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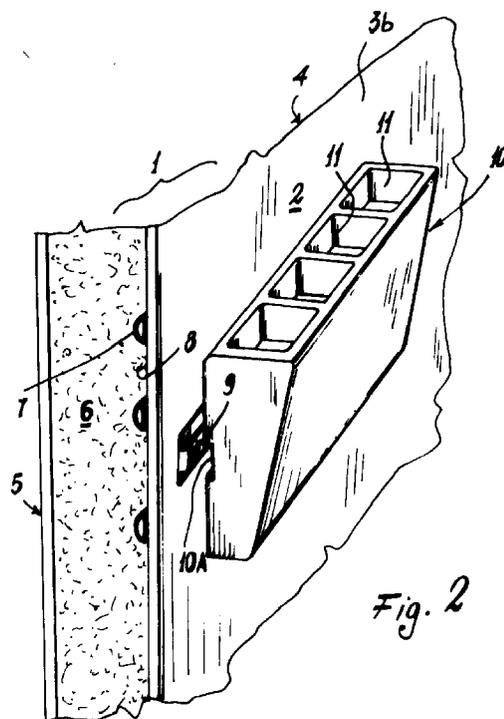
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(54) **Refrigerator of embedded evaporator type with ice production device**

(57) Within the refrigeration environment (2) of a static refrigerator comprising a plate evaporator (14) or an evaporator (7) embedded in the insulation and positioned against at least one of the walls (3b) of said environment, there is provided, preferably removably connected to said plate evaporator (14,7) or to said wall (3B), a container (10) containing a eutectic with a solidification temperature of preferably not less than -7°C and comprising cells (11) for containing water to be transformed into ice pieces. The cells (11) can form an integral part of the container (10) or be provided in a removable tray (12) of the container (10). The eutectic container (10) is of plastic material.



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## Description

This invention relates to a static (ie not forced-air) refrigerator provided with a plate evaporator or an evaporator embedded in insulating material for cooling a refrigeration compartment or chamber.

In these specific known refrigerators, in contrast to those which, although static, comprise an evaporator positioned within the refrigeration chamber but shaped to define a containing environment at low temperature such as to enable ice blocks or cubes to be formed in an appropriate tray, it is not possible to produce such ice blocks or cubes as the low temperature environment is lacking.

An object of the present invention is therefore to enable static refrigerators of the initially specified type to produce ice blocks, cubes or similar pieces.

A further object of the present invention is to enable these specific refrigerators to produce ice pieces by simple relatively economical means of small overall size and at least in part removable, which utilize the cold generated by the evaporator to form said pieces and to preserve them in the solid state, even during refrigerator defrosting, by virtue of a cold accumulation principle.

These and further objects which will be more apparent from the ensuing detailed description are attained by a refrigerator of the specified type, the inventive aspects of which are defined in the accompanying claims.

The invention will be more apparent from the detailed description of embodiments thereof given hereinafter by way of non-limiting example and shown on the accompanying drawing, in which:

Figure 1 is a schematic perspective view of a refrigerator of the invention, with parts omitted for clarity of representation;

Figure 2 is a partly sectional perspective view of a detail relative to a first embodiment of the invention;

Figure 3 is a view analogous to that of Figure 2 showing a second embodiment of the invention;

and

Figure 4 is a section through a further embodiment.

In Figures 1 to 3, the reference numeral 1 indicates overall a static refrigerator comprising a refrigeration chamber 2 bounded by walls 3a, b, c... pertaining to an inner liner 4. This inner liner is contained in but spaced from an outer housing 5, between the two there being provided insulating material 6 in which there is embedded a hairpin coil 7 forming the evaporator of the refrigerator refrigeration circuit and positioned against the outer face 8 of the walls 3a, b, c of the inner liner 4, but preferably prevalently against the wall 3b and only partly against the walls 3a and 3c.

To the wall 3b, which is hence the coldest wall, there are fixed in a convenient known manner support and positioning means 9 (in this example in the form of

a dovetail or undercut guide of aluminium or another good heat conducting metal) for a container 10 of relatively thin plastic material which is provided with counter-means 10A corresponding to the means 9, for its removable support and positioning. The container 10, which is hence maintained in contact with the cold wall 3b, contains a known eutectic mass which preferably has a solidification point not less than  $-7^{\circ}\text{C}$ , and comprises in its upper part a series of cells 11 to contain the water to be transformed into ice pieces (for example cubes or the like). The container preferably has a wedge-shaped cross-section.

In the embodiment of Figure 3 (in which equal or corresponding parts are indicated by the same reference numerals), the cells 11 pertain to a tray 12 which can be inserted into and extracted from a corresponding cavity 13 present in the eutectic container.

The embodiment shown in Figure 4 (in which equal or corresponding parts have the same reference numerals as heretofore) relates to a static refrigerator in which the evaporator is in the form of a substantially flat plate or body 14, comprising in known manner a channel or duct for the refrigeration fluid. This plate is situated, ie extends, within the refrigeration chamber 2, almost against the inner face of the wall 3b and supported by the latter by known fixing means indicated by 15. The eutectic container 10, which can comprise incorporated cells 11 as in Figure 2 or have the cells provided in a removable tray as in Figure 3, differs from the containers of these figures only by comprising hook-like appendices 16 for suspension from the upper edge 17 of the plate evaporator 14.

When water has been fed into the cells 11, the container 10 (or tray 12) is positioned in the refrigeration chamber 2 as shown in the figures. During the time in which the evaporator produces cold, the eutectic passes to the solid state and the water is transformed into ice. During the defrosting of the evaporator, in the course of which it does not provide cold, the eutectic may pass to the liquid state, transferring considerable cold to the ice pieces and hence preserving them in this state.

When the user wishes to procure the ice pieces, he removes the container 10 (in the case of the containers of Figures 2 and 4) or the tray 12 (in the case of Figure 3) and separates these pieces by deforming the container 10 or tray 12, possibly heating and softening the container under a water jet from a tap.

## Claims

1. A static refrigerator provided with a plate evaporator (14) or an evaporator (7) embedded in insulating material (6) for cooling a refrigeration compartment or chamber (2) thereof, characterised in that a eutectic container (10) is positioned in the refrigeration chamber (2) in heat transfer relationship with the evaporator (7, 14) and comprises cells (11) for

forming ice pieces from water placed in them.

2. A static refrigerator, of which the embedded evaporator (7) lies against the outside (8) of at least one wall (3B) of the refrigeration compartment or chamber (2), as claimed in claim 1, wherein the eutectic container (10) is removably supported by said wall. 5
3. A static refrigerator, of which the plate evaporator (14) is positioned within the refrigeration compartment or chamber (2), as claimed in claim 1, wherein the eutectic container (10) is removably supported by said evaporator. 10
4. A static refrigerator as claimed in one or more of the preceding claims, wherein the eutectic has a solidification temperature of not less than  $-7^{\circ}\text{C}$ . 15
5. A static refrigerator as claimed in claim 1, wherein the cells (11) in which the ice pieces are formed are provided either in the eutectic container (10) or in a tray (12) which can be connected to said container. 20
6. A eutectic container (10) provided with cells (11) for the formation of ice pieces, for use in a static refrigerator with a plate or embedded evaporator. 25

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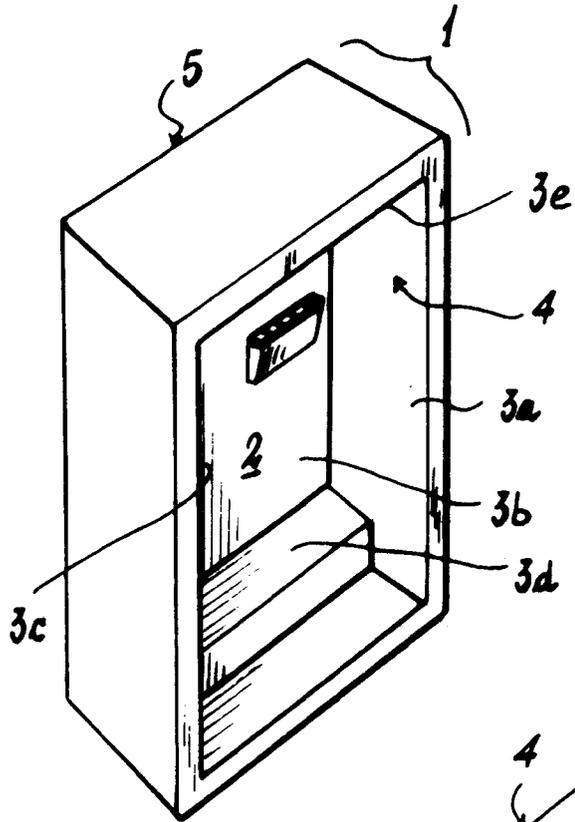


Fig. 1

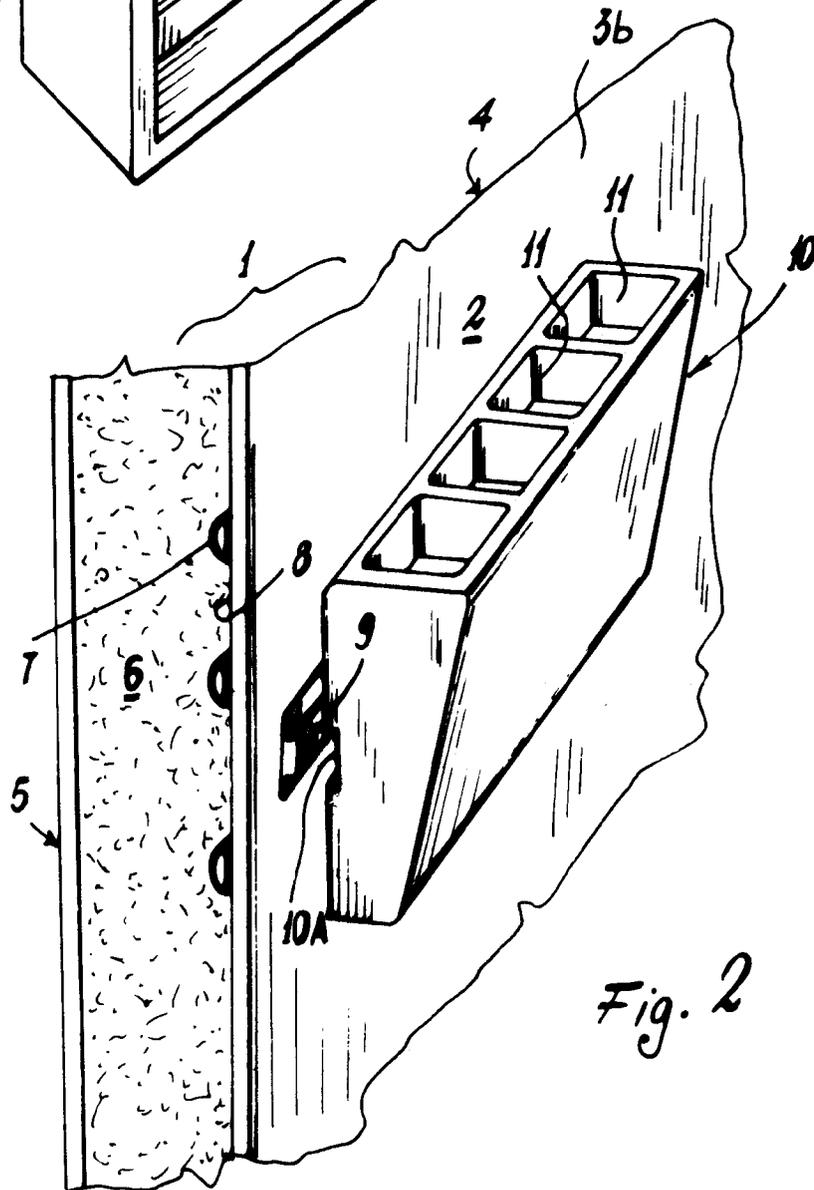


Fig. 2

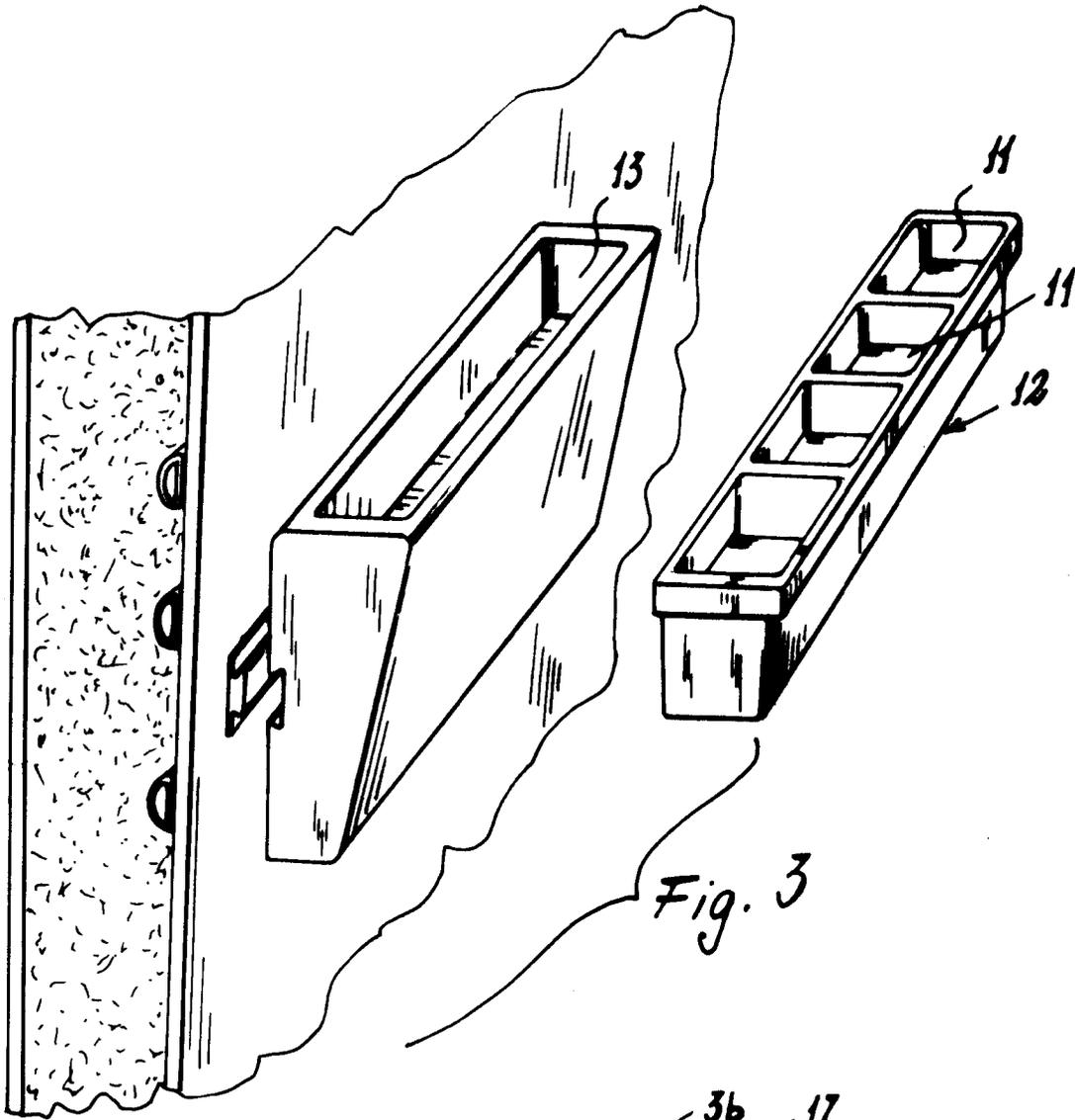


Fig. 3

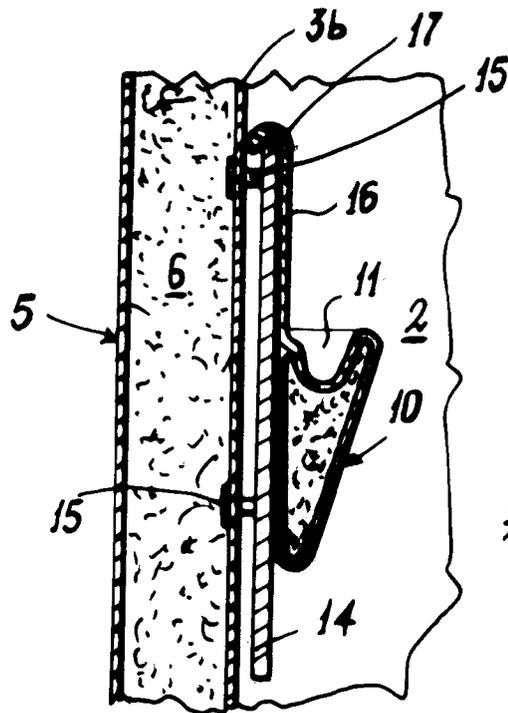


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number  
EP 97 12 2046

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)
X	DE 88 10 679 U (N.V.PHILIPS GLOEILAMPENFABRIEKEN)	6	F25C1/04 F25D23/06
Y	* page 2, line 1 - line 13; figure 2 *	1,2,5	
Y	FR 2 193 186 A (SOISSONNAIS MANUFACTURE) * page 4, line 30 - page 5, line 9; figure 1 *	1,2,5	
X	DE 40 23 664 C (BOSCH-SIEMENS HAUSGERÄTE GMBH)	6	
A	* column 2, line 27 - line 44; figure 1 *	1,2,5	
A	US 2 073 123 A (SMITH ROLF M) * column 2, line 22; figure 1 *	4	
A	DE 624 488 C (ROBERT BOSCH AKT.-GES.) * page 2, line 11 - line 35; figure 1 *		
A	US 2 478 312 A (PELTIER FRANK D)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F25D F25C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		27 March 1998	Jessen, F
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