July 19, 1966 C. BRAMMING 3,261,491

FILLERS FOR VACUUM BOTTLES

Filed Sept. 30, 1963 4 Sheets-Sheet 1

FIG. 1

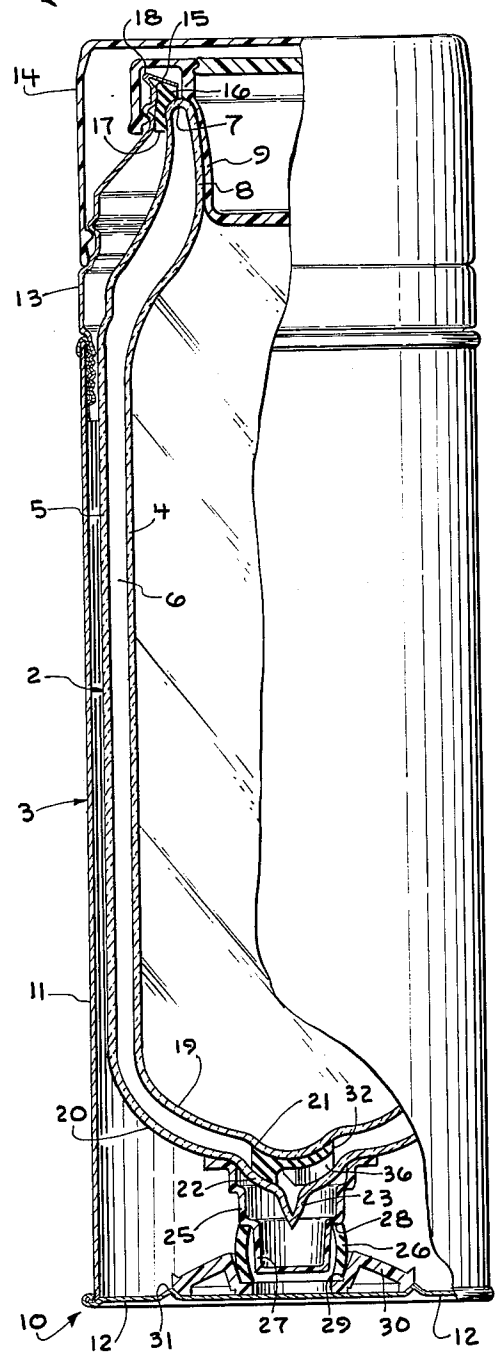


FIG. 2

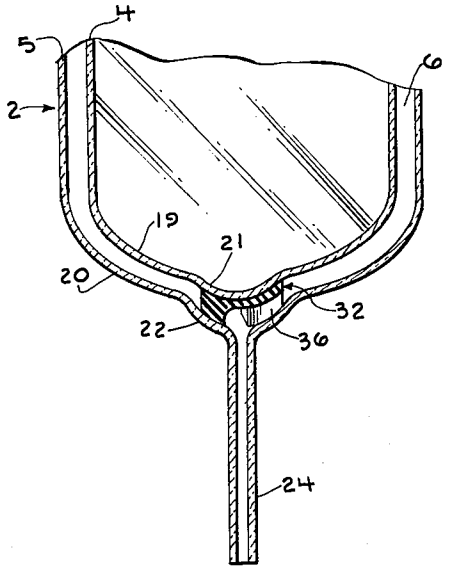


FIG. 3

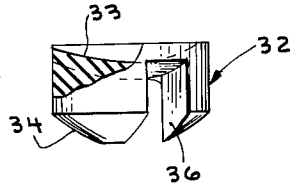
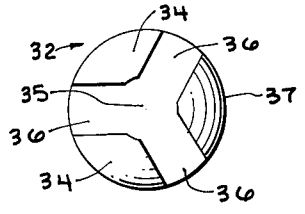


FIG. 4



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July 19, 1966 C. BRAMMING 3,261,491

FILLERS FOR VACUUM BOTTLES

Filed Sept. 30, 1963 4 Sheets-Sheet 2

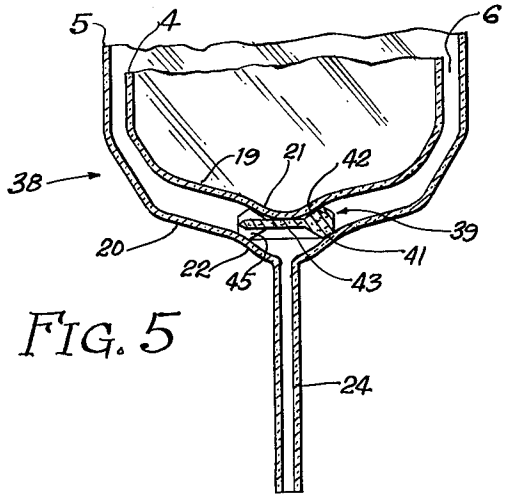

FIG. 5

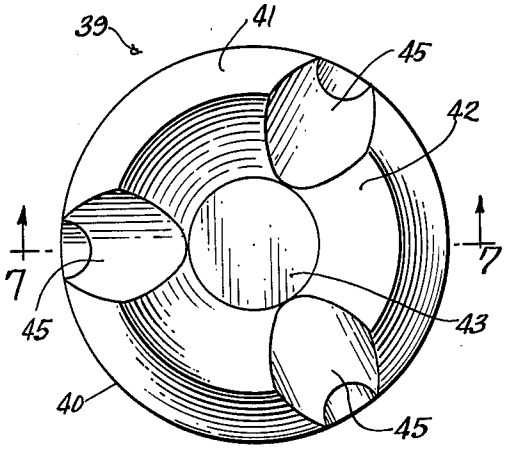

FIG. 6

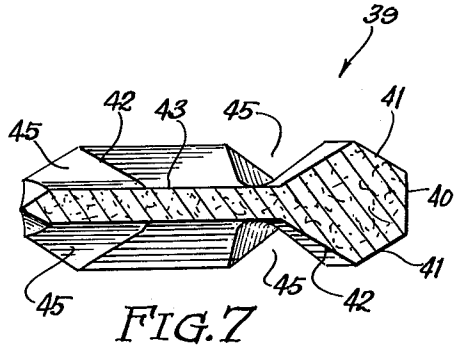

FIG. 7

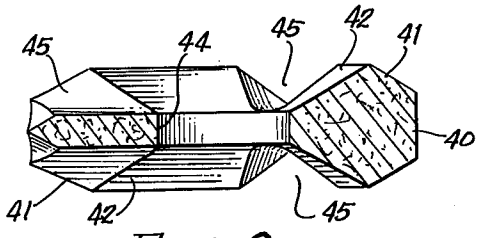

FIG. 9

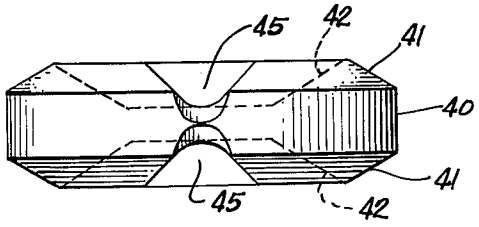

FIG. 8

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July 19, 1966 C. BRAMMING 3,261,491

FILLERS FOR VACUUM BOTTLES

Filed Sept. 30, 1963 4 Sheets-Sheet 3

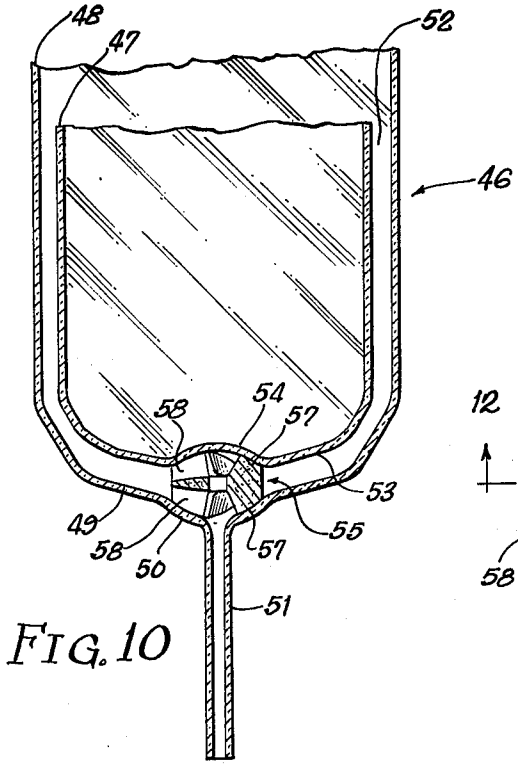

FIG. 10

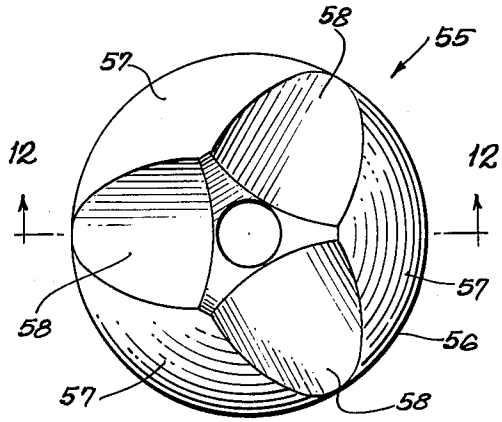

FIG. 11

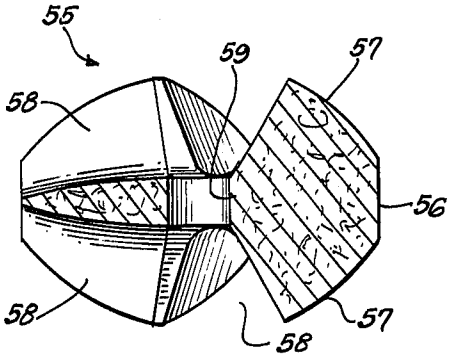

FIG. 12

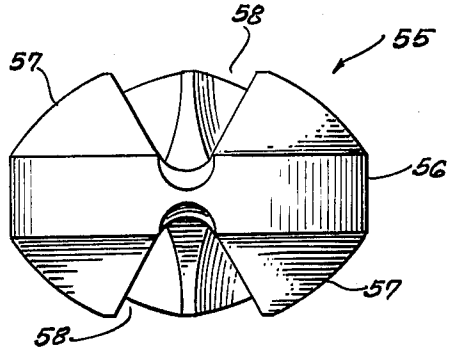

FIG. 13

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July 19, 1966 C. BRAMMING 3,261,491

FILLERS FOR VACUUM BOTTLES

Filed Sept. 30, 1963 4 Sheets-Sheet 4

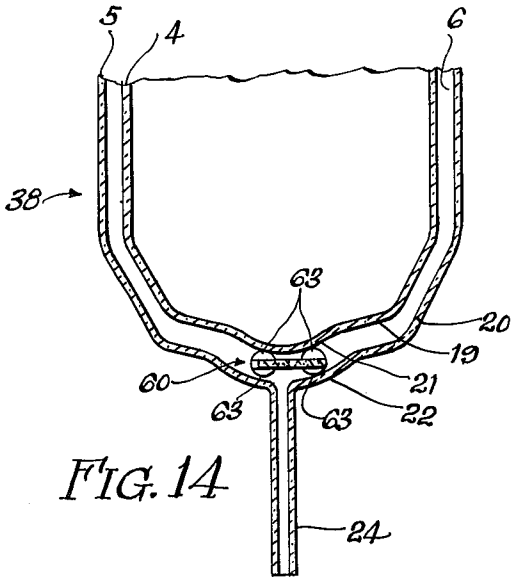

FIG. 14

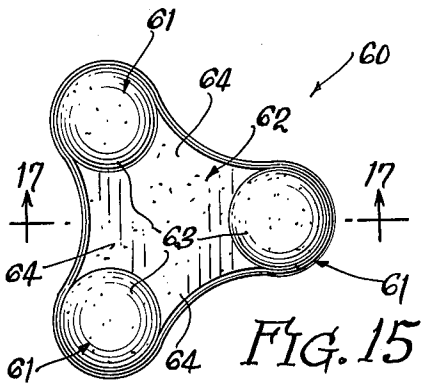

FIG. 15

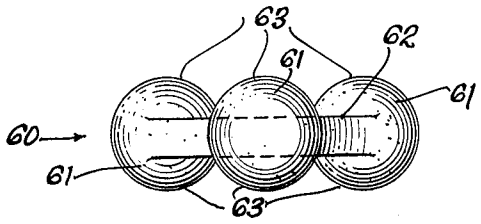

FIG. 16

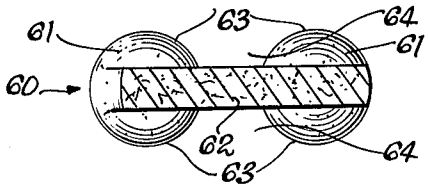

FIG. 17

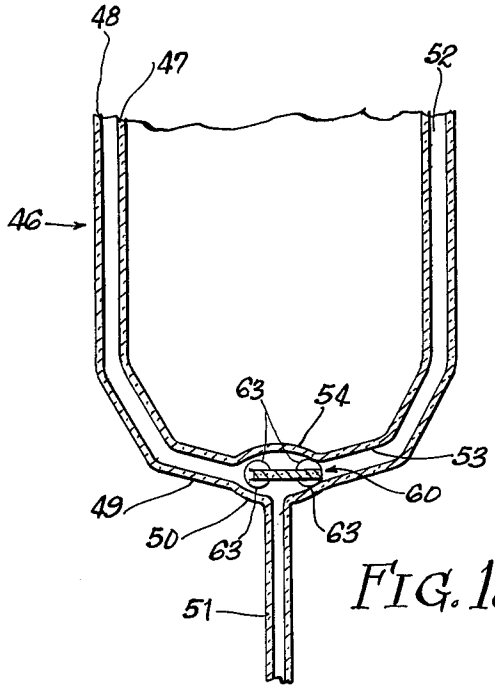

FIG. 18

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United States Patent Office 3,261,491 Patented July 19, 1966

3,261,491

FILLERS FOR VACUUM BOTTLES

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Filed Sept. 30, 1963, Ser. No. 312,768
4 Claims. (Cl. 215—13)

This invention relates to vacuum bottles of the type having a double-walled vacuum insulated filler or receptacle, normally made of glass, received within a protective outer jacket or casing which may be made of metal, plastic, or other suitable materials. This application is a continuation-in-part of my co-pending application Serial No. 210,350, filed July 17, 1962, now abandoned.

One object of the present invention is to provide a new and improved vacuum insulated filler having an improved arrangement for supporting and aligning the inner wall with respect to the outer wall.

A further object is to provide a new and improved filler in which a single pad or supporting member is snugly received between centrally disposed seat formations on the lower walls of the inner and outer shells, so that the inner shell will be accurately aligned and firmly supported relative to the outer shell.

Another object is to provide a new and improved vacuum insulated filler of the foregoing character, in which the centrally disposed pad is formed with grooves or other passages for carrying silvering solution and air to and from the tubulation during the manufacture of the filler.

A further object is to provide an improved filler which not only is stronger but also is easier to manufacture and more economical than heretofore.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which:

FIG. 1 is an elevational view, partly in section, of a vacuum bottle having a vacuum insulated filler to be described as an illustrative embodiment of the present invention.

FIG. 2 is a fragmentary sectional view of the filler during the process of manufacture, before the tubulation has been sealed off.

FIG. 3 is an enlarged elevational view, partly in section, of a pad employed in the filler of FIG. 1.

FIG. 4 is a bottom view of the pad of FIG 3.

FIG. 5 is a view similar to FIG. 2 but showing a modified form of pad.

FIG. 6 is an enlarged plan view of the modified pad shown in FIG. 5.

FIG. 7 is a sectional view through the pad, taken generally along a line 7—7 in FIG. 6.

FIG. 8 is an enlarged elevational view of the pad of FIG. 6.

FIG. 9 is a view similar to FIG. 7 but showing a slight further modification.

FIG. 10 is a view similar to FIG. 2 but showing another modified construction.

FIG. 11 is an enlarged plan view of the modified pad, shown in FIG. 10.

FIG. 12 is a sectional view through the pad, taken generally along a line 12—12 in FIG. 11.

FIG. 13 is an enlarged elevational view of the pad of FIG. 11.

FIG. 14 is a fragmentary sectional view, somewhat similar to FIG. 5, but showing still another modified form of the pad or supporting member.

FIG. 15 is an enlarged plan view of the pad of FIG. 14.

FIG. 16 is an elevational view of the pad of FIG. 15.

FIG. 17 is a sectional view, taken generally along the line 17—17 in FIG. 15.

FIG. 18 is a fragmentary sectional view somewhat similar to FIG. 10 but showing the pad of FIGS. 15–17, in position between the inner and outer walls of a filler similar to that of FIG. 10.

It will be seen that FIG. 1 illustrates a vacuum bottle 1 of the type having a double-walled vacuum insulated filler or receptacle 2 received within a protective outer jacket or casing 3. Normally, the filler 2 is made of glass and thus is quite fragile. The jacket 3 may be made of metal, plastics, or any other suitable materials.

The vacuum insulated filler 2 is generally bottle-shaped and comprises inner and outer shells 4 and 5 with an evacuated space 6 therebetween. The inner and outer shells 4 and 5 are sealed or otherwise joined together at their upper ends to form a rounded top or rim 7. It will be seen that the filler 2 has a reduced neck portion 8 adapted to receive a stopper or other closure 9.

The illustrated jacket 3 comprises a canister 10 having a cylindrical side wall 11 and a circular bottom wall 12. As shown, the canister 10 is made of metal, but it may be made of any suitable material. The upper end of the jacket 3 takes the form of a collar 13 which is screwed into or otherwise secured to the upper end of the canister 10. The collar 13 surrounds the neck portion 8 of the filler 2. In this case, the closure 9 is adapted to be screwed onto the upper end of the collar 13. A cup 14 may also be screwed onto or otherwise mounted on the collar 13. At its upper end, the illustrated collar 13 is formed with an inwardly projecting flange 15 which overlies the rounded upper end 7 of the filler 2. A sealing ring or gasket 16 is interposed between the flange 15 and the rounded upper end 7 of the filler 2. The sealing ring 16 also has a skirt portion 17 which is received between the collar 13 and the upper end of the outer shell 5 so as to center the upper end of the filler 2 in the jacket 3. At the outer rim of the flange 15, the illustrated collar 13 is formed with an outwardly projecting pouring lip 18 which may be of the construction disclosed and claimed in the Bramming Patent No. 2,832,492, patented April 29, 1958.

The illustrated inner and outer shells 4 and 5 of the filler 2 have curved bottom walls 19 and 20 which are generally in the shape of inverted domes. A substantially central, generally nipple-shaped projection 21 is formed on the bottom wall 19 of the inner shell 4. A similar nipple-shaped projection 22 is formed on the bottom wall 20 of the outer shell 5. In this case, the nipple-shaped projections 21 and 22 are directed downwardly. On the bottom wall 20 of the outer shell 5, the nipple-shaped projection 22 is formed with a centrally disposed downwardly projecting tubulation 23 which tapers to a point and is quite fragile. This tubulation 23 constitutes the last vestige of a tube 24 (FIG. 2) which extends from the outer shell 20 and is employed during the manufacture of the filler, for supplying silvering solution to the space between the inner and outer shells 4 and 5 and for removing the air so as to evacuate the space between the shells. The tube 24 is then sealed off so as to form the vestigial tubulation 23. It will be understood that the silvering solution is introduced into the space 6 through the tube 24 and is also removed through the tube. It will be noted that the silvering solution is effective to apply a coating of silver to the shells 4 and 5 so as to reduce the transmission of heat by radiation through the wall of the filler 2.

In this case, the fragile tubulation is enclosed within a cup-shaped tubulation protector 25 which is cemented or otherwise secured to the bottom wall 20 of the outer shell 5. The tubulation protector 25 may be made of plastic, metal or any other suitable material.

As shown, the filler 2 is supported and centered within the jacket 3 by means of a flexible resilient sleeve 26,

made of rubber or the like, and received around a reduced lower portion 27 of the tubulation protector 25, in the manner disclosed and claimed in the Bramming Patent No. 2,963,187, patented December 6, 1960. The upper end of the sleeve 26 engages a downwardly facing shoulder 28 on the tubulation protector 25. In this case, the lower end of the rubber sleeve 26 is received within a seat 29 formed in a locating ring 30 which is mounted on the upper side of the bottom wall 12. The ring 30 may be retained in a central position on the bottom wall 12 by means of an upwardly projecting circular rib 31 formed on the bottom wall. The rubber sleeve 26 provides resilient support for the filler 2 so that the filler is pressed upwardly to maintain tight sealing engagement between the rounded upper end 7 of the filler and the sealing ring 16. Thus, the filler 2 is compressed between the sealing ring 16 at its upper end and the rubber supporting sleeve 26 at its lower end.

The filler 2 of FIG. 1 is provided with a single curved pad or spacer 32 which is snugly received between the nipple-shaped projections 21 and 22 on the inner and outer shell 4 and 5. The pad 32 supports and centers the inner shell 4 with respect to the outer shell 5 and is effective to protect the inner shell from breakage due to shock and vibration. The pad 32 is also effective to align the shells 4 and 5 during the manufacture of the filler 2. The pad 32 may be made of asbestos fibers or other suitable materials.

It will be seen that the pad 32 has a curved concave upper contour 33 which snugly receives the nipple-shaped projection 21 on the inner shell 4. Similarly, the pad 32 has a curved convex lower contour 34 which is snugly received within the nipple-shaped projection 22 on the outer shell 5.

It will be seen that the pad 32 is disposed directly over the tubulation 23. A downwardly facing recess 35 is formed in the lower side of the pad 32 and is aligned within the tubulation 23. A plurality of grooves or other passages 36 extend in the pad 32 between the recess 35 and the circular periphery 37 of the pad. The recess 35 and the grooves 36 are adapted to carry the silvering solution between the tube 24 and the space 6 between the inner and outer shells 4 and 5, during the manufacture of the filler 2. The recess 35 and the grooves 36 also provide passages through which the air is evacuated from the space 6 through the tube 24, in the final stage of the manufacture of the filler.

Heretofore it has been the usual practice to provide three or more disk-shaped pads between the bottom walls of the inner and outer shells. The handling and accurate placement of the multiplicity of disk-shaped pads has presented serious problems in the manufacture of fillers. The present invention, utilizing a single curved centrally disposed pad makes it much easier and more economical to manufacture the fillers. In the manufacture of each filler, the single curved pad 32 may be cemented to the nipple-shaped projection 21 on the inner shell 4 before the shells 4 and 5 are assembled. The outer shell 5 is then slipped over the inner shell 4 and is automatically centered and aligned by engagement of the pad 32 with the inside of the nipple-shaped projection 22 on the outer shell. After the upper ends of the shells have been welded together, the silvering solution is introduced and removed through the tube 24. The recess 35 and the grooves 36 provide passages for the silvering solution through the pad 32. The filler is then evacuated by withdrawing the air from the space 6 between the shells 4 and 5 through the tube 24. Finally, the tube 24 is sealed off.

It will be observed that the inner shell 4 is centrally supported and aligned by the centrally disposed pad 32. Likewise, the supporting force is applied to the lower end of the filler 2 through the medium of the centrally disposed tubulation protector 25. At its upper end, the filler 2 is pressed downwardly by the engagement of the sealing ring 16 with the rounded rim 7 between the inner and outer shells 4 and 5. Thus, the endwise supporting forces on the filler 2 tend to augment the supporting action of the centrally disposed pad 32 so that the filler is effectively protected against breakage due to shock and vibration. It will be evident that the present invention provides an improved vacuum insulated filler which nevertheless is easier to manufacture and more economical than heretofore.

FIG. 5 illustrates a vacuum insulated filler 38 which may be the same as the filler 2 of FIG. 2 except that a modified pad or supporting member 39 is employed instead of the pad 32 of FIGS. 2–4. The modified pad 39 has the advantage that it is reversible in position. Thus, both the bottom and the top of the pad 39 are the same so that either side of the pad may face upwardly or downwardly. This construction facilitates the placement of the pad 39 between the nipple-shaped projections or seats 21 and 22 on the inner and outer walls 4 and 5. The feeding and placement of the pad by automatic machinery are thus greatly simplified.

As shown to advantage in FIGS. 6–8, the modified pad 39 is generally in the form of a disk having a circular periphery 40. On each side, the disk or pad 39 has a convex annular formation 41 and a concave annular formation 42. In this case, the convex formation 41 is adjacent the periphery 40 of the pad 39, while the concave formation 42 is spaced inwardly from the periphery. It will be seen from FIG. 5 that the convex formation 41 is adapted to be received within and seat against the concave inner surface of the nipple-shaped projection 22 on the outer wall 5. The concave formation 42 is adapted to receive and seat against the outside of the nipple-shaped projection 21 on the inner wall 4. In the construction shown in FIGS. 6–8, a flat web 43 extends across the center of the disk 39. The construction of FIG. 9 is slightly modified in that the web 43 is omitted so that a circular hole 44 is formed in the center of the disk 39. The construction of FIGS. 6–8 is somewhat stronger than the construction of FIG. 9.

The illustrated convex and concave annular formations 41 and 42 are frusto-conical in shape. However, it will be understood that they may be curved or of various other shapes.

On both sides, the pad or disk 39 is formed with a plurality of radical channels or grooves 45 to provide for the passage of silvering solution from the tube 24 to the space between the walls 4 and 5 during the manufacture of the filler 38. The channels 45 also permit air to pass outwardly through the tube 24 when the space between the walls 4 and 5 is evacuated. In this case, three equally spaced channels 45 are formed in each side of the disk-shaped pad 39. The channels 45 extend between the central portion 43 of the disk 39 and the periphery 40. It will be seen that the channels extend through the formations 41 and 42 and produce three equally spaced raised projections 45*a* on both the upper and the lower sides of the pad 39.

It will be observed that the pad 39 is symmetrical about its horizontal midplane. Thus, it makes no difference whether one side or the other of the pad is facing upwardly or downwardly.

FIG. 10 illustrates another modified filler 46 having inner and outer walls 47 and 48. The outer wall 48 may be the same as the outer wall 5 of FIG. 2 and thus may comprise a dome-shaped lower end portion 49 having a centrally disposed nipple-shaped projection or seat 50. A tube 51 is connected to the center of the nipple-shaped projection 50 for use in the manufacture of the filler 46. Thus, silvering solution is introduced through the tube 51 into the space 52 between the inner and outer shells 47 and 48. The silvering solution is also withdrawn through the tube 51. In addition, the tube 51 is employed for evacuating the space 52.

The inner shell 47 is similar to the inner shell 4 of FIG. 2 in that it has a dome-shaped lower wall 53. Moreover, the lower wall 53 has a centrally disposed nipple-

shaped seat portion or formation **54**. However, in this instance, the seat formation **54** projects upwardly rather than downwardly. Thus, the nipple-shaped seat **54** presents a downwardly facing concave surface, opposite the upwardly facing concave surface of the nipple-shaped formation **50** on the outer shell **48**. A modified pad **55** is snugly received between the oppositely facing concave surfaces of the seat portions **50** and **54**. As shown to advantage in FIGS. 11–13, the pad **55** is generally in the form of a disk having a circular periphery **56**. In this case, both sides of the disk-shaped pad **55** are formed with convex dome-shaped surfaces **57**. It will be seen that the convex surfaces **57** are generally of spherical curvature. Either of the convex surfaces **57** is adapted to be received in the upwardly facing concave seat **50** on the outer wall **48**. The other surface **57** is then received in the downwardly facing concave seat **54** on the inner wall **47**. The disk-shaped pad **55** is symmetrical about its horizontal midplane so that either side may face upwardly or downwardly.

As before, radial channels or grooves **58** are formed in the pad **55** to serve as conduits for silvering solution and air during the manufacture of the filler **46**. As shown, each side of the pad **55** has three equally spaced channels **58**. Of course, the number and arrangement of the channels **58** may be varied. The illustrated pad **55** has a centrally disposed hole **59** extending therethrough. It will be seen that the channels **58** extend between the hole **59** and the circular periphery **56**. The channels **58** extend through the convex formations **57** and produce three equally spaced raised projections **59'** on both sides of the pad or supporting member **55**.

It should be noted that the seats **50** and **54** and the pad **55** are so formed that the loading on the pad **55** is strictly compressive. No tensile stress is ever produced in the pad by the forces exerted upon the pad by the inner and outer walls **47** and **48**. This is a definite advantage in view of the fact that the pad may advantageously be made of materials such as asbestos which are considerably stronger in compression than in tension.

FIG. 14 illustrates a modified construction which employs the vacuum insulated filler **38** of FIG. 5, but utilizes a modified pad or supporting member **60** between the inner and outer walls **4** and **5** of the filler. The illustrated pad **60** is reversible in position and is snugly received between the nipple-shaped formations **21** and **22** at the lower ends of the inner and outer walls **4** and **5**.

As shown to best advantage in FIGS. 15–17, the modified pad **60** comprises three substantially spherical, equally spaced balls **61** which are connected together by a thin flat centrally disposed web **62** of generally triangular shape. The balls **61** and the web **62** may be molded or otherwise formed in one piece of asbestos or other suitable materials. It will be evident that the balls **61** provide three equally spaced raised projections **63** on both the upper and the lower sides of the pad **60**. The projections **63** are substantially hemispherical or dome shaped. The web **62** provides three equally spaced interconnected openings or channels **64** between the projections **63**, to conduct silvering solution and air during the manufacture and evacuation of the filler.

It will be seen from FIG. 14 that the spherically curved surfaces of the projections **63** engage the lower side of the nipple-shaped formation **21** on the inner wall **4**, and the upper side of the nipple-shaped formation **22** on the outer wall **5**. As a result, the pad **60** is automatically centered in the outer wall **5**, and is effective to center and support the inner wall **4**. Inasmuch as the pad **60** is symmetrical about its horizontal midplane, the pad may be inverted or reversed in its position. This reversability of the pad greatly facilitates the assembly of the vacuum insulated filler.

The modification shown in FIG. 18 employs the same pad **60** as illustrated in FIGURES 14–17, but the pad is employed in the vacuum insulated filler **46** of the construction shown in FIG. 10. This construction differs from the construction of FIG. 14 in that the nipple-shaped formation **54** on the inner wall **47** projects upwardly rather than downwardly. However, the pad **60** is fully adaptable to this construction inasmuch as the curved projections **63** on the upper side of the pad engage the lower side of the nipple-shaped formation **54** and are effective to center and support the inner wall **47**.

It would be recognized that the pad **60** is of such a shape that it is easy to manufacture by a molding process. Moreover, the pad employs a very small amount of material and is in point contact with both the inner and outer walls of the filler so that the heat conducted by the pad is minimized.

It will be evident that the present invention provides a single pad which is retained between centrally disposed seats on the inner and outer shells of the vacuum-insulated filler. The pad maintains the spacing and alignment of the inner and outer shells and transmits forces between the shells. Thus, the pad protects the vacuum-insulated filler from breakage due to shock or vibration. The present invention greatly facilitates the manufacture of the fillers, because the single pad may be fed and mounted very easily in its centrally disposed position.

Various other modifications, alternative constructions and equivalents may be employed without departing from the true spirit and scope of the invention, as exemplified in the foregoing description and defined in the following claims.

I claim:

1. For a vacuum bottle,

a generally bottle-shaped vacuum insulated filler comprising inner and outer shells with an evacuated space therebetween,

each of said shells having a bottom wall formed with a substantially central seat portion,

said seat portion on said outer shell providing a cup-shaped recess which is concave upwardly, said seat portion on said inner shell providing a cup-shaped recess which is concave downwardly and is opposite said recess in said outer shell,

and a single one piece generally button-shaped supporting member snugly received between said seat portions on said inner and outer shells for spacing and aligning said shells,

said supporting member being symmetrical about its horizontal mid-plane and having curved convex projections on both its upper and lower sides,

said projections being snugly received in said recesses in said outer and inner shells,

each of said projections having radial grooves affording communication between the central and edge portions of said supporting member to conduct air and silvering solution during the manufacture of said filler,

said supporting member being reversible in position during the manufacture of said filler.

2. For a vacuum bottle,

a generally bottle-shaped vacuum insulated filler comprising inner and outer shells with an evacuated space therebetween,

each of said shells having a bottom wall formed with a substantially central seat portion,

said seat portion on said outer shell providing a cup-shaped recess which is concave upwardly,

said seat portion on said inner shell providing a cup-shaped recess which is concave downwardly and is opposite said recess in said outer shell,

and a single one piece generally button-shaped supporting member snugly received between said seat portions on said inner and outer shells for spacing and aligning said shells,

said supporting member being symmetrical about its horizontal mid-plane and having curved convex dome-shaped projections on both its upper and lower sides,

said projections being snugly received in said recesses in said outer and inner shells,

each of said projections having radial grooves affording communication between the central and edge portions of said supporting member to conduct air and silvering solution during the manufacture of said filler, said supporting member being reversible in position during the manufacture of said filler.

3. For a vacuum bottle,

a generally bottle-shaped vacuum insulated filler comprising inner and outer shells with an evacuated space therebetween,

each of said shells having a bottom wall formed with a substantially central seat portion,

said seat portion on said outer shell providing a cup-shaped recess which is concave upwardly,

said seat portion on said inner shell providing a cup-shaped recess which is concave downwardly and is opposite said recess in said outer shell.

and a single one piece generally button-shaped supporting member snugly received between said seat portions on said inner and outer shells for spacing and aligning said shells,

said supporting member being symmetrical about its horizontal mid-plane and having curved convex dome-shaped projections on both its upper and lower sides,

said projections being snugly received in said recesses in said outer and inner shells,

each of said projections having three radial grooves affording communication between the central and edge portions of said supporting member to conduct air and silvering solution during the manufacture of said filler, said supporting member being reversible in position during the manufacture of said filler.

4. For a vacuum bottle,

a generally bottle-shaped vacuum insulated filler comprising inner and outer shells with an evacuated space therebetween,

each of said shells having a bottom wall formed with a substantially central generally nipple-shaped seat,

and a single one piece pad snugly received between said nipple-shaped seats on said inner and outer shells for spacing and aligning said shells,

said pad being symmetrical about its horizontal mid-plane and having at least three equally spaced substantially ball-shaped formations interconnected by a relatively thin web,

said ball-shaped formations engaging the lower side of said nipple-shaped seat on said inner shell and the upper side of said nipple-shaped seat on said outer wall,

said web being spaced from said seats to afford communication between said ball-shaped formations, said pad being reversible in position during the manufacture of said filler.

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