

March 21, 1967

J. E. DUNCAN

3,310,221

CONTAINER AND BLANK THEREFOR

Filed March 30, 1965

5 Sheets-Sheet 1

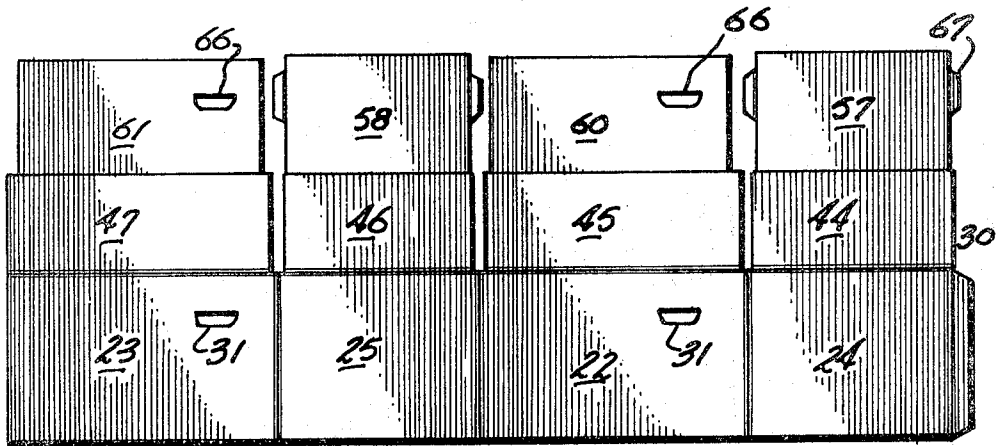
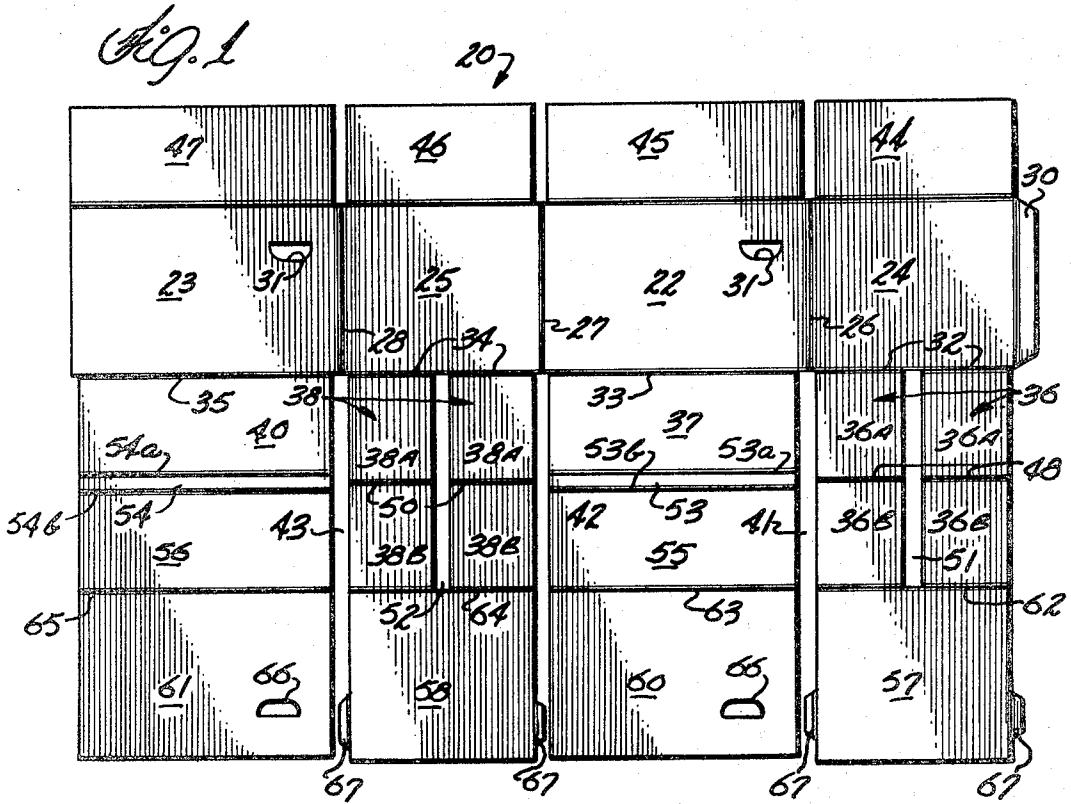


Fig. 2

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5 Sheets-Sheet 2

Fig. 3

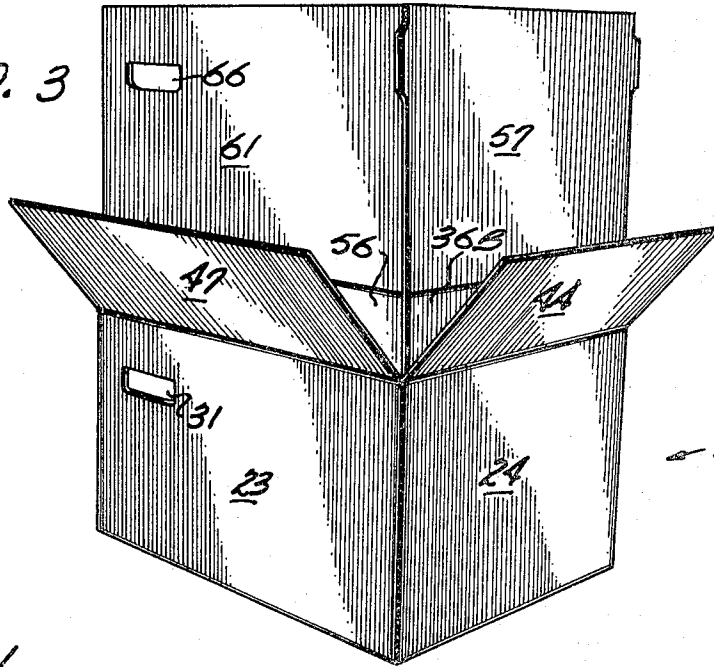
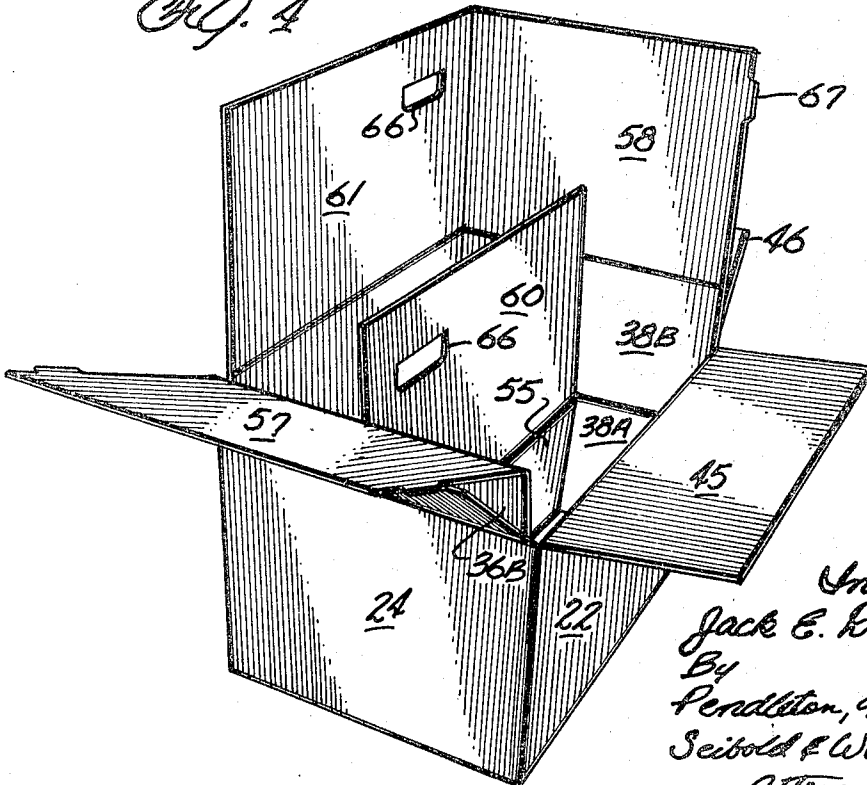


Fig. 4



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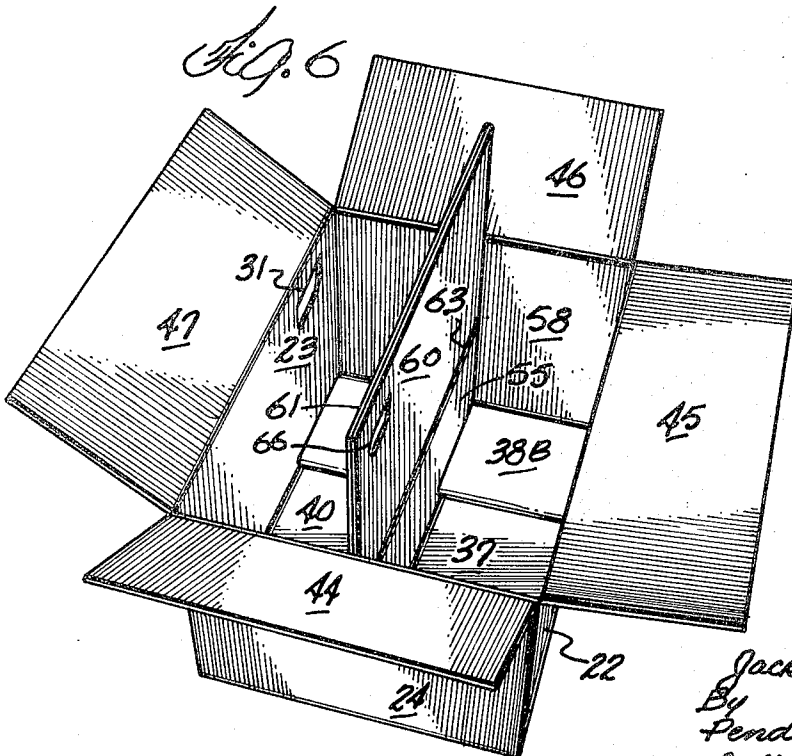
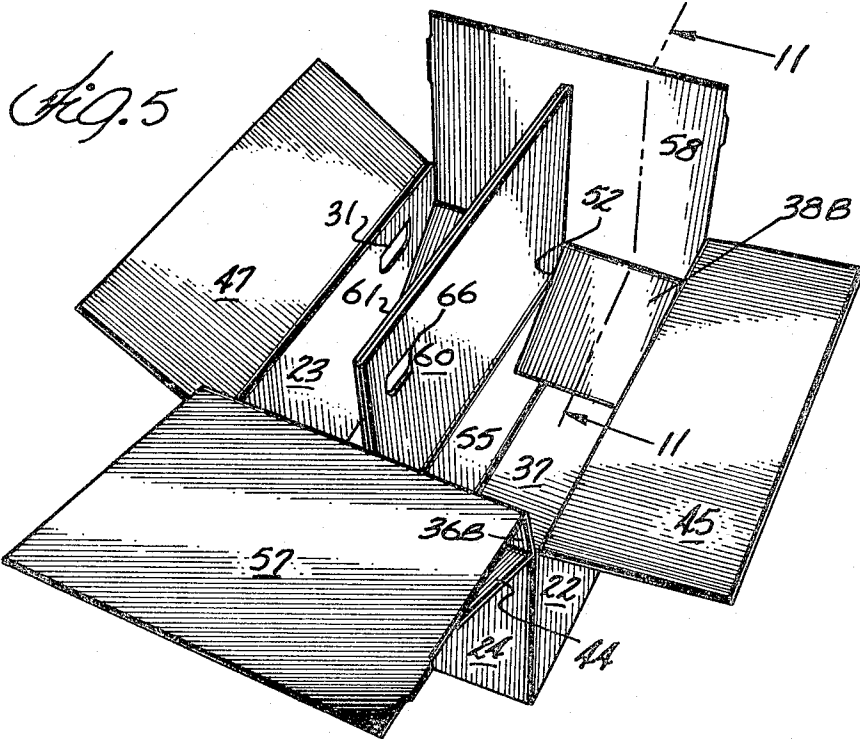
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5 Sheets-Sheet 3



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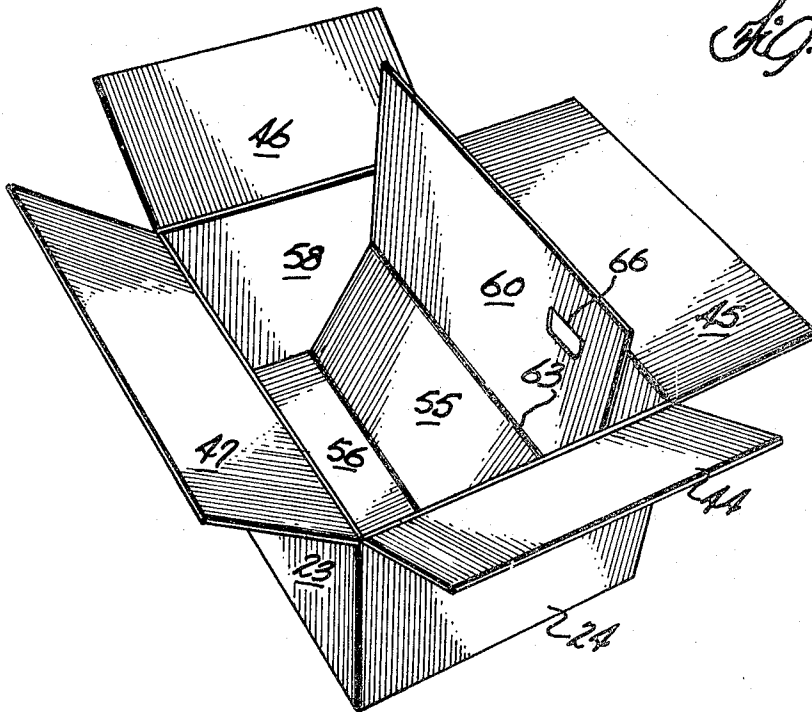


Fig. 7

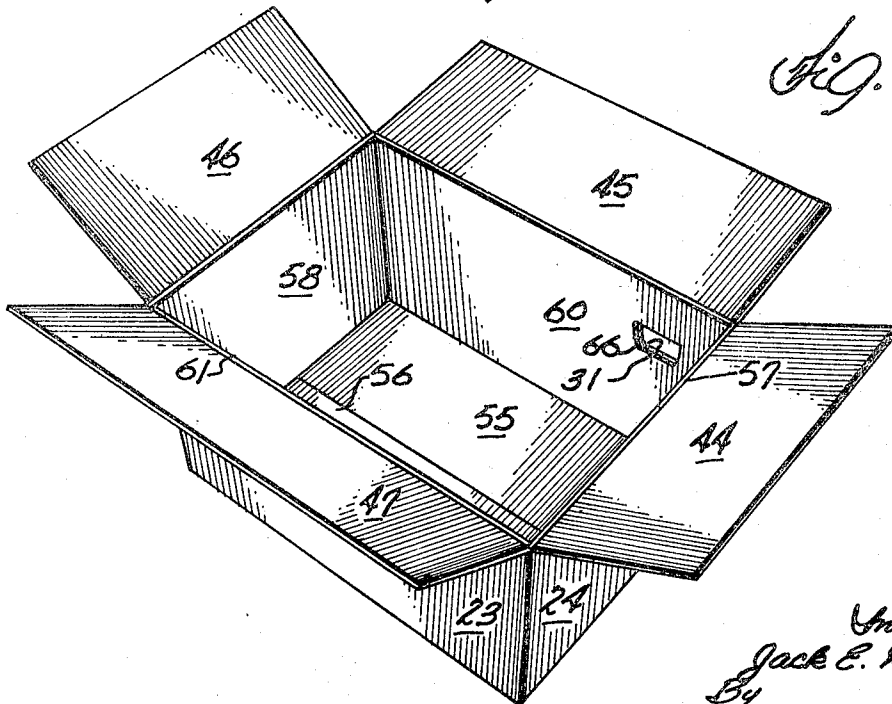


Fig. 8

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5 Sheets-Sheet 5

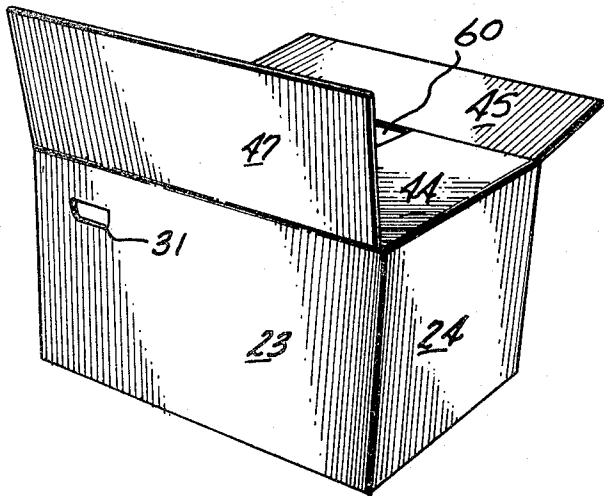


Fig. 9

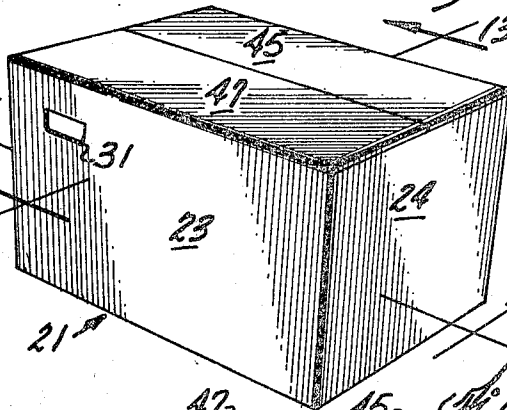


Fig. 10

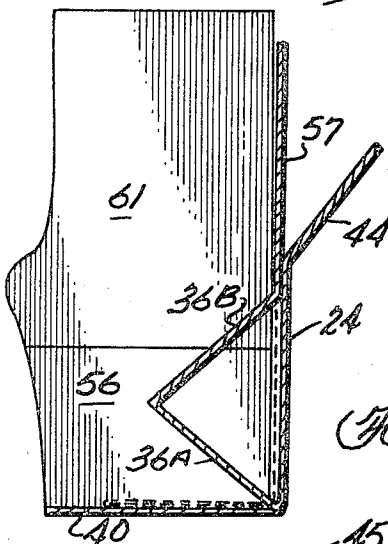


Fig. 11

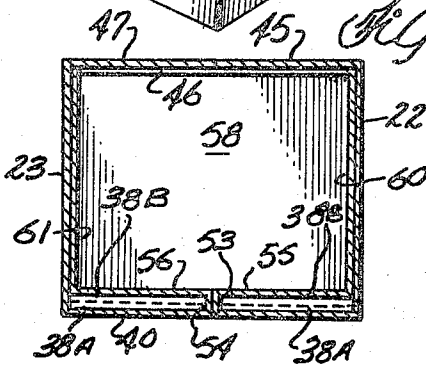


Fig. 13

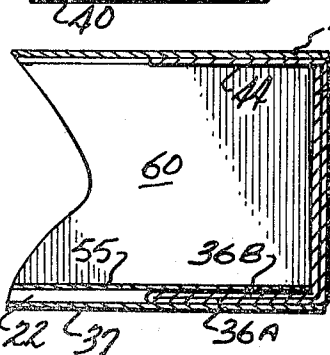


Fig. 12

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1

3,310,221

CONTAINER AND BLANK THEREFOR

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19 Claims. (Cl. 229—37)

This invention relates to a container, blank therefor, and method of erecting said container wherein the latter is of a self-locking reinforced type.

In the packing of various heavy articles, such as metal castings and the like, in corrugated containers for shipment in interstate commerce, it is necessary that said containers meet certain rigid structural requirements of the uniform freight classification. Compliance with these requirements is normally satisfied by the utilization of one or more thicknesses of corrugated fibreboard in the bottom, and/or side walls, and/or end walls, and/or top of the container. The manner of compliance with such requirements will depend upon the shape, size and weight of the article being packaged and the type of corrugated fibreboard to be used.

Various containers of the type in question, sometimes referred to as high density shipping containers, have heretofore been proposed which are of such design as to be beset with one or more serious shortcomings. Examples of these shortcomings are (a) requirement of a plurality of individual parts or inserts to form the erected container; (b) requirement of a container blank having a configuration which results in a considerable amount of material waste; and (c) difficulty in erecting the container either manually or by automatic machinery.

Thus, it is one of the objects of this invention to provide a self-locking reinforced container which is not beset with any of the aforementioned shortcomings.

It is a further object of this invention to provide a self-locking reinforced container, the exterior of which is of conventional configuration and yet may have the bottom, top, side walls, and/or end walls of multi-thickness.

It is a still further object of this invention to provide a self-locking reinforced container which may be readily stored or shipped in bulk in a collapsed compact tubular condition.

It is a still further object of this invention to provide a self-locking reinforced container which is simple in construction, inexpensive to produce, and complies with the rigid requirements of the uniform freight classification.

In accordance with one embodiment of this invention a high density shipping container is provided which is adapted to be formed from a sheet of corrugated fibreboard material. The container in question includes a multi-thickness bottom, multi-thickness side and end walls, and closure flaps foldably connected to the upper edges of said side and end walls. Each of the side and end walls comprises an inner panel and an outer panel disposed in face to face engagement; the outer panels are foldably connected so as to delimit the bottom. The bottom includes a pair of lower panels disposed in coplanar relation; the outer edges of the lower panels are foldably connected to the lower edges of the side wall outer panels and the inner edges of the lower panels are disposed in close proximity to one another. The bottom also includes a pair of intermediate panels, each intermediate panel comprises a pair of like sections disposed in overlapping relation with one another and said sections overlapping a lower panel. The lowermost (or first) section of each intermediate panel has the outer edge thereof foldably connected to the lower edge of an end wall outer panel. The inner edge of the first section is foldably connected to a corresponding edge of an up-

2

permost (or second) section of said intermediate panel. The opposite, or outer, edge of the second section is foldably connected to the lower edge of the inner panel of an end wall. Each pair of intermediate sections is provided with an elongated slot disposed substantially normal to the plane of the end wall and interrupting the foldline connection between said pair of sections. Substantially like portions of the slot are formed in each intermediate section.

The bottom also includes upper panels which overlie the pair of intermediate panels and the under panels. Each upper panel has an inner edge foldably connected to the corresponding inner edge of the lower panel overlaid by said intermediate and upper panels. The outer edge of each upper panel is foldably connected to an inner side wall panel.

The end portions of the foldably connected upper and lower panels are adapted to be disposed within the intermediate section slots and thus effect interlocking of the upper, intermediate, and lower panels forming the bottom of the container.

For a more complete understanding of this invention reference should be made to the drawings wherein:

FIG. 1 is a top plan view of a blank for one form of the improved container.

FIG. 2 is a top plan view similar to FIG. 1 but showing the blank in an initial folded condition.

FIG. 3 is a perspective view of the initially folded blank of FIG. 2 but showing such blank set up to form a tubular member.

FIGS. 4-8 are similar to FIG. 3 but show subsequent steps in the setting up of the container.

FIG. 9 is a perspective view of the set-up container showing the closure flaps thereof in partially closed condition.

FIG. 10 is a perspective view of the improved container in a fully set-up condition.

FIG. 11 is a fragmentary sectional view taken along line 11-11 of FIG. 5.

FIG. 12 is a fragmentary sectional view taken along line 12-12 of FIG. 10.

FIG. 13 is a sectional view taken along line 13-13 of FIG. 10.

Referring now to the drawings and more particularly to FIG. 1, a blank 20, preferably formed from a sheet of double-faced corrugated fibreboard material, is shown which is adapted to be set up to form a reinforced container 21, see FIG. 10, suitable for use as a high density shipper. The illustrated blank 20 is provided with a plurality of foldlines and cuts which cooperate to form a pair of outer side wall panels 22 and 23 and a pair of outer end wall panels 24 and 25. Panels 22-23 and 24-25 are arranged in alternate side by side relation and are separated from one another by spaced parallel foldlines 26, 27, and 28. To the outer edge of end panel 24 is foldably connected a flap 30 which is adapted to be secured by adhesive or staples to the outer edge portion of side panel 23 when the blank is set up to form the container 21. Panels 22 and 23 may be provided with handholes 31 to facilitate lifting of the container.

Connected by coaxial foldlines 32, 33, 34 and 35 to the lower edge of panels 24, 22, 25 and 23, respectively, see FIG. 1, are intermediate bottom panel 36, lower bottom panel 37, intermediate bottom panel 38, and lower bottom panel 40. Panel 36 is separated from panel 37 by a wide cut 41, which is disposed normal to foldlines 32-33. In a like manner panel 38 is separated from adjacent panels 37 and 40 by wide cuts 42 and 43. To the opposite edges of panels 24, 22, 25 and 23 are foldably connected closure flaps 44, 45, 46 and 47, respectively.

Each of the intermediate bottom panels 36 and 38 is of like construction and includes a first panel section 36A and 38A and a second panel section 36B and 38B. The first and second sections of each intermediate panel are of like configuration and are connected to one another by foldlines 48 and 50. Disposed centrally of each intermediate panel 36 or 38 is an elongated slot 51 or 52. Each slot is disposed normal to foldline 48 or 50 and extends in the illustrated embodiment the full length of the respective intermediate panel.

Connected by means of double foldlines 53 and 54 to the lower edges of lower bottom panels 37 and 40, as seen in FIG. 1, are upper bottom panels 55 and 56, respectively. Panels 37-55 and 40-56 cooperate, in a manner to be described more fully hereinafter, with intermediate panel sections 36A-B and 38A-B, respectively, to form a multi-thickness bottom for the erected container.

To the lower edges of panel sections 36B and 38B and panels 55 and 56 in the illustrated embodiment are foldably connected inner end and side wall panels 57-58 and 60-61, respectively. The foldline connections 62, 63, 64 and 65 for panels 57, 60, 58 and 61, respectively, are arranged in coaxial alignment, see FIG. 1. Panels 24-57, 25-58, 22-60 and 23-61 cooperate with one another to form multi-thickness end and side walls in the erected container. Panels 60 and 61 may be provided with handholes 66 which are adapted to register with the corresponding handholes 31 formed in outer side wall panels 22 and 23 when the container is set up.

It will be noted that blank 20 has a substantially rectangular peripheral configuration and thus, reduces material waste to a minimum. The size and shape of blank 20 may vary from that shown without departing from the scope of the invention and will depend upon the exterior design of the set-up container and upon the desired thickness of the various walls and bottom forming said container.

The method of setting up the container 21 is illustrated in FIGS. 2-10. Initially blank 20 is folded along coaxial foldlines 32, 33, 34 and 35 so that the outer side and end panels and the corresponding closure flaps connected thereto overlie the remainder of the blank, as seen more clearly in FIG. 2. After the initial fold of blank 20 has been completed, the blank is then folded further so as to form a tubular member A, see FIG. 3. Prior to the tubular member being formed flap 30 is secured to the interior (or exterior) surface of outer side panel 23 by suitable means such as adhesive or staples.

Upon the blank assuming the position A whereby end panels 24 and 25 are disposed in parallel relation with respect to one another and side panels 22 and 23 are disposed in a like manner, lower bottom panels 37 and 40 are folded toward one another so as to assume a substantially coplanar relation. Simultaneously with the folding of panels 37 and 40, the remainder of the panels 55 and 60, and 56 and 61, respectively, are moved into face to face substantially parallel upright positions, see FIGS. 4-6. It is to be noted that, in assuming their upright positions, panels 55-60 and 56-61 move about the corresponding segments 53a and 54a of the respective double foldlines 53 and 54 as axes.

Once panels 55-60 and 56-61 have assumed their upright positions, shown in FIG. 5, the inner end wall panels 57 and 58 are pushed downwardly causing the respective intermediate panel sections 36A-B and 38A-B to fold relative to one another whereby panel sections 36B and 38B will overlie sections 36A and 38A, respectively. Prior to the downward movement of end wall panels 57 and 58, it is necessary that the respective edges of upright panels 55-60 and 56-61 be in alignment with slots 51 and 52 formed in the intermediate panels 36 and 38. By reason of slots 51 and 52, panel sections 36A-B and 38A-B are adapted to assume substantially

horizontal positions whereby they partially overlie lower bottom panels 37-40, see FIG. 6.

With the intermediate panel sections in such folded positions, panels 55 and 56 are now capable of being folded about second corresponding segments 53b and 54b of the double foldlines 53 and 54 so as to overlie intermediate panel sections 36B and 38B. The spacing between the segments of each double foldline is such as to compensate for the combined thicknesses of the sections of each intermediate panel. Upon panels 55-56 being folded relative to one another so as to assume substantially coplanar relation, inner side wall panels 60 and 61 are simultaneously folded about the aligned foldlines 63 and 65 into face to face substantially parallel relation with respect to the outer side wall panels 22 and 23, see FIGS. 7 and 8.

The multi-thickness construction of the container bottom and end and side walls is clearly shown in FIGS. 12 and 13. It will be noted in FIG. 13, that the double foldline connected edges of panels 37-55 and 40-56 are in substantial abutting relation, and thus panels 37-40 or 55-56 substantially span the distance between the opposed side walls of the erected container. With such a construction the bottom of the erected container is closed. Furthermore, the relative disposition of the upper and lower bottom panels with respect to the intermediate panel sections, when the container is erected, as well as the dimensions of such panels and panel sections are such as to render the container self-locking.

Subsequent to the erected container being loaded, the closure flaps 44 through 47 are folded relative to one another so as to effect closing of the top of the container.

In the illustrated embodiment, it will be noted that the vertical side edges of each inner end wall panel 57 or 58 are provided with laterally extending lugs 67 which are adapted to frictionally engage the inner side wall panels 60 and 61 when the container is erected.

In instances where a closed bottom is not required for the container, the dimensions of panels 37, 40, 55 and 56 taken normal to aligned foldlines 32, 33, 34 and 35, see FIG. 1, may be reduced from that shown. In such a modified construction, two elongated spaced parallel slots would be substituted for the single wide slot in each intermediate panel 36 or 38.

The invention may be further exemplified by a modified container, wherein either or both the end walls and side walls of the erected container are of a single thickness of material. In such a modified construction, all or certain of the panels 57, 58, 60 and 61 may be eliminated. Furthermore, where an open top container is desired, closure flaps 44 through 47 may also be eliminated.

Thus, it will be seen that an improved self-locking reinforced container has been provided which can readily be set up either manually or mechanically from a blank wherein material waste is reduced to a minimum. In addition, the blank, when either fully unfolded or partially folded, may be compactly stored or shipped in bulk with a plurality of like blanks. The change in location and configuration of the handholes or the elimination of such handholes entirely may be effected without diminishing the scope of the invention.

While several embodiments of this invention have been described above, further modifications may be made there-to and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. A self-locking reinforced container formed of foldable sheet material, comprising a multi-panel bottom, and side and end walls cooperating with one another to delimit said bottom, each wall including inner and outer panels, said outer wall panels being foldably interconnected and said inner panels being independent of one another; said bottom including a pair of lower panels,

5

each lower panel having one edge thereof foldably connected to the lower edge of a side wall outer panel, the opposite edge of each lower panel terminating intermediate said side walls; a pair of intermediate panels overlying said lower panels; each intermediate panel having a first section overlaid by a second section foldably connected thereto, one edge of said first section being foldably connected to the lower edge of an end wall outer panel, the opposite second edge of said first section terminating between said end walls and being foldably connected to the corresponding edge of the overlying second section, the opposite edge of said second section being foldably connected to the lower edge of the inner end wall panel; and a pair of upper panels overlying said intermediate panels and said lower panels, each upper panel having one edge thereof foldably connected to the second edge of the lower panel overlaid thereby, the opposite edge of said upper panel being foldably connected to the lower edge of the inner side wall panel, the folding connections between said upper and lower panels and between the upper and lower panels and their respective side wall panels being of substantially equal extent; each pair of intermediate panel sections being provided with an open end slot in which is disposed end portions of the folding connections between the lower panel and the overlying upper panel.

2. The container recited in claim 1 wherein said lower panels and said upper panels cooperate to substantially span the distance between said side walls.

3. The container recited in claim 1 wherein closure flaps are foldably connected to the upper edges of the side and end walls.

4. The container recited in claim 1 wherein each upper panel and the lower panel connected thereto substantially span the distance between said inner end wall panels.

5. The container recited in claim 1 wherein the open end slot formed in each pair of intermediate panels is disposed substantially perpendicular with respect to said end walls.

6. The container recited in claim 1 wherein the inner and outer panels forming a wall are of like configuration.

7. A self-locking reinforced container formed of foldable sheet material, comprising a multi-panel bottom, and side and end walls cooperating with one another to delimit said bottom, said bottom including a pair of lower panels arranged in coplanar relation, each lower panel having one edge thereof foldably connected to the lower edge of a side wall, the opposite second edge of each lower panel terminating intermediate said side walls; a pair of intermediate panels overlying said lower panels, each intermediate panel including a first section overlaid by a second section, one edge of said first section being foldably connected to the lower edge of an end wall, the opposite second edge of said first section terminating between said end walls and being foldably connected to the corresponding edge of said overlying second section, the opposite edge of said second section terminating at the inner surface of the end wall to which said first section is foldably connected; and a pair of upper panels arranged in substantially coplanar relation and overlying said intermediate panels and said lower panels, each upper panel having one edge thereof foldably connected to the second edge of the lower panel overlaid thereby and the opposite second edge of said upper panel terminating at the inner surface of the side wall to which said overlaid lower panel is foldably connected, the folding connections between said upper and lower panels and between the upper and lower panels and their respective side wall panels being of substantially equal extent; each pair of intermediate panel sections being provided with an open end slot in which is disposed the end portion of the folding connection between at least one lower panel and the overlying upper panel.

8. The container recited in claim 7 wherein the end

6

portions of the folding connections between both pairs of upper and lower panels are disposed within the open slots of said intermediate panels.

9. The container recited in claim 7 wherein the upper and lower panels are of substantially like configuration and substantially span the distance between said end walls.

10. The container recited in claim 8 wherein the slotted sections of an intermediate panel are of substantially like configuration and substantially span the distance between said side walls.

11. The container recited in claim 8 wherein the open end slots formed in said pairs of intermediate panel sections are disposed substantially perpendicular to said end walls.

12. A self-locking reinforced container formed of foldable sheet material, comprising a multi-panel bottom, and side and end walls cooperating with one another to delimit said bottom, said bottom including a pair of substantially coplanar lower panels, each lower panel substantially spanning the distance between said end walls and having one edge thereof foldably connected to the lower edge of a side wall, the opposite second edge of each lower panel terminating intermediate said side walls; a pair of intermediate panels overlying said lower panels, each intermediate panel having one edge thereof foldably connected to the lower edge of an end wall, the opposite second edge of each intermediate panel terminating between said end walls; and a pair of substantially coplanar upper panels overlying said intermediate panels and said lower panels, each upper panel substantially spanning the distance between said end walls and having one edge thereof foldably connected to the second edge of the lower panel overlaid thereby and the opposite second edge of said upper panel terminating the inner surface of the side wall to which said overlaid lower panel is connected, each intermediate panel being provided with at least one open end slot for accommodating an end portion of the folding connection between the lower panel and the overlying upper panel.

13. A blank of foldable sheet material for forming a self-locking reinforced container having a multi-panel bottom delimited by side and end walls, said blank comprising two side panels and two end panels arranged in alternate side by side relation, adjacent panels being foldably connected, one edge of each panel being in co-axial alignment, each side panel having a lower bottom-forming panel foldably connected to said one edge thereof, the foldline connection between said lower and side panels being substantially normal to the foldline connection between said side and end panels; and upper bottom-forming panel foldably connected to said lower panel, the foldline connection between said upper and lower panels being substantially parallel to the foldline connection between said lower panel and said side panel; each end panel having a first bottom-forming intermediate section foldably connected to said one edge thereof, and a second bottom-forming intermediate section foldably connected to said first intermediate section, the foldline connection between each pair of intermediate sections being substantially parallel to the foldline connection between said first intermediate section and said panel; the foldline connection between said pair of intermediate sections being interrupted by an elongated slot, said slot being angularly disposed relative to the interrupted foldline and extending a substantially like distance into each section of said pair of intermediate sections.

14. The blank recited in claim 13 wherein the connections between the lower and upper panels are double foldline connections.

15. The blank recited in claim 13 wherein the lower and upper panels are of substantially like configuration and each pair of intermediate sections are of substantially like configuration.

7

16. The blank recited in claim 15 wherein the elongated slot separates each intermediate section into complementary portions of substantially like configuration.

17. A blank of foldable sheet material for forming a self-locking reinforced container having a multi-panel bottom delimited by double-panel side and end walls, said blank comprising two outer side wall panels and two outer end wall panels arranged in alternate side by side relation, adjacent outer panels being foldably connected, one edge of each outer panel being in coaxial alignment, each outer side wall panel having a lower bottom-forming panel foldably connected to said one edge thereof, the foldline connection between said lower panels and said outer side wall panels being substantially normal to the foldline connection between said outer side and outer end wall panels, an upper bottom-forming panel foldably connected to each lower panel, the foldline connections between said upper and lower panels being substantially parallel to the foldline connection between said outer side wall and lower panels; an inner side wall panel foldably connected to an edge of said upper bottom-forming panel opposite that connected to said lower bottom-forming panel, said inner side wall panel being adapted to assume face to face relation with an outer side wall panel, when said blank is set up to form a container, each outer end wall panel having a first bottom-forming intermediate section foldably connected to said one edge thereof, a second bottom-forming intermediate section foldably connected to said first intermediate section, the fold-

8

line connections between said outer end wall and said first section and between said first and second sections being substantially parallel; each pair of foldably connected intermediate sections being provided with an elongated slot which interrupts the foldline connection between said first and second sections; and inner end wall panels foldably connected to the edges of said upper bottom-forming intermediate sections opposite the edges thereof connected to said lower bottom-forming intermediate sections.

18. The blank recited in claim 17 including a closure flap foldably connected to the edge of each outer side and end wall panels opposite the said one edge thereof.

19. The blank recited in claim 17 wherein the connection between a lower bottom-forming panel and an upper bottom-forming panel is a double foldline.

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