



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.02.2016 Bulletin 2016/05

(51) Int Cl.:
F25D 25/00 (2006.01) B65D 71/70 (2006.01)

(21) Application number: **14179224.2**

(22) Date of filing: **31.07.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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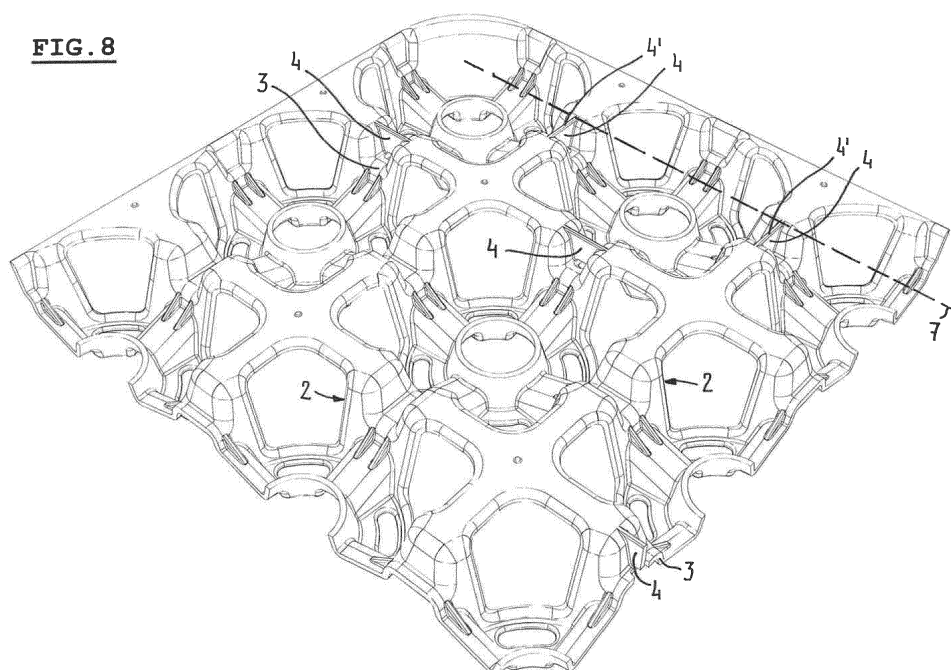
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(54) **Spacer**

(57) A spacer is provided which is intended for use in a cooling/freezing chamber to be positioned between stacked objects that have to be cooled or frozen in. The spacer comprises a substantially planar main body (1) which is provided with a number of projections (2), wherein the spacer is shaped such that it can be nested with another spacer in a nested configuration. The spacer is

provided with stop members (4) for, in the nested configuration, engaging said another spacer and maintaining an enlarged nesting distance between the main bodies of the spacers, wherein said nesting distance is defined as the vertical distance between corresponding parts of the main bodies.

FIG. 8



Description

[0001] The invention relates to a spacer intended for use in a cooling/freezing chamber to be positioned between stacked objects that have to be cooled or frozen in, comprising a substantially planar main body which is provided with a number of projections, wherein the spacer is shaped such that it can be nested with another spacer in a nested configuration.

[0002] When objects (for example food items) have to be cooled or frozen in a cooling or freezing chamber, the duration of the cooling or freezing process (and thus the energy consumption) can be reduced by ensuring that the objects are not closely stacked. Thus, spacers of the above mentioned type are used to position stacked objects at a certain (generally vertical) spacing. Cooling or freezing air then can pass between and around the objects, increasing the cooling or freezing efficiency.

[0003] The large amount of objects which generally are processed as a batch, requires the use of many spacers. For reducing the space needed for storing and transporting such large amount of spacers, these have a shape allowing them to be nested for forming large stacks. After use, the spacers in most times have to be cleaned and this too happens in the nested configuration of the spacers, for saving space. However, in the nested configuration state of the art spacers are very closely stacked and effectively reaching all parts of the spacers with a cleaning fluid is very difficult (and may prove to be very time consuming and requiring large quantities of such cleaning fluid). It appears that this may lead to sub-optimal or even poor cleaning results. If used in combination with food items, such badly cleaned spacers may contaminate the food items and thus may become a hazard to the health of consumers.

[0004] It is an object of the present invention to provide an improved spacer of the above mentioned type.

[0005] In accordance with the present invention the spacer is characterized in that the spacer is provided with stop members for, in the nested configuration, engaging said another spacer and maintaining an enlarged nesting distance between the main bodies of the spacers, wherein said nesting distance is defined as the vertical distance between corresponding parts of the main bodies.

[0006] In a state of the art spacer said nesting distance substantially will be equal to the vertical thickness of the main body (thus meaning that a lower surface of the main body of an upper spacer rests on the upper surface of the main body of a lower spacer). According to the present invention, however, a distance between the lower surface of the main body of an upper spacer and the upper surface of the main body of a lower spacer is defined. Thus, a cleaning fluid will have an improved access to parts of the spacers which otherwise would be hard to reach and as a result the cleaning process may be carried out more effectively, quicker and with the use of a reduced amount of cleaning fluid.

[0007] In a preferred embodiment of the spacer the

stop members are configured for maintaining a nesting distance ranging between 3-7 times the vertical thickness of the main body. More preferably, the stop members are configured for maintaining a nesting distance of 5 times the thickness of the main body. When, for example, the main body is about 3 mm thick, the nesting distance in such a case would be about 15 mm.

[0008] The stop members may be provided at many different locations. In one specific embodiment of the spacer in which adjacent projections are connected by hollow, nestable bridge members of which the height above the main body is less than the height of the projections above the main body, it is conceivable that at least some of said bridge members within their hollow cavity define said stop members. Although it is possible to provide said stop members at all bridge members, in most cases the provision of said stop members at selected bridge members only will be sufficient to maintain nested spacers at the required nesting distance in a stable manner.

[0009] The stop members also may come in many different shapes. In embodiments in which they are provided at said bridge members (as mentioned above), it is conceivable that the stop members are shaped as vertically extending walls traversing said hollow cavity. In the nested configuration said vertically extending walls of an upper spacer will rest on top of corresponding bridge members of a lower spacer (in the state of the art said hollow bridge members would be completely nested).

[0010] In a specific embodiment of such a spacer the walls have a lower edge flush with the lower surface of the main body.

[0011] In another embodiment of the spacer according to the present invention it has a rectangular shape with side edges, and it is provided with a number of stop members positioned such that they together define a tilting line in parallel with one of said side edges around which the spacer and said another spacer can be tilted relative to each other. Such a tilting movement may be used to gain an even better access to parts of the spacers to be cleaned. When a stack of nested spacers is positioned on a side, the tilting movements may occur automatically by gravity. Additional members or stops may be provided for limiting the tilting movement. This, however, also may be achieved by parts of the spacer already present.

[0012] It is noted that when, as discussed above, stop members embodied as vertical walls are used, it is not necessary that the vertical walls are aligned with such tilting line; even if the vertical walls extend perpendicularly to such a tilting line, corresponding parts of the vertical walls together may define such (imaginary) tilting line.

[0013] In another embodiment of the spacer the main body and/or the projections are provided with through-holes. Such through holes may improve the effectiveness of both a cooling or freezing fluid (for example air) for reaching the objects to be cooled or frozen in, and a cleaning fluid for reaching all parts of the spacers.

[0014] In yet another embodiment of the spacer according to the present invention the projections have upper horizontal supporting faces intended for engaging an object to be cooled or frozen in and radial open-top channels provided in said supporting faces extending inclined upwards as seen in a direction from the outside to the inside of the projections. Such channels are very effective in directing cooling or freezing fluid into contact with an object supported by said supporting faces of the projections.

[0015] The spacer may be manufactured from high density polyethylene. However, also other materials may be used.

[0016] The spacer may have a standardised shape (for example rectangular or square) with standardised dimensions. In most cases the projections will have a regular pattern such that spacers may be nested and stacked in different positions.

[0017] Hereinafter the invention will be elucidated while referring to the drawing, in which:

Figure 1 illustrates a top plan view of an embodiment of the spacer according to the present invention;

Figure 2 illustrates a side elevational view of the spacer of figure 1;

Figure 3 illustrates a bottom view of the spacer of figure 1;

Figure 4 shows, on an enlarged scale, a detail of the spacer of figure 1 in a top plan view;

Figure 5 shows a cross section according to V-V in figure 4 of two similar nested spacers;

Figure 6 shows, on an even larger scale, detail VI in figure 5;

Figure 7 shows, in a perspective view from above, part of the spacer according to figure 1, and

Figure 8 shows, in a perspective view from below, part of the spacer according to figure 1.

[0018] The spacer illustrated in the figures is intended for use in a cooling/freezing chamber to be positioned between stacked objects that have to be cooled or frozen in (for example food items in a packaging) and may be made of high density polyethylene. By using such a spacer (mostly in large numbers) the cooling or freezing process can be accelerated because the cooling or freezing fluid used during such a process gains a better access to the objects.

[0019] As follows from figures 1-3, the spacer comprises a substantially planar main body 1 which is provided with a number of projections 2. In the illustrated embodiment said projections 2 are positioned in a regular pattern of rows. It is noted, however, that said projections may be positioned in any other appropriate pattern. Further it is noted that, although in the illustrated embodiment all projections 2 have a similar shape and dimension, the spacer also may be provided with projections 2 with different shapes and/or dimensions. However, irrespective its design, the spacer is shaped such that it can be nested

with another spacer in a nested configuration.

[0020] Referring to figure 7 (view of part of a spacer from above) and figure 8 (a corresponding view of the spacer, but from the other side; thus in figure 8 the spacer is positioned upside down), the design of the spacer is further elucidated. One can clearly see that adjacent projections 2 are connected by hollow, nestable bridge members 3 of which the height above the main body 1 is less than the height of the projections 2 above the main body 1.

[0021] As is visible in figure 8, at least some of said bridge members 3 within their hollow cavity define stop members shaped as vertically extending walls 4 traversing said hollow cavity. Further one can see that, in the illustrated embodiment, the walls 4 have a lower edge 4' flush with the lower surface of the main body 1 (that is the surface of the main body 1 visible in the upside down position of figure 8).

[0022] Referring to figure 6, which on an enlarged scale illustrates a detail VI of figure 5 (which is a cross section according to V-V in figure 4), the stop members or vertical walls 4 of an upper spacer 6, in the nested configuration with another adjacent lower spacer 5, engage said another spacer 5 and maintain an enlarged nesting distance D between the main bodies 1 of the spacers (wherein said nesting distance D is defined as the vertical distance between corresponding parts of the main bodies 1). One can see that the vertical wall 4 provided in a bridge member 3 of the upper spacer 6 engages the top of a bridge member 3 of the lower spacer 5. The height of the vertical walls 4 has been indicated as H in figure 6.

[0023] The stop members or vertical walls 4 may be configured (height H) for maintaining a nesting distance D ranging between 3-7 times the vertical thickness d of the main body 1. Preferably they are configured for maintaining a nesting distance D of 5 times the thickness d of the main body 1. In a specific embodiment the thickness d of the main body 1 is about 3 mm and the nesting distance D is about 15 mm.

[0024] The spacer with a rectangular shape and with side edges as illustrated in figures 1-3, may be provided with a number of stop members or vertical walls 4 positioned such that they together define a tilting line in parallel with one of said side edges. For example, such a tilting line has been illustrated by a dotted line 7 in figure 8. The spacer 6 and said another spacer 5 can be tilted relative to each other around such a tilting line 7.

[0025] As follows immediately from the figures, the main body 1 and the projections 2 are provided with a multitude of through-holes (not numbered) for an improved flow pattern of a cleaning, cooling and/or freezing fluid. Further, the projections 2 have upper horizontal supporting faces 8 (see figure 7) intended for supporting and engaging an object to be cooled or frozen in. Also radial open-top channels 9 are provided in said supporting faces 8 extending inclined upwards as seen in a direction from the outside to the inside of the projections 2.

[0026] The invention is not limited to the embodiments

described before which may be varied widely within the scope of the invention as defined by the appending claims.

Claims

1. Spacer intended for use in a cooling/freezing chamber to be positioned between stacked objects that have to be cooled or frozen in, comprising a substantially planar main body which is provided with a number of projections, wherein the spacer is shaped such that it can be nested with another spacer in a nested configuration, **characterized in that** the spacer is provided with stop members for, in the nested configuration, engaging said another spacer and maintaining an enlarged nesting distance between the main bodies of the spacers, wherein said nesting distance is defined as the vertical distance between corresponding parts of the main bodies. 50
2. Spacer according to claim 1, wherein the stop members are configured for maintaining a nesting distance ranging between 3-7 times the vertical thickness of the main body. 25
3. Spacer according to claim 2, wherein the stop members are configured for maintaining a nesting distance of 5 times the thickness of the main body. 30
4. Spacer according to claim 3, wherein the main body is about 3 mm thick and the nesting distance is about 15 mm. 40
5. Spacer according to any of the previous claims, wherein adjacent projections are connected by hollow, nestable bridge members of which the height above the main body is less than the height of the projections above the main body and wherein at least some of said bridge members within their hollow cavity define said stop members. 45
6. Spacer according to claim 5, wherein the stop members are shaped as vertically extending walls traversing said hollow cavity. 50
7. Spacer according to claim 6, wherein the walls have a lower edge flush with the lower surface of the main body. 55
8. Spacer according to any of the previous claims and having a rectangular shape with side edges, and provided with a number of stop members positioned such that they together define a tilting line in parallel with one of said side edges around which the spacer and said another spacer can be tilted relative to each other.

9. Spacer according to any of the previous claims, wherein the main body and/or the projections are provided with through-holes.

- 5 10. Spacer according to any of the previous claims, wherein the projections have upper horizontal supporting faces intended for engaging an object to be cooled or frozen in and radial open-top channels provided in said supporting faces extending inclined upwards as seen in a direction from the outside to the inside of the projections. 10

11. Spacer according any of the previous claim and manufactured from high density polyethylene. 15

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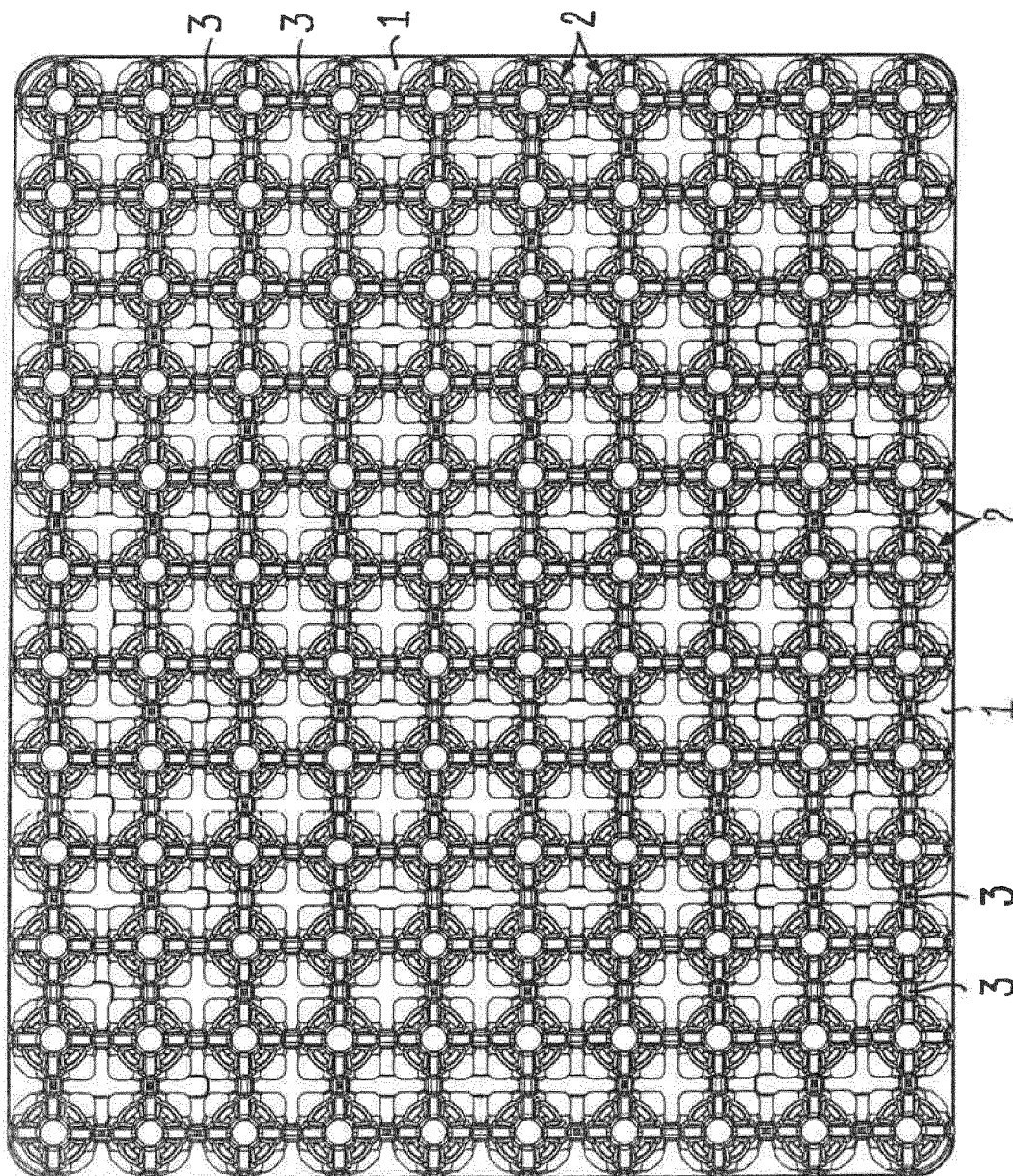
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FIG. 1



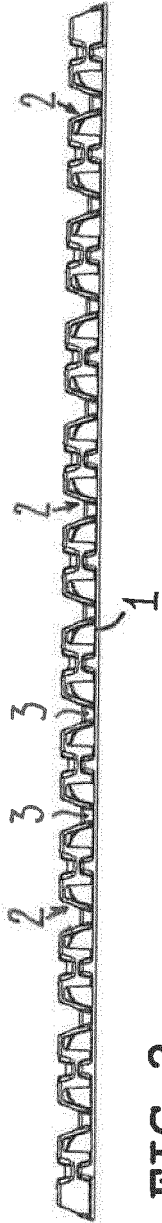


FIG. 2

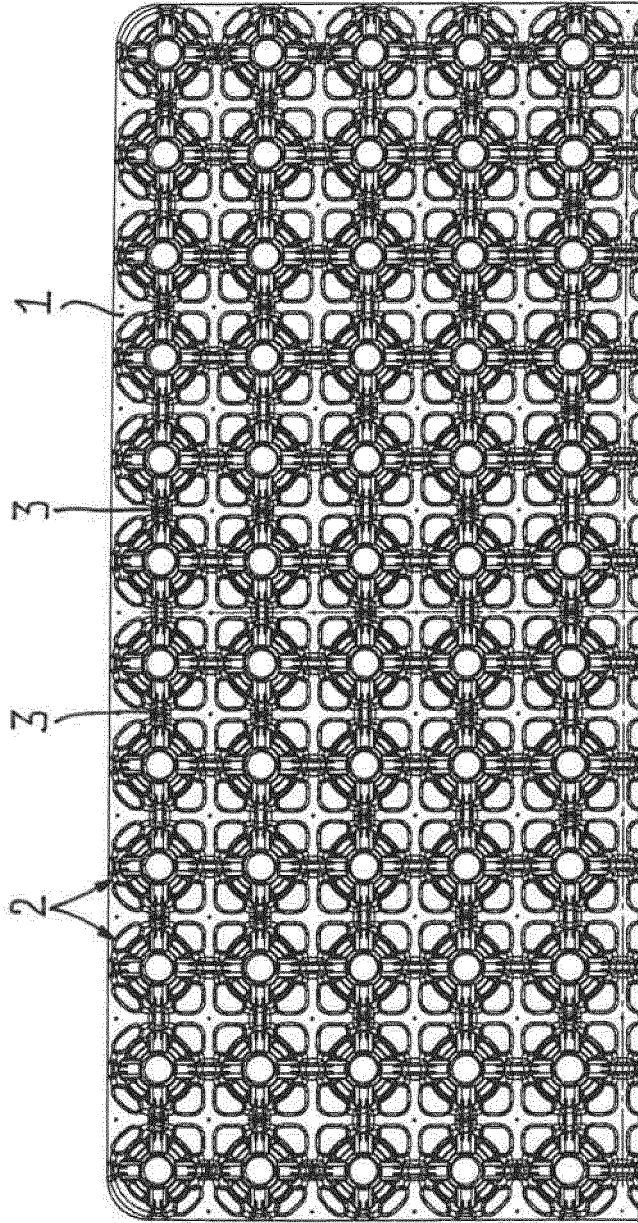
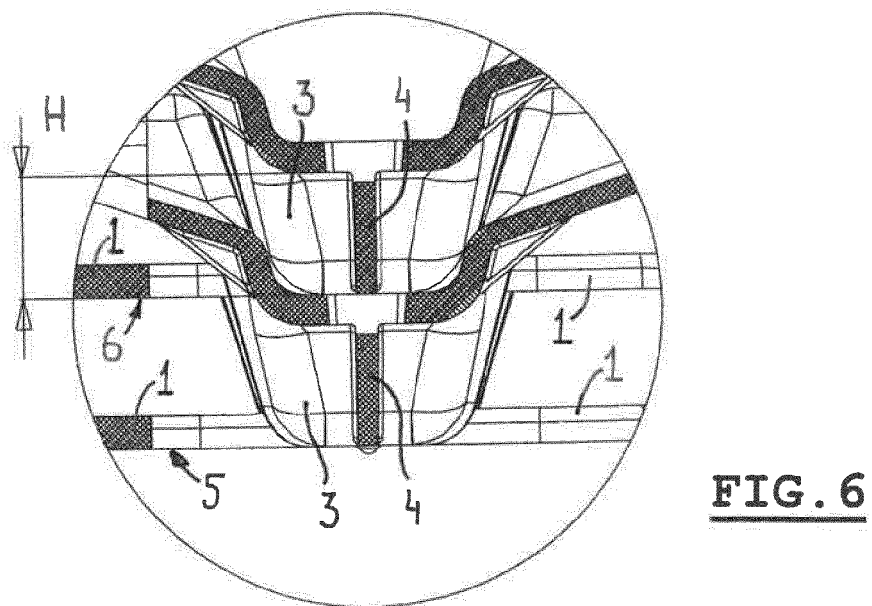
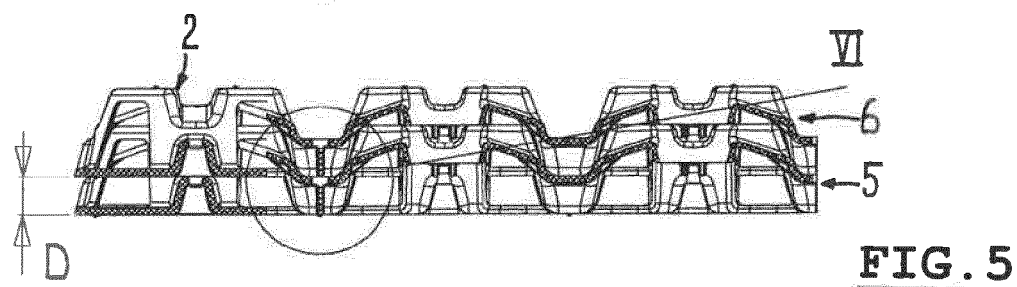
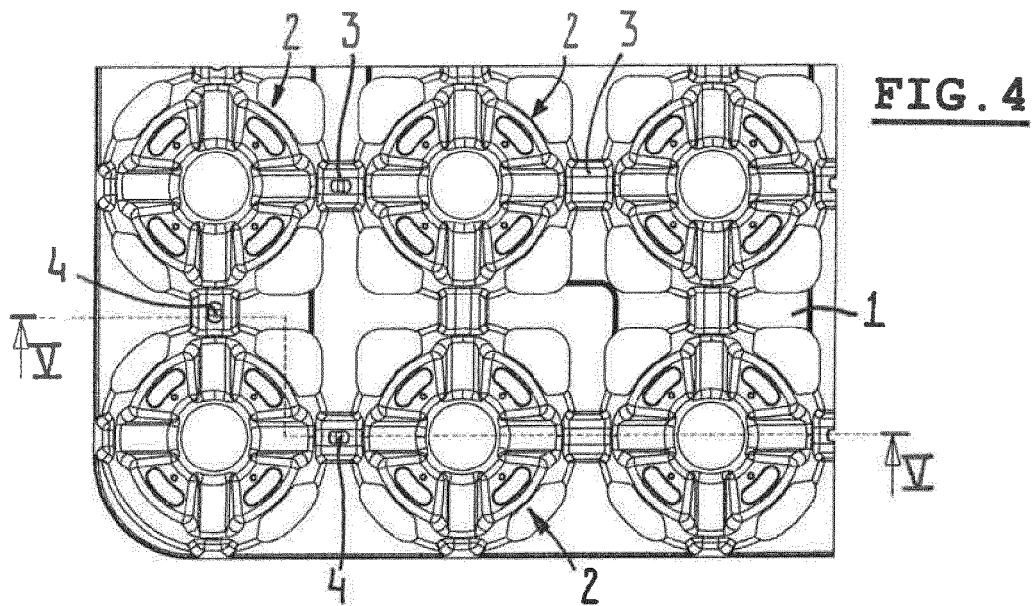


FIG. 3



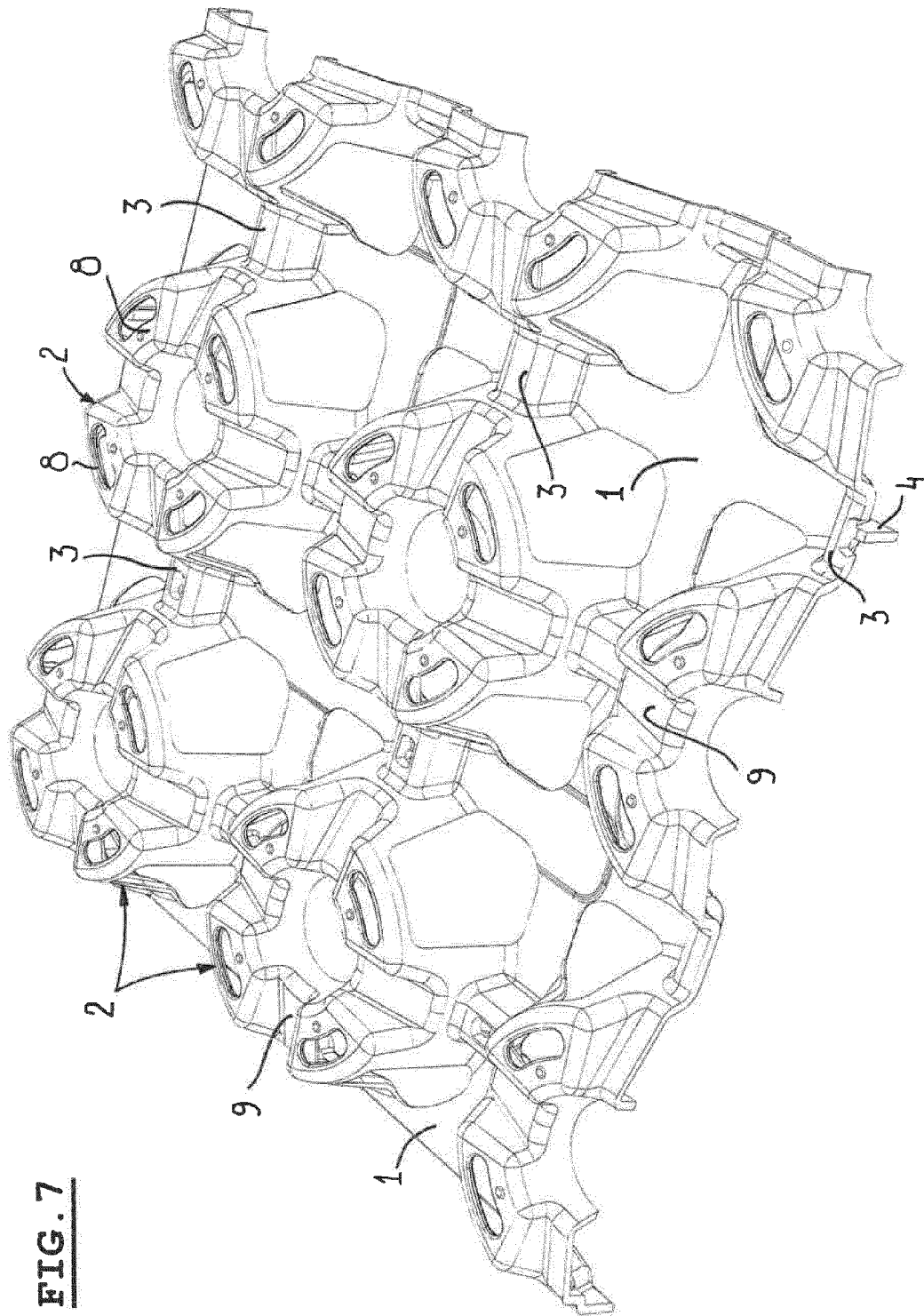


FIG. 7

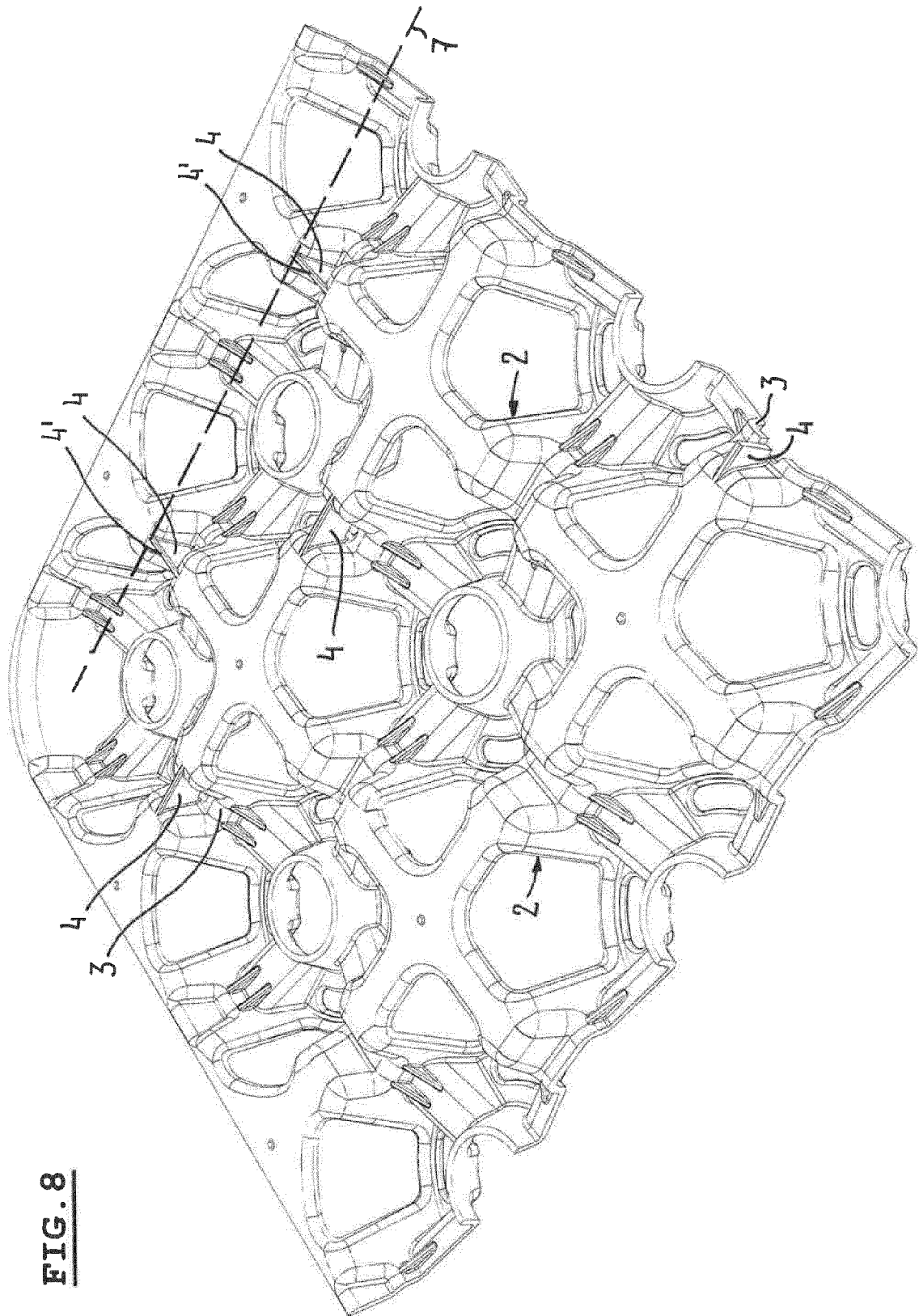


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 14 17 9224

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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