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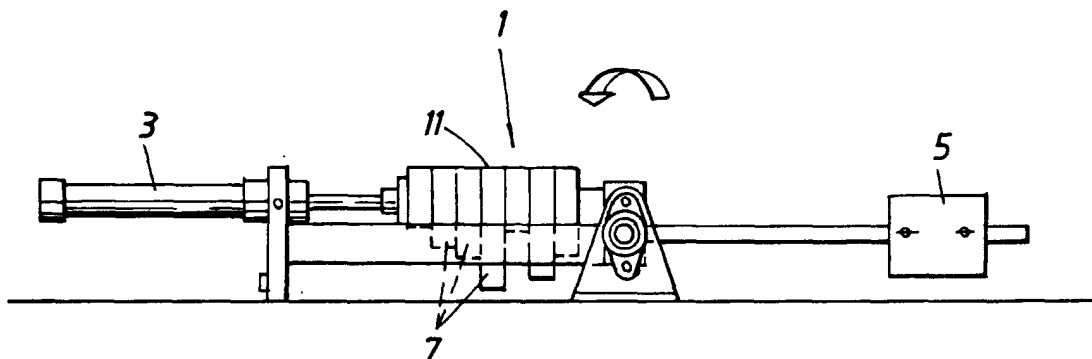
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(54) **Method of gluing and device therefor**

(57) The invention relates to a method for application of adhesive and/or hardener to a set (6) of pieces (7) of material, comprising feeding of said set (6) of pieces (7) of material on a conveyor (8), with the surface to be glued (11) facing a substantially plane surface of said conveyor; embracing said set (6) of pieces in a jig (1), clamping said set (6) of pieces together in said jig (1),

flipping said jig (1) with said set of pieces therein, to expose the substantially plane surface (11) of the set (6) of pieces, previously facing the substantially plane surface of the conveyor (8), and applying adhesive and/or hardener to the substantially plane surface (11) of said set (6) of pieces. The invention also relates to a device for carrying out the method.

Fig. 1



Description

[0001] The present invention relates to a method of even application of adhesive and/or hardener to pieces of materials such as wood, plastic or metal such as, for example, wooden lamellae in the production of furniture. The method of the invention comprises even spreading of adhesive and/or hardener on the surfaces of a set of pieces of material, which shall be joined by gluing. The invention also relates to a device for carrying out the method.

[0002] The simultaneous spreading of adhesive on the surfaces of at least one side of pieces of material to be glued together by means of a rotating roller is a method of common practice. The adhesive can be applied to the upper surface, or the lower surface (one side application), or both surfaces (double side application), of the materials to be glued together. The term "adhesive" in this disclosure is intended to embrace one-component adhesive, one or more of the components of a multi component adhesive, e.g., adhesive component and/or hardener component.

[0003] In the production of glued components made of wood, especially parts of furniture, a number of lamellae are assembled to an aggregate to be glued and pressed together. These lamellae normally have different height-dimensions (or width-dimensions). An example of such production is the production of chair seats, having for example the length and width of 600 and 500 mm, respectively. These seats may comprise 5 to 15 lamellae having varying width but with the same length of 600 mm. The width of the seat is 500 mm but can be made up of 5 up to 15 lamellae. These furniture components are glued together, for example, in a hot press, cold press or high frequency line.

[0004] The continuous application of adhesive takes place on the lower surfaces of the lamellae utilising the one side adhesive application. The lamellae are placed on the feeder device of the adhesive spreader, with the surfaces onto which adhesive is to be applied facing down, and with their length aligned in the feeding direction, and are conveyed over the applying roller. When the lamellae are of different height and thickness dimensions, they will also have different weights, and consequently, for some pieces, the weight thereof will not be sufficient to bring said pieces into continuous, intimate contact with the adhesive on the application roller, thereby jeopardising the continuous even application of adhesive, leaving areas of the lower surfaces to which adhesive has not been applied, or only insufficiently applied.

[0005] Thus, in order to obtain an even, continuous coating of adhesive, the conventional roller spreader of the above type, having a feeder roller, allows for continuous applying of adhesive to materials having different dimensions only within a narrow interval, such as ± 0.5 mm. When the dimensional variations are greater, and thus no feeder roller can be used, the problem of uneven

discontinuous spreading of adhesive, together with tilting of the pieces to be glued, arises, leading to inferior products and extensive discarding.

[0006] The present invention accordingly provides a new method and a device for carrying out the method, by which the above-mentioned problems are overcome.

[0007] The method according to the present invention provides a simultaneous, even application of adhesive and/or hardener to a set of pieces of material, which may have different height-dimensions in relation to each other. It comprises the steps of:

- a) feeding a set of pieces on a conveyor with the surface to be glued facing a substantially plane surface of the conveyor;
- b) embracing said set of pieces in a jig;
- c) clamping said set of pieces together in said jig;
- d) flipping said jig with said set of pieces therein, to expose the substantially plane surface of the said set of pieces, previously facing the substantially plane surface of the conveyor; and
- e) applying adhesive and/or hardener to the substantially plane surface of said set of pieces.

[0008] Suitably the jig and the set of the clamped pieces therein flip-over from about 90° to about 180° degrees, preferably to about 180° degrees, whereby the substantially plane surface of the set of pieces, previously in contact with the conveyor's substantially plane surface, is exposed and application of adhesive and/or hardener can take place. This gives rise to a controlled adhesive spread and diminishes adhesive and/or hardener waste. Preferably the set of pieces, after adhesive and/or hardener application, are released from the jig, in the flip-over position, onto a conveyor which removes the pieces away from the working area. As a result adhesive scrapping by the conveyor and smearing of the conveyor surface are avoided, providing a clean working area.

[0009] Suitably the jig after having released a set of pieces applied with adhesive and/or hardener, turns back and steps a) to e) according to the claimed invention are repeated for a new set of pieces.

[0010] Suitable adhesives for use in the present invention can be selected from urea-formaldehyde adhesives, melamine-urea-formaldehyde adhesives, phenol-resorcinol adhesives, polyvinyl acetate based adhesives, emulsion polymerisation-isocyanate adhesives, and polyurethane adhesives.

[0011] The device according to the claimed invention, which can be used for applying adhesive and/or hardener to a set of pieces of material, which may have different height-dimensions in relation to each other, comprises means for conveying a set of pieces of material on a substantially plane surface to a working area, a flip-over jig including means for embracing a set of pieces in said working area, means for clamping said set of pieces embraced in said jig together, and means for flip-

ping-over said jig with said set of pieces therein, to expose the substantially plane surface of said set of pieces, previously facing the substantially plane surface of the conveyor.

[0012] The clamping means exert pressure against the set of pieces, holding them together in place when the jig flips-over. The jig preferably also includes a counter weight, which facilitates the flip-over operation.

[0013] The claimed method provides an easy, fast and uniform adhesive application on pieces of material having different height-dimensions. Furthermore, it provides a controlled adhesive spread, saves adhesive waste and keeps the working area clean.

[0014] While described herein with reference to the adhesive, it is to be understood that, in addition to the above-mentioned adhesives, the method according to the present invention can, for instance, also be used for separate application of hardeners (as included in the definition of "adhesive" herein-above) of two-component adhesives to pieces, onto which pieces a corresponding adhesive component subsequently is to be applied. The hardener may, for instance, be a hardener suited for curing an aminoresin based or formaldehyde based adhesive. The hardener may also be in a mixture with the adhesive and be applied to the pieces as such.

[0015] The material of the pieces to which application of adhesive and/or hardener according to the invention is/are intended, can also, in addition to wooden material, be for example any suitable plastic or metallic material.

[0016] The invention will now be described in more detail with reference to the accompanying drawings. Fig. 1, is a side view of an embodiment of a flip-over jig and Fig. 2, is a front view of said jig. Fig. 3 and 4 show different steps during the flip-over operation.

[0017] Figures 1-4 show a jig 1 comprising embracing means 2, clamping means 3, bearings 4 and a counter weight 5. They show also a set 6 of pieces 7 of material, a feeding conveyor 8 with a substantially plane surface, a removing conveyor 9 and a working area 10.

[0018] The embracing means 2 can be a frame made, for example, of stainless steel or any other material suitable for this purpose.

[0019] The clamping means exert pressure against the pieces 7 of material (shown in Fig. 2 by arrows), keeping them closed together, avoiding tilting or tipping of the pieces 7. The exerted pressure against the pieces 7 can be obtained by movable rods, for example, in the form of cylinders operating hydraulically or pneumatically. Other suitable pressure exerting means could be springs or screws. Preferably, pneumatic cylinders are used as clamping means 3.

[0020] The jig 1 is made to flip-over manually or mechanically, for example, by using a geared motor.

[0021] The counter weight 5 facilitates the flip-over operation.

[0022] By "working area" is meant the place where the whole operation according to the present invention takes place.

[0023] With reference to Figures 1-4, a method according to the invention can be carried out by supplying a set 6 of pieces 7 of material to be glued, such as for example wooden lamellae, to a working area 10, where the jig 1 embraces the set 6 of pieces 7 of material, clamps it (see Fig. 1 and 2), and then flips-over with the set 6 of pieces 7 of material therein. Fig. 3 shows a position of the jig during the flip-over operation and Fig. 4 shows the jig flipped-over 180° degrees. Then adhesive is applied onto the exposed plane surface 11 of said set 6 of pieces 7 of material. By "the plane surface of the set of pieces" in the context of this disclosure is meant the surfaces of the pieces which are in one plane. The set 6 of pieces 7, after having being applied with adhesive, are released from the jig 1 onto a removing conveyor 9 and transported away for further processing. Thereafter, the lamellae can be pressed together, for example, to form a glued product, such as block wood or laminated timber, or to form components of furniture.

The jig 1 after having released the material applied with adhesive, in the flipped-over position, onto the removing conveyor 9 turns back and the process is repeated with a new set of pieces of material.

[0024] The set 6 of pieces 7 of materials to be glued are fed to the jig 1 by means of a conveyor 8, with the surface to be glued lying down on the conveyor's surface, which suitably is substantially plane. The surfaces of the pieces lying in one plane 11, initially facing the surface of the conveyor 8, come up, still lying in one plane, away from the conveyor's surface when the jig 1 is flipping-over. Preferably, they come up on the top, turned over 180 degrees (see Fig. 4) from their initial position, when the jig 1 flips-over 180 degrees from its initial position. In this position a simultaneous, even and easy adhesive application is practicable.

[0025] The adhesive application to the surface of the pieces 7 can be done in any suitable way, for example, by means of a roller spreader, or manually.

[0026] The releasing of the pieces 7 from the jig 1 onto the removing conveyor 9, after that they have been applied with adhesive, is done by removing the clamping means 3. The jig 1, after the releasing of the treated pieces 7, turns back, preferably 90° degrees, ready to restart the process according to the present invention.

The feeding conveyor 8, while the pieces 7 applied with adhesive are removing out, of the working area 10, by the removing conveyor 9, is bringing at the same time, into the working area 10, a new set 6 of pieces 7 of material. As soon as they are in position, the jig 1 turns over them and the process is repeated as described above.

[0027] The foregoing specification is intended to illustrate and exemplify the invention, but not to limit it. Various changes and modifications can be made in the device and the method of the invention without departing from the spirit and scope of the invention.

Claims

1. A method for application of adhesive and/or hardener to a set of pieces of material, comprising the steps of:
 - a) feeding a set (6) of pieces (7) of material on a conveyor (8) with the surface to be glued facing a substantially plane surface of said conveyor (8);
 - b) embracing said set (1) of pieces (7) in a jig (1);
 - c) clamping said set (6) of pieces (7) together in said jig (1);
 - d) flipping said jig (1), with said set (6) of pieces (7) therein, to expose the substantially plane surface (11) of the set (6) of pieces (7), previously facing the substantially plane surface of the conveyor (8), and
 - e) applying adhesive and/or hardener to the substantially plane surface (11) of said set (6) of pieces (7).
2. The method of claim 1, wherein said set (6) of pieces (7) of material have different height - dimensions.
3. The method of claim 1 or 2, wherein said jig (1) with said set (6) of pieces (7) therein, in step d) flips-over 180° degrees, whereby the substantially plane surface (11) of the set (6) of pieces (7), previously facing the substantially plane surface of the conveyor (8), now faces upwards and is exposed to application of adhesive and/or hardener.
4. The method of any of the preceding claims, wherein said set (6) of pieces (7), after having being applied with adhesive and/or hardener in step e), are released from the jig (1) in the flip-over position onto a conveyor (9), whereupon the jig (1) turns back and steps a)-e) in claim 1 are repeated for a new set (6) of pieces (7) of material.
5. The method of any of the preceding claims, wherein an adhesive selected from urea-formaldehyde adhesives, melamine-urea-formaldehyde adhesives, phenol-resorcinol adhesives, polyvinyl acetate based adhesives, emulsion polymerisation-isocyanate adhesives, and polyurethane adhesives, is used.
6. A device for applying adhesive and/or hardener to a set of pieces of material, comprising means for conveying (8,9) a set (6) of pieces (7) of material on a substantially plane surface to/from a working area (10), a flip-over jig (1) including means for embracing (2) a set (6) of pieces (7) in said working area (10), means for clamping (3) said set (6) of pieces (7) embraced in said jig (1) together, and means for flipping-over said jig (1) with said set (6) of pieces (7) therein, to expose the substantially plane surface (11) of said set (6) of pieces (7), previously facing the substantially plane surface of a feeding conveyor (8).
7. The device according to claim 6, wherein the means for embracing (2) the set (6) of pieces (7) is a frame.
8. The device according to any one of claims 6-7, wherein the clamping means (3) comprises movable rods operating pneumatically or hydraulically, or springs or screws.
9. The device according to claim 8, wherein the clamping means (3) comprises cylinders operating pneumatically or hydraulically.
10. The device according to any one of claims 6-9, wherein said jig (1) also includes a counter weight (5).

Fig. 1

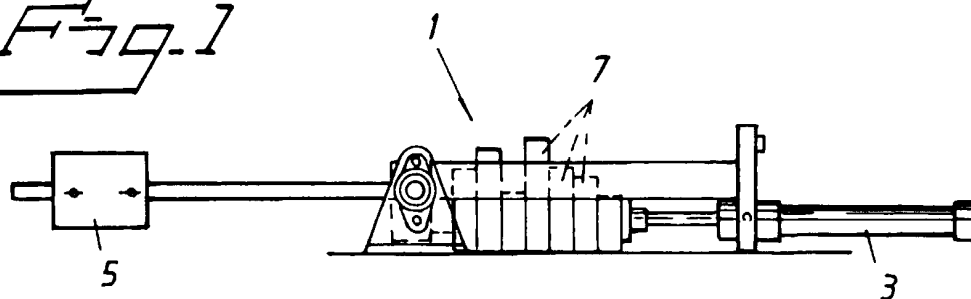


Fig. 2

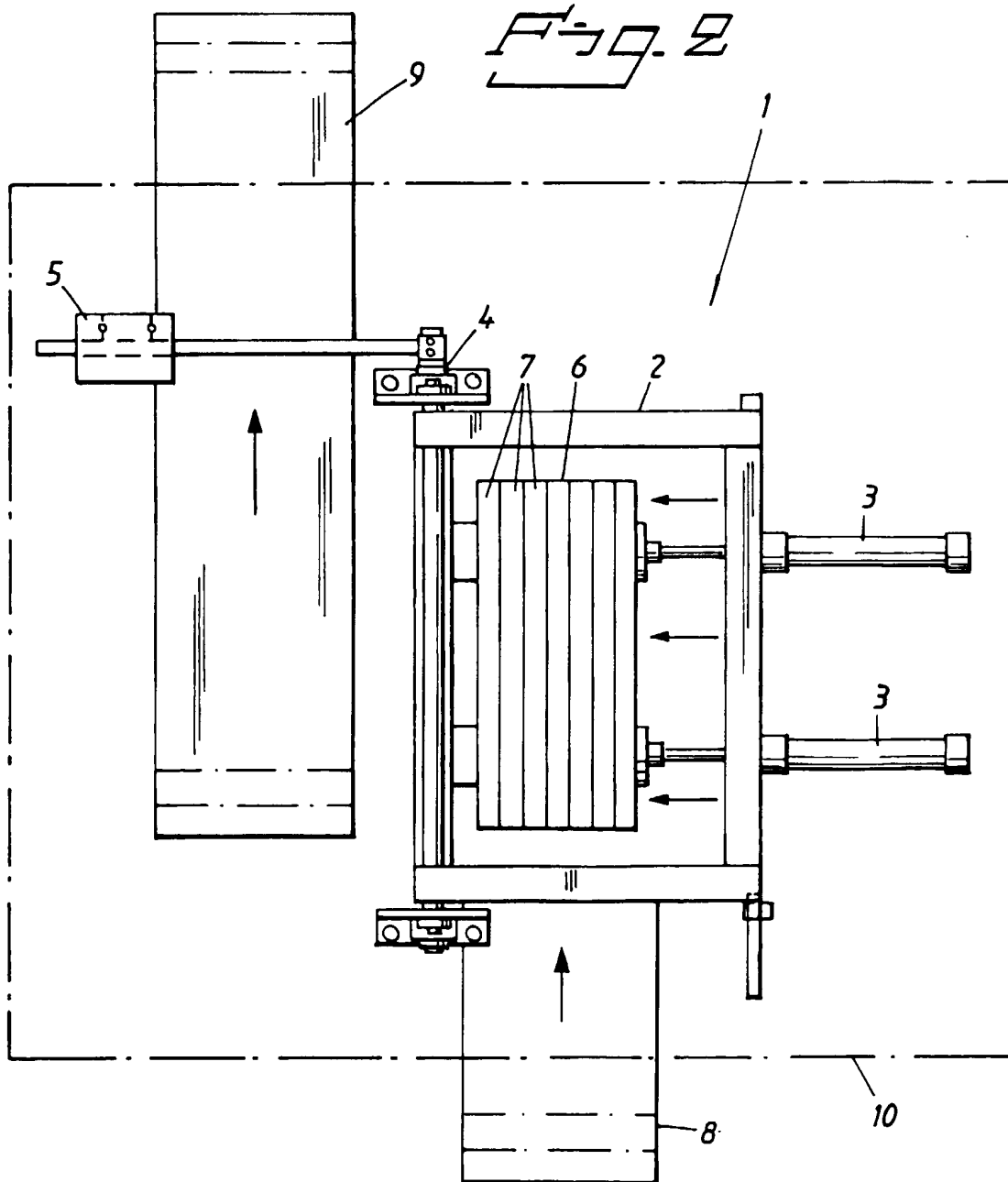


Fig. 3

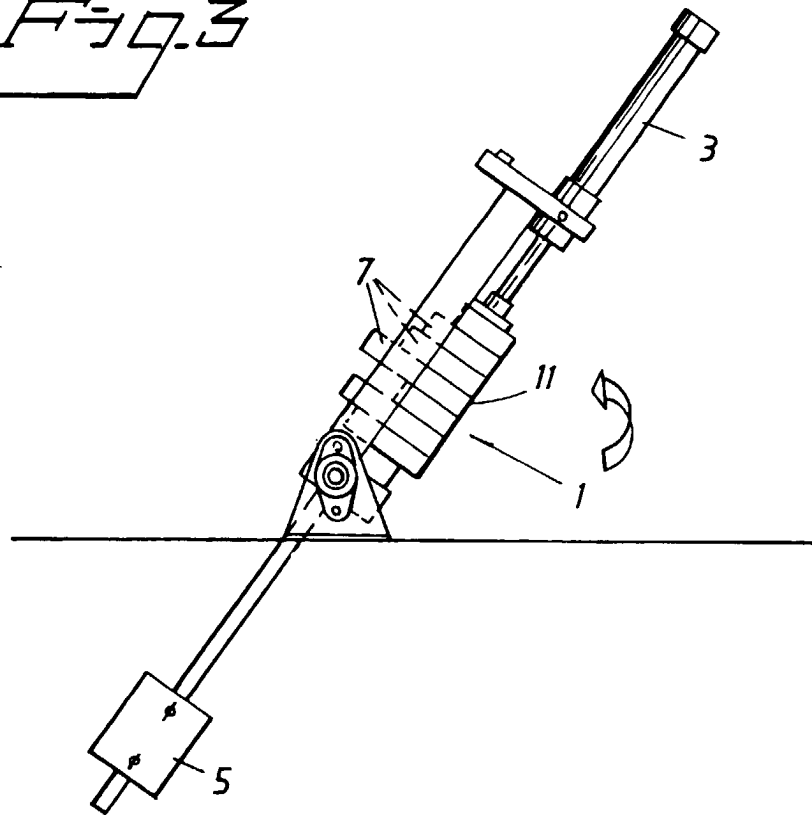
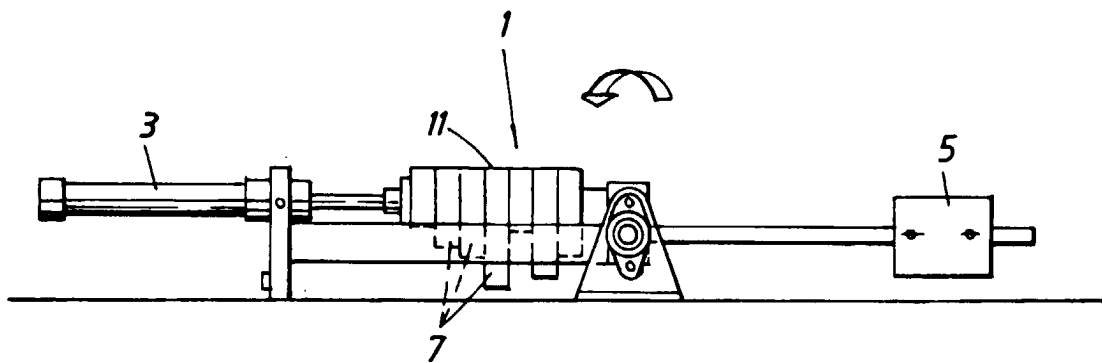


Fig. 4





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 85 0048

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 August 1999	Examiner Brévier, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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