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(54) **A FOOD CONTAINER**  
**LEBENSMITTELBEHÄLTER**  
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**EP-A2- 0 250 100 WO-A2-97/11887**  
**WO-A2-97/11889**

• **DE-Des.-49809141.1**

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## Description

### Field of the Invention

**[0001]** The present invention relates to a food container, in particular, a food container that comprises a combination of strengthening features which are adapted to increase the stiffness of the food container.

### Description of the Prior Art

**[0002]** Food containers have been manufactured in a variety of sizes and shapes depending on specific applications. A specific type of food container is the so-called two-piece container comprising a body and a cover. Two-piece containers are normally relatively small containers. In case of larger containers, it is often needed to produce the containers from three pieces - a bottom, a cover and a side piece.

**[0003]** In EP 0 480 854, a rectangular container for canned goods is disclosed - see Fig. 1. The container disclosed in EP 0 480 854 is a two-piece container - meaning that the body of the container is made out of one piece. A cover is positioned on top of the body for closing the container. In order to support the container, and thereby increase the stiffness of the container, the sidewalls are divided into an upper and a lower part. The upper part and the lower part being connected by two horizontally arranged shoulders. In order to further increase the stiffness of the sidewall vertically arranged corrugations are provided in the lower part of the sidewall. The lower one of the horizontally arranged shoulders upwardly concludes the corrugations so that no corrugations are found in the upper part of the sidewall.

**[0004]** WO 97/11887 also relates to a rectangular container for canned goods. The disclosed container has vertical corrugations and two shoulders dividing the sidewall into a lower part and an upper part. The upper of the two shoulders concludes the vertical corrugations so that no corrugations are found in the upper part of the sidewall.

### Description of the Invention

**[0005]** It is an object of the present invention to provide a food container with an improved stiffness and ability to be stacked and a container that at the same time requires only simple manufacturing tools.

**[0006]** The above-mentioned objects are obtained by providing a food container according to claim 1.

**[0007]** Preferably, the upper part overhangs the lower part, so that the containers may be stacked in a way that prevent the containers from sticking to each other.

**[0008]** A top cover that is hermetically sealed to the sidewall may cover the opening. When sealing the coverage to the sidewall, a horizontal edge portion of the upper part of the sidewall may be bent together with an edge portion of the cover. When the thickness of the side-

wall is low, prior art containers may deform in the upper part of the sidewall and such deformation can cause an unacceptable sealing of the container.

**[0009]** It has been found that the upper part of the sidewall can be provided with an extra stiffness by not ending the strengthening features with a shoulder. Thus, for preventing the above-mentioned deforming, the container according to the invention comprises one or more strengthening features that extend in a substantially vertical direction from the lower part of the sidewall, below the at least one abutment shoulder(s) and into the upper part of the sidewall, above the at least one abutment shoulder(s). The strengthening features thus stiffen both the lower part and the upper part of the sidewall as well as the abutment shoulder it self. When the strengthening features are provided unbroken from the lower part of the sidewall and into the upper part of the sidewall a 3-dimensional strengthening structure can be created close to the upper edge of the container. Such a 3-dimensional structure provides very good stiffening of the upper part of the sidewall close to the opening of the container wherein the stiffness of the container is of high importance.

**[0010]** The containers are typically stacked into piles of containers before they are delivered to the maker of the products to be packed in the containers. By the containers known in the art, there is a risk that vacuum arises between the stacked containers. The vacuum can complicate the de-stacking of the containers. The vacuum will not arise by stacking containers according to the present invention. Since the shoulder that serves as support for the next container in the stack of containers is intersected by the strengthening features, the chamber between the containers will always be in connection with the surrounding atmosphere and therefore vacuum between the containers is avoided.

**[0011]** Preferably one or more of the strengthening features are being formed in a length of at least 50 percent of the vertical size of the upper part of the sidewall. In that way the part of the sidewall that are near the opening of the container is being stiffened by the strengthening features.

**[0012]** The abutment shoulder(s) may form an unbroken line extending around the entire length of the sidewall or it may form a number of marks e.g. at corners of the sidewall or along rectilinear parts of the sidewall.

**[0013]** Depending on the required stiffness of the sidewall, the one or more strengthening features may extend from the bottom to the opening of the container.

The one or more strengthening features may have predetermined lengths, and preferably the lengths may exceed 50% of the shortest distance between the bottom and the opening of the container. However, the lengths may exceed 55%, such as 60%, such as 65%, such as 70%, such as 75%, such as 80% such as 85%, such as 90%, such as 95%, such as 98% of the shortest distance between the bottom and the opening of the container.

**[0014]** Preferably, the container has a rectangular

cross sectional shape with curved corner sections being connected by the sidewall. The one or more strengthening features may be positioned on the sidewall between two curved corner sections, and preferably they may intersect the abutment shoulder of the sidewall over a distance exceeding 50% of the shortest distance between the two curved corner sections. However, they may also intersect the abutment shoulder of the sidewall over a distance exceeding 55%, such as 60%, such as 65%, such as 70%, such as 75% of a distance between the two corner sections.

**[0015]** In a preferred embodiment, the one or more strengthening features comprise a corrugation that may be, e.g., die stamped in the sidewall. The corrugation may exceed as described above, and it may have a depth that preferably is in the range 0.1-2 mm, such as 0.2- 1.8 mm, such as 0.3 - 1.6 mm, such as 0.4 -1.4 mm, such as 0.5 - 1.2 mm, such as 0.6 -1 mm, such as 0.7 - 0.9 mm. Preferably, the sidewall comprises more than one corrugation, such as two or three or four or five or six or seven or eight or nine or ten or even more than ten corrugations.

**[0016]** The corrugations may be positioned in the sidewall with a mutual distance, and the distance between two valleys of two neighbouring corrugations (also called a corrugation period) may be in the range 1 - 10 mm, such as 2 - 9 mm, such as 3 - 8 mm, such as 4 - 7 mm, such as 5 - 6 mm. The corrugations may be divided into one or more parts of the sidewall corresponding to the four rectilinear parts of the sidewall. Furthermore, the corrugations may have various cross-sectional shapes.

**[0017]** The container could be made from a number of different materials. Preferably the container is made from a sheet of metal such as a light-alloy metal, e.g. aluminium or from tinplate or ECCS etc. The sheets of metal could be formed into a container, e.g. by die stamping or by deep drawing. Alternatively the container is made from more sheets of metal, e.g. one sheet for the bottom part and one sheet for the sidewall, the two sheets being individually formed and welded or glued together.

**[0018]** The container could also be made from a sheet of a substantially rigid plastic material being formed into the container shape e.g. by vacuum forming or pressing. Finally the container could be made from moulded or blow moulded plastic or composite material comprising plastic.

**[0019]** The sidewall may have any predetermined thickness depending on the size of the containers. Preferably, the thickness of the sidewall is within the range 0.05 - 1.5 mm, such as 0.06 - 1.3 mm, such as 0.07 - 1.2 mm, such as 0.08 - 1.0 mm, such as 0.1 - 0.8 mm, such as 0.11 - 0.6 mm, such as 0.12 - 0.4 mm, such as 0.13 - 0.3 mm, such as 0.14 - 0.2 mm.

**[0020]** The above-mentioned thickness may also apply to the bottom part and to a top coverage.

## Detailed description of the invention

**[0021]** A preferred embodiment of the present invention will now be described in details with reference to the accompanying drawings Fig. 1-4, wherein

Fig. 1 shows a rectangular body of a container for canned goods according to EP 0 480 854,

Fig. 2 is a side view of a container with a bottom and a sidewall having strengthening features according to the present invention,

Fig. 3 is a top view of a container according to the present invention, and

Fig. 4 is a cross-sectional view of two containers stacked in a pile.

**[0022]** Fig. 1 shows a rectangular body of a container for canned goods according to EP 0 480 854. The body comprises a bottom section 1 and a sidewall 2. The sidewall 2 comprises corrugations 3 that extend from the bottom section to a lower shoulder 4. The embossing mark 5 defines an upper shoulder. The flange 6 serves for the attachment of a closure by beading the flange 6 and a corresponding flange of the closure into sealing engagement.

**[0023]** Fig. 2 and 3 shows a container that comprises a bottom section 1 and a sidewall 2 extending from the edge of the bottom section 1 in an angle to vertical which is greater than zero.

**[0024]** The sidewall comprises embossing marks 5, in order to increase the stiffness of the sidewall and to facilitate stacking of the containers without the containers sticking to each other.

**[0025]** The embossing marks 5 of the sidewall of the container comprise a horizontally extending rectilinear edge forming an abutment shoulder near the upper edge 6 forming a flange for attaching a closure to the container. The shoulder 5 of the sidewall separates the sidewall in two parts - an upper part 7 having an opening provided in order to cover a larger area than the lower part 8 of the sidewall. The abutment shoulder 5 is adapted to provide stiffness to the upper edge of the container. In order to ensure adequate stiffness, the distance from the upper edge 6 of the sidewall to the horizontally extending edge of the shoulder 5 is between 1 mm and 10 mm. The shoulder forms an angle with the upper and lower parts of sidewall, so as to support another container body being stacked on top of the container body.

**[0026]** The sidewall further comprises vertical corrugations 9 extending from the lower part 8 to the upper part 7 of the sidewall 2 as seen in Figs. 2 and 3. The vertical corrugations 9 are adapted to increase the stiffness of the sidewall of the container and are embossed substantially perpendicular to the shoulder 5. The corrugations 9 intersect the shoulder 5, so as to stiffen the

abutment shoulder 5 and the upper part 7 and lower part 8 of the sidewall. As seen in Fig. 2 the corrugations 9 fades out in the upper part 7, close to the flange 6. The out-fading corrugations creates a 3-dimensional embossing structure which provides the area of the upper part 7 close to the flange 6 with a good stiffness.

**[0027]** The sidewall 2 comprises a flange 6 covering a larger area than the upper part of the sidewall. The flange 6 has a horizontal and plane surface 10, which is adapted to receive a closure/coverage for sealing the container by beating a corresponding flange of the closure into a sealing engagement. Furthermore, the upper edge 6 contributes to increasing the stiffness of the opening of the container.

**[0028]** As seen in Fig. 3, the bottom section 1 has embossed marks 11 for increasing the stiffness of the bottom section. The embossing marks 11 can have any shape that increases the stiffness of the bottom section in all directions such as a round or an oval mark.

**[0029]** The embossing marks 11 on the bottom section 1 and the corrugations 9 in the sidewall 2 is made by die stamping. Alternatively they can be made by deep-drawing or casting, or the features can be made in a separate process.

**[0030]** Fig. 4 shows a cross-sectional view of two containers being stacked in a pile. The abutment shoulders 5 form an edge providing a rest for containers stacked in a pile. This feature is provided for the reason of easy handling and storing of the containers until the time where they are being filled. The corrugations 9 (in Fig. 2 and 3) have upper parts terminating at the top point 12. As seen in Fig. 4 the corrugations 9 open a passage 13 where air can flow into the chamber between the containers.

## Claims

### 1. A food container comprising:

- a bottom (1) and an opening,
- a sidewall (2) vertically extending between the bottom and the opening, said sidewall comprising an upper and a lower part (7, 8),
- an upper abutment shoulder (5) serving as support for a next container in a stack of containers, the shoulder connecting the upper and the lower parts of the sidewall and possibly one or more lower abutment shoulder(s), said upper abutment shoulder extending in a substantially horizontal direction,

### characterized in that

the food container further comprises one or more strengthening features (9) substantially vertically extending from the lower part of the sidewall through the upper abutment shoulder and into the upper part of the sidewall in which upper part they fade out, the upper part of the sidewall being defined between the

upper abutment shoulder and the opening.

2. A food container according to claim 1, wherein at least one of the one or more strengthening features has a length exceeding 50% of the shortest distance between the bottom and the opening, such as 55%, such as 60%, such as 65%, such as 70%, such as 75%, such as 80% such as 85%, such as 90%, such as 95%, such as 98%.
3. A food container according to claim 1 or 2, wherein the one or more strengthening features are being formed in a length of at least 50 percent of the vertical size of the upper part of the sidewall.
4. A food container according to any of the preceding claims, having a rectangular cross sectional shape and comprising curved corner sections wherein the one or more strengthening features are formed in at least a part of the upper part of the sidewall and in a part of the lower part of the sidewall and thus intersects the upper abutment shoulder over a distance exceeding 50% of the shortest distance between two succeeding curved corner sections, such as 55%, such as 60%, such as 65%, such as 70%, such as 75%.
5. A food container according to any of the preceding claims, wherein the one or more strengthening features comprises a corrugation.
6. A food container according to claim 5, wherein the corrugation defines a corrugation depth.
7. A food container according to claim 6, wherein the corrugation defines a period.
8. A food container according to claim 6 and 7, wherein the corrugation depth is in the range 0.1-2 mm, such as 0.2 - 1.8 mm, such as 0.3 - 1.6 mm, such as 0.4 - 1.4 mm, such as 0.5 -1.2 mm, such as 0.6 -1 mm, such as 0.7 - 0.9 mm, and wherein the corrugation period is in the range 1-10 mm, such as 2 - 9 mm, such as 3 - 8 mm, such as 4 - 7 mm, such as 5 - 6 mm.
9. A food container according to any of the preceding claims, wherein the container is made from a sheet metal such as a sheet of iron, steel, tin-, light-alloy metal or aluminium.
10. A food container according to any of claims 1-8, wherein the container is made from a sheet of a substantially rigid plastic material.
11. A food container according to any of claims 1-9, wherein the container is made by plastic deformation, such as die stamping, deep-drawing or casting.

12. A food container according to claim 10, wherein the container is made by vacuum forming.
13. A food container according to any of the preceding claims, wherein the thickness of the sidewall is within the range 0.05-1.5 mm, such as 0.06 - 1.3 mm, such as 0.07 - 1.2 mm, such as 0.08 - 1.0 mm, such as 0.1 - 0.8 mm, such as 0.11 - 0.6 mm, such as 0.12 - 0.4 mm, such as 0.13 - 0.3 mm, such as 0.14 - 0.2 mm.

### Patentansprüche

#### 1. Lebensmittelbehälter mit:

- einem Boden (1) und einer Öffnung,
- einer Seitenwand (2), die vertikal zwischen dem Boden und der Öffnung verläuft, wobei die Seitenwand einen oberen und einen unteren Abschnitt (7, 8) aufweist,
- eine obere Lagerschulter (5), die als Träger für einen nachfolgenden Behälter in einem Stapel an Behältern dient, wobei die Schulter die oberen und unteren Abschnitte der Seitenwand und möglicherweise eine oder mehrere untere Lagerschulter(n) miteinander verbindet, wobei die obere Lagerschulter im wesentlichen horizontal verläuft,

#### **dadurch gekennzeichnet, dass**

der Lebensmittelbehälter zusätzlich ein oder mehrere Verstärkungen (9) aufweist, die im wesentlichen vertikal vom unteren Abschnitt der Seitenwand ausgehend durch die Lagerschulter hindurch in den oberen Abschnitt der Seitenwand verlaufen, in dessen oberen Teil sie auslaufen, wobei der obere Abschnitt der Seitenwand zwischen der oberen Lagerschulter und der Öffnung definiert ist.

2. Lebensmittelbehälter nach Anspruch 1, wobei mindestens eine der Verstärkungen eine Länge aufweist, die mehr als 50% der kürzesten Verbindung zwischen dem Boden und der Öffnung beträgt, wie 55%, wie 60%, wie 65%, wie 80%, wie 85%, wie 90%, wie 95%, wie 98%.
3. Lebensmittelbehälter nach Anspruch 1 oder 2, mindestens eine Verstärkung über eine Länge von mindestens 50% der vertikalen Ausdehnung des oberen Abschnitts der Seitenwand ausgebildet ist.
4. Lebensmittelbehälternacheinemdervorhergehenden Ansprüche, mit einem rechteckförmigen Querschnitt und mit gekrümmten Eckbereichen, wobei eine oder mehrere Verstärkungen zumindest in einem Teil des oberen Abschnitts der Seitenwand und in einem Teil des unteren Abschnitts der Seitenwand ausgebildet sind, und so die obere Lagerschulter

über eine Länge durchsetzen, die 50% der kürzesten Entfernung zwischen zwei angrenzenden gekrümmten Eckbereichen übertrifft, wie 55%, wie 60%, wie 65%, wie 70%, wie 75%.

5. Lebensmittelbehälter nach einem der vorhergehenden Ansprüche, wobei eine oder mehrere Verstärkungen Rillen aufweisen.
6. Lebensmittelbehälter nach Anspruch 5, wobei die Rillen eine Rillentiefe definieren.
7. Lebensmittelbehälter nach Anspruch 6, wobei die Rillen eine Periode festlegen.
8. Lebensmittelbehälter nach Anspruch 6 und 7, wobei die Rillentiefe im Bereich zwischen 0,1 - 2 mm, wie 0,2 - 1,8 mm, wie 0,3 - 1,6 mm, wie 0,4 - 1,4 mm, wie 0,5 - 1,2 mm, wie 0,6 - 1 mm, wie 0,7 - 0,9 mm, und wobei die Rillenperiode im Bereich von 1 - 10 mm liegt, wie 2 - 9 mm, wie 3 - 8 mm, wie 4 - 7 mm, wie 5 - 6 mm.
9. Lebensmittelbehälter nach einem der vorhergehenden Ansprüche, wobei der Behälter aus Metallblech hergestellt ist, wie Eisenblech, Stahlblech, Weißblech, Leichtmetallblech oder Aluminiumblech.
10. Lebensmittelbehälter nach einem der Ansprüche 1-8, wobei der Behälter aus einem Bogen eines im wesentlichen stabilen Kunststoffmaterials hergestellt ist.
11. Lebensmittelbehälter nach einem der Ansprüche 1-9, wobei der Behälter durch plastische Verformung wie Pressen, Tiefziehen oder Giessen hergestellt ist.
12. Lebensmittelbehälter nach Anspruch 10, wobei der Behälter durch Vakuum-Formen hergestellt ist.
13. Lebensmittelbehälter nach einem der vorhergehenden Ansprüche, wobei die Stärke der Seitenwände im Bereich von 0,05 - 1,5 mm liegt, wie 0,06 - 1,3 mm, wie 0,07 - 1,2 mm, wie 0,08 bis 1,0 mm, wie 0,1 - 0,8 mm, wie 0,11 - 0,6 mm, wie 0,12 - 0,4 mm, wie 0,13-0,3 mm, wie 0,14 - 0,2 mm.

### Revendications

#### 1. Récipient pour aliments comprenant :

- un fond (1) et une ouverture,
- une paroi latérale (2) s'étendant verticalement entre le fond et l'ouverture, ladite paroi latérale comprenant une partie supérieure et une partie inférieure (7, 8),
- un épaulement de support supérieur (5) ser-

vant de support pour un récipient suivant dans une pile de récipients, l'épaulement reliant les parties supérieure et inférieure de la paroi latérale et éventuellement un ou plusieurs épaulement(s) de support inférieur(s), ledit épaulement de support supérieur s'étendant dans une direction sensiblement horizontale,

#### caractérisé en ce que

- le récipient pour aliments comprend en outre un ou plusieurs éléments de renforcement (9) s'étendant sensiblement verticalement à partir de la partie inférieure de la paroi latérale à travers l'épaulement de support supérieur et jusque dans la partie supérieure de la paroi latérale, dans laquelle partie supérieure ils se fondent, la partie supérieure de la paroi latérale étant définie entre l'épaulement de support supérieur et l'ouverture.
2. Récipient pour aliments selon la revendication 1, dans lequel au moins un du ou des éléments de renforcement a une longueur de plus de 50 % de la distance la plus courte entre le fond et l'ouverture, comme 55 %, comme 60 %, comme 65 %, comme 70 %, comme 75 %, comme 80 %, comme 85 %, comme 90 %, comme 95 %, comme 98 %.
  3. Récipient pour aliments selon la revendication 1 ou 2, dans lequel le ou les éléments de renforcement sont formés selon une longueur d'au moins 50 pour cent de la dimension verticale de la partie supérieure de la paroi latérale.
  4. Récipient pour aliments selon l'une quelconque des revendications précédentes, ayant une forme de coupe rectangulaire et comprenant des sections de coins courbés, dans lequel le ou les éléments de renforcement sont formés dans au moins une partie de la partie supérieure de la paroi latérale et dans une partie de la partie inférieure de la paroi latérale et ainsi croisent l'épaulement de support supérieur sur une distance de plus de 50 % de la distance la plus courte entre deux sections de coins courbés se succédant, comme 55 %, comme 60 %, comme 65 %, comme 70 %, comme 75 %.
  5. Récipient pour aliments selon l'une quelconque des revendications précédentes, dans lequel le ou les éléments de renforcement comprennent des ondulations.
  6. Récipient pour aliments selon la revendication 5, dans lequel les ondulations définissent une profondeur d'ondulation.
  7. Récipient pour aliments selon la revendication 6, dans lequel les ondulations définissent une période.
  8. Récipient pour aliments selon les revendications 6 et 7, dans lequel la profondeur d'ondulation se trouve dans l'éventail allant de 0,1 à 2 mm, comme de 0,2 à 1,8 mm, comme de 0,3 à 1,6 mm, comme de 0,4 à 1,4 mm, comme de 0,5 à 1,2 mm, comme de 0,6 à 1 mm, comme de 0,7 à 0,9 mm, et dans lequel la période d'ondulation se trouve dans l'éventail allant de 1 à 10 mm, comme de 2 à 9 mm, comme de 3 à 8 mm, comme de 4 à 7 mm, comme de 5 à 6 mm.
  9. Récipient pour aliments selon l'une quelconque des revendications précédentes, dans lequel le récipient est fait de métal en feuille comme une feuille de fer, acier, métal d'alliage d'étain, léger ou aluminium.
  10. Récipient pour aliments selon l'une quelconque des revendications 1 à 8, dans lequel le récipient est fait d'une feuille de matériau plastique sensiblement rigide.
  11. Récipient pour aliments selon l'une quelconque des revendications 1 à 9, dans lequel le récipient est fait par déformation plastique, comme par estampage, formage profond ou moulage.
  12. Récipient pour aliments selon la revendication 10, dans lequel le récipient est fait par formage sous vide.
  13. Récipient pour aliments selon l'une quelconque des revendications précédentes, dans lequel l'épaisseur de la paroi latérale se trouve dans l'éventail allant de 0,05 à 1,5 mm, comme de 0,06 à 1,3 mm, comme de 0,07 à 1,2 mm, comme de 0,08 à 1,0 mm, comme de 0,1 à 0,8 mm, comme de 0,11 à 0,6 mm, comme de 0,12 à 0,4 mm, comme de 0,13 à 0,3 mm, comme de 0,14 à 0,2 mm.

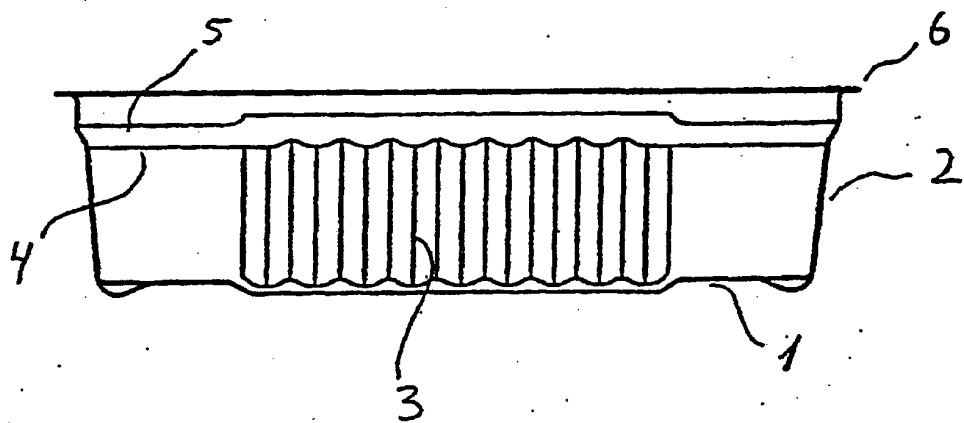


Fig. 1

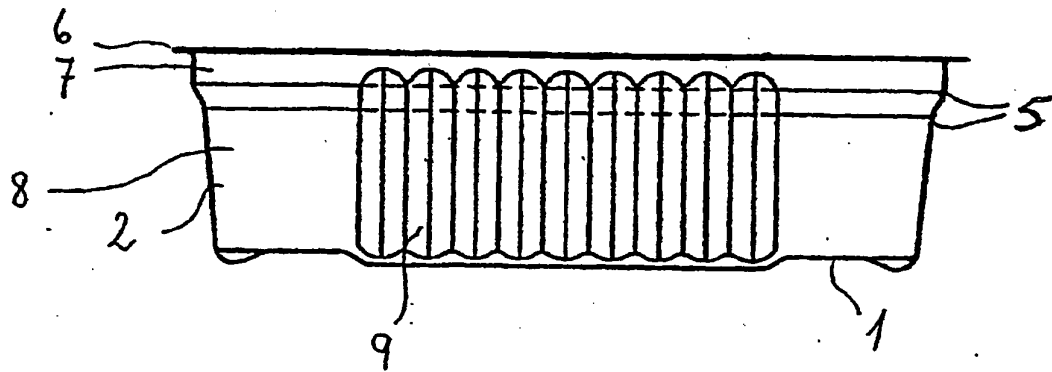


Fig. 2

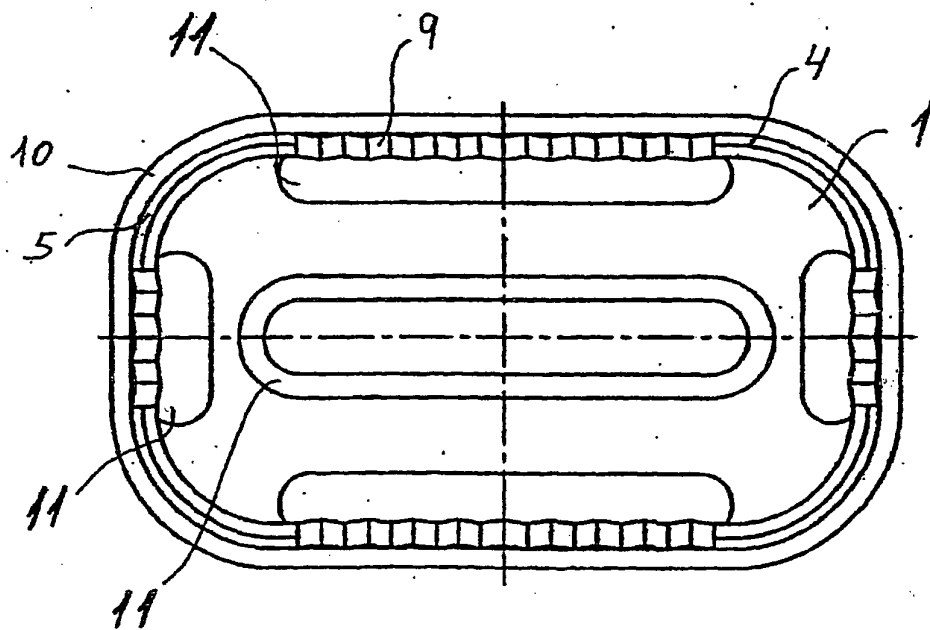


Fig. 3



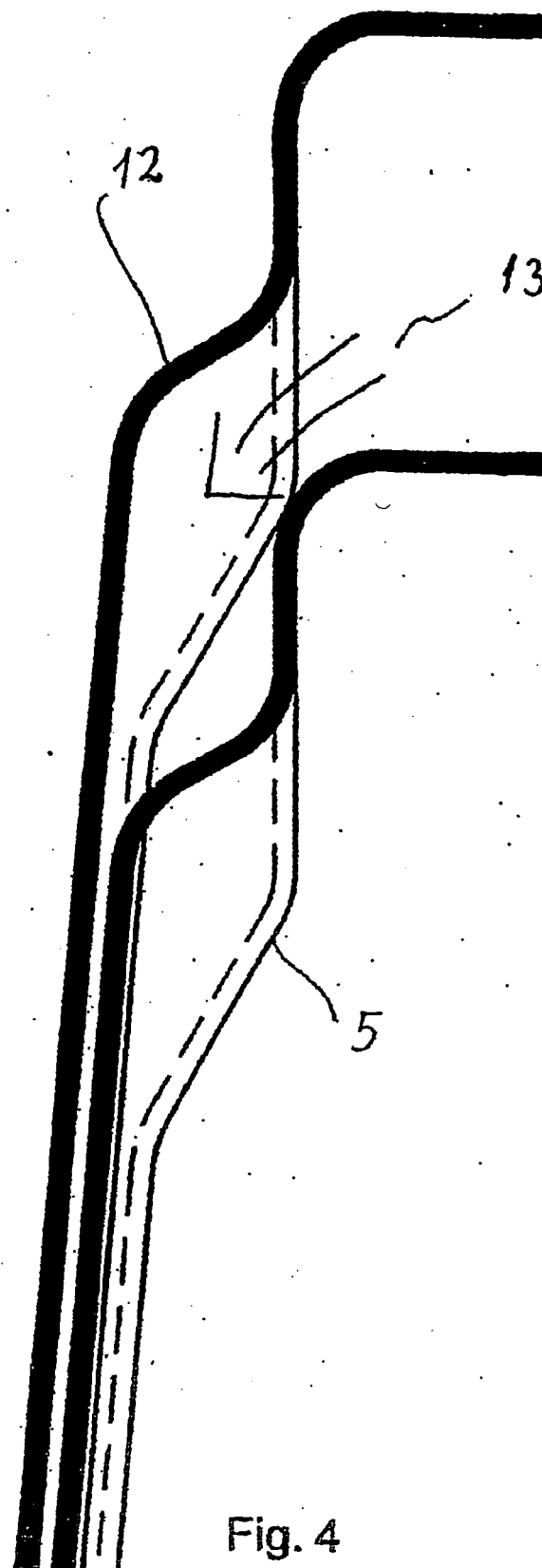


Fig. 4