

Oct. 6, 1925.

1,556,451

V. MAUCK

CONTAINER AND PROCESS OF MAKING THE SAME

Filed Jan. 27, 1923

2 Sheets-Sheet 1

FIG. I.

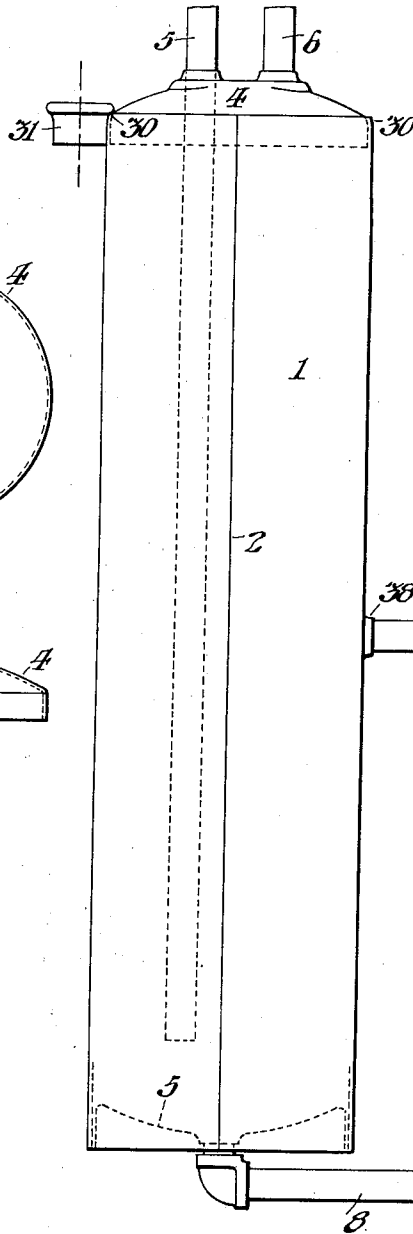


FIG. II.

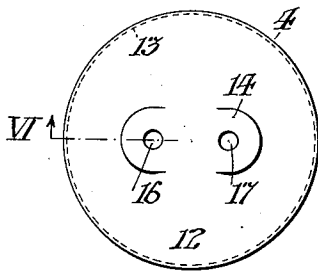


FIG. III.

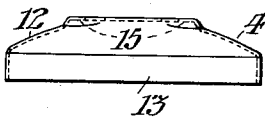


FIG. IV.

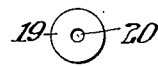


FIG. V.



Inventor:
VICTOR MAUCK,
by *Arthur E. Paige*,
Attorney.

Oct. 6, 1925.

1,556,451

V. MAUCK

CONTAINER AND PROCESS OF MAKING THE SAME

Filed Jan. 27, 1923

2 Sheets-Sheet 2

FIG. VI.

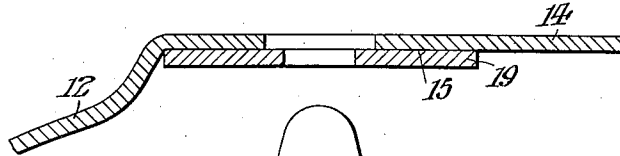


FIG. VII.

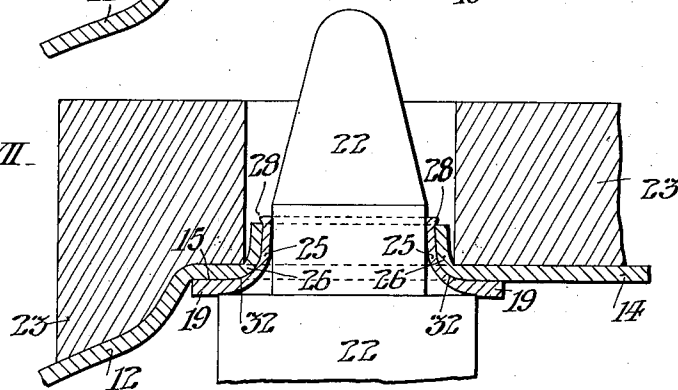


FIG. VIII.

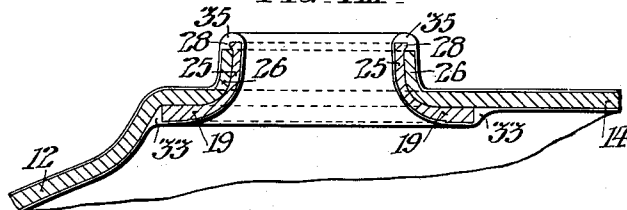
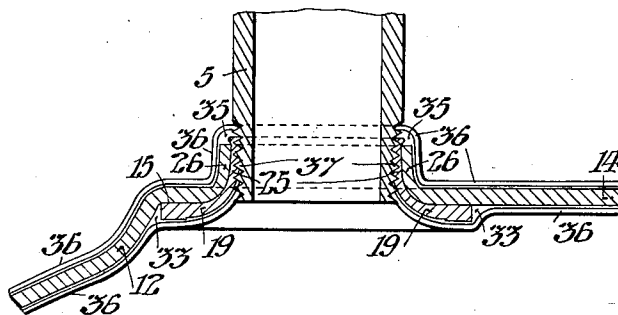


FIG. IX.



Inventor:

VICTOR MAUCK,

By *Arthur E. King*
Attorney.

UNITED STATES PATENT OFFICE.

VICTOR MAUCK, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO JOHN WOOD MANUFACTURING COMPANY, OF CONSHOHOCKEN, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CONTAINER AND PROCESS OF MAKING THE SAME.

Application filed January 27, 1923. Serial No. 615,278.

To all whom it may concern:

Be it known that I, VICTOR MAUCK, a citizen of the United States, residing at Norristown, in the county of Montgomery and State of Pennsylvania, have invented a certain new and useful Improvement in Containers and Processes of Making the Same, whereof the following is a specification, reference being had to the accompanying drawings.

My invention is particularly applicable to containers of the type known as "range boilers," i. e., water tanks provided with pipe fittings for inclusion in a water circulating system with a kitchen range water-back, or other water heating means. Such containers include a cylindrical tubular body or shell having opposite end closures and provided with means for screw threaded connection with ordinary water pipes through which water is circulated to and from the water chamber within the container. My improvements relate particularly to the method of and means for providing such a container with suitable pipe connecting means.

Heretofore, it has been the ordinary practice to provide such containers with what are known to the trade as "spuds," to wit, annular pieces of cast or wrought metal which are riveted or otherwise secured at openings in the container shell or its opposite end closures, or both; which spuds are screw threaded to engage the pipes aforesaid. Such devices of the prior art are unsatisfactory, in that it is not only difficult to make a tight joint between the primarily separate metal of the spud and the metal of the container shell or closure, but even after such a joint is made water-tight; it may be caused to leak under the stress to which the spud is subjected when a pipe is screwed into it; such stresses, of course, tending to twist the spud in its seat in the container wall. Moreover, as the screw threading operation is the last performed upon the container after the latter has been brazed at its joints and galvanized or otherwise coated inside and outside with alloy which is principally zinc; it is impossible to discover defects in the spuds at the portions thereof where the screw threads must be cut, until such final screw threading operation, and it may then be discovered that some spud in the container is so

defective that a tight screw threaded connection cannot be made therewith, and the entire container must be scrapped because of such defect.

Therefore, it is the object of my invention to avoid the defects aforesaid by providing a wrought metal reinforcement at each region of the container where it must be screw threaded for a pipe connection, and of such character that the reinforcement becomes an integral part of the container without any possibility of development of such defects as above noted with respect to the devices of the prior art.

As hereinafter described; such a reinforcement is primarily applied to the container wall as a plane annular plate washer, conveniently punched from a stock sheet of rolled steel. Such reinforcement is applied in registry with an opening in the container wall, and, thereupon, both the metal of the reinforcement and of the wall itself are distorted together, preferably outwardly from what is to be ultimately the inside of the container; so that said annular reinforcing plate is deformed at its central portion to form an outwardly extending tubular cone within a corresponding conical deformation in the container wall; preferably with the tubular portion of the reinforcement extending through the tubular portion of the wall thus formed, and expanded exterior to said wall so as to permanently engage the reinforcement with the wall without other means. That is to say; the annular reinforcement aforesaid immediately becomes an integral part of the container structure as the result of the first operation upon it in connection with such structure; and independently of the subsequent operations of brazing and galvanizing the metal parts thus primarily connected.

My invention includes the various novel features of construction, arrangement and procedure hereinafter more definitely specified.

In said drawings; Fig. I is an elevation of a container of the range boiler type, embodying my invention.

Fig. II is a plan view of the upper end closure of said container.

Fig. III is a side elevation of said closure shown in Fig. II.

Fig. IV is a plan view of a plane annular plate or washer reinforcement.

Fig. V is an edge view of said reinforcement shown in Fig. IV.

Fig. VI is a fragmentary radial sectional view taken on the line VI in Fig. II, diametrically with respect to one of the openings in said container closure and the annular plane reinforcement aforesaid, in registry therewith.

Fig. VII is a fragmentary sectional view, similar to Fig. VI, but showing the metal of said container closure and its reinforcement deformed by suitable die elements to form a tubular conical socket extending outwardly with respect to the interior of the container.

Fig. VIII is a fragmentary sectional view of said container closure and its reinforcement similar to Fig. VII, but after the structure has been brazed.

Fig. IX is a fragmentary sectional view similar to Fig. VIII, but with the structure in its final screw threaded form, and indicating a water-pipe connected therewith.

Referring to Fig. I; the container includes the cylindrical tubular body or shell 1, which is conveniently formed of a primarily flat sheet of steel, or other ferric metal, which is rolled to form a cylinder with edges abutting at the line 2, where said edges are electrically or otherwise welded to form a water-tight joint. Said container 1 is provided with the upper end closure 4 and lower end closure 5. Said closure 4 is provided with the cold water inlet pipe 3, in communication with the municipal supply, and the hot water outlet pipe 6 leading to the dispensing fixtures. Said container 1 is provided with the cold water outlet pipe 8 and the hot water inlet pipe 9, respectively leading to and from the range water-back 10, or other water heating means. Said pipe 8 is connected with said bottom closure 5, and said pipe 9 is connected with the side wall of the container 1, as shown.

I find it convenient to explain my invention with reference to the upper end closure 4 of said container 1. Said closure 4 is conveniently pressed to the peculiar form shown in Figs. II and III from a primarily flat sheet of steel or other ferric metal, and includes the convex web 12 having the cylindrical rim flange 13 in unitary relation therewith. Said closure web 12 has a principally plane panel 14 pressed therein, of the configuration indicated in Fig. II, with rounded edges merging into the convex surface of said web 12, as indicated in Fig. III, and forming a plane reinforcing seat 15. Two holes, 16 and 17, are punched through the metal of said closure 4 during the operation of forming the latter, and at the regions where it is desired to connect said pipes 5

and 6. However, as indicated, those openings are primarily much smaller in diameter than said pipes.

Respective annular plane reinforcing plates or washers 19 of ductile metal, preferably low carbon steel, of the configuration shown in Figs. IV and V, each having a central hole 20, of smaller diameter than the respective closure holes 16 and 17, are respectively applied in registry with said holes, upon said seat 15, at the inner surface of the closure 4, as indicated in Fig. VI. The two reinforcements 19 and the adjacent container wall metal of the closure 4 are then, preferably simultaneously, subjected to a pressing drawing operation, conveniently by means of the pair of die members 22 and 23 indicated in Fig. VII, which cooperate to deform the metal of said closure 4 and its reinforcements 19, together, and outwardly from what is to be ultimately the inside of the container, so that each annular reinforcing plate 19 is drawn at its central portion to form an outwardly extending tubular cone 25 within a corresponding tubular cone 26 in the metal of said container closure 4.

As indicated in Fig. VII; I prefer to so proportion the opening 20 in each reinforcement 19, with respect to the opening 16 or 17 in the closure 4, that when the metal of those parts is deformed, together, as above described, the tubular portion 25 of each reinforcement extends through the tubular portion 26 of the closure wall; with the result that, as the metal of said reinforcements is under compression during such deformation, it expands exterior to the metal of said closure, as indicated at 28 in Fig. VII, so as to permanently interlock the reinforcement 19 with the metal of the container wall, comprised in said closure 4, without other connecting means; so that said annular reinforcement 19 immediately becomes an integral part of the container structure as the result of the first operation upon it in connection with such structure.

However, in proceeding with the manufacture of such a container as indicated at 1 in Fig. I; I push the closure 4 into the cylindrical shell of the container until said shell overlaps the cylindrical skirt flange 13 on said closure 4 far enough to be rolled over the same as indicated at 30 in Fig. I. Such rolling operation may be conveniently effected by rotation of the container in contact with the roller 31 indicated in Fig. I.

Preparatory to brazing the structure thus assembled; I clean the metal at the regions which are to be brazed, by any suitable means, for instance, by immersing such metal in a detergent liquid which removes all grease and dirt therefrom. I then pre-heat both the closure 4 and the adjacent portion of the cylindrical shell of the con-

5 tainer 1, preferably to a visible red, and then invert and dip both the container shell and its closure 4 into a molten bath of brazing alloy, to a depth sufficient to submerge
 10 said closure flange 13 in said bath. I find it convenient to form such brazing alloy of fifty parts of copper and fifty parts of zinc, and to maintain the same at a temperature of from 1750 to 1800 degrees F., during the brazing operation; with a suitable
 15 flux, such as borax, molten upon the surface of the bath; so that the structure dipped therein is coated with such flux as it enters the brazing metal. The effect of said
 20 operation is to cause the brazing alloy to not only penetrate the interstice 32, indicated in Fig. VII, between the wall of the container and the reinforcement 19, but also to fillet the inner junction of said elements, as indicated at 33 in Fig. VIII, and form a rounded bead 35 at the outer interlocked edges of said elements, as indicated in Fig. VIII.

25 It is to be understood that the brazing operation above described is so effective in integrating the metal of the container wall with its reinforcement, that even if both be split, before such brazing operation, the split is bridged and closed so that a perfect
 30 screw thread may be formed at the region of the container thus reinforced. As above mentioned; it is the ordinary practice to provide such containers as indicated at 1 in Fig. I, with a coating 36 upon both the
 35 outside and the inside surfaces thereof, formed of an alloy known as spelter and which is principally zinc, and it is formed upon the container by first immersing the latter in a detergent liquid which removes
 40 all grease and dirt from the metal of the structure, and then immersing the structure in a molten bath of the coating alloy until the metal of the container is coated both inside and outside. Thereupon, the container
 45 is removed from the coating bath and drained.

Thereafter, and as next to the last step in the process of making a container in the form of my invention; each of the reinforced openings is reamed to the proper size for introduction of the screw threading tools and then, as the final step in said process, each of said openings is provided with a suitable pipe thread, such as indicated at 37 in Fig. IX.

55 It is to be understood that the bottom closure 5 may have a suitable opening therein provided with a reinforcement substantially as above described, for connection of the container with the pipe 8. Similarly, the wall of said container 1 may be provided with the reinforced screw threaded socket 38 for connection with the pipe 9.

65 Although I have explained my invention

with reference to the manufacture of a container of the range boiler type; it is to be understood that my improvements are equally applicable to containers of other types. Therefore, I do not desire to limit myself to the precise details of construction, arrangement and procedure herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising a circular annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial conically curved tubular relation, in contact with each other; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall, and through said wall; the tubular portion of said reinforcement extending through said wall being expanded to a larger outside diameter than the inside diameter of the tubular portion of said wall; whereby said wall and its reinforcement are interlocked; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them, and forming a bead at the ends of the tubular portions of said reinforcement and wall and forming a fillet at the junction of the other end of said reinforcement with said wall; a coating of zinc alloy extending over said wall and reinforcement; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

2. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall, and through said wall; the tubular portion of said reinforcement extending through said wall being expanded to a larger outside diameter than the inside diameter of the tubular portion of said wall; whereby said wall and its reinforcement are interlocked; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them, and forming a bead at the ends of the tubular portions of said reinforcement and wall and forming a fillet at the junction of the other end of said reinforcement with said wall;

a coating of zinc alloy extending over said wall and reinforcement; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

3. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall, and through said wall; the tubular portion of said reinforcement extending through said wall being expanded to a larger outside diameter than the inside diameter of the tubular portion of said wall; whereby said wall and its reinforcement are interlocked; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them, and forming a bead at the ends of the tubular portions of said reinforcement and wall and forming a fillet at the junction of the other end of said reinforcement with said wall; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

4. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall, and through said wall; the tubular portion of said reinforcement extending through said wall being expanded to a larger outside diameter than the inside diameter of the tubular portion of said wall; whereby said wall and its reinforcement are interlocked; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

5. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall; the tubular portion of said reinforcement being expanded to a larger out-

side diameter than the inside diameter of the tubular portion of said wall; whereby said wall and its reinforcement are interlocked; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

6. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall and being expanded thereover; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them, and forming a bead at the ends of the tubular portions of said reinforcement and wall and forming a fillet at the junction of the larger end of said reinforcement with said wall; a coating of zinc alloy extending over said wall and reinforcement; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

7. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall and being interlocked therewith; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them, and forming a bead at the ends of the tubular portions of said reinforcement and wall; a coating of zinc alloy extending over said wall and reinforcement; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

8. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in coaxial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall and permanently engaged therewith by a unitary portion of said reinforcement; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them, and forming a fillet

at the junction of the larger end of said reinforcement with said wall; a coating of zinc alloy extending over said wall and reinforcement; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

9. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in co-axial tubular relation; the tubular portion of the metal of said reinforcement extending within the tubular portion of the metal of said wall and directly permanently engaged therewith; a film of brazing alloy extending between said reinforcement and said wall, integrally uniting them; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

10. In a container, the combination with a sheet metal wall having an opening there-through; of a sheet metal reinforcement for said opening, comprising an annular plate having a central opening smaller than the opening in said wall; the metal of said wall and of said reinforcement extending in co-axial tubular relation; the tubular portion of the metal of said reinforcement extending within and being interlocked with the tubular portion of the metal of said wall; and an internal pipe screw thread formed in the tubular portion of said reinforcement which extends in said wall.

11. The process of making a container, which includes forming a cylindrical tubular body shell, from a primarily plane sheet of metal, by bending the same and welding opposite edges thereof together; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a circular web with a cylindrical flange; said web being principally convexly curved but having, in diametrical relation therewith, a plane panel forming, within said flange, a plane seat for annular reinforcements; said closure having holes therethrough in symmetrical relation with said panel, at opposite ends thereof, in eccentric relation with said circular web; forming annular reinforcements of plane sheet metal, each having an axial hole of smaller diameter than the holes in said closure; applying said reinforcements in contact with said seat, with their holes respectively in registry with the holes in said closure; deforming the metal of said closure and said reinforcements, together, outwardly from what is to be ultimately the inside of the container, so that each of said reinforcements is deformed at its central portion to form an outwardly extending tubular cone within a corresponding tubular

cone in the container wall; the tubular portion of each reinforcement extending through the tubular portion of the adjacent wall and being expanded exterior to said wall, so as to permanently engage the reinforcement with the wall; pushing said closure into said shell until the latter overlaps the cylindrical flange on said closure, far enough to be rolled over the same; rolling said shell over said closure; preheating both the closure and the adjacent portion of said shell, to a visible red; then dipping said shell and closure into a molten bath of brazing alloy of equal parts of copper and zinc, to a depth sufficient to submerge said closure flange in said bath; while maintaining said bath at a temperature of from 1750 to 1800 degrees Fahrenheit, during the brazing operation, with a suitable flux, such as borax, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcements and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing metal from the interior of said container through said openings, and cause said brazing metal to fillet the inner junction of said reinforcements with said container and also form respective rounded beads at the outer interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcements; chemically cleaning said structure; then immersing said structure in a molten bath of coating alloy of which the principal ingredient is zinc; withdrawing said structure from the coating alloy so as to drain the surplus coating metal from the interior of said container through said openings; reaming each of said openings to the proper size for introduction of a screw threading tool; then forming, in said openings, in said tubular portions of said reinforcements, suitable pipe screw threads.

12. The process of making a container, which includes forming a cylindrical tubular body shell; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a circular web with a cylindrical flange; said web having a plane panel forming, within said flange, a plane seat for annular reinforcements; said closure having holes therethrough in symmetrical relation with said panel, at opposite ends thereof, in eccentric relation with said circular web; forming annular reinforcements of plane sheet metal, each having an axial hole of smaller diameter than the holes in said closure; applying said reinforcements in contact with said seat, with their holes respectively in registry with the holes in said closure; deforming the metal

of said closure and said reinforcements, together, so that each of said reinforcements is deformed at its central portion to form a tubular cone within a corresponding tubular cone in the container wall; the tubular portion of each reinforcement extending in the tubular portion of the adjacent wall and being expanded so as to permanently engage the reinforcement with the wall; pushing said closure into said shell; preheating both the closure and the adjacent portion of said shell, to a visible red; then dipping said shell and closure into a molten bath of brazing alloy to a depth sufficient to submerge said closure flange in said bath; with a suitable flux, such as borax, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcements and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing metal from the interior of said container through said openings, and cause said brazing metal to fillet the junction of the larger ends of said reinforcements with said container and also form respective rounded beads at the interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcements; cleaning said structure; then immersing said structure in a molten bath of coating metal; withdrawing said structure from the coating metal so as to drain the surplus coating metal from the interior of said container through said openings; reaming each of said openings to the proper size for introduction of a screw threading tool; then forming, in said openings, in said tubular portions of said reinforcements, suitable pipe screw threads.

13. The process of making a container, which includes forming a cylindrical tubular body shell; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a circular web with a cylindrical flange; said web having a plane panel forming, within said flange, a plane seat for annular reinforcements; said closure having a hole through said panel; forming an annular reinforcement of plane sheet metal, having an axial hole of smaller diameter than the hole in said closure; applying said reinforcement in contact with said seat, with its hole respectively in registry with the hole in said closure; deforming the metal of said closure and said reinforcement, together, outwardly from what is to be ultimately the inside of the container, so that said reinforcement is deformed at its central portion to form an outwardly extending tubular cone within a corresponding tubular cone in the container wall; the tubular por-

tion of said reinforcement extending through the tubular portion of the adjacent wall and being expanded exterior to said wall, so as to permanently engage the reinforcement with the wall; pushing said closure into said shell until the latter overlaps the cylindrical flange on said closure, far enough to be rolled over the same; rolling said shell over said closure; preheating both the closure and the adjacent portion of said shell, to a visible red; then dipping said shell and closure into a molten bath of brazing alloy to a depth sufficient to submerge said closure flange in said bath; with a suitable flux, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcement and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing metal from the interior of said container through said opening, and cause said brazing metal to fillet the inner junction of said reinforcement with said container and also form a rounded bead at the outer interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcement; cleaning said structure; then immersing said structure in a molten bath of coating metal; withdrawing said structure from the coating metal so as to drain the surplus coating metal from the interior of said container through said opening; and forming, in said opening, in said tubular portion of said reinforcement, a suitable pipe screw thread.

14. The process of making a container, which includes forming a cylindrical tubular body shell; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a circular web with a cylindrical flange; said web having within said flange, a seat for a reinforcement; said closure having a hole through said seat; forming an annular reinforcement of plane sheet metal, having an axial hole of smaller diameter than the hole in said seat; applying said reinforcement in contact with said seat, with its hole respectively in registry with the hole in said seat; deforming the metal of said closure and said reinforcement, together, outwardly from what is to be ultimately the inside of the container, so that said reinforcement is deformed at its central portion to form an outwardly extending tubular cone within a corresponding tubular cone in the container wall; the tubular portion of said reinforcement extending in the tubular portion of the adjacent wall and being expanded so as to permanently engage the reinforcement with the wall; pushing said closure into said shell; preheating both the closure and the adjacent portion of said

shell; then dipping said shell and closure into a molten bath of brazing alloy to a depth sufficient to submerge said closure flange in said bath; with a suitable flux, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcement and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing metal from the interior of said container through said opening, and cause said brazing metal to fillet the inner junction of said reinforcement with said container and also form a rounded bead at the outer interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcement; cleaning said structure; then immersing said structure in a molten bath of coating metal; withdrawing said structure from the coating metal so as to drain the surplus coating metal from the interior of said container through said opening; and forming, in said opening, in said tubular portion of said reinforcement, a suitable pipe screw thread.

15. The process of making a container, which includes forming a cylindrical tubular body shell; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a circular web with a cylindrical flange; said web having within said flange, a seat for a reinforcement; said closure having a hole through said seat; forming an annular reinforcement of plane sheet metal, having an axial hole of smaller diameter than the hole in said seat; applying said reinforcement in contact with said seat, with its hole respectively in registry with the hole in said seat; deforming the metal of said closure and said reinforcement, together, so that said reinforcement is deformed at its central portion to form a tubular cone within a corresponding tubular cone in the container wall; the tubular portion of said reinforcement extending in the tubular portion of the adjacent wall and being expanded so as to permanently engage the reinforcement with the wall; pushing said closure into said shell; preheating both the closure and the adjacent portion of said shell; then dipping said shell and closure into a molten bath of brazing alloy to a depth sufficient to submerge said closure flange in said bath; with a suitable flux, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcement and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing

metal from the interior of said container through said opening, and cause said brazing metal to fillet the inner junction of said reinforcement with said container and also form a rounded bead at the outer interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcement; cleaning said structure; then immersing said structure in a molten bath of coating metal; withdrawing said structure from the coating metal so as to drain the surplus coating metal from the interior of said container through said opening; and forming, in said opening, in said tubular portion of said reinforcement, a suitable pipe screw thread.

16. The process of making a container, which includes forming a body shell; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a web with a flange; said web having a seat for a reinforcement; said closure having a hole through said seat; forming a reinforcement of sheet metal, having an axial hole of smaller diameter than the hole in said seat; applying said reinforcement in contact with said seat, with its hole respectively in registry with the hole in said seat; deforming the metal of said closure and said reinforcement, together, so that said reinforcement is deformed at its central portion to form a tube within a corresponding tube in the container wall; the tubular portion of said reinforcement extending in the tubular portion of the adjacent wall and being expanded, so as to permanently engage the reinforcement with the wall; pushing said closure into said shell; dipping said shell and closure into a molten bath of brazing alloy to a depth sufficient to submerge said closure flange in said bath; with a suitable flux, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcement and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing metal from the interior of said container through said opening, and cause said brazing metal to fillet the inner junction of said reinforcement with said container and also form a rounded bead at the outer interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcement; cleaning said structure; then immersing said structure in a molten bath of coating metal; withdrawing said structure from the coating metal so as to drain the surplus coating metal from the interior of said container through said opening; and forming, in said opening, in said tubular portion of said reinforcement, a suitable pipe screw thread.

17. The process of making a container, which includes forming a cylindrical tubular body shell; forming a closure for one end of said shell by pressing a primarily plane sheet of metal to form a circular web with a cylindrical flange; said web having a plane panel forming, within said flange, a plane seat for an annular reinforcement; said closure having a hole through said panel; forming an annular reinforcement of plane sheet metal, having an axial hole of smaller diameter than the hole in said closure; applying said reinforcement in contact with said seat, with its hole in registry with the hole in said closure; deforming the metal of said closure and said reinforcements, together, so that each of said reinforcements is deformed at its central portion to form a tubular cone within a corresponding tubular cone in the container wall; the tubular portion of said reinforcement extending in the tubular portion of the adjacent wall and being expanded so as to permanently engage the reinforcement with the wall; pushing said closure into said shell; preheating both the closure and the adjacent portion of said shell; then dipping said shell and closure into a molten bath of brazing alloy, to a depth sufficient to submerge said closure flange in said bath; with a suitable flux, molten upon the surface of the bath; so that said structure dipped in said bath is coated with such flux as it enters the brazing metal; thus causing the brazing metal to penetrate the interstices between said reinforcement and the adjacent wall; withdrawing said structure from the bath with the closure downward, so as to drain the molten brazing metal from the interior of said container through said opening, and cause said brazing metal to fillet the junction of the larger end of said reinforcement with said container and also form a rounded bead at the outer interlocked edges of the tubular elements aforesaid; thus integrating the metal of the container wall with said reinforcement; and forming, in said openings, in said tubular portions of said reinforcements, a suitable pipe screw thread.

18. The process of forming a reinforced pipe socket in a sheet metal container wall which consists in forming a circular hole in said wall of smaller diameter than the desired pipe socket; forming an annular reinforcement of plane sheet metal with an axial hole of smaller diameter than the hole in said wall; applying said reinforcement in registry with the hole in said wall; deforming the metal of said wall and said reinforcement, together, outwardly from what is to be ultimately the inside of the container, so that said reinforcement is deformed at its central portion to form an outwardly extending tubular cone within

the corresponding tubular cone in said wall; the tubular portion of said reinforcement extending through the tubular portion of said wall and being expanded exterior to said wall, so as to permanently engage said reinforcement with said wall; uniting said reinforcement to said wall, by molten metal introduced between them; reaming the tubular opening through said reinforcement to the proper size for introduction of a screw threading tool; and forming, in said opening, in said tubular portion of said reinforcement, the desired pipe screw thread.

19. The process of forming a reinforced pipe socket in a sheet metal container wall which consists in forming a circular hole in said wall of smaller diameter than the desired pipe socket; forming an annular reinforcement of wrought metal with an axial hole of smaller diameter than the hole in said wall; applying said reinforcement in registry with the hole in said wall; deforming the metal of said wall and said reinforcement, together, so that said reinforcement is deformed at its central portion to form a tubular cone within a corresponding tubular cone in said wall; the tubular portion of said reinforcement extending through the tubular portion of said wall and being expanded exterior to said wall, so as to permanently engage said reinforcement with said wall; uniting said reinforcement to said wall, by molten metal introduced between them; reaming the tubular opening through said reinforcement to the proper size for introduction of a screw threading tool; and forming, in said opening, in said tubular portion of said reinforcement, the desired pipe screw thread.

20. The process of forming a reinforced pipe socket in a sheet metal container wall which consists in forming a circular hole in said wall of smaller diameter than the desired pipe socket; forming an annular reinforcement of wrought metal with an axial hole of smaller diameter than the hole in said wall; applying said reinforcement in registry with the hole in said wall; deforming the metal of said wall and said reinforcement, together, so that said reinforcement is deformed at its central portion to form a tubular cone within a corresponding tubular cone in said wall; the tubular portion of said reinforcement extending through the tubular portion of said wall and being expanded exterior to said wall, so as to permanently engage said reinforcement with said wall; uniting said reinforcement to said wall, by molten metal introduced between them; and forming, in said opening, in said tubular portion of said reinforcement, the desired pipe screw thread.

21. The process of forming a reinforced

pipe socket in a sheet metal container wall which consists in forming a circular hole in said wall of smaller diameter than the desired pipe socket; forming an annular reinforcement of wrought metal with an axial hole of smaller diameter than the hole in said wall; applying said reinforcement in registry with the hole in said wall; deforming the metal of said wall and said reinforcement, together, so that said reinforcement is deformed at its central portion to form an outwardly extending tube within a corresponding tube in said wall; uniting said reinforcement to said wall, by molten metal introduced between them; reaming the tubular opening through said reinforcement to the proper size for introduction of a screw threading tool; and forming, in said opening, in said tubular portion of said reinforcement, the desired pipe screw thread.

22. The process of forming a reinforced

pipe socket in a sheet metal container wall which consists in forming a circular hole in said wall of smaller diameter than the desired pipe socket; forming an annular reinforcement of wrought metal with an axial hole of smaller diameter than the hole in said wall; applying said reinforcement in registry with the hole in said wall; deforming the metal of said wall and said reinforcement, together, so that said reinforcement is deformed at its central portion to form an outwardly extending tube within a corresponding tube in said wall; uniting said reinforcement to said wall, by molten metal introduced between them; and forming, in said opening, in said tubular portion of said reinforcement, the desired pipe screw thread.

In testimony whereof, I have hereunto signed my name at Conshohocken, Pennsylvania, this 27th day of November, 1922.

VICTOR MAUCK.