

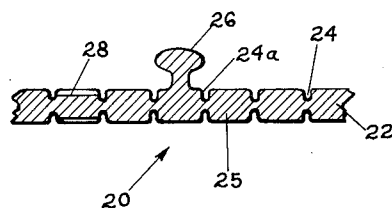
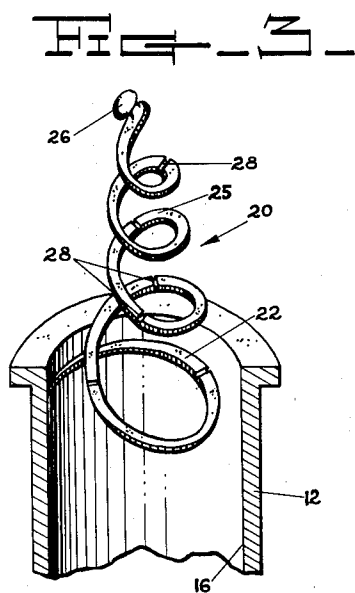
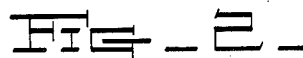
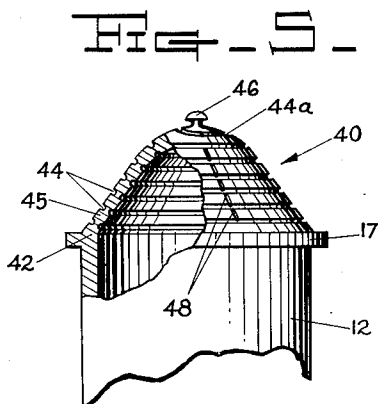
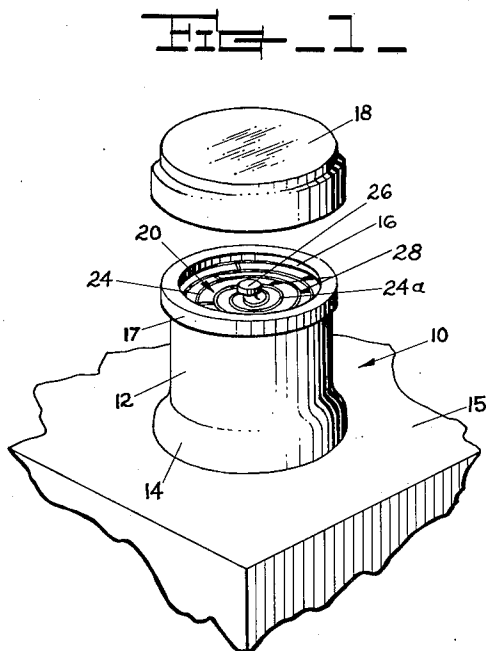
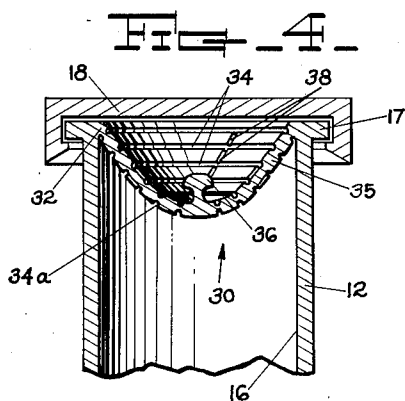
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3,034,680

CLOSURE

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3,034,680 CLOSURE

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This invention relates to closures and, more particularly, to a closure for a material storage device.

It is an object of the present invention to provide a tamper proof closure for material storage devices which will permanently insure against the accidental or unauthorized loss of contents from the container, and which will effectively prevent the entry of small particles, such as foreign matter, air, gas, and liquid material into and out of the interior of the material storage device.

Still an additional object of the present invention is to provide a frangible type closure for various types of material storage devices which can be conveniently opened without special tools or equipment, will not leak, and which can be selectively controlled to provide an opening of any desired size.

A more specific object of the present invention is to provide a closure of the above type which is of generally conical configuration and opened from the apex portion thereof to define a completely self contained pouring spout with the remaining portions of the closure.

Another specific object of the present invention is to provide a closure of the aforementioned type in the form of a wall having at least a single convoluted score line defining a spiral strip which is frangible from the wall along such score line, and which is further provided with means for withdrawing at least the innermost convolution of the spiral strip outwardly from the plane of the wall to any desired extent, thus enabling the size of the resulting opening to be of any desired size.

All of the foregoing and still further objects and advantages of this invention will become apparent from a study of the following specification, taken in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a perspective view of a material storage device embodying a closure made in accordance with one form of the present invention;

FIGURE 2 is an enlarged fragmentary cross sectional view of certain parts of the closure shown in FIGURE 1;

FIGURE 3 is a cross sectional perspective view illustrating the manner in which the convoluted spiral strip is removed from the material storage device to form the opening therethrough;

FIGURE 4 is a longitudinal cross sectional view of a modified form of closure; and

FIGURE 5 is a side elevational view, with parts broken away, of still another embodiment of the present invention.

Referring now to the drawing, and more particularly to FIGURES 1 to 3 thereof, a closure made in accordance with one form of the present invention is shown in operative association with a material storage device 10 having a fitting 12 with a base 14 connected to a wall 15 of a material storage container. This fitting 12 may be further provided with an annular flange 17 for detachably supporting a suitable lid 18 that may serve as a replaceable cap for sealing the outlet opening 16 through the fitting 12 after the closure that is made in accordance with the present invention has been partially or completely removed, in the manner hereinafter more fully described.

In FIGURES 1 to 3 of the drawing, a closure 20 made in accordance with one form of the present invention is shown to include a substantially flat wall 22 which is preferably integrally formed, such as by molding, with the adjacent fitting or container portions. This wall 22 has at least one convoluted spiral groove 24 which defines

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a convoluted strip 25. For purposes of illustration, the closure wall of each embodiment of the present invention is shown to include a convoluted groove on each side of the wall surface, to further facilitate the opening of the closure during use. The innermost portion of the groove 24a forming the innermost convolution of the spiral strip 25, is preferably deeper than the remaining portion of the spiral groove, to facilitate the initial tearing of the convoluted strip from its parent wall material.

Means are also provided for facilitating the removal of the innermost convolution of the strip 25 during use. This means, as is shown in FIGURES 1 to 3 of the drawing, is in the form of a manually engageable detent 26 that projects outwardly from the surface of the wall 22. However, since the wall 22 is recessed slightly below the outermost end of the fitting 12, there is sufficient clearance between the wall 22 and the cap 18 to accommodate the extra height of the detent 26. It will thus be recognized that by exerting an outward pull upon the detent 26, the deeper groove portion 24a of the spiral strip will facilitate the severance of the innermost convolution from its next adjacent convolution to start the tearing of the convoluted strip from the wall assembly in a continuously outwardly spiraled direction, as shown in FIGURE 3. By exerting a continuous outward pull upon the convoluted strip, the entire wall 22 may be removed from the storage device 12, as the convoluted groove 24 extends outwardly to the inside surface of the outlet opening 16. However, to facilitate the construction of an outlet opening of any desired size, the spiral strip 25 formed by the groove 24 is provided with at least one and preferably a plurality of transversely extending score lines 28 along of which the strip 25 may be severed. Upon severing the strip along one of the score lines 28, the remaining portion 35 of the wall 22 carried by the material storage device defines a central opening of exactly the desired size.

As is clearly shown in FIGURE 2 of the drawing, the depth of the transversely extending score lines 28 is less than the depth of the adjacent portions of the spiral groove 24, thus tending to prevent accidental transverse tearing of the spiral strip 25 as it is being withdrawn from the material storage device as shown in FIGURE 3. As a result, the strip will continuously tend to tear along its convoluted groove, whereas severance of the strip along any one of its transversely extending score lines requires an additional amount of force.

Reference is now made to FIGURE 4 of the drawing which illustrates a slightly modified form of closure 30 which may be mounted upon a similar storage device 12 and integrally formed therewith in a manner hereinbefore described. This closure 30 includes an outwardly concave wall 32 having at least the single convoluted score line 34 defining a continuous convoluted strip 35. The innermost convolution 34a of the score line is deeper than the remaining portions thereof in order to facilitate the removal of the innermost convolution of the strip 35, in a manner hereinbefore described. A detent 36 projects upwardly from the surface of the wall 32 and is accommodated within the concavity thereof so as not to interfere with the application of a replaceable cap member 18. A plurality of longitudinally spaced apart and laterally extending score lines 38 facilitate the severance of the strip at any desired portion along its length as it is withdrawn from the center of the closure.

Reference is now made to FIGURE 5 of the drawing which illustrates still another form of the present invention in which the closure 40 is of generally conical configuration. The convoluted groove 44 which defines the convoluted strip 45, is deepest at its innermost convolution 44a, to facilitate the severance of the innermost convolution of the strip 45 by an outward pull upon the outwardly projecting detent 46. This strip 45 is also provided

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with a plurality of longitudinally spaced apart and transversely extending score lines 48 along of which the strip may be severed at any desired point, thus controlling the size of the opening formed centrally of the wall 42 as the strip is withdrawn from the wall from the center portion outwardly thereof.

While the closures made in accordance with the present invention are preferably constructed from a thermal plastic type of material, such as polyethylene, it will be appreciated that other types of material may be used for this purpose. Since all material will tend to tear along its weakest line, the convoluted grooves assure the proper and uniform tearing of the strip from the innermost to the outermost ends thereof. It will also be recognized that these closures may be used to form a complete or partial end wall of a receptacle, may be used as a closure for a pouring spout, or may be used with other types of containers, such as collapsible wall tubes, and the like. In the embodiment shown in FIGURE 5, the conical shape of the wall 42 defines a self contained pouring spout as the innermost convolutions of the tear strip are removed. As such, the particular closure member may be used to form a completely self contained vessel or receptacle for other types of packaging, storage, and decorative purposes where it is required to control the size of an opening through which material is to be passed.

While this invention has been described with particular reference to the construction shown in the drawing, it is to be understood that such is not to be construed as imparting limitations upon the invention, which is best defined by the claims appended hereto.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a storage device, a closure, and means detachably securing at least selected portions of said closure for selective removal relative to other portions of said closure and forming an opening to allow material flow therethrough, said closure comprising a marginally supported wall having at least a single convoluted score line defining a spiral strip, and means for withdrawing at least the innermost convolution of said spiral strip from said wall.

2. In a storage device as set forth in claim 1, wherein said withdrawing means comprises a detent projecting outwardly from the surface of said wall.

3. In a storage device as set forth in claim 2, wherein said score line extends partially through said wall, the innermost portion of said score line defining said innermost convolutions of said spiral strip being greater in depth than the remaining portions of said score lines.

4. In a storage device as set forth in claim 3, wherein said wall has a pair of score lines, one of said score lines being impressed on each side of said wall to define said spiral strip.

5. In a storage device as set forth in claim 1, wherein said wall is substantially flat.

6. In a storage device as set forth in claim 1, wherein said wall is of substantially hollow concave configuration, and further comprising a detent carried by said innermost convolution of said wall projecting outwardly in the

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same direction as the outermost periphery of said wall.

7. In a storage device as set forth in claim 1, wherein said wall is of substantially conical configuration defining an outwardly tapered pouring spout in response to removal of at least said innermost convolution thereof.

8. In a storage device, a closure, means detachably securing at least selected portions of said closure for selected removal to allow material flow therethrough, said closure comprising a wall having at least a single convoluted score line defining a spiral strip, means for withdrawing at least the innermost end of said spiral strip from said wall and other portions of said strip, and means for severing the withdrawn strip along the length thereof.

9. In a storage device as set forth in claim 8, wherein said securing means comprises at least a single transversely extending groove in said strip intermediate the innermost and outermost ends thereof.

10. In a storage device as set forth in claim 9, wherein the thickness of said strip adjacent to each transverse groove is greater than the thickness of said wall through said score line on each side of said strip in the vicinity of said groove.

11. In a storage device as set forth in claim 10, wherein said wall is substantially flat.

12. In a storage device as set forth in claim 10, wherein said wall is of substantially hollow conical configuration, and further comprising a detent carried by said innermost convolution projecting outwardly in the same direction as the outermost periphery of said wall.

13. In a storage device as set forth in claim 10, wherein said wall is of substantially conical configuration defining an outwardly tapered pouring spout in response to removal of at least said innermost convolution of said strip.

14. In a storage device, a closure, means detachably securing at least selected portions of said closure for selected removal to allow material flow through said closure, said closure comprising a wall having at least a single convoluted score line defining a spiral strip, means for withdrawing at least the innermost end of said spiral strip from said wall, said withdrawing means comprising a detent projecting outwardly from the surface of said wall, means for severing the withdrawn strip along a selected portion of the length thereof, said severing means comprising at least a single transversely extending groove in said strip intermediate the opposite extremity thereof, and the depth of each said transversely extending groove being shallower than the depth of each said convoluted score line of said wall, and the radially innermost terminal of said score line being of greater depth than the spirally outwardly spaced portions of said score line.

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