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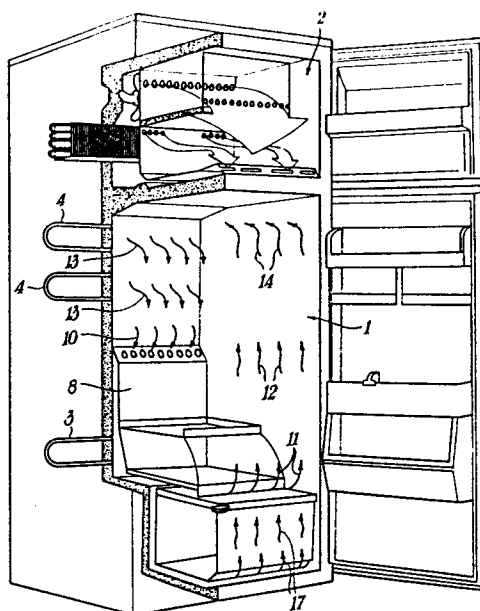
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⑤④ **Cooling circuit having a static evaporator for a refrigerating compartment with zones at different temperatures.**

⑤⑦ A cooling circuit having a static evaporator for a refrigerating compartment with zones at different temperatures, said cooling circuit comprising a static evaporator which is made up of a number of elements (3, 4) that are fed in series by the compressor, a conveyor wall (8) being also provided within said refrigerating compartment (1), said wall (8) forming a way for the flow of descending cold air, a port (16) being also provided arranged at a lower part with respect to said conveyor wall (8), which port (16) creates a way for the flow of descending cold air through the zone of the refrigerating compartment adjacent to the housing zone (5) of the compressor.



COOLING CIRCUIT HAVING A STATIC EVAPORATOR FOR A RE-
FRIGERATING COMPARTMENT WITH ZONES AT DIFFERENT TEM-
PERATURES

The present invention relates to a cooling circuit having a
5 static evaporator for a refrigerating compartment containing zones at
different temperatures. More particularly, the present invention re-
lates to a cooling circuit that allows two or more zones at different
temperatures to be obtained within the refrigerating compartment of a
refrigerator, employing a static evaporator as a cooling system.

10 At the present time, refrigerators which are commercially a-
vailable employing a static evaporator for cooling the refrigerating
compartment have within said compartment a substantially uniform temper-
ature distribution, except for a slight stratification of colder temper-
atures at the bottom.

15 Anyway, the maximum temperature difference occurring between
the various zones is of about 2-3°C.

In order to obtain a refrigerating compartment having zones at
different temperatures, some refrigerators are proposed at the present
time on the market which make use of a ventilated evaporator also for
20 said refrigerating compartment together with some different types of ad-
justable channel means that allow the refrigerating air flow to be con-
veyed into said compartment.

On the other side, said coupling gives rise to a number of eco-
nomic drawbacks originating from the employment of a ventilated evaporator
25 as well as from the presence of said channel means.

Moreover, ventilated evaporators are employed in freezing com-
partments as the dehydrating action of such evaporators on foodstuffs which

are usually stored within the refrigerating compartment causes said foodstuffs to be badly conserved.

5 In addition to the solution mentioned above, some other solutions have been proposed which are all characterized by very significant difficulties of a constructive kind.

It is also well evident that, in order to warrant a good conservation of all foodstuffs stored within the refrigerating compartment, it is necessary to have within said compartment zones at different temperatures.

10 More particularly, the ideal temperature for a good conservation of eggs, butter, milk etc. is of about 5°C, whereas in the case of vegetables and fruit the ideal temperature is of about 7° and for meat and fish it is of about 0°C.

15 From these date it can be observed that the temperature differences are quite high and that remarkable technical difficulties undoubtedly arise in the attempt at obtaining a temperature difference, ΔT , of about 7-8°C within the same room and by means of the same cooling system.

20 It is quite evident from the above that it is very important to have at once disposal a cooling system such as that proposed by the Applicant, said system allowing to obtain said zones at different temperatures within the refrigerating compartment through the employment of a static evaporator.

25 To obtain said object, the present invention proposes the realization of a static evaporator cooling system comprising a number of opportunely sized series-connected elements so as to obtain the desired temperature in each zone, said different temperatures being obtained also due to a suitable structural exploitation of cold air tendency to

become layered toward the bottom of a space.

Accordingly, it is a specific object of the present invention a cooling circuit having a static evaporator for a refrigerating compartment with different temperatures, said cooling circuit comprising
5 a static evaporator consisting of different elements which are series-fed by the compressor in the rising direction, a number of conveyor wall means being provided within said refrigerating compartment, which means form a way for the flow of the descending cold air as well as port means which are arranged inferiorly with respect to said conveyor wall
10 means, which port means form a way for the descending cold air through the zone of the refrigerating compartment adjacent to the zone wherein the compressor is housed.

According to the particularly preferred embodiment of the cooling circuit of the present invention, said static evaporator is made
15 up of two series-connected elements which are fed by the compressor in the rising direction, the first one of said elements having a cooling power lower than that of the second one which is arranged within the upper zone of said refrigerating compartment.

Again according to the present invention, said conveyor wall
20 means are arranged in the parallel direction with respect to the bottom wall of the refrigerator, in correspondence to the first of said elements of the static evaporator, so as to convey cold air coming from the upper zone of the refrigerating compartment into such zone.

In addition, said port means are arranged at the lower part
25 with respect to the cooling zone that is cooled by said first element, so as to convey a part of cold air canalized between said conveyor wall means and said back wall of the refrigerating compartment in the lowest zone of said refrigerating compartment.

Advantageously, according to the present invention said ele-

ments of the static evaporator, said conveyor wall means and said port means are so sized as to obtain within the refrigerating compartment three zones at different temperatures, respectively with the highest temperature at the bottom part, the lowest temperature at the middle part and the middle temperature at the top part.

More particularly, said three zones will be respectively at temperatures of about +7°C, about 0°C and about +5°C.

The present invention will be disclosed in the following for illustrative but not for limitative purposes with particular reference to the Figures of the enclosed drawings, wherein:

Figure 1 shows a schematic view of a longitudinal vertical cross section of a refrigerator working on a cooling circuit according to the present invention;

Figure 2 shows an exploded perspective view of the refrigerator of Figure 1; and

Figure 3 shows a refrigerator working on a cooling circuit according to the present invention with the indications pointing out the zones at different temperatures.

With reference now to Figures from 1 to 3, numbers 1 and 2 point out respectively the refrigerating compartment and the freezing compartment.

The cooling circuit of the refrigerating compartment 1 only will be disclosed, because the realization of the cooling circuit of the compartment 2 is independent of the object of the present invention.

The static evaporator is made up of a number of series-connected elements. Just two elements are shown in the figure, which are pointed out by the reference numbers 3 and 4, but it is clearly evident

that a number of said elements can be provided which can be varied according to the specific needs.

5 The compressor of the cooling circuit is housed as usually within the housing 5 arranged in the back lower zone of the refrigerating compartment.

Combining opportunely the elements of the cooling circuit with the tendency of cold air to become layered towards the bottom space, various temperature combinations can be obtained, one of said combinations which is of special interest being represented in the
10 figures.

The element 4 of the evaporator shown in Figure 1 is of such a size as to obtain a temperature of about +5°C within in the zone 6 of the compartment 1; see also Figure 3.

15 The element 3 of said evaporator is in turn of such a size as to obtain an average temperature of about 0°C within the zone 7 of said compartment 1.

In order to obtain such temperature in the zone 7 without oversizing the element 3, a conveyor wall 8 is arranged parallel to the bottom wall 9 of the compartment 1, which wall forms a forced way for
20 the flow of cold air descending from the zone 6 as shown by the arrows 10, 11 and, after said air has heated subtracting heat from the environment of said zone 7 according to arrow 12 (see Figure 2).

Arrows 13 and 14 point out respectively the direction of cold air created by said element 4 within the zone 6 and of the hotter air
25 coming from the bottom space.

In order to obtain a right working of such cooling circuit also with very low working percentages of the compressor it is necessary that

the two elements 3 and 4, and in general the elements provided as desired, are fed in the rising direction, i.e., the element 3 is to be fed first, whereas the element 4 is to be fed after it.

5 Thus, two zones are obtained within said compartment 1, the upper zone being at about +5°C whereas the lower zone is at about 0°C, i.e. at the optimal temperatures for storing foodstuffs such as milk, butter, cheese and the like, and meat.

10 In order to obtain in the lower part of said compartment 1 a zone at an average temperature of about 7°C, which zone is pointed out in the figures by the reference number 15, it will be sufficient to make the port 16 for the flow from the zone 7 of a suitable size so that a part of cold air conveyed by means of the conveyor wall 8 as well as a part of cold air created by the element 3 of the static evaporator both flow through said port 16 instead of following the path
15 pointed out by arrow 11, said air flow going out of the lower part of said zone 15 following the direction of arrow 17 (see Figure 2).

Thus a zone has been obtained at an average temperature which is optimal for storing fruit and vegetables, with no need for any further element of the static evaporator, just at a point corresponding to
20 the space in which such foodstuffs are stored usually.

The present invention has been disclosed according to some preferred embodiments of the same, but it is to be understood that modifications and changes can be introduced into the invention by those who are skilled in the art without departing from its spirit and scope
25 for which a priority right is claimed.

CLAIMS:

1. A cooling circuit for a refrigerating compartment having zones at different temperatures, said cooling circuit being characterized in that it comprises a static evaporator which is made up of a number of cooling elements that are fed in series and in the rising direction by the compressor, conveyor wall means being also provided within said refrigerating compartment, which means create a way for the flow of the descending cold air, and port means being also provided which are arranged at a lower position with respect to said conveyor wall means, said means creating a way for the flow of the cold descending air through the zone of the refrigerating compartment which is adjacent to the zone wherein the compressor is housed.

2. A cooling circuit according to claim 1, characterized in that said static evaporator is made up of two series-connected elements which are fed in the rising direction by the compressor, the first of said elements having a cooling power lower than that of the second of said elements, which in turn is arranged within the upper zone of said refrigerating compartment.

3. A cooling circuit according to claim 2, characterized in that said conveyor wall means are arranged in a direction parallel to the bottom wall of the refrigerating compartment in correspondence to the first of said elements of the static evaporator.

4. A cooling circuit according to claims 2 or 3, characterized in that said port means are arranged at a lower part with respect to the zone which is cooled by said first element of said static evaporator.

5. A cooling circuit according to any of the preceding claims, characterized in that said elements of the static evaporator are of such

a size as to obtain inside the refrigerating compartment three zones at different temperatures, the highest temperature being obtained in the bottom part, the lowest temperature being obtained in the middle zone whereas the middle temperature is obtained in the top space.

5 6. A cooling circuit according to claim 5, characterized in that said three zones are respectively at temperatures of about +7°C, about 0°C and +5°C.

10 7. A cooling circuit having a static evaporator for a refrigerating compartment having zones at different temperatures according to each one of the preceding claims substantially as illustrated and disclosed above.

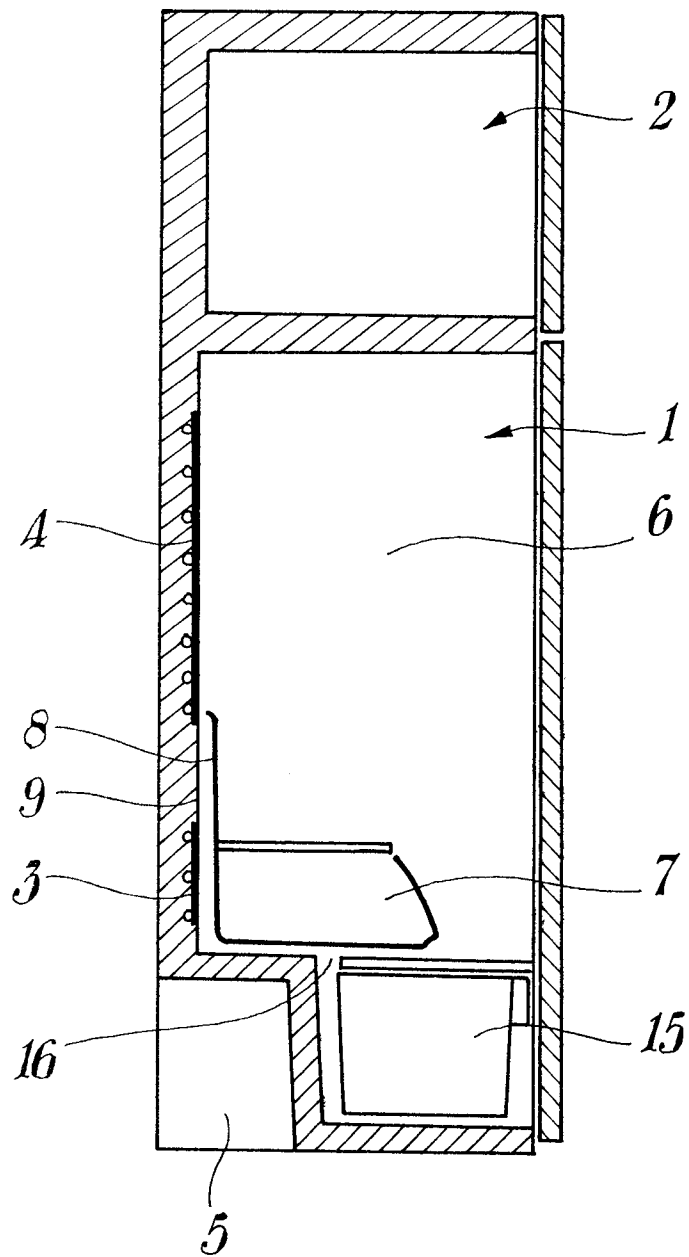
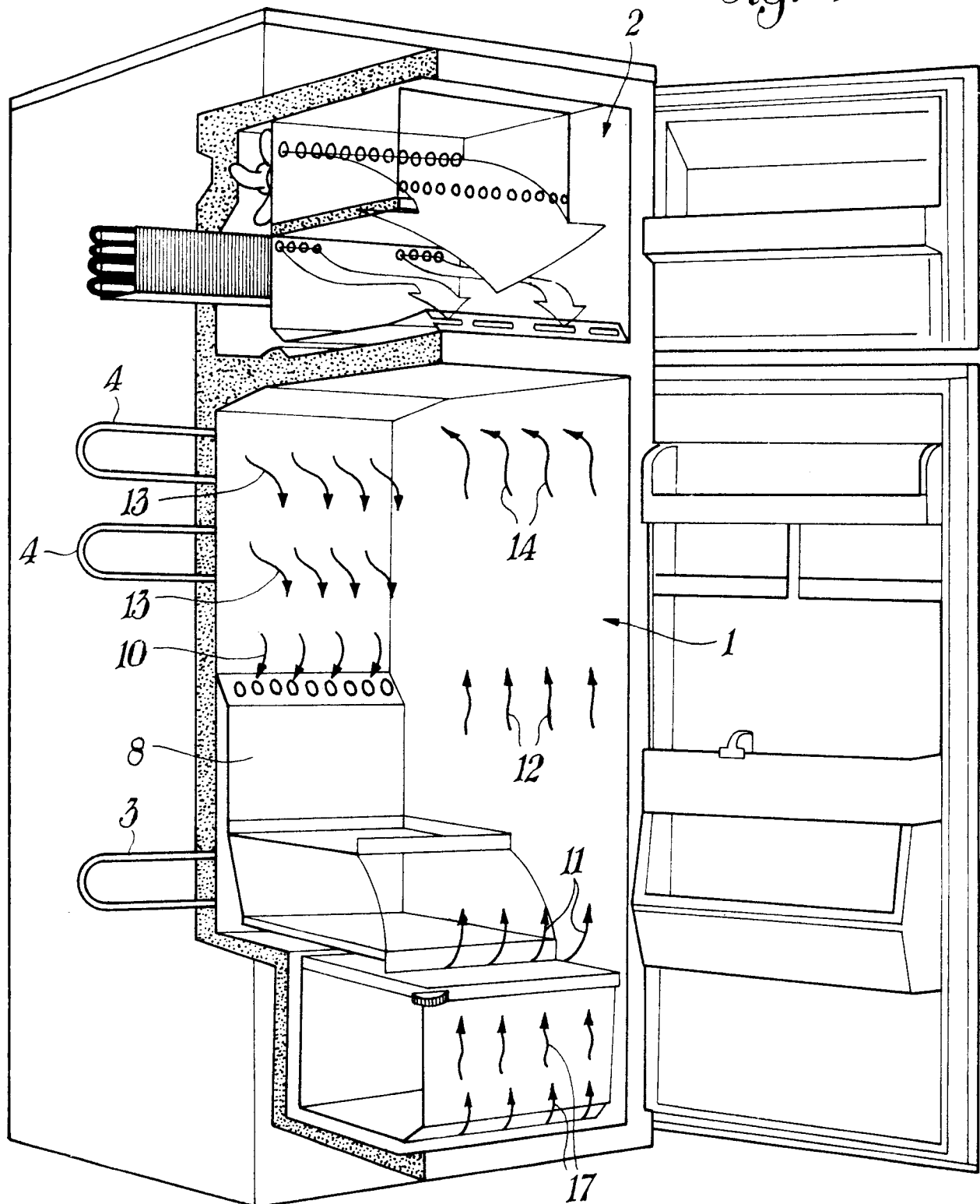
*Fig. 1*

Fig. 2



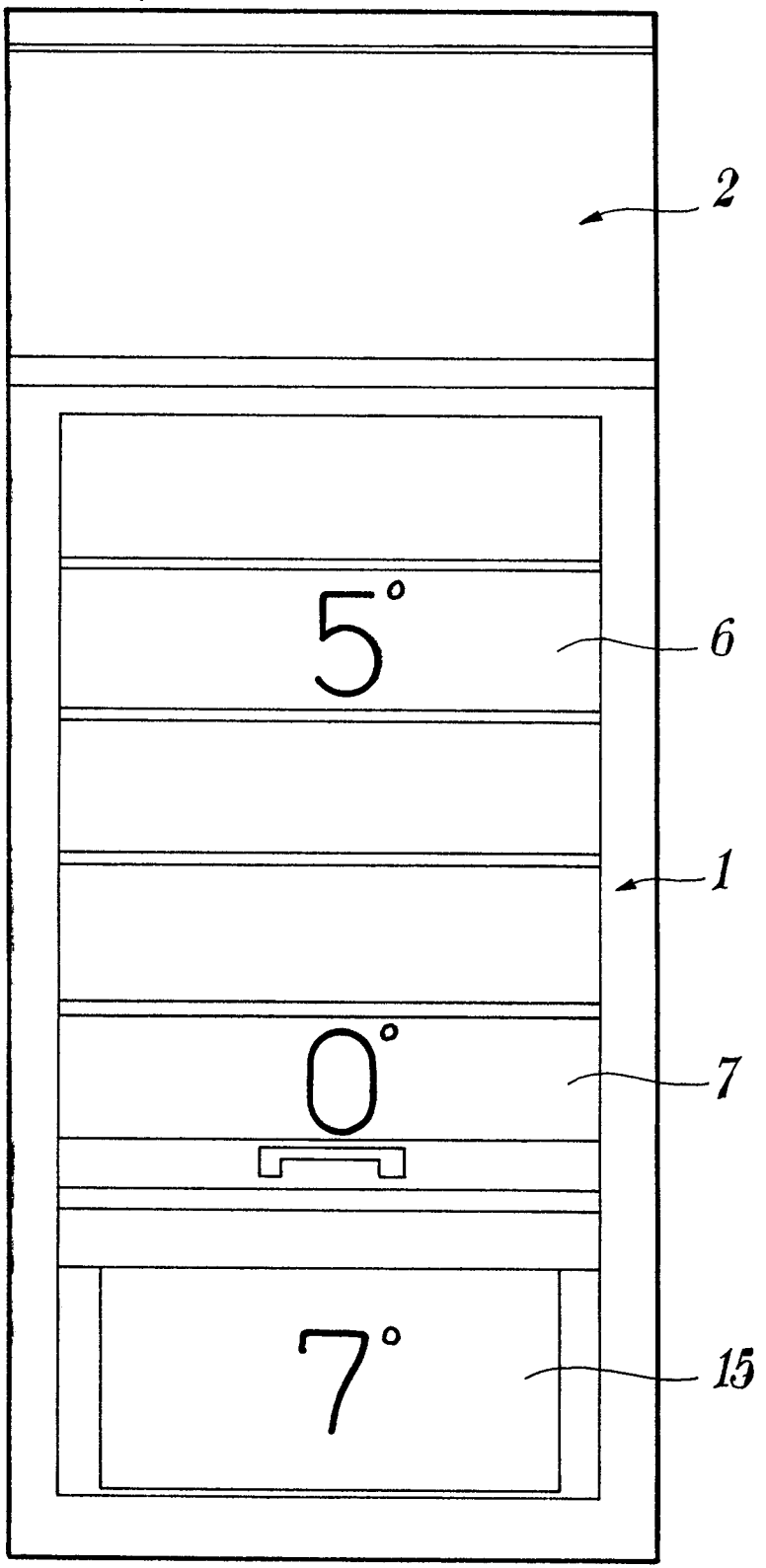


Fig. 3