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(54) A cooling chamber

(57) Interior space of cooling chamber (1) which is developed by this invention is separated into at least two different compartments (2, 3, 4), by at least one separator (5). Said separator (5) consists of at least two parts (8, 9a). At least one spring (11) is placed on at least one of said parts (8, 9a) and it pushes other part (9a, 8). One single spring gap (10) can be formed on parts (9a, 8), for placement of each spring (11) on parts. There is an air flow gap (12) on at least one of the parts (8, 9a) for adjustment of temperature of each compartment (2, 3, and 4). The compartments (2, 3, 4) formed by means of separator (5) can be in different sizes and temperatures by adjustment of said space (12).

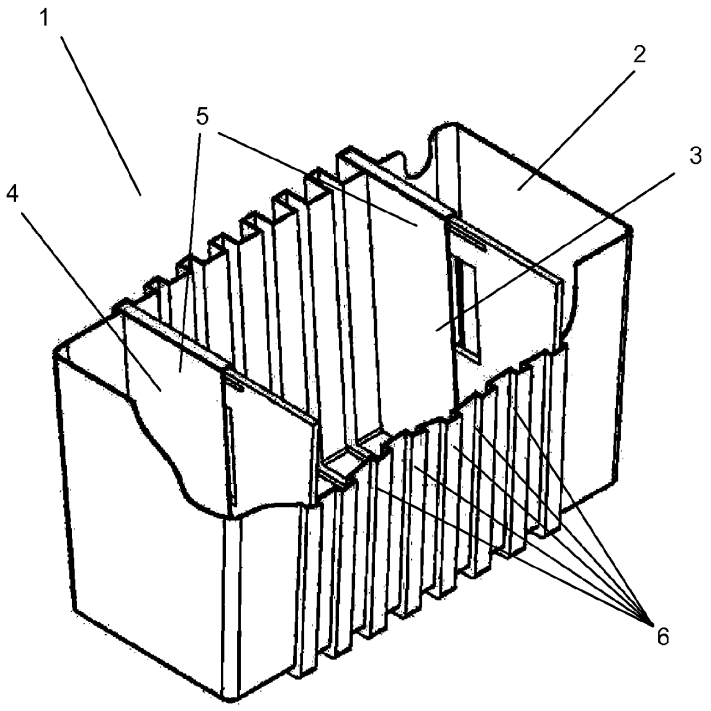

Figure 1

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Description

Technical Field

[0001] This invention relates to cooling chambers which are used in cooling devices and where the fruits/vegetables and/or foods to be kept under lower temperatures can be placed and which can be separated into different compartments in different temperatures by means of a separator, and which is developed in order to adjust the spaces of those compartments obtained.

Background of the Invention

[0002] One of the most important problems related to coolers is that the space of shelves and chambers can not be adjusted for user's momentary needs and/or difficulties encountered during adjusting. In other words, spaces between shelves of regular refrigerators does not meet user's needs and inter-shelf height and/or compartment spaces are needed to be changed, time to time.

[0003] Crisper and 0 °C compartments in a refrigerator are different and crisper can be in different locations and numbers in a refrigerator, in terms of keeping season vegetables fresh. 0 °C compartments are used to keep foods for which lower temperature storage than of crispers is necessary, such as meat and chicken. 0°C compartments can also be in different locations and numbers in a refrigerator as crispers. However, crispers and 0°C compartments are produced in a certain space, foods having higher bulks than this space either can not be stored or they should be divided into smaller pieces in order to store them.

[0004] The patent document numbered WO 2008135391 of to the prior art, mentions the usage of a two-leg separator which has at least one brace and which is used for dividing cooling chamber into compartments. This knitted-grid separator which is used in cooling chambers is held on chamber with locked keys on its feet.

[0005] Since crisper and 0 °C compartments in refrigerators usually have fixed space, user's demands can not be met completely. Thanks to invention of which details are given below, space of crisper and 0 °C compartments can be adjusted in conformity with the needs.

Brief Description of the Invention

[0006] Interior space of cooling chamber of which interior space is adjustable, which is developed with this invention, is divided at least into two different compartments as crisper and 0 °C compartments depending on user's needs and cooling power of each compartment is adjusted accordingly. There is an air flow gap at a fixed location on said separator for adjusting the temperature of each compartment. Said gap contains a part directed to adjust the gap in required manner according to location of the separator. Span of said gap is adjusted and amount of cool air flow into the compartment is regulated by this part.

Objective of the Invention

[0007] The aim of this invention is to develop a cooling chamber of which interior space is adjustable directed to usage of crisper and 0 °C compartments in a refrigerator, in different space in the same cooling chamber, by meansof a moving separator.

[0008] Another aim of this invention is to develop a cooling chamber the compartment space, and therefore their cooling capacities, of which can be adjusted.

[0009] Another aim of this invention is to develop a cheap, secure, and easily demountable cooling chamber the space of which is adjustable.

Description of Drawings

[0010] A sample space-adjustable cooling chamber is illustrated in attached figureswherein;

Figure 1 is an outlook of cooling chamber as separated into crisper and 0 °C compartments with separator.

Figure 2. is the side view of cooling chamber

Figure 3. is the top view of cooling chamber.

Figure 4. is the disassembled view of the separator.

[0011] Parts in figures are individually enumerated and their correspondences are given below;

Cooling chamber	(1)
1st compartment	(2)
2nd compartment	(3)
3rd compartment	(4)
Separator	(5)
Separator bearing	(6)
Separator bearing's end	(7)
Separator's parts	(8, 9a)
Exterior part	(9b)
Spring clearance	(10)
Spring	(11)
Air flow gap	(12)
Air intake channel	(13)
Air outlet channel	(14)

Disclosure of the Invention

[0012] An outlook of a space-adjustable cooling chamber (1) is shown in Figure 1. The separator (5), developed in the scope of present invention, is developed for separating the chamber (1) into compartments by seating into opposite slots (6) in the chamber (1). As shown in

said figure, cooling chamber (1) is separated into three compartments by two separators (5). 1st compartment (2) at one side of chamber (1)and 2nd compartment (3) in the middle, are, for example 0 °C compartment and the 3rd compartment (4) at the other side is for example crisper compartment. Chamber (1) can be separated into two compartments (2 and 3) by using single separator (5) or separator (5) can be removed completely and the chamber becomes single compartment as shown in figures 2 and 3 and usage space becomes larger, if required.

[0013] Said separator (5) includes at least two parts (8 and 9 a), which slide on each other and preferably in the form of a plate. There is at least one spring (11) on at least one of these parts (8 and 9 a) which pushes other part (9a or 8). Single spring gap (10) can be formed on aforementioned parts (8, 9a) for location of each spring (11) on parts (8, 9a).

[0014] At least one gap (12) is formed on at least one (8 or 9a) of mentioned parts (8, 9a). Said gap (12) is developed for creating air flow at each side of the separator. Thanks to this air flow gap (12), temperature of compartments formed by means of separator (5) can be adjusted according to user's requirement.

[0015] Span of the air flow gap(12), can vary depending upon locations of two parts (8, 9a) with respect to each other. Locations of those two parts (8, 9a) with respect to each other are determined by distance between edges (7) of slots (6) in which the separator (5) is inserted.

[0016] There is at least a pair of separator slots (6) in which the separator is inserted on opposite walls of sample cooling chamber (1) shown in figure 2. One edge (7) of those slots is placed at one side and the other edge (7) is placed at the other side of chamber (1). Said slots (6), can be formed in various shapes and those slots (6) protrude from opposite sides of chamber (1) in chambers (1) shown in sample chambers of Figure 1 to 3. Distances between the edges (7) of separator slots (6) placed at the opposite sides of chamber (7) vary with respect to each other. This difference among distances between opposite edges (7) ensures adjustment of air flow space (12). A sample cooling chamber (1) including separator slots (6), distance between opposite edges (7) of which are different with respect to each other, is shown in Figure 3. When the separator (5) inserted in the first slot (6) on the right (the separator slot (6) the distance between opposite edges of which is shortest with respect to others), parts (8, 9a) of separator (5) are close to each other and therefore the gap (12) is narrower. If the separator (5) is inserted in the first slot (6) on the left, (the separator slot (6) distance between opposite edges of which is longest with respect to others) gap (12) is wider since the parts (8 and 9a) of separator (5) diverge. Thus the slots (6), the distances between opposite edges of which is different from each other, adjust the span of gap (12) and therefore the amount of cool air flow.

[0017] Although, as shown Figure 1, distance between opposite edges (7) of separator slots (6) on opposite sides of sample cooling chamber (1) increases from left to right, it can be adjusted in different shapes according to usage purposes.

[0018] As shown in Figure 4 which is given as an example of said separator (5) application, span of air flow gap (12) can also be adjusted by an exterior part (9b). Said exterior part (9b) moves on separator (5) in a way to adjust the span of air flow gap (12). Thus, air flow gap (12) can be closed by exterior part (9b) in cases where compartment of chamber (1) which is separated considering requirement is desired to be large but air flow amount is desired to be less. Considering the sample cooling chamber (1) given in Figure 3, when the separator (5) is inserted in the slot (6) distance between opposite edges of which (7) is most (the slot on the leftmost slot (6) in figure (3)), a large compartment will be formed at one side of separator (5). However, when a large compartment is obtained, air flow gap (12) becomes larger. When the user desires to use said large compartment with less air flow amount, he/she can adjust the span of air flow gap (12) by moving the exterior part (9b) on separator (5).

[0019] Exterior part (9b) can also be considered as the cover of the part (8 or 9a) on the spring (11) as shown in Figure (4).Thus, springs (11) on the part (8 on 9a) can be covered and an aesthetic view can be obtained. Besides, exterior part (9b) can move as sliding on the parts of separator (5).

[0020] The amount of air flow, required to keep the compartments having various spaces which are obtained by using above explained separator (5) in desired temperatures, is determined as a result of quantitative and experimental tests carried out during its design. Air which exits from air outlet channel (14), was controlled primarily by providing intake of air in certain temperature from air intake channel (13) into chamber (1)

[0021] Temperatures of compartments on both sides of separator (5) were also checked by thermal flow analysis during these measurements. The temperature of compartment containing air intake channel (13) of compartments determined by separator (5) takes values close to the temperature of air provided from air intake channel (14), and temperature of other compartment takes values higher than the temperature of provided air intake. Considering the cooling chamber (1) given as example in Figure 2; when the separator (5) is inserted in the slot (6) closest to air intake channel (13), the gap (12) span of separator will be least. When this situation carried upon thermal sample; air, for example in the temperature range of -1, 0-0, 2 °C and time range of 0, 6-0, 8 m/s was provided and temperature values of compartments were examined. As result of test, it is observed that the temperature of compartment contains air intake channel (13) was in the range of -2, 3 °C and the temperature of compartment on the other side of separator (5), which contains air outlet channel was in the range of 8-10 °C.

[0022] As a result of these measurements, in compartments formed by using separator (5), amount of air flow

between compartments can be controlled owing to gap (5) on any part of separator (5) and different temperatures can be obtained in different compartments. Degree of the span of gap (5) formed to ensure temperature differences between compartments is determined during tests carried out on above explained thermal model. Air flow amount necessary for desired temperature value of each formed compartments determined during test phase and degree of span of gap (12) necessary according to determined air flow amount is ascertained.

[0023] In another embodiment of invention, low thermal conductor (thermal insulator) materials can be used as separator material in order to prevent condensation on separator (5) results from temperature difference.

Claims

1. A cooling chamber (1) which is used in cooling devices in which the food products are stored and can be separated into different compartments by at least one separator (5) **characterized in that** it comprises;

   - At least two parts (8;9a) of said separator (5) which can slide on each other
   - At least one spring (11) upon at least one of said parts (8, 9a) and pushes other part (9a,8);
   - At least one air flow gap upon at least one of said parts (8, 9a), and of which span can vary depending on location of parts (8,9a) with respect to each other. At least one pair of separator slots (6), between (7) which the separator (5) is inserted, and the edges of which are on opposite sides of chamber.

2. A cooling chamber (1) according to Claim 1, **characterized in that** it comprises;
   at least one exterior part (9b), which adjusts the span of air flow gap (12) and which can move on at least one of said parts (8, 9a)

3. A cooling chamber (1) according to Claim 2 **characterized in that**; the movement of said exterior part (9b) on separator parts (8, 9a) is sliding movement.

4. A cooling chamber (1) according to Claim 1 **characterized in that** its said parts (8, 9a) are in the form of plate.

5. A cooling chamber (1) according to Claim 2 **characterized in that**; the said exterior part (9b) is in the form of plate.

6. A cooling chamber (1) according to Claim (1), **characterized in that**; the said separator (5) is made of low thermal conductive (thermal-insulator) material.

7. A cooling chamber (1) according to Claim (1) **characterized in that** it comprises;
   at least one spring gap (10) provided on at least one part (8, 9a) where at least one spring (11) inserts in.

8. A cooling chamber (1) according to Claim 1 **characterized in that** it comprises;
   more than one pair of separator slots (6), distance between edges of which (7) varies with respect to each other.

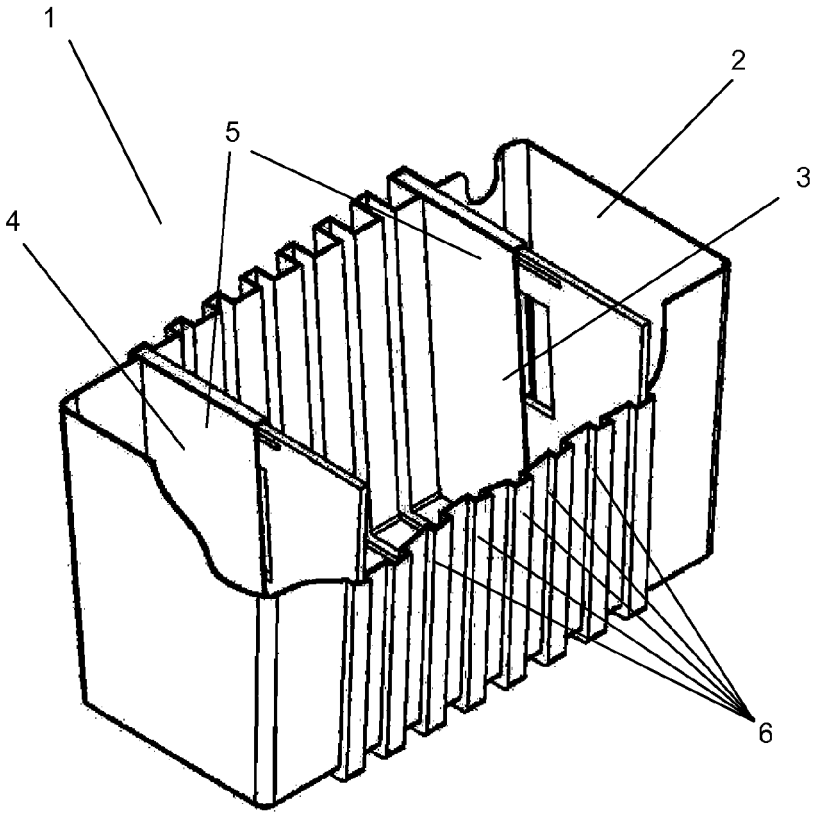

Figure 1

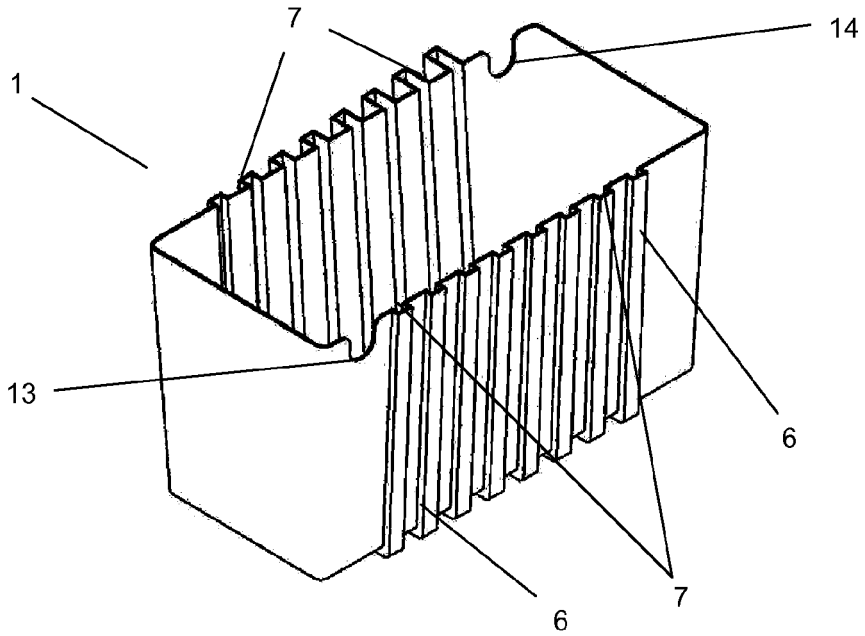

Figure 2

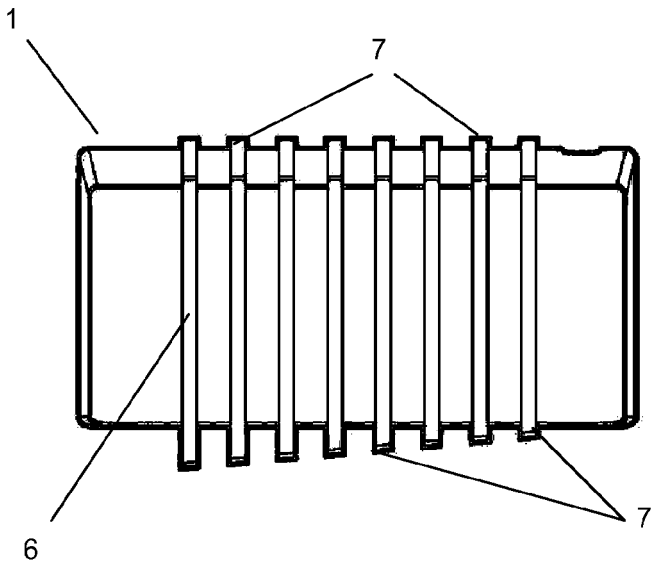

Figure 3

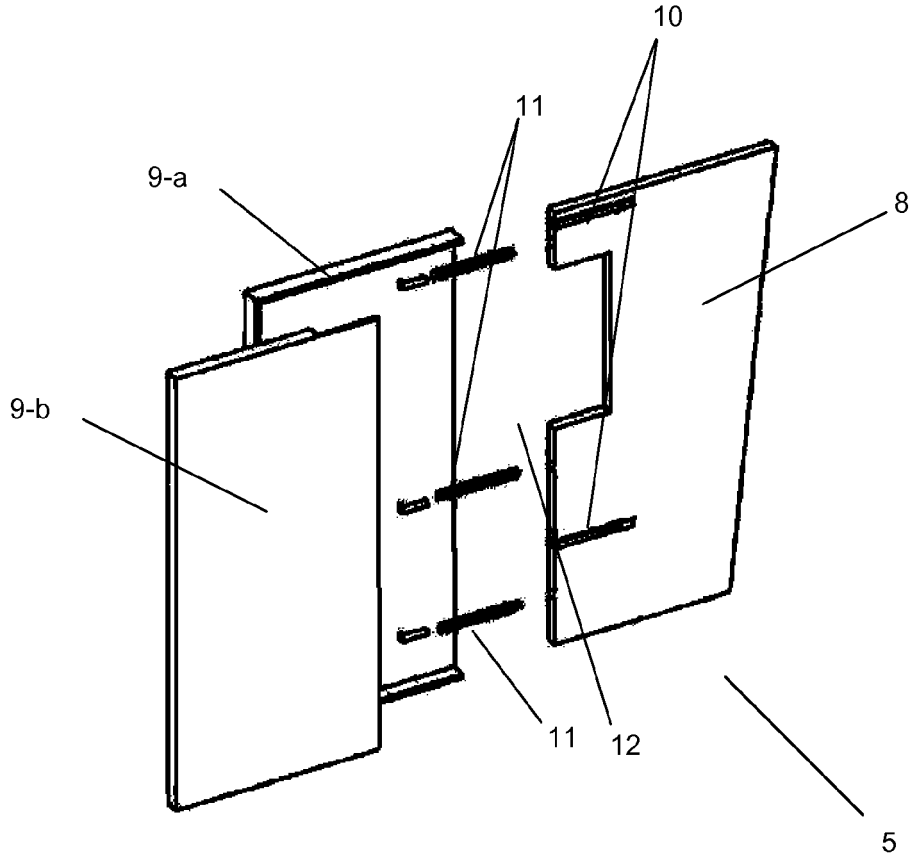

Figure 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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