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(57) Abstract

This invention explains a new procedure to manufacture a laminated packaging material. The procedure implies that the lamellas, made of distance material, included in the laminate at manufacturing are laid crosswise to the direction of movement of the material in the machine. Consequently a continuous path of the material is obtained directly after the lamination machine, which is included in the manufacturing process.

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METHOD TO MANUFACTURE A LAMINATED PACKAGING MATERIAL. LAMELLS ARE ATTACHED TO PATH OF MATERIAL TRANSVERSE TO THE DIRECTION OF MOVEMENT, OF THE MATERIAL, AT THE MANUFACTURING.

General description.

There is an existing packaging material which main field of application is as transport package for rolled goods for example: steel rolls, aluminium rolls, electric cable rolls. The known way to manufacture this packaging material is also suited for manufacturing of packaging material for packaging of long goods for example: tubes, profiles, cylinders.

The known packaging material is made of lamells of hardboard about 30 mm wide. These lamells, together with a 10 mm distance between them, forms the middle layer in the material laminate. The thickness of the hardboard is normally about 3 mm or 4,3 mm. The middle layer is on each side connected with thin surface layers. The surface layers cosists of different, depending of quality, paper qualities.

The packaging material forms when used an impact resistant, handy and cost effective material.

At the known way to manufacture the material is a production line used which in the 1:st step consists of

a unit which direction of movement is parallell with the length direction of the lamells. The wide of the production line is 1,55 m. Hardboard sheets are feeded in to a slicing unit where the hardboard sheets are cut/sheared to form lamells. Paper or paper laminate, in a wide of 1,55 m, is thereafter glued to each side of the path of lamells. Normally a hot melt type of glue is used. The paper paths are covered with strings of glue just before the paper paths come in contact with the lamells.

The continous path of material which is obtained is thereafter cut with a saw blade to, normaly, 6,1 m lengths. Sheets of the material in sizes of 6,1 x 1,55 m are piled on pallets with about 100 sheets on each pallet.

The 2:nd step, at the manufacturing, consists of a joint machine where the sheets from the 1:st step are jointed after each other, with the lamells parallel to the length of the joints, which implies a continuously path of material with a wide of 6,1 m. Normally 100 sheets of material are jointed after each other giving a sheet with a length of about 155 m and 6,1 m wide. The joints are formed by a 50-65 mm wide tape or paper strip on each side of the laminate. If paper strips are used they are glued with hot melt.

The 155 m long and 6,1 m wide sheet is thereafter folded and laid on a pallet. The wide of the fold is about 1,1 m, therefor the size of the pallet will be 6,1 x 1,1 x 0,6 m.

The 3:rd and last step in the manufacturing line is made of a sawing machine, where the width which the costumer wants is cut from the 6,1 x 1,1 x 0,6 m pallet. If the costumer needs for example a width of 0,5 m, 0,5 m is cut from the big pallet and the costumer gets a sheet with a size of 0,5 x 155 m.

The diameter of the saw blade in the saw machine is 1400 mm.

This invention describes a new procedure to manufacture the material mentioned above.

This new procedure means that the distance material is laid crosswise to the direction of movement in the manufacturing machine. The paths of material, on each side of the distance material, meet this in the lamination machine in a way that is perpendicular to the longitudal direction of the paths of material.

This procedure gives many important advantages compared with the earlier described, already known, technology.

1. The direction of movement of the paths of material correspond with the longitudinal direction which is wanted to be as long as possible. This leads to the fact that a continuous path of the packaging material is obtained, without any joining of sheets (as it is described above).

2. The machine which is needed to manufacture the packaging material, according to this new procedure, will be much more simple and therefore cheaper to build compared with the machine which uses the technology already known

3. The width of the material that is wanted can be easily achieved by preparing of the single laminate. The above mentioned method to cut the wished width from a pallet with a saw blade, with a diameter of 1400 mm, is very difficult technically.

4. Many users of the packaging material want to have their logotype printed on the material. This will be much easier to achieve logistically when using this new way to produce the material.

5. By using this new procedure it will be easier to use different methods to make the lamells from sheet formed material for example by sawing.

This increases the possibilities to use thicker distancematerial.

The above mentioned procedure to cut/shear hardboard sheets limits the possible thickness to about 5 mm. This is due to the fact that the mechanical forces on the lamell material are very big at the cutting.

6. This new procedure can use different methods to prepare the lamells from sheet formed material, for example by sawing. This makes it possible to use many different materials as distance materials. The known way to cut/shear the sheet material restricts the possible alternatives very much. Brittle materials can, for example, not be used.

7. This new procedure opens the possibilities to shelter the fragile edges, on the packaging material, with for example a tape. An increase in quality of the packaging material is achieved thereby.

Special description.

Explainings to the figures:

Figure 1: shows how the lamination machine can be designed. The distance material 10 is feeded via a cassette 1 to a spreading roll 2, which will see to it that the slices of distance material are spread out, on that in the machine,lower surface layer 3 with a certain interspace. The lower surface layer 3 passes a gluing roll 8 and the layer covered with glue meets the distance material 10 via the press roll 5. The upper surface layer 4 passes a gluing roll 9 before it via the press roll 7 meets the distance material 10. 6 is a reverse roll to the press roll 7. Eventually the finished laminate 13 passes through 2 press plates 11 and 12 before it can be rolled 14.

Figure 2: shows one design of the lamination machine which differs from figure 1. Here the glue is laid on the distance material before this meets the surface layers. The gluing rolls 1 covers the distance material with glue before it meets the, in the machine, lower surface layer. The gluing rolls 2 covers the distance material with glue before it meets the, in the machine, upper surface layer.

Figure 3: shows one part of an endless ribbon with notches 1 where lamells of the distance material fit. This type of ribbon can be used instead of a spreading roll.

Figure 4: shows a roll of distance material 1. Lamells of distance material have been fixed with 2 tape strips 3. The distance material is covered with glue from the gluing rolls 4 and 5. The upper surface layer 7, in the machine, meets the distance material via the combined press and steering roll 9. The lower surface layer 6, in the machine, meets the distance material via the combined press and steering roll 8. The finished laminate is thereafter rolled 10.

Figure 5: shows a design of the lamination machine where the surface layers are glued to the distance material in 2 steps compared with only 1 step in figure 4. The gluing rolls 2 cover the distance material with glue on the, in the machine, upper side. Thereafter is the, in the machine, upper layer 4 laid on. The gluing rolls 3 cover the distance material with glue on the, in the machine, lower side. Thereafter is the lower surface layer 5 laid on. The rolls 6, 8, 7 and 9 are all press rolls.

Figure 6: shows how an automated feeding system for lamells 2 of distance material to a cassette 4 can be designed. Lamells 2 fall down in to a cassette from above. 1 is distance material in form of sheets. 3 is a saw blade.

Figure 7: shows, as figure 6, how an automated feeding system for lamells 2 of distance material to a cassette 1 can be designed. In this case the feeding is carried out from the side.

Figure 8: shows how the edge perpendicular to the lamells of distance material 2, of the finished laminate 1, can be prepared with a tape 3.

In the following the term path of material will be used. The material in the path of material can be formed of: paper, paper laminate, plastic, plastic laminate, plastic film, cloth, cloth laminate, nonwoven, fiber glass, fiberweb.

In the following the term distance material will be used. The distance material can be formed of: hardboard, soft board, cardboard, wood, plywood, mdf board, chip board, plastic, cellular plastic, corrugated cardboard, composite material, recycled fiber material.

The lamination machine can be designed the way figure 1 shows. The glue is in this case of dispersion type and is laid on via rolls on each path of material before these meet the distance material.

Figure 2 shows another way to put on the glue. In this case the glue is laid on the distance material via rolls.

The distance material can be prepared at a separate unit, where lamells in useful width and length are made. These lamells are then feeded to a cassette (as in figure 1 and 2). The feeding to the cassette can be done manually or with some form of automatic process.

The distance between the lamells is, according to figure 1 and 2, formed by a spreading roll with notches where the lamells fit. Instead of a spreading roll a belt can be used, as in figure 3.

Another way to achieve the right distance between the lamells is to use 2: tapes, cords, wire or similar. The sheet which is formed is rolled. The roll is thereafter unrolled just before the lamination between the paths of material takes place. The surface layers can, in the next step, be laid on simultaneously (as in figure 4) or in 2 steps (as in figure 5).

The glue can also be of hot melt type where it is laid on the paths of material via rolls or dies.

Glue based on starch can also be used.

The glue can also be laid on perpendicular to the direction of movement of the paths of material at the manufacturing. A movable die which lays glue on lamell after lamell is used thereby.

The finished packaging material can be formed to the wished widths by different procedures:

1. The paths of material and the distance material are prepared to the right widths before they are fed in to the lamination machine.

2. The paths of material can be cut to the wished widths just before lamination against the distance material takes place. The cutting can be made for example with a knife equipment. In this case the distance material has been prepared to the right width before it is fed in to the lamination machine.

3. The finished laminate can be cut to the right widths direct after the lamination machine before it is rolled or folded.

4. The finished laminate can be prepared to wished widths at a special machine unit, which is separated from the lamination machine.

The finished laminate can be rolled direct after the lamination machine as in figure 1. It can also be folded, with a useful equipment, direct after the lamination machine. A special unit where rolled material is folded or folded material is rolled, owing to what the customers requirements are, can also be used.

The preparation of sheets of distance material to get lamells can be made in different ways: sawing, slicing/shearing, waterjet, laser. Many lamells can be made simultaneously by using many cutting devices in one sheet, or by letting one cutting device work in many sheets, laying on top of each other, at the same time.

An automatic feeding of the lamells can be made in different ways:

1. The cut lamells are falling down into the cassette from above, as in figure 6.

2. The cut lamells are feeded into the cassette from one side, as in figure 7.

A more simple type of packaging material can be made just by laminating one side of the distance material. This can be achieved by leaving out one of the paths of material that exists on for example figure 1.

Printing, which leads to it that the customers logotype is to be found on the finished laminate, can be made:

1. On one of the paths of material at the lamination machine before the lamination is made.

2. On one of the paths of material at the lamination machine after the lamination is made but before the laminate is rolled.

3. On one side of the finished laminate in connection with manufacturing of the packaging material at a special machine unit.

The edges of the finished laminate can be sealed with a tape, as in figure 8:

1. At the lamination machine after the lamination but before rolling of the finished laminate.

2. At the special manufacturing unit after the cutting to wished widhts is made.

Qualities of the finished laminate, with between themselves different distances among the lamells, can

be made by using various spreading rolls (se figure 1). The distances between the notches for the lamells can be made different on different rolls. If a belt is used (as in figure 3) different belts can be made with different distances between the notches.

The distance material doesn't necessarily have to be made of homogeneous material.

The lamells included in the packaging material don't need to be exactly of the same kind. For example different widths can be used. Lamells made from different materials can also be used in the same laminate.

The distances between the lamells in the same laminate don't need to be the same in the whole laminate. Asymmetry can be found.

CLAIMS.

1. A method to manufacture a laminated packaging material which purpose is to be a protective material, preferably transport package, which consists of after one another stiff and impact resistant distance material with interspaces in between and the mentioned distance material with interspaces on each side is attached to surface layers made of thin material comprising:
the material is manufactured in a continuous process in a machine with the distance material put in transverse to the direction of movement of the material in the machine.

2. A method according to claim 1, wherein said distance material with said interspaces is attached to said surface layer on one side only.

3. A method according to claim 1, wherein said distance material is put in said machine via a device similar to a cassette.

4. A method according to claim 1, wherein said distance material is put in said machine via a device similar to a cassette with feeding of the distance material into said device from above.

5. A method according to claim 1, wherein said distance material is put in said machine via a device similar

to a cassette with feeding of the distance material into said device from the side.

6. A method according to claim 1, wherein the bonding between said distance material and said surface layers is achieved by dispersion glue.

7. A method according to claim 1, wherein the bonding between said distance material and said surface layers is achieved by hotmelt glue.

8. A method according to claim 1, wherein the glue which is used to achieve the bond between said distance material and said surface layers is laid on the surface layers just before the bonding is made.

9. A method according to claim 1, wherein the glue which is used to achieve the bond between said distance material and said surface layers is laid on the distance material just before the bonding is made.

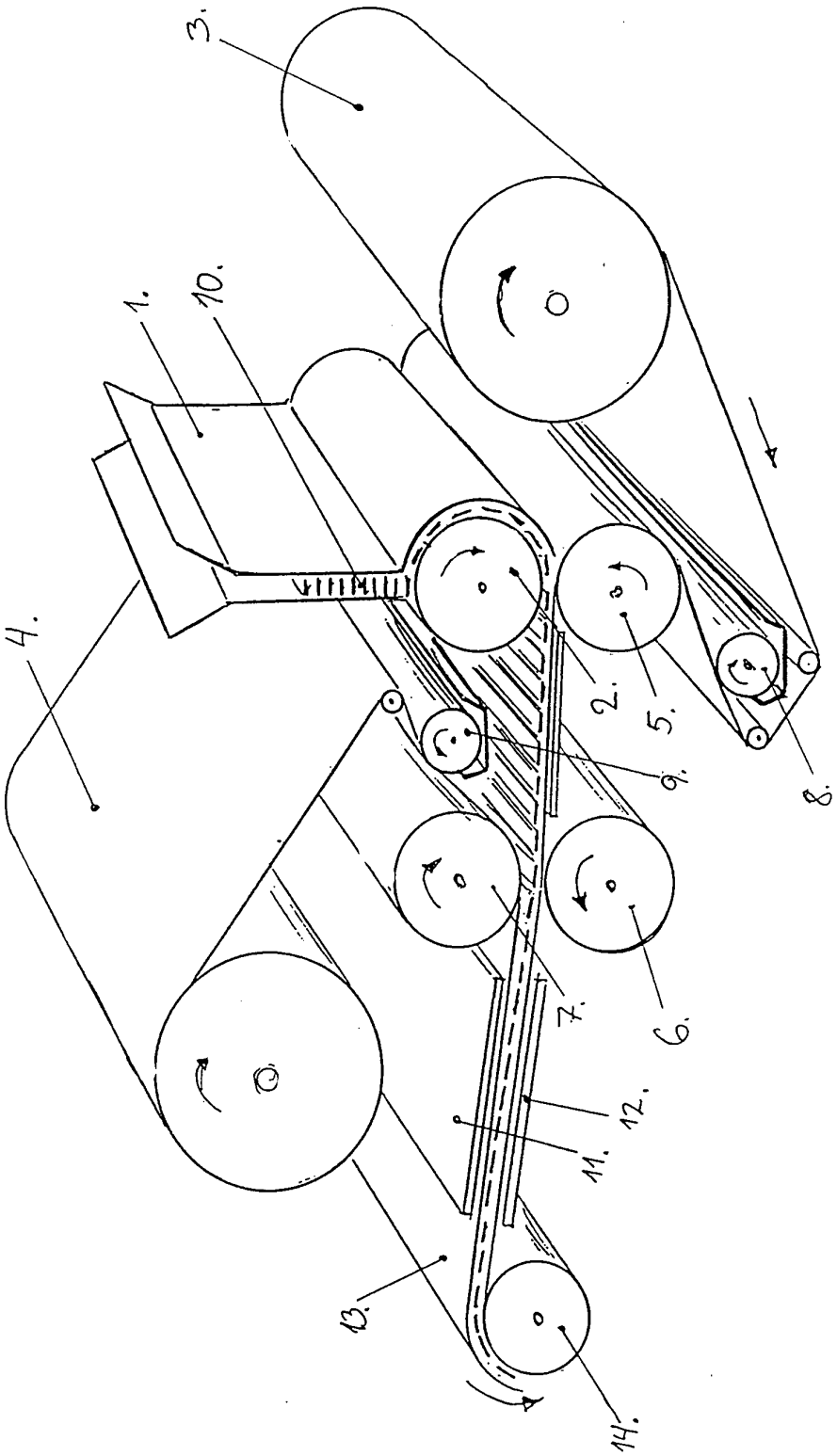


FIG 1.

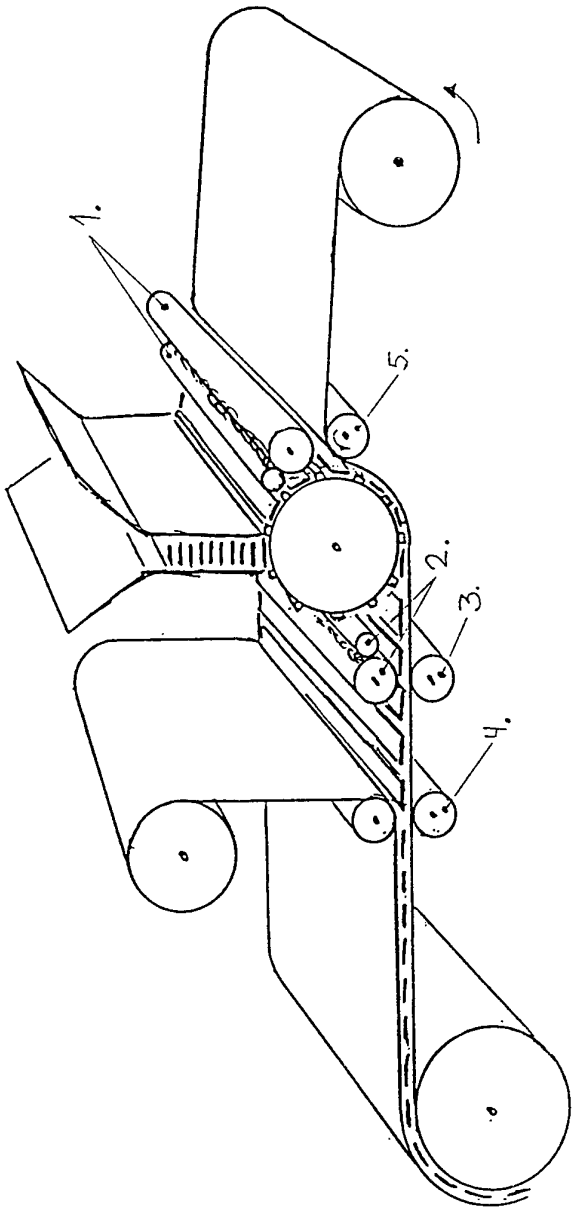


FIG. 2

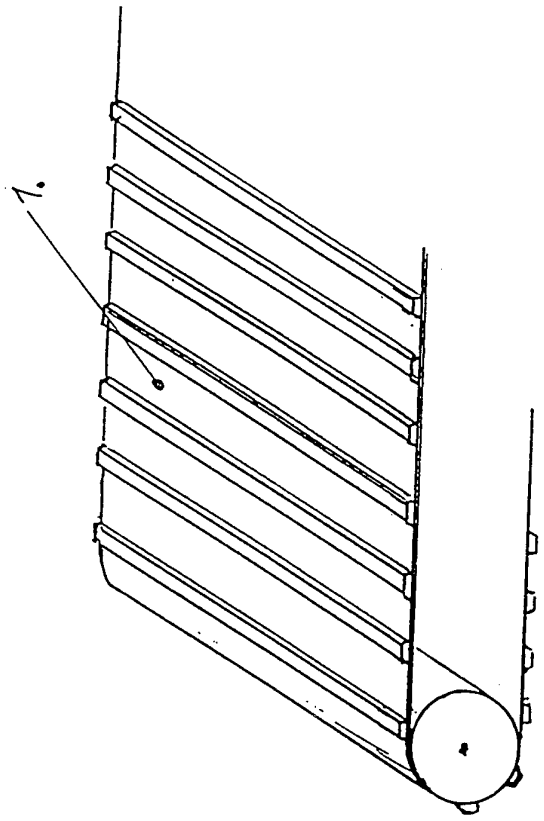


FIG. 3.

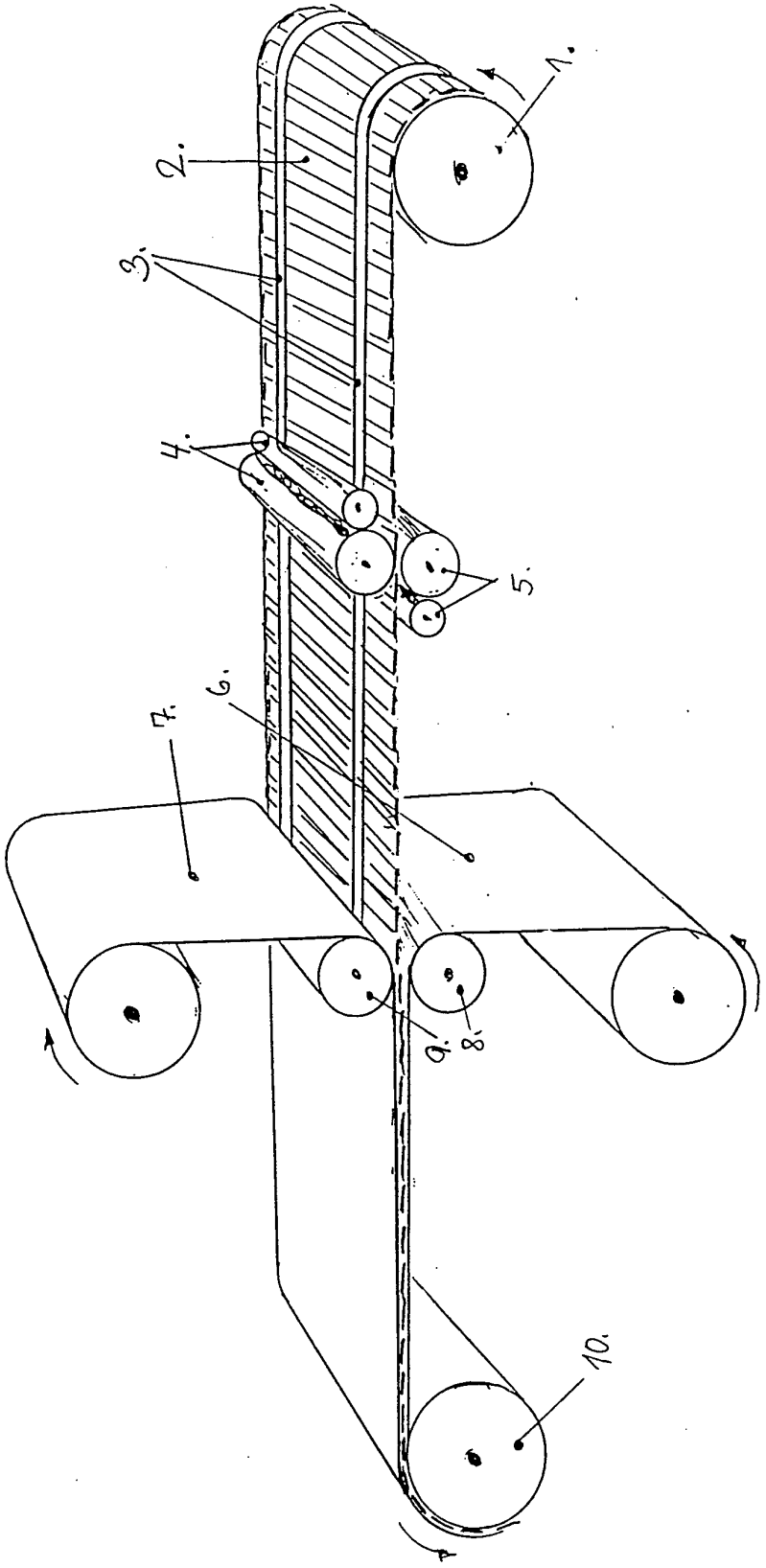


FIG. 4.

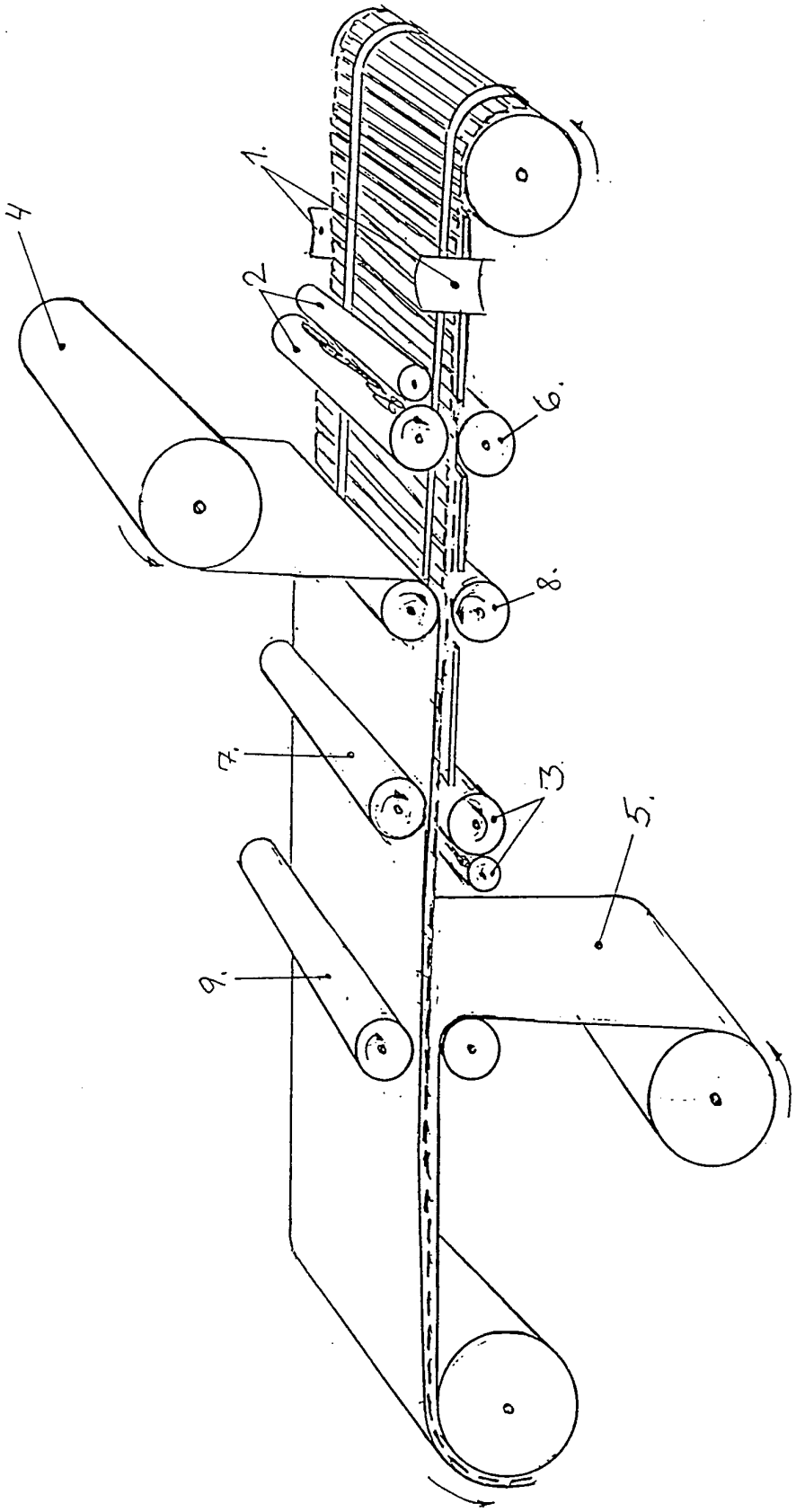


FIG. 5.

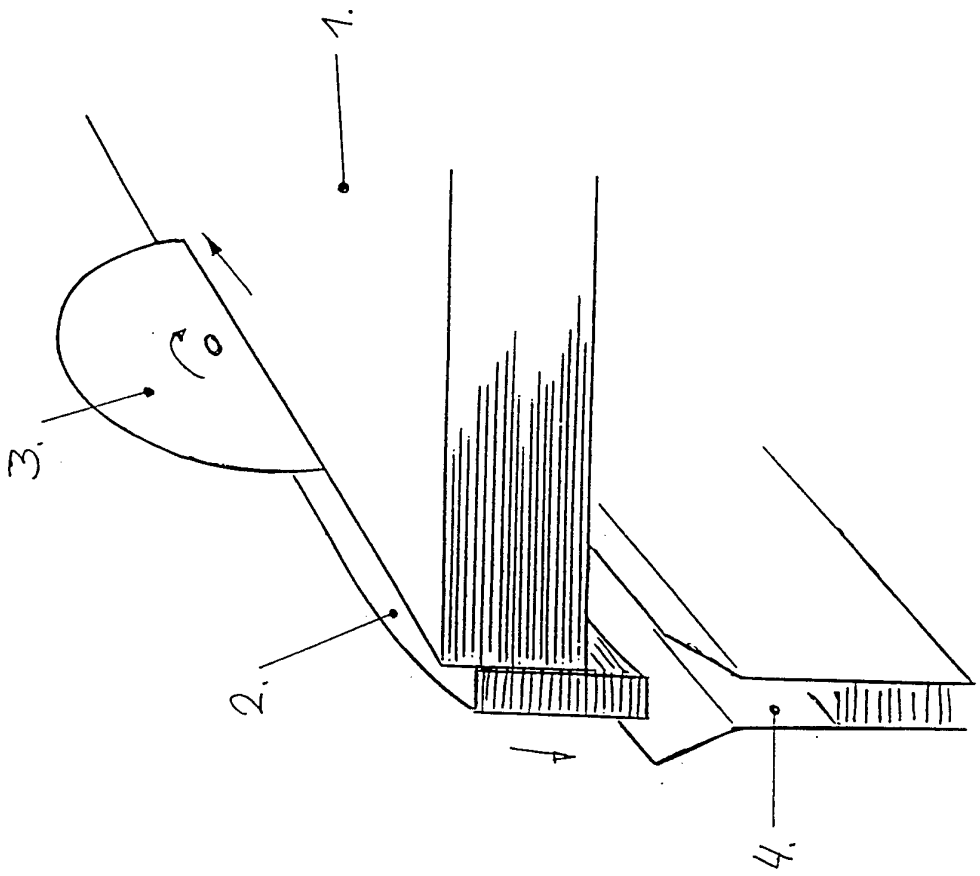


FIG. 6.

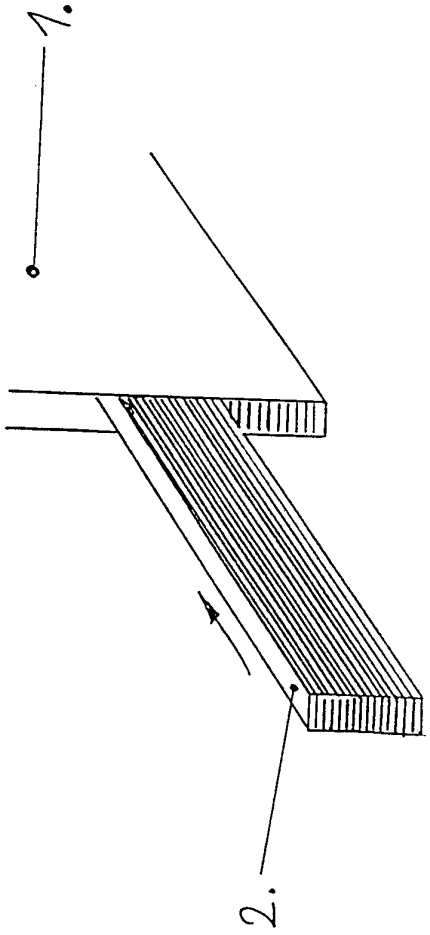


FIG 7.

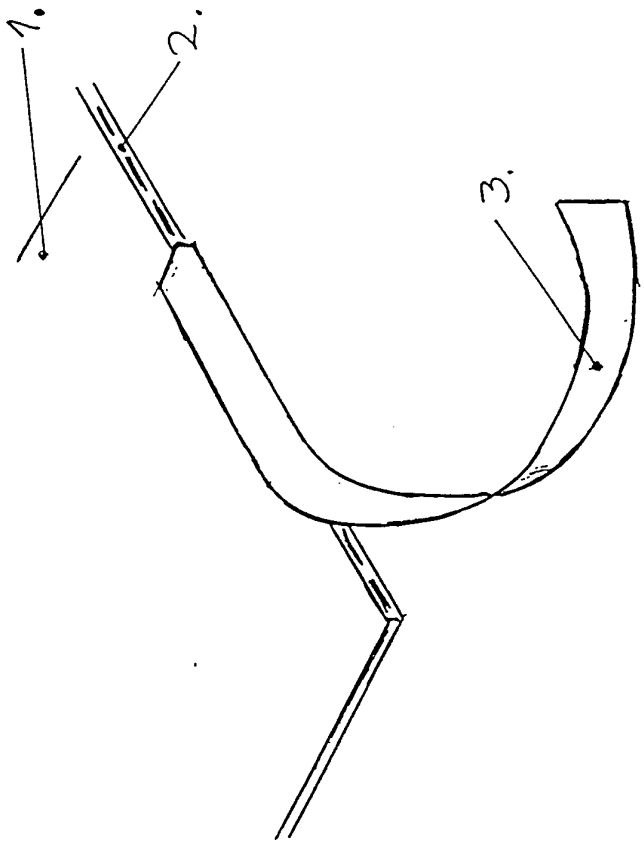


FIG. 8.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 93/01093

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B31F 3/00, B32B 31/10
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: B31D, B31F, B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP, A2, 0436065 (SOMAR CORPORATION), 10 July 1991 (10.07.91) -- --------	1-9

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INTERNATIONAL SEARCH REPORT

Information on patent family members

26/02/94

International application No.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A2- 0436065	10/07/91	JP-A- 3205134	06/09/91
		US-A- 5110391	05/05/92