(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 095 749 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.05.2001 Bulletin 2001/18

(51) Int Cl.[7]: **B27N 3/04**, B27N 3/14

(21) Application number: **00500220.9**

(22) Date of filing: **26.10.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **26.10.1999 ES 9902354**

(71) Applicant: **Tabsal Composites de Madera, S.A.**
31868 Echarren-Araquil (Navarra) (ES)

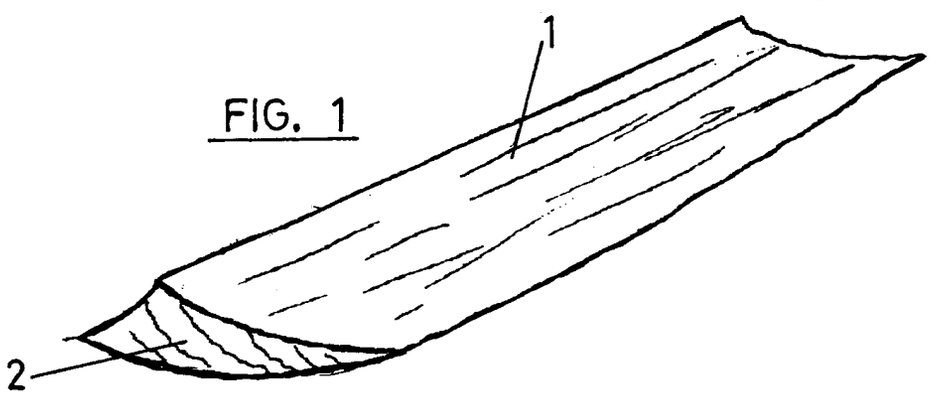
(72) Inventor: **Saldise Medina, Juan Antonio**
31002 Pamplona (Navarra) (ES)

(74) Representative: **Davila Baz, Angel**
c/o Clarke, Modet & Co.,
Goya, 11
28001 Madrid (ES)

(54) Production process for wood conglomerate boards

(57) Production process for wood conglomerate boards, based on elongated particles which are glued to form a blanket in which said particles run longitudinally or with slight deviations. Said blanket is pressed with heat and steam applied for curing the glue. The elongated particles which make up the board have an approximately curved triangular cross-section, with a length between 70 and 300 mm., a width between 4 and 30 mm., and a thickness, defined as the smallest height of the triangular section, between 0.5 and 4 mm.

FIG. 1



EP 1 095 749 A1

Description

[0001] The present invention relates to a production process for wood conglomerate boards built from elongated wooden particles.

[0002] Industrial use of solid wood is causing environmental problems, as well as presenting technical problems, so that it is becoming increasingly difficult to find solid wood with suitable technical and economic characteristics which allow to supply an increasingly quality-conscious market while at the same time preserving ecosystems.

[0003] In order to partially solve this problem, conglomerate boards are known in which low quality wood can be employed, due both to their nature and the parts employed.

[0004] Known processes for construction of wood conglomerate boards are normally related to obtaining boards of large surface area and typically small thickness, of approximately up to 30 mm., while not solving the problems which exist for thicker boards. A few processes meant to obtain greater thickness boards are known, although these are in general directed at solving structural problems, so that they lack edge and surface finish characteristics, while less thick boards lack important mechanical properties.

[0005] There exist several types of boards made from elongated particles, all of which have as a characteristic element a flat, approximately rectangular section particle with approximately parallel greater surfaces.

[0006] Based on this particle geometry, the process for obtaining boards is quite similar in all cases: particles are dried and glued with a heat-hardened adhesive, forming a blanket in which the particles are aligned longitudinally. This blanket is continuously or discontinuously introduced in a press where in high temperature conditions and with steam injection it is subjected to the appropriate pressures in order to obtain the desired final product, as regards thickness and density, so that the glue is cured and the conglomerate is formed which may later be longitudinally cut and calibrated.

[0007] During formation of the particle blanket it is frequent for many particles to be misaligned away from the longitudinal direction, so that there may be a large number of particle crossings. In these crossings appear gaps between particle sides and faces, so that if these gaps are to be reduced in order to increase the board density high pressures are required in the pressing stage, requiring powerful presses.

[0008] Higher board densities are not convenient for many applications, as it hinders later processes such as machining, nailing, etc.

[0009] Additionally, there exist parts with particles subjected to overpressures, so that the tendency to recover the original shape or thickness in the presence of moisture makes the increased thickness of these particles alter the surface appearance of the board.

[0010] The object of the present invention is to prevent the aforementioned problems by the use of elongated particles shaped so that they allow to minimise the gaps formed between particles when forming the blanket prior to obtaining the board.

[0011] A further object of the present invention is to obtain boards thicker than those obtained by traditional methods.

[0012] In order to obtain the board in accordance with the object of the invention, elongated particles are used which are glued to form a blanket in which the particles are distributed longitudinally or slightly deviating from said sense. As in traditional methods, the blanket is subjected to pressures under high temperatures and steam in order to cure the glue.

[0013] According to the invention, the elongated particles which form the board have an approximately curved triangular cross-section. Said particles are between 70 and 300 mm long, between 4 and 30 mm wide and a have thickness, defined as the smaller height of the triangle or section, between 0.5 and 4 mm.

[0014] The triangular cross section of the particles is preferably defined by two greater sides, one convex and one concave, forming an acute angle between them, and a third smaller concave side substantially shorter than the other two. The particles therefore have an elongated or pointed cross section.

[0015] The board obtained by the process of the invention can reach a thickness between 25 and 150 mm., with densities between 500 ad 900 kg/m^3.

[0016] Wood particles used to form the board may be obtained from either coniferous or broadleaf trees of low density. After drying, between 4% and 15% humidity, a heat hardening adhesive is applied to these particles in amounts ranging from 1.5% to 12%. Later a blanket is formed with these particles with a constant width and with the particles aligned predominantly in a longitudinal sense. Particles in the board will preferably have a deviation of under 10% in the horizontal plane and under 3% in the vertical plane.

[0017] The characteristics of the invention will be understood more clearly in view of the following description, made with reference to the accompanying nonlimiting drawings, where for purposes of illustration the following is shown:

[0018] Figure 1 shows a perspective view of an elongated wood particle used for the process of the invention.

[0019] Figure 2 shows an enlarged cross section of the particle of figure 1.

[0020] Figure 3 shows a perspective view of a board segment obtained in accordance with the process of the present invention, showing enlarged views of the particle distribution.

[0021] The board obtained by the process of the invention is formed from elongated particles (1), with a curved triangular cross-section (2), shown enlarged in figure 2.

[0022] This cross section (2) is elongated in shape,

with two longer sides labelled (3) and (4), the former concave and the latter convex, which form an acute angle between them. The third side, labelled (5), is concave and substantially shorter in length.

[0023] Figure 3 shows a segment (6) of a board obtained by the process of the invention. As may be seen in inset (7), particles (1) are clearly oriented in a longitudinal direction, with slight deviations which in the horizontal plane are preferably under 10%.

[0024] In the particles superposition at various levels, as shown in inset (8), particles (1) also run longitudinally with deviations from the vertical plane of under 3%.

[0025] As may be seen in inset (9) of figure 3, triangular sections of the particles are coupled to each other so that the minimum free spaces are left between them. Thus, when the board is pressed higher densities can be obtained with lower pressures and the thickness of board (6) can be increased.

[0026] Several laboratory tests have been performed, showing that boards obtained enjoyed physical, mechanical and surface finish characteristics which could hardly be obtained in a stable manner in the wood employed at the start.

[0027] Using Insignis pine trunk particles 120 x 20 x 1.5 mm were obtained using a cutter block and dried to 8% humidity, then glued with 3.5% isocyanate resins. Afterwards a blanket was formed with the particles oriented and it was inserted in a press where the glue was cured by applying heat and injecting steam under pressure. The product thus obtained had the following properties: density 620 kg/m^3; MOE 65,200 kg/cm^2; MOR 570 kg/cm^2; 24 hour swelling 5.6%; face-perpendicular tensile strength 15 kg/cm^2.

Claims

1. Production process for wood conglomerate boards, based on elongated particles which are glued to form a blanket in which said particles run longitudinally or with slight deviations from said direction, which blanket is pressed with heat and steam applied for curing the glue, characterised in that the elongated particles which make up the board have an approximately curved triangular cross-section, with a length between 70 and 300 mm., a width between 4 and 30 mm., and a thickness, defined as the smallest height of the triangular section, between 0.5 and 4 mm.

2. Process as claimed in claim 1 characterised in that the triangular cross-section of the particles is defined by two greater sides, one concave and one convex, which form an acute angle between them, and by a third concave side substantially shorter than the other two, defining an elongated, pointed shape.

3. Conglomerate wood board with thickness ranging between 25 and 150 mm., characterised in that it comprises elongated particles with a curved triangular cross-section and having a density between 500 and 900 kg/m^3.

4. Particle for forming conglomerate wood boards, with an elongated shape, characterised in that it has a curved triangular cross-section and a length between 70 and 300 mm., width between 4 and 30 mm., and a thickness defined as the smallest height of the triangular section between 0.5 and 4 mm.

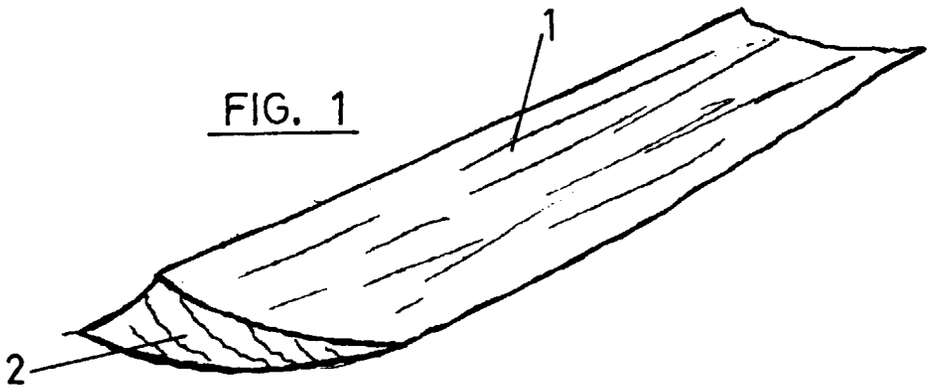


FIG. 1

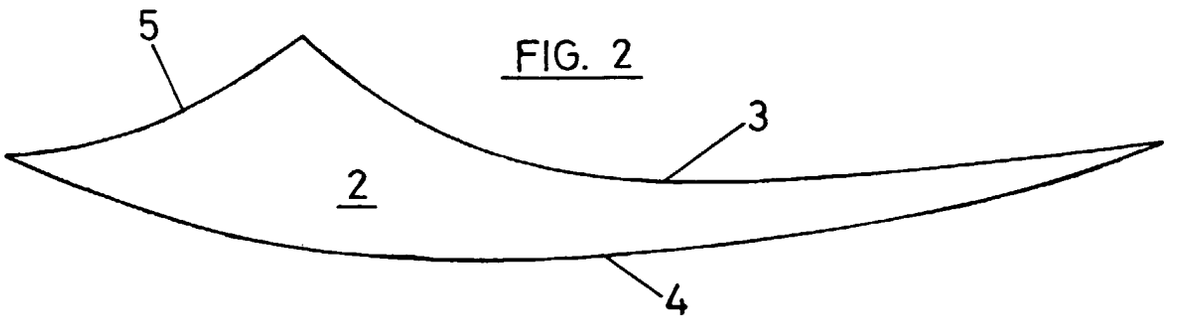


FIG. 2

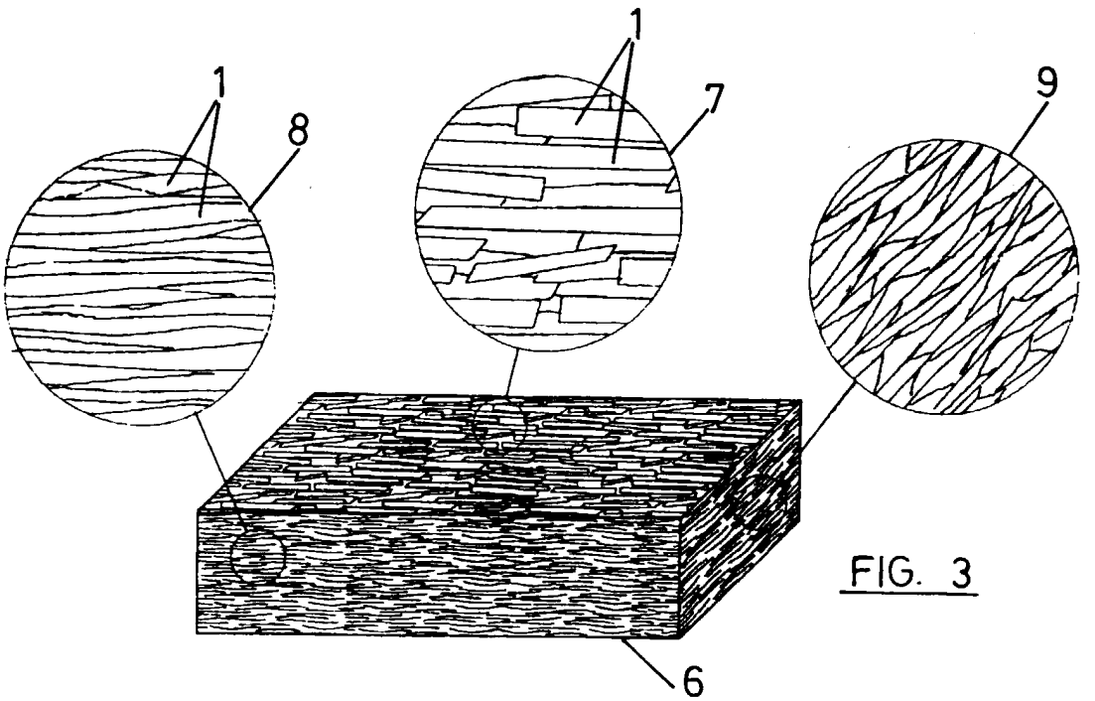


FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 50 0220

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
P,X	WO 00 00331 A (DIETZ HANS) 6 January 2000 (2000-01-06) * page 1, line 1 - line 8 * * page 3, line 12 - line 17; claims; figures 1,2 *	1-4	B27N3/04 B27N3/14
A	WO 99 24233 A (CARLSON BRIAN S ;HUBER CORP J M (US); PALARDY ROBERT D (US)) 20 May 1999 (1999-05-20) * abstract; claims; figures 1,4 *	1-4	
A	DE 196 32 997 A (SIEMPELKAMP GMBH & CO) 19 February 1998 (1998-02-19)		
A	EP 0 666 155 A (FORESTRY AND FOREST PRODUCTS R) 9 August 1995 (1995-08-09)		
A	US 4 232 067 A (COLEMAN JOHN D) 4 November 1980 (1980-11-04)		
A	WO 97 49547 A (B3 TECHNOLOGIES INC) 31 December 1997 (1997-12-31)		TECHNICAL FIELDS SEARCHED (Int.Cl.7) B27N D21B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 January 2001	Soederberg, J

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 50 0220

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-01-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0000331 A	06-01-2000	DE 19829112 C	30-03-2000
WO 9924233 A	20-05-1999	AU 1452599 A	31-05-1999
		BR 9814024 A	26-09-2000
		EP 1030766 A	30-08-2000
DE 19632997 A	19-02-1998	NONE	
EP 0666155 A	09-08-1995	US 5441787 A	15-08-1995
		DE 69409495 D	14-05-1998
		DE 69409495 T	24-09-1998
		US 5505238 A	09-04-1996
US 4232067 A	04-11-1980	AU 2424377 A	19-10-1978
		CA 1092500 A	30-12-1980
		DE 2716748 A	03-11-1977
		FR 2348050 A	10-11-1977
		GB 1582142 A	31-12-1980
		JP 1570528 C	25-07-1990
		JP 52154876 A	22-12-1977
		JP 63057201 B	10-11-1988
		SE 427014 B	28-02-1983
		SE 7704282 A	16-10-1977
		ZA 7702210 A	29-03-1978
WO 9749547 A	31-12-1997	AU 6292296 A	14-01-1998
		BR 9612688 A	24-08-1999
		EP 0907503 A	14-04-1999

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82