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2 Sheets-Sheet 1

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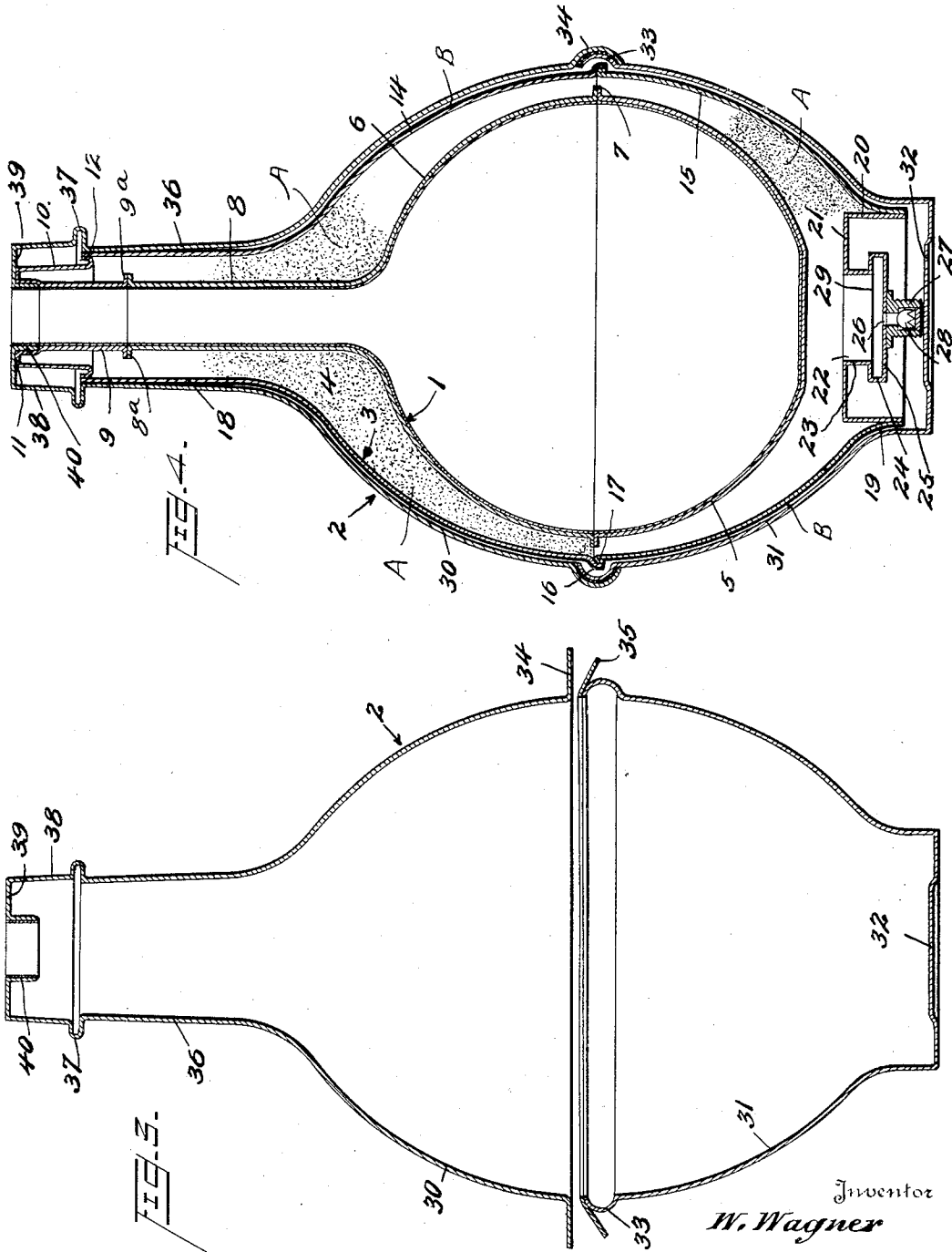
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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING METAL VACUUM BOTTLES OR CARAFES.

Application filed October 5, 1922. Serial No. 592,667.

This invention relates to certain new and useful improvements in the method of forming metal vacuum bottles or carafes and has reference to the specific steps such as spinning or pressing the several metallic sections from blanks and forming the same into the completely finished article.

An application filed by Walter Wagner for improvements in carafes on March 23, 1922, Serial No. 546,047 shows the completed article, while independent mechanical applications Serial No. 592,664 for improvements in vacuum bottle heaters, and Serial No. 592,666 for improvements in vacuum producing apparatus for metal carafes and Patent No. 1,483,027 for improvements in the art of welding receptacles filed on even date herewith show separate devices employed in the process of manufacturing the bottle or carafe as set forth hereinafter.

With the above general objects in view and others that will appear as the nature of the invention is better understood, the same consists of the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings, which show the several sections united to form the carafe:

Figure 1 is a vertical sectional view of the inner wall of the carafe showing several sections forming the same in spaced relation,

Figure 2 is a vertical sectional view of the intermediate wall of the carafe showing the same formed of sections in spaced relation,

Figure 3 is a vertical sectional view of the outer wall or casing showing the sections forming the same slightly spaced, and

Figure 4 is a vertical sectional view of the completed carafe showing the three walls forming the same.

The completed article produced by the method hereinafter set forth is shown in Fig. 4 of the drawing, the carafe being of multi-walled construction embodying an inner wall 1, an outer wall or casing 2 and an intermediate wall 3, the space 4 between the inner and intermediate walls being evacuated for rendering the inner wall 1 insulated from heat and cold in the completed vacuum bottle or carafe. All of the parts forming the carafe are constructed of metal and may either be spun or pressed into the desired configuration, such as illustrated in the drawings.

The method employed in producing the

metal carafe consists of spinning or pressing the inner wall 1, as shown in Fig. 1 to produce a lower bowl or bulb portion embodying lower and upper sections 5 and 6 having mated edges defining outwardly directed flanges 7 extending transversely of the bulbous portion and transverse to the elongated neck 8 carried by the upper bulbous portion 6. The mouth for the neck 8 as shown in Fig. 1 is of spaced double wall construction embodying an inner wall 9 and an outer wall 10 spaced therefrom, the walls 9 and 10 being connected at their outer ends by the flat ledge 11. An outwardly directed upturned flange 12 is formed at the lower edge of the outer wall 10 of the mouth while the upper end of the inner wall 9 carries an annular depression 13 for purposes hereinafter set forth. The lower edge of the inner wall 9 carries an outwardly directed annular flange 9^a cooperating with a similar flange 8^a formed at the outer end of the neck 8. The several sections of the inner wall 1 of the carafe as above described are preferably spun from a metal blank into the configuration set forth, and prior to uniting the several sections together, the inner faces of the walls are enameled by any suitable, well known method, such as by fusion, said faces being completely covered. This step in the process constitutes an important one as the enamel coating is evenly formed upon said wall faces, and as the several sections 5, 6 and 9 are separately coated, the escape of heated air or steam is unrestricted, thereby eliminating the formation of air bubbles, blisters or streaks upon the enameled surfaces during the coating operation which would occur should the faces of the wall be enameled after connecting the several sections thereof, a relatively long neck restricting the outlet for the heated air, gases or steam.

In connecting the sections 5, 6 and 9 after the enameling thereof, said sections are placed in any suitable welding apparatus wherein the opposed mating flanges 7 carried by the bulbous sections 5 and 6, and the mating flanges 8^a and 9^a carried by the bottle neck and mouth, are alone exposed, the remaining portions of the sections of the inner wall 1 being protected and cooled in any suitable manner. The mating flanges are welded, and the heating of said flanges will cause the enamel to soften at the joints and be evenly distributed thereover for present-

ing a continuous unbroken surface on the inner face of the wall 1. A suitable form of apparatus for permitting the welding of the mating flanges of the sections of the inner wall 1 without softening the enameled faces of the said sections except at the joints is shown in my Patent No. 1,483,027, referred to above.

The intermediate wall 3 of the carafe embodies upper and lower bulbous portions 14 and 15 having mating flanges 16 and 17 extending transversely of the bulbous portion and transversely to the relatively short neck portion 18, the flange 17 being swung downwardly into engagement with the outer face of the lower bulbous portion 15 for forming an annular bead as illustrated. The lower section 15 of the bulbous portion of the intermediate wall 3 is open at the lower end thereof and carries a depending annular skirt 19 within which an inverted pan-shaped member embodying an annular side wall 20 is received. The upper wall 21 of the inverted pan-shaped member has a central opening 22 therein surrounded by a depending annular wall 23, the lower end of the annular wall 23 being fashioned to provide an annular chamber 24 having a bottom wall 25 apertured as at 26. An externally threaded nipple 27 is secured to the bottom wall 25 of the chamber 24, the bore of which is alined with the aperture 26 and contains a rubber bumper or valve 28.

The welded sections of the inner wall 1 are placed within the sections 14 and 15 of the intermediate wall 1, the upper end of the neck 18 being frictionally received upon the flange 12 carried by the mouth portion of the inner wall while the flange 16 is moved into engagement with the bead 17 and spun thereover, the mating edges 16 and 17 being welded together while the contacting edges between the neck portion 18 of the intermediate wall section 14 and the flange 12 of the mouth of the inner wall are also welded. The depending skirt carried by the lower section 15 of the intermediate wall is welded to the side flange 20 of the pan-shaped member, thereby rigidly connecting the inner and intermediate walls of the carafe.

An insulating material A, preferably lamp black, after being highly heated, is placed within the space or chamber 4 between the inner and intermediate walls of the carafe, the lamp black being tightly packed therein, and the bottle in its embryo formation is placed in an inverted position within any suitable heating apparatus wherein the outer faces of the intermediate wall 3 may be subjected to a high degree of heat. A suitable form of apparatus for accomplishing this step of heating the outer faces of the intermediate wall 3 is suggested in my

referred to above. During this step of the process, gases in the pores of the metal wall will escape therefrom and all moisture in the insulating material will be vaporized and escape through the opening 26 in the bottom wall of the intermediate member. This operation is effected prior to the placing in position of the rubber valve 28 so that the gases and steam may readily escape from the embryo formation. Attention is called to the fact that the embryo formation is heated for removing gases and moisture therefrom prior to the evacuating of the air between the inner and intermediate walls, it having been found in actual practice that a more perfect vacuum may be produced when these steps in the method are separately performed in the order named.

The embryo formation is then ready for the vacuum producing apparatus, which may be of any suitable type, the connected inner and intermediate walls being supported in an inverted position upon a tensioned block while a flexible hose extending from a vacuum pump is attached to the threaded nipple 27, it being understood that the rubber valve 28 is placed in position within the nipple for cooperation with the valve aperture 26 prior to the connection to the vacuum pump. It is also noted that the embryo formation is evacuated while still in a heated condition as a more perfect vacuum in the space 4 may be procured, operation of the vacuum pump and the act of withdrawing the air from the space 4 causing a vibratory motion of the embryo formation on its resiliently mounted block which tends to loosen any particles of moisture or other deleterious substances adhering to the insulating lamp black or the adjacent walls or faces of the inner and intermediate walls. A suitable form of resiliently mounted block for supporting the embryo formation during the step of evacuating the space 4, whereby the embryo formation may freely vibrate, is suggested in my copending application Serial No. 592,666, referred to above. After the air has been completely exhausted from the space or chamber 4, a flexible hose or connection from the vacuum pump to the nipple 27 is disconnected, and the rubber valve 28 will automatically seat upon the valve aperture 26, a seal such as cement or white lead being immediately placed within the outer open end of the nipple 27 for permanently sealing the nipple and shutting off communication between the chamber 4 and the atmosphere. To prevent the withdrawal of the lamp black or insulating material during the act of creating the vacuum in the chamber 4, a series of screen members 29 are positioned in the chamber 24 as shown in Fig. 2, forming a substantial abutment therefor, but not in any manner interfering with the vacuum producing apparatus.

copending application Serial No. 592,664,

The outer face of the intermediate wall 3 is then coated with a suitable mineral oil B for effectively closing the pores in the metal, and the outer casing 2 is then placed in position upon the embryo formation to complete the carafe structure. The outer casing embodies a lower bulbous portion embodying upper and lower sections 30 and 31, the lower section having a bottom wall 32 and an outwardly directed annular bead 33 at its upper edge to be engaged by the outwardly directed mating flange 34 carried by the lower edge of the upper bulbous section which is spun thereover as shown in Fig. 4, a suitable gasket 35 being positioned between the beads 33 and flange 34. The upper bulbous portion 30 carries a neck extension 36 having an outwardly directed annular bead 37, and continuing upwardly to form an outer neck portion 38 and an upper wall 39, the inner edge of which carries a depending ring 40 to be received in the depression 13 formed in the upper end of the inner wall 9 of the mouth as shown in Figs. 1 and 4.

The carafe is now in complete construction, and it has been found by actual use, that the several steps in the method as hereinbefore specifically set forth are capable of producing a vacuum bottle or carafe that is non-breakable and wherein the vacuum between the inner and intermediate walls may be maintained for a considerable greater length of time. Another important step in the method has reference to the enameling of the inner faces of the inner wall 1 prior to the welding of the sections forming the same which will permit the escape of gases and steam during the enameling operation without the blistering or streaking of the inner face.

Variations are contemplated in the different steps of the process, and it is intended that the invention should only be limited by the subject matter claimed.

What is claimed as new is:—

1. In the art of producing metallic carafes wherein the external configuration includes a bulbous lower part and an upper neck portion, the method of producing the inner wall formation of the carafe which consists in producing mating sections with the mating line extending transverse to the axis of the neck and through the bulbous portion, applying an enamel coating to the interior faces of the several disconnected sections before assembly and then uniting the sections along the mating line by welding the sections and fusing and running together the enamel coating of the sections to form a smooth continuous surface.

2. In the art of producing metallic carafes wherein the external configuration includes a bulbous lower part and an upper neck portion, and wherein the carafe is of a three-wall formation with the vacuum chamber

between the intermediate and the inner wall, the method of producing the carafe which consists in forming each of the walls of mating sections with the mating line extending transversely through the bulbous portion and transverse to the axis of the neck portion, enameling the inner faces of the inner wall sections individually before assembly, securing said sections in mating position by welding the engaging edges of the sections and running together the enamel coating of the sections, positioning the inner wall within the sections of the intermediate wall and uniting the sections of the intermediate wall when so positioned to produce an embryo formation, producing a vacuum in the chamber between the walls, and then positioning the embryo formation within the sections of the outer wall and securing said sections together.

3. In the art of producing metallic carafes wherein the external configuration includes a bulbous lower part and an upper neck portion, and wherein the carafe is of a three-wall formation with the vacuum chamber between the intermediate and the inner wall, the method of producing the carafe which consists in forming each of the walls of mating sections with the mating line extending transversely through the bulbous portion and transverse to the axis of the neck portion, enamelling the inner faces of the inner wall sections individually before assembly and securing said sections in mating position after enamelling, applying heat to the securing line of said sections for running together the enamel coating of the sections to produce an unbroken enamel surface, positioning the inner wall within the sections of the intermediate wall and uniting the sections of the intermediate wall when so positioned to produce an embryo formation, placing an insulating material between the walls of the embryo formation, producing a vacuum in the chamber between the walls, and then positioning the embryo formation within the sections of the outer wall and securing said sections together.

4. In the art of producing metallic carafes wherein the external configuration includes a bulbous lower part and an upper neck portion, and wherein the carafe is of a three-wall formation with the vacuum chamber between the intermediate and the inner wall, the method of producing the carafe which consists in forming each of the walls of mating sections with the mating line extending transversely through the bulbous portion and transverse to the axis of the neck portion, enameling the inner faces of the inner wall sections individually before assembly and securing said sections in mating position after enameling, positioning the inner wall within the sections of the intermediate wall and uniting the sections of the intermediate

5 wall when so positioned to produce an embryo formation, placing heated lamp black between the walls of the embryo formation, producing a vacuum in the chamber between the walls, and then positioning the embryo formation within the sections of the outer wall and securing said sections together.

5. In the art of producing metallic carafes wherein the external configuration includes a bulbous lower part and an upper neck portion, and wherein the carafe is of a three-wall formation with the vacuum chamber between the intermediate and the inner wall, the method of producing the carafe which consists in forming each of the walls of mating sections with the mating line extending transversely through the bulbous portion and transverse to the axis of the neck portion, enameling the inner faces of the inner wall sections individually before assembly and securing said sections in mating position after enameling, positioning the inner wall within the sections of the intermediate wall and uniting the sections of the intermediate wall when so positioned to produce an embryo formation, placing an insulating material between the walls of the embryo formation, subjecting the embryo formation to a high degree of heat to remove gases and moisture from the metal and insulating material, producing a vacuum in the chamber between the walls, and then positioning the embryo formation within the sections of the outer wall and securing said sections together.

6. In the art of producing metallic carafes wherein the external configuration includes a bulbous lower part and an upper neck portion, and wherein the carafe is of a three-wall formation with the vacuum chamber between the intermediate and the inner wall, the method of producing the carafe which consists in forming each of the walls of mating sections with the mating line extending transversely through the bulbous portion and transverse to the axis of the neck portion, enameling the inner faces of the inner wall sections individually before assembly and securing said sections in mating position after enameling, positioning the inner wall within the sections of the intermediate wall and uniting the sections of the intermediate wall when so positioned to produce an embryo formation, placing an insulating material between the walls of the embryo formation, subjecting the embryo formation to a high degree of heat to remove gases and moisture from the metal and insulating material, vibrating the embryo formation and simultaneously producing a vacuum in the chamber between the walls, and then positioning the embryo formation with the sections of the outer wall and securing said sections together.

7. In the art of producing metallic ca-

rafes wherein the external configuration includes a bulbous lower part and an upper neck portion, and wherein the carafe is of a three-wall formation with the vacuum chamber between the intermediate and the inner wall, the method of producing the carafe which consists in forming each of the walls of mating sections with the mating line extending transversely through the bulbous portion and transverse to the axis of the neck portion, enameling the inner faces of the inner wall sections individually before assembly and securing said sections in mating position after enameling, positioning the inner wall within the sections of the intermediate wall and uniting the sections of the intermediate wall when so positioned to produce an embryo formation, placing an insulating material between the walls of the embryo formation, subjecting the embryo formation to a high degree of heat to remove gases and moisture from the metal and insulating material, vibrating the embryo formation and simultaneously producing a vacuum in the chamber between the walls, applying a mineral oil coating to the outer face of the embryo formation for closing the pores thereof, and then positioning the embryo formation with the sections of the outer wall and securing said sections together.

8. In the art of producing metallic carafes embodying spaced walls with a vacuum space therebetween, wherein the walls include bulbous lower parts and upper neck portions, and wherein the inner wall consists of mating sections with the mating line extending transverse to the axis of the neck and through the bulbous portion, the steps of interiorly enamelling the inner wall sections before assembly of the same, and then joining said sections with the employment of heat sufficient and in a manner to cause fusion of the enamel at the joints.

9. In the art of producing metallic carafes embodying spaced walls with a vacuum space therebetween, wherein the walls include bulbous lower parts and upper neck portions, and wherein the inner wall consists of mating sections with the mating line extending transverse to the axis of the neck and through the bulbous portion, the steps of interiorly enamelling the inner wall sections before assembly of the same, then joining said sections with the employment of heat sufficient and in a manner to cause fusion of the enamel at the joints, and protecting the remaining portions of the sections from the heat so as to confine the heat to the joints during the joining operation.

10. In the art of producing metallic carafes embodying spaced walls with a vacuum space therebetween, wherein the walls include bulbous lower parts and upper neck portions, the steps of placing the inner wall

within and joining the same to a further wall to provide a spaced wall embryo formation closed except at the bottom, then placing a filling of heat insulating material
5 between the walls, and thereafter inverting the embryo formation and subjecting the further wall to heat sufficient to cause moisture to be driven from the pores of the same and from the heat insulating material out of
10 the open bottom of the embryo formation.

11. In the art of producing metallic carafes embodying spaced walls with a vacuum space therebetween, wherein the walls include bulbous lower parts and upper neck
15 portions, the steps of placing the inner wall within and joining the same to a further wall to provide a spaced wall embryo formation closed except at the bottom, then placing a filling of heat insulating material
20 between the walls, and thereafter inverting the embryo formation and subjecting the further wall to heat sufficient to cause moisture to be driven from the pores of the same and from the heat insulating material out
25 of the open bottom of the embryo formation, then withdrawing the air from between

the walls while vibrating the embryo formation.

12. In the art of producing metallic carafes embodying spaced walls with a vacuum space therebetween, wherein the walls
30 include bulbous lower parts and upper neck portions, the steps of placing the inner wall within and joining the same to a further wall to provide a spaced wall embryo formation
35 closed except at the bottom, then placing a filling of heat insulating material between the walls, and thereafter inverting the embryo formation and subjecting the further wall to heat sufficient to cause moisture to be driven from the pores of the same
40 and from the heat insulating material out of the open bottom of the embryo formation, then withdrawing the air from between the walls while vibrating the embryo formation, then closing and sealing the bottom of the embryo formation, and finally
45 coating the further wall exteriorly with a pore-closing material.

In testimony whereof I affix my signature.

WALTER WAGNER.