

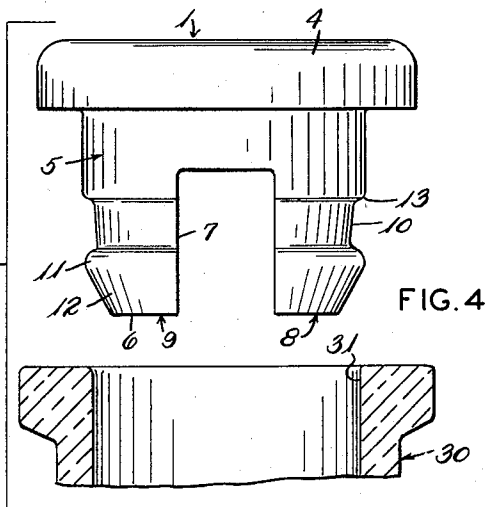
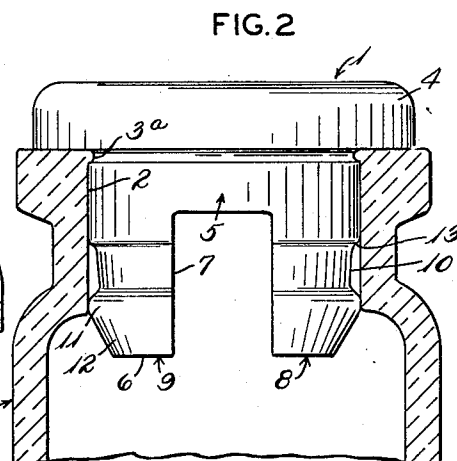
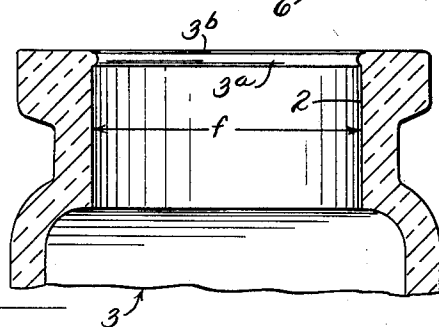
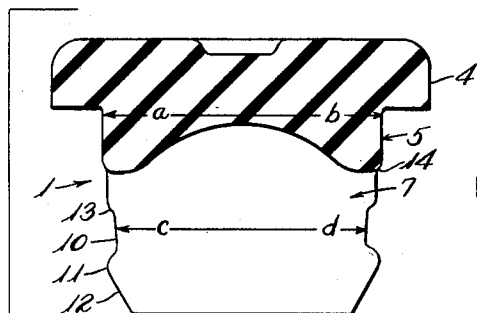
March 8, 1960

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2,927,709

BOTTLE STOPPLE

Filed July 7, 1959



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2,927,709

BOTTLE STOPPLE

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Application July 7, 1959, Serial No. 825,447

5 Claims. (Cl. 215—47)

This invention relates to stopples, or stoppers for articles such as glass bottles or other containers, as desired.

Heretofore there have been many different types of stopples provided for various containers and these stopples have had various constructions dependent upon the proposed uses thereof. In some uses, it is very desirable that stopples be engaged with bottles in non-sealing engagement therewith to allow uniform processing of materials received in the bottles and to provide for convenient, rapid sealing of the bottles after processing the bottle contents.

The general object of the present invention is to provide a novel and improved type of a stopple particularly characterized by a construction to give it a soft spring action when the leading end of the stopple engages a bottle neck or the like and to firmly grasp the bottle neck when in its first locating and inserted position in the bottle because of a rib adjacent the lower end of the stopple larger than the bottle opening.

Another object of the invention is to provide a stopple having a shoulder thereon to form an automatic stop in the initial insertion of a stopple into closure position to indicate to an operator when the stopple is in such predetermined position so that other operations can be performed on the bottle or its contents with the stopple inserted into a non-sealing engagement therewith.

A further object of the invention is to provide a bottle stopple with a cylindrical body section of larger diameter than the neck opening in a bottle with which the stopple will be used.

Another important object of the invention is to provide an effective immediate engagement between a bottle having a small radially inwardly protruding rib on the axially outer end of the bottle neck and a bottle stopple when initially inserted into such bottle neck and prior to sealing the bottle with the stopple.

Further objects of the invention are to provide a slotted end or other circumferential interruptions in the inner end of a bottle stopple and to have such slot or vent in the stopple available for ready flow of air to and from the container when the stopple is in its first inserted engagement position; to provide radiused corners for all possible junctures or corners of a bottle stopple to prevent any squeeze or rolling action of edge portions of the stopple as it is pressed into full engagement with a container; to provide a reduced diameter tapered inner end smaller than the opening into which the stopple is to be inserted; and to provide an attractive, low cost, easily used stopple for container closing action, and which stopple facilitates processing bottle contents with the stopple in uniform non-sealing engagement therewith.

Reference now is directed to the accompanying drawings, wherein:

Fig. 1 is an enlarged vertical section through a bottle stopple of the invention showing it in exploded association with a container, such as a glass bottle;

Fig. 2 is a fragmentary vertical section through the

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bottle of Fig. 1 and stopple when in their engaged position with the stopple being shown in elevation;

Fig. 3 is a reduced size elevation, partially broken away and shown in vertical section, of the bottle stopple when first engaged with a container and in a seated position in the container; and

Fig. 4 is an elevation of the uncompressed bottle stopple shown in association with a section of a bottle neck of a modified construction.

When referring to corresponding members shown in the specification and referred to in the drawings, corresponding numerals are used to facilitate comparison between the drawings and the specification.

The present invention in general relates to the combination of a container having a neck with a filling opening therein and a container neck stopple, the container neck stopple comprising a resilient member including a cylindrical body section having a flanged outer end forming a sealing body section and end flange for the stopple, said body section having an inner end with circumferential interruption such as a diametrically positioned axially extending slot extending thereinto from its inner end splitting it into two portions, the body section having a peripheral shoulder on the inner end portion thereof spaced from both ends of the body section and intermediate the ends of the slot, said peripheral shoulder being larger in diameter than the neck opening in said container to provide a stop for insert action of the body section prior to seating the body section in a sealed position, the slot being exposed for air flow therethrough when the shoulder initially engages said container neck, the split inner end of said body section being readily radially compressible to facilitate insertion into a bottle neck for closure action.

Particular attention now is directed to the details of the structure shown in the drawings, and a stopple of the invention is indicated as a whole by the numeral 1, and with such stopple being adapted to close or seal the opening in a container, such as the opening or bore 2 in the neck of a glass bottle 3. The stopple 1 is made from any suitable material, and usually is made from a compounded vulcanized natural or synthetic rubber material, or similar substance. Thus the stopple 1 has inherent resiliency and can be compressed, or distorted slightly to alter its shape as required for proper sealing action. The bottle 3 has a small radially inwardly extending rib 3a at the radially outer end or mouth of the neck opening or bore 2 thereof. Usually, a rounded outer end 3b is formed on the neck opening and the rib 3a smoothly blends therewith.

The stopple 1 preferably has a flange or head 4 extending from the outer end thereof and has a surface normal to the longitudinal axis of the stopple for positive sealing engagement with the outer edge of the neck of the bottle 3. The stopple 1 has a main body portion or section 5 protruding from the flange section thereof and with such body section 5 being cylindrical and of a diameter slightly larger than the diameter of the opening 2 in the article in which the stopple is to be positioned. Hence the body section 5, particularly adjacent the flange 4, is of sufficient size and length to effect a good seal for the bottle opening 2 when pressed home into final seated engagement therewith. At its axially inner end 6, the body section 5 has one or more circumferential interruptions or cut away sections therein that usually would be molded into the body portion or body section 5, and which comprises a longitudinally directed, axially positioned slot 7 extending across the diameter of such body section 5 so that two axially spaced portions 8 and 9 are provided at the inner end of the body section to make it readily compressible in a radial direction for

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facilitating engagement thereof with the opening 2 in the bottle 3.

In order to facilitate retention of the stopple 1 in engagement with the bottle 3 and obtain positive engagement of the stopple with the bottle when only partially inserted therein, a groove 10 is formed on the split inner end of the body section 5. As an important feature of the invention, such groove 10 provides, or forms a rib 11 on the axially inner end of the body section 5 of a larger diameter, when the body section 5 is uncompressed, than the inner diameter of the opening 2 in the bottle 3 so that the rib 11 temporarily will hold the stopple 1 in engagement with the bottle 3 when only a short axial length of the body section is inserted into the opening 2. The rib 11 being of larger diameter when uncompressed radially than the opening 2 has a definite resilient engagement with the rib 3a when the rib 3a is received in the groove 10 to retain the stopple in the bottle. The rib 11 connects to the axial inner end 6 of the body section 5 by an inwardly tapered or beveled section 12. The inner end 6 is smaller in diameter than the opening 2 to facilitate initial engagement of the stopple 1 therewith.

A further important feature of the present invention is that the stopple 1 has an automatic stop point provided when engaging the bottle 3 prior to full closure, or sealed engagement therewith. Thus a downwardly or inwardly directed shoulder 13 is provided on the body section 5 intermediate the axially outer end of the slot 7 and the axial inner end 6 of the body section 5. Such shoulder 13 is positioned axially outwardly of the rib 11, as best shown in Fig. 1 of the drawings, at the outer edge of the groove 10. The shoulder 13 has a diameter indicated by the line $a-b$ and such length $a-b$ is greater than the internal diameter of the opening 2, indicated by the line f , as the shoulder 12 is of the full size of the body section 5. The stopple 1 has sufficient resiliency and is of such design that when the split ends 8 and 9 of the body section 5 are engaged with the opening 2 and forced therein, still the shoulder 13 will be larger in diameter than the opening in the bottle and will automatically abut thereagainst on insert action of the stopple. Hence, the operator working with the bottle 3, after placing suitable material therein, to draw a vacuum in the bottle 3, or for other action, as desired, is notified that the stopple 1 has reached a definite inserted position in the bottle. At the time the shoulder 13 engages the opening 2, the slot, or other circumferential interruption 7 will still extend axially therebeyond so that final filling of the bottle, or other processing of its contents is permitted.

Fig. 1 of the drawings also shows that a reduced diameter section, indicated by the diameter $c-d$, is provided by the groove 10 in the body section 5 intermediate the rib 11 and the shoulder 13 and it extends to and smoothly connects with the rib 11. Such reduced diameter section at the groove 10 facilitates axial movement of the stopple after being initially engaged with the opening 2. The rib 11 has a maximum diameter equal to the dimension $a-b$.

A modified bottle 30 is shown in Fig. 4 and it is the same as the bottle 3 except for the rib 3a being omitted and a completely cylindrical neck bore or opening 31 is provided. The relationship in size of the stopples to the neck openings is the same in all figures of the drawings and the same stopple can be used with either bottle 3 or 30.

Fig. 1 of the drawings also best shows that the slot 7, at the diametrically opposed ends thereof has axially outwardly curved base corner portions 14 provided thereon and smoothly blending in with the peripheral surface of the body section 5. These base portions 14 hence do not present any sharp shoulder edges to squeeze or roll back towards the opening 2 in the bottle on closure or insert action of the stopple to make the stopple closing action more difficult. These radiused and edges eliminate the squeeze or roll backs which cause minute folds which

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of course are channels for air or gas passages causing bad sealing.

The maximum diameter e of the rib 11 usually is the same as the maximum diameter of the shoulder 13 but these dimensions may be slightly different, if desired. For example, the rib 11 may be slightly smaller than the diameter of the shoulder 13 but still larger than the neck 2. "Slightly larger" for the purposes of the invention means, for example, that the cylindrical body portion 5 may be about several hundredths of an inch larger than the inner diameter of the bottle neck or opening 2. The rib 3a likewise only protrudes radially inwardly about several thousandths or about a one hundredth of an inch or so from the cylindrical portion of the opening.

The slot 7 is of sufficient width that the split end portions 3 and 9 can readily be moved together sufficiently to be easily insertable into the opening 2 for resilient engagement therewith when released. The slot 7 preferably has a concave base surface to reduce the thickness of the stopple that must be penetrated by a hypodermic needle, for example, used to withdraw the contents of the bottle.

From the foregoing, it is believed that it will be seen that an easily engageable stopple has been provided by the invention and that the stopple will not be knocked out of engagement with the bottle easily. This member can be readily engaged with any suitable type of a container for effective closing action thereon and to present a definite location of the stopple in the article prior to full sealing engagement therewith. The stopple is effectively retained in engagement with a bottle when first inserted therein and provides uniform air flow past the stopple for processing the contents of the bottle when only partially seated therein. Hence it is believed that the objects of the invention have been achieved.

This application is a continuation-in-part of our application Serial No. 733,865, filed May 8, 1958, and now abandoned.

While one complete embodiment of the invention has been disclosed herein, it will be appreciated that modification of this particular embodiment of the invention may be resorted to without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. In combination, a container having a neck with a filling opening therein and a container neck stopple, said container neck stopple comprising a resilient member including a cylindrical body section for forming a seal for said container neck opening, said body section having an inner end with at least one diametrically positioned axially extending slot extending thereinto from its inner end splitting it into two portions, said body section having a peripheral shoulder on the inner end portion thereof spaced from both ends of the body section and intermediate the ends of said slot, said peripheral shoulder being larger in diameter than the neck opening in said container to provide a stop for insert action of the body section prior to seating the body section in a sealed position, said body section having a rib thereon parallel to said shoulder intermediate the inner end of said body section and said shoulder and having a recess parallel to said rib intermediate said rib and said shoulder, said rib being of a diameter larger than the inner diameter of the neck opening in said container, said rib merging with the inner end of said body section by a radially inwardly tapering portion to form the inner end of said body section of an uncompressed diameter smaller than the inner diameter of said opening in said container, said split inner end of said body section being readily radially compressible to facilitate insertion into a bottle neck for closure action.

2. A combination as in claim 1 where the base of said slot in said body section is connected to the cylindrical surface of said body section by axially outwardly curved corner portions to blend the edges of the bottom of said slot into said body section to facilitate sliding such por-

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tions of said body section into engagement with said container neck opening.

3. In combination, a bottle having a neck with a substantially cylindrical bore, a stopple of resilient material having a head of a size too big to go through the neck bore of the bottle and a substantially cylindrical body portion of slightly greater diameter than the neck bore to have a sealing fit with the neck bore; the body portion being formed with a circumferential groove spaced from the inner end of the body portion to define a rib on the inner end of the body portion; the rib, groove, and body portion being circumferentially interrupted at circumferentially spaced points on the inner end of said body portion from the inner end to a distance past the groove to provide passages in the body portion for flow of fluid into and out of the bottle when the stopple is pressed only part way into the neck bore, the axially outermost wall of said groove forming a shoulder for engaging said bottle neck to seat said stopple in a position extending only part way into said neck bore, said ribbed inner end of said stopple engaging said neck bore when only such inner end is inserted into said neck bore to retain said stopple in engagement therewith, the part of the body portion between the outermost ends of said passages and head sealing with the neck bore when the stopple is fully seated in the neck bore.

4. In combination, a bottle having a neck of lesser diameter than the body of the bottle, the neck having a substantially cylindrical bore and a radially inwardly extending rib on the bore at the axially outer end thereof, a stopple of resilient material having a head of a size too big to go through the neck bore of the bottle and a substantially cylindrical body portion of slightly greater diameter than the neck bore to have a sealing fit with the neck bore, the body portion being formed with a circumferential groove spaced from the inner end of the body portion to define a rib on the inner end of the body portion, the rib, and body portion of the stopple being interrupted at circumferentially spaced points and to a distance about midway between the groove and head to provide passages in the body portion for flow of fluid into and out of the bottle when the stopple is pressed only part way into the neck bore, the part of the body

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portion between the passages and head sealing with the neck bore when the stopple is pressed home in the neck bore, the stopple being retained in engagement with the bottle by said stopple rib engaging said rib of the bottle when the stopple is pressed only part way into said neck bore but said stopple rib is axially inwardly of the bottle with relation to said bottle rib.

5. In combination, a bottle having a neck of lesser diameter than the body of the bottle, the neck having a substantially cylindrical bore, a stopple of resilient material having a head of a size too big to go through the neck bore of the bottle and a substantially cylindrical body portion of slightly greater diameter than the neck bore to have a sealing fit with the neck bore, the body portion being formed with a circumferential groove spaced from the inner end of the body portion to define a rib on the inner end of the body portion, the rib and body portion of the stopple being interrupted at circumferentially spaced points on the periphery of said body portion to provide passages extending from the axially inner end of said body portion to a distance past the groove for flow of fluid into and out of the bottle along the passages of said body portion when the stopple is pressed only part way into the neck bore and the axially outer wall of the groove abuts on the bottle neck, the part of the body portion between the axially outer ends of the passages and head sealing with the neck bore when the stopple is pressed home in the neck bore, the rib having a slightly greater diameter than the neck bore but with the rib portion of the body portion being radially compressible and resiliently engaging the neck bore to be retained in engagement with the bottle by said stopple rib engaging the neck of the bottle when the stopple is pressed only part way into said neck bore.

References Cited in the file of this patent

UNITED STATES PATENTS

445,067	Lyon	Jan. 20, 1891
2,192,020	Stubler	Feb. 27, 1940
2,775,369	Waite	Dec. 25, 1956
2,790,582	Halpern	Apr. 30, 1957