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(54) METHOD AND APPARATUS FOR CONTACT DRYING OF ROTARY-PEELED OR CUT WOOD VENEERS

VERFAHREN UND VORRICHTUNG ZUR KONTAKTTROCKNUNG VON RUNDGESCHÄLTEN
ODER -GESCHNITTENEN HOLZFURNIEREN

PROCÉDÉ ET APPAREIL POUR SÉCHAGE PAR CONTACT DE FEUILLES DE PLACAGE DE BOIS
PELÉES PAR ROTATION OU DÉCOUPÉES

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Description

[0001] The invention primarily relates to a method for contact drying of rotary-peeled or cut wood veneers in which method fresh veneer, having a green moisture content, is heated while at the same time it is pressed whereby the result is dried veneer. The invention also relates to an apparatus for contact drying of rotary-peeled or cut wood veneers, which apparatus comprises a first belt assembly and a second belt assembly, of which the first belt assembly comprises a first metal belt, and the second belt assembly comprises at least a second metal belt whereby the belt assemblies have been arranged to receive wood veneers between them; heating means to heat at least the first metal band to the first temperature; and compressing means to press the first belt assembly and the second belt assembly towards each other during said heating in which case the wood veneer between them is pressed.

[0002] At present, a roller dryer, i.e. a hot-air drier that works according to the feed-through principle and based on convection is commonly used in drying veneer. It works such that hot air is blown through separate nozzle cases onto both surfaces of the veneer while it moves between the rollers from the front end of the drier to the back end. The moisture, i.e. water, travels from the veneer to the said hot air as gas and/or steam and disappears from the drying chamber with the hot air. Before the veneer reaches the end, it is cooled by taking the air to be blown directly from outside and blowing it out again as such after cooling. This kind of system for drying stiff and semi-stiff sheets of veneer is described in patent publication US 4,215,489. The method therein for drying veneers often causes water spots on the veneer because wood veneer is non-homogeneous with regard to both the concentration and discharge of the moisture. To avoid water spots, the veneer must be 'over-dried' to nearly 0 % moisture, although the optimal value with regard to durability is an ultimate 6 % - 7 % moisture in relation to the dry matter. Veneer that is excessively dry is brittle and it becomes twisted in which case it is not durable enough for processing and the durability of the product to be made from it suffers. Normally, plywood and laminated wood or other such products are made into layers by gluing veneers together, one on top of the other and at appropriate positions in relation to each other and other possible materials. In practice, the moisture divergence of convection-dried veneers is significant, in which case the possibilities for glue manufacturers to develop their glues to be reactive in the desired and controlled way becomes more difficult.

[0003] Another possibility is to use the type of contact drying method and compression drier as described in patent publication US 4,193,207, wherein each sheet of veneer is held compressed between two hot, stiff metal plates, whereby there is the same high temperature on both sides of the veneer and the water from the veneer evaporates through evaporation discharge grooves on

the surface of the metal plates. In this case, the contact temperature of the metal plates in relation to the veneers is adjusted between 121°C and 204°C to even the differences in moisture, and the compression pressure of the veneers is kept between 34 kPa and 483 kPa, i.e. so high that the veneer does not shatter. In this way, it may be possible to achieve a relatively even level of moisture, which may typically be between 1 % and 5 %. Due to the significant compression pressure, the veneer compresses together and the production efficiency decreases compared to the above described convection/hot-air drier. Published Japanese patent application JP-01-107084 also describes a compression drier for drying single veneer sheets, wherein the surfaces of the hot metal plates that press the veneer are shaped into a slight convex in an attempt to prevent a water spot from forming in the middle of the sheet of veneer. Due to the changes and temperature differences, there are some grooves in the surfaces of the metal plates, and, additionally, it is suggested that steel belts be used between the hot metal plates and the veneer to allow the steel belts to move the predefined distance.

[0004] Publication DE 103 29 832 A1 discloses a solution for drying wood veneers where the green veneer is fed between two transport chains comprising heated metal plates pressing against the green veneer. The metal plates have gaps between them during the pressing stage, which allows moisture and water vapor escape from the veneer to the surrounding air.

[0005] Publication DE 25 27 433 discloses a solution for drying and/or joining of veneer, where the veneer is fed between two belt assemblies, where each belt assembly comprises a plurality of adjacent belts having gaps between them. These gaps allow the moisture and water vapor to escape to the surrounding air during the drying process.

[0006] Publication WO 99/42655 discloses a method and an apparatus for drying a fiber web, where the fiber web is fed between two endless bands impermeable to air, preferably made of metal, where one of the bands is heated and the other cooled.

[0007] The objective of the invention is to create a method and apparatus for drying wood veneers to achieve the desired amount of final moisture, which is as even as possible. A further objective of the invention is to reduce the veneers' tendency to form peeling cracks, as well as to keep the changes in the veneer's volume at a minimal level during drying. Also, a further objective of the invention is to create dried veneers, which can be used to produce plywood and/or laminated wood with plausible durability properties.

[0008] The above described problems can be solved and the previously defined objectives can be achieved with the contact drying method according to the invention, characterized by what has been defined in the characterizing part of Claim 1, as well as with the contact drying apparatus according to the invention, characterized by what has been defined in the characterizing part of Claim

10.

[0009] In the following the invention will be explained in detail with reference to the enclosed figures, in which:

Fig. 1 is a diagrammatic view of the first advantageous embodiment of the equipment according to the invention, illustrated in the conveying direction, cut along the I-I level in Fig. 3.

Fig. 2 is a diagrammatic view of the second advantageous embodiment of the equipment according to the invention, illustrated in the conveying direction, cut along the II-II level in Fig. 4.

Fig. 3 is a diagrammatic, cross-sectional view of the equipment according to the first embodiment, with respect to the conveying direction, cut along the III-III level in Fig. 1.

Fig. 4 is a diagrammatic, cross-sectional view of the equipment according to the second embodiment, with respect to the conveying direction, cut along the IV-IV level in Fig. 2.

Fig. 5 is a diagrammatic, cross-sectional view of the equipment according to the third embodiment, with respect to the conveying direction, corresponding to the cuts in Figures 3 and 4.

Figs. 6A - 6C present the temperature distributions, effected by the invention, corresponding to the adjacent figures 3, 4 and 5 over the veneer and the components on both of its sides, i.e. temperature profiles between the hot first temperature and the cold second temperature, which is at two different temperatures.

[0010] The apparatus for contact drying rotary-peeled or cut wood veneers comprises a first belt assembly 3 and a second belt assembly 4. The first belt assembly 3 comprises a first metal belt 1 and the second belt assembly 4 comprises at least a second metal belt 2. These belt assemblies 3 and 4 are arranged to receive in between them wood veneers 5 which will be dried with this apparatus. For this purpose, belt assemblies 3 and 4 run parallel at some lengths and at a distance S3 corresponding to the thickness S2 of the veneers. "Wood veneer" or "veneer" refers to thinly cut wood panels that have been rotary peeled, i.e. spirally cut from a log or to thinly sliced wood panels that have been cut parallel, i.e. sliced from a log. Thus, in both cases, the wood is cut with a blade that has a uninterrupted/straight cutting edge with which slashes are made to produce veneers from the wood with essentially no waste material, which is a different principle than with sawing where a large number of small, separate blades remove the material in chips or sawdust from between the end products. Rotary peeling is the more commonly used method because the method produces wood panels, which are larger in surface area. It should be noted that the present invention does not relate to the drying of sawed products. Wood veneers are used to produce either plywood or laminated veneer lumber in which the direction of the grain in the

wood veneers may be perpendicular against each other, or the direction of the grain in the wood veneers may be parallel, the direction of the grain in the wood veneers may form an angle between 90° and 0° in relation to each other, or the structure of the plywood/laminated veneer lumber may be a combination of these. The thickness and size of the wood veneers varies according to the type of wood and needed use, but it is usually a maximum of 8 mm and typically 2.5 mm - 5 mm for laminated veneer lumber, and usually a maximum of 5 mm and typically 1.5 mm - 4 mm for plywood. Sliced, i.e. cut, wood veneers are often thinner, as thin as 0.5 mm. Furthermore, the apparatus comprises heating means 11 to heat at least the first metal belt 1 to the first temperature T1, as well as compressing means to press the first belt assembly 3 and the second belt assembly 4 towards each other during the said heating, at which time the wood veneer 5 between them is subjected to compression pressure P.

[0011] According to the invention, the second belt assembly 4 comprises, in addition to the said second metal belt 2, at least one porous screen band 6 or a porous surface section 8 in this second metal belt 2. Both of these alternative components, the porous one, i.e. the first screen band 6, as with the porous surface section 8, interpose the second metal belt 2 and the wood veneer 5. It is still to be emphasized that if the apparatus contains a first screen band 6, it is between the second metal band and wood veneer, as illustrated in Fig. 3; if the apparatus contains a porous section 8 on the surface of the second metal belt 2, it is between the second metal belt and the wood veneer, as illustrated in Fig. 4. According to the invention, the apparatus comprises particular cooling means 12 to keep the second metal belt 2 at the second temperature T2, which is about the amount of the difference in temperature ΔT lower than the said first temperature T1, i.e. the temperature of the first metal belt. The said temperature difference ΔT is at least 60°C or at least 80°C or at least 100°C. The above described first temperature T1 is accordingly at least 120°C and at most 210°C. The type of wood and the desired characteristics of the plywood and laminated veneer lumber to be made from the veneers affect the choice of the first temperature within this said temperature interval. According to the invention, the above-said second temperature T2 is a maximum of 50°C or a maximum of 30°C. In this case, the temperature difference between the first and second temperatures $T1 - T2 = \Delta T$ is at least 60°C or at least 80°C or at least 100°C. Fundamentally, the greater the temperature difference ΔT between the first and second temperatures T1, T2, the more effective the drying of the wood veneer according to the invention will be. This temperature difference is limited only by the heat resistance of the wood and to how low a temperature it is economically reasonable to cool it. In practice, it may be possible to use temperature differences ΔT even greater than those said above, such as 130°C, 160°C or even 180°C.

[0012] The above described heating means 11 for heating the first metal belt 1 can be embodied in several

ways. Firstly, a hot pressurized chamber 18 can be used, the one wall of which is formed by the moving first metal belt 1 in question. The other walls 38 of the hot pressurized chamber 18 are typically fixed. In this way, the hot pressurized chamber is bordered by five fixed walls, for example, if the chamber is even close to the shape of a parallelepiped, as well as one side or wall in the direction of its surface formed by the moveable or moving first belt assembly 3 and first metal belt 1, as can be perceived from Figures 1 and 3. Of course a differently shaped hot pressurized chamber may be used. In the pressurized chamber formed in this way, a pressurized hot medium F1 is circulated, the temperature of which is the first temperature T1 produced for the first metal belt $T1+\varepsilon1$. It is clear that there is a slight difference in the temperatures $\varepsilon1$ of the metal belt and the hot medium arising from the heat transfer, but it can often be ignored. Precisely speaking, the temperature of the pressurized hot medium F1 is higher than the predefined temperature of the first metal belt and relatively equal to the first difference $\varepsilon1$, i.e. it is $T1+\varepsilon1$. Alternatively, a rigid hot block 19 can be used, along the one outer surface of which the first belt assembly 3 and the first metal belt 1 move, as can be perceived from Figures 2 and 4. The hot block 19 has cables 20, either hoses for the medium or electrical wires, in which the hot medium F1 or electric current E circulates creating the temperature $T1+\varepsilon2$ in the said hot block 19, which produces the temperature T1 in the first metal belt. Generally speaking, this second small temperature difference $\varepsilon2$ is a little greater than the previously said first temperature difference $\varepsilon1$ because there is a hot block in the heat transfer path itself and a crossover in the contact of the metal belt and the hot block. In this lastly described embodiment, the temperature of the hot medium F1 is actually higher than the temperature of the hot block 19, $T2+\varepsilon2$, due to the transfer of heat between the hot medium and the hot block.

[0013] The cooling means 12 in accordance with the invention can be embodied in several ways. Firstly, a cold pressurized chamber 28 can be used, one wall of which is formed by the moving second metal belt 2. The other walls 48 of the cold pressurized chamber 28 are typically fixed. In this way, the cold pressurized chamber is bordered by five fixed walls, for example, if the chamber is even close to the shape of a parallelepiped, as well as one side or wall in the direction of its surface formed by the moveable or moving second belt assembly 4 and second metal belt 2, as can be perceived from Figures 1 and 3. Of course a differently shaped cold pressurized chamber 28 may be used. In this way, a pressurized cold medium F2, the temperature of which is the second temperature T2 produced for the second metal belt $T2+\varepsilon3$, is circulated in the formed pressurized chamber. It is clear that there is a slight third temperature difference $\varepsilon3$ of the metal belt and the cold medium arising from the heat transfer, but it can often be ignored. Precisely speaking, the temperature of the pressurized cold medium F2 is lower than the predefined temperature of the second met-

al belt and relatively equal to the third temperature difference $\varepsilon3$, i.e. it is $T2+\varepsilon3$. Alternatively, a rigid cold block 29 can be used, the one outer surface of which the second belt assembly 4 and the second metal belt 2 move, as can be perceived from Figures 2 and 4. The cold block 29 has channels 30 in which the cold medium F2 circulates creating in the said cold block 29 the temperature $T2-\varepsilon4$ that produces the second temperature T2 in the second metal belt. Generally speaking, this fourth small temperature difference $\varepsilon4$ is a little greater than the previously said third temperature difference $\varepsilon3$ because there is a cold block in the heat transfer path itself and a crossover in the contact of the metal belt and the cold block. In this lastly described embodiment, the temperature of the cold medium F2 is actually lower than the temperature of the cold block 29, $T2-\varepsilon4$, due to the transfer of heat between the cold medium and the cold block.

[0014] It should be understood that a combination of the hot pressurized chamber 18 and a cold pressurized chamber 28 can be used, as in Figure 3, or a combination of a rigid hot block 19 and a rigid cold block 29, as in Figure 4, or a combination of the hot pressurized chamber 18 and the rigid cold block 29, or a combination of the rigid hot block 19 and the cold pressurized chamber 28, as in Figure 5.

[0015] The apparatus comprises control units 9 for moving first belt assembly 3 and second belt assembly 4 at the same velocity V, either constantly or intermittently, between the afore-said hot pressurized chamber or hot block and cold pressurized chamber or cold block. At the same time as the first and second belt assemblies with their first and second metal belts 1, 2 move between the hot pressurized chamber or hot block and the cold pressurized chamber or cold block opposite it, compression pressure P is applied to the belt assemblies by means of these chambers/components and then to the wood veneer 5, between the metal belts, through the agency of metal belts 1, 2. The area confined by the hot pressurized chamber or the hot block and the cold pressurized chamber or cold block opposite it in the direction of the belt assemblies, i.e. the direction of the velocity V, on which belt assemblies 3, 4 with their metal belts 1, 2 run in between at the same time that the said compression pressure is applied to the belt assemblies and their metal belts is referred to as the drying zone DZ. The control units 9 comprise, in all embodiments, a set of rollers 21 through which at least the first metal belt 1 of the first belt assembly 3 winds, and a second set of rollers 22 through which at least the second metal belt 2 of the second belt assembly 4 winds. The first embodiment according to the invention also has a third set of rollers 23 through which the porous first screen band 6 winds as can be seen in Figure 1. The embodiment in Figure 1 also has a second screen band 7 that runs in between the first screen band 6 and the wood veneer at the point of the drying zone DZ; or, in the second possible embodiment, in between the porous surface section 8 of the second metal band and wood veneer 5. This possible

second screen band 7 runs through a fourth set of rollers 24. In the second embodiment according to the invention, the second metal band 2, including its porous surface section 8, wind through the second set of rollers 22. The control units can be of any commonly known type or of a new type appropriate for the purpose, and therefore they will not be explained further.

[0016] In the first embodiment where the first bolting belt 6 that takes up condensed water and carries it away is used, the apparatus further comprises a drier 34 for the second metal belt 2 and a drier or driers 35 and/or 36 for the porous screen band. The drier 34 for the second metal belt is, for example, a scraper with which the excess water on the outside of the drying zone DZ is removed from the surface of the second metal belt 2 that faces the wood veneer in the drying zone DZ, the excess water it has when the second belt assembly 4 is separated from the dried wood veneer and the first screen band 6 is also separated from the second metal belt 2. In this embodiment, most of the condensed water is on the said second screen band due to the influence of the separated wood veneer and the cold second metal belt. The possible second screen band 7 functions as a separator for the wet first screen band and the dry wood veneer and the water is intended only to go through it. The porous first screen band 6 has its own driers 35, 36 which are advantageously low-pressure suction apparatuses, i.e. to suck the water from the pores in the screen band 6 after which the first screen band 6 is able to take in water again for drying the wood veneer. The driers 35, 36 can be rather simple but still efficient because the first screen band 6, as with the subsequently explained second screen band 7, permeate air in which case drying can be done through percolation. The possible second screen band 7 can be dried with similar means used to dry the first screen band or, depending on the structure of the screen band, it can be left undried because the principle purpose of the second screen band is to keep the first screen band 6 that takes in and carries away condensed water separate from the dried wood veneer. Thus, the second screen band 7 functions as an insulator. Since it must also permeate the moisture coming from the wood veneer well, it would be appropriate to make it more sparse or for it to have larger pores than the first screen band. In a second embodiment, where the porous surface section 8 is used on the surface of the second metal belt that takes in and carries away condensed water, the apparatus further comprises a drier 17 for the surface section of the second metal belt with which water is removed from the pores of the porous surface section 8 after which the surface section 8 of the second metal band is able to take in water for drying a new wood veneer. Because it is a question of a coating, it cannot be dried with the same type of air percolation as with screen bands. Therefore, drier 17 may constitute an evaporator 32 that heats the metal belt and its surface section evaporating the water from the pores and, additionally, a possible low-pressure suction apparatus 33, which removes this evaporated water. The driers can be

of any other type, known as such, or of a new type, appropriate for the purpose.

[0017] According to the invention, compression pressure P, which is at least 20 kPa and at the most 500 kPa, is applied to the wood veneer 5 using the said hot pressurized chamber 18 and/or the cold pressurized chamber 28 and/or hot block 19 and/or cold block. These pressing means are embodied using one of the following alternatives:

The hot pressurized chamber 18 and the cold pressurized chamber 28 are opposite each other, in which pressurized chambers both of the said mediums F1 and F2 have predefined excess pressure Φ that creates the said compression pressure P on the veneer; or

The rigid hot block 19 and the rigid cold block 29 are opposite each other, as well as the compression mechanism 23, which is situated such that it creates the said compression pressure P on the veneer; or
The hot pressurized chamber 18 and the rigid cold block 29 are opposite each other. whereupon the hot medium F1 has predefined excess pressure Φ in the hot pressurized chamber that creates the said compression pressure P on the veneer; or

The rigid hot block 19 and the cold pressurized chamber 28 are opposite each other whereupon the cold medium F2 has predefined excess pressure Φ in the cold pressurized chamber that creates the said compression pressure P.

[0018] According to the method, rotary-peeled or cut wood veneers 5 are contact dried in the following way. In the method, undried, green wood veneer 5, which has a green moisture content RH 1, is fed in between and placed in contact with the first belt assembly 3 that comprises the first metal belt 1, and the second belt assembly 4 that comprises the second metal belt 2, as well as at least one porous screen band 6 or the porous surface section 8. The belt assemblies 3, 4 are brought together with the first set of rollers 21 and at least the second set of rollers, as can be perceived from Figures 1 and 2, and the veneer 5 is placed at the same point usually in sheets. The belt assemblies are such that the porous screen band 6 or similarly the porous surface section 8 of the second metal belt comes in between the second metal belt and the wood veneer. The first belt assembly 3 and the second belt assembly 4 are moved at the same velocity V either intermittently or continuously during drying. The belt assemblies thus synchronically move and possibly linger together at a distance S1 from each other equal to the thickness S2 of the wood veneer 5 in the longitudinal direction of the belts at least in the drying zone DZ. Before the drying in the drying zone DZ according to the invention, the wood veneer 5 has a green moisture content RH1, which may be the natural amount of moisture or the amount has been increased by moistening the veneer to the desired value or, most commonly,

the amount has been increased as high as possible. The natural amount of moisture in wood and thus in wood veneer can vary considerably depending on the species of wood, the place the wood has grown, when the wood was cut and the transportation and storing conditions of the wood, i.e. the logs gathered from the forest. Additionally, the moisture content in a single log, e.g. the moisture in the duramen and the alburnum, can be considerably different. Special attention should be given to the fact that, here, the percentage of moisture RH1 and RH2 refers to the weight of water in the wood in proportion to the dry substance weight in the wood in question, i.e. it is a question of the percentage of water weight in proportion to the amount of dry substance. Thus, for example, RH1 = 40% means 40 kg of water in the wood that weighs 100 kg when it is absolutely dry, 100 % moisture would mean 100 kg of water in 100 kg of wood-dry substance, etc. The log can be moistened by soaking it in water, for example, before the veneer is rotary-peeled or cut. By soaking, the intention is to get so much water to seep into the wood that the cells and the space between the cells are full of water, something that supports the wood material during cutting/rotary peeling, whereupon the wood does not break by splitting. On account of this, the moisture in the veneer is as high as possible after having been rotary-peeled and therefore the moisture content RH1 is maximum or - taking into consideration, of course, possible loss - nearly maximum.

[0019] In the drying zone, the belt assemblies, including their structural parts, and the veneer are situated in the following order from the hot side to the cold side: the first metal belt 1 of the first belt assembly 3 - wood veneer 5 - possible second screen band 7 - porous first screen band 6 of the second belt assembly 4 or the porous surface section of the second metal belt 8 - second metal belt of the second belt assembly 4. In this drying zone DZ, the first metal belt 1 is heat to the first temperature T1 and, at the same time, the second metal belt 2 is kept cold, i.e. at the second temperature T2, which is about the amount of the difference in temperature ΔT lower than the said first temperature. The second metal belt 2 is thus cooled with, for example, water, etc. at least in proportion to the first metal belt 1. In this drying zone DZ and therefore during the said heating, the metal belts 1, 2 are pressed towards each other in temperature T1, and while being kept cold, in temperature T2, whereupon the wood veneer between them receives compression pressure P from the said first metal belt and the said screen band or surface section. Furthermore in this drying zone DZ, water in the wood veneer 5 separates from it due to the effect of the first temperature T1 and condenses due to the effect of the second temperature T2 and is carried away onto the first screen band 6 or the surface section 8. These processes taking place in the drying zone DZ are essentially simultaneous irrespective of whether the movement of the belt assemblies is constant or intermittent. Thus the result in the drying zone is a dried veneer 5 from which water has been separated and carried away,

due to the effect of the temperature difference, onto the first screen band 6 or surface section 8. Maintaining simultaneous compression pressure P further improves the durability of the dried veneer.

[0020] Next, the wood veneer 5, dried in such a way, is removed from between the first belt assembly 3 and the second belt assembly 4, i.e. from the drying zone DZ. After the wood veneer 5 has been removed from between the first belt assembly 3 and the second belt assembly 4, the said second metal belt 2 and at least one porous screen band 6 or surface section 8 said are dried by scraping K and/or with the low-pressure vacuum S1, as was previously explained. The first belt assembly 3 and the second belt assembly 4 are permitted to return to the phase in which a new, green wood veneer 5 previously said is fed in between them whereupon the said contact drying takes places either intermittently or continuously. In other words, belt assemblies 3, 4 move through the drying zone DZ and carry with them the veneer being dried according to the invention. Usually only the control units 9 for the second belt assembly, either in the set of rollers 21 of the first belt assembly 3 or in the set of rollers 22 of the second belt assembly, comprise a moveable mechanism because the second belt assembly 4 or 3 moves along with the other just as the veneer. The final moisture content RH2 of a wood veneer, dried according to the invention, is advantageously under 12 %, the water concentration of which has thus been calculated from the weight of the dry material also.

[0021] In summary, the invention works as follows: a cut/sliced or rotary-peeled and wet sheet of veneer is fed into a compressing drier where there is a hot upper surface and a cold lower surface on opposite sides of the wood veneer. The veneer is pressed with slight, but sufficient, compression pressure in between the surfaces. The hot upper surface is typically smooth, and the cold lower surface is equipped with either grooving or bolting net for removing water. Additionally, the removal of the water on the lower surface can be made more effective using a vacuum. When there is a clear temperature difference between the surfaces, the water condensates onto the lower surface of the drier. In this way, a significant amount of the water in the wood is removed without the water coming to a boil and, intensely expanding, causing damage to the veneer. However, heating the wood veneer raises the evaporation pressure of the water in the veneer whereupon the water attempts to move to an area where there is lower evaporation pressure, i.e. to the porous first screen band or to the surface section of the second metal belt, where it then condenses due to the influence of a low temperature, i.e. when the temperature is less than dew point. Briefly speaking, water is removed from the wood veneer 5 as steam due the influence of the first temperature T1, it is let to condensate in another place under the influence of the second temperature T2, and it is finally discharged by separating the first screen band or surface section from the dry veneer.

[0022] The new method allows the drying of each sheet

of veneer in a different way or the dividing of consistent veneers or sheets of veneers into sections for which a positional drying model can be organized. For this purpose, the conveyance velocity V through the drying zone DZ can be adjusted for example progressively, if the process is a continuous one, or the time the sheets of veneer spend in the drying zone can be set, for example according to each individual veneer, when the process is an intermittent one. In the continuously functioning process, the wood veneer moves at a standard or varied velocity V through the drying zone; whereas in an intermittently functioning process, the wood veneer moves at some velocity V into the drying zone, stays there for a predefined time and it is then removed at some velocity V . In this way, it is possible to precision dry the veneers to the desired level of moisture. Due to this, the reactive features of the glue for the veneer can be developed and the gluing process made more efficient. This results in a higher average durability and a decrease in divergence. Both of these increase the characteristic durability of the product. Moreover, the coarse-meshed lower surface caused by the cutting checks during rotary peeling can be made denser. This helps in influencing the features of rolling shear strength in the direction of the veneer's surface.

Claims

1. A method for contact drying rotary-peeled or cut wood veneers whereby a green wood veneer, which has a green moisture content (RH1), is heated while simultaneously being compressed whereupon the result is dried wood veneer **characterized in that**:
 - said green wood veneer (5) is fed in between and placed in contact with a first belt assembly (3) and a second belt assembly (4), the first belt assembly of which comprises a first metal belt (1), and the second belt assembly comprises a second metal belt (2) together with at least one porous screen band (6) or a porous surface section (8) between the second metal belt and the wood veneer;
 - the first metal belt (1) is heated to a first temperature (T_1) and the second metal belt (2) is cooled to a second temperature (T_2) that is lower than said first temperature (T_1) by a temperature difference (ΔT);
 - the belt assemblies (3, 4) are pressed towards each other during said heating and cooling whereupon a compression pressure (P) is applied to the wood veneer between them from said first metal belt and said screen band or surface section;
 - water separated from the wood veneer (5) due to the effect of the first temperature is allowed to condense into said screen band (6) or into

said surface section (8) due to the effect of the second temperature; and
 - the wood veneer (5) hence dried is removed from between the first belt assembly (3) and the second belt assembly (4).

2. A method according to claim 2, **characterized in that** said temperature difference (ΔT) is at least 60 °C or at least 80 °C or at least 100 °C.
3. A method according to claims 1 or 2, **characterized in that** said first temperature (T_1) is at least 120 °C and at most 210 °C; and that said second temperature (T_2) is at most 50 °C or at most 30 °C.
4. A method according to claims 1 or 2 or 3, **characterized in that** said compression pressure (P) is at least 20 kPa and at most 500 kPa.
5. A method according to any one of the previous claims, **characterized in that** said green moisture content (RH1) of the wood veneer is the moisture achieved by soaking a log in water before rotary-peeling or cutting the veneer.
6. A method according to claim 5, **characterized in that** said green moisture content (RH1) is as high as possible; and that said dried wood veneer (5) has a final moisture content (RH2) that is less than 12 %.
7. A method according to any one of the previous claims, **characterized in that** after the wood veneer (5) has been removed from between the first belt assembly (3) and the second belt assembly (4), said second metal belt (2) and said at least one porous screen band (6) or porous surface section (8) is dried by scraping (K) and/or low-pressure suction.
8. A method according to claim 7, **characterized in that** said first belt assembly (3) and said second belt assembly (4) are allowed to return to the phase in which a new said green wood veneer (5) is fed in between them whereupon said contact drying occurs either intermittently or continuously.
9. A method according to any one of the previous claims, **characterized in that** the first belt assembly (3) and the second belt assembly (4) are moved at the same velocity (V) and without stopping during the drying.
10. An apparatus for contact drying rotary-peeled or cut wood veneer, which apparatus comprises:
 - a first belt assembly (3) and a second belt assembly (4), of which the first belt assembly comprises a first metal belt (1), and the second belt assembly comprises a second metal belt (2),

which belt assemblies are arranged to take wood veneer (5) in between them;

- heating components (11) for heating at least the first metal belt (1) to the first temperature (T1);

- compressing means for pressing the first belt assembly (3) and the second belt assembly (4) towards each other during said heating whereupon compression pressure (P) is applied to the wood veneer between them, **characterized in that** the apparatus further comprises:

- in addition to the second metal belt (2), the second belt assembly comprises at least one porous screen band (6) or a porous surface section (8) between the second metal belt and the wood veneer;

- cooling components (12) to maintain the second metal belt (2) at a second temperature (T2) that is lower than said first temperature (T1) by the amount of a temperature difference (ΔT);

- control units (9) to move the first belt assembly (3) and the second belt assembly (4) at the same velocity (V).

11. The apparatus according to claim 10, **characterized in that** said heating components (11) are:

- a hot pressurized chamber (18), one wall of which is formed by said first metal belt (1), in which pressurized chamber a hot pressurized medium (F1) is circulated at a temperature ($T1+\epsilon 1$) that produces the first temperature (T1) in the first metal band; or

- a rigid hot block (19), along the one outer side of which said first metal belt (1) moves and which has cables (20) in which the hot medium (F1) or electrical current (E) circulates creating in said hot block (19) a temperature ($T1+\epsilon 2$) that produces the first temperature (T1) in the first metal belt.

12. The apparatus according to claim 10, **characterized in that** said cooling components (12) are:

- a cold pressurized chamber (28), one wall of which is formed by said second metal belt (2), in which pressurized chamber a cold medium (F2) is circulated at the temperature ($T2-\epsilon 3$) that produces the second temperature (T2) in the second metal belt; or

- a rigid cold block (29), along one outer side of which said second metal belt (2) moves, and which has channels (30) in which a cold medium (F2) circulates creating a temperature ($T2-\epsilon 4$) in said cold block (29) that produces the second temperature (T2) in the second metal belt.

13. The apparatus according to claim 10 or 11 or 12, **characterized in that** said control units (9) comprise:

- a first set of rollers (21) through which the first metal belt (1) winds;

- a second set of rollers (22) through which the second metal belt (2) winds; and

- a third set of rollers (23) through which a porous screen band (6) winds.

14. The apparatus according to claim 13, **characterized in that** the apparatus further comprises a drier (34) for the second metal band and drier or driers (35 and/or 36) for the porous screen band; and that the drier (34) for the second metal belt is a scrapper, and the drier(s) for the porous screen band (35, 36) are low-pressure suction apparatuses.

15. The apparatus according to claim 10 or 11 or 12, **characterized in that** said control units (9) comprise:

- a first set of rollers (21) through which the first metal belt (1) winds; and

- a second set of rollers (22), through which the second metal belt (2) with its porous surface section (8) winds.

16. The apparatus according to claim 15, **characterized in that** the apparatus further comprises a drier (17) for the surface section of the second metal belt; and that the drier (17) for the surface section of the second metal belt is an evaporator (32) and, additionally, a possible low-pressure suction apparatus (33).

17. The apparatus according to any one of the claims 10 to 16 **characterized in that** said compressing means comprise one of the following alternatives:

- a hot pressurized chamber (18) and a cold pressurized chamber (28) opposite each other in which pressurized chambers both of said mediums (F1 and F2) have predefined excess pressure (Φ) that creates said compression pressure (P) onto the veneer; or

- a rigid hot block (19) and a rigid cold block (29) opposite each other as well as a compression mechanism (23) in association with them, which mechanism is positioned to create said compression pressure (P) on the veneer; or

- a hot pressurized chamber (18) and a rigid cold block (29) opposite each other whereupon the hot medium (F1) in the hot pressurized chamber has a predefined excess pressure (Φ) that creates said compression pressure (P) onto the veneer; or

- a rigid hot block (19) and a cold pressurized

chamber (28) opposite each other whereupon the cold medium (F2) in the cold pressurized chamber has a predefined excess pressure (Φ) that creates said compression pressure (P) onto the veneer.

18. The apparatus according to any one of the claims 10 to 17, **characterized in that** it further comprises a second screen band (7), which runs between the first screen band (6) and the wood veneer (5), or between the porous surface (8) section of the second metal belt and the wood veneer (5).

Patentansprüche

1. Verfahren zur Kontakttrocknung von rundgeschälten oder -geschnittenen Holzfurnieren, wobei ein grünes Holzfurnier, das einen Feuchtigkeitsgehalt im grünen Zustand (RH1) aufweist, erhitzt wird, während es gleichzeitig komprimiert wird, woraufhin das Resultat getrocknetes Holzfurnier ist, **dadurch gekennzeichnet, dass:**

- das grüne Holzfurnier (5) zwischen eine erste Bandanordnung (3) und eine zweite Bandanordnung (4) eingeführt und in Kontakt damit positioniert wird, wobei die erste Bandanordnung davon ein erstes Metallband (1) umfasst und die zweite Bandanordnung ein zweites Metallband (2) zusammen mit mindestens einem porösen Siebband (6) oder einem Abschnitt poröser Oberfläche (8) zwischen dem zweiten Metallband und dem Holzfurnier umfasst;
- das erste Metallband (1) auf eine erste Temperatur (T1) erhitzt wird und das zweite Metallband (2) auf eine zweite Temperatur (T2), die um einen Temperaturunterschied (ΔT) niedriger ist als die erste Temperatur (T1) gekühlt wird;
- die Bandanordnungen (3, 4) während des Erhitzens und Kühlens aufeinander zu gedrückt werden, woraufhin ein Kompressionsdruck (P) auf das Holzfurnier zwischen ihnen durch das erste Metallband und das Siebband oder den Oberflächenabschnitt aufgebracht wird;
- Wasser, das aus dem Holzfurnier (5) aufgrund der Wirkung der ersten Temperatur ausgeschieden wird, gestattet wird, in das Siebband (6) oder in den Oberflächenabschnitt (8) aufgrund der Wirkung der zweiten Temperatur zu kondensieren; und
- das folglich getrocknete Holzfurnier (5) aus zwischen der ersten Bandanordnung (3) und der zweiten Bandanordnung (4) entfernt wird.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** der Temperaturunterschied (ΔT) mindestens 60 °C oder mindestens 80 °C oder min-

destens 100 °C beträgt.

3. Verfahren nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die erste Temperatur (T1) mindestens 120 °C und höchstens 210 °C beträgt; und dass die zweite Temperatur (T2) höchstens 50 °C oder höchstens 30 °C beträgt.

4. Verfahren nach den Ansprüchen 1 oder 2 oder 3, **dadurch gekennzeichnet, dass** der Kompressionsdruck (P) mindestens 20 kPa und höchstens 500 kPa beträgt.

5. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Feuchtigkeitsgehalt im grünen Zustand (RH1) des Holzfurniers die Feuchtigkeit ist, die durch Einweichen eines Klobens in Wasser vor dem Rundschälen oder -Schneiden des Furniers erreicht wird.

6. Verfahren nach Anspruch 5, **dadurch gekennzeichnet, dass** der Feuchtigkeitsgehalt im grünen Zustand (RH1) so hoch wie möglich ist; und dass das getrocknete Holzfurnier (5) einen Endfeuchtigkeitsgehalt (RH2) aufweist, der geringer als 12 % ist.

7. Verfahren nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** nach Entfernen des Holzfurniers (5) von zwischen der ersten Bandanordnung (3) und der zweiten Bandanordnung (4) das zweite Metallband (2) und das mindestens eine poröse Siebband (6) oder der Abschnitt poröser Oberfläche (8) durch Schaben (K) und/oder Niederdrucksaugung getrocknet wird.

8. Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** der ersten Bandanordnung (3) und der zweiten Bandanordnung (4) gestattet wird, in die Phase zurückzukehren, in der ein neues grünes Holzfurnier (5) zwischen diese eingeführt wird, woraufhin das Kontakttrocknen entweder zeitweise oder kontinuierlich erfolgt.

9. Verfahren nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die erste Bandanordnung (3) und die zweite Bandanordnung (4) mit derselben Geschwindigkeit (V) und ohne Anhalten während des Trocknens bewegt werden.

10. Vorrichtung zur Kontakttrocknung von rundgeschältem oder geschnittenem Holzfurnier, wobei die Vorrichtung Folgendes umfasst:

- eine erste Bandanordnung (3) und eine zweite Bandanordnung (4), wobei die erste Bandanordnung davon ein erstes Metallband (1) umfasst und die zweite Bandanordnung ein zweites

Metallband (2) umfasst, welche Bandanordnungen angeordnet sind, um Holzfurnier (5) zwischen ihnen aufzunehmen;

- Erhitzungskomponenten (11) zum Erhitzen mindestens des ersten Metallbands (1) auf die erste Temperatur (T1);
- Kompressionsmittel zum Pressen der ersten Bandanordnung (3) und der zweiten Bandanordnung (4) während des Erhitzens aufeinander zu, woraufhin ein Kompressionsdruck (P) auf das Holzfurnier zwischen ihnen aufgebracht wird, **dadurch gekennzeichnet, dass** die Vorrichtung ferner Folgendes umfasst:

- zusätzlich zu dem zweiten Metallband (2) umfasst die zweite Bandanordnung mindestens ein poröses Siebband (6) oder einen Abschnitt poröser Oberfläche (8) zwischen dem zweiten Metallband und dem Holzfurnier;
- Kühlkomponenten (12) zum Halten des zweiten Metallbands (2) bei einer zweiten Temperatur (T2), die um die Menge eines Temperaturunterschieds (ΔT) niedriger ist als die erste Temperatur (T1);
- Reguliereinheiten (9) zum Bewegen der ersten Bandanordnung (3) und der zweiten Bandanordnung (4) mit derselben Geschwindigkeit (V).

11. Vorrichtung nach Anspruch 10, **dadurch gekennzeichnet, dass** die Erhitzungskomponenten (11) Folgendes sind:

- eine heiße unter Druck gesetzte Kammer (18), eine Wand derer durch das Metallband (1) gebildet ist, in welcher unter Druck gesetztes Medium (F1) bei einer Temperatur ($T1+\epsilon 1$) zirkuliert wird, die die erste Temperatur (T1) in dem ersten Metallband erzeugt; oder
- ein starrer heißer Block (19), der einen Außenwand dessen entlang das erste Metallband (1) sich bewegt, und der Kanal (20) aufweist, in denen das heiße Medium (F1) oder elektrischer Strom (E) unter Erzeugen, in dem heißen Block (19), einer Temperatur ($T1+\epsilon 1$) zirkuliert, die die erste Temperatur (T1) in dem ersten Metallband erzeugt.

12. Vorrichtung nach Anspruch 10, **dadurch gekennzeichnet, dass** die Kühlkomponenten (12) Folgendes sind:

- eine kalt unter Druck gesetzte Kammer (28), eine Wand derer durch das zweite Metallband (2) gebildet ist, in welcher unter Druck gesetztes Medium (F2) bei der Tempe-

ratur ($T2+\epsilon 3$) zirkuliert wird, die die zweite Temperatur (T2) in dem zweiten Metallband erzeugt; oder

- ein starrer kalter Block (29), einer Außenseite dessen entlang das zweite Metallband (2) sich bewegt, und der Kanäle (30) aufweist, in denen das kalte Medium (F2) unter Erzeugen, in dem kalten Block (29), einer Temperatur ($T2+\epsilon 4$) zirkuliert, die die zweite Temperatur (T2) in dem zweiten Metallband erzeugt.

13. Vorrichtung nach Anspruch 10 oder 11 oder 12, **dadurch gekennzeichnet, dass** die Reguliereinheiten (9) Folgendes umfassen:

- einen ersten Satz Walzen (21), durch die das erste Metallband (1) sich windet;
- einen zweiten Satz Walzen (22), durch die das zweite Metallband (2) sich windet; und
- einen dritten Satz Walzen (23), durch die das poröse Siebband (6) sich windet.

14. Vorrichtung nach Anspruch 13, **dadurch gekennzeichnet, dass** die Vorrichtung ferner einen Trockenapparat (34) für das zweite Metallband und einen Trockenapparat oder Trockenapparate (35 und/oder 36) für das poröse Siebband umfasst; und dass der Trockenapparat (34) für das zweite Metallband ein Kratzer ist und der/die Trockenapparat(e) für das poröse Siebband (35, 36) Niederdrucksaugvorrichtungen ist/sind.

15. Vorrichtung nach Anspruch 10 oder 11 oder 12, **dadurch gekennzeichnet, dass** die Reguliereinheiten (9) Folgendes umfasst:

- einen ersten Satz Walzen (21), durch die das erste Metallband (1) sich windet; und
- einen zweiten Satz Walzen (22), durch die das zweite Metallband (2) mit seinem Abschnitt poröser Oberfläche (8) sich windet.

16. Vorrichtung nach Anspruch 15, **dadurch gekennzeichnet, dass** die Vorrichtung ferner einen Trockenapparat (17) für den Oberflächenabschnitt des zweiten Metallbands umfasst; und dass der Trockenapparat (17) für den Oberflächenabschnitt des zweiten Metallbands ein Verdampfer (32) und zusätzlich eine mögliche Niederdrucksaugvorrichtung (33) ist.

17. Vorrichtung nach einem der Ansprüche 10 bis 16, **dadurch gekennzeichnet, dass** das Komprimiermittel eine der folgenden Alternativen umfasst:

- eine heiße unter Druck gesetzte Kammer (18) und eine kalte unter Druck gesetzte Kammer (28) einander gegenüber, in welchen unter

Druck gesetzten Kammern beide der Medien (F1 und F2) einen vordefinierten Überdruck (ϕ) aufweisen, der den Kompressionsdruck (P) auf das Holzfurnier erzeugt; oder

- einen starren heißen Block (19) und einen starren kalten Block (29) einander gegenüber, sowie einen Kompressionsmechanismus (23) in Verbindung mit ihnen, welcher Mechanismus zum Erzeugen des Kompressionsdrucks (P) auf das Fournier positioniert ist; oder

- eine heiße unter Druck gesetzte Kammer (18) und einen starren kalten Block (29) einander gegenüber, woraufhin das heiße Medium (F1) in der heißen unter Druck gesetzten Kammer einen vordefinierten Überdruck (ϕ) aufweist, der den Kompressionsdruck (P) auf das Holzfurnier erzeugt; oder

- einen starren heißen Block (19) und eine kalte unter Druck gesetzte Kammer (28) einander gegenüber, woraufhin das kalte Medium (F2) in der kalten unter Druck gesetzten Kammer einen vordefinierten Überdruck (ϕ) aufweist, der den Kompressionsdruck (P) auf das Holzfurnier erzeugt.

18. Vorrichtung nach einem der Ansprüche 10 bis 17, **dadurch gekennzeichnet, dass** sie ein zweites Siebband (7) umfasst, das zwischen dem ersten sieben Band (6) und dem Holzfurnier (5) oder zwischen dem Abschnitt poröser Oberfläche (8) des zweiten Metallbands und dem Holzfurnier (5) läuft.

Revendications

1. Procédé pour séchage par contact de feuilles de placage de bois pelées par rotation ou découpées selon lequel une feuille de placage de bois vert, qui possède une teneur en humidité verte (RH1), est chauffé tout en étant simultanément compressé à la suite de quoi le résultat consiste en une feuille de placage de bois séché **caractérisé en ce que** :

- ladite feuille de placage de bois vert (5) est alimentée entre et mise en contact avec un premier ensemble de ceintures (3) et un second ensemble de ceintures (4), le premier ensemble de ceintures qui comprend une première ceinture métallique (1), et le second ensemble de ceintures comprend une seconde ceinture métallique (2) ensemble avec au moins une bande d'écran poreuse (6) ou une section de surface poreuse (8) entre la seconde ceinture métallique et la feuille de placage de bois ;

- la première ceinture métallique (1) est chauffée à une première température (T1) et la seconde ceinture métallique (2) est refroidie à une seconde température (T2) qui est inférieure à ladite

première température (T1) par une différence de température (ΔT) ;

- les assemblages de ceintures (3,4) sont pressés l'un vers l'autre durant ledit chauffage et ledit refroidissement à la suite de quoi une pression de compression (P) est appliquée sur la feuille de placage de bois entre eux à partir de ladite première ceinture métallique et ladite bande d'écran ou section de surface ;

- on permet à de l'eau séparée à partir de la feuille de placage de bois (5) du fait de l'effet de la première température de se condenser dans ladite bande d'écran (6) ou dans ladite section de surface (8) du fait de l'effet de la seconde température ; et

- la feuille de placage de bois (5) ainsi séchée est éliminée d'entre le premier ensemble de ceintures (3) et le second ensemble de ceintures (4).

2. Procédé selon la revendication 1, **caractérisé en ce que** ladite différence de température (ΔT) est d'au moins 60 °C ou d'au moins 80 °C ou d'au moins 100 °C.

3. Procédé selon la revendication 1 ou la revendication 2, **caractérisé en ce que** la première température (T1) est d'au moins 120 °C et tout au plus de 210 °C, et **en ce que** ladite seconde température (T2) est tout au plus de 50 °C ou tout au plus de 30 °C.

4. Procédé selon la revendication 1 ou la revendication 2 ou la revendication 3, **caractérisé en ce que** ladite pression de compression (P) est d'au moins 20 kPa et tout au plus de 500 kPa.

5. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite teneur en humidité verte (RH1) de la feuille de placage de bois consiste en l'humidité obtenue par le trempage d'une bûche dans de l'eau avant le pelage rotatoire ou la découpe de la feuille de placage.

6. Procédé selon la revendication 7, **caractérisé en ce que** ladite teneur en humidité verte (RH1) est aussi élevée que possible ; et en ce que ladite feuille de placage de bois séché (5) possède une teneur en humidité finale (RH2) qui est inférieure à 12 %.

7. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la feuille de placage de bois (5) a été déplacé d'entre le premier ensemble de ceintures (3) et le second ensemble de ceintures (4), ladite seconde ceinture métallique (2) et ladite au moins une bande d'écran poreuse (6) ou section de surface poreuse (8) est séchée par raclage (K) et/ou par aspiration à basse pression.

8. Procédé selon la revendication 7, **caractérisé en ce qu'on** permet audit premier ensemble de ceintures (3) et audit second ensemble de ceintures (4) de retourner à la phase dans laquelle cette nouvelle feuille de placage de bois vert (5) est alimentée entre eux à la suite de quoi ledit séchage par contact se déroule soit de manière intermittente soit de manière continue.

9. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le premier ensemble de ceintures (3) et le second ensemble de ceintures (4) se déplacent à la même vitesse (V) et sans s'arrêter pendant le séchage.

10. Appareil pour séchage par contact de feuilles de placage de bois pelées par rotation ou découpées, lequel appareil comprend :

- un premier ensemble de ceintures (3) et un second ensemble de ceintures (4), parmi lesquels le premier ensemble de ceintures comprend une première ceinture métallique (1), et le second ensemble de ceintures comprend une seconde ceinture métallique (2), ces assemblages de ceintures sont agencés pour accommoder des feuilles de placage de bois (5) entre eux ;
- des composants de chauffage (11) pour chauffer au moins la première ceinture métallique (1) à la première température (T1) ;
- un moyen de compression pour presser le premier ensemble de ceintures (3) et le second ensemble de ceintures (4) l'un en direction de l'autre durant ledit chauffage à la suite de quoi une pression de compression (P) est appliquée sur la feuille de placage de bois entre eux, **caractérisé en ce que** l'appareil comprend en outre :

- en plus de la seconde ceinture métallique (2), le second ensemble de ceintures comprend au moins une bande d'écran poreuse (6) ou une section de surface poreuse (8) entre la seconde ceinture métallique et la feuille de placage de bois ;
- des composants de refroidissement (12) pour maintenir la seconde ceinture métallique (2) à une seconde température (T2) qui est inférieure à ladite première température (T1) de par la quantité d'une différence de température (ΔT) ;
- des unités de commande (9) pour déplacer le premier ensemble de ceintures (3) et le second ensemble de ceintures (4) à la même vitesse (V).

11. Appareil selon la revendication 10, **caractérisé en ce que** lesdits composants de chauffage (11) con-

sistent en :

- une chambre pressurisée chaude (18), une paroi de laquelle est formée par ladite première ceinture métallique (1), dans laquelle chambre pressurisée un milieu pressurisé chaud (F1) est mis en circulation à une température ($T1+\epsilon 1$) qui produit la première température (T1) dans la première ceinture métallique ; ou
- un bloc chaud rigide (19), le long du côté externe de celui-ci se déplace ladite première ceinture métallique (1) et qui possède des câbles (20) dans lesquels le milieu chaud (F1) ou un courant électrique (E) circule créant dans ledit bloc chaud (19) une température ($T1+\epsilon 2$) qui produit la première température (T1) dans la première ceinture métallique.

12. Appareil selon la revendication 10, **caractérisé en ce que** lesdits composants de refroidissement (12) consistent en :

- une chambre pressurisée froide (28), une paroi de laquelle est formée par ladite seconde ceinture métallique (2), dans laquelle chambre pressurisée un milieu froid (F2) est mis en circulation à la température ($T2-\epsilon 3$) qui produit la seconde température (T2) dans la seconde ceinture métallique ; ou
- un bloc froid rigide (29), le long d'un côté externe de celui-ci se déplace ladite seconde ceinture métallique (2), et qui possède des canaux (30) dans lesquels un milieu froid (F2) circule créant une température ($T2-\epsilon 4$) dans ledit bloc froid (29) qui produit la seconde température (T2) dans la seconde ceinture métallique.

13. Appareil selon la revendication 10 ou la revendication 11 ou la revendication 12, **caractérisé en ce que** lesdites unités de commande (9) comprennent :

- un premier ensemble de rouleaux (21) à travers lequel s'enroule la première ceinture métallique (1) ;
- un second ensemble de rouleaux (22), à travers lequel s'enroule la seconde ceinture métallique (2) avec sa section de surface poreuse (8) ; et
- un troisième ensemble de rouleaux (23) à travers lequel s'enroule une bande d'écran poreuse (6).

14. Appareil selon la revendication 13, **caractérisé en ce que** l'appareil comprend en outre un sécheur (34) pour la seconde bande métallique consiste en un sécheur ou des sécheurs (35 et/ou 36) pour la bande d'écran poreuse ; et **en ce que** le sécheur (34) pour la seconde ceinture métallique consiste en un grat-

toir, et le sécheur pour la bande d'écran poreuse (35, 36) consiste en des appareils d'aspiration à basse pression.

en bois (5), ou entre la section de surface poreuse (8) de la seconde ceinture métallique et la feuille de placage en bois (5).

15. Appareil selon la revendication 10 ou la revendication 11 ou la revendication 12, **caractérisé en ce que** lesdites unités de commande (9) comprennent :
- un premier ensemble de rouleaux (21) à travers lequel s'enroule la première ceinture métallique (1) ; et
 - un second ensemble de rouleaux (22), à travers lequel s'enroule la seconde ceinture métallique (2) avec sa section de surface poreuse (8).
16. Appareil selon la revendication 15, **caractérisé en ce que** l'appareil comprend en outre un sécheur (17) pour la section de surface de la seconde ceinture métallique ; et **en ce que** le sécheur (17) pour la section de surface de la seconde ceinture métallique consiste en un évaporateur (32) et, également, en un possible appareil d'aspiration à basse pression (33).
17. Appareil selon l'une quelconque des revendications 10 à 16, **caractérisé en ce que** ledit moyen de compression comprend une des alternatives suivantes :
- une chambre pressurisée chaude (18) et une chambre pressurisée froide (28) l'une en face de l'autre dans lesquelles chambres pressurisées les deux desdits milieux (F1 et F2) possèdent une pression d'excès prédéfinie (Φ) qui crée ladite pression de compression (P) sur la feuille de placage ; ou
 - un bloc chaud rigide (19) et un bloc froid rigide (29) l'un en face de l'autre ainsi qu'un mécanisme de compression (23) en association avec eux, ce mécanisme est positionné de façon à créer ladite pression de compression (P) sur la feuille de placage ; ou
 - une chambre pressurisée chaude (18) et un bloc froid rigide (29) l'un en face de l'autre à la suite de quoi le milieu chaud (F1) dans la chambre pressurisée chaude possède une pression d'excès prédéfinie (Φ) qui crée ladite pression de compression (P) sur la feuille de placage ; ou
 - un bloc chaud rigide (19) et une chambre pressurisée froide (28) l'un en face de l'autre à la suite de quoi le milieu froid (F2) dans la chambre pressurisée froide possède une pression d'excès prédéfinie (Φ) qui crée ladite pression de compression (P) sur la feuille de placage.
18. Appareil selon l'une quelconque des revendications 10 à 17, **caractérisé en ce qu'il** comprend en outre une seconde bande d'écran (7), qui circule entre la première bande d'écran (6) et la feuille de placage

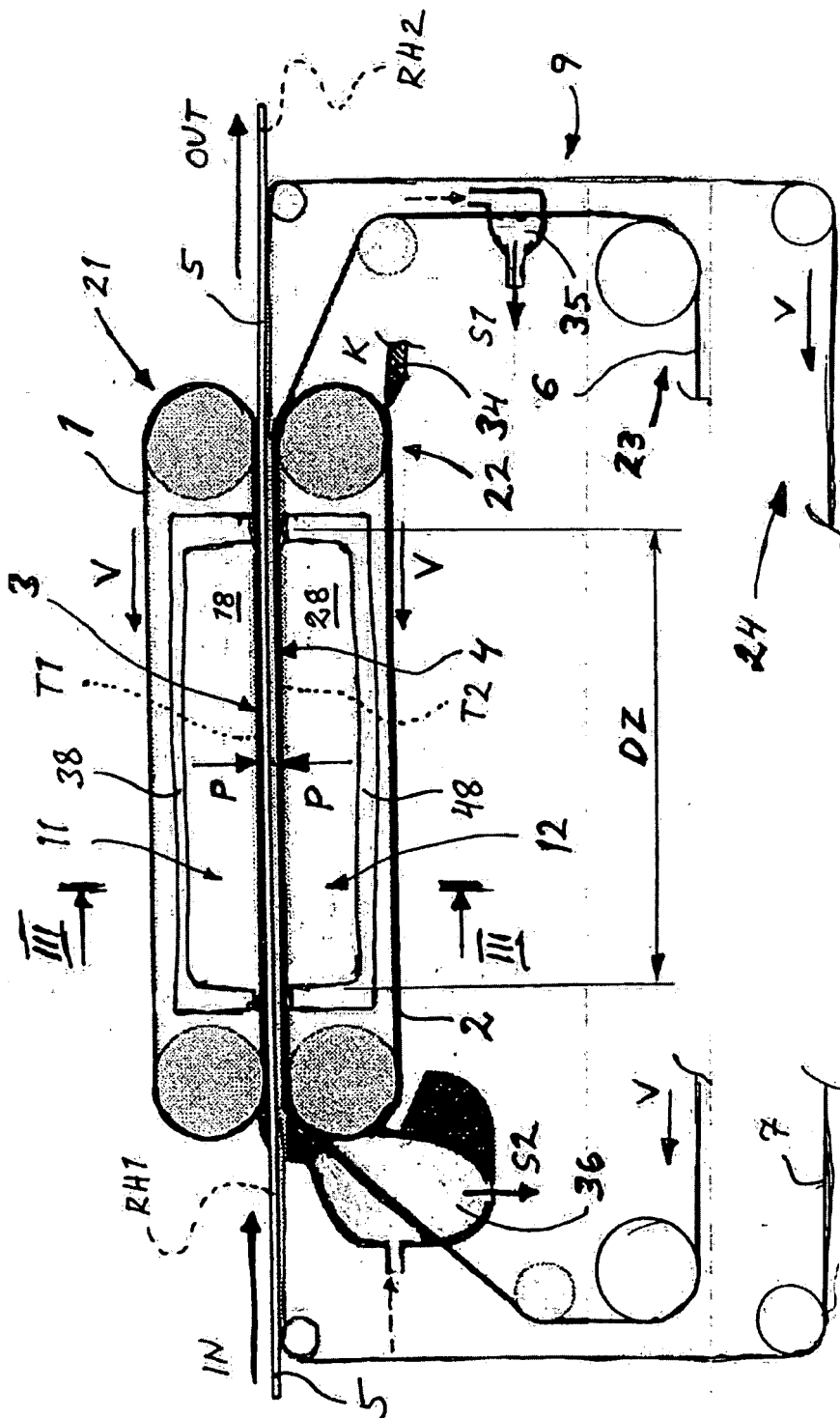


Fig. 1

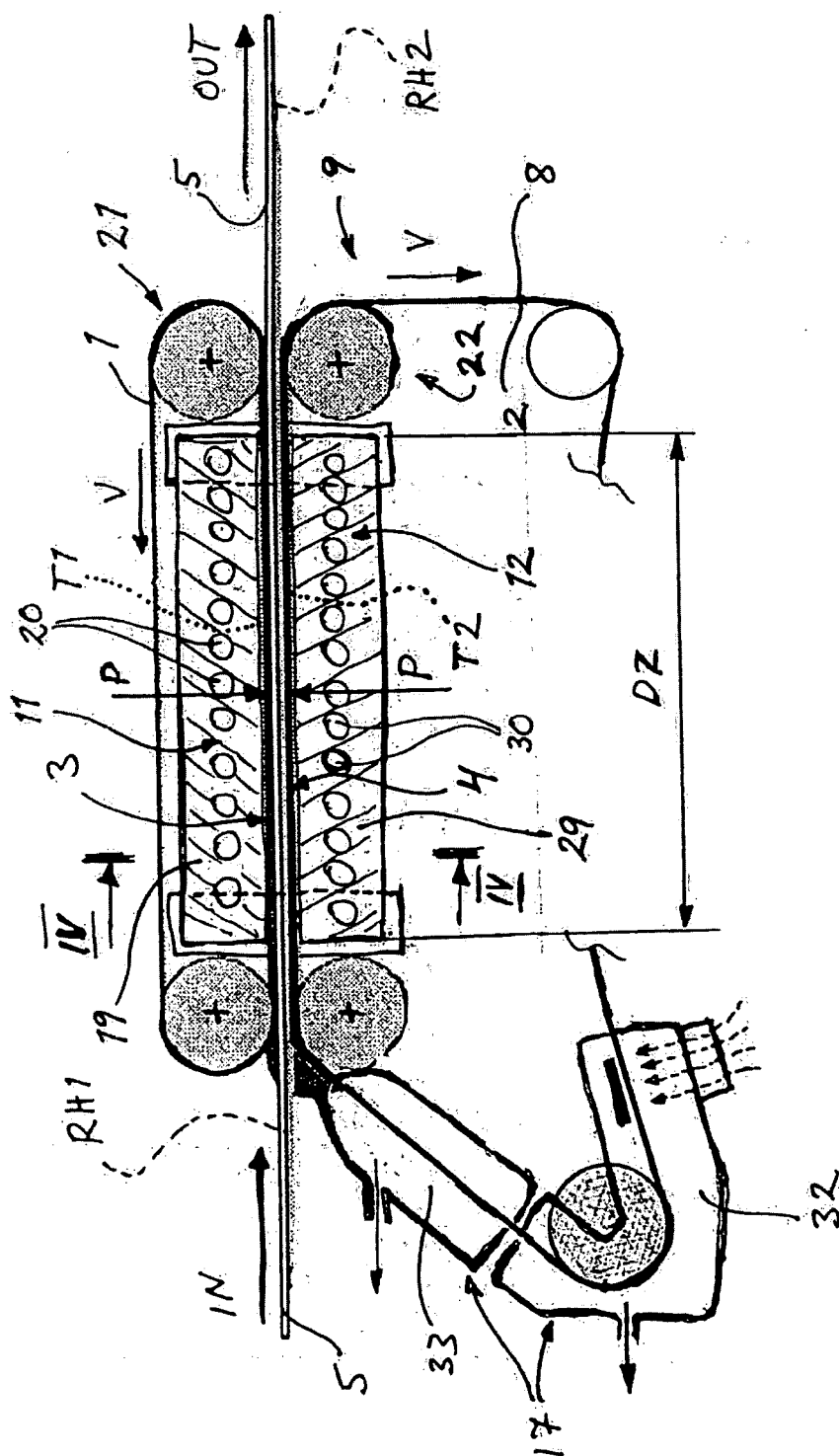
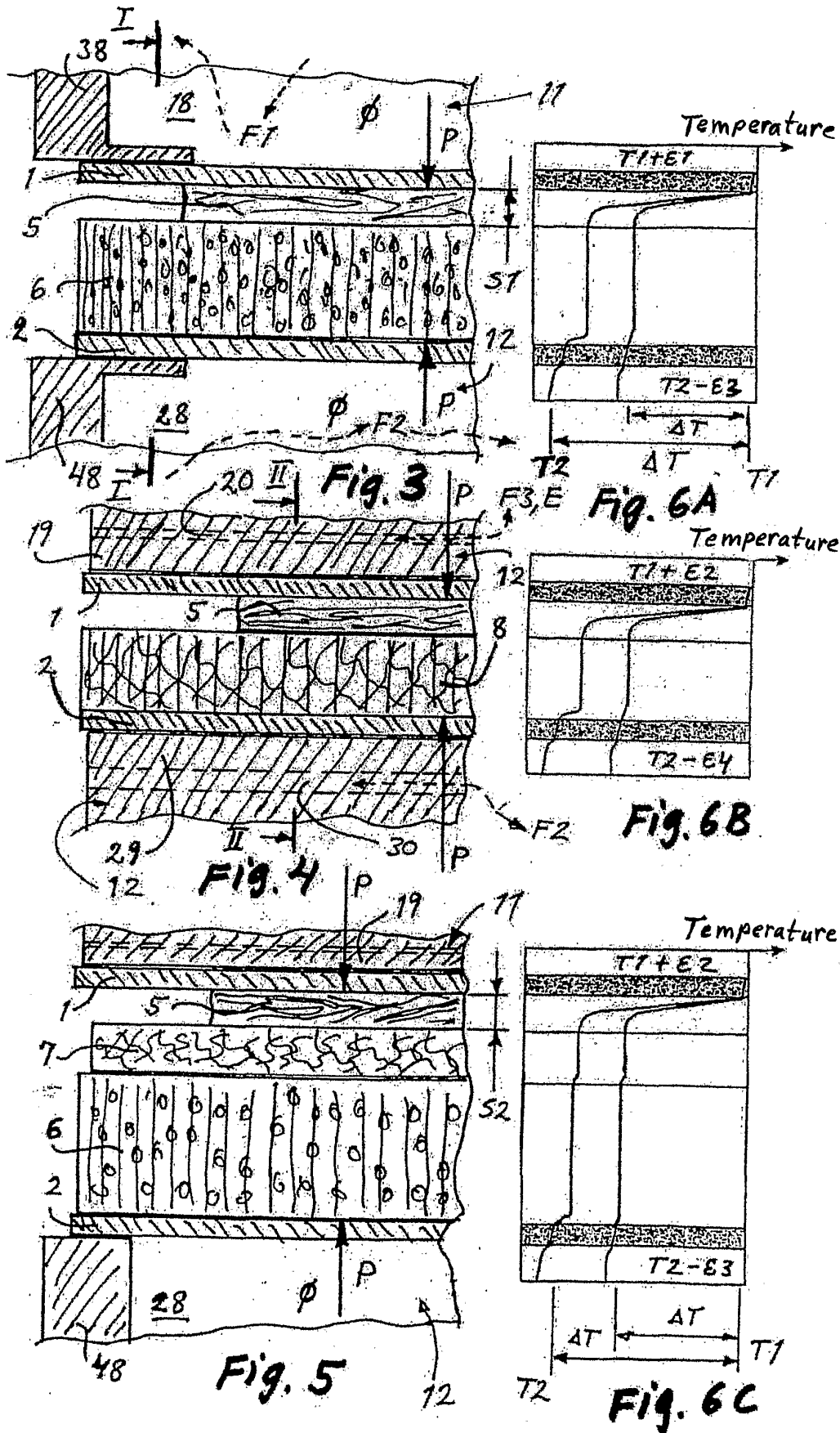


Fig. 2



REFERENCES CITED IN THE DESCRIPTION

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