July 24, 1962 E. G. AKERS 3,045,880

CLOSURE WITH SPOUT SECURABLE IN NON-USE POSITION

Filed July 6, 1959

FIG. 1.

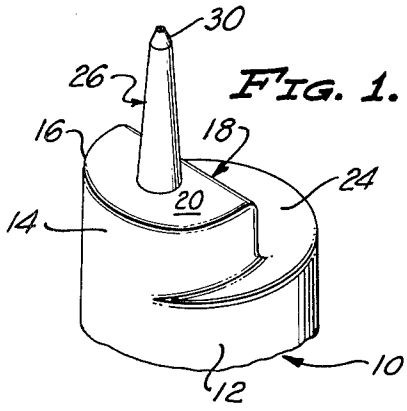


FIG. 2.

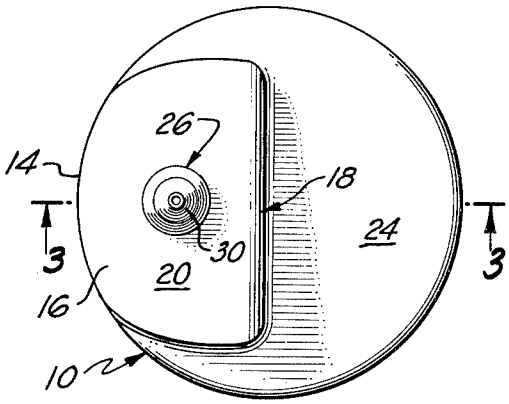


FIG. 3.

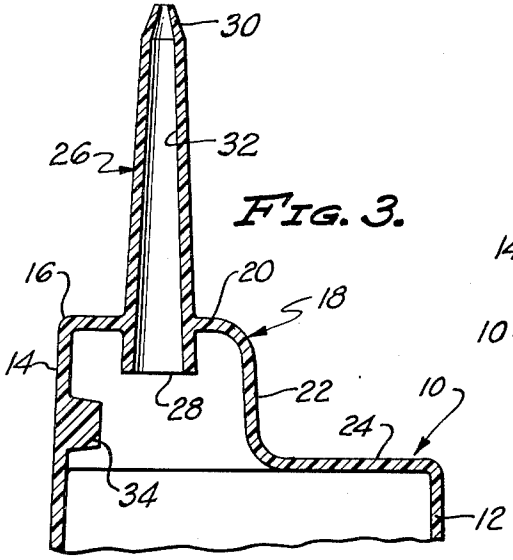


FIG. 4.

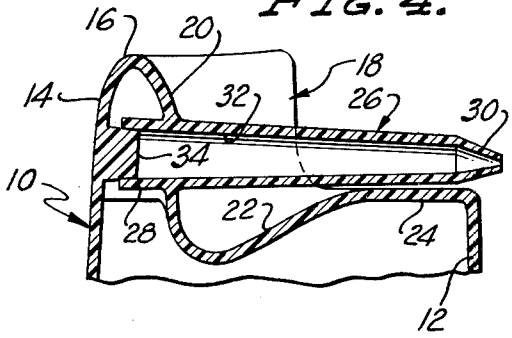


FIG. 5.

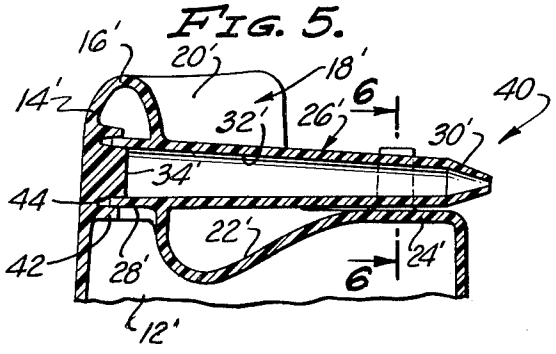
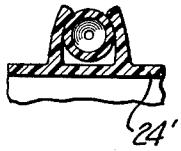


FIG. 6



INVENTOR.
EDWARD G. AKERS
BY Edward D. O'Brien
ATTORNEY

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3,045,880

CLOSURE WITH SPOUT SECURABLE IN NON-USE POSITION

Edward G. Akers, 7652 Coolgrove Ave., Downey, Calif., assignor, by mesne assignments, of thirty-two and one-third percent to Woodrow S. Wilson, thirty-two and one-third percent to Edward G. Akers, thirty-two and one-third percent to Dell M. Malick, and three percent to Edward D. O'Brian

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This invention relates to new and improved closures.

Although an extremely large number of different types of closures are known there exists at the present time a very definite commercial need for closures capable of being easily opened and closed possessing greater cost and utilitarian desirability than known, existing structures. In this field cost is of primary importance since any new closures developed must be sold in competition with a number of more or less related prior structures.

A number of factors enter into the cost of a closure. One of these is size. Because of the comparatively high cost of the materials employed in most closures it is normally desired to provide closures which are as small and hence, as light in weight as conveniently possible. Also it is normally desired to provide closures which are comparatively small so that they can be used without difficulty to replace prior lids, caps and the like used on existing metal containers. In certain commercial fields, such as in the marketing of oil, lighter fluid and the like, such lids and caps are practically always of a comparatively small size.

From the aforegoing it will be seen that there is a need for small, inexpensive closures. To be acceptable in present markets such closures must include an elongated spout which can be conveniently opened for use in dispensing various materials. There is a corresponding need for closures in which such a spout can be moved to a closed position in which it does not interfere with stacking or shipping. Further, because of cost considerations there is a need for closures of the general category indicated above which can be formed of one piece instead of two or more pieces.

A broad object of the present invention is to provide new and improved closures meeting these needs. A more specific object of the present invention is to provide low cost, small sized closures which can be easily and conveniently formed in a single operation by known injection molding techniques. A still further object of the present invention is to provide closures which include as an integral part of them an elongated pouring spout capable of being moved from a closed, substantially flat position to an open, extended position or vice versa. Another object of this invention is to provide structures of this category in which means are provided for forming a seal with respect to the pouring spout, which means are also capable of holding the spout in a fixed, closed position, so as to avoid the use of separate "hold down" or latch means.

These and many other objects and advantages of this invention will be fully apparent to those skilled in the art to which this invention pertains from a detailed consideration of the remainder of this description, including the appended claims and the accompanying drawing in which:

FIG. 1 is a perspective view of a closure of this invention in an open position;

FIG. 2 is a top plan view of this closure in this position;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 2;

FIG. 4 is a view similar to FIG. 3 showing this closure in a closed or sealed configuration;

FIG. 5 is a view similar to FIG. 4 of a modified closure of this invention; and

FIG. 6 is a cross-sectional view taken at line 6—6 of FIG. 5.

The accompanying drawing is primarily intended so as to clearly illustrate several presently preferred forms or embodiments of this invention. Those skilled in the art to which this invention pertains will realize that the particular closures illustrated may be changed or modified in accordance with routine design and development skill without departing from the type of action embodied in these closures.

As an aid to understanding this invention it can be stated in essentially summary form that it concerns closures, each of which includes a peripheral or edge portion holding an upstanding rear wall of a relatively rigid character. Between this wall and the peripheral portion in a closure of this invention there is provided a flexible diaphragm carrying an elongated, relatively rigid spout so that this spout, in an open position, is spaced from this wall. This rear wall is provided with a plug resembling a common cork which is adapted to fit within the spout when the spout is moved or rotated to a closed position so as to form a seal with the interior of the spout and so as to hold this spout in this closed position. These various parts are, in a closure of this invention, formed integrally with one another.

The actual nature of this invention is best more fully explained by referring directly to the accompanying drawing. In FIG. 1 there is shown a closure **10** of this invention formed as an integral unit out of known thermoplastic materials such as polyethylene, polypropylene, various vinyl resins or the like by known injection molding techniques. This closure **10** includes a peripheral skirt **12** having sufficient thickness so as to be of a relatively rigid character. If desired, the skirt **12** may be formed integrally with a container such as a bottle, a tube or the like or may be formed so as to include a snap bead, threads or the like so that the entire closure **10** may be attached to a can or other type of container in a known, established manner. From the skirt **12** there projects an upstanding, moon-shaped, curved back wall **14**. The wall **14** is also preferably sufficiently thick so as to be of a relatively rigid character. A curved upper edge **16** of the wall **14** is attached to a diaphragm **18** of sufficiently thin wall section so as to be of a flexible, deformable character. This diaphragm **18** consists of a top **20** of generally a half moon shape and an attached front wall **22**. The wall **22** is attached to a top **24** of the closure **10** which is secured to the skirt **12** and to the ends of the wall **14**.

An elongated spout **26** is secured to the top **22** between the edge **16** and the front wall **22** in such a manner that this spout **26** has ends **28** and **30** located on opposite sides of the top **20**. Preferably the spout **26** has a sufficient wall thickness so as to be relatively rigid and is tapered as indicated in FIG. 3 so that a passage **32** extending through it is of larger dimension adjacent to the end **28** than adjacent to the end **30**. If desired, this end **30** may be pointed slightly as shown in the drawing so as to facilitate the use of the spout **26** in dispensing lighter fluid or the like.

With this construction the entire closure **10** may be closed by the simple expedient of moving or rotating the spout **26** from the open position shown in FIG. 3 of the drawing to the closed position shown in FIG. 4. During such rotation a small plug **34** resembling a common bottle stopper and having a tapered exterior wall corresponding to the internal shape of the passage **32** adjacent to the end **28** will gradually be forced within this

end 28. When the spout 26 has been rotated to the closed position shown in FIG. 4 in effect, the plug 34 is forced within the end 28 of this spout 26 so as to securely form a seal within the interior of the passage 32 and so as to firmly engage the spout 26 so as to hold the spout 26 in this closed position. From this description it will be realized that friction between the plug 34 and the spout 26 is used in both forming a seal and in holding the spout 26 in a closed position.

It will also be realized that with this type of construction the plug 34 serves two separate and distinct functions. One of these is that the plug 34 forms a seal. The other one of these functions is that the plug in effect serves as a latch securing the spout 26 against movement. Thus, the use of the plug 34 eliminates the necessity for using with the closure 10 separate latch or holding parts which would otherwise have to be formed upon or used with this closure. Such separate parts require related closures to be of comparatively large physical dimensions.

This latter is quite important as far as the utilitarian value of closures as herein described is concerned. Closures, such as the closure 10, are primarily intended to be used with containers for lighter fluid, oil and the like where the sizes of these closures are critical. Since both the holding and sealing functions are performed in the same area in the closure 10, closures of this type can easily be formed of a comparatively small size for such uses. As an example of this a closure, such as the closure 10, can be manufactured so as to have a diameter of less than one inch.

Further, such a closure can have a spout, such as the spout 26, formed of virtually any desired length so that such a spout in an open position is sufficiently long to be conveniently used and so that such a spout in a closed position projects from the remainder of the closure itself so that it can be conveniently engaged by the hand of an individual in being moved or flipped into an open position. From an examination of the drawing it will be realized that in such an open position a spout, such as the spout 26, extends generally parallel to a wall, such as the wall 14, while in a closed position it is located at substantially a right angle to this wall and is held by the rigidity of it.

In FIG. 5 there is shown a modified closure 40 of the present invention which is similar to the closure 10 previously described. For convenience of explanation those parts of the closure 40 which are identical, or substantially identical, to corresponding parts of the closure 10 are not separately described and are indicated in the drawing and in the specification by the primes of the numerals previously employed.

The closure 40 differs from the closure 10 by adding to it a small annular flange 42 extending from the wall 14 around the plug 34' so as to describe an annular channel 44 between it and the plug 34'. This channel 44 is of a shape corresponding to the shape of the exterior of the end 28' of the spout 26' and provides an additional element to hold the spout 26' in a closed position by friction as indicated in FIG. 5 and to form a seal around the exterior of this spout 26'.

It is not normally considered necessary, but if desired, the closure 40 may be provided with small parallel arms 46 extending from the top 24' which are adapted to resiliently engage the spout 26' so as to hold it in the closed position indicated. Such arms 46 are, of course, of a sufficiently resilient character so as to snap around the spout 26' when this spout is being moved to or away from the closed position shown.

It will be realized from the aforegoing that the present invention provides closures which can be easily and conveniently manufactured at a low cost by known injection molding techniques so as to be of unitary character, which closures differ from prior related closures because they can be formed of a comparatively small size enabling them to be used in markets where such prior related closures could not be satisfactorily used. Because of the nature of this invention it is to be considered as being limited only by the appended claims forming a part of this disclosure.

This application is an improvement of the prior copending applications Serial No. 630,398, filed December 24, 1956, entitled Combined Spout and Closure Structure, now U.S. Patent No. 2,893,611, and Serial No. 631,944, filed December 31, 1956, entitled Combined Pouring Spout and Closure Structures, now U.S. Patent No. 2,893,612.

I claim:

1. A closure which includes: a rigid peripheral skirt; a rigid, upstanding back wall attached to said skirt so as to extend therefrom; a flexible diaphragm attached to the edges of said wall remote from said skirt and to said skirt so as to cover said peripheral portion; a rigid spout held by said diaphragm so as to extend therefrom, said spout being spaced from said wall and said peripheral portion in an open position and including ends located on opposite sides of said diaphragm, said spout having a tapered passage formed therein extending between said ends, said passage being larger at the end of said spout adjacent to said wall than at the other end of said spout; a plug having a tapered exterior wall corresponding to the dimensions of said end of said spout adjacent to said wall mounted on said wall so as to extend therefrom toward said diaphragm and toward said end of said spout, said spout being capable of being moved from a normal open position in which said passage is open between the sides of said diaphragm to a closed position extending generally along said skirt, said plug fitting within said passage in said closed position so as to form a seal with the interior of said passage and so as to hold said spout against movement.

2. A closure as defined in claim 1 including an annular flange located around said plug, said flange being separated from said plug by an annular channel corresponding to the shape of said end of said spout adjacent to said wall, said flange fitting against said spout when said spout is in said closed position so as to form a seal around the exterior of said spout and so as to hold said spout against movement.

3. A closure which includes: a peripheral skirt; a relatively rigid upstanding back wall attached to said skirt so as to extend therefrom; a flexible diaphragm attached to the edges of said back wall remote from said skirt and to said skirt so as to enclose an extremity of said peripheral skirt; a rigid spout held by said diaphragm so as to extend therefrom, said spout being spaced from said back wall and said skirt in an open position and including ends exposed on opposite sides of said diaphragm, said spout having a passage formed therein extending between said ends; combined sealing and holding means located on said back wall adjacent to an end of said spout, said combined sealing and holding means, at least part of said means being capable of fitting within the adjacent end of said spout in a closed position of said spout, said spout being capable of being moved from a normal open position in which said passage is open between the sides of said diaphragm to a closed position extending generally across said skirt, said part of said means fitting within said passage in said closed position so as to form a seal with respect to said passage and so as to hold said spout against movement.

4. A closure as defined in claim 3 wherein said combined holding and sealing means comprises a single plug having a tapered exterior wall corresponding to the dimensions of said end of said passage adjacent to said back wall.

5. A closure as defined in claim 3 wherein said plug means comprises a plug capable of fitting within said end of said passage in said closed position and an annular flange located so as to extend around said plug, said an-

nular flange fitting against the exterior of an end of said spout in said closed position so as to form a seal around the exterior of said spout.

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