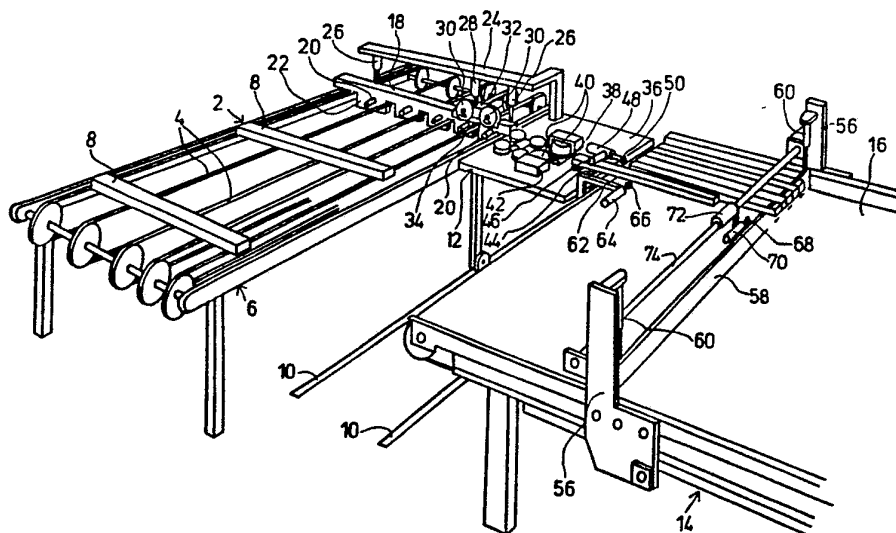




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification⁴ : B27M 3/00</p>	<p>A1</p>	<p>(11) International Publication Number: WO 89/08016 (43) International Publication Date: 8 September 1989 (08.09.89)</p>
<p>(21) International Application Number: PCT/DK89/00042 (22) International Filing Date: 23 February 1989 (23.02.89) (31) Priority Application Number: 976/88 (32) Priority Date: 25 February 1988 (25.02.88) (33) Priority Country: DK (71) Applicant (for all designated States except US): H. KALLESØE MASKINFABRIK A/S [DK/DK]; Bredgade 115, DK-6940 Lem St. (DK). (72) Inventor; and (75) Inventor/Applicant (for US only) : KALLESØE, Herluf [DK/DK]; Bredgade 115, DK-6940 Lem (DK). (74) Agent: K. SKØTT-JENSEN; Lemmingvej 225, DK-8361 Hasselager (DK).</p>		<p>(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), FI, FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent), US. Published <i>With international search report.</i></p>

(54) Title: METHOD AND APPARATUS FOR LAYING OUT GLUE SMEARED WOODEN STAVES ON A CARRIER SURFACE FOR FORMING A STABLE WOODEN PLATE ELEMENT



(57) Abstract

It is already known that for the manufacturing of a stable wooden plate element such an element can be built up by joining wooden staves, but hitherto it has required a substantial manual effort to lay out the glue smeared staves at a suitable carrier surface; even though the staves are only smeared with glue on the vertical sides, extravasated glue can obstruct a collective displacement of the staves on the carrier surface. The invention provides for an automatic feeding of the staves (8) in such a manner that each newly introduced stave be laterally displaced automatically (at 66, 68) inwardly against the free edge of a previously laid out layer of staves such that a close connection is achievable by a practicably realizable successive displacement of only a single stave at a time. With the use of a special feeder conveyor (2) the feeding of the staves (8) can be effected from a stationary feeding area, by means of a special feeding carriage (12) serving to pick up the staves and delivering them to the carrier surface.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT Austria	FR France	ML Mali
AU Australia	GA Gabon	MR Mauritania
BB Barbados	GB United Kingdom	MW Malawi
BE Belgium	HU Hungary	NL Netherlands
BG Bulgaria	IT Italy	NO Norway
BJ Benin	JP Japan	RO Romania
BR Brazil	KP Democratic People's Republic of Korea	SD Sudan
CF Central African Republic	KR Republic of Korea	SE Sweden
CG Congo	LI Liechtenstein	SN Senegal
CH Switzerland	LK Sri Lanka	SU Soviet Union
CM Cameroon	LU Luxembourg	TD Chad
DE Germany, Federal Republic of	MC Monaco	TG Togo
DK Denmark	MG Madagascar	US United States of America
FI Finland		

Method and apparatus for laying out glue smeared wooden staves on a carrier surface for forming a stable wooden plate element

The present invention relates to a method and an apparatus for laying out glue smeared wooden staves on a receiving area in preparation for production of a wooden plate body formed by these staves in compressed and glued condition. In this manner, i.e. by horizontal compression of the laid out, glue smeared staves, comparatively heavy and very steady wooden plate bodies can be made, which are applicable for table tops and other furniture and construction parts. The receiving area can be a table, that can be rolled into a hot press in which the staves are forced together at the horizontal level while securing the stave layer by means of a pressure plate above.

The procedure of laying out the staves on the receiving area is normally performed purely manually, even though this is somewhat inconvenient. Mechanical auxiliaries have been proposed but without particular success, among others because it can hardly be relied on to push a layer of staves across the receiving area. It has been suggested to perform a laying out of a single row of staves side-by-side on a support which could then be moved across the receiving area and be withdrawn whilst the stave layer is held-on so as to be brushed off to falling down onto the receiving area; however the mere withdrawal of the support in relation to the glue smeared staves may disarrange these, and all things considered the delivery to the receiving area takes place in a rather haphazard manner.

The purpose of the invention is to provide a method by which the laying out of the staves can be effected automatically in a safe and suitable manner.

According to the invention a conveyor belt is used which from a stave receiving front end is moved a step backward every time a transverse row of staves has been laid out thereon, and the staves are led to this area by means of a stepwise transversely moveable feeding carriage which re-

ceives the staves individually and lead these through glue applying side rolls to feeding onto the front of the receiving belt, the feeding carriage and/or the conveyor chassis having pusher means located above the belt so as to be moveable synchronously with the carriage in order to push each newly introduced stave laterally against the precedingly introduced stave or against a fixed side land along the conveyor belt, respectively.

Hereby it can be achieved that the individual staves upon appropriate inspection can just be delivered to the said carriage which will operate to pass the staves through a suitable glue applicator to easy, individual introduction on the receiving area, where the individual stave is displaced sideways to engagement against the latest introduced stave. Whereas it may be difficult to displace a whole row of already laid out staves at the receiving area due to adhesion from extravasated excess glue, there is no corresponding problem associated with a lateral displacement of a single laid out stave; therefore a row of closely placed staves can easily be formed when it is only every newly introduced stave that requires a lateral displacement for successive forming of the close row of staves.

When the width of the receiving band has been filled with staves, the band can be activated to being moved a suitable step forward such that a new stave row can be accommodated at the front end of the band. Later on the filled conveyor belt can be utilized direct as a carrier for the stave rows in a hot press, or the band can be brought to deliver the stave rows to a special carrier surface in such a press.

The said feeding carriage will move transversely along the front end of the conveyor belt, but according to the invention it is achievable that the staves in a desirable manner are delivered from a stationary area, viz. to a delivery conveyor extending along the direction of motion

of the carriage next to the latter. The carriage may have a gripping bar projecting over the delivery conveyor for stopping the staves at the particular place depending on the position of the carriage, and means for successively transferring the staves to the feeding means of the carriage. Hereby the operator can take up a permanent work position at the front end of the delivery conveyor.

The invention, which also comprises the related laying out apparatus, is described in more detail in the following with reference to the drawing, in which Fig. 1 is a schematic perspective view of an apparatus according to the invention, while Figs. 2 and 3 are plan views thereof.

The illustrated apparatus comprises a delivery conveyor 2 with a series of parallel belts 4 mounted on a stationary conveyor frame 6 and designed for receiving stave members 8 which at the front end are laid successively transversely to the belts 4.

Next to the conveyor 2, on a pair of floor rails 10, is placed a carriage 12 in a gap between the side of the conveyor 2 and the front end of a conveyor 14 placed at right angles to the former and having a wide plate or rail supported conveyor band 16.

The carriage 12 comprises a gripping bar 18, which projects over the conveyor belts 4 and is provided with protruding lower carrier rollers 20 placed on brackets 22 down below the upper surface level of the belts 4, while the bar 18 at the top is suspended in a fixedly guided manner at a stationary carrier arm 24 projecting from the carriage, by means of lifting cylinders 26. On the arm 24 is also placed a lifting cylinder 28 carrying a pair of slim, rotating driving discs 30 adjacent the front of the bar 18 on a block 32 carried by the cylinder 28.

On the bar 18 is placed an end stop sensor 34 which can react to the arrival of a stave member 8 and thereby activate the cylinders 26 to raising of the bar 18 such that

the stave by means of the rollers 20 is lifted away from the belts 4 and up to the somewhat higher level of a table top 36 on the carriage 12, and the cylinder 28 is activated to lowering of the driving discs 30 from a raised inactive position of these whereby these driving discs are pressed against the upper side of the arriving stave and cause a movement of this inwardly over the table top 36 of the carriage 12. In order to protect the upper sides of the staves it might be preferred that the carrier rollers 20 are the driven ones while the discs 30 are passively rotatable thrust wheels.

The caught stave member 8 is hereby pushed onto or into a driving roller conveyor path 38 on the table top 36; this path comprises a pair of rollers 40 for applying glue to the side areas of the stave member, the glue being supplied from a suitable glue store which is only schematically shown at 42.

The stave member is hereby pushed onto the front of the still-standing conveyor band 16 as it leaves the roller path 38 via a roller pair consisting of a lower, driven roller 44 and an overlying, resiliently depressed counter pressure roller 46, i.e. the stave member will be left having its rear end placed immediately in front of this roller pair.

Next to the roller pair 44, 46 is located a lying cylinder 48 with a thrust pad 50 which in its completely retracted position allows the table 12 to be moved a step forward for push-in of the next stave without the previously only partly introduced stave hitting the pad 50, and the cylinder 48 is positioned such that the pad 50 by actuation of the cylinder will hit the end of the previously deposited stave and thereby push it all the way onto the belt 16.

On the sides of the belt conveyor 14 is placed, adjustable in the longitudinal direction, a pair of upwardly protruding side brackets 56 which between them carry a transverse plate member 58, which between them carry a transverse

plate member 58, which stands upright from the surface of the belt 16 and is raisable from the belt by means of cylinders 60. In a lowered position this plate member will constitute a stop for the pushing forward of the stave members 8 when these are pushed forward by means of the thrust pad 50.

On the carriage 12 is placed a carrier arm 62, which projects over the front end of the conveyer belt 16 and carries a transverse cylinder 64, the piston rod of which comprises a presser foot 66 which can press the stave member 8 that has just entered the band 16 against the row of previously introduced staves. A corresponding presser foot 68 can be placed in connection with a cylinder 70 situated on and below a carrier bushing 72, which itself is situated at a screw spindle 74 between the brackets 56. This spindle is turned so as to displace the cylinder 72 corresponding to the displacement of the cylinder 64 at the movement of the carriage 12, 36 along the floor rails 10, driving means not illustrated being provided for causing such displacement of the carriage as the laying out of the staves on the belt 16 gradually proceeds.

When a transverse layer of stave members 8 thus has been laid out at the front of the belt 16 during successive lateral pushing in of the staves against the already laid staves it is time to move the belt 16 a step backward to facilitate a successive laying out of a new transverse layer of staves. To render this movement possible it must be ensured that the cylinders 60 be activated to raising the stopper plate 58, such that the laid out staves can be led past this place. The band 16 is moved such a distance that the laid out stave layer will just pass the plate 18, which is then lowered again, whereafter the laying out of a new layer can be commenced. When the band 16 is suitably filled it can be moved for transfer of the items to a suitable, known press arrangement.

Fig. 2 shows the situation where a stave 8, resting on the belts 4, is moved towards the lowered gripping bar 18 so as to hit this bar in a level above the lower rollers 20, while in Fig. 3 it is shown that the bar 18 is then lifted so as to carry the stave 8 on the rollers 20 into a correct level for the following transfer to the carriage 12; the driving discs 30 are lowered to contact the top side of the stave 8 for driving it into engagement with the roller conveyor 38 on the carriage 12. Also shown is the driving engagement of a stave 8 with the roller pair 44, 46 at the delivery side of the carriage 12.

It should be mentioned only briefly that the apparatus naturally should be provided with the necessary sensor and control equipment to ensuring an appropriate automatic progress of the various operations.

C L A I M S:

1. A method for laying out glue smeared wooden staves on a carrier surface for producing a wooden plate structure consisting of the joined staves characterized in that the staves are supplied individually to a feeder carriage which relative the carrier surface is transversely displaceable along an end edge of the latter, the staves by means of a moving mechanism on the carriage being pushed through an arrangement, likewise placed on the carriage, for smearing the vertical sides of the staves with glue and thereafter further onto the carrier surface on which, by pusher means moved synchronously with the trolley, they are displaced sideways into engagement with the side of the stave previously added to the stave layer.

2. A method according to claim 1, characterized in that the staves are supplied individually to a feeder conveyor by a transverse laying out at a front end area of the conveyor extending along the travel path of the feeder carriage at an infeeding side thereof, and that synchronously with the movement of the carriage an angle transition means is moved forward along the feeder conveyor in such a manner that a stave on the feeder conveyor automatically activates the angle transition means by arrival thereto to the effect that the stave is pushed into the feeder carriage.

3. An apparatus for carrying out the method according to claim 1, having a carrier surface for receiving the staves, characterized in that it comprises a feeding carriage, which is transversely moveable along an end edge of the carrier surface, and which has moving means for receiving successively supplied staves and pushing these forward through a glue applicator on the carriage to a delivery position on the carrier surface, and that in connection with the carriage and/or the carrier surface there is pro-

vided transversely oriented pusher means, which are moved synchronously with the carriage and are operable to laterally displace the latest introduced stave for pressing the same against the free side of the previously introduced stave.

4. An apparatus according to claim 3, characterized in that the pusher means comprise a lying pressure cylinder located above the carrier cylinder on a carrier arm projecting from the carriage and another lying pressure cylinder located spaced from the first cylinder on a transverse above the carrier surface and connected with moving means controlled so as to displace this other cylinder synchronously with the movement of the carriage.

5. An apparatus according to claim 3, characterized in that the carriage is provided with a roller conveyor with driven rollers for the conveying of the staves and with a pusher mechanism for pushing the staves further forwardly upon their leaving the roller conveyor.

6. An apparatus according to claim 5, characterized in that the pusher mechanism is adapted so as to advance the staves against an upright cross wall member extending transversely over the carrier surface.

7. An apparatus according to claim 6, characterized in that the carrier surface is constituted by a broad conveyor band and that the cross wall member is mounted so as to be raisable from this band, such that a laid out stave layer can be moved away from the laying out on and by the conveyor forming the carrier surface, when the cross wall member assumes a raised, inoperative position.

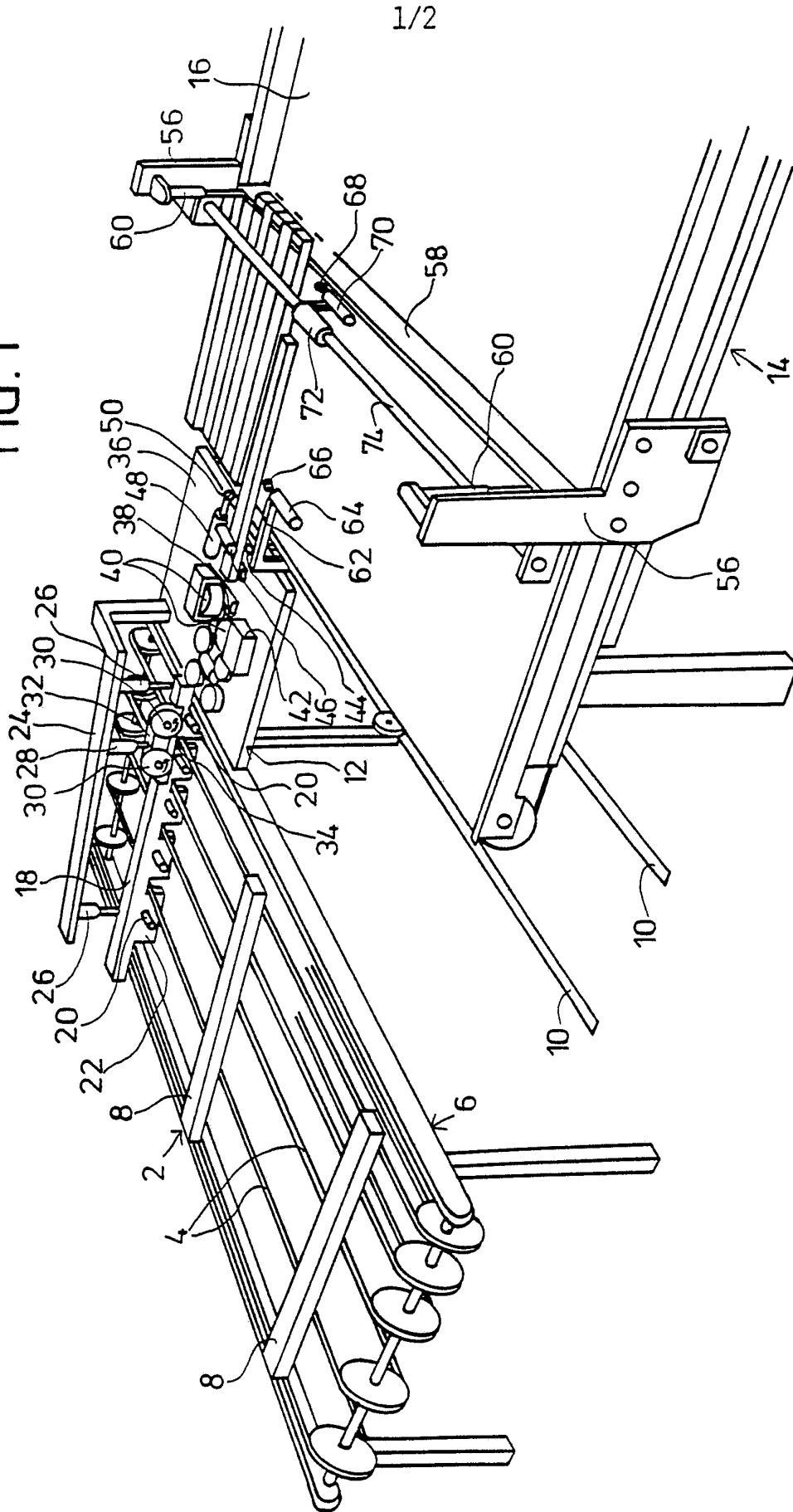
8. An apparatus according to claim 3, characterized in that it comprises a feeding conveyor extending parallelly with the travel path of the feeding carriage and close to the intake side of the carriage, and an angular transition

system extending across this conveyor and being displaceable along the conveyor synchronously with the motion of the said carriage, the transition system further being adapted such that by the arrival of a stave as placed transversely on the conveyor the transition system will be actuated to push out the stave for introduction thereof into the stave moving means of the said carriage.

9. An apparatus according to claim 8, characterized in that the angular transition system is mounted on a carrier arm projecting from the feeding carriage across and over the feeding conveyor.

10. An apparatus according to claim 5, characterized in that the pusher mechanism is mounted next to the side of the roller conveyor so as to be operable to longitudinal pushing in the stave supplied by the previous operation cycle.

FIG. 1



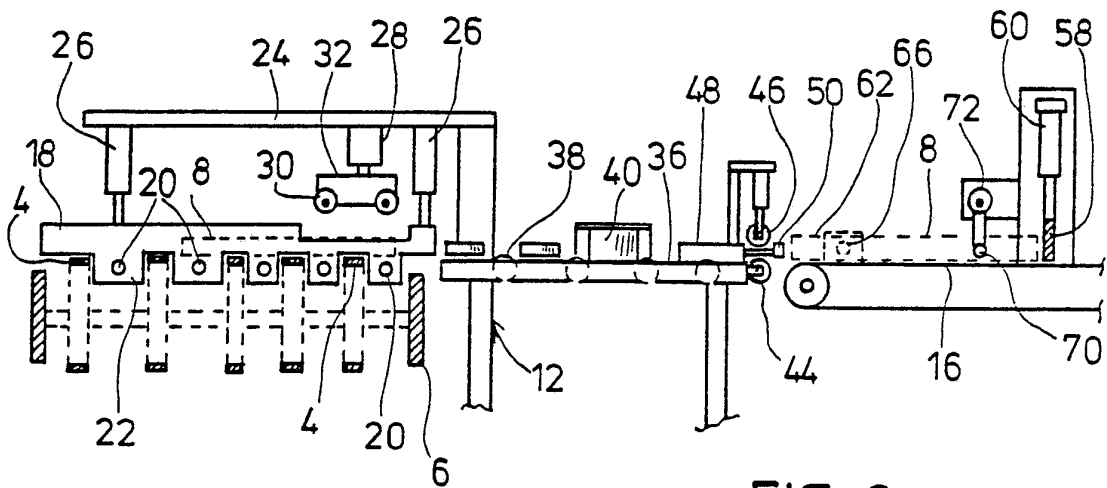


FIG. 2

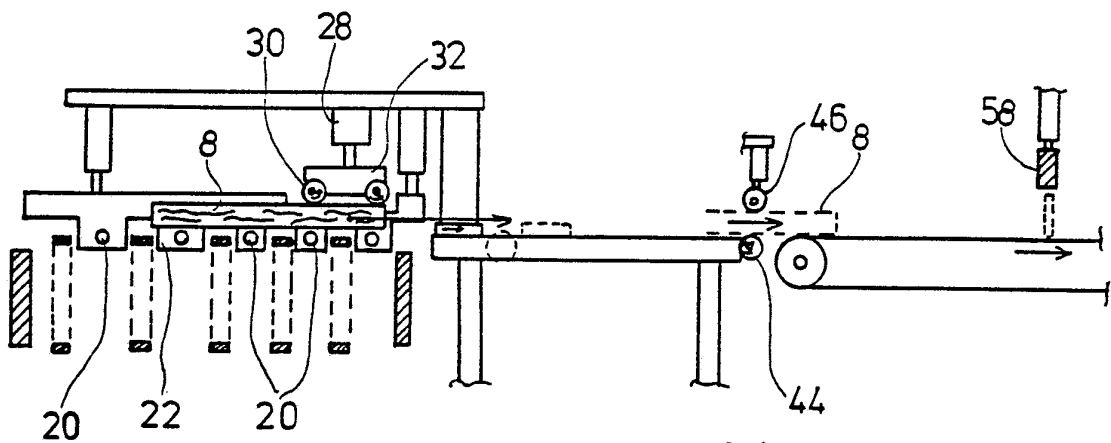


FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No PCT/DK89/00042

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC ⁴		
B 27 M 3/00		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System ¹	Classification Symbols	
IPC 4 US CI	B 27 M 3/00, /04, /06, /18; B 27 G 11/00 144:1, 309, 313-319, 329, 344-355	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US, A, 4 111 247 (HASENWINKLE) 5 September 1978 See fig. 8	1-10
A	SE, A, 124 274 (N. R. ALENIUS) 15 March 1949	1-10
A	DE, B, 1 126 121 (BAUWERK A.G.) 22 March 1962	1-10
A	DE, B, 1 161 001 (HERMANN LAMPE) 9 January 1964	1-10
A	GB, A, 986 383 (B. WEINING ET AL) 21 February 1961	1-10
<p>¹⁰ Special categories of cited documents: ¹⁶</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
1989-05-23	1989 -05- 30	
International Searching Authority	Signature of Authorized Officer	
Swedish Patent Office	Eddy Leopold 