May 16, 1939. F. WEINDEL, JR 2,158,972

BOX CONSTRUCTION

Filed Feb. 2, 1937 4 Sheets-Sheet 1

FIG. I.

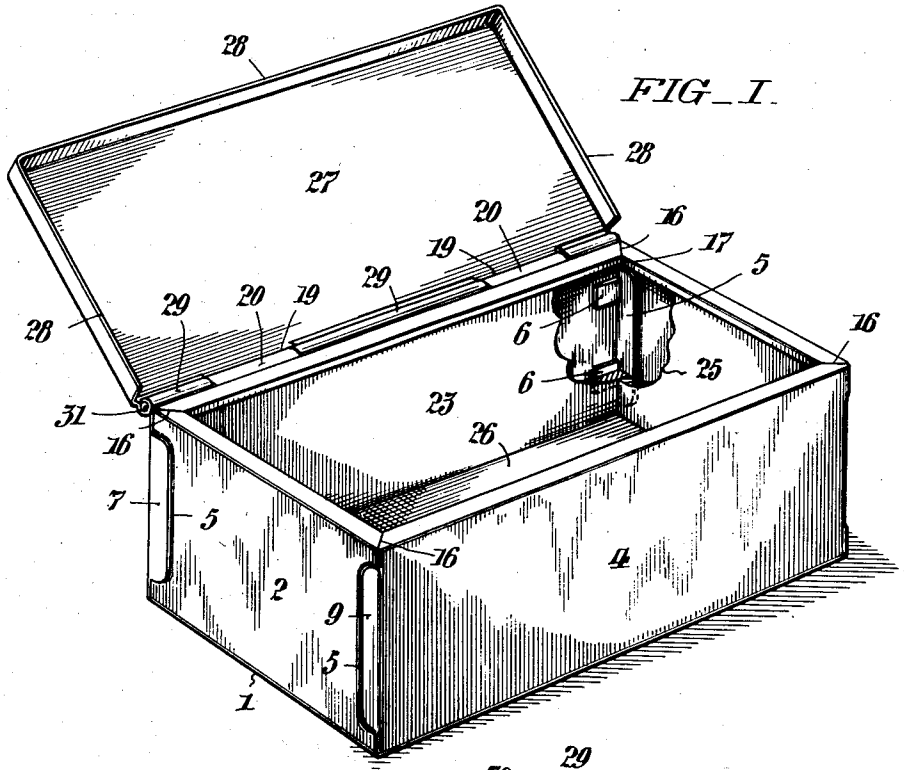

FIG. II.

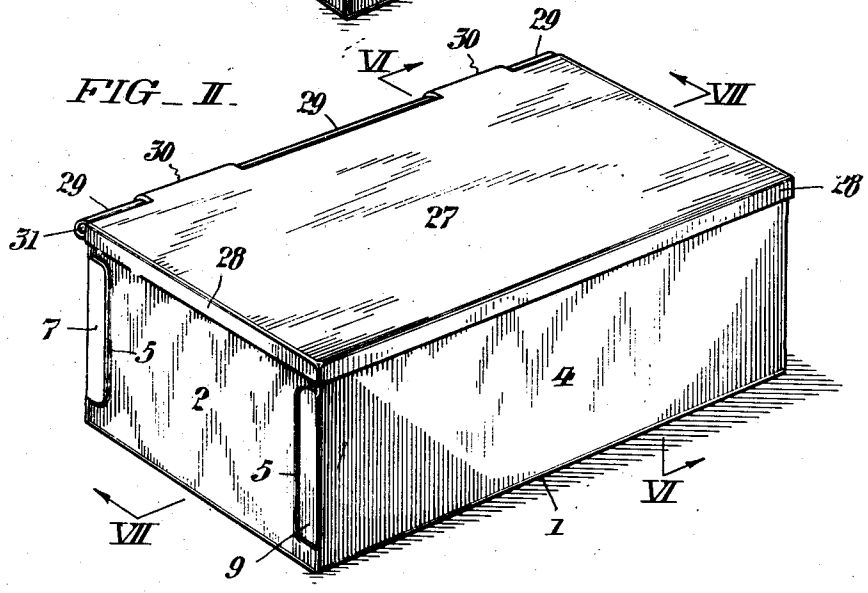

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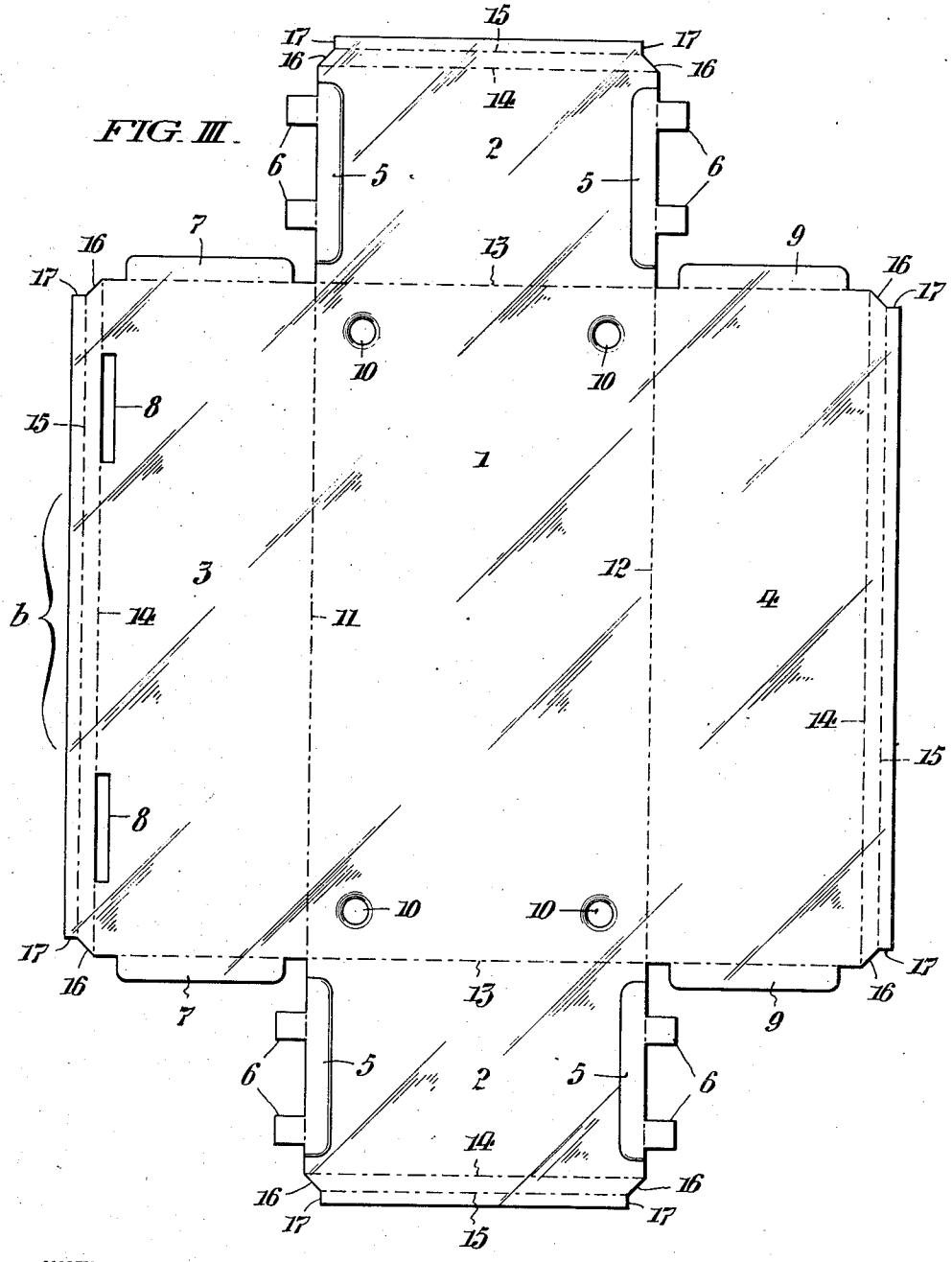
FIG. III.



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BOX CONSTRUCTION

Filed Feb. 2, 1937 4 Sheets-Sheet 3

FIG. IV.

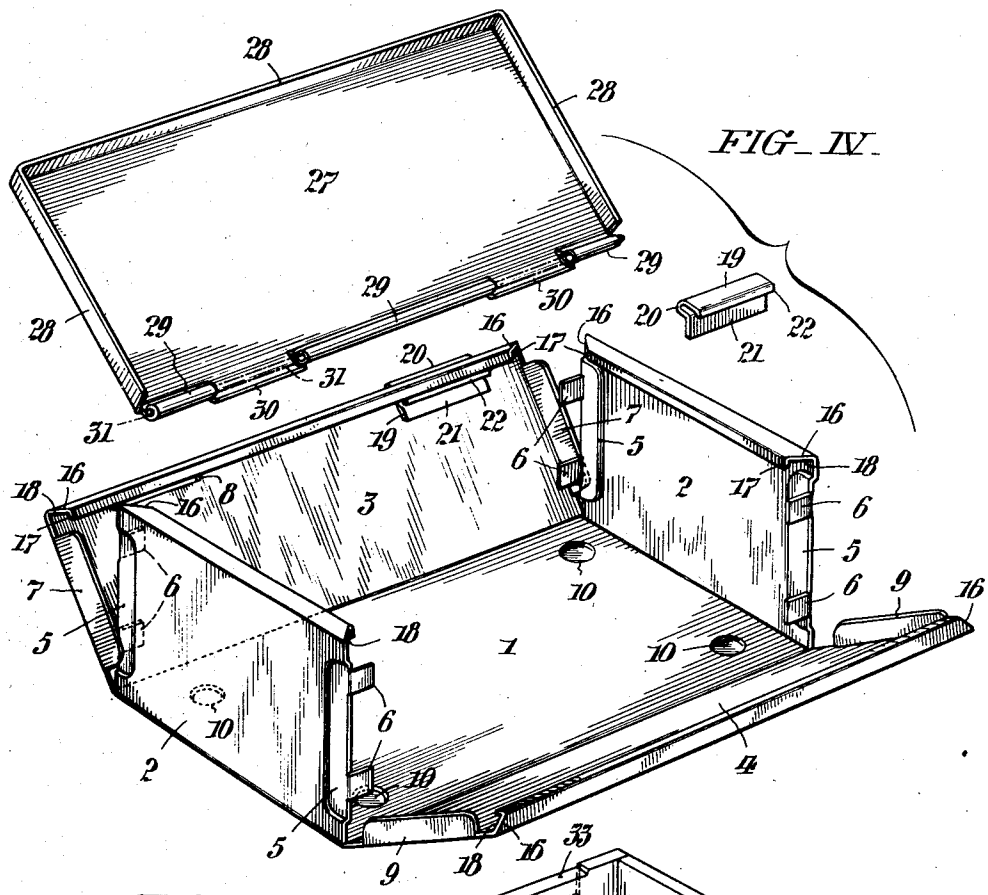
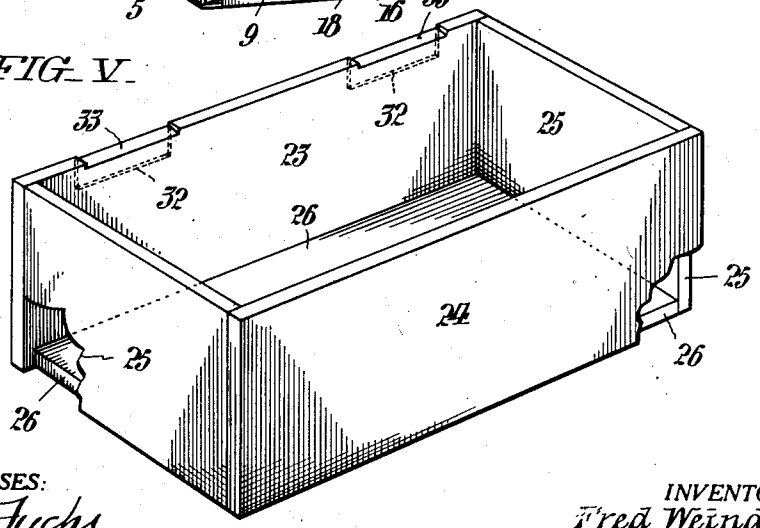


FIG. V.



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BOX CONSTRUCTION

Filed Feb. 2, 1937 4 Sheets-Sheet 4

FIG. VI.

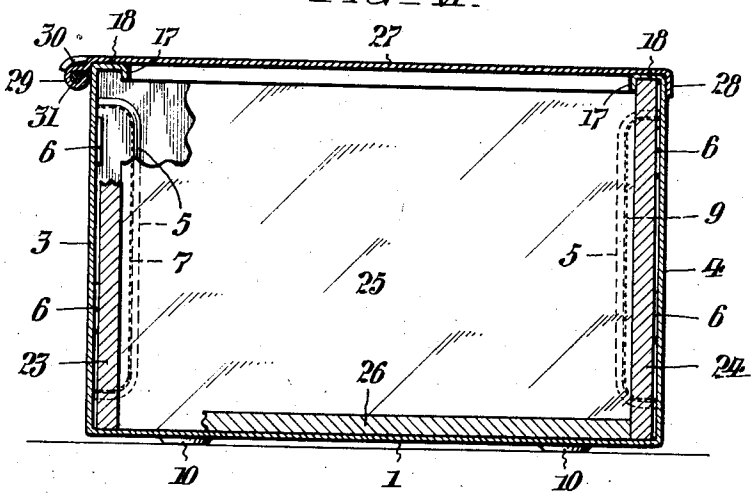


FIG. VII.

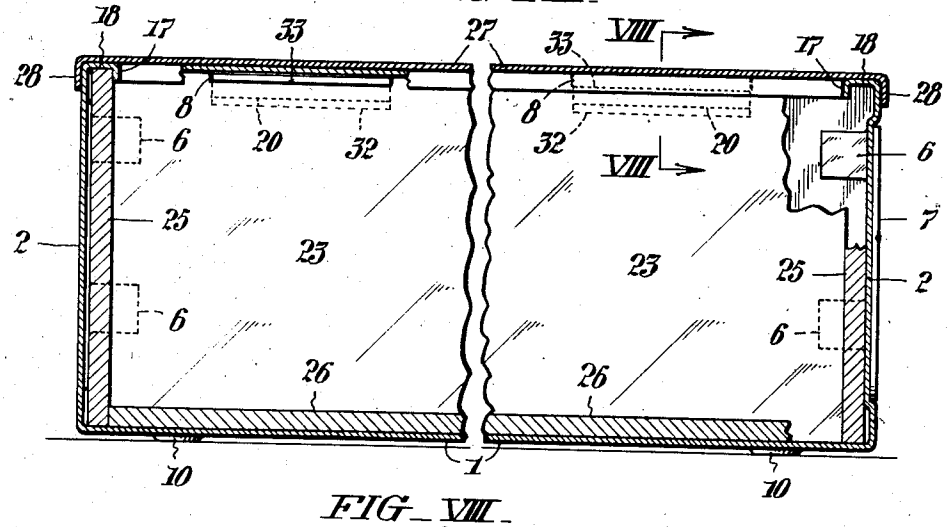
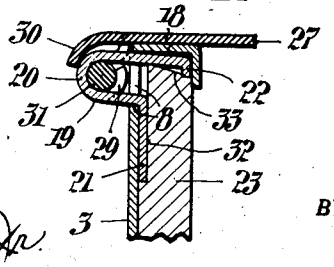


FIG. VIII.



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Patented May 16, 1939

2,158,972

UNITED STATES PATENT OFFICE

2,158,972

BOX CONSTRUCTION

Fred Weindel, Jr., Allentown, Pa., assignor to L. F. Grammes & Sons, Inc., Allentown, Pa., a corporation of Maryland

Application February 2, 1937, Serial No. 123,609

4 Claims. (Cl. 220—63)

This invention relates in its broader aspects to the manufacture of containers and the like, while having more particular reference to box construction; the primary object being to provide a substantially air-tight box or container devoid of nails, rivets, screws, solder or other component attaching means.

Another object is to furnish a box or container including a casing and a lining which when said parts are assembled interlock in a manner preventive of distortion or collapse of the structure as a whole.

A further object involves the manner and production of a lined box or container in which the angular corners are substantially closed against air infiltration without the application thereto of any sealing medium.

A still further object is to provide a box or container comprising but few parts which are capable of easy production and assembly in the minimum of time and expenditure of labor.

In addition to the above stated objects, and ancillary advantages, there are certain details of design and the method of production involved in this invention, whereby a simple, economical and highly serviceable structure is obtained.

With the foregoing in view, the present invention consists in a construction and combination of parts, of which a practical embodiment is illustrated in the accompanying sheets of drawings, but to which embodiment said invention is not to be restricted further than is imposed by the concluding claims herein and the prior art proscribes.

In the drawings:

Fig. I is a perspective view of a convenient type of box or container embodying the present invention, in open position, with a portion of the lining removed to better disclose otherwise hidden features.

Fig. II is a similar view of the box or container closed.

Fig. III is a plan view of a blanked-out piece of flat sheet material adapted to constitute the sheathing of the box or container shown in the preceding illustrations.

Fig. IV is an exploded perspective view of the box or container sheathing and cover components, and one of the hinge elements detached, with the back and front wall sections of said sheathing partially folded upwards, and the end sections vertical.

Fig. V is a perspective view of the box or container lining elements, in assemblage, with lower corner portions broken out for clarity in illustration of an otherwise obscured feature.

Fig. VI is a cross-section, taken as indicated by the arrows VI—VI in Fig. II, but drawn to a larger scale.

Fig. VII is a longitudinal-section on the plane designated VII—VII in Fig. II, and drawn to a scale corresponding with that of the preceding view; and,

Fig. VIII is a detail section, taken approximately as shown by the arrows VIII—VIII in Fig. VII, but drawn to a larger scale for the sake of clearness.

In carrying out the invention and premising, it is desired to produce a rectangular box, of the character illustrated in the drawings, a blank *b*, Fig. III, of predetermined dimensions is initially stamped or otherwise formed of flat sheet material, preferably metallic, to embody a bottom section **1**, opposing end wall sections **2**, a back wall section **3**, and a front wall section **4**. Each end wall section **2** also includes elongate side depressions **5** with laterally-projecting spaced edge tabs **6** for purposes later on set forth; the back wall section **3** embodies wings **7** of a configuration to seat in the depressions **5** aforesaid, as well as elongate apertures **8** paralleling the outer edge of said back wall section; and the front wall section includes side wings **9** corresponding with and for the same purpose as mentioned in connection with those of the back wall section **3**. Conveniently, although not essentially, the bottom section is provided with integrally formed embossments serviceable as supports or feet **10**, as readily understood from Figs. VI and VII, more particularly.

The blank *b* may be scored as indicated by the dot-and-dash lines **11**, **12**, **13**, to form the box bottom **1** as well as defining fold-up indications for the back wall **3**, front wall **4**, and end walls **2**, respectively. The outer portion of each end, back and front wall **2**, **3** and **4**, may be scored along parallel lines **14**, **15** and notched to define miter edge portions **16** with associated straight edges **17** at right angles to the outer confines of said walls. These scorings **14**, **15** conveniently serve as folding lines for the purpose of turning over the wall outer limits to constitute channel-section retainer-grooves **18**, for a purpose hereafter explained. Conveniently concurrent with formation of the retainer-groovings **18**, the respective wall wings **7**, **9** and the spaced tabs **6** are all simultaneously bent-up or inwardly relative to the box or casing, into substantially rectangular relation with respect to their associated walls. Previous to for-

mation of the retainer-groovings 18, hinge elements 19 are passed outwardly through the elongate apertures 8 and are held in place by the grooving 18 when bent thereover. Each of these hinge elements 19, as will be best understood from Figs. IV and VIII, consists of a rectangular section of the same sheet material of which the blank *b* is made, said section being medially retroverted to provide a U-section 20 of a dimension for free passage through the apertures 8, an abutment flange 21, and a locking-flange the outer edge whereof is angled at 22, for a purpose later on explained. It will be readily understood from Fig. VIII, that, when the hinge elements 19 are placed in position, the abutment flange 21 engages the inner face of the back wall 3, while the angled locking flange 22 is held against displacement in the retainer-grooving 18 of said wall.

Snugly fitting the back and front walls 3, 4 are liner pieces 23, 24, respectively, of wood, cardboard, backed velvet, backed silk or any other desired material or padded medium best suited for the purpose for which the box is intended to be used; said pieces seating between the bottom 1, side wings 7, 9 and the retainer grooves 18, in an obvious manner. Similarly fitting the end walls 2 are liner pieces 25 of a width to firmly engage between the liner pieces 23, 24 aforesaid, so that the latter are secured in close abutment with the respective back and front metallic walls when the box is fully folded upwardly, as readily understandable from Fig. I. It is also to be remarked that when the box is folded up, as just set forth, the channel-groove portions of the wall top edges defined by the scorings 14, 15 "lap" over and snugly hold the liners 23, 24 and 25 rigidly in place against displacement. In order to securely interlock the liners 23, 24 and 25 with respect to the several walls 2, 3 and 4, a bottom liner 26 is employed, said liner being of such linear dimensions as to exactly fill the space between the liners 23, 24 and 25 with a firm friction fit.

A closure or lid 27 is provided and made of the same material as the blank *b*, said lid having a flange 28 around its front and end edges for snug engagement about the corresponding upper edges of the box walls 2 and 4; while its rear edge is suitably provided with aligned substantially-tubular portions 29, and intervening curved beadings 30. The tubular portions 29, in conjunction with the hinge element U-section portions 20, receive the hinge pin 31 which is preferably of a diameter for friction engagement in the cover tubular portions 28 and free passage through the U-section portions 20 of the hinge elements 19.

Referring again to the back liner piece 23, it is to be noted the same is formed with recessions 32 in its face confronting the box back wall 3 for reception of the hinge abutment flanges 21, as well as cut-outs 33 in its upper edge for seating reception of the hinge elements 19, as clearly understandable from Figs. VII and VIII, more particularly. It is further observable that the curved beadings 30 cover and protect the hinge elements 19 from damage, as well as constituting a stop means for holding the cover 27 in open outwardly inclined position as shown in Fig. I, or preventing its falling over beyond desirable limits.

Having described the structural features of the invention, it will be readily understood that a blank *b*, preformed as hereinbefore set forth, with its back, front and end walls 3, 4 and 2, respectively, may be initially folded upwards as shown in Fig. IV, and the liners 23, 24 and 25 upwardly engaged in the channel-section groovings 18 as the folding proceeds; while the bottom liner 26 is placed in position just prior to final folding. Consequent upon the procedure just explained, it will be evident that the back and front wings 7, 9 are moved into frictional engagement with the depressions 5 while the tabs 6 are brought into contact with the front and back wall inner faces, thereby holding the liners 23—26 firmly together, while the wings 7, 9 not only clamp the several parts of the box in assembly, but by extending around and on the outside of the box end walls 2, into the depressions 5, act to close-in the vertical corners of the entire receptacle structure, thus producing a box that is solid and practically air-tight. In addition, the hinge elements 19 are secured firmly in place by the liner 23 without any other fastening medium, such as rivets, screws, solder or the like; while said elements are also protected by the curved beadings 30 which limit the "swing-back" of the lid 27.

From the foregoing it is thought the merits and advantages of the invention will be clearly apparent, but it is desired to herein emphasize the fact the particular embodiment illustrated and described is in no respect to be considered limitative, inasmuch as the fundamental features of construction and the manner of assembling the various components of the improved receptacle or box are capable of varied modification. For instance, the positions of the tabs 6 and wings 7 may, obviously, be reversed, as well as the end liners 25 run the full interior width of the box, and the back and front liners 23, 24, made to exactly fill or fit between the intervening dimension or distance. Accordingly, it is to be expressly understood the right is hereby reserved to the application of the essential features of this invention to box or container construction in general, including those made of steel with a sprayed finish, tin plate with lithographed finish, etc., as well as jewel cases, perfume, music, candy, vanity, and analogous boxes. Furthermore, it will likewise be appreciated the invention hereinbefore set forth is applicable to containers or boxes of various other configurative outline in plan than rectangular, as shown, without departing from the spirit and scope of said invention as tersely expressed in the following claims.

Having thus described my invention, I claim:

1. In a container or box having a hinged lid, the combination of an outer casing blanked from sheet material to define a bottom, opposing walls having their outer edges scored and bent to form retainer grooves, side wings on opposing walls engageable with complemental depressions in the adjoining walls; laterally projecting tabs from the depressed portions for abutment against the first mentioned walls; spaced elongate slots in one of the casing walls for reception of hinge elements and partly held in place by the retainer groove of said wall; a liner member engageable, along its upper edge, in each wall retainer groove and with the flanking liner members, when the outer casing is set up; a bottom liner member frictionally-fitting between the inner lower edges of the wall liner members, to hold the latter in place; and wherein the projecting tabs lap the outer surface of opposing liner members, to grip the latter to the adjoining liner members in said assembly, as well as to interlock the liner members with the casing.

2. A container or box as defined in claim 1, wherein the casing slotted-wall liner member is provided with cut-outs in its upper edge parallel-

ing the slots, and registering recessions in its face confronting the casing wall for jointly securing the hinge elements against displacement.

3. A container or box as defined in claim 1, wherein the opposing wall depressions are elongated, the projecting tabs are formed integral with the edge portions of said depressions and are rectangularly bent-up inwardly thereof; and the side wings, when frictionally engaged in the depressions, close-in the casing angular corners to form practically air-tight junctures thereat.

4. A container or box as defined in claim 1, wherein the casing walls have their upper edges shaped to inverted-channel cross-section; the back and front liner members extend the full length of their confronting walls, the end liner members snugly fit between the back and front liner members, and the bottom liner member is of a size to frictionally occupy the space surrounded by the first and second mentioned liner members.

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