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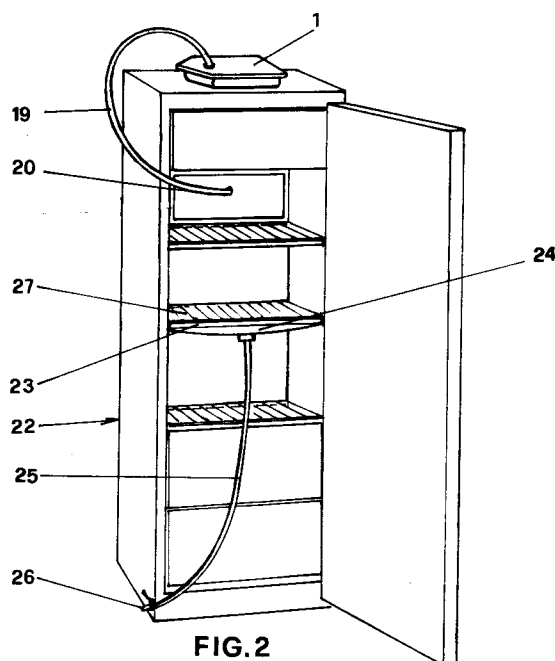
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**I-30172 Venezia-Mestre(IT)**(54) **Method for defrosting refrigerators and freezers and device for implementing the method.**

(57) A method for defrosting refrigerators and freezers, characterised by feeding into the refrigerator and/or freezer compartment a steam jet to cause the solidified ice to melt.

**FIG. 2****EP 0 487 070 A1**

This invention relates to a method for defrosting refrigerators and freezers, and a device for implementing the method.

The problem of ice formation on the evaporator plate of a refrigerator or evaporator coil of a freezer due to the condensation on the plate or coil of the moisture contained in the air and its subsequent solidification is well known.

As this layer of ice considerably reduces heat transfer, hence compelling the compressor to work at an increased rate and reducing the efficiency of the refrigeration unit, the plate has frequently to be defrosted. This operation is generally effected by interrupting the power to the compressor and possibly leaving the refrigerator and freezer compartment doors open.

This defrosting procedure has however certain drawbacks, and in particular:

- a considerable defrosting time, particularly in the coldest season, with a consequent possibility of partial thawing of foods preserved in the freezer;
- the formation of water by melting, which can partly flood the environment.

These drawbacks are overcome according to the invention by a method for defrosting refrigerators and freezers as described in claim 1.

To implement the method a device is used as described in claim 3.

A preferred embodiment of the present invention is described hereinafter with reference to the accompanying drawings, in which:

- Figure 1 is a cross-section through a device for implementing the method of the invention;
- Figure 2 shows it used in a refrigerator,
- Figure 3 shows the engagement of a fabric to the grill shelf of the refrigerator, and
- Figure 4 shows it used in a refrigerator provided with separated ice room.

As can be seen from the figures the method of the invention involves placing an electrically powered vaporizer under the upper surface of a refrigerator.

The vaporizer comprises substantially a box casing 1 enclosing a water container 2 and a vaporization chamber 3.

The water container 2 is provided upperly with a filler cap 4 which by means of a rod 5 operates a ball valve 6 housed in a seat 7. The seat 7 communicates with the container 2 via an upper hole 8 and with an accumulation chamber 10 via a lower hole 9.

A coil spring 11 interposed between the bottom of the seat 7 and the ball valve 6 keeps the holes 8 and 9 open when the cap is applied to the container 2.

The accumulation chamber 10 is provided with a vent tube 12 which connects it to the container 2, and has a wall 13 which is interrupted at its lower end to define a longitudinal aperture which connects it to the vaporization chamber 3.

Insulating pegs 15 are mounted on the base of the vaporization chamber 3 to support two separate overlying vaporization plates 16,16', connected electrically to the terminals 17 of the external power supply.

The vaporization chamber is provided at its upper surface with an articulated spout 18 to which a flexible tube 19 provided with a perforated diffuser 20 is fitted.

The vaporizer in a refrigerator provided with inner ice room is used as follows:

the cap 4 is firstly removed from the container to fill it with water. Following this removal, the elastic reaction of the spring 11 prevails to raise the ball valve 6 and close the upper hole 8. After the container has been filled, the vaporizer is placed on the upper surface of the refrigerator 22 and, after the diffuser 20 has been placed inside the refrigerator, is connected to the electric mains. As the plates 16,16' are separated from each other there is no passage of current.

An impermeable fabric is preferably placed below a grille shelf 21 and is fixed to the refrigerator walls for example by suckers 24. The bond between the fabric and the grill shelf is obtained through steel rods 27 introduced into pockets 28 provided in the fabric and which engage their ends with the longitudinal bars 29 of the shelf. The base of the fabric is provided with a hole carrying a discharge tube 25 and a cock 26.

The cap 4 is then screwed down, the rod 5 pushing the ball valve downwards so that the hole 8 opens. In this manner the water contained in the container 2 can flow out through the hole 8, the seat 7 and the hole 9 to enter the accumulation chamber 10 until it reaches a maximum level corresponding to the base of the seat 7.

At the same time a thin layer of water passes through the slot 14 by the principle of communicating vessels, to flood the bottom of the vaporization chamber 3. The water continually entering this chamber firstly immerses the lower plate 16 and then immerses the upper plate 16'. The conductivity characteristics of the water consequently change, to create electrical continuity between the two plates 16 and 16', current then flowing through them. In this manner the water layer between the two plates heats up to reach evaporation temperature in a short time, with the formation of steam which is conveyed through the spout 18 and diffuser 20 and fed onto the plate evaporator 27 of the refrigerator.

It is apparent that as the water between the two

plates 16,16' decreases, further water enters through the slot to produce a virtually constant vapour stream, until the water has been, completely consumed. The steam jet directed onto the plate evaporator causes the ice to melt and become water, which falls onto the fabric 23 and is fed to the outside via the tube 25.

In the case the evaporator is used to defrost a refrigerator having separated ice room (see figure 4), two elements 29 are applied to the lower front edge of the ice room for supporting a basin 30 provided with a discharge tube 25. Then, after having introduced inside the ice room the diffuser 20, the aperture of the ice room is closed with a fabric fixed by suckers 32.

When the jet is fed into the freezer compartment, the water resulting from the melting is collected into the basin 30.

### Claims

1. A method for defrosting refrigerators and freezers, characterised by feeding into the refrigerator and/or freezer compartment a steam jet to cause the solidified ice to melt.

2. A method as claimed in claim 1, characterised in that the water resulting from the melting is made to fall onto a container placed in position below the evaporator coil.

3. A device for implementing the method claimed in claims 1 and 2, characterised by comprising:

- a water feed container (2);
- a chamber (3) for vaporizing the water originating from said container;
- steam spray means (18,19,20).

4. A device as claimed in claim 3, characterised in that the vaporization chamber (3) is provided with two separate plates (16,16') connected electrically to terminal of the external power supply.

5. A device as claimed in claim 4, characterised in that the plates (16,16') are in superposed relationship.

6. A device as claimed in claim 3, characterised in that the feed container (2) communicates with the vaporization chamber (3) via a valve (5,6) operated by screwing down the cap (4) of the container (2).

7. A device as claimed in claim 6, characterized in that the feed container (2) communicates with the vaporization chamber (3) when the cap (4) is screwed down.

8. A device as claimed in claim 3, characterised in that an accumulation chamber (10) is interposed between the feed container (2) and the vaporization chamber (3).

9. A device as claimed in claim 8, characterised in that the accumulation chamber (10) has a wall (13) comprising a slot (14) which provides a constant water flow to the vaporization chamber (3). 10. A

device as claimed in claim 3 characterised in that it comprises a container for the melted ice.

11. A device as claimed in claim 10 characterised in that the container consists of an impermeable fabric (23) which is applied below a grille shelf (21) of the refrigerator.

12. A device as claimed in claim 11 characterised in that said fabric is provided with adjustable appendices engaging with the side of the grill shelf (21).

13. A device as claimed in claim 12 characterised in that the appendices consist of rods introduced in suitable pockets (28) provided in the fabric.

14. A device as claimed in claim 13 characterised in that the base of the impermeable fabric is provided with a hole carrying a discharge tube (25) and a cock (26).

15. A device as claimed in claim 10 characterised in that the container consists of a basin (30) which is applied to the front lower edge of the ice room which is subsequently closed by the impermeable fabric.

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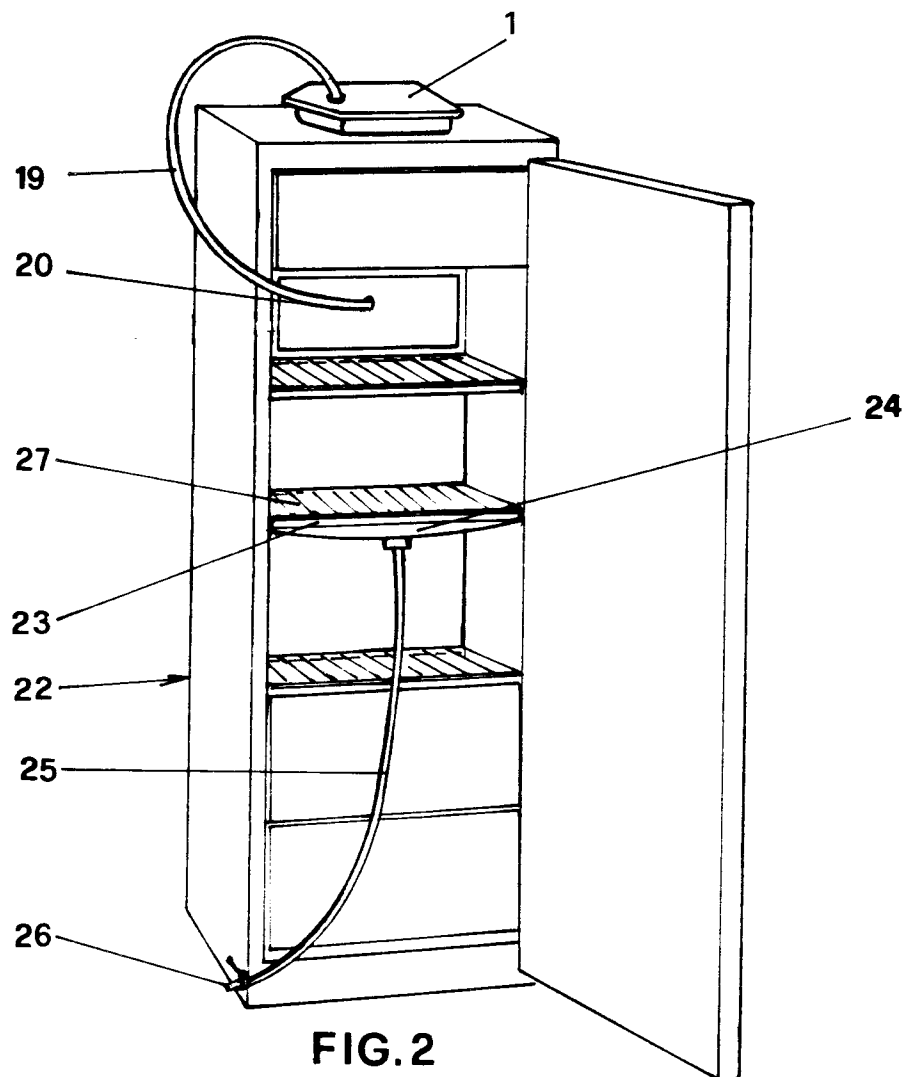
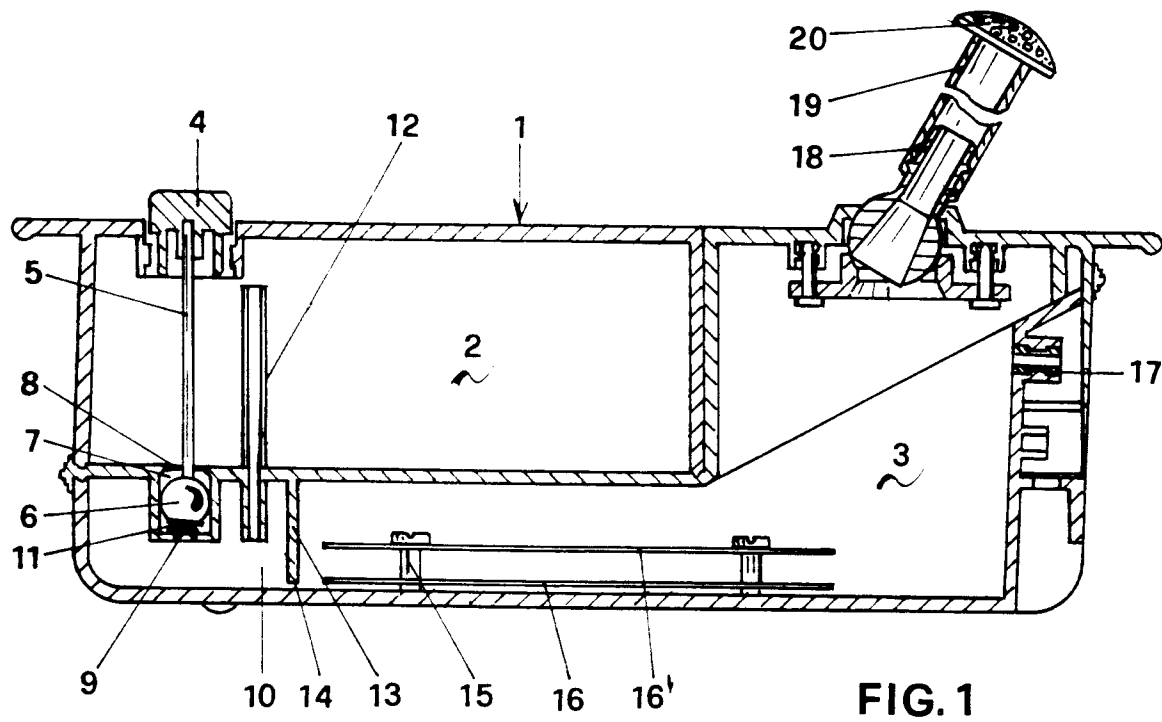
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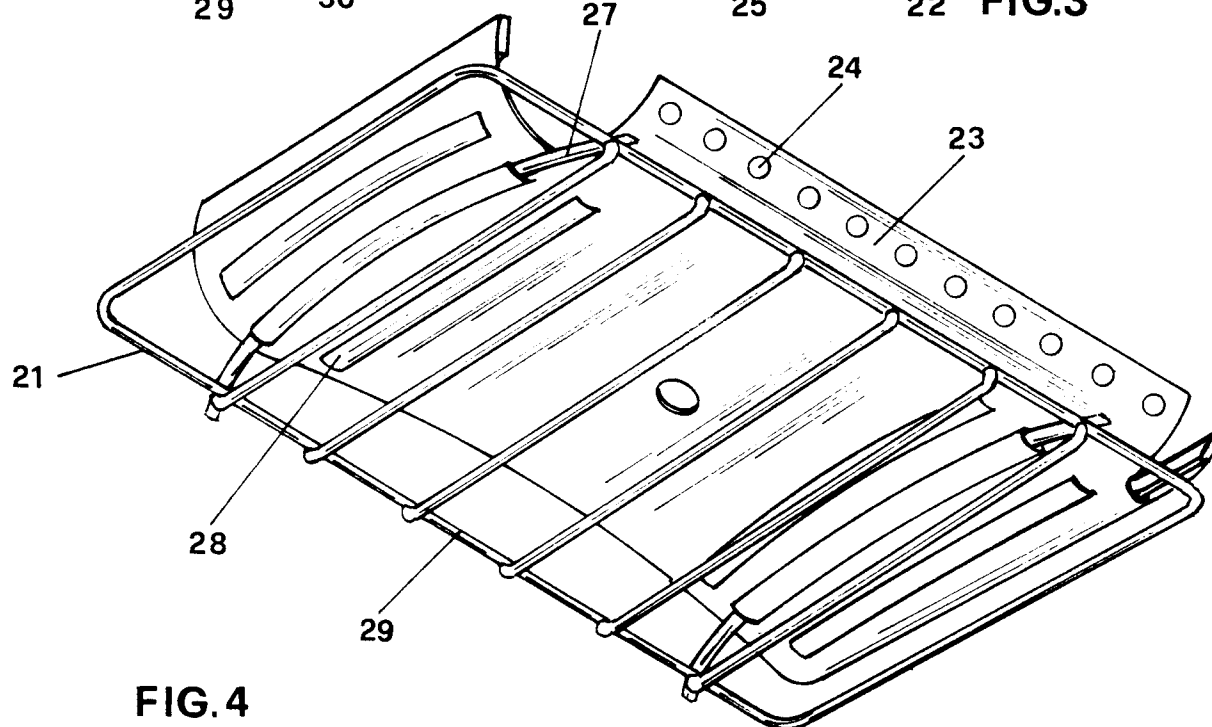
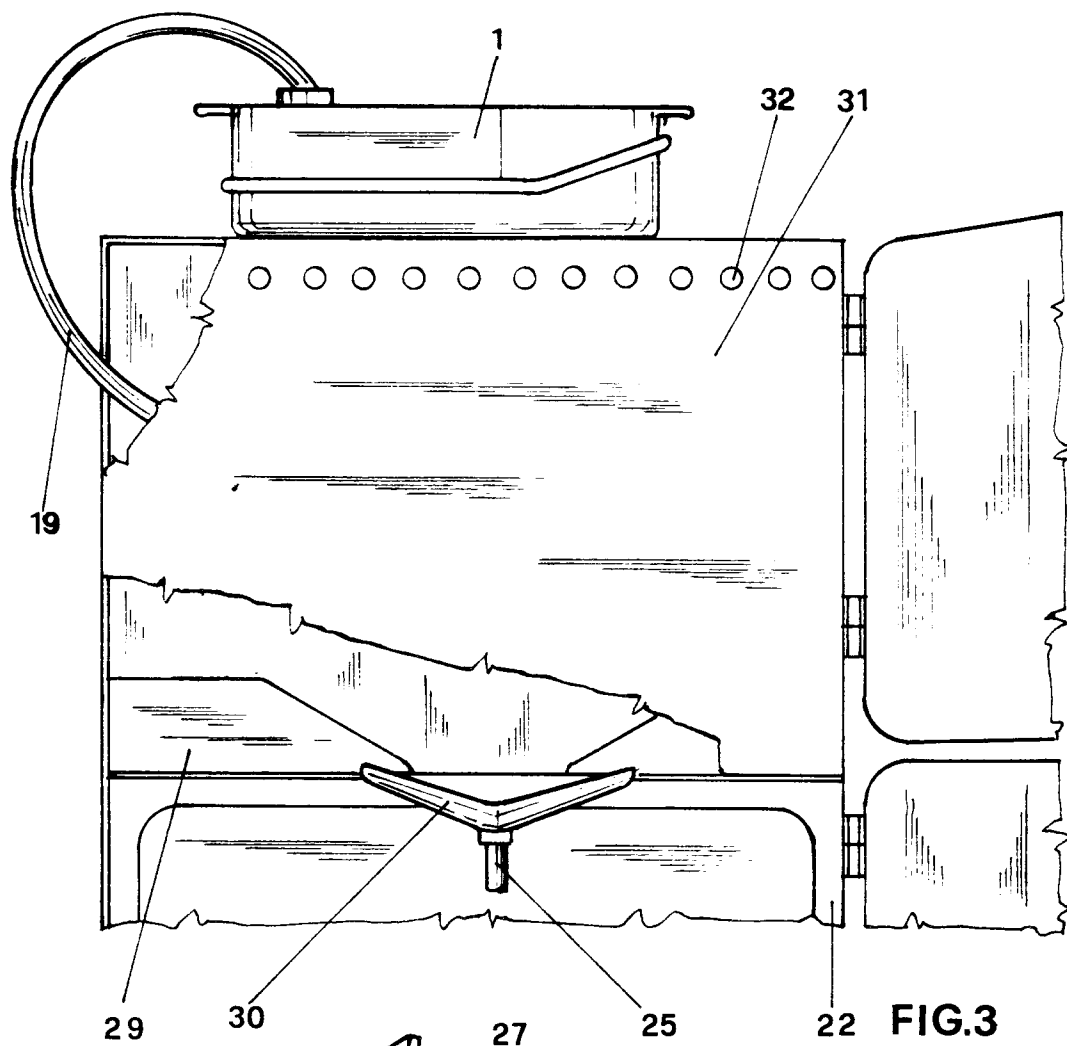
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## EUROPEAN SEARCH REPORT

Application Number

EP 91 11 9813

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.5)
X	US-A-3 033 967 (HIRD)	1	F25D21/06
Y	* the whole document *	2	F25D21/14
Y	---		
Y	US-A-3 998 069 (KRONENBERGER)	2	
A	* column 2, line 12 - column 5, line 68; figures 1-6 *	10,11	
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A	EP-A-0 017 633 (ELECTROLUX)	1,2	
	* page 2, line 7 - page 4, line 26; figures 1-4 *		
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A	US-A-4 132 883 (GRIME)	3,4,8,9	
	* column 3, line 29 - column 8, line 17; figures 1-8 *		
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A	US-A-4 810 854 (JURSICH)	3,6	
	* column 3, line 30 - column 8, line 13; figures 1-14 *		
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A	US-A-3 595 443 (JONES)	3	
	* column 2, line 31 - column 4, line 61; figures 1-2 *		
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A	GB-A-2 215 445 (HAWKINS)	10,11,14	F25D A47F F24F
	* page 3, line 1 - page 6, line 4; figures 1-6 *		
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A	DE-A-2 457 336 (ROSENLEW)		
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 FEBRUARY 1992	Examiner BOETS A, F, J.
CATEGORY OF CITED DOCUMENTS		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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