Jan. 13, 1959 A. B. NELSON 2,868,246

SELF-CLOSING FUNNEL FOR BOTTLES, JARS AND THE LIKE

Filed Sept. 4, 1956

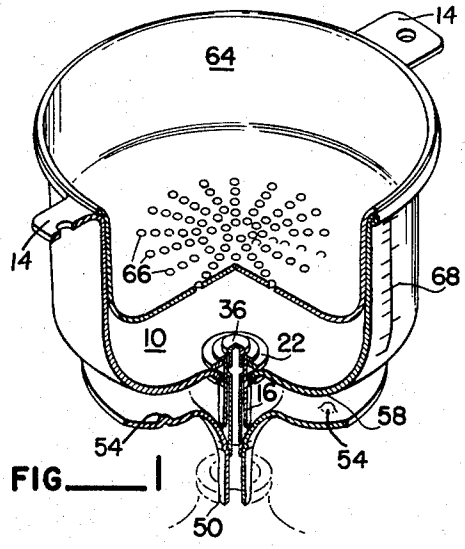


FIG. 1

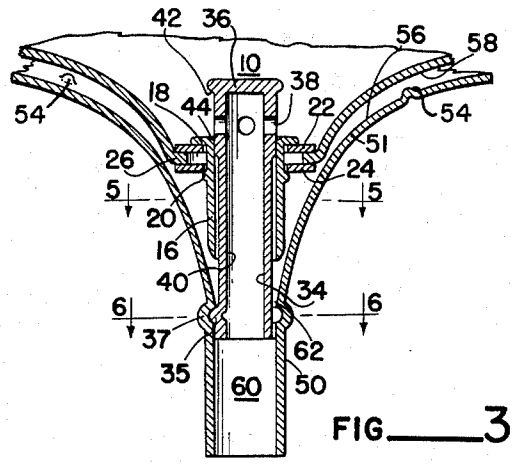


FIG. 3

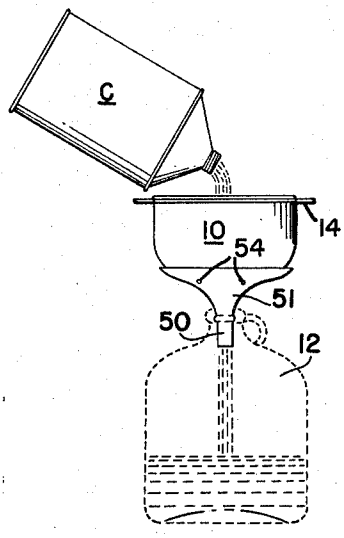


FIG. 4

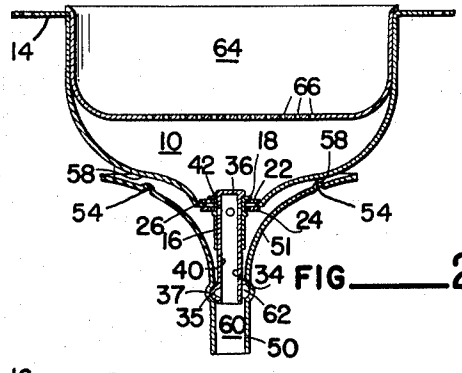


FIG. 2

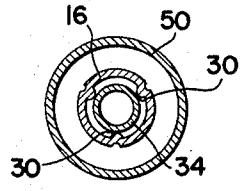


FIG. 5

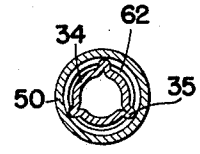


FIG. 6

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SELF-CLOSING FUNNEL FOR BOTTLES, JARS AND THE LIKE

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4 Claims. (Cl. 141—286)

This present invention relates to the general class of funnels used in directing liquids into small-mouthed containers, and more particularly this invention relates to the specific class of invention wherein the funnel is provided with valving means which is held open by resting the entire device on the bottle being filled with liquid and then, by raising the body of the funnel, gravity seats the shutoff valve, and the funnel with its contents may be lifted off the bottle without spillage.

In the past many attempts have been made to improve on the ordinary funnel, especially funnels for use in filling small-mouthed bottles and jars. In the past one of the great problems has been to be able to quickly fill a bottle and then shut the flow off without overfilling the bottle or running liquid over the mouth of the bottle or jar. The need for a funnel of this order has led to many attempts to solve this specific problem, and a number of these devices have been studied. However, those observed have been so constructed that they were not certain in operation and many times were of such a structure as to be easily stopped, especially in the closing of a valve when a small amount of solid matter came between the carefully fitted parts of the device. This problem was particularly aggravated in the handling of milk, where butter fat tends to cling to the tubular portions of any filling device and then, unless the device is particularly adapted for this service, it soon loses its certainty of operation.

In my present device I have provided a valve which is gravity-operated during the closing cycle and which is mechanically operated to open same and start the filling operation. In my present funnel arrangement special means are provided to insure that minimum interference with the operation of the device from any solids, greases or butter fat that may be contained in the liquids passing through the device. As a result I have produced a funnel arrangement which makes the filling of bottles, for instance, a very easily effected precision operation, while at the same time making it possible to fill bottles much more rapidly than has heretofore been possible with any of the equipment I have been able to observe.

A principal object of this present invention, therefore, is to provide a valved funnel arrangement in which the essential parts are provided with ample tolerances to insure the free working of the device under most all operational conditions and at the same time provide a unit that, because of its liberal tolerances, can be made quite inexpensively and thus sold to the using personnel at a reasonable price.

A further object of my invention is to provide a funnel that will permit of precisely filling bottles, jars and the like to a predetermined level.

A further object of my invention is to provide a valved funnel so arranged as to admit of very fast handling with the minimum of care and attention from the operator.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a perspective view showing a funnel made after the teachings of my present invention, the same being broken away in part and sectioned to better illustrate the structure.

Figure 2 is a vertical cross-sectional view taken by passing a plane through the vertical axis of the funnel and showing the same with the valve in its closed position.

Figure 3 is an enlarged vertical sectional view showing a portion of the funnel neck as in Figure 2, but with the parts in the position occupied when the funnel is dispensing liquids.

Figure 4 is an elevational view showing my funnel in use.

Figure 5 is a cross-sectional view taken along the line 5—5 of Figure 3.

Figure 6 is a cross sectional view taken along the lines 6—6 of Figure 3.

Referring more particularly to the disclosure in the drawings, the numeral **10** designates the main bowl portion of my funnel. This should be of a size to normally accommodate sufficient liquid to fill the usual bottle with which this equipment is to be used. In some instances this would not be practical, and such an example is shown in Figure 4, in which a gallon sized glass bottle **12** is being filled, and naturally it would be both unwieldy and too large for convenient storage if the funnel arrangement were made large enough to hold, say, a full gallon. Secured to bowl **10** is a convenient handle **14**, and at its lower portion, where the bowl **10** is brought in as in a more or less conventional funnel, a spoutlike ferrule **16** is fixedly secured in place. In the present showing the ferrule is provided with an exterior flange **18** and a spaced-apart bead **20**. Bead **20** is preferably formed on a heading machine and thus very snugly engages the two washers **22** and **24** in fixed relationship on the flange portion **26** formed at the lower extremity of the bowl **10**. For a portion equal to one-half or one-third of the length of spout member **16** the interior bore is cylindrical and the balance of the bore is provided with a plurality of inwardly extending ribs as **30** for purposes which will be explained later.

Disposed for limited reciprocation within bushing **16** is valve member **34**. This member is generally tubular in form and is provided, however, with a solid head portion as **36**. Near the head portion a plurality of liquid-passing openings **38** are provided so that this member, when in the position shown in Figure 3, will pass liquid through the plurality of openings **38** where it will flow downwardly through the interior bore **40** into the vessel or bottle being filled.

On both sides of the openings **38**, which are preferably disposed annularly around tubular member **34**, the outer surface of tube **34** is cylindrical in form so that it will form a close tolerance fit with the interior bore of bushing **16**. This is for the purpose of providing an adequate shutoff valve which to this extent is acting as a piston valve. It will be noted that the upper cap portion of the valve member is peripherally beveled as at **42** as a poppet valve, and this is adapted to seat in a similarly beveled portion **44** formed on the upper flange of member **16**. It will be noted, particularly from a study of Figure 5, that the lower portion of the interior bore of bushing **16** is longitudinally ribbed as by ribs **30**. This is to provide additional clearance between the valve member and the bushing member **16**, and thus any coatings of butterfat and the like, which is so prevalent in milk and other dairy products, will have a space where they can collect and still not build up to a degree to

interfere with the working of the valve arrangement, provided, of course, that the funnel is well cleaned and sterilized after each period of use.

At its lower end the tubular valve member **34** is provided with a plurality of outwardly extending detents **35**, and these detents, of which there are preferably three, are adapted to seat in an annular groove **37** formed in the outer spout member **50**. This arrangement tends to fixedly secure the valve member **34** to the exterior spout member **50** and thus an exterior element is available to cause the functioning of the valve proper under any normal conditions of use. The exterior spout member **50** is belled at its upper end at **51** so as to avoid contact with the various portions of the bowl **10**, its cylindrical spout **16** and the washer **24** secured to the bottom portion of bowl **10**. If the funnel is to be used only on narrow-necked bottles, then the belled portion **51**, as indicated, is sufficient. However, in many cases it is desirable to fill wide-mouthed jars such as fruit jars and the like, and for this purpose inwardly directed detents or spacing means **54** are provided, preferably die formed, from the sheet metal stock of the belled portion **51** of exterior spout member **50**. These spacers will prevent the deformation of belled portion **51**, when bowl **10** is filled with liquid, from making intimate contact between the surface **56** and the outer surface as **58** of the bowl **10**. In so doing a very ample air escape path is provided.

In filling bottles, particularly, air must escape in direct proportion as the amount of liquid poured into the bottle, and a pathway must be provided for the same when, as in the construction shown, the flared portion **51** of the exterior nozzle **50** will tend to form a seal with the mouth of the bottle or jar and prevent the escape of air. To overcome this the passageway **40** of the valve member is kept considerably smaller in cross-sectional area than the bore **60** of the exterior spout member **50**, and in this way air can find its way up bore **60**, passing between the detents **35** and out between surfaces **56** and **58**.

As a precaution to prevent any large curds or fruit particles or the like passing into and clogging the valve mechanism, a removable stainer **64** is provided, in which the bottom is pierced with a large number of small openings **66**. This strainer is preferably made to fit snugly within the upper portion of bowl **10** so that it can be used very conveniently and will store conveniently with the funnel itself. In keeping with many devices of this order, graduation marks are provided as at **68**, which will show on the interior surface of bowl **10** and indicate the number of cups of liquid measure in the bowl.

In Figure 4 one manner of using this device is shown in which the funnel itself is merely seated within the neck of bottle **12** and holds itself there by its tapered form, so that the user can employ both hands to handle a container as C while pouring into the funnel and finally having the liquid pass into a vessel **12**. This is a secondary use of the equipment, as normally it will be held by handle **14** and the liquid for entry into small bottles will be wholly contained within bowl **10** and will be periodically replenished.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of self-closing funnel.

Having thus disclosed the invention, I claim:

1. A self-closing funnel for bottles, jars and the like, comprising: a bowl-shaped body having a full diameter open top and a bottom having a relatively small discharge opening, a cylindrical ferrule, forming an interior spout, secured in said discharge opening, in axial alignment with said bowl, having an interior cylindrical bore in its upper end and a lower bore portion having a plurality of inwardly directed, longitudinally extending ribs, a valve member adapted for limited reciprocation within said ferrule and having a tubular form and asolid head closing the upper end and providing an outwardly extending valve flange, a plurality of openings in the wall of said valve member near its closed end, a bevel-seated valve surface formed on said valve flange and a coacting beveled valve seat formed in the upper end of said ferrule, an outer spout, having a belled upper end, secured to said valve member and in generally spaced relationship therefrom for the purpose of providing an air passageway, a flanged extension for the upper end of said outer spout and disposed in spaced relationship to the bottom of the funnel body, spacing means adapted to provide an air passageway between said outer spout and the bottom of the funnel body adjacent it, said outer spout having a bore with a cross-sectional area substantially larger than the cross-sectional area of the bore of said valve member, and a strainer adapted to fit into the upper portion of the funnel body.

2. A self-closing funnel for bottles, jars and the like, comprising: a bowl-shaped body having a full diameter open top and a bottom having a relatively small discharge opening, a cylindrical ferrule, forming an interior spout, secured in said discharge opening, and having a bore in axial alignment with said bowl, a valve member adapted for limited reciprocation within said ferrule and having a tubular form and a solid head closing the upper end and providing an outwardly extending valve flange, an opening in the wall of said valve member near its closed end disposed to pass fluid when the valve is in its upper position, an outer spout, having a belled upper end, secured to the lower end of the lower end of said valve member and in generally spaced relationship therefrom for the purpose of providing an air passageway, a flanged extension for the upper end of said outer spout and having a contour similar to the bottom of the funnel body, spacing means adapted to provide an air passageway between said outer spout and the bottom of the funnel body adjacent it, said outer spout having a bore with a cross-sectional area substantially larger than the cross-sectional area of the bore of said valve member.

3. A self-closing funnel for bottles, jars and the like, comprising: a body having a full diameter open top and a bottom having a relatively small discharge opening, a cylindrical ferrule, forming an interior spout, secured in said discharge opening, in axial alignment with said bowl, and having an interior cylindrical bore in its upper end and inwardly extending spacing ribs in its lower end, a valve member adapted for limited reciprocation within said ferrule and having a tubular form and a solid head closing the upper end and providing an outwardly extending flange, said valve having an interior bore of uniform diameter and an outer surface of two diameters the larger at its upper end, means for spacing the valve member away from said ferrule interior surface except at its upper end, a plurality of openings in the wall of said valve member near its closed end, a valve surface formed on said valve and a coacting valve seat formed in the upper end of said ferrule, an outer spout, having a belled upper end, secured to said valve member and in generally spaced relationship therefrom for the purpose of providing an air passageway, spacing means disposed between said outer spout and the bottom of the funnel body adjacent it, adapted to provide a displaced air passageway, said outer spout having a bore with a cross-sectional area substantially larger than the cross-sectional area of the bore of said valve member.

4. A self-closing funnel for bottles, jars and the like, comprising: a bowl-shaped body having an open top and a bottom having a relatively small discharge opening, a tube, forming an interior spout, secured in said discharge opening, and having an interior cylindrical bore in its upper end, a narrow flange formed in said bowl, encircling said discharge opening and disposed at right angles to the vertical axis of said bowl, two coacting, spaced washers secured in clamping relationship on opposite sides of said flange by an exterior flange and a spaced apart bead formed on said tube, said bead being

machine formed to provide adequate clamping pressure on said washers, a valve member adapted for limited reciprocation within said tube and having a tubular form and a closed head at its upper end and providing an outwardly extending valve flange, a plurality of openings in the wall of said valve member near its closed end, a bevel-seated valve surface formed on said valve flange and a coacting beveled valve seat formed in the upper end of said tube, an outer spout, secured to said valve member and in generally spaced relationship therefrom for the purpose of providing an air passageway, spacing means adapted to provide an air passageway between

said outer spout and the bottom of the funnel body adjacent it, and said outer spout having a bore with a cross-sectional area substantially larger than the cross-sectional area of the bore of said valve member.

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