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- (54) Benævnelse: **PACKAGING TRAY, ITS USE, AND PACKAGE INCLUDING THE TRAY**
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Description**Technical Field**

[0001] The invention relates to a packaging tray, a use of the packaging tray, as well as a packaging, which contains the packaging tray.

[0002] A packaging tray can be used to store goods, such as, for example, food. The packaging tray prevents damage to the goods. As so-called mirror, the packaging tray can additionally serve to position the goods, in particular in the case of confectionery.

Prior Art

[0003] A packaging comprising a support structure for confectionery is known from publication EP 1 931 579 B1. The packaging comprises a box, into which a support structure for the confectionery is inserted. For a respective confectionery, the support structure has an annular base element, on which the lower part of the confectionery rests. The support structure additionally has an annular retaining element, which is arranged above the base element and which is connected to the base element by means of wire-like connecting elements. The retaining element forms an opening for receiving the respective confectionery. The support structure has several of the retaining elements, which are arranged coplanar to one another and in parallel rows, and which are connected to one another via wire-like connecting webs. The wire-like or annular elements, respectively, of the support structure have a diameter of between 1 and 3 mm. This support structure is relatively heavy. An injection molding machine comprising an injection mold, which is relatively expensive, is additionally required for the production of the support structure. The injection mold itself is also expensive.

[0004] US 3 642 967 discloses a packaging tray according to the preamble of claim 1, and a method for the production thereof.

[0005] For the production, the material is slotted, so that a certain pattern is formed. The piece of material slotted in this way is subsequently opened by exerting a force to form a net-like structure and is heated to a temperature, at which the elastic memory of the material is turned off, so that the heated piece of material maintains a shape that was given to it.

Description of the Invention

[0006] It is an object of the invention to specify a packaging tray and a packaging comprising a packaging tray, which has a high dimensional stability with simultaneously low weight.

[0007] Due to the low material usage, raw materials and thus resources can be saved in an advantageous manner during the production of the packaging tray according to the invention.

[0008] A further advantage of the packaging tray according to the invention is that the cycle times for the production of the packaging tray can be reduced. The extruded plastic net used for the production has an extraordinarily low dead weight (surface weight). Correspondingly little thermal energy is thus also necessary to heat the plastic net to the extent that it is plastically deformable and can be brought into the desired shape. The heat-up time can thus be decreased and the energy expenditure for the production of the packaging tray can be reduced.

[0009] An additional advantage of the packaging tray according to the invention is that due to its open-mesh construction, the packaging tray allows the viewer to see the goods stored in the packaging tray from every direction.

[0010] The stackability of the packaging tray according to the invention is also provided. Larger quantities of the packaging tray can be stacked in this way, and the stack can be transported cost-efficiently with low volume.

[0011] The packaging tray according to the invention also offers advantages in the disposal. It can be easily crumpled into a ball and then maintains this shape essentially permanently.

[0012] The object is solved by means of a packaging tray comprising the features specified in patent claim 1.

[0013] The packaging tray according to the invention comprises a dimensionally stable support structure formed from an extruded plastic net, wherein the support structure has one or several receiving compartments, each comprising a depression for receiving the goods to be packaged.

[0014] The object is additionally solved by means of a packaging comprising the features specified in patent claim 11.

[0015] The packaging according to the invention comprises the above-described packaging tray and a tray, into which the packaging tray is inserted. A cover is additionally provided, which is formed in such a way that it can be fastened to the tray.

[0016] Advantageous further developments of the invention follow from the features specified in the dependent patent claims.

[0017] In the case of an embodiment of the packaging tray according to the invention, the mesh openings of the net are round, lenticular, square, or hexagonal.

[0018] In the case of a further embodiment of the packaging tray according to the invention, the net has polypropylene (PP) or polyethylene (PE). Polypropylene as well

as polyethylene are oil-, fat-, and acid-resistant. Compared to polyethylene, polypropylene is more temperature stable.

[0019] In the case of an additional embodiment of the packaging tray according to the invention, the net consists of a biodegradable material. The packaging tray according to the invention thus also meets the need of increased environmental protection.

[0020] In the case of a further development of the packaging tray according to the invention, the support structure has at least one reinforcing rib protruding upwards or downwards. This has the advantage that the packaging tray is even more dimensionally stable.

[0021] In the case of another further development of the packaging tray according to the invention, at least one of the receiving compartments has a small buffering foot on its underside. Sensitive goods can additionally be protected against shocks, blows, and vibrations with the help of the small buffering feet.

[0022] The support structure of the packaging tray according to the invention advantageously has a stabilizing edge along its circumference. The packaging tray according to the invention can advantageously be made even more dimensionally stable therewith.

[0023] It can additionally be provided that the stabilizing edge of the packaging tray according to the invention is formed as folded-over, folded, or flanged edge, or has a bead. An edge comprising a bead, which can be U-shaped, for example, or also a folded-over edge are generally more torsion-resistant than a beveled edge, whereby the entire packaging tray becomes more dimensionally stable. In the case of a stack of packaging trays, the shape of the edge of the packaging tray can play a role, when the destackability thereof is important. A packaging tray comprising a bead in the edge or a folded-over edge can generally be removed from the stack more easily than a packaging tray comprising a beveled edge.

[0024] In the case of the packaging tray according to the invention, it can further be provided that the extruded net of the support structure has a thickness of between 10 µm and 1 mm.

[0025] In the case of the packaging tray according to the invention, it can furthermore be provided that the support structure is formed in one piece. This has an advantageous effect on the production process and has the advantage that the number of production steps is minimal.

[0026] In the case of a further development of the packaging according to the invention, the tray and the cover are formed in a liquid-tight manner.

[0027] In the case of another further development of the packaging according to the invention, the cover is formed as film and is fastened to the tray by means of a

thermal process. The cover can be connected cost-efficiently to the tray in this way. The cover can thus advantageously also be sealingly connected to the tray.

[0028] The above-described packaging tray can be used as drip tray, sorting insert, protective packaging, substrate carrier, or as small cultivation pot.

Brief Description of the Drawings

[0029] The invention will be described in more detail below with several exemplary embodiments on the basis of ten figures.

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|-----------|---|
| Figure 1 | shows a first possible embodiment of the packaging tray according to the invention in a three-dimensional view from the top. |
| Figure 2 | shows a detail of the first embodiment of the packaging tray according to the invention in a three-dimensional view. |
| Figure 3 | shows the first embodiment of the packaging tray according to the invention in a three-dimensional view from the bottom. |
| Figure 4 | shows a possible embodiment of the packaging according to the invention comprising the packaging tray in a three-dimensional view. |
| Figure 5 | shows the packaging according to the invention comprising the packaging tray in the side view. |
| Figure 6 | shows a second possible embodiment of the packaging tray according to the invention in a three-dimensional view from the bottom. |
| Figure 7 | shows a detail of the second embodiment of the packaging tray according to the invention in a three-dimensional view from the bottom. |
| Figure 8 | shows a detail of the second embodiment of the packaging tray according to the invention in a three-dimensional view from the top. |
| Figure 9 | shows a third possible embodiment of the packaging tray according to the invention in the three-dimensional view. |
| Figure 10 | shows the third embodiment of the packaging tray according to the invention in the side view. |

Ways for Carrying out the Invention

[0030] The packaging tray according to the invention is made of an extruded plastic net. The production of an extruded plastic net is known to the person of skill in the art. A possible production method for such an extruded plastic net is described in publication DE 2 313 820. Plastic threads are thereby produced continuously by means of an extrusion process, partly separated from one another, and are brought together in the not yet solidified state, and are automatically connected to one another, for example welded together. Continuously running strands or threads, which run at a certain angle to one another, thus cross one another at a certain angle, are connected to one another to form the desired net. For this purpose, an extrusion head is provided, which contains two channels, which run coaxially to one another and which open out separately from one another, and which are connected to separate extruders. The channels can be at least partially opened or closed according to a certain program. The threads or strands running in the longitudinal direction can thus be placed continuously not only in a consecutive direction, but can, for example, also consist of sections, which are offset against one another individually.

[0031] It is likewise possible to produce the threads or strands running in the transverse direction not only as straight rings, but for example also as sections running back and forth, which connect the section, which are offset against one another, of the threads or strands running in the longitudinal direction, so that nets with polygonal, for example hexagonal openings, can be produced continuously.

[0032] It is likewise possible, however, to use this extrusion head to create conventional plastic nets, that is, longitudinal and transverse threads made of thermoplastic plastics, which cross one another at a right angle. Due to the fact that every second one of nozzle openings forming the longitudinal threads can be closed by means of a locking ring, the longitudinal threads can be formed in an interrupted manner or from sections, which are offset against one another, respectively, when the locking ring is rotated periodically step by step. Due to the fact that these rotations are performed during the opening times of the annular slit, the net is not interrupted. Unsightly appearances are also not caused on the finished net by means of the transition from the one half of the nozzle openings, which are provided for forming the longitudinal threads, to the other half of these nozzle openings.

[0033] Figure 1 shows a first possible embodiment of the packaging tray 1 according to the invention comprising an extruded plastic net in a three-dimensional view obliquely from the top. Figure 2 shows a corner region of the packaging tray 1 in an enlarged view. Figure 3 shows the packaging tray 1 in a three-dimensional view from the bottom. The packaging tray 1 according to the invention comprises an inherently

stable support structure 5, which is formed from an extruded plastic net 2. The support structure 5 is also referred to as carrying structure. The support structure 5 has one or several receiving compartments 6, each comprising a depression for receiving the goods to be packaged. The receiving compartments 6 can also be formed, for example, in a cup- or trough-shaped manner.

[0034] As long as the extruded plastic net 2 is present as semifinished product, it generally has a plurality of strands 4 lying parallel to one another and a plurality of strands 3 lying parallel to one another. The strands 3 and 4 cross one another at a certain angle, wherein this angle can be predetermined by the above-described production method. The angle, which will also be referred to as crossing angle below, can be, for example, 90°. However, a semifinished product comprising virtually any other crossing angle can also be produced. As described in the case of the production method according to DE 2 313 820, the strands 3 and 4 are connected to one another by means of a welding at the crossing points.

[0035] As can in particular be seen in Figure 2, the strands 3, which are originally parallel in the case of the semi-finished product, no longer run parallel in the corner region of the support structure 5. The same also applies analogously for the strands 4, which originally run in parallel. The shape of the meshes 7 and the opening width of the mesh openings 7.1 and 7.2 can also change due to the thermoplastic deformation process, as can likewise be seen in Figure 2. The reason for this is that the extruded plastic net is stretched more at some points than at others during the thermoplastic deformation. This, in turn, has the result that in the regions, in which the extruded plastic net is stretched more, it also becomes thinner than in those regions, in which it is not or only slightly stretched.

[0036] Depending on the used semifinished product, the meshes 7 of the extruded net 2 and the openings 7.1, 7.2 thereof can be, for example, round, lenticular, square, or hexagonal.

[0037] When the extruded net 2 is present as semifinished product, thus before it has been formed into the support structure 5 by means of thermal forming, it preferably has a thickness of between 0.1 mm and 2 mm. After the forming, it can have a thickness of between 10 µm and 1 mm in places.

[0038] As shown in Figure 1, the support structure 5 can have a continuous bottom. However, this is not absolutely necessary. It is thus also conceivable that the bottom has more or less large recesses. These recesses, which are not shown in the figures, can be created, for example, by means of punching. If necessary, an absorbent non-woven fabric (not shown in the figures) can be located on the bottom of the packaging tray. If, for example, meat is stored in the packaging tray, the non-woven fabric can serve the purpose of absorbing the meat juice. Due to the fact that the non-woven fabric is preferably arranged on the underside of the bottom of the

packaging tray, the non-woven fabric cannot adhere to the meat or to the food lying in the packaging tray, respectively, but remains on the packaging tray when the food is removed from the packaging tray.

[0039] The support structure 5 illustrated in Figure 1 has a consistently high side wall. However, this must not necessarily be this way. The side wall can thus also be formed to be higher or lower at the one or other point.

[0040] The support structure 5 shown in Figure 1 has nine reinforcing ribs 10, which run in parallel and protrude upwards into the receiving compartments. However, the reinforcing ribs 10 can also protrude downwards. It is also possible that a portion of the reinforcing ribs 10 protrudes upwards, and a further portion of the reinforcing ribs 10 protrudes downwards. The number of the reinforcing ribs 10 and the orientation thereof to one another is preferably adapted to the respective needs. The reinforcing ribs 10 have the advantage that the packaging tray 1 according to the invention thus becomes even more dimensionally stable than it already is. The reinforcing ribs 10 can also be formed so that they divide the interior of the support structure 5 and thus form additional receiving compartments 6.

[0041] In the case of the embodiment according to Figure 1, further reinforcing ribs 14, which are molded slightly different than the reinforcing ribs 10, are arranged in the side walls of the support structure 2. In the case of this embodiment, the further reinforcing ribs 14 protrude inwards. On the one hand, the reinforcing ribs 14 serve for an additional dimensional stability and, on the other hand, divide the interior of the support structure 5 into further receiving compartments 6.

[0042] If necessary, the support structure 5 can be molded in a certain region so that the material of the support structure 5 can serve as handle 12 there. The handle 12 is preferably arranged in the region of the center of gravity.

[0043] In the case of the packaging tray 1, the support structure 5 has a circumferential edge 11, which can be formed as reinforcing edge. The reinforcing edge will also be referred to as stabilizing edge below. As illustrated in Figure 3, the cross section thereof can be formed in a U-shaped manner. The reinforcing edge 11 thus has a circumferential bead. However, this is not absolutely necessary. Instead, the reinforcing edge 11 can also be formed as folded-over, folded, or flanged edge. Should the additional dimensional stability not be required at this point, the reinforcing edge can also be forgone.

[0044] The dimensionally stable support structure 5 can be produced, for example, as follows. An extruded plastic net, which is available, for example, as rolled goods, serves as semi-finished product. In this shape, it is still flat, thus essentially two-dimensional.

[0045] The machine for producing the support structure 5 comprises a negative mold and a die arranged above the negative mold. The die has essentially the same

shape (positive mold) as the support structure 5, which is to be produced. The contour of the die is thus molded similar to the inner contour of the support structure. The negative mold forms the counter piece to the die and is essentially molded like the outer contour of the support structure 5.

[0046] To produce the support structure 5, a sufficiently large piece of the extruded plastic net is preferably positioned flat between the die and the negative mold. The piece of plastic net is now heated to the extent that it can be plastically deformed. When the plastic net is sufficiently heated, the die is lowered. It thereby deforms the plastic net 2 and pushes it into the negative mold. If necessary, the plastic net 2, which is now three-dimensionally deformed, can also be trimmed circumferentially. The die is subsequently pulled out of the negative mold again; the plastically deformed plastic net 2 now has the shape of the support structure 5. In a next step, the support structure 5 formed in this way is cooled down until the plastic no longer or virtually no longer plastically deforms. Lastly, the support structure 5 is removed from the negative mold. It is now available for the further use.

[0047] The support structure 5 can be produced with virtually any shape in the above-described manner.

[0048] The packaging tray 1 illustrated in Figures 1 to 3 can be placed into a tray 21 and, together with the latter, can form a packaging 20. The tray 21 will also be referred to as outer tray below; the packaging tray 1 then has the function of an inner tray. Figure 4 shows a possible embodiment of such a packaging 20 comprising a packaging tray 1 in a three-dimensional view obliquely from the top. Figure 5 shows the packaging 20 comprising the packaging tray 1 in the side view. The tray 21 can be manufactured, for example, from a transparent or opaque plastic, so that the view onto the packaging tray 1 or the content thereof, respectively, is not blocked by the tray 21. On the top, the tray 21 has a circumferential edge, to which a cover 22 can be fastened. The cover 22 can be made of a film.

[0049] The cover 22 and the tray can be liquid-tight, and the cover 22 can be fastened to the tray 21 in such a way that, together with the tray 21, it forms a liquid-tight packaging 20.

[0050] The circumferential edge of the tray 21 can have an undercut and can form a snap connection with a cover 22, which is correspondingly molded in the edge region. The cover 22 can be snapped onto the tray 21 in this way. When the edge 11 of the support structure 5 is correspondingly molded, the cover 22 can also be snapped onto the support structure 5.

[0051] The cover or the film 22, respectively, can be provided with a label (not shown in the figures). The label can be adhered to the cover 22 by means of adhesive. As an alternative, the cover 22 and the label can also be fused together (in-

mold labeling). Instead of applying the label to the cover 22, it can also be applied to or on the tray 21.

[0052] Figure 6 shows a second possible embodiment of the packaging tray 100 according to the invention in a three-dimensional view from the bottom. The packaging tray 100 designed in this way can be used, for example, as sorting insert. The support structure 5 of the packaging tray 100 is molded here so that a row of heart-shaped receiving compartments 6 result. Figure 7 shows three of the heart-shaped receiving compartments 6 of the packaging tray 100 in an enlarged three-dimensional view from the bottom. Figure 8 shows one of the receiving compartments 6 of the packaging tray 100 in a three-dimensional view obliquely from the top. In the case of this embodiment of the packaging tray 100, the support structure 5 also has a circumferential reinforcing edge 11. In contrast to the first embodiment, the reinforcing edge 11 is folded in the case of the packaging tray 100. The circumferential edge 11 increases the dimensional stability of the packaging tray 100.

[0053] It can be provided that, after the receiving compartments 6 have been filled, a film (not shown in the figures) is fastened to the edge 11 of the support structure 5, in order to close the receiving compartments 6. The film can be fitted or imprinted with a label.

[0054] As illustrated in Figure 6, some of the receiving compartments 6 in the case of the packaging 100 each have a small buffer foot 15 on the underside thereof. Sensitive goods can additionally be protected against shocks, blows, and vibrations with the help of the small buffering feet 15.

[0055] Figure 9 shows a third possible embodiment of the packaging tray 200 according to the invention in a three-dimensional view. Figure 10 shows the packaging tray 200 in the side view. In the case of this embodiment, the packaging tray 200 has a single receiving compartment 6, which has the shape of a cup. The packaging tray 200 can serve, for example, for receiving bulk material or as small cultivation pot for seedlings.

[0056] In the case of the packaging tray 200, the circumferential edge 11 also has chamfers. The edge 11 and thus the entire packaging tray 200 thus becomes more dimensionally stable.

[0057] As illustrated in Figure 9, the bottom 16 of the packaging tray 200 can be formed in a wave-like manner. Reinforcing ribs, which make the bottom 16 more dimensionally stable, are thus created in the bottom 16. The reinforcing ribs can be arranged offset from one another (see Figure 9).

[0058] The packaging tray 1, 100, or 200, respectively, is advantageously formed so that it supports goods, which are to be stored therein, holds them at the desired position and/or protects them.

[0059] The extruded plastic net 2 is preferably made of polypropylene (PP) or polyethylene (PE). It is also possible, however, to use an extruded plastic net made of polystyrene or nylon to produce the packaging tray 1.

[0060] The use of a biodegradable material, such as, PLA (polylactide), for example, for producing the extruded plastic net 2 is advantageous in particular with regard to environmental protection.

[0061] The receiving compartments 6 can in each case have a bottom, wherein the bottoms can be coplanar.

[0062] The support structure 5 can have, for example, the shape of a platter.

[0063] The packaging tray 1 can be used, for example, as drip tray. Seafood, such as shrimp or generally wet food can be stored therein. The packaging tray 100 can also serve as sorting insert and can receive, for example, chocolate, confectionery, pralines, pastries, or the like. The packaging tray 1, 100, 200 can also be used as protective packaging in order to elastically catch shocks, blows, and vibrations. The packaging tray 1, 100, 200 can furthermore also serve as substrate carrier, as propagation tray, or as small propagation pot for receiving seedlings, plants, or root balls.

[0064] The preceding description of the exemplary embodiments according to the present invention serves only for illustrative purposes. Various changes and modifications are possible as part of the invention. For example, the various components of the packaging tray 1, 100, 200 or of the packaging 20, respectively, which are shown in Figures 1 to 11, can thus also be combined in another way, which differs from that shown in the figures.

List of Reference Numerals

[0065]

1	packaging tray
2	extruded plastic net
3	strand
4	strand
5	support structure
6	receiving compartment
7	mesh
7.1	mesh opening
7.2	mesh opening
10	reinforcing rib
11	edge
12	handle

13	bead
14	reinforcing rib
15	small buffer foot
16	bottom
20	packaging
21	tray/outer tray
22	cover
100	packaging tray
200	packaging tray

PATENTKRAV

1. Emballeringsbakke,

- med en formstabil støttestruktur (5), der er dannet af et plastnet (2),
- hvor støttestrukturen (5) omfatter et eller flere optagelsesrum (6), der hver især omfatter en fordybning til optagelse af varen, der skal emballeres,

kendetegnet ved, at plastnettet (2) er ekstruderet.

2. Emballeringsbakke ifølge krav 1, hvor nettets (2) åbninger (7.1; 7.2) er runde, linseformede, firkantede eller sekskantede.

3. Emballeringsbakke ifølge krav 1 eller 2, hvor nettet (2) indeholder polypropylen (PP) eller polyethylen (PE).

4. Emballeringsbakke ifølge krav 1 eller 2, hvor nettet (2) består af et biologisk nedbrydeligt materiale.

5. Emballeringsbakke ifølge et af kravene 1 til 4, hvor støttestrukturen (5) omfatter mindst én opadragende eller nedadragende afstivningsribbe (10).

6. Emballeringsbakke ifølge et af kravene 1 til 5, hvor mindst ét af optagelsesrummene (6) på sin underside omfatter en buffer fod (15).

7. Emballeringsbakke ifølge et af kravene 1 til 6, hvor støttestrukturen (2) langs sin omkreds omfatter en stabiliseringskant (11).

8. Emballeringsbakke ifølge krav 7, hvor stabiliseringskanten (11) er udformet som en omslået, foldet eller bertlet kant eller som en vulst (13).

9. Emballeringsbakke ifølge et af kravene 1 til 8, hvor det ekstruderede net (2) har en tykkelse på mellem 10 µm og 1 mm.

10. Emballeringsbakke ifølge et af kravene 1 til 9, hvor støttestrukturen (5) er udformet i ét stykke.

11. Emballering med en emballeringsbakke ifølge et af kravene 1 til 10,

- som omfatter en bakke (21), som emballeringsbakken (5) er indlagt i, og

- som omfatter et låg (22), som er udformet på en sådan måde, at det kan fastgøres til bakken (21).

12. Emballering ifølge krav 11, hvor bakken (21) og låget (22) er væsketæt udformet.

13. Emballering ifølge krav 11 eller 12, hvor låget (22) er udformet som en folie og som ved hjælp af en termisk proces er fastgjort på bakken (20).

14. Anvendelse af emballeringsbakken ifølge et af kravene 1 til 10 som drypbakke, sorteringsbakke, beskyttende emballage, substratbærer eller som plantepotte.

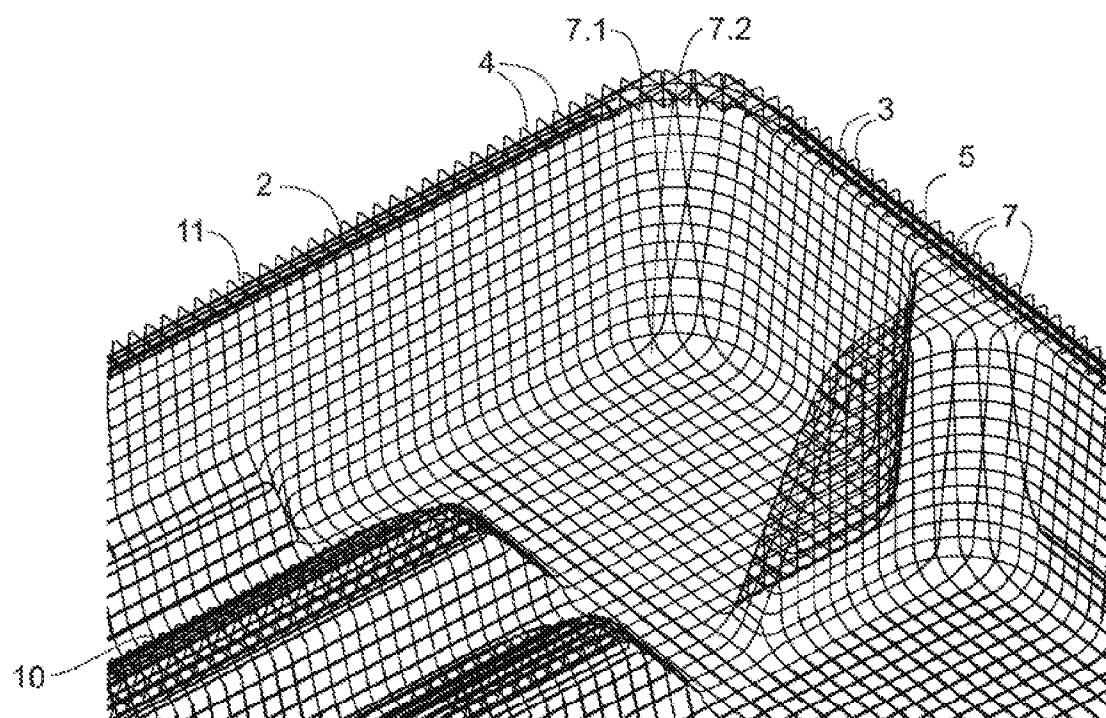
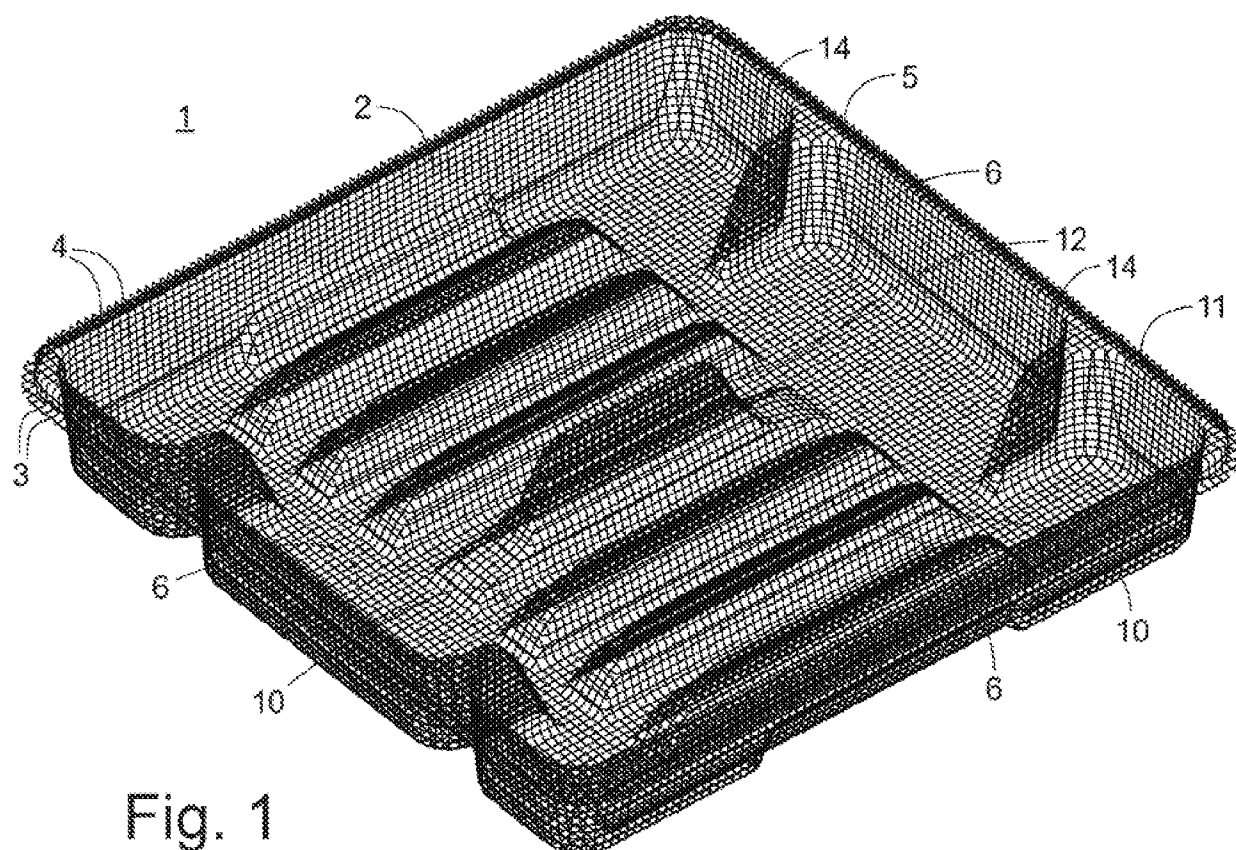
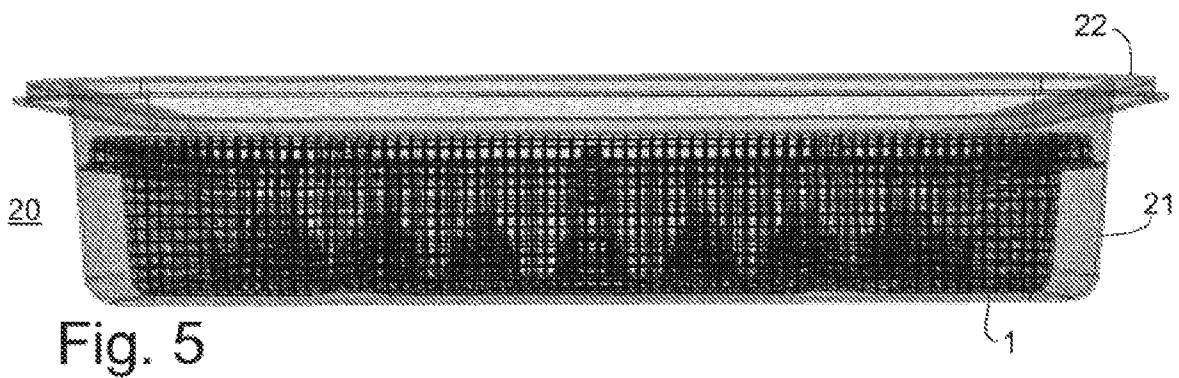
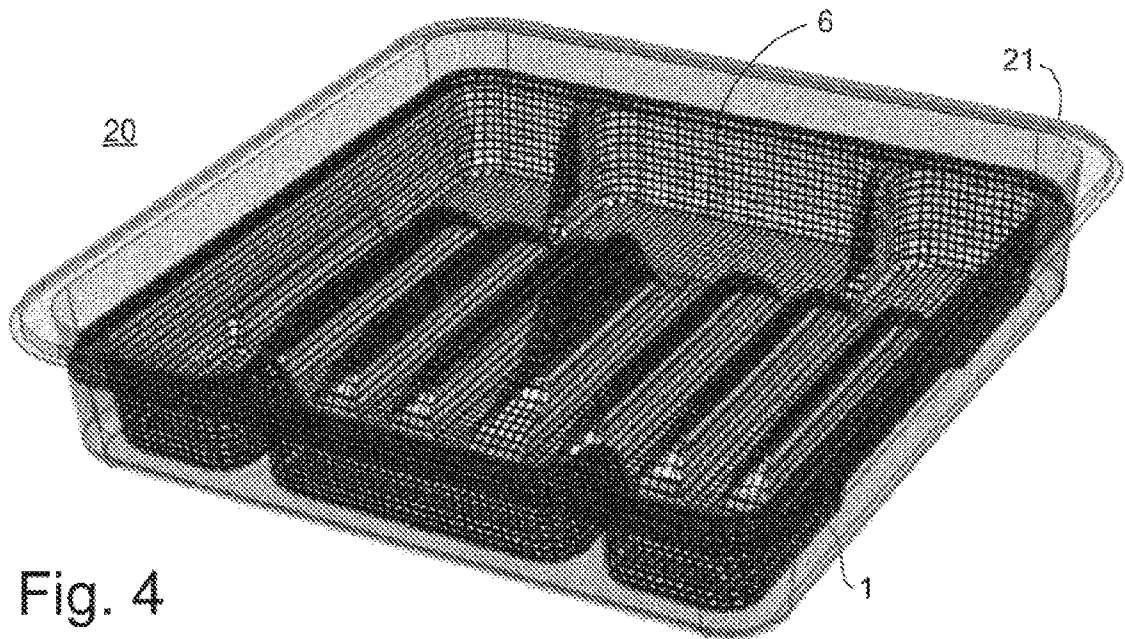
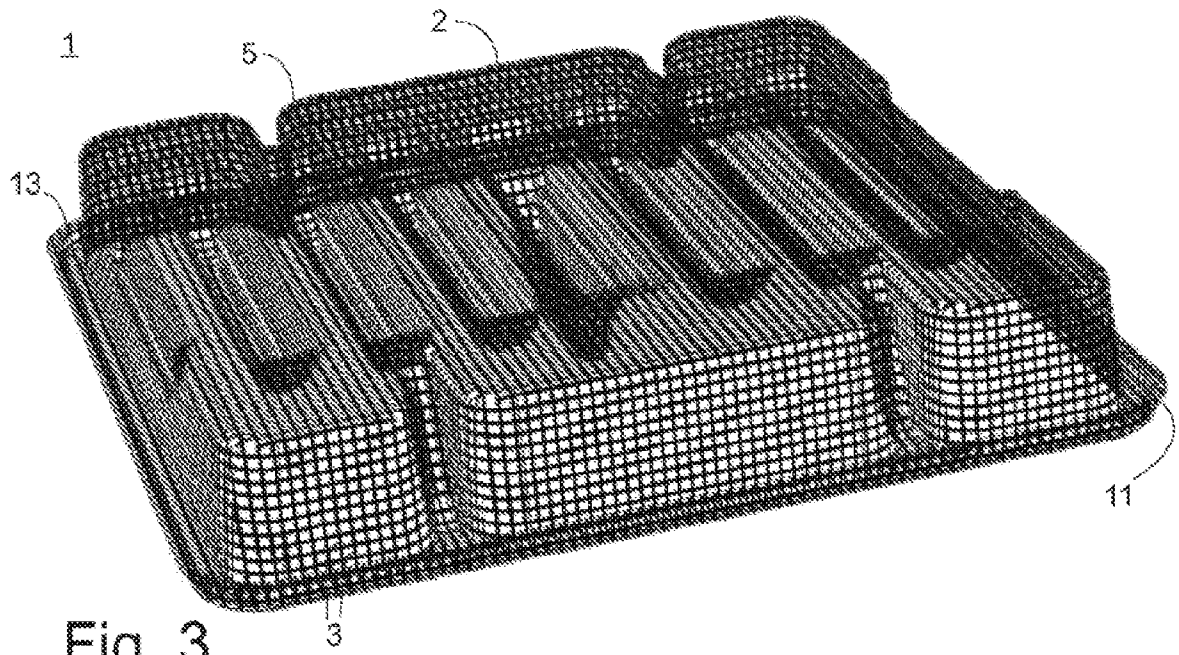
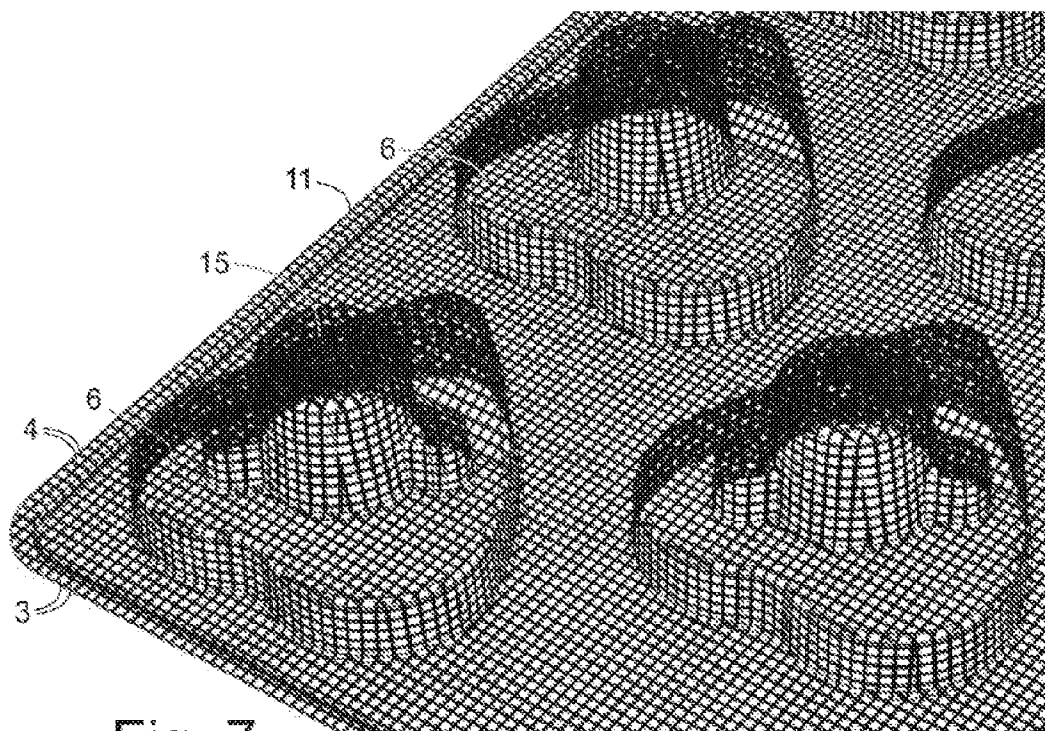
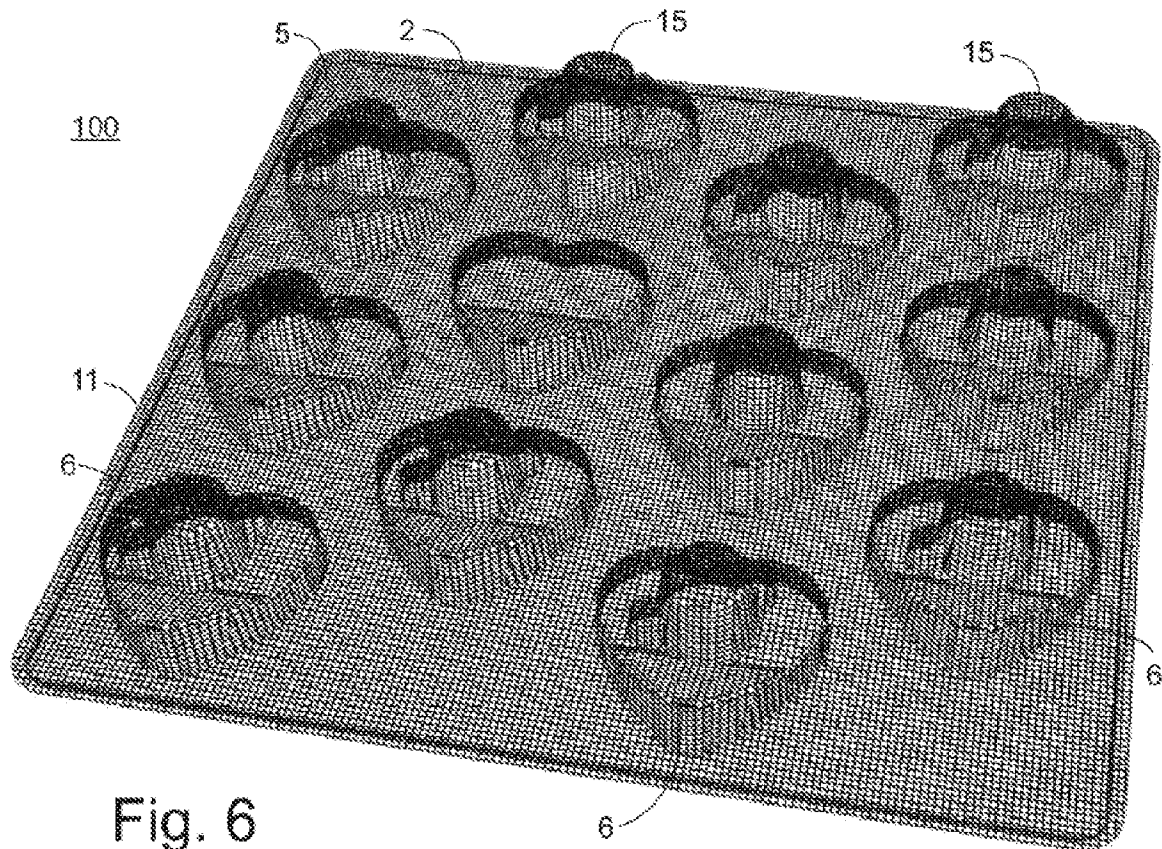


Fig. 2





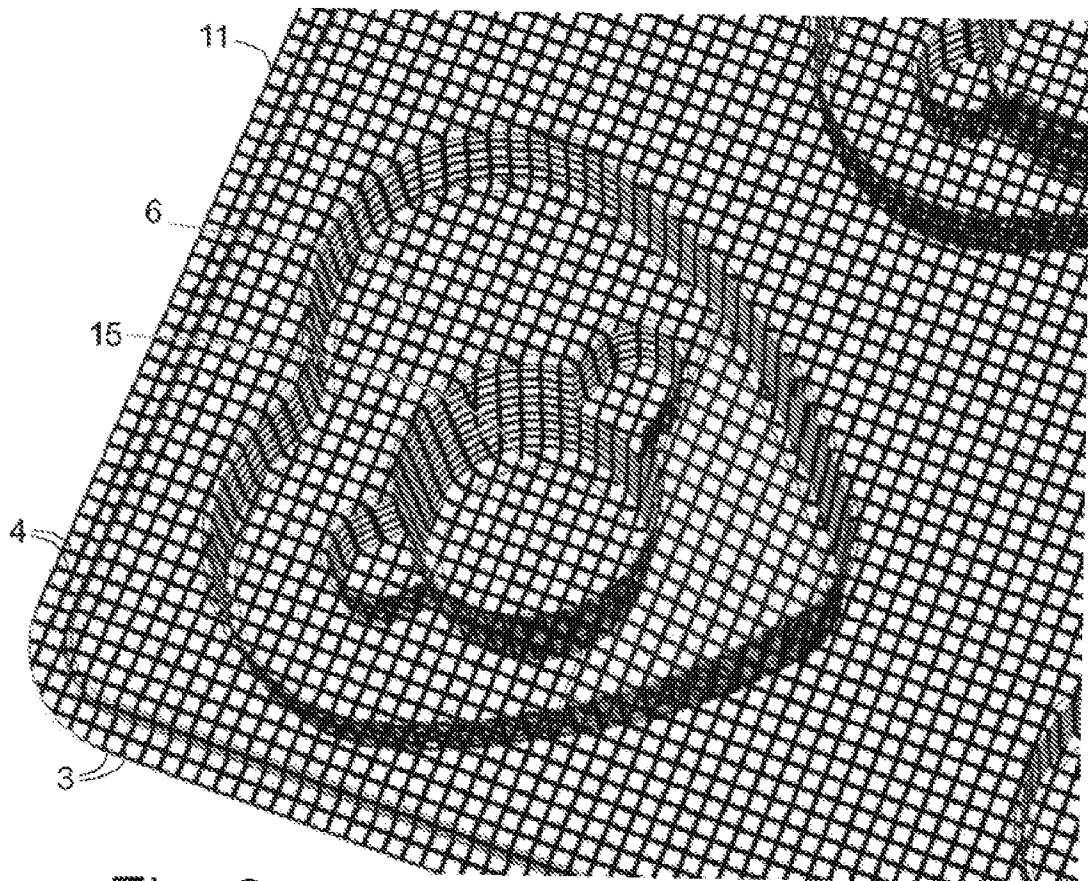


Fig. 8

