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(71) Applicant: **SMARTPETCARE AG** [CH/CH]; Haslenstrasse 4, 8832 Wilen bei Wollerau (CH).

(72) Inventors: **SCHMIDHEINY, Felix Peter**; Sonnenbergstrasse 7, 8835 Feusisberg (CH). **MÜLLER, Thomas**; Somnhaldenstrasse 25, 6353 Weggis (CH). **SANTANA-SIEGENTHALER, Cedric**; Betliserstrasse 3, 8872 Weesen (CH). **SANTANA SIEGENTHALER, Vivian**; Betliserstrasse 3, 8872 Weesen (CH). **BALKAU, Werner**; Lassigen 277, 8762 Schwändi b. Schwanden GL

(CH). **DACHS, Markus**; Kalkofenstrasse 11, 8810 Horgen (CH). **LÜNENBÜRGER, Oliver**; Wangerbergstrasse 62, 9497 Triesenberg (CH).

(74) Agent: **BOVARD AG**; Optingenstrasse 16, 3013 Bern (CH).

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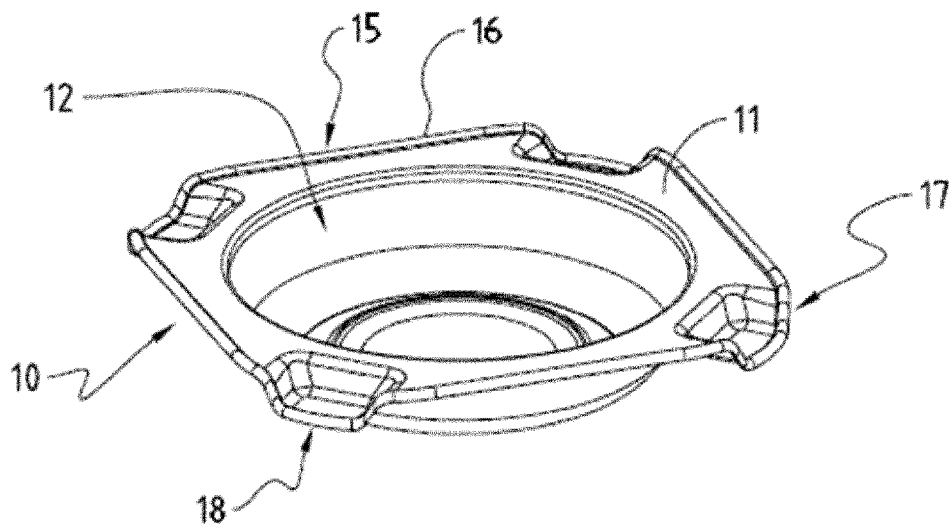


FIG. 3

(57) Abstract: The present invention is directed to a food container (1) for an animal feeding system, comprising a bowl shaped basic body (10) comprising at least two edges (11, 11'), and a removable cover (20) attachable on and/or hermetically sealable with the edges (11, 11') of said bowl shaped basic body (10). At least one portion (17, 17') of the edges (11, 11') of the bowl shaped basic body (10) are formed with a deepening (18, 18') providing an access for removing the cover (20). The invention is further directed to an animal feeding system comprising such food container, as well as to a process for opening such food container.



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FOOD CONTAINER FOR AN ANIMAL FEEDING SYSTEM, ANIMAL FEEDING SYSTEM
AND PROCESS FOR OPENING A FOOD CONTAINER

Technical Field

The present invention relates generally to a food container, especially for a system for feeding an animal, in particular a pet. The food
5 container is hermetically closable by a cover provided on top of a bowled shaped basic body and covering at least an inner volume thereof fillable with a defined quantity of food, especially of animal food, preferably for pet feeding, in particular for cat feeding. The food container is suitable for an autonomous
10 system, especially an animal feeding system comprising a stock of food containers, transportation means and an automatically opening mechanism to open in determinable order and time schedule one food container to present it especially to a cat or other domestic animal and/or to dispose the food container in a hygienically manner.

The present invention is not limited to a food container for animal
15 food, especially for cats. The food container of the present invention could as well be used for any kind of food such as dairy products, salads, etc. for humans.

Background of the invention

There exists an increasing demand for automatic and intelligent
20 feeding systems for animals, in particular for pets. These automatic feeding systems allow the pet, e.g. a cat, to be cared for, at least for a certain period of time, even when the carrying person is absent. Pet food is generally available in sealable containers containing one or more portions of animal food, which can be as well described as capsules. The capsules can contain both dry food and
25 wet food or another forms of animal food or the like. The food container can be hermetically sealed by means of a removable cover and can be stored for example in a storage compartment of an automatic animal feeding system. The cover can comprise a lid, a layer, a film, or a combination thereof, wherein in this case the layer or film can be at least partially removed from the container
30 together with the lid. Since each known automatic animal feeding system has

an individual structure, the containers are designed to match to this specified animal feeding system such that the animal food containers can be stored, automatically transported, opened by an opening mechanism and/or disposed in a provided waste section thereof.

5 Sealable containers are also known as food packages for dairy products, salads, etc. comprising a base and a lid with a separate seal, e.g. foil, placed underneath the lid. The foil can be made of any flexible material such as thin plastic or metal membranes in form of sheets or films capable to cover and to seal the container to a desired degree of sealing. For opening this film can be
10 peeled, torn, or slid off the base.

WO 2015/198222 A2 discloses an animal feeding system and a food container adapted thereto. The food container comprises a sterilizable rimmed base with an at least partially removable cover and/or a seal applied on an edge of the food container. For a hermetical seal the cover comprises a lid and/or a
15 foil seal or a combination of both welded or glued to the edge of the container. The lid or the foil seal is at least partially removable from the base by means of an opening mechanism or in other cases can be torn or slit to open. The opening mechanism is designed to grasp a rigid opening element or the like protruding beyond the edge of the base, lift it and at least partially remove it via
20 a sliding relative movement between the base and the cover. After presenting the content of the container to the pet the more or less empty container can be disposed whereby the cover is placed back on the edge of the base such that the container is closed, preferably hermetically sealed due to application of an adhesive. This food container is designed in relation to the specific animal
25 feeding system and in particular as such that the opening mechanism can grasp an opening element protruding from the food container which can be a weak spot. Furthermore, the upper surface and the lower surface of the food container have the same form; they are both either squared (Fig. 17 I), rectangular (Fig. 17F; Fig. 17G-1) or circular (Fig. 17H-1/2), whereby several
30 food containers can also share one cover (Fig. 17 I).

DE 10 2006 005700 A1 describes a container which is closed by a covering film. To remove the covering film, a predetermined breaking point is

created on the container and a gripping device grips a tab-like gripping portion of the covering film delimited by the predetermined breaking point in order to remove the covering film. The container is not easy to open, and the breaking point can be a flaw in regard of stability.

5 US 2007205206 A1 describes a closable and re-openable container comprising a removable lid. The removable lid is arranged on top of the container in a sealing and lockable engagement. The removable lid has a peripheral outwardly extending tab which can be grasped and lifted to open the container. The peripheral outwardly extending tab can be torn of compulsory.

10 US 2022/142120 discloses a pet feeding device for supplying and opening filled capsules having a lid, whereby at least one stamp is used for indenting and/or bending an edge of the capsule (mechanical deformation) about at least one substantially horizontal axis (see Fig. 11 and 12), whereby the lid is not deformed, so that a gap between the lid and the flange results
15 which can be used for gripping the lid to remove it and thus, open the capsule. The capsule as well as its flange and its lid are circular (Fig. 1).

 US 5,167,339 discloses rectangular multilayer containers having one projecting portion 7 (Fig. 1, Fig. 2) which serves as portion for beginning opening of the container. Since the projection portion is only at one of the four
20 edges of the container, an automated opening of such containers may only be possible if the containers are put into a foreseen direction into the opening apparatus.

 FR 1,398,922 discloses an arrangement where four food containers are covered by a single cover. As can be seen in Fig. 1 the cover hereby
25 extends beyond the outer circumference of the edges of such arrangement and is especially reinforced in the corner portions. The pull-off tabs hereby cover said corner portions 5.

 The food container of DE 25 56 230 is designed as a square with rounded corners, whereby one corner is less rounded and has a protruding
30 portion corresponding to a protruding portion of the lid. Also here, only one

corner is equipped with such a protruding portion. Thus, an automated opening of such food containers may only be possible if the food containers are put into a foreseen direction into the opening apparatus

Summary of the invention

5 Therefore, objects of the invention are to provide a food container especially for an animal feeding system suitable for different types of animal food which comprises a cover hermetically sealable therewith. The cover should be partially removable easily and preferably automatically, whereby the orientation of the food container during an opening procedure is not limited to
10 one predetermined position. Further, the food container and the cover should be sterilizable, robust, and compact in design to provide storage and insensitive handling. Furthermore, the food container is designed without any protruding tab or latch, which minimizes the risk of damage of delicate protruding parts and therefore the impossibility of opening in the case of broken protruding tabs.
15 Additionally, the risk of injury of the animal by fragments is not existing anymore. Another advantage of a container without protruding tab or latch is that the orientation of the container in an opening position relative to an opening mechanism is not limited to one defined orientation.

 The objects of the invention are achieved by a food container
20 according to the features of claim 1 and an animal feeding system according to claim 13. Further preferable embodiments are disclosed in the dependent claims. A further object of the present invention is a process according to claim 15 for opening a food container according to the present invention.

 Even if the invention relates to a food container for animal or pet
25 feeding, preferably a cat, it is not limited to that. The container may be as well filled with human food of any kind, which for example can be stored in a preferably coolable vending machine.

 Thus, the present invention is directed to a food container for an animal feeding system comprising a bowl shaped basic body comprising at
30 least two edges limited by an outer circumference, wherein at least one portion

of the edges of the bowled shaped basic body forms a deepening. In a preferred embodiment, the food container further comprises a cover attached on and sealed with the edges of said bowled shaped basic body, wherein no part of the cover protrudes beyond the outer circumference of the edges.

5 According to one aspect of the present invention a food container comprises a bowled shaped basic body comprising at least two edges limited by an outer circumference and a removable cover attachable on and sealable with said at least two edges. The food container has no part of the cover protruding beyond the outer circumference of said at least two edges and at least one
10 portion of the at least two edges of the bowled shaped basic body forms a deepening providing an access for removing the cover.

The food container may be of any kind of shape like rectangular or even circular and/or of any dimension, such as configured as one portion container, a multiple portion container, a multiple compartment container, etc.
15 Hereby a “one portion container” is preferred. The removable cover may comprise a lid, a seal, e.g. foil, lid with seal or lid with coating or other means.

In a preferred embodiment, the part of the food container containing the food is squared, rectangular, triangular, pentagonal or hexagonal, or said part is circular, so that the bottom of said food container is squared, rectangular,
20 triangular, pentagonal or hexagonal, or said bottom is circular. In a more preferred embodiment, the upper surface of the food container is squared, rectangular, or triangular. Hereby the main opening has preferably the same shape as the bottom of said food container whereby their dimensions may differ. That means that in a preferred embodiment the upper surface and/or
25 removable cover of the food container have the same shape, whereas its lower surface (bottom) differ from them with respect to their shape.

The bowled-shaped basic body provides an inner volume to be filled with a defined quantity of animal food via a main opening providing a filling hole and access to the filled-in food for the pet. Surrounding the main opening of the
30 bowled shaped basic body the edge extends largely horizontally and a rim can be formed at the outer circumference of the edge. The edge provides a contact

surface on which the removable cover can be arranged and/or hermetically sealed with. The removable cover is preferably sized to be arranged on the edge of the bowled shaped basic body covering the main opening but without extending with no parts over the outer circumference of the edge of the bowled shaped basic body.

The bowled shaped basic body has a lower surface and an upper surface, wherein the edges extend largely horizontally from the upper surface. The outer circumference of the edges forms a rim, preferably a thickly rim. This thickly rim stabilizes the shape to the food container and can function as positioning means by applying the removable cover on the edge.

At least one portion of the edge of the bowled shaped basic body of the food container is formed with a deepening or depression. The deepening can be designed as a recess or a groove in the at least one portion of the edge extending below the upper surface and limited by side walls. Limiting side walls can be tapered to create three sides of a trapezoidal enclosure.

According to an embodiment of the invention, the food container, in particular the edge of the bowled shaped basic body as well as the removable cover have angular shape seen in top view. Therefore, the food container and/or especially its upper surface can be of triangular, rectangular, preferably square, or polygon shape with a plurality of corner portions, preferably smoothly rounded corners. A square shape of the food container has the advantage to be easy to handle, automatically transportable in a guided manner, stackable in a storage compartment of an animal feeding system and due to symmetry easy to orientate. According to one embodiment of the invention, the at least one deepening formed within the edge of the bowled shaped basic body is formed in at least one corner portion of the angular shaped bowled shaped basic body, preferably in two or more corner portions of the bowled shaped basic body.

Furthermore, one or more corner portions of the bowled shaped basic body can be configured as a cut corner and/or as a smoothed rounded corner without sharp edges to avoid any risk of injury for the pet and provide easy handling. The removable cover at least partially arranged on and sealed

with the edge of the bowled shaped basic body can be adapted to the shape of the edge of the bowled shaped basic body. The cover is hereby preferably not sealed with the rim of the deepenings of such bowled shaped basic body. Preferably, the removable cover have rounded corners which are optionally also cut or so-called shortened.. These shapes of the food container including the cover ensure that the risk of damages due of falling on the floor or being grabbed harshly is minimized.

Therefore, a preferred embodiment of the present invention is directed to a food container, wherein the cover comprises at least a shortened corner portion and/or at least a rounded corner portion lying over each of the at least two deepenings of the bowled shaped basic body. These corner portions are therefore preferably not sealed with the at least two deepenings of the bowled shaped basic body, but only with the edge of the main opening.

The term "shortened corner portion" means that a part of the corner portion is cut off so that the cover does not extend up to the circumference of the edge of the upper surface of the bowled shaped basic body.

For easy handling, the food container is designed symmetrical with equal designed corner portions such that the orientation of the food container during an opening procedure is irrelevant.

Preferred embodiments of the food container of the present invention are as follows:

- A food container, whereby its bottom (lower surface) and its main opening are circular, and whereby its upper surface is squared with rounded corner portions.
Hereby preferably all edges of the upper surface are formed with a deepening or depression as described above.
- A food container, whereby its bottom (lower surface) and its main opening are circular, and whereby its upper surface is rectangular with rounded corner portions.

Hereby preferably two edges, being diagonally opposite each other, are formed with a deepening or depression as described above.

- A food container, whereby its bottom (lower surface) and its main opening are circular, and whereby its upper surface is triangular with rounded corner portions.

If the triangle is isosceles, all its three edges are formed with a deepening or depression as described above.

If the triangle is right-angled, either the not-right angled two edges are formed with a deepening or depression as described above, or the right-angled edge is formed with a deepening or depression as described above. For these preferred embodiments the further preferences as given in this specification also apply.

These preferred food containers are given as exemplary embodiments for the present invention. The present invention is, however, not limited to them. Food containers with a different form of their bottom and/or their main opening are also covered by the present invention.

The dimensions of the at least one deepening, in particular its depth and its width, can be selected such that an opening mechanism, e.g. means of the opening mechanism of an associated animal feeding system, may be at least partially inserted, or introduced in the deepening. But the food container can as well be opened by hand by grasping and lifting the corner portion of the cover lying above the deepening of the edge. Automated opening of the food container is, however, preferred. The food container may be opened by the opening mechanism of the animal feeding system by engagement of at least a part of the opening mechanism, preferably by introducing means of the opening mechanism into at least one of the deepening underneath the removable cover such that the cover can be lifted for being removed. The manner of removing the cover from the bowled shaped basic body is advantageous since no tab or latch is necessary which may be teared off and which may be hard to grasp by a pincer. For example, the opening mechanism of an associated automatic feeding system may comprise means such as a pin or other suitable element introducible into the at least one deepening underneath the cover. Alternatively,

the opening mechanism can be configured to clamp the cover between movable elements. Preferably, to reduce the opening force more than one deepening is provided such that partially removing of the cover may occur by lifting the cover at different points, preferably simultaneously.

5 According to one embodiment, the removable cover attachable to the edge of the bowled shaped basic body is designed as such that the main opening thereof is hermetically sealed by the cover lying on and sealed with at least an inner circular part of the edge.

10 In one embodiment at least one part of the cover does not extend up to the outer circumference of the edge. In particular, the cover may have at least one shortened corner portion and/or at least one rounded corner portion lying at least partially over the at least one deepening provided on the edge of the bowled shaped basic body. Said cut/shortened and/or rounded corner portion is not preferably not sealed with the rim of the deepening, but with the
15 edge of the main opening. In particular, the food container does not have protruding grasping tabs or latches which in certain cases have to be of more rigid material than the material of the foil seal or the like. The corner portion and/or the shortened corner portion and/or the rounded corner portion of the cover may be reinforced by reinforcing elements, preferably providing at least
20 one reinforced portion.

 The food container may be hermetically sealed by the cover against ingress and egress of germs, bacteria, oxygen and/or other materials and odor as well as to keep the pet food fresh. Therefore, the removable cover may comprise a lid and/or a foil seal for covering and sealing the food container to a
25 predetermined degree of sealing. The cover can be removed by lifting, peeling, torn off or otherwise removed. The removable cover may be attached on the top surface of the edge of the bowled shaped basic body so as to seal, preferably hermetically, the food container by an adhesive applied on a preferably circular line on the top surface of the edge. Alternatively, the cover may be joined to the
30 top surface of the edge of the bowled shaped basic body by thermal or sonic welding or bonding along a line which forms the hermetically sealing. Furthermore, the edge and/or the cover can be coated at least partially with a

layer of an activable material providing a hermetically sealed connection between edge and cover. For example, the coating can be made of polypropylene, which can be thermally activated. Preferably, the coating applied on the side of the cover contacting the edge forms a thin layer of several μm and may provide a sealing material. Another coating layer can be applied to the opposite side of the cover.

A preferred embodiment of the present invention is therefore directed to a food container, wherein the cover is hermetically sealed with at least two edges of the bowled shaped basic body by means of a sealing material applied at least partially on a contact surface between these edges and the cover.

In a preferred embodiment the cover is a lid having a lower surface and an upper surface. The lower surface has the same form as the main opening and therefore fits into it. That means that the lid has a certain extension from the upper surface to the lower surface in the vertical direction. This embodiment facilitates the stapling of the food containers on top of each other. Furthermore it facilitates the automatic positioning of the lid onto the bowled shaped basic body during the closing of the food container.

According to one aspect of the invention, the geometry of the applied sealing material provides easy and robust removal of the lid from the food container. The sealing material applied in a ring shape around the main opening can form a tip at least on one corner portion, in particular at that corner portion where the opening procedure starts, in particular where the opening mechanism is initially positioned. Therefore, the present invention is preferably directed to a food container, wherein the sealing material is applied on the contact surface such that at least one tip is formed at a position at which an opening procedure is initiated. In a preferred embodiment the sealing material applied in a ring shape around the main opening can form a tip in each corner portion so that the opening is facilitated in each corner portion and there is no need to fix the food container in a certain position for opening.

The specific form of the applied sealing material provides a gradual increasing sealing surface such that an automatic removal can be performed

with a minimized initial force and with constant or quasi constant force. To enhance the hermetical sealing on further portions of the contact surface between the edge and the cover sealing material can be applied. For example, portions of sealing material can be provided in the proximity of the one or more
5 deepening.

In a preferred embodiment of the food container according to the present invention the bowled shaped basic body also has pairs of local sealing spots, preferably flanking at least a deepening, more preferably flanking each deepening. These sealing spots may have the form of triangles. Other forms
10 may also be possible. These sealing spots reduce the risk of damaging the cover during storage and handling: When the cover is pushed down into the deepening in any of the four corners, the cover will be tensioned between those sealed spots. Said tension prevents pushing the cover fully into the recess and hereby prevents its damaging.

According to one aspect of the invention, the food container, in particular the bowled shaped basic body and/or the removable cover, may be made of a rigid material suitable for filling therein a defined quantity of food, especially of animal food, and withstanding the temperature and the pressure associated with sterilization. For example the bowled shaped basic body and/or
20 the cover may be made of metal, preferably aluminum, plastic including multi-layered material, or any suitable material for packing therein food, especially animal food. In particular, the food container may be made of a material withstanding the temperature and the pressure associated with sterilization at temperatures above 130°C and pressure of 2 to 3 bar during approximately 60
25 minutes. An appropriate material of the food container can be selected in regard of the food to be encapsulated as well as the sterilization conditions.

According to another aspect of the invention, the food container may be filled with any kind of pet food, such as not limited to wet food (semi-soup, flakes, chunks, or any other food type known), moist food, dry food, and treats.
30 Furthermore, different kinds of food can be mixed together to present a healthy and rich nutrition for the pet. The food container may have further features to provide an individual feeding of a pet, preferably a cat, such as a readable code

for recognition the type of food and/or food container or any code for distinguishing between different foods and/or food containers and/or for authorizing the food container to be used with the animal feeding system.

Therefore, a further preferred embodiment of the present invention is
5 directed to a food container, wherein the food container comprises a defined quantity of food of a dry and/or wet and/or liquid state, and preferably wherein the defined quantity is one food portion for an animal, especially for feeding at least a cat.

In another embodiment of the present invention the food container
10 may be filled with any kind of food for humans, such as not limited to wet food (semi-soup, flakes, chunks, or any other food type known), moist food, dry food, and treats. Furthermore, different kinds of food can be mixed together to present a healthy and rich nutrition for the human.

The food container according to the invention, may be configured to
15 be associated to an automatic system, especially an animal feeding system, in particular to be opened by an opening mechanism thereof, preferably an automatic opening mechanism. The removable cover may be lifted from the edge of the bowled shaped basic body by engagement of means of the automatic system, especially of the animal feeding system which are intro-
20 ducible partly into at least one of the deepening, especially into one of the at least two deepenings, covered by the removable cover. The removable cover may be removed by a relative movement between the partly introducible means of the opening mechanism. Therefore, the present invention is preferably directed to a food container, wherein the cover is at least partially removable
25 from the bowled shaped basic body by a relative movement between the opening means and the bowled shaped basic body. To reduce the opening force more than one means can be introduced in more than one deepening, in particular from different directions, preferably diagonal directions, to lift the cover from the bowled shaped basic body.

30 Another aspect of the invention is related to an animal feeding system comprising at least a food container as disclosed and an automatic

opening mechanism. Furthermore, the animal feeding system may comprise further features providing storage, transportation, and disposal of wasted food containers.

The present invention is preferably directed to such an animal
5 feeding system further comprising a storage compartment for storage of food
containers according to the present invention, transportation means for
transporting one of said food containers along a transportation direction to an
opening mechanism comprising opening means configured to be at least partly
introduced into a deepening, preferably into one of the at least two deepenings,
10 and to grab the cover such that by a relative movement between the opening
means and the bowled shaped basic body the cover is at least partly removed.

A further object of the present invention is a process for opening a
food container with the preferences as disclosed herein comprising the following
steps:

- 15 a) Providing an animal feeding system comprising an opening mechanism
comprising opening means;
- b) Fixating the food container in said animal feeding system;
- c) At least partly inserting the opening means into at least one of the
20 deepenings of the food container underneath the cover lying on and
sealed with the bowl-shaped basic body;
- d) Fixating the corner portion of the cover by clamping it by a vertical
movement of the opening means;
- e) Moving the opening means further in the vertical direction away from the
25 bowled shaped basic body or moving the food container in the opposite
vertical direction away from the opening means, thereby lifting the corner
portion of the cover from the bowled shaped basic body;
- f) Moving the opening means in a horizontal direction above the cover of
30 the food container away from the corner portion, where the opening of
the food container started, or moving the food container in the opposite
horizontal direction towards the corner portion, where the opening of the

food container started, thereby removing the cover at least partly of the
bowled shaped basic body;

whereby step f) can also be carried out before step e), or steps e) and b) can be
5 carried out simultaneously.

The steps of said process are now described in more detail below and an
embodiment thereof illustrated in Fig. 6 to 11.

10 As a first step a) an animal feeding system comprising an opening mechanism
comprising opening means is provided.

In a next step b) the food container is fixated in said animal feeding system.

As shown in Fig. 6 (step c) the opening means are then at least partly inserted
into at least one of the deepenings of the food container underneath the cover
15 lying on and sealed with the bowl-shaped basic body. The cover is hereby not
sealed with the rim of such deepenings of the food container. In a further
embodiment it may also be possible to insert the opening means into two of
such deepenings of the food container.

As shown in Fig. 7 (step d) the corner portion of the cover is then fixated by
20 clamping it by a vertical movement of the opening means. Of course other
options of fixating the corner portion are also possible.

As shown in Fig. 8 and 9 (step e), the opening means are then moved further in
the vertical direction away from the food container, thereby lifting the corner
portion of the cover from the bowled shaped basic body.

25 The opening means are then moved in a horizontal direction above
the cover of the food container (Fig. 10, step f) away from the corner portion,
where the opening of the cover started, thereby removing the cover at least
partly of the bowled shaped basic body 10 (Fig. 11). If the upper surface of the
bowled shaped basic body is rectangular or squared, the movement of the

opening means can be diagonally to said surface or parallel to one of the sides of the rectangle or the square.

In an alternative embodiment of the process of the present invention, in step c) (Fig. 8 and 9) the opening means are not moved, but the bowled shaped basic body is moved in the vertical direction away from the opening means. Hereby the corner portion of the cover is lifted from the bowled shaped basic body. The bowled shaped basic body is then moved in a horizontal direction below the opening means of said animal feeding system (Fig. 10, step f) towards the corner portion, where the opening of the cover started, thereby removing the cover at least partly of the bowled shaped basic body (Fig. 11).

The horizontal movement of the opening means and the bowled shaped basic body, respectively, may be performed before its vertical movement; i.e. step f) may be performed before step e). Furthermore, steps e) and f) can also be carried out simultaneously. In that case a diagonal opening of the food container takes place, in case its upper surface is rectangular or squared.

Brief description of the drawings

For a more complete understanding of the invention and the advantages thereof, exemplary embodiments of the invention are explained in more detail in the following description with reference to the accompanying figures, in which like reference characters designate like parts and in which:

Figure 1 is a schematic view of a food container according to a first embodiment;

Figure 1a is a schematic detail view of an applied sealing material to provide sealing of the cover with the bowled shaped basic body;

Figure 2 is a schematic side view of the food container according the first embodiment;

Figure 3 is a schematic perspective view of a bowled shaped basic body of the food container according to the first embodiment;

Figure 4 is a schematic perspective view of a removable cover of the food container according to the first embodiment;

5 Figure 5 is a schematic bottom view of a removable cover according to an embodiment;

Figure 6 is a schematic perspective view of a food container in engagement with an opening mechanism;

10 Figures 7 to 11 are schematic perspective views of the steps of the process of opening the food container;

Fig. 12 is a schematic view of an applied sealing material to provide sealing of the cover with the bowled shaped basic body;

Fig. 13 is a schematic bottom view of a food container according to an embodiment.

15 Detailed description of a preferred embodiment

The accompanying figures are included to provide a further understanding of the present invention and are incorporated in and constitute a part of this specification. The figures illustrate particular embodiments of the invention and together with the description serve to explain the principles of the invention. Other embodiments of the invention and attendant advantages of the invention will be readily appreciated, as they become better understood with reference to the following detailed description. The figures are now in detail described with reference to an animal feeding system. The invention is, however, not limited to animal feeding systems, but also encompasses systems to provide food for humans. Furthermore, the invention is illustrated for a preferred embodiment, where the food container, especially its upper surface, has a square shape, but the invention is not limited thereto. Preferably the

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opening of the food container has a circular shape, but the invention is not limited thereto.

Referring to figure 1, a preferred food container 1 for an animal feeding system comprises a bowled shaped basic body 10 and a removable cover 20. The bowled shaped basic body 10 is configured in a square shape with an edge 11 surrounding an inner volume which may be filled with a defined quantity of food via a main opening 12 (as seen in fig. 3). The food container 10 has an upper surface 13 and a lower surface 14 or bottom as shown in fig. 2. In this preferred embodiment the upper surface 13 has a square shape whereas the bottom has a circular shape. The edge 11 extends horizontally at the upper surface 13 of the bowled shaped basic body 10 and provides a contact surface on which the removable cover 20 can be attached, preferably in a sealed manner. The edge 11 has an outer circumference 15 configured as a thickly rim 16 for a more stable form. As can be seen from fig. 1 from a top view, the square shape of the food container 1, in particular of the bowled shaped basic body 10, has smoothed rounded corner portions 17.

At least at one of the corner portions 17, preferably at least at two corner portions 17, 17', more preferably at least at all corner portions 17, 17', 17'', 17''', the edge 11 of the bowled shaped basic body 10 has a deepening 18, 18', 18'', 18''' extending below the upper surface 13 and forming a recess or a groove, as shown in fig. 2 and 3. Each deepening 18 is limited by walls determining at least partly the dimension of the deepening 18. Preferably, the bowled shaped basic body 10 is provided with a deepening 18 at each corner portion 17 such that the cover 20 can be removed from different directions and independently of its orientation.

The food container 1 further comprises the cover 20 or lid removable attached to the edge 11, preferably in a hermetically sealed manner. In particular, the cover 20 is placeable on and sealable with the bowled shaped basic body 10, in particular the edge 11, within the outer circumference 15 limited by the thickly rim 16.

According to an embodiment, the cover 20 is designed as a thin sheet or foil hermetically sealed on a circular rim of the edge 11 adjacent to the main opening 12. For example, the cover 20 can be connected to the bowled shaped basic body 10 by means of an adhesive or by an applied sealing material 19 (shown in fig. 1a). As can be seen in top view, corner portions 22 of the cover 20 are configured as cut corner portions not extending completely up to the corner portions 17 of the bowled shaped basic body 10 or up to the thick rim 16 but only to a certain amount. An enclosure is formed in the corner portions 17 limited by the deepening 18 and the at least partially overlying cover 20 providing an access for opening the food container 1 by an opening mechanism configured to lift or differently removing the cover 20 at these corner portions 17.

Figure 1a shows a detail of an applied sealing material 19, in particular of the sealing material 19 applied to connect the bowled shaped basic body 10 with the cover 20. The sealing material 19 can be applied as a layer or coating on the edge 11 and/or a contact surface of the cover 20 with the edge 11. The applied sealing material 19 can be applied in a ring form about the main opening 12 with a tip 19a at least in one corner portion 17, preferably in all corner portions 17. Starting the opening procedure at one of the corner portions 17 the tip 19a is removed first. This has the advantage that the initial opening force can be small.

According to fig. 1a, the sealing material 19 can be applied additionally on portions of the contact surface between the edge 11 and the cover 20, in particular in the proximity of the corner portions 17.

Figure 2 shows the food container 1 in a schematic side view. The deepening 18 formed at least at one corner portion 17 of the edge 11 is shown. Furthermore, the enclosure between the deepening 18 and the cover 20 is shown, in which means for opening may be partly inserted during an opening procedure for removing the cover 20 from the bowled shaped basic body 10.

As illustrated in figure 3, the bowled shaped basic body 10 comprises the surrounding edge 11 extending from the main opening 12 to the outer

circumference 15, e.g., to the thickly rim 16, in a horizontal plane. At each corner portion 17 the deepening 18 is formed such that a circular surface of the edge 11 adjacent to the main opening 12 remains providing part of the contact surface for the cover 20 lying on and sealed with the edge 11.

5 Figure 4 shows a schematic perspective view of the cover 20 with cut corner portions 22. Each cut corner portion 22 overlays at least partially the deepening 18, 18' formed in at least one corner portion 17 of the edge 11 of the bowled shaped basic body 10. Alternatively, the cover 20 can be provided with rounded corner portions 23. Preferably the cut/shortened corner portion 22
10 and/or the rounded corner portion 23 are not sealed with the deepening 18, 18', but with the edge 42 of the main opening or with the sealing material 19 forming a ring around said edge 42 (see Fig. 1a).

 Figure 4 shows also a preferred embodiment of the cover 20 being a lid having a lower surface 25 and an upper surface 26. The lower surface 25 fits
15 into the main opening 12. That means that the lid 20 has a certain extension from the upper surface 26 to the lower surface 25 in the vertical direction. This embodiment facilitates the stapling of the food containers 1 on top of each other. Furthermore it facilitates the automatic positioning of the lid 20 onto the bowled shaped basic body 10 during the closing of the food container 1.

20 As illustrated in figure 5 showing a bottom view of the cover 20, the cover 20 may have smoothed rounded corner portions 23 additional or alternative to the cut corner portions 22. Preferably, the cover 20 is configured symmetrically either with rounded corner portions 23 or cut, in particular shortened corner portions 22. In one preferred embodiment the shortened
25 corner portions 22 and/or the rounded corner portions 23 comprise reinforcing elements 24 in a suitable form. For example, the reinforcing elements 24 can be configured in U-shape, in a double U-shape and/or as bars. These reinforcing elements give the cover 20 more stability in the corner portions 22, 23, in particular during an opening procedure when means of an opening mechanism
30 is/are introduced into the deepening 18 and is moved upward to lift the removable cover 20.

As shown in Fig. 13 no part of the cover 20 protrudes beyond the outer circumference 15 of the edges 11, 11' of the food container 1, i.e. the cover 20 does not extend beyond the rim 16 of the food container 1. In this embodiment the corner portions of the cover 20 are reinforced by reinforcing elements 27, 27', 27'', 27''', thus providing reinforced portions of the cover. In this embodiment the reinforcing elements 27, 27', 27'', 27''' are curved upwards or downwards of the upper surface of the cover 20. Furthermore, here the cover 20 is a lid having a lower surface 25 fitting to the edge 42 of the main opening. The lower surface 25 has the same form as the main opening and therefore fits into it. That means that the lid has a certain extension from the upper surface 26 to the lower surface 25 in the vertical direction illustrated by the most inner circle in Fig. 13.

Fig. 6 shows the food container 1 during an opening procedure comprising an opening mechanism 30 with opening means 32 configured to be at least partly introducible into the at least one deepening 18 underneath the cover 20 lying on and sealed with the bowl-shaped basic body 10. In one embodiment the opening means 32 can be provided as a clamping mechanism to be partly introducible into the deepening 18 and to clamp between parts of this clamping mechanism the cover 20.

Fig. 6 to 11 illustrate the single steps of the process for opening a food container 1 according to the present invention.

As a first step a) an animal feeding system 100 (not shown) comprising an opening mechanism 30 comprising opening means 32 is provided.

In a next step b) the food container 1 is fixated in said animal feeding system.

As shown in Fig. 6 (step c) the opening means 32 are then at least partly inserted into at least one of the deepenings 18, 18', 18'', 18''' of the food container 1 underneath the cover 20 lying on and sealed with the bowl-shaped basic body 10. The cover 20 is hereby not sealed with the rim of such deepenings 18, 18', 18'', 18''' of the food container 1. In a further embodiment it

may also be possible to insert the opening means 32 into two of such deepenings 18, 18', 18'', 18''' of the food container 1.

As shown in Fig. 7 (step d) the corner portion 22 of the cover is then fixated by clamping it by a vertical movement of the opening means 32. Of course other
5 options of fixating the corner portion 22 are also possible.

As shown in Fig. 8 and 9 (step e), the opening means 32 are then moved further in the vertical direction away from the food container, thereby lifting the corner portion 22 of the cover from the bowled shaped basic body 10.

The opening means 32 are then moved in a horizontal direction
10 above the cover 20 of the food container (Fig. 10, step f) away from the corner portion, where the opening of the cover 20 started, thereby removing the cover 20 at least partly of the bowled shaped basic body 10 (Fig. 11). If the upper surface of the bowled shaped basic body is rectangular or squared, the movement of the opening means 32 can be diagonally to said surface or
15 parallel to one of the sides of the rectangle or the square.

In an alternative embodiment of the process of the present invention, in step c) (Fig. 8 and 9) the opening means 32 are not moved, but the bowled shaped basic body 10 is moved in the vertical direction away from the opening means. Hereby the corner portion 22 of the cover is lifted from the bowled
20 shaped basic body 10. The bowled shaped basic body 10 is then moved in a horizontal direction below the opening means 32 of said animal feeding system 100 (Fig. 10, step f) towards the corner portion, where the opening of the cover 20 started, thereby removing the cover 20 at least partly of the bowled shaped basic body 10 (Fig. 11).

25 In the embodiment of the food container 1 according to Fig. 12 the sealing material 19 is applied in a ring around the main opening 12 to provide sealing of the cover 20 with the bowled shaped basic body 10. In each corner section hereby the sealing material 19 has a tip 19a, 19a', 19a'', 19a''' to facilitate an easy removal, e.g. an easy peeling off, of the cover 20. The tip 19a

is the point where the cover 20 or the lid 20 is pulled away from the bowled shaped basic body first.

The embodiment of the food container 1 according to Fig. 12 also has pairs of local sealing spots 19b and 19c, preferably flanking at least a
5 deepening 18, more preferably flanking each deepening 18, 18', 18'', 18'''. Here these spot welds 19b/19c, 19b'/19c', 19b''/19c'', 19b'''/19c''' have the form of triangles. Other forms may also be possible. These sealing spots 19b/19c, 19b'/19c', 19b''/19c'', 19b'''/19c''' reduce the risk of damaging the cover 20 or the lid 20 during storage and handling: When the cover 20 or the lid 20 is
10 pushed down into the deepening 18 in any of the four corners, the cover 20 or the lid 20 will be tensioned between those pair of sealed spots 19b/19c. Said tension prevents pushing the cover/lid 20 fully into the deepening 18.

List of Reference Signs

	1	food container
	10	bowled shaped basic body
	20	removable cover
5		
	11, 11', 11'', 11'''	edge
	12	main opening
	13	upper surface of the food container 1
	14	lower surface or bottom of the food container 1
10	15	outer circumference of the edge 11
	16	thickly rim
	17, 17', 17'', 17'''	(smoothed) rounded corner portion
	18, 18', 18'', 18'''	deepening
	19	adhesive or sealing material
15	19a	tip of the adhesive or sealing material 19
	19b, 19c	sealing spot
	22	(cut/shortened) corner portion of the cover 20
	23	(smoothed) rounded corner portion of the cover 20
20	24	reinforcing element of shortened corner portion 22 or rounded corner portion 23
	25	lower surface of the cover/lid 20
	26	upper surface of the cover/lid 20
	27, 27', 27'', 27'''	reinforcing elements of the cover
25		
	30	opening mechanism
	32	opening means
	42	edge of the main opening 12

Claims

1. A food container (1) for an animal feeding system comprising:
 - a bowled shaped basic body (10) comprising at least two edges (11, 11') limited by an outer circumference (15),
- 5 wherein at least one portion (17, 17') of the edges (11, 11') of the bowled shaped basic body (10) forms a deepening (18, 18').
2. The food container (1) according to claim 1, wherein the food container further comprises a cover (20) attached on and sealed with the edges (11, 11') of said bowled shaped basic body (10), wherein no part of the cover
- 10 (20) protrudes beyond the outer circumference (15) of the edges (11, 11').
3. The food container (1) according to claim 1 or claim 2, wherein the bowled shaped basic body (10) has a lower surface (14) and an upper surface (13), wherein the edges (11, 11') extend largely horizontally from the upper surface (13) and a rim (16) is formed at the outer circumference (15) of the
- 15 edges (11, 11').
4. The food container (1) according to claim 2 and/or 3, wherein the edges (11, 11') of the bowled shaped basic body (10) and correspondingly the cover (20) are formed in angular shape.
5. The food container (1) according to claim 4, wherein the cover (20)
- 20 and/or the bowled shaped basic body (10) are designed in a rectangular form, preferably in a square form, with the deepening (18, 18') in two or more corner portions (17, 17') of the bowled shaped basic body (10).
6. The food container (1) according to claim 4 or 5, wherein the cover (20) comprises at least a shortened corner portion (22) and/or at least a
- 25 rounded corner portion (23) lying over each of the at least two deepenings (18, 18') of the bowled shaped basic body (10).

7. The food container (1) according to claim 6, wherein the shortened corner portions (22) and/or the rounded corner portions (23) are reinforced by reinforcing elements (24).

5 8. The food container (1) according to one of the preceding claims, wherein the cover (20) is hermetically sealed with the edges (11, 11') of the bowled shaped basic body (10) by means of a sealing material (19) applied at least partially on a contact surface between the edges (11, 11') and the cover (20).

10 9. The food container (1) according to claim 8, wherein the sealing material (19) is applied on the contact surface such that at least one tip (19a) is formed at a position at which an opening procedure is initiated.

15 10. The food container (1) according to one or more of the preceding claims, wherein the bowled shaped basic body (10) and/or the cover (20) are made of a rigid material suitable for filling therein a defined quantity of food, withstanding the temperature and pressure associated with sterilization.

11. The food container (1) according to one or more of the preceding claims, wherein the food container comprises a defined quantity of food of a dry and/or wet and/or liquid state, and preferably wherein the defined quantity is one food portion for an animal, especially for feeding at least a cat.

20 12. The food container (1) according to one of the preceding claims, wherein the cover (20) is at least partially removable from the bowled shaped basic body (10) by engagement of opening means (32) of an opening mechanism (30) of the animal feeding system, preferably an automatic opening mechanism (30), introducible at least partly in one of the at least two
25 deepenings (18, 18').

13. The food container (1) according to claim 12, wherein the cover (20) is at least partially removable from the bowled shaped basic body (10) by a relative movement between the opening means (32) and the bowled shaped basic body (10).

14. The food container (1) according to one of the preceding claims, wherein the deepenings (18, 18') can be designed as a recess or a groove in the at least one portion (17, 17') of the edges (11, 11') extending below the upper surface and limited by side walls.

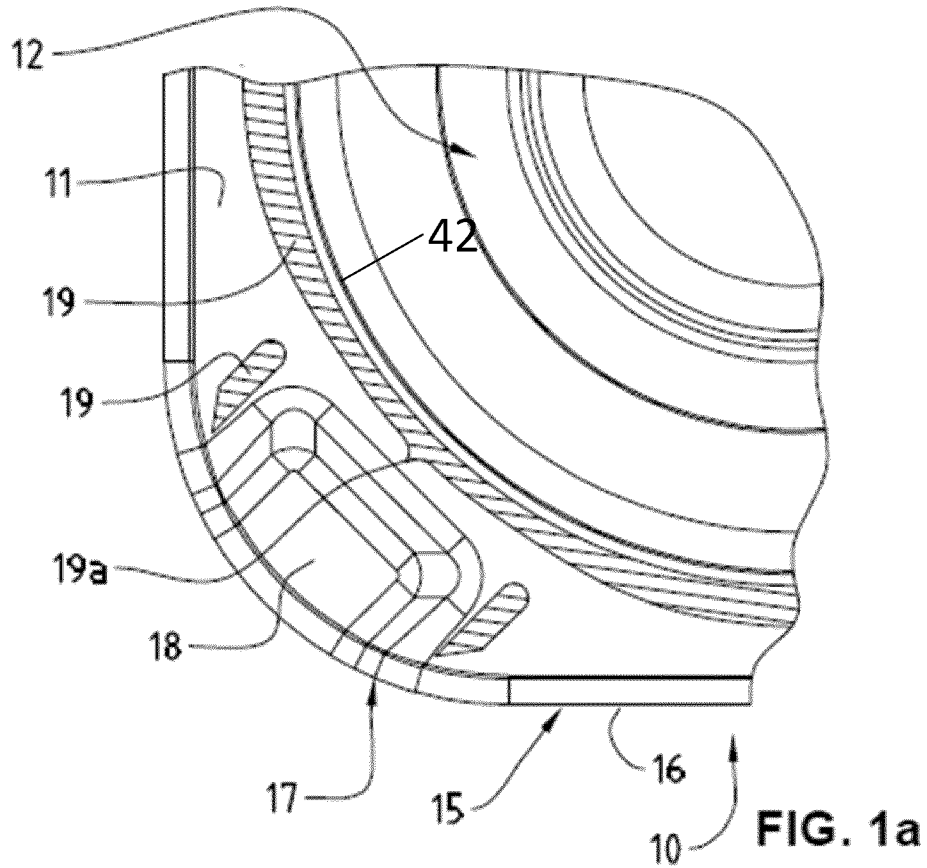
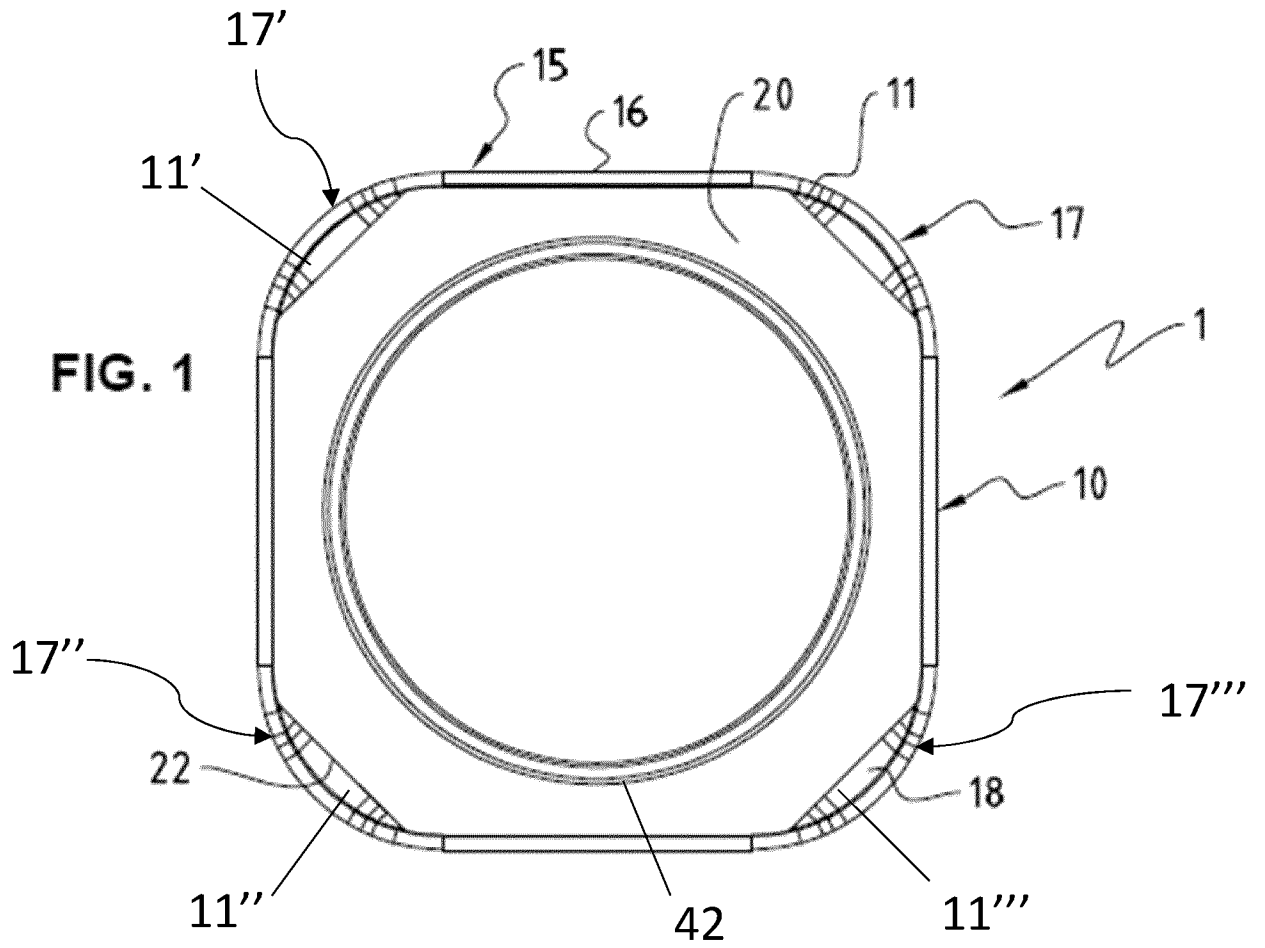
5 15. An animal feeding system (100) comprising at least a food container (1) according to any one or more of claims 2 to 14 and an automatic opening mechanism (30).

10 16. The animal feeding system (100) according to claim 15, further comprising a storage compartment for storage of food containers (1) according to any one or more of claims 1 to 14, transportation means for transporting one of the food containers (1) along a transportation direction to an opening mechanism (30) comprising opening means (32) configured to be at least partly introduced into one of the two deepenings (18, 18') and to grab the cover (20) such that by a relative movement between the opening means (30) and the
15 bowed shaped basic body (10) the cover (20) is at least partly removed.

17. A process for opening a food container (1) according to any one of claims 2 to 14 comprising the following steps:

- a) Providing an animal feeding system (100) comprising an opening mechanism (30) comprising opening means (32);
- 20 b) Fixating the food container (1) in said animal feeding system (100);
- c) At least partly inserting the opening means (32) into at least one of the deepenings (18, 18') of the food container (1) underneath the cover (20) lying on and sealed with the bowl-shaped basic body (10);
- d) Fixating the corner portion (22) of the cover by clamping it by a vertical
25 movement of the opening means (32); and
- e) Moving the opening means (32) further in the vertical direction away from the bowed shaped basic body (10) or moving the food container in the opposite vertical direction away from the opening means, thereby lifting the corner portion (22) of the cover from the bowed shaped basic body
30 (10);

- 5 f) Moving the opening means (32) in a horizontal direction above the cover (20) of the food container away from the corner portion (22), where the opening of the food container (1) started, or moving the food container (1) in the opposite horizontal direction towards the corner portion (22), where the opening of the food container (1) started, thereby removing the cover (20) at least partly of the bowled shaped basic body (10);
- whereby step f) can also be carried out before step e), or steps e) and b) can be carried out simultaneously.



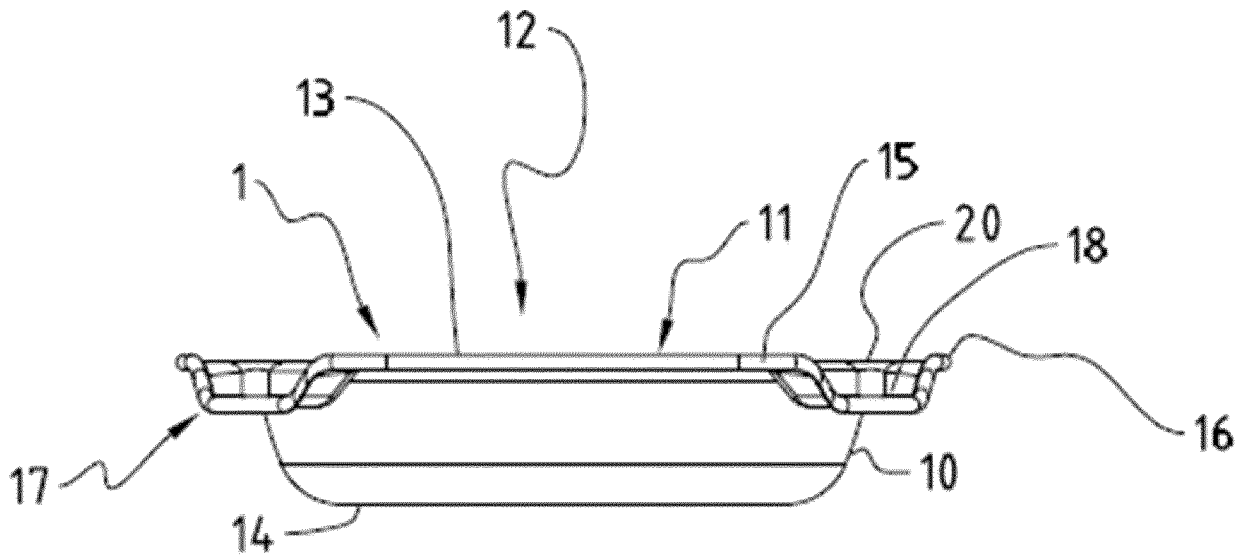


FIG. 2

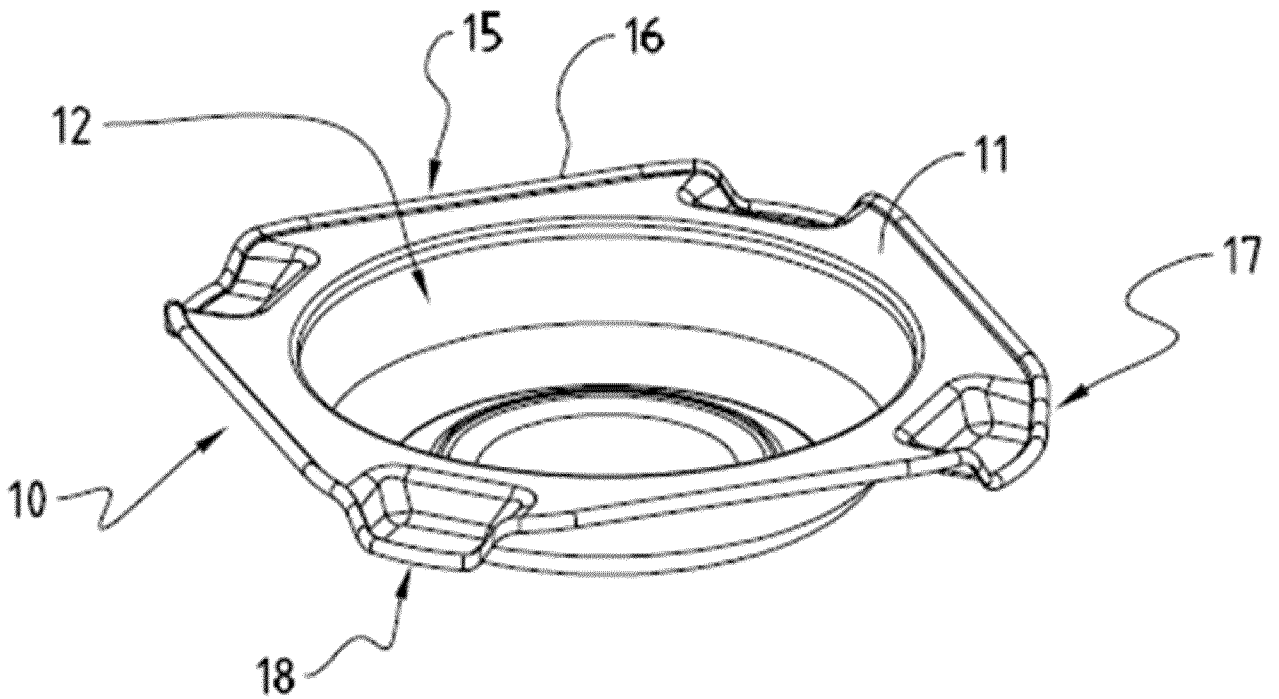


FIG. 3

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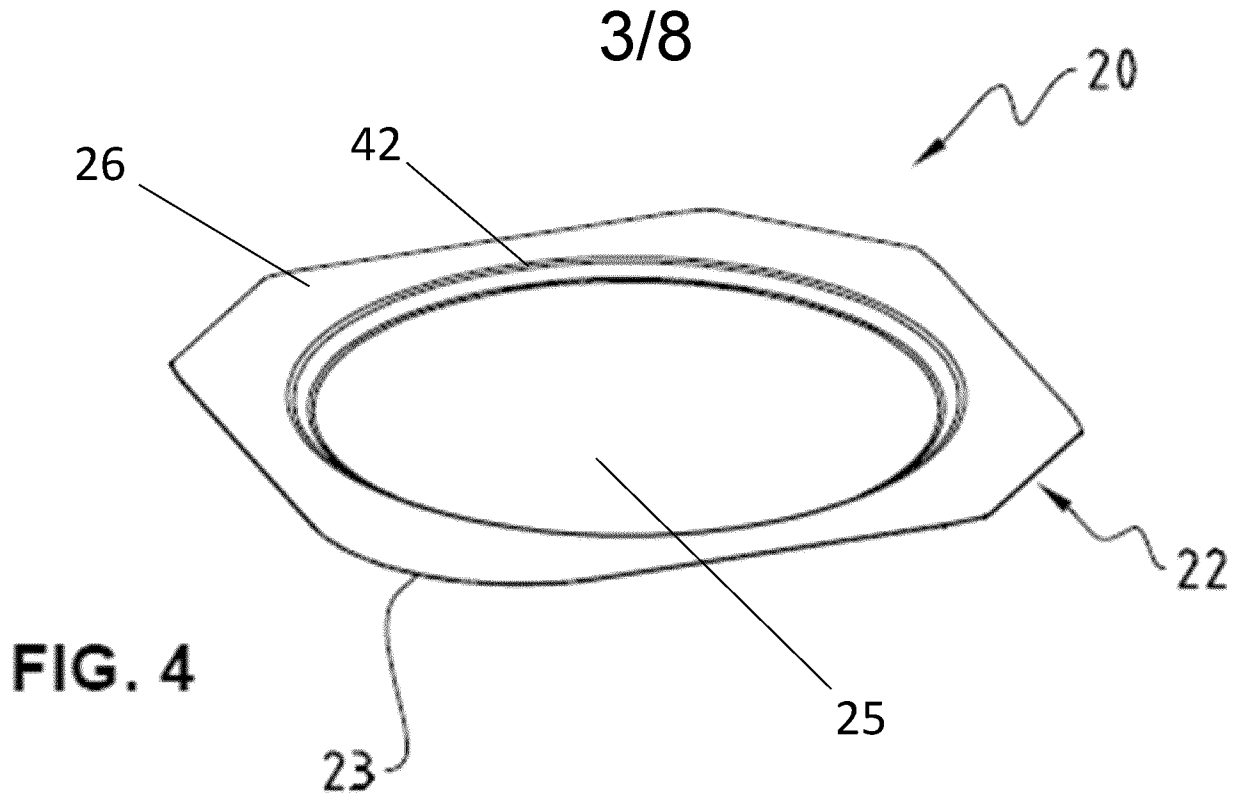


FIG. 4

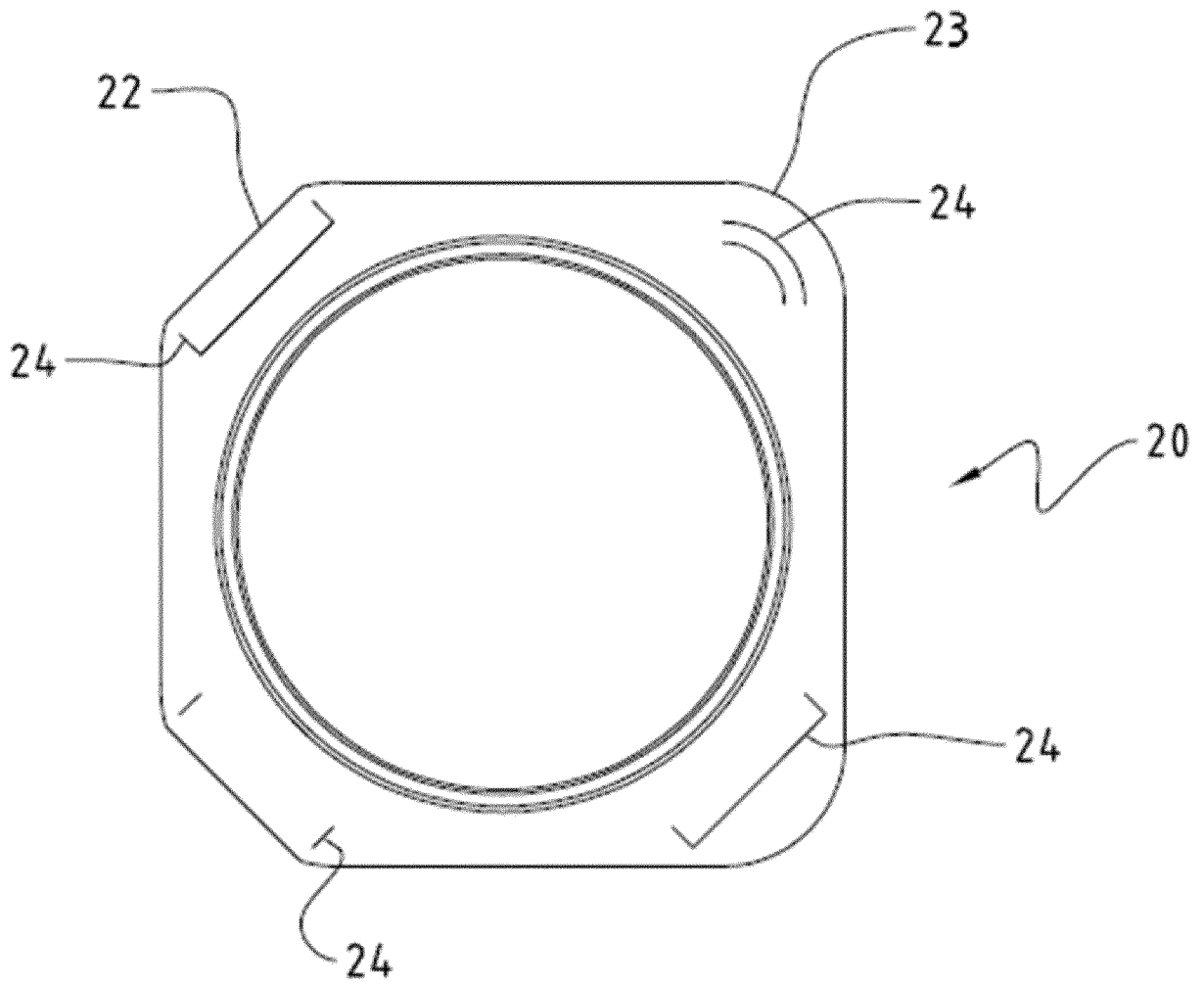
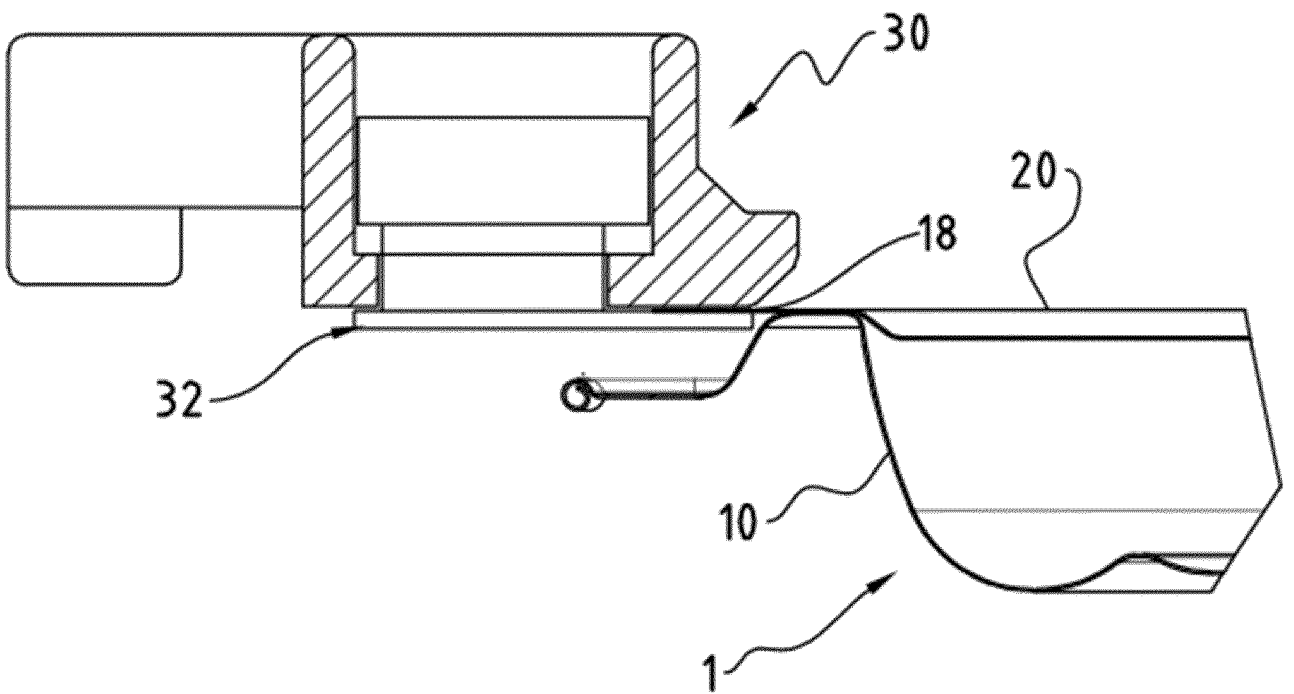
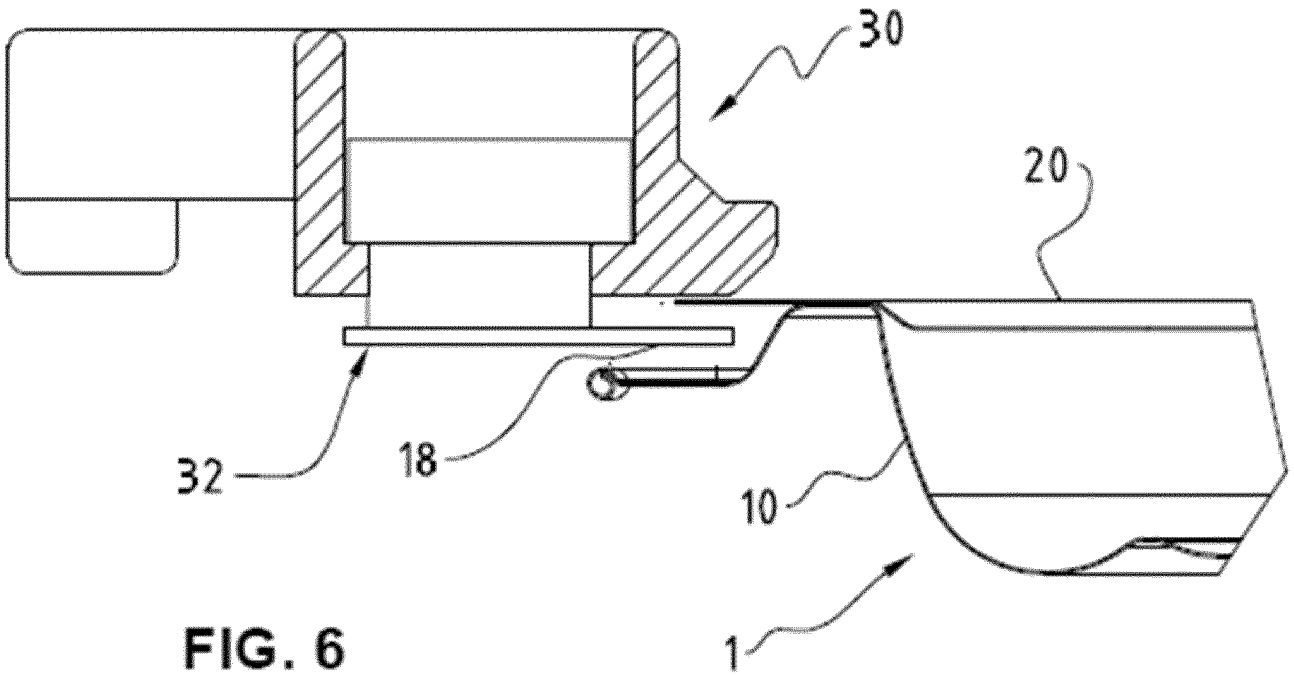


FIG. 5



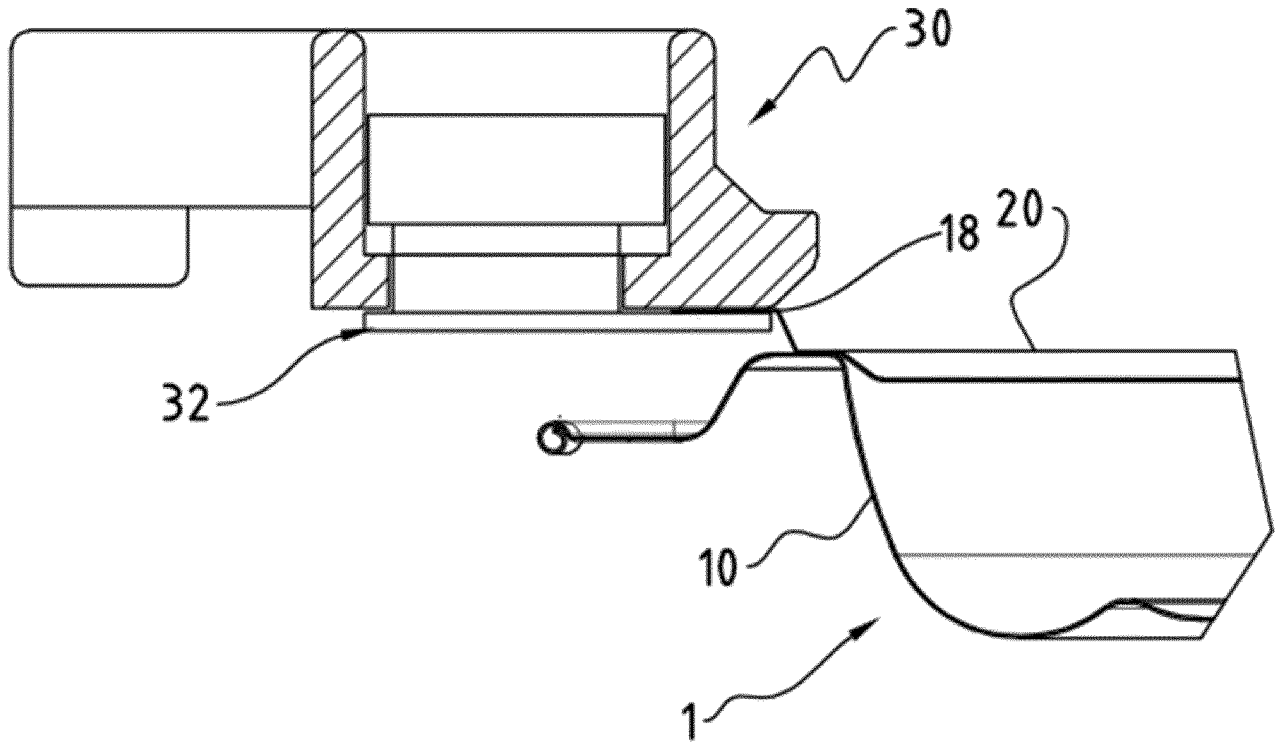


FIG. 8

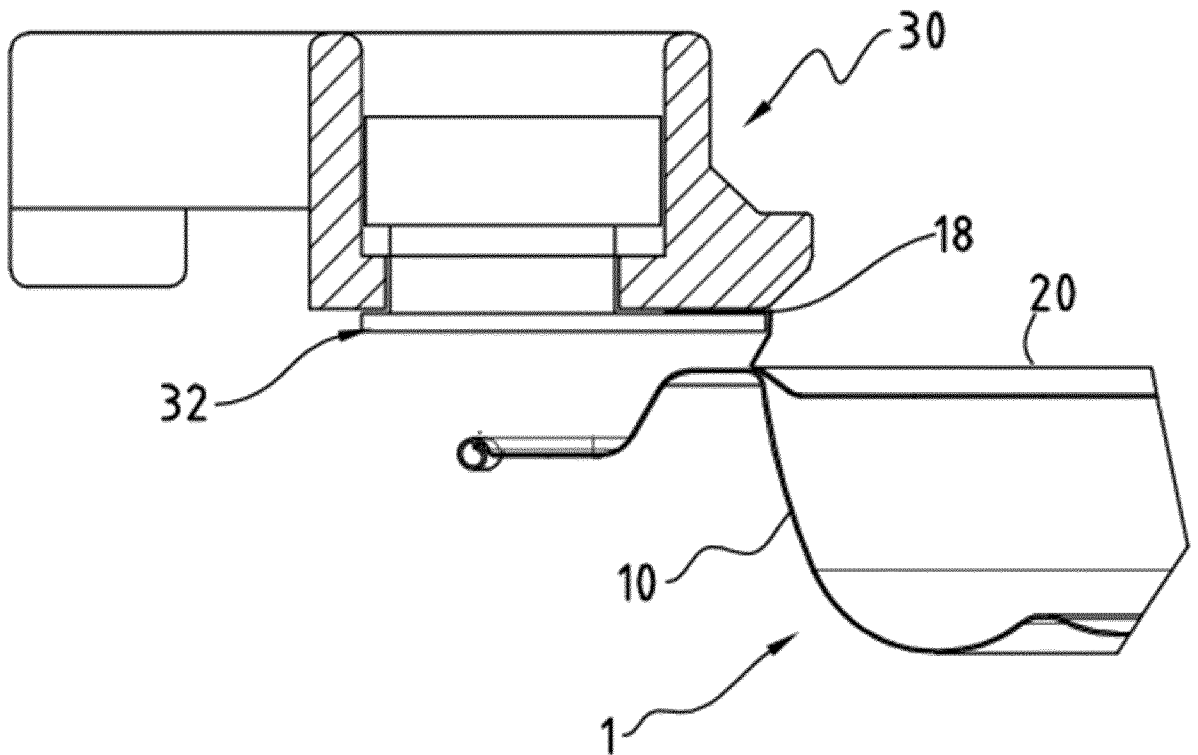


FIG. 9

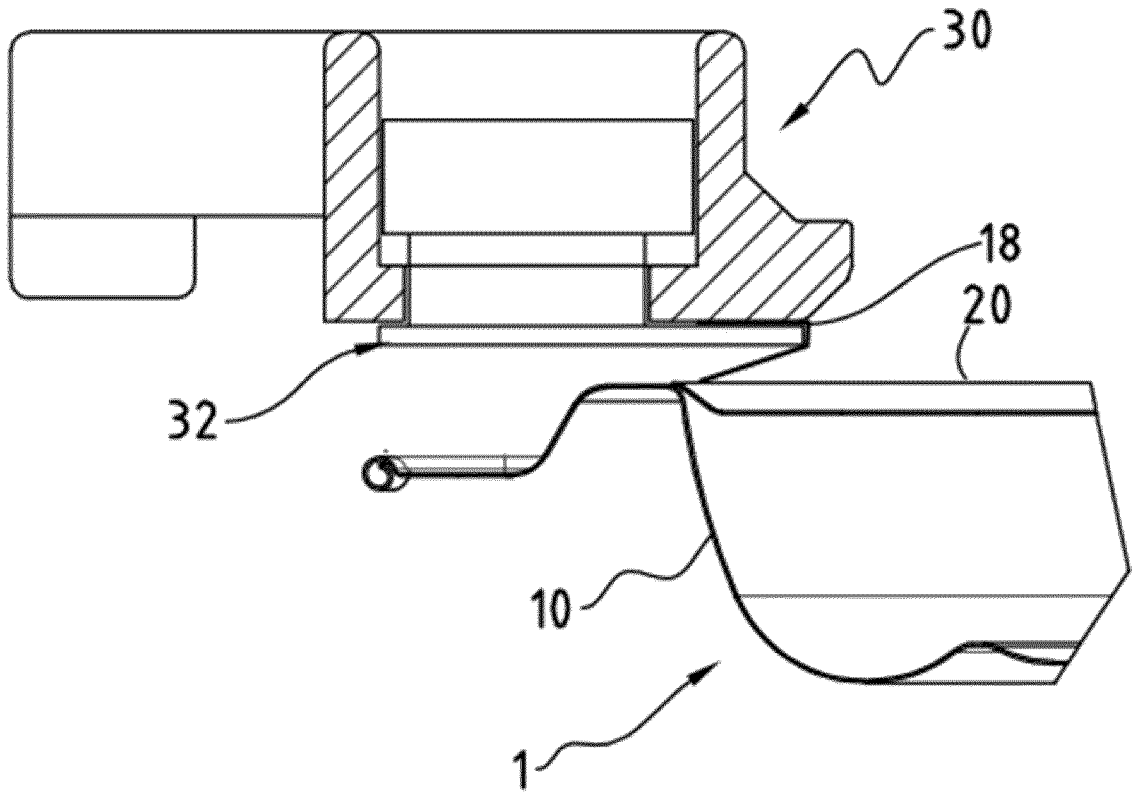


FIG. 10

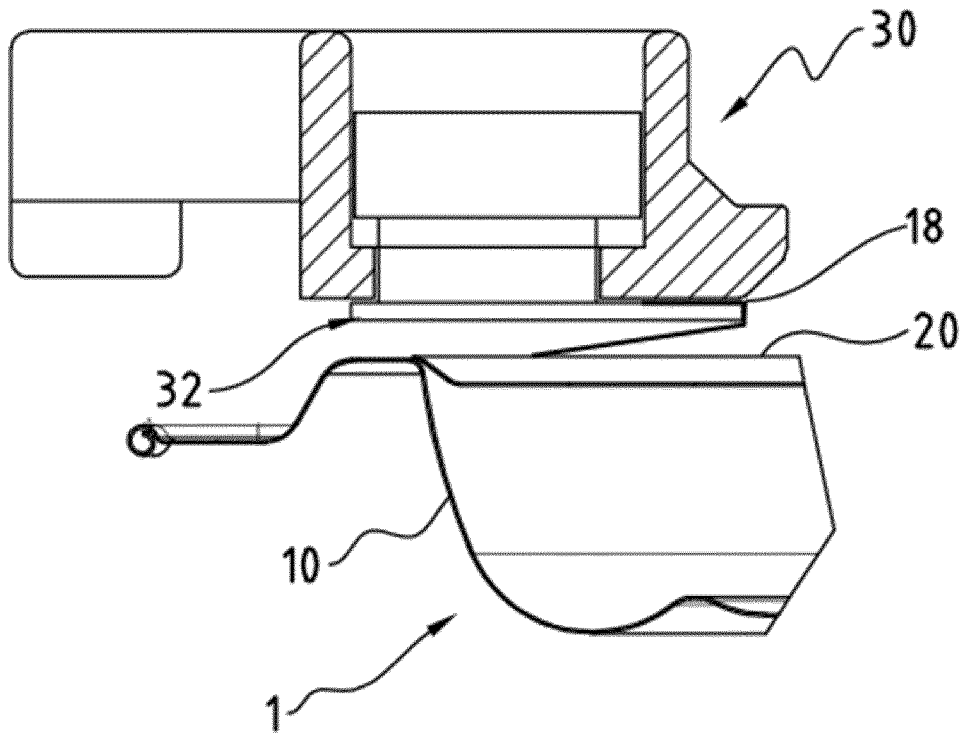


FIG. 11

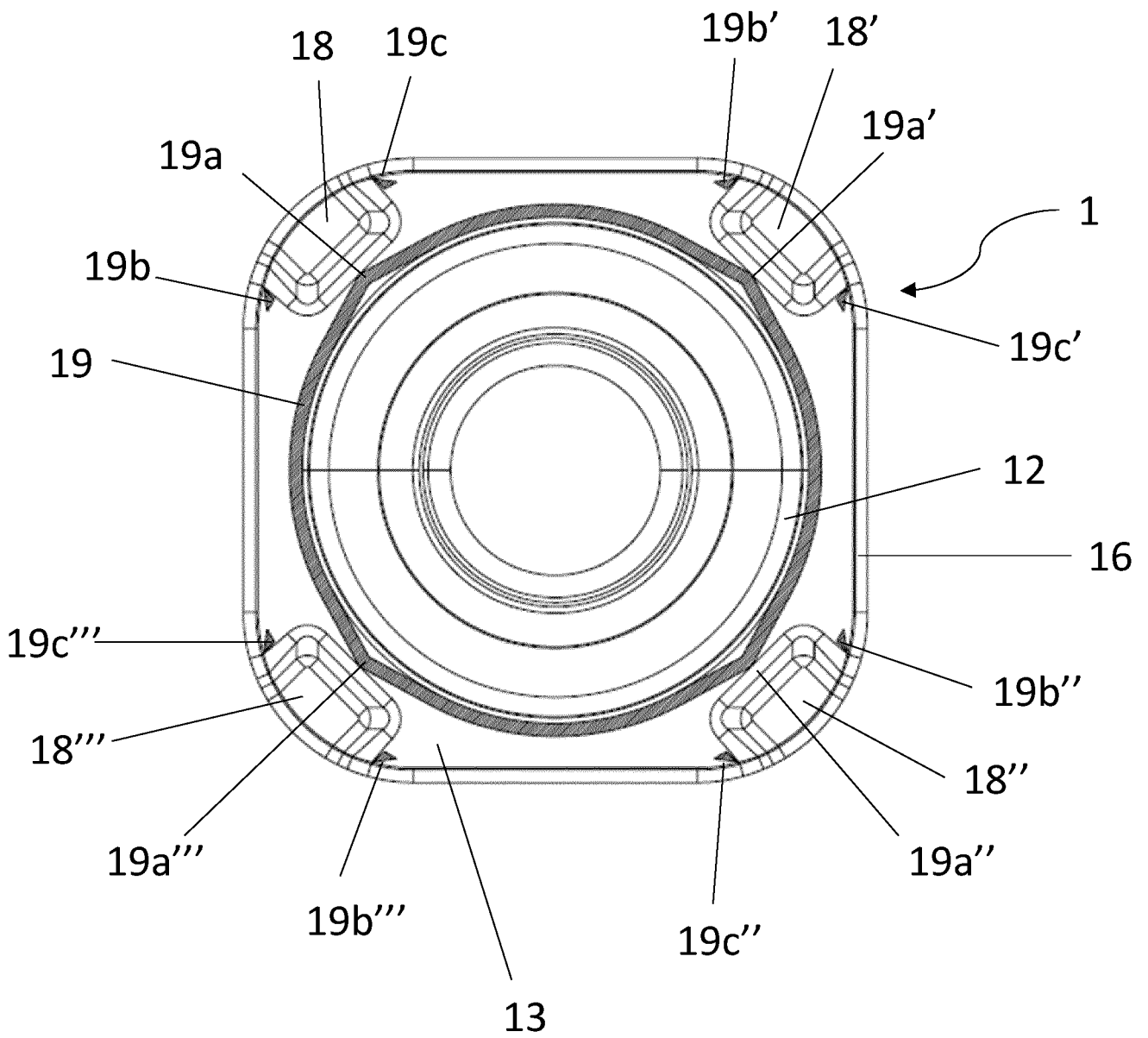


FIG. 12

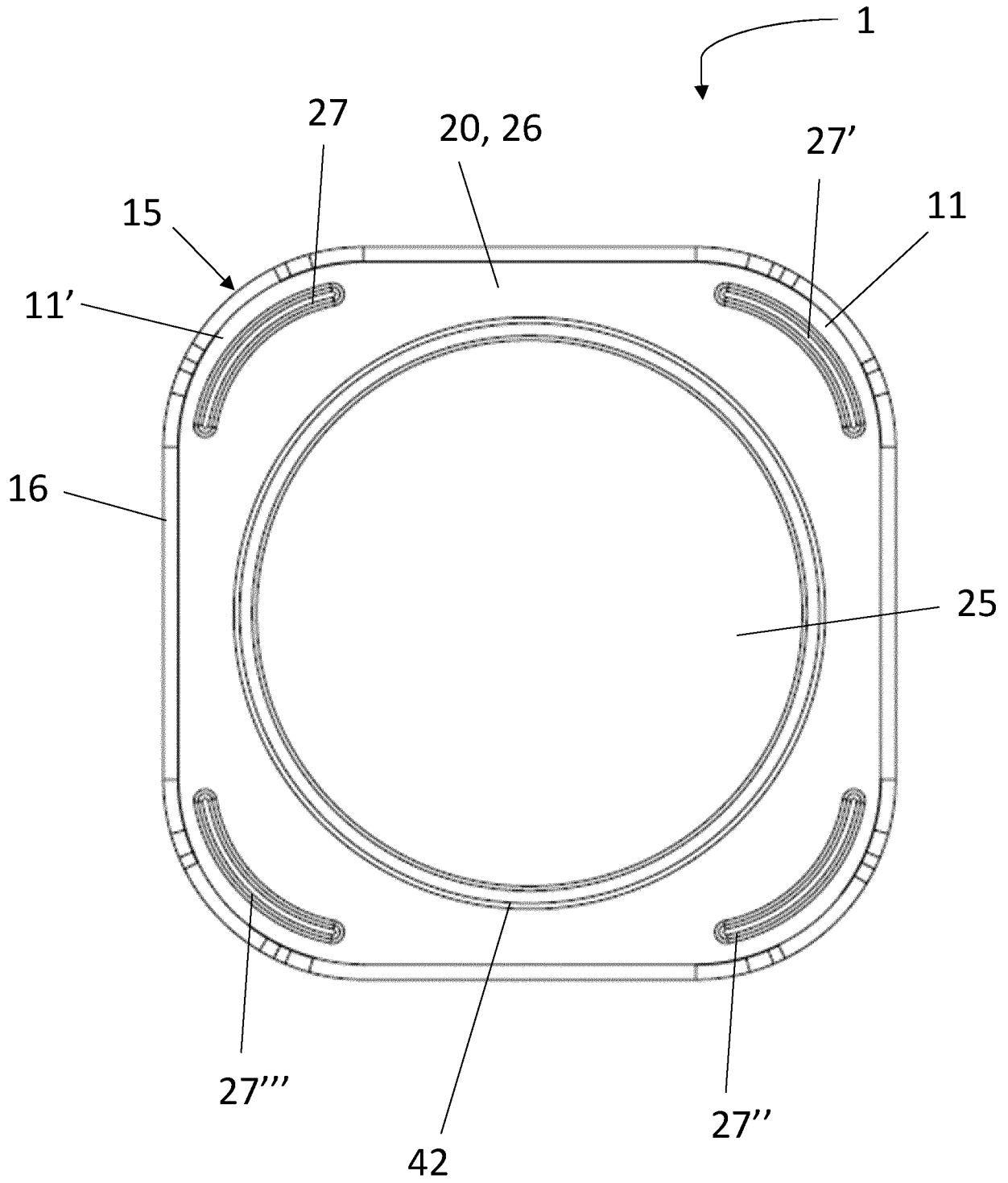


FIG. 13

INTERNATIONAL SEARCH REPORT

International application No PCT/EP2024/065814

A. CLASSIFICATION OF SUBJECT MATTER				
INV. B65D77/20 ADD. A01K5/02				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) B65D B65B A01K				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 2019/187245 A1 (DAINIPPON PRINTING CO LTD [JP]) 3 October 2019 (2019-10-03)	1-8, 10-14		
Y	figures 17,18 -----	9,15-17		
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- / - -				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; border: none; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
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Date of the actual completion of the international search	Date of mailing of the international search report			
28 August 2024	09/09/2024			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Fitterer, Johann			

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/065814

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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