April 6, 1965 G. E. SEGER, JR 3,176,898

BOX CONSTRUCTION

Filed Feb. 1, 1963 3 Sheets-Sheet 1

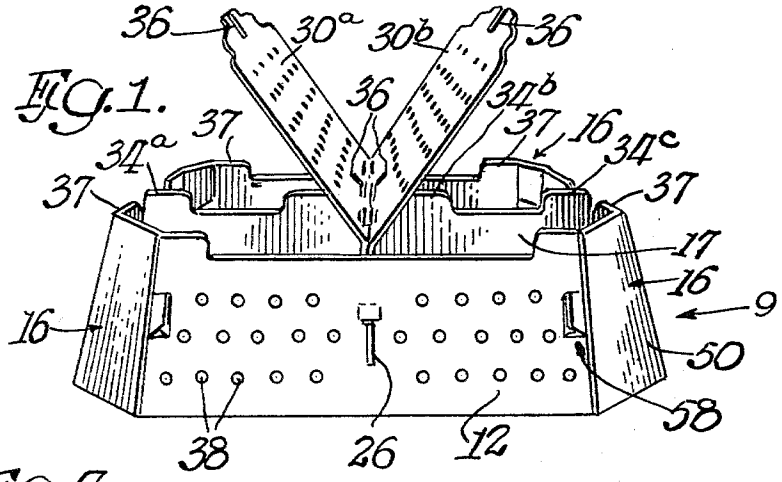


FIG. 1.

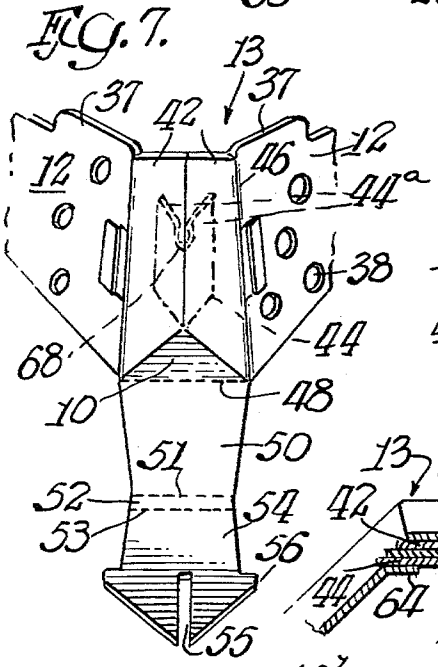


FIG. 7.

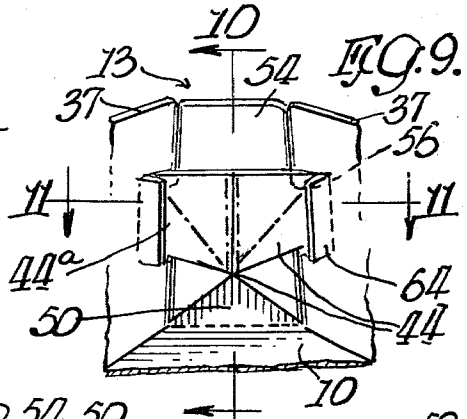


FIG. 9.

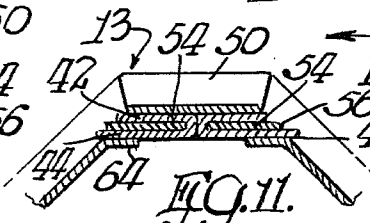


FIG. 11.

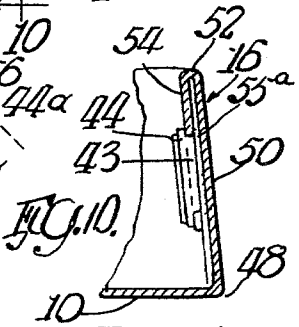


FIG. 10.

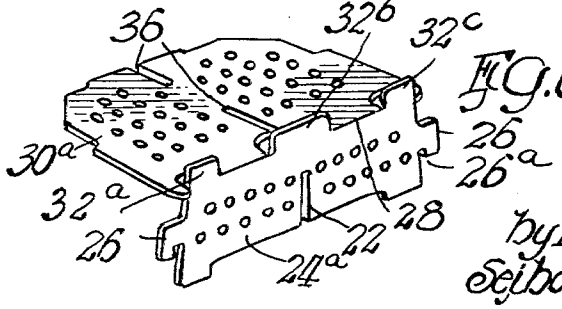


FIG. 6.

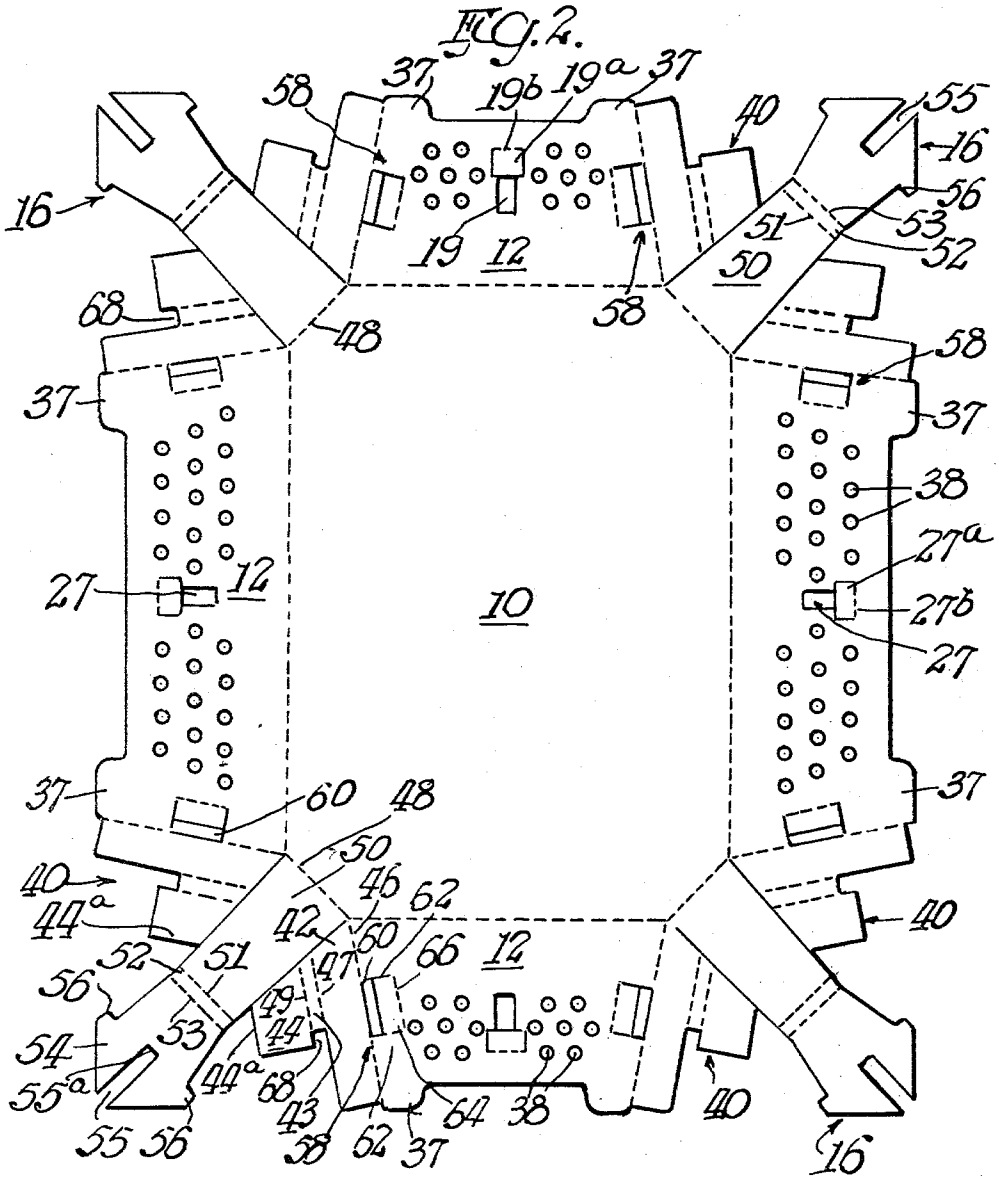
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BOX CONSTRUCTION

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FIG. 2.



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BOX CONSTRUCTION

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FIG. 3.

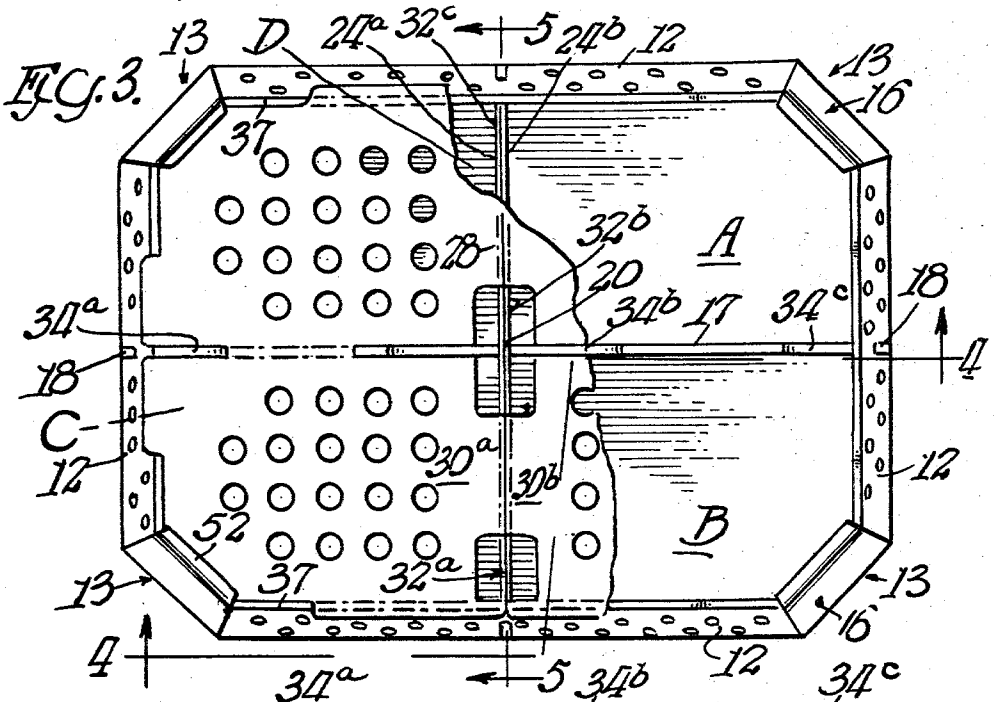


FIG. 4.

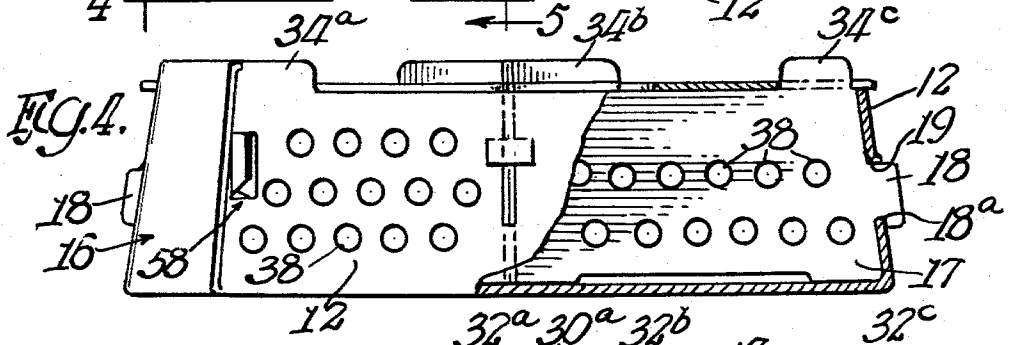
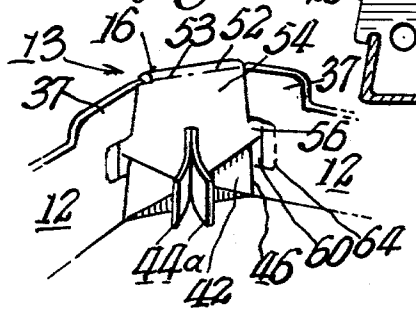


FIG. 8.



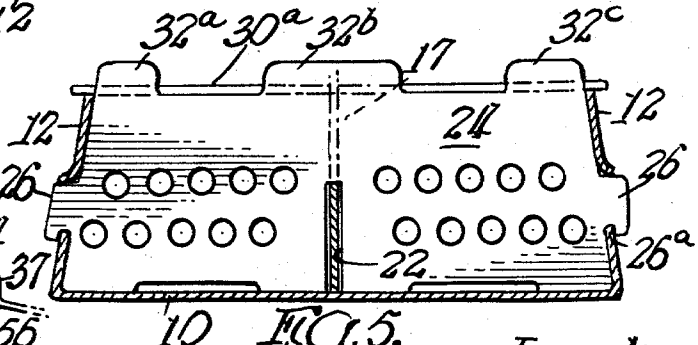


FIG. 5.

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BOX CONSTRUCTION

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Filed Feb. 1, 1963, Ser. No. 255,535
11 Claims. (Cl. 229—6)

This application relates to an improved box construction and more particularly to boxes adapted for use in shipping live poultry or the like.

In such boxes it is desirable that they be formed from relatively flat inexpensive fiberboard material, be capable of being shipped or stored in a flat or collapsed condition, and be capable of being readily assembled or set up manually at the time the box is to be used. Furthermore, it is important that the interior of the box be readily capable of being properly ventilated, at all times, particularly when such box is accommodating live poultry and such box is arranged in stacked relation with other boxes of like configuration. It is also essential that a box of this type be sufficiently strong to resist collapsing when a large number of loaded boxes are stacked thereupon.

Various boxes of this general type have heretofore been proposed but because of certain design characteristics have not effectively fulfilled the above-noted requisites.

Thus, it is one of the objects of this invention to provide a poultry box which meets the requisites aforenoted.

It is a further object of the present invention to provide an improved box construction which is formed of inexpensive fiberboard material and yet is provided with strengthened corner assemblies which are capable of resisting collapse when subjected to high load factors.

Another object of the present invention is to provide an improved box capable of being shipped or stored in a flat or collapsed condition and then subsequently easily and quickly set up manually for use.

A further object of the present invention is to provide an improved box construction which may be assembled without the need for adhesives or other fastening materials.

It is a still further object of this invention to provide an improved box wherein the interior thereof is capable of effective ventilation notwithstanding that such boxes are arranged in stacked as well as side-by-side relation.

Other and further objects of the present invention will be apparent to those skilled in the art by reference to the accompanying specification, drawings and claims.

In one embodiment of the present invention, there is provided an improved box construction having a bottom-wall, side walls foldably connected to the periphery of said bottom wall and extending upwardly therefrom. Disposed intermediate the side walls are corner assemblies. Each assembly includes a first element which is foldably connected to the periphery of the bottom wall. Each corner assembly also includes second elements foldably connected to the adjacent peripheral portions of the adjoining side walls. The second elements have corresponding first portions arranged in abutting coplanar relation and corresponding second portions foldably connected to the abutting segments of said first portions and extending inwardly therefrom. The first element of the corner assembly overlaps the exterior and interior surfaces of the abutting coplanar first portions. The first and second elements of the corner assembly interlock with one another to retain the coplanar first portions in abutting relation.

Reference will now be made to the accompanying specification and drawings in which:

FIG. 1 is a perspective view of a box constructed in accordance with the present invention and showing a cover thereof in an open position;

FIG. 2 is a plan view of a blank from which may be formed the bottom wall, the four side walls, and the corner assemblies of the box illustrated in FIG. 1;

FIG. 3 is a plan view of the box shown in FIG. 1 and with the cover thereof partly cut away;

FIG. 4 is an elevational view partially in longitudinal section; said section being taken along line 4—4 of FIG. 3;

FIG. 5 is a transverse sectional view taken along line 5—5 of FIG. 3;

FIG. 6 is a fragmentary perspective view of the cover and the transverse divider member integral therewith which are utilized in the box illustrated in FIG. 1;

FIG. 7 is an enlarged fragmentary perspective exterior view of a corner assembly for the improved box and showing the corner assembly in a partially set-up condition;

FIG. 8 is a fragmentary perspective interior view of the corner assembly shown in FIG. 7 and in a further, yet partial, state of set-up;

FIG. 9 is an enlarged fragmentary perspective interior view of the corner assembly shown in FIG. 8 and in a fully set-up condition;

FIG. 10 is a fragmentary vertical sectional view taken along line 10—10 of FIG. 9; and

FIG. 11 is a fragmentary horizontal sectional view taken along line 11—11 of FIG. 9.

Referring now to the drawings, a box 9, suitable for transporting live poultry (chicks) or the like is shown which comprises an imperforate bottom wall 10 and four apertured side walls 12 integral with and foldably connected to the periphery of said bottom wall. Between each two adjacent side walls 12 is provided a corner assembly 13, the exterior portion of which comprises a fork-like first member 16, see FIG. 2, which will be described in more detail hereinafter. The box 9, except for certain component parts, to be hereinafter enumerated, is preferably formed from a single blank 11 of stiff, yet foldable flat material, such as double-faced corrugated fiberboard. The form of the blank 11 is shown generally in FIG. 2, wherein the solid internal lines indicate cutting lines, and the dashed internal lines indicate folding scores.

An apertured longitudinal divider member 17, see FIGS. 3 and 4, is also provided, which is formed from a separate blank and is disposed within the interior of the set-up box so as to extend normal to the bottom wall 10. Formed on the opposed narrow peripheral portions of member 17 are protruding tabs 18 which are adapted to extend through suitable slots 19 formed in the corresponding opposed side walls 12, see FIG. 2. A vertical, centrally disposed slot 20 (see FIG. 3) is provided in the upper portion of member 17. The slot 20 at one end opens at the upper peripheral segment of the member 17 and at the other end terminates within the member slightly below mid-height thereof. Slot 20 interlocks with a corresponding inverted centrally disposed vertical slot 22 which is formed in the lower part of a transverse divider member 24, see FIG. 5. The opposed narrow peripheral portions of transverse divider member 24 are provided with protruding end tabs 26 which extend through suitable slots 27 formed in the other two corresponding opposed side walls 12, see FIG. 2.

In the illustrated embodiment the transverse divider member 24 is formed of two connected sections 24*a* and 24*b* which are of like configuration, see FIGS. 3 and 4, and each section, in turn, is integral with and foldably connected along a score 28 to an apertured cover member 30*a* or 30*b*, see FIG. 6. Each cover member 30*a* or 30*b*, as seen in FIG. 3, is adapted to overlie and close off one half the open top formed by blank 11 when it is in set-up conditions. By reason of folding scores 28, the

cover members 30*a* and 30*b* are adapted to be pivoted to open positions as shown in FIG. 1. Each divider section 24*a* or 24*b* has formed in the upper peripheral segment thereof three upwardly extending tabs 32*a*, *b*, and *c* which are struckout from the corresponding cover member when the divider section is folded relative to the cover member along the score 28.

The longitudinal divider member 17 in a like member is provided with three tabs 34*a*, *b* and *c* which project upwardly from the upper peripheral segment thereof. Tabs 34*a*, *b* and *c* are adapted to extend through suitable slots 36 provided in cover members 30*a* and 30*b*, see FIG. 1. Accordingly, when the cover members 30*a* and *b* are closed by pivoting them into positions parallel with bottom wall 10, the tabs 32*a*, *b* and *c* and 34*a*, *b* and *c* will project upwardly above the plane of the closed cover members and operate to contact the underside of the bottom wall 10 of a box stacked thereabove and maintain the same in spaced relation from the cover members. By reason of this spaced arrangement, an effective air passage is provided between adjacent stacked boxes, and thus, a fresh supply of air may be circulated through the cover apertures 38 to the interior of the lower box.

Each apertured side wall 12 is provided on the upper peripheral segment thereof with a pair of spaced tabs 37, which project above the plane of the closed cover members the same distance as tabs 32*a* and *b* and 34*a* and *b*, aforedescribed and serve the same function as the latter tabs.

Divider members 17 and 24 cooperate with one another to form the interior of the box into four compartments A, B, C and D which are of similar configuration. Each compartment is adapted to accommodate live poultry (i.e. chicks) and thus by reason of such divider members the live poultry, while accommodated within the box, are segregated into four groups. The number of divider members may be increased, if desired, to provide greater segregation of the accommodated poultry.

As aforenoted and as illustrated in the drawings each side wall 12, divider member 17 or 24, and cover member 30*a* and *b* is provided with a plurality of apertures 38, which permit ventilation of compartments A, B, C, and D. The size of the aperture is such as to prevent passage therethrough of the accommodated poultry.

It will be noted in FIGS. 2, 4 and 5 that each slot 19 or 27 formed in the side walls 12 has at the upper end thereof a flap 19*a* or 27*a*, respectively, which is connected to the corresponding side wall by a foldline 19*b* or 27*b*. The function of each flap is to lock the respective divider member end tab 18 or 26 in the accommodated side wall slot. As seen in FIGS. 4 and 5, tabs 18 and 26 are undercut to form a recess 18*a* or 26*a* which is adapted to accommodate the portion of the side wall adjacent the bottom of the slot 19 or 27.

It will be noted that the side walls 12 of the set-up box converge toward the open top thereof such that the box has a configuration approximating that of a truncated pyramid. Thus, when two or more boxes are arranged in side by side relation, a V-shaped ventilating passageway will be disposed therebetween which is defined by the sloping side walls of the adjacent boxes. Furthermore, by reason of the inclination of the side walls, the tabs 37 formed thereon will more readily contact the underside of the bottom wall 10 of a similar box disposed thereabove. By reason of the inclination of the side walls and the peripheral configuration of the cover sections 30*a* and 30*b*, the cover sections when moved to a closed position will resiliently slip past the upwardly extending tabs 37. Thus, when the cover sections are in closed positions, the tabs will serve to hold such cover sections in closed positions and resist accidental opening of such sections during handling of the box.

Referring now to FIGS. 7 to 11, the corner assembly 13 at each of the corners of the box is illustrated in various stages of set-up. Each side wall 12 (see FIGS. 2 and 7) is provided wtih a flap 40, having a relatively wide inner section 42 which is foldably connected to the end of the side wall, an intermediate section 43, and a relatively narrow outer section 44. A folding score 46 provides the junction between the wall 12 and the section 42. A pair of folding scores 47 and 49 are provided which connect the intermediate section 43 to sections 42 and 44, respectively, see FIG. 2.

A fork-like member 16, as shown in FIG. 2, is provided having an inner portion 50 which is connected by folding score 48 to the periphery of bottom wall 10. The outer end of portion 50 is connected by folding score 51 to an intermediate portion 52, which, in turn, is connected by a folding score 53 to an outer portion 54. A slot 55 is provided, at the distal end of outer portion 54, and is adapted to receive the relatively narrow portions 43 and 44 of each flap 40 when the latter is in a predetermined state of fold to be described more fully hereinafter. A pair of laterally extending lugs 56 are provided on the sides of outer portion 54, see FIG. 2, and, when the corner assembly is set up, such lugs are adapted to be disposed within a pair of slots 58, one of which is disposed in each side wall 12 adjacent folding score 46 thereof. The slot 58, in each instance, includes a rectangular hole 60 having a segment of the perimeter thereof defined by score 46. A pair of spaced, parallel cutting lines 62 extend perpendicularly away from the side of hole 60 opposite that formed by score 46. The cutting lines 62 terminate at a folding score 66 so as to form a tab 64, which is foldable inwardly to enlarge the size of the slot 58, if necessary, during set-up of the corner assembly.

Setting-up a corner assembly

Each flap 40 of a corner assembly is folded along score 46 until a position is reached in which the inner section 42 is disposed in substantially coplanar abutting relation with respect to the corresponding section 42 of the other side wall flap forming the assembly. The section 44 of each flap 40 is then folded inwardly as shown in dashed lines in FIG. 7.

Once flap sections of the corner assembly have assumed the position shown in FIG. 7, member 16 is then folded upwardly about score 48 whereby portion 50 thereof overlies the exposed surface of both the coplanar abutting flap sections 42. Portions 52 and 54 of member 16 are then folded inwardly about score 51 so that intermediate portion 52 overlies the upper edges of abutting sections 42. After portion 52 has assumed its overlying position, the outer portion 54 of member 16 is folded downwardly about score 53, whereupon the inwardly folded sections 43 and 44 of the flaps 40 are received within the slot 55 formed in the distal end of member 16. Upon fork member portion 54 assuming its fully downwardly folded position (that is, in a position substantially parallel to previously folded portion 50), the deepest part 55*a* of the slot 55 cooperates with a notch 68 cut into the upper edge of each intermediate portion 43, see FIGS. 2 and 10, and thus, the outer portion 54 is locked in its downwardly folded position. Upon portion 54 reaching its fully downwardly folded position, the laterally extending tabs 56 thereof are caused to extend through slots 58 in the respective side walls 12 and serve to further hold the outer portion 54 in its downwardly folded position.

Subsequent to the member 16 having assumed its fully folded position, flap sections 44 are folded in opposite directions, or back to their sides of origin, about scores 49, until the outer edge segments 44*a* thereof are likewise accommodated in the respective slot holes 60 in the side walls, see FIGS. 9–11.

Once the corner assembly 16 has assumed set-up condition, an extremely rigid structural wall is provided between the adjacent side walls 12. It will also be appreciated that although the slot 55 of member 16 func-

tions to hold the two flap sections 43 in abutting face to face relation, the normal force exerted upon flaps 40 when the box is in stacked position, tends to urge these flap sections together due to the downwardly and inwardly extending attitude of the side walls 12. This force exerted upon flaps 40 stems from a compressive force which is exerted upon side walls 12, from the boxes stacked thereabove. The compressive force, tends to cause the side walls to collapse inwardly, however, this force is resisted by the flap sections 42 which are held in abutting coplanar relation by member 16. Outer portion 54 of member 16 also provides added resistance to the compressive force tending to collapse the side walls inwardly. This added resistance of portion 54 is by virtue of its bridging the interior surfaces of the two adjacent side walls 12. Tab 64, forming a part of each slot 58, by virtue of its normal resiliency, urges the flap section 44 of each flap 40 into engagement with member tab 56.

A further means of resisting collapse of the side walls 12 is effected by divider members 17 and 24, and also the cover members 30*a* and *b*, when the latter are in their closed position.

Although the present invention has been described in connection with a hinged nonremovable cover member 30, this is not essential to the invention, and may be replaced by a unitary removable cover member cut from a separate blank of material, not shown. The transverse divider member 24 in such an embodiment could be the same as member sections 24*a* and *b* with a cutting line being substituted for score 28, or, on the other hand, such divider could be represented by but one section 24*a* or 24*b*. The configuration of such unitary cover would be akin to that effected by cover members 30*a* and *b* being joined together along scores 28. Such unitary cover would be apertured and possessed of suitable slots to accommodate the tabs 34*a*, *b* and *c* of divider member 17 and tabs 32*a*, *b* and *c* of divider member 24.

While the improved box construction has heretofore been described in relation to its use for accommodating live poultry, it is to be understood of course that it is not limited thereto, as it may be readily used for accommodating many other types of products. Furthermore, the ventilating holes 38 may be arranged differently from that shown and added to the bottom wall as well. On the other hand, such ventilating apertures may be eliminated entirely, if desired, depending upon the type of product accommodated. The number and configuration of the divider members may also vary from that shown and described.

Thus, it will be seen that an improved box construction has been provided which is formed of inexpensive foldable material and yet is possessed of a high degree of structural stability capable of supporting high load factors. The improved box construction is also capable of assuming a compact collapsed condition, when desired, so that numerous collapsed boxes may be stored or transported in bulk without occupying a large space.

The improved box is readily capable of being set up manually at its place of use and does not require tape, adhesive, staples, or other similar fastening means to retain the box in its set-up condition. The set-up box provides adequate means for ventilating the interior thereof notwithstanding that several of the boxes are arranged in stacked and/or side-by-side relation.

In addition to the exemplary embodiments of my invention, it will be apparent to those skilled in the art that additional modifications and changes may be made without departing from the scope of my invention.

I claim:

1. A foldable box construction for accommodating live poultry or the like comprising a bottom wall, a plurality of side walls foldably connected to the periphery of said bottom wall, and corner assemblies disposed intermediate and connecting adjacent side walls; each corner assembly including a first element foldably connected to the periphery of said bottom wall, and second elements foldably connected to adjacent peripheral portions of said side walls, said second elements having corresponding first portions disposed in coplanar edge abutting relation and corresponding second portions foldably connected to said first portions; the first element of said corner assembly sequentially overlapping the exterior and interior surfaces of the coplanar abutting first portions of said second elements and having its end portions cooperating with the second element second portions to effect interlocking of said first and second elements.

2. The box construction recited in claim 1 wherein the side walls and the corner assemblies extend upwardly and inwardly from the periphery of said bottom wall.

3. The box construction recited in claim 1 wherein the second portions of the second elements of each corner assembly interlockingly engage the portions of said side walls adjacent said corner assembly to retain said first element in overlapping relation with respect to the coplanar abutting portions of said second elements.

4. The box construction recited in claim 1 wherein the first element of each corner assembly includes a portion thereof which straddles segments of said second element corresponding second portions and retains the second element first portions in abutting relation.

5. A foldable box construction for accommodating live poultry or the like comprising a bottom wall, a plurality of apertured side walls foldably connected to the periphery of said bottom wall and extending upwardly and inwardly therefrom, and corner assemblies interposed said side walls and interconnecting same; each corner assembly including a first element foldably connected to the periphery of said bottom wall, and second elements foldably connected to adjacent peripheral portions of said side walls; said second elements having corresponding first portions disposed in coplanar edge abutting relation, and corresponding second portions disposed inwardly of said first portions and foldably connected to the abutting segments of said first portions; said first element sequentially overlapping the exterior and interior surfaces of said coplanar abutting first portions of said second elements and having its end portion disposed in interlocking relation with the second portions of said second elements.

6. A foldable box construction for accommodating live poultry or the like comprising a bottom wall; a plurality of side walls foldably connected to the periphery of said bottom wall; corner assemblies disposed intermediate and connecting adjacent portions of said side walls; said side walls, corner assemblies, and bottom wall cooperating with one another to form a chamber; and divider means disposed within said chamber and cooperating with said side walls to effect compartmenting of said chamber; each corner assembly including a first element foldably connected to the periphery of said bottom wall, and second elements foldably connected to adjacent peripheral portions of said side walls, said second elements having corresponding first portions disposed in coplanar edge abutting relation and corresponding second portions foldably connected to said first portions, the first element of said corner assembly sequentially overlapping the exterior and interior surfaces of the coplanar abutting first portions of said second elements and having its end portion cooperating with the second element, second portions to effect interlocking of said first and second elements.

7. The box construction recited in claim 6 and including a cover for said chamber, said cover, when in closed position, frictionally engaging the upper peripheral portions of said side walls and said divider means; said side walls having upper peripheral portions thereof projecting above the plane of said cover when the latter is in closed position.

8. The box construction recited in claim 6 wherein said

side walls, divider means, and said cover are apertured to permit ventilation of said compartmented chamber.

9. The box construction recited in claim 6 wherein said cover and said divider means have portions thereof integral and foldably connected to one another.

10. A blank of foldable sheet material for forming a box construction adapted for use in accommodating live poultry or the like; said blank comprising a bottom-forming first panel, a plurality of side wall-forming second panels symmetrically arranged about the periphery of said first panel and foldably connected thereto, and corner-forming third panels disposed intermediate said second panels and foldably connected to the periphery of said first panel, the outer portion of each third panel being provided with an elongated slot, the axis of said slot being normal to the foldline between said first and third panels, the outer portion of each third panel being provided with transversely extending protuberances; each second panel being provided with laterally extending foldable flaps joined thereto by fold lines, said flaps being separated from, but adjacent to, said third panels, each third panel and said adjacent flaps being adapted to cooperate with one another to form a corner when said blank is set up to form a box, each of said second panels being provided with an aperture adjacent the foldline between said second panel and said flap, said aperture being adapted to interlockingly accommodate a peripheral portion of the adjacent third panel when said blank is set up to form a box.

11. The blank recited in claim 10 wherein each flap has the outer periphery thereof provided with a notch which is spaced from the foldline between said second panel and said flap and is spaced from the peripheral portion of said flap furthest removed from said foldline.

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