Nov. 6, 1945. C. M. DE WOODY 2,388,634

CONTAINER FOR ASEPTIC FILLING AND DISPENSING OF STERILE LIQUIDS

Filed Dec. 7, 1944 3 Sheets-Sheet 1

Fig. 1

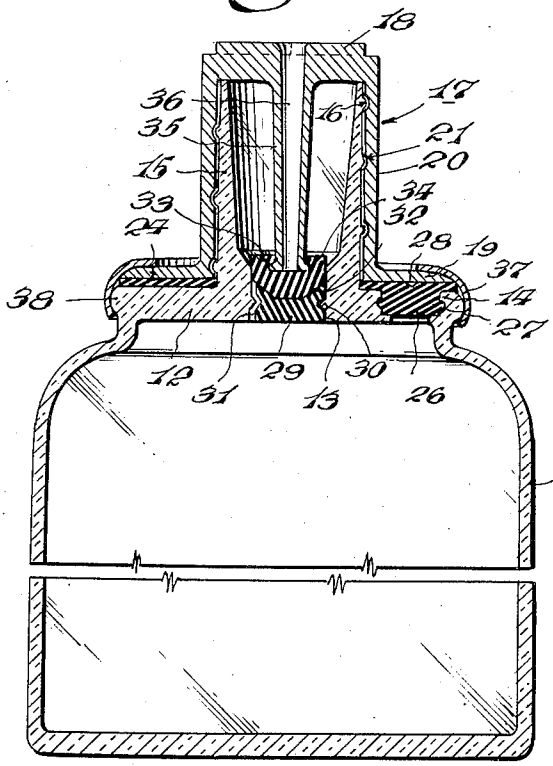


Fig. 2

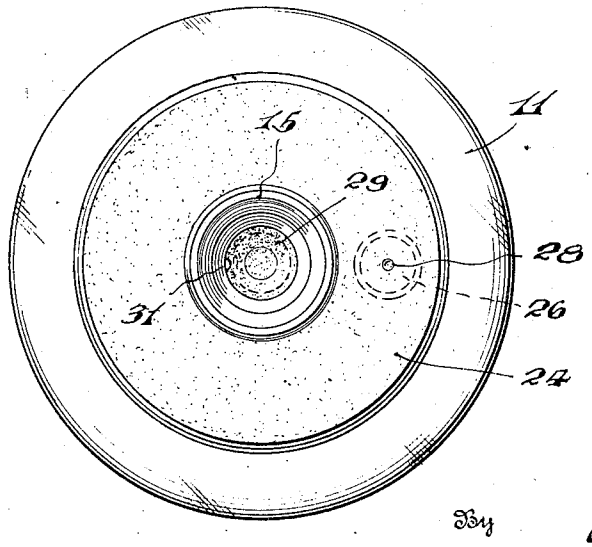


Fig. 3

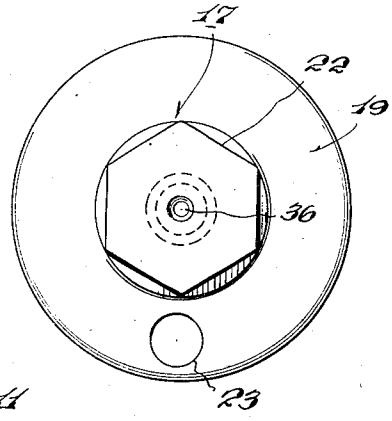
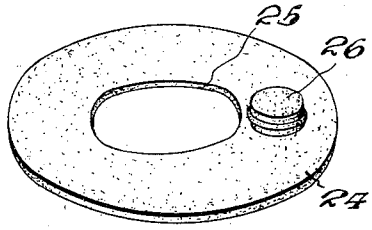


Fig. 4



Inventor
C. M. De Woody,

By Prevost & Prevost
Attorneys

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CONTAINER FOR ASEPTIC FILLING AND DISPENSING OF STERILE LIQUIDS

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Fig. 5

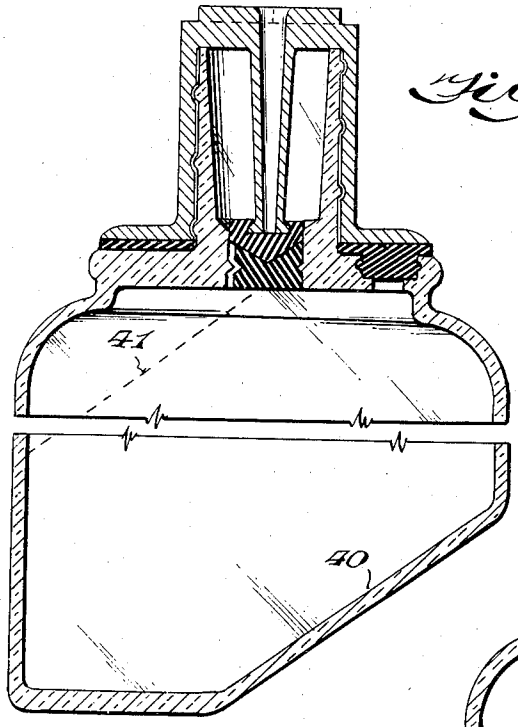


Fig. 6

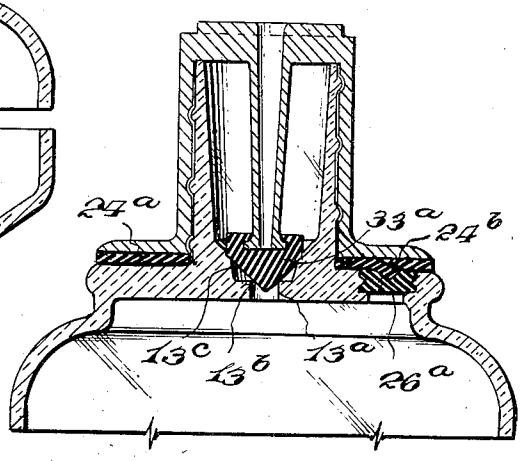
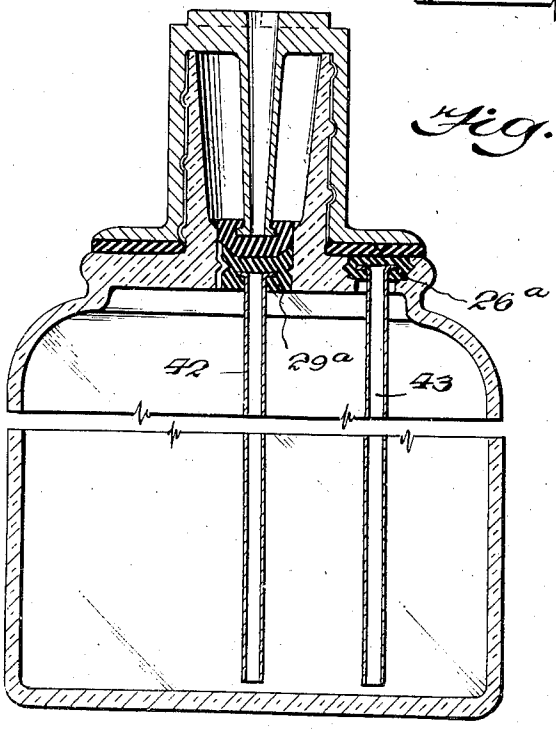


Fig. 7



Inventor
C. M. De Woody,

Prevost & Prevost
Attorneys

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CONTAINER FOR ASEPTIC FILLING AND DISPENSING OF STERILE LIQUIDS

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Fig. 8

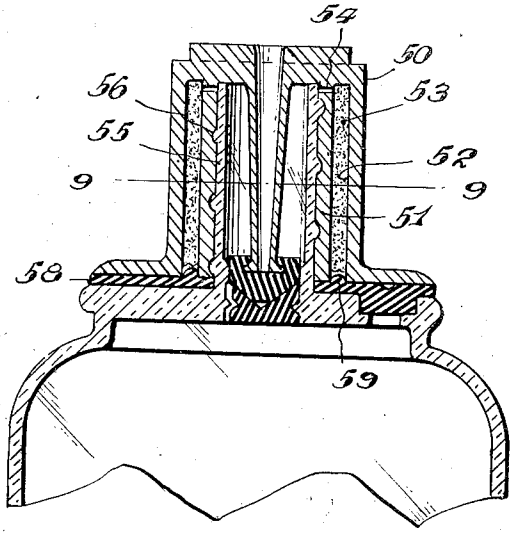
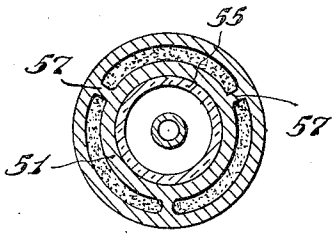


Fig. 9



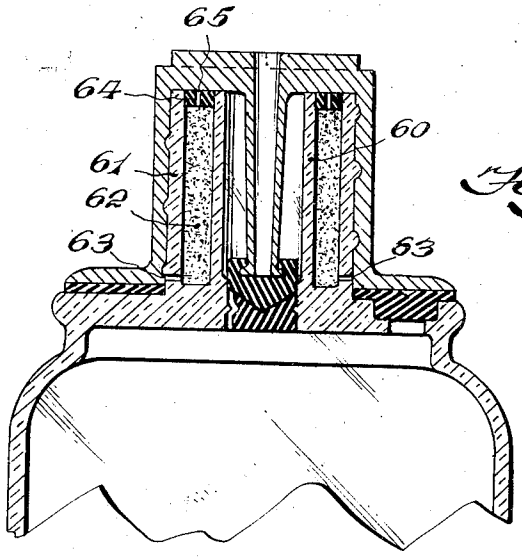


Fig. 10

Inventor
C. M. De Woody,

By Prevost & Prevost
Attorneys

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UNITED STATES PATENT OFFICE

2,388,634

CONTAINER FOR ASEPTIC FILLING AND DISPENSING OF STERILE LIQUIDS

Charles M. De Woody, Vineland, N. J., assignor to Ace Glass Incorporated, Vineland, N. J., a corporation of New Jersey

Application December 7, 1944, Serial No. 567,094

13 Claims. (Cl. 128—272)

This invention relates to a container for aseptic filling and dispensing of sterile liquids, and more particularly to novel closures for such containers.

Many types of closures have been used for containers of sterile liquids. However, those fluids which are not adaptable to heat sterilization present special problems. Containers for such materials or fluids must be sterilized before filling and maintained sterile. Strict aseptic manipulation must be observed throughout, particularly with those fluids which are intended for human consumption either by mouth or by injection.

Heretofore, containers for such purposes have been proposed and used to some extent but they have disadvantages. The primary object of the present invention is to provide a container adapted particularly for use with fluids which are not heat sterilizable, that is, fluids which would decompose, congeal, etc. under the influence of sterilizing heat, and one which eliminates the objectionable features of the devices heretofore proposed.

With the foregoing object outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a vertical sectional view of a container in accordance with the invention.

Fig. 2 is a top plan view with the cap removed.

Fig. 3 is a top plan view of the cap.

Fig. 4 is a perspective view of a washer or gasket employed in the construction shown in Fig. 1.

Fig. 5 is a view similar to Fig. 1 but illustrating a modification.

Fig. 6 is a vertical sectional view of the top portion of a container and illustrating another modification.

Fig. 7 is a view like Fig. 1 of another embodiment of the invention.

Fig. 8 is a vertical sectional view of the upper portion of a container having a double walled cap.

Fig. 9 is a horizontal sectional view taken on the line 9—9 of Fig. 8.

Fig. 10 is a view similar to Fig. 8 but showing a container with a double walled neck.

Referring to the embodiment illustrated in Figs. 1 to 4, inclusive, 11 designates the body of a container made of glass or any other suitable material, provided at its upper end with a top 12 having a center hole 13 and an off center hole 14, the latter being preferably counter-bored. Rising from the top is a neck 15 having at the exterior thereof a coarse pitched screw thread 16.

17 designates a cap of plastics or other suitable material, having a top 18 at one end and an external flange 19 at the other. A substantially cylindrical portion 20 of the cap is provided with an internal screw thread 21 corresponding with the thread 16 and engaging the latter with a loose fit so that air can travel between the neck of the bottle and the cylindrical wall of the cap when the latter is elevated relatively to the container. The cap terminates in a hexagonal portion 22 to facilitate turning of the same, and the cap flange has an orifice 23 designed to register with the hole 14 when the cap is in a certain position relatively to the container.

24 designates a resilient washer of rubber or the like, having a central hole 25 for the reception of the neck of the bottle, and also provided at one side with a plug 26 designed to fit in the hole 14 of the container. A tongue and groove joint 27 may be provided between the plug and the wall of the hole 14 for sealing purposes, and the washer has an indication or indentation 28 immediately above the center of the plug, serving as a guide for the insertion of a hypodermic needle or the like.

The hole 13 is closed substantially by a second plug 29 secured in position by a tongue and groove joint 30, and this plug has an air vent 31. The plug 29 is also preferably formed of rubber or the like and has a cavity 32 in the top thereof for the reception of a frusto-conical stopper 33 formed of resilient material, such as rubber, and grasping an annular flange 34 at the lower end of a tubulature 35 which depends from the top 18 of the cap and is provided with a tapered bore 36.

When the parts are in the positions shown in Fig. 1, an annular crown cap 37 may be employed to interlock the flange of the cap with an annular bead 38 at the top of the bottle.

Before filling the bottle, the screw cap 17 is loosely engaged on the neck of the bottle so that the stopper 33 does not contact the bottle above the plug 29, leaving the air vent 31 open. Similarly, there is no pressure upon the washer 24 so that slight pressure within the bottle will cause the plug or button 26 to rise to permit the escape of air from the container during filling. With the parts in loose engagement, the assembly is heat sterilized and is then ready for filling.

Filling is accomplished by means of a veinipuncture needle or other sterile device, inserted through stopper 33 and plug 29 via tubulature 35,

sterile air escaping through 31 and also through 14 in the event that 26 is made loosely fitting. When the filling operation is terminated, the needle is withdrawn and the screw cap tightened, pressing together stopper 33 and plug 29 to seal off the air vent 31. Because of the resiliency and wedging action of 33 and 29, the needle perforations are satisfactorily sealed in tightening the screw cap. In the tightening operation, the hole 23 in the flange of the cap moves out of registration with the hole 14 and therefore the flange will bear upon the resilient washer to effectively seal the hole 14. Afterwards, as a precautionary measure, a crown cap 37, of conventional design with the center removed, may then be slipped over the neck of the bottle and tightened over the cap flange 19 to prevent unscrewing of the cap.

In dispensing the sterile liquid within the container, the crown cap is removed and the screw cap loosened until the hole 23 in the cap flange is centered above the plug 26. A sterile dispensing needle is then inserted at indentation 28 through the washer and plug 26. The unscrewing of the cap causes the stopper 33 to be lifted free of plug 29, and the constricted portion of the center neck of the container, thus removing the obstruction from vent 31, which now acts as an air inlet.

By virtue of the high resiliency of the parts 29 and 33, the holes punctured in them by the filling device remain closed so that the air which is admitted into the bottle must follow the less resistant path along the loosely fitting screw threads and so into the container.

Instead of making the container in the usual manner with a flat bottom, I may provide it with an inclined bottom portion 40 (Fig. 5) so the liquid level will be along the line 41 in this figure when the bottle is resting on the portion 40. With this arrangement a positive liquid head is provided at the beginning of the dispensing, so that the dispensing line may be filled by a self-starting syphon action, thus making the usual inverting of the bottle unnecessary. This pressure head may be varied by changing the distance between plugs 26 and 29.

In the embodiment illustrated in Fig. 6 the hole 13*a* is counter-bored so as to provide an annular edge 13*b* designed to contact with the conical face 13*c* of the stopper 13*a*. With this construction the plug 29 is eliminated and a single plug or stopper serves the same purpose. Also in this embodiment the plug or button 26*a* is shown as a part separate from the washer 24*a* but serving the same purpose as the combined washer and button ensemble. In this construction the washer has a depending nipple 24*b* projecting into a cavity in the top of the button.

If desired, tubes 42, 43 may be connected to either one or both of the plugs 29*a* and 26*a*, as illustrated in Fig. 7. These tubes need not be straight as shown, but may be bent to reach any point in the interior of the bottle, and may be used either as vent or delivery tubes.

In the embodiment illustrated in Figs. 8 and 9, the cap 50 has an outer wall and base flange similar to the caps in the other figures, but in addition has an inner wall 51 arranged parallel to and spaced from the outer wall by an annular chamber 52 for the reception of filtering material 53. Near the upper end, the chamber is adapted to communicate by means of ports 54, in the inner wall, with the interior of the bottle neck 55. Here also the inner wall of the cap and the neck have coarse screw threads, as indicated at 56 and these threads are in tight engagement so that no air travels between the bottle neck and the inner wall 51. Near the lower end of the cap the walls may be connected by spaced partitions 57 (Fig. 9). The washer 58 in this form of the invention may be provided with an annular top bead 59 designed to enter the lower end of the chamber 52 for sealing purposes. It will be obvious that when the cap is partially unscrewed to move the ports 54 to a higher elevation than the top of the bottle neck, air may travel through 53 and 54 and beneath the base flange of the cap either into or out of the bottle during filling and discharging.

In Fig. 10, instead of using a double wall cap, I provide the bottle neck with an inner wall 60 and an outer wall 61, spaced apart to provide an annular chamber for the reception of filtering material 62. In this case the outer wall is provided near its lower end with ports 63 for the entrance of air into the filtering chamber or for the exit of air therefrom. A resilient gasket 64 having air ports 65 forms a cover for the upper end of the filter chamber. In this modification, when the cap is raised slightly air may travel through 63, 65 and the filter chamber and beneath the base flange of the cap in filling or emptying the receptacle.

While I have disclosed what I now consider to be some preferred embodiments of the invention in such manner that the same may be readily understood by those skilled in the art, I am aware that changes may be made in the details without departing from the spirit of the invention as expressed in the appended claims.

What I claim and desire to be secured by Letters Patent is:

1. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member.

2. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, the threaded engagement between the cap and neck being sufficiently loose to permit air to travel betwen them, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for

the central opening including a stopper carried by said tubular member.

3. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, a closure for the central opening including a stopper carried by said tubular member, and an annular cap securing the base flange to the top of the receptacle.

4. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, said washer and plug being formed of puncturable material.

5. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member, said closure being of puncturable material.

6. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, a second plug of resilient puncturable material closing the central opening and provided with an air vent, and a puncturable stopper carried by the tubular member and cooperating with the second plug in closing the central opening.

7. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, an annular washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member.

8. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, the washer and plug being formed of puncturable material and the washer having indicating means in its top immediately above the central portion of the plug, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member.

9. A receptacle of the character described having a top provided with a central opening and an off-center opening, the receptacle having a bottom provided with a supporting surface arranged at an obtuse angle to the vertical center of the receptacle, a neck extending upwardly from the top and provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member.

10. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having inner and outer walls spaced apart to provide a chamber for filtering material, the inner wall having threaded engagement with said neck, the cap also having a passageway to place said chamber in communication with the interior of the neck, a base flange united with the outer wall and extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally

closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member.

11. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having inner and outer walls spaced apart to provide a chamber for filtering material, the inner wall having threaded engagement with said neck, the cap also having a passageway to place said chamber in communication with the interior of the neck, a base flange united with the outer wall and extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, a closure for the central opening including a stopper carried by said tubular member, and an annular bead provided on the washer and extending upwardly into said annular chamber.

12. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with a screw thread, a cap having inner and outer walls spaced apart to provide a chamber for filtering material, the inner wall having threaded engagement with said neck, the cap also having a passageway to place said chamber in communication with the interior of the neck, a base flange united with the outer wall and extending over said off-center opening, said flange having an opening designed to register with said off-center opening when the cap is in a predetermined position, a washer arranged between said flange and the top of the receptacle and provided with a plug normally closing said off-center opening and adapted to be held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, a closure for the central opening including a stopper carried by said tubular member, and spaced partitions connecting said walls near the base flange of the cap.

13. A receptacle of the character described having a top provided with a central opening and an off-center opening, a neck extending upwardly from the top and provided with inner and outer walls spaced apart to provide a substantially annular chamber adapted to contain filtering material, means near the lower end of the outer wall to permit entrance of air into and exit of air from the chamber, removable means closing the top of the chamber and provided with an air vent, said outer wall being provided with a screw thread, a cap having threaded engagement with said screw thread and provided with a base flange extending over said off-center opening, said flange having an orifice designed to register with said off-center opening when the cap is in a predetermined position, a washer of puncturable material arranged between said flange and the top of the receptacle and provided with a puncturable plug normally closing said off-center opening, said plug being held in closed position by the flange, a tubular member connected to the cap and extending into the bottle neck, and a closure for the central opening including a stopper carried by said tubular member.

CHARLES M. DE WOODY.