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54 **Thermal insulating system for refrigerating apparatus and relative realization process.**

57 An insulating system for a refrigerating apparatus is described in which the side wall (1'), the upper wall (1) and the lower wall (1) of the cooling compartment (20, 21) are formed by two plates of air-impermeable material (11, 16, 30, 31) parallel to one another and with their facing surfaces made reflecting, and by a seal (14) which is also impermeable to air, which together form a cavity which is in the form of a hollow parallelepiped and in which a certain degree of vacuum is created.

The two plates (11, 16, 30, 31) are held apart and parallel to one another by a grid (12, 33) of thermally insulating material, the profile of which is shaped in such a way that the surface of contact between the said spacer grid (12, 33) and the said two plates of air-impermeable material (11, 16, 30, 31) results in being as small as possible.

The cooling compartment (20, 21) is completed by the addition of a door (4, 5) and an insulating back wall (2, 9) in conventional manner.

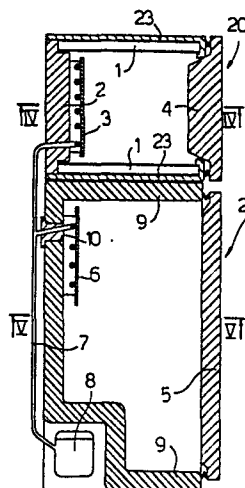
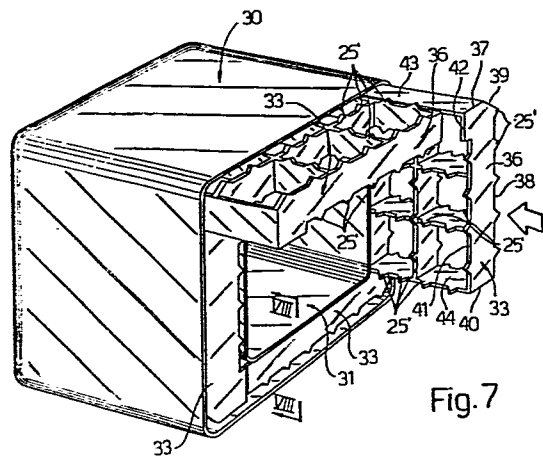


Fig.1

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INSULATING THERMAL SYSTEM FOR REFRIGERATING APPARATUS AND RELATIVE REALIZATION PROCESS

The present invention relates to a thermal insulating system and relative realization process for a refrigerating apparatus, comprising a compressor for compressing the refrigerant fluid, a condenser for condensing the refrigerant fluid coming from the compressor, means for expanding the refrigerant fluid coming from the condenser and for supplying it to at least one evaporator means, a return duct connecting the outlet of the evaporator means to the inlet of the compressor and at least one cooling compartment containing the evaporator means.

It is known that a refrigerating apparatus, in particular a freezer, has substantially two distinct operating phases; a freezing phase (when fresh foods are introduced to be frozen), and a preservation phase (when the foods have been brought down to the required temperature at which they must remain). Clearly, if the said refrigerating apparatus had perfect insulation there would be no dispersion of cold towards the external environment and the cold to be recovered, in this second phase, would only be that dispersed during opening of the door of the refrigerating apparatus.

In reality, the walls of the known refrigerating apparatus are not thermally insulating at all, and so a good deal of the cold is dispersed through them.

This loss is directly proportional to the temperature difference existing between the cooling compartment

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and the external environment, and inversely proportional to the thermal resistance of the walls; for example in a freezer or in the freezing compartment of a combined or double-door refrigerator apparatus (which
5 can reach -25°C) in the worst ambient conditions envisaged (32°C) there is a temperature jump of 57°C , and even between the fresh food compartment of a refrigerator apparatus (which can reach temperatures of about 0°C) and the external environment in tropical
10 climates (which can reach $40-45^{\circ}\text{C}$) there is a temperature difference of $40-45^{\circ}\text{C}$.

On the other hand, taking into consideration the fact that the major part of the cold dispersed in a refrigerator
15 apparatus, when its door is closed, is dispersed through the truck walls, and the structural supports for these walls, whilst the remaining part is dispersed through the rubber seals positioned between the cupboard and the door of the refrigerator apparatus, and through
20 the small gaps which inevitably remain between the cupboard of the apparatus and the rubber seals, one can conclude that if energy saving is desired, it is necessary to reduce as much as possible the thermal conductivity of the walls and to improve the seals of
25 the refrigerating apparatus.

But as already mentioned, the major part of the cold is dispersed through the walls and the structural supports of the refrigerator apparatus, so that it is the said
30 walls which need to be made as insulating as possible.

It is also known that the heat is transmitted

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by conduction, convection and radiation, and that the type of wall which offers the greatest thermal resistance and which conserves heat (or cold) better than any other, is that formed by two specularly facing surfaces
5 between which a vacuum has been formed, and minimizes the losses due to conduction, convection and radiation.

It is also known that it is not easy to obtain the vacuum, and maintain it for a long time, even if it
10 is not high; and this is the case especially of containers which are not made in one piece and which may even be made of materials of different natures.

Therefore, the object of the present invention is to
15 overcome the above mentioned disadvantages and provide an insulating system for the walls of the refrigerating apparatus which will ensure a significant reduction of the losses of cold, and consequently a significant saving of energy during operation, and which will also
20 be reliable and will not alter its effectiveness over a long period of time.

A further object of the present invention is to indicate a process for the industrial realization of the said
25 system which will be relatively simple and economical so as to allow to be utilized for mass-production.

To achieve these objects the subject of the present invention is an insulating system for a refrigerating
30 apparatus comprising a compressor for compressing the refrigerant fluid, a condenser for condensing the refrigerant fluid coming from the compressor, means

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for expanding the refrigerant fluid and for supplying it to at least one evaporator means, a return duct connecting the outlet of the evaporator means with the inlet of the compressor and at least one cooling compartment containing the evaporator means, characterized by the fact that at least one of the walls of the cooling compartment is constituted by two plates of air-impermeable material (11, 16) maintained substantially parallel to one another and whose facing walls are specularly reflecting, and by a seal (14) which is also air-impermeable and which, together with the two plates (11, 16) forms a cavity in which a vacuum is formed to increase the thermal resistance of the wall and thus allow an improved conservation of cold within the cooling compartment itself.

Further objects and advantages of the present invention will become clearly apparent from the detailed description which follows and from the attached drawings given purely by way of explanatory and non-limiting example, in which:

Fig. 1 is a diagrammatic sectional side view of a combined or two-door refrigerator apparatus the frozen food compartment of which is provided with an insulating system forming the subject of the present invention;

Fig. 2 is a diagrammatic cross-sectional view of the same refrigerator apparatus shown in Fig. 1, but in

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axonometric projection;

Fig. 3 is a perspective view of a constructional detail of the type of walls used in the insulating
5 system forming the subject of the present invention;

Figures 4 and 5 are two horizontal sections of the refrigerator apparatus along line IV-IV (at the height of the frozen food compartment) and V-V (at the height
10 of the fresh food compartment), respectively;

Figures 6 and 7 are perspective views showing a frozen food compartment in two phases of the process of realization of the system forming the subject of the present invention;
15

Fig. 8 is a sectional view of a portion of the compartment shown in Fig. 7, along line VIII-VIII, in a successive phase of the process of realization:

20 Fig. 9 shows a portion of the compartment according to the present invention in a final phase of realization; and

Fig. 10 is a sectional side view showing showing a phase of the realization process which is intermediate between
25 the phases of Figures 6 and 7.

With reference to Fig. 1, there can be seen the upper and lower walls 1 of a removable freezer compartment 20 which also includes two side walls 1' (Fig. 4) which

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form a hollow parallelepiped within the cavity of which there has been formed a vacuum $1/10 \div 1/100$ tor (the way this cavity is formed will be described in more detail in Fig. 3), an upper back wall 2, which forms part of the freezer compartment 20 itself, filled with molded high density insulating material, an upper evaporator plate 3 rigidly connected to the upper back wall 2, an upper door 4 thermally insulated in a known way. The walls 1 and 1' of the freezer compartment 20 are thus coated by a wall 23. Disposed below the freezer compartment 20 is a fresh food cooling compartment 21 comprising a lower door 5 also thermally insulated in a known way, a lower evaporator plate 6, a lower back wall 10 which allows the insertion of the lower evaporator plate 6 into the compartment 21 and is also filled with molded high density insulating material and upper, lower and back sidewalls 9 for the compartment 21 which are filled with polyurethane foam.

20

For the two upper and lower back walls 1 and 10 a molded high density material has been used because it has a thermal resistance approximately equal to that of a polyurethane foam, so as not to create in the walls of the refrigerator apparatus zones of discontinuity of insulation.

With reference to Fig. 2 which represents an axonometric projection of the same refrigerator apparatus as shown

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in Fig. 1, there are shown, for the sake of clarity, only some of the components shown in Fig. 1, which are indicated by the same reference numerals as in Fig. 1.

5

From Fig. 2 it will be better understood how the insulating system forming the subject of the present invention is composed, and the assembly procedure used for the production of the refrigerator apparatus.

10

With reference to Fig. 3 showing the structure of a cooling compartment (in particular that of the freezer compartment 20) of a refrigerator apparatus according to the present invention, there can be seen an outer plate 11 formed by a welded stainless steel sheet having a thickness of about 1,5 mm, whose outer face is painted and the inner face is chromium-plated to make it reflecting, an inner plate 16 positioned at a distance of about 15-20 mm from the outer plate 11, formed from a welded stainless steel sheet having a thickness of about 1,5 mm; whose outer face is painted and the inner face is chromium-plated to make it reflecting; the two plates 11 and 16 are shaped in such a way as to form a hollow parallelepiped; a hard closed cell rubber seal 14 having on the inner side two grooves 24 in which there is first spread silicone grease and into which the two and edges of the two plates 11 and 16 are then inserted, an evacuating tube 13 inserted into outer plate 11 and communicating with the cavity between the two plates 11 and 16 which serves to suck the air contained in the

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cavity and create the vacuum, a spacer grid 12 of polystyrene, acrilnitrile butadiene srtyrene (ABS) or polyvinyl chloride (PVC), having very wide meshed
5 crossed at right angles, positioned in the cavity between the two plates 11 and 16 to prevent the outer plate 11 and the inner plate 16 from flexing due to the external pressure when the vacuum is formed therein, and proovided along its profile with pointed teeth 25' which are
10 triangular in shape and have such dimensions that the surface of contact between the said spacer grid 12 and the two plates 11 and 16 is extremely reduced. relative to the facing surface of the said spacer grid 12. Fixed to the inner plate 16 of the sidewalls 1' is a
15 fixing bracket 15 for fixing within the compartment 20 the upper evaporator plate 3 and the upper back wall 2 which are rigidly connected together.

The process for assembling the freezer cell 20 described
20 in relation to Fig. 3 is clearly apparent also from a study of the Fig. 2. The compartment is assembled separately and is then positioned in the refrigerator apparatus in such a way that it may eventually be easily removed and replaced by the technical service personnel.

25

As far as the construction of the true compartment 20 is concerned, after having arranged the various elements as shown in Fig. 3 and will be described more in detail later, a suction pump is connected to the
30 evacuation tube 13 and the suction of air commences.

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In this phase, the use of the silicone grease which has been spread into the grooves 24 of the seal 14 is indispensable because if the grease were not there the air would enter the cavity through the empty spaces wing to the imperfect contact between the two plates 11 and 16 and the seal 14, and the air which would be drawn from the cavity would enter from said empty spaces, thus preventing the formation of the vacuum.

10

The presence of the silicone grease; on the other hand, ensures that the said empty spaces are reduced to the minimum and very little air enters the cavity, so that it is possible to "prime the vacuum": i.e. a depression commences to form in the said cavity, so that the external pressure presses the seal 14 against the ends of the two plates 11 and 16, thus allowing a perfect seal to be formed.

20 The suction is continued until a degree of vacuum of $1/10 \div 1/100$ tor has been reached, and at this point (with the suction pump still working) the evacuating tube 13 is throttled and hermetically closed.

25 It is not necessary to have a higher vacuum because the loss of cold due to other causes renders it superfluous.

It is to be noted that the spacer grid 12 is indispensable because otherwise the two plates 11 and 16, because of the external pressure, could even flex into contact with

30

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one another annulling the effects of the insulation due to the vacuum. This necessity, however, carries with it the disadvantage that a certain quantity of cold is dispersed by conduction through the said spacer grid 12, so that to minimize these losses the meshes of the said grid are very wide, the material of which it is made is an excellent insulator, and moreover the profile which comes into contact with the two plates 11 and 16 is given a pointed shape such as to minimize the said contact area. As has already been said previously, Figures from 6 to 9 show in more detail the process of realization of the thermal insulating system according to the present invention.

15

In fact, one starts from an outer structure 30 made of plate (Fig. 6), in the form of a parallelepiped with the ends open, which forms the outer plate 11 shown in Fig. 3, and which is conveniently positioned in a respective mounting equipment comprising for example (Fig. 10) four centering rollers 50, fixed on a base 52, on which there is formed a housing for a seal 14, and bearing on each of the four outer sides of the structure 30. Into said structure 30 there is inserted an inner structure 31 made of plate, also positioned by means of four centering rollers 51 inserted in its interior, on each side, and having the form of a parallelepiped with the ends open which forms the inner plate 16 shown in Fig. 3. Into the gap between the two structures 30 and 31 there is then introduced

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the spacer grid 12 which in Fig. 7 is shown as being composed of four portions 33 of equal shape, also formed by meshes crossed at right angles and also made of
5 the same materials as already defined for the grid 12. The teeth 25' which project from the portions 33 and which come into contact with the structures 30 and 31 are preferably defined by a profile forming an angle of 120° . In this way the area of contact
10 between the grid 12 and the structures 30 and 31 is very much reduced, by about 90%, and consequently there is obtained a reduction of the quantity of cold dispersed because of the conduction through the said grid 12.

15

As can be seen in Fig. 7, each portion 33 is rectangular (or square) when seen in plan, with a substantially rectangular plane end wall 36 whose perimeter is defined by a plane section 37 on a smaller side, a plane
20 section 38 on a larger side from which a plurality of teeth 25' originate towards the outside, the first of which in the direction towards the plane section 37 defines a beveled section 40, opposed to the section 37, and a plane section 41 provided with the teeth 25',
25 opposed to the section 38; towards the end situated near the section 37 section 41 forms a plane step 42 projecting towards the outside.

Sections 37 and 40 are then connected to the respective
30 sections at the other end of the portions 33, 43 and 44

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by means of plane walls 43 and 44, respectively.

During the mounting into the gap between the structures 30 and 31 the walls 43 rest on the inner
5 surface of the structure 30 and the walls 44 of each portion 33 rest on the steps 42 of the contiguous portions 33; the assembly of the portions 33, besides having advantageous characteristics of modularity, thanks to the described bearings of the various sections,
10 forms a compact grid 12, with a stable positioning both reciprocally and thanks to the bearing onto the structure 30.

Anyhow, the bearing of the plane surface walls 43 on
15 the structure 30 does not deteriorate the thermal insulation between the structures 30 and 31, because the bearing of the portions 33 on the structure 31 takes place only by means of the teeth 25'.

20 It is to be note also that the insertion of the portions 33 into the gap between the structures 30 and 31 is easy, because the thickness of the said gap is by about 1 mm larger than the height of the portions 33. It is pointed out that ~~with~~ the use of the centering
25 rollers 50 and 51 it is very easy to position the structures 30 and 31 in such a way as to obtain the exact distance between the plates 11 and 16, with a precision higher than $\frac{1}{100}$.

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Subsequently, as shown in Fig. 8, the seal 14 is applied also to the upper end of the gap between the structures 30 and 31, with the important modalities already described hereinabove, i.e. with the use of the silicone grease spread into the grooves 24 of the seal 14. The vacuum is then created within the gap, as already described hereinabove, and with the described configuration of the grid 12 provided with the pointed teeth 25' (Fig. 9) a deformation towards the interior of the gap of the structures 30 and 31 (of about $0,5 \div 0,3$ mm), so that the teeth 25' engage the inner surface of the structures 30 and 31. This engagement ensures a stability of positioning of the grid 12 within the gap between the structures 30 and 31, thus allowing to maintain the relative and parallel position between the structures 30 and 31 and, consequently, a constant positioning of the seals 14 against the edges of the structures 30 and 31, which ensures the keeping of the degree of vacuum created within the gap itself. In addition, the seal 14 abuts against the plane end walls of the portions 33.

Finally, it is to be noted that if the structure of the spacer grid 12, its shape and the material of which it is made minimize the cold lost by conduction, that if the vacuum reduces to the minimum the cold lost by convection, to minimize the losses due to radiation the inner walls of the two plates 11 and 16 are positioned parallel to one another and made specularly reflecting.

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To obtain such specularity the inner walls can be chromium-plated or polished or painted by alluminizing or other similar technological processes.

5

Since the average life of a refrigerator should be at least 10-15 years, and since it is possible that with the ageing of the materials air molecules will enter the cavity between the two plates 11 and 16 degrading
10 the vacuum which has been formed in it, it may be envisaged to provide the refrigerator apparatus with an instrument for measuring the degree of vacuum and to provide the evacuating tube 13 with a valve accessible from the outside, in such a way that should the degree of vacuum
15 become degraded to less than an optimum value it can be easily renewed, possible during a maintenance operation performed on the apparatus.

Turning to the manner of assembly of the complete
20 apparatus, with reference also to Fig. 2 it can be said that the freezer compartment 20 constructed in one of the ways mentioned hereinabove is then mounted on the refrigerator apparatus; from the side having the fixing bracket 15 the are inserted into the
25 apparatus the upper evaporator 3 and upper back wall 2, which are rigidly conneted to one another, until a perfect contact between the said upper back wall 2 and the seal 14 of the freezer compartment is obtained; from the opposite side the upper door 4 is introduced
30 in such a way as to obtain a perfect contacto also between this latter and the seal 14 (by means of the

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coating wall 23).

The mounting of the upper back wall 2 and of the
5 upper door 4 is carried out in such a way the freezer
compartment 20 can be easily removed and replaced in
the event of the vacuum contained therein being
degraded to below a level which would no more ensure
a good degree of insulation.

10

Should it be desirable to use the same insulating
system, forming the subject of the present invention,
also for the fresh food compartment 21, the way of
assembling said system would be entirely similar to
15 that just outlined.

From the above description the advantages of the
insulating system for a refrigerator apparatus, forming
the subject of the present invention, will be clear.

20

In particular, these advantages are represented by
the possibility of obtaining a significant saving of
energy in the use of a refrigerating apparatus, in
particular a freezer or the freezer compartment of
25 a combined or double door refrigerator, by the use
of technical means which allows a significant reduction
of the losses through the walls of the apparatus itself,
and with a very simple and relatively economical
construction system.

30

It is clear that numerous other variations may be

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made to the insulating system described by way of example, without departing from the scope of the principles of novelty inherent in the inventive idea.

5

For example, the number of insulating walls obtained by using the technique described can be increased to obtain an improvement in the insulation or can be reduced depending on the objective which it is intended

10 to achieve; among the possible solutions, the wall which separates the freezer compartment 20 of a combined or double door refrigerator from the fresh food compartment 21 can be insulated by known methods or can even be insulated by rendering less efficient
15 the usual insulation for the purpose of supplying cold from the freezer compartment 20 to the fresh food compartment 21.

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CLAIMS

1. A thermal insulating system for a refrigerating apparatus comprising a compressor for compressing
5 the refrigerant fluid, a condenser for condensing the refrigerant fluid coming from the compressor, means for expanding the refrigerant fluid coming from the condenser and for supplying it to at least one evaporator means, a return duct connecting the
10 outlet of the evaporator means with the inlet of the compressor and at least one cooling compartment containing the evaporator means, characterized by the fact that at least one of the walls of the cooling compartment is constituted by two plates of air-impermeable
15 material (11, 16) maintained substantially parallel to one another and whose facing walls are specularly reflecting, and by a seal (14) which is also air-impermeable and which, together with the two plates (11, 16), forms a cavity in which a vacuum is formed
20 for the purpose of increasing the thermal resistance of the wall and therefore allowing an improved conservation of cold within the cooling compartment itself.
- 25 2. An insulating system for a refrigerating apparatus according to Claim 1, characterized by the fact that the walls are four and are disposed in such a way as to forma a hollow parallelepiped the interior of which constitutes the available space of the cooling
30 compartment.

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3. An insulating system for a refrigerating apparatus according to Claim 2, characterized by the fact that the said cooling compartment is completed by a back wall fitted to the said hollow parallelepiped, thermally insulated by using a material of high thermal resistance, and by a door which is also thermally insulated by means of a material having a high thermal resistance.
- 10 4. An insulating system for a refrigerating apparatus according to Claim 1, characterized by the fact that the said plates (11, 16) of air-impermeable material are made of steel.
- 15 5. An insulating system for a refrigerating apparatus according to Claims 1 and 4, characterized by the fact the facing walls of the said steel plates (11, 16) are rendered reflecting particularly by chromium-plating or polishing or alluminizing paint.
- 20 6. An insulating system for a refrigerating apparatus according to Claim 1, characterized by the fact that the said plates (11, 16) of air-impermeable material are maintained parallel to one another by thermally insulating support means.
- 25 7. An insulating system for a refrigerating apparatus according to Claim 6, characterized by the fact that the said thermally insulating support means are formed by a spacer grid (12).
- 30

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8. An insulating system for a refrigerating apparatus according to Claim 7, characterized by the fact that the said spacer grid (12) is provided, along the profile which comes into contact with the said plates of air-impermeable material (11, 16), with teeth (15') which substantially reduce the area of contact between the said spacer grid (12) and the said plates of air-impermeable material (11, 16).

10

9.- An insulating system for a refrigerating apparatus according to Claim 8, characterized by the fact that the said teeth (25') are pointed in shape.

15

10. An insulating system for a refrigerating apparatus according to Claim 9, characterized by the fact that the said teeth (25') are defined by a profile which forms an angle of about 120° .

20

11. An insulating system for a refrigerating apparatus according to one of the Claims from 7 to 10, characterized by the fact that the height of the said grid (12) is smaller than the height of the gap between the said plates (11, 16) into which it is inserted.

25

12. An insulating system for a refrigerating apparatus according to one of the Claims from 7 to 11, characterized by the fact that the said spacer grid (12) is formed by a plurality of portions (33) identicalaibh each other.

- 20 -

13. An insulating system for a refrigerator apparatus according to Claim 12, characterized by the fact that each of the said portions (33), seen in plan, is rectangular or square.

14. An insulating system for a refrigerating apparatus according to Claim 13, characterized by the fact that the said portions (33) are four.

15. An insulating system for a refrigerating apparatus according to Claims 13 and 14, characterized by the fact that the said portions (33) are provided with sections (40, 42) for the reciprocal rest of contiguous portions and with sections (37) for a relatively extended rest on only one (11) of the said plates.

16. An insulating system for a refrigerating apparatus according to one of the Claims from 7 to 15, characterized by the fact that the said spacer grid (12) is made of polystyrene.

17. An insulating system for a refrigerating apparatus according to one of the Claims from 7 to 15, characterized by the fact that the said spacer grid (12) is made of acryl butadiene styrene (ABS).

18. An insulating system for a refrigerating apparatus according to one of the Claims from 7 to 15, characterized by the fact that the said spacer grid (12) is made of charged polyvinyl chloride (PVC).

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19. An insulating system for a refrigerating apparatus according to one of the preceding Claims, characterized by the fact that the said cooling compartment is the cooling compartment of a freezer.

20. An insulating system for a refrigerator apparatus according to one of the preceding Claims, characterized by the fact that the said cooling compartment is the freezer compartment (20) of a combined refrigerator.

21. An insulating system for a refrigerating apparatus according to one of the preceding Claims, characterized by the fact that the said cooling compartment (20) is the freezer compartment (22) of a two-door refrigerator.

22.- An insulating system for a refrigerating apparatus according to one of the preceding Claims, characterized by the fact that the said cooling compartment is the fresh food cooling compartment (21) of a refrigerator.

23. An insulating system for a refrigerating apparatus according to one of the preceding Claims, characterized by the fact that the said seal (14) is made of hard, closed-cell rubber.

24. An insulating system for a refrigerating apparatus according to Claim 23, characterized by the fact that the said seal (14) has grooves (24) which are spread with silicone grease to improve the air-impermeability thereof.

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25. An insulating system for a refrigerating apparatus according to one of the preceding Claims, characterized by the fact that in one of the said two air-impermeable
5 plates (11, 16) there is inserted an evacuation tube (13) which after the evacuation operation is hermetically closed.

26. An insulating system for a refrigerating apparatus
10 according to Claim 25, characterized by the fact that at the end of the said evacuation tube (13) there is located a valve accessible from the exterior of the said refrigerating apparatus in such a way as to allow restoring the vacuum if it should become degraded.

15 27. An insulating system for a refrigerating apparatus according to Claims 1 and 2, characterized by the fact that the said cooling compartment in the form of a hollow parallelepiped is positioned on the refrigerating
20 apparatus, by the fact that on the side on which it is provided with a fixing bracket (15) there are inserted into the apparatus an upper evaporator (3) and an upper back wall (2) until a perfect contact between the said upper back wall (2) and the said seal (14) is obtained,
25 and by the fact that from the opposite side an upper door (4) is inserted into the apparatus in such a way that also between the upper door (4) and the said seal (14) there is a perfect contact.

30 28. A process for the realization of a

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thermal insulating system for a refrigerating apparatus comprising a compressor for compressing the refrigerant fluid, a condenser for condensing the refrigerant

5 fluid coming from the compressor, means for expanding the refrigerant fluid coming from the condenser and supplying it to at least one evaporator means, a return duct which connects the outlet of the evaporator means with the inlet of the compressor and at least one

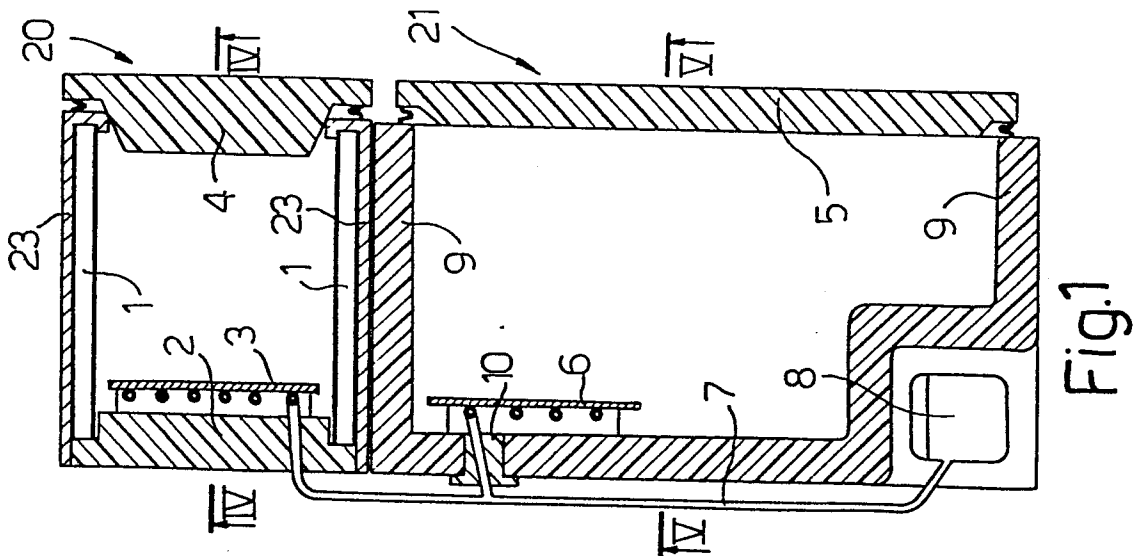
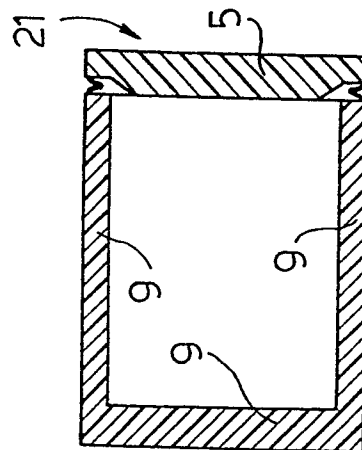
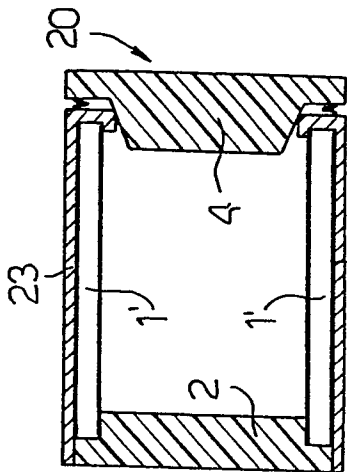
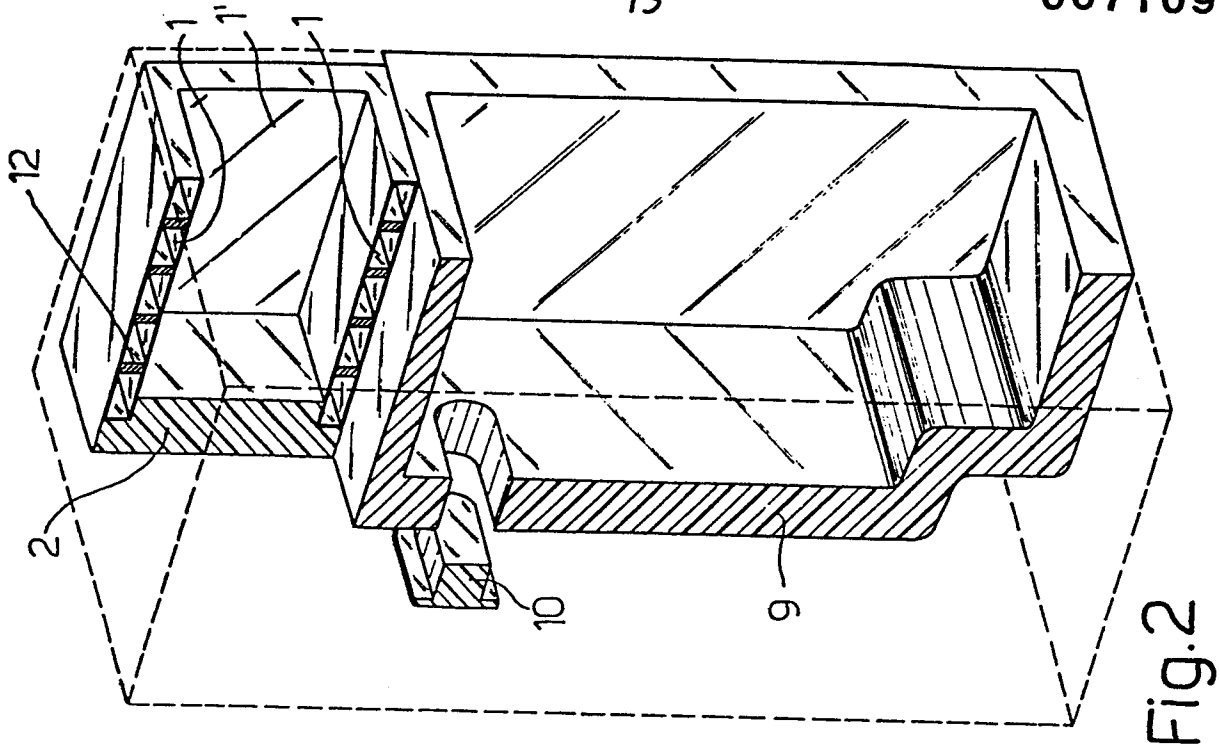
10 cooling compartment containing the evaporator means, characterized by the fact that it comprises a first phase of relative positioning of an outer structure (30) and an inner structure (31) in the form of a hollow parallelepiped open at the ends and forming a

15 thermal insulating gap for the said cooling compartment, a second phase of introduction of a thermally insulating support means (12) into the said gap; a third phase of complete application of two seals (14), provided with grooves (24), onto the respective end edges
20 of the said outer and inner structures (30, 31), into the said grooves (24) there having been previously introduced silicone grease; and a fourth phase for creating a vacuum in the said gap.

25 29. A process according to Claim 28, characterized by the fact that in the said first phase the said outer and inner structures (30, 31) are reciprocally positioned by means of a respective double plurality of positioning rollers (50, 51).

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30. A process according to Claims 28 and 29,
characterized by the fact that it is applied to
a thermal insulating system for a refrigerating
apparatus according to one of the Claims from 1 to 27.



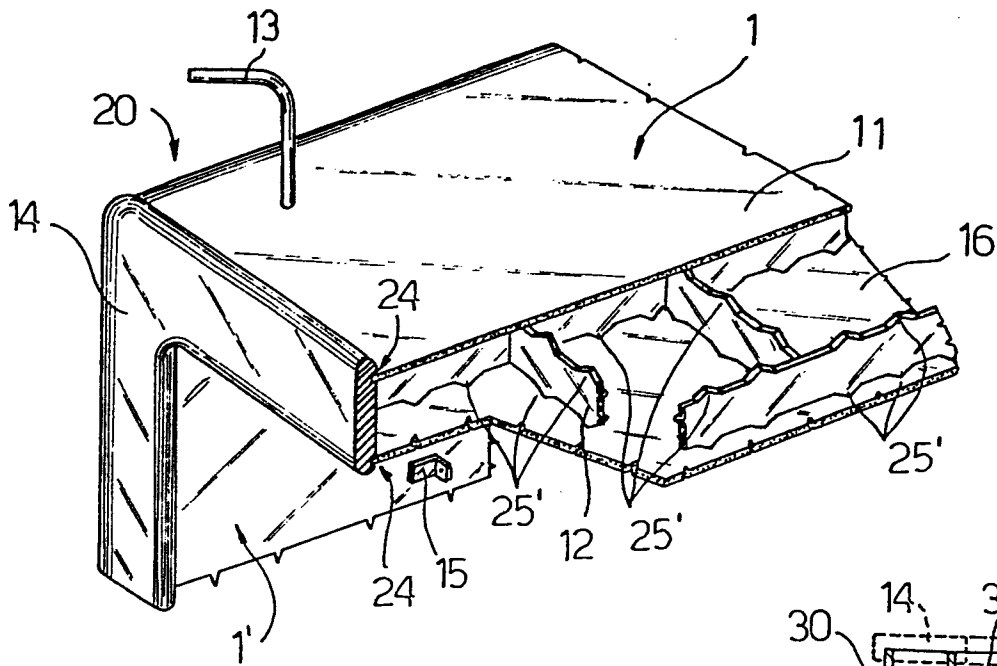


Fig. 3

Fig. 10

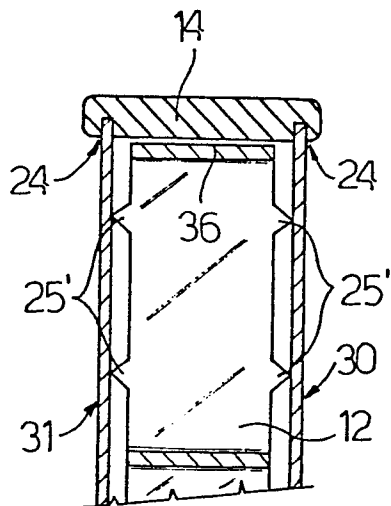
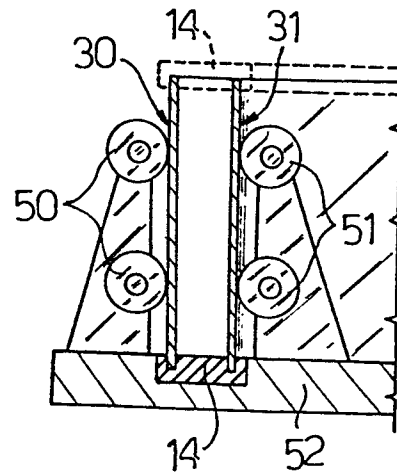


Fig. 8

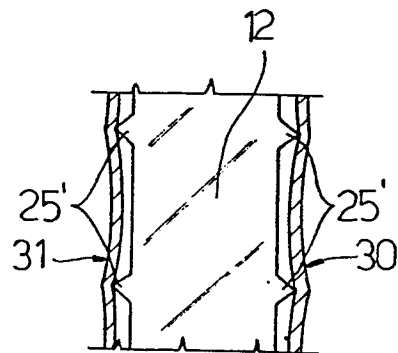
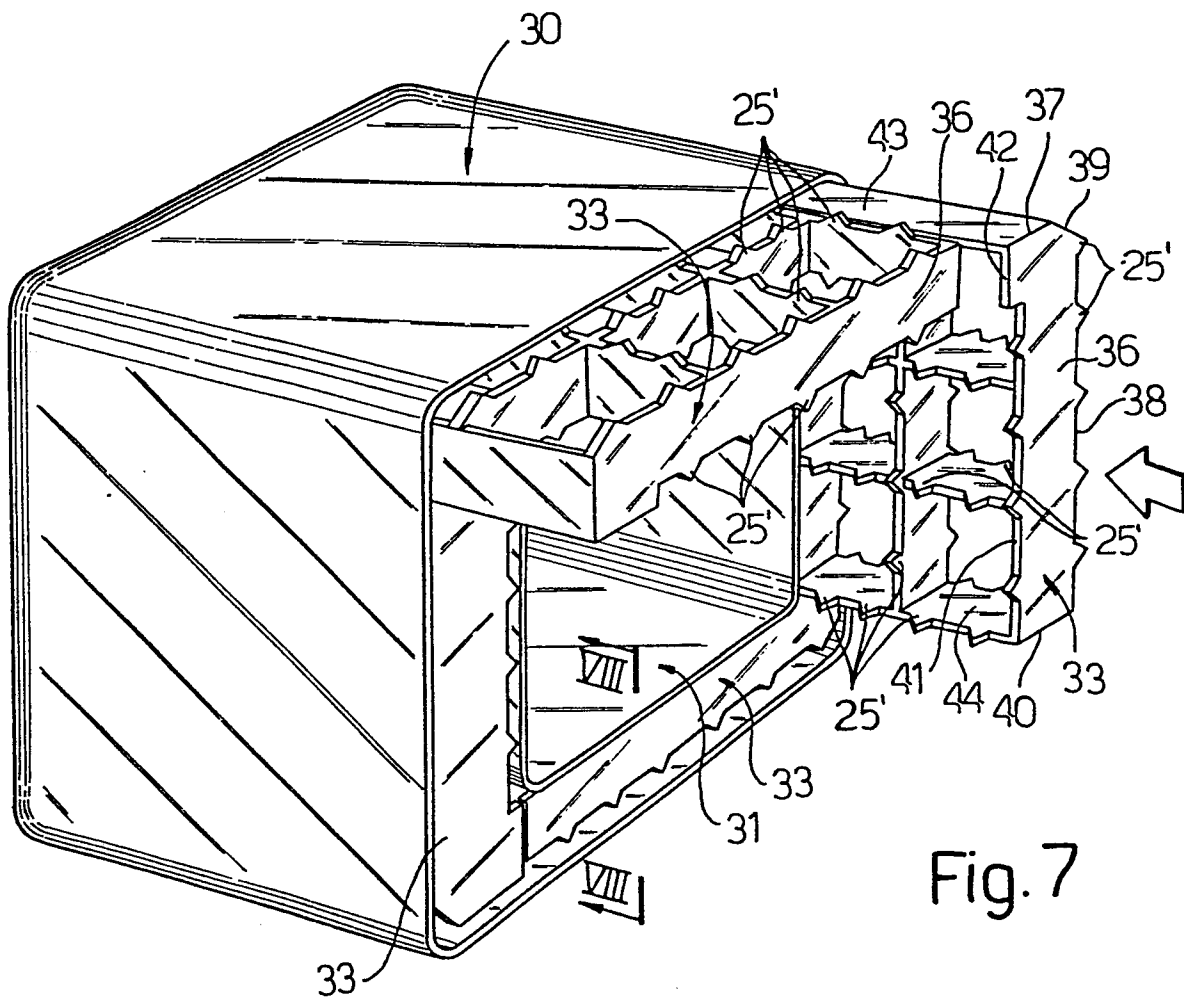
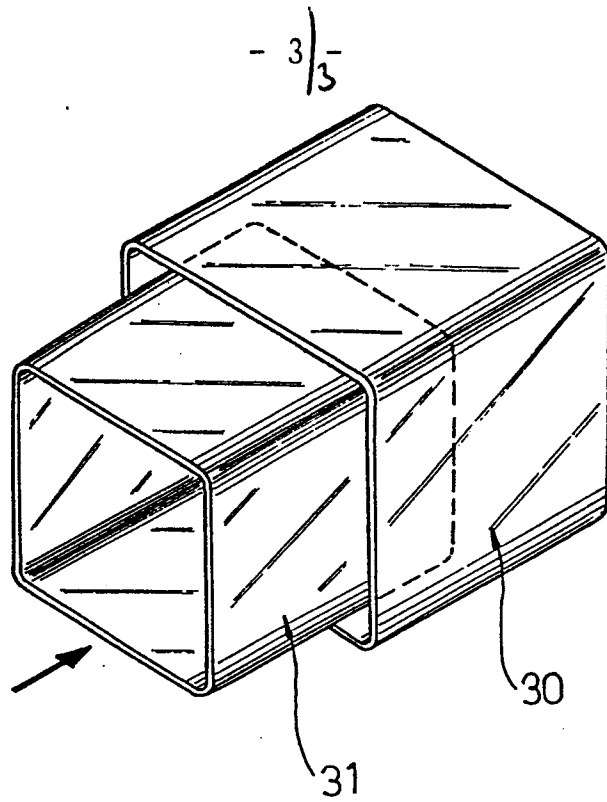


Fig. 9





European Patent
Office

EUROPEAN SEARCH REPORT

0071090

Application number

EP 82 10 6317

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Category	Citation of document with indication where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Y	--- US-A-1 459 280 (C.G.CARD) *Page 1, lines 49-70; page 1, lines 85-99; figures 1,2,4,6*	1-6, 19 , 22, 24 -27	F 25 D 23/06
Y	--- DE-C- 715 485 (F.WALTER) *The whole document*	1-6, 19 , 22, 24 -27	
A	--- US-A-2 065 608 (C.G.MUNTERS) *Page 2, line 4 - page 4, line 37; figures 1-6*	1-4, 6, 11-14, 19, 22, 27	
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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 20-10-1982	Examiner SILVIS H.
CATEGORY OF CITED DOCUMENTS			
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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 20-10-1982	Examiner SILVIS H.
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			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-10-1982	Examiner SILVIS H.
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