Jan. 17, 1956 G. A. MOORE 2,731,167

HEAVY DUTY CONTAINERS

Filed March 26, 1952 2 Sheets-Sheet 1

FIG. 2

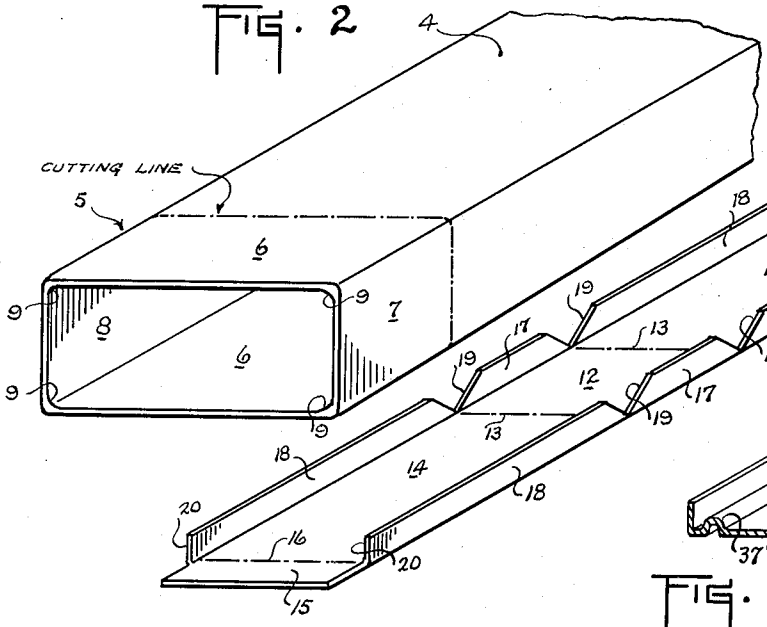


FIG. 3

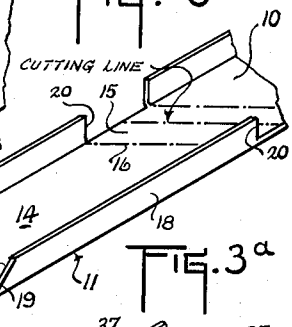


FIG. 3a

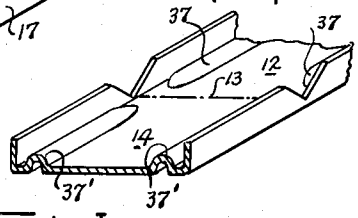


FIG. 1

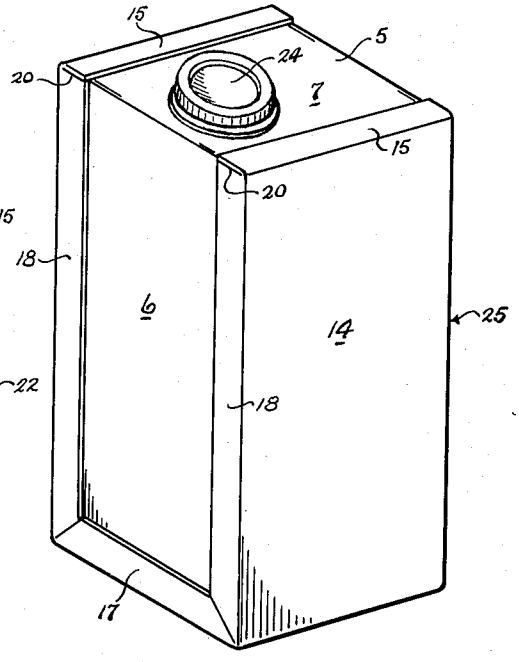
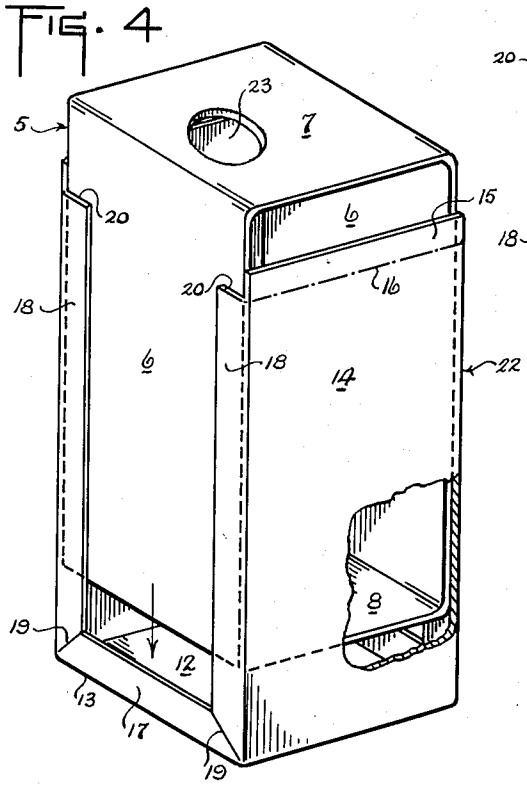


FIG. 4



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FIG. 10

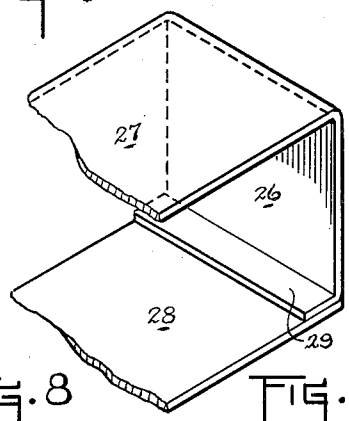


FIG. 6

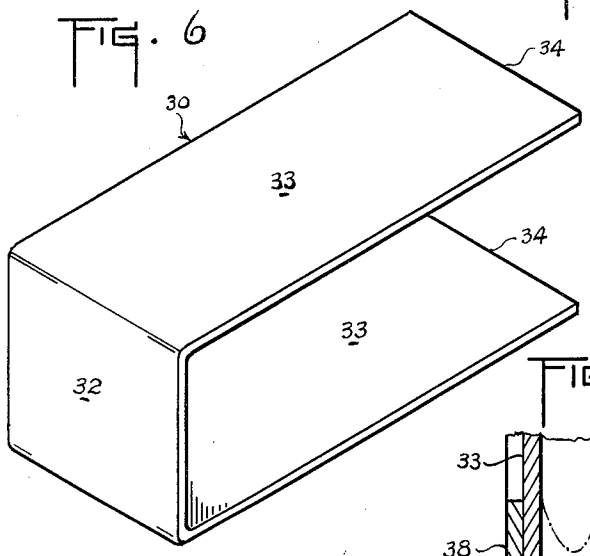


FIG. 8

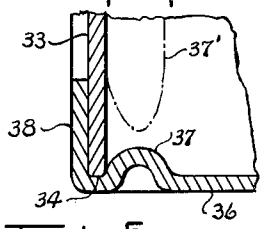


FIG. 9

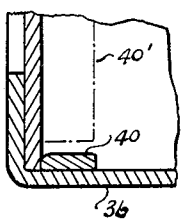


FIG. 7

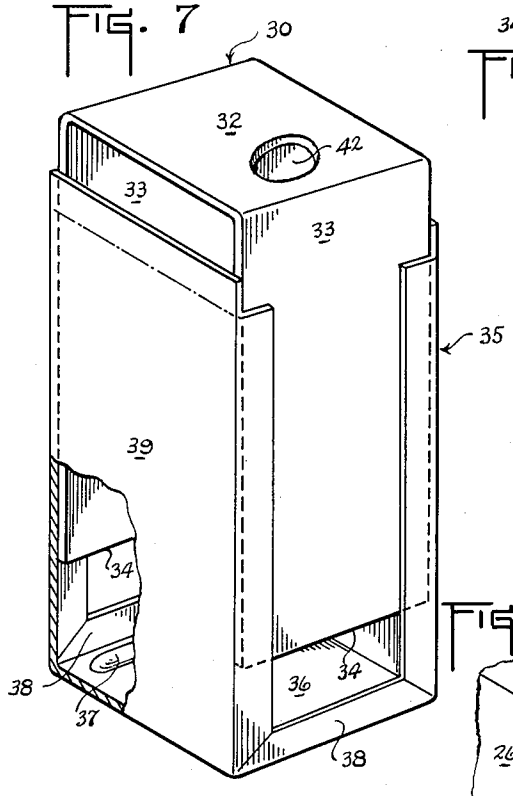


FIG. 5

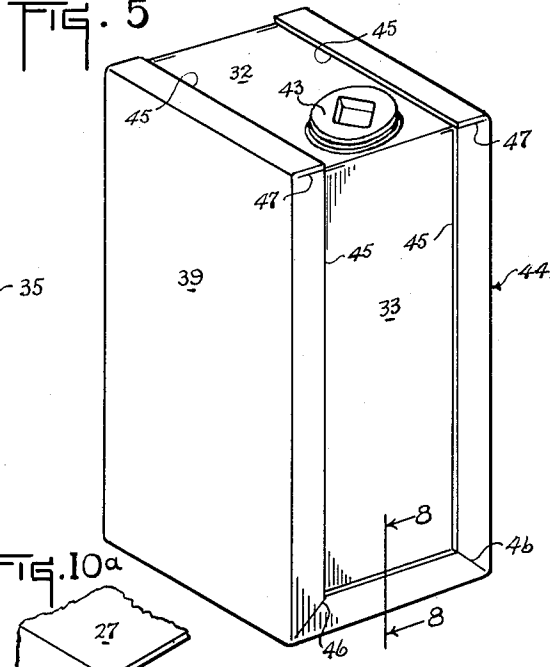
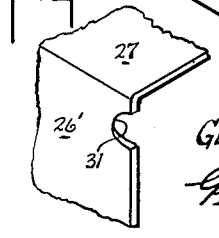


FIG. 10a



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HEAVY DUTY CONTAINERS

George Arlington Moore, New York, N. Y.

Application March 26, 1952, Serial No. 278,528

9 Claims. (Cl. 220—4)

This invention relates to containers made of generally rectangular shape and of metallic materials including sheet. One such material may be aluminum, the containers being especially adapted to hold liquids and have a wide range of sizes for varying capacity. The invention is more particularly concerned with improvements in containers to be formed of pre-shaped parts constituting male and female members that are assembled together in such manner that the bottom, side walls and top end closure of the container may be completed in simple and efficient steps of operation to provide a strongly reinforced and liquid tight container.

Inasmuch as the production of aluminum is increasing rapidly, new end uses for this material must be discovered and developed to assist in maintaining such expanded production. The containers of this invention when made of aluminum will provide an end use of such material of large potential turn-over and this is one of the objects of the invention.

In fabricating round drum type containers for use in distributing many products such as liquids, the circular tops and bottoms of such containers are cut from sheet and there is waste to the extent of at least twenty-three percent of the material; and the completed conainers due to their circular shape may waste up to thirty percent of shipping and storage space.

Another object of the present invention is to provide improved containers that may be fabricated substantially without waste of material and conserve for useful purposes an additional thirty percent of shipping and storage space otherwise required for conventional round shaped containers and in some cases the improved containers having relatively up to sixty percent in net weight advantages when empty.

A general object of the invention is to provide a container fabricated of sheet material and/or, in combination with an extruded shaped part having two side walls and two joined end walls, the sheet material part being a pre-flanged strip adapted to be bent U-shape and provide an end wall and two integral side walls, the said combination of parts being assembled together in seam forming relation to provide a bottom, side walls and top enclosure for the container.

Another object of the present invention is the provision of improved heavy duty containers economically made of materials readily supplied from existing machinery and equipment in the required shape or form for container assembly and the seam junctions thereof being secured in sealed relation by well known and conventional methods of operation such as, soldering or welding processes.

A further object of the invention is to provide improved heavy duty containers made of metallic sheet material parts in such manner that the assembly of the containers do not require relatively expensive and complicated machinery, dies and tools necessary to fabricate conventional round shaped containers especially with respect to the construction of the body and end closure

seams thereof, the improved containers being provided with marginal flat surface engagements secured together constituting the complete seams of the container including the top closure thereof.

A further object of the invention is to provide a container having a side wall and end structure completely enclosing the interior of the container prior to the securing of the seams thereof, whereby the engaged marginal portions of the wall surfaces are internally supported for seam securing operation by means being provided on marginal portions of the complementing walls of the container structure.

These and other objects of the invention will be apparent from a consideration of the forms of containers which are shown by way of illustration in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a completed container in accordance with the invention;

Fig. 2 is a fragmentary view in perspective of the preformed sectional shape of one member used in constructing the container;

Fig. 3 is a fragmentary view in perspective of a stage in pre-forming the shape of the other member comprising a part of the container;

Fig. 3A is a fragmentary view in perspective of a modification of the illustration in Fig. 3;

Fig. 4 is a perspective view of the members in stage of assembly and showing a broken section of one wall;

Fig. 5 is a perspective view of another completed container in accordance with the invention;

Fig. 6 is a perspective view of a modified pre-formed part used in constructing the container;

Fig. 7 is a perspective view of assembly stages in forming the container of Fig. 5, with a wall portion broken away to show the assembled wall relationship of the two members;

Fig. 8 is a fragmentary view in cross-section taken on line 8—8 at the bottom of the container shown in Fig. 5;

Fig. 9 is a fragmentary view in cross-section showing a modification in the bottom structure of the container;

Fig. 10 is a fragmentary view in perspective of a modified form of the member part shown in Fig. 6, and

Fig. 10A is a fragmentary part in perspective of the opposing end wall shown in Fig. 10.

Referring to Figs. 1 to 4, there is illustrated a container (Fig. 1) formed from two pre-shaped members one of which (Fig. 2) is generally a section of a tube having two parallel flat side walls and two flat end walls, the adjacent sides being open. The other member (Fig. 3) is a rolled flat strip with upright flanges extending parallel on each side thereof, the said flanges on each side being divided into three portions separated by V-shaped notches cut in the flanges, which notches define a fold line of the strip. The ends of the strip have lateral extensions constituting transversely disposed flanges, the said strip being folded about the fold lines, the latter bounding a central area. The other pre-shaped member is assembled with the folded strip in container forming relation, the extended end flanges 15 being bent and overlapped upon two opposite side marginal portions of the top end wall 7 (Fig. 1) locking the related parts in assembled position.

The material preferred for the specific embodiment of the tube (Fig. 2) is aluminum, the shape being extruded or otherwise formed in rectangular tubular shape by conventional methods. The corners of the tube walls when being extruded may be reinforced by increasing the sectional thickness of the walls at these junctions. The other member (Fig. 3) may be made of any suitable sheet material. However, aluminum in any desired gauge thickness is preferred as being more compatible

upon being assembled with the tubular member when fastening the seams of the container.

Referring particularly to Fig. 2 of the drawing an extruded hollow section 4 of tubing of indefinite length having four side walls, provides a sectional cut portion 5 of predetermined length, the said portion providing two opposed side walls 6 and two opposed end walls 7 and 8, the corners thereof being reinforced with increased cross-sectional thickness over the thickness of the adjoining walls. The said sectional portion is provided with a hole 23 in the end wall 7 into which a dispensing closure cap 24 (Fig. 1) of any desired conventional type may be incorporated prior to the assembly of the container. It is to be noted that severed portion 5 of tubing 4 provides a rigid wall forming component upon which to build and complete the structural form of the container, marginal wall portions thereof being adapted to rigidly support pressure upon marginally applied seam forming structure engaged thereupon to complete the above container.

A strip 10 (Fig. 3) of aluminum sheet is cut to provide a free section 11 having a central wall portion 12 defined by two parallel bending lines 13 disposed transversely to the long way of the strip and two extending wall forming portions 14 disposed on opposite sides of the said central wall portion, and extended wall portions 15 having inwardly disposed bending lines 16. Central wall 12 is formed with a pair of oppposed upright flanges 17 in longitudinal line with pairs of opposed side flanges 18 on each side of the said lateral wall portions of the strip, the said flanges being substantially separated by V-shaped notches 19, the apices of which terminate at the ends of the transverse bending lines 13 which constitute the junction borders of the central wall. The flanges 18 terminate in vertically disposed cut edges 20 at the ends of the transverse bending lines 16.

The strip portion 11 is further shaped by being bent substantially U-shape on the parallel bending lines 13 providing an end wall 12 and two opposing side walls 14 the said walls having the flanges inwardly disposed with the notches 19 closed, the end edges being in abutment, the said flanges being adapted to receive in assembly alignment the pre-shaped part 5.

The assembly of the container (Fig. 4) consists of pressing one pre-shaped part 5 (male) into the other pre-shaped part 22 (female) the former being properly positioned when the outer surface of the end wall 8 thereof engages the inner surface of the opposing end wall 12 of the latter part. The wall corner edges of the male part fit in snug abutment with marginal inner surfaces of the female part, its flanges 13 and 18 overlapping adjacent wall surface of the male member in face to fact contact. The horizontal end flanges 15 overlapping two opposite side marginal portions of the top end wall of the container.

The engaging flanges 15, 17 and 18 of the female member may be fastened in seam forming relation with male member 5 by employing well known methods of soldering or welding, the engaged said flanges constituting the only seams of the container, the side walls, bottom and top closure of the container 25 (Fig. 1) being formed and seamed in such simple manner that it avoids the structural complications inherent in conventional containers that employ separate closures that are attached to the ends of a body wall portion thereof. The end closures for the container of the present invention are integral with the side walls and are simultaneously formed at assembly combining the side walls and the end closures together in seam forming relationship.

Containers of the present invention may be made from black or tinned plate sheet materials with soldered seams. When such containers are to be fabricated, the male member may be pre-formed as illustrated in Fig. 10, an opposite end wall 26 being formed from an extended wall

portion 27 and connected with the wall portion 28 by being flanged and soldered thereto with a further extended marginal portion 29 of the end wall 26, the flange 29 being positioned in face contact with an end marginal inner portion of the wall 28. The female member may be formed substantially as heretofore described except for a slight modification required in the pre-fabrication of the strip comprising the female member partially illustrated in Fig. 3A where the central portion 12 and extending portions 14 have recessed ribs 37 raised on the surfaces thereof disposed in parallel relation and terminating short of the transverse bending lines 13 and 16. The ribs provide support for outer marginal portions of the male member walls with inner face surfaces of the overlapping flanges of the female member as illustrated in Fig. 8 of the drawings. The said support is necessary when the thickness of the sheet material is less than that required for bridging and marginal edge rigidity. When the male member type (Fig. 10) is used in the assembly the opposite end wall 26' (Fig. 10A) is provided with circular cuts 31 at each adjacent corner of the end wall in order to clear the ribs 37' as it is assembled with its associated member.

When it is desired to fabricate containers of the present invention to have relatively large capacity, the male member 30 (Fig. 6) may be employed and which may be made of relatively heavy gauge sheet material such as aluminum or black plate. A strip of such sheet material is formed substantially U-shaped having an end wall 32 constituting one end closure for the container and extensions projecting therefrom at substantially right angles thereto constituting a pair of parallel side walls 33 ending in transverse edges 34, the ends 34 of the said side walls being at a distance apart greater than the distance of the related end wall 32.

The female member 35 (Fig. 7) is quite similar to the member 11 (Fig. 3) heretofore described except for the thickness of the strip which may be increased to suit the purpose intended for the container. The bottom end wall 36 of the said member is provided with upwardly recessed ribs 37 disposed inwardly of and parallel with the longitudinal flanges 38, the ends of the ribs terminating short of the transverse side walls 39. The ends 34 of the side walls 33 (Fig. 8) are firmly anchored between the inner faces of the flanges 38 and the outer sides of the ribs 37 when the male member is pressed home during assembly of the container. When fabricating the container of relatively heavy guage sheet material, the bottom end wall 36 (Fig. 9) may be provided with a pair of parallel related cleats 40 that may be fastened thereto by spot-welding.

The male member 30 (Fig. 7) may be provided with a hole 42 in the end wall 32 which may be used for any desired type of conventional filling and dispensing orifice such as, a female bushing fastened within the hole and having a threaded hole adapted to receive a threaded male plug 43 (Fig. 5).

The completed heavy duty container 44 (Fig. 5) is provided and serviceable for large liquid capacity. The seams are secured in the manner described for the container 25 (Fig. 1). One suitable method that may be employed to secure the engaging surfaces of the flanges to the exterior marginal surfaces of the other walls of the container is as follows; prior to the assembly, the said engaging surfaces are treated with a suitable welding flux and after assembly the flanges are clamped tightly to the engaging wall surfaces. The assembly then is passed through a heating oven or tunnel to raise the temperature of the metal to a heat less than the fusing temperature of the metal which welds the said flanges in seam forming relationship. Other conventional methods may be employed if desired such as torch welding a fillet around the inner edges 45 and abutted joints 46 and 47 of the flanges. The said flange engaging surfaces and side edges

of the abutted walls may be doped with sealing compounds prior to the assembly.

Aluminum is one of the easiest metals to work. Suitable tempers are available for any degree of hardness that may be desired for fabricating the container to be suitable for the purpose intended. Such metal may be easily welded or brazed together. Processing machinery is of standard design, and equipment for working can often be used without major modifications. Aluminum is immune to detrimental action of a great variety of products such as milk, edible oils, syrups, paints, varnishes, solvents, certain acids and etc.

The containers may be treated by methods that are standard practice consisting of anodizing, flushing and spraying with materials for both interior protection of wall surfaces and exterior wall finishes.

The container when made for relatively light capacity, may be provided with other types of filling and dispensing closures than heretofore described, such as a relatively larger hole provided in the end wall of the male member into which a recessed friction type cover may be employed to provide a removable closure.

I claim:

1. A rectangular shape hermetic container of rigid sheet drawn metallic material comprising an assembly of two pre-shaped structural components formed of said material, one of said components composed of flat wall forming portions of the container, which wall portions consist of two opposed end walls with two opposed side walls shaped in tubular form with open sides, the second of said components composed of other flat wall forming portions of said container, which portions consist of an enclosure end wall with two opposed alternate side walls, which walls are positioned to enclose open sides of said tubular wall component including one end wall thereof, said alternate side walls and bottom end wall thereof being provided with opposing pairs of marginal seam forming flanges along corner border edges of their respective corresponding wall portions, interior surfaces of which flanges being flatly disposed upon corresponding margins of exterior surface portions of walls provided by said tubular component, including wall surface engagement of one end wall thereof upon the interior surface of said enclosure end wall having a pair of said flanges, marginally opposed surface portions of the top end wall of the tubular component being engaged by clamping wall margins provided by a pair of said flanges along top corner edges of said alternate side walls and thereby secure said assembly, said clamped margins being transverse of said bottom end wall flanges both with respect to longitudinal direction thereof and surface plane of wall portional engagements thereof.

2. A container as set forth in claim 1 wherein said seam forming wall surface engagements are treated with seam weld compound intermediate of said engagements, and the marginal wall portions of the treated seams being clamped to impose pressure thereupon and being strongly supported by the walls of said tubular component while being subjected to heat with which to activate said compound and unite said seam forming engagements, and thereby secure said assembled components together with marginally overlapping seams arranged in opposing pairs that strongly reinforce the container upon marginal border sides of two opposed side walls and an integral end wall thereof, including two opposed transverse lower border sides of said side walls adjacent the opposing double end wall of the container structure, the first mentioned end wall being provided with closure means through which to fill and dispense intended contents of said container.

3. A container of aluminum adapted for holding liquid products comprising a rectangular tubular body part having two opposed rigid side walls integral with two opposed rigid end walls thereof, and said walls having open sides the opposed vertical and horizontal corner edges of said open sides of said body part being disposed in edge to flat surface abutment with marginal interior surface portions of two opposed alternate side walls provided by a flat U-shape part, said alternate side walls having an integral flat bottom end wall of the U, which walls are provided with in-turned flanged wall margins along their respective corner edges, interior surfaces of said flanges being flatly engaged with corresponding exterior marginal wall surfaces of said tubular body part including flat engagement of the exterior surface of the bottom end wall of the body part with interior surface of the end wall of said U, upper wall flanged margins of each alternate side wall thereof being in-turned flatly upon corresponding exterior marginal surface portions of said rigid top end wall of the tubular body part, all of said surface to surface wall engagements of the container structure having pre-applied seam weld compound disposed intermediate thereof to constitute the seams of the container, which seams upon being acted upon with heat and pressure rigidly weld said tubular body part of said U-shape part constituting six hermetically sealed fixed enclosure walls of said container.

4. A rigid aluminum container of rectangular cross section formed of two wall forming pre-shaped structural parts comprising one part being formed of an extruded hollow rigid tube of rectangular vertical cross section and having increased wall thickness at converging corners, a section of said tube being cut transversely from its indefinite longitudinal length in increment of pre-determined length, the second part being formed of bent flat sheet cut transversely from said sheet from its indefinite length in increment of pre-determined length, said two pre-shaped parts being assembled together, said one extruded part being composed of substantially rigid wall portions that provides a foundation upon which the seams of the container structure are formed by wall enclosure portions composed of two opposed side walls integral with two opposed end walls, upon which wall portions, marginal portions of two alternate side walls and an integral end wall thereof being provided by the second pre-shaped structural part, marginal wall portions of which part are disposed in surface to surface engaging seam forming relationship, which relationship includes a rigid combining lock of said two pre-shaped parts together, said seam forming engagements being provided with pre-applied adhesive compound disposed intermediate of the surfaces thereof, which compound upon being activated by heat and pressure applied upon exterior wall surfaces of the container structure effectively and rigidly bonds said seam forming relationship to complete said container.

5. A rigid container as defined in claim 4 wherein the flat surface of cut corner edges of opposed open ends of said hollow tube are disposed with each edge in abutment with interior marginal wall portions, which engaged portions surround four border sides of each alternate side wall of the second part adjacent right angularly disposed marginal wall surfaces thereof in engagement, including bottom wall surface engagement that constitute the seams of the container.

6. A rectangular container constructed of two prefabricated parts of aluminum assembled together having four flat side walls arranged in opposing pairs and a pair of opposed flat end walls, which comprises one tubular part of said assembly being disposed in a position to provide two of said opposed side walls in vertical position integral with two opposed horizontal end walls thereof, a flat base U-shape part of said assembly having two opposed alternate side walls, which walls form an enclosure over the open end sides of said tubular part including an integral bottom end wall of the U over the exterior surface of the bottom end wall of the tubular part, said U-shape walls being provided with bent marginal wall portions engaged in surface to surface

relationship with corresponding marginal exterior wall portions of the tubular unit, which marginal wall engagements extend vertically horizontal across two opposed exterior wall surface portions of two opposed side walls adjacent bottom corner edges thereof and junctively changing in direction vertically upward along corner edges of corresponding side walls and terminating in changing direction transversely across flat marginal surface sides of the top end wall, said marginally engaged wall surfaces having pre-applied coated adhesive of epoxy resin disposed between said surfaces, the resin being activated by applied pressure and heat upon marginal wall borders of the container thereby effective to form a rigid union of said structural parts.

7. A container structure as defined in claim 6 wherein the top end wall of the male element is provided with openable and closable means through the wall thereof with which to fill and dispense intended contents of said container.

8. A generally rectangular metallic rigid container structure composed of telescoped male and female elements, the male element including a top end wall, a bottom end wall and two opposed side walls, the female element including a bottom end wall and two opposed side walls alternate of the side walls of the male element, the three walls of said female element being provided with bent flanged wall margins along horizontal opposed corner sides of its bottom end wall and along vertical opposed corner sides of its side walls including unbent flanged wall margins upon upper ends of said side walls, pre-determined wall surface portions of said elements having applied resinous adhesive thereupon, said elements being telescoped together, the male element being disposed inwardly of interior wall surface portions of the female element, said flanged margins thereof being engaged upon corresponding marginal exterior wall surface portions of the male element, surfaces of each bottom end wall of the assembled elements being in seam forming relationship including said engagements of the flanged margins, said flanged wall margins upon upper ends of side walls of the female element being bent inwardly and downwardly upon and along upper marginal faces of said top end wall of the male element and thereby lock said telescoped assembly together, the telescoped assembly of elements being tightly clamped upon exterior surface wall portions thereof while being heated to activate the cure of said adhesive thereby to rigidly secure the telescoped wall relationship of the male and female elements in hermetic bonded seam forming relationship.

9. A substantially rigid rectangular container made of two pre-formed structural component parts, each being shaped to form together six sides constituting fixed enclosure walls of said container comprising one of said components being rigid and shaped to provide two opposing side walls having two opposed seamless and integral end walls formed thereof, said side walls having open sides, which open sides are enclosed by engagement with two opposing side walls of the second of said components of lesser rigidity and having an integral end wall formed thereof including marginal side flanges being disposed to provide right angular bent border sides of each of said walls, and said flanges being engaged in flat surface relationship with corresponding margins of the walls of said one rigid component, the exterior surface of one end wall of said one component being flatly engaged upon the interior surface of the end wall of the second component, two opposed portions of said engaged marginal side flanges thereof being positioned upwardly and horizontal along two opposed corner edges of said end wall of the second component including two inwardly opposed portions being disposed along vertical corner edges of each side wall thereof, each horizontal top end of the two opposed side walls of the second component having an inwardly bent flange disposed downwardly upon a corresponding marginal portion of the opposed second end wall of said one rigid component and thereby securely clamp said two component parts together in assembly relationship to complete said six enclosure walls, intermediate surfaces of said engaged flanges being provided with pre-applied seam welding compound, and said flanged margins being clamped and heated in their respective engagements to effect a welded bond thereof and simultaneously seal said six enclosure walls in seam forming relationship.

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