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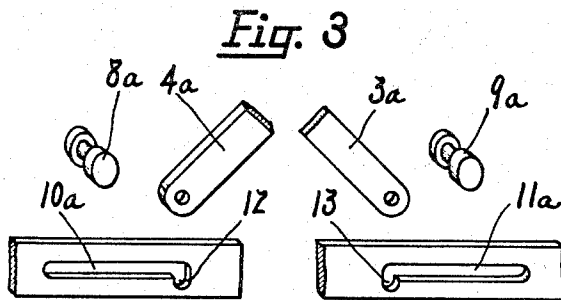
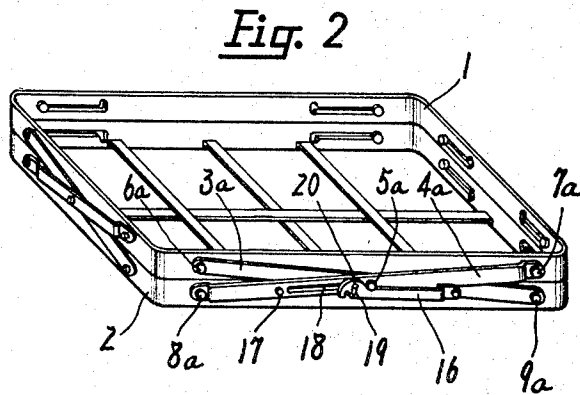
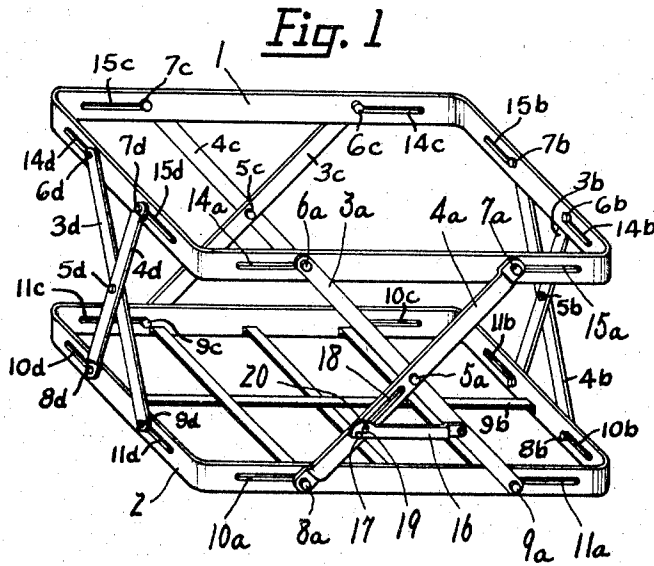
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3,410,328

DELIVERY CONTAINER FOR PERISHABLE FOODS

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2 Sheets-Sheet 1



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DELIVERY CONTAINER FOR PERISHABLE FOODS
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ABSTRACT OF THE DISCLOSURE

This invention relates to collapsible delivery containers for the transportation of perishable food products, such as fruit and vegetables, which are light and compact when empty. The container consists of bottom and top rectangular frame members which are connected by struts or rods which are lockably pivotally attached to slots in the bottom and top frame members, so that the space required and separating the bottom and top members is adjustable. A containing bag is attached to the inner circumference of the top frame member. The struts can be easily released to fold the bottom and top members together and adjusted in their relative positions. Pairs of struts on the respective sides of the bottom and top frame members are arranged in X form and at their point of intersection mid-way between the bottom and top frame members are pivotally connected together, and a removable latch arm locks two of the struts in fixed position. In a modified form provision is made for additional slots for further adjustment of the position of the struts.

The present invention relates to delivery containers for repeat transportation of farm produces, especially such as vegetables and fruits or marine products such as fresh fish and shell-fish.

The principal object of the present invention is to remove difficulties with regard to packaging, transportation and handling of perishable foods, which difficulties have caused serious limitations in their distribution and consumption.

Another object of the present invention is to provide delivery containers requiring only small space at the time of their return empty transportation.

Still another important object of the present invention is to provide containers having a changeable capacity when required and having great resistance against external forces, accordingly being proof against rough usage and moreover, being of relatively light weight and requiring small dead space in transportation empty.

Still another object of the present invention is to provide delivery containers which require little labor and time for changing their capacity.

Further objects of the present invention will be apparent from the following description taken in connection with the drawing in which:

FIG. 1 is an oblique perspective view of the solid truss of a first embodiment of the present invention in its set-up or extended position.

FIG. 2 is an oblique perspective view of the solid truss shown in FIG. 1 in its folded position.

FIG. 3 is an exploded view of the parts showing means for changing the cross angle of connecting rods and means for settling positions of rivets of the solid truss shown in FIG. 1.

FIG. 4 is an oblique perspective view of the solid truss with the net bag mounted in position of a second modified embodiment of the present invention but shown partially.

FIG. 5 is an exploded view of the parts showing means

for changing the cross angle of the connecting rods and means for locking positions of rivets of the solid truss shown in FIG. 4.

Changes of consumer's market handling in recent years has been attended with several difficulties with respect to transportation and handling of perishable foods. It is well known that wooden boxes, cages as of wire and petroleum cans have been used for many years as containers for packaging or transportation of perishable foods such as vegetables, fruits or fishes. However, the wooden box is not only heavy but nowadays, raw material therefor is becoming scarce and expensive, and is being used much less. The cage is fragile and does not stand repeat usages. The petroleum can is lacking in flexibility and has only limited uses. In recent years, corrugated cardboard boxes have appeared and their usage is spreading every day. But, their price is unexpectedly high because of shortage of pulp which is their raw material. Besides, because they cannot be used more than once, they are not advantageous except for packaging some light articles. Also appeared in recent years are collapsible steel containers for transportation. But, these require much labor in folding and setting up and also they have the disadvantage that their internal aeration is small.

A delivery container for perishable foods according to the present invention comprises a solid truss and a bag, said truss as of metal having an upper frame and a lower frame, the said frames facing each other in parallel and being of a substantially equal size, and said truss having also at least two pairs of connecting rods intersecting and crossing each other by pin engagement, said pairs of connecting rods facing vertically side by side, each said connecting rod being attached with pins to a side of said upper frame and to a side facing said upper frame side of said lower frame at the upper and lower ends of each said connecting rod, at least a portion of said upper frame, lower frame or connecting rods having means for changing the intersecting cross angle of said connecting rods of said pair of connecting rods, and at least a portion of said upper frame, lower frame or connecting rods having locking means for the pin for fixing said cross angle of said connecting rods at their maximum cross angle, said bag being fixed to the inner side circumference of said upper frame at a side wall circumference of said bag. Thus the truss has an upper rectangular frame and a lower similar rectangular frame, said two frames being mounted substantially parallel to each other and there being four pairs of connecting rods adjustably connecting said two frames, each said pair of connecting rods being connected to one side of the upper frame and the corresponding side of the lower frame and the rods of each said pair of connecting rods crossing and connecting each other together substantially midway of their length.

Referring now to FIG. 1 to FIG. 3 representing the truss of a first embodiment of the present invention, 1 and 2 are respectively a rectangular upper frame and a rectangular lower frame. Four pairs of connecting rods are shown at 3a, 4a, 3b, 4b, 3c, 4c, 3d, 4d, which are connected at their mid-points by rivets 5a, 5b, 5c, 5d, which have I-shaped axial cross-section. These connecting rods are attached to a side of the upper frame with rivets 6a, 7a, 6b, 7b, 6c, 7c, 6d, 7d, at the upper ends of these rods and also attached to a side of the lower frame with rivets 8a, 9a, 8b, 9b, 8c, 9c, 8d, 9d. Each of these mentioned rivets is of substantially the same structure as rivets 5a, 5b, 5c, 5d. Guide channels 10a, 11a, 14a, 15a, 10b, 11b, 14b, 15b, 10c, 11c, 14c, 15c, 10d, 11d, 14d, 15d, are provided respectively for guiding these rivets laterally. For changing the intersecting cross angle of the connecting rods. Recesses 12 and 13 shown in FIG. 3 are provided respectively for locking therein the rivets 8a and 9a

which are to be moved respectively in guide channels 10a and 11a. Recesses of the same structure as 12 and 13 are provided at the inner ends of guide channels 14a and 15a for locking respectively rivets 6a and 7a but are not shown. 16 is a displaceable latch which is hinged on connecting rod 3a at the right end of said latch. The latch 16 is provided with a short guide channel 19 on a circle having its center at rivet 17' and also provided with a nail for engaging a rivet 17 which is fixed on the other connecting rod 4. 20 is a rivet which is to be moved freely in a channel 18 provided in connecting rod 4 and in said guide channel 19.

At a given position of the above-mentioned truss shown in FIG. 1, each rivet of the respective end of the connecting rods is locked in a recess provided at the inner end of a corresponding guide channel. Accordingly, the positions of the above-mentioned rivets are fixed, since the cross angle of the connecting rods is unchangeable. The fixation of said positions of the rivets is enforced by the engagement of latch 16 and rivet 19.

To fold up the truss into the position as shown in FIG. 2, the latch 16 is at first pulled upwardly for loosening the engagement of said latch and rivet 17. Next, the upper frame 1 is lifted for taking rivets 8 and 9 out of the corresponding recesses 12 and 13. Next, by permitting the upper frame 1 to fall during pushing the lower ends of the connecting rods outwardly the rivets 6a and 7a come out of the corresponding recesses and the rivets 6a, 7a, 8a and 9a slide outwardly in the corresponding guide channels. Accordingly, the intersecting cross angle of the connecting rods 3a and 4a changes for engaging the upper and lower frames with each other.

In the above, the structures, functions and effects of a pair of connecting rods which engages side of the upper frame and side of the lower frame, the means for fixing the rivets and the means for changing the intersecting cross angle of said connecting rods have been explained. However, the structures, functions and effects of the other pairs of connecting rods engaging respectively other corresponding sides of the upper and lower frames, and both the above-mentioned means, are equal to these characteristics of the above first mentioned pair of the rods and both the first means. And however, single latch 16 which is the means for the reinforcement of the means for fixing the rivets will be sufficient for the four pairs of connecting rods.

It will be seen from the above explanation, that in other modified embodiments of the present invention, only guide channels 14a and 15a need be provided as means for changing the intersecting cross angle of the connecting rods 3a and 4a, instead of the four guide channels 10a, 11a, 14a and 15a, and the positions of rivets 8a and 9a can be fixed. Or, upper channel 14a and lower channel 10a can be provided but providing positions of rivets 7a and 9a fixed. However, in these cases a guide channel should be provided in each connecting rod for the rivet 5a which engages the rods 3a and 4a for allowing said rivet 5a to move along each said rod.

Further, the embodiment of the above description as shown in FIG. 1 has a net mesh bag which is not shown, but is similar to that shown in FIG. 4. But, the bag will be explained for the second embodiment of the present invention which is as follows:

Referring now to FIG. 4 and FIG. 5 showing a second modified embodiment of the present invention, an upper frame 21 and a lower frame 22 are connected with four pairs of connecting rods which are represented by members 23a, 23b, 23c, 23d and 24a, 24b, 24c, 24d which cross or intersect another connecting rod by a pin-connection in forming a solid truss. Said pin-connection is achieved by the similar rivets as illustrated in the foregoing first embodiment of FIG. 1 of the present invention except for a pair of bolts and nuts which will be explained in the following. A connecting rod composed of members 23a and 24a is attached to a side of the upper

frame 21 and a side of the lower frame 22. The member 23a is composed of a straight rod and the member 24a is composed of a shallow channel. Said members 23a and 24a are provided respectively with guide channels 29a and 29b as shown in FIG. 5. Another connecting rod composed of members 23a and 24a has similar structures to members 23a and 24a respectively. All the guide channels lie one upon top of another and a bolt 31 passes through all the guide channels to have said screw bolt being clamped with a butterfly screw nut 32. 30a, 30b, 30c and 30d are pit-falls for the screw bolt 31 which are provided at the corresponding guide channels. The members 24a and 24'a are channel members having raised marginal edges between which the flat members 23a and 23'a slide for adjustment in telescoping relation.

In this second embodiment of FIG. 4 of the present invention, the screw bolt 31 and all the guide channels compose means for changing the cross angle of the connecting rods. Said means are explained as follows: When the upper frame is pushed downwards in releasing butterfly screw nut 32, the bolt 31 slides in each guide channel 29a and 29b without changing its position. Then, the intersecting cross angle of the connecting rods changes, and finally the upper and lower frames come to engage for the position for the truss being folded up. When the screw bolt 31 reaches the inner end of each guide channel as a result of the lifting of the upper frame 21, said bolt settles in the recesses 30a, 30b, 30c and 30d. Thus, the screw bolt 31 is fixed temporarily and does not move in said guide channel even if the upper frame is pushed downwards. By clamping the butterfly screw nut 32, the several connecting members are fixed perfectly, for causing the fixation or locking of the whole truss. To fold up the truss, the butterfly screw nut is released and the upper frame is lifted. Consequently, the bolt 31 will come on to the axial line of each guide channel. The upper frame is then pushed downwards under the foregoing relative position of screw bolt 31 and the guide channels 29a and 29b.

In FIG. 4, only a portion of the net bag 25 is shown for avoiding complication of the figure. However, the bottom of this net bag 25 lies upon plates 27, 27' and 27'' which are the bottom of the truss. The top opening of this net bag 25 is attached to the upper frame 21 with a thick wire 26. When required, the net bag will be extended upwardly, and the top opening thereof will be passed through with a cord for the amount of opening being tightened. 28 is a corner covering piece to a corner portion of the upper frame and which is useful when the containers are stacked up. The above mentioned net bag 25 can be replaced with a cloth bag or a water tight bag such as a rubber bag according to the particular use.

The basic frame structure of a container according to the present invention is a solid locked truss. Accordingly, said frame is extremely strong, because, when an external force such as a weight or impact is applied on a solid truss, only tensile or compressive stresses work in the truss members and bending or shearing forces cannot be applied therein. Besides, this container is of comparatively light weight, because the basic frame thereof is composed of a small number of members. And, even if the substance of this container is composed of a weak material such as net, cloth or rubber, said substance is protected within a strong truss.

A container according to the present invention is folded up tight to a thinness in which the upper and lower frames engage each other, because said frames of a truss are connected with pairs of connecting members, a pair of said members intersecting and crossing each other and having a changeable intersecting cross angle. Accordingly, it requires only a small dead space in transportation and storing, and the cost of transportation is particularly reduced in return empty transportation. Moreover, this container requires little trouble for setting up on account of not having separate members requiring dis-

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jointing and assembling, resulting in short working hours and no particular skill for folding and setting up.

Having described my invention what I claim is:

1. A delivery container for perishable foods which comprises a collapsible truss structure and a bag, an upper rectangular frame and a lower similar rectangular frame, said frames being mounted substantially parallel to each other, four pairs of connecting rods adjustably connecting said two frames together, each said pair of connecting rods being connected to one side of said upper frame and the corresponding side of said lower frame, and the connecting rods of each said pair of connecting rods crossing and connecting each other together substantially in the middle of their length, said upper frame, said lower frame and connecting rods having means for changing the intersecting cross angle of said pairs of connecting rods, and said upper frame, said lower frame, said connecting rods having locking means for fixing said cross angle of said pairs of connecting rods at their maximum cross angle, and a collapsible bag attached to one said frame and adapted to collapsibly extend to the other said frame.

2. A delivery container for perishable foods which comprises a collapsible truss structure and a bag, an upper rectangular frame and a lower similar rectangular frame, said frames being mounted substantially parallel to each other, four pairs of connecting rods adjustably connecting said two frames together, each said pair of connecting rods being connected to one side of said upper frame and to the corresponding side of said lower frame, each said frame having a plurality of lengthwise grooves corresponding to the respective ends of said connecting rods assigned to said frame, lockable rivets adapted to pass from an end of each said rod to a groove in said frame, a pivot member pivotally connecting to-

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gether the connecting rods of each said pair substantially in the middle of their length, and a locking member connecting together the two connecting rods of one said pair of connecting rods and being adjustably attached to the two connecting rods of the said pair at joints substantially spaced from the middle of their length, and a collapsible mesh bag attached to one said frame and adapted to collapsibly extend to the other said frame.

3. A container according to claim 1, each connecting rod of each said pair of connecting rods being provided with a longitudinal slot substantially midway of its length, and a screw bolt and wing nut therefor adapted to adjustably lock together the two connecting rods of each said pair of connecting rods at intermediate positions along their length.

4. A container according to claim 3, each connecting rod of each said pair of connecting rods consisting of a channel member having raised marginal edges and a flat member which slides in said channel member between said edges in telescoping relation.

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