United States Patent

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[73] Assignee **the United States of America as represented by the Secretary of the Air Force**

[54] **PALLET HAVING HINGED END PANELS AND FLEXIBLE COVER MEMBERS**
8 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **150/49,** 220/6, 220/1.5
[51] **Int. Cl.** **A45c 7/00,** A45c 13/00, A45c 220/7, B65d 7/12
[50] **Field of Search** 220/1.5, 6, 97, 97-A; 150/.5, 49; 294/67; 105/366

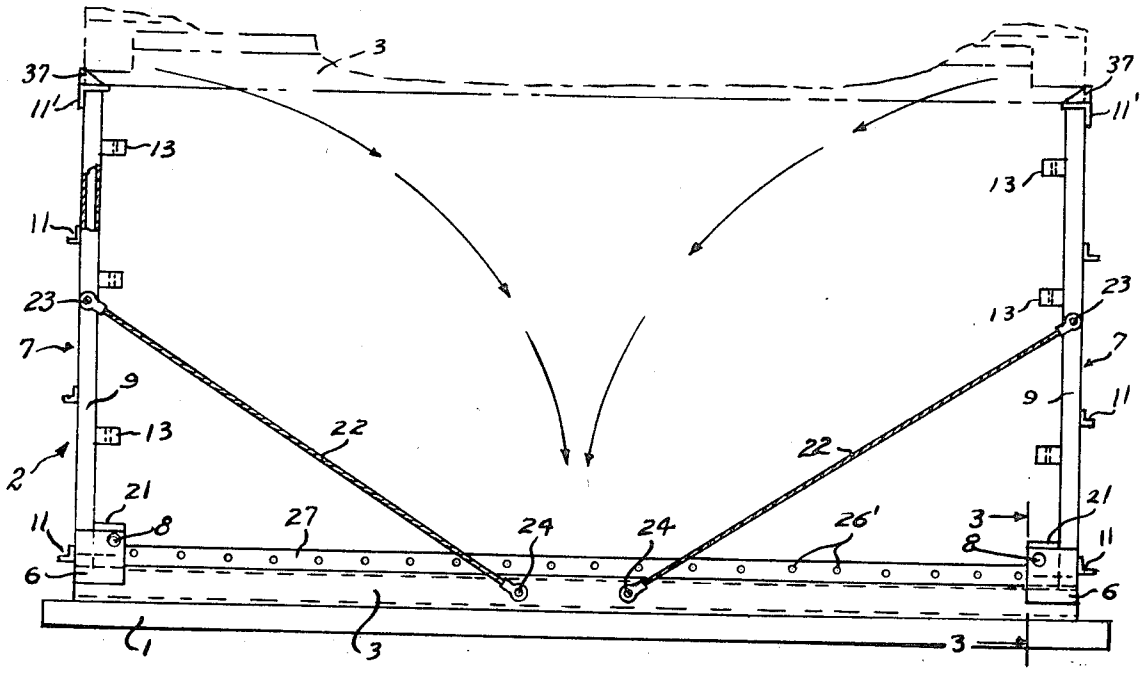
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ABSTRACT: A rectangular collapsible boxlike mail carrier which may be mounted on a standard-type cargo pallet and which includes a main, cargo-supporting floor member equipped with depending tunnels or channels to receive spaced forklift blades and provide support for rigid end panels which are hinged to fold downwardly toward each other and the floor member, flexible sidewalls reinforced with battens that telescope between the corner posts of the end panels, and a flexible reinforced cover secured to the top of one of the sidewalls and adapted to be drawn down over the top of the carrier and which is detachably secured to the top of the other sidewall. The cover has attached end and side flaps which cover, overlap and protect the top, side and end edges of the carrier. Socket means are also provided at the top of the corner posts of the end panels for receiving and stacking a similar carrier thereon against accidental displacement.



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SHEET 1 OF 4

Fig-1

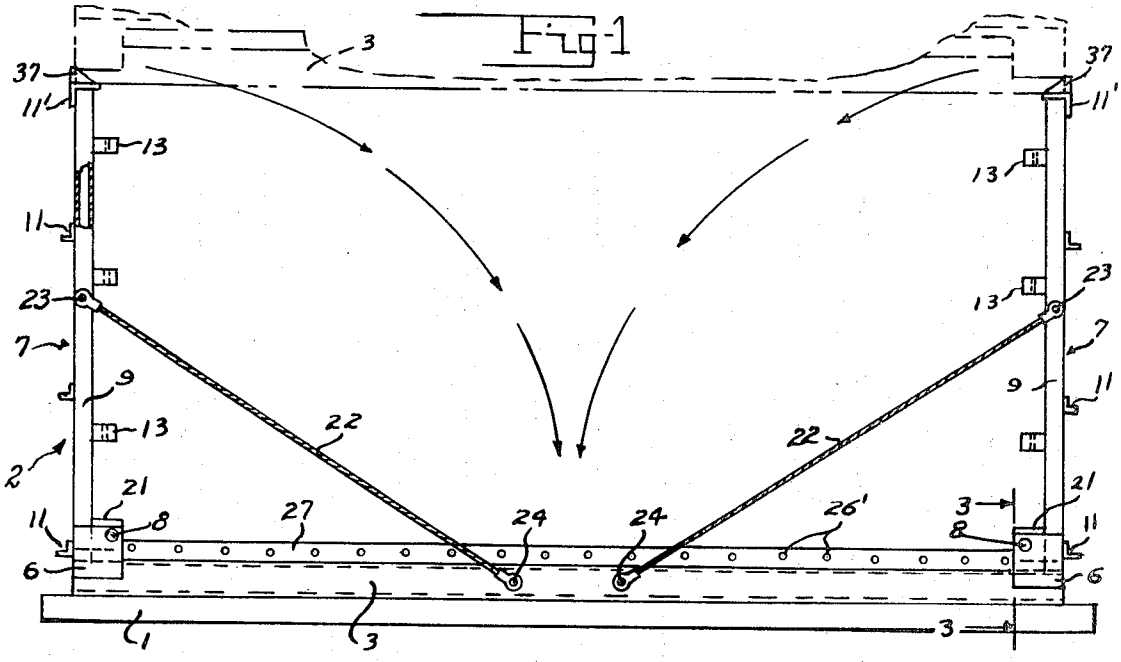


Fig-2

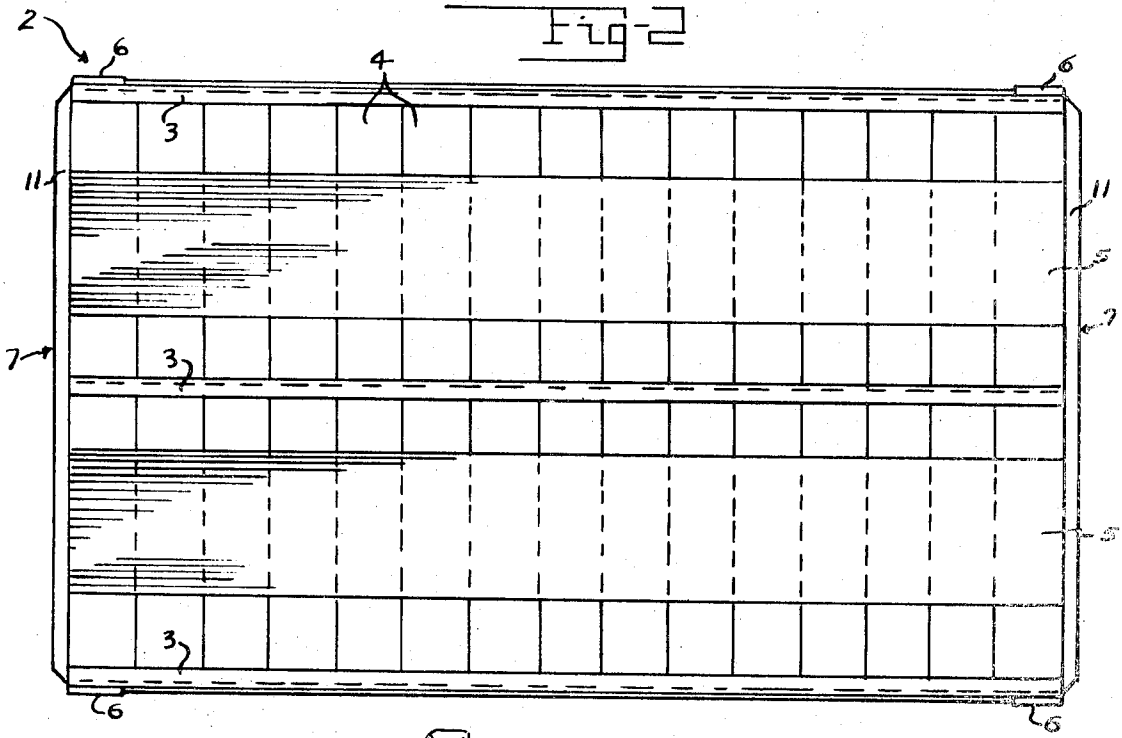
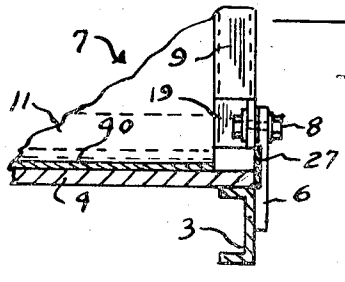


Fig-3



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Fig-4

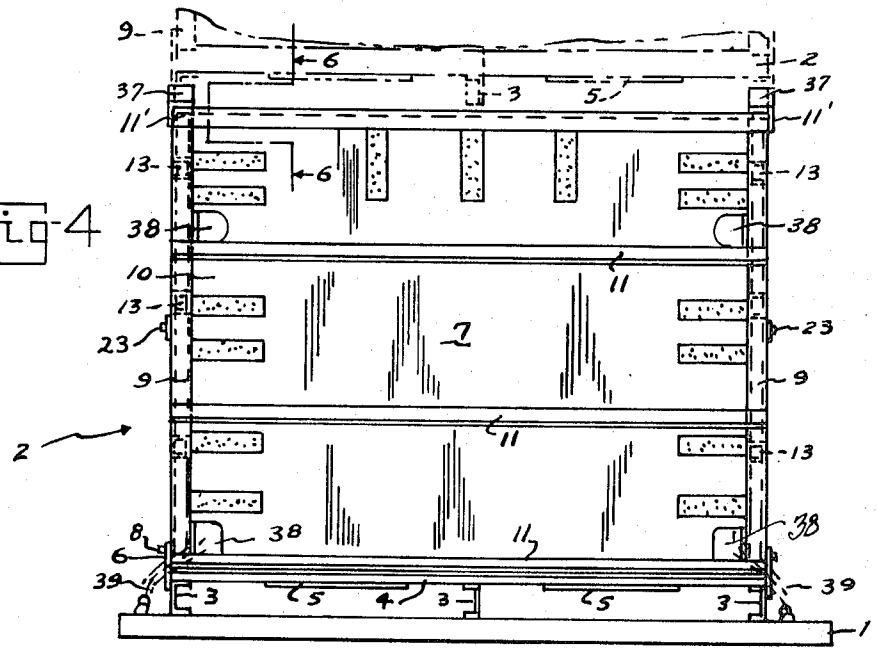


Fig-5

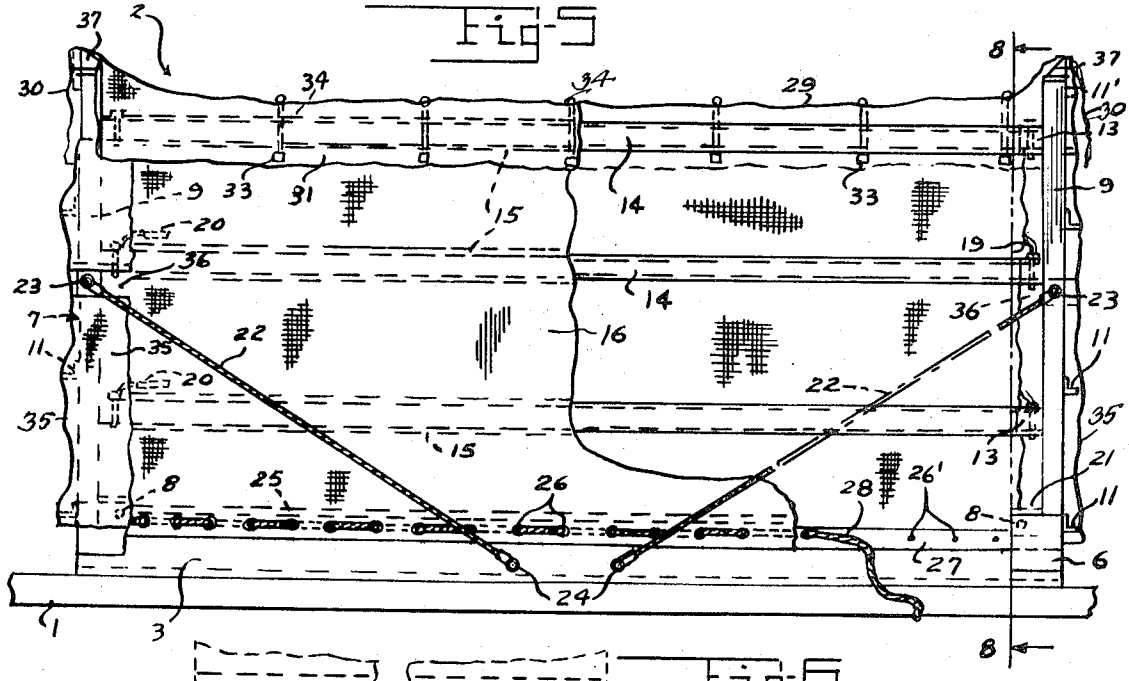
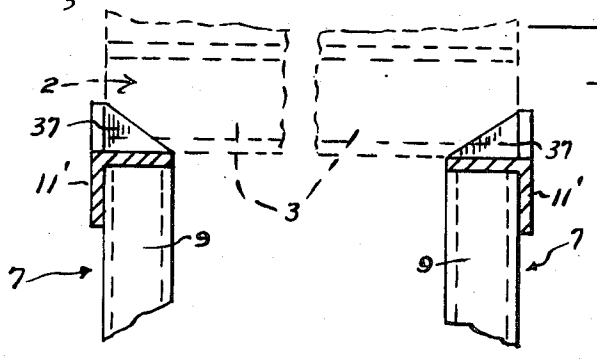


Fig-6



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Fig-7

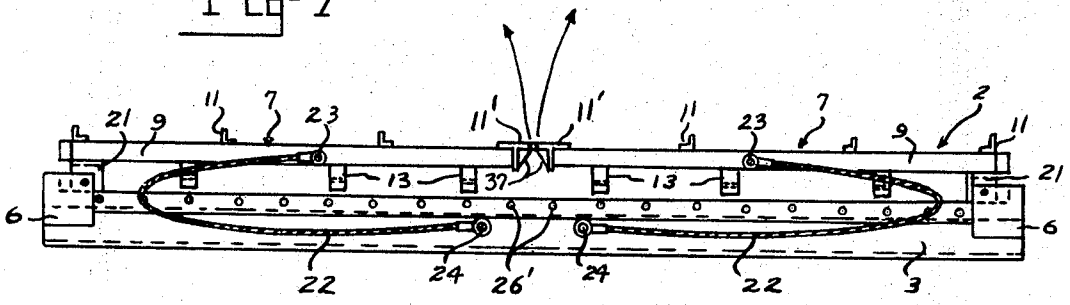


Fig-8

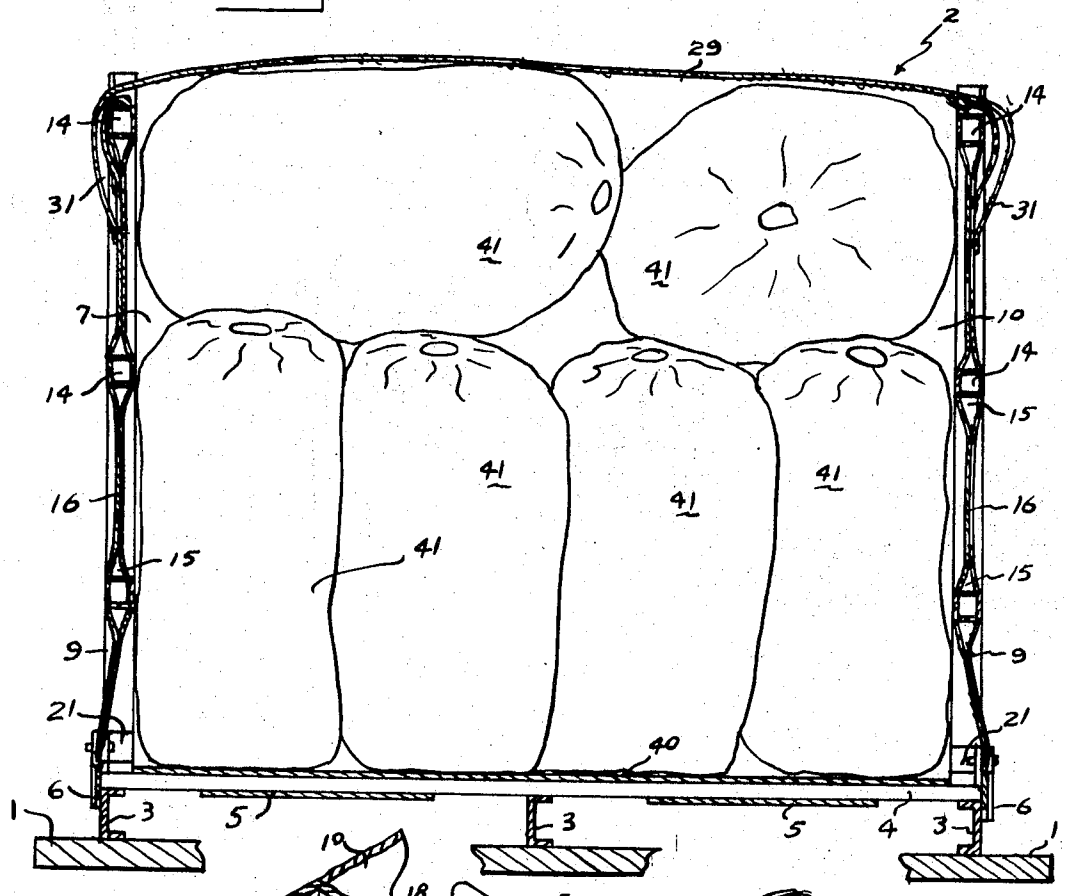
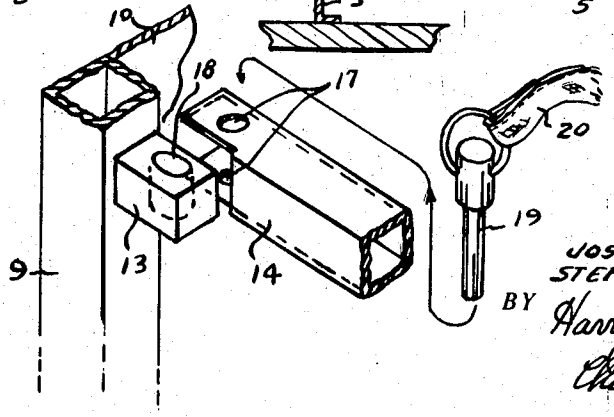


Fig-9



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Fig-10

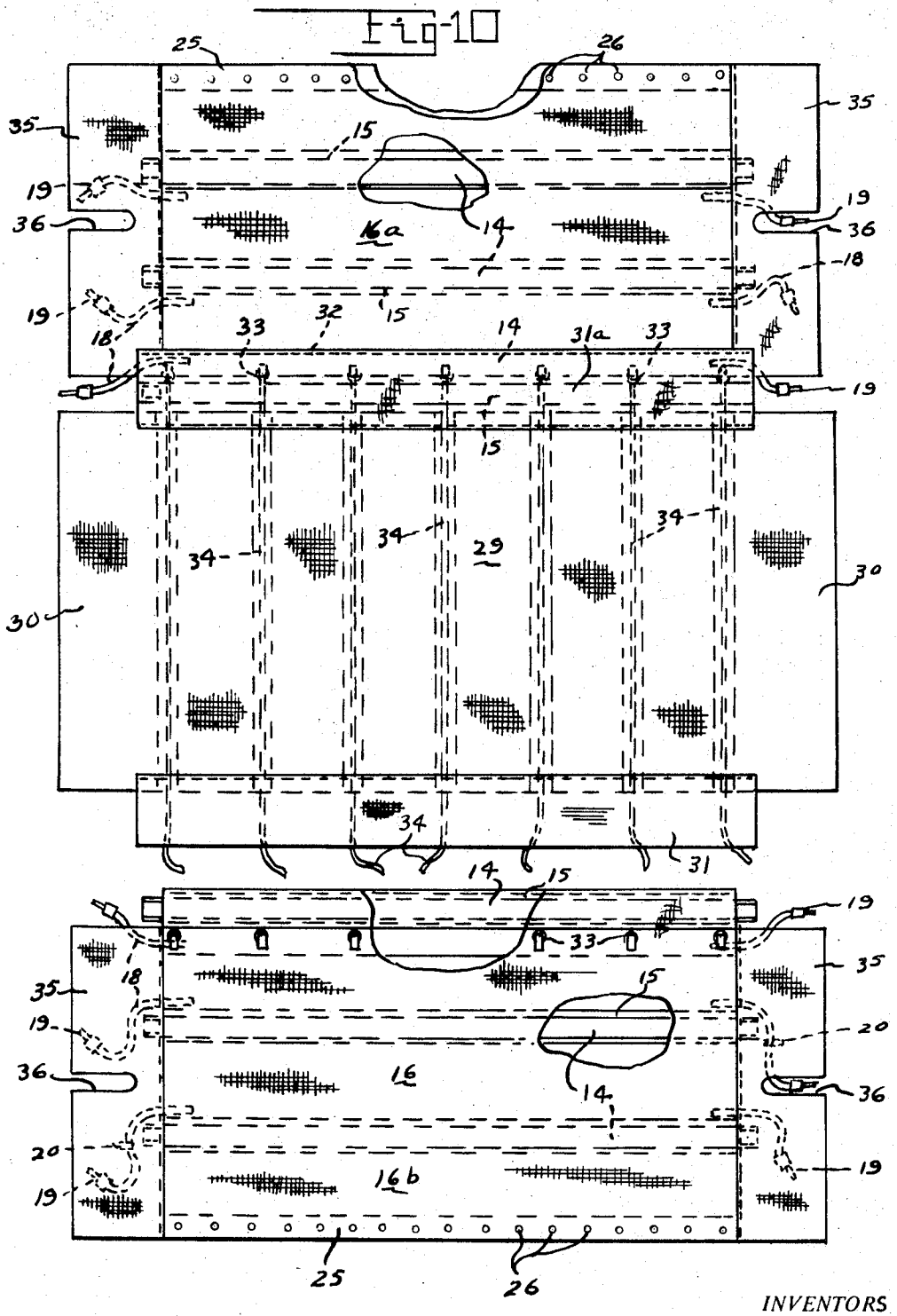


Fig-10a

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PALLET HAVING HINGED END PANELS AND FLEXIBLE COVER MEMBERS

BACKGROUND OF THE INVENTION

The invention relates primarily to cargo airlift containers of high volume mail. The space available in cargo planes is limited and it has been found that the usual method of air transporting high volume mail involved a serious waste of space and aircraft payload capacity. The usual mail airlift systems were based on prepalletized cargo. In this method, there was a limit as to how high mail bags can be stacked and tied down or in "cargo nets". As a result, the average weight of a mail pallet was about 2,000 pounds versus an average weight for all other cargo of 7,500 pounds per pallet. A cargo aircraft, for instance a C–130, is capable of carrying five pallets aggregating about a 35,000 pound payload while formerly the aircraft carrying mail on five similar pallets in cargo nets would limit this payload to about 10,000 pounds.

The invention comprises light weight, foldable containers which are capable of being stacked on pallets and utilizing substantially all of the available pallet space to thereby materially increase the payload of mail being carried on pallets by cargo aircraft.

The invention therefore comprises a collapsible rectangular container for carrying mail, for instance mail in sacks and other cargo that is lighter in weight, easier to handle, and comprises a rigid protecting frame in which the sacks and cargo can be closely packed and confined, and the containers can be easily stacked one above the other on the pallets and secured without danger of displacement in handling and flight, and can be conveniently lifted and handled by the conventional forklift trucks, and may be quickly collapsed when emptied so as to be easily stacked to preclude payload losses when not containing mail or other similar cargo.

A further object is the provision of a container in which the end closures are reinforced panels having supporting corner posts that are pivoted to longitudinal bottom channel supporting members that support the floor of the container in spaced relation for reception of forklift truck blades in which the end closures fold downwardly toward each other from the opposite ends of the channels toward each other into spaced substantially parallel relation to the supporting floor of the container, and reinforced, fabric sidewall closure members are formed with hems in which reinforcing elongated rectangular rigid battens are disposed, that are removably connectable at their ends to the corner posts of the hinged end panels to form a rigid reinforced rectangular mail container in which the side closures include end flaps that extend therefrom around the corner posts toward each other and are securable to the exterior surfaces of the end panels, together with the provision of a rectangular fabric protecting top closure or cover which includes end flaps adapted to extend over the tops of the end panels and downwardly against the exterior of the end panels, with elongated side flaps secured to the opposite sides of the top closure or cover in which one of the elongated side flaps is secured to the top of one of the reinforced fabric side panels and the other or opposite side flap is detachably secured along the top portion of the other or opposite reinforced fabric sidewall panel, to completely cover the top of the rectangular mail container and extend over the top of sides and ends thereof and downwardly against the exterior sides of the container.

A further object includes socket members fixed on the tops of the corner posts of each rectangular container for receiving the opposite ends of the longitudinal supporting channel members of a superimposed similar rectangular container, when placed on the top thereof.

A further object is the provision of flexible cable bracing means connected at one end to the corner posts intermediate their opposite ends, and connected at their opposite ends to the longitudinal channel members at points adjacent the intermediate portions thereof.

Other objects and advantages of the invention will become apparent from the following description and accompanying drawings in which like reference characters refer to like parts in the several FIGS.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view of the rectangular container of the present invention shown resting in position on a standard-type cargo pallet and; with the end panel members thereof raised, but with the fabric reinforced side panels and fabric cover or top closure being eliminated therefrom, dot and dash lines depicting a portion of a similar superimposed container seated on the top of the corner posts of the first container.

FIG. 2 is a bottom plan view of the container shown in FIG. 1, with the standard-type cargo pallet, shown in FIG. 1, being omitted therefrom.

FIG. 3 is a fragmentary sectional view taken about on line 3–3 of FIG. 1, likewise with the standard-type cargo pallet being omitted therefrom.

FIG. 4 is an end view of the collapsible container shown in FIG. 1, with the cover omitted.

FIG. 5 is a side view similar to FIG. 1, but with the reinforced fabric side panels and cover or top closure in position to the side panels. The right hand portion of the outer fabric layer of the side panel and cover being broken away to show the side panel reinforcing bars interconnected with projecting lugs on the corner posts.

FIG. 6 is a fragmentary sectional view taken about on line 6–6 of FIG. 4.

FIG. 7 is a side view showing the end panel members folded down on top of the container bottom or floor, but the fabric side panels and cover removed, which can be stowed between the floor and the collapsed end panel members.

FIG. 8 is a somewhat schematic transverse sectional view taken about on line 8–8 in FIG. 5 and looking in the direction of the arrows.

FIG. 9 is a fragmentary perspective view of a portion of one of the end panel corner posts 9, showing one of the projecting lug members with the end portion of one of the side panel reinforcing bars in position for receiving the lug member in the end thereof and one of the locking pins which interlock the battens and the corner posts together.

FIG. 10 is a plan view of the fabric closure or cover member with one of the reinforced fabric sidewall panels secured thereto under one of the cover longitudinal side flaps, more particularly showing the end flap members of the reinforced fabric sidewall panel member extended.

FIG. 10A shows the other reinforced fabric sidewall panel member in plan, with parts of the outer fabric layer broken away to show the rectangular reinforcing bars in the hems and projecting from the ends of the hems.

Referring to the drawing, the reference numeral 1 denotes a rectangular standard pallet for use in aerial cargo movement, while the improved high volume mail and cargo collapsible reinforced container incorporating the invention is indicated generally at 2 and comprises longitudinal C-shape channel members 3 extending longitudinally on the rectangular pallet 1 in elongated parallel relation. The channel members 3 are disposed in spaced relation to each other to receive the blades of a conventional forklift truck therebetween with a cargo supporting floor 4 securely fastened to the upper flanges of the channel member 3. Secured to the bottom of the floor 4 between the central and side channel members 3 are "runner" members or elongated wide plate members 5 for supporting engagement by the blades of the forklift truck.

The ends of the outer channel members 3 each have an end panel pivot plate 6 secured to the outer sides thereof to which the hinged end closure panels 7 are pivoted at 8. More specifically the end panels 7 each comprise spaced parallel rectangular corner posts 9 to which a solid end closure plate 10 extends therebetween and is connected, the plate extending upwardly from about the plane of the floor 4 to the top of the corner posts 9.

Transverse reinforcing angle irons, indicated at **11**, are secured across the end panel closure plates **10** in vertically spaced parallel relation with the top angles **11'** secured on the tops of the corner posts **9**, substantially as shown.

The "inside" faces of the corner posts **9** are provided with substantially rectangular lug members **13**, projecting inwardly toward each other parallel to the channels **3**, to telescopically receive the opposite ends of rectangular batten members **14** which are enclosed in hems **15** formed in the fabric sidewall closures indicated at **16**, and extend between the end panels **7** with the ends of the battens **14** projecting slightly beyond the edges of the fabric **16** with their outer projecting faces cut away to receive the lug members **13** therein, as best seen in FIG. **9**.

With the end panels **7** raised into operative position, these battens **14** are insertable outwardly from the inside, onto the lugs **13**, and registering vertical apertures **17** and **18** in the ends of the battens **14** and in the lugs **13** are adapted to receive locking pins **19**, which are connected by lanyards **20** to the fabric sidewall or curtain members **16** adjacent the ends of the hems **15**.

The end panels **7** are thus secured together by the battens **14** to form a rigid rectangular frame enclosing structure or container, as seen in FIGS. **5** and **8**.

The lower ends of the corner posts **9** having angle plates **21** secured thereto, through which the pivots at **8** pass. Bracing cable members **22** which limit the outward swinging movement of the end panels **7** are connected at their upper ends at **23** to the outer sides of the corner posts **9** and at their lower ends at **24** to the outer sides of the bottom outer channel members **3**, about midway between the opposite ends thereof.

The two reinforcing fabric sidewall or curtain members **16** are more specifically indicated at **16*a*** and **16*b*** and are each formed with a lower hem **25** that is provided with eyelets **26** which are adapted to substantially register with the eyelets **26'** in the longitudinal lacing strips **27** which project upwardly from the channel members **3** and extend between the end panels **7**. The hems **25** are adapted to be secured to the lacing strips **27** by suitable lacing **28**.

The cover member **29**, as seen in FIG. **10** more particularly, is formed with end flaps **30** adapted to extend over the top bars **11'** of the end panels **7**, and downwardly and have side flaps **31** and **31*a*** to extend downwardly over the top edges of the fabric side members **16*a***. The flap **31*a*** of the cover **29** is preferably secured along the upper longitudinal edge of the side closure **16*a*** as indicated at **32** to thus make the cover **29** and side closure **16*a*** integral so that the cover **29** can be thrown back over the top of the side fabric panel **16*a*** while the container is being loaded.

Both side panels **16*a*** and **16*b*** have spaced D-rings along the exterior of their upper edges, indicated at **33**, while the cover or roof **29** is provided with spaced parallel tie tape cables **34** with the ends thereof projecting beyond the side edges of the cover **29** proper, and under the side flaps **31** and **31*a***. These are adapted to be tied to the D-rings **33** to secure the cover **29** to the tops of the reinforced side closures **16*a*** and **16**, and hold the flaps, particularly the flap **31**, in place when the cover **29** is secured over the top of the container.

The opposite ends of the fabric side panels **16** and **16*a*** are provided with end flaps **35**.

The end flaps **35** are provided with inwardly extending recesses **36** to accommodate the upper connected ends **23** of the bracing cables **22**.

The upper ends of the corner posts **9** carry angle iron retainers **37** which open inwardly toward the center of the container to receive the opposite ends of the channels **3** of a superimposed similar collapsible container to the collapsible container **1**, as shown in broken lines in FIGS. **1**, **4** and **5**.

The pivoted end closure **7** may be provided with small openings **38** therethrough, as seen in FIG. **4**, so that suitably secured anchoring means, such as chains **39** secured to the pallets **1**, may be passed upwardly through these openings **38**, and similar openings in the ends of a similar superimposed container deposited on the tops of the corner posts **9** of the lower container, with the channels **3** thereof seated in the sockets **37** to prevent displacement between the containers.

The floor **4** of the container **2** may be covered by a plate or thin layer of wear-resisting material to provide a wear surface, indicated at **40** in FIG. **8**. In FIG. **8** the reference numeral **41** denotes mail bags packed and confined in the container **2**.

In order to collapse the containers **1**, when empty, for storage or return, the transverse tie cables **34** in the top fabric cover **29** are untied from the D-rings **33** which permits the cover to be thrown back over the top of the far side **16*a*** of the container.

The locking pins **19** can now be withdrawn to release the rectangular batten members **14** as they are pushed inwardly off of the lugs **13**. This frees the side panels or curtains **16**, **16*a*** and cover **29**, and they can be folded back and forth across the bottom **4** between the sides and ends of the container. The battens **14** could be withdrawn from the hems or pockets **15** and packed in the folds of the cover, if desired. After the sidewall closures **16**, **16*a*** and the top cover or closure **29** have been folded and packed in place on the floor **4**, the two end panels **7** can be swung downwardly around the pivots **8** to the positions shown in FIG. **7**. The lugs **37** function to contain the enclosed fabric sidewall curtains and cover against their displacement out of the space between the floor and the end panels **7**.

Erection of the container is easy and quick. The end walls or panels **7** are first raised to the positions shown in FIG. **1**. The cables **22** are not disconnected in collapsed position and thus limit the upward and outward swinging movement. The sidewall or panel **16** can be progressively raised by engaging the ends of the battens **14** on the lugs **13** and inserting the pins **19** that are secured by the lanyards or flexible connectors **20** to the fabric side members **16**.

The top or cover **29** should be pulled over the top of the sidewall or closure **16*a*** to the outside of the container and the container can now be loaded or packed with mail sacks or other cargo as seen in FIG. **8**.

After loading, the cover can be pulled back across the top of the container over its contents as seen in FIGS. **5** and **8** and secured by fastening the tie cables **34** to the D-rings **33**, with the side flap **31** covering the juncture. The end flaps **30** are brought down over the ends of the panels **7** as seen in FIG. **5** and the end flaps **35** from the side panels **16** and **16*a*** are brought around the corner posts **9** and secured to the outer faces of the hinged end panels **7** by tapes or other suitable means.

A fork lift truck can be employed for loading by running the lifting blades under the plates **5**, between the channels. If desired, the container can now be lifted to superimpose the same by lowering to dispose the ends of the outer two channels **3** of the superimposed container into the sockets or angle plates **37**. The two containers **2** and the pallet **1** may be raised, transported, and loaded in the receiving section of a cargo aircraft by forklift trucks with a minimum of time, trouble and inconvenience.

For purposes of exemplification, a particular embodiment of the invention has been shown and described to the best understanding thereof. However, it will be apparent that minor changes and modifications in the arrangement and construction of the parts thereof may be resorted to without departing from the true spirit and scope of the invention as defined in the accompanying claims.

We claim:

1. A rectangular collapsible mail shipping container comprising, a rectangular mail and cargo supporting platform, elongated supporting side channel members fixed to the underside of said platform in transversely spaced parallel relation to each other under the opposite side edges of said platform from end to end thereof to support the platform in an elevated relation to receive the blades of a conventional lift truck therebetween, swingable end closure panel members having lower ends pivotally connected to the opposite end portions of said side channel members for swinging movement

between raised vertical positions at the opposite ends of said platform normal to the surface thereof and lowered horizontal positions in spaced parallel relation to the upper surface of said platform, flexible cable brace means at the opposite sides of said platform, each connected at one end to the opposite sides of the swingable end closure panel members intermediate the pivoted ends and the outer ends thereof, and connected at their opposite ends to said elongated supporting side channel members intermediate the opposite ends thereof, lug members projecting from the adjacent sides of said end panel members toward the opposite panel members in similar spaced parallel relation from the pivotal ends of said panel members, a plurality of elongated side rail batten members receivable between said end panel members, each having a lug member receiving socket formed in one side of each of their opposite ends to receive one of said projecting lug members therein when said end closure panel members are in raised parallel relation normal to the supporting surface of said platform, said lug members and sockets having cooperating apertures formed therein for vertical alignment when said side rail batten members are disposed between said end closure panel members in said different vertical spaced parallel relation to said platform with said lug members seated in said sockets, and locking pin means insertable through said aligned apertures to connect the opposite ends of each of said elongated side rail batten members to said panel members in vertically spaced parallel relation above the sides of said platform, and between said pivoted end closure panel members.

2. A rectangular collapsible mail- and cargo-shipping container as set forth in claim 1 including flexible fabric side panel members extending between said end panel members and upwardly from the opposite side edges of the supporting platform to the top of the uppermost elongated batten member, and formed with parallel spaced longitudinal hems therein receiving and enclosing said elongated batten rail members between the opposite ends thereof in vertically spaced parallel relation to said longitudinal channel members, to form reinforced fabric side closure panels at the opposite sides of the container, extending between the end closure panel members.

3. A rectangular collapsible mail-shipping container as set forth in claim 2 including flexible fabric end flap members secured to and projecting from the opposite ends of said flexible fabric side panel members from the top edges to the bottom edges thereof and adapted to extend therefrom around the opposite side edges of said end closure panels and overlap the juncture between the ends of the fabric side closure panels and the end closure panels.

4. A rectangular collapsible reinforced mail-shipping container as set forth in claim 3, including a flexible fabric cover member extensible over the top of said container between the opposite ends and sides thereof, side flaps secured to the opposite side edges of said cover and adapted to extend downwardly over and beyond the top side edges of the flexible fabric side panels, and including flexible fabric end flap members secured across the opposite end of said cover adapted to extend over the top edges of said swingable end closure panel member and downwardly against the outer surfaces of said end closure panels.

5. A rectangular collapsible mail-shipping container as set forth in claim 4 including separable fastening means on the cover disposed under said cover side flap and along the flexible fabric side panel members adjacent the outsides of the top edges thereof for securing the cover to said side panel members with the side flaps thereof covering said fastening means between said cover and said side panel members.

6. A rectangular collapsible mail- and cargo-shipping container as set forth in claim 5 including means for permanently securing the outer edge portion of one of the side flaps of said cover from end to end thereof to the outside of one of said flexible fabric side panel members substantially from end to end thereof adjacent its top portion and below said separable fastening means thereof between the edges of the cover and the just mentioned side panel member.

7. A rectangular collapsible mail- and cargo-shipping container as set forth in claim 6 in which said side panel members include corner posts at the opposite sides thereof on which said lug members are fixed and angle sockets are fixed at the top of said corner posts to receive the opposite ends of the outside channel members of a second similar rectangular container when superimposed thereon to secure the same on said corner posts against lateral displacement in any direction during shipment.

8. A rectangular collapsible mail-shipping container comprising, a rectangular mail- and cargo-supporting platform, a plurality of elongated supporting side C-channel members fixed to the under side of said platform in transversely spaced parallel relation to each other under the opposite side edges of said platform, and intermediate said side edges, from end to end thereof, swingable reinforced solid end closure panel members having their lower edge portions pivotally connected to the outside of the opposite ends of said side channel members, at the opposite sides of the ends of said platform and swingable between raised parallel positions normal to said supporting platform and lowered positions in end to end parallel relation, in spaced relation above the upper surface of the platform flexible brace means connected between the opposite sides of the end panel members and the outer sides of the outer channel members intermediate the ends thereof, said end panel members each comprising a spaced pair of rectangular corner posts pivoted at their lower ends to the sides of the ends of the outer channel members, and a reinforced solid panel secured to the opposite corner posts and extending therebetween across and above the ends of the platform, elongated lacing plates extending upwardly from the outside channel members along the side edges of said platform from end to end thereof, fabric side curtains extending between the pivoted corner posts at the opposite ends of the platform member, lacing means extending along the lower edges thereof secured to said lacing plates, said side curtains each having spaced parallel batten receiving hems formed therein extending between the opposite side ends thereof, rigid rectangular batten members in said hems, extending between said corner posts to form vertically spaced rigid side rails between the pivoted end closure panels, disposed in parallel relation above the supporting platform, rectangular lug member fixed to the sides of corner posts, in aligned relation to said battens when inserted in said hems, said battens each having one side of the opposite ends thereof open to receive one of said lug members therein, and means for removably securing said opposite ends of said battens on said lug members to support said fabric side curtains above the side edges of said platform between the corner posts, to provide a rigid shipping container structure, a fabric cover extending over the top of said container structure from end to end and side to side thereof, side flap members secured along the opposite side edges of said cover from end to end thereof, end flap members connected to the opposite ends of said fabric cover extending between the opposite sides thereof, said fabric cover having the outer edge of one of said side flaps secured to the upper portion of one of said fabric side curtain members, to secure the cover permanently to the last mentioned fabric side curtain member, and disconnectable securing means between the other side curtain member and said cover for removably securing said cover across the top of said container between the fabric side curtain member.