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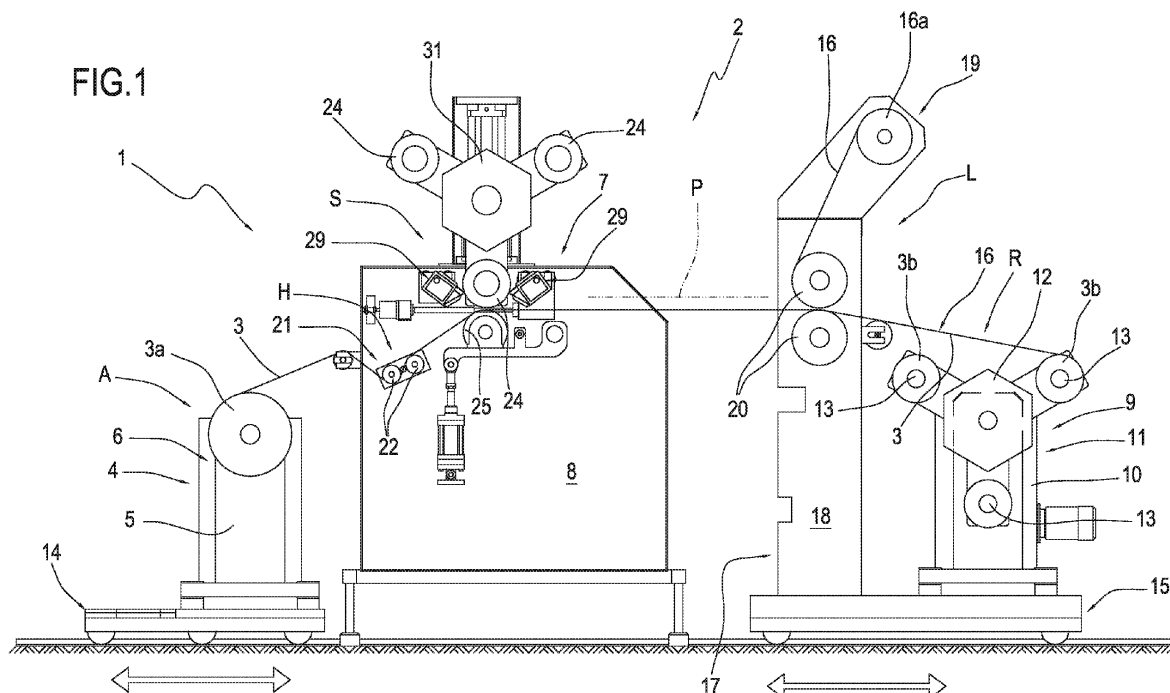
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(54) **Process and machine for finishing fabrics or leathers**

(57) A machine and a process for finishing fabrics or leathers, according to which a decoration is permanently applied on a respective band (3) of fabric or leather by spreading a hot-melt glue on the band (3); the spreading step being carried out by transferring the hot-melt glue from a reservoir (23) to the band (3) by means of a spread-

ing roller (24) on whose surface (26) a matrix (27) of cells (28) for receiving and transferring the hot-melt glue is made; and after the spreading step, application of the decoration comprises superposing and laminating a decorative layer (16) on the hot-melt glue and on the band (3). [Figure 1]



Description

[0001] This invention relates to a process and a machine for finishing fabrics or leathers.

[0002] In this text the term "band" refers either to a continuous band of fabric or leather or to a piece of band, or a sheet, of fabric or leather.

[0003] In the textile and leather tanning sectors a known technique for finishing a band consists of transferring to the surface of the band a decorative layer, which is pressed and made to adhere to the band by passing the band and the layer through a passage formed by a presser roller and a counter-roller.

[0004] This technique, consisting of a lamination process, allows the transfer to the band both of a layer designed to completely cover the band and a patterned layer.

[0005] The layers which are used for this processing are available in various colours and may also be metalised or have holographic or multi-coloured effects.

[0006] The process of lamination of the entire surface of the band, also called "all over" lamination, involves a first step of depositing a hot-melt glue on the surface of the band, a subsequent step of drying the glue and a final step of applying the layer on the band by means of the above-mentioned presser roller and counter-roller.

[0007] The surface of the presser roller, and if necessary also the surface of the counter-roller, is heated in a controlled fashion to allow the reactivation of the glue previously applied.

[0008] In contrast, the background art of the patterned lamination process involves coupling a patterned adhesive transfer film on the surface of the band, delaminating the transfer film after a catalysing process, and applying the layer on the adhesive surface of the band.

[0009] Alternatively, the patterned lamination process involves applying on the band a patterned layer whose surface which is intended to adhere to the band already has glue on it.

[0010] The lamination processes described above are not very satisfactory, since they involve high production costs.

[0011] In particular, the process described above, of "all over" lamination of the surface of the band, is quite long and, since it requires a station for drying the hot-melt glue, needs a machine with large dimensions.

[0012] In contrast, the patterned lamination processes described above are not very suitable for productions with many decorative variants, since for each production there must be a related store of patterned layers or patterned transfer films. The aim of this invention is to provide a process for finishing fabrics or leathers which is free of the above-mentioned disadvantages.

[0013] In particular, the aim of this invention is to provide a process for finishing fabrics or leathers which allows low production costs and/or which allows the decoration to be changed in a simple, economical way.

[0014] This invention also has for an aim to provide a

machine for finishing fabrics or leathers which has limited dimensions.

[0015] A further aim of this invention is to provide a machine for finishing fabrics or leathers which is versatile for being able to change the decoration in a simple and economical fashion.

[0016] Accordingly, this invention provides a process for finishing fabrics or leathers comprising the features described in one or more of the appended claims.

[0017] Accordingly, this invention also provides a machine for finishing fabrics or leathers comprising the features described in one or more of the appended claims.

[0018] The technical features of the invention are clearly described in the claims below and its advantages are more apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred, non-limiting example embodiment of the invention and in which:

- Figure 1 is a front view of a machine for finishing fabrics or leathers made in accordance with this invention;
- Figure 2 is an enlarged view of a detail of the machine of Figure 1;
- Figure 3 is a side view of the machine of Figure 1; and
- Figure 4 is a view of a detail of the machine of Figure 1.

[0019] In Figure 1 the numeral 1 denotes in its entirety a machine for finishing fabrics or leathers. More precisely, by means of a machine 1 application unit 2, it is possible to permanently apply a decoration on the surface of a band 3 of fabric or leather.

[0020] In particular, in the example shown, the band 3 is a continuous band unwound from a reel 3a and taken up on a reel 3b along a processing path P. The reels 3a and 3b both have a horizontal axis.

[0021] Along the path P, the application unit 2 comprises a station S for spreading a hot-melt glue on the band 3.

[0022] The hot-melt glue is a reactive polymer, which is particularly insensitive to washing, even at high temperatures, of the products obtained from the band 3, or, alternatively, it is a thermoplastic polymer.

[0023] The application unit 2 also comprises a station A for feeding the band 3 to the spreading station S and a station R for collecting the finished band 3, that is to say, the band on which the surface decoration has been applied.

[0024] The path P starts in the station A and ends in the station R.

[0025] The feed station A comprises a first module 4 of the machine 1, equipped with a frame 5. The frame 5 supports a device 6 for unwinding the band 3 from the reel 3a. The unwinding device 6 is of the known type and therefore is not described in detail herein.

[0026] The spreading station S, described in detail below, is formed by a second module 7 of the machine 1,

equipped with a frame 8.

[0027] The collecting station R is formed by a third module 9 of the machine 1, equipped with a frame 10.

[0028] The frame 10 supports a device 11 for taking up the band 3 onto the reel 3b.

[0029] The take up device 11 comprises a reel-holder support 12 on which three reel-holder pins 13 are mounted. The pins are motor-driven, horizontal and arranged at 120° from each other. The support 12 rotates about a horizontal axis to allow the movement of each pin 13 from the operating position for take up of the band 3 on the reel 3b to a position for delivery of a complete reel 3b. In other words, once a reel 3b is complete, the take up of the band 3 is switched to the reel 3b supported by the adjacent pin 13, which takes over the take up position thanks to the 120° rotation of the support 12.

[0030] The modules 4 and 9 are alongside the module 7, on opposite sides of it, relative to which they can move in a linear fashion for facilitating processing start, maintenance and cleaning operations. In particular, the frames 5 and 10 are mounted on respective carriages 14 and 15 can move independently and in a linear fashion from and towards the frame 8.

[0031] The movement of the carriages 14 and 15 is preferably assisted by or driven by a motor-driven drive unit.

[0032] The application unit 2 also comprises a lamination station L for superposing and pressing a decorative layer 16 onto the hot-melt glue and the band 3. Along the path P, the lamination station L is positioned downstream of the spreading station S, between the latter and the collecting station R. Between the station S and the station L the path P is substantially horizontal.

[0033] The lamination station L comprises a laminating device 17, which is preferably housed in the module 9.

[0034] The laminating device 17 comprises a frame 18, which is preferably mounted on the carriage 15 alongside the frame 10.

[0035] Mounted on the frame 18 there is a device 19 for unwinding the layer 16 from a respective reel 16a, and a pair of laminating rollers 20 with horizontal axes, which are positioned on the path P on opposite sides of the band 3.

[0036] The unwinding device 19 is of the known type and therefore is not described in detail herein.

[0037] The rollers 20 are pressed against each other in the known way in a direction which is at a right angle to that of their horizontal axes of rotation. The upper roller 20 receives the layer 16 from the unwinding device 19 and conveys it, superposed on the band 3, towards the zone where the upper roller 20 and the lower roller 20 operate in conjunction with each other to press the layer 16 onto the hot-melt glue and the band 3, making the layer adhere to them.

[0038] The application unit 2 also comprises a station H for preheating the band 3. Along the path P, the preheating station H is positioned upstream of the spreading station S and comprises a heating device 21.

[0039] The heating device 21 is housed in the module 7 and, more precisely, is formed by a pair of return rollers 22 for the band 3. The rollers 22, both with horizontal axes, are heated and kept at a controlled temperature, and are supported cantilever-style by the frame 8 immediately upstream of the spreading station S.

[0040] As Figure 2 shows more clearly, the spreading station S comprises at least one spreading roller 24 with a horizontal axis, and at least one counter-roller 25, which also has a horizontal axis and which is positioned on the opposite side of the band 3 from the spreading roller 24.

[0041] The roller 24 has a cylindrical lateral surface 26. With reference to Figure 2, the spreading station S also comprises two wiping blades 29 operating on the spreading roller 24 with angles of incidence which, relative to one direction of rotation of the roller 24, are respectively acute and obtuse, and which, relative to the opposite direction of rotation of the roller 24, are respectively obtuse and acute.

[0042] Each of the two wiping blades 29 will therefore be "positive" or "negative" depending on the direction of rotation of the spreading roller 24.

[0043] The wiping blades 29, in conjunction with the lateral surface 26 of the roller 24 facing the counter-roller 25, form respective compartments for accumulating the hot-melt glue, the compartments forming as many glue reservoirs 23.

[0044] Therefore, the reservoir 23 is a chamber containing the hot-melt glue and comprises at its base an opening for feeding the roller 24. The roller 24, with its lateral surface 26, closes the above-mentioned opening and, at the same time, with its rotation, draws the hot-melt glue from the reservoir 23. More precisely, as shown in Figure 4, the lateral surface 26 of the roller 24 comprises a matrix 27 of cells 28 designed to receive and transfer the hot-melt glue from the reservoir 23 to the band 3.

[0045] The cells 28 are arranged on the surface 26 of the spreading roller 24 according to a pattern which reproduces a predetermined ornamental motif. Alternatively, the cells 28 may be arranged on the surface 26 of the spreading roller 24 in a regular and uniform way for transferring the hot-melt glue onto the entire surface of the band 3 rather than in a pattern.

[0046] The flow of hot-melt glue transferred is selected depending on the degree of absorption of the fabric.

[0047] The surface 26 of the spreading roller 24 is kept hot at a predetermined temperature, for example between 100°C and 200°C, by a temperature control system and a heating device, both of the known type. For example, the heating device may be of the kind with a heating element or induction and may be connected to a thermostat.

[0048] The spreading roller 24 and the counter-roller 25 are motor-driven for rotating in the same direction of rotation, or, according to a different operating mode, with respective opposite directions of rotation.

[0049] If the spreading roller 24 rotates in the opposite

direction to the direction of infeed of the band 3 into the space between the spreading roller 24 and the counter-roller 25, the quantity of hot-melt glue transferred to the band 3 may be increased by increasing the speed of rotation of the spreading roller 24.

[0050] Both of the wiping blades 29 are kept hot at a predetermined temperature, for example between 100°C and 200°C, by a temperature control system and a heating device, both of the known type. According to the example shown, the spreading roller 24 is interchangeable with at least one other roller 24 for being able to change the spreading, with or without a pattern, of the hot-melt glue by simply swapping over the above-mentioned rollers 24. For that purpose, the spreading station S comprises a roller support 31 on which three spreading rollers 24 are mounted. The three rollers 24 are positioned at 120° from each other.

[0051] The support 31 rotates about a horizontal axis to allow the movement of each spreading roller 24 from the spreading station S to a standby station and vice versa.

[0052] The support 31 can move vertically to allow lifting of the spreading roller 24 from the path P, before rotation of the support 31, and lowering of the spreading roller 24 onto the path P again, in conjunction with the counter-roller 25, at the end of support 31 rotation.

[0053] Preferably, as Figure 3 shows more clearly, the vertical movement of the support 31 is driven by an electric, hydraulic or pneumatic movement unit 32, while the balanced rotation of the support 31 about its own horizontal axis is manual.

[0054] According to alternative embodiments, not illustrated, there are actuator means for automatically performing rotation of the support 31 about its horizontal axis.

[0055] At both of the standby stations, or just one of them, there is a unit 33 for cleaning the surface 26 of the spreading roller 24.

[0056] The cleaning unit 33 preferably comprises a washing chamber and/or a battery of washing nozzles, able to move away from and towards the roller 24, and/or scraper means such as brushes or wiping blades, able to move away from and towards the surface 26 of the roller 24.

[0057] During operation, depending on the spreading roller 24 selected, the hot-melt glue is spread on the entire surface of the band 3 with a predetermined flow, or in a patterned fashion according to a predetermined ornamental motif. In the latter case, the layer 16, which is not patterned, is laminated on the hot-melt glue and on the band 3 to obtain on the band 3 the ornamental motif determined by the layout of the cells 28 of the spreading roller 24. With a simple 120° rotation of the roller support 31, changing the spreading roller 24 being used for a spreading roller 24 on standby, equipped with a different number and/or different layout and/or depth and/or density of cells 28, it is possible to rapidly and economically change the decoration, while keeping layer 16 feed un-

changed. Preferably, the spreading rollers 24 which are not operating can be preheated so that they are ready to substitute the operating roller and to receive the hot-melt polymer without waiting times and reductions in productivity.

[0058] According to an alternative embodiment, the lamination station L is absent and the decoration on the band 3 is obtained by simply depositing hot-melt glue and subsequently drying it. In that case, the hot-melt glue is spread in a patterned fashion according to a predetermined ornamental motif and contains, mixed with it, coloured pigments. Moreover, to guarantee complete drying of the hot-melt glue before the band 3 is taken up on the reel 3b, there are preferably drying means, not illustrated herein, which are positioned between the stations S and R.

[0059] According to alternative embodiments not illustrated, there are more than three spreading rollers 24 mounted on the roller support 31. More generally, the number of spreading rollers 24 mounted on the support 31 is between 2 and 12. According to further alternative embodiments not illustrated, one or both of the above-mentioned laminating rollers 20 of the laminating device 17 are heated.

[0060] The one or more rollers 20 are heated using known methods and devices.

[0061] Advantageously, with the use of non-thermo-plastic polymers, said heating of the roller 20 allows re-activation of the glue previously applied. Advantageously, according to a preferred embodiment, the machine according to this invention comprises a single control unit, not illustrated, for controlling heating of the wiping blades 29 and the preheating station H (in particular of the rollers 22 of the heating device 21), and the spreading roller 24 and even at least one of the laminating rollers 20.

[0062] According to that advantageous embodiment, the use of a single control unit allows the best possible coordination and management of all of the machine heating steps.

[0063] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

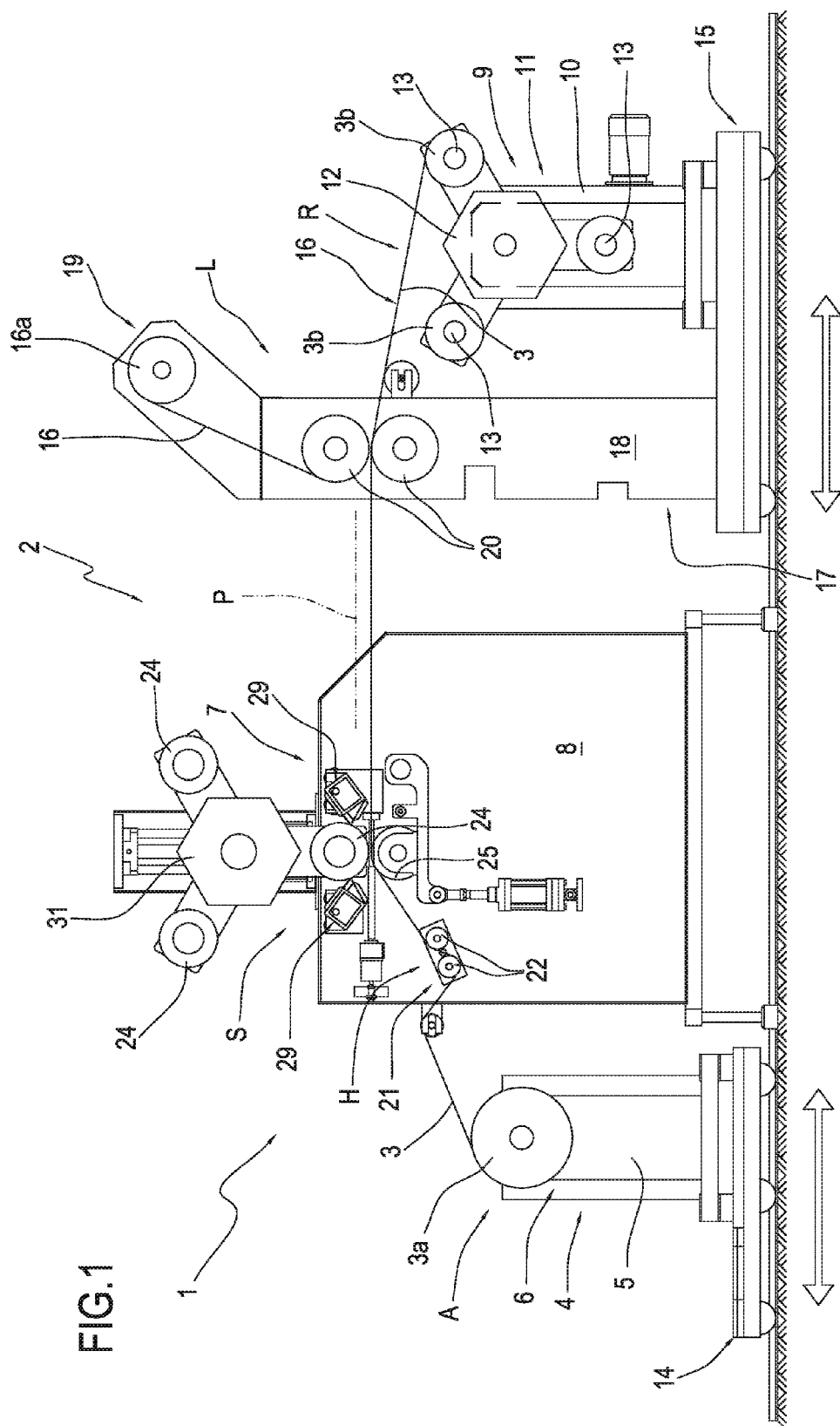
1. A process for finishing fabrics or leathers, comprising the steps of applying a decoration on a respective band (3) of fabric or leather and stabilising the decoration on the band (3) to make it permanent; **characterised in that** application of the decoration comprises a step of spreading a hot-melt glue on the band (3).
2. The process according to claim 1, **characterised in**

that the spreading step is carried out by transferring the hot-melt glue from a reservoir (23) to the band (3) by means of a spreading roller (24) on whose surface (26) there is a matrix (27) of cells (28) designed to receive and transfer the hot-melt glue.

3. The process according to claim 2, **characterised in that** the cells (28) are made on the spreading roller (24) according to a predetermined pattern.
4. The process according to any of the foregoing claims from 1 to 3, **characterised in that** the hot-melt glue is spread in a patterned fashion according to a predetermined ornamental motif.
5. The process according to claim 4, **characterised in that** the hot-melt glue contains coloured pigments which are mixed in with it.
6. The process according to any of the foregoing claims from 1 to 3, **characterised in that**, after the spreading step, application of the decoration comprises a step of superposing a decorative layer (16) on the hot-melt glue; the superposing step being followed by pressing the layer (16) and the band (3) together.
7. A machine for finishing fabrics or leathers, comprising a unit (2) for applying a decoration on a respective band (3) of fabric or leather; the unit (2) comprising a station (S) for spreading a hot-melt glue on the band (3), the spreading station (S) comprising at least one hot-melt glue reservoir (23) and at least one spreading roller (24) on whose surface (26) there is a matrix (27) of cells (28) designed to receive and transfer the hot-melt glue from the reservoir (23) to the band (3).
8. The machine according to claim 7, **characterised in that**, downstream of the spreading station (S), the application unit (2) comprises a lamination station (L) for superposing and pressing a decorative layer (16) onto the hot-melt glue and the band (3).
9. The machine according to claim 7 or 8, **characterised in that** the spreading station (S) comprises a roller support (31) on which at least two spreading rollers (24) are mounted; the support (31) being able to move, allowing each spreading roller (24) to be moved from the spreading station (S) to a standby station and vice versa.
10. The machine according to claim 9, comprising a lamination station (L) equipped with at least two laminating rollers (20) with horizontal axes which are pressed against each other, **characterised in that** at least one of the rollers is heated.
11. The machine according to claim 9 or 10, **character-**

ised in that the standby station comprises means (33) for cleaning the surface (26) of the spreading roller (24).

12. The machine according to any of the foregoing claims from 7 to 11, **characterised in that** the spreading station (S) comprises at least one counter-roller (25) positioned on the opposite side of the band (3) from the spreading roller (24); the spreading roller (24) and the counter-roller (25) being motor-driven in such a way that they have the same direction of rotation.
13. The machine according to any of the foregoing claims from 7 to 11, **characterised in that** the spreading station (S) comprises at least one counter-roller (25) positioned on the opposite side of the band (3) from the spreading roller (24); the spreading roller (24) and the counter-roller (25) being motor-driven in such a way that they rotate in opposite directions.
14. The machine according to any of the foregoing claims from 7 to 13, **characterised in that** the spreading station (S) comprises two wiping blades (29) operating on the spreading roller (24) with angles of incidence which are respectively acute and obtuse.
15. The machine according to any of the foregoing claims from 7 to 14, comprising a station (A) for feeding the band (3) to the spreading station (S) and a station (R) for collecting the finished band (3); the feed, spreading and collecting stations (A, S, R) being formed by respective modules (4, 7, 9) of the machine, **characterised in that** the modules (4, 9) forming the feed station (A) and, respectively, the collecting station (R) are positioned in a mobile fashion on opposite sides of the module (7) forming the spreading station (S).
16. The machine according to claims 10 and 14, comprising a preheating station (H), **characterised in that** it comprises a single control unit for heating the wiping blades (29), the preheating station (H), the spreading roller (24) and at least one of the laminating rollers (20).



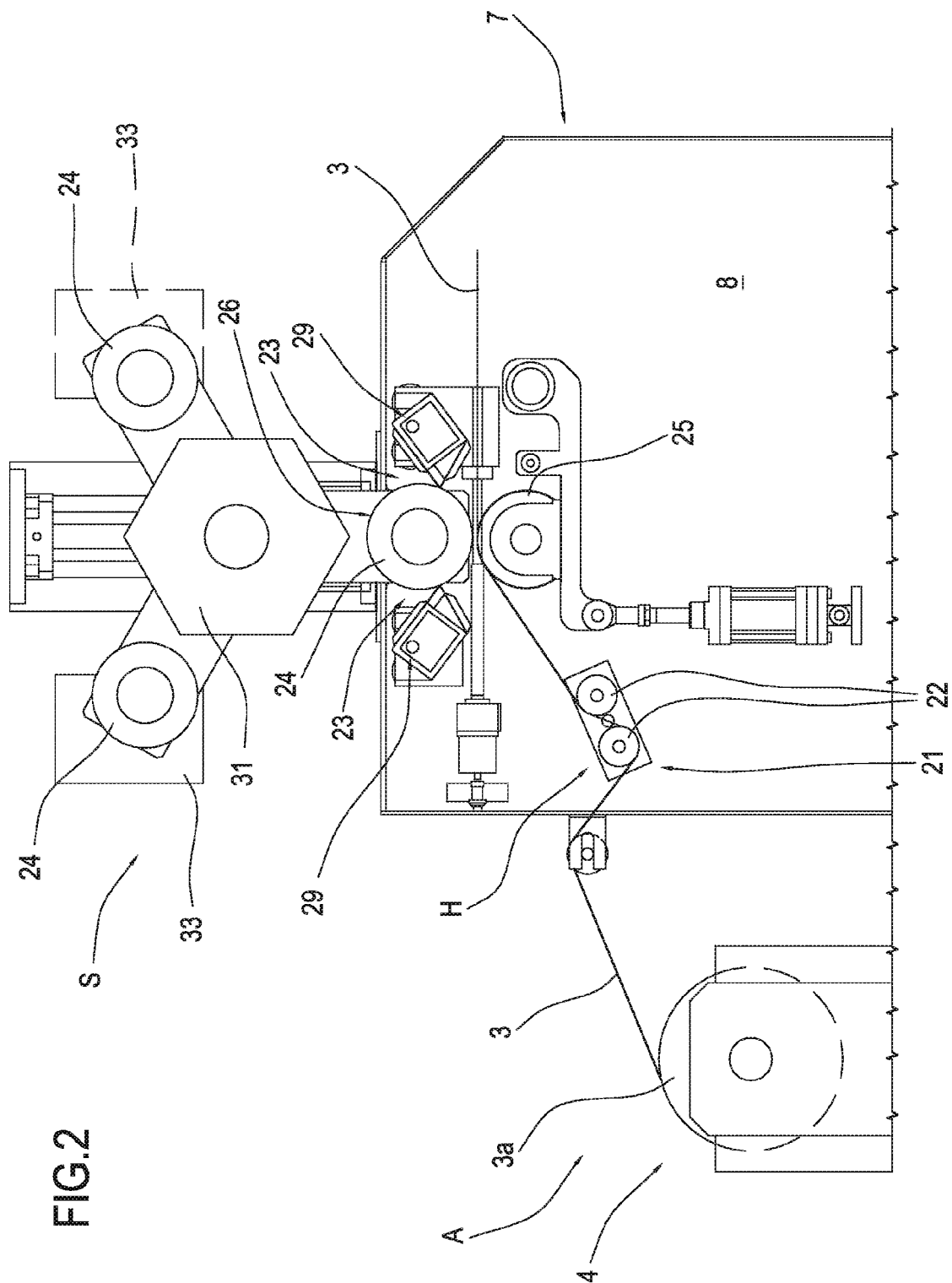


FIG.3

