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A. C. ERTNER

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BOX

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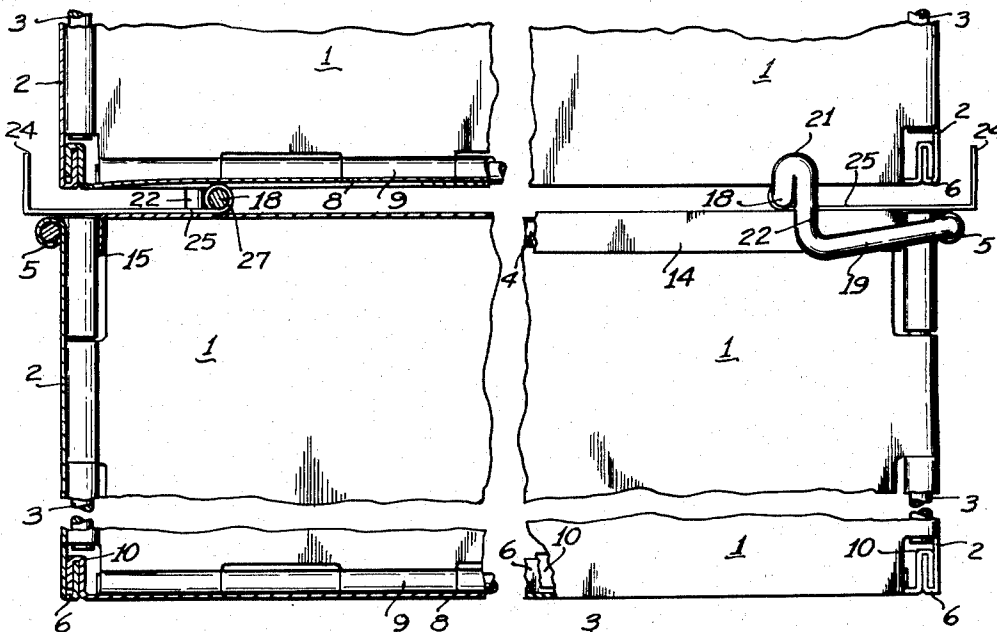


Fig 2

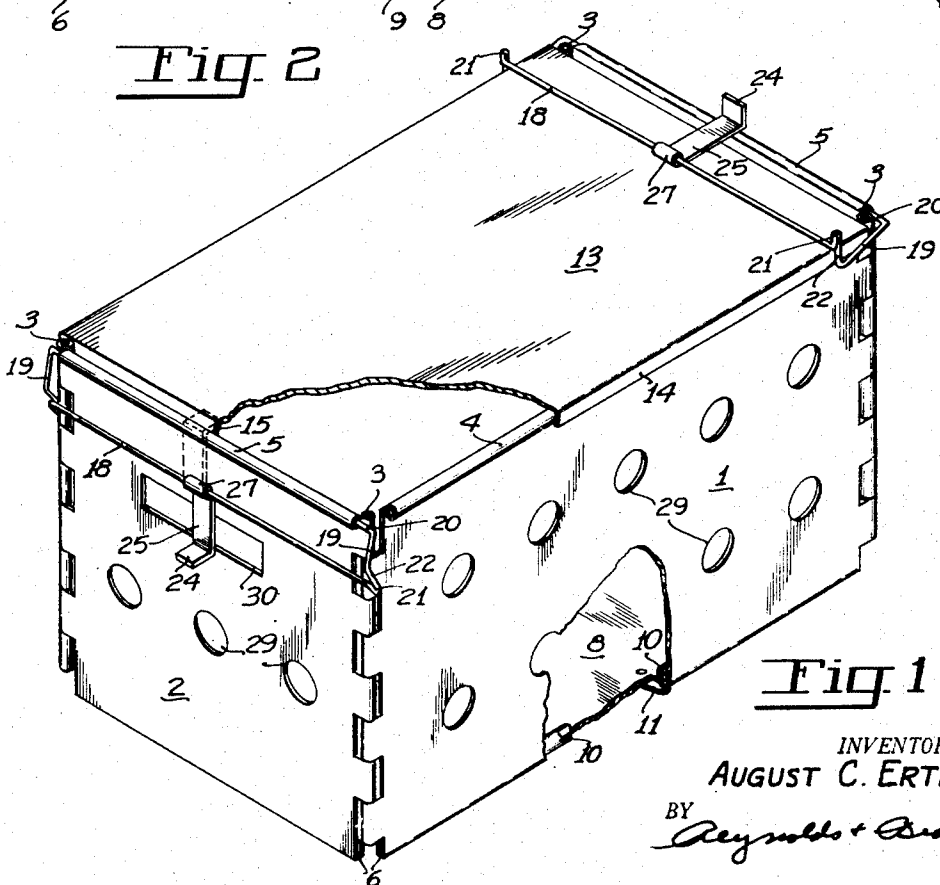


Fig 1

INVENTOR.
AUGUST C. ERTNER
BY *Reynolds + Brach*
ATTORNEYS

UNITED STATES PATENT OFFICE

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BOX

August C. Ertner, Seattle, Wash.

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4 Claims. (Cl. 220-97)

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The requirements of the fruit picking and packing industry annually consume millions, even billions, of board feet of the highest grade of lumber in the construction of field boxes and shipping boxes, and thereby decrease the amount of high grade lumber available for other purposes. Field boxes are usable repeatedly, yet are subject to breakage from time to time, so that a large number of them have to be replaced each season, and shipping boxes, such as are used for apples, pears, peaches and the like, to the number of hundreds of thousands, are shipped out and are not returned, for it is uneconomical to return them empty, even if the purchaser and consumer were inclined to cooperate in their return, which seldom he is. Thus while wooden boxes are individually fairly cheap, and the trade is accustomed to using such boxes, and has box-making and top-nailing machines and the like for use with wooden boxes, nevertheless because of the wastage of a valuable and increasingly scarce natural resource, it is becoming more and more important to provide a substitute for the wooden box, equally suited for the same uses and in substantially the same general manner as are wooden fruit boxes, but more durable, and capable of and of a nature to encourage return and re-use.

The general object of this invention is to provide a box of the general nature indicated, made of a material such as sheet metal, light yet inherently durable, collapsible for economy and convenience in return shipment, usable as a field box without a cover, or equally well as a shipping box with a cover applied, and sufficiently inexpensive that, considering its much greater life, and taking into account the cost of return shipment, it becomes cheaper in the end than the wooden boxes.

Wooden boxes lend themselves readily to stacking and handling in tiers three, four, or five boxes high, or even considerably higher in warehouse storage. Because of this capability, various box dumping devices are in widespread use, particularly in citrus fruit areas, for handling, dumping, and returning field boxes. In storage sheds, fruit packing plants, and in warehouses lift trucks handle such tiered boxes. In consequence it becomes a necessity that any substitute for the wooden box be equally capable of being stacked several high, and it is an object of this invention to provide means whereby this is readily accomplished in the sheet metal box, and indeed to improve upon the capability of the wooden box in this respect in that, in the sheet metal box of this invention, a box properly

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stacked upon another cannot shift either laterally or longitudinally with respect to the immediately supporting box, but instead is held firmly and securely in correct vertical alignment, and may, in turn, support another box in similar alignment.

In connection with the ability to stack the boxes it is a further object to provide stacking means of such nature, and so arranged with respect to the box, that these stacking means will not interfere appreciably with the collapsing of the box for return shipment, but will, when parts are moved into the collapsed position, be themselves moved out of the way, and into positions where they are not likely to be injured.

It is also an object of the invention, and necessary to the attainment of the main objective of a reasonably cheap box, to make the box parts and the stack controlling elements thereof in simple, economical form, of materials readily and cheaply available, and put together with a minimum of assembly operations.

It is a detail object to provide such a bottom for the box, and such an interlock thereof with side walls of the box, that there can be no possibility of the bottom falling through, notwithstanding that it is hingedly or otherwise movably mounted with respect to the side walls, nor, on the contrary, is there any possibility of the bottom shifting upwardly toward collapsed position when once it has been moved into and locked in setup or operative position.

Further objects, and particularly such as relate to details of ventilation, of providing handholds or grips to lift the box, and like advantages, or conveniences, will be determined more fully as this specification progresses, and by inspection of the drawings, or will be contained within the claims at the end of this specification.

In the accompanying drawings the invention is shown embodied in a typical box form, the principles whereof will be pointed out hereinafter, and which can be embodied in various other forms of execution.

Figure 1 is a general isometric view of a shipping box with parts in a setup position, in the main, and with various elements broken away for better illustration of details and interior construction.

Figure 2 is in part a general longitudinal sectional view on a vertical plane through a lower box and a part of an upper box stacked thereon, and in part a side elevational view of the same.

The box illustrated is a typical apple box comprising longer side walls 1 and shorter end walls 2.

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These walls are made of sheet metal, and are hingedly connected at their corners by hinge pins 3. Each wall 1 and 2 is beaded or similarly reinforced at its upper end as indicated at 4 for the wall 1, and at 5 for the wall 2. By such beads and by the flange formation of their edges, such as is best shown in Figure 2 at 6, these walls are stiffened, and of course, they are stiffened vertically by the interlocking hinge eyes that receive the hinge pins 3.

A bottom 8 of a size to close in the space within the enclosure defined by the walls 1 and 2, is hingedly or otherwise movably mounted upon one of the walls, such as a side wall 1, the hinge being indicated at 9 in Figure 2. Along at least its opposite edge, and preferably along all its other edges, the bottom is flanged as indicated at 10 to interfit with the flanges 6 of the other walls. When thus interfitted the bottom edges are securely and firmly supported, to support in turn the weight of the fruit placed within the box. To further insure the integrity of the bottom, particularly against its being pressed upwardly, a latch 11 is carried on the bottom and engages lockingly beneath the edge of a side wall, or several such latches may be provided.

The box as described thus far constitutes a complete box, entirely suitable for use as a field box, and to it may be applied a cover 13, flanged over at at least two edges, as indicated at 14, to embrace the beads 4 of the side walls, and it might similarly embrace the beads 5 of the end walls, or it may be, and preferably is, flanged at 15 to fit somewhat inside the beads 5 of the end wall.

While the box so far described will constitute an acceptable field box or shipping box, it would not, without more, stack readily. Accordingly, I provide means to enable stacking and to embrace and hold the upper box against relative shifting in a horizontal plane relative to the supporting box, and thereby to transmit compressive loads most directly from the walls of one box to the walls of the box below, rather than through the bottom or top, in part. Since these stacking or stack retaining means should be of a nature that will permit their employment when the box is used as a field box without a cover, and as well when it is used as a shipping box with a cover, and because support of an upper box upon the cover of a lower box is undesirable in any event, it is evident that it is necessary to provide supports for the upper box which, to some degree, span the space within the enclosure defined by the walls 1 and 2 of the box, and which will function whether or not a cover is used, to afford adequate support independently of the cover. While the supports for this purpose as herein shown are provided at the ends only, spanning the space between the two opposite sidewalls, it would be merely an extension of the same principle to span the space between the two end walls instead, or even to span the space across corners between end walls and side walls.

As a convenient means of supporting a stacked box, while still permitting collapse of the box proper, I provide bars 18 which are conveniently formed of stout wire, of a length to extend from one side wall 1 to the other, and to rest upon both, spaced somewhat inwardly from the end walls 2 of the box. These bars are conveniently supported upon arms 19 which for simplicity are formed from the same piece of wire, with their ends turned inwardly, shown at 20, for reception within the beads 5 at the upper edge of the

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end walls, as a hinge. By such means, the bars 18 may be hinged over to overlie the enclosed space as shown at the right in Figure 1, or can be sprung aside to lie outside of, and somewhat below, the top edge of the end wall and in the same general plane as the outwardly directed bead 5 thereof, as shown at the left in Figure 1. By inclining the arms 19 downwardly from the hinge at 20, when the bar 18 rests upon the top edge of the side walls, and by directing the wire upwardly at 22 to the ends of the bar 18, the extensions 22 serve to grip the beads 4, and will yield the extent of the thickness of the flanges 14, thus to hold the bar 18 frictionally in supporting position, and also to retain the cover upon the box.

Such bars will afford support for the box stacked thereabove, but since there should also be means to prevent shifting of the stacked box, as a part of the same piece of wire I provide upwardly directed stops 21 at each end of the bar 18, these continuing on downwardly to constitute the extensions 22 already referred to. The stops 21, which may be designated lateral stops, embrace the sides of the bottom of the box stacked thereabove, to prevent its lateral shifting when so stacked.

It is desirable also to prevent longitudinal shifting of the stacked box, to which end an upwardly directed stop 24 may be formed as part of a clip 25 which is hingedly mounted at 27 upon the bar 18. The clip 25 is of a length to extend from the bar outwardly to and somewhat beyond, the end wall 2, or, otherwise expressed, of a length to extend from the downswung bar 18 over the hinge 5, and to be retained frictionally engaged with the latter. If there is no cover on the box below, the end wall 2 will support the clip in set up position, and the clip in turn will assist in supporting the box stacked above, and the stop 24, cooperating with the similar stop at the opposite end, will embrace the bottom portion of the stacked box and prevent its longitudinal shifting. The two clips function in substantially the same manner if a cover is employed. When the bar 18 is hinged over into the inoperative position, shown at the left in Figure 1, the clip 25 and stop 24 are not appreciably in the way, particularly if the stop be hooked over the upper edge of the end wall 2, in the manner already described.

When the box is to be set up for use the walls are hingedly moved from a flat collapsed condition into a rectangular enclosing position, and the bottom 8, which has been swung up within the collapsed walls, is now swung downwardly about the hinge 9 to engage its flange or flanges 10 with the corresponding flange or flanges 6, and its latch 11 is secured. Now the box is filled, and if used as a field box the bars 18 are thrown into stack supporting position, the clips 25 also fall into operative position, and a number of such boxes may be stacked one upon the other. If the box is to be used for shipping, a cover 13 is placed upon it, the bars 18 are moved into operative position wherein they retain the cover securely in place, and wherein they assist in supporting a box stacked thereupon. The lateral stops 21 and the longitudinal stops 24 automatically assume their operative position and enable stacking of the boxes.

Although openings and cracks are inevitable in such a box, if additional ventilation is desired various holes may be provided in the walls of the box, as shown at 29, and handholds or slots

for lifting the box are provided at 30 in the end walls, or as custom or convenience may make desirable or necessary

Securement of the cover merely requires tying together the bars 18, and its removal requires no more than the breaking of such ties and swinging upward of these bars, to disengage the extensions 22. When the contents have been emptied, it is only necessary to disengage the latch 11 in order to swing the bottom upwardly and thereby enable collapse of the walls, hinging at 3 one upon the other. The parts are sufficiently thin and light that a large number of such boxes may be stacked or packaged and shipped readily to a collecting point for re-use.

It has been found that notwithstanding the somewhat greater initial cost of such boxes as compared to wooden boxes, their useful life is so much longer than the life of a wooden box, that even considering the cost of repeated re-shipment, they are still, in the end, much more inexpensive than wooden boxes.

I claim as my invention:

1. A box comprising side and end walls and a bottom, and a cross bar at each end having supporting arms pivotally mounted at the top of the corresponding end wall to swing about a transverse axis, thus to shift each cross bar from a stack-supporting position, wherein it extends between and rests upon the opposite side walls, spaced inwardly from the corresponding end wall, to an inoperative position wherein it lies outside of and below the level of the upper edge of such end wall, a longitudinal clip supported from each cross bar, and in the latter's stack-supporting position extending outwardly beyond the upper edge of the respective end walls, and a stop projecting upwardly from the clip when the latter is so disposed, to embrace between the longitudinal stops at the opposite end walls the bottom portion of a superimposed box.

2. A box as in claim 1, wherein each longitudinal stop is pivotally supported upon its corresponding cross bar intermediate the latter's ends, to hang therefrom in the latter's inoperative position, and is of a length to rest upon the corresponding end wall for support, when parts are in stack-supporting position.

3. A box as in claim 1, wherein the cross bar supporting arms are located outwardly of the opposite side walls, and in stack-supporting position of the parts extend downwardly from their pivotal mounts and closely embrace these side

walls to retain the cross bars in such position, the box including also lateral stops carried at the ends of each cross bar, which in stack-supporting position of the parts project upwardly above the level of and lie outside the plane of the respective side walls, to embrace between them the bottom portion of a super-imposed box.

4. A box comprising side and end walls and a bottom, a wire bent to define pivot trunnions inwardly directed at each end, two supporting arms, one at each end, formed as a generally radially directed continuation of the respective trunnions, and an intermediate cross bar portion, each such wire being pivotally mounted by its trunnions in the upper edge of each of two opposite walls of the box, its supporting arms and its cross bar portion being respectively of such length that in a stack-supporting position its cross bar portion rests upon and extends between the upper edges of the walls intermediate the trunnion-pivoting walls, and the supporting arms extend alongside and embrace between them such intermediate walls, each wire also including an extension directed upwardly, when parts are in such stack-supporting position, and located intermediate the outer ends of the arms and the cross bar portion, said extensions being located outside the planes of the respective intermediate walls, and extending upwardly to embrace between them, as stops, the lower portion of a superimposed box, and a clip pivotally mounted upon the cross bar portion of each wire, of a length to extend beyond and rest upon the upper edge of each trunnion-pivoting wall, and a stop which, when parts are in such stack-supporting position, projects upwardly above the level of the upper edge of said wall, and in cooperation with the opposite stop restrains horizontal displacement of a superimposed box.

AUGUST C. ERTNER.

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