting disc (3), the pickup means (14, 15, 20, 21, 23, 24, 25, 114) comprising a collector (20) for feeding the adhesive to the distributor (4), the collector (20) being in fluid communication with a substantially cylindrical lateral face (18) of the first collecting disc (3) and with a substantially cylindrical lateral face (19) of the second collecting disc (17), a first value (L1) of the level of the adhesive in the container (2) causing at least a part of the quantity of adhesive to be transferred to the lateral face (18) of the first collecting disc (3), and a second value (L2) of the level of the adhesive in the container (2) causing at least a second part of the quantity of adhesive to be transferred to the lateral face (19) of the second collecting disc (17).
5. The applicator device according to claim 4, **characterized in that** the first and second collecting discs (3, 17) are integral with each other.
6. The applicator device according to claim 5, **characterized in that** the first and second collecting discs (3, 17) are made in a single piece.
7. The applicator device according to claim 3, **characterized in that** the regulator means (8, 12, 13) for regulating the level of the adhesive in the container (2) comprise a measuring system (10) for acquiring a parameter expressing the level (L) of the adhesive in the container (2), the regulator means (8, 12, 13) for regulating the level (L) of the adhesive in the container (2) being driven as a function of that parameter.
8. The applicator device according to any one of claims 1 to 7, **characterized in that** the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating

the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) comprise regulator means (8, 9, 10, 11, 12, 13, 23, 25, 27, 28, 29) for regulating the portion of adhesive received by the distributor (4).

9. The applicator device according to claim 8, **characterized in that** the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) comprise regulator means (8, 12, 13, 17, 19) for regulating the quantity of adhesive collected by the collecting disc (3) and comprising a substantially frusto-conical collecting surface (22) associated with the collecting disc (3), the quantity of adhesive being collected by the frusto-conical collecting surface (22), the pickup means (14, 15, 20, 21, 23, 24, 25, 114, 115) comprising at least a third pickup surface (23) inclined at an angle to the frusto-conical collecting surface (22), the regulator means (8, 12, 13, 17, 19) for regulating the quantity of adhesive collected by the collecting disc (3) comprising regulator means (8, 12, 13) for regulating the level (L) of the adhesive in the container (2) between a minimum value (Lmin) and a maximum value (Lmax) as a function of the rotation speed of the applicator roller (5).

10. The applicator device according to claim 9, **characterized in that** the frusto-conical collecting surface (22) is coaxial with the collecting disc (3).

11. The applicator device according to any one of claims 8 to 10, **characterized in that** the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) comprise regulator means (8, 12, 13, 17, 19) for regulating the quantity of adhesive collected by the collecting disc (3), the collecting disc (3) having a front face (6), the quantity of adhesive being collected by the front face (6), the level (L) determining the height (h), measured according to a radius of the collecting disc (3), of a ring (7) of adhesive collected by the front face (6) during a rotation of the collecting disc (3), the pickup means (14, 15, 20, 21, 23, 24, 25, 114, 115) comprising a fourth pickup surface (25) which is inclined at an angle to the front face (6).

12. The applicator device according to any one of the preceding claims, **characterized in that** the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) comprise regulator means (8, 9, 10, 11, 12, 13, 23, 25, 27, 28, 29) for regulating the portion of adhesive received by the distributor

(4) which in turn comprise means (27, 28, 29) for moving the pickup means (14, 15, 20, 21, 23, 24, 25, 114, 115) between a position close to and a position away from the collecting disc (3) as a function of the rotation speed of the applicator roller (5).

13. The applicator device according to claim 12, **characterized in that** the movement means (27, 28, 29) comprise an electromechanical actuator (27, 29) operating on the distributor (4).

14. The applicator device according to claim 12 or 13 **characterized in that** the pickup means (14, 15, 20, 21, 23, 24, 25, 114, 115) are movable along a direction parallel to the axis of rotation (R) of the collecting disc (3).

15. The applicator device according to any one of the preceding claims, **characterized in that** it comprises a computerized control unit (8) equipped with an acquisition system (9) for acquiring a second parameter expressing the rotation speed of the applicator roller (5), the computerized unit (8) being in communication with the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) in order to drive the selfsame regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the second parameter.

16. The applicator device according to any one of the preceding claims, **characterized in that** it comprises a computerized control unit (8) equipped with a memory unit (11) which stores a predetermined pattern of the volumetric flow rate of adhesive to the distributor (4) as a function of the speed of the applicator roller (5), the computerized unit (8) being in communication with the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) in order to drive the selfsame regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of that predetermined pattern.

17. A filter tip attachment machine comprising an adhesive applicator device (1) for applying a layer of adhesive to a continuous web (W) of paper, the continuous web (W) being subsequently divided into patches (202) used to connect filter tips (206) to respective cigarette sticks (208) to define a smokable article (215), the filter tip attachment machine being **characterized in that** the applicator device (1) is of the type according to any one of claims 1 to 16.

18. The filter tip attachment machine according to claim 17, **characterized in that** it comprises inspection

means (217, 305) for checking the smokable articles (215) to cause one or more of the smokable articles (215) to be rejected, the applicator device (1) being in communication with the inspection means (217, 305) and being driven based on the results of rejection. 5

19. The filter tip attachment machine according to claim 18, **characterized in that** the inspection means (217, 305) comprise a checking system (217) operating on the smokable article (215), the filter tip attachment machine comprising a computerized unit (8) in communication with the checking system (217) and with the applicator device (1), the computerized unit (8) being configured to check the duration of a period during which the smokable articles (215) are rejected and, if the duration exceeds a preset value, to drive the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) in order to vary the volumetric flow rate of adhesive distributed on the applicator roller (5). 10 15 20

20. The filter tip attachment machine according to claim 18 or 19, **characterized in that** the inspection means (217, 305) comprise a second checking system (305) operating on the continuous web (W) of paper and located downstream of the applicator device (1) relative to a feed direction (V1) of the continuous web (W) of paper, the second checking system (305) being configured to check a distribution of the adhesive applied to the continuous web (W) of paper in a predetermined zone of a map (306) corresponding to the distribution of the adhesive applied to the continuous web (W) of paper, the filter tip attachment machine comprising a computerized unit (8) in communication with the second checking system (305) and with the applicator device (1), the computerized unit (8) being configured to drive the regulator means (8, 9, 10, 11, 12, 13, 22, 27, 28, 29, 114) for regulating the volumetric flow rate of adhesive to the distributor (4) as a function of the rotation speed of the applicator roller (5) in order to vary the volumetric flow rate of adhesive distributed on the applicator roller (5) based on the distribution of the adhesive applied to the continuous web (W) of paper. 25 30 35 40 45

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FIG.1

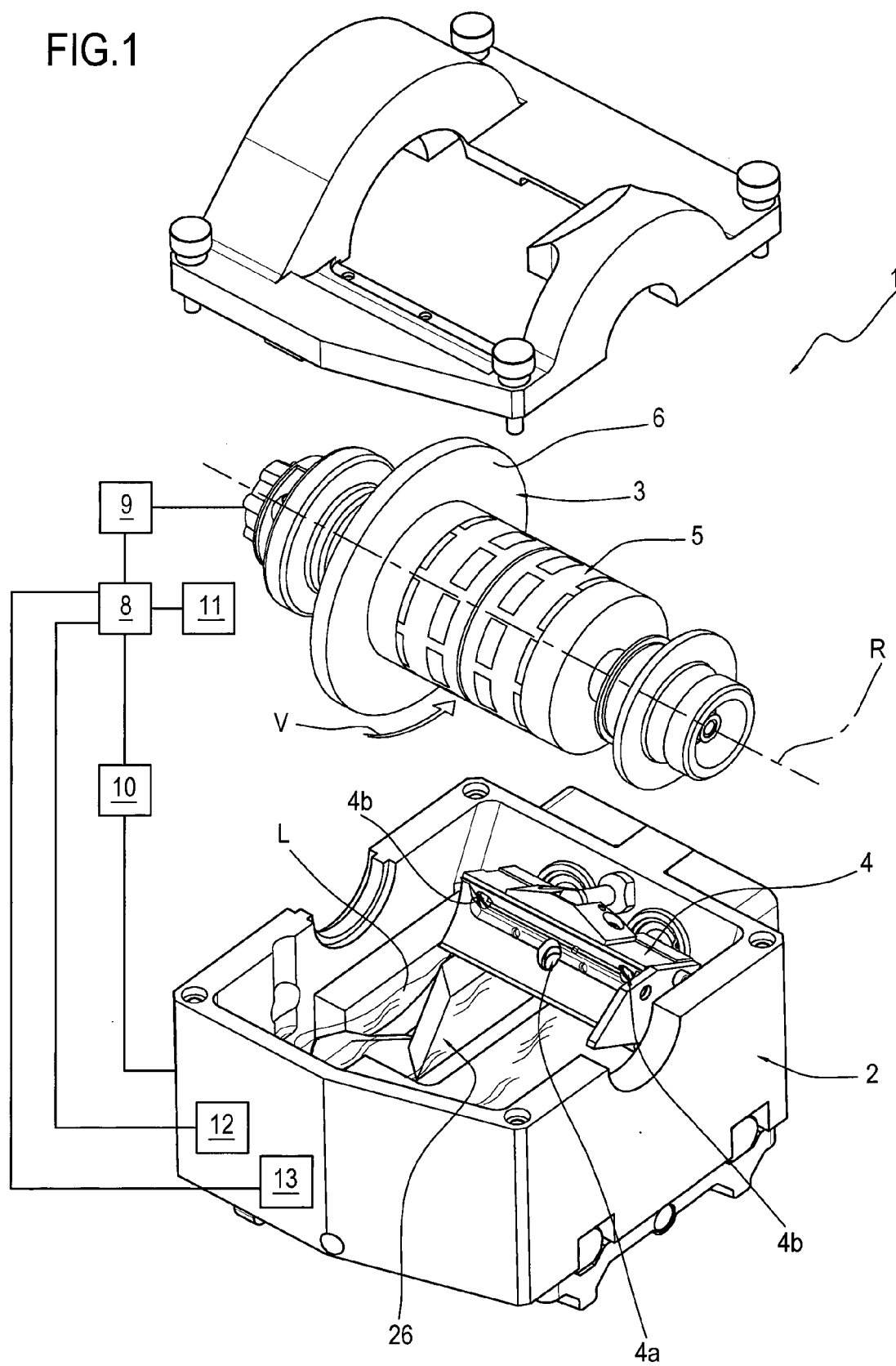


FIG.2

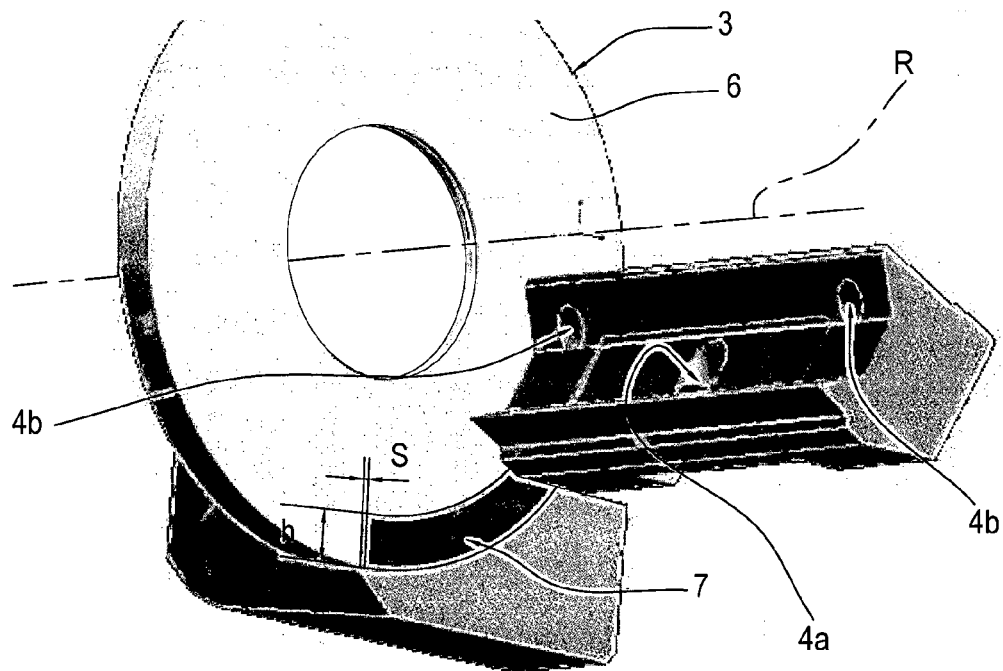


FIG.3

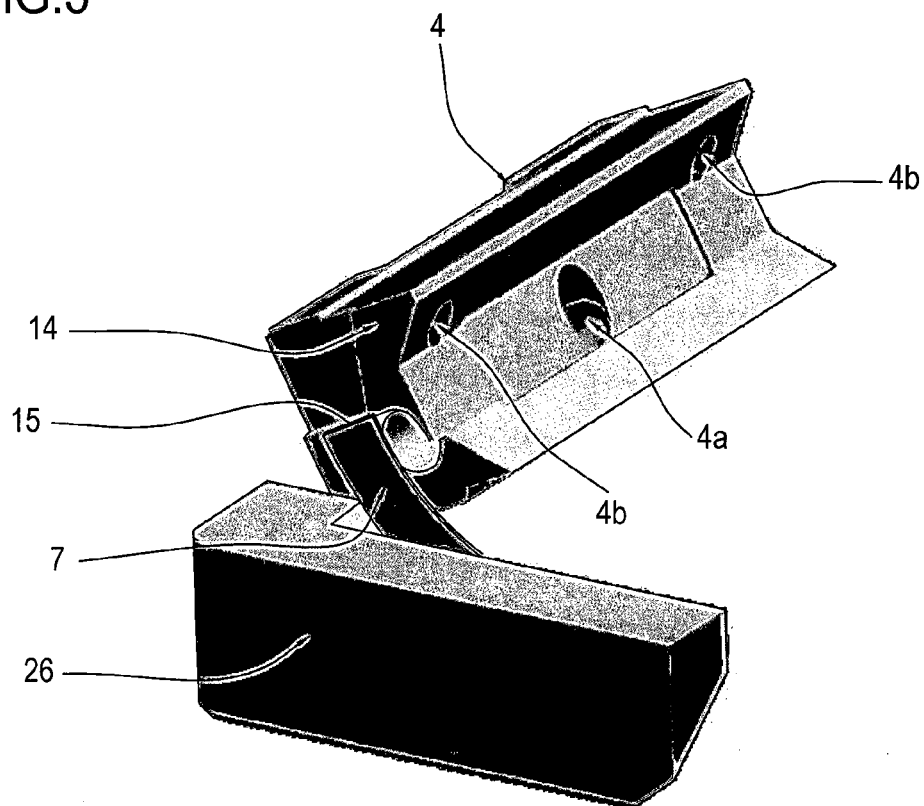


FIG.4

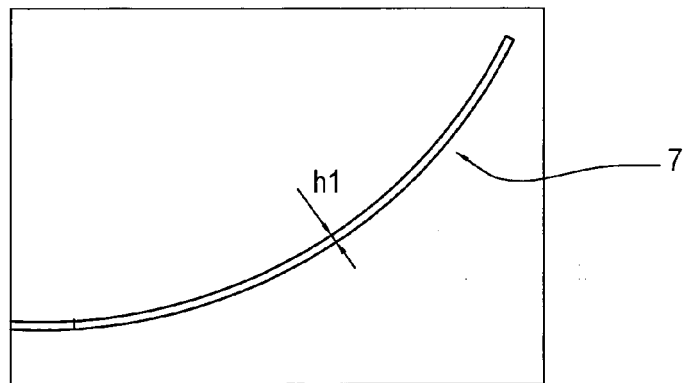


FIG.5

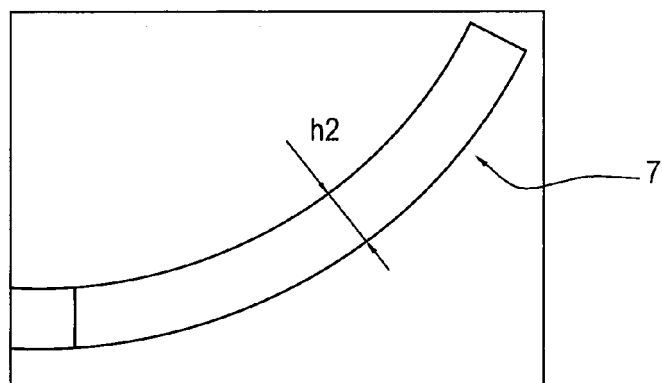


FIG.6

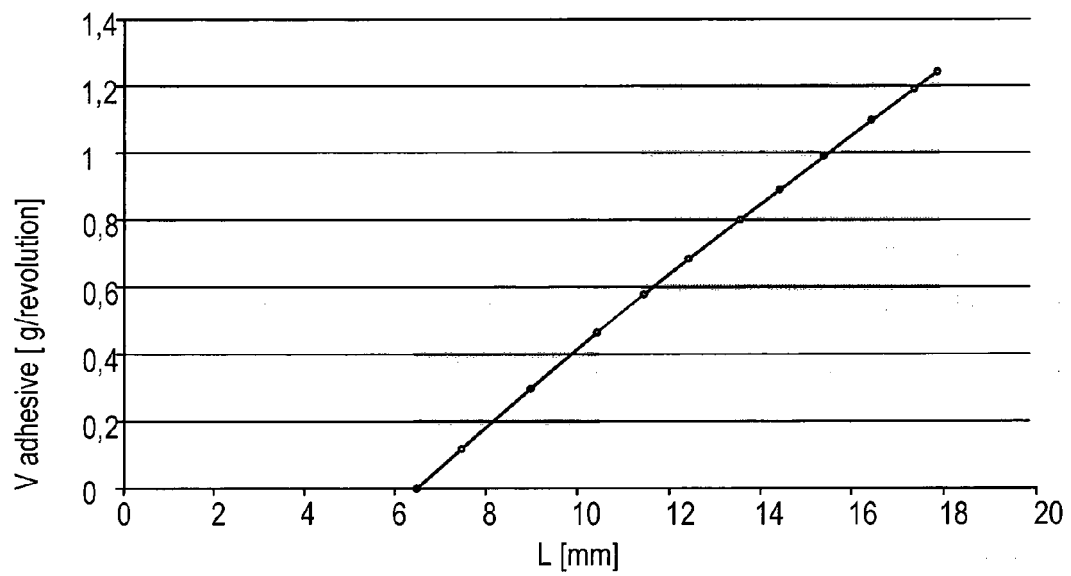


FIG.7

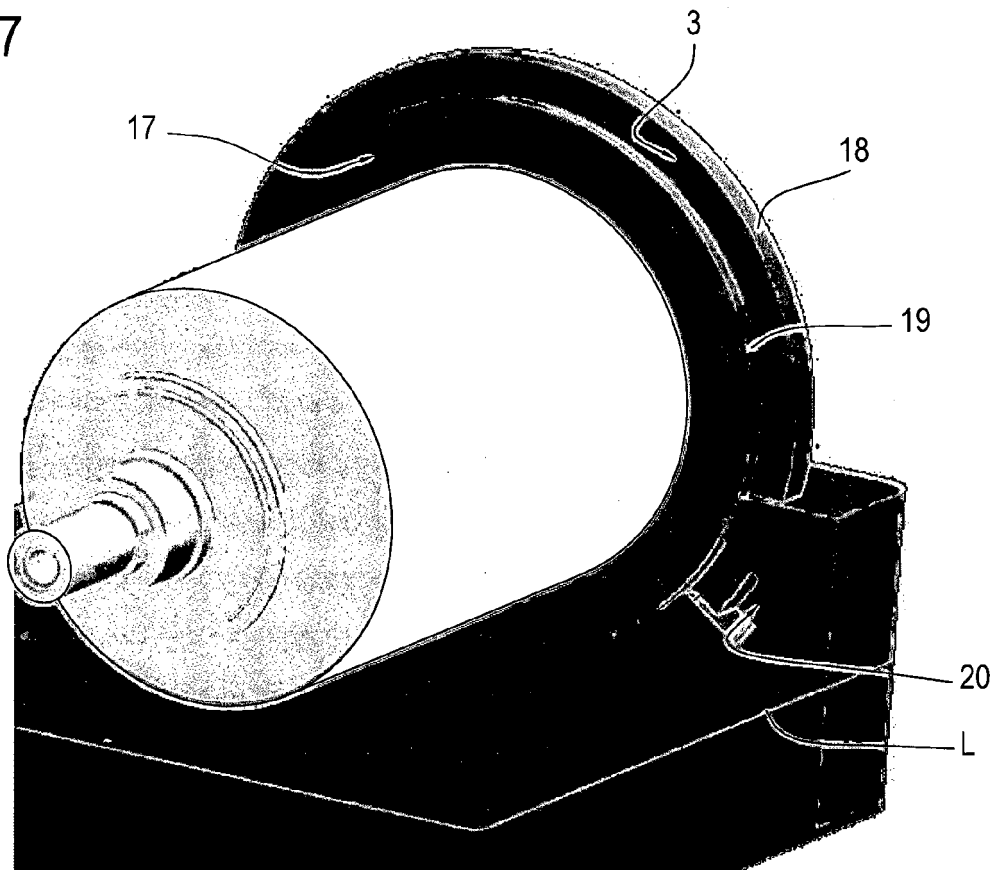


FIG.8

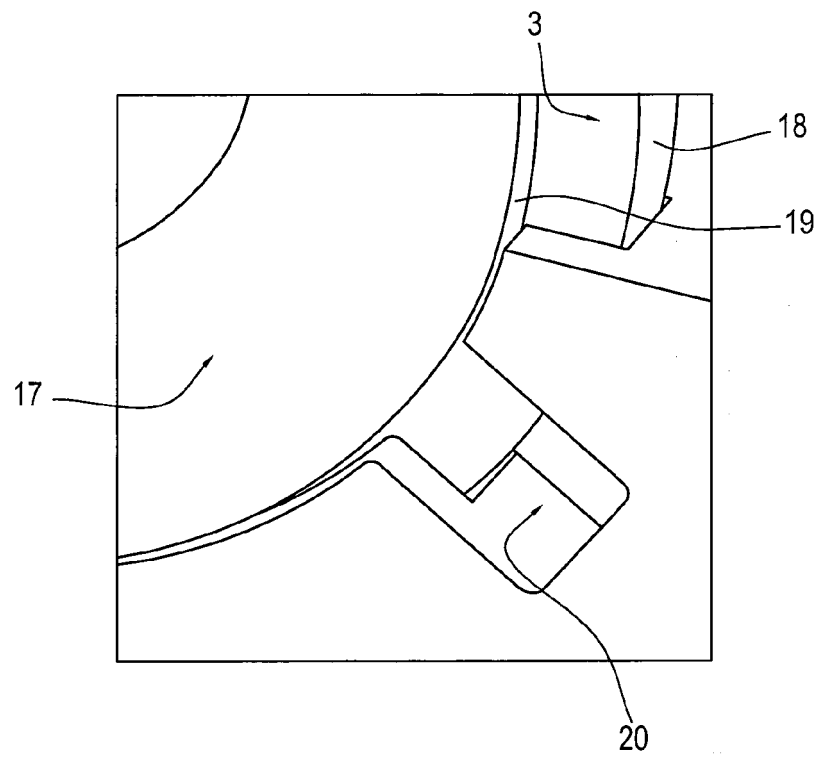


FIG.9

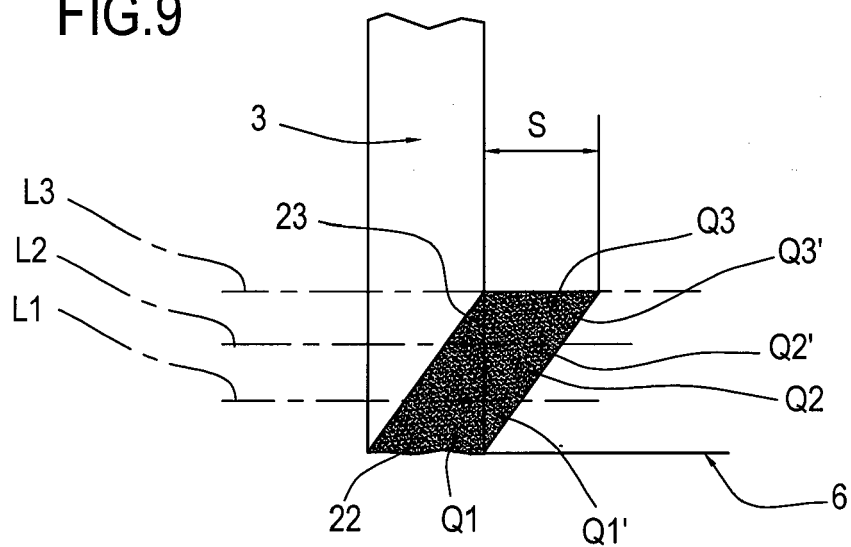


FIG.10

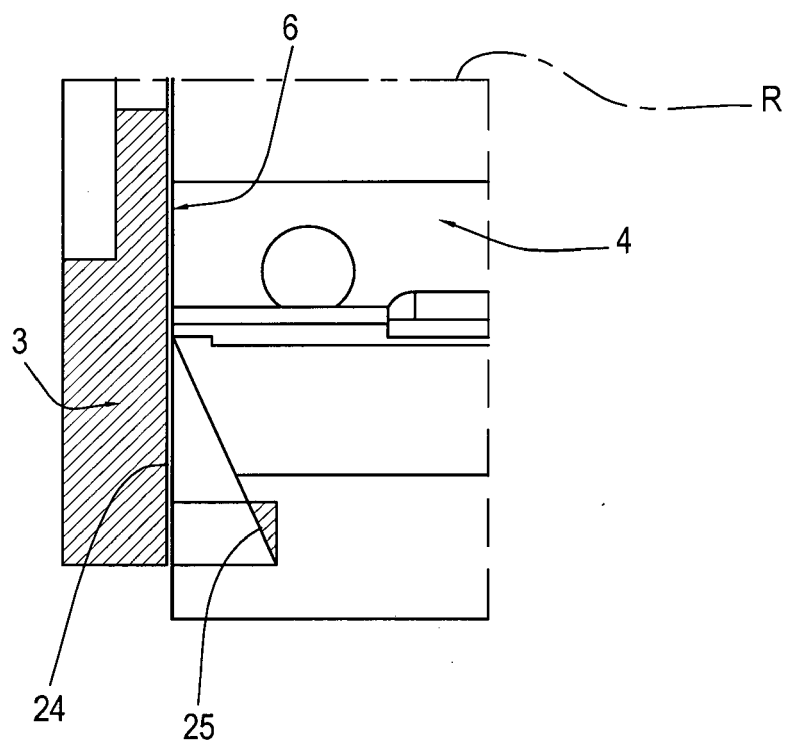


FIG.11

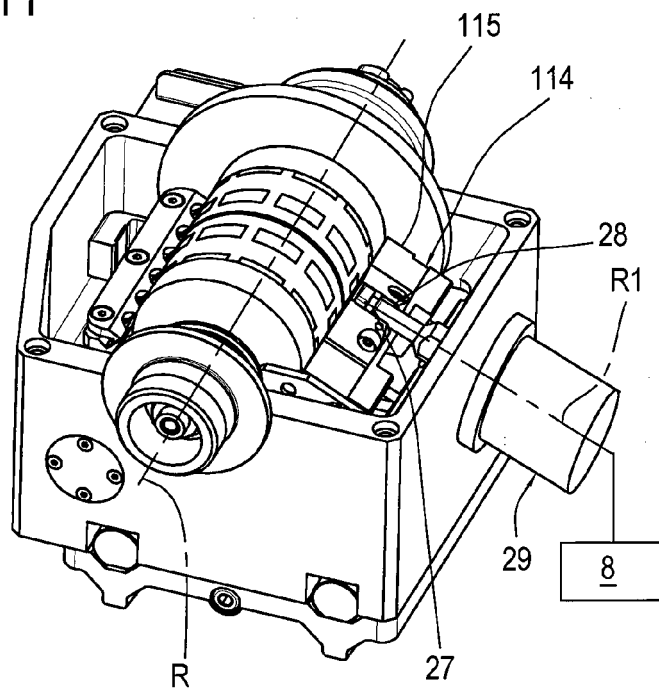


FIG.12

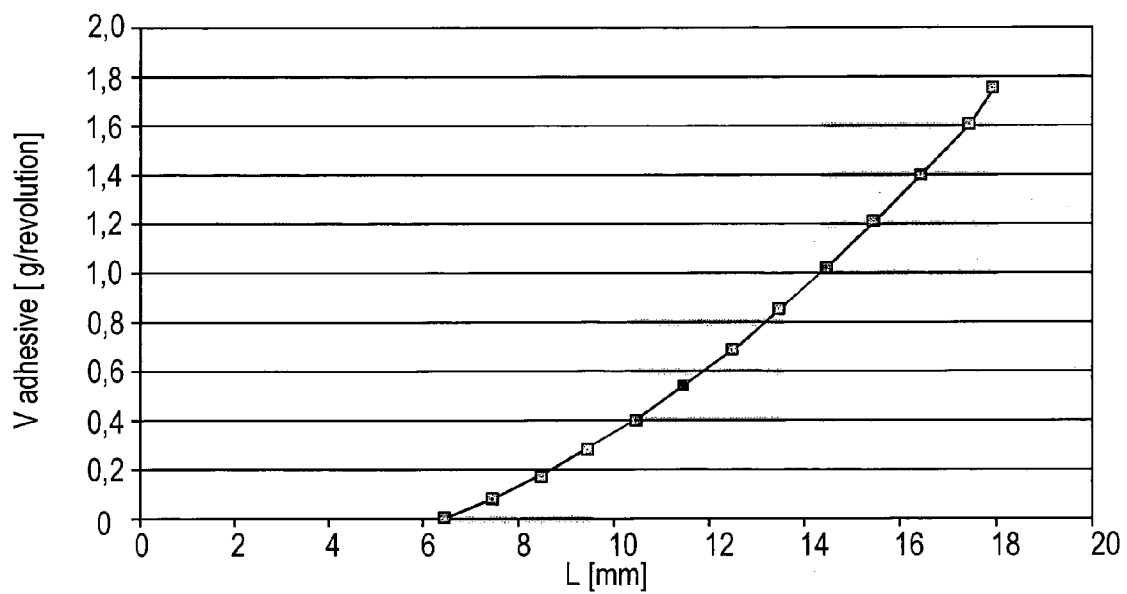


FIG.13

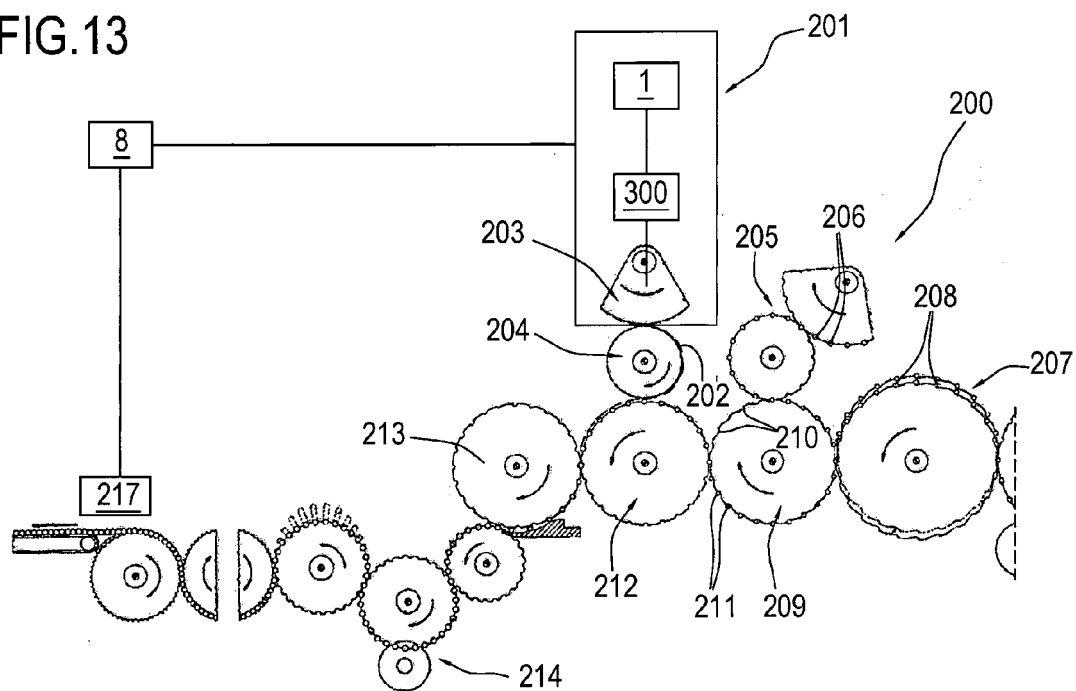
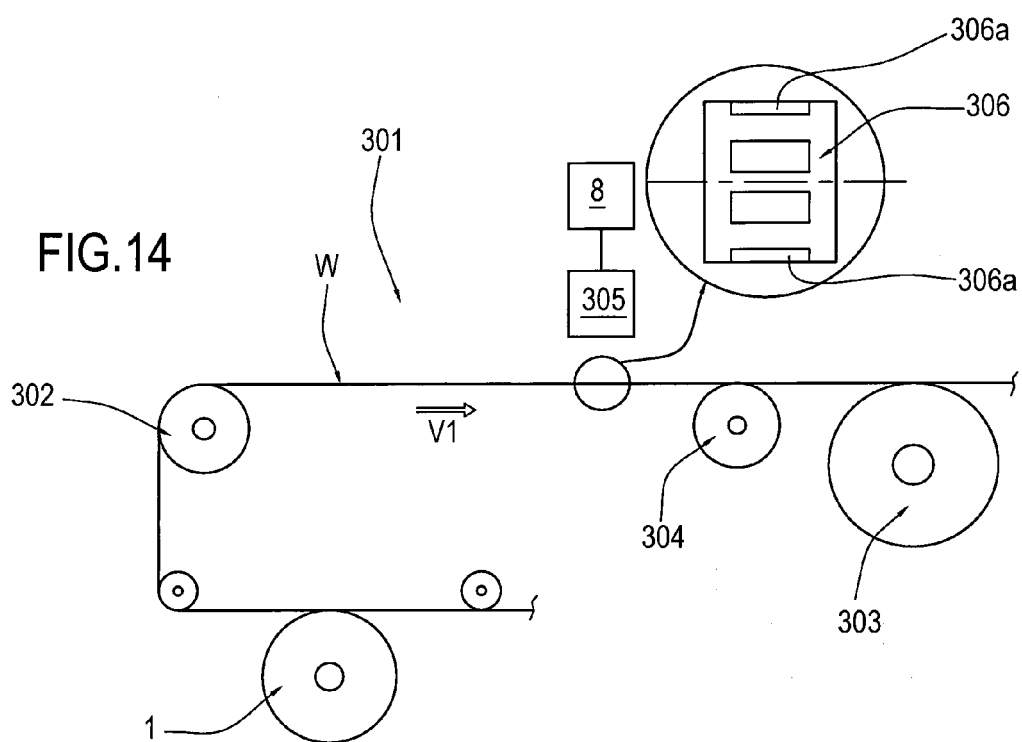


FIG.14





EUROPEAN SEARCH REPORT

Application Number
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A	-----	4-6,8-20	
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A	* the whole document *	4-6,8-20	
A	EP 1 712 295 A1 (JOSEF VAN BAAL GMBH [DE]) 18 October 2006 (2006-10-18)	1-20	
	* the whole document *		

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			B05C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 September 2014	Examiner Moroncini, Alessio
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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The members are as contained in the European Patent Office EDP file on
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