Oct. 31, 1944. T. BENZINGER 2,361,449

ARTICLE OF MANUFACTURE

Filed Feb. 24, 1940

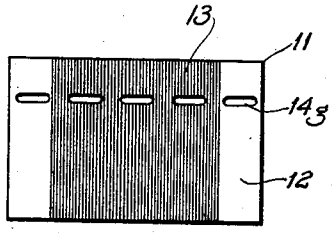


Fig. 2

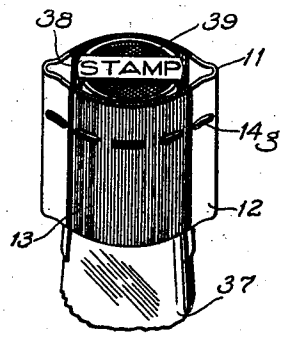


Fig. 3

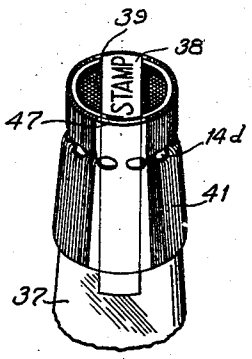
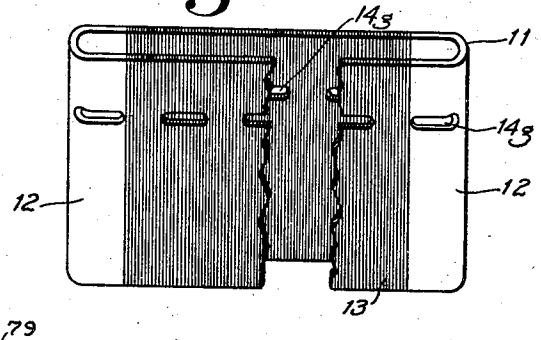


Fig. 4

Fig. 1



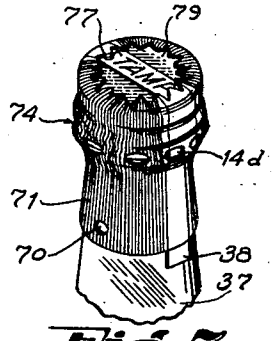
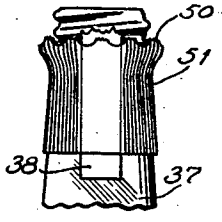


Fig. 7

Fig. 5



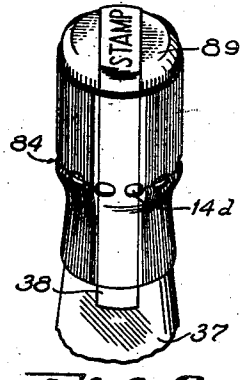


Fig. 8

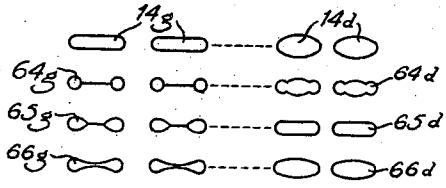


Fig. 6

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UNITED STATES PATENT OFFICE

2,361,449

ARTICLE OF MANUFACTURE

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Application February 24, 1940, Serial No. 320,617

5 Claims. (Cl. 215—38)

This invention relates to shrinkable, non-fibrous secondary closure devices, especially regenerated cellulose and like bands adapted, upon shrinking, to tightly fit over and satisfactorily seal the primary closure to a bottle. More particularly it appertains to bands suited for easy removal (without the aid of any instrument) from bottle tops and their primary closures.

Shrinkable, non-fibrous secondary closures such as thimble-shaped caps and tube-shaped bands for bottles have been known and used for years. The bands are cheaper to manufacture and allow all or a part of the top of the primary closure to be exposed. They provide an attractive decoration to the container, a deterrent against tampering with the contents thereof, and when suitably pigmented, an effective background for printed matter (advertising, etc.).

To seal a bottle the band in gel (hydrated) form, is placed over the bottle top (the primary closure being in place) and allowed to dry. The well known shrinkage which accompanies the drying of (loss of water from) gel regenerated cellulose results in the dry band fitting into extremely firm engagement with the bottle neck and primary closure.

Due to their non-fibrous character, the dried pellicles are extremely tough (in some cases being almost of a horny nature). It is almost never possible to puncture them with a finger-nail, and due to the tight engagement between the pellicles and the bottles it is difficult to find a place where they can be grasped in order to pull them off.

A still further difficulty in shrunk cellulosic closure removal is found in the specific use of these bands in the distilled alcoholic liquor field. In some cases the law requires, that part of the government stamp remain on the bottle until the contents are consumed. These stamps do not adhere well to the bottle in the first place, and since the bottles are frequently handled with wet hands during and after the original opening, it is very difficult to ensure compliance with the aforementioned regulation. In consequence, reliance has come to be placed on shrunken cellulosic bands to guarantee that a lower end of the stamp remain on the bottle. This in turn has raised the problem of easily removing only so much of the band as is necessary to gain access to the contents of the bottle, and leaving enough of the band in position to retain the stamp in place.

Various solutions of the problem set out above have heretofore been proposed, but up to the present time no scheme or arrangement has been developed which solved the problems satisfactorily from a cost standpoint.

Most of the heretofore proposed schemes for easy removal which involved special configurations for the band have been unsatisfactory since they give rise to "dry splitting" or other defects which militate against the useful life of the band.

By "dry splitting," as used in this art, is meant the splitting or tearing of the band during storage or handling. These bands when dried have internal strains and have a tearing grain running lengthwise. While it is difficult to start a tear, once a tear is started it will proceed very easily (much as happens with a crack in a piece of glass). A nick or other sharp deviation from a straight line in the edge of a band is known to be a common cause of "dry splitting."

This invention has for an object the provision of a non-fibrous, shrinkable, pellicular, secondary closure, capable of being tightly shrunk into contact with a bottle top and its primary closure, and capable of having its top portion readily and easily removed, after such shrinkage, without detriment to the portion remaining on the bottle neck. Another object was to provide a regenerated cellulose secondary closure band which could easily be removed after being shrunk into position by drying. Another object was to provide a non-fibrous, shrinkable, pellicular cellulosic bottle closure capable of being shrunk into close contact with a bottle top without splitting, and capable, in its dry, shrunk state, of being readily removed without the use of any implement. Another object was to provide a regenerated cellulosic band capable of being shrunk over a bottle top and its primary closure to tightly seal the same, and capable of being torn by hand to permit separation of the bottle and primary closure (to permit access to the bottle contents) without the aid of any external device, and without disturbing a revenue stamp retaining portion. A still further object was to provide a cellulosic band closure capable of satisfactorily and efficiently performing its intended function up to the moment of willful removal, and capable of being easily torn away as a whole or in part, when desired. A general advance in the art, and other objects which will appear hereinafter, are also contemplated.

It has now been found that if a line or series of slots (rounded end oblong perforations) lying end-to-end be made around a gel band, that the objects of the present invention are accomplished, and that the difficulties of the prior art and the previous proposals, are overcome.

From the following description, in which is disclosed certain embodiments of the invention as well as details of what is believed to be the best mode for carrying out the invention, it will be apparent how the foregoing objects and related ends are accomplished.

The written description is amplified by the accompanying drawing, in which:

Figure 1 is a perspective view of a secondary closure (in gel form) of the present invention. In this view certain dimensions of the secondary

closure are exaggerated to more clearly bring out its features;

Figure 2 is an elevation view of a secondary closure of the present invention (in gel condition) ready to be placed in position on a bottle top;

Figure 3 is a perspective view of a bottle top and its primary closure, having the gel secondary closure of Figure 2 in position thereon;

Figure 4 is a perspective view of a bottle top and its primary closure sealed with a secondary closure of Figure 2. In this figure the secondary closure is shrunk into position over the bottle top and its primary closure. The primary closure is of the stopper type, and a revenue stamp is shown underneath the secondary closure;

Figure 5 is an elevation view of the bottle top shown in Figure 4 after removal of the primary closure and the top part of the secondary closure and revenue stamp;

Figure 6 is an outline view showing the form taken by perforations of various shapes upon drying. The gel shape is shown at the left of the dotted lines, and the dry shape at the right;

Figure 7 is an elevation view of a bottle having a metal primary closure (screw cap) and a secondary closure. In this view the upper edge of the secondary closure is serrated to provide tabs (for grasping with the fingers); and

Figure 8 is an elevation view of a bottle having a long skirted molded screw cap primary closure and a secondary closure of the type shown in Figure 1.

Similar characters refer to similar parts throughout the drawing.

Referring now to the drawing, 11 indicates a gel regenerated cellulose band such as that shown in Figures 1, 2 and 3. The band in Figure 1 is shown with a part broken away to better illustrate its shape. The same band, after drying and shrinking on a bottle, is shown at 41 in Figure 4. The band has transparent and opaque sections indicated at 12 and 13, respectively. A series of perforations 14—*g* lie end-to-end around the gel band near one end thereof. Each perforation changes shape upon drying, assuming the shape shown at 14—*d* in Figure 6.

A bottle 37 bearing a revenue stamp 38 over its neck and primary closure (in this case a wood topped cork) 39 is shown in Figure 3. The line of perforations in the gel band is positioned at the junction of the wood stopper 39 and the bottle top. The top 47 of the band may be flush with, or above or below, the top of the primary closure after drying, as desired. As shown in Figure 4, it is flush. In Figure 7 it is above, and in Figure 8, below.

The intended manner of utilizing the present invention is to hold the bottle in one hand while twisting the bottle closure with the other hand, or vice versa, or both. As a result of such an action, the band is severed along the line of perforations.

A recent type of primary bottle closure designed for more convenient handling is illustrated at 89 in Figure 8. This primary closure, which for convenience may be called a long-skirted cap, is usually manufactured in molded plastic, and is threaded to be screwed on to the bottle top. A common length for such caps is $1\frac{3}{16}$ inches. The embodiment illustrated had an outside bottom diameter of 1¼ inches. The dried band 81 may be severed along the line of perforations 84 by twisting the parts above and below the line of perforations in opposite directions. As a result the component parts of the secondary closure retain portions of the revenue stamp both on the cap and on the bottle.

A metal screw cap primary bottle closure 79, having thereover a shrunken band 71, is shown in Figure 7. The row of perforations is shown at 74. Twisting the band apart at the line of perforations causes part of the band to remain on the bottle, as shown at 51 in Figure 5. This portion of the band maintains part of the revenue stamp 38 on the bottle. The portion of the band remaining on the cap (primary closure) may be left on or removed, as desired. The torn edge of the band 51 is shown at 50.

The secondary closures may have an ornate edge or edges if desired, and such an embodiment having 5 to 7 serrations per inch is illustrated at 77 in Figure 7.

If a circular hole about $\frac{3}{16}$ inch in diameter, such as that illustrated at 70 (Figure 7), is placed about ⅛ inch from the edge of the secondary closure band, it will afford a means of removing the entire band from the bottle top. By placing the finger-nail in this hole and scraping it along the bottle toward the near edge of the band, the intervening portion of the band is easily torn to provide a tab which can be taken between the fingers and pulled to tear the band as desired.

Example I

A regenerated cellulose gel band (cast from viscose) having a flat width of 50 millimeters, was perforated with a series of "rounded end oblong" perforations lying end-to-end around the band and near one edge thereof. Such a band is illustrated in Figure 1. The perforations in the gel band were $\frac{5}{16}$ inch in length with an intervening space of $\frac{3}{32}$ inch, and were 0.044 inch wide.

The band was slipped over and about the top of a suitable size liquor bottle, closed with a molded screw cap and sealed with a revenue stamp. The band was positioned so that the line of perforations was on the junction between the edge of the cap and the neck of the bottle. The resulting package was set aside to dry, whereupon the band shrank and snugly fitted the container. The perforations became elliptical or oval-shaped upon drying. Such an oval shape is illustrated in Figure 6. It was found that such a band endured handling and storage well, and even though the humidity at times became low, there was no "dry splitting." It was found, also, that the seal could be broken by twisting the cap (the primary closure) in the usual manner with the hand while holding the bottle stationary. The upper portions of the band came away with the cap while the lower portion remained on the bottle, safeguarding the ends of the revenue stamp. The retained portion is illustrated in Figure 5. The torn edge of the lower portion of the band being below the pouring edge of the bottle did not interfere with the removal of the contents thereof.

Example II

A regenerated cellulose gel band having a flat width of 100 millimeters was perforated with a series of perforations composed of rounded end oblongs lying end-to-end around the band and lying near one edge thereof. The perforations were $\frac{5}{16}$ inch in length with an intervening space of $\frac{3}{32}$ inch, and were 0.044 inch wide. The band having this design of perforation was applied to a bottle in the same manner as described in Ex-

ample I, and gave the same results upon drying. The dried band is illustrated in Figure 4.

Example III

A regenerated cellulose gel band having a flat width of 30 millimeters was perforated with a series of perforations composed of rounded end oblongs. The perforations were arranged end-to-end around the band and near one edge thereof. They were $\frac{5}{16}$ inch in length, and the cut-outs were 0.044 inch in width. An intervening space of $\frac{3}{32}$ inch was allowed between the perforations. The band having this design of perforation was applied to a bottle in the manner described in Example I, and gave similar results.

Example IV

A regenerated cellulose gel band having a flat width of 54 millimeters was perforated with a series of perforations of the type illustrated in Figure 1. The perforations were ¼ inch in length with an intervening space of $\frac{5}{32}$ inch. The perforations were 0.044 inch in width at the widest part. The band was slipped over a suitably sized liquor bottle closed with a long-skirted, molded screw cap and carrying a revenue stamp. The band shrank and dried snugly around the neck of the bottle and primary closure in the manner illustrated in Figure 8.

A long-skirted screw cap provides a better grip so that more force may be applied in breaking the band along the line of perforation. It follows that bands designed for this type of cap need not be perforated to the usual extent, and this in turn gives added insurance against "dry splitting." In order that adequate resistance to the twisting force applied to the primary closure may be furnished, it is necessary that the portion of the gel band below the line of perforation should be of sufficient area to well engage or satisfactorily grip the bottle neck.

Other designs for perforations in the wet, unshrunken gel band which have been found to be fairly satisfactory are illustrated in Figure 6. They comprise round holes joined by a slit, tear drop cut-outs joined by a slit and hour-glass-shaped perforations lying lengthwise around the band. The individual gel perforations are shown at 64—*g*, 65—*g* and 66—*g*, respectively. The corresponding dry perforations are indicated at 64—*d*, 65—*d* and 66—*d*.

The invention is satisfactorily used with various kinds of primary bottle and like container closures. Corks, wood-topped stoppers, molded plastic screw caps and metallic screw caps are the type most commonly encountered. The secondary closures of the present invention operate very satisfactorily with each of these types.

The bands may be formed of materials other than regenerated cellulose, for example, cellulose esters and ethers. While the non-fibrous cellulosic pellicles are the most common type, in some instances pellicular bands formed of non-cellulosic materials such as gelatin, casein and the like, may be used. Lowly etherified (up to one mol of substitution per glucose unit of the cellulose), alkyl and hydroxy alkyl celluloses such as low substituted ethyl (and methyl) cellulose and low substituted glycol cellulose, are quite satisfactory. The same is true of cellulose acetate.

For convenience the invention has been described in terms of bands and perforations of particular sizes. Deviation from these sizes is permissible, depending upon such variables as the particular substance of which the band is made, the thickness of the band, the probable humidities to which the package will be exposed, the amount of leverage afforded by the particular primary closure, the size of the band with respect to the size of the bottle, etc.

In general, for a gel regenerated cellulose band in the neighborhood of 0.017 of an inch in thickness, a perforation of ¼ inch to ⅝ inch in long dimension, with an intervening space of $\frac{1}{16}$ inch to ⅛ inch, is preferred. Such a band has a thickness of approximately 0.004 to 0.005 inch in the dry state. Perforations of the rounded end oblong style ⅛ by ⅜ inch with corresponding spacing, have been used.

It has been convenient to describe the invention in terms of secondary closures for bottles containing distilled liquor, but it is to be understood that the invention is equally applicable to many other types of packages presenting the same or related problems.

Although the bands may be manufactured by various procedures, they are usually made by cutting short sections from continuous lengths of regenerated cellulose tubes. The manufacture of such tubes is described in detail in U. S. A. Patent No. 2,141,776 (Vautier and Fays). The cutting of such tubes into bands is described in U. S. A. Patent No. 1,647,489.

The most convenient way of perforating the bands is to punch through two thicknesses of the same while it is in flat or collapsed condition.

The bands may be suitably decorated by pigmentation and printing. Typical procedures are described in U. S. A. Patents Nos. 2,141,744 (Evans) and 1,997,769 (Fletcher).

The primary purpose of this invention was to design a secondary closure band which could be opened by twisting, and the specific description was made on that basis, but it should be noted that the line of perforations in a dried band of this invention will also serve as a tear line. A row of circular holes will not serve as a tear line. With the bands of this invention a tear can be made from one edge to the line of perforations and continued circumferentially around that line. For example, one can take hold of one of the serration tabs at the top of the band of Figure 7, and by pulling it, easily start a tear that can be continued down to the line 74, and if the tear is then directed around the neck of the bottle, it will continue along the aforementioned line 74 (or any other tear line present in the band), with the result that access to the contents of the bottle is easily gained and the lower portion of the government stamp is still firmly secured to the bottle by means of that portion of the band below the line of tear. Similarly, by breaking out a tab from the hole 70, as previously described, a tear may be made up to the line of perforations.

With the present invention the band may be ruptured near the junction of the bottle and its primary closure by means of a twist, as in the usual act of unscrewing the primary closure. As a result, access to the contents of the bottle is simple and easy. Perforations of the design and dimensions described above are resistant to "dry splitting" during storage and handling. A portion of the band remains in place to provide a safeguard in retaining a portion of the revenue stamp as long as desired. An important advantage of the present invention lies in the fact that the perforation of the gel band adds only

slightly to the cost thereof. Furthermore, the perforations of the secondary closure being of pleasing and regular design and neatly arranged around the band, add to the attractiveness thereof.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that this invention is not limited to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. In combination, a container having an open top with a closure therefor, and an open tube of regenerated cellulose disposed on the container, said tube overlying the adjoining portions of the container and its closure, and having a ring of oblong perforations lying end-to-end thereabout.

2. The combination comprising a bottle, a primary closure therefor, and a secondary closure comprising a dry tough regenerated cellulose pellicular sleeve occupying a position about adjacent portions of the bottle and its primary closure, the sleeve being maintained in position by being tightly stretched in the manner resulting from being dried in said position, and a line of oval perforations extending end-to-end around the said sleeve near the junction of the bottle and primary closure.

3. The combination comprising a bottle, a primary closure therefor and a secondary closure comprising a tough regenerated cellulose pellicular sleeve occupying a position about adjacent portions of the bottle and its primary closure, the sleeve being maintained in position by being tightly stretched in the manner resulting from being dried in said position, and having a ring of elongated perforations lying end-to-end about the sleeve at the junction of the bottle neck and primary closure.

4. A shrinkable secondary closure consisting of a band of gel regenerated cellulose having a circumferential line of perforations, said perforations being oblong in shape but having rounded ends and being positioned end-to-end in the line around the band, said perforations being $\frac{5}{16}$ inch in length, 0.044 of an inch wide, and spaced $\frac{3}{32}$ of an inch from each other.

5 The combination comprising a bottle, a primary closure therefor, and a secondary closure comprising a dry, tough regenerated cellulose pellicular sleeve occupying a position about adjacent portions of the bottle and its primary closure, the sleeve being maintained in position by being tightly stretched in the manner resulting from being dried in said position, and a line of oval perforations extending end-to-end around the said sleeve near the junction of the bottle and primary closure, the said perforations being of the shape resulting from drying a gel sleeve having rounded end oblong cutouts.

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