Jan. 5, 1965 A. R. WILLIAMS, JR. 3,164,281

COLLAPSIBLE CONTAINER

Filed June 1, 1962 2 Sheets-Sheet 1

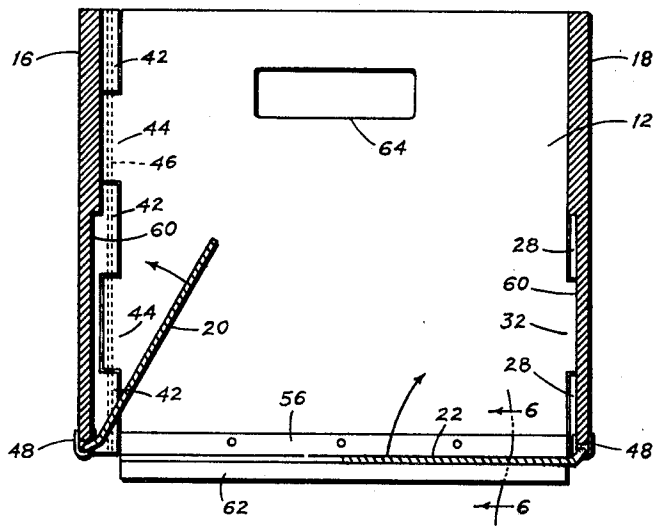


Fig. 2

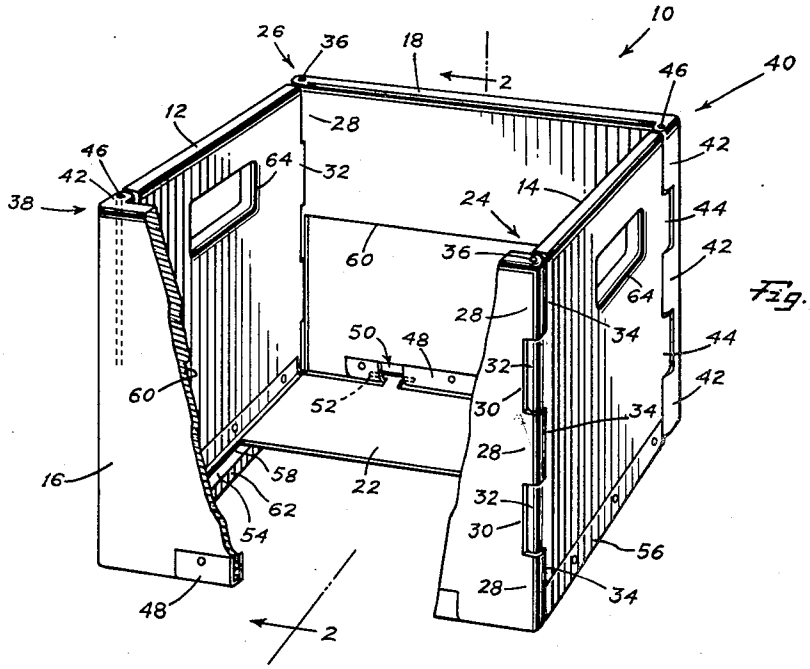


Fig. 1

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Fig. 3

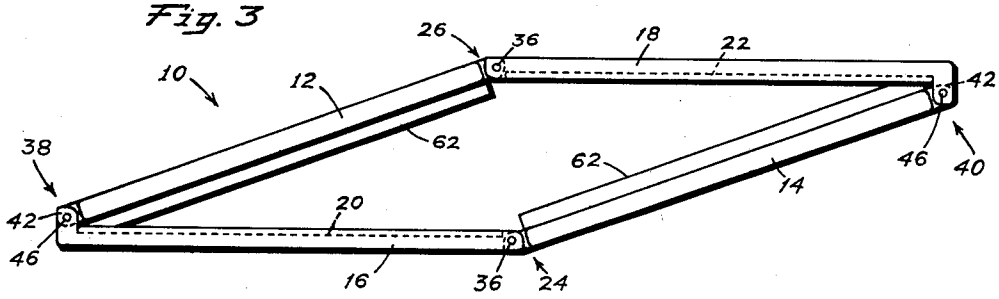


Fig. 4

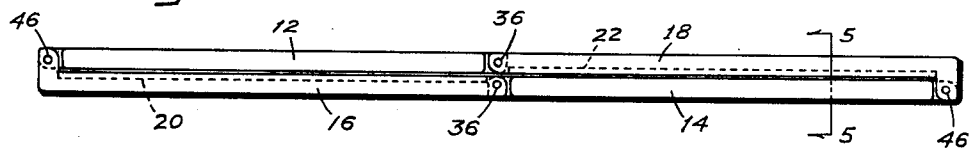


Fig. 5

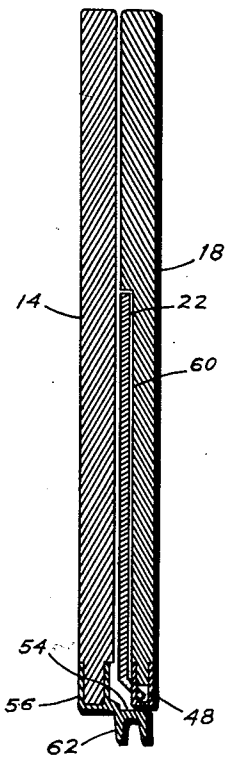


Fig. 6

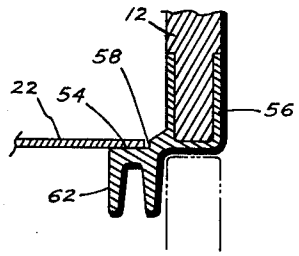
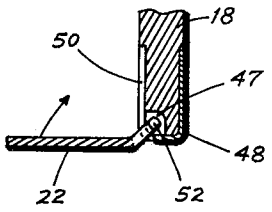


Fig. 7



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COLLAPSIBLE CONTAINER

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3 Claims. (Cl. 217—14)

This invention relates to a collapsible container.

The invention has for an object to provide a novel and improved collapsible container characterized by novel structure enabling the container to be easily and quickly collapsed, and wherein the collapsed container occupies a minimum of space as related to the bulk provided by the opened container.

Another object of the invention is to provide a novel and improved collapsible container of the character specified which is open at the top and in which the bottom of the container is formed to nest within the open top of an underlying container to facilitate stacking of the containers.

A further object of the invention is to provide a novel and improved collapsible container of the character specified wherein all of the walls thereof are hingedly interconnected and wherein the hinged bottom walls cooperate with the side walls to retain the container in its open condition.

With these general objects in view and such others as may hereinafter appear, the invention consists in the collapsible container hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention:

FIG. 1 is a perspective view of a fully opened container with the front wall partly broken away and one of the two hinged bottom flaps removed;

FIG. 2 is a vertical section taken on the line 2—2 of FIG. 1;

FIG. 3 is a plan view of the container shown in its partially collapsed condition;

FIG. 4 is a similar view shown in its fully collapsed condition;

FIG. 5 is a cross sectional view taken on the line 5—5 of the fully collapsed container shown in FIG. 4;

FIG. 6 is a cross sectional detail view taken on the line 6—6 of FIG. 2 showing the structure provided along the lower edges of two opposed side walls to enable interlocking stacking of the containers; and

FIG. 7 is an enlarged cross sectional detail view of the structure provided along the lower edges of two opposed side walls in which the bottom flaps are hinged.

In general the present invention contemplates a novel and improved collapsible container particularly adapted for use as a shipping case and whose construction is such as to occupy a minimum of storage space when in its collapsed condition. In its preferred form the illustrated container is open at its upper end and the bottom of the container is constructed to nest within the open end of an underlying container to facilitate stacking of the containers. The present collapsible container has several particular advantages over conventional containers in that it is strong, lightweight and may be easily dissambled and cleaned.

Referring now to the drawings and particularly to FIG. 1, the illustrated collapsible container 10 is substantially rectangular in shape and open at its upper end. In general the container 10 comprises four upstanding side walls including two opposed side walls 12, 14 and two opposed side walls 16, 18 hingedly connected together, and a pair of opposed bottom closure flaps 20, 22 hingedly connected to the lower edges of the side walls 16, 18.

The hinge structures provided at diagonally opposed corners 24, 26 of the container are of similar construction and as shown at the corner 24 include hinge portions 28

formed by cutout portions 30 in a longitudinal edge of the side wall 16. The cutout portions 30 are arranged to snugly receive hinge portions 32 formed by cutout portions 34 in the adjacent longitudinal edge of the side wall 14. A hinge pin 36 ie extended through openings in the hinge portions as shown. In practice the hinge pin 36 may be fast in the hinge portions 28 and may extend loosely through the hinge portions 32 to permit outward rocking of adjacent side walls when the container is collapsed.

The hinge structures provided at the other diagonally opposed corners 38, 40 are also of similar construction and differ from the hinge structures shown at the diagonal corners 24, 26 in that the hinge portions 42 in the longitudinal edges of the side walls 16, 18 are offset at right angles to their side walls for cooperation with the hinge portions 44 of the adjacent opposed side walls 12, 14. The right angle hinge portions 42 extend from the longitudinal edges of their respective side walls a distance substantially equal to the thickness of the side walls and the hinge pins 46 are located so as to permit inward folding of the adjacent side walls, as illustrated in FIG. 3, and to present the side walls 12, 14 flat against their adjacent side walls 16, 18, respectively, in their completely collapsed condition as shown in FIG. 4.

From the description thus far it will be seen that the hinge structures at the diagonally opposed corners 24, 26 are formed by interlocking hinge portions aligned with their respective side walls, that is, the hinge pins occur at the intersection of the center line of adjacent side walls so as to permit outward pivotal movement of adjacent side walls at the hinge and the hinge structures at the diagonally opposed corners 38, 40 are formed by interlocking hinge portions wherein the hinge portions from one edge of each of opposed side walls 16, 18 are offset at right angles from their respective side walls for cooperation with hinge portions aligned with their respective side walls so as to permit inward pivotal movement of adjacent side walls at the hinge whereby to permit collapse of the container walls into face-to-face relation. The offset of the pivot pins is such that the distance from the inner face of the side wall to the pivot pin is equal to one half the thickness of the side wall. With this construction it will be seen that the collapsed container is of a thickness equal to but two thicknesses of the side walls whereby to occupy a minimum of storage space.

The bottom of the container is closed by the opposed bottom closure flaps 20, 22 hingedly connected to the lower edges of opposed side walls 16, 18. As herein shown, the lower edge of each wall 16, 18 is provided with a U-shaped retaining and reinforcing member 48 which extends throughout the length of an intermediate portion of the side walls. The upstanding legs of the U-shaped member 48 may and preferably will be recessed into the opposite faces of the side walls, as shown. The lower portion of each side wall 16, 18 may be cut away to form openings, as indicated at 47 in FIG. 7, and the inner legs of the U-shaped member 48 may be provided with slotted potrions 50, as shown in FIG. 1, adapted to receive and retain T-shaped extensions 52 provided along the adjacent marginal edges of the bottom closure flaps for the purpose of hingedly connecting the flaps to the side walls. It will be evident that the T-shaped ends 52 of the flaps may be placed within the U-shaped member 48 prior to assembling the same with the lower edge of its side wall. As illustrated in FIG. 7, the T-shaped portions 52 may be bent upwardly or offset at an angle of about 45°, and the laterally extended portions of the T are confined within the opening 47 defined by the U-shaped member to form the hinged connection.

The bottom closure flaps 20, 22 may each be of a length to cover one half of the bottom when in their open posi-

tion, and the marginal side edges of the open flaps are supported on inwardly extended shelves **54** formed integrally with U-shaped reinforcing members **56** provided along the lower edges of opposed side walls **12**, **14**, the upstanding legs of which may also be recessed into the opposite faces of the side walls, as shown in FIG. 6, to present the outer faces of the legs flush with the faces of the side walls. When in their closed position the marginal side edges of the bottom flaps also engage and cooperate with the upstanding edges **58** of the shelves **54**, and such engagement maintains the container in its open and squared-up position by preventing collapse of the container until the bottom flaps **20**, **22** are rocked upwardly against the inner faces of and parallel to their respective side walls. As illustrated in FIGS. 2 and 5, the side walls **16**, **18** are provided with recessed portions **60** arranged to receive the upwardly rocked flaps **20**, **22**, respectively, so as to present the outer faces thereof flush with the inner faces of the side walls. It will be observed that the angularly bent T-shaped hinged portions **52** permit the flaps to assume a parallel relationship with the side walls.

The inwardly extended shelves **54** are formed in the upper portions of depending elements **62** formed integrally with the U-shaped members **56**, and when the containers are in their opened condition the inwardly extended and depending elements **62** are adapted to fit within opposed side walls of the open upper end of an underlying container to provide an interlock or nesting arrangement whereby to facilitate stacking of the containers one upon another, as indicated by the broken lines in FIG. 6. It will be observed that when in its folded or collapsed condition the lower edges of the walls **16**, **18** are fitted within the shelf portions **54** as shown in FIG. 5. Opposed side walls may also be provided with hand holes **64**, as shown, to facilitate handling of the containers.

From the above description it will be seen that the present collapsible container is constructed with a minimum of parts and that all of the parts are hingedly interconnected in a manner such as to enable quick and easy erection of the container into its open condition and in a manner such as to provide a minimum of bulk in its closed condition.

It will be understood that the four side walls may and preferably will be of uniform thickness and that the container may be constructed of wood, molded plastic or other suitable material. In the illustrated embodiment of the invention the elements provided along the lower edges of the side walls may comprise metal, and the bottom closure flaps may also be metal. When the side walls are made of molded material the elements provided along the lower edges of the side walls may be molded integrally therewith.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. A collapsible container open at its upper end comprising four side walls hingedly connected together, and a bottom wall including opposed bottom closure flaps hingedly connected to the lower edges of two opposed side walls, and means extending inwardly from the lower edges of the two adjacent side walls for supporting the marginal side edges of the flaps when the container is in its open condition said flap supporting means arranged to be folded under the adjacent side walls when the container is in a closed position, said bottom closure flaps being foldable upwardly parallel to their side walls, said side walls being recessed to receive the upwardly folded flaps to present the outer surfaces thereof flush with the inner surfaces of their respective side walls, the hinge structure at two diagonally opposed corners including pivot pins disposed at the intersection of their respective walls, and the hinge structure at the other two diagonally opposed corners including pivot pins disposed in offset relation to the intersection of their respective walls whereby to permit inward folding of the side walls at said last named diagonally opposed corners to present two adjacent side walls flat against the other two adjacent side walls when the container is in its collapsed condition, said offset pivot pins being disposed a distance of one-half the thickness of the side walls from the inner face of their respective side walls.

2. A collapsible container comprising four side walls of uniform thickness hingedly connected together, and a pair of bottom closure flaps of reduced thickness hingedly connected to two opposed side walls and engageable with portions mounted on the adjacent side walls to maintain the container in its open condition, said two opposed side walls having recesses formed therein to receive the bottom closure flaps when folded upwardly preparatory to collapse of the container, the hinge structures interconnecting the side walls including offset portions permitting collapse of the container to present two adjacent side walls flat against the two remaining side walls to provide a collapsed structure of a thickness equal to two thicknesses of the side walls, said portions mounted on the adjacent side walls being folded under said side walls when the container is in a closed position.

3. A collapsible container as defined in claim 2 wherein the hinge structures connecting the bottom closure flaps to their respective side walls includes T-shaped extensions received in openings in the lower edges of their side walls, said extensions being offset to permit folding of the flaps into said recesses to present the outer surfaces thereof flush with the inner surfaces of their respective side walls.

References Cited in the file of this patent

UNITED STATES PATENTS

619,093	Shadinger	Feb. 7, 1899
974,820	Pinto	Nov. 8, 1910
995,880	Long	June 20, 1911
1,484,651	Kamerer	Feb. 26, 1924
1,809,917	Thomas	June 16, 1931
2,232,346	Sikes	Feb. 18, 1941
2,235,093	Warnick	Mar. 18, 1941
2,868,404	Mattes	Jan. 13, 1959