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(21) International Application Number: PCT/DK93/00348 (22) International Filing Date: 28 October 1993 (28.10.93) (30) Priority data: 1329/92 30 October 1992 (30.10.92) DK (71) Applicant (for all designated States except US): BRØDRENE HARTMANN A/S [DK/DK]; Klampenborgvej 203-205, DK-2800 Lyngby (DK). (72) Inventors; and (75) Inventors/Applicants (for US only) : RASMUSSEN, Torben [DK/DK]; Christoffers Allé 63, DK-2800 Lyngby (DK). KJELDTSEN, Ib, Jørgen [DK/DK]; Hyldager 3, Ny Fløng, DK-2640 Fløng (DK). LAURIDSEN, Claus, Bjarnø [DK/DK]; Sallingvej 23, st.th., DK-2720 Vanløse (DK). HOLMQUIST, Ib [DK/DK]; Morelhaven 117, st., DK-2630 Høje Taastrup (DK).		(74) Agent: BUDDE, SCHOU & CO. A/S; Sundkrogsgade 10, DK-2100 København Ø (DK). (81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>With amended claims.</i>
(54) Title: INTEGRALLY MOULDED EDGE OR CORNER PROTECTOR (57) Abstract An integrally moulded protector for protecting the edges (C) on objects (ABC) comprises at least two side-wall segments (10, 12), each adapted to abut against one each of edge surfaces (A, B) converging to form an edge (C). Together, the side-wall segments (10, 12) form a wall section (14) intended to be placed along the edge (C). Each side-wall segment (10, 12) comprises mutually spaced rib-like projections (16) protruding from the outside of the wall segment, the inside of which comprises corresponding recesses (18), as well as lower wall segments (20) bordering upon the projections (16), corresponding projections (22) protruding from the inside of the wall segment. The wall section (14) intended to be placed along the edge (C) of the object comprises a continuous ridge (24), formed between the ends of the projections (16) and the lower wall segments (20), extending from each side-wall segment to meet each other, whereas the recesses (18) in the rib-like projections (16) protruding from the outside of the wall segment are closed at their mutually facing ends by means of an end wall (26), the free terminal edge (28) of which terminates at the same level as and in continuation of the junction line (30) between the ends of the bottom parts (32) of bordering lower wall segments (20).		

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INTEGRALLY MOULDED EDGE OR CORNER PROTECTORTECHNICAL FIELD

5 The present invention relates to an integrally moulded edge or corner protector for protecting edges of an object, said protector having at least two side-wall segments, each intended to abut against one of a number of edge surfaces forming a common edge, said side-wall segments together
10 forming a wall section intended to be placed along the edge, each side-wall segment having mutually spaced rib-like projections protruding from the outside surface of the wall segment, the latter comprising corresponding recesses in its internal surface as well as lower wall segments bordering
15 upon said projections, projections protruding from the inside surface of the wall segment corresponding to said lower wall segments.

BACKGROUND ART

20 Edge or corner protectors of the kind referred to above serve to absorb impact energy from impact directed against the edge regions of the object. They are especially suitable for use as a kind of cushion between the outside surface of the object, against which the edge or corner
25 protector is to abut with its inside surface, and an external packaging means, e.g. in the form of a cover, against the inside surface of which the edge or corner protector is to abut with its outside surface.

 In previously known protectors of the kind referred
30 to, said wall section intended to be placed along said edge of the object is shaped with a recess facing the inside of the protector and having a limiting wall embracing the edge of the object at a distance from the latter, said recess being either in the form of a channel or gutter facing the
35 edge and extending along practically the whole length of the edge being embraced, or in the form of a linear series of recesses extending along and facing the edge. Such protectors are not always able to provide sufficient protection

against impact directed directly against an edge region of the object.

DISCLOSURE OF THE INVENTION

5 It is the object of the present invention to provide an edge or corner protector of the kind referred to above, that can provide a highly effective protection, also against impact against the edges of the object, including corner regions formed by converging edges.

10 According to the present invention, this object is achieved by

 a) that the wall section intended to be placed along the edge of the object comprises a continuous ridge, formed between the ends of projections and lower wall segments
15 extending from the side-wall segments so as to meet each other, and

 b) that at their mutually facing ends, the recesses in the rib-like projections protruding from the outside surface of the wall segment are closed by means of an end
20 wall, the free terminal edge of which terminates at the same level as and in continuation of the junction line between the ends of the bottom surfaces of bordering lower wall segments.

 When placed against the object, the ridge referred
25 to will be able to abut against the edge and provide a rigid protection means, both in the regions of the mutually facing ends of the rib-like projections and in the region of the junction line between the ends of the bottom parts of the adjoining lower wall segments.

30 For providing said continuous ridge, the bottom parts of the lower wall segments should preferably, according to the invention, be plane.

 Another advantageous embodiment of the edge or corner protector can, according to the invention, consist in that
35 the lateral limiting walls of the rib-like projections and the bordering lower wall segments are of equal height. This

implies that they are preferably in the form of common lateral limiting walls.

Preferably, the cross-sectional shapes of the projections and the lower wall segments are substantially rectangular.

Further, a simple and hence advantageous embodiment can, according to the invention, consist in that the recesses in the rib-like projections protruding from the outside surface of each wall segment are closed by means of an end wall, the latter being common for two projections meeting each other.

The embodiments referred to above may be used, whether the protector is to serve to protect an edge - if so, having two side-wall segments - or to protect a corner - if so, having more than two, e.g. three, side-wall segments. Exploiting the constructional features characteristic of the invention, a corner protector with side-wall segments converging in a pyramid-like manner, can according to the invention be characterized in that the rib-like projections are terminated at the apex of the pyramid in a common solid apical segment.

With this arrangement, a particularly resistant protection is achieved against impact directed towards the corner of the object, partly due to the mass of the apical segment proper, partly due to the rigidifying support provided to the apical segment by the aforementioned continuous ridges being characteristic of the invention.

According to the invention, a further development of this corner protector can consist in that the projections are terminated by apices protruding beyond the solid apical segment. In addition to the impact protection described above, these apices will be able to provide an initial damping or absorption of impact directed against the corner, before the apical segment receives the impact directly.

In general, an edge or corner protector shaped in the manner indicated above can according to the invention

consist of a fibre-pulp material and be formed by aspirating a fibre pulp against a liquid-permeable mould, the moulding surface of which corresponds to the inside surface of the side-wall segments of the protector.

5 In addition to providing a well-defined contour of the inside surface of the edge or corner protector, with which inside surface it can abut suitably against the outside surface of the embraced object, this manufacturing method can, while utilizing the aspirating technology, advantageously
10 be used for producing e.g. said common end walls for the rib-like projections and the solid apical segments in a corner protector.

BRIEF DESCRIPTION OF THE DRAWINGS

15 In the following detailed portion of the present description, the present invention will be explained in more detail with reference to the drawings, in which

 Figure 1 is a diagrammatic perspective view of an embodiment of an edge protector, adapted to protect a
20 straight edge of an object,

 Figure 2 at an enlarged scale shows a first detailed embodiment of the protector shown in Figure 1,

 Figure 3 at an enlarged scale shows a second detailed embodiment of said protector,

25 Figure 4 shows diagrammatically an embodiment of a corner protector, said protector being placed on a corner of the object and itself embraced by an external packaging means,

 Figure 5 is an external apical view of the corner
30 protector of Figure 4, and

 Figure 6 is an internal apical view of said corner protector.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

35 The embodiment of an integrally moulded edge protector according to the invention shown in Figure 1 is intended

for use as a means for protecting a straight edge of an object (not shown in detail).

The edge protector comprises two side walls generally designated 10 and 12, these side walls abutting against two edge surfaces A and B respectively of said object. The edge surfaces A and B intersect, forming the edge C of the object. Together, the side walls 10 and 12 form a wall section, generally designated 14, intended to be placed along the edge C. Each side-wall segment 10 and 12 comprises mutually spaced rib-like projections 16 projecting outwards from the outside of the side walls. The rib-like projections 16 are shaped like inverted gutters or channels, recesses 18 on the inside of the wall segment corresponding to the rib-like projections 16. Further, the side-wall segment comprises wall segments or recesses 20 bordering on and lower than the projections 16, projections 22 protruding from the inside of the wall segment corresponding to the recesses 20.

As will be evident from the above, this enables the edge protector shown to serve as a protective insert between the object ABC and an enveloping wrapping, e.g. in the form of a cover, in which case the edge protector will abut against the outside of the object with its inwardly protruding projections 22, and the enveloping wrapping will be placed in abutment against the outwardly protruding projections 16 of the edge protector.

The wall section 14, intended to be placed along the edge C of the object, comprises a continuous ridge 24, formed in part between the ends of projections 16,16, in part between the ends of recesses 20,20, said projections and recesses extending from each side-wall segment 10 and 12 respectively to meet each other in the wall section 14. The reason for this is the fact, that the recesses 18 in the rib-like projections 16 protruding from the outside of each wall segment 10 and 12 at their ends facing each other in the wall section 14 are closed by means of an end wall 26, the free terminal edge 28 of which ends at the same level

as and in continuation of the junction line 30 between the ends of the bottom surfaces 32 formed in the lower wall segments 20. The bottom surfaces 32 are plane. The projections 16 and the lower wall segments 20 have common lateral limiting walls 34, the projections 16 and the lower wall sections 20 having the same height. Further, in the embodiment shown, the projections 16 and the lower wall segments 20 have a substantially rectangular cross-sectional shape.

In the embodiment shown in Figure 2, two mutually facing projections 16 in the region of the wall section 14 comprise an end wall 26, common to both projections 16. In another embodiment shown in Figure 3, each projection 16 has its own end wall 28b, the two end walls 28b together forming an outwardly open angle, inwardly continuing in a common wall segment 28a. In this case, each projection 16 ends in an apex 38. The apex may have various contour shapes, and may e.g. also converge into a point.

The embodiment of a corner protector according to the invention shown in Figures 4-6 comprises three side-wall segments 10,11,12, intended to embrace the corner of the object ABC. The side-wall segments 10,11,12 converge in a pyramid-like manner. This embodiment is based on the same basic idea as the embodiment described above with reference to Figures 1-3, for which reason mutually analogous parts carry the same reference designations.

In the embodiment shown in Figures 4-6, the rib-like projections 16 converge in a common, solid apical segment 36.

Further, the same figures show an embodiment, in which each of the projections 16 is terminated by a solid apex 38, projecting beyond the solid apical segment 36.

It will be possible to manufacture an edge or corner protector, that is shaped as described above, from a fibre-pulp material, and it may be formed in a manner known per se by aspirating a fibre pulp against a liquid-permeable mould, the moulding shape of which corresponds to the inside

of the side-wall segments of the edge or corner protector. In this manner, the finished-moulded product will already exhibit an inside surface, that corresponds fairly accurately to the outside surface of the object to be protected. By
5 using this fibre-pulp technology, it is also possible in a simple manner to form the edge or corner protector with a greater number of solid segments than explicitly stated above, especially in other regions, in which the wall segments meet each other forming acute angles.

10 Together, the parts 16 and 20 will function as a cushion between the object ABC and an external packaging means 40, as shown in Figure 4. The continuous ridge 24 protects the edge C of the object, while at the same time protecting against impact directed against the edge of the
15 object. Likewise, the ridge 24 contributes towards protection against impact directed against a solid apical segment 36 constituting a part of an edge or corner protector.

LIST OF PARTS

5		
	A	Edge surface)
		)
10	B	Edge surface) (packaged) object
		)
	C	Edge)
	10	Side wall / side-wall segment
	11	Side wall / side-wall segment
15	12	Side wall / side-wall segment
	14	Wall section
	16	Rib-like projection
	18	Recess
	20	Wall segment / recess
20	22	Projection
	24	Ridge
	26	End wall
	28	Free terminal edge
	28a	Common wall segment
25	28b	End wall
	30	Junction line
	32	Bottom surface
	34	Lateral limiting wall
	36	Apical segment
30	38	Apex
	40	External packaging means

C L A I M S :

1. Integrally moulded edge or corner protector for protecting edges of an object, said protector having at least two side-wall segments (10,12), each intended to abut
5 against one of a number of edge surfaces (A,B) forming a common edge (C), said side-wall segments together forming a wall section (14) intended to be placed along the edge (C), each side-wall segment (10,12) having mutually spaced rib-like projections (16) protruding from the outside surface
10 of the wall segment, the latter comprising corresponding recesses (18) in its internal surface as well as lower wall segments (20) bordering upon said projections (16), projections (22) protruding from the inside surface of the wall segment corresponding to said lower wall segments (20),
15 **characterized in**

a) that the wall section (14) intended to be placed along the edge (C) of the object comprises a continuous ridge (24), formed between the ends of the projections (16) and the lower wall segments (20) extending from the side-wall segments (10,12) so as to meet each other, and
20

b) that at their mutually facing ends, the recesses (18) in the rib-like projections (16) protruding from the outside surface of the wall segment are closed by means of an end wall (26), the free terminal edge (28) of which terminates at the same level as and in continuation of the
25 junction line (30) between the ends of the bottom surfaces (32) of bordering lower wall segments (20).

2. Integrally moulded edge or corner protector according to claim 1, **characterized in** that the bottom parts (32) of the lower wall segments (20) are plane.
30

3. Integrally moulded edge or corner protector according to claim 1, **characterized in** that the lateral limiting walls (34) of the rib-like projections (16) and the bordering lower wall segments (20) are of equal height.

35 4. Integrally moulded edge or corner protector according to claim 1, **characterized in** that the cross-sectional

shapes of the projections (16) and the lower wall segments (20) are substantially rectangular.

5 5. Integrally moulded edge or corner protector according to claim 1, **characterized** in that the recesses (18) in the rib-like projections (16) protruding from the outside surface of each wall segment are closed by means of an end wall (26), the latter being common for two projections (16) meeting each other.

10 6. Integrally moulded edge or corner protector according to any one or any of the claims 1-5 and having at least three side-wall segments for embracing a corner, said side-wall segments converging in a pyramid-like manner, **characterized** in that the rib-like projections (16) are terminated at the apex of the pyramid in a common solid apical segment
15 (36).

7. Integrally moulded edge or corner protector according to claim 6, **characterized** in that the projections (16) are terminated by apices (38) protruding beyond the solid apical segment (36).

20 8. Integrally moulded edge or corner protector according to any one or any of the claims 1-7, in which the edge or corner protector consists of a fibre-pulp material and is produced by aspirating fibre pulp against a liquid-permeable mould, the moulding surface of which corresponds to
25 the inside surface of the side-wall segments of the edge or corner protector.

AMENDED CLAIMS

[received by the International Bureau on 24 March 1994 (24.03.94);
original claims 1-8 replaced by amended claims 1-5 (2 pages)]

1. Integrally moulded edge or corner protector for protecting edges of an object, said protector having at least two side-wall segments (10,12), each intended to abut
5 against one of a number of edge surfaces (A,B) forming a common edge (C), said side-wall segments together forming a wall section (14) intended to be placed along the edge (C), each side-wall segment (10,12) having mutually spaced
10 rib-like projections (16) protruding from the outside surface of the wall segment, the latter comprising corresponding recesses (18) in its internal surface as well as lower wall segments (20) bordering upon said projections (16), projections (22) protruding from the inside surface of the wall
15 segment corresponding to said lower wall segments (20), characterized in the recesses (18) in the rib-like projections (16) protruding from the outside surface of the wall segment are at their mutually facing ends closed by means of an end wall (26), the free terminal edge (28) of which terminates at the same level as and in continuation of the
20 junction line (30) between the ends of the bottom surfaces (32) of bordering lower wall segments (20) and thereby forms a continuous coherent ridge (24) together with said ends of said bottom surfaces.

2. Integrally moulded edge or corner protector according to claim 1, characterized in that the recesses (18) in the rib-like projections (16) protruding from the outside
25 surface of each wall segment are closed by means of an end wall (26), the latter being common for two projections (16) meeting each other.

3. Integrally moulded edge or corner protector according to any one or any of the claims 1-2 and having at least three side-wall segments for embracing a corner, said side-wall segments converging in a pyramid-like manner, characterized in that the recesses (18) are closed at the apex of
30 the pyramid by means of a common solid pyramide apical segment (36), in which the ridges (24) end (Fig. 6).

4. Integrally moulded edge or corner protector according to claim 3, characterized in that the projections (16) are terminated by apices (38) protruding on the outside, beyond the solid pyramide apical segment (36).

5 5. Integrally moulded edge or corner protector according to any one or any of the claims 1-4, in which the edge or corner protector consists of a fibre-pulp material and is produced by aspirating fibre pulp against a liquid-permeable mould, the moulding surface of which corresponds to
10 the inside surface of the side-wall segments of the edge or corner protector.

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FIG. 1

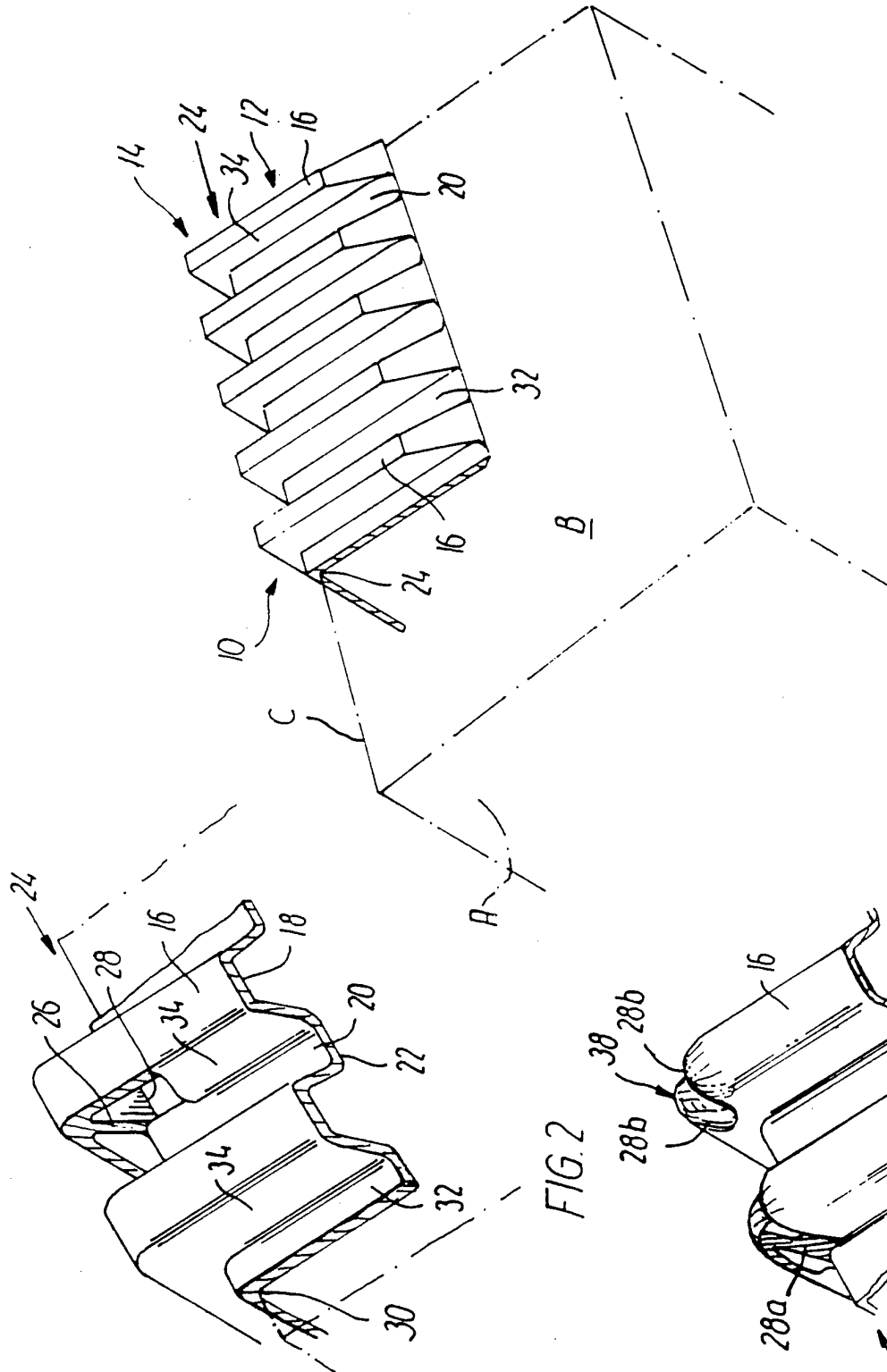


FIG. 2

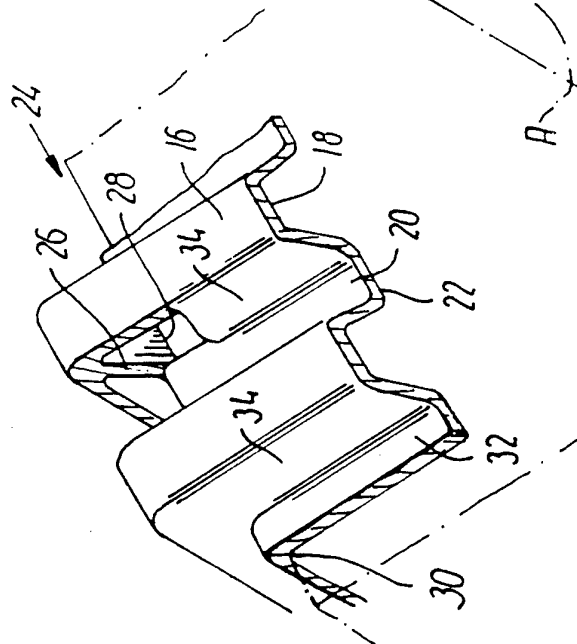
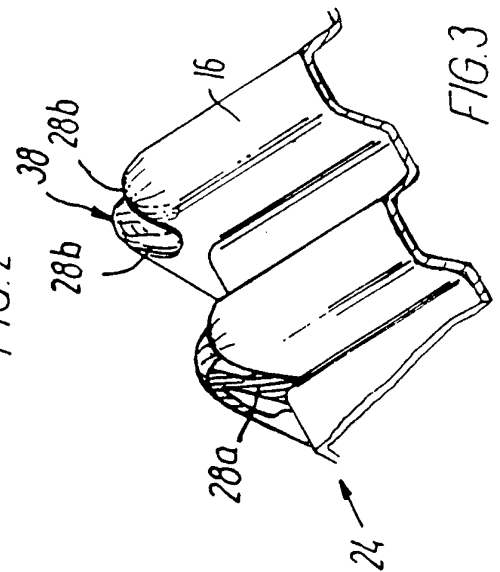


FIG. 3



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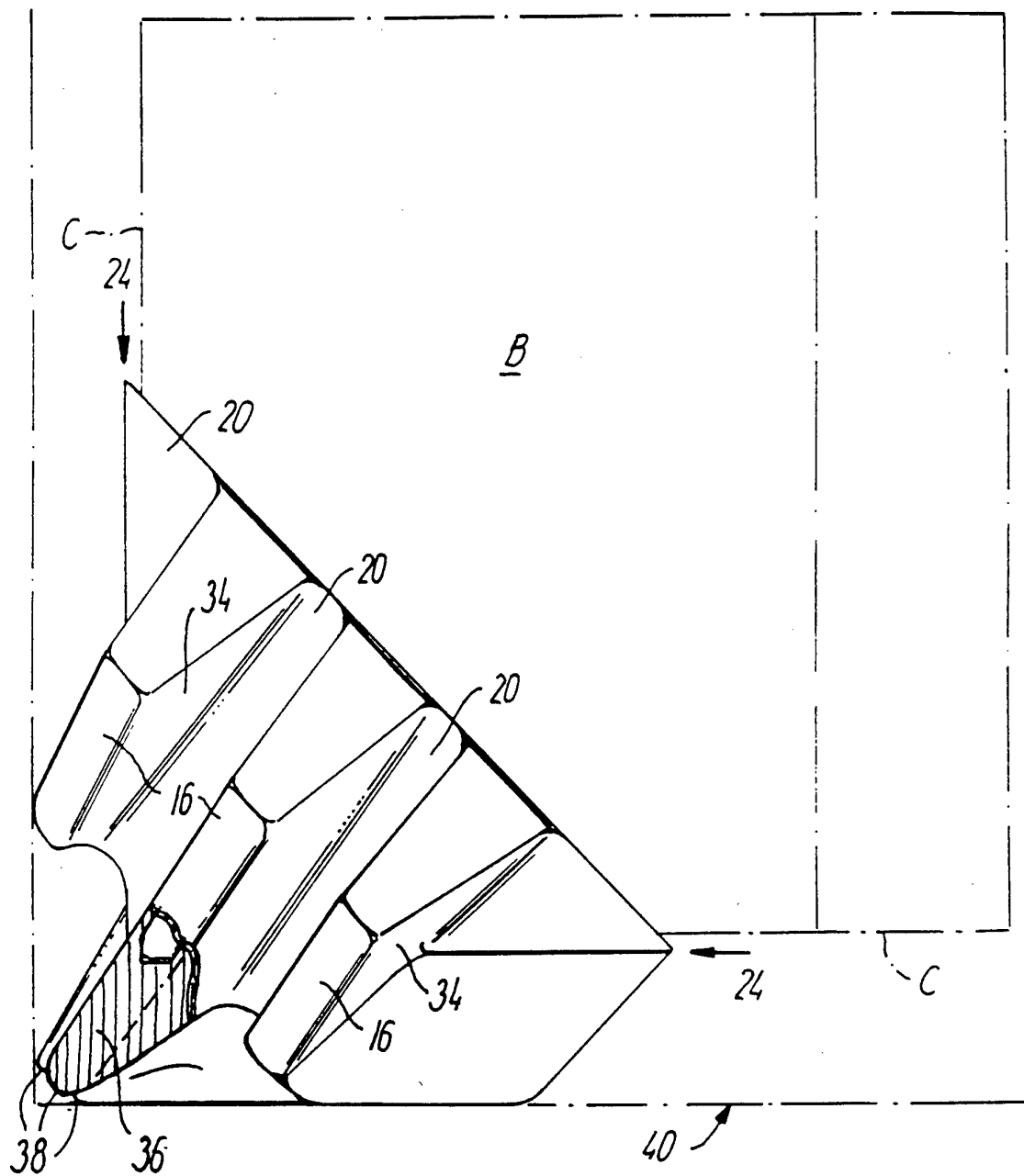


FIG. 4

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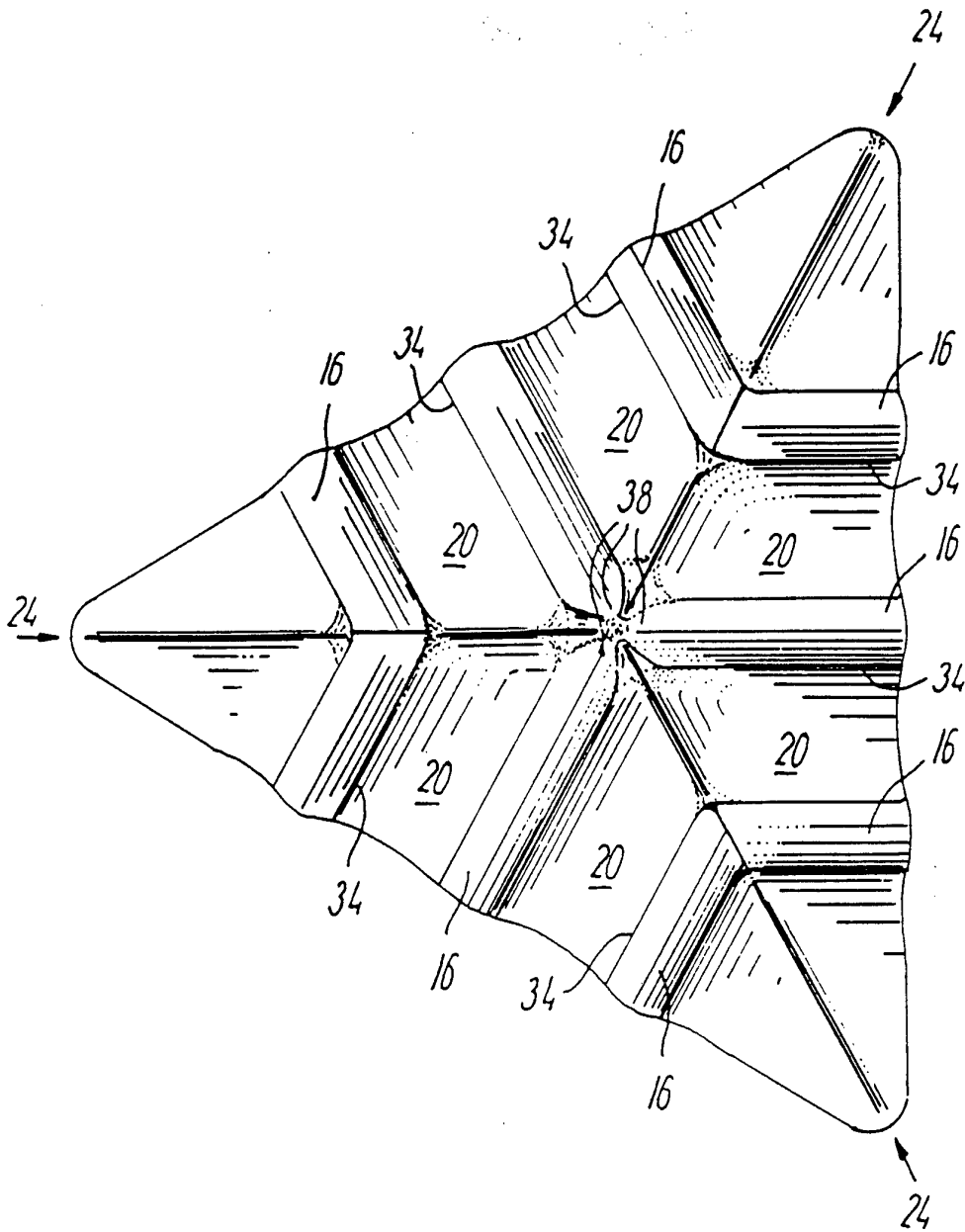


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00348

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B65D 59/00, B65D 81/02

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: B65D

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB, A, 2052427 (UNIVERSAL PULP CONTAINERS LTD.), 28 January 1981 (28.01.81) --	1-8
A	US, A, 3047142 (H.H. HEFFLEY), 31 July 1962 (31.07.62) --	1-8
A	US, A, 3762626 (DORSEY), 2 October 1973 (02.10.73) --	1-8
A	US, A, 4838427 (HURLEY), 13 June 1989 (13.06.89) -- -----	1-8

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 ☒ See patent family annex.

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Date of the actual completion of the international search

Date of mailing of the international search report

10 February 1994

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INTERNATIONAL SEARCH REPORT

Information on patent family members

30/12/93

International application No.

PCT/DK 93/00348

Patent document ^o cited in search report		Publication date	Patent family member(s)		Publication date
GB-A-	2052427	28/01/81	NONE		
US-A-	3047142	31/07/62	NONE		
US-A-	3762626	02/10/73	CA-A-	968312	27/05/75
			CA-A-	980733	30/12/75
US-A-	4838427	13/06/89	NONE		