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(54) **Multi-functional support element for a domestic refrigerator.**

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(73) Proprietor: **N.V. Philips' Gloeilampenfabrieken**
Groenewoudseweg 1
NL-5621 BA Eindhoven (NL)

(72) Inventor: **Casoli, Fiorenzo**
c/o INT. OCTROOIBUREAU B.V. Prof. Holstlaan 6
NL-5656 AA Eindhoven (NL)
Inventor: **Pelizzari, Armando**
c/o INT. OCTROOIBUREAU B.V. Prof. Holstlaan 6
NL-5656 AA Eindhoven (NL)

(74) Representative: **Bos, Kornelis Sjoerd et al**
INTERNATIONAAL OCTROOIBUREAU B.V. Prof.
Holstlaan 6
NL-5656 AA Eindhoven (NL)

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Description

This invention relates to a multi-functional support element for a domestic refrigerator with a preservation compartment in which an evaporator in the form of a plate is arranged near the back wall of said compartment.

It is an aim of manufacturers to simplify the assembly of their appliances in order to reduce the manufacturing costs. Concerning refrigerator cabinets a simplification can be attained by joining different parts to one integrated unit, especially parts such as walls and support elements for shelves or for the evaporator. An example thereof is described in FR—A—2 240 664 in which an inner wall of a refrigerator compartment of plastics material is formed integrally with elastical projections for spacing, supporting and fixing e.g. an evaporator plate and with two parallel side walls. In another example DE—A—1 401 543 a refrigerator compartment is described in which spaced from each inner wall a support plate is arranged which is provided with seats for supporting shelves. Between each support plate and the corresponding inner wall there is provided an evaporator. The support plate further comprises at its lower side a channel for collecting water when the evaporator is defrosted, which channel is formed integrally with said support plate.

The object of the invention is to provide a multi-functional support element for a domestic refrigerator, having means to support other parts and which offer the possibility to be combined with inner walls of the preservation compartment, which might be either of plastics or of thin sheet metal.

According to the present invention there is provided a multi-functional support element for a domestic refrigerator with a preservation compartment in which an evaporator in the form of a plate is arranged near the back wall of said compartment, said support element being made of plastics material, self-supporting and comprising:

- a substantially flat rear wall formed integrally with projections for spacing, supporting and fixing the evaporator plate,
- two parallel side walls formed integrally with the rear wall and provided with a series of aligned seats for supporting removable shelves,
- at the bottom of the rear wall a channel for collecting water resulting from the defrosting of the evaporator plate, and
- seats along the edges for snap-connection with at least some of the walls of the preservation compartment.

The invention will be more apparent from the detailed description given hereinafter by way of example with reference to the accompanying drawings, in which:

Figure 1 is a front perspective view of a refrigerator with two superposed preservation compartments which incorporates the multi-functional support element according to the

invention and from which the doors have been removed;

Figure 2 is a fragmentary perspective view of the support element with the upper part shown in section, certain details having been omitted for simplicity of representation;

Figure 3 is a partial perspective view of a detail of the support element;

Figure 4 is a section on the line IV—IV of Figure 2;

Figure 5 is a diagrammatic vertical section through the entire refrigerator cabinet on the line V—V of Figure 1;

Figure 6 is a horizontal section through part of the refrigerator on the line VI—VI of Figure 1, and

Figure 7 is a section on the line V—V of Figure 1 to an enlarged scale but limited to the lower preservation compartment.

In the drawings, the reference numeral 1 indicates generally a domestic refrigerator with the doors removed, which doors respectively close a large lower compartment 2 and an upper compartment 3 which is smaller and operates at a lower temperature than the lower compartment.

Each compartment is cooled by a different section of the evaporator of a conventional refrigeration circuit. In particular, the higher working temperature of the compartment 2 is obtained by means of a plate evaporator 4 formed from two panels 4A, 4B which are cemented together and which have passages 4C between them for the circulation of the refrigerant fluid. The evaporator 4 which is slightly curved or bent round at its side edges 4D, is fixed and supported by the multi-functional element according to the invention, indicated generally by 5, on the substantially flat rear wall 5A thereof by means of spacer projections 5B (see Figure 4) which are formed integrally with said rear wall 5A. More precisely, in a position corresponding with the projections 5B the evaporator 4 comprises holes by means of which it is mounted on the cylindrical terminal parts 5C of said projections. The remaining part of each projection can be conical (as shown) or cylindrical with a greater diameter than said terminal part 5C. The evaporator 4 is constructed to the rest on the shoulder 5D of the projection. That portion of the terminal part 5C which projects beyond the hole in the evaporator 4 is deformed, for example by hot-riveting with a suitable tool, in such a manner as to form a head 5E which securely fixes the evaporator 4 to the multi-functional element (as shown by the broken line in Figure 4).

As can be seen in Figure 2, the evaporator 4 comprises an upwardly extending portion 4F which passes through a bridge 5G on the upper part of the rear wall 5A, and by the way of which the hydraulic connection is made to the rest of the conventional refrigeration circuit. The bridge in question serves to hide from view the point at which the portion 4F passes through the upper wall of the compartment 2.

The rear wall 5A of the multi-functional element 5 also constitutes a certain part of the back wall of the compartment 2 and at its bottom comprises a

channel 5W formed integrally with the described parts. The channel serves for collecting the water which results from the defrosting of the evaporator 4, and in the bottom of the channel there is a connector 8 for connecting a tube (not shown) which discharges the defrosting water outside the refrigerator, for example on to the compressor housing of the refrigeration circuit.

Two narrow side walls 5M having a profiled cross-section and formed integrally with the rear wall 5A extend down the vertical sides of said rear wall of the multi-functional element 5 and below this wall, the height of the side walls being equal to the height of the compartment 2. Each side wall comprises a vertical series of shaped seats 5P used for the engagement and support of removable article-carrying shelves, which are not shown because they do not form subject matter of the present invention. Starting from its front edge, each side wall comprises a first portion 5'' perpendicular to the rear wall 5A, then a first oblique face 5R, followed by a step 5S and then a face 5T which form substantially a right angle with the front face of the rear wall 5A. The seats 5P in each side wall open out of the oblique face 5R of the wall and comprise a horizontal lead-in portion 5Q and a downwardly directed terminal vertical portion 5U which opens into the former portion and has a rounded lower end. Below the channel 5W the back wall of the compartment 2 is completed by a panel 6 of thin sheet metal which is snap-fitted into suitable vertical seats 5V provided in those portions of the side walls 5M which lie below the channel 5W (see Figure 6).

In order to enable the panel 6 to be also snap-connected to the multi-functional element 5 at the bent horizontal upper edge of the panel, suitable seats 5Y are provided in the lower edge of the rear wall 5A of said element 5 (see Figure 7). The bent horizontal lower edge of said panel 6 snap-fits into seats 5X provided in a lower wall 5F which form part of the element 5 and which interconnects the lower ends of the two side walls 5M of said element. At its front, the lower wall 5F comprises similar seats 5G for the snap-connection of the rear edge of a sheet metal panel 20, which forms the bottom wall of the preservation compartment 2.

At its top, the multi-functional element 5 comprises a top wall 21 which interconnects the two side walls 5M and the rear wall 5A. In its edge, said wall 21 comprises horizontal seats 5' for the snap-connection of the bent horizontal rear edge of the panel 22 which constitutes the upper wall of the preservation compartment 2 (see Figure 7).

As can be seen in Figure 6, the side walls 5M of the multi-functional element 5 are provided laterally with suitable vertical seats 5Z for the snap-connection of the side walls 11A of the preservation compartment 2, the edge 11B each wall 11A being suitably bent in order to permit this snap-connection.

The assembly is carried out as follows:

Using known conventional methods, the inner liner 11 and outer housing 12 of the refrigerator

are firstly placed in position with the exception of the back wall of the outer housing 12 and the back wall of the preservation compartment 2 which operates at higher temperature, so that the refrigerator is open rearwards at said compartment 2. Separately, the evaporator 4 of the compartment 2 is mounted and fixed (in the manner heretofore described) to the multi-functional element 5. The multi-functional element 5, with the evaporator 4 fixed to it, is then inserted through the rear of the compartment 2, and the evaporator 13 of the other compartment 3 which has already been placed about the box member 10 which defines this latter compartment is then connected to the evaporator 4 at the upwardly extending portion 4F thereof (see Figure 5).

As already stated, the side walls 5M of the multi-functional element 5 are provided laterally with suitable vertical seats 5Z for the snap-connection of the side walls 11A of the preservation compartment 2, the edge 11B of each wall 11A being suitably bent to permit this snap-connection. The bottom and top panel 20 and 22 are inserted into the respective seats 5G and 5'. Through the rear, the panel 6 is then inserted and its suitable bent lateral edges snap-engage in the seats 5V of the multi-functional element as heretofore stated. Finally, the back wall 14 of the outer housing 12 is mounted, and the foamed polyurethane 15 is injected between the inner panels 6, 11, 20, 22 and housing 12. The cross-linking of the foamed polyurethane makes the refrigerator cabinet monolithic, and in particular it "cements" the rear wall 5A and the side walls 5M of the multi-functional element, thus giving them a rigidity which is much greater than that of previously known constructions.

Claim

1. A multi-functional support element (5) for a domestic refrigerator (1) with a preservation compartment (2) in which an evaporator in the form of a plate (4) is arranged near the back wall of said compartment, said support element being made of plastics material, self-supporting and comprising:

— a substantially flat rear wall (5A) formed integrally with projections for spacing, supporting and fixing the evaporator plate (4),

— two parallel side walls (5M) formed integrally with the rear wall and provided with a series of aligned seats (5P) for supporting removable shelves,

— at the bottom of the rear wall (5A) a channel (5W) for collecting water resulting from the defrosting of the evaporator plate, and

— seats (5V—5Y—5X, 5Z, 5G, 5') along the edges for snap-connection with at least some of the walls (6, 11, 20, 22) of the preservation compartment.

Patentanspruch

Mehrzweck-Trägerelement (5) für einen Haushaltskühlschrank (1) mit einem Aufbewahrungsfach (2), in dem ein Verdampfer in Form einer Platte (4) vorgesehen ist, und zwar in der Nähe der Rückwand dieses Faches, wobei das Trägerelement aus Kunststoff hergestellt ist, selbsttragend ist und die folgenden Teile aufweist:

— eine im wesentlichen flache Rückwand (5A), die ein Ganzes mit Vorsprüngen zum auf Distanz Halten, Tragen und Fixieren der Verdampferplatte (4) bildet,

— zwei parallele Seitenwände (5M), die ein Ganzes mit der Rückwand bilden und mit einer Anzahl fluchtender Auflagen (5P) zum Tragen entfernter Regale versehen sind,

— am Boden der Rückwand (5A) einen Kanal zum Ansammeln von Wasser, das vom Abtauen der Verdampferplatte herrührt und

— Auflagen (5V—5Y—5X, 5Z, 5G, 5') an den Rändern zur Schnappverbindung mit wenigstens einigen der Wände (6, 11, 20, 22) des Aufbewahrungsfaches.

Revendication

Elément de support à fonctions multiples (5) pour un réfrigérateur ménager (1) présentant un compartiment de conservation (2) dans lequel un évaporateur en forme de plaque (4) est disposé à proximité de la paroi arrière dudit compartiment, élément de support qui est en matière plastique, est autoportant et comporte:

— une paroi arrière sensiblement plate (5A) formée d'une seule pièce avec des saillies pour espacer, supporter et fixer la plaque d'évaporateur (4),

— deux parois latérales parallèles (5M) formées d'une seule pièce avec la paroi arrière et présentant une série d'évidements d'appui alignés (5P) pour supporter des clayettes amovibles,

— du côté inférieur de la paroi arrière (5A), une goulotte (5W) pour recueillir l'eau de dégivrage de la plaque d'évaporateur et

— des évidements de fixation (5V—5Y—5X, 5Z, 5G, 5') le long des bords pour l'assemblage par encliquetage avec au moins quelques-unes des parois (6, 11, 20, 22) du compartiment de conservation.

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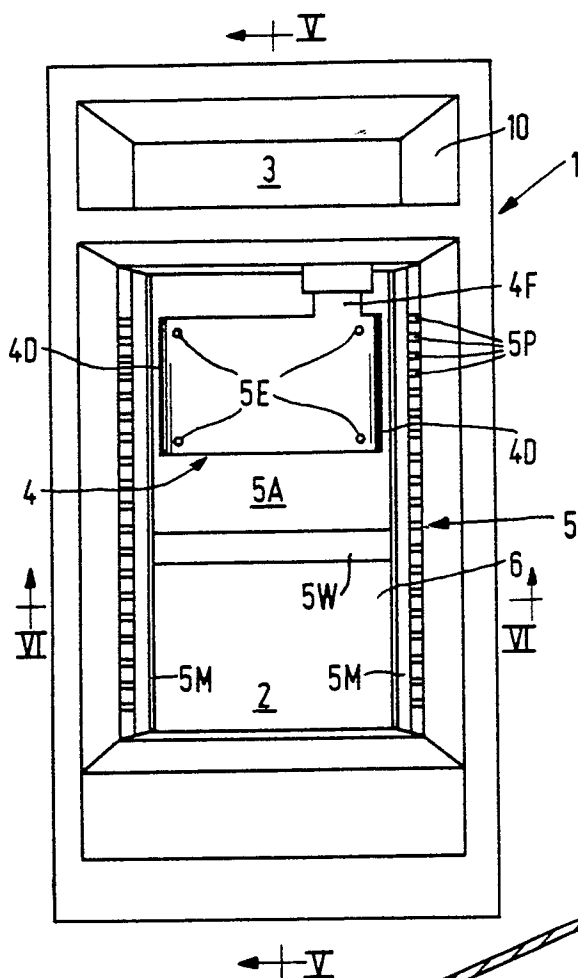


FIG.1

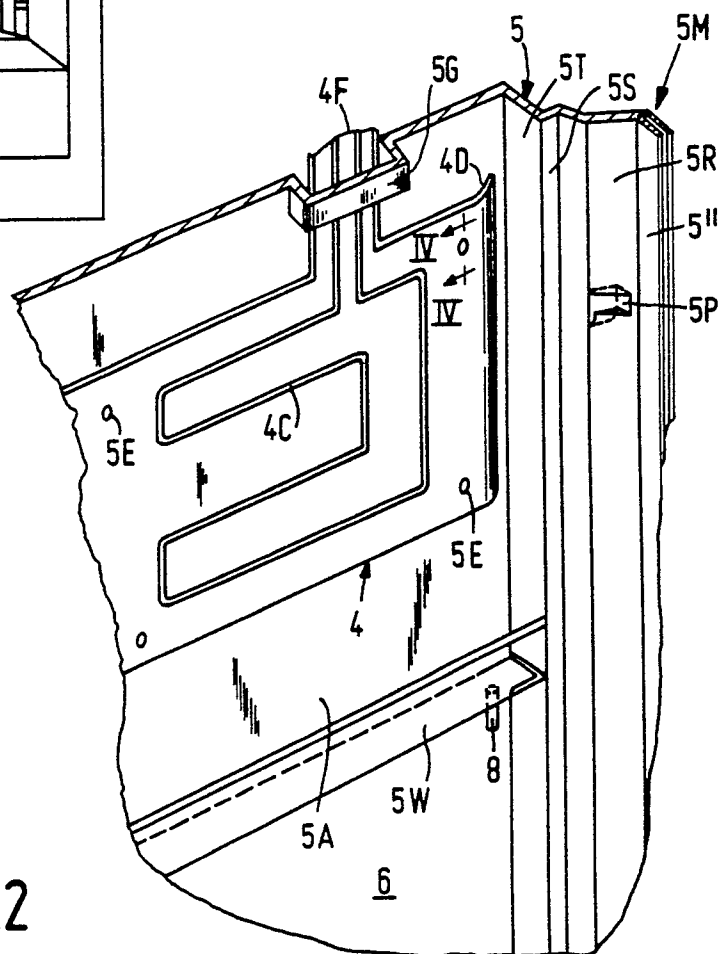


FIG.2

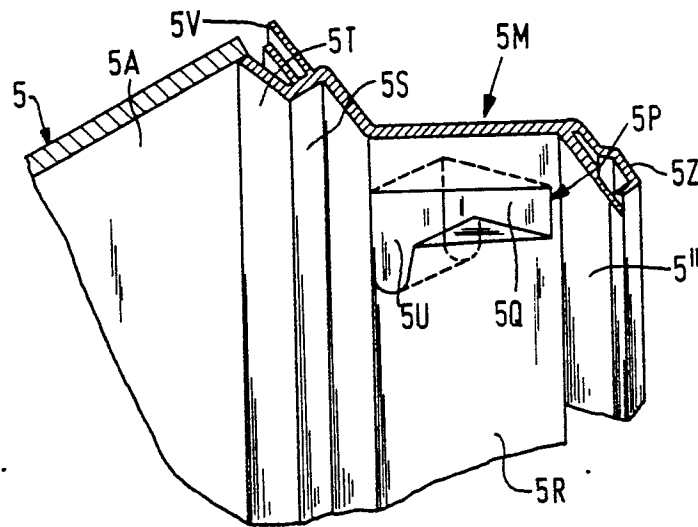


FIG. 3

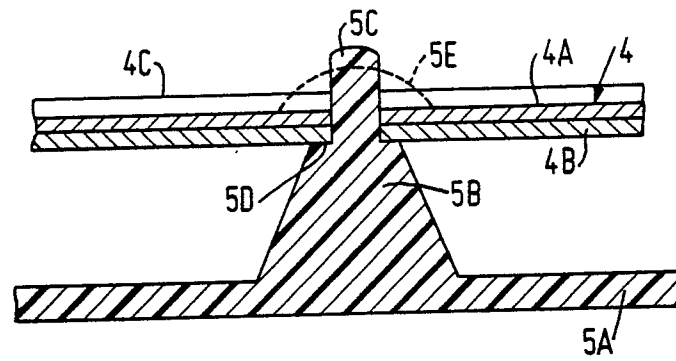


FIG. 4

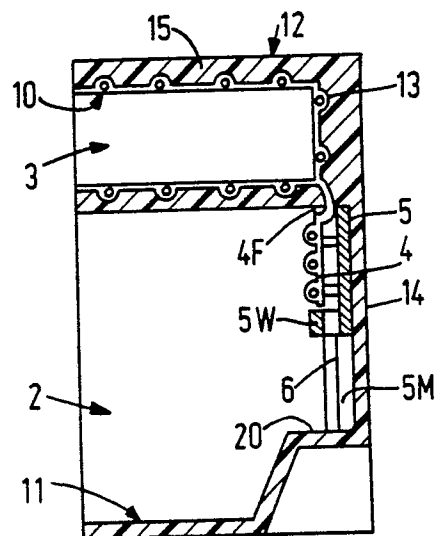


FIG. 5

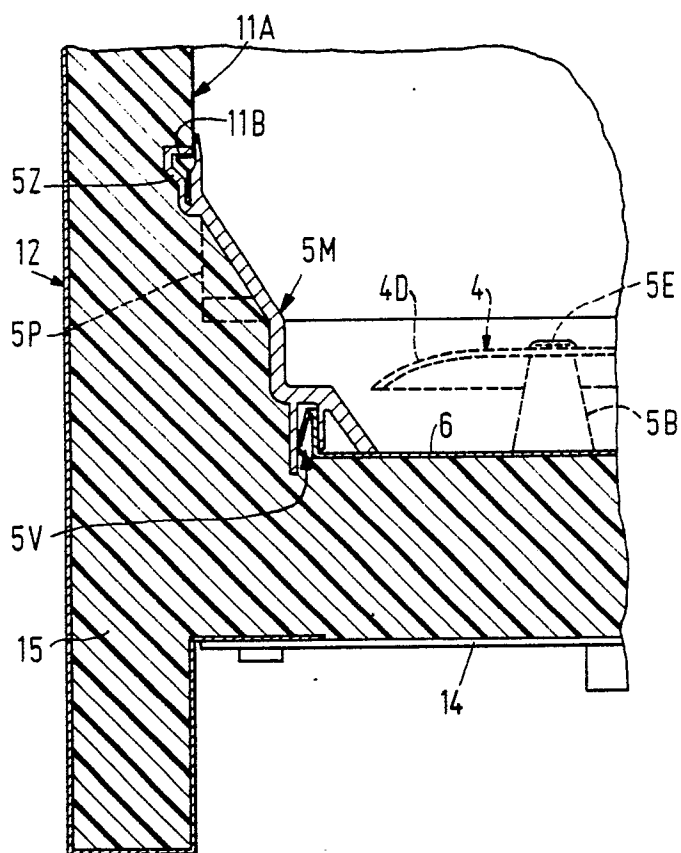


FIG. 6

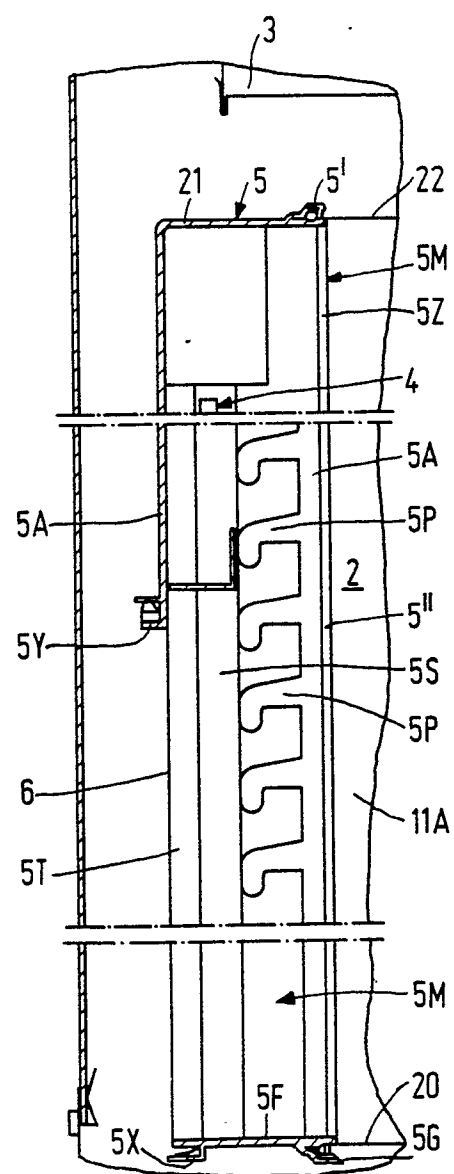


FIG. 7