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SAFETY CLOSURE FOR CONTAINERS

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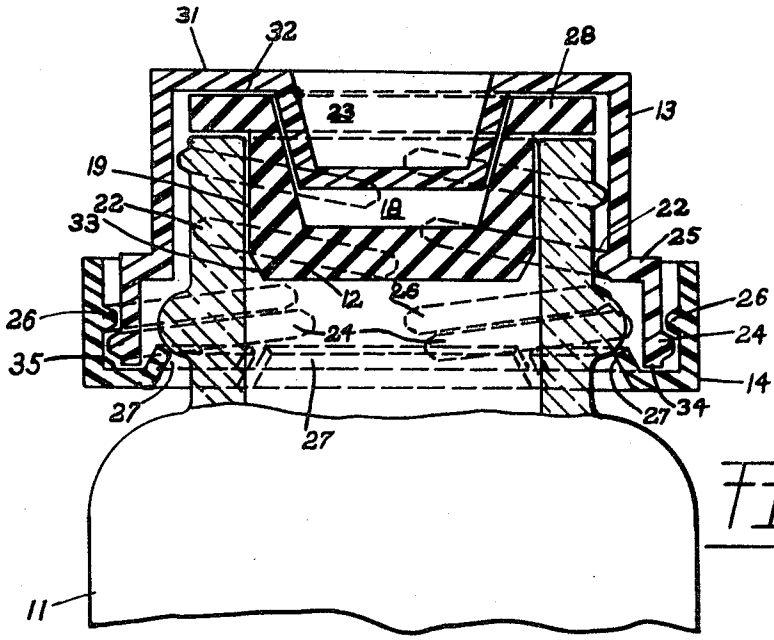


Fig. 1

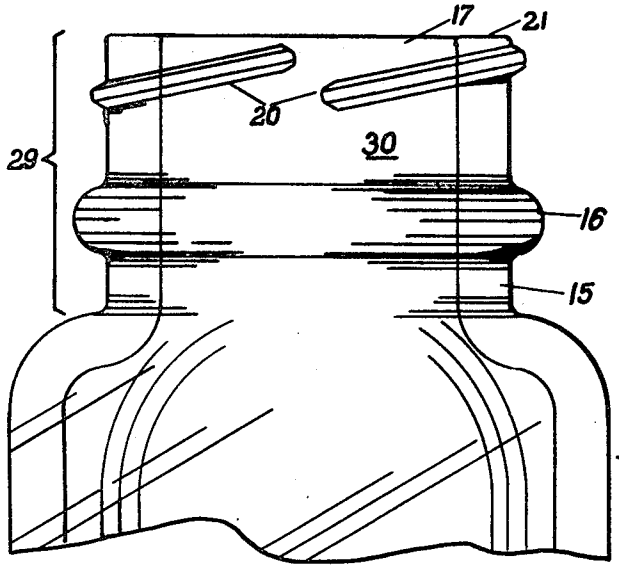


Fig. 2

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SAFETY CLOSURE FOR CONTAINERS

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ABSTRACT OF THE DISCLOSURE

This invention relates to new and useful improvements in tamperproof safety closures for containers, and more specifically to a closure device for containers, which may contain dangerous chemicals or drugs, and where it is desired to prevent children from removing the cap, or to prevent the removal of the closure by any person inadvertently. Closure caps have traditionally been provided with screw threads of various designs as a means of securing them upon the container. Although this in itself is sufficient to provide a tight seal on the container, it does not offer any safeguards against accidental removal. We believe we have overcome these prior deficiencies by employing a cap bearing opposite handed segments of screw threads. Internal thread segments are used to screw the cap onto the container neck which bears a particular design of thread segments. An external thread is used for fastening closure cap to a locking collar which is held captive upon container neck. This results in a unit capable of being rotated in either direction but cannot be removed endwise and without unlocking or losing its sealing action.

The principal object of the invention is to provide a device of the character herewithin described which, although is easily manipulable to engage and disengage the closure from the container and can be rotated in either direction when in locked position, it is nevertheless impossible to remove merely by rotating the unit.

Another object of the invention is to provide a device of the character herewithin described, which is eminently suitable for manufacture in either plastic or metal and adaptable for use on containers made of either glass, plastic or metal.

Another object of the invention is to provide a device of the character herewithin described, which is cheap and simple to manufacture and for which manufacturing procedures now available can be used.

Another object of the invention is to provide a device of the character herewithin described, which provides a closure for a container that would be effectively locked and made airtight and the opening of said container rendered a definite intentional act thereby eliminating a person, or persons, from using the contents unintentionally. Any random twisting applied, in either direction, to the closure unit would merely result in the device being rotated on the container neck.

A further object of the invention is to provide a device of the character herewithin described which is a locking closure made of durable materials of an indefinite life so as to encourage re-use.

A still further object of the invention is to provide a device of the character herewithin described which is compact and of a readily acceptable relative size to the container.

With the foregoing in view, and all those objects, purposes and advantages which may become apparent from consideration of this disclosure and specification, the present invention consists of the inventive concept embodied in the method, process, construction, arrangement of parts

or new use of same, as herein particularly exemplified in one or more specific embodiments of such concept, reference being had to the accompanying figures in which:

FIGURE 1 is a cross section of the closure device in a locked position on a container neck.

FIGURE 2 shows the upper portion of a container, in this case, a glass bottle such as is used for medical drugs.

Proceeding therefore to describe the invention in detail reference should first be made to FIGURE 1 which shows the embodiment of the invention.

Insert seal **12** which is made of a soft, resilient, nonporous material, such as plastic or rubber, has a flange **28** on its upper, outer perimeter which fits against the top of the container neck **21** and having a tapered recess **18** with an external cylindrical portion **19** with a chamfered lower edge **33** to facilitate its insertion into mouth **17** of container neck **29**.

Inherent with design of seal **12** is tapered recess **18** in top of said seal which permits easy withdrawal of said seal from container mouth **17**.

Cap **13** with tapered recess **23** in closure plate **31** mating with tapered recess **18** of seal **12** and with multiple thread segments **22** to mate with container neck multiple thread segments **20** and with an expanded cylindrical skirt **25**. The cylindrical portion of said skirt is of such depth and diameter as to completely enclose annular rim **16** and to permit the engagement of external multiple thread segments **24**, which are opposite handed to multiple thread segments **22**, with multiple thread segments **26** on interior of cylindrical wall of locking collar **14**. Following this engagement, bottom of cap skirt **34** will bind against inner upper face **35** of locking collar **14**. Cylindrical wall of locking collar **14** to be of such depth as to enclose expanded cylindrical skirt **25** and inner, upper face **35** of locking collar **14** butting against bottom edge **34** of skirt **25** on completion of engagement of said locking collar **14** to said skirt **25**. Retaining tabs **27** facing radially inward are angled upward. On assembly of locking collar **14** to base of container neck **15**, the inside diameter formed by retaining tabs **27** is pressed over annular rim **16**, retaining tabs **27** returning to a position of lesser diameter than the annular rim **16**, thereby holding locking collar **14** captive on container neck base **15** in that it cannot be removed axially but is still free to rotate.

FIGURE 2 illustrates the upper portion of a container, in this case, a glass bottle such as is used for medical drugs, and shows the container cylindrical neck **29** which is provided with an annular rim **16** formed externally upon the neck adjacent to the base **15** thereof and the clearance area **30** above said rim and below the multiple thread segments **20**.

To assemble closure unit and seal container, seal **12** is inserted, cylindrical portion **19** downwards, into mouth **17** of container neck until seal flange **28** rests on the top of container neck **21**. Cap **13** is then screwed downward onto neck of container **29** mating multiple thread segments **20** with multiple thread segments **22**, at which point recess **23** in closure plate **31** enters seal recess **18** in the top of seal **12** and continues in that motion until multiple thread segments **20** are no longer mating with multiple thread segments **22** permitting cap **13** to be rotated freely in area **30** adjacent to annular rim **16** with no further tightening action.

Locking collar **14** is then raised and screwed in an upward motion onto expanded cylindrical skirt **25** of cap **13** multiple thread segments **26** mating with multiple thread segments **24**, until bottom edge **34** of skirt **25** of closure cap **13** butts against inner, upper face **35** of locking collar **14**, that, which is enclosed by the cylindrical wall and retaining tabs **27**, thereby completing the locking action. As locking action is completed, retaining tabs **27** bear against annular rim **16** which pulls down on cap **13**

causing recess 23 to further enter seal recess 18 and to radially expand seal 12 against inner wall of container neck and to cause closure plate 31 to bear on seal flange 28 effecting a seal between container neck 21 and seal flange 28.

Two seals have now been effected, the first between seal 12 and inner wall of container neck caused by radial expansion of seal cylindrical portion 19 by cap recess 23 and, the second, by closure plate 31 bearing on seal flange 28 which is compressed between said plate and the top of container neck 21.

Since various modifications can be made to the invention herein described, within the scope of the inventive concept disclosed, it is not intended that protection of the said invention should be interpreted as restricted to the modification or modifications of known parts of such concept as have been described, defined or exemplified, since this disclosure is intended to explain the construction and operation of such concept and not for the purpose of limiting protection to any specific embodiment or details thereof.

What we claim is:

1. On a container with a cylindrically shaped neck and an annular rim adjacent to the base thereof, and having a multiplicity of external thread segments which permit a closure cap, provided with a multiplicity of internal thread segments which mate with the external segments, to screw and pass beyond said segments allowing closure cap to be rotated freely upon container neck in area between external thread segments and annular rim but will not permit its removal without unscrewing action and where said cap is also provided with a cylindrically expanded skirt which passes over and radially encloses annular rim of container neck and is of such depth as to allow its bottom edge to come into contact with and bind against the inner, upper face of the locking collar, that, which is enclosed by retaining tabs and cylindrical wall, upon completion of engagement of locking collar to closure cap, thereby performing the locking action, this also makes any undue tightening of closure cap against seal impossible, and where said skirt is provided with a multiplicity of external thread segments, which are opposite handed to internal thread segments in upper cylindrical portion of closure cap, for mating with multiple external thread segments of locking collar and where closure plate forming upper end closure of closure cap is provided with a conical flat-bottomed recess, which, when closure cap is screwed downward, the wall of said recess, protruding internally, contacts the wall of a conical flat-bottomed recess which is radially enclosed by the flange of the seal and effects radial expansion of said seal, thereby providing an additional seal to the compression seal effected by the conventional closure cap.

2. The container of claim 1 bears a locking collar which is held captive upon the container neck in an area enclosed by the annular rim and the body of the container by means of a multiplicity of radially inward facing retaining tabs, which, in addition, are also angled upwards, and are constricted to a diameter which is less than the diameter of the said annular rim but is, nevertheless, freely rotatable and axially retractable within that area so defined and where the interior wall of the cylindrical portion of the locking collar is provided with a multiplicity of internal thread segments for mating with the multiple external thread segments on the exterior wall of the cylindrically expanded skirt of the closure cap and where the cylindrical wall of the locking collar is of sufficient depth as to receive expanded skirt of closure cap which means that the screw action will terminate when bottom edge of skirt of closure cap butts against the inner, upper face of the locking collar thereby effectively locking closure cap against locking collar and where locking collar retaining tabs are of such arrangement as to permit locking collar to be assembled onto container by passing container neck, including annular rim, through inner diameter formed by retaining tabs, allowing these to be pushed back during passage of said annular rim when, on completion of passage, retaining tabs are constricted to a lesser diameter than that of annular rim thereby holding collar captive in area between annular rim and body of container and to prohibit removal of said collar without gross distortion.

3. The container of claim 1 having thread segments so arranged as to permit the closure cap to screw and pass beyond them into a free area and, when locking collar, which is held captive by retaining tabs being of a lesser diameter than the annular rim over which it has been passed, is assembled to it, the closure device can be rotated in either direction without unlocking and without deterioration of its sealing action.

References Cited

UNITED STATES PATENTS

2,960,247	11/1960	Christie	215—9
3,308,979	3/1967	Hailes	215—9

GEORGE T. HALL, Primary Examiner.