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(54) **Press feed arrangement.**

(57) An arrangement for feeding a mat of disintegrated lignocellulose-containing material into a press with continuously driven lower and, respectively upper press belts (6,9) for the manufacture of board, such as particle board, fiberboard etc. The arrangement comprises a conveyor with a movable nose portion (5) extending into the nip between the press belts (6,9). A mechanism (4) is provided for moving the nose portion (5) along a fixed roll surface (7), the geometry of which corresponds to the geometry in the press nip, so that the distance of the nose portion (5) to the lower press belt (6) is maintained substantially constant at the movement of the nose portion (5).

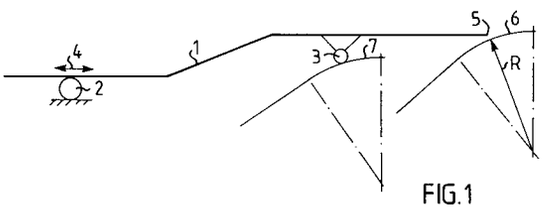

FIG.1

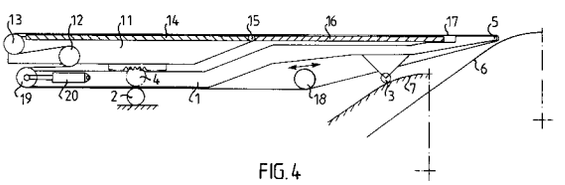

FIG.4

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This invention relates to an arrangement for feeding a mat of disintegrated lignocellulose-containing fiber material into a press comprising continuously driven lower and, respectively, upper press belts for the manufacture of board, such as particle board, fiberboard etc.

The manufacture of board based on lignocellulose according to the dry method is carried out in known manner by disintegrating the lignocellulose-containing raw material to a suitable form, drying and glueing it, form it to a material mat which is pre-pressed and transported to a hot press, which can be a discontinous or continuous press where the material mat is compressed and the glue by the influence of heat hardens and gives the resulting board the strength required.

Board types manufactured in principle in this way are particle board, fiberboard and other board.

Medium Density Fiberboard (MDF) and similar fiberboard with varying density are board types, which in recent years have been used to a rapidly increasing extent, and which are based on lignocellulose-containing raw material defibered to fibers. The material mat thus obtained is almost exclusively a so-called single-layer board, i.e. it has a substantially homogenous structure with uniform fiber distribution, and the mat has a considerable thickness after forming, but also after pre-pressing and at the transport into the hot press.

Particle board at present is built up mostly as three-layer board, i.e. it comprises a central layer with coarse chips and two surface layers with fine chips. As these surface layers are made separately, the possibility is used to choose different moisture content and glue content in the layers, The fiber mat at the use of chips is not as thick as at MDF.

At the introduction of a material mat of the said or similar kind into the inlet of a continuous press, the material mat is exposed to heat from the hot upper steel belt in the hot press, and at the inlet to the press nip it is subjected to a reduction in thickness, which implies a.o. that air included in the material mat rapidly must be evacuated out of the material mat.

The material mat, thus, is not exposed symmetrically to the hot steel belts, because the lower surface of the mat is protected by its conveyor all the way to the take-off occasion. Arrangements to protect the upper surface of the mat against radiation heat from the hot upper steel belt are known, but have practical disadvantages, such as the risk of accumulation of chips/fibers, which can fall down on the mat and cause second quality board etc. The undesired heating of the surface layer of the mat. results in the drying-out of the surface layer whereby also the glue dries out and is inactivated. The surface layer, therefore, is given an unsatisfactory hardness and strength. The surface layer thus obtained often is called pre-hardening layer, because the glue there is hardened and/or dried up before sufficient surface pressure effecting good contact between fibers or particles has been produced in the press nip. In order to compensate for the pre-hardening layer, the board must be manufactured with excess size, which must be ground off. Unsymmetrical heating implies greater grinding allowances.

At board manufacture in a continuous press, in order to obtain a desired high surface density, the material web should be compressed rapidly to a thickness immediately above its final thickness. The ingoing material mat has a considerably greater thickness, at times up to ten times the final thickness. It is, therefore, understood that a great amount of air must be evacuated out of the material mat. This should take place, thus, as rapidly as possible, but is restricted by the fact that the overpressure thus built up in the material mat must not become so high, that the material mat is disrupted. This appears mostly in the form of transverse stripes in the finished board. These surface cracks often can pass unnoticed through the production, and first when the board is to be painted at the customer it is observed,that the surface cracks have caused variations in the surface density, resulting in varying paint absorption and thereby varying glaze. This inevitably gives rise to reclamations.

The design and control of the conveyor delivering the material mat into the press nip, therefore, is of great importance for minimizing the aforesaid shortcomings.

Known designs of feed conveyors have disadvantages in these respects and, moreover, are not guided safely for preventing collision with the hot lower steel belt.

The method and arrangement according to the present invention imply minimization of the said problems and at the same time offer additional advantages. The mat, for example, can be guided into the press nip so that the air evacuation out of the material mat. takes place in the most lenient manner at the same time as the nose of the feed conveyor cannot collide with the steel belt and pre-hardening can be affected.

The characterizing features of the invention become apparant from the attached claims.

A feed arrangement according to the invention can be designed so that the nose portion is movable and rolls against a roll surface, the geometry of which mirrors the geometry in the press nip, whereby the nose follows the geometry of the lower press belt in the inlet and, thus, always is at a certain distance from the lower steel belt. The equipment can be pre-programmed so that adjust-

ment of the nose position can be carried out automatically by means of rack and pinion drive, for example to a suitable pre-programmed nose position when the board thickness is changed or in that a continuous measuring of the thickness of the material mat immediately before the press provides corresponding information, which then is processed in the control equipment and provides a suitable nose position.

The invention is described in greater detail in the following, with reference to the accompanying drawings showing only one embodiment of the invention.

- Fig. 1 shows the movable structure for the conveyor and the lower press nip and roll surface.
- Fig. 2 shows the nose portion of the movable structure and the press nip.
- Fig. 3 shows a detail of the nose portion with the lower press nip.
- Fig. 4 shows an imagined embodiment of the conveyor.

The inlet gap in the continuous hot press shown in the Figures is designed in known manner to comprise front guide rollers and heating plates, which are formed with a large guide radius R of the same magnitude as the radius of the guide rollers. The heating plates thereafter transform to a substantially horizontal portion. Depending on the thickness of the board to be produced, the inlet opening b is adjusted so that the press operation is optimized.

The material mat in all Figures is thought to move from left to right.

The movable structure 1 shown in Fig. 1 rests on rolls 2 and 3 and is movable in a substantially horizontal direction by a mechanism 4. The nose 5 of the structure is located at a certain distance above the lower steel belt 6 of the press nip. The roll surface 7 is designed so that the distance between the nose 5 and steel belt 6 is maintained almost constant when the stucture is moved by the mechanism 4. The form of the roll surface 7 mirrors the geometry of the lower steel belt 6, geared with regard to the distances between roll 2 and roll 3 and, respectively, roll 2 and nose 5, and the distances between the centre for radius R and the radius of the roll surface 7 in horizontal direction, and the distances between roll 2 and roll 3 and, respectively, roll 2 and nose 5 in vertical direction.

Fig. 2 shows the location of the material mat 8 in the press nip with the lower steel belt 6 and upper steel belt 9. The height of the material mat is m, and the nose 5 has been placed on height c below the inlet opening with the measure b. The guide radius is R, and its angle with the nose 5 is v.

Fig. 3 shows the geometry about the nose 5 with nose radius r, the distance a between the nose 5 and steel belt 6, and the height h of the nose 5 above the nearest point 10 on the steel belt 6. The geometry is now fully determined and can relatively simply be drafted. So is, for example, $h = r + (r + a) \cos v$.

Fig. 4 shows a preferred embodiment of the invention, where the mechanism 4 for moving the structure 1 comprises a rack and pinion drive, where the rack is mounted on the fixed stand 11, in which drive roll 12, rear end roll 13 and fixed gliding plane 14 with link 15 are mounted. In the link 15 the pivoting gliding plane 16 is attached. At its free end it rests on the movable structure 1. The endless conveying belt 17 is guided over the nose 5, passes on its return a guide roll 18 and a drawing roll 19, which is operated by cylinders 20. The parts 18-20 are mounted on the movable structure 1. By means of this design, the structure 1 can be moved without changing the length of the belt 17 and without changing the speed of the belt, i.e. also of the material mat 8.

The arrangement also comprises a control system (not shown) with associated suitable measuring equipment. Hereby information on actual production parameters, such as nominal board thickness, selected thickness b in the press nip, thickness of the material mat to the hot press (either as measured value or as programmed experience value stored in the control system for every nominal thickness) etc. is obtained. According to the invention, furthermore, the distance c has been preprogrammed for all nominal thicknesses, in a certain relation to the actual thickness of the material mat and with regard to previous experience and calculations of optimum position with regard to most lenient air evacuation and pre-hardening. By means of this information and with the knowledge of the geometry according to above, a suitable position of the structure 1 is calculated automatically, whereafter the result controls the operation 4.

Tne arrangement can be varied within the scope of the invention idea and is not restricted to the embodiment shown.

Claims

1. An arrangement for feeding a mat of disintegrated lignocellulose-containing material into a press with continuously driven lower and, respectively, upper press belts (6,9) for the manufacture of board, comprising a conveyor with a movable nose portion (5) extending into the nip between the press belts (6.9), **characterized in** that a mechanism (4) is provided for moving the nose portion (5) along a fixed roll surface (7), the geometry of which corresponds

to the geometry in the press nip, so that the distance of the nose portion (5) to the lower press belt (6) substantially is maintained constant at the movement of the nose portion (5).

2. An arrangement as defined in claim 1, **characterized in** that a control system is provided for adjusting the position of the nose portion (5), depending on the thickness of the material mat or board.

3. An arrangement as defined in claim 2, **characterized in** that a thickness measuring gauge for measuring the material mat before the press is coupled to the control system.

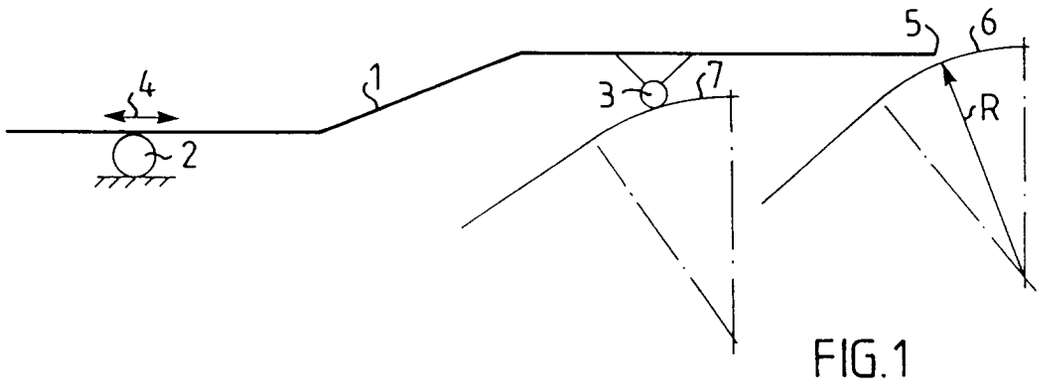

FIG.1

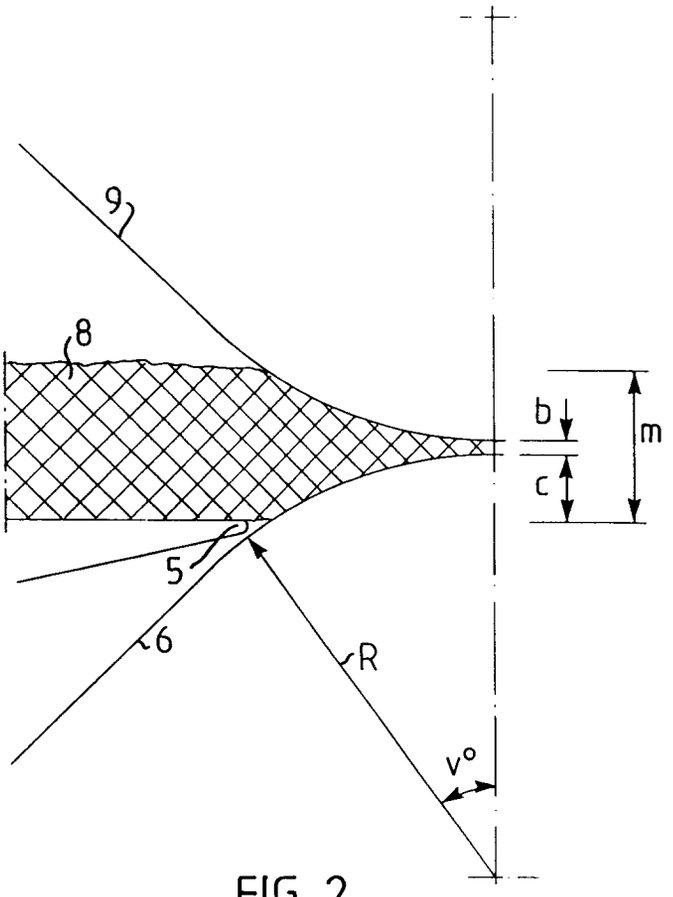

FIG. 2

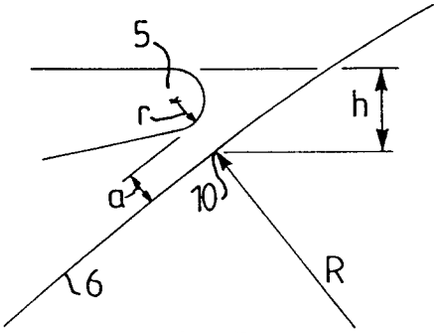

FIG.3

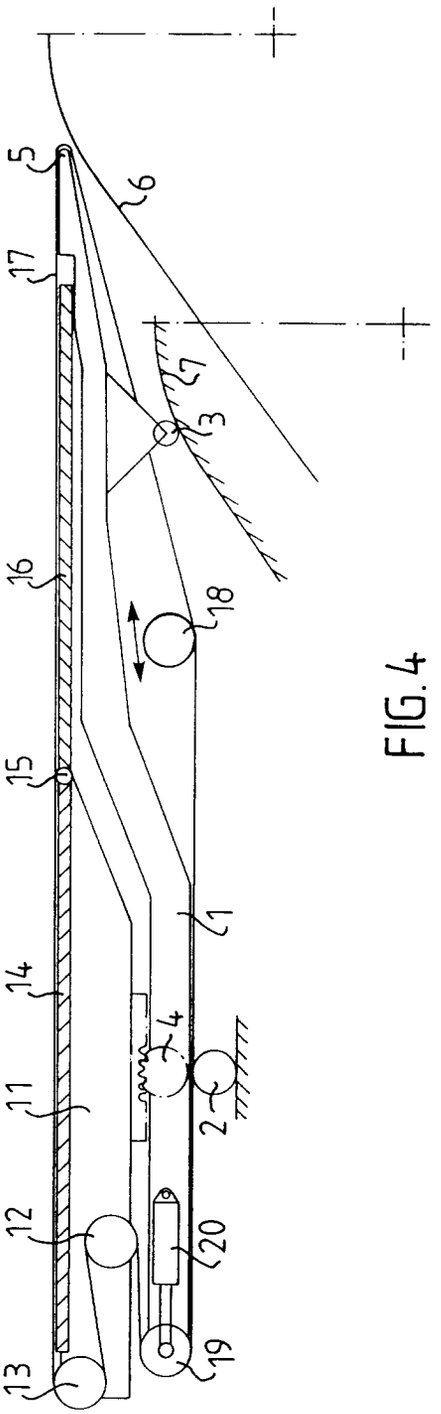

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 5228

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.5)
A	US-A-4 850 846 (KARL WALTER)	1	B27N3/16 B27N3/24

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

B27N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
STOCKHOLM	17 August 1994	OLOV JENSEN

CATEGORY OF CITED DOCUMENTS

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