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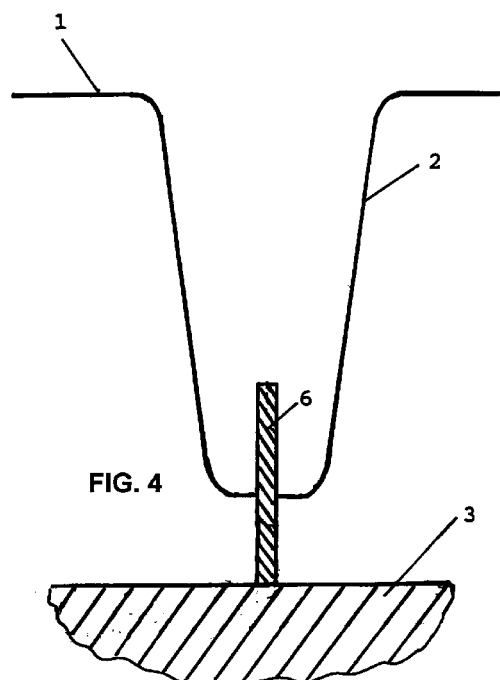
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(54) **Method for controlling the local thickness of a moulded pulp product**

(57) Method of controlling the local thickness of moulded pulp product by placing filling members on the mould is described. Filling members (6) are placed on the suction mould (1) in the valley defined by the mesh (2). The filling members are attached to the base member (3) of the suction mould. With the filling members in the bottom of the valley, the wet pulp still accumulates at the bottom of the valley, but when the product is removed from the suction mould, it will define a cavity at the place where the filling member was. The product has now a substantially equal wall thickness in the valley area, and twisting during drying will be avoided.



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Description

[0001] The present invention relates to a method for controlling the local thickness of a moulded pulp product and to a method for controlling the twisting of moulded pulp products, said methods being of the kind set forth in the preamble of claims 1 and 2.

TECHNICAL FIELD

[0002] Moulded pulp products are made by depositing wet pulp on a suction mould. The moulded pulp products often have a complicated three-dimensional shape, in which, seen in the direction of suction, one or more valleys are defined by the walls of the product. Such valleys exist e.g. between two closely arranged cone-shaped parts of a moulded article, so that the side walls of the cones define a narrow valley. In the valleys, e.g. at the bottom of the valleys, pulp material tends to accumulate and reaches a thickness that is bigger than that of the rest of the product. The wet product is then removed from the suction mould and transported into a drying oven. During the drying process the products tend to twist, if the product does not dry at the same speed all over the product. In order to achieve an equally distributed speed of drying over the product it is necessary that the thickness of the product is substantially equal all over the product. The thicker walls at the bottom of the valleys pose a problem, since they lead to twisted products. Until now the only possibility to avoid these problems was to design the product without such valleys, e.g. by spacing the tops of the cones far enough from one another. These cones can serve e.g. to receive products to be packed. Bigger distance between the cones leads to a reduction in the number of products that can be packed by a moulded product article with a certain size. This requirement poses severe limitations on the freedom of design and construction.

DISCLOSURE OF INVENTION

[0003] On the background of the above, it is the object of the present invention to provide a method of the kind referred to initially, with which moulded pulp products can be produced that have a substantially uniform thickness all over the product, and to provide a method of producing a moulded pulp product that does not twist during the drying step of the production process. This object is achieved by proceeding in the manner set forth in the characterizing clause of claim 1 or 2. By proceeding in this manner, the thickness of the moulded pulp product can be controlled locally, and the product as a whole can be made without the product twisting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] In the following detailed portion of the

present description, the invention will be explained in more detail with reference to exemplary embodiments according to the invention and shown in the drawings, in which

Figure 1 is a perspective view on a moulded product,

Figure 2 is a section across the product along the shorter side of the product, as it is intended to be shaped, and turned upside down with respect to Figure 1,

Figure 3 is an enlarged detail of an area of product in which too much pulp material accumulates,

Figure 4 is a diagrammatic drawing of a suction mould,

Figure 5 is an enlarged section of the area of the product in which too much pulp material tends to accumulate, made according to the method of the present invention,

Figure 6 is the same area as shown in Figure 5 after the after-pressing,

Figure 7 is a cross-section along the longitudinal axis of the product without using the present method,

Figure 8 is the same cross-section as in Figure 7 when using the method according to the present invention, and

Figure 9 is a cross-section as in Figure 8 after the after-pressing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0005] Figure 1 shows a moulded product defining a plurality of cone-shaped pockets, that serve e.g. to receive products to be packed. Figures 2 to 9 show the product upside down with respect to Figure 1. The position shown in Figures 2 to 9 corresponds to the position in which the product is moulded. Figure 2 shows a cross-section along the shorter side of the product, as it is intended to be shaped. Valleys 5 are defined by the side walls of the cones extending down from two tops of the mould 1 that are positioned relatively close to one another. The thickness of the product at the bottom of the valleys 5 should be the same as in the rest of the product. Such a moulded pulp product is made by supplying wet pulp 4 to a suction mould 1, which is provided with a fluid-permeable mesh 2 that is shaped in accordance with the product to be moulded. A detail of such a mould can be seen from Figure 4. The mould comprises a base member 3 and a means for providing vacuum

(not shown). When the wet pulp is supplied to the mould, the wet pulp tends to accumulate in the valleys as seen in Figures 3 and 7.

[0006] As can be seen from Figure 4, filling members 6 are placed on the suction mould 1 in the valley 5 defined by the mesh 2. The filling members 6 are attached to the base member 3 of the suction mould 1. With the filling members 6 in the bottom of the valley 5, the wet pulp still accumulates at the bottom of the valley 5, but when the product is removed from the suction mould, it will define a cavity 7 at the place where the filling member was, as can be seen from Figures 5 and 8. The product has now a substantially equal wall thickness in the valley area, and twisting during drying will be avoided. The shape and size of the filling members 6 can be varied in accordance with circumstances. Factors influencing the shape are e.g. the size and shape of the valley.

[0007] The product can be subjected to an after-pressing step. After the after-pressing step the product will take shape as can be seen from Figures 6 and 9. The cavity 7 has now been reduced to a relatively small cavity 8. With the after-pressing step the product shape thus comes very close to the intended shape as shown in Figure 2. It is also possible to after-press the moulded pulp product only partially leaving the bottom of the valley area unpressed so that the product will still have the shape as in Figures 5 and 8.

[0008] The filling members may be of any shape, but in a preferred embodiment they have a plate-like shape with a straight top, that has rounded-off edges. For a product with a valley extending over a longer area the filling member 6 should be correspondingly long. The filling member 6 may have side walls that diverge towards the bottom of the valley. The filling member 6 can be made of any suitable material, such as e.g. metal or plastic. It is not necessary that the product defines valleys as described here. The filling members may be placed in any area of the mould where the product tends to accumulate more pulp than average.

LIST OF PARTS

[0009]

1. Suction mould
2. Mesh
3. Base member
4. Pulp
5. Valley
6. Filling member
7. Cavity
8. Cavity after after-pressing
9. Cone

Claims

1. Method of controlling the local thickness of a

moulded pulp product using a fluid-permeable suction mould (1), **characterized** by selectively placing filling members (6) on the suction mould (1), where the pulp tends to form thicker walls than the rest of the product.

2. Method of controlling the twisting of moulded pulp products during the drying step of the production process comprising the steps of providing a suction mould (1), **characterized** by selectively placing filling members (6) on the suction mould (1), where the pulp (4) tends to form walls thicker than the rest of the product.
3. Method according to any of claims 1 - 2, **characterized** in that the moulded product is subjected to an after-pressing step.
4. Method according to any of claims 1 - 3, **characterized** in that the moulded product is after-pressed only on a selected part of the product.
5. Method according to any of claims 1 - 4, **characterized** in that the filling members (6) are placed in the valleys (5) of the suction mould (1).
6. Method according to any of claims 1 - 5, **characterized** in that the filling members (6) are integrated with the suction mould (1).
7. Method according to any of claims 1 - 6, **characterized** in that the height of the filling member (6) is varied.
8. Method according to any of claims 1 - 7, **characterized** in that the filling members (6) have a curved top surface.
9. Method according to any of claims 1 - 8, **characterized** in that the filling members (6) have a plate-like shape.
10. Method according to any of claims 1 - 9, **characterized** in that the filling members (6) have a longitudinal axis which extends perpendicular to the mould (1).
11. Method according to any of claims 1 - 10, **characterized** in that the filling members (6) have divergent side walls in the direction towards the mould.
12. Method according to any of claims 1 - 11, **characterized** in that the filling members are attached to the base member (3) of the suction mould (1).
13. Method according to any of claims 1 - 12, **characterized** in that the filling members (6) are made of a metal.

14. Method according to any of claims 1 - 12, **characterized** in that the filling members (6) are made of plastic.
15. Moulded pulp product made according to the method of any of claims 1 - 14. 5
16. Suction mould (1) with filling members (6) placed on it for carrying out the method according to any of claims 1 - 14. 10

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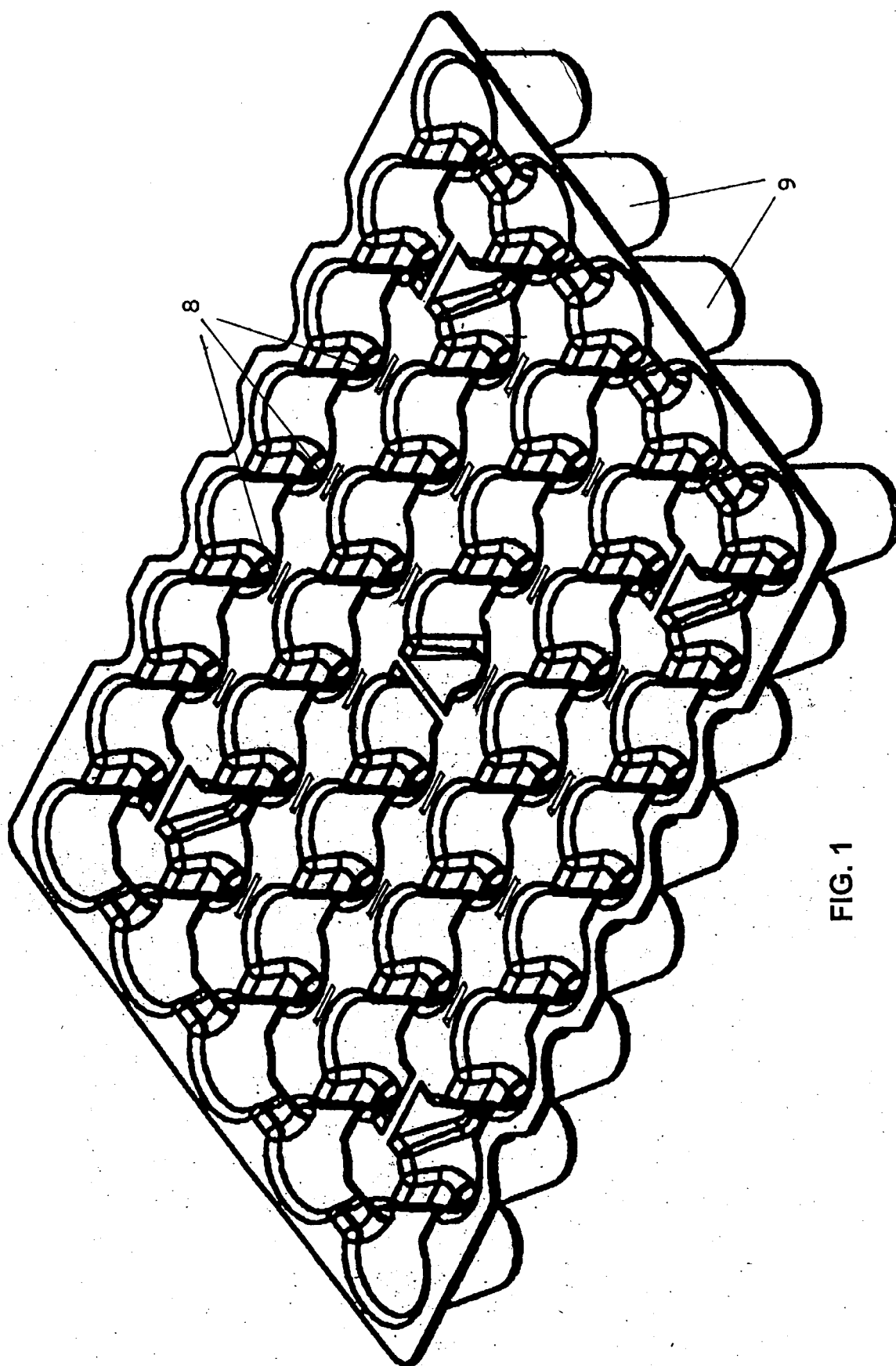
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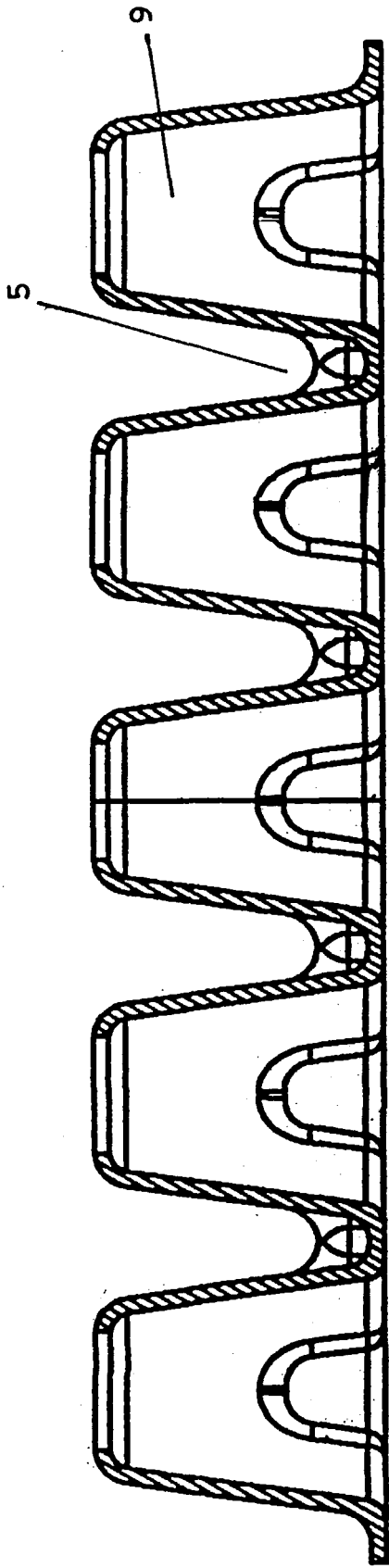
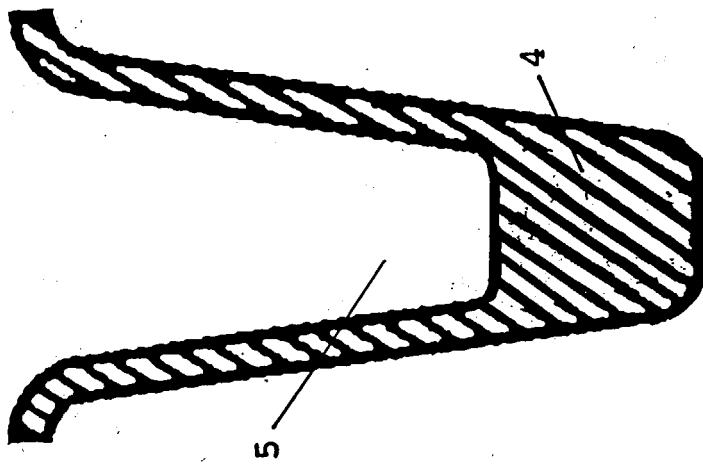
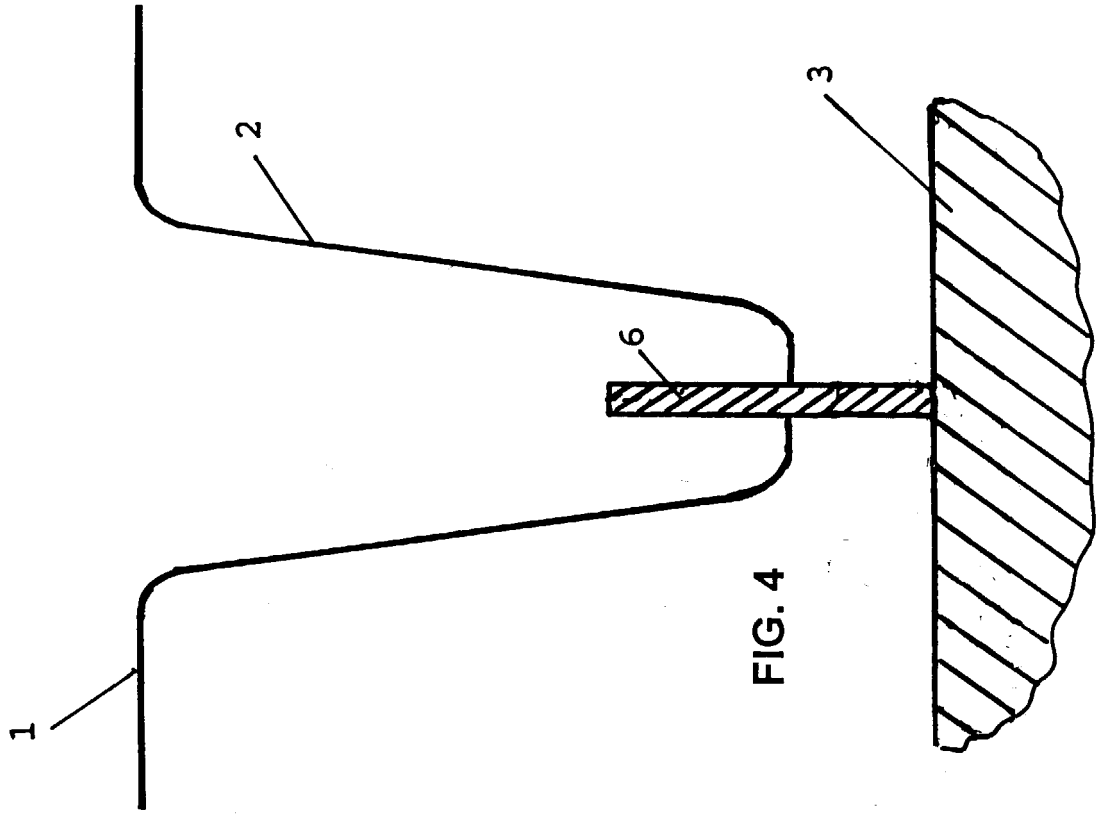


FIG. 2



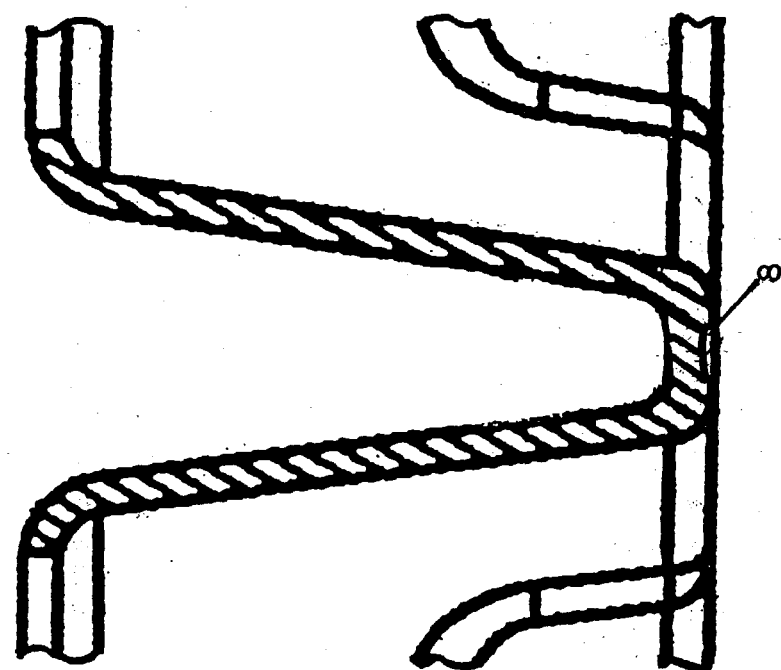


FIG. 6

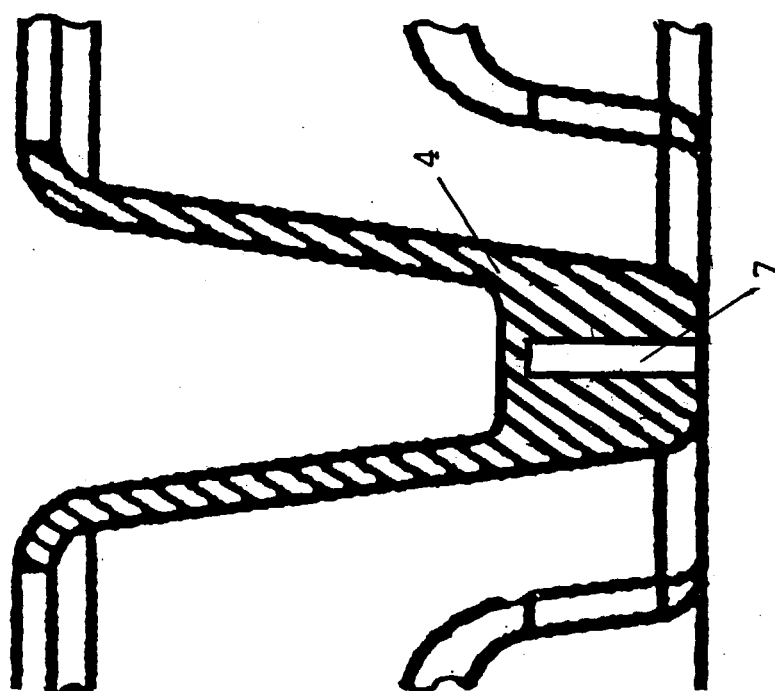


FIG. 5

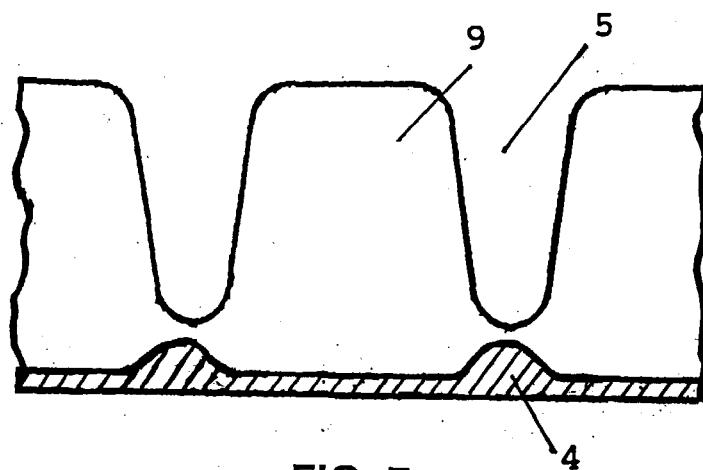


FIG. 7

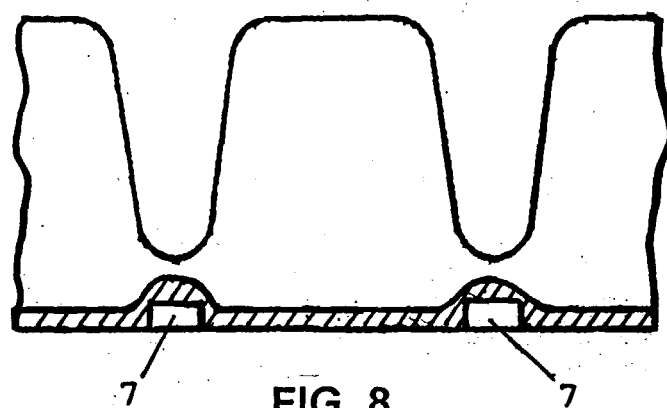


FIG. 8

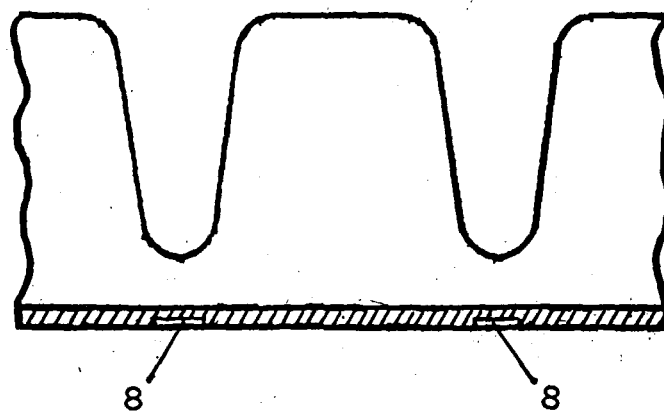


FIG. 9



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 3987

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.6)
A	WO 90 04679 A (HARTMANN AS BRDR) 3 May 1990 * abstract; figure 16 * * page 17, line 28 - page 18, line 15 * ---	1,2	D21J7/00
A	GB 1 023 770 A (SKANDINAVISK EMBALLAGE) * page 2, line 16 - line 84; figures * -----	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D21J
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 December 1998	Examiner Helpiö, T.
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 11 3987

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
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17-12-1998

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9004679 A	03-05-1990	DK 592388 A	26-04-1990
		AT 398094 B	26-09-1994
		AT 903189 A	15-01-1994
		AU 644778 B	23-12-1993
		AU 4513389 A	14-05-1990
		CA 2001299 A	25-04-1990
		CH 677945 A	15-07-1991
		CN 1045616 A,B	26-09-1990
		EP 0441847 A	21-08-1991
		GR 89100679 A,B	29-11-1990
		JP 4502184 T	16-04-1992
		MX 169791 B	26-07-1993
		NL 8921188 T	01-08-1991
		PT 92097 A	30-04-1990
		SE 467058 B	18-05-1992
		SE 9101241 A	24-04-1991

GB 1023770 A		NONE	
