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(54) **GLUING APPARATUS FOR GLUING ENDS OF WOOD VENEER TOGETHER**

KLEBEVORRICHTUNG ZUM MITEINANDERVERKLEBEN VON HOLZFURNIERENDEN

APPAREIL À COLLER PERMETTANT D ASSEMBLER PAR COLLAGE DES EXTRÉMITÉS DE FEUILLES DE BOIS MINCES

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Description

[0001] This invention relates to a gluing apparatus for gluing wood veneer strips together as per the preamble of claim 1, and a process for gluing together ends of wood veneer strips as per claim 15.

The State of the art

[0002] BE 1014641 describes a process and an apparatus according to the preamble of claim 1 for gluing cut ends of two wood veneer strips together. According to this patent, the process comprises the following steps:

- Two wood veneer strips of a certain length and width are arranged next to one another in the longitudinal direction, such that the opposite ends of each strip are at a certain distance from one another.
- The two opposite ends of the strips are cut, whereby sharp tooth-shaped ends are obtained.
- A strip of glue is placed in the space between two opposite cut ends of the veneer strips.
- The two opposite cut ends are moved together, such that the teeth of one end are inserted into the notches of the other end.
- The glued ends are worked with a means of exerting pressure to ensure an even adhesion of the glue.

Description of the Invention

[0003] The present invention relates to a gluing apparatus according to claim 1 to improve the gluing of opposite cut ends of wood veneer strips together, with regard to speed and/or the properties and/or quality. Moreover, the gluing apparatus can be constructed as a detachable cassette that can be placed in an existing installation for manufacturing rolls/sheets of wood veneer.

[0004] The invention or embodiments of the apparatus/process according to the invention are suitable for solving one or more problems and/or are suitable for one or more improvements in the production of wood veneer and/or for improving the quality of the wood veneer and/or the glue junction or binding means between two ends of adjacent wood veneer strips:

- embodiments of the invention suitable for gluing together veneer strips having possibly different thickness, and/or
- embodiments of the invention suitable for achieving glue joints or bonds resistant to temperature and/or water and/or humidity and/or chemicals and/or solvents, and/or
- embodiments of the invention enabling to add colour within the glue or joint, and/or
- embodiments of the invention improving the production of loop by fleece lamination, and/or
- embodiments of the invention preventing or reducing differences of colour in the glued wood strips, and/or
- embodiments of the invention preventing or reducing torsion or bending between adjacent glued wood strips, and/or
- embodiments of the invention preventing or reducing the formation of cracks or splits within the wood strips, especially at the level of the glued lines, and/or
- embodiments of the invention using simple in feed table(s) for feeding wood strips and/or out feed table for transport of glued strips, and/or
- embodiments of the invention enabling an easier removal of excess glue present on the glue band support, by moving the band support to and/or in front of a glue drying unit, before submitting the band provided with excess glue to a scrapping means, and/or
- embodiments of the invention enabling to prevent or reduce friction of the support band during the transversal movement of said support band with respect to the strips to be glued or glued together, and/or the movement of the glued strips with respect to said support band, and/or
- embodiments of the invention enabling a better removal of waste from the cut operation from the pusher plate(s), and/or
- embodiments of the invention enabling a take over of forces by cylinders and/or springs of the pusher plate(s), and/or
- etc.

[0005] The invention is a gluing apparatus for gluing together the ends/sides of wood veneer strips, in which the apparatus comprises a carrier that is flexible such that the carrier can at least be deformed between a substantially flat position and a bent position to move the glue strip upwards, and a means to bend the carrier to move the glue strip upwards.

[0006] The invention relates to a gluing apparatus as per claim 1.

[0007] The gluing apparatus can be mounted on a moving table in order to move the tooth profiles of the ends together.

[0008] The gluing apparatus of the invention has advantageously one or more of the characteristics disclosed in the attached dependent claims.

[0009] The invention further relates to a process for gluing an end of a first wood veneer strip to an end of a second wood veneer strip as per claim 15.

[0010] The details and characteristics of advantageous embodiments according to the invention will arise from the following description, which also refer to the attached drawings.

Brief description of the drawings

[0011] These drawings show:

- Figure 1 steps involved in gluing the ends of two wood veneer strips together.
- Figure 2 schematic view of a gluing unit with moving

table and cutting dies.

- Figure 3 a cross-section along line III-III of the unit of figure 2 showing details of the gluing apparatus.
- Figures 4A - 4F cross-sections of the pressure bar of the gluing apparatus in various stages of the gluing of two ends of wood veneer strips together.
- Figure 4G a cross-section of the pressure bar during the step of moving of the strips glued together, while the carrier or portion of the carrier provided with a new glue strip is moved, said new glue strip being intended for the next gluing cycle of two cut ends of wood veneer strips.
- Figures 4H and 4I cross-sections of the pressure bar provided with a system for feeding/depositing a paper and or film for covering at least partly the cut ends glued together,
- Figures 5 and 6 side views of the pressure bar.
- Figures 7 and 8 views of the mechanism to drive the moving table.
- Figure 9 a cross-section along the line IX - IX of figure 2.
- Figures 10A - 10E various steps of the cutting of an end of a wood veneer strip.
- Figure 11 a screen on which various images of the process are shown.
- Figures 12A and 12B top views of the ends before and after the gluing of them.
- Figures 13A and 13B cross-sections of a pressure bar that can also operate without pivoting around an axis 16.
- Figures 14A and 14B cross-sections of another embodiment of a pressure bar.
- Figures 15A, 15B and 15C cross-sections of an additional embodiment of a pressure bar.
- Figures 16 and 17 schematic views of processes in which at least a pressure bar is used according to the invention during the gluing of two sides of wood veneer strips, and
- Figures 18A and 18B cross-sections of pressure bar that can also operate without pivoting or turning.

Description of preferred embodiments

[0012] The installation schematically shown in figure 2 comprises:

* a gluing apparatus 1
* a left cutting unit 2 with cutting die 3
* a right cutting unit 4 with cutting die 5
* one or more tables 6 to move the wood veneer strips when gluing the ends together.

[0013] The process for gluing the ends of wood veneer strips together comprises the following steps:

- Step 1

[0014] A wood veneer strip BF1 is moved to the right to place an end of it under the cutting die 3.
A wood veneer strip BF2 is moved to the left to place an end of it under the cutting die 5.
These movements can be done by the tables 6 and an eccentric 35. The implementation of wood veneer strip (s) can also be realised by rollers that are driven by motor (s), linear motor(s), etc.

- Step 2

[0015] The ends of the wood veneer strips are cut by the dies 3,5. The cut ends have a tooth profile (see figures 10A - 10D).

- Step 3

[0016] A carrier 9 for a strip of glue 10 is moved to place the glue strip under a first part 7 of the pressure bar 8. Step 3 can be done before, after or during the implementation of step 2. Steps 2 and 3 are preferably done simultaneously.
[0017] Step 3 can also be carried out at least partly during the moving away of the strips glued together (see for example Figure 4G). This is advantageous as a new glue strip can be placed for a new gluing cycle or step, before the end of the cutting of the ends of the strips to be glued together. This is advantageous as it enables to save time, for example 1 to 2 seconds per complete cycle, with respect to a total cycle time of 6 to 10 seconds, when all the steps are carried out the one after the other.

- Step 4

[0018] The carrier 9 is bent so that the strip of glue is moved upwards. The strip of glue is now substantially at the level of the wood veneer strips that have to be glued together.

- Step 5

[0019] The cut ends of the wood veneer strips are moved together by the moving table 11, whereby the teeth of one end are inserted and glued in the notches between the teeth of the other end.

- Step 5bis (optional)

[0020] depositing a paper or film at least partly above the teeth of one end inserted in the notches between the teeth of the other end. Said paper or film can be provided or not with gluing means or layer. Said paper or film can be fed on the inserted cut ends from a removable cassette, whereby the cassette can easily be replaced by another when the cassette is empty or when another type of paper or film has to be fed.
[0021] Said paper or film can be pressed on the cut ends during the curing or hardening of the glue. Said paper or film can form a protection layer for preventing

the gluing or adherence of a part or portion of the pressure bar with the glued cut ends.

[0022] Said paper or film can optionally removed or tear off after the curing or hardening of the glue, for example during the moving away of the glued cut ends from the gluing apparatus (Step 8).

[0023] Said paper or film (removable or not after curing or hardening of the glue) can possibly be provided with one or more information (for example, information relating to the production, name of the producer, trademark, lot number, etc.) and/or can possibly be adapted for later printing of one or more of said information.

- Step 6

[0024] The pressure bar 8 is moved (for example turned - arrow R or moved downwards Figure 18), such that a (second) part 17 of the pressure bar touches the glued ends and exerts a pressure on them. The (second) part 17 is heated to accelerate the setting of the glue.
The rotation of the pressure bar can also be avoided by using a pressure bar whose profile 17 is moveable with respect to the pressure bar and/or by using a pressure bar moveable as a whole towards the cut ends to be glued together.

[0025] When the pressure bar or the part 17 exerts a pressure on the glued ends, a pressure is then also exerted on the carrier 9, such that this carrier is bent less and/or returns to its initial position (the carrier is substantially in a plane).

- Step 7

[0026] The carrier 9 is returned to its unbent position. The pressure bar is turned or moved, such that the pressure bar is removed from the ends and no more exerts pressure on the glued cut ends.

- Step 8

[0027] The glued ends of the two strips are moved to place a free end of the glued strips under the die 5. A new wood strip can then be introduced, with its end under the die 3. Steps 1 to 7 inclusive can be further executed, such that a roll of glued strips can be manufactured.

[0028] Step 3 is advantageously at least partly carried out during step 8, for example from the end of the end 7.

-Step 9 (optional)

[0029] The cut ends glued together are possibly humidied. Said humidification step can possibly carried out (partly or not) carried out at the end of step 6 and/or in step 7 and/or in step 8.

[0030] Figure 3 is a view of the gluing apparatus 1.
This gluing apparatus 1 comprises a system 11 to make a carrier belt 9 move between guide rollers (preferably Teflon coated), such that the belt 9 (preferably Teflon coated on which the glue strip has to be placed. The belt can also be a steel belt, preferably a stainless steel belt.) runs along various units of the gluing apparatus. The gluing apparatus contains a unit 13 for applying glue, advantageously substantially substantially liquid glue, to the carrier belt 9. The application of the glue to the belt is done during the movement of the belt 9 in the direction of the pressure bar 8. The system also comprises a unit 14 to deform the flexible carrier belt (e.g. by using air, by moving the lateral sides of it towards one another, etc), such that the central part of the belt 9 is moved (upwards in the figures) towards the pressure bar 8. When gluing the two cut ends of the wood veneer strips, the carrier belt 9 is no longer moved. After the gluing operation, the carrier belt is moved to a unit 15 to remove the waste glue from the carrier belt 9, for example by using one or more brushes. For facilitating the removal of excess glue present on the carrier belt 9 (to be removed in unit 15), the apparatus or the installation is provided with a unit 15ter for curing or hardening the waste glue present on the carrier belt before said waste glue being treated in unit 15. The unit 15ter can also be a unit for treating waste glue with one or more solvents and/or one or more chemical agents.

[0031] The belt 9 can be an endless belt. This belt 9 can also, in an embodiment, be a single-use belt that already has a glue strip, such that the gluing apparatus does not have to have a system for applying glue to the belt, a system for removing waste glue from the belt, etc.

[0032] The belt can also be made of silicone paper.

[0033] According to an advantageous embodiment, the carrier is a steel belt (preferably stainless steel belt) that is flexible.

[0034] According to another embodiment, the carrier is a pre-glued carrier.

[0035] The pressure bar 8 is advantageously mounted on a rotary shaft 16 whereby the turning of the shaft 16 is driven by a motor and/or a cylinder. The pressure bar can turn (for example 90°) between a first position in which the first part 7 is directed downwards (i.e. the first part is opposite the carrier belt 9), and a second position in which the second part 17 is directed downwards (opposite the carrier belt 9).

[0036] Preferably the rotary shaft 16 is mounted in vertical slots such that the rotary shaft 16 can be moved vertically to adjust and/or increase the distance between the pressure bar 8 and the carrier 9 after gluing the ends together.

[0037] The first part 7 is a profile that is inserted into a slot 18 of the pressure bar 8. The profile 7 can preferably be detached from the bar 8. The profile 7 is connected to the pressure bar 8 by a means to adjust the position of the profile 7 with respect to the rotary shaft 16. The profile 7 has two longitudinal teeth 19, between which there is a central groove 20. The profile 7 preferably has a non-stick layer and preferably acts to equalise the veneer glue thickness. The profile 7 can be part of a system for delivering paper or film for covering the glued cut ends.

[0038] The glue strip 10 that is moved under the pressure bar 8 by the carrier belt 9 is opposite or in front of the groove 20. As a result of the rotation of the pressure bar, a tooth 19 of the profile 7 can touch the glue strip, if the glue strip is too thick.

[0039] The second part 17 comprises a rubber profile 21 that is inserted in a slot 22 of the pressure bar. The profile 21 is made of a heat conductive material, such that heat can be conducted from a heating element 23 to the glue while gluing the ends together. The heating element is used to accelerate the setting and/or curing and/or hardening of the glue, as soon as the teeth of the ends of the strips are inserted into one another. The profile 21 is adapted to compensate for a possible difference of thickness between the ends. The profile 21 contains side projections 24, 25 between which is a central part 26 with a groove 27. The groove 27 is used to push the side projections 24, 25 together when the profile 21 pushes on the ends of the wood veneer strips. By pushing the ends of the wood veneer strips towards one another, the teeth of an end of one wood veneer strip are correctly and neatly pushed into the notches between the teeth of the other end of the other wood veneer strip.

[0040] The gluing apparatus also preferably comprises a heating element 9*bis* that forms a support for the carrier 9 when the pressure bar pushes on the carrier and the ends of the wood veneer strips. The heating element is used to accelerate the setting, curing or hardening of the glue.

[0041] The pressure of the bar 8 on the glued cut ends of the wood veneer strips during the gluing step and/or curing, hardening or setting step of the glue can be controlled by a cylinder (which for example control the position of the axis 16). The pressure can possibly be given by the cutting die cylinder(s) or cylinder(s) moving the cutting die(s) of the installation. For example, the pressure can be controlled by adjusting the difference of level between the cutting position and the press position of the upper bar 67.

[0042] Figures 13A and 13B are cross-sections of a pressure bar that can also operate without pivoting around an axis 16.

[0043] In the embodiment of Figure 13, the profile 17 has a central longitudinal opening 90 in which a pressure plate 91 can be moved by a cylinder 92.

[0044] When applying glue under the pressure bar 8, the pressure plate is move upwards, such that a rather longitudinal recess is formed. This recess is opposite the glue carrier 9. The glue strip 10 is intended to be below or partially in the recess after bending the carrier 9.

[0045] The cylinder 92 then exerts a force on the pressure plate 91, such that the glued ends of the wood veneer strips are pressed together between the carrier 9 and the pressure plate 91 (see figure 13B).

[0046] The pressure plate 91 is preferably linked to a heating element 9*bis* to accelerate the setting of the glue.

[0047] In the embodiment of Figures 14A and 14B, the pressure bar 8 can be moved with respect to the glue carrier 9 by a pressure cylinder. The pressure bar 8 comprises a groove 93 in which a profile 94 can move against the action of a spring 95. The profile 94 has slanting sides 96 that slide along the slanting sides of the groove or channel 93 when moving the profile 94 with respect to the bar 8.

[0048] The profile 94 is at least partially deformable. For example, the profile is made of rubber and/or a foam material. According to an embodiment, the profile 94 has two separate elements 97, between which a rubber element is stretched. The rubber element 98 has a central slot 99 to enable movements between the separate elements 97.

[0049] When applying a glue strip under the pressure bar 8, the profile 94 is partially outside the groove 93. In this position the slot 99 of the rubber element 98 is open. The carrier 9 is bent in order to place the glue strip in the vicinity of the slot 99.

[0050] After moving the ends of the wood veneer strips towards one another, the pressure bar 8 is moved downwards such that the profile 94 touches the glued ends. The profile 94 then moves in the groove or channel 93, such that the rubber element 98 is deformed. As a result of this deformation, a force is exerted on the glued ends in order to move or push these ends together. By moving the profile 94 in the groove or channel 93, the slot 99 is at least partially closed (See figure 14B).

[0051] In the embodiment of figure 15A, the pressure profile comprises two components 120, 121, that move towards one another when the pressure profile is moved in the direction of the base of the groove or channel 93 of the pressure bar 8.

[0052] The groove or channel has side walls 122, 123 that are slanting, such that an angle α of around 90° is formed between the above-mentioned side walls 122, 123 (angle defined between the planes comprising said side walls).

[0053] The components 120, 121 exhibit side surfaces 124, 125 that are intended to slide along side walls 122, 123 of the groove or channel in order to bring about relative movements between the components 120, 121.

[0054] Each component has a tooth profile 126, 126*bis* that is profiled such that the teeth 130 of a component 120 can be moved between the recesses between the teeth of the tooth profile of the other component when the side surfaces 125, 125 of the components 120, 121 slide along the side walls 122, 123 of the groove 93.

[0055] Each component has a foot 127 in order to avoid a component dropping out of the groove 93. A spring 128 exerts a pushing force on the foot 127 of each component.

[0056] Each component 120, 121 has a lower surface 129 that is it intended to touch a wood veneer strip. Preferably the teeth of the tooth profiles of the components 120, 121 do not touch the glued ends of the strips.

[0057] By moving the pressure bar downwards (in the direction of the wood veneer strips), the components 120, 121 are pushed against the wood veneer strips, such that

the components 120, 121 are pushed against the action of the springs 128 in the groove or channel 93 of the pressure bar 8. As a result of this vertical movement and the slanting walls of the groove and the components, the components are moved towards one another, such that an end of a strip is pushed to the end of the other strip. (Figure 15B)

[0058] Figure 15C is a partial view of the tooth profile of the components 120,121.

[0059] According to an advantageous embodiment, the pressure profile contains two components that each have teeth, such that the teeth 130 of a component can be moved between the teeth of the other component.

[0060] Figures 18A and 18B are cross-sections of an additional embodiment of a pressure bar according to the invention.

[0061] The pressure bar of figures 18A and 18B comprises a pressure profile 200 that consists of a number of parts 201, 202, whereby each part is separately adjustable. The downward movement of each part 201, 202, and or the relative position of the lower surface of a part with respect to the lower surface of another part, is for example obtained by separate cylinders and/or springs and/or screws 203, 204. The pressure profile 200 is in a channel 205 of a cap 206 that can preferably be moved to the carrier 9 by a cylinder 207 in order to press the ends of the wood veneer strips together.

[0062] The cap 207 is connected to adjustable fingers 208, 209. A cylinder 210, 211 acts on each finger whereby a pressure difference can occur between the pressure exerted on a strip and the pressure exerted on the other strip.

[0063] The carrier 9 is similar to the carrier 9 shown in figures 4, 13 and 15.

[0064] In order to obtain the bending of the portion of the carrier 9 provided with the glue strip 10 (portion located below the pressure bar 8), the carrier 9 is between two feet 212, 213, at least one of which is moveable with respect to the other.

[0065] In the embodiment shown, the two feet with fingers 212, 213 are moveable with respect to a basic element 214. The movement of the feet is preferably obtained by a separate cylinder 215, 216.

[0066] Each foot 212, 213 has a slanting surface that is intended to slide along a slanting surface of the basic element 214, when the foot is pushed upwards. By pushing a foot upwards, the carrier will be bent upwards, while a force will be exerted on a strip in order to move or push an end or side of it to an end or side of another strip.

[0067] Preferably the first part 201 of the pressure profile 200 is intended to hold an end of a first wood veneer strip between first part of the pressure profile and the carrier 9. The first part of the pressure profile has to push on a part of the carrier that does not have a glue strip.

[0068] The gluing apparatus of said embodiment thus has the following advantages:

- Possibility to adjust the glue height
- Possibility to exert even pressure on the wood veneer strips
- Possibility to glue strips of a different thickness together.

[0069] The apparatus 2 also has a cooling system to avoid the glue setting when the second part of the pressure bar is not touching the ends of the strips.

[0070] The pressure bar 8 of each embodiment preferably has a means to control the compressing and pressing force.

[0071] The apparatus 2 is advantageously in the form of a cassette that can be detached from the unit by a sideways movement. This is advantageous for the maintenance of the apparatus, and for replacing an apparatus 2 by another apparatus 2, for example in case of defect, replacement of the carrier belt, etc.

[0072] The apparatus 2 can also be provided or associated to a system 500 for feeding/depositing a piece of paper or film above the glued cut ends of the wood veneer strips, advantageously before the curing or hardening of the glue. Said system 500 can also be in the form of a distinct cassette which is directly or not mounted on the apparatus or cassette 2, for example on the pressure bar 8. The system 500 is for example mounted in a removable way on the apparatus 2 or pressure bar 8, so as to be able an easy replacement thereof.

[0073] The feeding or deposit of paper/film element on the glued cut ends of the wood strips is advantageously a system 501 mounted on the pressure bar 8, preferably in a removable way. For example in Figures 4H and 4I, the pressure bar 8 is provided with a system 501 for taking and holding a piece of paper or film (for example from a paper or film staple 503).

In the position of Figure 4H, the system 501 is in front of the paper/film staple or reserve cassette 503, so as to take one paper/film layer and hold said paper/film layer. Said step occurs advantageously during the curing/hardening of the glue of a previous gluing cycle. In Figure 4I, after rotation of the pressure bar 8, the system 501 is located above the glue supported by the carrier 9 in which the cut ends of wood veneer strips have been pushed. The system 501 then release a piece of paper or film on the glued cut ends, before the curing or hardening of the glue. The pressure bar 8 is rotated back in its position of Figure 4H whereby pressing (by means of the part 17) the piece of paper or film 502 onto the glued cut ends, and whereby pressing the cut ends towards each other during the curing or hardening of the glue.

[0074] The system 501 can also be a stocking unit comprising for example a paper staple, and comprising a means for releasing the paper, piece by piece.

[0075] Such a system can also be a system for feeding a piece of paper or film under the glue strip and/or above the glued cut ends of the wood strips.

[0076] According to an embodiment a piec of paper or film is deposited onto the carrier before and/or (preferably) during the deposit of glue on the carrier.

[0077] The apparatus 2 can have (a) pressure system (s), and/or means to move the pressure bar or component (s) of it.

[0078] The apparatus 2 can be used to with various glues, for example two-component adhesives, fusion adhesives, hotmelt glues, etc. Glue means also any composition suitable for generating bonds between the cut ends of two wood veneer strips inserted the one into the other.

[0079] Thus a cassette 2 can be used in existing units to glue ends of wood veneer strips, for example in a unit as described in BE 1014641. The gluing of wood veneer strips can be done to connect a series of strips lengthways and/or breadthways.

[0080] Various positions of the rotating pressure bar 8 are shown in figures 4A to 4F inclusive.

[0081] In Figure 4B, the pressure bar 8 and the carrier 9 are away from each other, whereby preventing direct contact of the part 7 with the glue strip 10 while the carrier 9 is moving (transversely with respect to the direction of movement of the cut ends the one towards the other) . In Figure 4C, the portion of the carrier 9 under the part 7 of the pressure bar is bent, whereby the glue strip 10 is moved upwards (at the level of the cut ends of the wood veneer strips). The wood veneer strips are then moved the one towards the other, so that the teeth of one end of a wood veneer strip are inserted into the notches between the teeth of the end of the other wood veneer strip, and inversely (Figure 4D). The pressure bar 8 is rotated so as to bring the part 17 in contact with the inserted and glued cut ends, and so as to heat said glue so as to accelerate the curing or hardening of the glue (Figure 4E) After said curing or hardening the portion of the carrier 9 under the glued cut ends of the wood veneer strips is unbent and the pressure bar 8 is rotated (Figure 4F). A moving table 6 is used to push the cut ends towards one another. This table 6 comprises:

- A first movable support plate 30 with a clamping means 31 to hold a first veneer strip BF1,
- A second movable support plate 32 with a clamping means 33 to hold a second veneer strip BF2, and
- A mechanism 34 to simultaneously move the support plates 30, 32 towards one another.

[0082] The mechanism 34 (figures 7 and 8) comprises advantageously:

- An eccentric 35 which is mounted and rotatable with respect to the table (vertical axis V)
- An arm 36 that extends between the eccentric 35 and the support plate 30.
- An arm 37 that extends between the eccentric 35 and the support plate 32.
- Ball bearings 38 whereby the ends of the rods are rotatable with respect the eccentric 35 and the support plate 30, 32 (axes of rotation V1, V2, V3, V4), and
- A finger 39 to connect the eccentric to the rod 40 of a cylinder (using a ball bearing 38 between the finger 39 and the rod 40).

[0083] The eccentric 35 is preferably located below the machine, while the drive cylinder of the eccentric is preferably along a side of the machine.

[0084] By exerting a force on the finger 39, the eccentric 35 turns around its axis of rotation V, such that a tensile force or pushing force is exerted on the support plates. By the rotation of the eccentric 35, the support plates are moved simultaneously towards one another or away from one another.

[0085] The gluing unit has two cutting units with cutting dies 3, 5. These cutting units can operate simultaneously or otherwise.

[0086] The cutting unit 2 or 4 comprises:

- A basic element 50 in the form of a frame with a bottom plate 51, a top plate 52 and side elements 53, 54.
- A lower block 55 that is fixed with respect to the basic element 50 and which carries a first component 56 (the die plate) of the cutting die 3 or 5, whereby this first component or die plate 56 of the cutting die has a top support surface 57, as well teeth located next to one another 58.
- A removal plate 59 with a lower support surface 60.
- A mechanism 61 for making the removal plate 59 move between a first position in which the support surface 60 is in the vicinity of the support surface 57 in order to hold a part of the wood veneer strip when cutting the end, and a second position in which the support surface 60 is removed from the support surface 57, whereby the wood veneer strip is no longer held between these surfaces 57, 60.
- Springs 62*ter* and guides 62 to control the vertical movement of the removal plate, such that the support surface 60 is parallel to the support surface 57, even with narrow wood veneer strips.
- A second component or stamp 63 of the cutting die 3, 5, that is pushed downwards by the mechanism 61 and by a cylinder 64, in order to cut the end.
- An intermediate block 65 that is fixed with the basic element 50, with passages to guide the rods 66.
- A top bar 67 that is moveable with respect to the basic element 50 by the mechanism 61.

[0087] A relative movement between the removal plate and the stamp can be obtained by the action of the cylinder 64, which is advantageous for withdrawing the cut strip.

[0088] In an embodiment, there is only one cutting unit 2 or 4 as described above with a removal plate, while the other cutting unit primarily consists of a die plate and a stamp (and no removal plate 59).

[0089] The guides 62 each have a head 62*bis* that moves in a channel 67*bis* of the top bar 67 against the action of the springs 62*ter.*

[0090] These springs 62*ter* preferably exert a pushing force between the removal plate 63 and the top bar 67.

[0091] The second component or stamp 63 of the cutting die has teeth that can be moved in the notches between the teeth 58 of the first component or die plate 56 of the cutting die, and in notches between the teeth of the removal plate 59.

[0092] The die plate 56 and the stamp 63 have a tooth profile in order to cut the end of a wood veneer strip in the shape of a series of sharp teeth located next to one another, with notches between the teeth.

The removal plate 59 is always under pressure with respect to the top plate 52. This pressure is distributed by a series of springs 72 in order to obtain parallel pressures of the removal plate. The springs 72 are distributed over a length of the top bar, for example over a length of 80cm to 150cm. On the other part of the top bar 67, there are cylinders 73 and/or springs such that the position of the top bar 67 can be adjusted with respect to the top plate 52.

[0093] According to an embodiment the top bar has a number of series of springs and/or cylinders, for example a first series of springs 72A along a first part of the bar, a second series of springs 72B along a second part of the bar, and a third series of springs and/or cylinders 73 along a third part of the bar.

[0094] In this way it is possible to make the bar 67 descend in parallel, even if only a part of the width of the removal plate and the stamp is used.

[0095] The correct descent of the bar can be obtained by controlling the pushing force of the cylinders 73. If the stamp is used for the simultaneous cutting of the ends or sides of a number of wood veneer strips, the cylinders are in operation, whereby the same pressure is exerted on each wood veneer strip. By using the cylinders a good pressure balance can be obtained.

[0096] The action of the cylinders 73 can be controlled by a computer.

[0097] In an additional embodiment, the springs and cylinders work along the entire length of the top bar, such that each cylinder is driven out separately.

[0098] The mechanism 61 (for example a cylinder) acts such that the stamp 63 descends, and the removal plate 59 descends with it.

[0099] The relative position of the removal plate 59 with respect to the top bar 67, and thus with respect to the stamp, can be controlled by changing the position of the head along the rod 62.

[0100] The end of a wood veneer trip is cut as follows:

In a first step the top bar 67 is moved downwards (B) by the mechanism 61, such that the stamp 63 and the removal plate 59 descend to the die plate 56 (Figure 10A). In this position the springs 62*ter* exert a pushing force on the removal plate 59, such that the head 62*bis* of the rod 62 rests against the bottom of the channel 67*bis* in order to limit the maximum distance between the top bar 67 and the removal plate.

[0101] The stamp 63 touches the wood veneer strip, before the removal plate touches the strip. (figure 10B - in this position the distance between the removal plate and the top plate is still a maximum). At least the start of the cutting of the end his thus done without the wood veneer strip being tensioned between the die plate 56 and the removal plate 59. This is advantageous as there are fewer small bands in the stamp that cause rubbing, and as cleaner end points are obtained for the cut end.

[0102] After the stamp is in the die plate 56 sufficiently, the removal plate 59 can touch the wood veneer strip. (Figure 10C).

[0103] If the stamp 63 moves further downwards, the removal plate will be pushed further against the wood veneer strip, such that the springs 62*ter* are further tensioned. The heads of the rods 62 will be moved upwards in the channels 67*bis.*

[0104] The waste AF from cutting the end is pushed downwards to fall into a container C (a container that is at least partially under the die plate 56). (figure 10C)

[0105] When the main cylinder 61 pulls the top bar upwards, the stamp 63 and the removal plate 59 move upwards (Figure 10D). The cut wood veneer strip is then raised slightly before the removal plate 59 pushes on it (figure 10E), such that the cut wood veneer strip is no longer attached to the stamp 63.

[0106] Through the further action of the main cylinder 61, the stamp 63 is moved further upwards, as is the removal plate 59.

[0107] The stamp 63 and the removal plate 59 are then in the position shown in figure 10A.

[0108] To correctly control the gluing unit and the cutting dies, a number of cameras or webcams or optical lenses (100) are provided for taking various images of the wood veneer strips to be glued together, the cutting dies, the carrier for the glue strip, the glue strip deposited on the carrier, etc.

[0109] These cameras, webcams or optical lenses send these images to control screens (101) whereby an operator can visually control different steps, but also to a computer 102 in which these images are processed to compare one or more parameters of them to reference parameters. If the difference between a parameter of an image and/or a number of images and the reference parameter is greater than a certain percentage, the computer sends an alarm signal. Preferably the computer processes the difference between the parameter(s) and the reference parameter(s) to send signal(s) to control elements of the components of the unit in order to at least partially correct the difference, and/or in case of detection of not suitable glue strip, to prevent the movement of the cut ends of the wood veneer strips the one towards the other and the moving of the carrier so as to place a new glue strip between the cut ends to be glued together. Especially for viewing the glue strip before the movement of the cut ends the one towards to the others (for inserting teeth of one end into notches of the other end, and inversely), the camera(s) or webcam(s) or optical lens(es)

will be appropriate for taking enlarged views (for example with an enlargement factor of 10 to 100).

[0110] A computer 102 can also be used as an ordinary vision system with a series of small cameras for detecting different places of the machine/wood veneer strips. These small cameras then place different parts of the machine/wood veneer strip on a split screen (for example divided into 4, 6, 8 etc), preferably in black-and-white combination.

[0111] The cameras of the vision system send data to the screen. The black-and-white combination of the images can be processed in the cameras, in the vision system, in the computer, etc.

The vision system according to the invention can also be used for other gluing applications, for example in machines for gluing wood veneer strips lengthways. The cameras can preferably be controlled separately, to zoom in/out separately.

[0112] The pressure bar as illustrated in one of the figures 4, 13, 14 and 15 can be used for gluing along the length and/or the width of the wood veneer strips, with or without intermediate plates and/or elements, for example for manufacturing parquet, marquetry, etc. The pressure bar is preferably connected to a gluing apparatus, preferably a gluing apparatus with a carrier 9 for a glue strip, in which the carrier is bendable as illustrated in Figures 4A to 4F inclusive.

[0113] The cassette with gluing apparatus and pressure bar is preferably detachable with respect to the machine with tables for the wood veneer strips that have to be glued together, and/or with cutting die(s).

[0114] The pressure bar is intended to push the ends of the wood veneer strips on the carrier 9, such that the glued ends of the wood veneer strips are pushed together.

[0115] Various machines and processes will now be described, in which the gluing of two ends is done by a pressure bar according to the invention.

A. Process in which wood veneer strips are inserted breadthways. (see figure 16)

[0116] The longitudinal sides that have to be glued together are cut.

[0117] Glue is applied to at least one cut side of a wood veneer strip, for example by means of an adhesive roller, adhesive brush, spray gun, etc. Preferably glue is applied to the two cut sides.

[0118] The wood veneer strips are moved together, such that the cut sides are next to one another.

[0119] By using heat and a pressure bar according to the invention, the wood veneer strips are glued together breadthways with a pushing force from a longitudinal side of a wood veneer strip to the longitudinal side of the other wood veneer strip.

[0120] The wood veneer strips glued together form a wider strip that can subsequently be glued to another wider strip in order to obtain a wider wood veneer roll.

[0121] The machine also contains cutting systems to cut the lateral ends of the wider strips that have to be glued together, system(s) to apply glue to at least one cut lateral end, and a system to press the cut ends together, preferably by means of a pressure bar according to the invention.

[0122] The machine also preferably contains a heating system to accelerate the setting of the glue.

B. Process and machine for gluing wood veneer strips breadthways. (see figure 17)

[0123] The opposite longitudinal sides of the strips that have to be glued together are cut.

[0124] Glue is applied to at least one cut side of a wood veneer strip, for example by means of an adhesive roller, adhesive brush, spray gun, etc. Preferably glue is applied to the two cut sides.

[0125] The wood veneer strips are moved together, such that the cut sides are next to one another.

[0126] By using heat and a pressure bar according to the invention, the wood veneer strips are glued together breadthways with a pushing force from a longitudinal side of a wood veneer strip on the longitudinal side of the other wood veneer strip.

[0127] The wood veneer strips glued together form a sheet of strips.

[0128] The longitudinal end of the sheet of strips that is opposite the longitudinal end of a new wood veneer strip are cut, glued and pressed as described above.

[0129] The two longitudinal ends of each wood veneer strip may also be cut in parallel before gluing the two wood veneer strips together.

[0130] The table can be fitted with stops to correctly position the new wood veneer strip before gluing it to another wood veneer strip.

[0131] The table preferably has a means to correctly position the free longitudinal end of the sheet of strips with respect to the stop and/or the pressure bar, in which the correct positioning of this free longitudinal end is determined by means of one or more photocells. By using such a positioning system (e.g. guillotines or guides) the problem of the inserted sheets being crooked can be reduced/avoided.

Claims

1. A gluing apparatus (1) for gluing an end/side of a first wood veneer strip (BF1) to an end/side of a second wood veneer strip (BF2), whereby the ends/sides of the first and second wood veneer strips (BF1,BF2) are cut in the form of a series of sharp teeth located next to one another, and whereby the tooth profile of the end/side of the first wood veneer strip (he1) perfectly matches the tooth profile of the end/side of the second wood veneer strip, so that the teeth of the tooth profile of the first wood veneer

strip can be perfectly inserted in the notches between the teeth of the tooth profile of the second wood veneer strip,
whereby this apparatus can be mounted on a moving table (6,11) in order to move the tooth profiles of the ends towards one another,
whereby this apparatus comprises:

- a carrier (9) for a strip of glue (10),
- a means adapted for placing the carrier (9) with a glue strip (10) between the ends of the first and second wood veneer strips (BF1,BF2), so that after moving the tooth profiles of the ends towards one another, the tooth profiles of the ends inserted into one another are glued together,
- a means (8,17) adapted for pressing and/or for treating the glue for curing and/or drying and/or hardening the glue located between the tooth profiles when inserted into one another, preferably for thermally treating and/or for treating with rays glued tooth profiles inserted into one another,

an elongated pressure bar (8), that is at least partially moveable at least between:

- a first position in which a glue strip (10) is located under the pressure bar (8), without the pressure bar (8) touching or contacting a glue strip (10) located on the carrier (9), and
- a second position in which the pressure bar (8) or a part (7,17) of it at least partially touches or contacts glued tooth profiles inserted into one another, possibly with interposition of a paper or a film layer;

a means (16) to move the pressure bar (8) or a part of it between at least said first and second positions **characterised in that** the gluing apparatus further comprises:

a carrier (9) for a strip of glue (10) that is flexible such that a portion of the carrier (9) can at least be deformed between a substantially flat position and a bent position in order to move a glue strip (10) upwards; and
a means (212,213) adapted to bend said portion of the carrier (9) in order to raise a glue strip (10).

2. The gluing apparatus of claim 1, **characterised in that** the elongated pressure bar (8) is mounted at least partially rotatable around an axis of rotation that is substantially perpendicular to the direction of the converging movement of the tooth profiles of the ends of the wood veneer strips (BF1,BF2) that have to be glued together, between said first and second positions, and in which the means (16) for moving the pressure bar (8) is a means adapted at least to rotate the pressure bar (8).

3. The gluing apparatus according to claim 1 or 2, **characterised in that** a first part (7) of the pressure bar (8) is a longitudinal profile with a central groove (20) that is intended to be above the glue strip (10) in the first position of the pressure bar (8).

4. The gluing apparatus according to claim 3, **characterised in that** the first part (7) of the pressure bar (8) is a profile that is mounted in a slot (18) of the pressure bar (8), whereby the first profile (7) is mounted in a detachable or removable way on the pressure bar (8).

5. The gluing apparatus according to claim 4, **characterised in that** the first profile (7) is mounted in a slot (18), whereby the first profile (7) and/or the pressure bar (8) at least comprises a means to adjust the position of the first profile (7) with respect to the axis of rotation of the pressure bar (8).

6. The gluing apparatus according to one of the preceding claims, **characterised in that** the gluing apparatus has a means to move away the pressure bar (8) from the carrier (9) after gluing the ends of the first and second wood veneer strips (BF1,BF2).

7. The gluing apparatus according to one of the preceding claims, **characterised in that** the pressure bar (8) has a means (27) adapted for heating at least a part of the pressure bar (8), preferably a second part (17).

8. The gluing apparatus according to one of the preceding claims, **characterised in that** a part of the pressure bar (8) comprises a means adapted for compensating the thickness of the ends of the first and second wood veneer strips (BF1,BF2) placed next to one another in the second position of the pressure bar (8), whereby
the means adapted for compensating the thickness comprises advantageously a rubber element that is at least heat conductive.

9. The gluing apparatus according to one of the preceding claims, **characterised in that** the apparatus has a control system that comprises a number of webcams (100) and/or cameras and/or optical lenses adapted for at least sending images of the cut ends and/or the glue strip (10) to a computer system, whereby said
computer system is advantageously suitable for processing images of the cut ends and/or glue strip in order to compare certain parameters of these images with reference parameters, and to issue instructions to one or more components of the gluing

apparatus as a function of the comparison/difference with respect to the reference parameters.

10. A gluing unit that comprises a gluing apparatus (1) according to any one of the preceding claims, as well as at least a moving table (6,11) to move the tooth profiles of the ends towards one another, whereby the gluing apparatus (1) is preferably moveable and/or detachable with respect to the moving table (6;11), wherein
the moving table has advantageously:

- a first element adapted to hold a part of the first wood veneer strip,
- a second element adapted to hold a part of a second wood veneer strip, and
- a means to simultaneously manoeuvre or move the above-mentioned first and second elements, whereby this means at least comprises an eccentric that is connected to the first and second elements, by a first rod and a second rod respectively.

11. The gluing unit according to claim 10, **characterised in that** it has one or more cutting dies (3,5) in order to cut the ends of the first and second wood veneer strips (BF1, BF2) in order to obtain sharp tooth-shaped ends.

12. The gluing unit according to the preceding claim, **characterised in that** the unit has a basic element (50),

- that is connected to one or more lower blocks (55) that are adapted to be fixed with respect to the basic element (50) when cutting the ends, and
- that is connected to a means adapted to push the cutting die or dies (3,5) downwards in the direction of one of the lower blocks (55) for cutting the ends of the wood veneer strips (BF1,BF2), wherein

the basic element (50) has advantageously one or more removal elements that are intended to work together with the die or dies (3,5) in order to remove the waste from the cutting of the ends of the wood veneer strips (BF1,BF2) from the die or dies (3,5).

13. The gluing unit according to claim 12, **characterised in that** the basic element (50) has one or more movable pressure elements (59) adapted to push and hold the wood veneer strips (BF1,BF2) against one or more lower blocks (55), at least while cutting the ends.

14. The gluing unit according to claim 13, **characterised in that** the pressure elements (59) are connected to the basic element (50) by means of at least a number of springs (62ter) and a cylinder (61), whereby the springs (62ter) exert pushing forces so that the bottom surface of each pressure element (59) is parallel with respect to the top surface of each lower block (55), when a part of the wood veneer strip (BF1,BF2) is held between the above-mentioned top surface and bottom surface.

15. A process for gluing an end of a first wood veneer strip (BF1) to an end of a second wood veneer strip (BF2), whereby these ends of the first and second wood veneer strips (BF1,BF2) are cut in the form of a series of sharp teeth located next to one another, and whereby the tooth profile of the end of the first wood veneer strip perfectly matches the tooth profile of the end of the second wood veneer strip, so that the teeth of the tooth profile of the first wood veneer strip can be perfectly inserted into the notches between the teeth of the tooth profile of the second wood veneer strip,
in which the gluing of a cut end of a first wood veneer strip (BF1) to the cut end of the second wood veneer strip (BF2) is done in a gluing apparatus according to any one of the claims 1 to 9,
in which the process at least comprises the following steps:

A. Movement of the carrier (9) to place a strip of glue (10) under a part/the first part (7) of the pressure bar (8), whereby the glue strip (10) extends between the cut ends of the wood veneer strips (BF1,BF2) located away from one another,
B. Bending of the carrier (9) so that strip of glue (10) is moved upwards,
C. Movement, preferably simultaneously movement, of the cut ends towards the glue strip (10) whereby the teeth of an end are perfectly glued in the notches between the teeth of the other end,
D. Movement and/or rotation of the pressure bar (8) to press the glued ends together, and
E. Movement of the pressure bar (8) to move away the pressure bar (8) from the glued ends.

Patentansprüche

1. Klebevorrichtung (1) zum Kleben eines Endes/einer Seite eines ersten Holzfurnierstreifens (BF1) an ein Ende/eine Seite eines zweiten Holzfurnierstreifens (BF2), wobei die Enden/Seiten des ersten und des zweiten Holzfurnierstreifens (BF1, BF2) in Form einer Reihe von scharfen Zähnen geschnitten sind, die nebeneinader angeordnet sind, und wobei das Zahnprofil des Endes/der Seite des ersten Holzfurnierstreifens (BF1) perfekt für das Zahnprofil des En-

des/der Seite des zweiten Holzfurnierstreifens passt, so dass die Zähne des Zahnprofils des ersten Holzfurnierstreifens perfekt in die Lücken zwischen den Zähnen des Zahnprofils des zweiten Holzfurnierstreifens eingebracht werden können,
wobei diese Vorrichtung auf einem bewegbaren Tisch (6, 11) angebracht werden kann, um die Zahnprofile der Enden auf einander zu zu bewegen, wobei die Vorrichtung aufweist:

- einen Träger (9) für einen Klebestreifen (10),
- eine Einrichtung, die zur Platzierung des Trägers (9) mit einem Klebestreifen (10) zwischen den Enden des ersten und des zweiten Holzfurnierstreifens (BF1, BF2) ausgebildet ist, sodass nach dem Bewegen der Zahnprofile der Enden aufeinanderzu die Zahnprofile der Enden, die ineinander eingefügt sind, zusammengeklebt werden,
- eine Einrichtung (8, 17), die zum Pressen und/oder zum Behandeln des Klebstoffs zum Abbinden und/oder Trocken und/oder Aushärten des Klebstoffs ausgebildet ist, der zwischen den Zahnprofilen angeordnet ist, wenn sie ineinander gefügt werden, vorzugsweise zum thermischen Behandeln und/oder zum Behandeln geklebter Zahnprofile mit Strahlung, die ineinandergefügt sind,
- einen länglichen Pressstab (8), der zumindest teilweise bewegbar ist zumindest zwischen:
- einer ersten Position, in der ein Klebestreifen (10) unter dem Druckstab (8) angeordnet ist, ohne dass der Druckstab (8) einen Klebestreifen (10), der auf dem Träger (9) angeordnet ist, berührt oder kontaktiert, und
- einer zweiten Position, in der der Druckstab (8) oder ein Teil (7, 15) von ihm zumindest teilweise verklebte Zahnprofile, die ineinander gefügt sind, berührt oder kontaktiert, möglicherweise unter Zwischenfügung eines Papiers oder einer Filmschicht,
- eine Einrichtung (16) zum Bewegen des Druckstabes (8) oder einen Teil von ihm zwischen zumindest der ersten und der zweiten Position, **dadurch gekennzeichnet, dass** die Klebevorrichtung ferner aufweist:
- einen Träger (9) für einen Klebestreifen (10), der flexibel ist, sodass ein Teil des Trägers (8) zwischen einer im Wesentlichen flachen Position und einer gebogenen Position deformierbar ist, um einen Klebestreifen (10) nach oben zu bewegen,
- eine Einrichtung (212, 213), die ausgebildet ist, um den Teil des Trägers (9) zu verbiegen, um einen Klebestreifen (10) anzuheben.

2. Klebevorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der längliche Druckstab (8) zumindest teilweise drehbar um eine Drehachse montiert ist, die im Wesentlichen rechtwinklig zu der Richtung der konvergierenden Bewegung der Zahnprofile der Enden der Holzfurnierstreifen (BF1, BF2) ist, die zusammen zu kleben sind, zwischen der ersten und der zweiten Position, und wobei die Einrichtung (16) zum Bewegen des Druckstabes (8) eine Einrichtung ist, die ausgebildet ist, um zumindest den Druckstab (8) zu drehen.

3. Klebevorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** ein erster Teil (7) des Druckstabes (8) ein Längsprofil ist mit einer Mittennut (20), die in der ersten Position des Druckstabes (8) dafür gedacht ist, oberhalb des Klebestreifens (10) zu sein.

4. Klebevorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** der erste Teil (7) des Druckstabes (8) ein Profil ist, das in einem Schlitz (18) des Druckstabes (8) montiert ist, wobei das erste Profil (7) in einer abnehmbaren oder entfernbaren Weise an dem Druckstab (8) montiert ist.

5. Klebevorrichtung nach Anspruch 4, **dadurch gekennzeichnet, dass** das erste Profil (7) in einem Schlitz (18) montiert ist, wobei das erste Profil (7) und/oder der Druckstab (8) zumindest eine Einrichtung zum Einstellen der Position des ersten Profils (7) mit Bezug auf die Drehachse des Druckstabes (8) aufweist.

6. Klebevorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Klebevorrichtung eine Einrichtung aufweist zum Wegbewegen des Druckstabes (8) von dem Träger (9) nach dem Verkleben der Enden des ersten und des zweiten Holzfurnierstreifens (BF1, BF2).

7. Klebevorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Druckstab (8) eine Einrichtung (27) aufweist, die zum Erwärmen zumindest eines Teils des Druckstabes (8), vorzugsweise eines zweiten Teils (17) ausgebildet ist.

8. Klebevorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Teil des Druckstabes (8) eine Einrichtung aufweist, die zum Kompensieren der Dicke der Enden des ersten und des zweiten Holzfurnierstreifens (BF1, BF2) ausgebildet ist, die nebeneinander in der zweiten Position des Druckstabes (8) angeordnet sind, wobei die Einrichtung, die zur Kompensation der Dicke ausgebildet ist, vorzugsweise ein Gummielement aufweist, das zumindest wärmeleitend ist.

9. Klebevorrichtung nach einem der vorstehenden An-

sprüche, **dadurch gekennzeichnet, dass** die Vorrichtung ein Steuersystem aufweist, das eine Anzahl von Webcams (100) und/oder Kameras und/oder optische Linsen aufweist, die zumindest zum Senden von Bildern der Schnittenden und/oder des Klebestreifens (10) an ein Computersystem ausgebildet sind, wobei das Computersystem vorzugsweise zur Bearbeitung von Bildern der Schnittenden und/oder des Klebestreifens geeignet ist, um bestimmte Parameter dieser Bilder mit Bezugsparametern zu vergleichen und um Befehle an eine oder mehrere Komponenten der Klebevorrichtung als eine Funktion des Vergleichs/des Unterschiedes mit Bezug auf die Bezugsparameter auszugeben.

10. Klebeeinheit, die eine Klebevorrichtung (1) nach einem der vorstehenden Ansprüche aufweist, sowie zumindest einen Bewegungstisch (6, 11) zum Bewegen der Zahnprofile der Enden mit Bezug aufeinander, wobei die Klebevorrichtung (1) vorzugsweise mit Bezug auf den Bewegungstisch (6, 11) bewegbar und/oder abnehmbar ist, wobei der Bewegungstisch vorzugsweise aufweist:

- ein erstes Element, das zum Halten eines Teils des ersten Holzfurnierstreifens ausgebildet ist,
- ein zweites Element, das zum Halten eines Teils des zweiten Holzfurnierstreifens ausgebildet ist, und
- eine Einrichtung zum gleichzeitigen Handhaben oder Bewegen der oben genannten ersten und zweiten Elemente, wobei diese Einrichtung zumindest einen Exzenter aufweist, der mit dem ersten und dem zweiten Element über einen ersten Stab bzw. einen zweiten Stab verbunden ist.

11. Klebeeinheit nach Anspruch 10, **dadurch gekennzeichnet, dass** sie einen oder mehrere Schnittwerkzeuge (3, 5) aufweist, um die Enden des ersten und des zweiten Furnierstreifens (BF1, BF2) zu schneiden, um scharfe zahnförmige Enden zu erhalten.

12. Klebeinheit nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Einheit ein Basiselement (50) aufweist,

- das mit einem oder mehreren unteren Blöcken (5) verbunden ist, die ausgebildet sind, um mit Bezug auf das Basiselement (50) fixiert zu sein, wenn die Enden geschnitten werden, und
- das mit einer Einrichtung verbunden ist, die ausgebildet ist, um das Schnittwerkzeug oder die Werkzeuge (3, 5) nach unten in Richtung auf einen der unteren Blöcke (55) zum Schneiden der Enden der Holzfurnierstreifen (BF1, BF2) zu bewegen, wobei
- das Basiselement (50) vorzugsweise ein oder mehrere entfernbare Elemente aufweist, die dazu gedacht sind, mit dem Werkzeug oder den Werkzeugen (3, 5) zusammenzuarbeiten, um Abschnitte vom Schneiden der Enden der Holzfurnierstreifen (BF1, BF2) von dem Werkzeug oder den Werkzeugen (3, 5) zu entfernen.

13. Klebeeinheit nach Anspruch 12, **dadurch gekennzeichnet, dass** das Basiselement (50) ein oder mehrere bewegbare Druckelemente (59) aufweist, die ausgebildet sind, um die Holzfurnierstreifen (BF1, BF2) gegen einen oder mehrere untere Blöcke (55) zumindest beim Schneiden der Enden zu drükken und zu halten.

14. Klebeeinheit nach Anspruch 13, **dadurch gekennzeichnet, dass** die Druckelemente (59) mit dem Basiselement (50) mittels zumindest einer Anzahl von Federn (62ter) und eines Zylinders (61) verbunden sind, wobei die Federn (62ter) durch Druckkräfte ausüben, sodass die Bodenfläche jedes Druckelementes (59) parallel mit Bezug auf die obere Fläche jedes unteren Blocks (55) ist, wenn ein Teil des Holzfurnierstreifens (BF1, BF2) zwischen der oben genannten oberen Fläche und der Bodenfläche gehalten wird.

15. Verfahren zum Verkleben eines Endes eines ersten Holzfurnierstreifens (BF1) mit dem Ende eines zweiten Holzfurnierstreifens (BF2), wobei diese Enden des ersten und des zweiten Holzfurnierstreifens (BF1, BF2) in Form einer Reihe von scharfen Zähnen geschnitten sind, die nebeneinander angeordnet sind, und wobei das Zahnprofil des Endes des ersten Holzfurnierstreifens perfekt zum Zahnprofil des Endes des zweiten Holzfurnierstreifens passt, sodass die Zähne des Zahnprofils des ersten Holzfurnierstreifens perfekt in die Lücken zwischen den Zähnen des Zahnprofils des zweiten Holzfurnierstreifens eingebracht werden können,
wobei das Verkleben eines Schnittendes des ersten Holzfurnierstreifens (BF1) mit dem Schnittende des zweiten Holzfurnierstreifens (BF2) in einer Klebevorrichtung gemäß einem der Ansprüche 1 bis 9 durchgeführt wird,
wobei das Verfahren zumindest die folgenden Schritte aufweist:

A. Bewegen des Trägers (9) zum Platzieren eines Klebestreifens (10) unter einem Teil/dem ersten Teil (7) des Druckstabes (8), wobei der Klebestreifen sich zwischen den Schnittenden der Holzfurnierstreifen (BF1, BF2) angeordnet ist, die von einander entfernt angeordnet sind,
B. Biegen des Trägers (9), sodass der Klebestreifen (10) nach oben bewegt wird,
C. Bewegen, vorzugsweise gleichzeitiges Bewegen, der Schnittenden zum Klebestreifen

(10), wobei die Zähne eines Endes perfekt in den Lücken zwischen den Zähnen des anderen Endes verklebt werden,
D. Bewegen und/oder drehen des Druckstabes (8) zum Zusammenpressen der verklebten Enden und
E. Bewegen des Druckstabes (8), um den Druckstab (8) von den verklebten Enden wegzubewegen.

Revendications

1. Appareil à coller (1) pour coller une extrémité/un côté d'une première feuille de bois mince (BF1) sur une extrémité/un côté d'une deuxième feuille de bois mince (BF2), dans lequel les extrémités/côtés des première et deuxième feuilles de bois minces (BF1, BF2) sont coupées sous la forme d'une série de dents pointues qui sont disposées les unes à côté des autres, et dans lequel le profil denté de l'extrémité/du côté de la première feuille de bois mince (BF1) coïncide parfaitement avec le profil denté de l'extrémité/du côté de la deuxième feuille de bois mince, de telle sorte que les dents du profil denté de la première feuille de bois mince puissent être parfaitement insérées dans les encoches entre les dents du profil denté de la deuxième feuille de bois mince, dans lequel cet appareil peut être monté sur une table mobile (6, 11) dans le but de déplacer les profils dentés des extrémités l'un vers l'autre, et dans lequel cet appareil comprend:

- un support (9) pour une bande de colle (10),
- des moyens adaptés pour placer le support (9) comportant une bande de colle (10) entre les extrémités des première et deuxième feuilles de bois minces (BF1, BF2), de telle sorte qu'après le déplacement des profils dentés des extrémités l'un vers l'autre, les profils dentés des extrémités insérés l'un dans l'autre soient collés l'un à l'autre,
- des moyens (8, 17) adaptés pour presser et/ou pour traiter la colle afin de faire prendre et/ou sécher et/ou durcir la colle qui est située entre les profils dentés lorsqu'ils sont insérés l'un dans l'autre, de préférence pour traiter thermiquement et/ou pour traiter avec des rayons les profils dentés collés qui sont insérés l'un dans l'autre,
- une barre de pression allongée (8) qui est au moins partiellement mobile entre:

  - une première position, dans laquelle une bande de colle (10) est située en dessous de la barre de pression (8), sans que la barre de pression (8) touche ou entre en contact avec une bande de colle (10) qui se trouve sur le support (9), et
  - une deuxième position, dans laquelle la barre de pression (8) ou une partie (7, 17) de celle-ci touche ou entre en contact au moins partiellement avec les profils dentés qui sont insérés l'un dans l'autre, éventuellement avec interposition d'un papier ou d'une couche de film;

des moyens (16) pour déplacer la barre de pression (8) ou une partie de celle-ci entre au moins lesdites première et deuxième positions,
caractérisé en ce que l'appareil à coller comprend en outre:

un support (9) pour une bande de colle (10) qui est flexible de telle sorte qu'une partie du support (9) puisse au moins être déformée entre une position sensiblement plate et une position pliée dans le but de déplacer une bande de colle (10) vers le haut; et
des moyens (212, 213) adaptés pour plier ladite partie du support (9) de manière à élever une bande de colle (10).

2. Appareil à coller selon la revendication 1, **caractérisé en ce que** la barre de pression allongée (8) est montée de façon au moins partiellement rotative autour d'un axe de rotation qui est sensiblement perpendiculaire à la direction du déplacement convergeant des profils dentés des extrémités des feuilles de bois minces (BF1, BF2) qui doivent être collées les unes aux autres, entre lesdites première et deuxième positions, et dans lequel les moyens (16) pour déplacer la barre de pression (8) sont des moyens adaptés au moins pour faire tourner la barre de pression (8).

3. Appareil à coller selon la revendication 1 ou 2, **caractérisé en ce qu'**une première partie (7) de la barre de pression (8) est un profil longitudinal qui comporte une rainure centrale (20) qui est destinée à se trouver au-dessus de la bande de colle (10) dans la première position de la barre de pression (8).

4. Appareil à coller selon la revendication 3, **caractérisé en ce que** la première partie (7) de la barre de pression (8) est un profil qui est monté dans une fente (18) de la barre de pression, dans lequel le premier profil (7) est monté d'une façon détachable ou amovible sur la barre de pression (8).

5. Appareil à coller selon la revendication 4, **caractérisé en ce que** le premier profil (7) est monté dans une fente (18), dans lequel le premier profil (7) et/ou la barre de pression (8) comprend au moins des moyens pour régler la position du premier profil (7) par rapport à l'axe de rotation de la barre de pression

(8).

6. Appareil à coller selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'appareil à coller comprend des moyens pour écarter la barre de pression (8) du support (9) après le collage des extrémités des première et deuxième feuilles de bois minces (BF1, BF2).

7. Appareil à coller selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la barre de pression (8) comprend des moyens (27) adaptés pour chauffer au moins une partie de la barre de pression (8), de préférence une deuxième partie (17).

8. Appareil à coller selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**une partie de la barre de pression (8) comprend des moyens adaptés pour compenser l'épaisseur des extrémités des première et deuxième feuilles de bois minces (BF1, BF2) qui sont placées l'une derrière l'autre dans la deuxième position de la barre de pression (8), dans lequel les moyens adaptés pour compenser l'épaisseur comprennent de façon avantageuse un élément de caoutchouc qui est au moins conducteur de chaleur.

9. Appareil à coller selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'appareil comprend un système de commande qui comprend un certain nombre de webcams (100) et/ou de caméras et/ou de lentilles optiques qui sont adaptées pour au moins envoyer des images des extrémités coupées et/ou de la bande de colle (10) à un système d'ordinateur, dans lequel ledit système d'ordinateur est de façon avantageuse approprié pour traiter des images des extrémités coupées et/ou de la bande de colle dans le but de comparer certains paramètres de ces images avec des paramètres de référence, et de délivrer des instructions à un ou plusieurs composant(s) de l'appareil à coller en fonction de la comparaison/différence par rapport aux paramètres de référence.

10. Unité de collage comprenant un appareil à coller (1) selon l'une quelconque des revendications précédentes, ainsi qu'une table mobile (6, 11) pour déplacer les profils dentés des extrémités l'un vers l'autre, dans laquelle l'appareil à coller (1) est de préférence mobile et/ou détachable par rapport à la table mobile (6, 11), dans laquelle la table mobile comprend de façon avantageuse:

- un premier élément qui est adapté pour supporter une partie de la première feuille de bois mince,
- un deuxième élément qui est adapté pour supporter une partie de la deuxième feuille de bois mince,
- des moyens pour manoeuvrer ou déplacer simultanément les premier et deuxième éléments mentionnés ci-dessus, dans laquelle ces moyens comprennent au moins un excentrique qui est connecté aux premier et deuxième éléments par une première tige et une deuxième tige, respectivement.

11. Unité de collage selon la revendication 10, **caractérisée en ce qu'**elle comprend un ou plusieurs outil (s) de tranchage (3, 5) destiné(s) à couper les extrémités des première et deuxième feuilles de bois minces (BF1, BF2) dans le but d'obtenir des extrémités en forme de dents pointues.

12. Unité de collage selon la revendication précédente, **caractérisée en ce que** l'unité comprend un élément de base (50):

- qui est connecté à un ou plusieurs bloc(s) inférieur(s) (55) qui est/sont adapté(s) pour être fixé(s) par rapport à l'élément de base (50) lors de la coupe des extrémités, et
- qui est connecté à des moyens adaptés pour pousser l'outil ou les outils de tranchage (3, 5) vers le bas dans la direction d'un des bloc(s) inférieur(s) (55) afin de couper les extrémités des feuilles de bois minces (BF1, BF2), dans laquelle l'élément de base (50) comprend de façon avantageuse un ou plusieurs élément(s) d'enlèvement qui est/sont destiné(s) à opérer de concert avec l'outil ou les outils de tranchage (3, 5) pour éliminer les déchets issus de la coupe des extrémités des feuilles de bois minces (BF1, BF2) de l'outil ou des outils de tranchage (3, 5).

13. Unité de collage selon la revendication 12, **caractérisée en ce que** l'élément de base (50) comprend un ou plusieurs élément(s) de pression mobile(s) (59) qui est/sont adapté(s) pour pousser et maintenir les feuilles de bois minces (BF1, BF2) contre un ou plusieurs blocs(s) inférieur(s) (55), au moins pendant la coupe des extrémités.

14. Unité de collage selon la revendication 13, **caractérisée en ce que** les éléments de pression (59) sont connectés à l'élément de base (50) au moyen d'au moins un certain nombre de ressorts (62ter) et d'un cylindre (61), dans laquelle les ressorts (62ter) exercent des forces de poussée de telle sorte que la surface inférieure de chaque élément de pression (59) soit parallèle à la surface supérieure de chaque bloc inférieur (55), lorsqu'une partie de la feuille de bois mince (BF1, BF2) est maintenue entre la surface supérieure et la surface inférieure mentionnées ci-dessus.

15. Procédé pour coller une extrémité d'une première feuille de bois mince (BF1) sur une extrémité d'une deuxième feuille de bois mince (BF2), dans lequel ces extrémités des première et deuxième feuilles de bois minces (BF1, BF2) sont coupées sous la forme d'une série de dents pointues qui sont disposées les unes à côté des autres, et dans lequel le profil denté de l'extrémité de la première feuille de bois mince coïncide parfaitement avec le profil denté de l'extrémité de la deuxième feuille de bois mince, de telle sorte que les dents du profil denté de la première feuille de bois mince puissent être parfaitement insérées dans les encoches entre les dents du profil denté de la deuxième feuille de bois mince, dans lequel le collage d'une extrémité coupée d'une première feuille de bois mince (BF1) sur l'extrémité coupée de la deuxième feuille de bois mince (BF2) est réalisé dans un appareil à coller selon l'une quelconque des revendications 1 à 9, et dans lequel le procédé comprend au moins les étapes suivantes:

a) déplacer le support (9) afin de placer une bande de collage (10) en dessous d'une partie/de la première partie (7) de la barre de pression (8), dans lequel la bande de colle (10) s'étend entre les extrémités coupées des feuilles de bois minces (BF1, BF2) qui sont situées à distance l'une de l'autre;
b) plier le support (9) de telle sorte que la bande de colle (10) soit déplacée vers le haut;
c) déplacer, de préférence déplacer simultanément, les extrémités collées en direction de la bande de colle (10), dans lequel les dents d'une extrémité sont parfaitement collées dans les encoches entre les dents de l'autre extrémité;
d) déplacer et/ou faire tourner la barre de pression (8) afin de presser les extrémités collées l'une contre l'autre; et
e) déplacer la barre de pression (8) afin d'écarter la barre de pression (8) des extrémités collées.

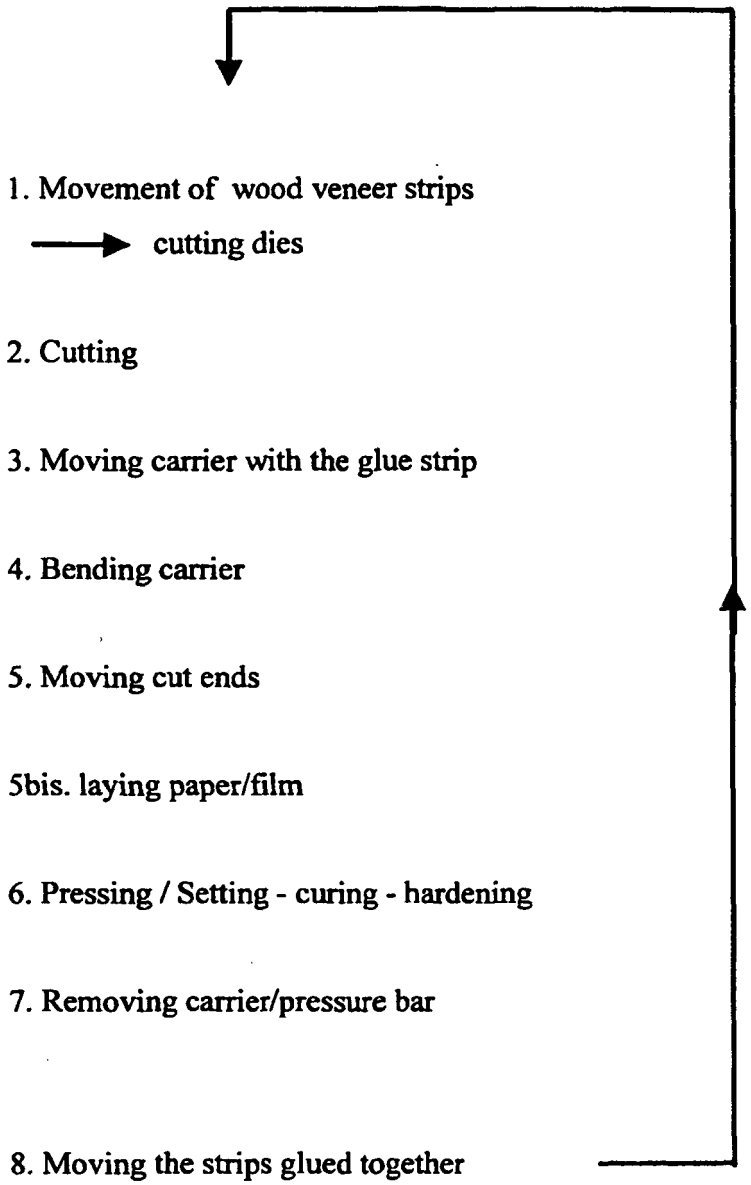

1. Movement of wood veneer strips
cutting dies
2. Cutting
3. Moving carrier with the glue strip
4. Bending carrier
5. Moving cut ends
5bis. laying paper/film
6. Pressing / Setting - curing - hardening
7. Removing carrier/pressure bar
8. Moving the strips glued together
9. humidifying

Fig. 1

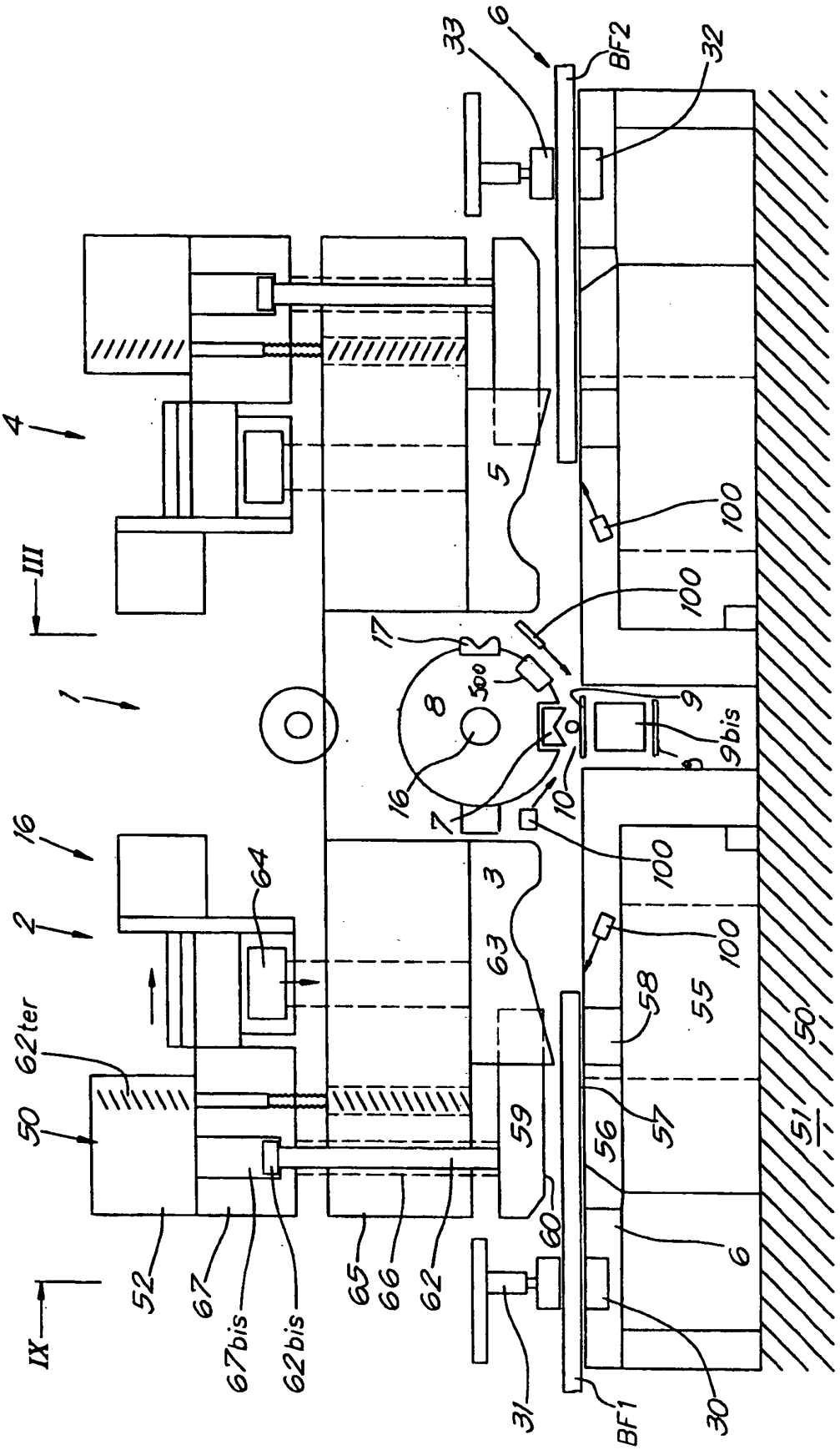

33
6
BF2
32
4
5
100
III
17
500
8
9
9bis
1
16
7
10
16
2
64
3
100
63
62ter
58
55
100
50
50
59
57
56
51
52
67
67bis
62bis
65
66
62
60
6
IX
31
BF1
30

Fig.2

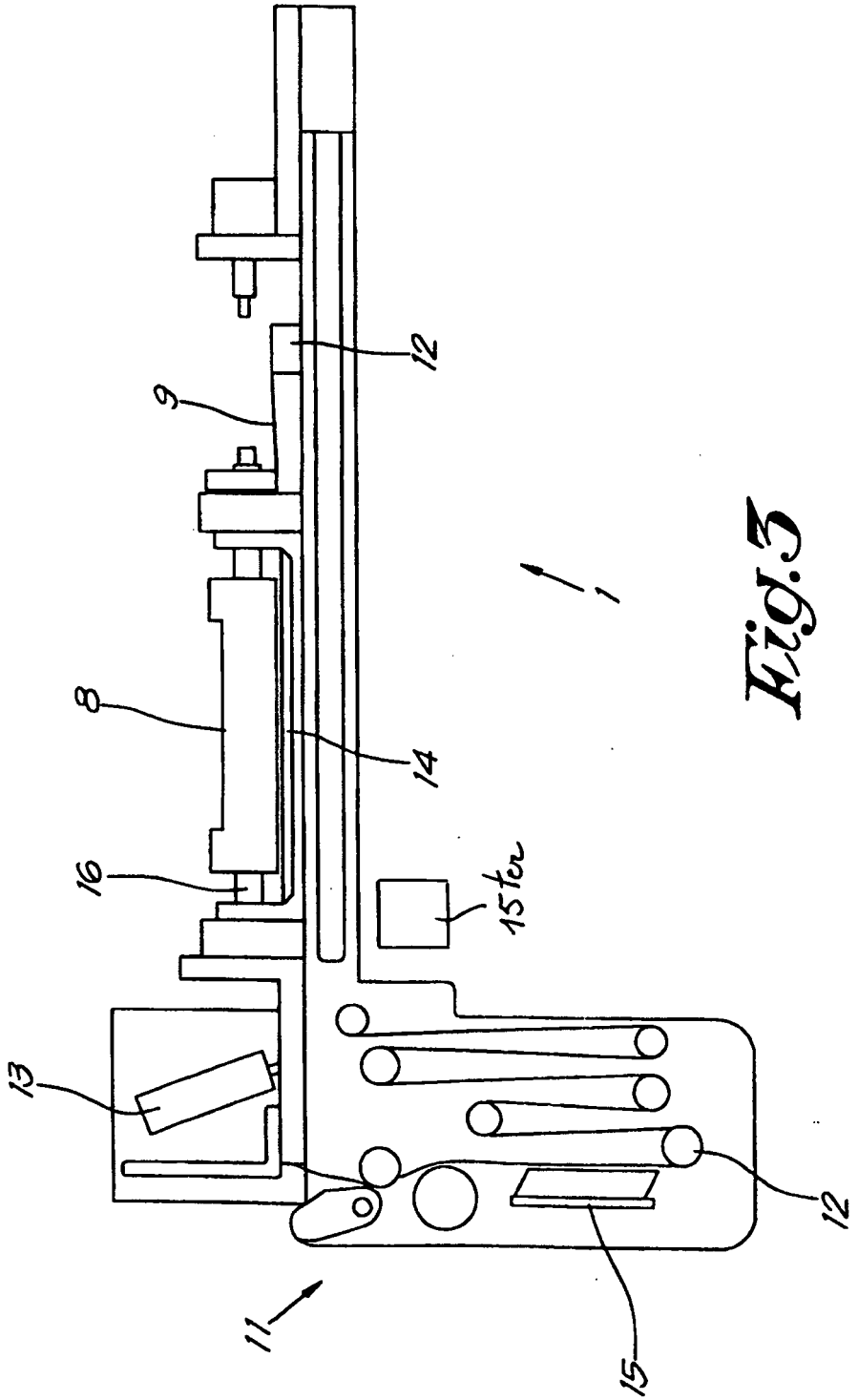


Fig.3

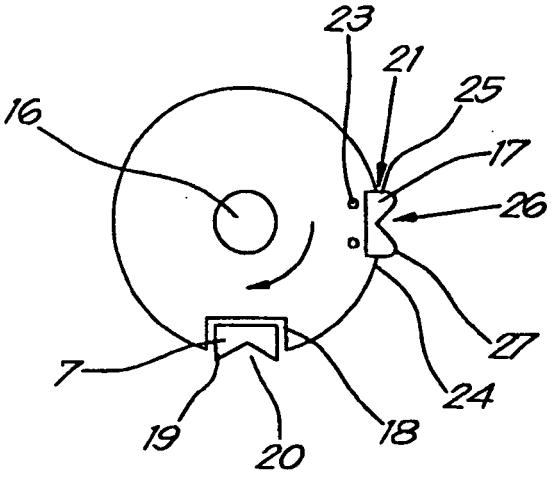


Fig.4A

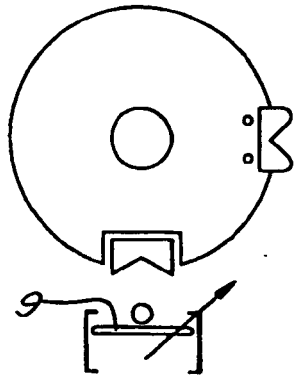


Fig.4B

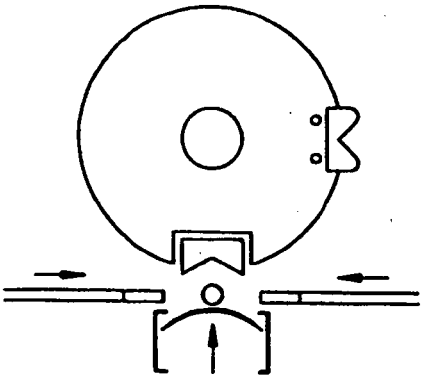


Fig.4C

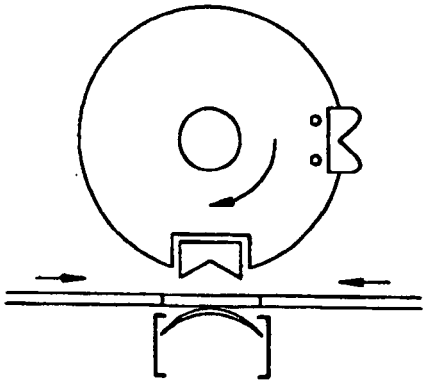


Fig.4D

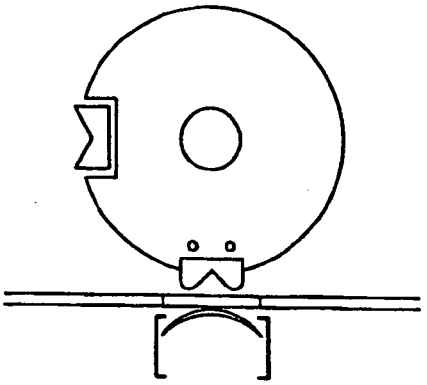


Fig.4E

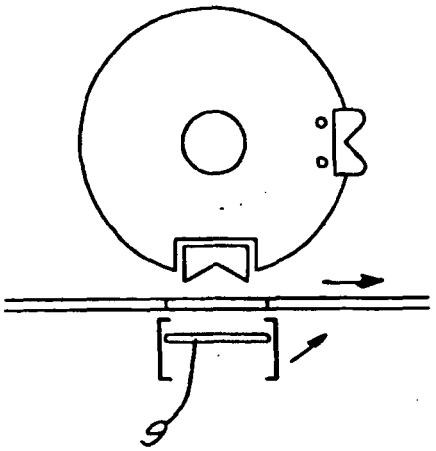


Fig. 4G

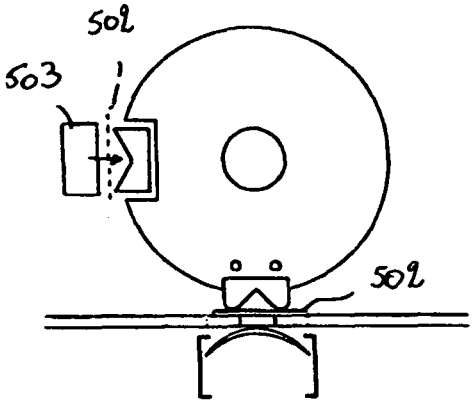


Fig. 4H

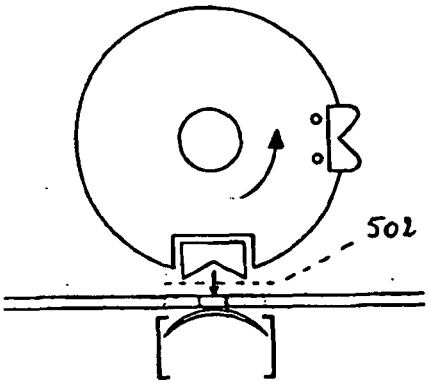


Fig. 4I

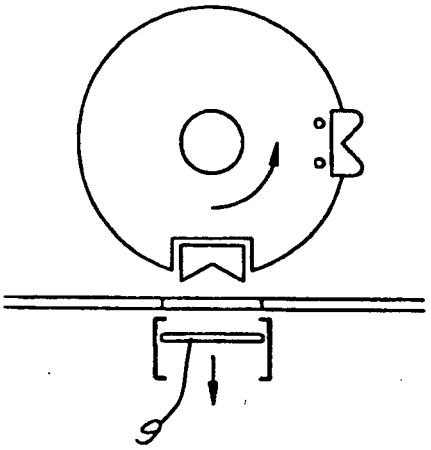


Fig.4F

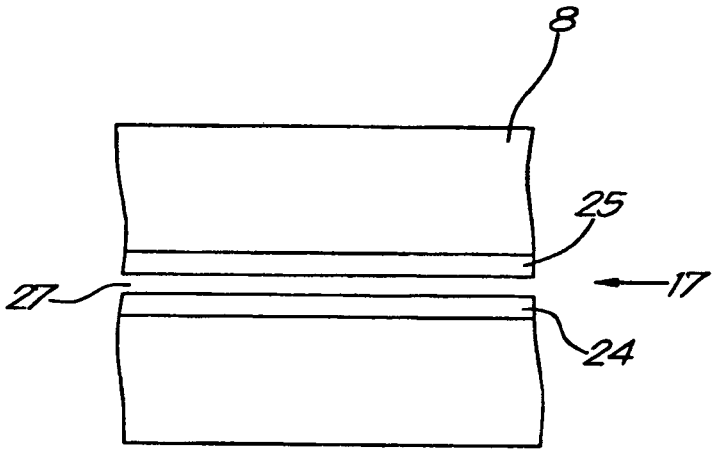


Fig.5

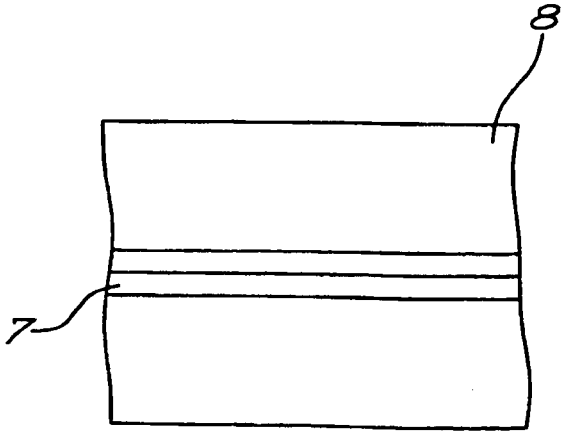
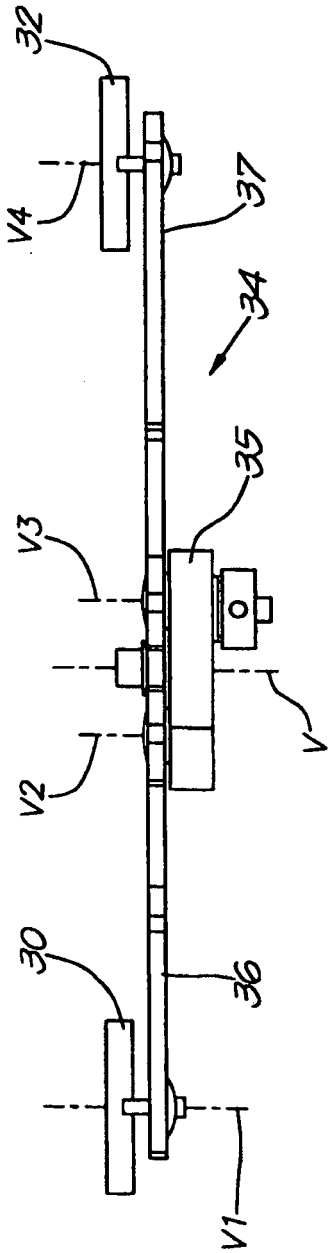


Fig.6

Fig.7



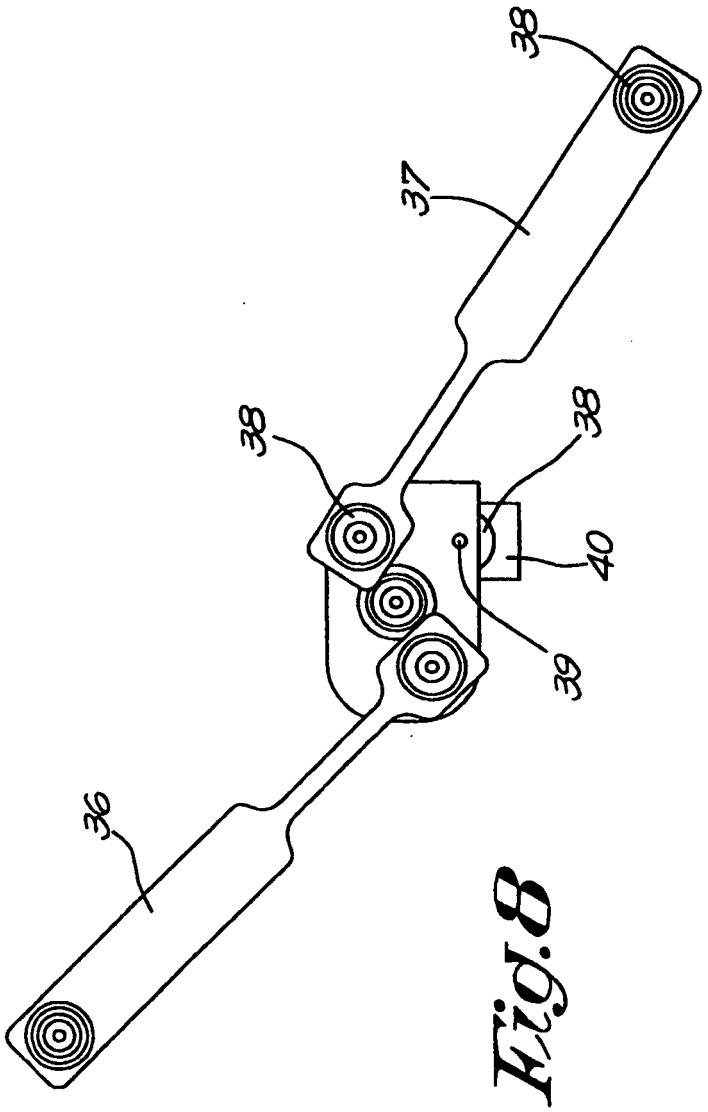


Fig.8

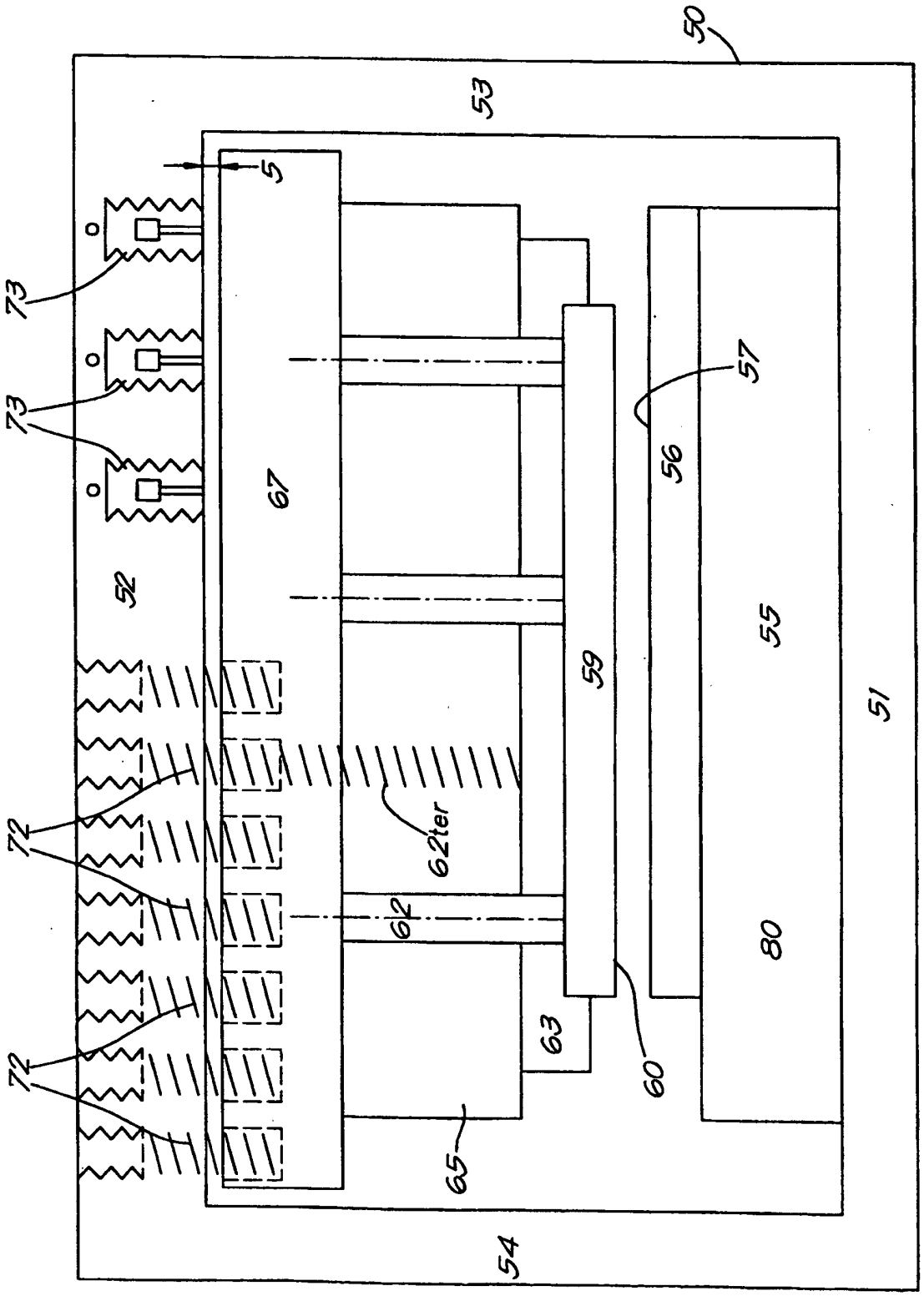


Fig.9

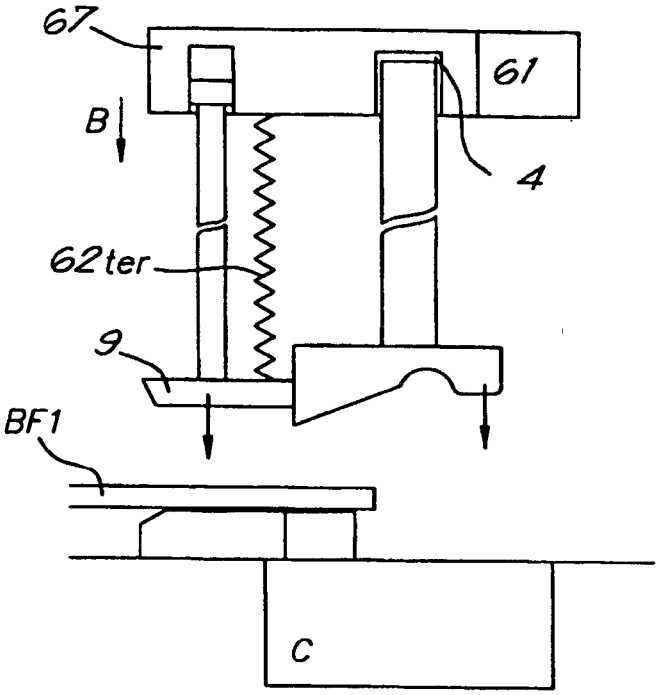


Fig.10A

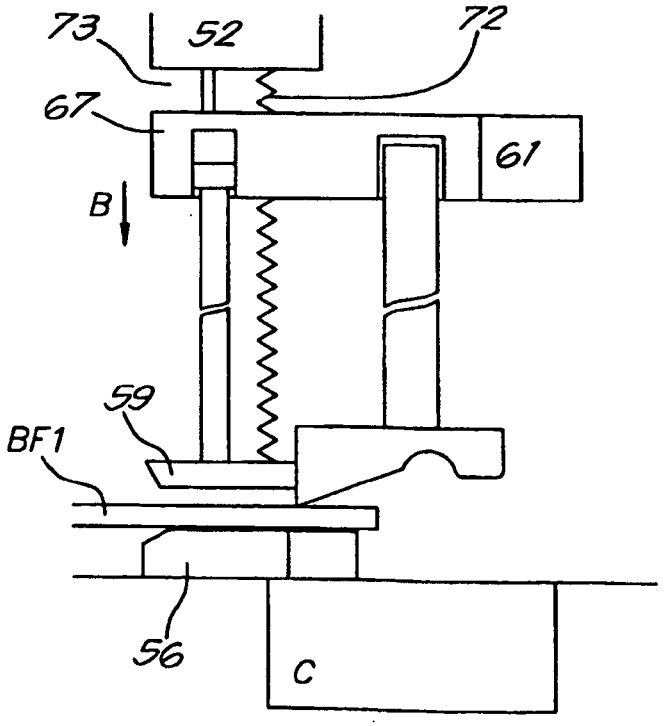


Fig.10B

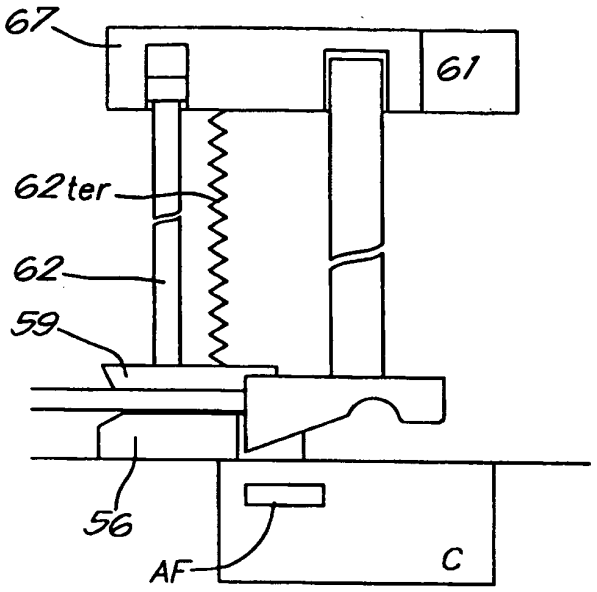


Fig.10C

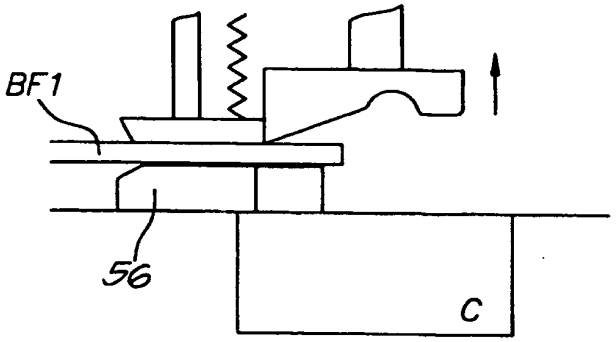


Fig.10D

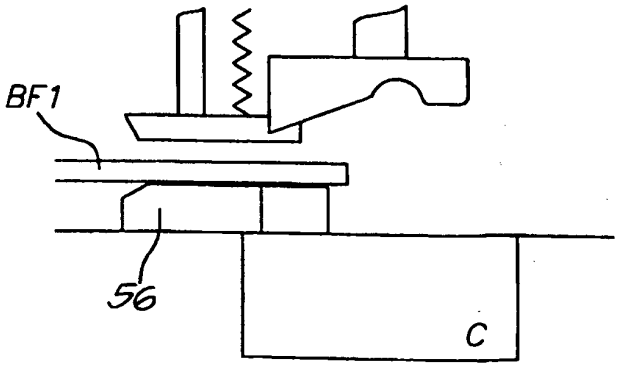


Fig.10E

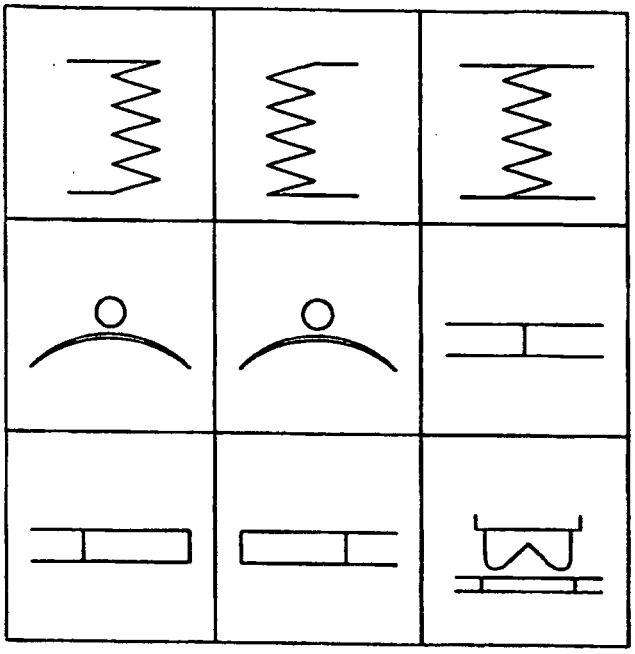


Fig. 11

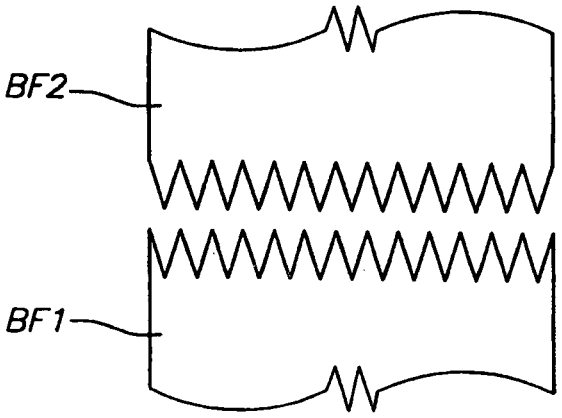


Fig. 12A

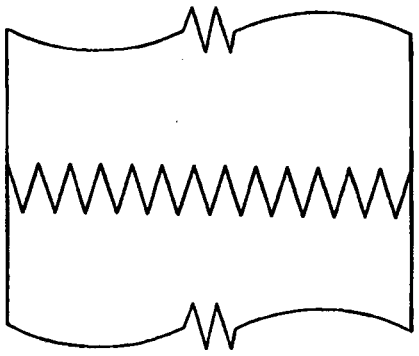


Fig. 12B

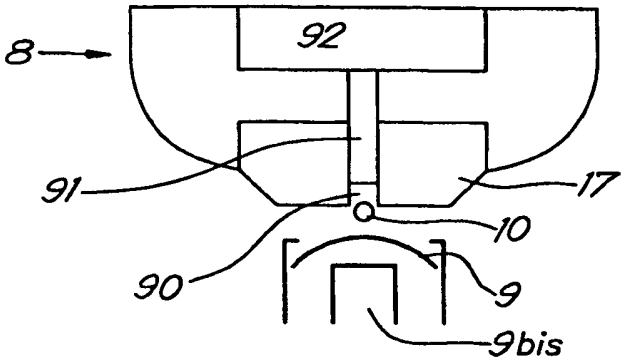


Fig. 13A

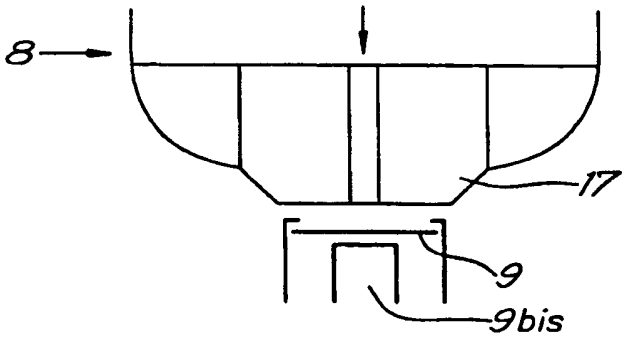


Fig. 13B

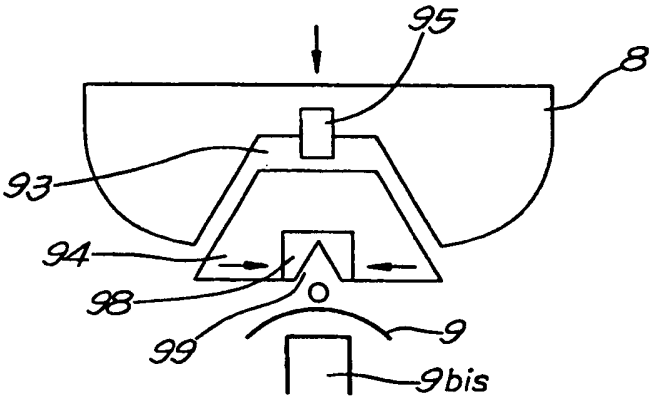


Fig. 14A

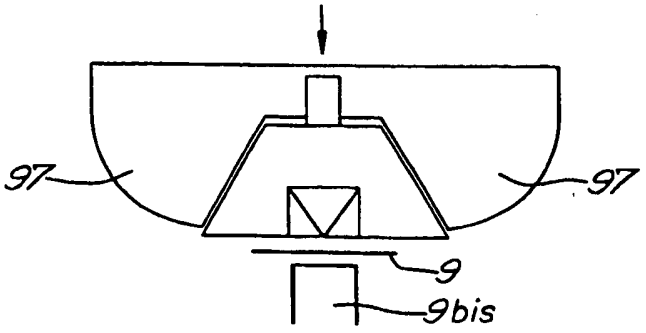


Fig. 14B

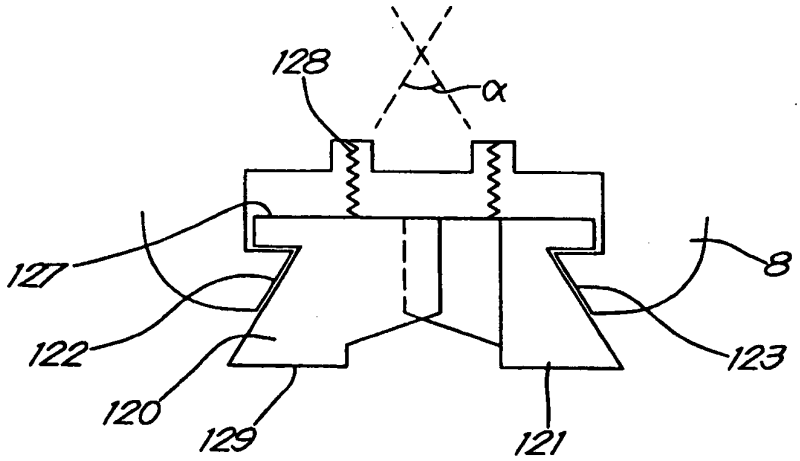


Fig. 15A

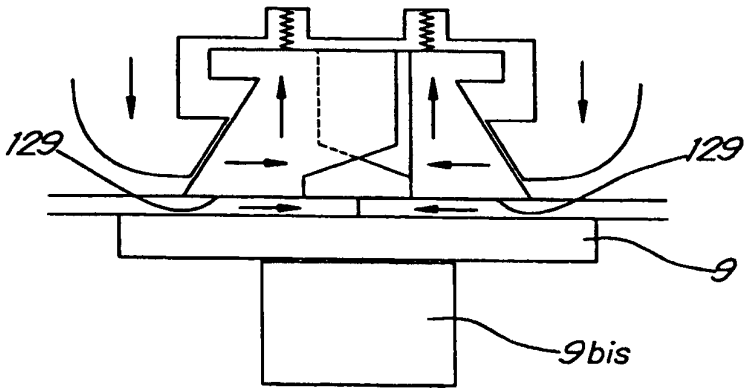


Fig. 15B

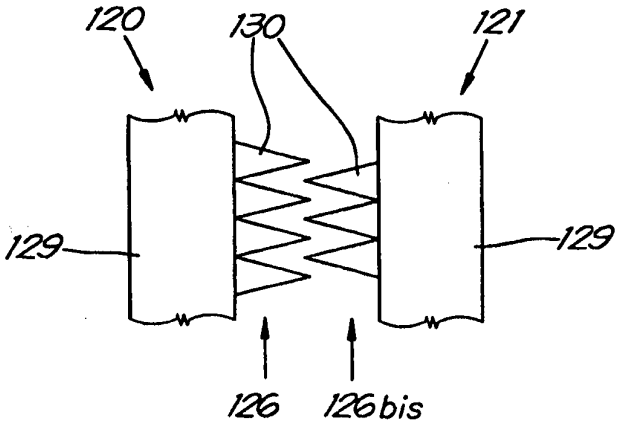


Fig. 15C

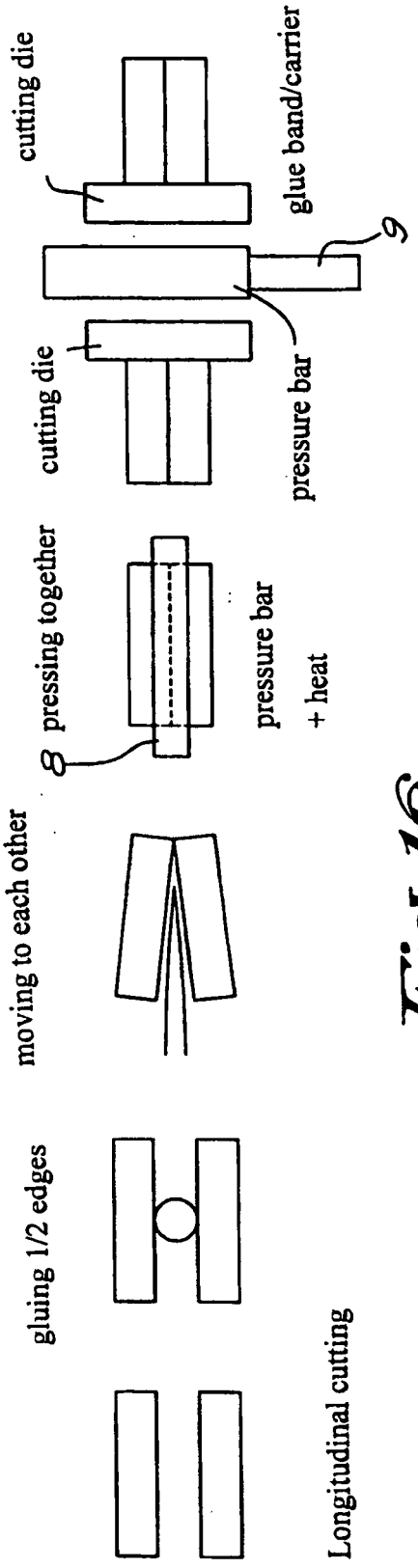

cutting die
glue band/carrier
9
cutting die
pressure bar
8 pressing together
pressure bar
+ heat
moving to each other
gluing 1/2 edges
Longitudinal cutting

Fig. 16

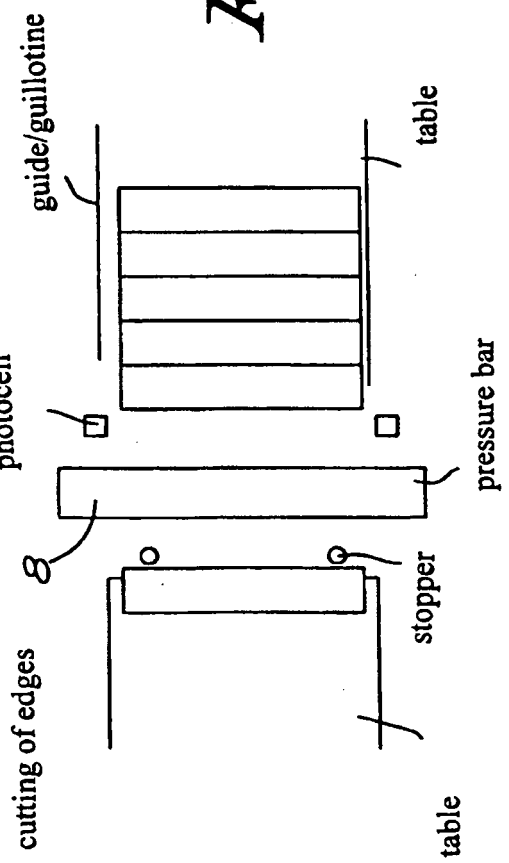

guide/guillotine
table
photocell
pressure bar
8
stopper
cutting of edges
table

Fig. 17

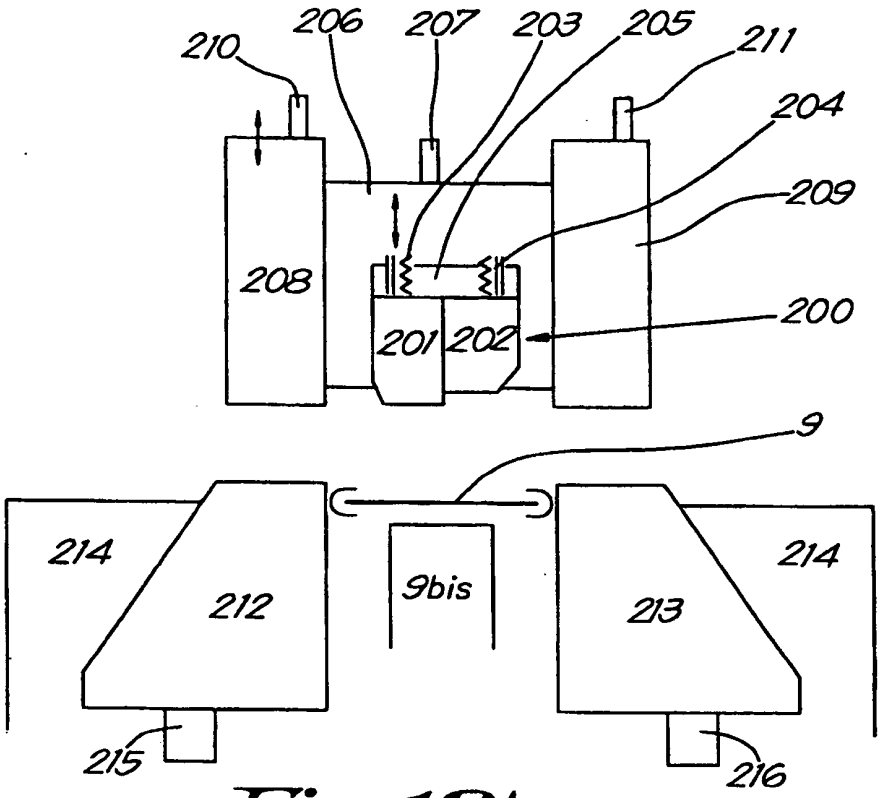


Fig. 18A

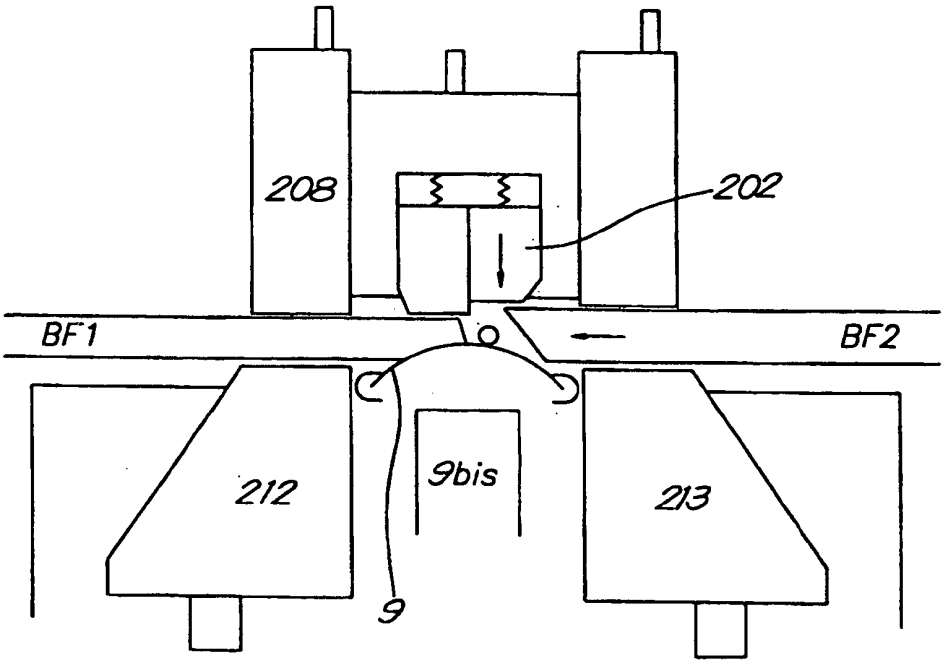


Fig. 18

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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