Sept. 28, 1937. H. ROSENBERG 2,094,496

COLLAPSIBLE CONTAINER

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Fig. 1

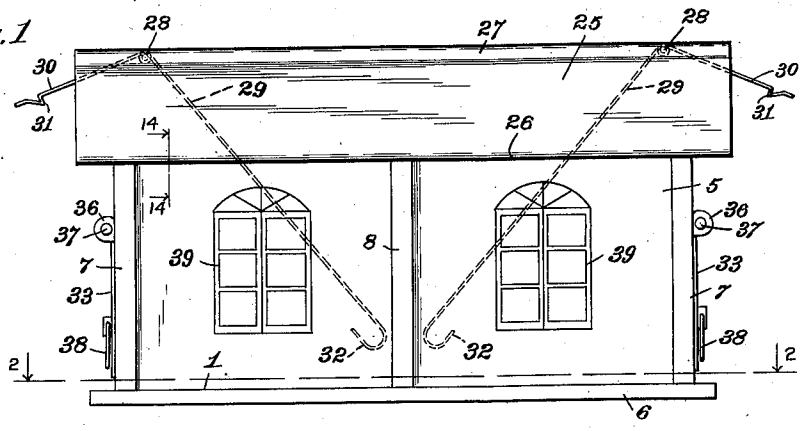


Fig. 2.

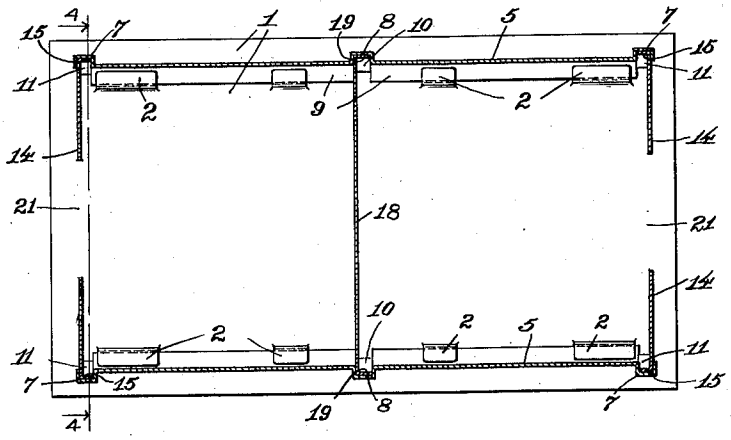


Fig. 3.

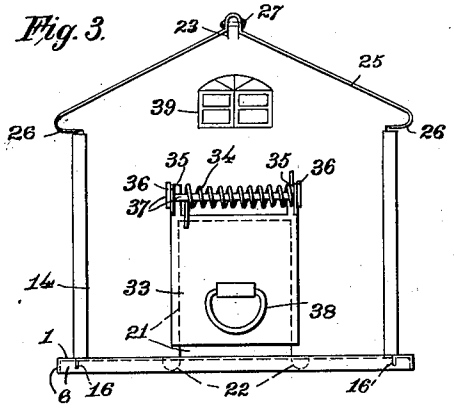
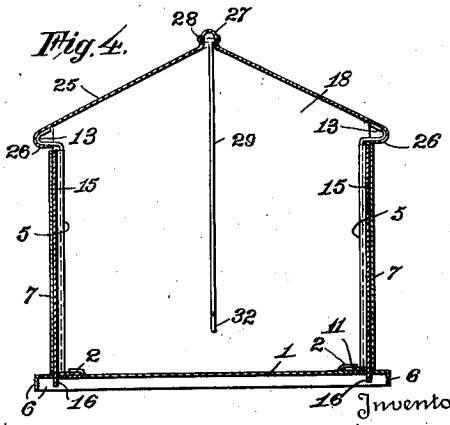


Fig. 4.



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Fig. 6.

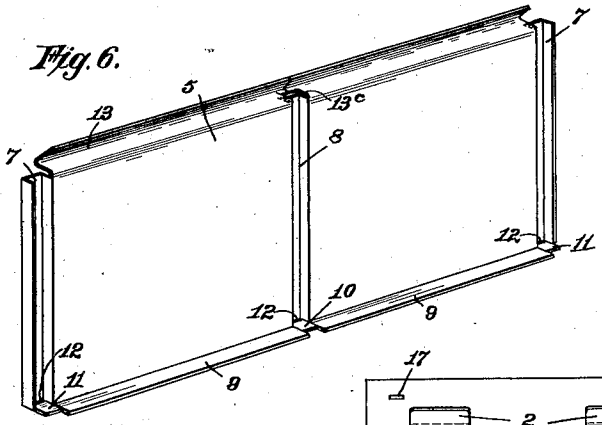


Fig. 5.

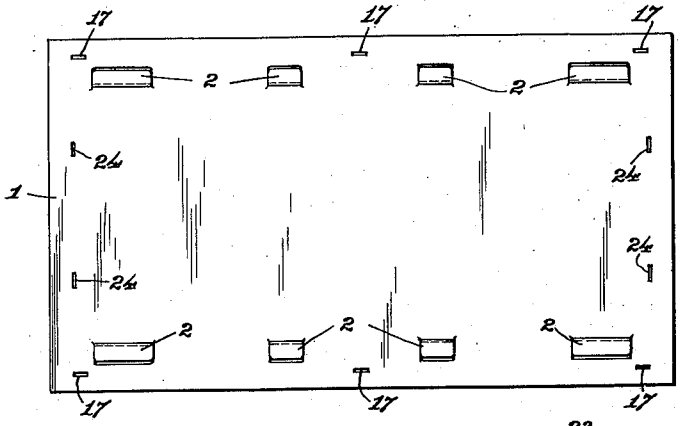


Fig. 8.

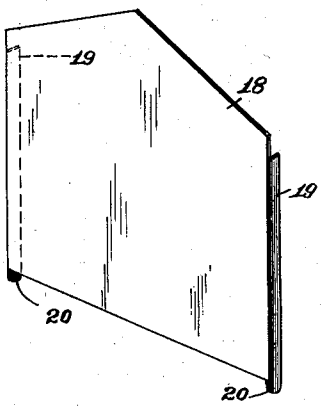
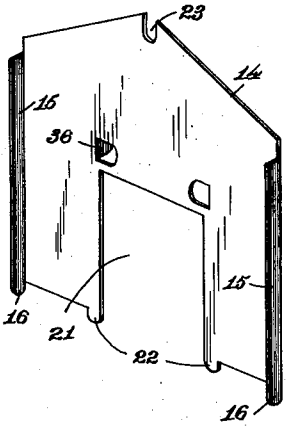


Fig. 7.



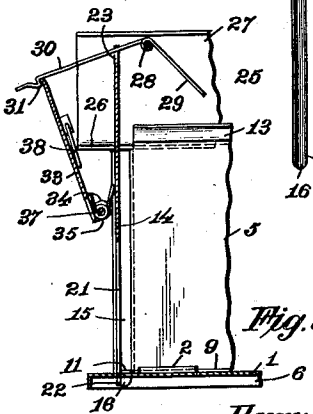
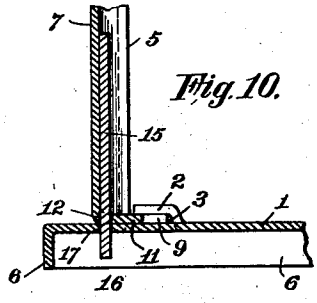


Fig. 9.

Fig. 10.



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COLLAPSIBLE CONTAINER

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Fig. 11.

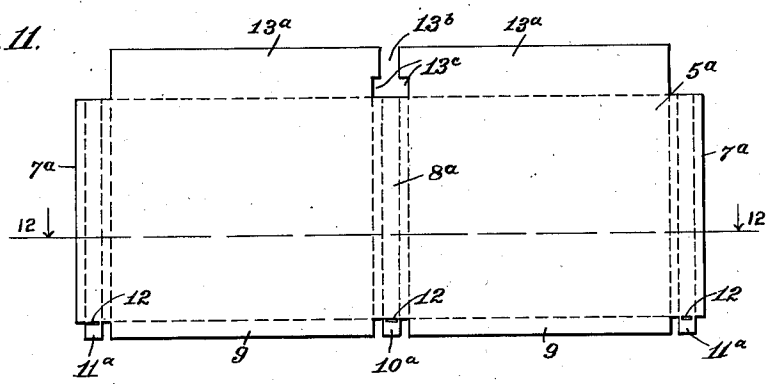


Fig. 12.

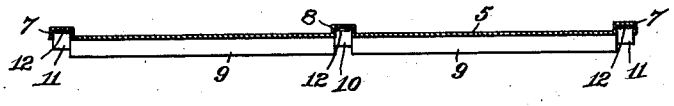


Fig. 13.

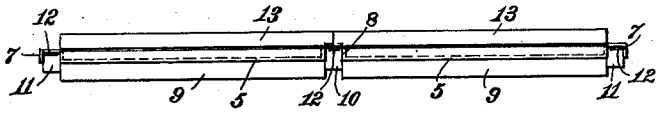
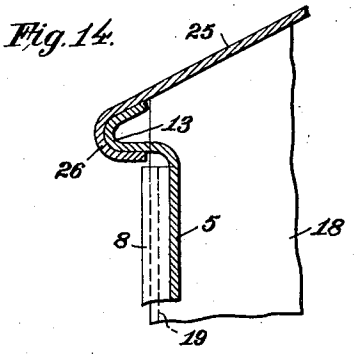


Fig. 14.



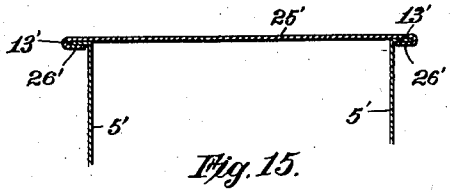


Fig. 15.

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COLLAPSIBLE CONTAINER

Heyman Rosenberg, New York, N. Y.

Application October 27, 1934, Serial No. 750,370

8 Claims. (Cl. 220—4)

This invention relates to improvements in boxes, housings, crates, and other containers of the knock-down type, and has as one of its essential objects readiness and ease of assemblage and dismantling accompanied by dependability of maintaining the extended or container form during use.

Further objects are inexpensiveness of construction and adaptability of form to various materials.

With these and further objects in view, the invention includes a bottom, side walls engaging the same and detachably locked thereto, and a roof or cover detachably engaging and retaining the side walls in their locked engagement with the bottom.

The invention also includes in such a structure end walls and partitions also detachably locked to the bottom and side walls by the presence of the roof in engagement with the latter.

The invention still further includes in combination with such a collapsible container a door resiliently stressed toward closing, a trip retaining the door against closing, and means carrying the trip and pivoted between the folds of the roof of the container and extending into the container for controlling and actuating the trip.

In still greater detail, an embodiment of the present invention includes a sheet metal container bottom having tabs stamped upward from and extending generally along the bottom, side walls flanged to underhang said tabs, end walls having projections extending through the flanges of the side walls and the bottom, and a cover or roof enclosing upper portions of the side walls in a manner to prevent spreading of the side walls.

The invention further comprises certain other novel constructions, combinations, and arrangements of parts as subsequently specified and claimed.

In the accompanying drawings,—

Figure 1 is a view in side elevation of a container embodying the features of the present invention, the parts being shown in their fully assembled position.

Figure 2 is a horizontal section taken on the plane indicated by line 2—2 of Figure 1, the bottom of the structure being seen in plan.

Figure 3 is an end view of the parts as seen in Figure 1.

Figure 4 is a vertical section taken on the plane indicated by line 4—4 of Figure 2.

Figure 5 is a plan view of the bottom detached.

Figure 6 is a perspective view of one of the sides detached and viewed from the inside.

Figure 7 is a similar view of one end detached.

Figure 8 is a perspective view of the middle partition detached.

Figure 9 is a fragmentary, vertical, longitudinal, central section through one of the ends of the structure as seen in Figure 1, parts being seen in elevation.

Figure 10 is an enlarged, detailed, fragmentary sectional view showing the connection of one of the sides and the bottom and one of the ends of the partition.

Figure 11 is an extended plan view of the original blank from which the side shown in Figure 6 is to be stamped or shaped by bending portions of the blank.

Figure 12 is a horizontal section taken on what would be the equivalent of the plane of line 12—12 of Figure 11 except that the parts are shown bent to their completed condition as seen in Figure 6.

Figure 13 is an edge view looking from above of the parts seen in Figure 6, that is looking down upon the upper edge of the parts seen in Figure 11 after the completion of the bending operations of the several parts thereof.

Figure 14 is a fragmentary, transverse, vertical section on an enlarged scale through the roof and one of the sides showing the connection therebetween, the parts being seen on a somewhat enlarged scale.

Figure 15 is a fragmentary, vertical section through the cover plate or roof and the upper portions of the side walls showing a modified connection of the roof to the side walls.

Referring to the drawings by numerals, 1 indicates the bottom of the knockdown container which is preferably made up of a single sheet of material, such as thin sheet iron. As best seen in Figures 2, 5, and 14 tabs 2, 2 are stamped from the sheet or bottom plate 1 in rows, one along each longitudinal edge portion of the plate. The tabs may be of any desired length, but preferably each is short enough to avoid undue weakening of the marginal portions of the plate. Each tab, as seen in Figure 10, is not only severed from the body of the plate along three sides but stamped to upstand and have a portion extend parallel to the upper face of the plate to provide a recess 3 between it and the plane of the surface of the plate for allowing ready edgewise insertion and withdrawal of a cooperating horizontal flange 9 extending inward from the upright or vertical side wall 5. The bottom 1 is preferably also provided

with pendent marginal flanges 6, 6, adapted to support the super-structure on their edges so as to leave a space beneath the plate 1 and above the surface on which it rests. Each side wall 5 is formed from a blank such as seen in Figure 11, which blank is so constructed that it may be readily stamped or otherwise bent or folded to the finished condition seen in Figure 6. The various sheet metal parts of the present improved structure are preferably stamped to their bent conditions, but may, of course, be otherwise given their shape within the spirit and intent of the invention, and the term "stamp" as herein used is to include any method of bending or manipulating the part referred to to give it the shape shown and stated. The blank 5*a* from which the side 5 is formed is, as appears in Figure 11, of greater length and width than the completed side in order to provide the required length and width after the stamping operation. Each side wall 5, of which there are two, one engaging each row of tabs 2, is stamped at each end into vertical channels 7 from extensions 7*a* of the blank, and stamped with an intermediate channel 8 stamped from the intermediate portion 8*a* of the blank 5*a*. The stamping of the channels 7 and 8 from the portions 7*a* and 8*a* produces longitudinal contraction or shortening of the overall length of the structure seen in Figure 11, so that its length, when finished, is that indicated in Figures 12 and 13. Each side wall is also stamped with a horizontal, inwardly-extending, longitudinal flange 9 that would be continuous throughout the length of the side but for the interruption necessary incident to the contraction occasioned by the stamping of the channel 8. A flange 10 partly continuous of the two portions of the flange 9, though ordinarily separate therefrom, is located between the adjacent ends of the two sections of flange 9 and is formed from a tab 10*a* of the blank stamped to occupy a portion of the space between the adjacent ends of the two parts of flange 9. Of course, the portion 10*a* could be formed sufficiently longer than shown in Figure 11 to cause the tab 10*a* to fully fill the space between the two sections of flange 9, but that would require a waste of material from the sheet from which the blank 5*a* is cut. The channels 7 at the ends of each side wall 5 have their lower ends closed by flanges 11, 11, bent horizontally from tab 11*a*, 11*a* of the blank 5*a* similar to the flange 10. Each of the flanges 10 and 11 is provided with a hole preferably in the form of a slot 12 at its outer portion, that is the place of juncture with the offset wall of the respective channel 7.

At the outer edge portion of each side wall 5 the material of the plate making up the side wall is bent to produce a laterally projecting and outstanding longitudinal bead 13 stamped from the portions 13*a* of blank 5*a*. A space 13*b* is provided in the blank 5*a* between the portions 13*a* to allow for the longitudinal contraction in the length of the side wall plate during the stamping of the channel 8, so that the ends of the portions 13*a* are brought together to form a continuous bead 13 when the stamping is completed. The opening 13*b* is provided with enlargements 13*c* which, in the finished structure, afford space to accommodate the corresponding portions of partition 18, but this does not in any way detract from the fact that the adjacent ends of the bead portions 13 are brought together and abut in the finished condition of the side wall. It should be understood, of course, that wherever severed edges are brought together in this manner, as where the ends of the portions 13*a* meet or where the edges of the flanges 10 meet the edges of the portions of the flange 9, the parts may be welded together if the structure is to be of sufficiently stable and expensive construction as to justify the expense; but for toys, mouse traps, and such light articles made of relatively thin sheet metal such welding is not necessary for strength, and, therefore, not desirable on account of the additional expense.

Each end of each side wall 5 is engaged by an end wall 14, and each of said end walls is stamped to provide lateral, marginal flanges 15 having at their lower end portions projecting parts 16 corresponding in size and shape to the slots 12, and the bottom plate 1 is formed with holes or slots 17 registering with the slots 12 when the side walls are in position, so that the projections 16 may be readily inserted through the slots or holes 12 and 17 to secure the side walls and end walls to the bottom 1, and the snug fitting of the flanges 15 in the respective channel 7 stabilizes the connection between the parts.

The use of a partition or partitions within the enclosure of the side and end walls is of course optional, but at least one partition, indicated at 18, is preferably employed and shaped to correspond with the end walls 14 and provided with laterally stamped flanges 19 at its ends to be snugly seated in the channels 8 of the side walls. The flanges 19 have their lower end portions formed into projections 20 corresponding to the projections 16 and adapted to extend through the slots 12 of flange 11 and registering slots 17 of the bottom plate 1, as seen in detail in Figure 10. The partition 18 is substantially the same in marginal contour as the end walls 14, except that each end wall 14 is preferably provided with a doorway 21 and pendent projections 22, 22, and at its apex or roof-ridge engaging portion is formed a notch 23 to accommodate a moving part hereinafter described. The projections 22 are accommodated in slots 24, 24 in the bottom plate 1 to assist in anchoring the end walls to the bottom.

A cover plate or roof 25 is provided and shaped transversely to correspond to the tapered upper ends of the end walls 14 and partition 18; that is to say, the roof is ridged to give the appearance of a house roof and fits snugly down over the upper ends of the end walls and partition. Each of the longitudinal edge portions of the roof 25 is stamped to provide an inturned or return flange 26 corresponding to and snugly fitting the outer surface of the respective bead 13 so that, when the parts are being assembled after the sides and end walls and middle partition have been properly located on and in engagement with the bottom plate 1 and with each other, the roof plate 25 may be slid longitudinally into the interlocking relation of the flanges 26 with bead 13 seen in Figures 4 and 14. The frictional engagement is sufficient to prevent any accidental longitudinal displacement of the roof and the other parts of the structure can not become displaced so long as the roof retains its engagement with the beads 13 which insures maintenance of the flanges 15 and 19 respectively in the channels 7 and 8.

As seen in Figures 3 and 4, the roof plate 25 is stamped to provide a longitudinal ridge or comb 27 which is, of course, internally hollow, and, therefore, adapted to receive operating parts between the upstanding sides formed by the ridge or comb.

In one preferred embodiment of the structure, near each end portion of the roof 25 a cross pin

28 is preferably fixed through the ridge or comb 27 and to each cross pin is pivoted an operating lever 29 extending into the respective area or "room" at the corresponding side of the partition 18. Beyond each pivot 28 the operating lever 29 is provided with an arm 30 extending through the respective notch 23, and carrying a detent trigger 31 at its outer end preferably in the form of a rounded hook or other appropriate trip device. The lower or innermost end of each lever 29 is provided with a hook or other appropriate bait-receiving or containing means 32.

A door 33 is arranged to close each of the doorways 21 and each of the doors 33 is preferably pivoted at its upper end to the respective end wall and stressed by a spring 34 toward the closed position. The hinge connection between each door 33 and its respective end wall 14 may assume any desired form, one inexpensive and therefore desirable embodiment including ears 35 upstanding from the door and lapping ears 36 outstanding from the respective end wall. A pintle 37 extends through the several ears 35 and 36 and thus pivotally connects the respective door 33 to the end wall. The spring 34 is preferably a coiled spring surrounding the pintle 37 and having one end portion extended to rest against the other face of the respective end wall 14 and the other end portion extended to rest against the outer face of the respective door 33, so that, when the door is swung upon its pivot to the open and upper position as seen in Figure 9, the spring will be further coiled and accordingly tend to swing the door back to its closed position. The door, however, in operation, when opened, is preferably set back of and in engagement with the respective trip detent 31, which retains the door in the open position as long as the detent 31 is not moved or vibrated. However, when the lever 29 is even slightly moved to swing it on its pivot 28, the trip detent 31 is tripped and the door is free to swing shut under the spring action.

Each door 33 is preferably provided with an appropriate handle, such, for instance, as a ring 38 pivoted to the door to facilitate operating the door.

The structure, as is clearly indicated in the drawings, is preferably intended to simulate the appearance of a house or cottage, but may be made of any other shape desired so long as the parts are constructed to be assembled and connected and to operate with respect to each other in the manner above indicated. To carry out the further appearance of a cottage, the side and end walls may be die pressed or otherwise decorated to give the appearance of windows 39, or such decorations may be merely depict on the respective surfaces.

The operation of the structure, when assembled as a mouse trap, will, of course, be obvious from the foregoing, and it should be understood that when the structure is not intended for use as a mouse trap but otherwise as a container, the lever and trip mechanism may be omitted.

The several projections 16, 20, and 22 are of sufficient length to extend through the bottom or floor plate 1, but are sufficiently short to terminate within the space beneath said plate provided by the flange 6, so that the cabin or cottage making up the assembled structure can be placed on a flat surface and readily supported on the flange 6.

The tabs 2, by overlying the laterally extending lower marginal flanges 9 of the side walls 5 prevent any vertical movement or play of the side walls relative to the bottom plate 1. Also, the cross walls 14 and 18 are held against lateral play or looseness by their marginal flanges 15 and 19 snugly seated in the respective channels 7 and 8 of the side walls, and in turn prevent any lateral separation or play of the side walls with respect to the bottom or cross walls by the downward projections 16 and 20 extending through the registering holes or slots 12 and 17 in the said wall flanges and bottom. The said cross walls are prevented from having any vertical movement, looseness or play by contact of their upper edges with the under surface of the roof plate 25, and the roof plate is firmly held against any vertical movement, looseness or play by its interlock with the side walls. This interlock consists of the respective return flange 26 snugly enclosing the upper marginal flange making up the bead 13 of the respective side wall. The interlock is sufficiently tight to assure sufficient friction to prevent accidental or other undesired longitudinal sliding movement of the top 25 relative to the side walls, so that, when the parts are fully essembled, a container of dependable stability is provided. Yet the container may be collapsed readily by first moving the roof or top plate 25 longitudinally out of its interlocked relation with the side walls, lifting out the cross walls and moving the said walls laterally from engagement with the tabs 2. The several parts making up the bottom plate, side walls, cross walls, and roof plate are all preferably of sheet material, such as relatively thin sheet iron, but may be made of other material so long as provided with the relatively interlocking parts as just stated.

In Figure 15 is shown a modified form of roof plate such as is well adapted for use for ordinary containers not having the appearance of a cottage or cabin. In this embodiment, the roof plate 25' is provided at its longitudinal margins with return flanges 26' interlocked with the out-turned flanges 13' of the side walls 5'. The structure of Figure 15 otherwise corresponds in detail with that above described, except of course that the cross walls are of a height and shape at their upper ends to engage roof plate 25'.

What is claimed is:

1. A knockdown container comprising a floor plate and side and cross walls, the side walls having vertical channels and also having inwardly-extending flanges, and the floor plate having outwardly-extending tabs between which and the upper surface of the floor plate the flanges of said side walls extend, the cross walls having flanges seated in the channels of the side walls and having downwardly-extending projections, and the floor plate and flanges of the side walls having registering openings receiving said projections.

2. A knockdown container as claimed in claim 1 in combination with a roof having means engaging the side walls and retaining the side walls in engagement with the cross walls and floor plate.

3. A knockdown container as claimed in claim 1 wherein the side walls are formed with laterally outstanding beads, in combination with a roof plate having an eaves return channel snugly enclosing the side wall beads for detachably securing the parts together.

4. A knockdown container as claimed in claim 1 in combination with a roof engaging the side walls and retaining the parts in their assembled relation, and a partition wall between the side walls, the side walls having each a vertical chan-

nel intermediate its ends receiving the respective ends of the partition wall.

5. A knockdown container comprising a relatively thin sheet metal bottom plate, and relatively thin sheet metal side and cross walls, the side walls having stamped channels formed in their end portions to receive the end edges of the cross walls, tabs outstanding from the bottom plate, flanges extending inward from the side walls beneath said tabs, and means locking the side walls against withdrawal of their flanges from engagement with said tabs.

6. A knockdown container as claimed in claim 5 in combination with a roof plate of relatively thin sheet metal having return flanges along its longitudinal margins slidingly engaging the said side walls and securing the roof plate against vertical movement, and the roof plate contacting with upper edge portions of the cross walls.

7. A knockdown container comprising bottom, side, cross, and top plates or walls of sheet metal, all detachably interengaged, the bottom having tabs facing its margins, the side walls having flanges resting on the bottom and interlocked with and beneath the tabs to prevent vertical separation of the side walls from the bottom, the bottom and side wall flanges having registering holes, and the side walls having channels, the cross walls being marginally flanged and having their marginal flanges seated in said channels, and the cross walls having projections extending through the registering holes and thus retaining the side walls and bottom against lateral separation, and the roof interlocking with the side walls to prevent vertical movement of the roof relative to the side walls, and the roof contacting with upper portions of the cross walls to prevent relative vertical movement of the cross walls.

8. The knockdown container as claimed in claim 7 wherein the interlock between the roof and the side walls comprises a laterally outstanding longitudinal upper marginal bead on each side wall and a return flange on each of the longitudinal marginal portions of the roof proportioned to snugly engage and underlie the respective bead and have frictional contact therewith.

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