O. J. W. HIGBEE.
MANUFACTURE OF HOLLOW WALL VESSELS.
APPLICATION FILED JUNE 29, 1911.
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FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

WITNESSES:

INVENTOR

ATTORNEY.
To all whom it may concern:

Be it known that I, ORLANDO J. W. HIGBEE, a citizen of the United States, and residing in the city of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in the Manufacture of Hollow-Wall Vessels, of which the following is a specification.

My invention consists in new and useful improvements in the manufacture of hollow wall vessels of glass or metal, provided with interior and exterior tapers, said tapers being adapted to the method of constructing the blanks for said vessels, and protecting a vacuum in the chamber containing the same.

In the accompanying drawings, which are merely illustrative of the principles of my invention and not intended to limit the scope thereof to what is therein shown, Figure 1 is a vertical section showing the inner and outer blanks assembled ready to be attached together; Figure 2 is a similar view showing the blanks attached together, the bottom of the outer blank cut-in or closed, and also showing the method of establishing a vacuum between the blanks; Figure 3 is a broken plan view looking in the direction of the arrow in Figure 2; Figure 4 is an enlarged detail in section showing the method of protecting the vacuum seal; Figure 5 is a perspective view showing the form of cap used for such protection, and Figure 6 is a plan view showing the cushion member which interposes between the bodies of the inner and outer blanks to prevent vibration or rupture of the inner blank.

The following is a detailed description of the drawings:

A is the inner blank blown or otherwise formed with a closed bottom and a body preferably upwardly tapered toward the neck 1.

B is the outer blank preferably pressed or otherwise formed with an open bottom and upwardly tapered body.

4 is the neck of said blank B, of a length equal to that of neck 1 of blank A above the lip 2 and adapted to slip over the neck 1. The outer surface of neck 4 is provided at the outer end with a circumferential bead 5 and 6 is a similar bead at the juncture of said neck with the shoulder of the blank B.

40 During the pressing of blank B a hollow projection or boss 8 is formed on its shoulder, which boss is afterward broken through with a tool, as shown in dotted lines in Figure 1. Surrounding said boss 8 and integral with the blank is an annular flange 9, preferably outwardly flaring but of insufficient height to interfere with the blank freely rolling when laid on its side.

50 C is a cushion member or ring, formed of metal or other suitable material and provided with a plurality of bends or curved portions 10—10 which bear against the walls of the inner and outer blanks when the member C is mounted in the tapered body of blank A and the blanks A and B are assembled.

100 In assembling and attaching the blanks together, the member C is mounted on the body of blank A, the tapered form of said body maintaining said member at the desired position. The blank A is then inserted in blank B, the neck 4 of said blank B telescoping over the neck 1 of blank A and resting upon the lip 2. The necks of the blanks A and B are then reheated and fused or welded together for their common lengths.

125 A suitable tool being preferably used which engages the interior of necks 5 and 6 on the exterior of neck 4, thus preventing injury to the thread 7. The inner extremities of the bends 10—10 of the member C bear against the wall of blank A while the outer extremities of said bends bear against the wall of blank B, thus by their resiliency preventing the vibration of the inner blank and its breakage by any sudden jar or blow on the outer blank. The bottom of blank B is next reheated and cut-in or brought together to inclose the chamber D between the walls of the two blanks A and B. Where a vacuum is to be established in said chamber D I fuse to the open boss 8 a glass tube 11 provided adjacent to its fused
end with annular indentation or restriction 12 in its bore. A second tube 13 is now fused to the end of tube 11, said tube 13 being connected with a vacuum pump, not shown, by means of which the air is then removed from the chamber D. When the proper vacuum has been established and while the pump is still connected with the tube 13, I apply a blow flame 14 to the portion 12 of the tube 11, severing said tube and causing the same by the action of the vacuum in chamber D and the atmospheric pressure without to seal itself against the entrance of air. A suitable cement 15 in plastic state is then filled into the interior of the annular flange 9 to cover and protect the sealed end of tube 11 and also on the exterior face of said flange, especially about the base thereof. A metal cap 16, having an annular flange 17 is then pressed down on the flange 9 and the flange 17 clamped or pinched in tightly against said flange 9. Watertight cement 18 hardens the vacuum seal is protected by a closure that cannot be disturbed without breaking the vessel. The vessel is now completed. To close the vessel after filling the same with contents whose temperature is to be preserved, a cork is inserted in the neck of the vessel, which cork will expand slightly and occupy the groove or recess 2, thus preventing the accidental escape of the cork and a metal cap may be screwed down onto the thread 7 to protect the cork and to give the vessel a finished appearance.

The advantages of my invention are numerous. Among them may be mentioned the following: By providing the inner blank A with a longer neck than the outer blank B, I lower the body of the inner blank in the chamber D and extend the chamber D up the shoulder and lower neck of the inner blank, thus better protecting the contents of the vessel and at the same time not impairing the firm attachment of the blank A to the blank B. The provision of the lip 2 enables the proper position of the blank B to be automatically adjusted in assembling, serves to hold the blanks in proper position during the reheating process and provides a better union between the blanks by aiding in preventing injurious vibration of the inner blank. The cushioning member C introduced between the blanks A and B prevents any unusual or excessive jar or blow exerted on the vessel, such as by dropping the same from a considerable height, from vibrating or fracturing the inner blank. The design of the member C is such that the appreciable effect is had upon the efficiency of the vacuum in chamber D. The method of establishing a vacuum in chamber D and sealing off the same is easily accomplished and no danger of impairing the vacuum during the sealing off process exists. My method of protecting the seal is effective and prevents injury which would impair the vacuum and destroy the usefulness of the vessel.

What I desire to claim is—

1. The process of manufacturing hollow wall vessels of glass or similar material which consists in, first, forming a closed bottom inner blank having a neck and an open bottom outer blank having a neck shorter than the neck of the inner blank, second, inserting said blank inner blank in said outer blank, the neck of said outer blank telescoping the outer portion of the neck of said inner blank and fusing said necks together for the full length of the neck of the outer blank, and, third, closing in the bottom of the outer blank.

2. The process of manufacturing hollow wall vessels of glass or similar material which consists in, first, forming a closed bottom inner blank having a neck and an open bottom outer blank having a neck shorter than the neck of the inner blank, second, inserting the inner blank in the outer blank, the neck of the outer blank telescoping the outer portion of the neck of the inner blank and fusing said necks together for the full length of the neck of the outer blank, third, closing in the bottom of the outer blank, and fourth, establishing and sealing off a vacuum in the space between the walls of said blanks.

3. The process of manufacturing hollow wall vessels of glass or similar material which consists in, first, forming a closed bottom inner blank having a neck, said neck being provided with an exterior circumferential lip spaced above the shoulder of the blank, and an open bottom outer blank having a neck shorter than the neck of the inner blank, second, inserting the inner blank in the outer blank, the neck of the outer blank telescoping the neck of the inner blank and resting upon said lip, and fusing said necks together for the full length of the neck of the outer blank, and, third, closing in the bottom of the outer blank.

4. The process of manufacturing hollow wall vessels of glass or similar material which consists in, first, forming a closed bottom inner blank having a neck, said neck being provided with an exterior circumferential lip spaced above the shoulder of the blank, and an open bottom outer blank having a neck shorter than the neck of the inner blank, second, inserting the inner blank in the outer blank, the neck of the outer blank telescoping the neck of the inner blank and resting upon said lip, and fusing said necks together for the full length of the neck of the outer blank, third, closing in the bottom of the outer blank, and, fourth, establishing and sealing off a vacuum in the space between the walls of said blanks.
5. The process of manufacturing hollow wall vessels of glass or similar material which consists in, first, forming outer blank and an inner blank adapted to be inserted in said outer blank, second, mounting on said inner blank a cushioning ring provided with bends whereby it is spaced away from said blank, and, third, assembling said blanks and fusing together the mouths of the same, the bends in said ring alternately engaging the walls of said blanks.

6. The process of manufacturing hollow wall vessels of glass or similar material which consists in, first, forming an outer blank and an inner blank adapted to be inserted in said outer blank, second, mounting on said inner blank a cushioning ring provided with bends whereby it is spaced away from said blank, third, assembling said blanks and fusing together the mouths of the same, the bends in said rings alternately engaging the walls of said blanks, and, fourth, establishing and sealing off a vacuum between the walls of said blanks.

7. The process of manufacturing vacuum wall vessels of glass or similar material, which consists in, first, forming a vessel having a wall provided with an inclosed chamber, second, attaching a glass tube to the exterior of said wall surrounding an opening into said chamber, said tube having a contraction in its bore, third, establishing a vacuum in said chamber through said tube, fourth, severing and sealing off said tube by heat applied to its contracted portion, and, fifth, securing to said wall a cap covering the sealed end of said tube.

8. The process of manufacturing vacuum wall vessels of glass or similar material, which consists in, first, forming a vessel having a wall provided with an inclosed chamber, the outer surface of said wall being provided with an annular flange surrounding an opening into said chamber, second, attaching to said wall about said opening a glass tube, said tube having a contraction in its bore, third, establishing a vacuum in said chamber through said tube, fourth, severing and sealing off said tube by the application of heat to its contracted portion, and, fifth, securing to said flange a cap covering the sealed end of said tube.

9. The process of manufacturing vacuum wall vessels of glass or similar material, which consists in, first, forming a vessel having a wall provided with an inclosed chamber, the outer surface of said wall being provided with an annular flange surrounding an opening into said chamber, second, attaching to said wall about said opening a glass tube, said tube having a contraction in its bore, third, establishing a vacuum in said chamber through said tube, fourth, severing and sealing off said tube by the application of heat to its contracted portion, and, fourth, providing a covering for the sealed end of said tube to protect the same.

Signed at Pittsburgh, Penna. this 16th day of June 1911.

ORLANDO J. W. HIGBEE.

Witnesses:

T. CHALMERS DUFF,
EDWARD A. LAWRENCE.