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(54) Folding crate, particularly suited for carrying fruit and vegetable products.

(57) Folding crate, particularly suited for carrying fruit and vegetable products, made up by a rigid, rectangular bottom wall (1), by a rigid, rectangular upper edge (2), by two first, opposed side walls (3), being each subdivided into two parts (4 and 5) at half height by one horizontal hinge (6), and being hinged, each of them, along the lower edge to said bottom wall (1) and along the upper one to said upper edge (2), and by two second, opposed side walls (7), each one being hinged only to said upper edge (2) and separated from the other walls along the remaining three sides; furthermore there are provided blocking means (13, 14, 15) for fastening each one of said second side walls (7) to said bottom one (1) as well as to said first side walls (3) along said remaining three walls.

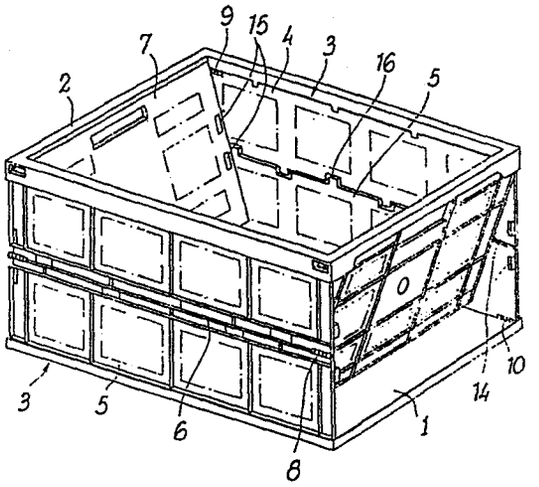

Fig. 2

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FOLDING CRATE, PARTICULARLY SUITED FOR CARRYING FRUIT AND VEGETABLE PRODUCTS

The present invention relates to a folding crate, particularly suited for carrying fruit and vegetable products. More particularly, the invention relates to a parallelepiped shaped crate, in plastic material, which, when open, has the look of an usual crate for fruit, but which can be closed, by folding its side walls, when empty, in such a way as to occupy an extremely reduced volume.

It is common knowledge that usually fruit and vegetable products are carried from the place of production to that of marketing, and then offered on sale, within containers shaped as parallelepiped crates of varied height, built with light wood or plastic material.

Said packing implies undoubtedly some great advantages, such as the greater ease of products' handling, while safeguarding their integrity, the possibility of selling the goods at a controlled net weight, as well as of highly respecting the hygienic-sanitary rules, during all handlings from the moment of harvest to that of consumption.

Fruit and vegetable products, like other goods too, are usually forwarded to distribution on heavy transport vehicles, mostly by land, such as lorries, trailer trucks or box-cars, in which the crates are stowed, by stacking them in piles, so as to obtain a compact and stable load, just thanks to the parallelepiped shape of containers.

However in said case there is a scarcely negligible drawback, affecting the economy of goods' transport: the crates occupy the same volume both full and empty, and ther-

efore in order to recover them it is required to provide as many return trips of the unloaded vehicle as are the outward ones with goods' load.

This obviously burdens the cost of transportation with the return one, in such a ratio that could be easily reduced if the crates could take on a more compact shape once empty.

An alternative possibility lays in eliminating the recovery of containers, thus completely avoiding the return trips; however in this case there weighs upon the distribution cost that of crates, which are continuously lost and restored, so that the solution does not anyway appear to be economically profitable.

In order to overcome said drawback, plastic material crates have been suggested which, when empty, can be disassembled and folded so as to occupy a minimum possible of space, thus allowing to gather the empty crates, corresponding to several loads of goods, in just one return load.

In said crates the four side walls are each hinged to a side of the base, and are completely separated one from another, in such a way that they can be individually folded to lay upon the base wall, turning around their hinges.

The crate is opened by lifting the four walls in a vertical position, fastening them mutually along the vertical edges, so as to lock them in the open shape.

Said structure however appears to be unreliable when loaded, since, not being a rigid unit, it tends to open in correspondence with the vertical corners under the stress of the contained weight, and mostly, owing to same cause, it

cannot be stacked in rather high piles.

It is therefore one object of the present invention to provide a crate for carrying fruit and vegetable products or other types of goods, which can be easily folded so as to occupy a minimum of space when empty, but which does not entail the above referred to drawbacks, looking wholly rigid and resistant when full, thus allowing its safe stacking.

On that purpose it is suggested according to the invention to manufacture the crate with a new fold system, and to supply it with a one piece rigid upper edge which keeps safely joined the four side walls. The crate is folded by turning over two of the walls, mutually opposed, inwardly, through rotation around said upper edge, and by folding the other pair, still inwardly, thanks to a hinge dividing them by half of their height; through such operation the rigid upper edge is lowered down to nearing the base wall and the crate takes up the shape of a rectangular plate whose thickness equals that of the bottom wall plus that of the edge.

It is therefore a specific object of the present invention a folding crate, particularly suitable for carrying fruit and vegetable products, made out by a rigid, rectangular bottom wall, by a rigid, rectangular upper edge, by two first, opposed side walls, being each subdivided at half height by one horizontal hinge and being hinged, each of them, along the lower side to the bottom wall and along the upper one to the upper edge, and by two second, opposed side walls, each one being hinged only to the upper edge and separated from the other walls along the remaining three sides,

there being provided first blocking means for fastening each one of the second side walls to the bottom one as well as to the first side walls.

On each of first side walls second blocking means are provided, in correspondence with the middle hinge, in order to secure the vertical position of the wall, thus avoiding that it might bend outwardly, in correspondence with the hinge.

First blocking means are formed by several cogs projecting from the surfaces of first side walls as well as of bottom wall, which fit in suitable seats provided on the corresponding surfaces of second side walls.

Second blocking means are formed, on their turn, by a set of cogs projecting, alternately, from either of the two parts in which is divided each of the two first side walls, which fit in suitable seats, alternately provided on both said parts, each one from the side opposed to its appropriate cog.

The invention shall now be described, as an example, with reference to a preferred embodiment, shown in the enclosed drawings, in which:

figure 1 shows a perspective view of the crate according to the invention, in its open shape;

figure 2 shows a perspective view of the same crate at the beginning of the fold operation;

figure 3 shows a partial side view of the crate during its fold;

figure 4 is a topside view of the folded crate;

figure 5 is a side view of the crate as per figure

4; and

figure 6 shows, in perspective, an enlarged detail of the crate, as seen from its inside.

In figures 1 and 2 there are shown by 1 the bottom wall, by 2 the rigid upper edge, by 3 the first side walls, subdivided into two parts, 4 and 5, along the hinging line 6, and by 7 the second side walls.

First side walls 3 are hinged, by their upper part 4, to edge 2, and by their lower part 5, to bottom wall 1, while the second side walls 7 are only hinged to edge 2.

Hingings can be provided in several ways, by placing along the appropriate lines some hinge's stretches of a variable length and differently spaced; for instance along line 6 one can see two hinges 8 placed at both ends, while other hinges can be seen in 9 and 10. In the detail of figure 6 one can see the implementation of hingings in the upper part 4 of side wall 3 to edge 2, as well as of the lower part 5 to bottom wall 1: the first one is implemented with end hinges 9 and with intermediate couplings 11, while the second one is formed by several hinges of the same type as 10 and 12, placed at regular intervals.

As it can be remarked in figure 2, the first motion for closing the crate is to turn both sides 7 around their hinging line with edge 2, towards the inside and upwardly. When both walls 7 have taken up the horizontal position, then walls 3 can be folded, by pushing inwardly hinging line 6, as shown in figure 3.

The rigid edge 2 is then lowered to lean upon the bottom wall 1 and the crate is reduced to shape shown in fig-

ures 4 and 5. From the top there can obviously be seen only the edge 2 and both side walls 7, while side walls 3, folded, are placed between walls 7 and bottom 1.

In order to give a rigid configuration to the crate when open, some blocking means are provided, fastening the three free sides of each of the walls 7 to adjacent walls 3 and 1. Said means can be differently shaped as coggings,particularly as shown in figure 6, where can clearly be seen cogs 13 on the edge of bottom wall 1 and cogs 14 on the vertical surface of side walls 3. Said cogs mate with suitable seats on walls 7, some of which are shown by 15 in figures 1 and 2.

In the same way the cog type blocking means 16 are provided between the two parts 4 and 5 of side walls 3 (shown in figures 1 and 2 and, better, in figure 6) in order to avoid that walls bend outwardly owing to load's push.

It is clear that a crate of the type now described, preferably made out of plastic material, can be used to contain and to carry any type of objects, whenever it be desirable to avoid the burden of empty crates.

When used for carrying fruit and vegetable products, the crate's walls can be advantageously holed for ventilation, in correspondence with the zones marked in the figures by dash and dot lines, which can be occupied by holes of sundry shapes and dimensions and differently arranged.

The present invention has been described with special reference to its preferred embodiments, but is understood that changes and modifications might be made by the skilled in the art without departing from the general scope of the invention itself.

CLAIMS:

1. Folding crate, particularly suited for carrying fruit and vegetable products, made out by a rigid, rectangular bottom wall, by a rigid, rectangular upper edge, by two first, opposed side walls, being each subdivided at half height into two parts by one horizontal hinge and being hinged, each of them, along the lower edge to the bottom wall and along the upper one to said upper edge, and by two second, opposed side walls, each one being hinged only to said upper edge and separated from the other walls along the remaining three sides, there being provided first blocking means for fastening each one of said second side walls to said bottom one as well as to said first side walls along said remaining three sides.

2. Folding crate according to claim 1 in which on each of said first side walls second blocking means are provided, in correspondence with said middle horizontal hinge, in order to secure the vertical position of the wall, thus avoiding that it might bend outwardly in correspondence with said hinge.

3. Folding crate according to claims 1 or 2 in which said first blocking means are formed by several cogs projecting from the surfaces of said first side walls as well as of bottom wall, which fit in suitable seats provided on the corresponding surfaces of said second side walls.

4. Folding crate according to claims 1-3 in which said second blocking means are formed by a set of cogs projecting, alternately, from either of the two parts in which is divided each of said first side walls, which fit in suit-

able seats, alternately provided on both said walls, each one from the side opposed to its appropriate cog.

5. Folding crate, particularly suited for carrying fruit and vegetable products, according to claims 1-4, substantially as previously shown and described.

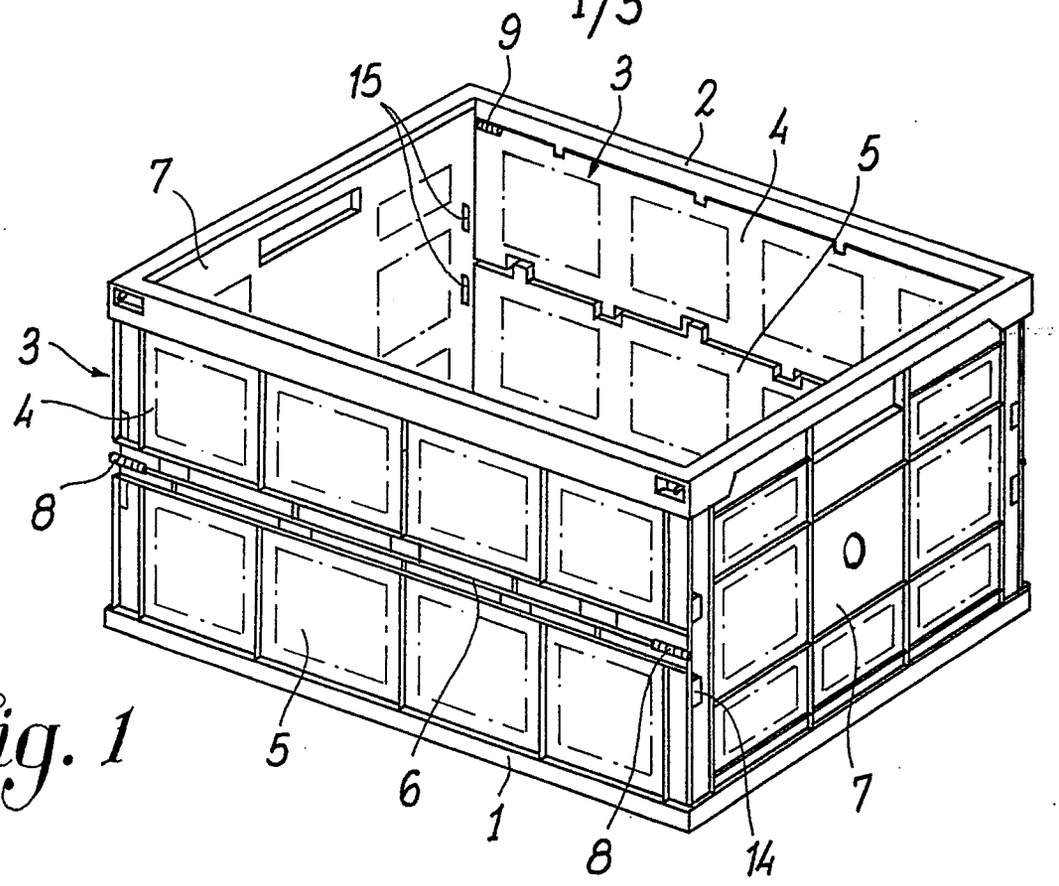

Fig. 1

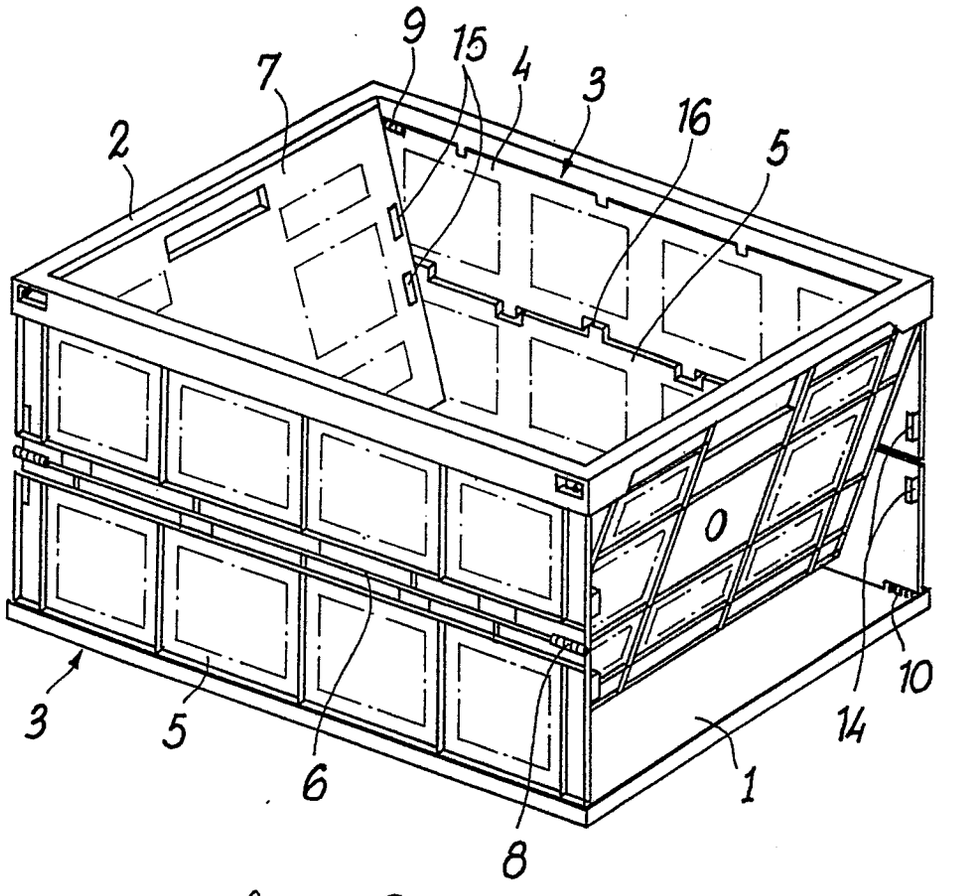

Fig. 2

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Fig. 4

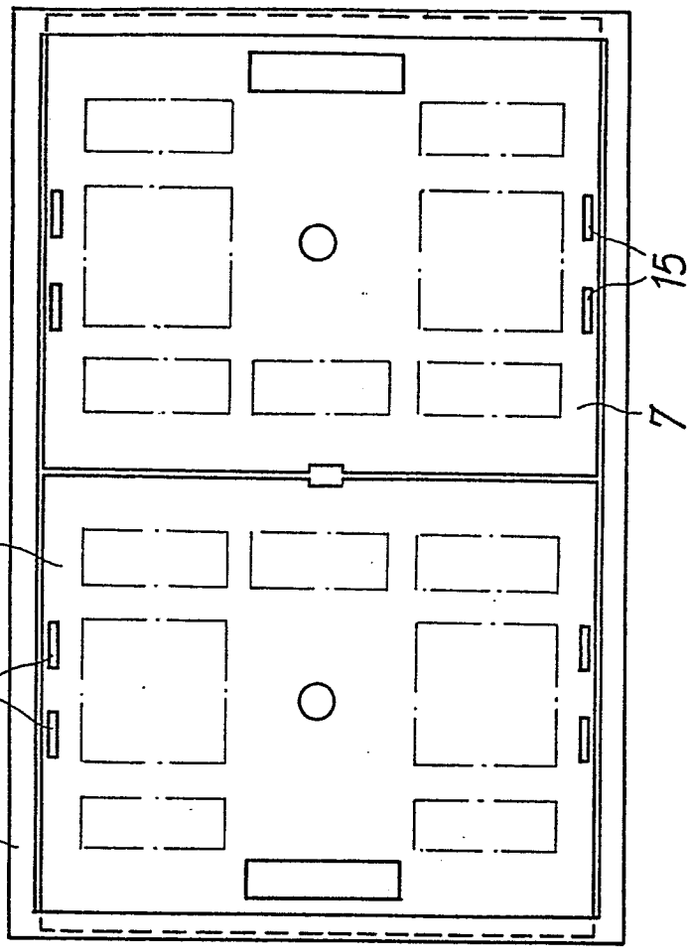

Fig. 5

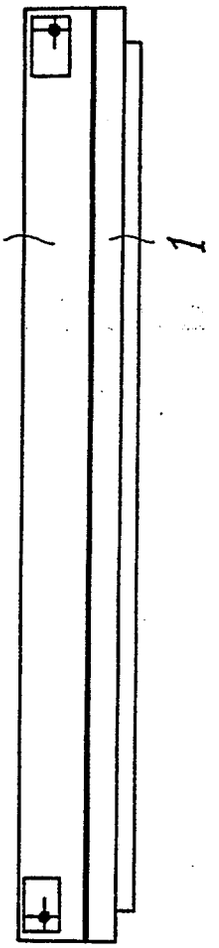

Fig. 3

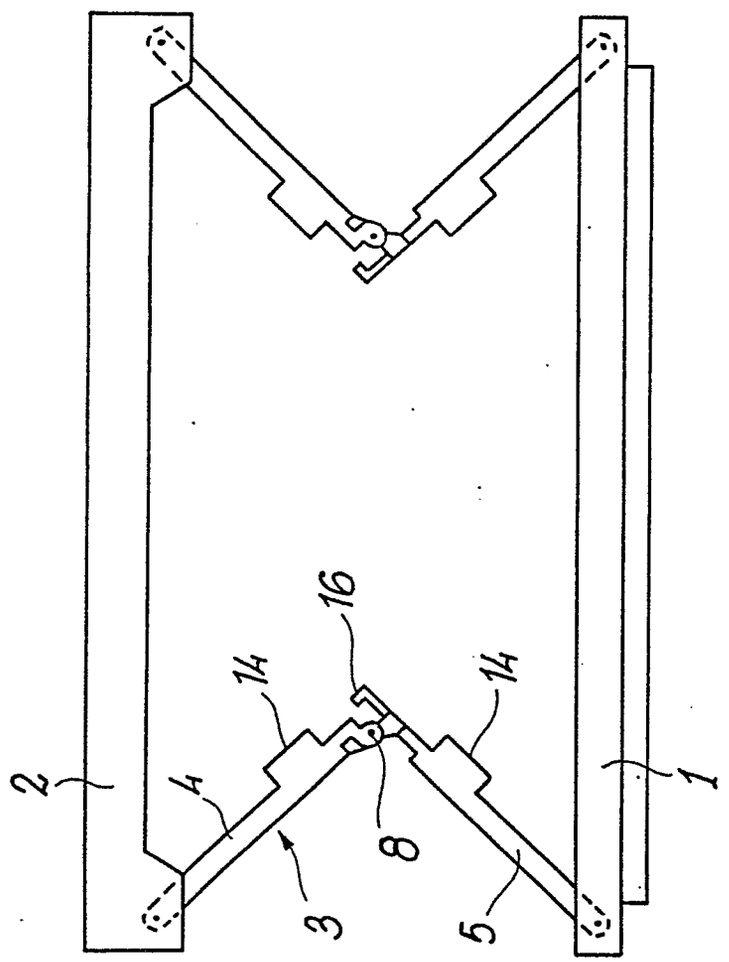

Fig. 6