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(54) **Condensate collector**

Kondensatsammler

Collecteur de condensat

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Description

This invention relates to a condensate collector as defined in the preamble of claim 1. Such a condensate collector is known, for instance, from US-A-2 670 611. The collector of the invention has been designed particularly though not necessarily solely for use in association with a refrigerator fruit or vegetable bin.

Vegetables and fruit are often kept in a lidded food compartment in a refrigerator. As these vegetables and fruit are generally still respiring, the water produced may cause water droplets to condense and form on the cold upper surface of the vegetable bin lid. These droplets are then able to fall back onto the fruit and vegetables thus resulting in rotting and spoilage thereof. This is disadvantageous.

US Patent 2 670 611, Fagerberg et al, seeks to overcome the problem of dripping condensation by provision of a condensate collector. The condensate collector has two substantially horizontal plates which have a downward inclination of between 8° and 11° toward a moisture collecting trough. It is also envisaged in this specification that these plates may be ribbed or otherwise channelled to direct the running drops as they flow towards this collection trough. Such a simple incline surface works adequately with metal or even glass materials, which have inherent drop forming capabilities and surface adhesion, but it has been found that the water adhesion to plastic surfaces is inadequate to oppose gravity and the droplets tend to fall from the surface rather than flow across the surface.

German Patent specification DE-B-1 006 441, Brown, Boveri, also considers the issue of condensate collection on the underside of surfaces. This specification proposes to overcome this difficulty by inclusion of means on the underside surface to improve the adhesion of water vapour thereto. The specification includes as an example use of absorbing materials such as blotting paper, a surface coating lacquer or provision of capillary channels. The formation of condensate collection surfaces with such coatings or narrow capillary channels as set forth in this specification would be difficult and/or costly.

It is an object of the foregoing invention to provide an apparatus which will go at least some way to obviating or minimizing the foregoing disadvantages in a simple yet effective manner or which will at least provide the public with a useful choice.

Accordingly, the invention consists in a condensate collector comprising a member having a downwardly facing portion disposed substantially horizontally in use and having a plurality of spaced apart, drainable elongate grooves on said downwardly facing portion, each of said grooves being defined by a pair of side walls connected at their distal ends by a base adjacent said downwardly facing portion, said grooves being disposed at an angle relative to horizontal such that said condensate, accumulated in said grooves, can drain to a drain-

ing means positioned on said downwardly facing portion of said member for the purpose of receiving any condensate accumulated in said grooves, *characterised in that* said member is plastic and, said walls of said grooves are arranged in substantially inverted V-shaped formation wherein the angle between said walls of said V-shape is between about 15° and about 30° and the distance between the proximal ends of said side walls is between about 1.6mm and about 2.8mm such that condensate collecting on said portion migrates to the bases of said grooves by capillary action.

In a second aspect, the invention consists in a lidded food compartment for use in a refrigerator comprising a container and a lid positionable over said container, said lid including a condensate collector as set forth in the above paragraph.

In a further aspect the invention consists in a cover of a self supporting material capable of stable location over foodstuffs positioned on a supporting surface or tray, said cover including a condensate collector as set forth in the above paragraph.

In a yet further aspect, the invention consists, in combination, in a tray onto which a foodstuff can be positioned, and a cover positionable over a foodstuff positioned on the tray, said cover being of a self supporting material and being capable of stable location over said tray, said cover including a condensate collector as set forth in the above paragraph.

To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claim 1. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

The preferred form of the invention will now be described with reference to the accompanying drawings wherein:

Fig 1 is a perspective view of a condensate collector in the form of a lid positionable over a vegetable bin according to one preferred form of the invention; Fig 2 is a sectional end view through BB of the lid shown in Fig 1;

Fig 3 is an exploded view of the area X in Fig 2; Fig 4 is a schematic drawing of a series of grooves according to an alternative preferred form of the invention; and

Fig 5 is a perspective view of a lid positioned over a vegetable bin according to one preferred embodiment of the invention, and;

Fig 6 is a cross sectional side view of the vegetable bin and lid of Fig 6 when located in a refrigerator according to one preferred form of the invention.

The invention relates to a condensate collector. The condensate collector can be used in any situation where condensate is formed and it is desirable to remove the

condensate to a selected area.

In the preferred embodiment of the invention however, the condensate collector comprises a lid or cover 1 being positionable over a food container (such as a vegetable bin 2) in a refrigerator 24. In the embodiment of Fig 5, two vegetable/fruit bins 2 are shown. Of course, a single tray or bin 2 could be provided.

The lid or cover 1 is formed from plastics material.

The condensate collector has a member 3 defining a downwardly facing portion 4 and is disposed substantially horizontally in use. In the preferred embodiment of the invention, a shelf 5 is provided in the refrigerator 24 and the lid or cover 1 can be affixed to the shelf 5 via loose hooks 6. Flat portions 7 may be provided at the front edge 20 and side edges 19 of the lid or cover 1. These portions 7 are able to rest on the peripheral edge of the food container 2. In this embodiment, when the vegetable bin 2 is pushed under the lid or cover 1 the lid or cover 1 is lifted slightly (by about 1mm for example) and this creates a seal, though imperfect, between the vegetable bin 2 and the portions 7 of the lid or cover 1.

Alternatively, the lid 1 can be formed so as to be substantially engageable with the vegetable bin 2.

The condensate collector has a plurality of spaced apart, drainable elongate grooves or channels 9 on the downwardly facing portion 4 thereof. Desirably, the grooves 8 are positioned substantially side-by-side. In alternative embodiments of the invention, however, the grooves or channels 9 may be provided in a rectangular pattern or in a circular pattern on the downwardly facing portion 4 of the lid 1.

Figs 2 & 3 show one preferred embodiment of the invention wherein the grooves 9 can be formed in plastic by vacuum forming. The grooves 9 have an upwardly disposed base 10 and a pair of side walls 11 extending downwardly from the base 10. The cross sectional width A of the upwardly disposed base 10 is preferably less than the distance B between the distal ends of the side walls 11.

The distance B is in the range between about 1.6mm and about 2.8mm so that a droplet of water is able to be retained in the groove or channel 9 and will not tend to be displaced downwardly by gravity. The distance A may for example be between about 1.5mm and 2.5mm in the embodiment of Fig 2 & 3.

The downwardly extending ridges or junctions 12 between adjacent grooves 9 may form part of the downwardly facing portion 4. In experiments conducted to date it has been found that small droplets of condensate forming on the ridges 12 tend to be drawn into the channels 9 and towards the upwardly disposed bases 10 thereof by water tension. It is desirable to maximise the area of plastic available in the channel 9 so that the condensate will be drawn therein under water tension.

In the embodiment of Fig 3, the angle C between side walls 11 of adjacent grooves 9 is between about 15° and 30°. Preferably, the angle C is about 25°.

Fig 4 shows an alternative form of the invention.

This shows a plurality of adjacent channels 9 which may be formed in plastic by injection moulding for example. In this embodiment, the side walls 11 of the channels 9 are arranged in substantially inverted V-shaped formation. The angle D between the walls 11 of the V-shape is between 15 and 30° and is preferably 25°. The internal apex of the V-shape or upwardly disposed base 10 of the groove 9 may have an extended surface area wherein the extended surface area can comprise a flat surface blended into the walls 11 of the grooves 9 or can comprise a curved surface of substantially semi-circular shape. This facilitates ease of cleaning the channels 9. The junctions 12 may be of radiused or planar shapes as this reduces the risk of physical damage to the thin sections between the channels 9.

In the embodiment of Fig 4, to increase the potential condensate loadings in the grooves 9 it is desirable to have a greater depth E of the inverted V-shape than the distance F between the distal ends of the side walls 11 such that a given volume of condensate is exposed to a large surface area of plastic material which reduces the tendency of drops to form and escape from the grooves 9. For example, the depth E of the inverted V-shape may be between about 1mm to about 4mm. The distance F, of course, depends on the angle D and depth E chosen.

The dimensions, spacings and disposition of the grooves 9 are such that condensate collecting on the downwardly facing portion 4 as well as the walls 11 of the grooves 9 tends to migrate to the upwardly disposed bases 10 of the grooves 9 under water tension.

The grooves 9 are provided at a slight angle relative to horizontal when positioned over the food bin 2. For example, the lid 1 may be constructed such that the tilt of the grooves 3 is a small angle of between about 2-3°. Therefore, any accumulation of condensate in the grooves 9 can be drained in use to a draining area under gravity. The draining area may be formed on a downwardly extending portion of the lid 1. For example, a downwardly extending baffle 13 may be provided which extends transversely to the grooves 9. Desirably, the length of each groove 9 is longer than the length of the bin 2 from the front face 21 to the rear face 22 thereof (by about 10% for example). Thus, the ends of the grooves 9 in the overlapping area 14 extend away from the open area of the bin 2 so droplets do not fall on food located in the bin 2.

Many different ways of providing the grooves or channels 9 at a slight angle relative to horizontal are envisaged. The embodiment shown in Fig 6 is just one of these. As shown in Fig 6, the side walls 19 of the lid 1 may taper from the overlapping area 14 to the front edge 20 of the lid 1. The front wall 21 of the bin 2 may similarly be longer than the rear wall 22 of the bin 2. A locating member 23 may be provided in the refrigerator 24 to locate the vegetable bin 2 in the designed disposition. The loose hooks 6 hold the lid 1 in the required disposition such that the grooves 9 are provided on a slight tilt to-

wards the rear inside face of the refrigerator 24. Accordingly, condensate forming a result of vegetables or fruit in the bin 2 respiring is collected in the channels 9 and can slowly drain to the draining area 13 where it can evaporate or drain to the back of the refrigerator 24.

Alternative means for draining condensate from the grooves 3 are clearly envisaged. For example, the lid 1 may normally be provided horizontally and may be manually tilted so as to drain the condensate from the grooves 9 and the lid 1 can then be removed for cleaning.

Experiments conducted to date indicate that, after cleaning with detergent, the ability of the grooves 9 to hold condensate is enhanced.

Thus it can be seen that in at least the preferred form of the invention a condensate collector is provided which, surprisingly, can store substantial amounts of condensate formed when, for example, vegetables or fruit contained within a vegetable bin in a refrigerator respire. The condensate collector can be made self-draining which is desirable.

Claims

1. A condensate collector comprising a member (3) having a downwardly facing portion (4) disposed substantially horizontally in use and having a plurality of spaced apart, drainable elongate grooves (9) on said downwardly facing portion (4), each of said grooves (9) being defined by a pair of side walls (11) connected at their proximal ends by a base (10) adjacent said downwardly facing portion (4), said grooves (9) being disposed at an angle relative to horizontal such that said condensate, accumulated in said grooves (9), can drain to a draining means (13) positioned on said downwardly facing portion (4) of said member (3) for the purpose of receiving any condensate accumulated in said grooves (9), *characterised in that* said condensate collector is made of plastic and, said pairs of walls (11) of said grooves (9) are arranged in substantially inverted V-shaped formation wherein the angle (C, D) between said walls (11) of said V-shape is between about 15° and about 30° and the distance (B, F) between the distal ends of said side walls (11) is between about 1.6mm and about 2.8mm such that condensate collecting on said portion (4) migrates to the bases (10) of said grooves (9) by capillary action.
2. A condensate collector as claimed in claim 1 wherein the junctions (12) of side walls (11) from adjacent grooves (9) are of shapes selected from radiused and planar shapes such that the tendency of water droplets to form at said junctions (12) is reduced.
3. A condensate collector as claimed in claim 1 or

claim 2 wherein the base (10) of said V-shape has an extended surface area, wherein said extended surface area is selected from a flat surface blended into said walls (11) of said grooves (9) and a curved surface of substantially semi-circular shape.

4. A condensate collector as claimed in claim 1 or claim 2 wherein said grooves (9) are inclined at an angle between about 2° and about 3° relative to horizontal.
5. A lidded food compartment for use in a refrigerator comprising a container and a lid positionable over said container, said lid including a condensate collector as claimed in any one of claims 1 to 4.
6. A cover of a self supporting material capable of stable location over foodstuffs positioned on a supporting surface or tray, said cover including a condensate collector as claimed in any one of claims 1 to 4.
7. In combination, a tray onto which a foodstuff can be positioned, and a cover positionable over a foodstuff positioned on the tray, said cover being of a self supporting material and being capable of stable location over said tray, said cover including a condensate collector as claimed in any one of claims 1 to 4.

Patentansprüche

1. Kondensatsammler mit einem Element (3), das einen nach unten zeigenden Bereich (4) aufweist, der im Gebrauch im wesentlichen horizontal angeordnet ist und mehrere voneinander beabstandete, ablaßbare längliche Rillen (9) an dem nach unten zeigenden Bereich (4) aufweist, wobei jede dieser Rillen (9) von einem Paar von Seitenwänden (11) gebildet wird, die an ihren proximalen Enden durch eine zu dem nach unten zeigenden Bereich (4) benachbarte Basis (10) verbunden sind, wobei die Rillen (9) unter einem Winkel relativ zu der Horizontalen derart angeordnet sind, daß in den Rillen (9) angesammeltes Kondensat zu einer Abfließeinrichtung (13) ablaufen kann, die an dem nach unten zeigenden Bereich (4) des Elements (3) zum Aufnehmen von irgendeinem in den Rillen (9) angesammelten Kondensat positioniert ist, dadurch gekennzeichnet, daß der Kondensatsammler aus Kunststoff hergestellt ist und die Paare von Wänden (11) der Rillen (9) in Gestalt eines im wesentlichen umgekehrten V angeordnet sind, worin der Winkel (C, D) zwischen den Wänden (11) der V-Gestalt zwischen ungefähr 15° und ungefähr 30° beträgt und die Entfernung (B, F) zwischen den distalen Enden der Seitenwände (11) zwischen ungefähr 1,6 mm und ungefähr 2,8 mm beträgt, so daß das sich an

dem Bereich (4) sammelnde Kondensat durch Kapillarwirkung zu den Basen (10) der Rillen (9) wandert.

2. Kondensatsammler nach Anspruch 1, dadurch gekennzeichnet, daß die Verbindungsstellen (12) der Seitenwände (11) von benachbarten Rillen (9) Formen aufweisen, die aus gewölbten und ebenen Formen ausgewählt sind, so daß die Neigung von Wassertropfen, sich an den Verbindungsstellen (12) zu bilden, verringert wird. 5
3. Kondensatsammler nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Basis (10) der V-Gestalt ein verlängertes Oberflächengebiet aufweist, worin das verlängerte Oberflächengebiet aus einer ebenen Fläche, die in die Wände (11) der Rillen (9) übergeht, und einer gekrümmten Fläche mit im wesentlichen halbkreisförmiger Gestalt ausgewählt ist. 10
4. Kondensatsammler nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Rillen (9) unter einem Winkel zwischen ungefähr 2° und ungefähr 3° relativ zu der Horizontalen geneigt sind. 15
5. Ein mit einem Deckel versehenes Lebensmittelfach für einen Kühlschrank, mit einem Behälter und einem über dem Behälter positionierbaren Deckel, wobei der Deckel einen Kondensatsammler nach irgendeinem der Ansprüche 1 bis 4 einschließt. 20
6. Eine Abdeckung aus einem selbsttragenden Material, die über Nahrungsmitteln, die auf einer Tragfläche oder in einer Schale positioniert sind, stabil anordbar ist, wobei die Abdeckung einen Kondensatsammler nach irgendeinem der Ansprüche 1 bis 4 einschließt. 25
7. Eine Kombination einer Schale, auf der ein Nahrungsmittel positioniert werden kann, und einer Abdeckung, die über einem in der Schale positionierten Nahrungsmittel positionierbar ist, wobei die Abdeckung aus einem selbsttragenden Material und über der Schale stabil anordbar ist und einen Kondensatsammler nach irgendeinem der Ansprüche 1 bis 4 einschließt. 30

Revendications

1. Un collecteur de condensat comprenant un organe (3) ayant une partie (4) orientée vers le bas, placée sensiblement horizontalement en utilisation et ayant une pluralité de rainures (9) espacées, allongées, susceptibles d'être purgées, sur ladite partie (4) orientée vers le bas, chacune desdites rainures (9) étant définie par une paire de parois latérales 35

(11) reliées à leurs extrémités proximales par une base (10) adjacente à ladite partie (4) orientée vers le bas, lesdites rainures (9) étant disposées avec un angle relatif par rapport à l'horizontale, de manière que ledit condensat, s'étant accumulé dans lesdites rainures (9), puisse s'évacuer jusqu'à des moyens de drainage (13) placés sur la dite partie (4) orientée vers le bas dudit organe (3), afin de recevoir tout condensat s'étant accumulé dans les dites rainures (9), caractérisé en ce que ledit collecteur de condensat est réalisé en plastique, et les dites paires de parois (11) desdites rainures (9) sont disposées sensiblement en forme de V inversé, dans lequel l'angle (C, D) fait entre les dites parois (11) à forme en V est compris entre environ 15° et d'environ 30°, et la distance (B, F) existant entre les extrémités distales des dites parois (11) latérales est d'environ 1.6 mm et d'environ 2.8 mm, de manière que le condensat s'étant collecté sur la dite partie (4) migre vers les bases (10) des dites rainures (9), par l'action de la capillarité.

2. Un collecteur de condensat selon la revendication 1, dans lequel les jonctions (12) des parois latérales (11) des rainures adjacentes (9) sont de formes sélectionnées parmi des formes arrondies et planes, de manière que la tendance des gouttelettes d'eau à se former au niveau desdites jonctions (12) soit réduite. 40
3. Un collecteur de condensat selon la revendication 1 ou la revendication 2, dans lequel la base (10) de ladite forme en V a une aire de surface étendue, dans lequel ladite aire de surface étendue est sélectionnée parmi une surface plate ondulée pour donner lesdites parois (11) desdites rainures (9) et une surface courbe de forme sensiblement semi-circulaire. 45
4. Un collecteur de condensat selon la revendication 1 ou la revendication 2, dans lequel lesdites rainures (9) sont inclinées sous un angle d'environ 2° à 3° par rapport à l'horizontale. 50
5. Un compartiment à nourriture avec couvercle pour une utilisation dans un réfrigérateur, comprenant un récipient et un couvercle pouvant être positionné au dessus dudit récipient, ledit couvercle comprenant un collecteur à condensat selon l'une quelconque des revendications 1 à 4.

6. Un couvercle en matériau auto-portant capable de rester en position stable au-dessus de denrées alimentaires, placées sur une surface de support ou bac, ledit couvercle comprenant un collecteur à condensat selon l'une quelconque des revendications 1 à 4. 55

7. En combinaison, un bac sur lequel des denrées alimentaires peuvent être positionnées, et un couvercle susceptible d'être positionné au-dessus d'une denrée alimentaire placée sur le bac, ledit couvercle étant réalisé en un matériau auto-portant et étant capable de rester en un emplacement stable au-dessus dudit bac, ledit couvercle comprenant un collecteur de condensat selon l'une quelconque des revendications 1 à 4.

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FIG 1

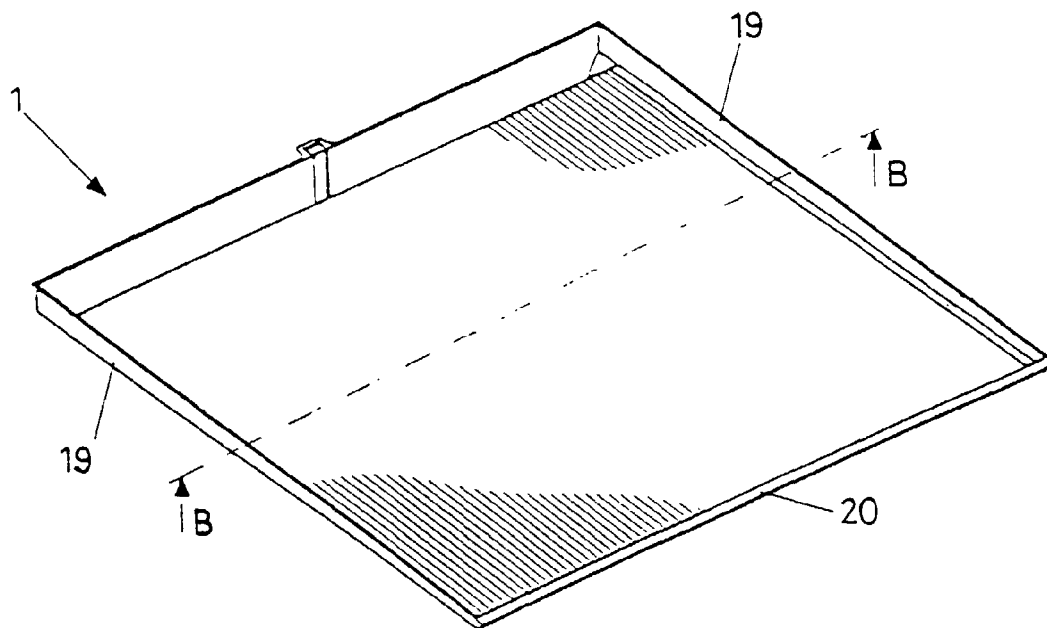


FIG 2

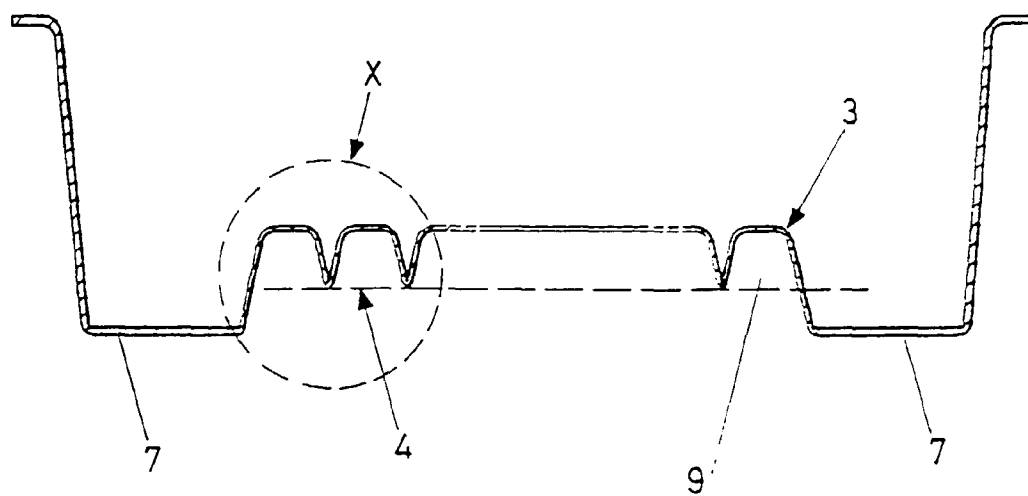
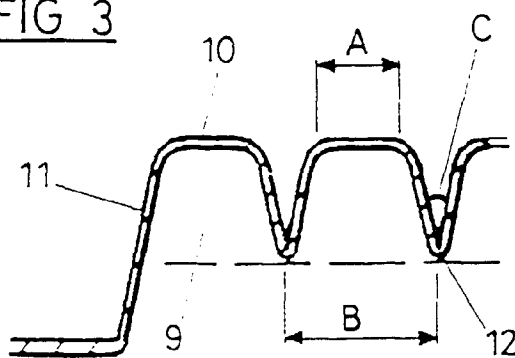


FIG 3



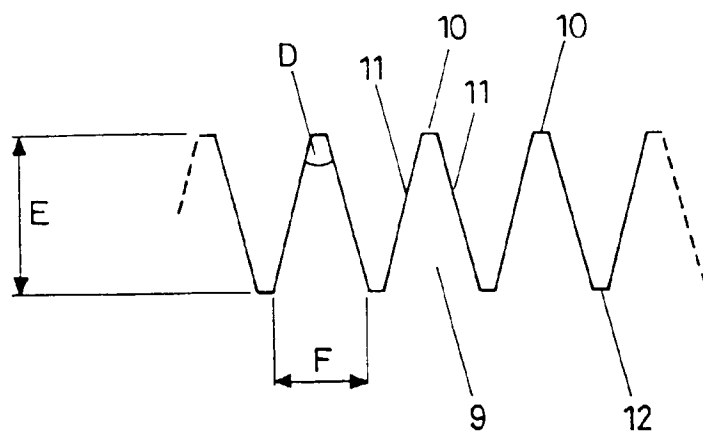


FIG 4

FIG 5

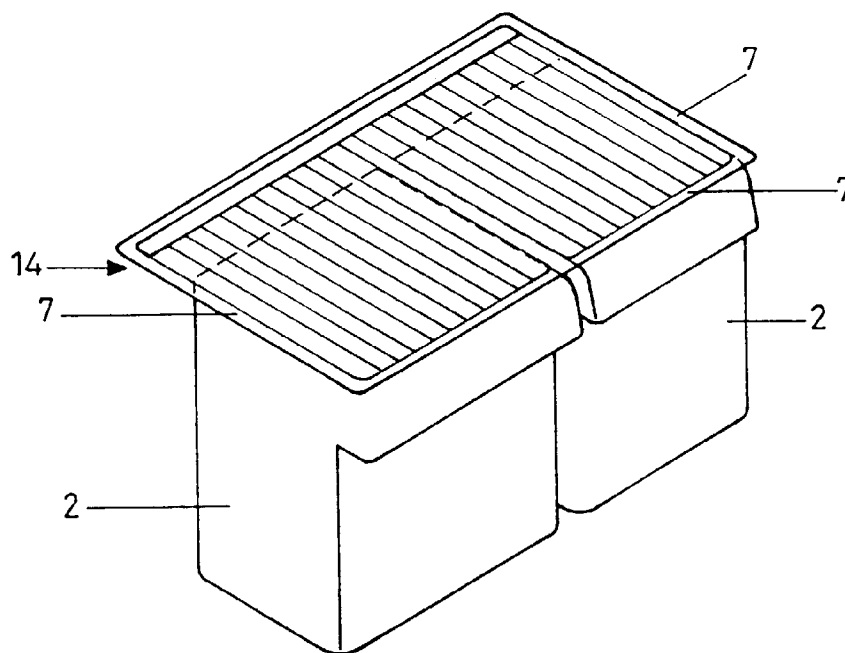


FIG 6

