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(54) Supporting and stacking structure for refrigerators

(57) A supporting and stacking structure (1) for refrigerators (2) is described, comprising: a supporting base adapted to support the bottom of a refrigerator (2) and adjustable at least in a transverse direction with respect to the bottom of the refrigerator (2); a plurality of bearing and stacking elements (7) of the refrigerator (2) operatively connected to the supporting base; and a plurality of substantially vertical structural elements (5), op-

eratively connected to the bearing and stacking elements (7) and in vertical extension with respect to the height of the refrigerator (2), wherein the bearing and stacking elements (7), when stacking many structures (1), are adapted to be placed in abutment above a corresponding structural element (5) of another structure (1) on which the stacking must be performed.

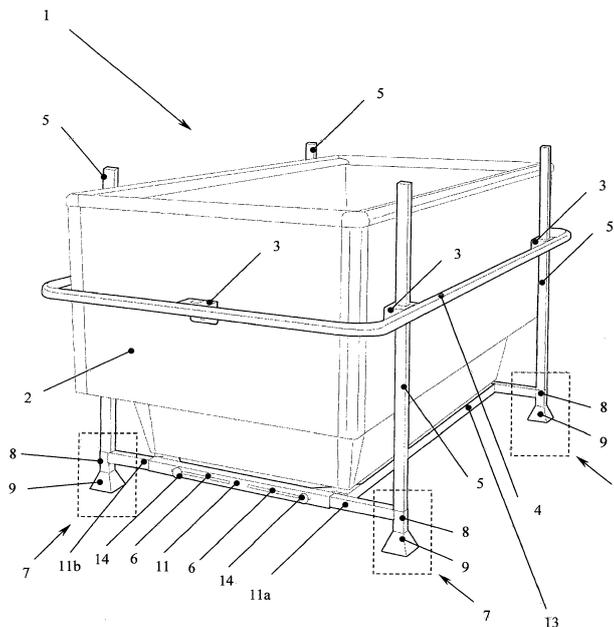


FIG. 1

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Description

[0001] The present invention refers to a stacking structure for refrigerators, in particular to make it easier to transport and store them, and to a refrigerator equipped with such structure.

[0002] Services are known for distributing fixtures for refrigeration in destination points of sale; the type of loading and unloading system and the distribution service chosen by distribution operators takes into account the use of the most suitable means of transport, depending on the path and on the destination, depending on costs, and depending on travel times and quality of the offered service.

[0003] In particular, the following are known as vehicles dedicated to such distribution service: a vehicle with caisson wherein the refrigerating equipment rests on a flatbed fastened to the vehicle chassis, while side panels capable of being overturned are hinged onto the four sides of such chassis, in order to enable loading and unloading operations; a vehicle with carlines, which has the same features of the vehicle with caisson, with additionally a structure composed of carlines fastened onto the flatbed, to which a sheet is fastened, thereby forming a load room with sheet.

[0004] Loading and unloading systems related to the above described distribution services are further known, such as electric trans-pallets with footboard and a double pallet, allowing to simultaneously transport two refrigerating equipment, stacking them and enabling the loading and unloading maneuver on and from a distribution vehicle, offering two lifting heights of 1660 and 2000 mm with a total capacity of about 2000 Kg.

[0005] The distribution service of such refrigerating equipment is characterized by a high time frequency: the refrigeration equipment are moved from a delivery site to another one frequently, and therefore, during its loading and unloading operations, the equipment are not packaged again, not being thereby able to ensure the integrity of the equipment during its transport.

[0006] Also the possible use of a vehicle with carline and of the related integrated coating with a sheet does not guarantee the integrity of the transported equipment.

[0007] Finally, since it is not possible to advantageously stack the refrigerators, the loading system of the vehicle flatbed implies a high handling cost, since such flatbed loading system cannot be optimized.

[0008] Object of the present invention is solving the above prior art problems, by providing a stacking structure for refrigerators which allows an optimized and efficient transport and storage of such refrigerators.

[0009] A further object of the present invention is providing a refrigerator equipped with such stacking structure integrated in the refrigerator.

[0010] A further object of the present invention is providing a stacking system which enables overlapping the refrigerators without packaging, guaranteeing their integrity.

[0011] The above and other objects and advantages of the invention, as will appear from the following description, are obtained with a stacking structure for refrigerators as claimed in claim 1.

[0012] Preferred embodiments and non-trivial variations of the present invention are the subject matter of the dependent claims.

[0013] It is intended that all enclosed claims are an integral part of the present description.

[0014] It will be immediately obvious that numerous variations and modifications (for example related to shape, sizes, arrangements and parts with equivalent functionality) could be made to what is described, without departing from the scope of the invention as appears in the enclosed claims.

[0015] The present invention will be better described by some preferred embodiments thereof, provided as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 shows a three-dimensional view of an embodiment of the stacking structure according to the present invention;
- Figure 2 shows a front view of the stacking structure according to the present invention;
- Figure 3 shows a top view of the stacking structure according to the present invention;
- Figure 4 shows an assembling view of the components of the stacking structure according to the present invention;
- Figure 5 shows a part of the stacking structure according to the present invention; and
- Figures 6, 7, 8 show the stacking of different types of refrigerators through the use of the stacking structure according to the present invention.

[0016] With reference to the Figures, it can be noted that the supporting and stacking structure 1 for refrigerators 2 comprises:

- a supporting base adapted to support the bottom of a refrigerator 2 and adjustable at least in a transverse direction with respect to the bottom of the refrigerator 2;
- a plurality of bearing and stacking elements 7 of the refrigerator 2 operatively connected to the supporting base; and
- a plurality of substantially vertical structural elements 5, operatively connected to the bearing and stacking elements 7 and in vertical extension with respect to the height of the refrigerator 2, wherein the bearing and stacking elements 7, when stacking many structures 1, are adapted to be placed in abutment above a corresponding structural element 5 of another structure 1 on which the stacking has to be performed.

[0017] The supporting base is made in order to be able

to place thereon all types and sizes of refrigerators 2 or refrigerating banks available on the market, and, for such purpose, it must be adjustable according to the refrigerator 2 to be placed thereon.

[0018] The supporting base is then preferably equipped with a plurality of structural elements, such as, for example, bars, tubes, beams or other suitable ones, mutually interconnected and adapted to compose the basement of the inventive supporting and stacking structure 1; in particular, at least two structural elements of the supporting base are equipped with telescopic operation, while at least two structural elements 13 are arranged perpendicular to such structural elements with telescopic operation (in parallel to the plane of the bottom of the refrigerator 2) and strictly connected thereto, advantageously through at least one cross-member element 12; such cross-member element 12 has at its ends two plane surfaces, one suitable to be connected to the internal surface (with respect to the structure 1) of the structural element 13, and the other one suitable to be connected to a hollow element 11 of the structural element with telescopic operation. The cross-member element 12 thereby makes a recess adapted to have inserted therein an abutment end of the refrigerator 2, and contributes to guarantee the stability of the refrigerator 2 inside the stacking system 1.

[0019] The structural elements with telescopic operation, as shown in Figure 1, are adapted to arrange the stacking structure 1 for refrigerators of any size and/or shape and are composed of the hollow element 11 equipped with at least two longitudinal slits 6 arranged along one of its surfaces. Inside the hollow element 11 two elements 11a and 11b are arranged, adapted to slide each with respect to the hollow element 11 which contains them in diametrically opposite directions, favoring the elongation or the shortening of the structural element with telescopic operation: their sliding is regulated by a control element (preferably cylindrical) 14, such as for example a bar with an helical thread, or another suitable element inserted inside the longitudinal slit 6.

[0020] Moreover, being the bearing and stacking elements 7 strictly connected to the side surface of the structural elements with telescopic operation, the sliding of the elements 11a and 11b in diametrically opposite directions induces a lateral displacement of two or more bearing and stacking elements 7 along the movement axis of the related elements 11a and 11b, guaranteeing the stability of such stacking structure 1 for every type of refrigerator.

[0021] The structural elements with telescopic operation can have a first configuration, as shown for example in Figure 2, in which none of the two elements 11a and 11b slides with respect to the hollow element which contains them; a second configuration, as shown for example in Figures 1, 6 or 7, in which both elements 11a and 11b slide with respect to the hollow element which contains them, and consequently also the bearing and stacking elements 7 have laterally moved outwards, favoring the

insertion of various types of refrigerators such as refrigerating banks, or horizontal or vertical refrigerators, or other suitable ones; and a third configuration (not shown), in which only the element 11a slides with respect to the hollow element which contains them, favoring the lateral displacement only of a bearing and stacking element 7.

[0022] The inventive structure 1, in order to guarantee a greater operation sturdiness, can be integrated with a perimeter frame 4, placed around and fastened to the refrigerator 2 and further fastened to the structural elements 5 of the structure 1 itself.

[0023] For such purpose, fastening elements 3 are also provided, such as for example L-shaped brackets, small blocks or other suitable ones, which are fastened along the perimeter of the refrigerator 2 and are adapted to favor the fastening, on their front surface, of the perimeter frame 4. In particular, each fastening elements 3, fastened along the longitudinal side of the refrigerator 2, is equipped with at least one hole 10 adapted to allow the insertion of the substantially vertical structural elements 5 in the perimeter frame 4, as shown in Figure 4; only as a non-limiting example, the holes 10 has a square shape.

[0024] The bearing and stacking elements 7, as shown in the various Figures as a non-limiting example, are composed in the lower part of a frustum-of-pyramid element 9, advantageously with a square base, and on the upper part of a hollow element 8 with parallelepiped shape, advantageously with a square base; the frustum-of-pyramid element 9 and the hollow element 8 are strictly connected in order to form the bearing and stacking element 7. In particular, each frustum-of-pyramid element 9 is equipped therein with a recess, advantageously with a square base, adapted to insert therein the upper portion of each structural element 5, allowing the positioning of another supporting and stacking structure 1 above the first stacking structure 1.

[0025] The structural elements 5, such as for example pillars, small beams, or other suitable ones, advantageously with a square base and preferably equal to four, as shown, are therefore adapted to support the inventive structure 1 and to favor the above stacking of various structures 1. In particular, the lower portion of the structural element 5 is inserted inside the hollow element 8 of the bearing and stacking element 7, and the central portion is inserted inside the hole 10 of the fastening elements 3; finally, the upper portion is possibly inserted in the room of the frustum-of-pyramid element 9 of the bearing and stacking element 7 of another structure 1.

[0026] Instead of placing a refrigerator 2 on a structure 1 for its transport and/or stacking (for example in a warehouse), the refrigerator 2 itself could have been manufactured originally equipped with an integrated supporting and stacking structure 1: in particular, the refrigerator 2 is thereby manufactured already integrated or equipped with the supporting base with its related bearing and stacking elements 7, of the fastening elements 3 and of the related perimeter frame 4 fastened on the front surface of the fastening elements 3, while the structural el-

elements 5 are advantageously placed, as shown in Figure 4, in a room place below the chassis of the refrigerator 2, through a suitable fastening system.

[0027] A refrigerator 2 equipped with such stacking structure 1 is thereby arranged for the displacement, for example in a warehouse or among various sales points, through the steps of:

- placing the refrigerator 2 on the supporting base equipped with the bearing and stacking elements 7;
- recovering the structural elements 5 initially placed below the chassis of the refrigerator 2;
- fastening the structural elements 5 to the perimeter frame 4, through the holes 10 of the fastening elements 3 placed on the side surface of the refrigerator 2; and
- inserting the lower portion of the structural elements 5 in the hollow elements 8 of the bearing and stacking element 7.

[0028] Some preferred embodiments of the invention have been described, but obviously they are susceptible to further modifications and variations within the same inventive idea. In particular, it will be immediately clear to the skilled people in the art that there are numerous variations and modifications, functionally equivalent to the previous ones, which fall within the scope of the present invention, as pointed out in the enclosed claims.

[0029] For example, the above described structure 1 is suitable to operate with any type of refrigerator (horizontal, vertical, etc.) or with refrigerated banks (as previously shown) or other similar or equivalent machines.

Claims

1. Supporting and stacking structure (1) for refrigerators (2), **characterized in that** it comprises:

- a refrigerator (2) to be supported and stacked;
- a supporting base adapted to support the bottom of the refrigerator (2) and adjustable at least in a transverse direction with respect to the bottom of the refrigerator (2);
- a plurality of bearing and stacking elements (7) of the refrigerator (2) operatively connected to the supporting base; and
- a plurality of substantially vertical structural elements (5), operatively connected to the bearing and stacking elements (7) and in vertical extension with respect to the height of the refrigerator (2), wherein the bearing and stacking elements (7), when stacking many structures (1), are adapted to be placed in abutment above a corresponding structural element (5) of another structure (1) on which the stacking has to be performed.

2. Structure (1) according to claim 1, **characterized in that** said supporting base is equipped with a plurality of structural elements, mutually interconnected and adapted to compose the basement of the supporting and stacking structure (1), at least two structural elements of the supporting base being equipped with telescopic operation, while at least two structural elements (13) are arranged perpendicular with such structural elements with telescopic operation, in parallel to the plane of the bottom of the refrigerator (2), and are connected thereto through at least one cross-member element (12).

3. Structure (1) according to claim 2, **characterized in that** said cross-member element (12) has at its ends two plane surfaces, one adapted to be connected to the internal surface, with respect to the structure (1), of the structural element (13), and the other one adapted to be connected to a hollow element (11) of the structural element with telescopic operation, said cross-member element (12) thereby realizing a recess adapted to insert therein an abutment end of a refrigerator (2).

4. Structure (1) according to claim 1, **characterized in that** said structural elements with telescopic operation are composed of a hollow element (11) equipped with at least two longitudinal slits (6) arranged along one of its surfaces, inside the hollow element (11) two elements (11a, 11b) being arranged, adapted to slide each one with respect to the hollow element (11) which contains them in diametrically opposite directions to perform the elongation or the shortening of the structural element with telescopic operation, the sliding of said two elements (11a, 11b) being regulated by a control element (14), preferably cylindrical, inserted inside the longitudinal slit (6).

5. Structure (1) according to claim 1, **characterized in that** it further comprises a perimeter frame (4), placed around and fastened to the refrigerator (2) and further fastened to the structural elements (5) of the structure (1).

6. Structure (1) according to claim 5, **characterized in that** it is further equipped with fastening elements (3) fastened along the perimeter of the refrigerator (2) and adapted to favor the fastening, on their front surface, of the perimeter frame (4).

7. Structure (1) according to claim 6, **characterized in that** each fastening element (3), fastened along the longitudinal side of the refrigerator (2), is equipped with at least one hole (10) adapted to allow the insertion of the structural elements (5) in the perimeter frame (4).

8. Structure (1) according to claim 1, **characterized in**

that each of said bearing and stacking elements (7) is composed in its lower part of a frustum-of-pyramid element (9) and in its upper part of a hollow element (8) with parallelepiped shape, each frustum-of-pyramid element (9) being equipped therein with a recess, adapted to insert therein the upper portion of each structural element (5), allowing the positioning above it of another supporting and stacking structure (1).

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9. Refrigerator (2), **characterized in that** it is equipped with the structure (1) for its transport and/or stacking according to claim 1.

10. Refrigerator (2) according to claim 9, **characterized in that** it comprises: the supporting base equipped with the bearing and stacking elements (7); the fastening elements (3) fastened onto the refrigerator (2); the perimeter frame (4) fastened onto the front surface of the fastening elements (3); and the structural elements (5) placed in a room placed below the chassis of the refrigerator (2).

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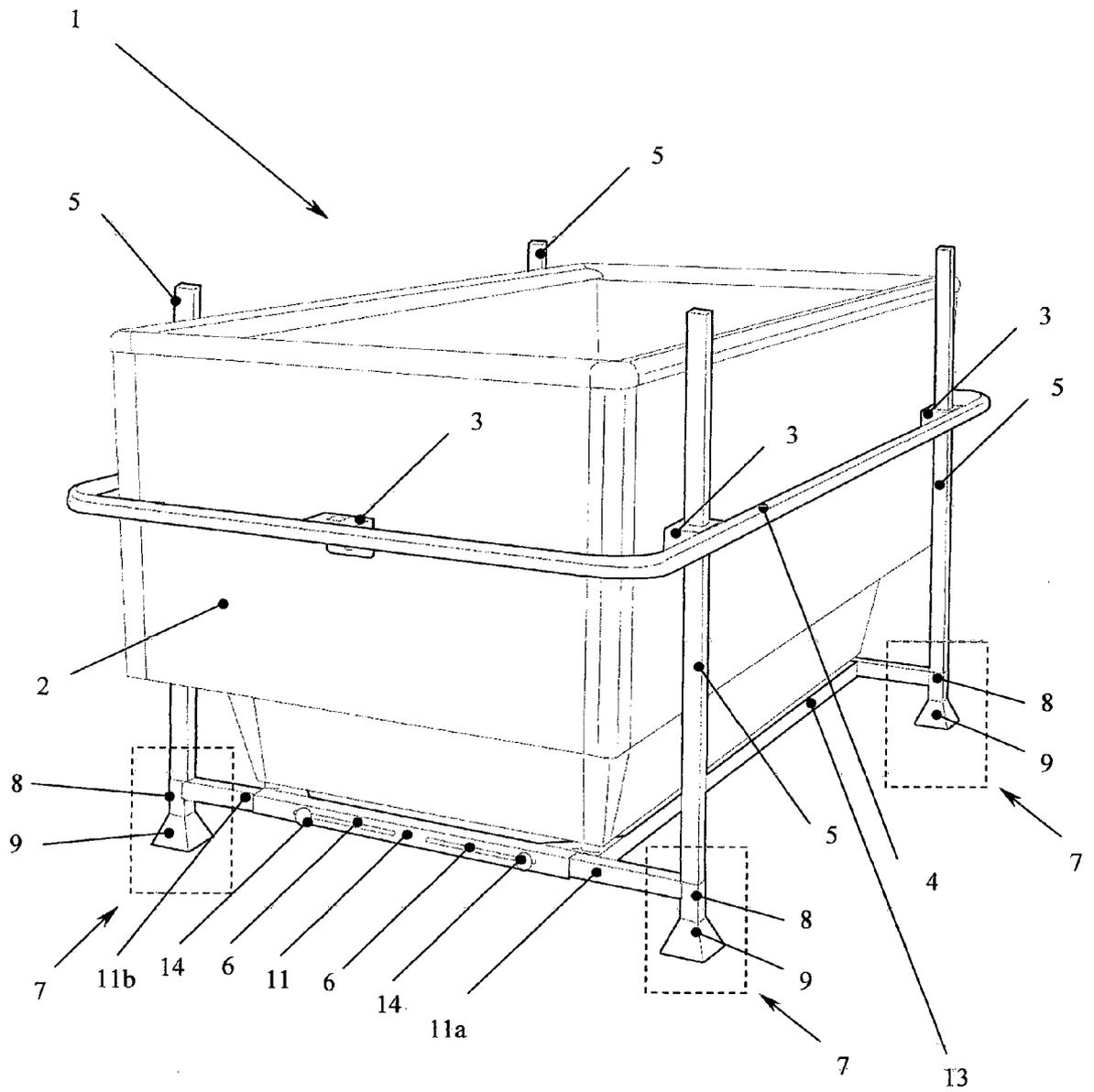


FIG. 1

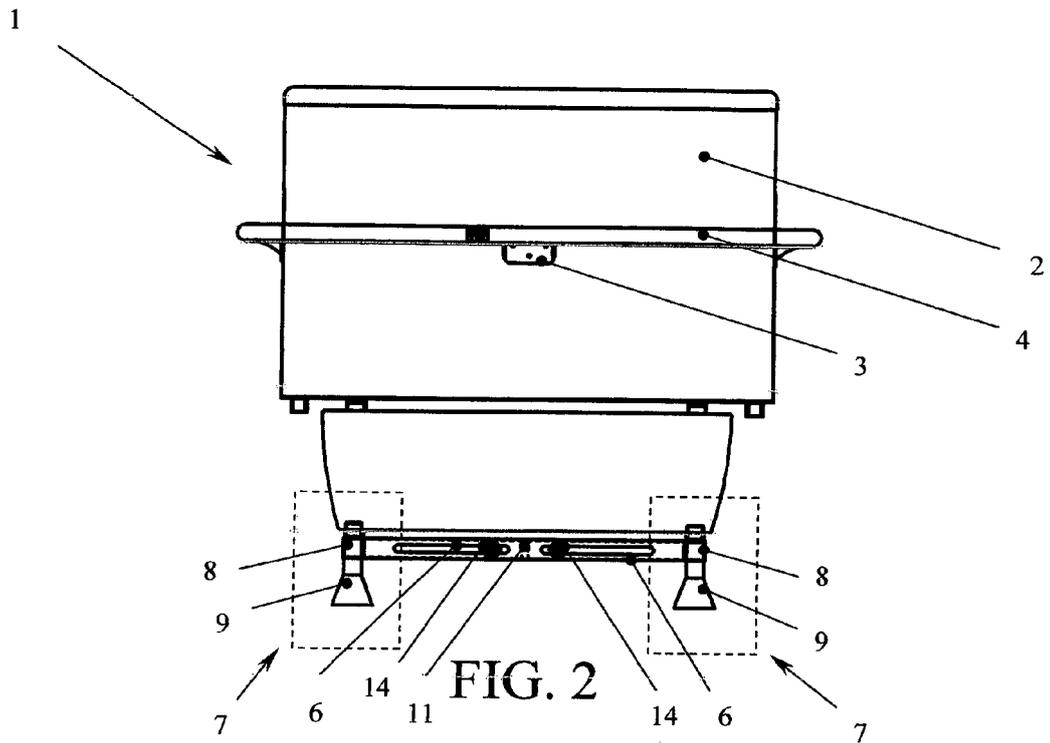


FIG. 2

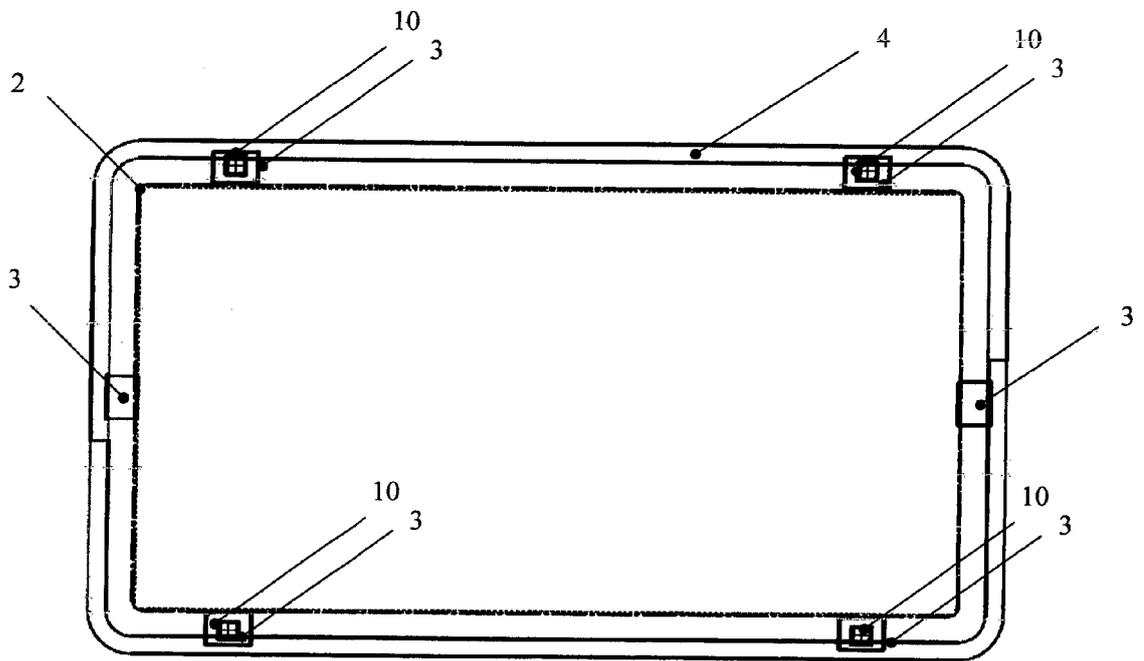
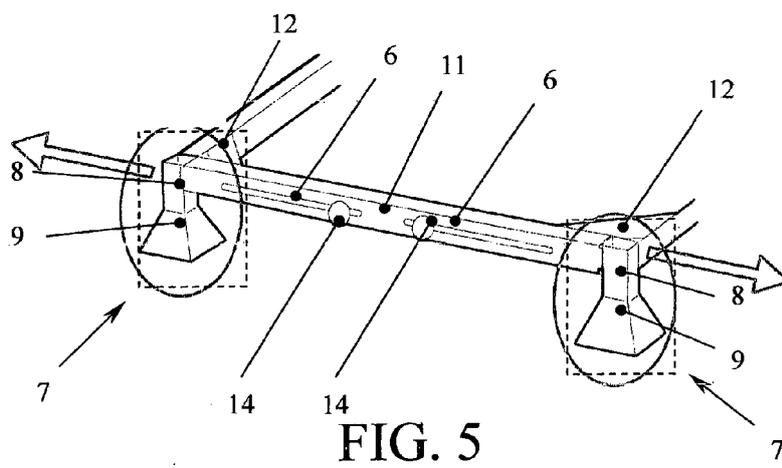
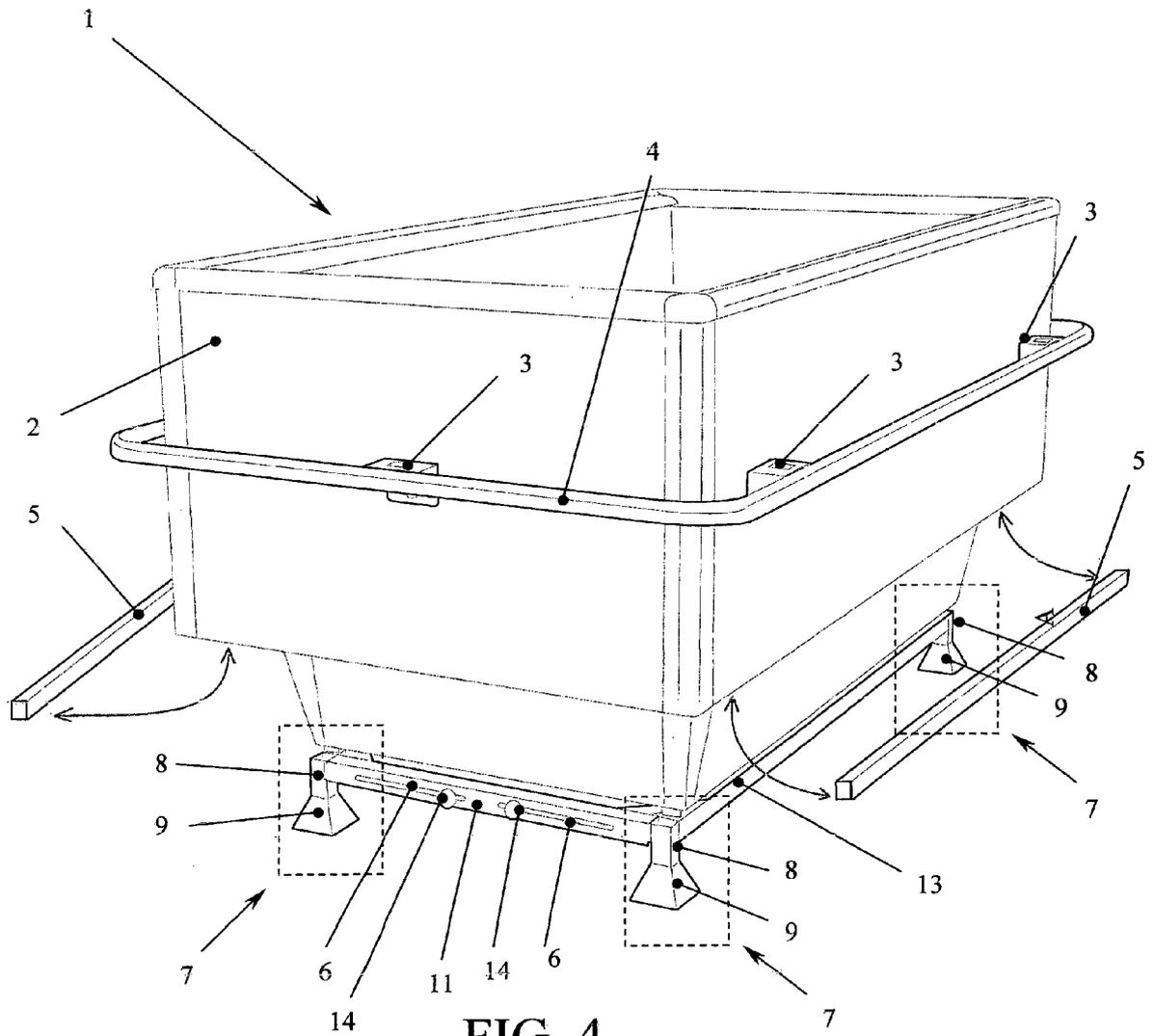


FIG. 3



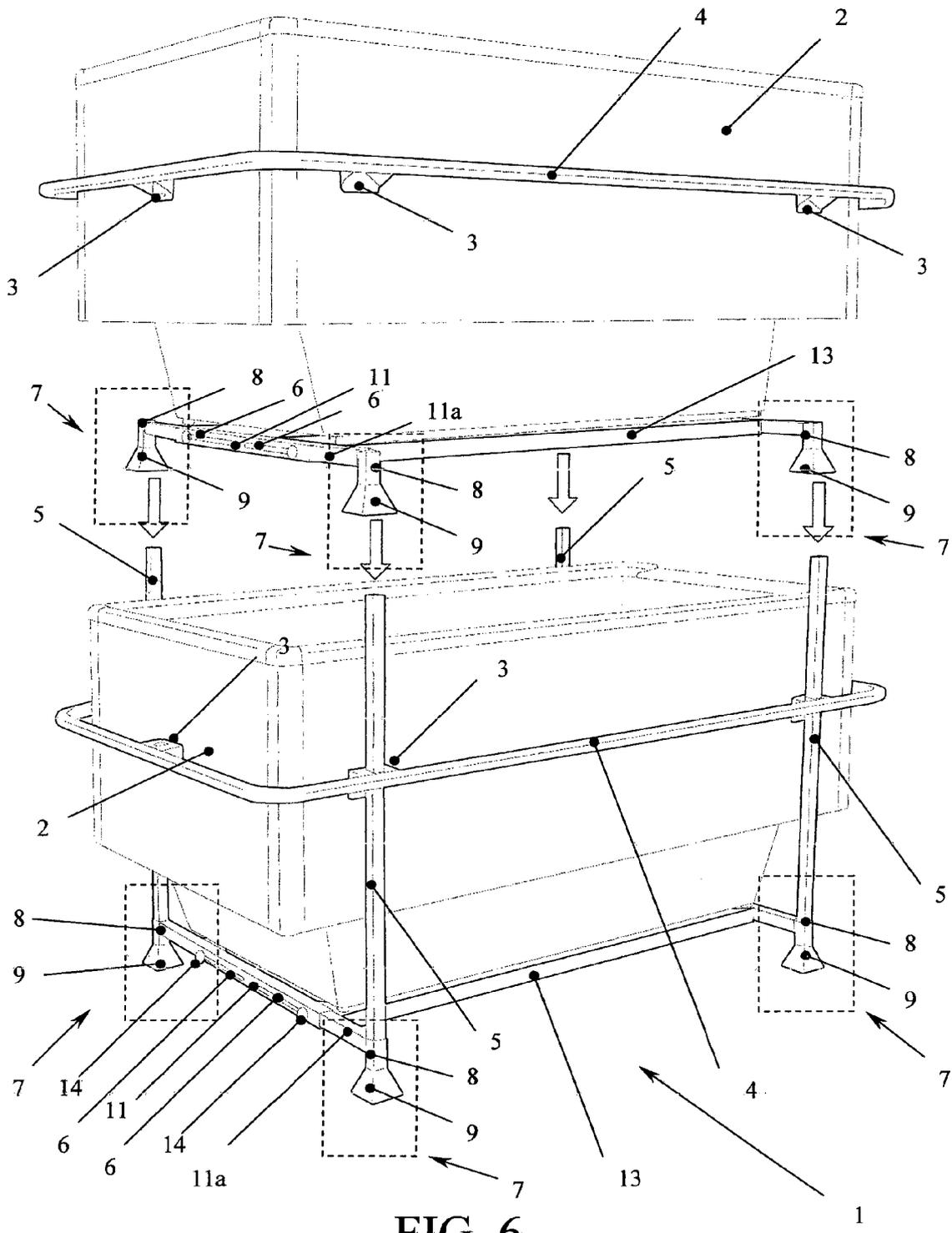


FIG. 6

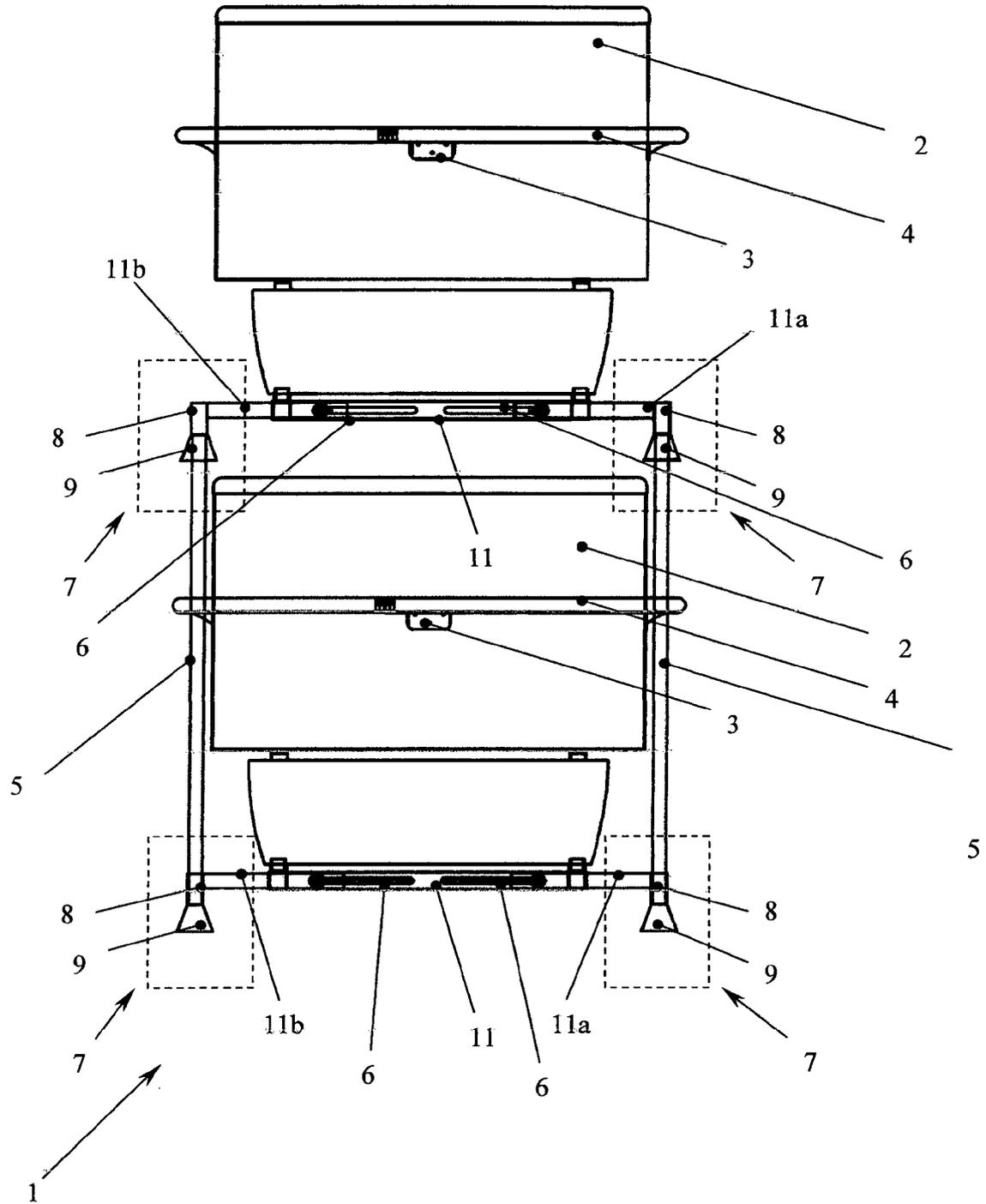


FIG. 7

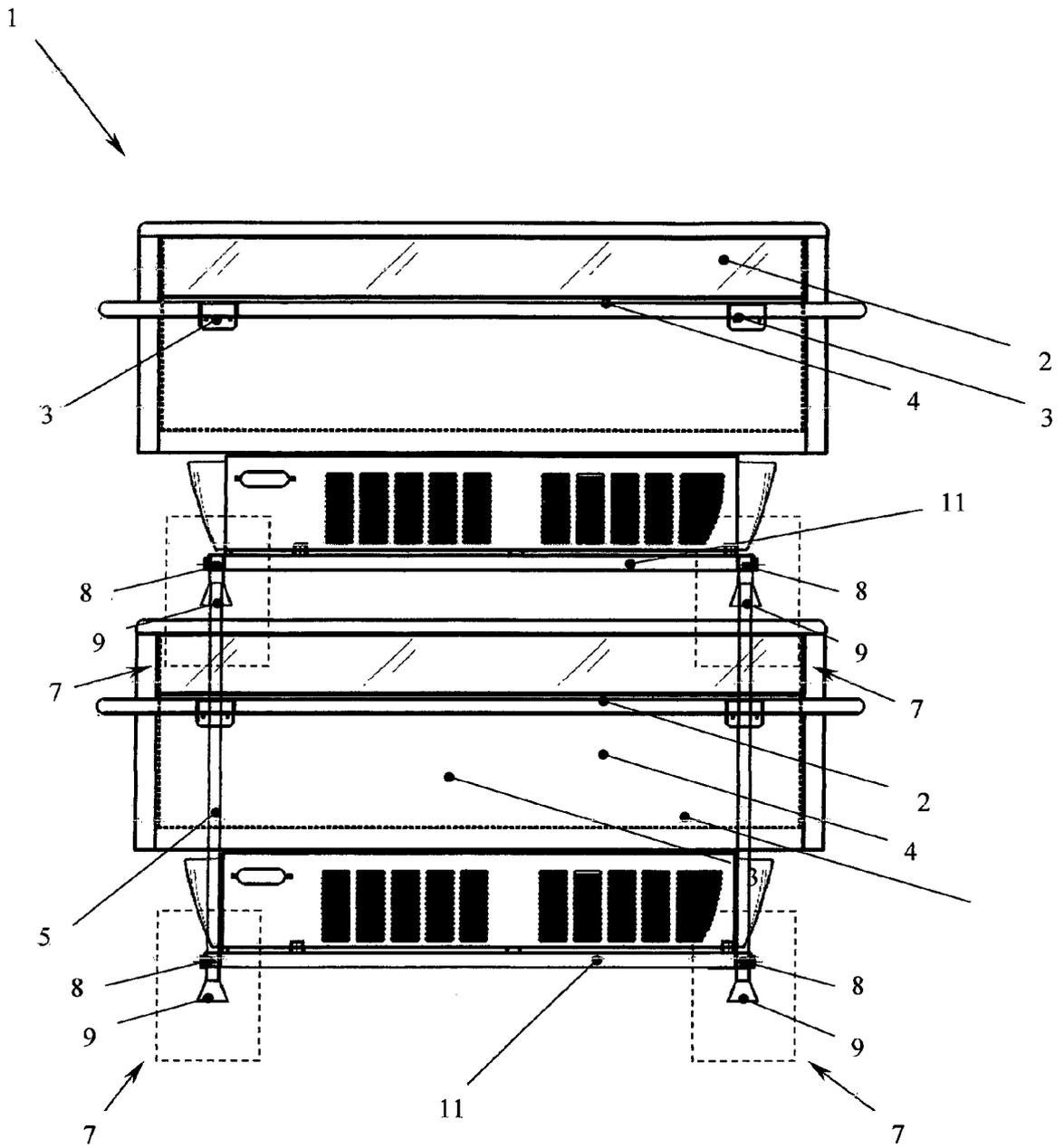


FIG. 8



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