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(54) **Folding box**

(57) The invention relates to a returnable folding box for food use intended for small-sized logistic circuits, which is variable in height, easy to handle and sanitize, constructed entirely from plastic and formed by a base

(1) with short edges and four columns (7) which can be anchored, removed and lowered.

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Description

Object of the Invention

[0001] The present invention relates to a returnable folding box for food use intended for small-sized logistic circuits (SMEs), which is variable in height, easy to handle and sanitize, constructed entirely from plastic and formed by a base with short edges and four columns which can be anchored, removed and lowered.

State of the Art

[0002] Different packages for transporting foodstuffs are known in the state of the art, the foodstuffs being transported in boxes to the different markets mainly by means of two types of packages,

- (1) single-use packages (non-recoverable wood, cardboard or plastic packages) and/or
- (2) multiple-use packages (returnable, rigid or folding plastic packages)

[0003] Historically, for most consumer products, but especially for fruits and vegetables, the first packages that were used were made of wood, and were lightweight, flexible and non-recoverable (single-use packages) or robust, rigid and returnable (multiple-use packages), according to whichever was the most suitable alternative. From the time in which the use of plastic appeared and became widespread, both variants started to be made of this new material. Although with serious limitations while they were made of wood, both variants have tended to become increasingly smaller and flatter.

[0004] All this worked in essentially national markets in which transport covered relatively short distances, whereas cardboard was used from the start for the longer distances demanded by international transport, especially when it started to be cheaper, easier to use and more hygienic than wood. Cardboard packages reached their peak in developed countries in the early 90s with the enormous increase of international trade and of large distribution chains, and this was when an important problem of waste, logistics and merchandising (aesthetics) was created, with the consequent problem of costs. To solve the problems generated by solid waste, large distribution chains created and started to use returnable plastic packages administered by means of a pool promoted by them.

[0005] Depending on whether countries are more or less demanding with the problem of waste, and according to whether trade in them is more or less developed and, therefore, the cost of the return is more or less considerable because the transport has or does not have alternative returns (opportunity cost), classic returnable plastic packages have evolved in different ways. These packages have evolved into:

- (1.1) economic rigid plastic packages which are used

indifferently as returnable or non-recoverable packages for less developed countries, with low opportunity cost of transport and storage in the event that these packages are returned or stored, or few problems of waste when the decision is made to render them non-recoverable; and into

(1.2) returnable folding plastic packages (the sides of which are completely lowered to minimize the volume and thus facilitate the return) for more developed countries which have a considerable cost of transport and storage and are very demanding with the problem of waste.

[0006] In this context, due to their simplicity, single-use cardboard packages still have some clear advantages such as simple logistics based on an exclusive proprietary use, they avoid the problem of sanitization since they are not reused, and especially, they have a low cost of production, storage and transport as a result of an economic and quick process. In contrast to these unquestionable advantages, there are important drawbacks such as generating a large volume of waste which, despite being recyclable in principle, is difficult and complicated to store and handle if the size of the establishment does not allow having the suitable means for compacting it (presses). In addition and at the other end of the food chain, cardboard packages have the serious drawback of being unsuitable for their use in normal humid environments in the food industry, and this is especially acute in the conditions of Mediterranean agricultural production.

[0007] The alternative of returnable plastic packages does not have these problems of waste or humidity, but it does have a considerable problem with cost since, besides the problems of humidity and waste, those of sanitization and logistics have been at the cost of adding to these packages another considerable cost of handling to those already considerable and awkward costs of their manufacture and their administrative-financial management in a proprietary system, all of which means a high rent (and substantial guarantee deposits) which is normally borne by the supplier upon the demand of large distribution chains. Therefore, although conventional returnable plastic packages may have involved an added value (savings) for large distribution chains, for the supply chain as a whole they have the problem of involving a considerable cost which these chains, making use of their negotiating power, charge to the producer or manufacturer. However, for a considerable number of distribution companies, this system and its high rental cost is neither operational, necessary nor can it be "externalized" to their suppliers. For these channels with a smaller size and, in any case, with a logistics rationale different from that of large distribution chains, returnable folding plastic packages offered on the market today do not solve any problem for them but rather, on the contrary, are a serious cost which does not add value.

[0008] In relation to disposable rigid plastic packages,

as already mentioned, they are also expensive with regard to both empty return transport and storage, except in those countries, -those of southern Europe, including Spain -, in which there still are significant sectors of traditional small trade and of local agricultural production close to consumer markets and there is furthermore no alternative return for these short distances, or in those other countries in which, although distant, these packages are not returned because they can still be used and do not yet constitute waste, therefore they have not been the object of restrictive measures against them. In summary, in relation to disposable rigid plastic packages, it can be stated that they are chosen in those trade environments in which, since their return is possible, their cost is lower than that of their returnable folding counterparts and than those of cardboard, or because, their return not being possible, their cost is similar to those of cardboard but they perform better in humid and poorly equipped environments. On the contrary, large distribution chains with better equipped environments do not accept this type of disposable package.

[0009] In relation to non-recoverable cardboard packages, although they can be the most competitive in costs, they have, as has already been seen, important drawbacks in relation to being unsuitable for their use in humid production environments, which is occasionally an insurmountable problem, in addition to the generation of a large volume of waste.

[0010] In response to all the previous problems, with the enormous increase of mass distribution and considering its problems of logistics and especially of solid waste, large German distribution chains created a company as an administrator of a pool of returnable folding plastic packages, designed on the basis of a proprietary system renting out such packages, making them very expensive because:

- They require a specific, complex and expensive distribution and return logistics which does cover small and medium-sized enterprises,
- In a specific aspect which is of interest herein, they require an expensive and difficult sanitization for the proprietary companies due to the fact that once the box is folded, the base is duplicated and even triplicated by the lowered sides, making it difficult to clean between the various layers formed, which forces taking the boxes to specialized plants located at certain geographic points in order to automatically open and close the box for its sanitization.
- They involve an expensive service because currently existing pools of returnable packages are configured as closed logistic proprietary systems, each of them managed by a large company which owns the packages and circulates them in a rental system for the users, such that the systematic and quick rotation of the packages and financial flows are key factors for system efficiency. As occurs with any market dominated by proprietary systems, the incompatibil-

ity between such systems limits competition and makes the service excessively expensive, imposing high rental prices in a system which is hard for small and medium-sized enterprises to access.

- Although they are boxes especially designed for handling fruits and vegetables, they are especially designed for Dutch and Central European fruits and vegetables, which makes their small-sized tray design rather unsuitable for the conditions of Mediterranean production and fruit, which are normally larger and for which ventilation and refrigeration are a priority.

Description of the Intention

[0011] The present invention, returnable plastic box, is especially aimed at the conditions of Mediterranean production and markets.

[0012] In this context, the invention proposes a returnable plastic box, in principle of the same dimensions (in volume) as its current counterparts, both full and open and empty and folded, but more standardized (with a single model instead of one for every height as the current ones must necessarily be) in order to be used in a proprietary (and not rental) system in the smaller and simpler logistic circuits of traditional trade channels, for the purpose of enabling these channels to make use of their own logistic infrastructure which they normally have partially inactive, either trucks, warehouse spaces, personnel or others and, therefore, to involve low logistic costs or, in another case, to be able to be treated as non-recoverable packages given their assumable cost.

[0013] The box of the present invention is preferably made of plastic material, not because it is considered that plastic is more "ecologic" than cardboard, but rather because it is essential for the boxes to suitably perform in the environments of an agricultural production with high relative humidity and condensation, typical of the Mediterranean climate. Likewise, and if the use conditions allow it, it will be possible to manufacture them in other materials, such as cardboard for example. Therefore these boxes are designed to be used by small farmers and likewise small and medium-sized merchants, although, nevertheless, they could also be used by typical distribution chains, both by any of the large ones and especially by the small ones.

[0014] The box object of the present invention generally involves a much lower outlay since the user does not have to make the onerous deposits demanded as a guarantee by large rental companies and, in any case, having to make use of fewer units (fewer different classes as the columns are manually interchangeable by the user). In relation to the manufacturing cost, the plastic base has a lower cost than that of any rigid or folding box since they are made with less material because instead of having a perimeter of plastic of 10x140 cm of plastic, the box has 4 columns which are only 10x20 cm of plastic. Furthermore, any of the components can be repaired by the

user as they can be replaced simply. Likewise, they allow a much simpler and more efficient sanitization, all of which also means a simpler and lower operating cost.

[0015] Likewise, compared to the single-use cardboard packages, the new folding plastic boxes by means of lowerable columns object of the present invention are perfectly comparable insofar as their low cost of logistics, sanitization and production without having any of the drawbacks of waste and humidity (low ventilation).

[0016] The returnable box object of the present application is formed of five pieces (a base and four columns), consisting of a base with a standard dimension, preferably and only 40x60 cm, with a short perimetric edge, for example 4 cm externally, and having 4 anchors in which columns of different length (height) can be manually fitted, which columns can either be lowered towards the inside of the box to minimize its volume (height) when empty (an operation which will be the most usual one), or can be removed to replace them with others with a different size.

[0017] In relation to the folding boxes existing in the state of the art, the box object of this invention, is much simpler and more economic to manufacture, open to ventilation and lighting, in addition to being easier to handle and assemble, which allows performing a manual handling in the processes to be carried out after the manufacture of its components since both the assembly and the replacement of components or the sanitization of the box can be performed manually, unlike what occurs with those currently offered on the market, which must be assembled with machinery, thus preventing the replacement and use of components by the user.

[0018] In relation to the better sanitization compared to current folding boxes, it is possible because, with the standing columns disassembled or lowered, the entire box is accessible for cleaning, which allows washing it by immersion even when forming complete pallets of stacked empty boxes since, in a completely lowered position of the columns, the latter only cover 8% of the surface of the base in the most favorable case and up to 15% of the surface of the base in the least favorable case (for example, a 40x60x20 box with 4 lowerable 5x18 columns), whereas in currently used folding boxes, after lowering the sides the base is completely covered and even doubly covered by the lowered sides when they are 20 cm in height. In another case, to wash folding boxes it is necessary to open them, wash them and close them again and palletize, which involves a very complex and expensive operation since it must be carried out in large, automated and specialized sanitization plants to which it is necessary to take the boxes. Compared to this, the boxes object of the present invention are designed to be washed by immersion, folded and stacked on pallets.

[0019] Likewise, since it is a box designed to house a single layer of products with certain unit dimensions, it allows the plastic sides to not be necessary, achieving, in the first place, a reduction in the amount of raw material necessary for producing a box of more than 20% in any

case and of up to 40% in higher boxes and, furthermore, it allows the vision by image capture of all the products contained in the box in order to, through this image and its processing, be able to apply the computer vision and image processing technologies that are currently being developed to the handling and quality control of the product.

[0020] In summary, the main advantages of the invention are having boxes with more and better features; having boxes with a lower cost since they are manufactured with less raw material; having boxes with advantages derived from their composition, such as for example the ease in cleaning them and a smaller stock, the use of internal logistic resources of small and medium-sized enterprises, which allows having them on a proprietary basis, and at the same time it allows such enterprises access to the latest advances in this logistics fields; all of the above meaning that the product has a very superior and more popular ease of use and access and at the same time a radical improvement of the price/features ratio.

Description of the Drawings

[0021] A series of drawings is very briefly described below which aid in better understanding the invention in relation to a specific embodiment of the invention and which are set forth as a non-limiting embodiment thereof.

[0022] Figure 1 shows a perspective view of the box object of the present patent application.

[0023] Figure 2 shows a plan view and side elevational views of the box object of the invention.

[0024] Figure 3 shows a sequence of lowering a column arranged in the box.

[0025] Figure 4 shows a plan, side elevational and perspective view of the column component of the box.

Preferred Embodiment

[0026] The box (1) object of the present invention comprises a preferably rectangular base (5), two longer side walls (2) opposite to one another and another two shorter side walls (3) also opposite to one another, although evidently the lengths can be modified depending on the needs. Said side walls form a single body with the base, their preferred dimensions being 600x400x40 mm of side height.

[0027] Two of the walls (2) opposite to one another have at least one fixed flange (6), preferably two fixed flanges (6) per wall (2), the objective of which is to allow stacking the boxes one on top of the other when they are empty or when they contain products shorter than the side walls, occupying the smallest possible space in height, i.e., only the height of the walls of the box.

[0028] However, if products the height of which exceeds that of the side walls are to be transported, it is possible to use columns (7) which are pivotably assembled in housings (4) intended for such purpose and ar-

ranged in the side walls (3) which do not have fixed flanges (6). Said columns have different heights, preferably up to 200 mm, and allow stacking boxes containing products the height of which exceeds that of the walls (2, 3), said columns being fitted by means of coupling elements (8) in the housings (4) arranged in two of the walls (3). Said housings (4) are preferably arranged in only two of the walls (3) and distributed in an even manner in each wall, although it is also possible to distribute them in any manner, for example a single housing (4) centered in each wall (2, 3) (not shown). It is likewise possible to have at least one hole, with a smaller dimension than that of the housing (4), on at least one side of said housing, and preferably a hole on each side of the housing (4). A tab (9) will be introduced in each of said holes, which tab is integral with the lower part of the pivotable columns (7) which allow maintaining said columns (7) in the work position when the tabs (9) are introduced in the holes, as well as releasing them so that the columns (7) can be lowered.

[0029] As can be observed in Figure 3, said columns can be folded over the base of the box (5), which allows stacking a larger number of boxes (1) in a smaller space. Said columns (7) can be removed and replaced with other columns (7) of different lengths.

[0030] The components of the box object of the present invention are manufactured by means of plastic injection in the corresponding steel molds. An injection machined supplies the molten plastic material- polypropylene, polyethylene-, at a high pressure and, once it has solidified by means of cooling by refrigeration, the part is extracted from the mold. This process is carried out both for the base and for the columns, the latter by means of a mold with multiple cavities. Finally, the columns are assembled to the base, which can be done manually or assisted with a tool-frame.

Claims

1. A folding box comprising a body formed by a base (1) and four walls (2, 3) with a certain height, **characterized in that** at least two of the walls (3) of said box (1) have at least one housing (4) for removably and pivotably coupling a column (7) with a greater height than the height of the walls (2, 3) of the box.
2. The box according to claim 1, **characterized in that** it has two housings (4) in two opposite walls (3).
3. The box according to claim 1, **characterized in that** the columns (7) are interchangeable.
4. The box according to claim 1, **characterized in that** the column (7) pivots on the base (5) of the box (1).
5. The box according to claim 2, **characterized in that** the walls (2, 3) have at least one flange (6) on the

upper edge of the wall (2).

6. The box according to claim 5, **characterized in that** the walls having a flange (6) do not have a housing (4).
7. The box according to claim 1, **characterized in that** it has at least one hole located on at least one side of the housing (4) to house at least one tab (9) existing in the removable and pivotable column (7).
8. The box according to claim 7, **characterized in that** it has a hole on each side of the housing (4).
9. A column for a folding box, **characterized in that** it has coupling means (8) at one of its ends to be coupled in the housing (4) of a box (1), said same coupling means (8) allowing the column (7) to pivot with respect to the housing (4).
10. The column according to claim 9, **characterized in that** the height thereof is greater than the height of the walls (2, 3) of the box (1).
11. The column according to claim 9, **characterized in that** on at least one side of the coupling means (8) it has at least one tab (9) integral with the lower part of the pivotable columns (7).
12. The column according to claim 11, **characterized in that** it has a tab (9) on each side of the coupling means (8).

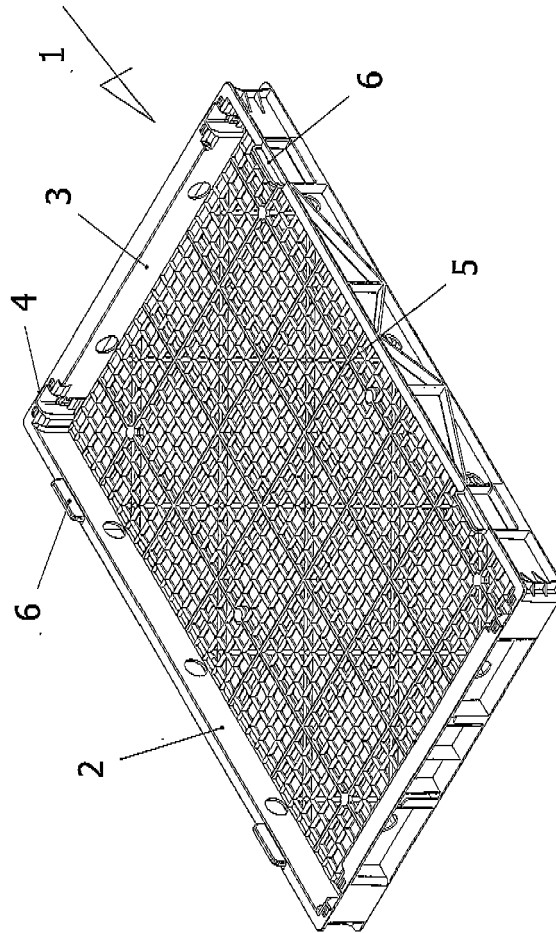


Fig. 1

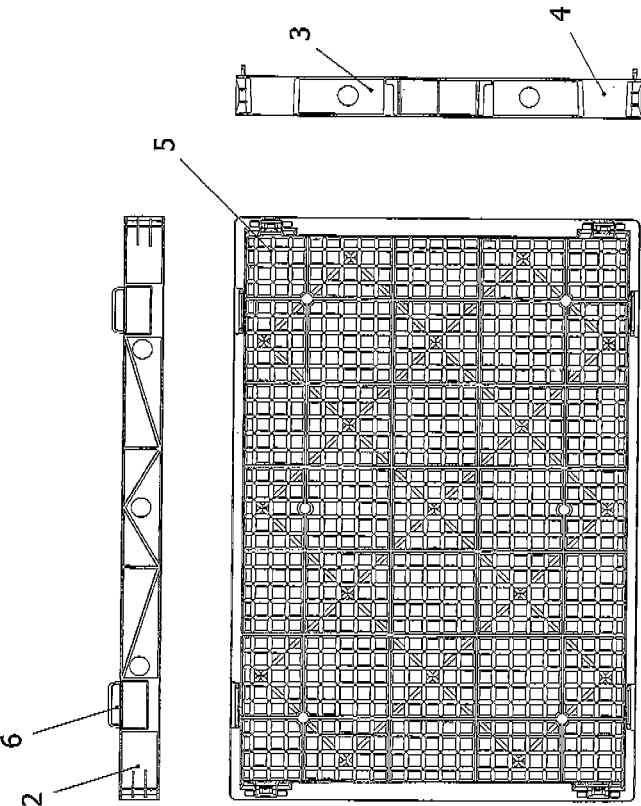


Fig. 2

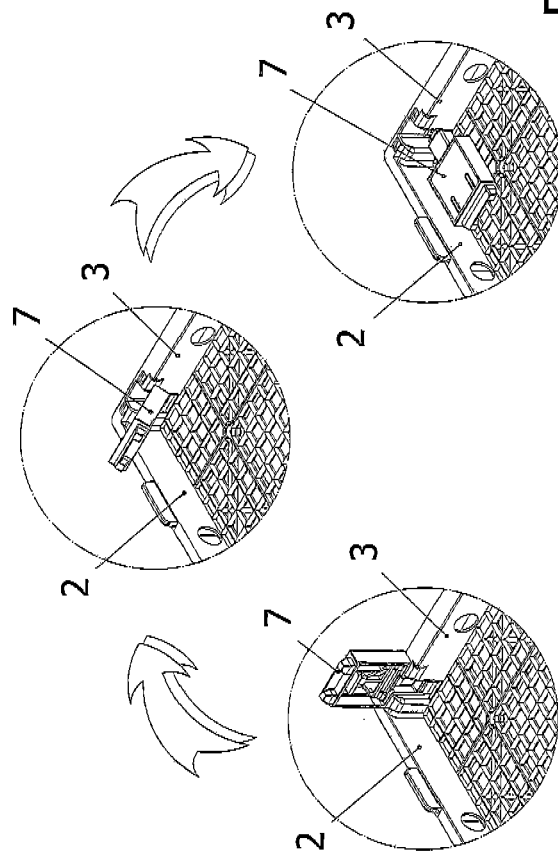


Fig. 3

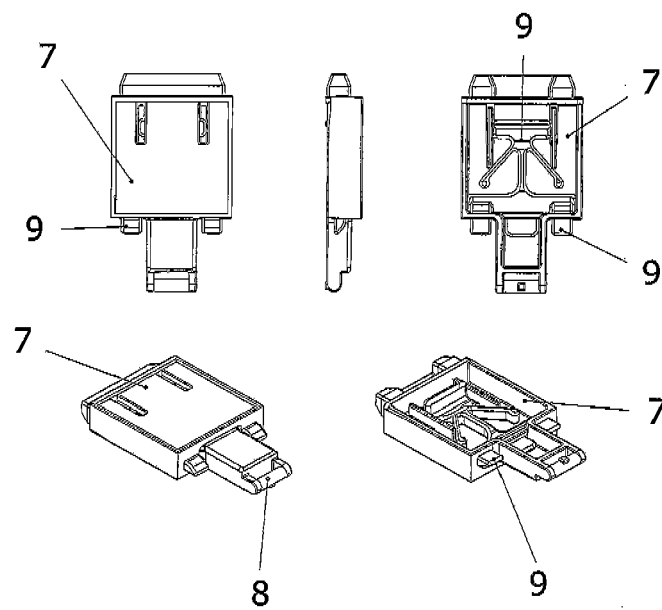


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 09 38 0038

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) B65D E05D
Place of search Munich		Date of completion of the search 18 August 2009	Examiner Cazacu, Corneliu
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 38 0038

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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