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(54) Arrangement at a refrigerator or freezer display cabinet

(57) At a refrigerator or freezer display cabinet (10) with an access opening (14) for furnishing goods (12) an element (40) is arranged outside the cabinet, the element showing a surface (42) facing the goods (12), which surface is kept refrigerated so that it absorbs heat radiating from the goods (12) through the opening and by that refrigerates the goods.

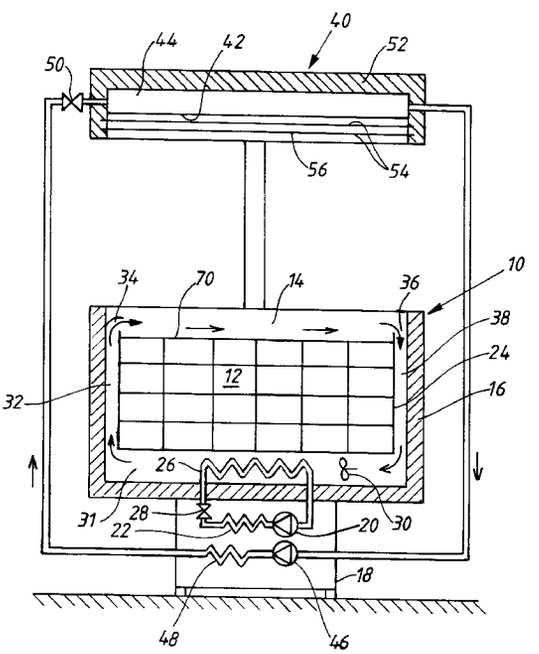

Fig.1

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Description

The invention refers to an arrangement at a refrigerator or freezer display cabinet with an access opening for furnishing goods.

A great part of the heat load in such a cabinet consists of heat radiating against the goods from the surroundings and heating goods, which is located next to the surroundings.

The object of the invention is to bring about a lower temperature of goods located next to the surroundings and by that obtain a more even temperature distribution between goods on different depths in the cabinet.

This object is reached at the arrangement according to the invention by an element arranged outside the cabinet and having a surface facing the goods, which surface is kept refrigerated so that it absorbs heat radiating from the goods through the opening and by that refrigerates the goods.

By suitable adjustment of the refrigerating of the surface and by suitable shaping and placing of the surface in relation to the goods it can by this be reached, that the goods which are located next to the surroundings get substantially the same temperature as the other goods in the cabinet.

An embodiment of an arrangement according to the invention is described below in connexion with the enclosed drawings, in which fig. 1 shows a sectional view of the arrangement at a freezer display cabinet of gondola type, where goods are refrigerated by a forced air circulation, fig. 2 shows a sectional view of the arrangement at an other type of freezer gondola, where the goods are refrigerated by self-circulating air and Fig. 3 shows the arrangement at a refrigerator or freezer display cabinet, where the goods are furnished from shelves arranged above each other.

By 10, see Fig. 1, is designated a freezer display cabinet known per se of gondola type, at which goods 12 are furnished through a horizontal access opening 14. The cabinet, the walls of which show a heat insulation 16, shows a base 18, in which a compressor 20 and a condenser 22 of a refrigerant circuit are arranged.

The goods 12, which are placed in a tray 24, are refrigerated by air, which in its turn is refrigerated by an evaporator 26, in which refrigerant from the circuit, after the refrigerant has been expanded in a throttle valve 28, is evaporated under taking up of heat from the air. A fan 30 located in a horizontal duct 31 below the bottom of the tray brings the air to circulate through the evaporator 26, upwards through a duct 32 located between the insulation 16 and the tray 24 to a first place 34 at one side of the opening 14, from where the air flows above the goods to a second place 36 at the other side of the opening, where the air flows downwards through a duct 38 located between the insulation 16 and the tray 24 and from there back to the fan 30. The circulating air will by this refrigerate the goods by heat conduction from the ducts 31, 32 and 38 through the bottom and walls of the tray. The upper side 70 of the goods 12 is refrigerated by the air which flows from the place 34 to the place 36. This air is heated by the goods, so that the goods at the upper side 70 become warmest at the place 36. The valve 28, which is provided with a not shown automatic control device, is kept open so much that the temperature of the goods 12 will be about -20°C.

By 60, see Fig. 2, is designated an other freezer display cabinet known per se of gondola type. Here the goods 12 are refrigerated partly by an evaporator 62 arranged in the bottom 64 and sides 66 of the cabinet and partly by an evaporator 68 arranged at the sides of the cabinet above the goods. The upper side 70 of the goods 12 is refrigerated by air, which by self convection has flown past, see the arrows 72, the evaporator 68 and been refrigerated by it. The goods heat the air 72, so that the goods at the upper side 70 become warmest in midway between the evaporators 68. Refrigerant is supplied to the evaporators 62 and 68 from the condenser 22 via throttle valves 74 and 76, respectively.

The goods in the freezer display cabinet 10 of Fig. 1 and in the freezer display cabinet 60 of Fig. 2 are also refrigerated by an element 40 arranged so high above the opening 14, that it does not hinder access to the goods 12. The element 40 shows a surface 42, which is part of an evaporator 44 included in a refrigerant circuit which furthermore shows a compressor 46, a condenser 48 and a throttle valve 50. After the refrigerant has been expanded in a valve 50, it is evaporated in the evaporator 44 under taking up of heat radiating from the goods 12 to the surface 42. The valve 50, which is provided with a not shown automatic control device, is kept open so much that the temperature of the surface 42 will be about -35°C. The surface 42 can also be refrigerated in another way, e.g. by Peltier elements.

The element 40 is on its back and at its edges covered by a heat insulation 52 and on its front by a window 54, which lets the heat radiation through and has such a great heat resistance that moisture does not condense on its outside. The window 54 can consist of a number of air layers separated by a number of thin plasic films with a plate 56 of glass or hard plastic having a low capability of absorbing long wave radiation farthest out.

Without the element 40 the whole temperature level of the upper sides 70 of the goods in Figs. 1 and 2 would be raised as a consequence of heat radiation from the surroundings. The temperature differences which are prevalent in horizontal direction at the upper sides 70 of the goods can at the gondola of Fig. 1 be equalized by arranging the element 40 so that it refrigerates goods 12 located at the place 36 more than goods located at the place 34, and at the cabinet of Fig. 2 by arranging the element 40 so that it refrigerates goods located in midway between the evaporators 68 more than goods located adjacent to these evaporators.

In Fig. 3 is shown another refrigerator or freezer display cabinet 80 of a type known per se, where the goods 12 are furnished from shelves 82 and are available

through a substantially vertical access opening 84. The goods are refrigerated by air circulated by a fan 86 through a cooling element 88, which refrigerates the air, in ducts 90 below, behind and above the goods and in an air curtain in front of the goods. At such a cabinet heat radiates from the surroundings through the opening 84 and heats mostly the goods which are located next to the opening 84 at the front edges of the shelves. This heating can be suppressed by placing the elements 40 at the upper and/or lower edges of the opening 84 with their radiation absorbing surfaces 42 directed towards said front edges.

Claims

1. Arrangement at a refrigerator or freezer display cabinet(10, 60; 80) with an access opening (14; 84) for furnishing goods (12), **characterized** by an element (40) arranged outside the cabinet and having a surface (42) facing the goods (12), which surface is kept refrigerated so that it absorbs heat radiating from the goods (12) through the opening (14;84) and by that refrigerates the goods.

2. Arrangement according to claim 1, the cabinet being of gondola type with a substantially horizontal access opening (14), **characterized** in that the element (40) is arranged above the opening (14).

3. Arrangement according to claim 1 or 2, **characterized** in that the surface is covered by a window (54), which lets the radiation through and has such a great heat resistance that moisture does not condense on its outside.

4. Arrangement according to claim 3, **characterized** in that the window consists of a number of thin plastic films separated by air layers with a plate (56) of glass or plastic having a low capability of absorbing long wave radiation next to the cabinet.

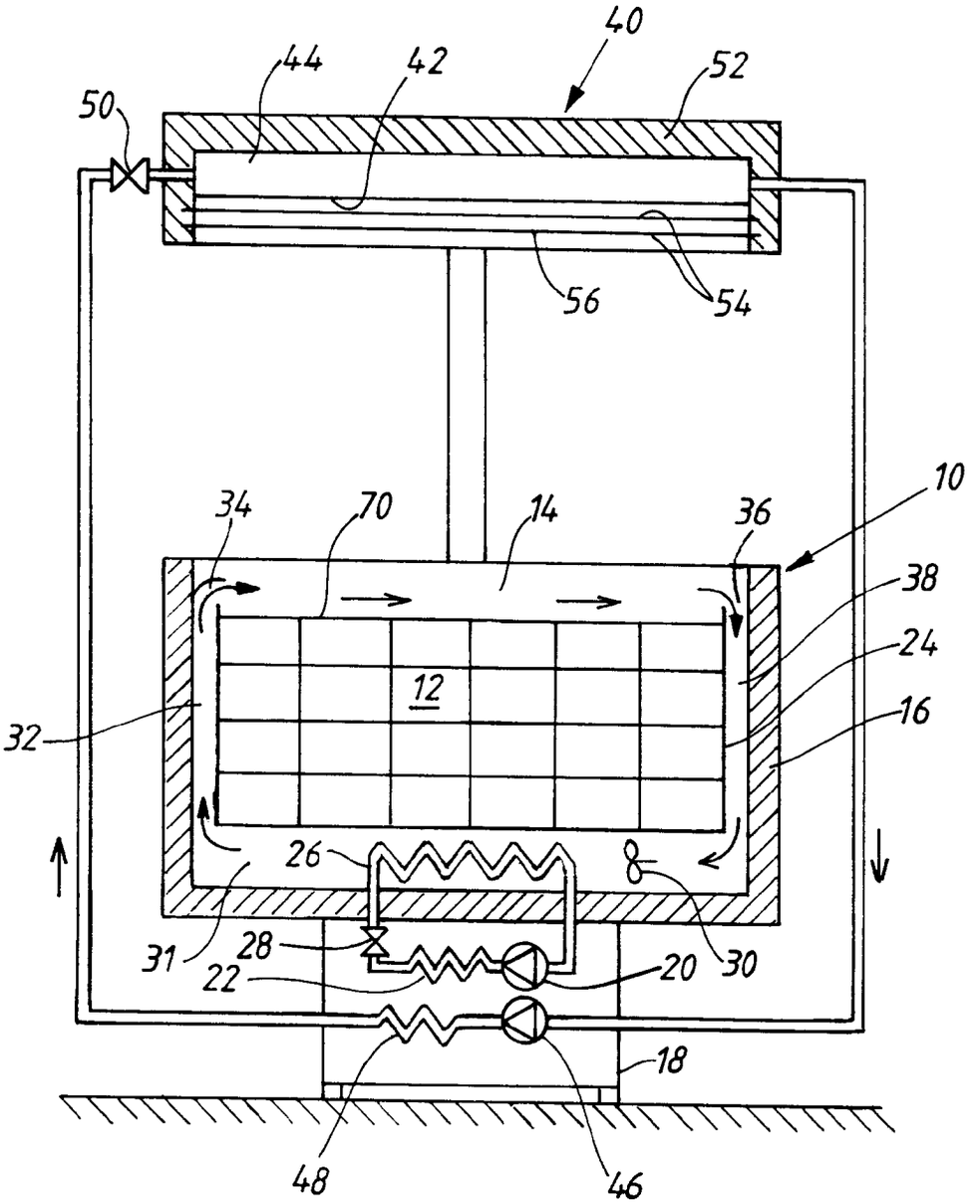
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Fig.1

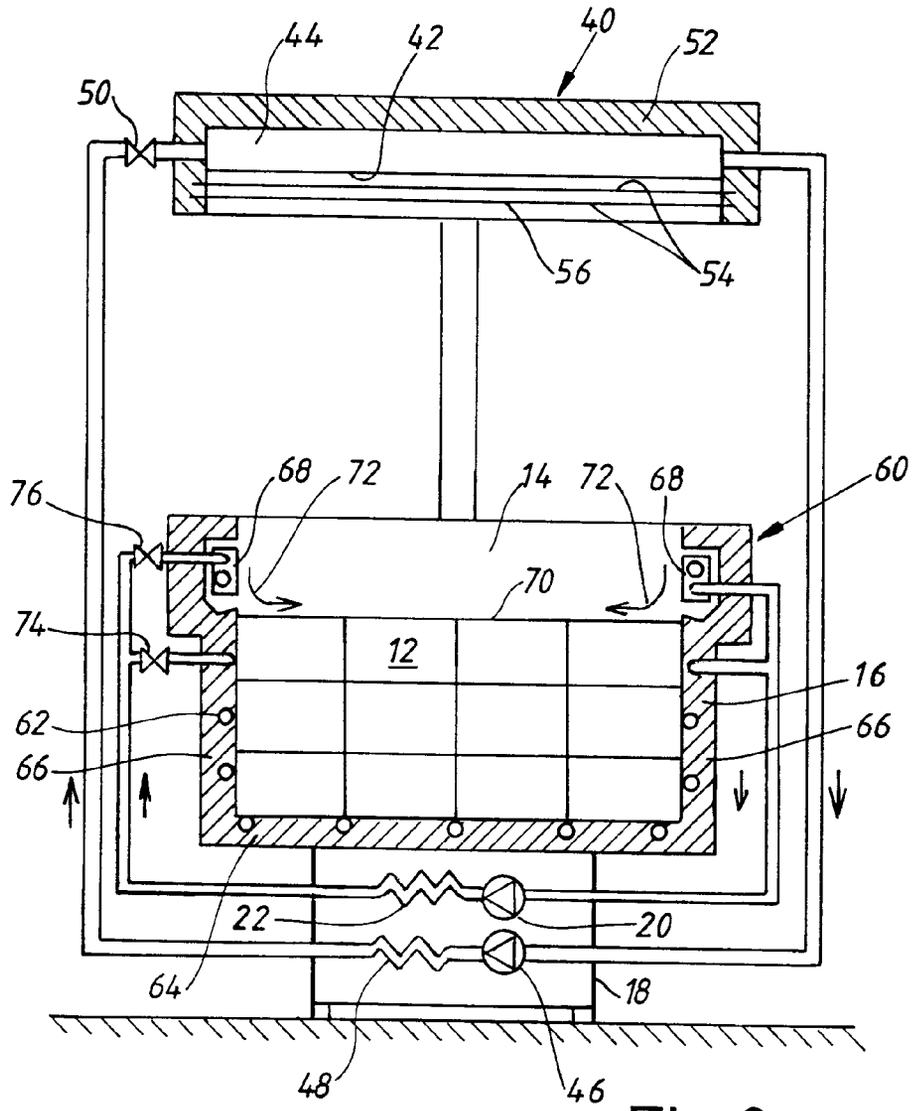
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Fig. 2

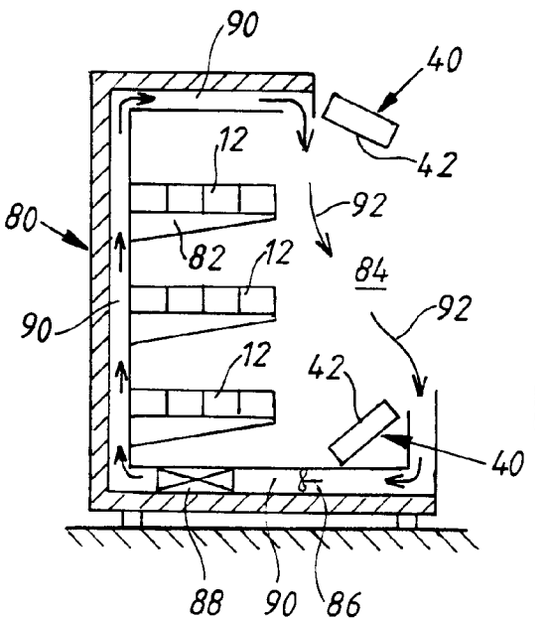
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Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 95 85 0161.1

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)
A	WO, A1, 9221271 (TERMO-FROST AB), 10 December 1992 (10.12.92) --	1-2	A47F 3/04
A	US, A, 4580693 (FRECHET), 8 April 1986 (08.04.86) --	1-2	
A	SE, A, 87017737 (FLÄKT AB), 30 October 1988 (30.10.88) -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.6)

A47F
F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
STOCKHOLM	29 November 1995	ANNIKA ERIKSSON

CATEGORY OF CITED DOCUMENTS

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