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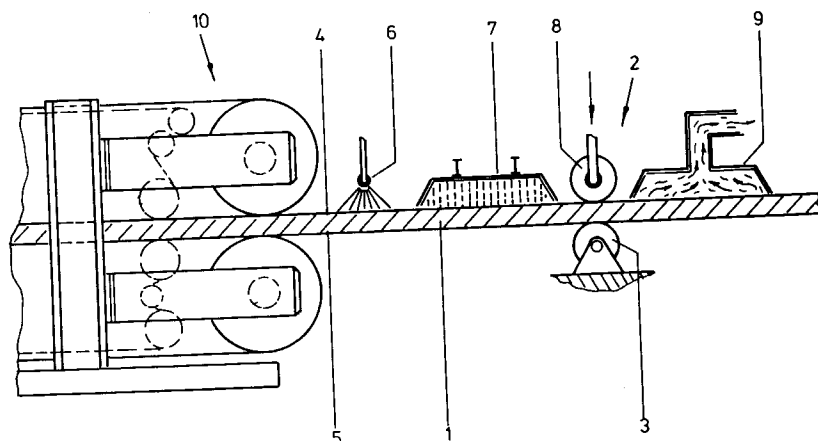
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(54) **PROCEDE ET EQUIPEMENT DE PRODUCTION DE  
PANNEAUX A PARTIR DE DERIVES DU BOIS**

(54) **PROCESS AND EQUIPMENT FOR PRODUCING SHEETS MADE  
FROM WOOD-DERIVATIVES**



(57) L'invention a trait à un procédé de production de feuilles comme des panneaux de particules ou des panneaux de fibres de bois à partir de produits dérivés du bois. Le procédé consiste à utiliser un mélange de particules contenant de la cellulose de bois et/ou de la cellulose comme des copeaux, des fibres et des rognures, etc. qui ont été traités avec un liant; les particules sont ensuite pulvérisées par un diffuseur sur une bande mobile de moulage pour former une couche de matériel à presser qui est livrée à une presse multicouche ou continue pour être pressée puis durcie sous l'effet de la pression et de la chaleur. Pour améliorer le formage et la production des panneaux au cours du cycle de traitement, l'invention propose de soumettre les nouveaux panneaux finis obtenus par pressage à un procédé de formage d'une seule face ou de deux faces.

(57) The invention relates to a process for producing sheets made from wood-derivatives, such as chipboard or fibreboard, from a mixture of particles containing wood cellulose and/or cellulose, such as chips, fibres and shavings etc., which have been treated with a bonding agent, the individual particles being sprinkled from a spreader on to a moving moulding belt to form a mat of material to be pressed and this mat being delivered to a multilayer or a continuous press and pressed and hardened under pressure and heat conditions. For the purpose of effecting the structuring and production in an operating cycle the invention consists of subjecting the newly finished wood-derivative sheet exiting from the pressing stage to a single-side or two-side structuring process.

Abstract

The invention relates to a process for producing sheets made from wood-derivatives, such as chipboard or fibreboard, from a mixture of particles containing wood cellulose and/or cellulose, such as chips, fibres and shavings etc., which  
5 have been treated with a bonding agent, the individual particles being sprinkled from a spreader on to a moving moulding belt to form a mat of material to be pressed and this mat being delivered to a multilayer or a continuous press and pressed and hardened under pressure and heat  
10 conditions. For the purpose of effecting the structuring and production in an operating cycle the invention consists of subjecting the newly finished wood-derivative sheet exiting from the pressing stage to a single-side or two-side structuring process.

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Process and Equipment for Producing  
Sheets made from Wood-derivatives

The invention refers to a process for producing sheets from wood-derivatives and to apparatus for executing the process.

The process concerns the selective production of  
5 structured surfaces and sheets made from wood-derivatives -- preferably OSBs (oriented stranded boards) -- produced in single-layer or multilayer presses or continuous presses. The use of structured surfaces for OSBs is known, a single-side structuring being preferred to obtain better  
10 adhesiveness (for example, in roof sheeting) which is particularly necessary in prefabricated house construction. OSBs are produced with single-side structuring in single-layer or multilayer presses by spreading the shavings on woven metal mats or perforated conveyor plates. The metal  
15 mats match the geometrical size of the particular pressing or heating plate in the single-layer or multilayer press. A woven metal belt or perforated conveyor plate has two functions in a single-layer or multilayer system.

First, the woven metal belt transports the material to  
20 be pressed into the particular layer between the press heating plates in the multilayer press and conveys it out again as finished sheet, and second, the woven structure of this metal belt (conveyor mat) is, for example, used to produce the structuring on the OSB surface during the  
25 pressing process, while use is at the same time made of the plasticity created automatically in the heated wood-derivative material by vapour-deposit from the moisture introduced with the material to be pressed.

Surface structuring for wood-derivative sheets in a  
30 continuous press is known from DE 43 33 614 A1, in which a woven metal belt is led around the lower press heating plate and is used as both conveyor and structuring belt as in the case of the multilayer press. In addition to the demonstrated advantages of a preheating section a structuring

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of the wood-derivative sheet is created during the continuous press process with the plasticity of the wood-derivative sheet being similarly maintained during that process.

A disadvantage of both these applications is that the combination of the two functions -- conveyance and simultaneous structuring -- makes selective pressing with smooth surfaces on both sides possible only if the feed units are retrofitted at considerable expense, that is to say, in single-layer or multilayer presses woven metal belts must be replaced by flat plates and in continuous presses the endless woven metal belt must be replaced by a flat belt or else the revolving conveyor belt must be removed and the material to be pressed must be delivered directly to the press by means of delivery belts. Retrofits of this sort are therefore not economic. Moreover, modern businesses strongly insist heavily on just-in-time production, so that long idle periods between the selective production of wood-derivative sheets with a flat surface or single-side or two-side structuring are not desirable. The alternative solution, which is to effect the structuring later on the finished and cooled wood-derivative sheets, reduces the bending strength of the sheet and the adhesiveness on these structured surfaces.

The purpose of the invention is to describe a process which will solve the problem outlined above and will make it possible to produce wood-derivative sheets selectively with smooth and structured surfaces without interrupting production and without limiting the mechanical strength of the sheets and the adhesiveness on the structured side and to devise apparatus for executing this process.

According to one aspect of the invention, there is provided a process for the production of wood-derivative sheets, made from chipboard or fibreboard, from a mixture of particles containing wood cellulose and/or cellulose, such as chips, fibres and shavings etc., which have been treated with a bonding agent, the individual particles being sprinkled from a spreader on to a moving moulding belt to form a mat of material for pressing, this mat being delivered into a

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multilayer or a continuous press and pressed and hardened under pressure and heat conditions, characterized in that the newly finished wood- derivative sheet exiting from the pressing process is subjected to a single-side or two-side structuring process.

According to another aspect of the invention, there is provided apparatus for the production of wood-derivative sheets by a process as described above, consisting of a spreader, a single-layer or multilayer press or a continuous press, characterized in that a structuring roller frame designed for one or both surfaces is positioned immediately after the exit of the wood-derivative sheet from the press.

As will be seen from the above, the solution to the problems underlying the invention is to subject the newly finished wood-derivative sheet exiting from the pressing process to a single-side or two-side structuring process. The newly finished wood-derivative sheet exiting from the pressing process may be sprayed with water on one side or on both sides and then to pass it through a vapour-deposit section and afterwards subject it to a structuring process. The newly finished wood-derivative sheet exiting from the pressing process may alternatively be sprayed with water on one side or on both sides and then to pass it through a heated vapour-deposit section and afterwards subject it to a structuring process.

The advantage of the process as described by the invention is that both in clock-controlled multilayer and single-layer presses and in a continuous press the exit from the press is immediately followed by a structuring process which can be switched selectively to the production of structured surfaces, with the result that the heat still stored in the freshly pressed wood-derivative sheets can be used with the increased plasticity before the wood-derivative sheet is sent to be cooled and dried (stored).

For the apparatus as described by the invention this means that the structuring roller frame is placed immediately at the exit from a continuous press and in this way the

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apparatus uses the heat still accumulated in the wood-derivative sheet and the increased moisture in the core of the wood-derivative sheet. For example, the core temperature in the centre of the wood-derivative sheet is somewhat less than 120° Celsius and on the surface over 150° Celsius, the moisture level in the sheet at its core being 1% to 2% higher than after the drying and cooling stage and this means that the sheet still has sufficient plasticity for the structuring process.

10 In some processes and methods of finishing the wood-derivative sheet exits from the press with a temperature which is too low for optimal structuring. This drawback can be offset in accordance with a second and third solution whereby a water spray is connected up for the surfaces of the wood-derivative sheet ahead the structuring process and a subsequent vapour-deposit section, heated if necessary, is used to vaporize the introduced moisture, so that the surfaces to be structured are rendered sufficiently plastic. Radiation systems, such as microwave or infrared heating, are used in preference to heat the vapour-deposit stage.

20 The parameters of the process make it advantageous to use the following apparatus in accordance with the invention: In the immediate vicinity of the point where the sheet exits, for example from a continuous press, a structuring roller frame is positioned only if the plasticity of the outer layers is sufficient for structuring or in a second embodiment there is also a water spraying device operating continuously and transversely to the given structuring surface of the wood-derivative sheet and immediately next to it a steaming cone, since the sprayed water vaporizes at once because of the high temperature existing in or introduced into the surface which is still at about 150° Celsius. The third way of achieving the invention's purpose is to add a heating device to the steaming cone, using microwave or infrared equipment. Behind the steaming cone the structuring roller frame comes into operation with the result that the increased plasticity makes it possible for the structure to

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be formed on the structuring roller in the same way as on the woven metal belt in accordance with the state of the technology, the advantage being that the surface structure has the same adhesiveness as can be obtained in accordance  
5 with the state of the technology without the bending strength being less than in a cold structuring process.

The following additional advantages are offered by the apparatus and devices:

By analogy to the state of the technology in which woven  
10 metal belts and perforated sheets are used in the pressing process to produce a structured surface it is possible, by replacing the structuring roller, to use any surface structures offering the desired adhesiveness or bonding technology for the surface which is to be applied later, for  
15 example, a planned burlled structure using a knotting technique and depending on requirements a structuring roller can be used to produce flat surfaces and also structured surfaces, arranged stripwise along the line of travel. If necessary, when single-side surface structuring is to be  
20 carried out on a wood-derivative sheet a drying section can advantageously be inserted after the structuring roller frame to counteract any single-side warping of the wood-derivative sheet. Here too the physical devices can be a radiation system such as microwave or hot air.

25 To satisfy the market (prefabricated house construction) the practice has been to provide the OSBs used with structured surfaces. In particular market niches such structured surfaces can still be applied to chipboard and MDF board, on chipboard for prefabricated house construction and  
30 on MDF board for the production of artistic designer surfaces. Consequently, a completely new market exists for the structuring process technology as described in the invention.

Additional practical embodiments of the invention are  
35 described in detail and illustrated by the accompanying drawing, which is a longitudinal section of the preferred apparatus according to the invention.

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The drawing shows a continuous press 10 being selected for the purpose of explanation. The finished wood-derivative sheet 1 exiting from the continuous press 10 is structured in accordance with the first embodiment in the structuring roller frame 2 by the structuring roller 8 pressing against the mating roller 3 while the structuring roller 8 embosses a selected pattern on the upper surface 4 of the wood-derivative sheet 1 as it passes through. If the lower surface 5 of the wood-derivative sheet is to be structured as well the mating roller 3 is fitted up with an embossed pattern. If the wood-derivative sheet 1 does not arrive from the continuous press 10 with an adequate temperature, that is, it no longer has sufficient plasticity for optimum structuring, it is advantageous to spray the wood-derivative sheet 1 with hot water on one or both surfaces 4 and/or 5 in a water spraying device 6; it then passes through a vapour-deposit section in the form of a steaming cone 7 before it goes through the structuring roller frame 2. Still greater plasticity is obtained in the upper layers of the wood-derivative sheet 1 if the steaming cone 7 is heated. If necessary the apparatus placed after the roller frame 2 is also provided with cooling and drying apparatus 9. To facilitate the process and deepen the structuring it is also suggested that the structuring roller 8 in the structuring roller frame 2 should be positioned to oscillate or pulsate vertically.



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Legend of Reference Numerals Used in the Drawing

- |      |                          |     |                           |
|------|--------------------------|-----|---------------------------|
| 1.   | Wood-derivative sheet    | 7.  | Steaming cone             |
| 2.   | Structuring roller frame | 8.  | Structuring roller        |
| 3.   | Mating roller            | 9.  | Cooling and drying device |
| 5 4. | Upper surface of 1       | 10. | Continuous press          |
| 5.   | Lower surface of 1       |     |                           |
| 6.   | Water spraying device    |     |                           |

Claims:

1. A process for the production of wood-derivative sheets, made from chipboard or fibreboard, from a mixture of particles containing wood cellulose and/or cellulose, such as  
5 chips, fibres and shavings etc., which have been treated with a bonding agent, the individual particles being sprinkled from a spreader on to a moving moulding belt to form a mat of material for pressing, this mat being delivered into a multilayer or a continuous press and pressed and hardened  
10 under pressure and heat conditions, characterized in that the newly finished wood- derivative sheet exiting from the pressing process is subjected to a single-side or two-side structuring process.

2. A process for the production of wood-derivative sheets  
15 especially as in Claim 1, characterized in that the newly finished wood-derivative sheet exiting from the pressing process is sprayed on one or both surfaces with water and then passes through a vapour-deposit section and is afterwards subjected to a structuring process.

20 3. A process for the production of wood-derivative sheets especially as in Claim 1, characterized in that the newly finished wood-derivative sheet exiting from the pressing process is sprayed on one or both surfaces with water and then passes through a heated vapour-deposit section and is  
25 afterwards subjected to a structuring process.

4. A process for the production of wood-derivative sheets especially as in one of Claims 1, 2 or 3, characterized in that the wood-derivative sheet is subjected immediately after the structuring process to cooling and drying.

30 5. Apparatus for the production of wood-derivative sheets by a process according to any one of Claims 1 to 4, consisting of a spreader, a single-layer or multilayer press or a

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continuous press, characterized in that a structuring roller frame designed for one or both surfaces is positioned immediately after the exit of the wood-derivative sheet from the press.

- 5 6. Apparatus according to Claim 5, characterized in that a water spraying device, and next to it a heatable or unheated steaming cone and then a structuring roller frame designed for one or both surfaces are positioned immediately after the exit of the wood-derivative sheet from the press for  
10 continuous operation transversely over one or both surfaces.

7. Apparatus according to Claim 5 or Claim 6, characterized in that a cooling and drying device is placed after the structuring roller frame.

8. Apparatus according to Claim 5, Claim 6 or Claim 7,  
15 characterized in that the structuring roller in the structuring roller frame is positioned to oscillate or pulsate vertically.

