(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 359 892 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88850317.4**

(51) Int. Cl.5: **F25D 3/10 , B65D 88/74**

(22) Date of filing: **20.09.88**

(43) Date of publication of application:
28.03.90 Bulletin 90/13

(84) Designated Contracting States:
AT BE CH DE ES FR GB IT LI NL SE

(71) Applicant: **M C TRADING AG**
Gubelstrasse 17
CH-6300 Zug(CH)

(72) Inventor: **Fredrixon, Benny**
Hersbyvägen 58
S-181 42 Lidingö(SE)

(74) Representative: **Nordén, J. Ake et al**
Oscar Grahn Patentbyrä AB Box 19540
S-104 32 Stockholm(SE)

(54) Top structure for cold and freeze transport container.

(57) Top structure (4) made of a block like unit of foamed or cellular plastic for closing the top of an insulated box like transport container (1) and for cooling goods therein, which top structure (4) is supported by said box like container (1) and has cavities (7) for receiving an un-pressurized liquid cooling medium that evaporates to a gaseous state, and emerges into the container (1) to keep the contents thereof at a predetermined temperature.

The new feature is that the cavities (7) for the liquid cooling medium are formed directly in the foamed or cellular plastic and communicate via a liquid trap (8) with output channels (19) opening out at the underside of the block like unit (6) and that filling openings are arranged to allow gravity filling of the cavities.

EP 0 359 892 A1

TOP STRUCTURE FOR COLD OR FREEZE TRANSPORT CONTAINER

The present invention relates to a top structure for transport container primarily intended to be used for air freight of goods to be kept cold or frozen.

One over all object of the invention is to arrange a light weight container for one way use and made from rather in-expensive materiel so that the goods transported inside same can be kept at or below a set temperature for a predetermined time.

The invention is partly based on the knowledges disclosed in my earlier U.S. Patent No. 4,561,262 which devises a container lid structure for ordinary card board or the like shipping containers intended to keep the contents of such a container at a given temperature during transport. The known lid structure is primarily intended to be used for truck transport between wholesaler and retailer and for repeated use. The lids used are simply returned on next days transport. Return transport is of minor interest in air freight and the known lid is too expensive to be disposed of after use. Furthermore the known lid includes metal tanks, piping, nozzles et cetera, which makes it difficult to dispose of even if the cost could be minimized.

The idea behind this invention is to use only cheap light weight material for the entire container, which material facilitates the production of the container, makes it sufficiently sturdy, gives it good heat insulating properties and facititates desctruction of the used containers without any environmental hazards.

The essential object of this invention is to provide an extremely simple yet reliable top structure for light weight insulated containers primarily for air freight purposes and arranged as a cooler unit.

Another object of this invention is to provide a top structure which is so in-expensive that it may be disposed of after use and which contains no material involving environmental hazards.

Liquid cooling medium such as nitrogen may not in its liquid state reach the goods to be cooled and liquid may not escape from the storing spaces during handling of the container. To ensure this a further object of the invention is to provide a container top structure so arranged that only gas may emerge from same.

The new container and top structure for same includes the combination of an insulated box like structure formed by bottom and walls and made from foamed plastic or like and having a size adapted to the intended use; an insulated top structure supported by an upper edge of the box structure also made of foamed plastic and adapted to be received inside the upper portion of the interior of the box like structure engaging the inside border portion of the box walls, and including cavities formed in the foamed plastic adapted to hold the liquid gas, a passage communicating with each cavity and with the interior of the box structure and a liquid trap, i.e. flow of gasified liquid controlling device inserted in the passage to permit only gasified liquified gas to enter the interior of the box like structure.

A preferred embodiment of the transport container and top structure according to the invention will be described in details below with references to the accompanying drawings, wherein:

Fig. 1 is a schematic side view of an example of a transport container and top structure.

Fig. 2 is a top view of the top structure.

Fig. 3 is a bottom view of the top structure.

Fig. 4 is a cross section along line C-C.

Fig. 2 and Fig. 5 is an enlarged cross section along line D-D of Fig. 3.

In the drawing, the box structure is generally designed 1 and said structure which is made of foamed plastic preferably acrilonitrile-butadiene-styrene-plastic, includes a bottom 2 and side walls 3 or the like self-supporting heat insulating material. The bottom or base 2 of the box structure can be a standard pallet of so called Euro-type entirely made of foamed plastic and the wall sections may be secured to the base in any suitable way. The box structure may also have a lining of cardboard, plastic sheet material or the like.

The top structure generally designed 4 is also made of foamed or cellular plastic such as acrylonitrile-butadiene-styrene plastic and is designed so it can be inserted into and be supported by the top end of the box structure. A protruding flange like projection 5 is intended to rest against the upper edge of the box structure walls 3. The top structure consist of a block like body 6 with a number of internal cavities 7 and a gas flow controlling device 8 is to be found at the centre thereof.

The block like body includes a top part 9 with parallel upper and lower sides. The outer edges are step-wise arranged to form the outer flange 5 intended to rest against the upper edge of the box structure walls 3 and a lower cut out 11 intended to engage a lower part 11 as described below. At the center of the top part 9 there is a circular opening 12 having a cut out 13 at its upper end.

The lower part 11 of the body may be formed in one piece and may also - if sufficiently large forming machines are not available - be formed as four separate triangular pieces subsequently joined. Lines x indicate joints between four such pieces.

The lower part 11 has four triangular cavity

forming recesses 15 separated by walls 16 and a hub-like centre portion 17. The upper edge of the outer walls 16′ of the lower part 11 is to engage the cut out 10 of the top part 9, whereas the top side of the recess separating walls 16 engage the lower side of the top part 9. The centre portion 17 has a bore 18, which extends through the lower part 11 to the underside thereof. The lower edge of the bore is bevelled and four V-shaped grooves 19 extend diagonally towards the outer corners of the underside.

From the inner corner of each of the recesses 15 to the bore 18 extends a U-shaped groove (not shown) each adapted to receive and position a pipe as described below.

A plug 20 having a peripheral flange 21 engaging the cut-out 13 at the upper end of the circular opening 12 of the top part 9 is insertable into said opening so as to meet the upper side of the hub like centre portion 17. Before the plug 20 is inserted the inner corners of each of the recesses or cavities are accessible through the circular opening 12.

The gas flow control device 8 includes an outer sleeve 22 having bottom and top walls 23 and 24 respectively, the sleeve being formed by two separate pieces 22′ and 22″ joined at a snap action V-joint 25; four radially oriented pipes 26 attached to the outer sleeve at holes 27 therein; an internal flange 28 attached to the inside of the sleeve 22 below the holes and pipes 27 and 26 respectively; an inner sleeve 29 open at both ends and secured to the inner edge of the flange 28 and extending upwardly above the holes 27 of the outer sleeve but terminating remote from the outer sleeve top wall 24. The bottom wall 23 extends radially beyond the outside of the outer sleeve forming an abutment for a circular disc 30 and perforations 31 are made through the outer sleeve adjacent the bottom wall thereof.

One piece of the gas flow control device 8 including the top end 22′ of the outer sleeve with the pipes 26, the internal flange and inner sleeve 29 are inserted into the bore 18 from above and the pipes 26 are received in the U-grooves at the top end of the hub like centre portion 17 of the lower cellular plastic block part 11 and the other piece 22″ upon which the disc 30 is slipped, is inserted into the bore 18 from below and the two pieces are pressed together so that the snap joint secures them.

The top part 9 and the lower part 11 may be glued together. In case the lower part 11 consists of four separately formed pieces also such pieces may be glued together. In the latter case lower part pieces are also mechanically held together by the pipes 22 engaging the top of each centre portion 17 and the disc 30 engaging the underside. Pins attached to the disc and pressing into the bottom material further ensures a good mechanical contact.

When the top structure is positioned at the container or box structure the cavities 7 are filled to a predetermined level with liquid gas, e.g. nitrogen through the inner corner portions of the cavities accessible through the central opening 12. The filling preferably is made with a four barrelled gravity funnel or mouthpiece. After filling the plug 20 is inserted thereby sealing the cavities 7 from the exterior. Gas evaporating from the contents of the cavities now escapes through the pipes 26 into the chamber 32 defined by the inside of the outer sleeve 22, the flange 28 and the inner sleeve 29 and from this chamber over the upper edge of the inner sleeve 29 downwardly through same and out via the perforations 31 to be radially channelled along the V-grooves 19 downwardly partly covered by the disc 30.

In case, due to movement of the aircraft or when handling the container un-gasified gas runs out through any of the pipes 26, such liquid is trapped in the chamber defined by the outer and the inner sleeve 22 and 29 respectively and remains at the bottom portion of said chamber and evaporates gradually. Un-evaporated gas, thus, cannot reach the interior of the container and cannot be spilled even if the top structure is removed.

The rate of evaporation is in per se way determined by the thickness of the insulation and the duration of the transport determines the volume liquid gas necessary. The simplicity of the construction using non-pressurized liquid gas makes it also possible to re-fill the cavities during the transport by removing the plug and pouring liquid into the cavities.

Claims

1. A top structure made as a block like unit of foamed or cellular plastic for closing the top of an upwardly open transport container and for cooling goods contained in the transport container, said top structure having means for supporting the same at the top of said container in a position for closing the top of said container and having inside said unit cavity means formed directly in the foamed or cellular plastic for receiving an unpressurized liquid cooling medium that evaporates to a gaseous state, filling means including openings with a removable plug means for filling said cavity means with liquid cooling medium, a liquid trap means by pipe means connected to the cavity means and debouching to permanently open output channel means for causing cooling medium in gaseous state only to flow downwardly into said compart-

ment.

2. A top structure as claimed in claim 1, wherein said cavity means comprises a plurality of cavities.

3. A top structure as claimed in claim 1, wherein said top structure is rectangular and said cavity means includes triangular cavities defined by recesses in the foamed plastic block, wherein a corner portion of each cavity is localized adjacent the centre of the structure.

4. A top structure as claimed in claim 1, wherein said liquid trap means comprises an outer upwardly closed sleeve means, via permanently open pipe means connected to each of the cavity means, an upwardly and downwardly open inner sleeve means, a flange means connecting a lower end of the inner sleeve means to the inside wall of the outer sleeve means and wherein the pipe means connecting the cavity means with the outer sleeve means open out into a trap chamber defined by the inner sleeve means, the flange means and the inside wall of the outer sleeve means below the upper end of the inner sleeve means, which upper end is localized remote from the closed upper end of the outer sleeve means.

5. A top structure as claimed in claim 4, wherein the permanently open output channel means comprise downwardly open V-grooves arranged at the bottom of the block like top structure unit from the center of the said body towards the edges thereof and a disc like means at least partially covering said grooves from below, and wherein said disc like means is attached to the end of the outer sleeve, which end is downwardly closed but has radially directed perforations.

6. A top structure as claimed in claim 4, wherein the outer sleeve means comprises two axially connectible pieces.

7. A top structure as claimed in claim 3, wherein an inner corner portion of each of the cavity means opens out into an upwardly open recess forming filling means for the cavity means and being closable by the plug means insertable into said recess.

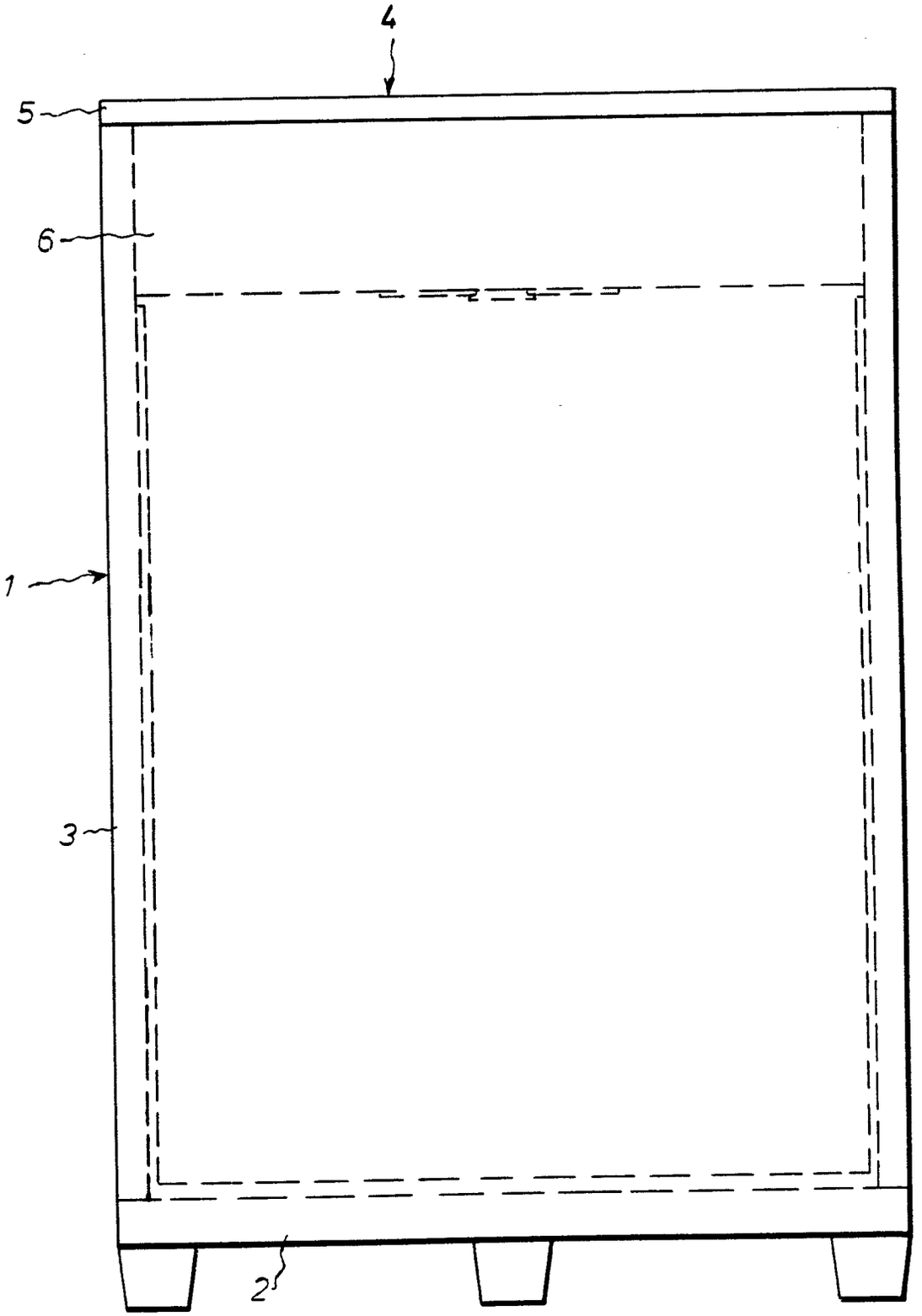


Fig.1

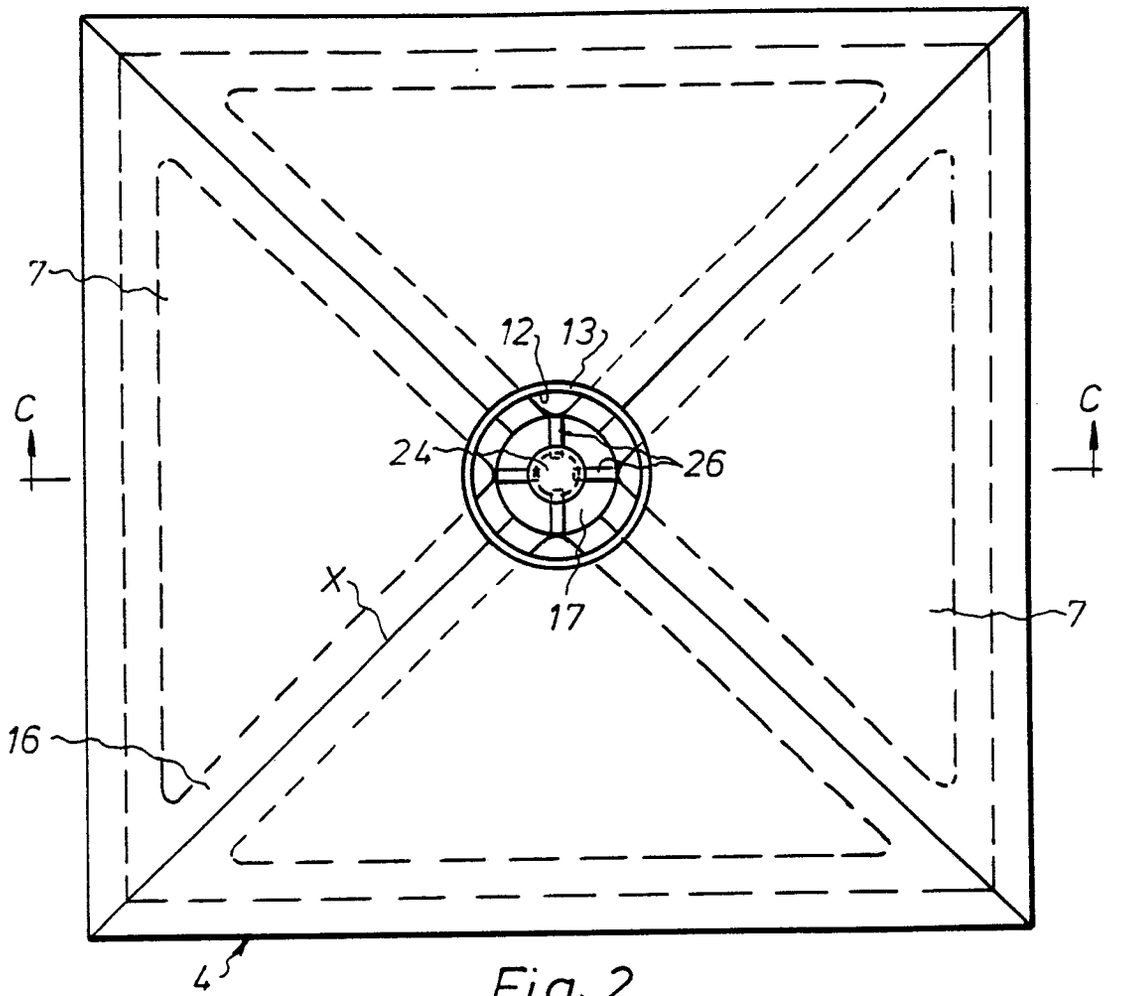

7
12
13
C
C
24
26
X
17
7
16
4

Fig. 2

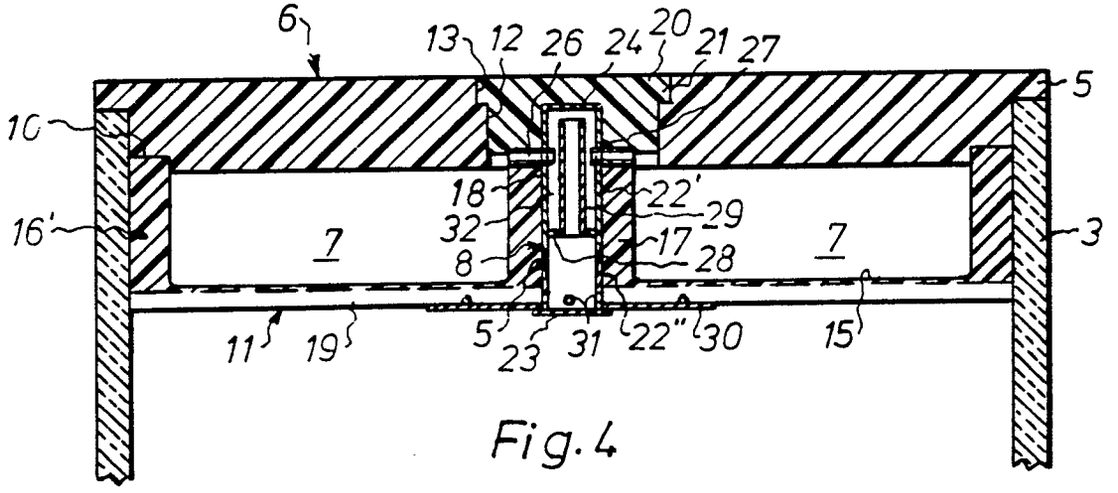

6
13
12
26
24
20
21
27
5
10
18
22'
29
16'
32
17
28
7
7
3
8
11
19
5
23
31
22"
30
15

Fig. 4

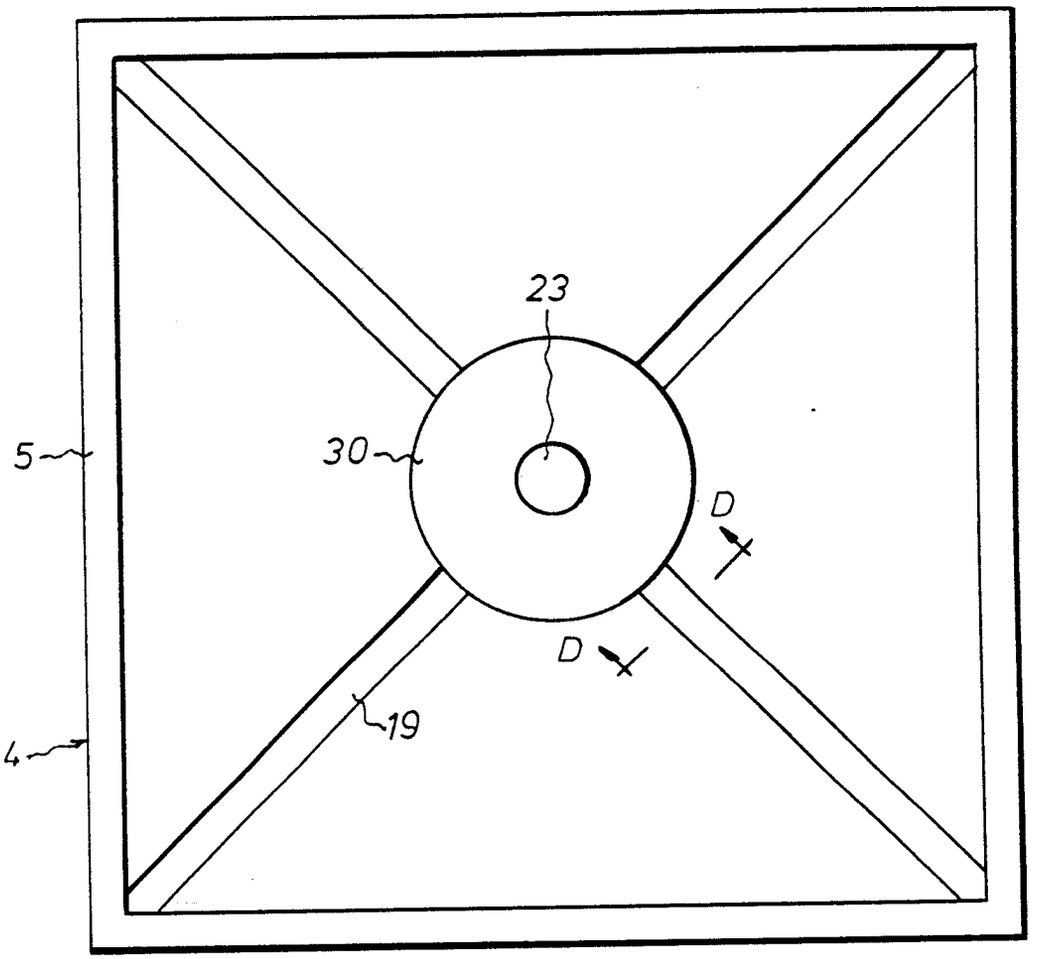
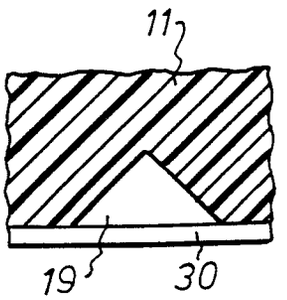


Fig.3

Fig.5



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 85 0317

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.3)
E	US-A-4 794 761 (FREDRIXON) * Whole document *	1-7	F 25 D 3/10 B 65 D 88/74
D,A	US-A-4 561 262 (FREDRIXON) * Whole document *	1,2	
A	DE-A-3 003 987 (MESSER GRIESHEIM GmbH) * Whole document *	1	
A	US-A-1 865 155 (WETMORE) * Whole document *	1	
A	GB-A-2 163 538 (GOODALL)		

TECHNICAL FIELDS SEARCHED (Int. Cl.3)

F 25 D
B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19-05-1989	SILVIS H.

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

EPO FORM 1503 03.82 (P0401)