Dec. 25, 1962 C. BRAMMING 3,070,250

RETAINED STOPPERS FOR VACUUM BOTTLES, CARAFES OR THE LIKE

Filed Feb. 10, 1961 3 Sheets-Sheet 1

FIG. 1

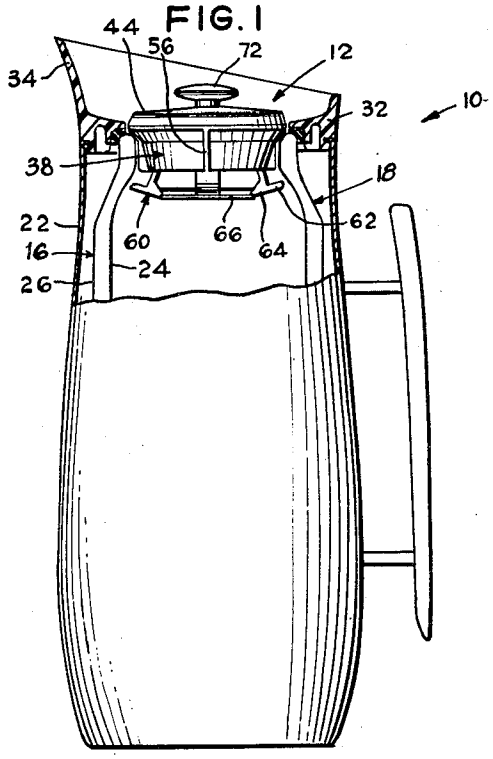


FIG. 2

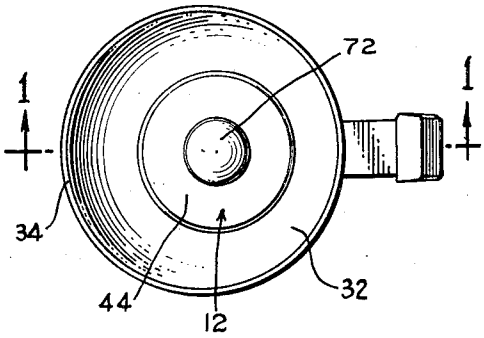
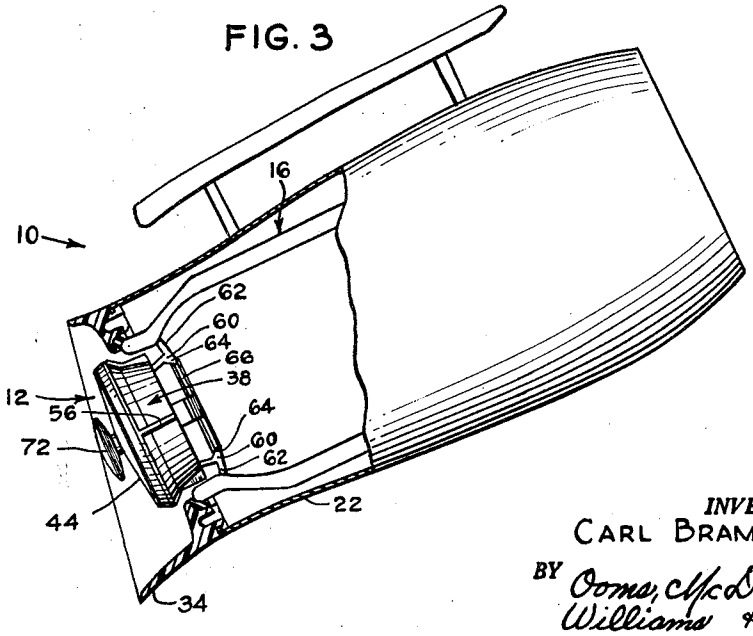


FIG. 3



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FIG. 4

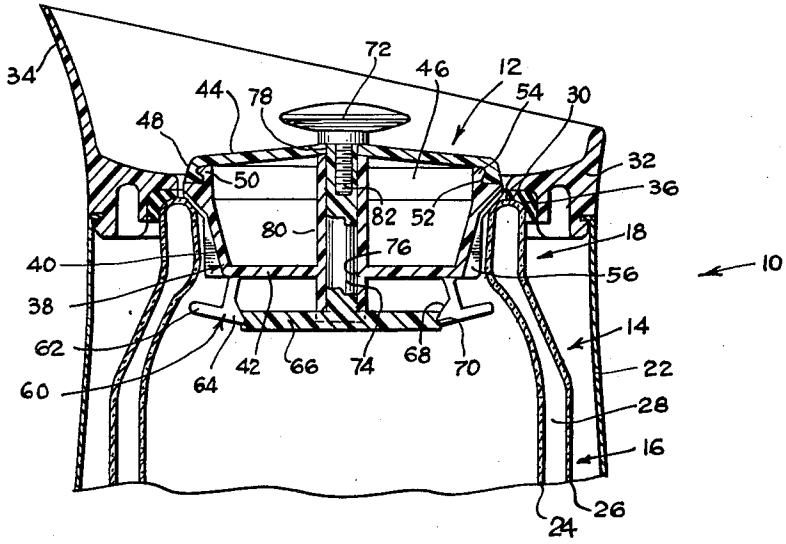


FIG. 5

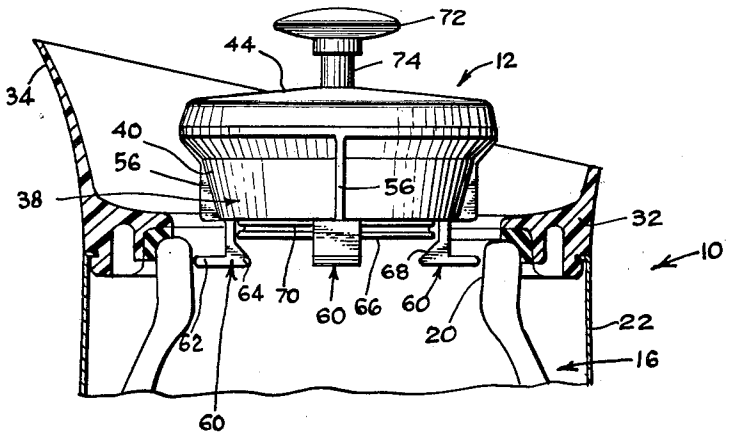
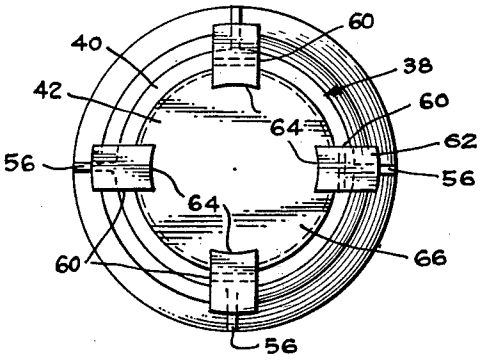


FIG. 6



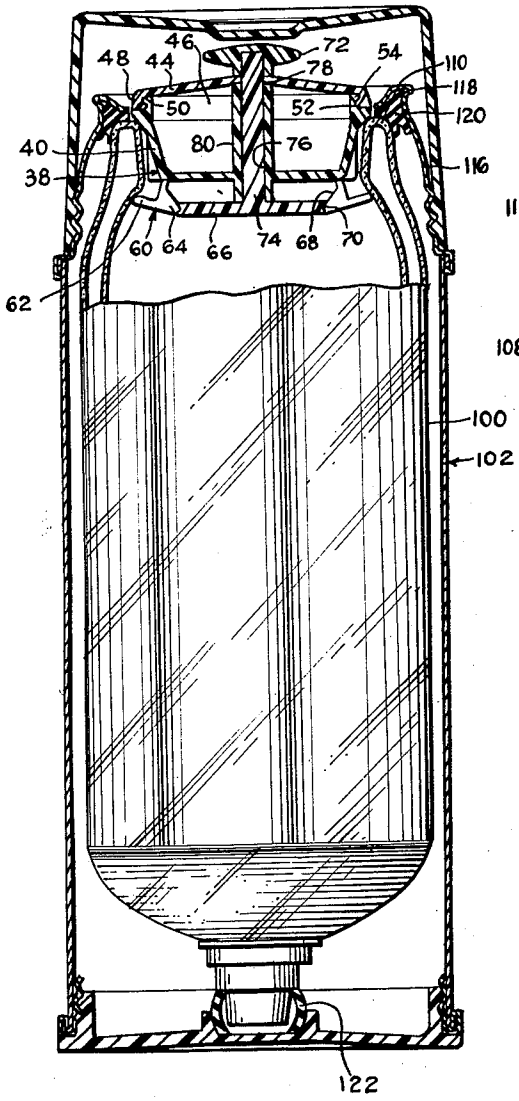
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FIG. 7



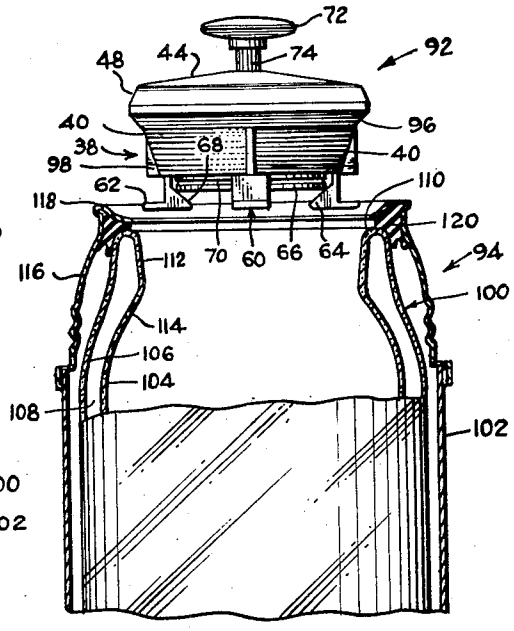


FIG. 8

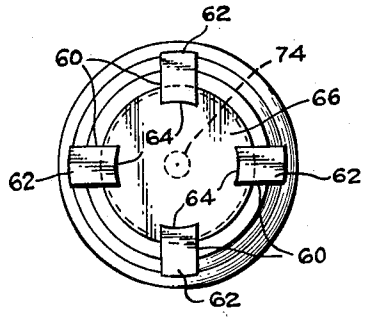


FIG. 9

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RETAINED STOPPERS FOR VACUUM BOTTLES, CARAFES OR THE LIKE

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Filed Feb. 10, 1961, Ser. No. 88,504
6 Claims. (Cl. 215—13)

This invention relates to a new and improved closure for vacuum insulated bottles, carafes or other similar receptacles.

One general object of the present invention is to provide a stopper which is disengageably retained in the mouth of a vacuum insulated bottle or the like against accidental or unintended loss or displacement from the vacuum bottle.

In one aspect, it is an object of the present invention to provide a new and improved stopper which forms a seal with the mouth of a vacuum botle or the like and is securely retained in sealing engagement with the mouth by manually operable means on said stopper, including elements adapted to be moved outwardly below said stopper and into engagement with the neck of the vacuum bottle.

In another aspect it is an object of the present invention to provide a new and improved closure which comprises a stopper adapted to fit loosely in the mouth portion of a vacuum insulated bottle or the like, together with manually operable means on said stopper adapted to be moved outwardly below said stopper and beyond the lower outline thereof, so as to prevent said stopper from falling out of the mouth portion of said bottle when said bottle is tipped into a pouring position. With this arrangement, the fluid contained in said bottle unseats the stopper so that the fluid can flow around the stopper, out of the mouth of the bottle. At the same time, the stopper is retained in the mouth portion of the bottle so that it will fall back into its sealing position when the bottle is returned to an upright position.

Thus, it is an object of the present invention to provide a new and improved stopper which closes the mouth of the bottle, when the bottle is in an upright position, yet permits the pouring of liquid from the bottle when the bottle is tipped, the stopper being loosely retained in the mouth portion so that the stopper will return to its initial position when the bottle is returned to an upright position.

A further general object is to provide a new and improved stopper which may readily be inserted into the mouth of a bottle, and which is provided with manually operable means for retaining the stopper in the mouth of the bottle against loss or displacement.

Another general object is to provide new and improved stoppers of the foregoing character which are easy to manufacture and low in cost.

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 of a vacuum insulated carafe provided with a closure to be described as one illustrative embodiment of the present invention, the view being partly in longitudinal section, generally along a line 1—1 in FIG. 2.

FIG. 2 is a top view of the carafe and closure of FIG. 1.

FIG. 3 is a view similar to FIG. 1, but showing the action of the closure when the carafe is tipped into a pouring position.

FIG. 4 is an elevational sectional view showing the closure of FIG. 1 on an enlarged scale.

FIG. 5 is a view similar to FIG. 4, but showing the manner in which the closure is removed from the carafe.

FIG. 6 is a bottom view of the closure of FIG. 1.

FIG. 7 is a central elevational sectional view of a vacuum bottle equipped with a modified closure to be described as a second embodiment of the present invention.

FIG. 8 is a fragmentary view similar to FIG. 7 but showing the manner in which the closure is removed from the vacuum bottle.

FIG. 9 is a bottom view of the closure of FIG. 7.

As already indicated, FIGS. 1–5 illustrate a vacuum insulated carafe or pitcher **10** which is provided with a pouring closure or stopper **12**. It will be understood that the closure of the present invention may be employed with various types of vacuum bottles or other similar receptacles.

The illustrated carafe **10** comprises a vacuum insulated receptacle or bottle **14** having a generally cylindrical body portion **16** and a neck portion **18** of reduced diameter. A circular mouth **20** is formed within the neck portion **18**. The vacuum insulated receptacle **16** is surrounded by a protective outer jacket or shell **22** which may be made of metal, plastic or other suitable material.

In accordance with the usual construction, the vacuum insulated receptacle **16** is formed with inner and outer walls **24** and **26** with an evacuated space **28** therebetween. The walls **24** and **26** may be made of glass or the like. It will be seen that the upper ends of the walls **24** and **26** are joined to form an annular rim **30** at the upper end of the vacuum insulated receptacle **16**.

A top member or wall **32** is mounted on the upper end of the protective jacket **22**. It will be seen that a pitcher-type pouring spout **34** is formed on the member **32**. A gasket or sealing ring **36** is interposed between the top member **32** and the rim portion **30** of the vacuum insulated receptacle **16**.

The stopper **12** is adapted to fit loosely in the mouth **20** of the vacuum insulated receptacle **16**. The stopper prevents the entry of dust or the like into the receptacle **16** and minimizes the transfer of heat between the inside and the outside of the receptacle **16**. Thus, the stopper **12** has a heat insulating effect, so that hot liquids will be kept hot, while cold liquids will be kept cold when contained within the receptacle **16**. Thus, the closure **12** comprises a generally cup-shaped stopper **38** which tapers downwardly and fits loosely in the mouth. The stopper **38** has a downwardly tapering annular side wall **40**, closed at its lower end by a bottom wall **42**. The stopper **38** may be made of a plastic material, such as polyethylene or polypropylene, for example, on any other suitable material.

As shown, the stopper **38** is provided with a top wall member **44** which closes the top of the cup-shaped stopper so that a hollow space or cavity **46** will be formed within the closure **12**. This hollow space contains dead air and thus enhances the heat insulating value of the closure. If desired, the space **46** may be filled with an insulating material, such as ground cork or the like, so as to enhance the insulting value to an even greater degree. The top wall member **44** may be secured to the cup-shaped stopper member **38** in any suitable manner. In this case, the top wall member **44** is formed with a skirt portion **48** which is received around an upwardly projecting flange **50** on the upper end of the cup-shaped stopper member **38**. Interlocking beads **52** and **53** are formed on the skirt **48** and the flange **50**. The top wall member **44** may be mounted on the stopper member **38** by pushing the top wall member **44** downwardly until the bead **52** snaps past the bead **54**. The top wall member **44** may be made of some suitable material, such as polyethylene or polypropylene.

The closure **12** is arranged so that liquid may be poured from the carafe **10** without removing the closure **12** from

the mouth 20 of the vacuum insulated receptacle 16. To facilitate the passage of liquid therebetween, the illustrated stopper member 38 is formed with a plurality of outwardly projecting longitudinal fins 56 which engage the mouth 20 and prevent the formation of an absolute seal between the stopper member and the mouth. Thus, the liquid can flow through the spaces between the fins. In addition, the flow of the liquid and the action of gravity tend to dislodge the closure 12 so that it will move part way out of the mouth 20. In this way, a larger passage is opened for passage of liquid between the mouth and the closure 12. This action is clearly illustrated in FIG. 3, which illustrates the carafe 10 in its pouring position.

In accordance with the present invention, means are provided for loosely retaining the closure in the mouth of the receptacle to prevent the closure from falling away from the receptacle when liquid is poured out of the receptacle. Such retaining means are manually actuated after the closure is mounted in the mouth of the receptacle. Thus, the closure may be freely inserted into the mouth of the receptacle without any interference on account of the retaining means. After the closure is in place, the retaining means are actuated so that the closure will be retained against loss.

In the illustrated embodiment, the retaining means take the form of a plurality of retaining members 60 which are mounted on the lower portion of the stopper member 38 and are movable outwardly to retain the closure 12. As shown, the retaining members 60 take the form of swingable arms or flaps which project downwardly from the lower wall 42 of the stopper 38 and may be molded integrally therewith. The retaining arms 60 are flexible and resilient so that they may be swung outwardly. Each of the illustrated retaining arms 60 has an outwardly projecting ear or flange 62 and an inwardly projecting lug 64.

Initially, the ears 62 on the retaining arms 60 extend outwardly to a diameter small enough to permit easy insertion of the stopper 38 through the mouth 20. Thus, the illustrated ears 62 extend outwardly to a diameter somewhat less than the maximum diameter of the side wall 40, and substantially equal to the internal diameter of the mouth 20.

After the stopper 38 has been inserted into the mouth 20, the arms 60 may be swung outwardly by means of a disc or other member 66 which is moveable downwardly to act in the manner of a cam against the lugs 64. Thus, sloping cam surfaces 68 are formed on the upper sides of the lugs 64 for engagement by the disc 66. A detent groove 70 is formed in the outer edge of the disc 66 for engagement with the lugs 64 so as to detain the disc 66 in its downwardly displaced position.

The disc 66 is adapted to be operated by means of a hadnle or knob 72 which is connected to the upper end of a stem or shaft 74 extending upwardly from the disc 66. The shaft 74 is slideable through aligned openings 76 and 78 in the lower wall 42 and the upper wall member 44. In this case, the shaft 74 also extends through a guide sleeve 80 which projects upwardly from the lower wall 42 and may be formed integrally therewith. The sleeve 80 extends between the lower wall 42 and the upper wall member 44. The handle 72 may be secured to the shaft 74 by means of a threaded stud 82 which extends downwardly from the handle and is screwed into the upper end of the shaft 74. The handle 72 is disposed above the closure 12 and is engageable with the upper wall member 44 to limit the downward movement of the disc 66. When the handle 72 is pulled upwardly, the disc 66 is disengaged from the lugs 64 so that the retaining arms 60 may return to their initial positions by virtue of the biasing action imparted by the inherent resilience of the retaining arms.

FIG. 5 illustrates the manner in which the closure 12 is inserted into or removed from the mouth 20 of the receptacle 16. It will be seen that the handle 72 is raised so that the disc 66 is out of engagement with the lugs 64. Thus, the retaining arms 60 are in their initial or retracted positions, so that the ears or flanges 62 will pass freely through the mouth 20.

After the closure 12 is in place in the mouth 20 the handle 72 is pushed downwardly so as to move the disc 66 downwardly against the lugs 64. This swings the retaining arms 60 outwardly, as shown to advantage in FIG. 4. The ears 62 are thereby moved outwardly to a greater diameter, so that the ears will retain the closure 12 against loss from the receptacle 16 when the carafe is tipped into a pouring position. As shown in FIG. 3, the closure 12 becomes unseated from the receptacle 16 but is retained loosely in the mouth 20 of the receptacle, when liquid is being poured therefrom. It will be apparent that the pouring closure of the present invention is convenient to use and effective in operation. At the same time, the closure is easy to manufacture and extremely low in cost.

FIGS. 7, 8 and 9 illustrate a modified closure 92 adapted to be employed with a vacuum bottle 94. The closure 92 differs from the closure 12 of FIGS. 1–6 in that the closure 92 forms a tight seal with the vacuum bottle and is securely retained in the vacuum bottle. Thus, the closure 92 closes the vacuum bottle against leakage and does not permit pouring of the liquid from the vacuum bottle unless the closure 92 is removed from the vacuum bottle.

The closure 92 is substantially the same in construction as the closure 12 except that the upper portions of the ribs 56 are omitted from the closure 92, so as to provide a smooth annular sealing surface or shoulder 96 on the body of the closure 92. It will be seen that the annular sealing surface 96 tapers downwardly and is disposed adjacent the upper end of the side wall 40 of the closure 92. The remaining portions of the vertical ribs 56 on the side wall 40 are designated 98 in FIGS. 7–9. In some cases, the ribs 98 may also be omitted.

The vacuum bottle 94 may be of any suitable construction, but, as shown, is of the type frequently employed in connection with lunch kits. Thus, the vacuum bottle 94 comprises a vacuum insulated receptacle or filler 100 which is surrounded by a protective jacket 102. The filler 100 is normally made of glass while the jacket 102 is usually made of metal, plastic or the like. As shown, the filler 100 has inner and outer walls 104 and 106, with an evacuated space 108 therebetween. The upper ends of the inner and outer walls 104 and 106 are joined by a rounded rim portion. At its upper end, the filler 100 has a mouth or opening 112. Below the mouth 112, the inner wall 104 is formed with a downwardly facing internal shoulder 114.

At its upper end, the protective jacket 102 has a collar portion 116. A pouring lip 118 may be formed on the upper end of the collar portion 116. In this respect, the vacuum bottle embodies the construction disclosed and claimed in the Bramming Patent No. 2,832,492. A sealing ring or gasket 120 may be provided between the pouring lip 118 and the upper end of the filler 100 to prevent any liquid from leaking into the space between the filler and the jacket 102. At its lower end, the filler 100 may be resiliently supported and cushioned by means of a rubber or rubberlike sleeve 122, in the manner disclosed and claimed in the Bramming Patent No. 2,963,187.

As shown in FIG. 8, the closure 92 may be inserted into the mouth 112 of the filler 100, with the retaining members 60 in their normal or retracted positions. The closure 92 may be moved downwardly until the downwardly tapering annular shoulder 96 comes into sealing engagement with the rounded upper rim 110 of the filler 100. The handle or knob 72 is then pushed downwardly to spread or extend the retaining members 60. In this case, the vertical length of the stopper is related to the position of the internal shoulder 114 on the filler 100 so that the outwardly projecting ears 62 on the retaining

members **60** come into firm engagement with the shoulder **114** when the members **60** are swung outwardly by the downwardly movement of the disc **66**. Thus, the ears **62** securely retain the closure **92** in the vacuum bottle, with the annular shoulder **96** in sealing engagement with the filler **100**. The stopper **92** prevents any leakage of liquid from the filler **100**.

When it is desired to remove the stopper **92**, the handle **72** is pushed upwardly so as to raise the disc **66**. This permits the retaining members or arms **60** to return inwardly to their original retracted positions. The stopper **92** may then be withdrawn from the mouth **112** of the filler **100**.

The retaining members **60** may be moulded integrally with the stopper body **38** and may be made of a relatively soft resilient rubberlike material, such as polyethylene, polypropylene or the like, so that the ears **62** will be capable of flexing, when forced against the shoulder **116**. This action insures that the stopper will be tightly retained in the filler, and enables the stopper to compensate for slight variations in the dimensions of the filler.

It will be evident that the present invention provides a retaining stopper which is highly convenient and economical. Moreover, the stopper may be employed with any standard or desired type of vacuum bottle, without any need for special formations or modifications on the vacuum bottle. The stopper provides a secure seal, yet may be operated easily, even by children. Existing vacuum bottles may readily be equipped with stoppers of this construction.

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

I claim:

1. In a vacuum bottle, the combination comprising a vacuum insulated receptacle having a lower body portion and an upper neck portion of reduced diameter relative to said body portion, said neck portion having a circular mouth extending therethrough, said neck portion having an annular rim extending around said mouth at the upper end of said neck portion, a stopper movably receivable in said mouth and having a downwardly facing annular shoulder for seating against said rim, a plurality of tabs swingably mounted on said stopper and projecting downwardly therefrom, each of said tabs having an inwardly projecting cam lug and an outwardly projecting ear, said ear projecting outwardly to a diameter corresponding to the diameter of said mouth so as to be movable through said mouth when said stopper is inserted into said mouth, said stopper having a central opening extending therethrough, a stem slidably received in said opening, a knob connected to the upper end of said stem and disposed above said stopper for moving said stem downwardly and upwardly, and a disk connected to the lower end of said stem and movable downwardly against said lugs for swinging said tabs outwardly to a diameter greater than the diameter of said mouth, said tabs thereupon being effective to retain said stopper against loss from said vacuum bottle, said ears being spaced a substantial distance from the inside of said receptacle when said tabs are swung outwardly, so that said stopper is movable through a limited range to permit unseating of said shoulder from said rim when the content of said receptacle is poured outwardly through said mouth and around said stopper.

2. In a closure, the combination comprising a stopper having an annular side wall and a circular bottom wall, a plurality of tabs swingably mounted on said bottom wall adjacent the periphery thereof and projecting downwardly from said bottom wall, said tabs when in a free state projecting outwardly to a diameter less than the diameter of said annular side wall, a member adjacent said bottom wall and movable downwardly against said tabs for swinging said tabs outwardly to a diameter substantially greater than the diameter of said annular side wall, and means connected to said member and extending upwardly through said stopper for manually operating said member from the upper side of said stopper.

3. In a closure, the combination comprising a stopper having an annular side wall and a circular bottom wall, a plurality of tabs projecting downwardly from said bottom wall of said stopper, said tabs being swingably mounted on said stopper and being disposed adjacent the margin of said circular bottom wall, said tabs normally extending outwardly to a diameter less than the maximum diameter of said annular side wall, said stopper having an opening extending therethrough between the upper and lower sides thereof, a stem slidably received in said opening, a disk connected to the lower end of said stem and disposed adjacent said bottom wall of said stopper, said disk being movable downwardly by operation of said stem for engaging said tabs and swinging said tabs outwardly to a diameter substantially greater than the diameter of said annular side wall, each of said tabs having an inwardly projecting cam lug for engagement by said disk, said disk having a circumferential detent groove therein for receiving said lugs to detain said disk in its downwardly displaced position.

4. In a vacuum bottle, the combination comprising a vacuum insulated receptacle having a lower body portion and an upper neck portion of reduced diameter relative to said body portion, said neck portion having a circular mouth therein, a stopper having a circular bottom wall and an annular side wall receivable in said mouth, a plurality of tabs swingably mounted on said bottom wall and projecting downwardly therefrom adjacent the margin thereof, said tabs normally projecting outwardly to a diameter less than the maximum diameter of said side wall so as to be freely movable through said mouth, a member adjacent said bottom wall of said stopper and movable downwardly for engaging said tabs and swinging said tabs outwardly to prevent said stopper from falling out of said mouth when said vacuum bottle is tipped into a pouring position, and means connected to said member and extending upwardly through said stopper for operating said member from the upper side of said stopper.

5. In a vacuum bottle, the combination comprising a vacuum insulated receptacle having a lower body portion and an upper neck portion of reduced diameter relative to said body portion, said neck portion having a circular mouth extending therethrough, said neck portion having an annular rim extending around said mouth at the upper end of said neck portion, a stoppper movably receivable in said mouth and having a downwardly facing annular shoulder for seating against said rim, a plurality of tabs swingably mounted on said stopper and projecting downwardly therefrom, each of said tabs having an inwardly projecting cam lug and an outwardly projecting ear, said ear projecting outwardly to a diameter corresponding to the diameter of said mouth so as to be movable through said mouth when said stopper is inserted into said mouth, said stopper having a central opening extending therethrough, a stem slidably received in said opening, a knob connected to the upper end of said stem and disposed above said stopper for moving said stem downwardly and upwardly, and a disc connected to the lower end of said stem and movable downwardly against said lugs for swinging said tabs outwardly to a deiameter greater than the diameter of said mouth, said tabs thereupon being effective to retain said stopper against loss from said vacuum bottle.

6. In a vacuum bottle, the combination comprising a vacuum insulated receptacle having a lower body portion and an upper neck portion of reduced diameter relative to said body portion, said neck portion having a circular mouth therein, a stopper having a circular bottom wall and an annular side wall receivable in said mouth, a plurality of tabs swingably mounted on said bottom wall and projecting downwardly therefrom adjacent the margin

thereof, said tab normally projecting outwardly to a diameter less than the maximum diameter of said side wall so as to be freely movable through said mouth, a member adjacent said bottom wall of said stopper and movable downwardly for engaging said tabs and swinging said tabs outwardly to retain said stopper in said mouth, and means connected to said member and extending upwardly through said stopper for operating said member from the upper side of said stopper.

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