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Description

BACKGROUND OF THE INVENTION

[0001] Embodiments of the invention concern a crate or container for accommodating products, more specifically, embodiments of the invention concern a plastic crate that is provided for receiving and/or for transporting foods, like fruits, vegetables, meat and the like.

[0002] Crates for storing and transporting products such as fruits and vegetables are widely used in the market. Such crates are light and stable which makes them suitable for bringing the crops from the field to the customer. For example, for tropical fruits like bananas, it is common to harvest the crop while it is still unripe and pack it into the crates for subsequent shipping and transportation. On this journey, the fruits have time to ripen. Also, other fruits like apples or the like, or vegetables like lettuce or the like, but also meat or eggs may be put into the crates at the producers site and transported using such crates.

[0003] The crates may be used for transporting foods, like vegetables, fruits and meat or the like. These products may require cooling and it is therefore desired to provide to the interior of the crate a cooling liquid, like ice-water or the like ensuring that the goods stay fresh and/or at a desired temperature. While the crates, in general, have openings in the side walls and the bottom for allowing the circulation of air, these openings may not be sufficient to allow a sufficient flow of cooling liquid into the interior of the crate, for example, when using ice-water, it may well be that ice particles are within the fluid stream which cannot pass the holes provided for air ventilation and, that may actually block the holes, thereby avoiding that the liquid reaches the interior of the crate.

[0004] EP 0 846 633 A1 describes a durable container according to the preamble of claim 1 and claim 2 for storing and transferring crops, such as fruits and vegetables, from the field to market is described. The container is adapted to provide efficient air or water circulation for the preservation of crops. Particularly, the container contains openings in the floor and the sides of the container, which are of a defined size and proportion of the total area, to allow for effective air or water circulation.

[0005] US 4,184,625 A describes a container for fresh products such as asparagus comprising the combination of an open box body having interconnecting front, bottom, back and end walls, the walls having a substantially rectangular configuration, an insert positionable in the box body and defining therewith an interior of trapezoidal-shaped cross-section for accommodating the fresh products, and a cover for placement over the box body and the insert. The box body allows hydro-cooling the products by flooding the products in the box body with ice water.

SUMMARY OF THE INVENTION

[0006] It is an object of the invention to provide a crate having sufficient openings in the side walls for introducing a cooling liquid, the side walls also having vent holes of smaller dimension, without reducing the structural integrity of the side walls.

[0007] This object is achieved by a crate according to claim 1 or claim 2.

[0008] In accordance with embodiments the invention provides a crate including a bottom, two end walls, and two side walls. At least one of the end and side walls comprises a plurality of inlets for introducing a predefined amount of cooling liquid into the interior of the crate. The side walls have a continuous stiffening member extending parallel to the first and second lateral edges and parallel to the upper edge. A first inlet is provided at the left portion of the side wall at a distance from the lower edge with a part of the continuous stiffening member between the second inlet and the first lateral edge and the upper edge. A second inlet is provided at the right portion of the side wall at a distance from the lower edge with a part of the continuous stiffening member between the second inlet and the second lateral edge and the upper edge.

[0009] In accordance with embodiments, at least two opposing walls may comprise a plurality of inlets, for example each side wall may comprise a plurality of inlets.

[0010] In accordance with other embodiments the continuous stiffening member has a U-shaped portion in a central area extending toward the lower edge. The first inlet is provided at the left portion of the side wall at a distance from the lower edge with a part of the continuous stiffening member between the second inlet and the first lateral edge, the upper edge and the central area. The second inlet is provided at the right portion of the side wall at a distance from the lower edge with a part of the continuous stiffening member between the second inlet and the second lateral edge, the upper edge and the central area.

[0011] In accordance with embodiments, in the central area of the side wall a third inlet may be provided at a distance from the upper edge and with a part of the continuous stiffening member between the third inlet and the lower edge, the left portion and the right portion. The third inlet may have a dimension that is smaller than the dimension of the first and second inlet. The inlets may be provided with a lattice having a mesh size allowing the passage of a liquid, for example, ice-water having ice particles therein.

[0012] Embodiments of the invention may provide crates that are formed of plastic and that are provided for receiving and/or transporting foods, like fruits, vegetables, meat and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Embodiments of the invention will be described with reference to the accompanying drawing, in which:

Fig. 1 is a perspective view of an exemplary crate;

Fig. 2 is a side view of the exemplary crate of Fig. 1;

Fig. 3 is a schematic representation of one layer of a stack of exemplary crates provided in the 5-down configuration;

Fig. 4 shows a side wall of an exemplary crate having a modified stiffening member;

Figs. 5(a)-(c) show different configurations of the modified stiffening member of Fig. 4;

Fig. 6 shows a side view of the crate in accordance with embodiments of the invention; and

Fig. 7 shows a similar arrangement as in Fig. 6, except that the side wall has a structure as shown in Fig. 4.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0014] Figs. 1 to 5 concern exemplary crates that do not form part of the invention but represent background art that is useful for understanding the invention. Fig. 1 is a perspective view of the exemplary crate 100 comprising a bottom 102 that may comprise a plurality of openings 104. The crate 100 further comprises a first end wall 106a and a second end wall 106b being opposed to the first end wall 106a. Further, two opposing side walls 108a and 108b are provided opposite to each other. As can be seen, the side walls 108a and 108b are longer than the end walls 106a and 106b. The side walls and end walls may be foldable towards the bottom 102 such that, for example, first of all the end walls 106a and 106b are folded onto the bottom and then the side walls 108a and 108b are folded towards the bottom. The dimension of the side walls in the height direction may be such that upon folding same towards the bottom, the side walls may overlap. The advantage of folding the side walls and end walls towards the bottom is that the remaining volume of the crate is minimal, so that in the folded state the crate occupies only a low height, so that a large number of empty crates may be stacked, for example onto a single pallet for transport. The crate may be made of plastic, thereby providing a low weight and a high stability for storage and/or transport applications. Besides the holes 104 in the bottom 102 also holes 110 are formed in the respective walls and may provide vent holes. Further, larger holes 112a and 112b are provided in the upper part of the end walls 106a and 106b, the holes 112a and 112b defining grip holes. As can be seen, an upper edge 114a and 114b of the end walls may have an increased thickness thereby ensuring that carrying the crate when gripping the grip holes 112a and 112b is secure and that a sufficient strength of the portion of the end wall above the grip holes is provided.

[0015] Fig. 2 shows a side view of the exemplary crate 100. In Fig. 2(a) the first side face 108a is shown that extends upward from the bottom 102. As mentioned above, in case the crate is a foldable crate, Fig. 2(a) shows the side wall 108a in its upright position or unfolded position. Further, a plurality of vent holes 110 is shown. The side wall 108a comprises a stiffening member 126 having a first part extending parallel to a first lateral edge 118 of the side wall 108a. The lateral edge 118 is, for example, adjacent to the first end face 106a shown in Fig. 1. The stiffening member 126 also extends parallel to a second lateral edge 120 of the side wall 108a wherein the second lateral edge 120 is adjacent to the second end wall 106b. The stiffening member further extends parallel to an upper edge 122 of the side wall 108a wherein the upper edge 122 is distant from a lower edge 124 that, in turn, is adjacent to the bottom 102. As is shown in Fig. 2(a), the stiffening member 126 is a continuous stiffening member that is, for example, obtained during molding the plastic side wall 108a, using the water injection molding process. The continuous stiffening member 126 extends, as mentioned above, parallel and adjacent to the first lateral edge, the

upper edge and the second lateral edge in a manner as shown in Fig. 1, and the vent holes 110 are provided in an area of the side wall 108a that is surrounded by the stiffening member 126 and the lower edge 124.

[0016] Fig. 2(b) shows a cross-sectional view of the side wall 108a along the line b-b'. As can be seen, the stiffening member 126 has a hollow structure with a cavity 116a there between that is formed by the water injection molding process and provides for a member having a high stiffness with a reduced amount of material and thereby also with a reduced amount of weight.

[0017] The side wall structure shown in Fig. 2(a) is disadvantageous in situations where a plurality of crates are stacked in the above-mentioned 5-down configuration. Fig. 3 is a schematic representation of one layer of a stack of crates provided in the 5-down configuration. As can be seen, three crates 100a-100c are arranged side by side, i.e. side walls of the crates 100a-100c are adjacent. In addition, two further crates 100d and 100e are arranged adjacent to the end walls of the crates 100a-100c such that two end walls of the crates 100d and 100e are adjacent. Thus, as can be seen from Fig. 3, the shorter end walls of crates 100a-100c abut the longer side walls of the crates 100d and 100e, resulting in the above-mentioned problem that a force that acts onto the side walls of the crates 100d and 100e is high in a central part of the side wall and may result in damaging the crates 100d and 100e in case of a movement of one or more of the crates 100a-100c due to a shock or the like. For example, upon stacking first the crates 100e and 100d are provided and then the further crates 100a-100c are added and during the arrangement of the additional crates 100a-100c they may impact onto the side walls of the crates 100d and 100e, resulting in a possible damaging of the side walls.

[0018] Thus, the stiffening structure of the side wall of the crate shown in Fig. 2(a) which works fine when the crates are arranged parallel to each other like the crates 100a-100c is disadvantageous in case of an arrangement of the crates as shown in Fig. 3.

[0019] Fig. 4 shows a modified stiffening member. Fig. 4 shows the side wall 108a having the modified stiffening member 126. Again, the stiffening member 126 has a first part 126a extending parallel and adjacent to the first lateral edge 118. A second part 126b of the modified stiffening member 126 extends parallel and adjacent to the second lateral edge. The modified stiffening member 126 is also a continuous stiffening member extending continuously from the lower left-hand corner of the side wall 108a along the lateral edge 118 and along the upper edge towards the second lateral edge and downward to the lower right-hand corner of the side wall 108a. The modified stiffening member 126 further comprises in a central area of the side wall 108a a U-shaped portion 128. The U-shaped portion 128 comprises two vertical stiffening member parts 126c and 126d, being substantially parallel to the parts 126a and 126b. Further, a part 126e is provided adjacent to the lower edge 124. In the left and right portions outside the central portion of the side wall 108a the modified stiffening member 126 comprises the parts 126f and 126g being arranged adjacent to the upper edge 122. As mentioned above, the modified stiffening member 126 is a continuous member, i.e. all parts 126a-126g are connected with each other, thereby forming the continuous member in a way as shown in Fig. 4. The vent holes 110 are provided in the left and right portions of the side wall with the stiffening member being provided between the vent holes and the lateral edges 118 and 120, respectively, the

central area and the upper edge 122. In the central area the vent holes are provided with a stiffening member between the left and right portions and the lower edge 124.

[0020] The arrangement of Fig. 4 provides for an increased stiffness of the side wall 108a and the central part, thereby avoiding damages in situations as described above when the plurality of crates are stacked in a 5-down configuration shown in Fig. 3.

[0021] Different configurations of the modified stiffening member 126 may be provided and are now described with regard to Figs. 5(a) to (c). The respective figures show schematically the side wall 108a also described with regard to Fig. 4 with respective modified stiffening members 126. In Fig. 5(a) the side wall comprises two U-shaped portions of the modified stiffening member, both of which extend all the way towards the lower edge. In Fig. 5(b) the U-shaped portion of the stiffening member only extends half the height of the side wall 108a down towards the lower edge. Fig. 5(c) shows a schematic representation of another example using three U-shaped stiffening member portions with different "depths", i.e., extending by different amounts toward the lower edge of the side wall.

[0022] While U-shaped stiffening member portions extending towards the lower edge have been described, it is noted the portion of the stiffening member extending in an area of the side wall away from the lateral edges toward the bottom may be different, for example the portion may be V-shaped or may have, if desired, also an unsymmetrical shape.

[0023] In the following, embodiments of the invention will be described. Conventional crates as described above only provide vent holes 110 allowing for a ventilation of air through the crate. However, for various reasons, for example for rapid cooling of goods inside the crates or for maintaining goods, like vegetables, for example lettuce and the like, at a predefined temperature it may be desired to also supply a cooling liquid, preferably ice-water into the interior of the crate. Since the cooling liquid, like ice-water, may also comprise small ice particles, it is not possible to introduce a desired amount of cooling liquid through the vent holes 110 shown in Fig. 2, rather using ice-water or the like having therein respective particles will result in a blocking of the vent holes and not allowing the introduction of cooling liquid into the interior at all.

[0024] In accordance with embodiments of the invention, a crate is provided that provides a plurality of inlets for introducing the cooling liquid into the interior of the crate, wherein the inlets have dimensions ensuring that the cooling liquid can be introduced as desired.

[0025] Fig. 6 shows a side view of the crate in accordance with embodiments of the invention. Fig. 6 is showing a side wall 108a similar to the one shown in Fig. 2. The side wall 108a comprises the stiffening member 126 and the vent holes 110. In addition, three inlets 200a-200c are provided, wherein the first inlet 200a is provided at an upper left-hand corner of the side wall 108a adjacent to the stiffening member 126. In a similar manner, the second inlet 200b is provided at the upper right-hand corner of the side wall 108a. The third inlet 200c is provided at a central position of the side wall 108a adjacent to the lower edge 124 of the side wall 108a or adjacent to the bottom 102.

[0026] Fig. 7 shows a similar arrangement as in Fig. 6, except that the side wall 108a has a structure as shown in Fig. 4. The stiffening member 126 has the two n-shaped portions and the one U-shaped portion there between and the inlets 200a and 200b are arranged to be in the upper end of the n-shaped portions of stiffening member 126 distant from the lower edge 124 of the side wall 108a. The third inlet 200c is provided at the bottom of the U-shaped portion of the stiffening member 126 adjacent to the lower edge 124 of the side wall 108a.

[0027] The arrangement of the inlet 200a-200c as shown in Figs. 6 and 7 may be advantageous as the inlets 200a and 200b may be larger than inlet 200c and are provided close to the stiffening members, thereby avoiding any reduction of structural integrity of the side wall due to the provision of the inlets having a dimension being larger than the vent holes.

[0028] In accordance with embodiments, the one or more inlets 200a-200c are provided with a mesh having a mesh size that is adapted such that particles provided in the cooling liquid may pass through the mesh without blocking the inlet. While Figs. 6 and 7 show embodiments of the invention having three inlets it is noted that the invention is not limited to such an arrangement. Rather, the number of inlets may be freely selected dependent on the needs, for example one or two inlets only may be provided or more than three inlets. Also, in accordance with embodiments of the invention, the inlets may, alternatively or in addition, be provided on the end walls.

[0029] By means of embodiments of the invention, it is ensured that sufficient cooling liquid, like ice-water may be introduced into the interior of the crates even when same are stacked on a pallet as, for example, when stacking the crates on a Euro-pallet, three crates are arranged side by side in two rows with their side walls adjacent. Thus, the crates in the center of the stack have the side walls adjacent to respective side walls of the respective outer crates, so that when applying the liquid at the outer crates with a sufficient volume it will also pass due to the large inlet to the interior of the crate. The same is true for a 5-down configuration as it may be used in the U.S. and as is shown in Fig. 3. Crates 100a-100c are provided with their side walls adjacent, thereby allowing the flow of the cooling liquid in a manner as just described. For the other two crates 100d and 100e, the cooling liquid can simply be introduced through their side walls facing the outside of the stack.

[0030] Thus, by means of embodiments of the invention, a sufficient flow of cooling liquid is ensured due to the provision of the inlet.

[0031] The above described embodiments are merely illustrative for the principles of the present invention. It is understood that modifications and variations of the arrangements and the details described herein will be apparent to others skilled in the art. It is the intent, therefore, to be limited only by the scope of the claims and not by the specific details presented by way of description and explanation of embodiments herein.

P A T E N T K R A V

1. Kasse, der omfatter:

5 en bund (102);
to endevægge (106a, 106b); og
to sidevægge (108a, 108b),

10 hvor mindst en af ende- og sidevæggene omfatter et antal indløb (200a-200c) til
indføring af en kølevæske i det indre af kassen,

15 hvor hver sidevæg (108a, 108b) omfatter første og andre sidekanter (118, 120)
nær de respektive endevægge (106a, 106b), en nedre kant (124) nær bunden
(102) og en øvre kant (122) fjernt fra bunden (102),

20 **kendetegnet ved, at**

25 den mindst ene af ende- og sidevæggene omfatter et antal lufthuller (110), idet
indløbene (200a-200c) har en større dimension end lufthullerne;

30 sidevæggen (108a, 108b) endvidere omfatter et kontinuert afstivningselement
(116), der strækker sig parallelt med de første og andre sidekanter (118, 120) og
parallelt med den øvre kant (122),

35 et første indløb (200a) af antallet af indløb er tilvejebragt ved et venstre parti af
sidevæggen (108a, 108b) i afstand fra den nedre kant (124) med en del af det
kontinuerte afstivningselement (116) mellem det første indløb (200a) og den første
sidekant (118) og den øvre kant (122), og

40 et andet indløb (200b) af antallet af indløb er tilvejebragt ved et højre parti af si-
devæggen (108a, 108b) i afstand fra den nedre kant (124) med en del af det

kontinuerte afstivningselement (116) mellem det andet indløb (200b) og den anden sidekant (120) og den øvre kant (122).

2. Kasse, der omfatter:

5

en bund (102);

to endevægge (106a, 106b); og to sidevægge (108a, 108b),

hvor mindst en af ende- og sidevæggene omfatter et antal indløb (200a-200c) til indføring af en kølevæske i det indre af kassen,

10

hvor hver sidevæg (108a, 108b) omfatter første og andre sidekanter (118, 120) nær de respektive endevægge (106a, 106b), en nedre kant (124) nær bunden (102) og en øvre kant (122) fjernt fra bunden (102),

15

kendetegnet ved, at

den mindst ene af ende- og sidevæggene omfatter et antal lufthuller (110), idet indløbene (200a-200c) har en større dimension end lufthullerne,

20

sidevæggen (108a, 108b) endvidere omfatter et kontinuert afstivningselement (126) omfattende et U-formet parti (126a, 126c, 126d) i et centralt område, der strækker sig mod den nedre kant (124),

25

hvor det første indløb (200a) er tilvejebragt ved det venstre parti af sidevæggen (108a, 108b) i afstand fra den nedre kant (124) med en del af det kontinuerte afstivningselement (126) mellem det første indløb (200a) og den første sidekant (118), den øvre kant (122) og det centrale område, og

30

hvor det andet indløb (200b) er tilvejebragt ved det højre parti af sidevæggen (108a, 108b) i afstand fra den nedre kant (124) med en del af det kontinuerte

afstivningselement (126) mellem det andet indløb (200b) og den anden sidekant (120), den øvre kant (122) og det centrale område.

5 3. Kasse ifølge krav 1 eller krav 2, hvor mindst to modsatte vægge hver omfatter et antal indløb (200a-200c).

4. Kasse ifølge krav 3, hvor hver af sidevæggene (108a, 108b) omfatter et antal indløb (200a-200c).

10 5. Kasse ifølge krav 2, hvor der i det centrale område er tilvejebragt et tredje indløb (200c) i afstand fra den øvre kant (122) og med en del af det kontinuerte afstivningselement mellem det tredje indløb (200c) og den nedre kant (124), det venstre parti og det højre parti.

15 6. Kasse ifølge krav 5, hvor det tredje indløb (200c) har en mindre dimension end de første og andre indløb.

7. Kasse ifølge et af krav 1 til 6, hvor det ene eller flere indløb (200a-200c) omfatter et net.

20

8. Kasse ifølge et af krav 1 til 7, hvor kassen er dannet af plast.

9. Kasse ifølge et af krav 1 til 8, hvor kassen er tilvejebragt til optagelse og/eller transport af madvarer, f.eks. frugt, grøntsager, kød og lignende.

25

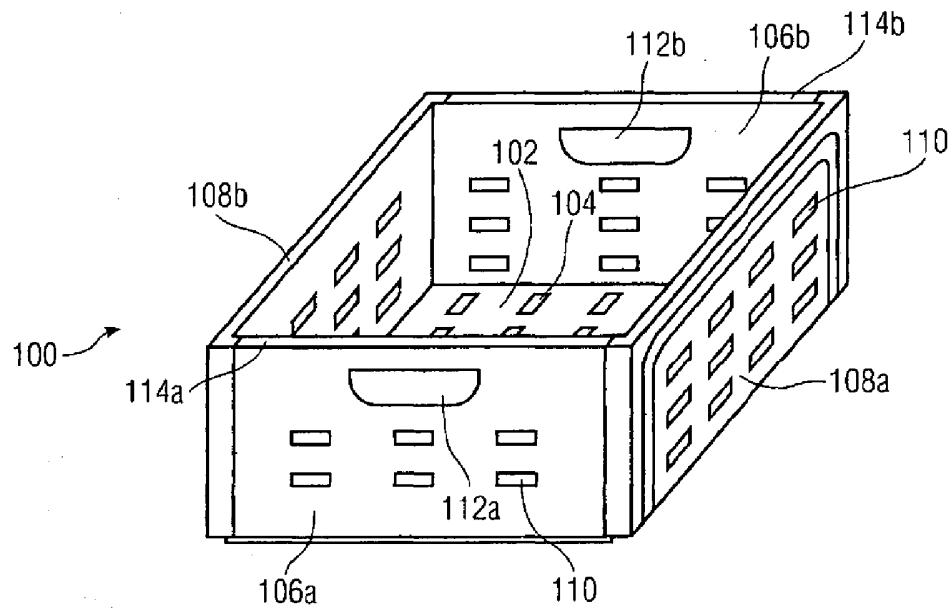


FIG 1

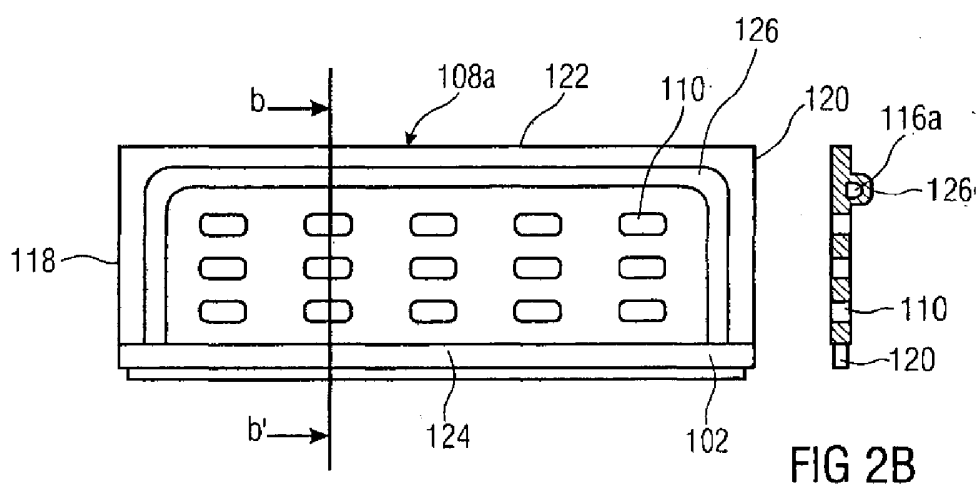


FIG 2A

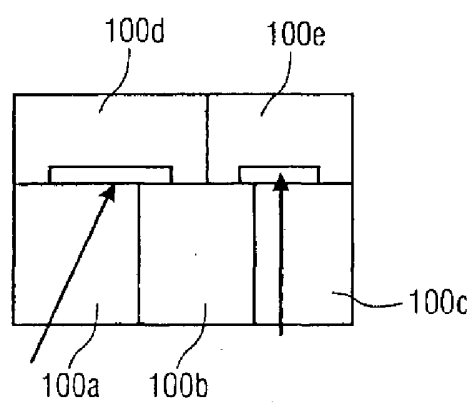


FIG 3

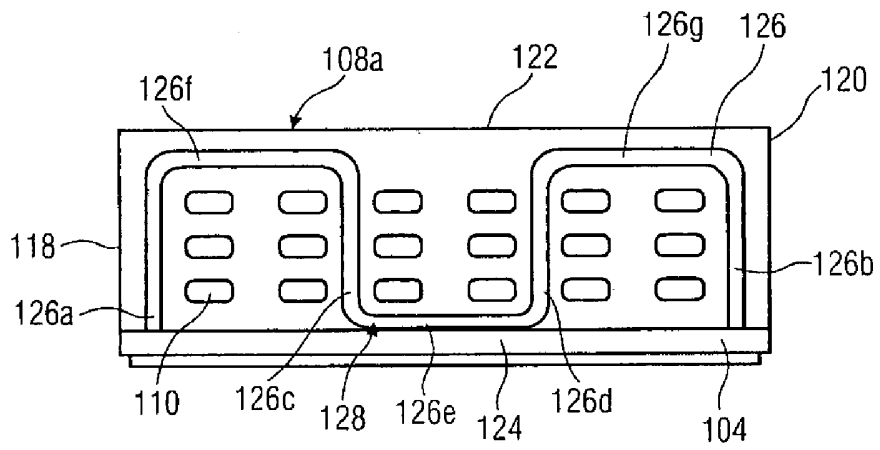


FIG 4

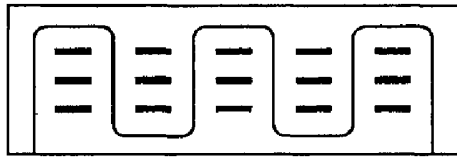


FIG 5A

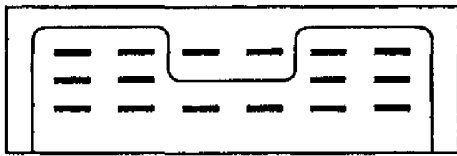


FIG 5B

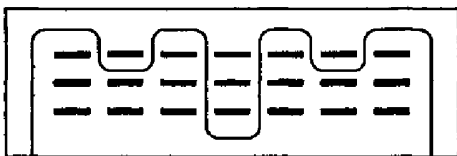


FIG 5C

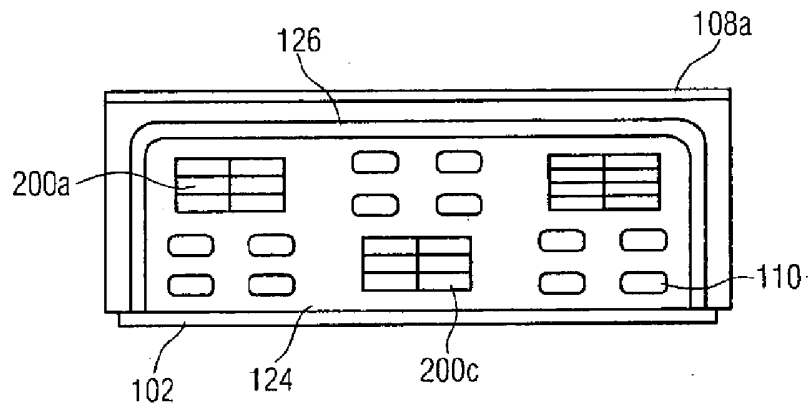


FIG 6

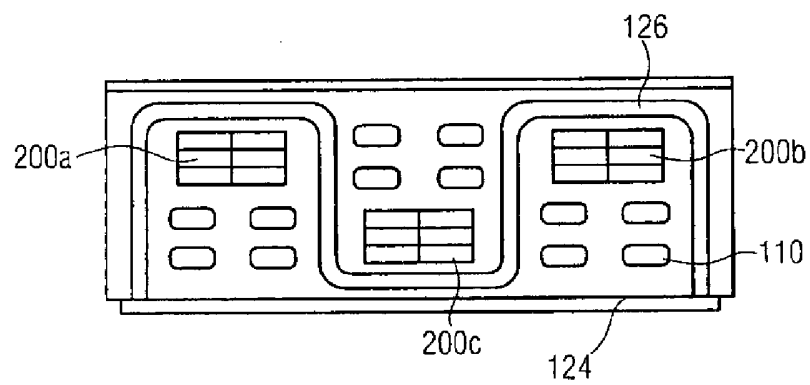


FIG 7