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(54) **SYSTEM FOR STORING AND TRANSPORTING PERISHABLE PRODUCTS**

(57) A packaging system for cooling in a "California tunnel" or forced-air cooling system, and refrigerated land and maritime transport and storage, for the agro-export of perishable products. This system consists of three basic assemblable and fastenable elements:

1) Rigid containers (10) that are made of plastic material and contain the products,

2) Supporting squares (41) to enable stacking once full of the perishable products. Without these supporting squares (41), the containers (10) are stacked, fitting in-

side each other perfectly and occupying very little space, with resulting storage and transport advantages.

3) Spreader/anchor parts (51). This element contributes both to securing the containers (10) as the containers are stacked on top of one another, with the products, providing the assembly with uniformity, and also to the distribution of the air inside the system in order to contribute to a faster cooling, which is required to preserve the products.

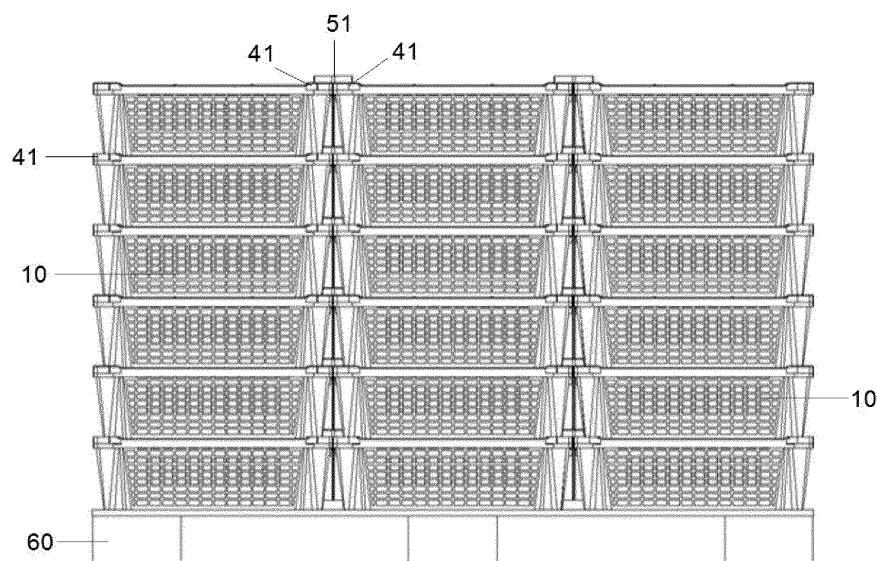


FIG. 9a

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Description

SCOPE OF THE INVENTION

[0001] The present invention relates to a system for storing and transporting perishable products that is based on rigid containers that are made of plastic and that are designed to be stacked.

BACKGROUND TO THE INVENTION

[0002] Spanish utility model 1030289 describes a basket (or box) that is in particular designed for storing and transporting shellfish, said basket comprising a rebated body that is made of plastic-like materials and that has an overall inverted truncated pyramid shape, with the upper face open and a lid for closing. The base and the side walls of the box include firstly zones formed by a rectangular grid formed by respective successions of mutually perpendicular parallel ribs and secondly zones with no holes. This provides a box firstly that is rigid enough to perform the intended function, and secondly that has enough ventilation orifices to ensure the preservation of the products contained therein. The boxes and lids are designed to enable stacking with and without lids.

[0003] For certain perishable products, such as grapes for example, it is beneficial to store and transport same using pallets carrying an assembly of boxes arranged in rows and columns.

[0004] However, with the boxes described in Spanish utility model 1030289, these assemblies cannot be formed either to ensure the stability thereof or to enable air to flow through all of the boxes in the assembly.

[0005] The present invention is intended to address these drawbacks.

SUMMARY OF THE INVENTION

[0006] The invention provides a system for storing and transporting perishable products that includes three components that are preferably made of plastic materials: (a) rigid containers for storing and transporting perishable products that are designed to be stacked, with each container fitting into the container below, (b) supporting squares for the corner zones of the containers to enable the containers to be stacked by arranging one on top of another once the containers contain perishable products, and (c) spreader/anchor parts to secure assemblies of containers stacked in rows and columns.

[0007] The containers are formed by a base and conventional side walls with a plurality of orifices to facilitate the ventilation of the perishable products and corner zones formed by upper frames that are recessed in relation to the side walls and by curved walls arranged with an angle of inclination in relation to the bases that enables stacking.

[0008] The upper frames and the supporting squares have cooperating means ensuring that the supporting

squares are positioned on top of the upper frames, providing bearing zones when stacked when containing perishable products.

[0009] The upper frames, the supporting squares and the spreader/anchor parts have cooperating means designed to prevent movements in assemblies of containers stacked in multiple rows and columns.

[0010] Advantageously, the curved walls of the corner zones of the containers include a central section in the form of a cone segment with the apex oriented towards the base and two end sections that are adjacent to the side walls, in the form of cone segments with the apex oriented towards the upper portion of the container.

[0011] Advantageously, the supporting squares have a trapezoidal shape that is designed to be arranged on the upper frames, and the thickness thereof is substantially equal to the recess of the upper frames in relation to the contiguous side walls. Furthermore, the supporting squares have a through-hole close to the vertex and two internal cylindrical hollows close to the side edges thereof.

[0012] Advantageously, the height of the spreader/anchor parts is substantially equal to the height of the containers and said spreader/anchor parts include a head with a base with a specially shaped plan designed to facilitate stacking of the containers, the lower portions of which are attached to two flat X-shaped plates and four lugs arranged between said flat plates.

[0013] Other characteristics and advantages of this invention are set out in the detailed description below of embodiments illustrating the purpose thereof, in relation to the attached figures.

SHORT DESCRIPTION OF THE FIGURES

[0014]

Figure 1 is a plan view showing the three basic components of the system according to the invention: stackable containers, corner supporting squares and spreader/anchor parts.

Figure 2 is an elevation view of a container.

Figure 3 is a perspective view of the corner zone of a container.

Figures 4a and 4b are perspective views of the outside and the inside of a supporting square and figure 4c is a partial cross-section view taken along A-A in figure 1 of a supporting square arranged on a corner zone of a container.

Figures 5a and 5b are two perspective views of a spreader/anchor part.

Figure 6 is a cross-section view taken along A-A in figure 1, this figure showing one column of two

stacked containers.

Figure 7 is a cross-section view taken along C-C in figure 6.

Figure 8 is a cross-section view taken along B-B in figure 1, this figure showing one column of two stacked containers.

Figures 9a and 9b are respectively elevation and plan views of an assembly of 36 containers stacked in an assembly formed by six rows and six columns, arranged on a pallet.

Figures 10a, 10b and 10c are respectively perspective and side elevation views of an assembly of 36 empty containers stacked in an assembly formed by six rows and columns, arranged on a pallet.

DETAILED DESCRIPTION OF THE INVENTION

[0015] The system according to the invention includes firstly containers 10 for storing and transporting perishable products, and secondly supporting squares 41 for the corner zones 15 of the containers 10 and spreader/anchor parts 51 for the containers 10.

[0016] The containers 10 are designed to be stacked by fitting into one another when empty (see figures 10a, 10b, 10c) and to be stackable on top of one another when containing perishable products (see figures 9a, 9b) in assemblies of rows and columns positioned in particular on pallets 60 in combination with the supporting squares 41 and the spreader/anchor parts 51.

[0017] In the embodiment of the invention described in detail, the containers 10 are formed (see figures 1 and 2) by bases 11, side walls 13 and corner zones 15 made of plastic materials.

[0018] The bases 11 and the side walls 13 are formed, with the exception of the edges thereof, by a grid of strips arranged in two directions (as in other containers known in the prior art), forming therebetween a plurality of square and/or rectangular orifices 17. The side walls 13 are arranged with an angle of inclination greater than 90° in relation to the bases 11 thereof to enable stacking.

[0019] The difference between the containers 10 according to the invention and the containers known in the prior art lies in the corner zones 15 that are designed (see figure 3) with curved walls 20 and upper frames 31.

[0020] The curved walls 20 include a central section 23 and two end sections 21 adjacent to the side walls 13, in the form of cone segments, the vertex of the end sections 21 being oriented towards the upper portion of the container 10 and the vertex of the central section 23 being oriented towards the base 11 thereof. As a whole, the curved walls 20 are arranged with an angle of inclination in relation to the bases 11 that is substantially equal to the angle of inclination of the side walls 13 to facilitate stacking thereof (see figure 2).

[0021] The upper frames 31 have an external outline formed by straight sections aligned with the side walls 13 contiguous to the corner zone 15 and a curved internal outline fitting the upper edge of the central section 23 of the curved walls 20. The upper frames are recessed in relation to the contiguous side walls 13 and have a through-hole 33 in the vertex and two cylindrical projections 35 in the edges thereof contiguous to the side walls 13.

[0022] The supporting squares 41 for the corner zones 15 (see figures 4a, 4b and 4c) have a pentagon shape designed to be placed on top of the upper frames 31 of the containers 10, and are wide enough to cover the recess thereof in relation to the lateral walls 13. The vertex thereof has a through-hole 43 arranged to be positioned above the through-hole 33 of the upper frames 31 and the ends thereof have two internal cylindrical hollows 45 arranged to seat the cylindrical projections 35 of the upper frames 31. The supporting squares also have side harpoons 48 that facilitate the snap-fitting thereof to the container 10, such that a container 10 with four supporting squares 41 arranged in the corner zones 15 thereof form a one-piece assembly. Reinforcing ribs are provided on the lower portion of the supporting squares 41.

[0023] In the internal cylindrical hollows 45, bodies 46 designed to cooperate with the cylindrical projections 35 of the upper frames 31 are arranged such to be rigidly connected together when a supporting square 41 is positioned on an upper frame 31. For this purpose, the cylindrical projections 35 are not solid, but are hollow with an end neck designed to receive the bodies 46.

[0024] Consequently, when the supporting squares 41 are placed on the containers 10, the structural behavior of the assembly is enhanced since the containers 10 are further stiffened, which helps each container to withstand the weight of the containers located above said container in the same column.

[0025] The supporting squares 41 for the corner zones 15 are designed to facilitate the stacking of containers 10 containing perishable products, preventing the containers from entering the container located below (which would occur in the absence of supporting squares).

[0026] Figure 6 shows a stack of a first container and a second container with curved walls 20, 20' respectively (see also figure 7). The curved walls 20' of the second container rest on the supporting squares 41 located in the corner zones of the first container. The supporting squares 41 located on the curved walls 20' of the second container enable another container to be stacked thereupon.

[0027] The spreader/anchor parts 51 are intended to secure and facilitate the ventilation of an assembly of containers 10 arranged in particular in rows and columns on a pallet 60 (see figures 9a and 9b).

[0028] This assembly is formed by 36 containers 10 containing perishable products and arranged in six rows and six columns, each container 10 resting on the container positioned below in the same column, for which

purpose all of the corner zones of the containers 10 are provided with supporting squares 41.

[0029] This assembly also includes spreader/anchor parts 51 in the areas in which the corner zones of four containers 10 come together. Consequently, in the example shown in figures 9a and 9b, twelve spreader/anchor parts 51 enable the assembly of 36 containers to be secured.

[0030] The height of the spreader/anchor parts 51 is substantially equal to the height of the containers 10 and said parts include (see figures 5a, 5b) two flat plates 59 that are arranged perpendicularly in an X shape and joined to the base 55 of a head 53, the sides of which include curved zones 58 in the central portion thereof to facilitate stacking of the containers, as well as four lugs 57 arranged between said flat plates 59. The head 53 is designed as a rebate on the base 55 with reinforcing ribs 56. This arrangement of the spreader/anchor parts 51 has the advantage of facilitating self-positioning of the containers when the containers are stacked on top of one another. The curved zones 58 act as guides or slides to stack the containers correctly.

[0031] Figure 8 shows a first container 10 and a second container 10' containing perishable products being stacked. Figure 8 shows how the lugs 57 of the spreader/anchor parts 51 located on the containers 10 and 10' pass through the through-holes 43 of the supporting squares 41 of the corner zones and the through-holes 33 of the upper frames 31 of said containers 10 and 10'.

[0032] Similarly, the other three lugs 57 of the spreader/anchor parts 51 engage in the through-holes 43 and 33 of, respectively, the supporting squares 41 and the upper frames 31 of the three contiguous containers located in the same row. In this regard, it can be seen that the spreader/anchor parts 51 are designed to be inserted in four contiguous corner zones 15 of four containers, the head 53 thereof finally being positioned on a portion of the supporting squares 41 of these corner zones 15 and with the flat plates 59 thereof arranged perpendicularly along the directions (longitudinal and transverse) of the side walls 13 of the containers 10.

[0033] An important advantage of the invention is that the special arrangement of the corner zones 15 of the containers 10 and the combination thereof with the flat plates 59 of the spreader/anchor parts 51 (that are positioned in line with the longitudinal and transverse sides of the containers) along with the open arrangement of the upper portion of the containers 10 (since the supporting squares 41 only cover the corner zones 15) enable air to flow through an assembly of stacked containers 10 (as shown in figures 9a and 9b) in all directions.

[0034] In this regard, it should be noted that with many perishable products, and specifically fruit such as grapes, good preservation depends essentially on the fruit being cooled rapidly following harvesting, and as such the containers 10 according to the invention, stacked on pallets, facilitate the cooling of the fruit, either during transportation or storage, since the flow of cooled air in all directions

helps to optimize cooling both in terms of time and cost.

[0035] Very specifically, the containers 10 according to the invention are especially suited to use in cooling systems commonly referred to as "Californian tunnels".

[0036] "Californian tunnels" or rapid-cooling tunnels are used to rapidly cool goods, based on a system providing greater air pressure and quantity than rapid-cooling chambers. Such tunnels can be used to cool any type of goods, fresh or frozen. The tunnels have a double bottom containing electric fans with greater power and capacity than evaporators. These electric fans raise the pressure of the air flow so that the air can pass through the palletized fruit more often by unit of time, and therefore the cooled air reaches the center of the pallet more quickly. The pallets must be arranged such that the gaps therebetween create air flow tunnels. These circuits must be correctly designed to achieve the required air pressure.

[0037] Although the present invention has been described with reference to multiple embodiments, it is clear from the description that multiple combinations of elements, variations or improvements thereof are possible within the scope of the invention defined in the attached claims.

Claims

1. A system for storing and transporting perishable products that includes rigid containers (10) formed by bases (11) and side walls (13) that include a plurality of orifices (17) and corner zones (15) between same, the side walls (13) being arranged with an angle of inclination in relation to the bases (11) that enables the containers (10) to be stacked when empty, a container fitting (10) into the container below, **characterized in that:**

- the corner zones (15) of the containers (10) are formed by upper frames (31) that are recessed in relation to the side walls (13) and that have an external outline that is aligned with said walls, and by curved walls (20) that are arranged with an angle of inclination in relation to the bases (11) that enable the containers to be stacked when empty by fitting one container (10) into the container below,

- the system also has supporting squares (41) for the corner zones (15) of the containers (10) that are designed to provide bearing zones for stacking a container (10) on another container when the containers contain perishable products, and spreader/anchor parts (51) that are designed to rigidly connect together four contiguous corner zones (15) of four containers (10) arranged in a single row, in which the height of said spreader/anchor parts (51) is substantially equal to the height of the containers (10) and

- said spreader/anchor parts include a head (53) with a base (55), the lower portions of which are attached to two flat X-shaped plates (59) and four lugs (57) arranged between said flat plates (59), the sides of the base (55) having curved zones (58) in the central portion to facilitate stacking of the containers (10).
- the upper frames (31), the supporting squares (41) and the spreader/anchor parts (51) have cooperating means ensuring that the supporting squares (41) are positioned on top of the upper frames (31) and the spreader/anchor parts (51) are positioned on the supporting squares (41) of four contiguous corner zones (15) such as to prevent movements in assemblies of containers (10) stacked in multiple rows and columns.
2. The system as claimed in claim 1, in which said upper frames (31) have through-holes (33) close to the vertices of same and two cylindrical projections (35) arranged on the edges thereof adjacent to the side walls (13).
 3. The system as claimed in any one of claims 1-2, in which the curved walls (20) include a central section (23) in the form of a cone segment with the apex oriented towards the base (11) and two end sections (21) that are adjacent to the side walls (13), in the form of cone segments with the apex oriented towards the upper portion of the container (10).
 4. The system as claimed in any one of claims 1-3, in which said supporting squares (41):
 - have a trapezoidal shape that is designed to be arranged on the upper frames (31),
 - have a thickness that is substantially equal to the recess of the upper frames (31) in relation to the contiguous side walls (13),
 - have a through-hole (43) close to the vertex, two internal cylindrical hollows (45) close to the side edges thereof, and two side harpoons (48).
 5. The system as claimed in claim 4, in which the cooperating means of the upper frames (31) and the supporting squares (41) are respectively the two cylindrical projections (35), the two internal cylindrical hollows (45) and the two side harpoons (48).
 6. The system as claimed in claim 5, in which the two cylindrical projections (35) and the two internal cylindrical hollows (45) are designed to be rigidly connected together when a supporting square (41) is positioned on an upper frame (31).
 7. The system as claimed in claim 6 in which the cylindrical projections (35) are hollow and the internal cylindrical hollows (45) have bodies (46) designed to be inserted in the cylindrical projections (35).
 8. The system as claimed in claim 1 in which the cooperating means of the upper frames (31), the supporting squares (41) and the spreader/anchor parts (51) are firstly through-holes (33, 43) of respectively the upper frames (31) and the supporting squares (41) and secondly the lugs (57) of the spreader/anchor parts (51).
 9. The system as claimed in any one of claims 1-8, in which the containers (10), the supporting squares (41) and the spreader/anchor parts (51) are made of plastic materials.

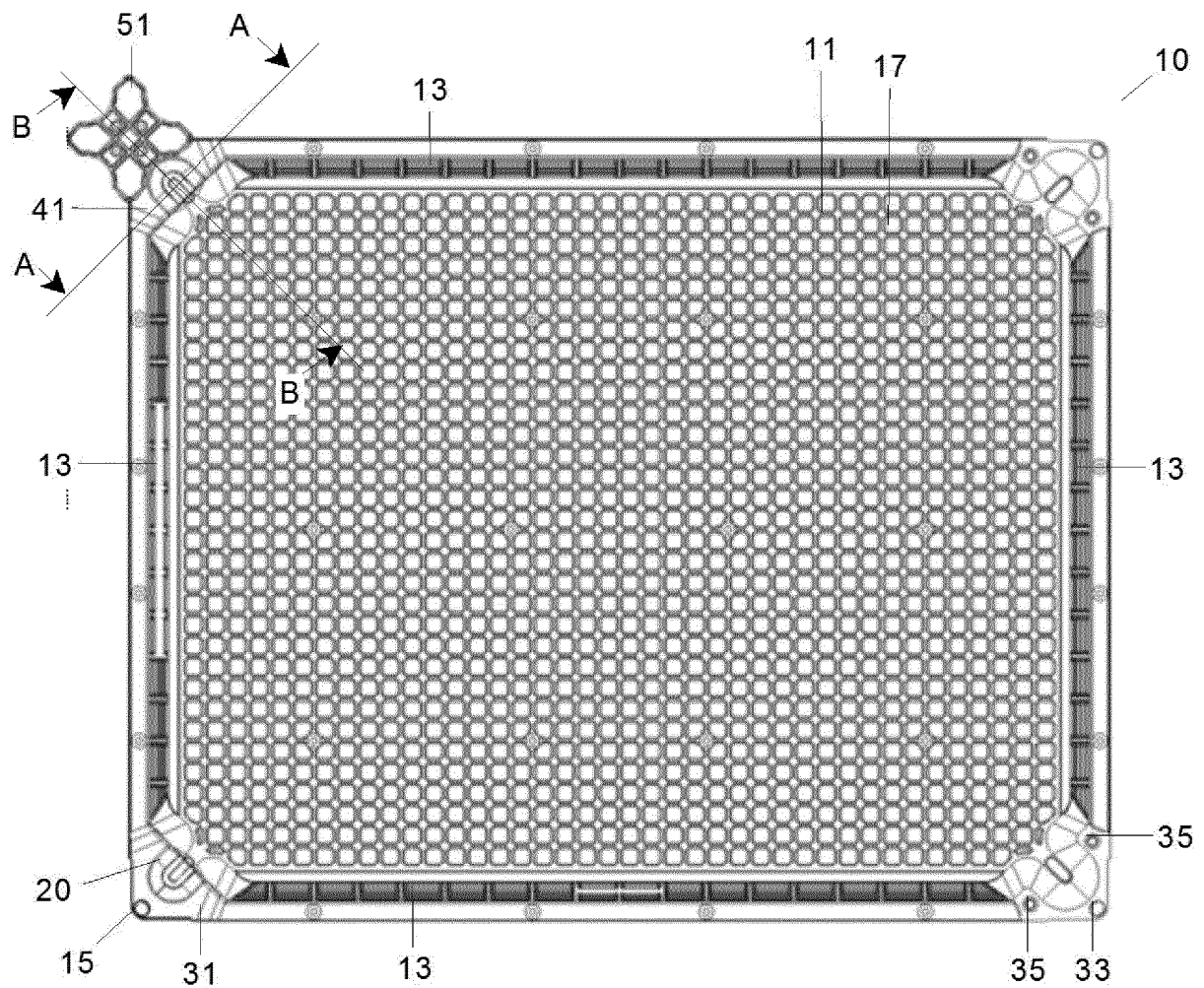


FIG. 1

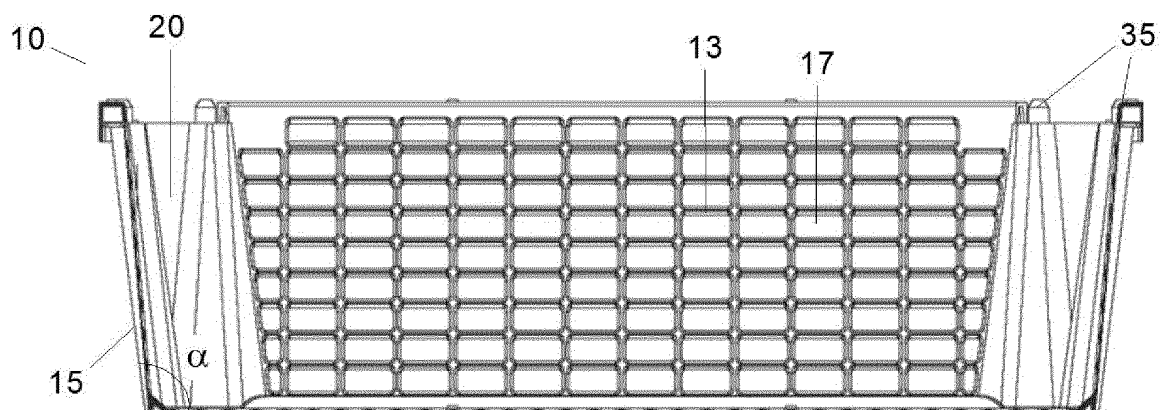


FIG. 2

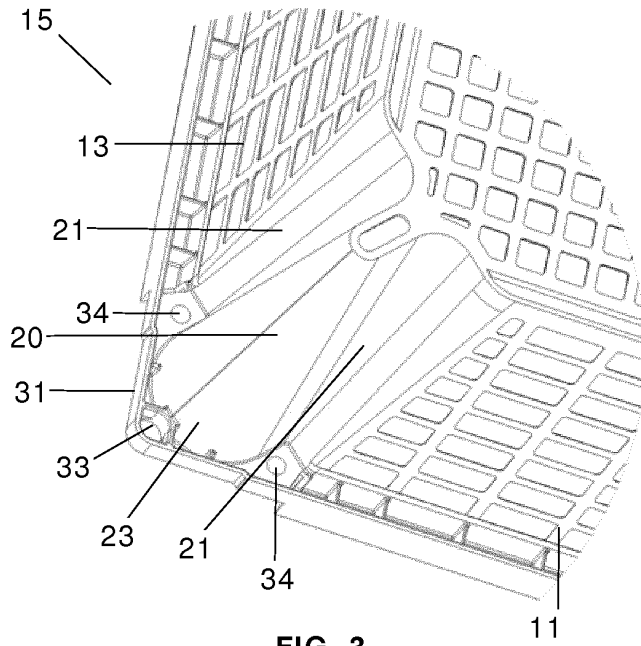


FIG. 3

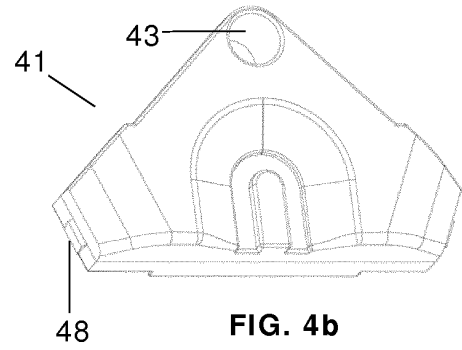


FIG. 4b

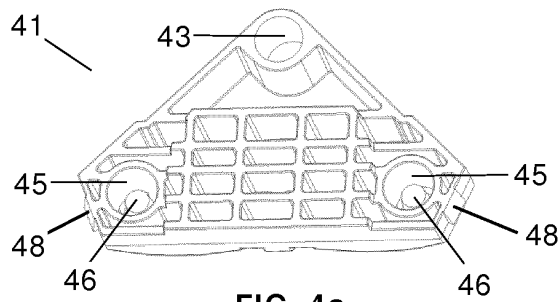


FIG. 4a

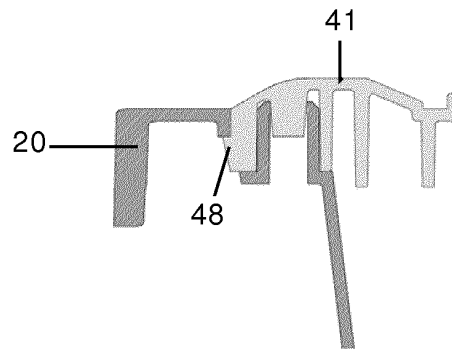


FIG. 4c

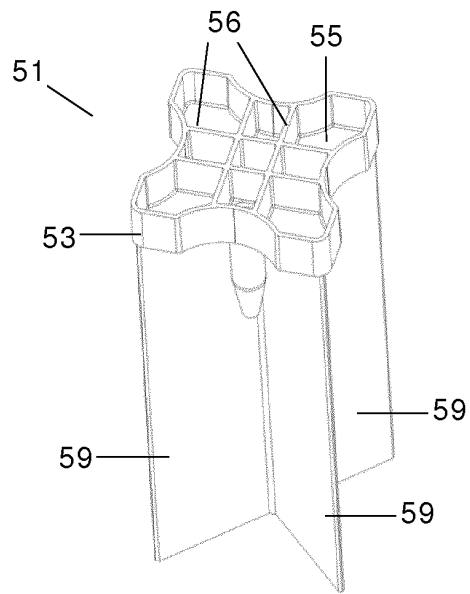


FIG. 5a

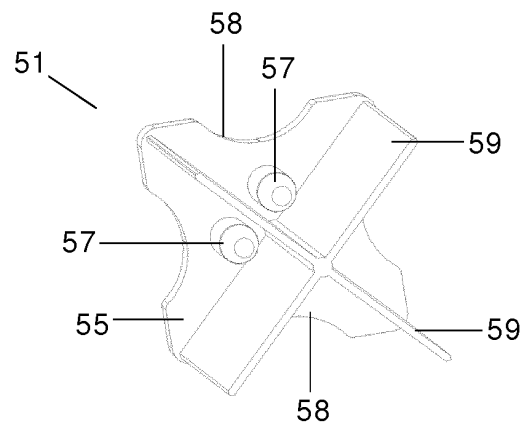


FIG. 5b

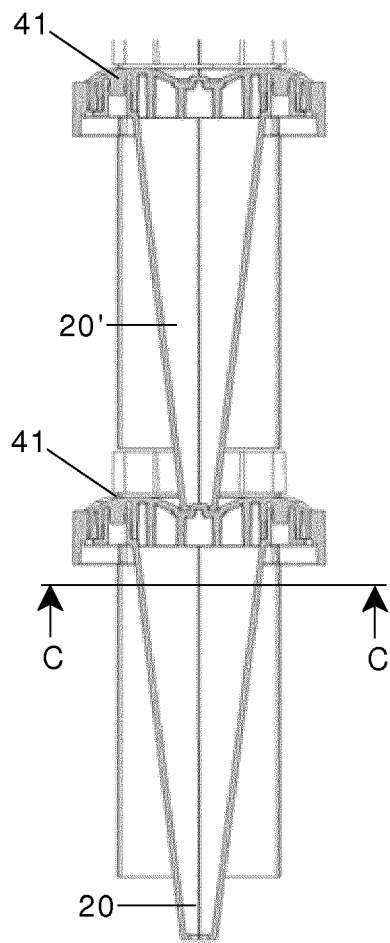


FIG. 6

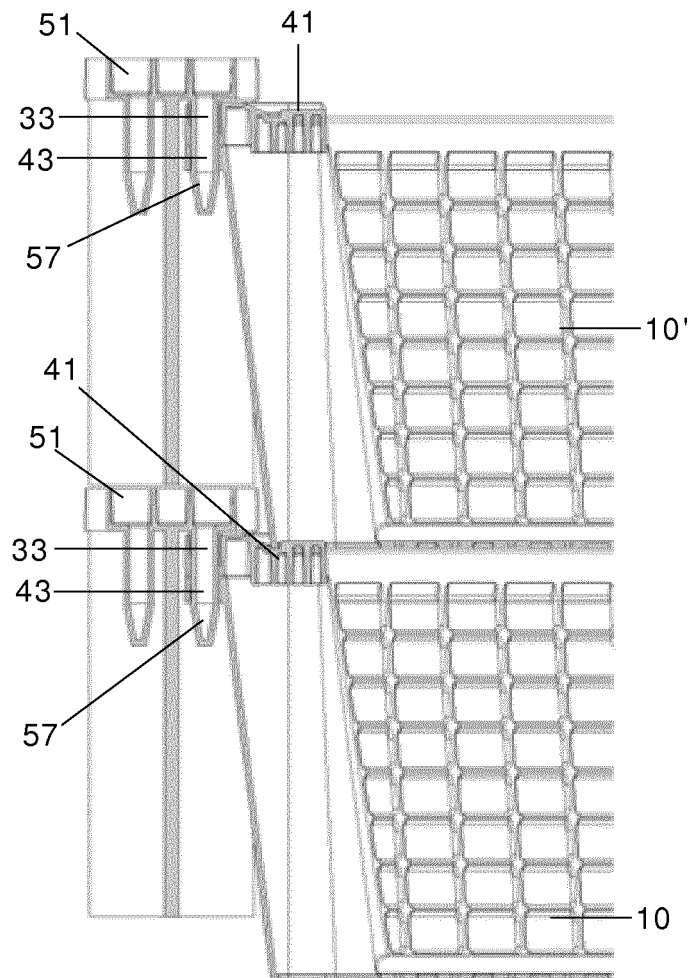


FIG. 8

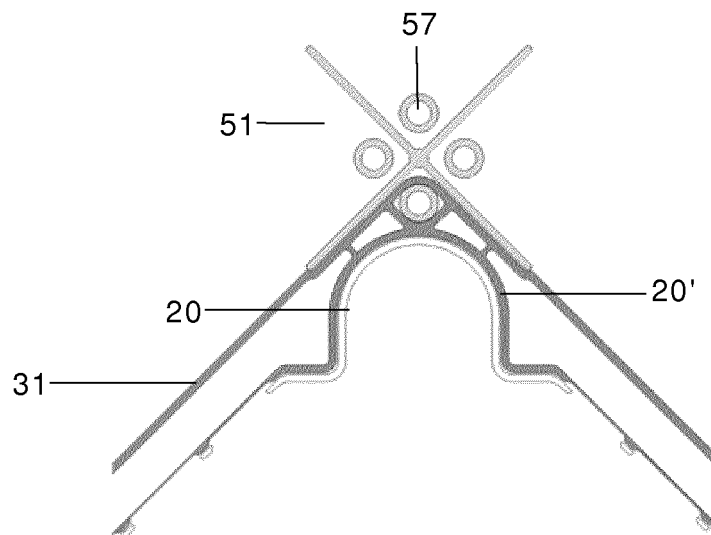


FIG. 7

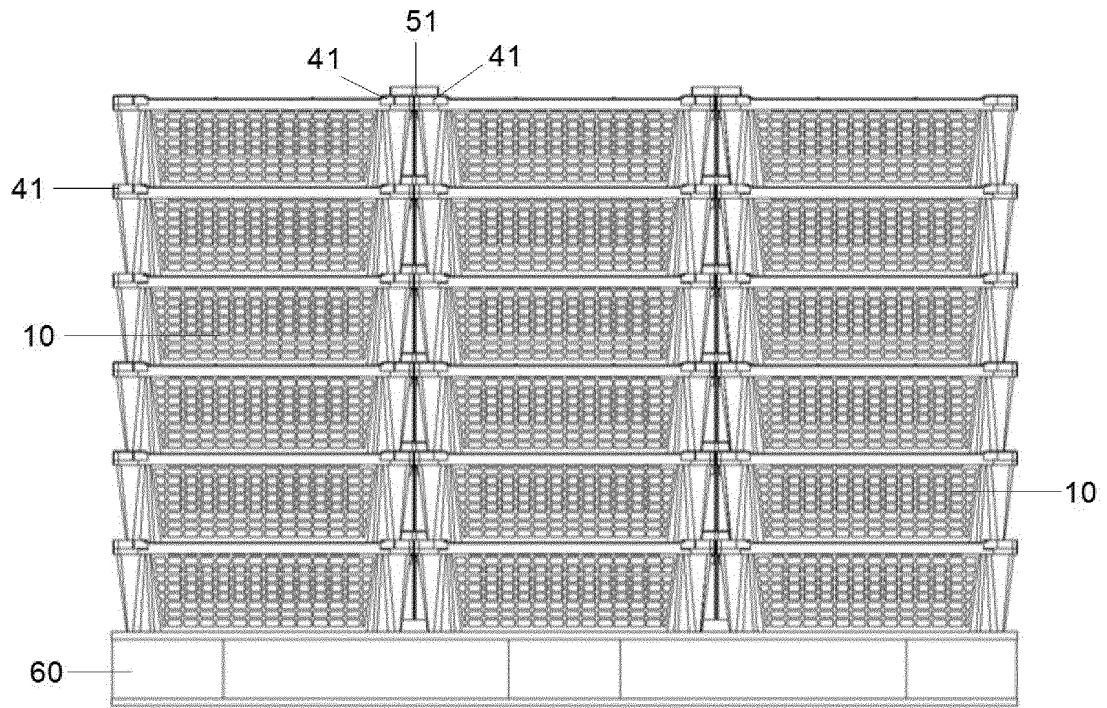


FIG. 9a

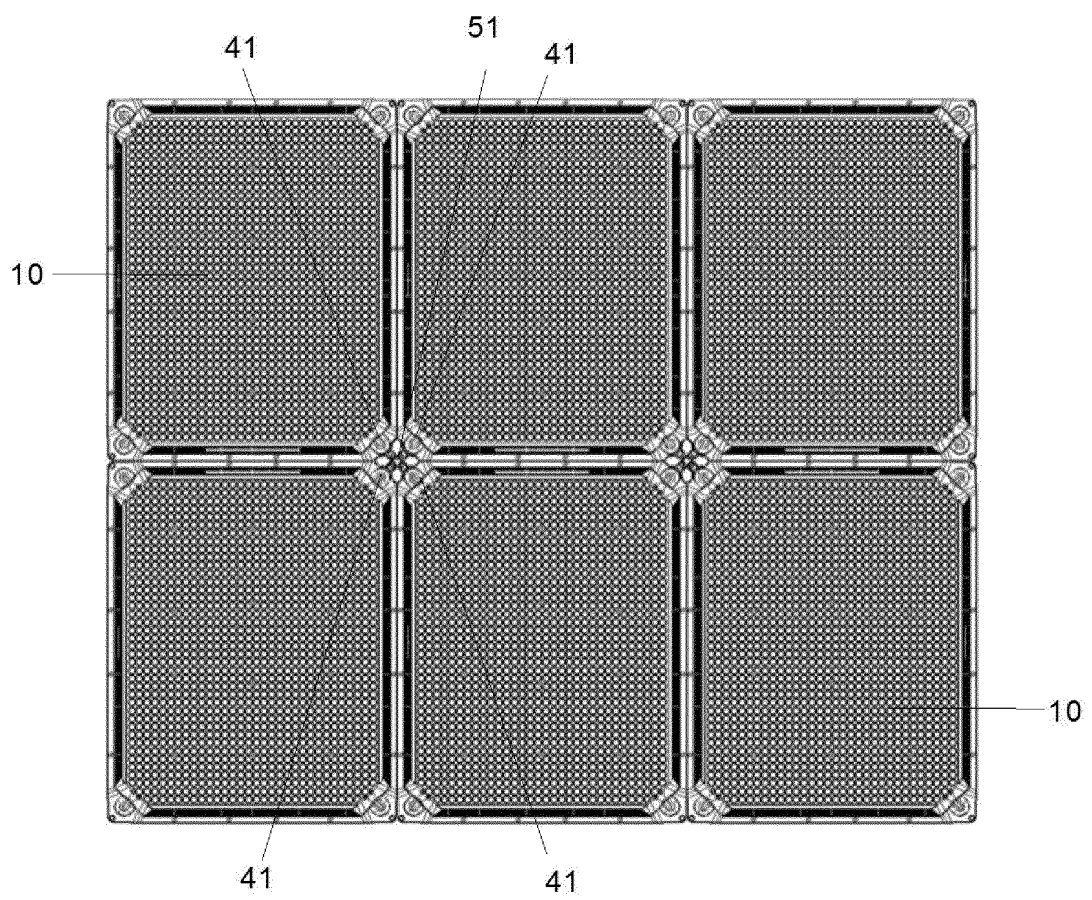


FIG. 9b

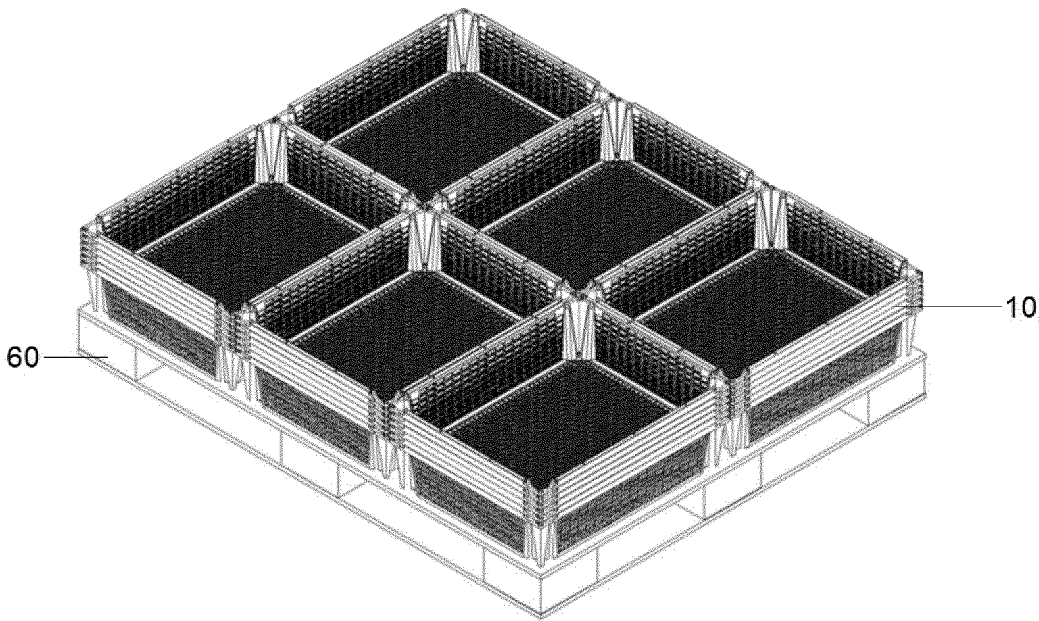


FIG. 10a

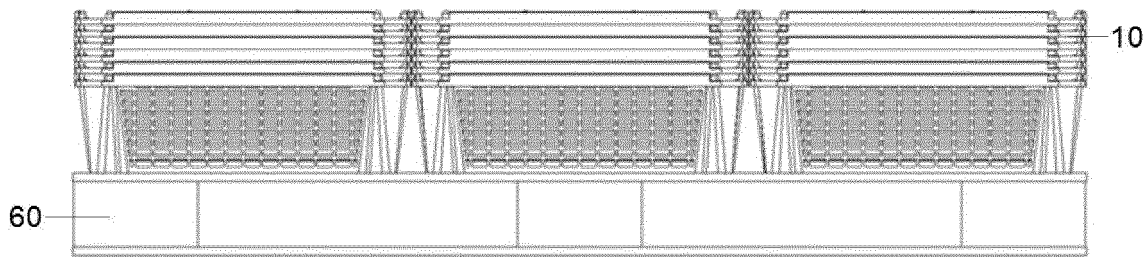


FIG. 10b

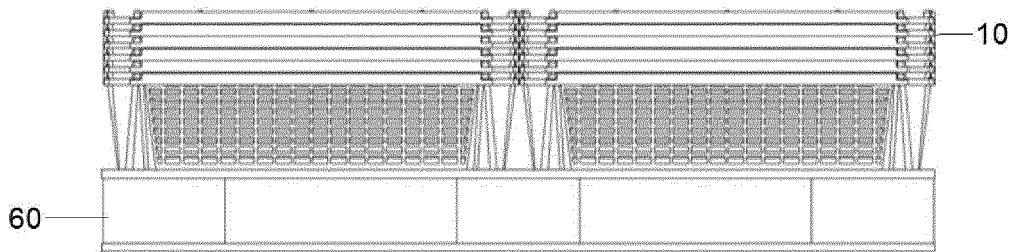


FIG. 10c

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2015/070758

A. CLASSIFICATION OF SUBJECT MATTER

B65D21/06 (2006.01)

B65D21/02 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

11/07/2016

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2015/070758

C (continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
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INTERNATIONAL SEARCH REPORT

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Information on patent family members

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