Dec. 10, 1957 A. V. BLATZ ET AL 2,815,880

CONTAINER

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FIG. 1.

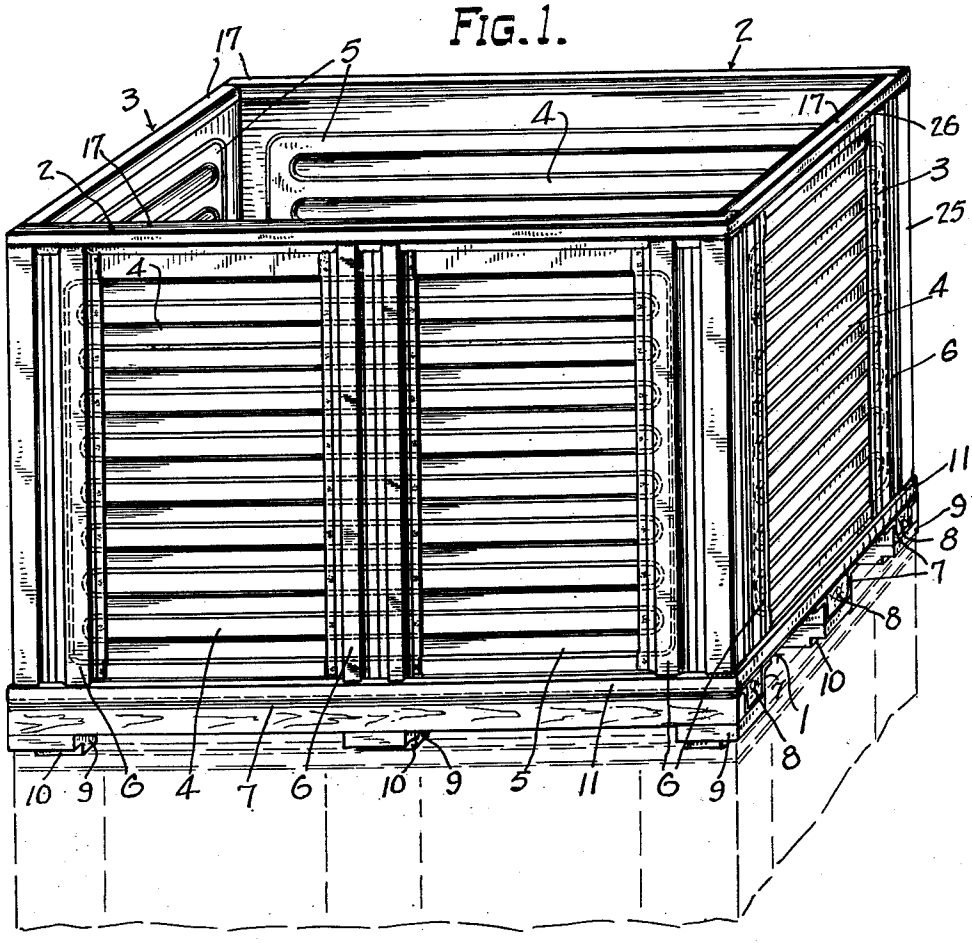


FIG. 2.

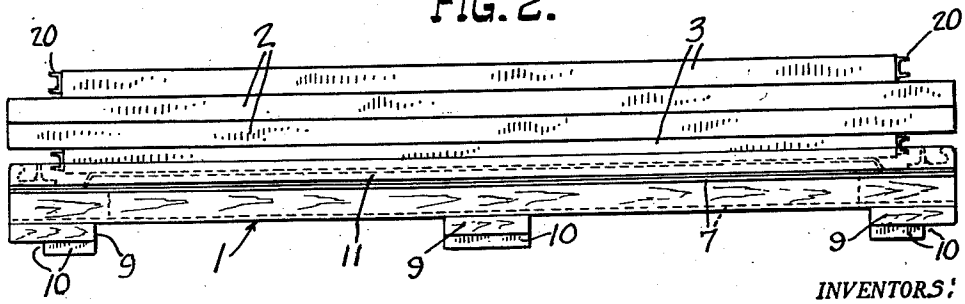


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FIG. 3.

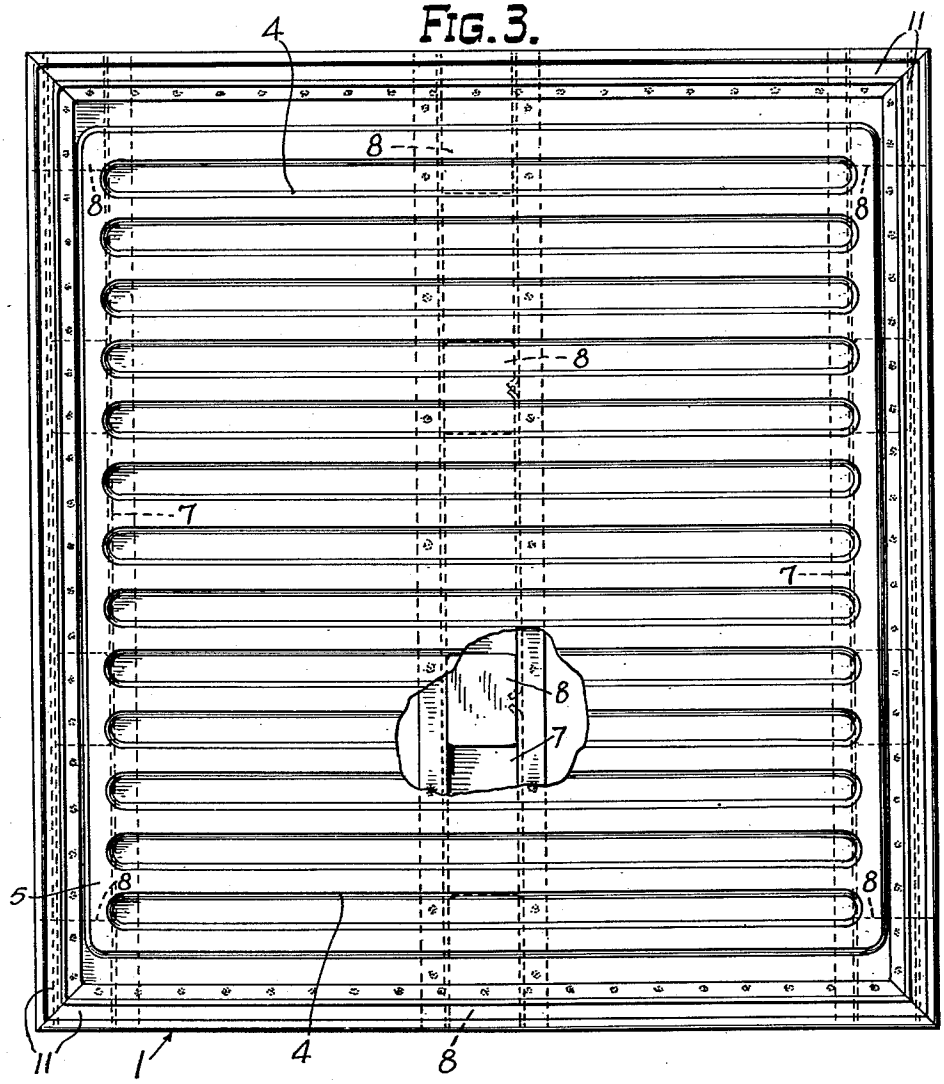


FIG. 4.

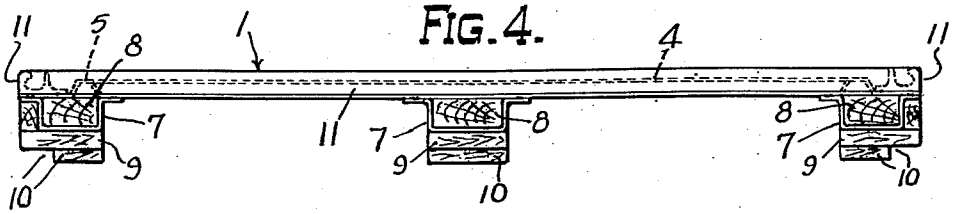


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FIG. 5.

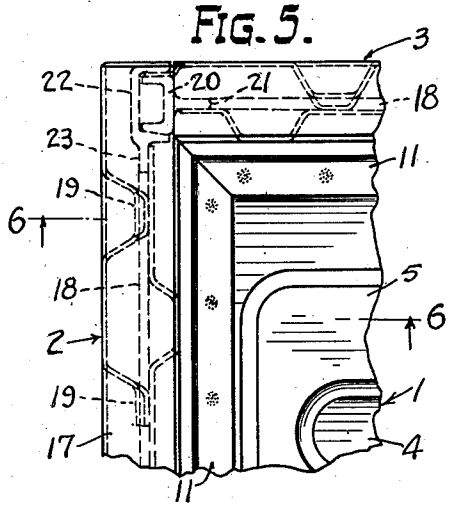


FIG. 7.

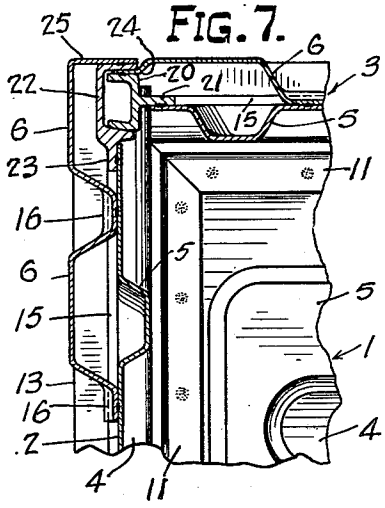


FIG. 6.

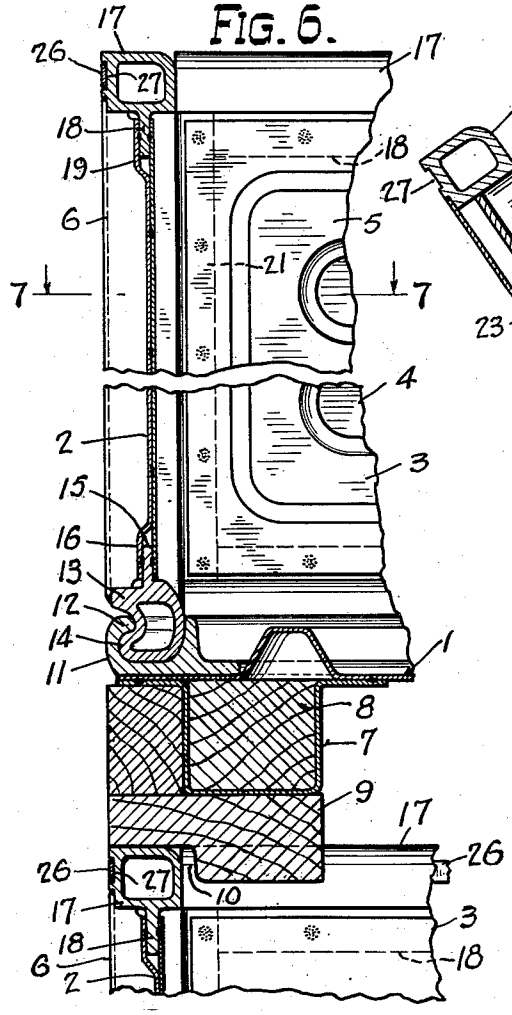


FIG. 8.

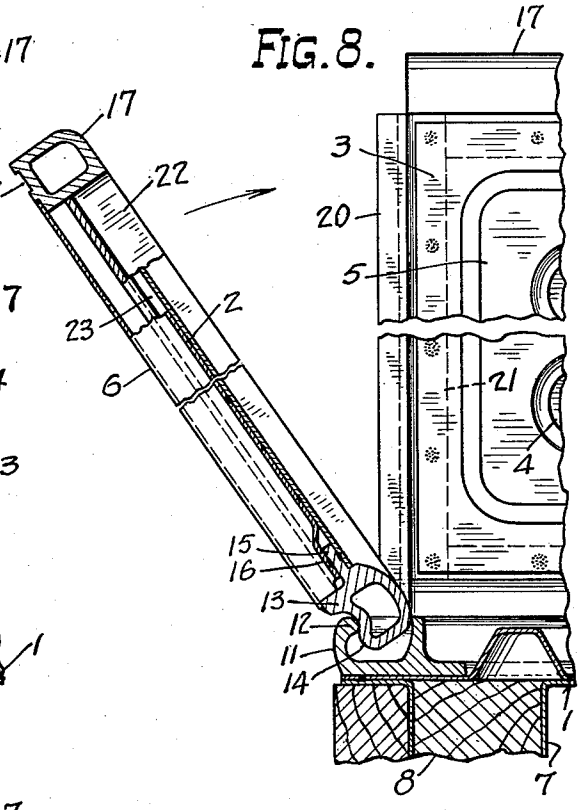


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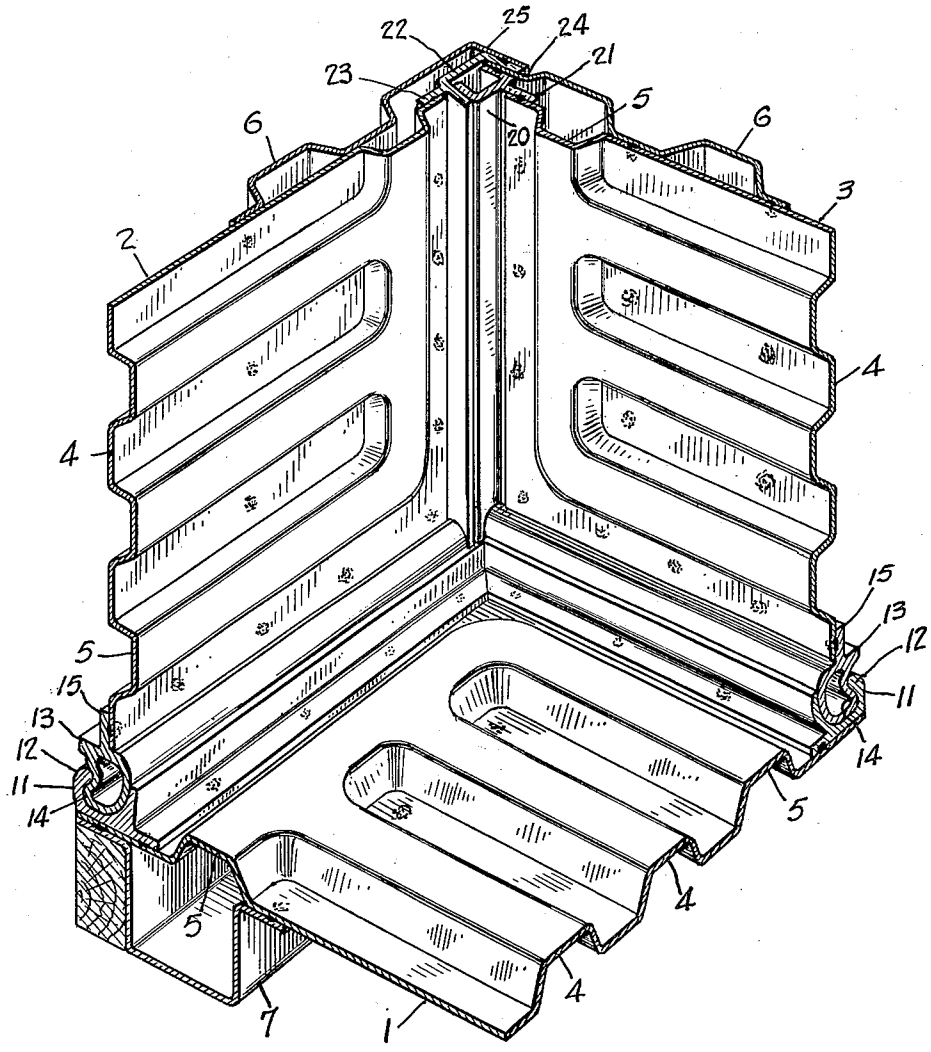
FIG. 9.

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United States Patent Office 2,815,880 Patented Dec. 10, 1957



2,815,880

# CONTAINER

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Application March 17, 1955, Serial No. 494,873

5 Claims. (Cl. 220—4)

This invention relates to containers, and more particularly to re-usable collapsible metal containers that may be used for shipping flowable plastic material such as synthetic rubber.

Heretofore, great difficulties have been encountered in shipping synthetic rubber or like materials from the producer to the consumer. The rubber is manufactured in the form of cakes or bales which may weight 70 pounds or more. Because of the form and weight of the material, and because of its cold flow characteristics, the baled material tends to flow outwardly under the pressure of its own weight. This is especially true when a number of bales are stacked vertically for shipping.

Prior to storage or shipping, the bales have usually been dusted with talc or soap-stone, or placed in polyethylene covers and then placed in strong multi-wall paper cartons or bags which hold as many as thirty bales. The purpose of talc dusting or polyethylene covers has been to prevent the bales from sticking to the container. Polyethylene covers, although more expensive, have been heretofore preferred to talc dusting because the paper cartons have allowed the bales to cold flow to such a degree that they broke through the talc surface and adhered to the container.

The use of paper containers has not proved satisfactory due to the substantial bulging pressure of the bales. Frequently a paper container ruptures, allowing the rubber or other material to flow into the boxcar or the like with a resulting contamination of the rubber. Due to synthetic rubber's unusual characteristics, it has been found difficult, if not impossible, to retrieve the rubber, and then only at great expense.

In addition, the bulging and flowing of the plastic material within the cartons prevents the latter from maintaining uniform external dimensions, thus producing substantial handling problems. Furthermore, the large cartons have not been acceptable for storing in commercial warehouses.

Another disadvantage of paper bags and cartons is that they are not re-usable, and previous types of containers made from metal, fiberboard or the like have proved too costly.

Furthermore, to the knowledge of the inventors, no container has been made heretofore from which it was relatively simple to remove the rubber. When paper containers were used, they necessarily had to be destroyed in order to remove the bales. It has not been feasible to lift the rubber out of more rigid containers vertically; and no means had been found heretofore to easily remove the side panels of such containers since the bulging pressure of the rubber tended to tighten the joint connecting the side panels with the base member or pallet.

Thus, the problems were to develop a re-usable metal container of sufficient rigidity and strength to withstand all cold flow, to eliminate the need for the more costly plastic film wrap, and to permit high stacking in warehouses. The container had to be of comparatively light



weight to hold return transportation costs to a minimum, easily assembled and disassembled, and so close fitting that the cold flowing material could find no exit or crevice to flow through.

The present invention solves the above-mentioned problems by providing a light-weight collapsible metal container of novel construction which is strong enough to withstand the bulging forces and weight of over a thousand pounds of plastic or fine granulated material, has interlocking features which seal the container to prevent leakage of the material stored therein, and yet is sufficiently light in weight and compact when disassembled to make it economical to return it to the manufacturer for re-use. Handling problems are substantially reduced and removal of the rubber after shipment is facilitated.

The accompanying drawings illustrate the best mode presently contemplated by the inventor for carrying out the invention.

In the drawings:

Figure 1 is a perspective view of an assembled container constructed in accordance with the invention;

Fig. 2 is a side view of the container in disassembled form and nested for storage or return shipment;

Fig. 3 is a top plan view of the bottom pallet of the container with parts broken away;

Fig. 4 is an end view of the pallet;

Fig. 5 is a top plan view of a corner portion of the container;

Fig. 6 is a broken vertical section through one side of the container taken on line 6—6 of Fig. 5;

Fig. 7 is a horizontal section through a corner of the container taken on line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 6 showing the method of assembly or diassembly of the container and with parts broken away and sectioned; and

Fig. 9 is a fragmentary perspective view of an inside lower corner of the assembled container.

As shown in the drawings, the container, when assembled, comprises a bottom panel or pallet 1, a pair of side panels 2 and a pair of end panels 3 which are joined together in a manner to be described to form a generally rectangular box-like structure with an open top. Pallet 1, side panels 2 and end panels 3 are formed of thin-gauge drawn extruded aluminum, steel and its alloys, or other suitable ferrous or non-ferrous metals which provide sufficient strength and are light in weight.

To provide the container with the necessary strength and ridigidty a series of horizontally extending corrugations 4 and a peripheral corrugation 5 are formed in both the pallet 1 and the panels 2 and 3. Corrugations 4 extend to and into peripheral corrugation 5 to provide un broken longitudinal and transverse support of the panels.

Drawn panels are used to gain the additional strength due to the cold working of the metal as well as to provide flat surfaces adjacent the edges of the panels to simplify the attachment of extruded or fabricated interlocks.

Additional reinforcement of side panels 2 is provided by a plurality of corrugated ribs 6 which are welded to the outer surface of the panels. Ribs 6 extend vertically of the central portion of each of the side panels 2 and adjacent the vertical edge of each side and end panel. The ribs 6 not only serve to reinforce panels 2 and 3 but in addition transmit super-imposed loads to pallet 1 when the containers are vertically stacked.

Skid support and means for stacking a number of containers vertically is provided by flanged channel members 7 secured to the lower surface of pallet 1 adjacent and midway between the longitudinal edges thereof. Channel members 7 extend the entire length of pallet 1. Internal

support for channels 7 may be provided by spaced wooden blocks 8 disposed therein.

Support blocks 9 are suitably secured to the underside of channels 7, with each of the blocks secured to the outer channels 7 having a longitudinal cut-out 10 to provide for vertical stacking of a number of containers, to be described hereinafter. Buffers may be secured to the outer vertical surface of outer channels 7 to protect the channels during handling.

To provide for assembly of the container, a socket member 11 having a generally U-shaped cross-section is welded or otherwise secured to each edge of the pallet 1. The outer edge portion of each socket member 11 is defined by an inwardly curved upwardly extending flange forming the outer socket wall and with the flange having a rounded or curved overhang 12 or lip to facilitate locking the sides of the container to the pallet. The inner edge or wall portion of each socket is extended to about the same height as the outer portion and is generally concave.

The four socket members 11 come together at the corners of the container to form tight-mitered joints, as seen in Figs. 3 and 9.

To attach the side panels 2 and end panels 3 to pallet 1, a tubular tongue member 13 is secured to the lower edge of each panel and is adapted to fit within the corresponding socket member 11.

The tongue members 13 have a generally convex rounded inner surface and are shaped to complement the socket members 11. Each member 13 is provided with a rounded outer surface having a projecting nose 14 which extends the length of the tongue member and is adapted to be engaged beneath the overhang 12 within socket 11 to lock the panels to the pallet when the panels are rotated to a vertical position. In addition, the inner edge portion of each socket engages the longitudinal tangent line of the rounded inner surface of tongue 13 to help seal the container.

As best seen in Fig. 6, tongue members 13 are provided with upwardly extending flanges 15 which are spot welded to the outside of the respective panels. In addition, the lower extremities of the ribs 6 are outwardly offset, as indicated by 16, to receive the flanges 15. The flanges 15 are also welded to the flanges of ribs 6.

To reinforce the upper portion of the panels 2 and 3, tubular members 17 are secured to the upper edges of each panel and to the upper ends of ribs 6. Members 17 are provided with downwardly extending flanges 18 which are received within a clearance between the offset upper portion 19 of ribs 6 and the outer surface of the panel. The flanges 18 are secured to ribs 6 and the panels by welding or the like. Members 17 are adapted to be received within the cut-outs 10 in block 9 on the bottom of the upper adjacent container so that a number of containers may be stacked vertically without any substantial horizontal shifting of the containers during transit.

The flat upper surfaces of members 17 provide a supporting surface for the container stacked above, and the vertical loads are transmitted from members 17 downwardly through the side panels and ribs 6 to pallet 1. In addition, lateral stiffness of the container is increased by support members 17.

To provide a seal between the adjoining vertical edges of the panels 2 and 3, a channel or tongue member 20 is secured to the vertical edges of each panel 3. Each channel member 20 is provided with an inwardly extending flange 21 which is welded flatwise to the respective side edge portions of the end panel.

The open end of each channel member 20 faces outwardy toward the corresponding side panel 2 and is received within the open end of a vertically extending channel member 22 which is secured to the adjacent vertical edge of the side panel 2. Each channel member 22 is provided with a flange 23 which is welded flatwise to the respective side portion of the side panel 2.

The vertical edge portions 24 of the corrugated ribs 6 disposed adjacent the side edges of end panels 3 are welded flatwise to the outer flange of channel member 20 while the vertical edge portions 25 of the ribs 6 secured adjacent the side edges of side panels 2 are bent generally normal to the body of ribs and are welded flatwise to the outer flange of channel member 22.

On assembly of the container, as the panels are pivoted upwardly to a vertical position, the channel members 20 and the corresponding attached rib edge portion 24 are received within the open end of channel members 22 to provide an interlocking seal between the side panels 2 and the end panels 3.

The inner flange of channel 22 extends down to the tangent line of tongue 13 and when each panel is in a vertical position, the end of the flange engages the inner edge or flange portion of socket 11, thereby sealing the container against leakage.

To assemble the container, end panels 3 are placed horizontally with tongues 13 in registry with sockets 11. As the panels are pivoted upwardly to a vertical position tongues 13 are received and locked within sockets 11 by the engagement of nose 14 with the overhanging portion 12 of the socket. Side panels 2 are then placed horizontally with similar tongue-to-socket alignment, and as they are pivoted upwardly to a vertical position tongues 13 are interlocked with the corresponding sockets 11 and channel members 20 are interlocked with channel members 22. The inside flange of channel 22 is fitted to the inside rounded surface of tongue 13 so that an inside seal is obtained at the corners which effectively prevents the escape of any of the material.

On end panels 3, the ends of tongues 13 are cut away and contoured so that the tongues on the side panels 2 will fit into the contour of the first-mentioned tongues upon assembly of the container.

To additionally secure the side panels together, a strap 26 of any suitable material, preferably metal, may be secured around the upper outside portion of the container. This may best be done by providing an outer groove 27 in members 17 so that strap 26 will fit therein and may be wrapped around the upper portion of the container.

After assembly of the container, the bales of plastic material or other material to be contained are placed therein, and a number of containers are stacked vertically in a railroad car or other shipping space for shipment to the consumer. The containers are sufficiently strong to prevent bulging due to the outward pressure of the material. They are also light in weight so that both shipping and return costs are reduced to a minimum.

Upon arrival at their destination, the containers may be easily stored or quickly disassembled for removal of the material therein. Strap 26 is removed and side panels 2 are pivoted downwardly to a horizontal position and removed. Then end panels 3 are similarly lowered and removed from pallet 1.

All of the movement of the side panels and end panels upon disassembly is outwardly and downwardly away from the material, no vertical or inward movement being necessary. This is highly advantageous in comparison with the prior structures, for the movement of the panels is with the direction of flow of the material rather than against it. The curved overhang 12 complements the curvature of tongue member 13 to substantially prevent binding of the hinge joint due to any outward pressure exerted adjacent the base of the panels by the flowable material within the container.

The above described construction of the containers together with their light weight, facilitate their return to the shipper for further use. Figure 2 shows how the container may be shipped when not in use. As can be seen, a substantial number of collapsed containers may be shipped in the space required for one assembled container.

The invention provides a novel container which is light in weight and yet strong enough to contain and support very heavy loads. The construction of the container allows it to be easily handled by pick-up forks or the like, and to be easily stacked and readily disassembled for unloading and return shipment. The joints between the panels and the pallet and between the panels themselves seal the container against any but liquid leakage, and at the same time strengthen the container.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

We claim:

1. A collapsible shipping container comprising, a rectangular base pallet, support means secured to the underside of said pallet, a plurality of socket members provided on the pallet adjacent the edges thereof, a plurality of vertical wall panels corresponding in number to the edges of the pallet, a tongue member provided on the lower edge of each of said panels, said tongue member having a generally convex rounded inner surface and being shaped to be received within the corresponding socket member and hingedly connect said panel with said pallet, the inner edge portion of the corresponding socket engaging the longitudinal tangent line of the rounded surface of said tongue upon assembly of the container to seal the joint between said pallet and the lower edge portion of each panel, a channel member provided on each vertical edge portion of two opposite and facing panels, a sealing member having a cross-sectional dimension to fit within said channel member and provided on each vertical edge portion of the other two panels, said sealing member being received within the corresponding channel member when the panels are hingedly raised to an upright position, said tongue and socket members engaging said sealing and channel members upon assembly to provide a seal therebetween and prevent outward leakage of the material stored within the container, means for removably securing each panel to the adjacent panel to maintain the panels in an upright position and retain the sealing engagement therebetween, and means secured to the top edges of said panels and engageable with the support means of a similar vertically superimposed container to vertically align said containers.

2. A collapsible container for shipping solid or semi-solid material or the like comprising, a rectangular base pallet, lower support means secured to the underside of said pallet and provided with a recess therein, a plurality of socket members secured to the pallet adjacent the edges thereof, a plurality of vertical wall panels corresponding in number to the edges of the pallet, a tongue member secured to the lower edge of each of said panels and having a generally convex rounded inner edge, said tongue member being shaped to be received within the corresponding socket member and hingedly connect said panel with said pallet with the inner edge portion of the corresponding socket engaging the longitudinal tangent line of the rounded surface of said tongue upon assembly of the container to seal the joint between said pallet and the lower edge portion of each panel, a channel member secured to each vertical edge portion of two opposite and facing panels, a second channel member of smaller cross-sectional dimension than said first channel member and secured to each vertical edge portion of the other two panels, said first and second channel members being disposed to face each other at the corners of the container with said second channel member being received within the corresponding first channel member when the panels are hingedly raised to an upright position, said channels interfitting with said tongue members and engaging said socket members upon assembly to provide a seal therebetween and prevent outward leakage of the material stored within the container, a top support member secured to the upper edge of each of said panels and disposed to engage the recess formed in the lower support means of a similar vertically superimposed container to vertically align said containers, a plurality of ribs secured to the panels and extending between the tongue means and the corresponding top support member to transfer the load of the superimposed container to the pallet of the lower container, and means for removably securing each panel to the adjacent panel to maintain the panels in an upright position and retain the sealing engagement therebetween.



3. A collapsible container for shipping plastic material or the like comprising, a rectangular base pallet, a plurality of socket members secured to the pallet adjacent the edges thereof, a plurality of vertical wall panels corresponding in number to the edges of the pallet, a tongue member secured to the lower edge of each of said panels, said tongue member being shaped to be received within the corresponding socket member and hingedly connect said panel with said pallet, a channel member secured to each vertical edge portion of two opposite and facing panels, a second channel member of smaller cross-sectional dimension than said first channel member and secured to each vertical edge portion of the other two panels, said first and second channel members being disposed to face each other at the corners of the container with said second channel member being received within the corresponding first channel member when the panels are hingedly raised to an upright position, said tongue and socket members interfitting with said channels upon assembly in sealing engagement to prevent outward leakage of the material stored within the container, and means for removably securing each panel to the adjacent panel to maintain the panels in an upright position and retain the sealing engagement therebetween.

4. A collapsible storage container comprising, a generally rectangular base pallet, a plurality of wall panels, connecting means for hingedly connecting said wall panels to the respective side edges of the pallet with said connecting means being continuous and extending the length of each side edge of the pallet to provide a seal between the pallet and the lower edge of the corresponding wall panel, a channel member secured to each vertical side edge portion of opposite and facing panels and extending the length of the respective side edge, each of said channel members having a web and a pair of side flanges with the web disposed generally normal to the face of the corresponding panel, a second channel member secured to each vertical side edge portion of the other two panels and extending the length of the respective side edge, each of said second channel members having a pair of side flanges and having a web of greater dimension than the web of said first channel member with said second web disposed generally parallel to the face of the corresponding panel, a vertical rib connecting the outer side flange of each of said first channel members and the outer face of the corresponding panel, and a second vertical rib connecting the outer side flange of each of said second channel members and the outer face of the corresponding panel, said first and second channel members being disposed to face each other at the corner of the container with the first channel member and the portion of the attached rib secured thereto being received between the side flanges of the adjacent second channel member as the panels are hingedly raised to an upright position to provide a sealing engagement between adjacent panels.

5. In a thin-walled container for receiving a cold-flowable material, a generally rectangular pallet having a recess extending along a side edge portion thereof, an inwardly curved upwardly extending flange forming the outer socket wall of said recess, a curved lip extending along the upper edge portion of said flange, a panel forming a wall of the container and having a lower edge portion shaped to be receivable within the recess when the panel is disposed in a substantially horizontal plane and pivotable within the recess as the panel is pivoted to a substantially vertical plane, the lower edge portion of said panel having a rounded outer surface fitting in said recess when said panel is in said vertical plane and with said

lower edge portion having a generally convex rounded inner surface, means response to the pivotal movement of said panel for locking the panel against vertical and lateral displacement with respect to said pallet when said panel is in a vertical plane, and means associated with the recess for preventing the panel from pivoting beyond a substantially vertical plane, the inner wall of said recess constituting a flange extending upwardly from the pallet and complementing the rounded inner surface of the lower edge portion of said panel to provide a seal between the pallet and the panel, said curved lip being complemented by the lower edge portion of said panel whereby binding of the joint caused by outward loads exerted adjacent the base of the panel by the cold-flowable material



within the container is substantially prevented and outward pivoting of the panel is thereby facilitated.

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