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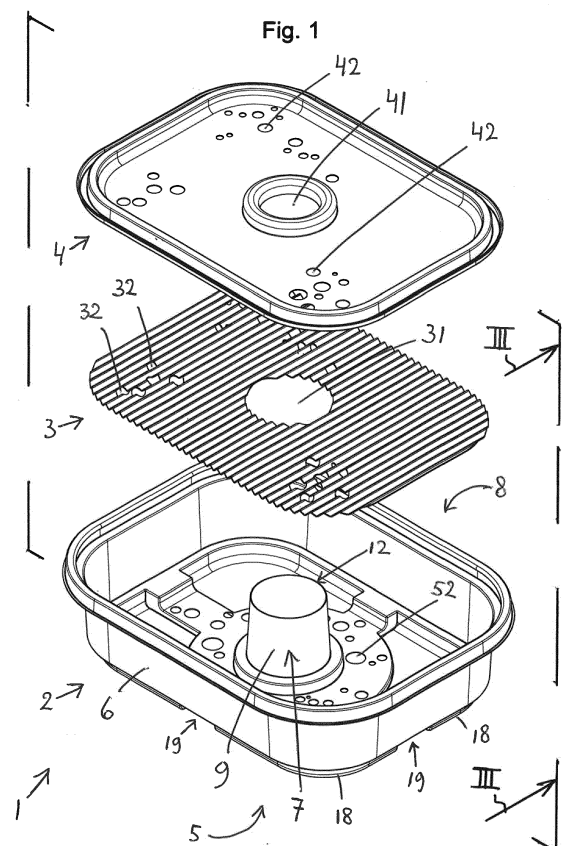
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(54) **CONTAINER FOR FRESH PRODUCE**

(57) According to the invention, a container (1) for fresh produce comprises a tray (2), a lid (4), and a ventilation shaft (7). The ventilation shaft is extending from the bottom wall of the tray in the direction of the open top of the tray. Multiple ones of the container are stackable on top of one another to form a stack of containers. When stacked, the interior shaft spaces of the ventilation shafts of the stacked containers are in in-line fluid-flow communication with one another along the longitudinal shaft directions, while at the same time they are in sideways fluid-flow communication with the interior container spaces. The invention provides for a highly effective ventilation flow, which is extending through a stack of containers, more or less similar to a chimney-like air-draught.



Description

[0001] The invention relates to a container for fresh produce, wherein the container comprises a tray, which comprises a bottom wall, a circumferential outside wall and an open top for insertion and removal of the fresh produce.

[0002] Containers based on such a tray, which is a relatively flat device, are often used for storing certain types of small vegetables or fruits. The reason is that, in many cases, these kinds of products are not suitable to be directly stacked onto one another in more than one or only a few layers. If stacked (too high) onto one another, these products may easily get bruised by mutual product pressure and/or may easily receive too little ventilation, which will shorten their shelf life considerably. Mainly for these reasons, flat tray-based containers are often used for these kinds of products, wherein every container contains only one or only a few layers of the products, and wherein the containers are stacked onto one another.

[0003] However, in stacked tray-based containers there still is the drawback of non-optimum ventilation of the produce. Especially the portions of the produce located in the central regions of each flat tray in a stack of trays tend to receive poor ventilation.

[0004] It is an object of the invention to provide a solution according to which vulnerable fresh products are packed in such manner that bruising of the products is prevented, while at the same time the packed products are reliably ventilated at all times, also when the packings are stacked onto one another.

[0005] For that purpose the present invention provides a container according to the appended independent claim 1. Preferable embodiments of the invention are provided by the appended dependent claims 2-12.

[0006] Accordingly, the invention provides a container for fresh produce, wherein the container comprises:

- a tray, which comprises a bottom wall, a circumferential outside wall and an open top for insertion and removal of the fresh produce;
- a ventilation shaft, comprising a longitudinal shaft direction, a circumferential shaft wall around said longitudinal shaft direction, an interior shaft space being defined by at least said circumferential shaft wall, and a first shaft end and a second shaft end, lying mutually opposite in said longitudinal shaft direction, wherein:
 - the ventilation shaft is extending with its longitudinal shaft direction from at least said bottom wall in the direction of said open top, which corresponds to the direction of said second shaft end of the ventilation shaft,
 - the first shaft end and the second shaft end are open longitudinal ends of the ventilation shaft,
 - said circumferential outside wall of the tray cir-

cumferentially envelopes the circumferential shaft wall,

- the ventilation shaft is connected to said bottom wall at a transverse circumferential cross-section of the circumferential shaft wall, wherein said transverse circumferential cross-section circumferentially envelopes a first bottom-passageway through said bottom wall;

- a lid for closing and opening the container, wherein:

- the container has a closed condition in which the lid is covering said open top, and an open condition in which the lid is removed from said open top for insertion and removal of the fresh produce,
- the lid has a first lid-passageway through the lid; and

- an interior container space for containing the fresh produce, said interior container space being defined by at least said bottom wall, said circumferential outside wall and said ventilation shaft; and wherein said tray, said ventilation shaft, said lid and said interior container space are arranged in such manner that multiple ones of the container, in their respective closed conditions, are stackable on top of one another to form a stack of containers in a stacked condition, in which:

- the bottom wall of each upper container of said stack is resting on the lid of a corresponding lower container of said stack,
- the interior shaft spaces of the corresponding ventilation shafts of said upper container and said lower container, respectively, are in in-line fluid-flow communication with one another along the corresponding longitudinal shaft directions and via the first lid-passageway of the lid of the lower container,
- the interior shaft spaces of the corresponding ventilation shafts of said upper container and said lower container, respectively, furthermore are in sideways fluid-flow communication with the corresponding interior container spaces of said upper container and said lower container, said sideways fluid-flow communication being branched-off from said in-line fluid-flow communication.

[0007] Hence, the container according to the invention is a tray-based container, which, as explained above, is suitable for preventing bruising of packed vulnerable products. Furthermore, the abovementioned ventilation shaft, and the abovementioned in-line fluid-flow communication and sideways fluid-flow communication that it offers, allow the packed products to be reliably ventilated at all times, also when the packings are stacked onto one

another. In fact, the invention provides for a highly effective ventilation flow, which is extending through a stack of containers, more or less similar to a chimney-like air-draught.

[0008] In a preferable embodiment of the invention, the container further comprises at least one shaft-wall-passageway through said circumferential shaft wall for realizing said sideways fluid-flow communication.

[0009] In a further preferable embodiment of the invention, said sideways fluid-flow communication of the container is realized at least via a first fluid-flow path, which is at least partly extending between a first circumferential bordering edge of the first lid-passageway and a second circumferential bordering edge of the second shaft end.

[0010] In a further preferable embodiment of the invention, said sideways fluid-flow communication is realized at least via a second fluid-flow path, which, as seen in said stacked condition, is at least partly extending between the bottom wall of said upper container of the stack and the lid of said lower container of the stack.

[0011] In a further preferable embodiment of the invention, said second fluid-flow path, as seen in said stacked condition, is extending from said interior shaft spaces of said upper container and said lower container to an exterior environment of the stack of containers, said exterior environment being located on a side of the circumferential outside walls of said upper container and said lower container, which side is facing away from said ventilation shafts.

[0012] In a further preferable embodiment of the invention, the container further comprises at least one second bottom-passageway through the bottom wall of the container, said second bottom-passageway not being enveloped by said transverse circumferential cross-section.

[0013] In a further preferable embodiment of the invention, the container further comprises at least one second lid-passageway through the lid of the container.

[0014] In a further preferable embodiment of the invention, the container further comprises at least one outside-wall-passageway through the circumferential outside wall of the container.

[0015] In a further preferable embodiment of the invention, the container further comprises:

- an elevated carrying platform for carrying the fresh produce, wherein the elevated carrying platform is located at an elevated level relative to the bottom wall, and wherein the elevated carrying platform is dividing the interior container space into an interior ventilation space and an interior storage space, wherein the interior ventilation space is located in-between the bottom wall and said elevated carrying platform.

[0016] In a further preferable embodiment of the invention, the elevated carrying platform has a first platform-passageway through the elevated carrying platform, wherein the ventilation shaft is extending through the first

platform-passageway.

[0017] In a further preferable embodiment of the invention, the container further comprises at least one second platform-passageway through the elevated carrying platform of the container.

[0018] Thanks to said elevated carrying platform, a controlled distance is provided in-between the products in the container and a surface on which the bottom wall of the container is resting. This controlled distance, in the form of said interior ventilation space, provides for a controlled ventilation underneath the products. Especially the combination of the thus created interior ventilation space with the ventilation shaft provides synergistic effects regarding said controlled ventilation underneath the products, since the interior ventilation space of its own would normally be prone to forming a dead-flow area underneath the products. That is, the ventilation shaft provides for a very effective air-draught, which prevents the occurrences of such dead-flow areas.

[0019] In a further preferable embodiment of the invention, said interior ventilation space contains a liquid absorbing material. The liquid absorbing material may for example be a liquid absorbing pad lying at the bottom of the interior ventilation space. The liquid absorbing material is suitable for absorbing liquids dripping off from the products, while at the same time the elevated carrying platform separates the products from lying directly on top of the wet absorbing material.

[0020] The abovementioned aspects and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described herein-after by way of non-limiting examples only and with reference to the schematic figures in the enclosed drawing.

Fig. 1 shows, in a perspective exploded view from above, an example of an embodiment of a container according to the invention.

Fig. 2 separately shows the tray of the container of Fig. 1 in a perspective view at the bottom side of the tray.

Fig. 3 shows a cross-section through the abovementioned "stack of containers in a stacked condition", based on two identical ones of the container of Fig. 1, and wherein the shown cross-section is a vertical cross-section according to a mid-plane through the stack of containers, which mid-plane is indicated by arrows III in Fig. 1.

[0021] The reference signs used in the abovementioned Figs. 1-3 are referring to the abovementioned parts and aspects of the invention, as well as to related parts and aspects, in the following manner.

1	(upper) container
1A	lower container
2	tray
3	elevated carrying platform
4, 4A	lid

5	bottom wall
6, 6A	circumferential outside wall
7, 7A	ventilation shaft
8	open top
9	circumferential shaft wall
10	interior storage space
11	first shaft end
12	second shaft end
14	transverse circumferential cross-section of the circumferential shaft wall
15	liquid absorbing material
17, 17A	longitudinal shaft direction
18	foot part of the bottom wall
19	elevated part of the bottom wall
20	interior ventilation space
30, 30A	interior shaft space
31	first platform-passageway
32	second platform-passageway
40	exterior environment
41, 41A	first lid-passageway
42	second lid-passageway
51	first bottom-passageway
52, 52A	second bottom-passageway
61	outside-wall-passageway
71	shaft-wall-passageway
81	first fluid-flow path
82	second fluid-flow path
91	first circumferential bordering edge
92	second circumferential bordering edge

[0022] Based on Figs. 1-3, and with the aid of the recited meanings of the reference signs, the abovementioned aspects of the invention will be clear. Some further elucidation is given below.

[0023] In the shown example, the tray 2 and the lid 4 are made from plastic, wherein the ventilation shaft 7 has been manufactured as an integral part of the tray 2. The elevated carrying platform 3 is made from cardboard.

[0024] In Figs. 1 and 2, foot parts 18 of the bottom wall 5, as well as elevated parts 19 of the bottom wall 5 are shown. In the situation of Fig. 3, where the upper container 1 and the lower container 1A are stacked relative to one another, the foot parts 18 of the upper container 1 are resting on the lid 4A of the lower container 1A. The foot parts 18, however, are of course not visible in Fig. 3, since the cross-section of Fig. 3 is according to the mid-plane III of Fig. 1, which mid-plane does not have the foot parts 18.

[0025] As compared to Figs. 1 and 2, Fig. 3 schematically shows the additional passageways 61 and 71, as well as some further optional locations for the passageways 52.

[0026] In Fig. 3, the various shown two-way arrows are indicating various fluid-flow communications or fluid-flow paths through the various passageways, spaces, interspaces, or the like. Of these, the two-way arrows indicating the first fluid-flow path and the second fluid-flow path have been specifically indicated by the reference numer-

als 81 and 82, respectively, as mentioned above. Clearly, the second fluid-flow path 82 is extending between the lid 4A of lower container 1A and elevated parts 19 (see Fig. 2) of the bottom wall 5 of the upper container 1.

[0027] Furthermore, in Fig. 3, the lower container 1A has been shown to contain the abovementioned liquid absorbing material 15, while the upper container 1 has been shown without the liquid absorbing material.

[0028] While the invention has been described and illustrated in detail in the foregoing description and in the drawing figures, such description and illustration are to be considered exemplary and/or illustrative and not restrictive; the invention is not limited to the disclosed embodiments.

[0029] For example, the shown lid of the shown container is fully detachable relative to the shown tray. Instead, the lid of a container according to the invention may for example also be fixedly connected to the tray, for example by means of a hinging mechanism, such as e.g. a living hinge.

[0030] Many various materials and production methods are possible for the various parts of a container according to the invention, including all materials and production methods which are known in the art for fresh produce containers. For example, many various plastics are possible for the tray and/or ventilation shaft and/or lid and/or elevated carrying platform, while these may be produced, e.g., by thermoforming and/or injection moulding.

[0031] As another example, it is mentioned that the ventilation shaft of a container according to the invention may be manufactured as an integral part of the (bottom wall of the) tray, but the ventilation shaft may also be manufactured separately from the (bottom wall of the) tray. For example, the tray may be manufactured by thermoforming, while the ventilation shaft is separately manufactured by injection moulding, whereafter the tray and the ventilation shaft may be (fixedly or detachably) connected to one another. Separately manufacturing the ventilation shaft by injection moulding, instead of by thermoforming, provides additional freedom for designing the ventilation shaft, such as for designing the abovementioned at least one shaft-wall-passageway through the circumferential shaft wall of the ventilation shaft.

[0032] Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims.

[0033] In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. For example, a single container according to the invention may comprise more than one ventilation shafts of the discussed type, the respective ventilation shafts being connected at mutually different locations, respectively, to the bottom wall of the tray. Furthermore, a single other unit may fulfill the functions of several items recited in the claims. For the purpose of clarity and a concise description, features are

disclosed herein as part of the same or separate embodiments, however, it will be appreciated that the scope of the invention may include embodiments having combinations of all or some of the features disclosed. Any reference signs in the claims should not be construed as limiting the scope.

Claims

1. Container (1) for fresh produce, comprising:

- a tray (2), which comprises a bottom wall (5), a circumferential outside wall (6) and an open top (8) for insertion and removal of the fresh produce;

- a ventilation shaft (7), comprising a longitudinal shaft direction (17), a circumferential shaft wall (9) around said longitudinal shaft direction, an interior shaft space (30) being defined by at least said circumferential shaft wall, and a first shaft end (11) and a second shaft end (12), lying mutually opposite in said longitudinal shaft direction, wherein:

- the ventilation shaft is extending with its longitudinal shaft direction from at least said bottom wall in the direction of said open top, which corresponds to the direction of said second shaft end of the ventilation shaft,
- the first shaft end and the second shaft end are open longitudinal ends of the ventilation shaft,

- said circumferential outside wall of the tray circumferentially envelopes the circumferential shaft wall,
- the ventilation shaft is connected to said bottom wall at a transverse circumferential cross-section (14) of the circumferential shaft wall, wherein said transverse circumferential cross-section circumferentially envelopes a first bottom-passageway (51) through said bottom wall;

- a lid (4) for closing and opening the container, wherein:

- the container has a closed condition in which the lid is covering said open top, and an open condition in which the lid is removed from said open top for insertion and removal of the fresh produce,
- the lid has a first lid-passageway (41) through the lid; and

- an interior container space (10, 20) for containing the fresh produce, said interior container space being defined by at least said bottom wall,

said circumferential outside wall and said ventilation shaft;

and wherein said tray, said ventilation shaft, said lid and said interior container space are arranged in such manner that multiple ones of the container, in their respective closed conditions, are stackable on top of one another to form a stack of containers (1, 1A) in a stacked condition, in which:

- the bottom wall of each upper container (1) of said stack is resting on the lid of a corresponding lower container (1A) of said stack,
- the interior shaft spaces (30, 30A) of the corresponding ventilation shafts of said upper container and said lower container, respectively, are in in-line fluid-flow communication with one another along the corresponding longitudinal shaft directions (17, 17A) and via the first lid-passageway (41A) of the lid (4A) of the lower container,
- the interior shaft spaces of the corresponding ventilation shafts of said upper container and said lower container, respectively, furthermore are in sideways fluid-flow communication with the corresponding interior container spaces of said upper container and said lower container, said sideways fluid-flow communication being branched-off from said in-line fluid-flow communication.

2. Container according to claim 1, further comprising at least one shaft-wall-passageway (71) through said circumferential shaft wall (9) for realizing said sideways fluid-flow communication.

3. Container according to claim 1 or 2, wherein said sideways fluid-flow communication of the container is realized at least via a first fluid-flow path (81), which is at least partly extending between a first circumferential bordering edge (91) of the first lid-passageway (41) and a second circumferential bordering edge (92) of the second shaft end (12).

4. Container according to any one of the preceding claims, wherein said sideways fluid-flow communication is realized at least via a second fluid-flow path (82), which, as seen in said stacked condition, is at least partly extending between the bottom wall (5) of said upper container (1) of the stack and the lid (4A) of said lower container (1A) of the stack.

5. Container according to claim 4, wherein said second fluid-flow path (82), as seen in said stacked condition, is extending from said interior shaft spaces (30, 30A) of said upper container (1) and said lower container (1A) to an exterior environment (40) of the

stack of containers, said exterior environment being located on a side of the circumferential outside walls (6, 6A) of said upper container and said lower container, which side is facing away from said ventilation shafts (7, 7A).

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6. Container according to any one of the preceding claims, further comprising at least one second bottom-passageway (52) through the bottom wall (5) of the container (1), said second bottom-passageway not being enveloped by said transverse circumferential cross-section (14). 10
7. Container according to any one of the preceding claims, further comprising at least one second lid-passageway (42) through the lid (4) of the container (1). 15
8. Container according to any one of the preceding claims, further comprising at least one outside-wall-passageway (61) through the circumferential outside wall (6) of the container (1). 20
9. Container according to any one of the preceding claims, further comprising: 25
 - an elevated carrying platform (3) for carrying the fresh produce, wherein the elevated carrying platform is located at an elevated level relative to the bottom wall (5), and wherein the elevated carrying platform is dividing the interior container space (10, 20) into an interior ventilation space (20) and an interior storage space (10), wherein the interior ventilation space is located in-between the bottom wall and said elevated carrying platform. 30 35
10. Container according to claim 9, wherein the elevated carrying platform (3) has a first platform-passageway (31) through the elevated carrying platform, wherein the ventilation shaft (7) is extending through the first platform-passageway. 40
11. Container according to claim 9 or 10, further comprising at least one second platform-passageway (32) through the elevated carrying platform (3) of the container (1). 45
12. Container according to any one of claims 9-11, wherein said interior ventilation space (20) contains a liquid absorbing material (15). 50

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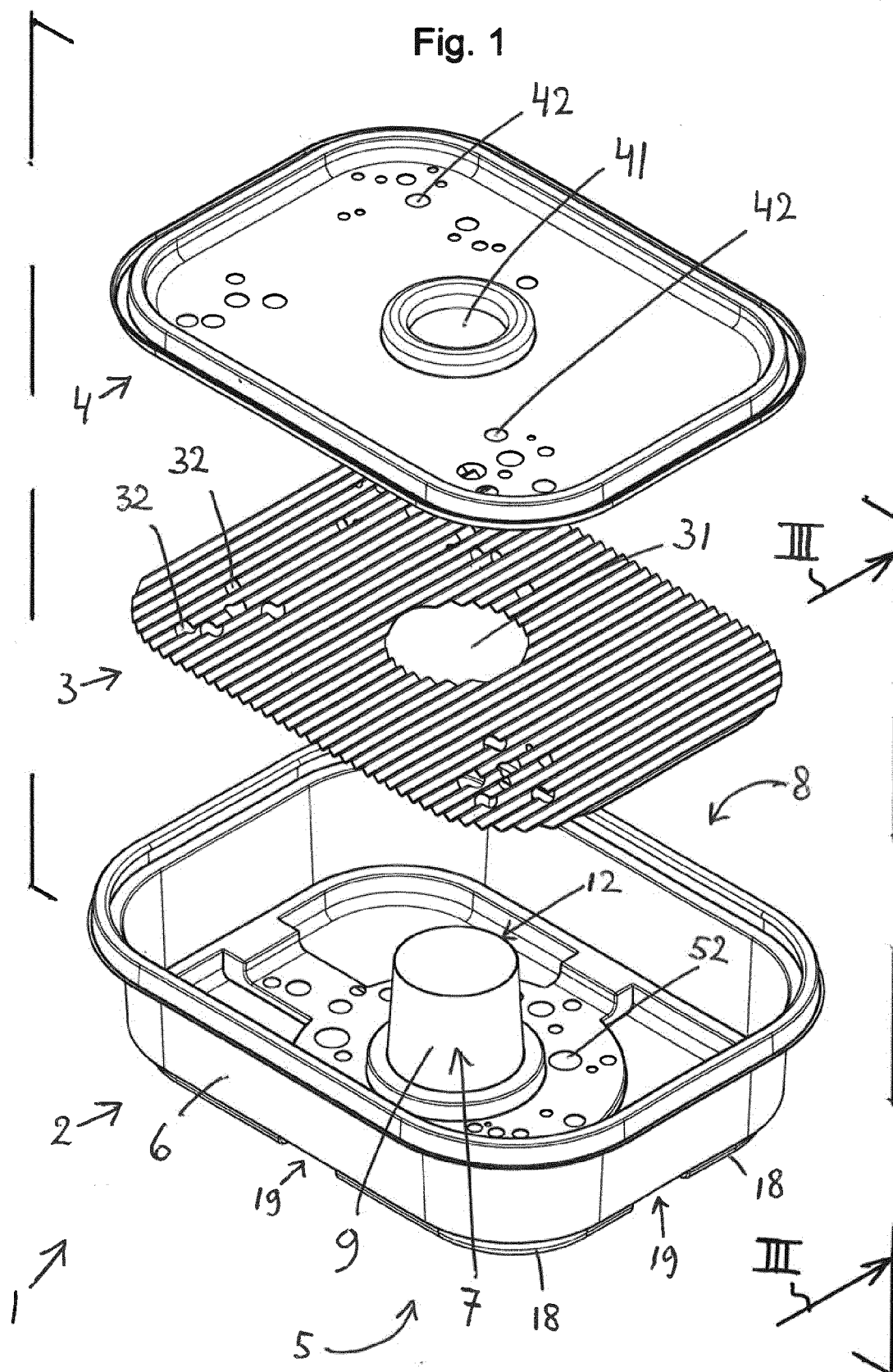


Fig. 2

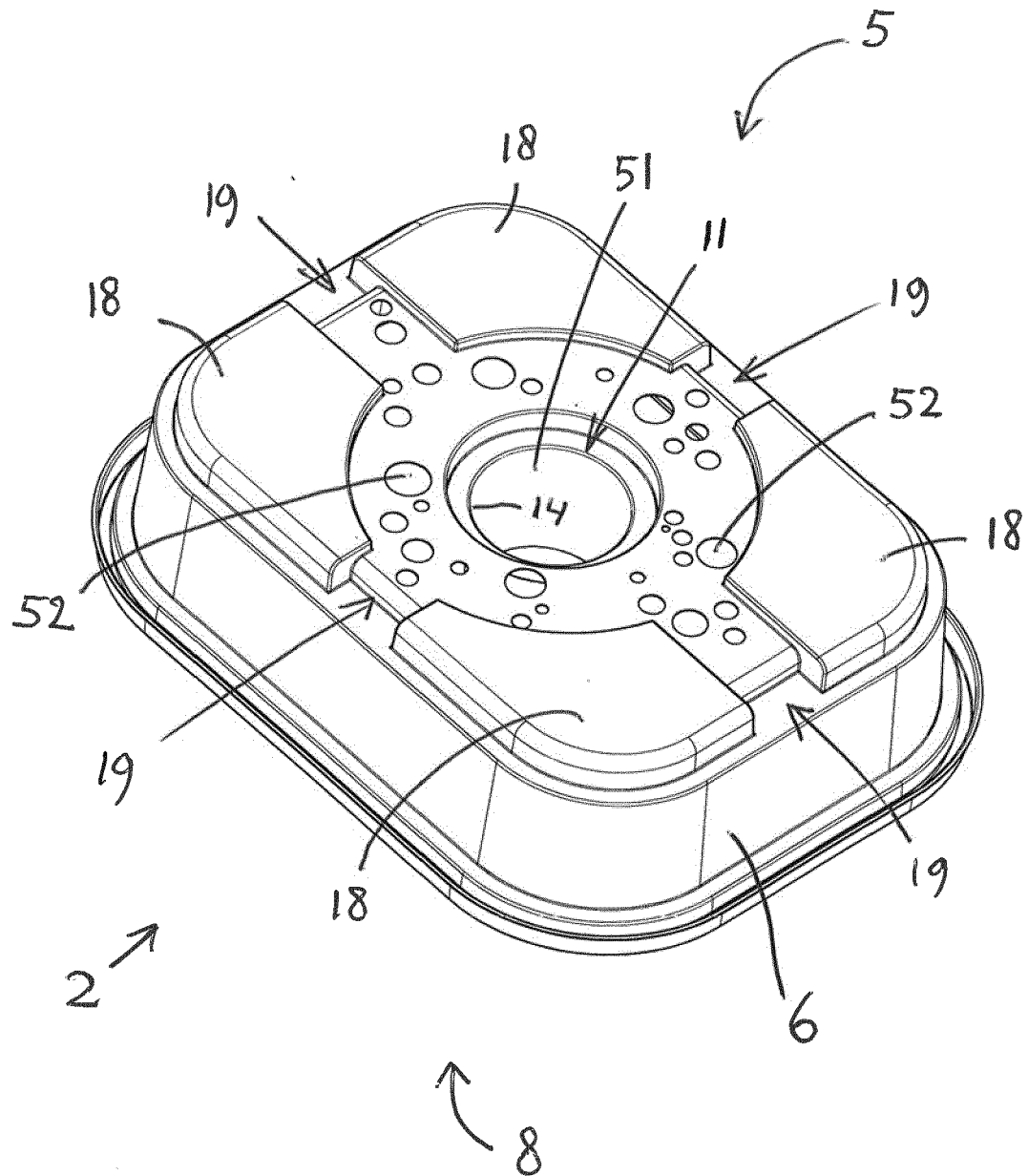
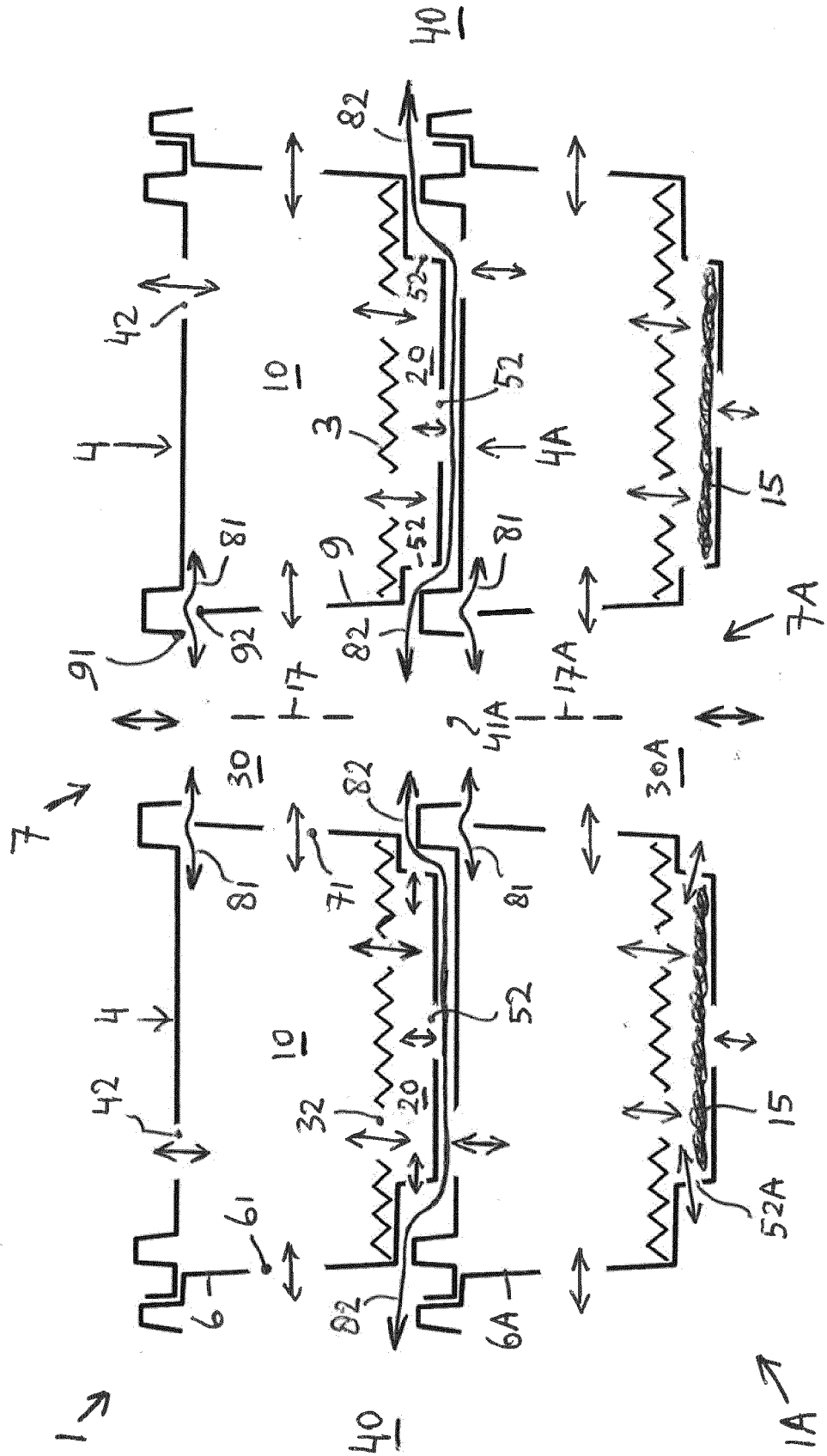


Fig. 3





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Application Number
EP 15 18 5020

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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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