

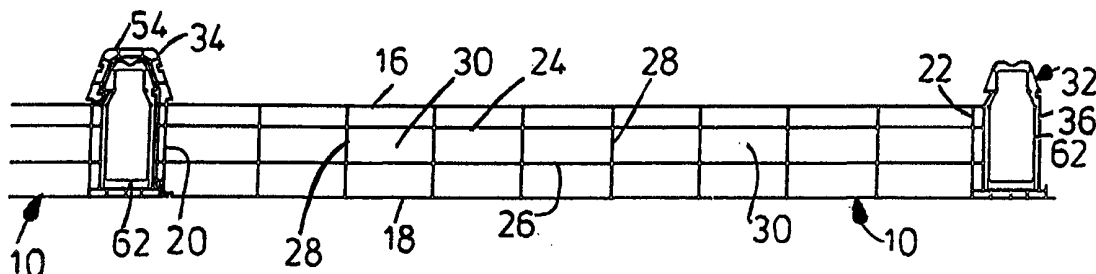


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<p>(21) International Application Number: PCT/GB98/02588 (22) International Filing Date: 27 August 1998 (27.08.98) (30) Priority Data: 9719612.5 9 September 1997 (09.09.97) GB (71) Applicant: ULTRAFRAME (UK) LIMITED [GB/GB]; Enterprise Works, Salthill Road, Clitheroe, Lancashire BB7 1PE (GB). (72) Inventor: RICHARDSON, Christopher; 4 Willow Drive, Barrow, Clitheroe, Lancashire BB7 9FG (GB). (74) Agent: ROYSTONS; Tower Building, Water Street, Liverpool, Merseyside L3 1BA (GB).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>
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(54) Title: BUILDING ELEMENTS



(57) Abstract

A hollow building element (10) of plastics material comprises one or more longitudinal ducts (30) and has, at opposite sides thereof, coupling members (32, 34), whereby elements may be connected to each other, a coupling member at one side comprising a duct (36) for receiving a reinforcing beam (62) and having a ducted bottom wall.

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TITLE: Building Elements

DESCRIPTION

This invention concerns building elements for making structures and structures made from such building elements, such as conservatory roofs.

Self-supporting roofs or roof sections are known which comprise a plurality of extruded plastics profile elements connected side by side, each element having at least one longitudinal chamber or duct and coupling members by which neighbouring profile elements are interconnected. The adjacent coupling members of neighbouring profile elements engage to form a duct.

In GB 1528874, the coupling of adjacent elements forms together a duct through which is inserted an elongate locking member, the locking member having at least two opposite longitudinal edges that are a sliding fit within the duct, so as to prevent the locking member from twisting under load.

In GB 1511189, it was further proposed that the longitudinal chamber of each element have an internal partition substantially parallel to the outer surfaces of a building structure made up of the elements. The partition was principally to provide additional heat insulation.

Further proposals for such profile elements have been made in EP-A-070930 in which multiple duct elements have main ducts and intermediate secondary ducts having internal partitions that are in line. Connection of these elements together is as disclosed in

GB 1511189 and GB 1528874.

A yet further proposal for such elements was made in GB 2147334A, in which upper coupling members consisted of cylindrical slotted downwardly open flanges of such dimension that a flange of a first element could be snap-locked to a flange of a second identical element. In addition, the lower end of one side wall of an element was integrally connected to a guide member which was adapted to engage the anchoring member of an adjacent element so as to maintain the lower ends of two adjacent side walls in spaced relationship, so as to form a tight connection between such elements.

In GB 2268765A, we proposed a hollow building element of plastics material comprising a plurality of hollow ducts in two layers and having at opposite sides thereof coupling members, whereby elements may be connected to each other, upper coupling elements comprising a part engageable with a stiffening or reinforcing beam.

A problem with all of the above described building elements lies in the formation of cold spots on which condensation forms. The cold spots are formed where elements are coupled together because aluminium stiffening beams, used to reinforce and, in most cases, hold elements together, are in contact with single layers of plastics material forming coupling members and provide a path for heat loss by condensation.

An object of this invention is to provide a building element for making structures that are less susceptible to formation of cold spots.

According to this invention there is provided a hollow building element of plastics

material comprising one or more longitudinal ducts and having, at opposite sides thereof, coupling members, whereby elements may be connected to each other, a coupling member at one side comprising a duct for receiving a reinforcing beam and having a ducted bottom wall.

The invention further provides a building structure, such as a roof, comprising two or more hollow building elements connected side by side, the hollow building elements comprising one or more longitudinal ducts and having, at opposite sides thereof, coupling members, whereby the elements are connected to each other, wherein a coupling member at one side comprises a duct for receiving a reinforcing beam and has a ducted bottom wall.

Preferred building elements of the invention may have a single longitudinal duct, a single layer of adjacent longitudinal ducts, a pair of longitudinal ducts one on top of the other, or a plurality of longitudinal ducts in two or more layers, especially three layers.

The ducted coupling member at one side of the building element of the invention preferably has a top part adapted to be engaged by a hook-like upper coupling member of an adjacent element. The top part preferably has an undercut in to which an inwardly returned edge of the hook-like coupling member can be fitted, preferably by a snap-fit action.

The bottom wall of the ducted coupling element preferably extends beyond its outer side wall to provide a flange engageable with a lower coupling formation of an adjacent element. The lower coupling formation preferably comprises a hook-like formation to sit on an upwardly extending part of the flange. The flange preferably extends further as a single layer and a lower part of an adjacent element is preferably rebated to accommodate said

single layer extension of the flange.

The hook-like upper coupling member at one side of the building element of in the invention is preferably formed as a ducted member and said ducting preferably extends to the lower coupling member. The upper coupling member preferably also has side notches, slots or the like to receive complementary formations of an additional capping member to cover the coupling of adjacent building elements, if desired.

The reinforcing beam is preferably formed as a hollow element and is preferably provided at least on its base and preferably also on its sides one or more ribs or the like to reduce contact areas between the beams and the walls of the ducted coupling member. The reinforcing beam top is preferably formed with a depression therein and the ducted coupling member top wall also has a depression therein, whereby contact between the beam and the ducted coupling member at their tops is only between their respective depressed parts.

The ducted coupling member preferably has its inner side wall formed with ducts therein.

The building elements of this invention will be made of plastics material, such as, for example, polyvinyl chloride or polycarbonate, and preferably by extrusion moulding.

This invention will now be further described by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows part of a building structure made up of building elements according to the invention;

Figure 2 shows a detail connection between two building elements according to the

invention;

Figure 3 shows a coupling member at one side of a building element according to the invention; and

Figure 4 shows a coupling member at the other side of the building element of Figure 3.

Referring to the accompanying drawings a building structure, such as a conservatory roof, comprises building elements 10 of plastics material connected side-by-side. The building elements 10 are hollow and have flat top and bottom walls 16, 18 respectively, side walls 20, 22 and intermediate walls 24, 26 parallel to the top and bottom walls and intermediate walls 28 parallel to the side walls, thereby forming ducts 30 through the elements in three rows on top of each other. The intermediate walls 24, 26 and 28 are generally thinner than outer walls of the elements. At each side of the building elements 10 are coupling members 32, 34 respectively. The coupling members 32 at one side of an element are provided by a duct formation 36. The duct 36 has an inner side wall 38 that is itself ducted and a ducted bottom wall 40 that extends beyond single layer outer side wall 42. The duct 36 extends above the top wall of the element 10 and has top wall 44 with a central depression 46. Just above the top wall of the element, the duct has a longitudinal recess 48 in its inner wall. The extension of the bottom wall of the duct 36 forms a flange having an upstand 50 and a single layer continuation 52.

The coupling member 34 at the opposite side of the element provides upper and lower coupling parts 54 and 56 respectively. The upper part 54 is in the form of a hook-like

member with an inwards return 58 at its free end. The hook member 54 fits over the top of the ducted formation 36 with the return 58 locating in the recess 48. The hook 54 is formed as part of a ducted section at the end of the element, which continues down to form part of the second coupling part 56.

The second coupling part 56 comprises a downwardly open slot 59 to fit onto the upstand 50 and a rebate 60 in the bottom wall 18 of the element to receive the continuation 52 of the flange extension of the duct 36.

The duct 36 contains an aluminium reinforcing beam 62 desirable to large roof spans. The reinforcing beam 62 is a ducted beam and has on its bottom and side walls (64, 66 respectively) ribs 68 that act as spacers to reduce areas of contact between the beam and the walls of the duct. The beam has a top wall 70 that includes a top depression 72 to correspond to the top depression 46 of the duct 36. Contact between the beam and the duct at the top is preferably made only in between their respective depressed parts.

To construct a roof using building elements 10 the hook-like member 54 of one element is pressed over the duct 36 of an adjacent element for the return 58 of the member 54 to locate in the recess 48 of the duct 36 while at the same time the slot 58 locates on the upstand 50. The reinforcing beam may already be in place or may be added later by sliding it into the duct 36.

Because the reinforcing beam is more or less completely surrounded by ducted parts of the coupling members, it is better insulated against heat loss, so that risk of formation of cold spots and hence condensation is reduced compared to prior art structures of the same

general type.

CLAIMS

1. A hollow building element of plastics material comprising at least one longitudinal duct and having, at opposite sides thereof, coupling members, whereby elements may be connected to each other, a coupling member at one side comprising a duct for receiving a reinforcing beam and having a ducted bottom wall.
2. A building element as claimed in claim 1 comprising a plurality of longitudinal ducts in at least two layers.
3. A building element as claimed in claim 2 comprising a plurality of longitudinal ducts in three layers.
4. A building element as claimed in claim 1, 2 or 3, wherein the ducted coupling member at one side of the building element of the invention has a top part adapted to be engaged by a hook-like upper coupling member of an adjacent element.
5. A building element as claimed in claim 4, wherein the top part has an undercut in to which an inwardly returned edge of the hook-like coupling member can be fitted.
6. A building element as claimed in claim 4 or 5, wherein said coupling members snap fit together.
7. A building element as claimed in any one of claims 1 to 6, wherein the bottom wall of the ducted coupling element extends beyond its outer side wall provide a flange engageable with a lower coupling formation of an adjacent element.
8. A building element as claimed in claim 7, wherein the lower coupling formation

comprises a hook-like formation to sit on an upwardly extending part of the flange.

9. A building element as claimed in claim 7 or 8, wherein the flange extends further as a single layer and a lower part of an adjacent element is rebated to accommodate said single layer extension of the flange.

10. A building element as claimed in any one of claims 4 to 9, wherein the hook-like upper coupling member at one side of the building element is formed as a ducted member.

11. A building element as claimed in claim 10, wherein the ducted coupling member has its inner side wall formed with ducts therein.

12. A building element as claimed in claim 10 or 11, wherein said ducting extends to a lower coupling member.

13. A building element as claimed in claim 10, 11 or 12, wherein the upper coupling member also has side slots to receive complementary formations of an additional capping member to cover the coupling of adjacent building elements, if desired.

14. A building structure comprising two or more hollow building elements connected side by side, the hollow building elements comprising one or more longitudinal ducts and having, at opposite sides thereof, coupling members, whereby the elements are connected to each other, wherein a coupling member at one side comprises a duct for receiving a reinforcing beam and has a ducted bottom wall.

15. A building structure as claimed in claim 14, wherein the reinforcing beam is formed as a hollow element.

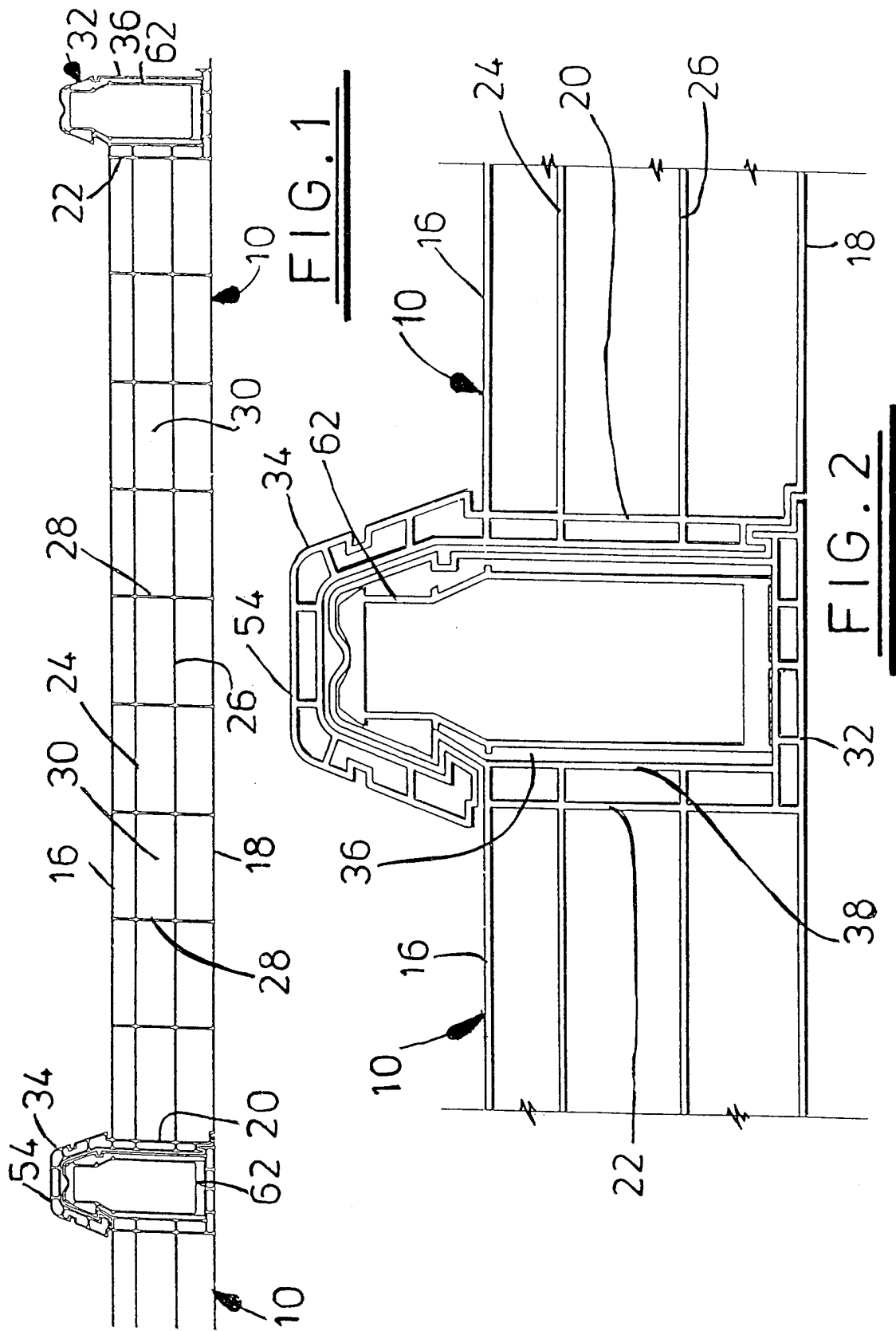
16. A building structure as claimed in claim 14 or 15, wherein the reinforcing has beam

at least on its base at least one rib to reduce contact areas between the beam and the walls of the ducted coupling member.

17. A building structure as claimed in claim 14, 15 or 16, wherein the reinforcing beam top is formed with a depression therein and the ducted coupling member top wall also has a depression therein, whereby contact between the beam and the ducted coupling member at their tops is only between their respective depressed parts.

18. A building element substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

19. A building structure substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.



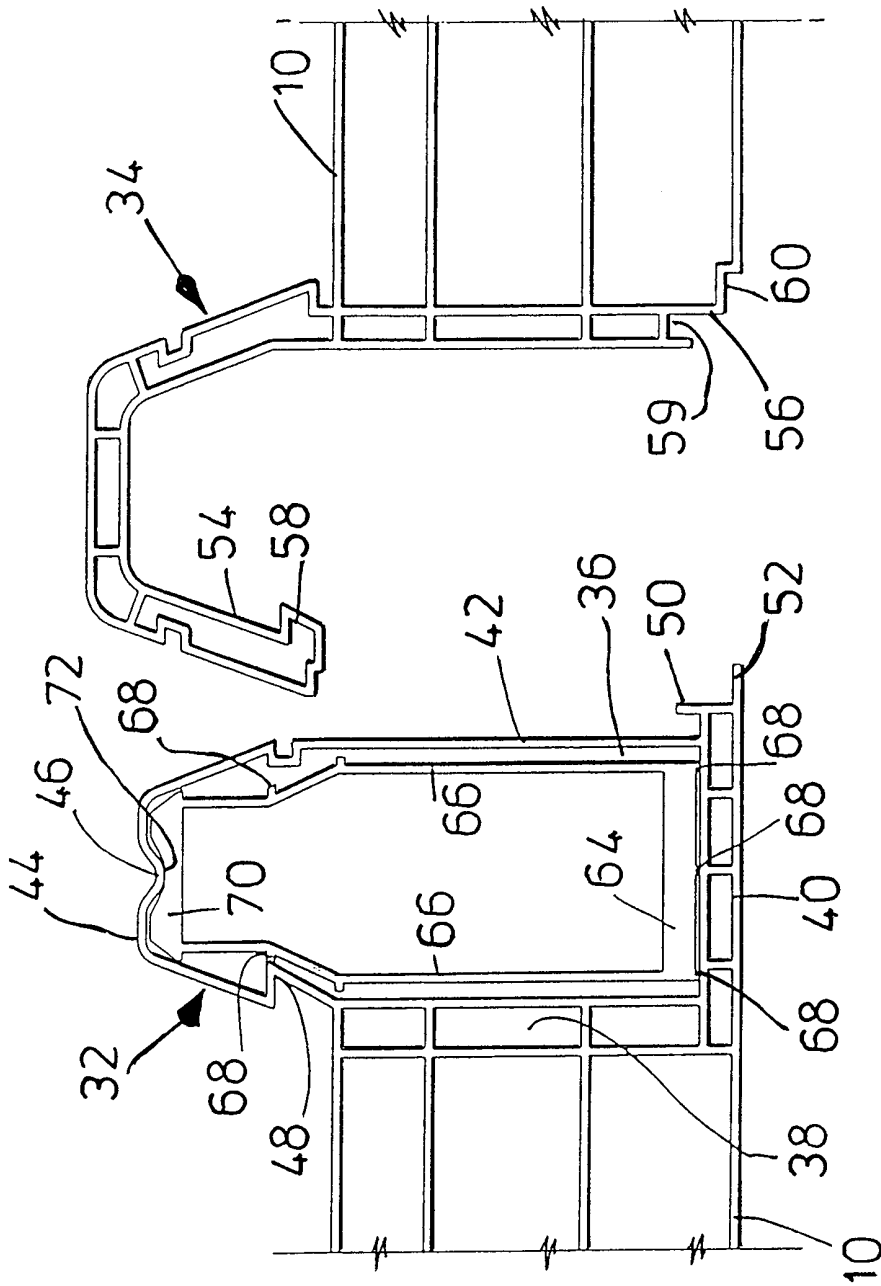


FIG. 4

FIG. 3

INTERNATIONAL SEARCH REPORT

Inter. nal Application No

PCT/GB 98/02588

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E04D3/28

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)
IPC 6 E04D

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

Electronic data base consulted during the international search (name of data base and, where practical, 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.
X	DE 87 09 349 U (HELGE, HANS HEINZ) 20 August 1987	1, 4, 14
A	see page 3, line 17 - page 4, line 22; claims 1-6; figure 1 ----	2, 7, 9, 18, 19
A	DE 296 14 086 U (RODECA KUNSTSTOFFPROFILE GMBH & CO. KG) 10 October 1996 see claims 1-5; figures 1, 2 ----	1, 2, 4-8, 10-14, 18, 19
A	EP 0 437 810 A (VEREINIGTE ALUMINIUM-WERKE AKTIENGESELLSCHAFT) 24 July 1991 see the whole document ----	1-4, 7, 9, 14, 18, 19
A	GB 1 528 874 A (EVERLITE A/S) 18 October 1978 cited in the application see claim 1; figures 1-3, 9 ----- ----- -/--	1-19

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 268 765 A (ULTRAFRAME PLC) 19 January 1994 cited in the application see abstract; claims 1,4-9; figures 1,2 ---	1,2,6,7, 9,14-19
A	GB 2 147 334 A (AKTIESELSKABET JENS VILLADSENS FABRIKER) 9 May 1985 cited in the application see abstract; claims 1-12; figures 1,2 -----	1,2,6,9, 14,18,19

INTERNATIONAL SEARCH REPORT

Information on patent family members

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