LIGHTWEIGHT KNOCKDOWN CONTAINER

Assignee: Gentex Corporation, New York, N.Y.
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References Cited
UNITED STATES PATENTS
2,876,275 3/1959 Schulz........................................... 217/65 UX
1,040,242 10/1912 Schafer........................................ 217/15
2,869,750 1/1959 Doerr ........................................ 220/4
2,578,644 12/1951 Mautner ........................................ 217/12 UX

FOREIGN PATENTS OR APPLICATIONS
219,036 12/1956 Australia ........................................ 220/9 F
313,778 8/1969 Sweden ........................................ 220/4

Primary Examiner—George E. Lowrance
Attorney—Shenier and O'Connor

ABSTRACT
A durable lightweight knockdown container in which abutting panels of the container are releasably held in assembled position on a base partially to complete the container for loading. The remaining panel or panels are then simply and expeditiously secured in place to complete the container for shipment. Continuous interengangeable connectors along abutting edges of the container panels inhibit bowing or separation of the panel edges under load without external straps while at the same time permitting easy disassembly of the container without the use of tools.

20 Claims, 28 Drawing Figures
LIGHTWEIGHT KNOCKDOWN CONTAINER

BACKGROUND OF THE INVENTION

Various suggestions have been advanced in the prior art for holding cargoes of various kinds in position on a pallet for shipment. In the simplest arrangement used in the prior art, cargo stacked on a pallet has merely been tied down in position on the pallet. This arrangement of course does not effectively protect the cargo against either the elements or against accidental damage. Moreover, it does not permit the most efficient use of space in storing the cargo.

Other attempts have been made in the prior art to provide auxiliary containers for covering the cargo on the pallet so as to lend it a measure of protection. One example of such an arrangement is the "Hula Hut" which is positioned over the cargo on the pallet and over which straps or webbing lengths are passed to hold the hut in position over the cargo. These devices are relatively lightweight so that they do not afford a very effective protection to the cargo. Moreover, they are not disassemblable so that they themselves cannot readily be stored.

There are of course known in the prior art containers of heavy construction which might be employed to house cargo. The weight of these containers, however, makes their use entirely impracticable for shipment by air and the like. Moreover, most of these containers are not demountable. Even relatively heavy containers of the prior art cannot effectively withstand internal loads occurring in flight without bowing or separation at the edges.

I have invented a lightweight knockdown container which overcomes the defects of containers of the prior art discussed hereinabove. My container is lightweight and yet is durable. It affords material stored therein a relatively high measure of protection. My container is completely demountable so as to permit it to be stored in a small space. My container is so constructed as to protect cargo against weather and water. The interior of the container is readily accessible for loading and unloading. It avoids the necessity for the use of external straps to hold the cargo. It effectively overcomes the problem of bowing at the edges as a result of internal loads.

SUMMARY OF THE INVENTION

One object of my invention is to provide a lightweight knockdown container which may readily be assembled and disassembled without the use of tools.

Another object of my invention is to provide a lightweight knockdown container which affords cargo stowed therein a high measure of protection.

Still another object of my invention is to provide a lightweight knockdown container so constructed as to avoid bowing out or gaps along the edges of the container as a result of internal loads applied to the panels thereof.

A still further object of my invention is to provide a lightweight knockdown container which does not require external straps for assisting the container parts in withstanding internal loads.

Other and further objects of my invention will appear from the following description.

In general my invention contemplates a lightweight knockdown container in which abutting panels of the container are held assembled by interlocking elements extending continuously along the length of the abutting panels. The panels of my container are releasably held in assembled position on a pallet or base partially to complete the container for loading. The remaining panel or panels are simply and expeditiously assembled in place to complete the container for shipment. My interengageable elements provide seals along all abutting joints.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIG. 1 is a perspective view of one form of my lightweight knockdown container.

FIG. 2 is a perspective view of the upper side of the base or pallet of the form of my container illustrated in FIG. 1.

FIG. 3 is a perspective view of the inside of the base of my lightweight knockdown container illustrated in FIG. 1.

FIG. 4 is a perspective view of the inside of the front of the form of my lightweight knockdown container illustrated in FIG. 1.

FIG. 5 is a perspective view of the outside of the left panel of the form of my lightweight knockdown container illustrated in FIG. 1.

FIG. 6 is a perspective view of the inside of the top of the form of my lightweight knockdown container illustrated in FIG. 1.

FIG. 7 is a fragmentary sectional view of my lightweight knockdown container taken along the line 7—7 of FIG. 1.

FIG. 8 is a fragmentary sectional view of my lightweight knockdown container taken along the line 8—8 of FIG. 1.

FIG. 9 is a fragmentary sectional view of my lightweight knockdown container taken along the line 9—9 of FIG. 1.

FIG. 10 is a fragmentary sectional view of my lightweight knockdown container taken along the line 10—10 of FIG. 1.

FIG. 11 is a fragmentary sectional view of my lightweight knockdown container taken along the line 11—11 of FIG. 1.

FIG. 12 is a fragmentary sectional view of my lightweight knockdown container taken along the line 12—12 of FIG. 1.

FIG. 13 is a perspective view illustrating an alternate embodiment of my lightweight knockdown container.

FIG. 14 is a fragmentary sectional view of the form of my lightweight knockdown container illustrated in FIG. 13 and taken along the line 14—14 of that Figure.

FIG. 15 is a fragmentary sectional view of the form of my lightweight knockdown container illustrated in FIG. 13 taken along the line 15—15 of that Figure.

FIG. 16 is a fragmentary sectional view of the form of my lightweight knockdown container illustrated in FIG. 13 taken along the line 16—16 of that Figure.

FIG. 17 is a fragmentary sectional view of the form of my lightweight knockdown container illustrated in FIG. 13 taken along the line 17—17 of that Figure.

FIG. 18 is an exploded view illustrating yet a further form of my lightweight knockdown container.

FIG. 19 is a fragmentary sectional view of a base to front panel connection which may be employed in the form of my container illustrated in FIG. 18.

FIG. 20 is a fragmentary sectional view of a side panel to front panel connection which may be employed in the form of my container illustrated in FIG. 18.

FIG. 21 is a fragmentary sectional view of an alternate side panel to front panel connection which may be employed in the form of my container illustrated in FIG. 18.

FIG. 22 is a fragmentary sectional view of an alternate form of base to front panel connection which may be employed in the form of my container illustrated in FIG. 18.

FIG. 23 is a fragmentary sectional view of an upper right hand front corner construction which may be employed in the form of my container shown in FIG. 18.

FIG. 24 is a fragmentary sectional view of a still further base to front panel connection which may be employed in the form of my container illustrated in FIG. 18.

FIG. 25 is a fragmentary sectional view of the top and sides of another embodiment of my lightweight knockdown container.

FIG. 26 is a fragmentary sectional view of the top, front and back of the form of my lightweight knockdown container illustrated in FIG. 25.

FIG. 27 is a fragmentary sectional view of the connection between the front and side panels of the form of my lightweight knockdown container illustrated in FIG. 25.

FIG. 28 is a fragmentary sectional view of the connection between the front and the base of the form of my lightweight knockdown container illustrated in FIG. 25.
DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1, 2 and 8, one form of my lightweight knockdown container indicated generally by the reference character 10 includes a base or pallet 12 comprising a body 14 provided with upper and lower skins 16 and 18. The body 14 may be formed of any suitable material which is adapted to withstand the load applied thereto. The skins 16 and 18 may be made from approximately 85% glass fibers and 15% epoxy resin while the body may be made from urethane foam. Alternatively the skins 16 and 18 might be made of aluminum sheet. Moreover, as will be explained more fully hereinafter, the base 12 as well as all the other panels may be provided with corrugated reinforcing members of aluminum sheet or the like embedded in the plastic foam.

I provide respective reinforcing members 20 all around the periphery of the base or pallet 12. These members may be made from any suitable material such as example as sheet aluminum so formed as to lend rigidity to the base structure. I secure respective aluminum angles 22 to each of the reinforcing members 20 by any suitable means such as by welding or by rivets or the like. These angles 22 are secured to the reinforcing members 20 as to provide inwardly directed lips 24 spaced above the upper surface of the base 12 to permit them to receive a gasket 26 which may be placed or which may be continuous. The base may be provided with skins 25.

Referring now to FIGS. 1, 3, 11 and 12 the back panel indicated generally by the reference character 28 of the container 10 comprises a body 30 of a suitable material such as example as urethane foam provided with skins 32 and 34 made from glass fibers and epoxy resin or aluminum sheet or the like. I provide a plurality of reinforcing channels 36 extending around the entire periphery of the back 28 to afford rigidity thereto. These channels may be formed from a suitable material such as for example as sheet aluminum. Preferably I provide the back panel 28 with corrugated reinforcing members 35 of sheet aluminum or the like embedded in body 30. The other panels to be described may also have such reinforcing members.

I secure respective aluminum angles 38 and 40 to the reinforcing members 36 running along the side edges of the back 28 so as to provide respective inwardly directed lips 41 and 42 spaced from the inner surface of the back and adapted to receive gaskets 44 and 46. I also secure respective angles 48 and 50 respectively to the reinforcing members 36 running along the upper edge of the back panel 28 to form respective outwardly directed lips 52 and 54 spaced above the edges of the back panel 28 so as to receive gaskets 56 and 58. I mount respective snap locks indicated generally by the reference characters 60 and 62 on the inside of the panel 28 adjacent the side edges thereof to hold the side panels of the container in position in a manner to be described.

Referring now to FIGS. 1, 4, 7 and 9, the front panel indicated generally by the reference character 64 of the container 10 has a body 66 which may be formed in the manner described hereinabove in connection with the body 30 of the back panel 28. The body 66 is provided with reinforcing channels 68 similar to channels 36 around its entire periphery. I provide respective angles 70 and 72 secured to the member 68 adjacent the side edges of the panel 64 provide inwardly directed lips 74 and 76 spaced from the inner surface of the panel 64 to receive gaskets 78 and 80. Another angle 82 secured to the reinforcing member 68 at the lower edge of the panel 64 provides an outwardly directed lip 84 which receives a gasket 86. I provide respective spring locks indicated generally by reference characters 88 and 90 on the inside of panel 64 adjacent the side edges thereof as to hold in the side panels in position in a manner to be described.

I mount a latch plate 89 on the outside of panel 64 at the upper edge thereof by any suitable means. Plate 89 pivots supports a link 91 which in turn pivotally carries a hook 92 having a relatively wide lateral extent. Hook 92 carries a hasp 94 provided with a slot 96 for receiving a ring 98 on plate 88 to permit the box to be locked in a manner to be described hereinafter by use of a padlock or the like.

Referring now to FIGS. 1, 5, 8, 9 and 11 the box includes respective sides indicated generally by the reference characters 100 and 102 the left-hand side 100 of which is illustrated in detail in FIG. 5. Each of the sides 100 and 102 includes a body 104 similar in construction to the bodies of the other panels described hereinabove. Each of the bodies 104 carries reinforcing channels 106 around its entire periphery. I secure respective angles 108 to the reinforcing members 106 at the side edges and at the bottom edges of the panels 100 and 102 to form outwardly directed lips 110 spaced from their corresponding edges so as to receive gaskets 112. No lip is formed at the upper edge of either of the panels 100 and 102.

Referring now to FIGS. 1, 6, 7, 10 and 12 the container 10 is completed by a top indicated generally by the reference character 114 having a body 116 similar to the bodies of the other panels which is provided with reinforcing channels 118 around its entire periphery. I secure an angle 120 to the reinforcing member 118 at the rear edge of panel 114 to provide an inwardly directed lip 122 spaced from the inner surface of the top 114 and adapted to receive a gasket 124. I secure respective guide plates 126 and 128 at the other edges of top 114. These guide plates slip over the side panels in a manner to be described when this form of my container is assembled. I secure a keeper forming element 130 to the front edge of the top 114 to receive the hook 92 in a manner to be described when this form of my container is locked up. Any suitable means such as for example as the lips of the foam rubber strips 132 to the inner surface of the top 114 adjacent the side and front edges thereof to provide a seal with the upper edges of the front and side panels when the box is erected.

Referring now to FIG. 9 I have shown the details of one of the locks 88 carried by the inside of the back panel 28 and the front panel 64. An opening 134 in the inner surface of the panel receives the locking element 136 which is normally urged outwardly of the panel by a spring 138 bearing on a bracket 140 secured to the panel.

To assemble the form of my container illustrated in FIGS. 1 to 12 the back panel 28 and the front panel 64 may be erected by sliding their respective lips 52 and 84 under the lips 22 at the front and back edges of the base 12 so as to bring the edges of the lips into engagement with the gaskets on the other members. When that has done the two sides 100 and 102 may be erected by slipping the lips 110 along the lower edges thereof under the lips 22 at the side edges of the base. As the right-hand back panel, for example, is swung upwardly to bring the lips 110 along the lower edges thereof into engagement with a lip 42 on the right side of the back panel and with a lip 74 at the right side of the front panel, this side panel snaps in behind the locks 62 and 88. In a similar manner as the left-hand side panel is erected it slips in behind the locks 60 and 90.

In the condition of the parts just described, all of the sides, front and back panels of the box are in position and it is ready for loading. After loading the top panel 114 is placed in position by slipping the guides 126 and 128 over the rear upper corners of the side panels and bringing the lip 122 into cooperative relationship with the lip 54 to cause the respective lips to cooperate with gaskets 58 and 80. When this has been closed in this manner, hook 92 is brought into engagement with the keeper 130 and the hasp 94 is moved down over the eye 98. The box now is completely closed. If desired a padlock or the like may be passed through the eye 98 to lock the box.

Referring now to FIGS. 13 and 17 I have shown an alternate form of my lightweight knockdown container indicated generally by the reference character 142 which opens from the front rather than from the top. Owing to the fact that many of the constructional details of this form of my container are similar to those of the form shown in FIGS. 1 to 12, I will describe in detail only the differences between this form and the form described hereinabove. The container 142 includes a base or pallet 144, respective sides 146 one of which is shown, a front panel 148 and a back panel (not shown) which is the same as the back panel of the form of my container shown in
FIGS. 1 to 12. The differences between the form of my invention shown in FIGS. 1 to 12 and that shown in FIGS. 13 and 17 are in the connections between the top panel 150 and the sides 146, between the base or pallet 144 and the front panel 148, between the front panel 148 and the sides 146 and between the base 144 and front panel 148.

Referring to FIG. 17 in the form of my invention shown therein, the sides 146 bear respective angles 152 providing lips 154 spaced from the upper edges of the panels and directed outwardly. The recesses formed by the lips receive gaskets 156. The top 150 carries respective angles 158 along its side edges providing inwardly directed lips 160 which receive gaskets 162. When this form of my box is assembled, the side lips 154 ride into the spaces between the top flanges or lips 160 and the underside of the top 150. In so doing flanges 154 and 160 engage gaskets 162 and 156.

Referring to FIG. 14 the base 144 carries a sheet metal receptacle 164 having an arcuate portion 166 adapted to receive the arcuate portion 168 of a locking element 170 secured to the front panel 148. As the front panel 148 is swung into position it engages a foam rubber seal 172 carried by the front panel 148.

Referring to FIG. 15 I secure a pair of guide plates 174 and 176 to the front panel 148 to form a recess for receiving the front edge of a side 146. The front edge of the side carries a foam rubber gasket 178 which seals against the bottom of the recess formed by guide plates 174 and 176.

Referring now to FIG. 16 the front panel 148 carries a pair of spaced guides 180 and 182 forming a recess for receiving the front edge of the top panel 150 as the panel is swung into position. A gasket 184 located in the recess formed by plates 180 and 182 seals against the front edge of the top.

I provide a pair of locking devices indicated generally by the reference characters 186 and 188 on the top panel 150. These devices may be similar to the assembly of the locking hook 92 and its associated element provided in the form of my invention shown in FIGS. 1 to 12. When operated the locking assemblies 186 and 188 engage a hook 190 formed on plate 180 to draw the front panel into position and to hold it in that position.

To erect the form of my container illustrated in FIGS. 13 to 17 the back is raised and the sides are erected in a manner similar to that described hereinabove in connection with FIGS. 1 to 12 so that the locks 60 and 62 hold the sides in position. Next, the top is applied to the back and sides so that the lips 154 and 160 and the gaskets 156 and 162 cooperate in the manner illustrated in FIG. 17. The container is then ready for loading through the front. After loading the arcuate portion 158 of the member 170 is inserted in the arcuate portion 166 of the lip and the front is swung upwardly to cause the sides 146 to ride into the recesses formed by members 174 and 176 and to cause the top 150 to ride into the recess formed by members 180 and 182. When that has been done the latches 186 and 188 are brought into engagement with the hook 190 and operated to draw the front 148 firmly in position and to hold it in that position.

Referring now to FIGS. 18 to 20 in yet another form of my container indicated generally by the reference character 192 I provide a back panel 194, side panels 196 and 198, a base 200, a top 202 and a front 204. In this form of container both the top panel 202 and the front panel 204 are readily removable for loading. The differences between this form of container and that shown in FIGS. 1 to 12 are the manner in which the front panel 204 is connected to the base 200 and the manner in which the side panels 196 and 198 are connected to the front panel 202. Referring to FIG. 19 I secure an upper element 206 along the top of the base 200 adjacent the front edge thereof. A second element 208 secured to the underside of the base along its front receives a gasket 210. I shape the elements 206 and 208 as to permit opening 212 for the insertion of a connector element 214 bent outwardly from the inner surface of the front 204 adjacent the bottom edge thereof. The recess formed by element 214 receives a gasket 215. To assemble the front with the base element 200 is slid into opening 212 to bring it into engagement with gasket 215.

Referring now to FIG. 20 each of the sides 196 and 198 includes an angle 216 providing a lip 218 spaced outwardly some distance from the edge of the side to permit play between the front and side panels in a manner to be described. Each side edge of the front panel 204 carries an angle 220 providing a lip 222 which permits some distance from the inner surface of the front panel. The recesses formed by the respective lips 218 and 222 receive respective gaskets 224 and 226. In this form of my container I provide a hook 228 running along the edge of the top panel and clamping assemblies 230 and 232 on the outside of the front panel.

In assembling the form of my container illustrated in FIG. 18 to 20 the back and sides are erected in the manner described in connection with FIG. 1 so that the back locks 60 and 62 hold the sides 196 and 198 erected. The container is now ready for loading. After loading the front may be placed in position by sliding the lips 222 downwardly through the space between lips 218 and the front edges of the sides 196 and 198 until elements 214 moves into the opening 212 and finally the front comes to rest. Next, the top is moved into position in the manner described in connection with FIGS. 1 to 12 and latches 230 and 232 may be operated securely to hold the front in position.

Referring to FIG. 24 I have shown a slightly modified arrangement for connecting the front 204 to the base 200. In this form an angle 234 secured to the underside of the base adjacent its front edge receives a gasket 236. A strip 228 secured to the inner surface of front 204 adjacent its bottom has an offset 240 forming a recess for a gasket 242. When the front is assembled in the manner described in connection with FIG. 18, offset 240 rides into the space formed by angle 234 to secure the front panel 204 to the base 200.

In yet another form of my invention shown in FIG. 21 I employ the same base to front panel connection as that illustrated in FIG. 14. However, instead of employing the front to side connection illustrated in FIG. 15 I use a somewhat modified arrangement wherein the side panels 146 are locked to the front panel 148 by a resilient locking element 244 carried by the front edge of the side which snaps in behind a guide and retainer 246 secured to guide element 174 as the front is brought into position.

In another modification illustrated in FIG. 22 of the manner in which the front panel 148 can be secured to the base 144 I provide the base with an angle 48 providing a downwardly directed lip 250 receiving a gasket 252. Front 204 carries an angle 254 providing an upturned lip 256 receiving a gasket 258. In this form of closing the entire front panel is moved upwardly to engage it with the base.

FIG. 23 shows an alternate arrangement in which the top panel carries a strip 260 of foam rubber which rests on the upper edge of the front panel 204. A flange 262 on the front panel has an opening 264 for receiving a snap lock (not shown) on the side.

By way of summarizing the construction of the various forms of my lightweight container, in all forms thereof the back to top panel, back to base panel, back to side panels and base to side panels all are interconnected in the same manner as that described above in connection with the form of my invention illustrated in FIGS. 1 to 12. The first alternative form of my invention illustrated in FIGS. 13 and 17 differs from that illustrated in FIGS. 1 to 12 in that the top to side connections are provided by interengaging lips rather than merely abutting. The front to side panel connections are a butt joint and not interengaging lips as in FIG. 1. Moreover, the front panel is pivoted to the base and the front butts on the top rather than the top butting on the front.

The form of my container illustrated in FIGS. 18 to 20 differs from the form shown in FIGS. 1 to 12 in that the front to base joint is a vertical sliding connection and that the interengaging lips which connect the sides to the front permit of
some play to enable the front to be assembled. Moreover, in this form of my invention the front butts on the top rather than the top butting on the front.

The form of my invention shown in FIG. 21 wherein the sides are connected to the front panel by a resilient snap lock rather than lips is used with a front panel which is pivoted to the base as in the form of my invention illustrated in FIGS. 13 to 17.

FIGS. 22 and 24 illustrate alternate forms of front to base connections which are employed with a front which butts against the side panels rather than employing interengaging lips.

In use of the form of my invention illustrated in FIG. 1 when the container is in storage all of the end panels are stacked on top of each other and in that condition the vertical extent of the stack is only approximately ten inches. This permits four stacked containers to be shipped in less space than would be required to ship one full container.

To erect this form of my container the front panel 64 and the back panel 28 first are assembled on the base or pallet 12. The two side panels 100 and 102 are then erected and are releasably held in erect position by the pairs of locking assemblies 88 and 60 and 90 and 62. Next the container is loaded and finally the top panel 114 is slid into position and hook 92 is engaged with the hooked flange 130 to complete the assembly.

In the form of my container illustrated in FIGS. 13 to 18 the back panel, the side panels 146 and the top panel 150 all are erected and the container is ready for loading. After loading the elements 168 and 166 are brought into engagement and the front panel 148 is swung upward until its edges butt the edges of the side panel and of the top panel and the locks 186 and 188 may be closed to complete the container.

In the form of my container illustrated in FIGS. 18 to 20 the side panels 196 and 198 and the back panel 194 are erected on the base 200. The container may then be partially loaded and the front panel attached thereto by sliding it downwardly until the member 214 enters opening 212 and the lips 218 and 222 are brought into engagement with the gasket 226 and 224. Then the front and top panels can be locked together.

The assembly of the front panel 148 on the box in the form of my invention illustrated in FIG. 21 is similar to that described in connection with FIG. 13. However, as the front is moved to closed position the resilient locking element 244 snaps behind retainer 246 to lock the front in place. This lock can be released as dissemble the container by sliding a screwdriver down behind the retainer.

In the form shown in FIG. 22 the front panel 204 is assembled by sliding it upwardly until it locks in place with the side panels to prevent downward movement thereof.

FIG. 24 shows a front panel which is assembled in much the same way as is the panel 204 illustrated in FIG. 19.

Referring now to FIGS. 25 to 28 I have shown a still further form of my lightweight knockdown container including a top 266, sides 268 and 270, a back 272, a front 274 and a base 276. As will be apparent from the description hereinafter this form of my invention is highly resistant to damage in use. Where angles are spot welded to the panel frame the possibility exists that the welds may break if the panel is, for example, run over by a piece of heavy equipment. The form of my invention to be described reduces this possibility.

I provide the form of my container illustrated in FIG. 25 to 28 with a plurality of end hooks indicated generally by the reference character 278 along various edges of the panel such as the edges of the panel 276 as shown in FIG. 25. Each of the end hooks 278 is made up of a first sheet metal member 280 which extends around the edge of the panel from the inside thereof to form a hook 282 spaced outwardly from the panel edge. Another element 284 extends from the outside surface of the panel over the edge and along the hook 282 to complete the hook assembly 278. It is to be understood that the panels 266, 268, 270, 274 and 276 may be constructed in a manner similar to that described hereinabove with the other forms of my invention. The elements 280 and 284 making up end hook assembly 278 may be made of any suitable material such as for example 0.020 inch thick aluminum.

The form of my invention shown in FIGS. 25 to 28 further includes a plurality of S-hooks indicated generally by the reference character 286 integrated into each hook portion 288 to complete the step hook assembly 284 and forming an end hook assembly 278 which may be made of any suitable material such as for example 0.040 inch thick aluminum and may be secured to the panels in any suitable manner known to the art.

I provide end hook assemblies along the side edges of the top panel 274 as shown in FIG. 25, entirely around the perimeter of the back panel 272 as shown in FIG. 26, along the side edges of the front panel 276 as shown in FIG. 27 and along the bottom edges of the sides. The elements 280 and 284 making up the assembly 278 may be made of any suitable material such as for example 0.020 inch thick aluminum.

The form of my invention shown in FIGS. 25 to 28 further includes a plurality of S-hooks indicated generally by the reference character 286 integrated into each hook portion 288 to complete the end hook assembly 278 and forming an end hook assembly 278 which may be made of any suitable material such as for example 0.020 inch thick aluminum and may be secured to the panels in any suitable manner known to the art. I provide S-hooks 286 along the top edges of the sides as illustrated in FIG. 25 and along the front edges of the sides as shown in FIG. 27.

I provide respective side hook assemblies indicated generally by the reference character 292 along various edges of the container. Each side hook assembly 292 includes a element 294 secured to the inner surface of the associated side panel and bent back so as to form a hook portion 296. The other element 298 of each assembly 292 extends from the outer surface of the panel around the edge and over the hook portion 296 to form a double thickness of material at the hook. I may make the elements 294 and 298 of 0.020 inch thick aluminum. These side hooks are provided at the rear edge of the top as shown in FIG. 26 and at the rear edges of the sides as well as at the side and rear edges of the base 276.

In order to connect the lower edge of the front panel 274 to the base 276 I employ a modified side hook assembly indicated generally by the reference character 300 along the front edge of the base. Assembly 300 forms a hook 302 which is somewhat shorter than are the hooks of the other side hook assemblies such as assembly 292. I secure a modified end hook assembly indicated generally by the reference character 304 along the lower edge of the front panel 274 for cooperation with the assembly 300. The mouth of the hook 306 of assembly 304 is made wider than are the mouths of the other end hook assemblies such as 278 to facilitate assembly of the front panel 274 in a manner to be described.

I provide the form of my container being described with a flat latch assembly indicated generally by the reference character 308 for holding the top 266 down on the front panel 274. The front edge of the top panel 266 carries a cap 310 to which I secure an angle 312 the flange 314 of which extends downwardly over the parting line between the top and front panels when the front panel is in place. The flange 314 and cap 310 form an opening 316 for the reception of the draw hook 318 of the latch assembly 308. The upper edge of the front panel 274 receives a cap 320 which butts on the underside of cap 310 when the container is closed. A mounting plate 322 secured to the outer surface of the panel 274 in any suitable manner carries pivots 324 which support a handle 326 carrying a pin 328 which supports the draw hook. I provide the front panel 274 with a recess 330 for receiving the handle 326.

From the structure thus far described, it will be apparent that the base 276 has side hook assemblies 292 along its rear edge and a modified side hook assembly 300 along its front edge. Each of the sides has S-hooks 286 along its top and front edges, an end hook 278 at its bottom edge and a side hook 292 at its rear edge. The back panel 272 has end hooks around all of its edges. The front panel 274 has end hooks 278 along its side edges and a modified end hook 304 along its bottom edge. The top panel 266 has end hooks 278 along its side edges and a side hook 292 along its back edge.

In order to assemble the form of my container illustrated in FIGS. 25 to 28 first erect the sides 268 and 270 and the back panel 272 on the base 276. This is accomplished by inserting all of the end hooks 278 along the bottom edges of these
5 panels in the side hooks 292 along three edges of the base 276. In the course of this operation end hooks at the side edges of the back engage side hooks at the back edges of the sides.

Next, the top panel 266 is put in place by engaging the side hook 292 at the back edge thereof with the end hook 278 along the top edge of the back. In the course of that operation, the end hooks 278 along the side edges of the top 266 engage the side hooks 286 along the top edges of the sides. The top panel 266 may be lifted slightly as the front panel moves to its home position to permit flange 314 to ride over the upper front edge of panel 274. With the parts in that position hook 318 is swung into opening 316 and handle 326 is moved to closed position to position pin 328 beyond dead center securely to close the container.

It will be seen that I have accomplished the objects of my invention, I have provided a lightweight knockdown container which is readily assembled and disassembled with the use of tools. My container affords a good measure of protection to cargo stowed therein. It is lightweight and yet is durable, it is so constructed as to minimize the possibility of gaps along edges of mating panels. It does not require any external strips to assist it in avoiding internal loads.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. It is further obvious that various changes may be made in details without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. A lightweight knockdown container including in combination, a base, a front, respective sides and a top, means forming an inwardly opening groove along the side and back edges of said base, means forming respective outwardly extending lips along the bottom edges of said back and sides for reception in said base groove, means forming respective grooves along the side edges of said back, said grooves opening inwardly in a direction generally parallel to the plane of said back, means forming respective lips along the back edges of said sides, said side back edge lips extending in a direction generally parallel to the back edges of said sides to engage in said back side edge grooves in response to sliding movement of said sides outwardly of said container from the interior thereof and readily releasable means carried by the inside of said back and responsive to said sliding movement for engaging the inner surfaces of said sides to hold said sides erected on said base.

2. A container as in claim 1 including means forming respective grooves along the side edges of the front, said front side edge grooves opening inwardly in a direction generally parallel to the plane of the front, means forming respective lips along the front edges of said sides, said side front edge lips extending in a direction generally parallel to the front edges of said sides to engage in said front side edge grooves in response to said sliding movement, and second readily releasable means on the inside of said front and responsive to said sliding movement for engaging the inner surfaces of said sides.

3. A container as in claim 1 in which said releasable means comprises respective biased catches movable between operative and inoperative positions, each of said catches being positioned to be engaged by an edge of side panel as it is erected whereby to move the catch from operative to inoperative position and each of said catches being adapted to return to operative position to engage the inner surface of a panel after the panel is erected.

4. A container as in claim 1 in which each of said lip forming and groove forming means comprises respective members L-shaped in cross section and positioned so that one leg of each is secured to an edge to be joined and the other leg is spaced from the edge to provide interengaging lips.

5. A container as in claim 4 including a plurality of gaskets, each of said gaskets being supported by one of said members and positioned to be engaged by the lip of the other member.

6. A container as in claim 4 in which each of said members is formed from sheet metal.

7. A lightweight knockdown container including in combination, a base, a front, respective sides and a top, first interengangeable means extending around the periphery of said base and respective outwardly directed lips along bottoms of said front and back sides, second interengangeable means extending along the side edges of said back and along the back edges of said sides, said second interengangeable means comprising inwardly directed lips extending along the side edges of said back and outwardly directed lips extending along the back edges of said sides, third interengangeable means extending along the side edges of the front and along the front edges of the sides, said third interengangeable means comprising inwardly directed lips extending along the side edges of the front and outwardly directed lips along the front edges of the sides, said lid being movably adapted to engage in response to sliding movement of said sides outwardly of the interior of said container after erection of said front and back on said base, and biased catches on the inside of the front and back for holding said sides and front and back erected, said catches being movable between operative and inoperative positions, said catches being adapted to be moved from operative to inoperative positions by the edges of a side and back to operative position to engage the inner surface of the side in response to said sliding movement thereof.

8. A container as in claim 7 in which said sides comprise a body of synthetic-resin foam and a corrugated reinforcing element embedded in said foam.

9. A container as in claim 7 in which said lips are formed by members of L-shaped cross section one leg of which is attached to an edge to be joined with the other leg spaced from the edge to form the lip.

10. A container as in claim 7 including fourth interengangeable means along the upper edge of said back and the rear edge of said top, said fourth interengangeable means comprising an outwardly directed lip at the upper edge of the back and an inwardly directed lip along the upper edge of the top.

11. A container as in claim 10 including a latch for securing said top to said front said latch comprising interengangeable elements elongated in a direction laterally of said front.

12. A container as in claim 11 including sealing gaskets disposed between the undersurface of the container top and the upper edges of said said sides.

13. A container as in claim 11 including arcuate interengangeable means along the front edge of the base and along the bottom edge of the front to permit the front to be swung into closed position.

14. A container as in claim 13 including gaskets positioned between the front edges of the container top and sides and said front.

15. A container as in claim 13 including resilient tabs on the front edges of said sides and means on the side edges of the front for receiving said tabs as said front swings to closed position.

16. A container as in claim 11 including interengangeable means along the front edge of the base and along the bottom edge of the front adapted to engage upon vertical movement of the front.

17. A container as in claim 16 in which said interengangeable means comprises an upwardly directed lip along the lower edge of the front and a downwardly directed lip along the front edge of the base.

18. A container as in claim 16 in which said interengangeable means comprises an upwardly directed lip along the front edge of the base and a downwardly directed lip along the lower edge of the front.
19. A lightweight knockdown container including in combination a base and a front and a back and sides and a top, first interengageable means comprising inwardly extending side hooks running around the perimeter of said base and outwardly extending end hooks running along the bottom edges of each of the sides and the back and the front for connecting said sides and back and front to said base, second interengageable means comprising inwardly extending end hooks along the side edges of said back and outwardly extending side hooks along the back edges of the sides for connecting said sides to said back, third interengageable means comprising inwardly extending end hooks along the side edges of the front and outwardly extending hooks along the front edges of the sides for connecting the sides to the front, fourth interengageable means comprising an inwardly directed side hook along the back edge of the top and an outwardly directed end hook along the top edge of said back for connecting said top to said back, fourth interengageable means comprising downwardly extending end hooks along the side edges of the top and upwardly extending side hooks along the top edges of the sides for connecting said sides to said top, and releasable means for connecting said top to said front.

20. A container as in claim 19 in which said releasable means is a flush latch assembly.