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(54) Bottle crate and method for producing same

(57) Disclosed is an injection-moulded plastic crate for holding a plurality of bottles, comprising: an outer wall structure, a floor construction, and a plurality of compartments for receiving one bottle each, wherein the compartments can host bottles having different sizes. Dividers are provided between adjacent compartments for maintaining a clearance between the bottles. At least some of the dividers extend over only part of the separation between two adjacent compartments which leaves a central opening that maximizes bottle space. inside the wall structure. These dividers comprise spacer parts for maintaining a predetermined clearance between the bottles in the adjacent compartments for at least a first bottle size and a second bottle size.

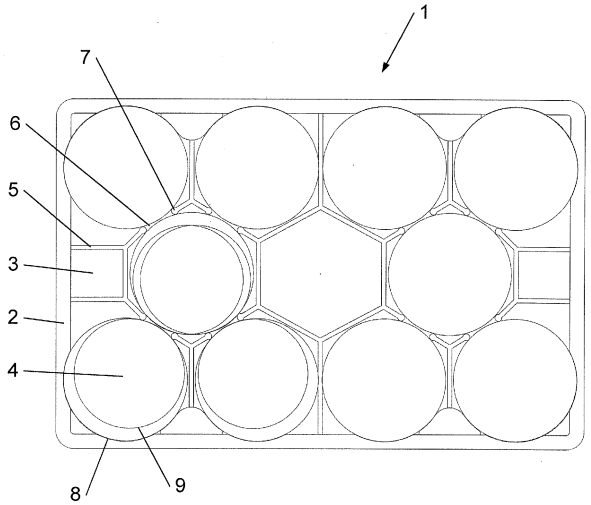

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to injection-moulded plastic crates for carrying and storing bottles and packs of bottles, and a method for producing them.

BACKGROUND OF THE INVENTION

[0002] WO 94/11263 discloses a full-depth bottle crate assembly for handling different sets of bottles of different sizes, using the same full-depth crate for each size. In order to handle a different type of bottle, it is needed to unsnap and remove the existing bottle divider from the crate and insert and snap in another divider that is configured differently. When snapped into place, none of the dividers touches the interior surfaces of the crate walls. This implies a manipulation that may be time-consuming, uncomfortable and source of confusion and/or possible errors.

SUMMARY OF THE INVENTION

[0003] It is an aim of the present invention to provide a crate with compartments that can fit different sizes of bottles without having to modify the configuration of the compartments and dividers.

[0004] This aim is achieved according to the invention with an injection-moulded plastic crate for holding a plurality of bottles, comprising an outer wall structure, a floor construction connected to said wall structure, and a plurality of compartments for receiving one bottle each, said compartments being provided inside the wall structure for supporting the bottles on the floor construction in an upright position, wherein the compartments can host bottles having different sizes, and wherein dividers are provided between adjacent compartments for maintaining a clearance between the bottles, of which at least a set of the dividers extend over only part of the separation between two adjacent compartments, which leaves a central opening in view of maximizing bottle space inside the wall structure. Due to the fact that bottle crates of the type of the invention are manufactured by injection moulding, the dividers have a given minimum wall thickness, e.g. 1.0 mm for a divider extending up to shoulder height of the bottles to be hosted, in order to ensure that the plastic material can completely fill up the cavity in the mould. Leaving a central opening in the divider wall between two adjacent compartments can therefore allow a compartment to fit bottles with larger diameters (for the same size of the crate). The invention is characterized in that the dividers of the set of dividers where there is such a central opening comprise spacer parts on at least one side of the central opening for maintaining a predetermined clearance, e.g. about 0.5 mm, between the bottles in the adjacent compartments. These spacer parts are configured such that the clearance can be ensured for at least a first bottle size having a first predetermined diameter and a second bottle size having a second predetermined diameter, different from the first predetermined diameter.

[0005] The inventors have found that such a configuration of the crate can lead to several improvements. Firstly, the spacer parts can prevent any contact between the bottles of at least the first and second sizes by maintaining the clearance between the bottles. Contact between the bottles is undesirable since this may lead to scuffing and breakage of the bottles during manipulation and transportation and the like. With the crate of the invention, there is no need for an adaptation of the bottle crate to configure it for storing bottles of the other size. Furthermore, the bottle crate of the invention can be configured to maximize bottle space, i.e. to host bottles of a maximum diameter, by leaving the central opening where needed and simultaneously still maintaining the desired clearance between the bottles by means of the spacer parts. In this way, the available space inside the crate can be optimized.

[0006] When leaving such a central opening in the divider walls, it is clear that the bottle crate could become less suitable for storing bottles of a smaller size, since the risk of contact between the bottles through the central opening increases. This risk is reduced in the bottle crate of the invention for at least one additional bottle size by providing the spacer parts for bottles of a second diameter. As a result, the crate of the invention can be used for at least two different bottle sizes, namely a first bottle size having a first predetermined diameter and a second bottle size having a second predetermined diameter, allowing manufacturers and retailers to manufacture, stock and use only one type of crate for a plurality of, bottle sizes having different predetermined diameters.

[0007] In embodiments according to the invention, the first and second predetermined diameters may be extremes of a manufacturing tolerance of the bottle manufacturing process. In other embodiments according to the invention, the first and second predetermined diameters may be selected in view of storing bottles of predeterminedly different sizes or diameters, examples of which are given herein.

[0008] It is another aim of the present invention to provide a method to produce injection-moulded plastic crates for carrying bottles.

[0009] This aim is achieved according to the invention with a method for manufacturing the injection-moulded plastic crate, comprising a wall structure, a floor construction connected to said wall structure, and a plurality of compartments for receiving one bottle each, said compartments being provided inside the wall structure for supporting the bottles on the floor construction in an upright position, wherein the compartments can host bottles having different sizes, and wherein dividers are provided between adjacent compartments for maintaining a clearance between the bottles, of which at least a set of dividers extend over only part of the separation between two

adjacent compartments which leaves a central opening in view of maximizing space inside the wall structures; said method comprising the steps of configuring a mould for injection-moulding the crate, supplying a thermoplastic material in molten form to the mould and injection-moulding the crate and cooling the moulded crate to solidify the thermoplastic material wherein in said configuring step the mould is configured such that the dividers of the crate manufactured by means of the mould comprise spacer parts on at least one side of the central opening for maintaining a predetermined clearance between the bottles in the adjacent compartment for at least a first bottle size having a first predetermined diameter and a second bottle size having a second predetermined diameter.

[0010] In embodiments according to the invention, the dividers of the set comprise spacer parts configured for maintaining a predetermined clearance for any bottles having a diameter ranging from the first predetermined diameter to the second predetermined diameter. This has the advantage that the crates of such embodiments can be used for a range of different bottle sizes, namely a first bottle size having a first predetermined diameter, a second bottle size having a second predetermined diameter and any bottles having a diameter in between. This allows manufacturers and retailers to manufacture, stock and use only one type of crate for a plurality of bottle sizes having a range of diameters.

[0011] The first predetermined diameter may be a maximum diameter, i.e. the maximum diameter that can be fitted into the crate, or a diameter close to such a maximum diameter (e.g. to take manufacturing tolerances into account); the second diameter may be a diameter which is a predetermined extent smaller than the first diameter (e.g. to overcome bottle manufacturing tolerance or to be able to host different bottle sizes).

[0012] In embodiments according to the invention, the predetermined clearance for the first and the second bottle sizes may be at least 0.40 mm, preferably at least 0.45 mm.

[0013] In embodiments according to the invention, the predetermined clearance for the first and the second bottle sizes may be at most 1.00 mm, preferably at most 0.90 mm, more preferably at most 0.80 mm, even more preferably at most 0.70 mm, yet more preferably at most 0.60 mm, more preferably at most 0.55 mm.

[0014] It has been found that a clearance of about 0.5 mm is optimal for avoiding scuffing and breakage without substantially reducing the bottle space in the crate for bottles having a predetermined maximum diameter.

[0015] In embodiments according to the invention, the central openings may have a width in the range of 10 to 50% of the first diameter.

[0016] In embodiments according to the invention, the spacer parts may have a bulbous shape. The bulbous spacer parts may have a diameter in the range of 0.50 and 20.00 mm. The dimensions of the spacer parts may depend on their position on the dividers and/or the size of the opening. The inventors have found that a bulbous shape for the spacer parts can increase the stability of the bottles contained in the crate, and that this shape is suitable for preventing damage to the bottles for a variety of bottle sizes.

[0017] In embodiments according to the invention, the ratio of the first diameter on the second diameter may be in the range of 1.5:1, preferably 1.4:1, more preferably 1.3:1, even more preferably 1.2:1, yet more preferably 1.1:1, preferably 1.05:1. It has been found that the spacer parts, when adapted to maintain the desired clearance for the first and second diameters, may also function to maintain a clearance for any intermediate bottle size between the first and second diameter. Therefore, the crate may fit bottles over the entire range of diameters.

[0018] In embodiments according to the invention, the crate may be configured for receiving bottles bundled into packs, and the dividers are provided in the form of pinnacles with side wings extending upwardly from the crate bottom. The advantage thereof is that the crate can fit both packs and individual bottles. Also, a same crate can fit the packs, and after use, the empty bottles, still preserving the bottles from scuffing and breakage by avoiding contact between the bottles.

[0019] In embodiments according to the invention, the crate may have a full depth wall structure with dividers extending up to shoulder height of the bottles. This means that the wall structure of the crate is higher than the height of the bottles for which it is intended. In alternative embodiments, the crate may also have a reduced height, e.g. up to shoulder height of the bottles, which means that weight of a crate placed on top of one crate is supported by the bottles themselves.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The invention will be further elucidated by means of the following description and the appended figures.

Figure 1 shows a first embodiment of a crate according to the present invention.

Figure 2 shows a detail of the crate of figure 1.

Figure 3 shows a second embodiment of a crate according to the present invention.

Figure 4 shows a detail of the crate of figure 2, indicating the contact points between the bottles and the spacer parts on the dividers.

Figure 5 shows a perspective view of a detail of an embodiment of a crate, similar to the one of figure 1.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0021] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only

schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0022] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

[0023] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

[0024] Furthermore, the various embodiments, although referred to as "preferred" are to be construed as exemplary manners in which the invention may be implemented rather than as limiting the scope of the invention.

[0025] The term "comprising", used in the claims, should not be interpreted as being restricted to the elements or steps listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising A and B" should not be limited to devices consisting only of components A and B, rather with respect to the present invention, the only enumerated components of the device are A and B, and further the claim should be interpreted as including equivalents of those components.

[0026] As used herein, the term "maximum diameter" refers to the largest diameter that a bottle can have to fit in a compartment inside of the crate. If the diameter of the bottle would be superior to the maximum diameter, it would be necessary to use a crate which can fit bottles with larger diameters.

[0027] As used herein, the term "minimum diameter" refers to the smallest diameter of bottles that a skilled person would store in the crate, taking into account for example the maximum diameter of the next crate model fitting smaller bottles and the fact that it is desirable to store and keep the bottles in an upright position during transportation.

[0028] For example, the maximum and minimum diameter may be a manufacturing tolerance on the bottle diameter: a tolerance of 1.00 to 1.50 mm regarding the diameter of the bottle is accepted by the manufacturer. The maximum diameter and the minimum diameter may also be a predetermined difference in size. In a specific example, a crate according to the invention may fit 40cl bottles having a diameter of 63.9±1.3 mm and 50cl bottles having a diameter of 68.8±1.4 mm.

[0029] As used herein, the term "pinnacle" refers to a pillar having a roughly cross-shaped cross-section. Pinnacles are placed so that they extend vertically in the space between a group or pack of four bottles to keep the bottles aligned in the crate. In some embodiments, the pinnacles may be slotted in at least one direction, parallel to the side walls or to the end walls of the outer wall structure, to form a group of facing pinnacles.

[0030] Figure 1 shows a crate 1, made by injection moulding and having a wall structure 2, a floor construction 3 connected to the wall 2, and a plurality of compartments 4 for receiving one bottle each. Dividers 5 are provided between adjacent compartments. The dividers 5 extend over only part of the separation between two adjacent compartments 4, which leaves a central opening 6. The dividers have spacer parts 7 on either side of the central opening 6. In the configuration as shown on fig. 1, the openings 6 are created in the divider walls in order to fit larger bottles, thereby optimising the space inside the crate without increasing its dimensions. The spacer parts 7 can prevent any contact between the bottles in the adjacent compartments by always maintaining a predetermined clearance, e.g. at least 0.4 mm, between the bottles. This avoids scuffing and breakage of the bottles during transportation and manipulation of the crate. The crate 1 can be used for a first bottle size having a first predetermined diameter, schematically shown by the larger circle 8, a second bottle size having a second predetermined diameter, schematically shown by the smaller circle 9, and any bottles having a diameter in between the first and second diameters. This allows manufacturers and retailers to manufacture, stock and use only one type of crate for a plurality of bottle sizes having different predetermined diameters, going from a maximum diameter to a minimum diameter.

[0031] Figure 2 shows a closer view on the central opening 6 and the dividers 5 on either side. It is clear that the bulbous spacer parts 7 function to maintain a clearance between bottles 8 having the first predetermined diameter as well as bottles 9 having the second predetermined diameter. The first diameter is the maximum diameter that the crate can fit. The second diameter is a predetermined extent smaller than the first diameter.

[0032] In the embodiment of figures 1 and 2, the spacer parts 7 have a bulbous shape. The diameter of the bulbous parts 7 may be chosen in function of the diameters of the bottles that one wants to store in the crate 1. Alternatively, the crate may be adapted to different bottle sizes by acting on the position, shape and/or size of the spacer parts, the width of the central opening 6 and the like. For example, the spacer parts 7 may also be simply the extremities of the divider walls on either side of the central opening 6. In further examples, the construction may also be asymmetric, e.g. having only a bulbous spacer part (or other shape) on one side of the central opening.

It is also not essential that the central opening is exactly in the middle of the separation between two compartments.

[0033] By way of non-limiting example, some suitable size ranges are given:

- the spacer parts 7 are preferably configured such that the predetermined clearance for the first and the second bottle sizes may be at least 0.40 mm, preferably at least 0.45 mm;
- the spacer parts 7 are preferably configured such that the predetermined clearance for the first and the second bottle sizes may be at most 1.00 mm, preferably at most 0.90 mm, more preferably at most 0.80 mm, even more preferably at most 0.70 mm, yet more preferably at most 0.60 mm, more preferably at most 0.55 mm;
- the central openings may have a width in the range of 10 to 50% of the first diameter;
- the bulbous spacer parts 7 may have a diameter in the range of 0.50 and 20.00 mm;
- the ratio of the first diameter for the larger bottles 8 on the second diameter for the smaller bottles 9 may be in the range of 1.5:1, preferably 1.4:1, more preferably 1.3:1, even more preferably 1.2:1, yet more preferably 1.1:1, preferably 1.05:1.

[0034] Figure 3 provides a 3D view of a crate 11, made by injection moulding and having a wall structure 12, a floor construction 13 connected to the wall 12, and a plurality of compartments 14 for receiving one bottle each. In this embodiment the dividers 15 include pinnacles 10 as dividers for allowing the crate 11 to fittingly contain packs, for example a plurality of carton packs comprising four or six bottles each. On this figure, the crate may receive 4 packs of 6 bottles each. The packs are maintained in place by the pinnacles 10. Each pinnacle 10 has a roughly cross-shaped cross-section, allowing it to occupy the space which is left between a group of four bottles. Such crates with pinnacles, configured to hold bottle packs as well as individual bottles, are well known in the art and therefore do not need to be described in great detail here. However, the crate 11 shown in figure 3 differs from the generally known crates by an adapted shape and size of the pinnacles 10, such that they contain spacer parts for maintaining a clearance between the bottles stored in the crate and this for at least two different diameters of bottles.

[0035] Figure 4 shows a plan view of the bottom of the crate 11, which indicates the contact points 17 and 27 respectively between bottles 18, 19 of different sizes (i.e. with different, predetermined diameters) and the pinnacles 10. In this case, the bottles 18, 19 are extremes of a manufacturing tolerance. The pinnacles function to maintain the bottles in an upright position whatever their diameter between these extremes thanks to a predetermined design, such that the pinnacles function as dividers with spacer parts at the contact points 17, 27 shown in the figure. It is clear that other parts of the pinnacle may also function as spacer part for bottles having a diameter in between the extremes.

[0036] Figure 5 shows a front perspective view of a detail of a crate similar to the one of figures 1 and 2. This figure more clearly shows the dividers 5 dividing up the space in the crate into compartments 4, the opening 6 which is provided in view of maximizing bottle space, and the spacer parts 7 having a bulbous shape which are provided for preventing the bottles received in the compartments 4 from touching each other. It has been found that such a bulbous shape may increase the stability of the bottles contained in the crate, and that this shape is suitable for preventing damage to the bottles for a variety of bottle sizes. The bulbous spacer parts are in most of the cases in direct contact with the bottles.

[0037] The crates of figures 1-5 are manufactured in a thermoplastic material by means of an injection moulding process. This process generally comprises the following steps: configuring a mould for injection-moulding the crate 1, 11; supplying a thermoplastic material in molten form to the mould and injection-moulding the crate 1, 11; and cooling the moulded crate 1, 11 to solidify the thermoplastic material. The cooling step is preferably performed prior to opening the mould. In accordance with the invention, the mould is configured such that the dividers 5, 10 of the crate 1, 11 manufactured by means of the process comprise the spacer parts 7, 17, 27 which are shaped, dimensioned and/or positioned such that they can maintain the predetermined clearance between the bottles in the adjacent compartments for at least a first bottle size 8 having a first predetermined diameter and a second bottle size 9 having a second predetermined diameter.

Claims

1. An injection-moulded plastic crate (1, 11) for holding a plurality of bottles, comprising:

   an outer wall structure (2, 12), a floor construction (3, 13) connected to said wall structure (2, 12), and

   a plurality of compartments (4, 14) for receiving one bottle each, said compartments being provided inside the wall structure for supporting the bottles on the floor construction (3, 13) in an upright position, wherein the compartments (4, 14) can host bottles having different sizes; and

   wherein dividers (5, 10, 15) are provided between adjacent compartments (4, 14) for maintaining a clearance between the bottles, of which at least a set of the dividers extend over only part of the separation between two adjacent compartments (4, 14) which leaves a central opening (6) in view of maximizing bottle space inside the wall structure;

characterized in that the dividers (5, 10, 15) of said set comprise spacer parts (7, 17, 27) on at least one side of the central opening for maintaining a predetermined clearance between the bottles in the adjacent compartments for at least a first bottle size having a first predetermined diameter (8, 18) and a second bottle size having a second predetermined diameter (9, 19).

2. The injection-moulded plastic crate (1, 11) according to claim 1, wherein the dividers of the set comprise spacer parts configured for maintaining a predetermined clearance for any bottles having a diameter ranging from the first predetermined diameter to the second predetermined diameter.

3. The injection-moulded plastic crate (1, 11) according to claim 1 or 2, wherein the predetermined clearance for the first and the second bottle sizes is at least 0.40 mm, preferably at least 0.45 mm.

4. The injection-moulded plastic crate (1, 11) according to any one of the preceding claims, wherein the predetermined clearance for the first and the second bottle sizes is at most 1.00 mm, preferably at most 0.90 mm, more preferably at most 0.80 mm, even more preferably at most 0.70 mm, yet more preferably at most 0.60 mm, preferably at most 0.55 mm, more preferably 0.50 mm.

5. The injection-moulded plastic crate (1, 11) according to any one of the preceding claims, wherein the central openings have a width in the range of 10 to 50% of the first diameter.

6. The injection-moulded plastic crate (1, 11) according to any one of the preceding claims, wherein the spacer parts have a bulbous shape.

7. The injection-moulded plastic crate (1, 11) according to any one of the preceding claims, wherein the ratio of the first diameter on the second diameter is in the range of 1.5 to 1.05:1.

8. The injection-moulded plastic crate (1, 11) according to any one of the preceding claims, wherein the crate is configured for hosting bottle packs and the dividers are provided in the form of pinnacles (10).

9. The injection-moulded plastic crate (1, 11) according to claim 8, wherein the pinnacles have first spacer parts (17) for the first bottle size and second spacer parts (27) for the second bottle size.

10. The injection-moulded plastic crate (1, 11) according to any one of the preceding claims, wherein the crate has a full depth wall structure, the dividers extending up to shoulder height of the bottles.

11. Use of the injection-moulded plastic crate (1, 11) according to any one of the claims 1-10 to hold a plurality of bottles of the first size and/or a plurality of bottles of the second size.

12. The combination of the injection-moulded plastic crate (1, 11) according to any one of the claims 1-10 and a plurality of bottles of the first size and/or a plurality of bottles of the second size, stored in the compartments of the crate.

13. Method for manufacturing an injection-moulded plastic crate (1, 11), comprising
a wall structure (2, 12), a floor construction (3, 13) connected to said wall structure (2, 12), and
a plurality of compartments (4, 14) for receiving one bottle each, said compartments (4, 14) being provided inside the wall structure for supporting the bottles on the floor construction (3, 13) in an upright position;
wherein the compartments (4, 14) can host bottles having different sizes, and
wherein dividers (5, 10, 15) are provided between adjacent compartments (4, 14) for maintaining a clearance between the bottles, of which at least a set of dividers extend over only part of the separation between two adjacent compartments (4, 14) which leaves a central opening in view of maximizing space inside the wall structures;
said method comprising the steps of:

configuring a mould for injection-moulding the crate,
supplying a thermoplastic material in molten form to the mould and injection-moulding the crate, and
cooling the moulded crate to solidify the thermoplastic material;
characterized in that in said configuring step the mould is configured such that the dividers (5, 10, 15) of the crate (1, 11) manufactured by means of the mould comprise spacer parts (7, 17, 27) on at least one side of the central opening (6) for maintaining a predetermined clearance between the bottles in the adjacent compartment for at least a first bottle size having a first predetermined diameter (8, 18) and a second bottle size having a second predetermined diameter (9, 19).

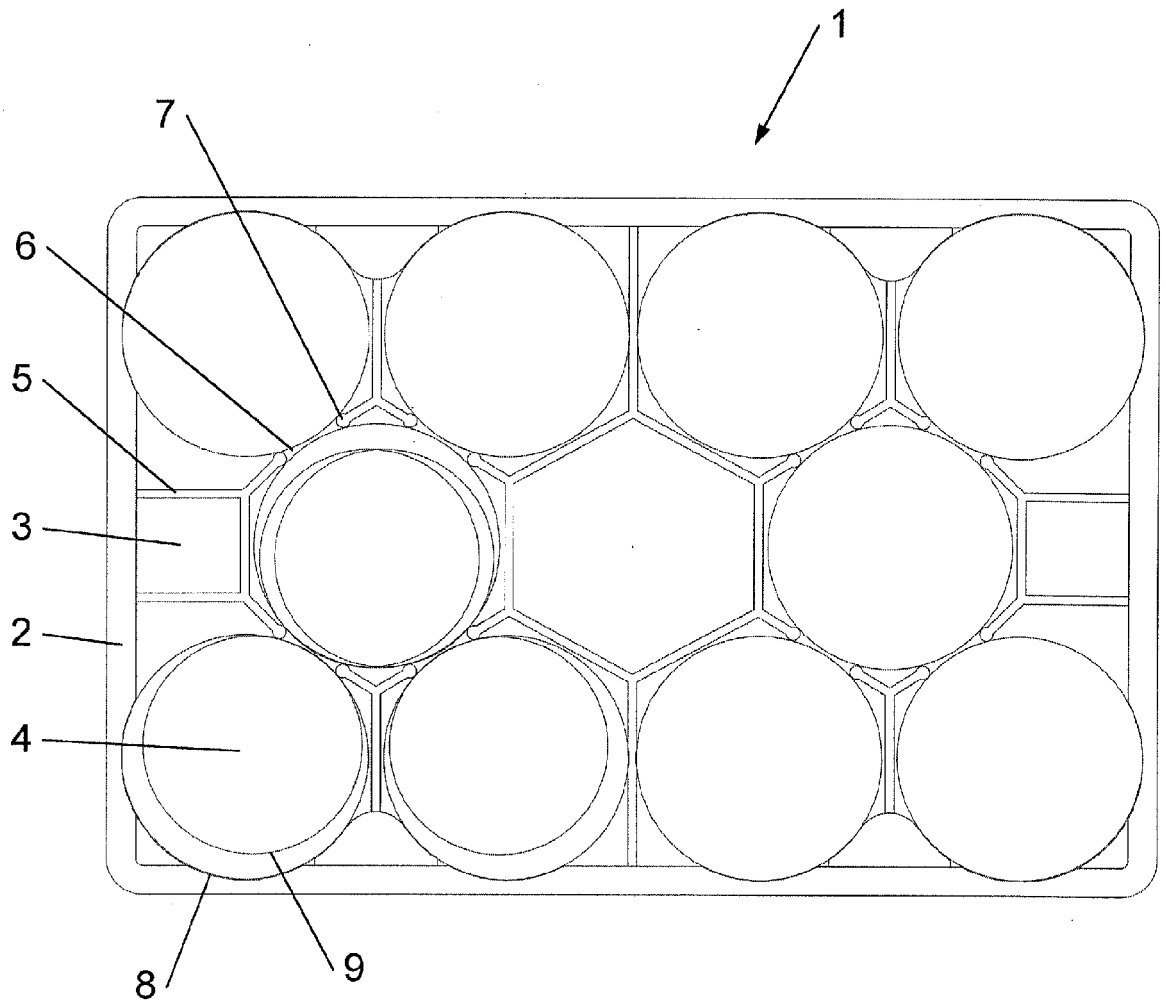

Fig. 1

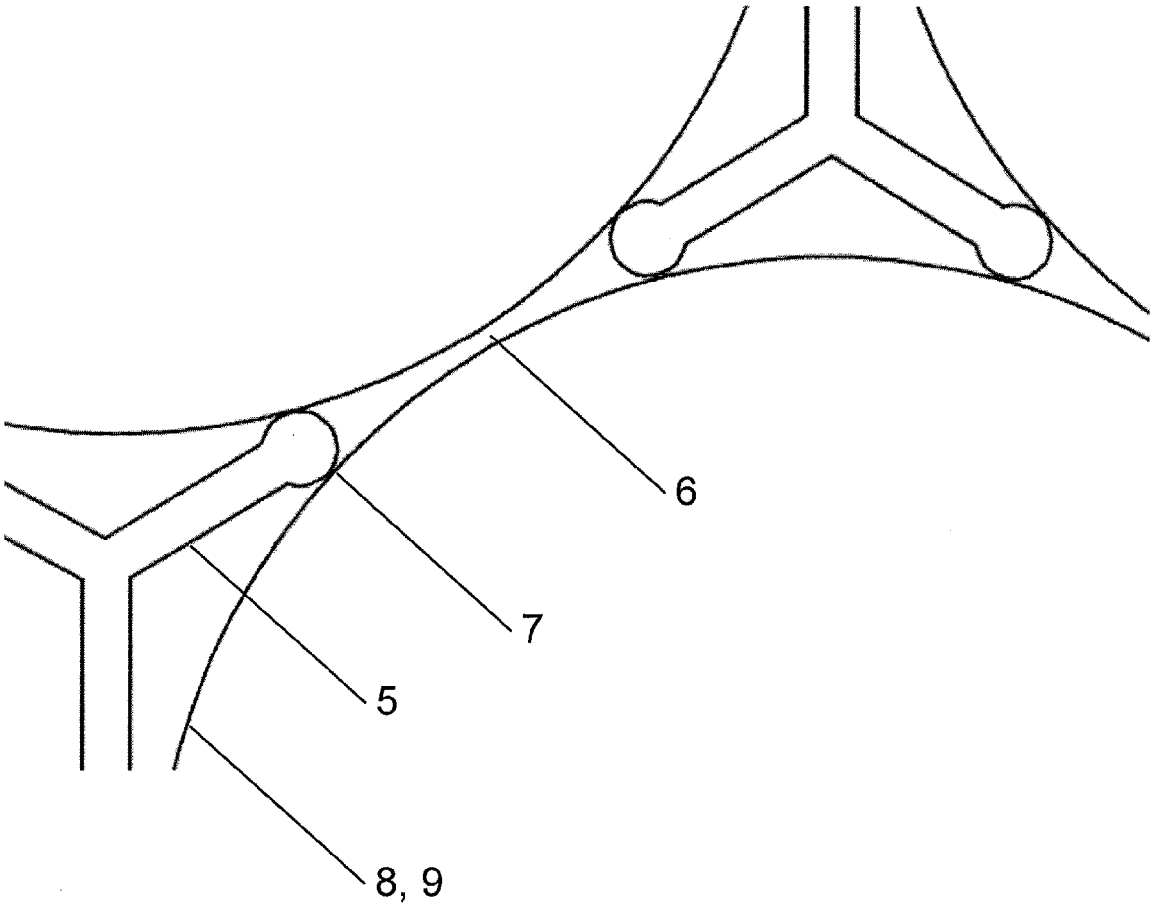

Fig. 2

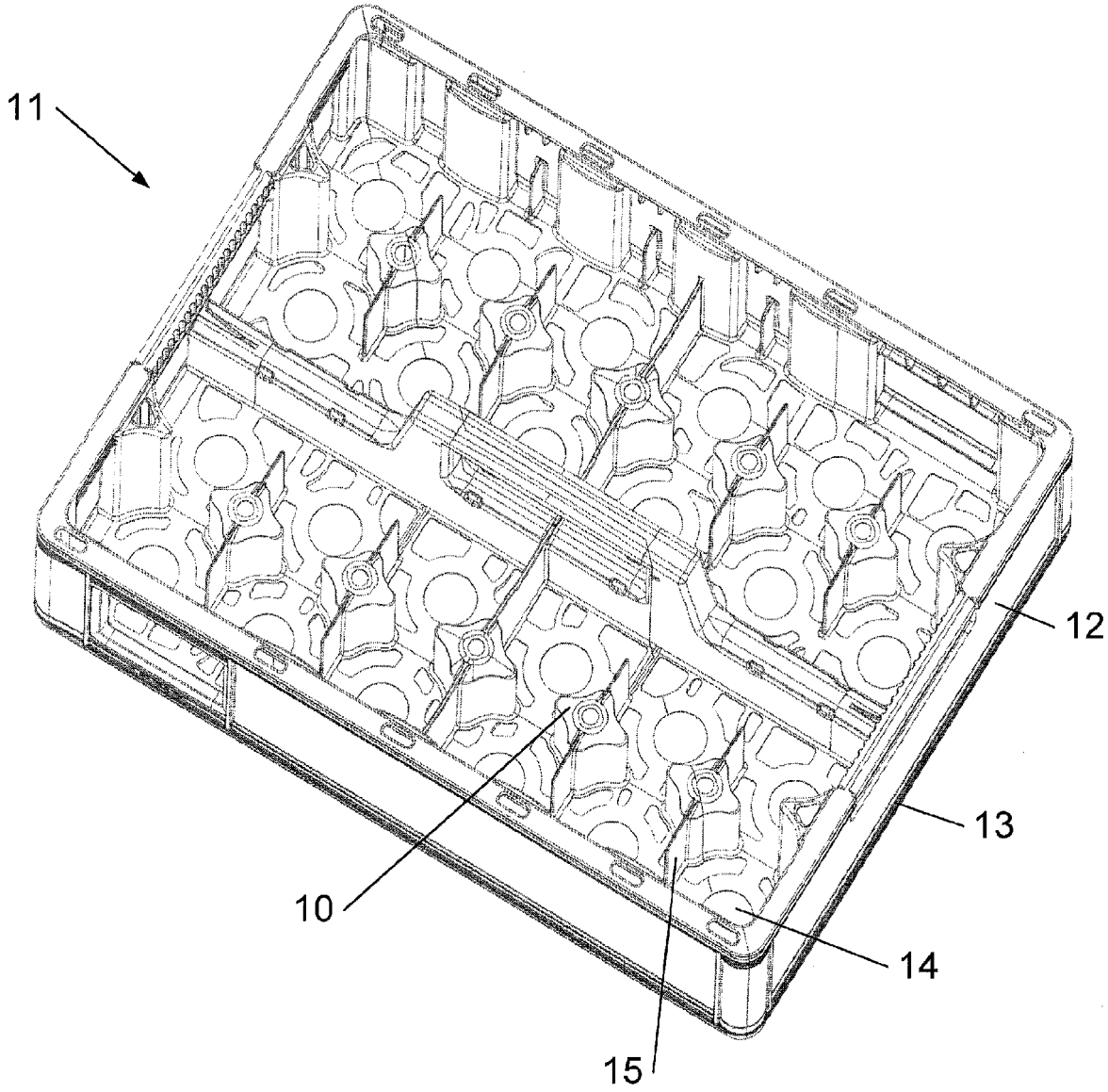

Fig. 3

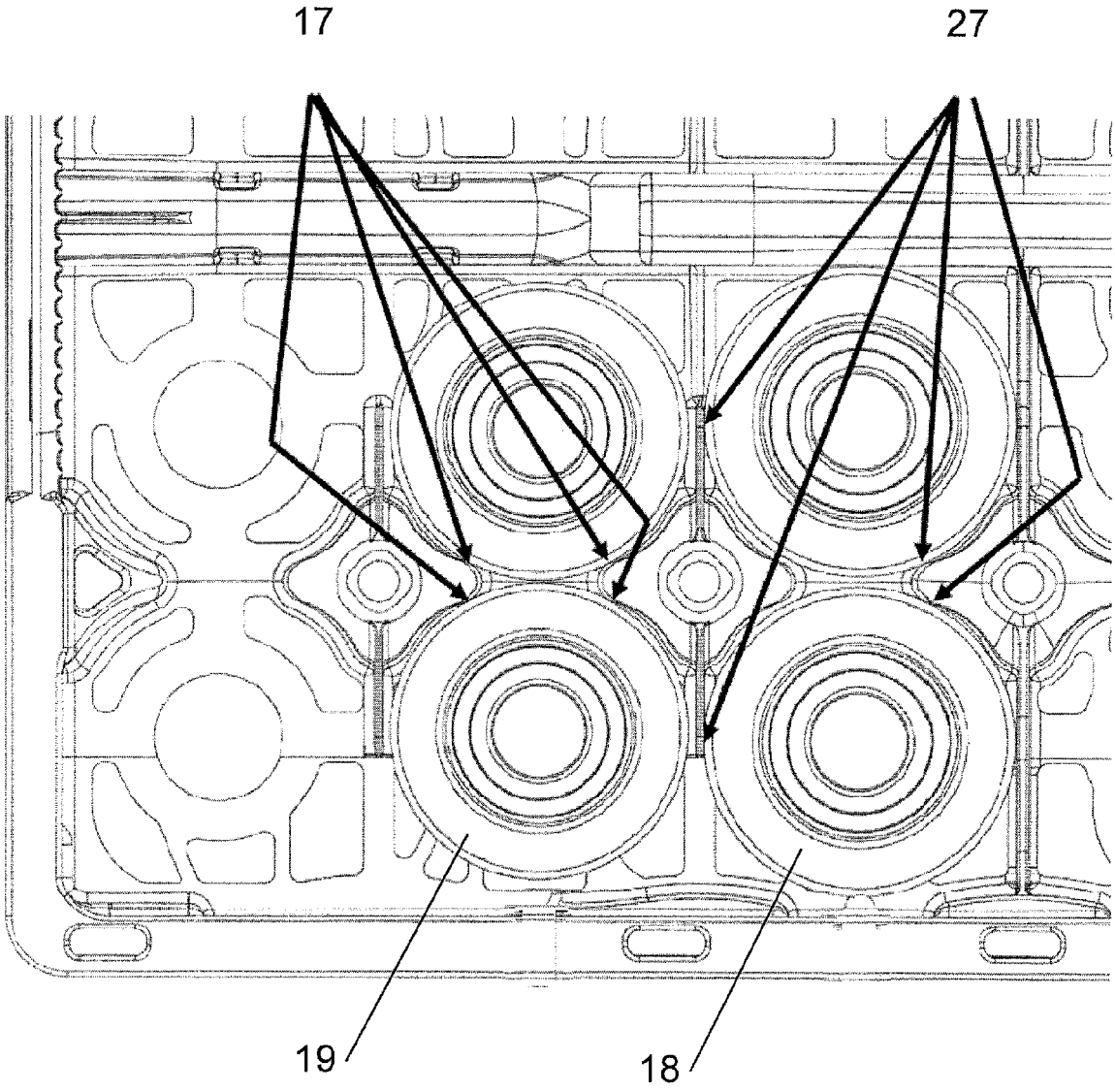

Fig. 4

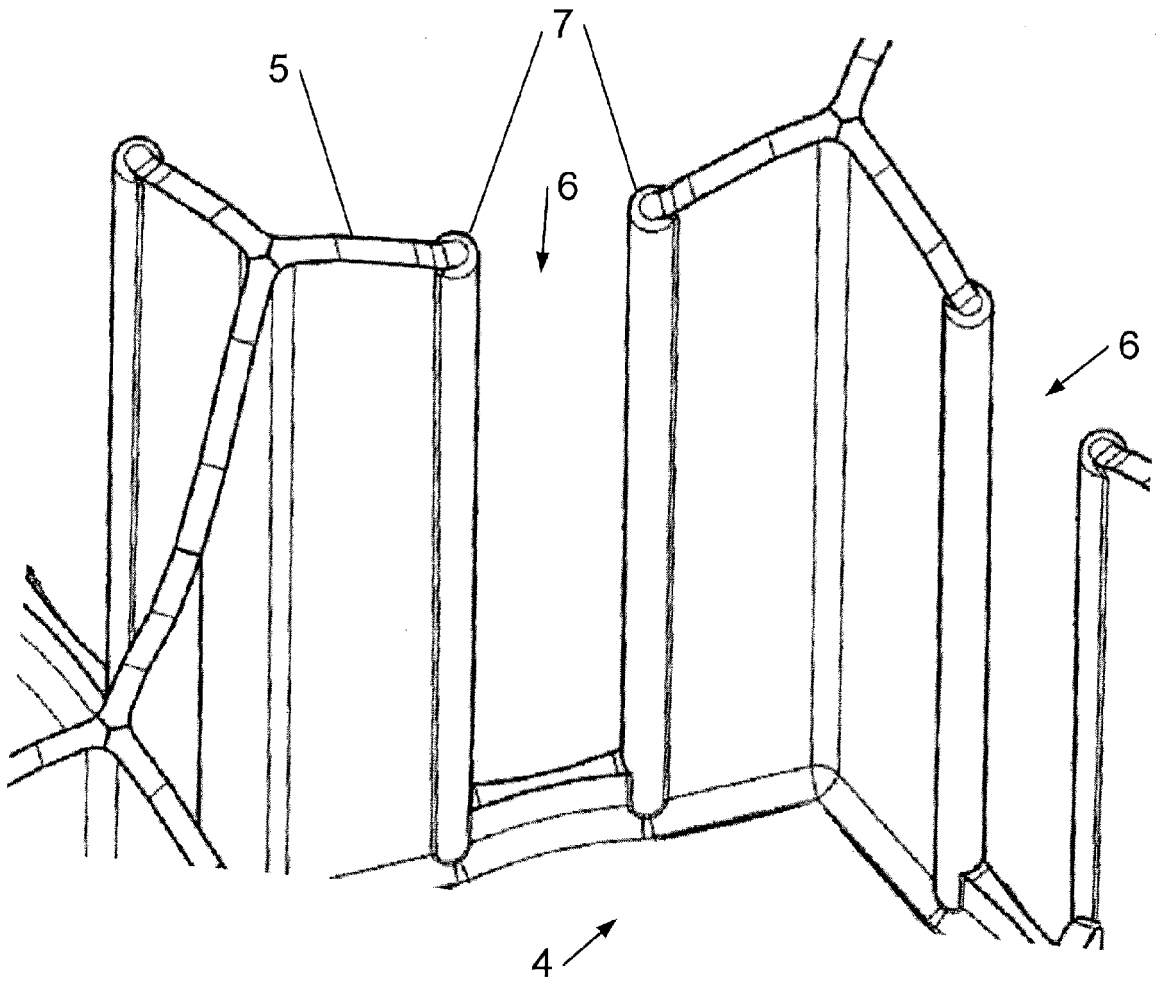

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 14 15 8817

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 August 2014	Lämmel, Gunnar

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 15 8817

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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