Feb. 5, 1957 R. M. SCHLABACH ET AL 2,780,395

CONTAINER CLOSURE CONSTRUCTION

Filed Nov. 14, 1952 3 Sheets-Sheet 1

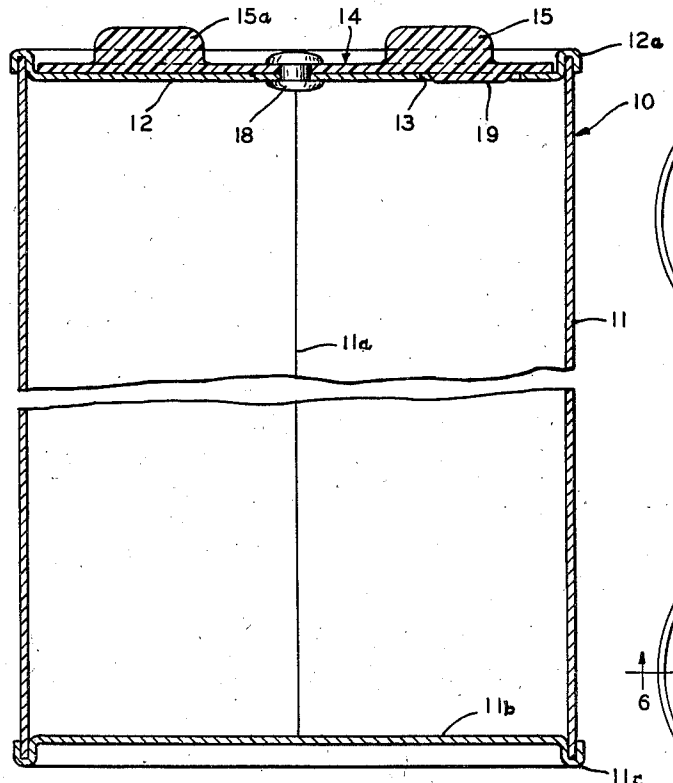


Fig. 1

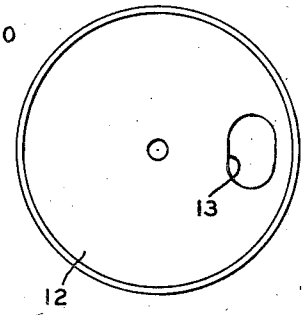


Fig. 2

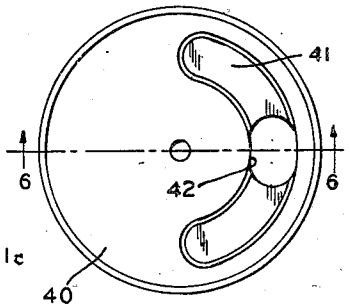


Fig. 5

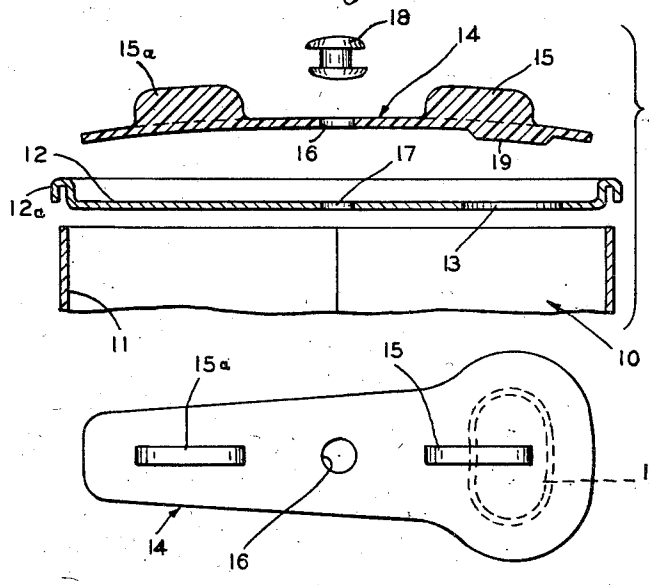


Fig. 3

Fig. 4

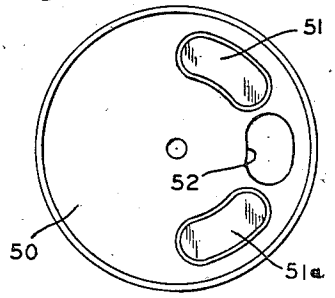


Fig. 7

INVENTORS
Raymond M. Schlabach
BY and Louis V. Bochius
Frease & Bishop
ATTORNEYS

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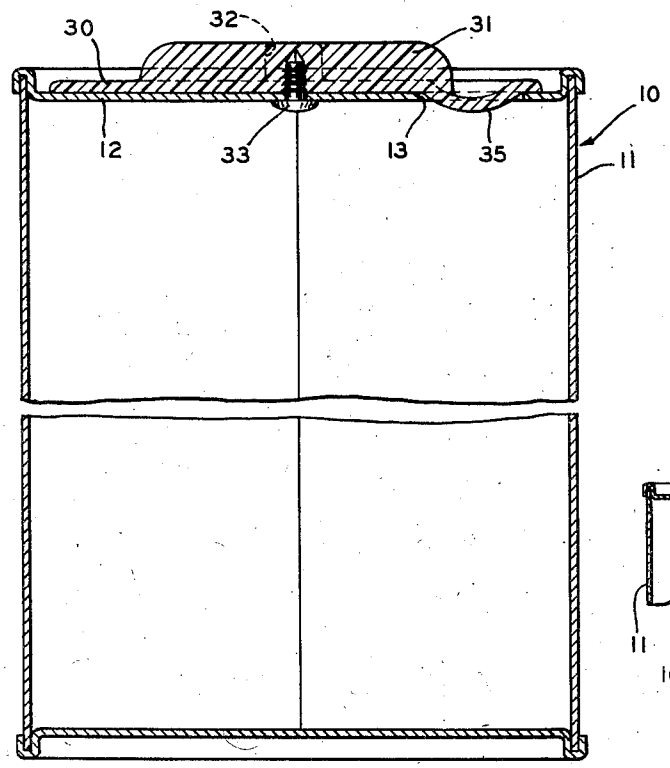


Fig. 8

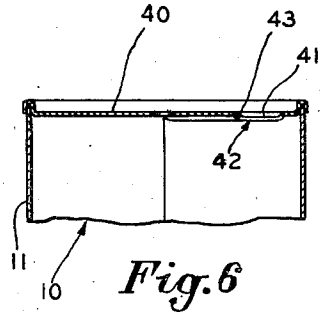


Fig. 6

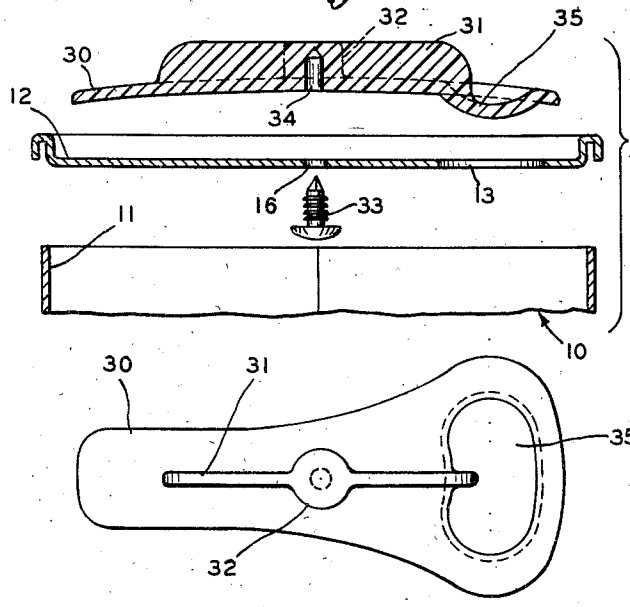


Fig. 9

Fig. 10

INVENTORS
Raymond M. Schlabach
BY and Louis V. Bockius
Frease & Bishop
ATTORNEYS

Feb. 5, 1957 R. M. SCHLABACH ET AL 2,780,395

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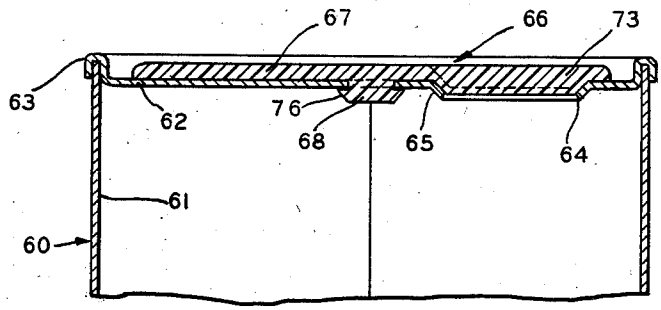


Fig. 11

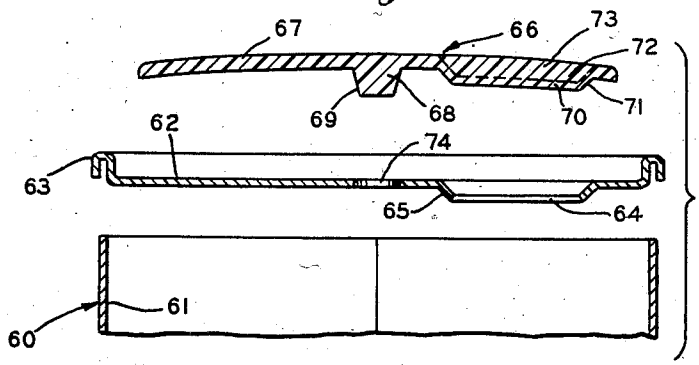


Fig. 12

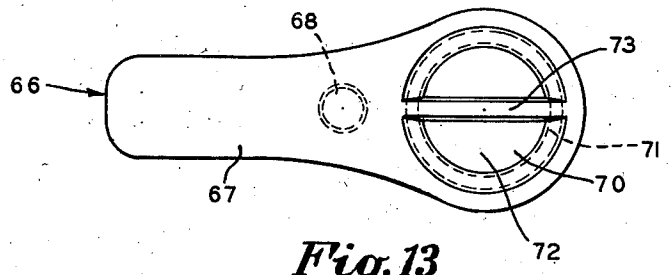


Fig. 13

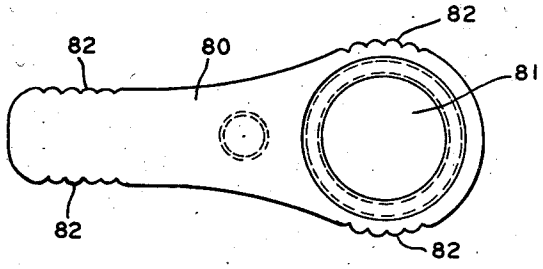


Fig. 14

INVENTORS
Raymond M. Schlabach
BY and Louis V. Bockius
Frease & Bishop
ATTORNEYS

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CONTAINER CLOSURE CONSTRUCTION

Raymond M. Schlabach, Hills and Dales, Canton, and Louis V. Bockius, Congress Lake, Ohio

Application November 14, 1952, Serial No. 320,547

1 Claim. (Cl. 222—516)

The present invention relates to a new and novel container closure and more particularly and specifically to a closure construction adapted for containers of powdered or granular materials.

Many powdered and granular materials should be contained so as to be maintained in relatively air-tight condition and substantially closed off from contact with the atmosphere. The usual container used for such purposes today consists of a metal can or the like of sheet material which carries a plug type closure wedge fitted in the conventional dispensing opening in the container.

It has been found that the prying action required to open such containers and the forceful wedging pressure necessary to the closing of such containers provides a generally unsatisfactory container for normal everyday use. This is particularly true with respect to the closing operation of the containers presently used since it is the tendency of most users to fail to close the containers sufficiently tight so as to maintain the substantially air-tight and sealed closure usually required. Likewise, the failure to properly close such containers permits of the spilling of the contents of such containers if they should be accidentally tilted or inverted. These difficulties are particularly annoying with respect to containers for powdered chemical compounds for cleaning toilet bowls since such chemical compounds usually comprise materials which form acid in the presence of water or moisture.

An additional disadvantage in the usual wedged plug closure used in containers for granular materials of the type above noted, which has become increasingly evident, lies in the fact that severe shocks and blows to the container will cause the plug to pop out of the closure opening. This disadvantage is particularly annoysome and actually destructive when, due to rough handling of the container, one or more cans in a case lot open up to permit the granular material to be distributed within the case. This usually causes a substantially total loss of the case and is very often injurious to other goods stored in close proximity to the damaged case when cleaning chemicals and the like are the particular granular material involved.

The primary object of the present invention resides in the provision of a container closure which inherently overcomes those objections now found to exist in containers presently used by providing a container closure which does not rely on the wedging closure action heretofore set forth as a requisite of the presently used containers.

Another object of the present invention lies in the provision of a simple and easily operated closure which provides a substantially airtight and sealed closure, and which prevents the spilling of the contents of the container upon tilting or inversion thereof.

It is a further object of the present invention to provide a closure construction which will not become displaced from its sealing condition under the roughest handling conditions to which the containers of this type can be subjected.

Still another object of the present invention is the provision of a closure construction which permits of simple and inexpensive manufacture and assembly at a cost substantially reduced over the type heretofore utilized, and a closure construction which readily lends itself to production and assembly in the conventional can manufacturing and assembly plant.

Still further objects and advantages of the present invention will become readily apparent when the following description is read in the light of the accompanying drawings.

The instant invention, in general terms, consists of a container of the can type which is provided with a dispensing opening in one wall thereof, and of a rotating bar element mounted for rotation upon the outer surface of that wall having the dispensing opening therein and having a finger grip portion to facilitate rotation thereof; said bar element being additionally provided with a plug element adapted to move into and out of said dispensing opening for the purpose of closing or opening the same.

By way of illustration only, reference is made to the accompanying drawings in which are shown several preferred embodiments of the present invention, wherein:

Figure 1 is a vertical cross section of the preferred form of container and of one embodiment of the closure member;

Fig. 2 is a top plan view of the container shown in Fig. 1;

Fig. 3 is a partial vertical section of an assembly view of the container and the closure element as shown in Fig. 1;

Fig. 4 is a top plan view of the closure element;

Fig. 5 is a top plan view of a modified form of the container shown in Fig. 1;

Fig. 6 is a section taken on the line **6—6**, Fig. 5;

Fig. 7 is a top plan view of a second modified form of the container shown in Fig. 1;

Fig. 8 is a vertical cross section of the preferred container illustrating a modified form of the closure element thereon;

Fig. 9 is a vertical sectional assembly view of the container and the modified closure element shown in Fig. 8;

Fig. 10 is a top plan view of the modified closure element;

Fig. 11 is a fragmentary vertical section of a modified container and associated closure element;

Fig. 12 is a partial vertical section of an assembly view of the container and closure element as shown in Fig. 11;

Fig. 13 is a top plan view of the closure element shown in Fig. 12; and

Fig. 14 is a top plan view of a modified form of the closure element shown in Fig. 13.

Referring now in particular to the above described drawings in which like numerals refer to similar parts throughout the several views, **10** generally designates the improved container consisting of a cylindrical body **11**, which may or may not have a longitudinal seam **11***a*. At one end of the cylindrical body **11** there is provided a bottom wall **11***b* which is formed of a cup-type construction and secured in an inverted position to the lower circumferential edge of the container by means of the usual beaded seam **11***c*.

The upper end of the container is provided with an end wall **12**, similar to the bottom wall **11***b*, this wall being secured to the upper circumferential edge of the container by a single beaded seam **12***a* in the same and usual manner as is the lower bottom wall secured by seam **11***c*.

A dispensing opening **13**, of any desired configuration, is formed in the top end wall **12** at a point spaced radially from the central axis of said container and spaced inwardly from the peripheral edge of the top wall **12**.

The closure element used in conjunction with the con-

tainer consists of an elongated bar member generally designated as 14 which may be formed preferably of a plastic material. This bar element, as best illustrated in Figs. 3 and 4, is formed with a pretensioned, bowing configuration, so that it bows outwardly from the extreme ends thereof toward its central portion, thus providing it with slightly concave and convex surfaces along its length. In addition, this bar element is provided on its convex surface, adjacent the ends, thereof with upstanding finger grip elements 15 and 15*a* extending longitudinally and centrally of said member.

A central mounting bore 16 is formed in the elongated bar element 14 to correspond with a bore opening 17 formed centrally in the top end wall of the container. This permits a conventional rivet member 18 to be extended through the bores 16 and 17 to rotatably secure the bar element 14 on the outer face of the top end wall of the container.

Referring to Fig. 3, the pretensioned, bowed configuration of the rotatable closure bar 14 may be readily observed. It can be further noted, from Fig. 1, that when the bar element has been secured by rivet 18 in juxtaposition with the outer face of wall 12 that the central, bowed portion of the bar is drawn downwardly against the wall face thereby placing the end portions of the bar under tensioned engagement with the outer surface of the wall.

An additional structural provision of the bar element 14 lies in a plug element 19 which is formed on the concave side or surface of the bar element at a point spaced inwardly from one end and the adjacent longitudinal edges thereof and substantially beneath the finger grip 15. Such plug is so positioned on the bar so as to coincide with the dispensing opening 13 in the top end wall of the container when the bar element is rotated to bring such plug into radial alignment with the dispensing opening. The plug element 19 is preformed to coincide with the configuration of the dispensing opening, and its depending edges are tapered inwardly of the plug element to provide inclined edges and a relatively flat bottom or undersurface, as shown, permitting of the free and easy movement of the plug into and out of the dispensing opening with rotation of the bar element. It should be noted at this point that the tensional contact, above described, between the end portions of the bar 14 and the wall 12 will cause the plug 19 to snap into the dispensing opening 13 when rotated to a position of coincidence therewith. This resilient factor inherent in bar 14 will also securely maintain plug 19 in the dispensing opening 13 effecting a substantially airtight seal for the closure of the opening. An additional sealing factor is contributed by the resilient contact maintained between that surface area of the can wall 12 immediately surrounding the opening 13 and that undersurface area of the bar 14 immediately surrounding the plug depending therefrom.

In the modified embodiment of the closure element as is illustrated in Figs. 8, 9 and 10, there is shown a bar element 30 similar in its structural configuration to the bar element shown and described as element 14. However, rather than the use of individual finger grip portions 15 on the convex face thereof, the bar element 30 is provided with a single elongate finger grip 31 originating at points inwardly from the ends and extending centrally and longitudinally of the element. Additionally, there is formed as an integral portion of the finger grip and the bar element a central enlarged boss 32, best shown in Fig. 10, positioned on said finger grip so as to be normally positioned above and in coincidence with the bore opening 16 in the container top end wall. A central bore hole is formed, from the normal undersurface of the bar 30 upwardly terminating in the boss 32. This permits a clincher or barbed drive screw or rivet 33 to be driven upwardly through the inner face of the end wall 12 into the bore 34 of the boss 32 to fasten the central portion of the bar 30 flush against the wall 12 and rotatable thereon.

Still an additional modification in the form of the closure element shown in Figs. 8 through 10 includes that wherein the plug element 35 thereof is formed by a depression in the convex face of the lever extending beneath and depending from the concave face thereof in a manner so as to provide curved, tapering surfaces defining the periphery of the plug element from that point where it depends from the bar element throughout its curvilinear configuration.

In Figs. 5, 6 and 7 there are shown two modified forms of the top end wall of a container adaptable for use with closure members such as have been heretofore described, wherein in Fig. 5 a wall member 40 secured to a container in the same manner as was wall 12 secured to container 10 is provided with an arcuate depression or channel 41 extending beyond both edges of dispensing opening 42 and through a substantial portion of the face of the wall. This channel is formed with inwardly and downwardly inclined edges 43 and provides a guide slot for the plug member 19, or 35 as the case may be, in its movement toward and away from its closing position relative to the dispensing opening 42. The form of end wall here shown will serve only to limit rotation of the closure bar and plug to retain them within easy access range of the opening and prevent the plug from becoming unnecessarily turned through 180° away from the opening and thereby requiring undue operative movement of the closure bar.

In Fig. 7 there is disclosed a further modification of a container end wall, designated as 50, wherein there are formed a pair of depressed arcuate channels 51 and 51*a* each spaced from a dispensing opening 52 and lying in the same radial arc therewith. The configuration of these channels, as was the case with channel 41 in Fig. 5, is such as to permit them to receive and retain the plug 19, or 35 as the case may be, of the rotating closure bar associated therewith. However, in the instant modification, the channels 51 and 51*a* not only serve as a means of limiting rotation of the plug away from the dispensing opening, but they also serve to hold the plug in one of two pre-set "open" positions while the contents of the can are being dispensed.

Disclosed in Figs. 11 through 13 are additional and important modifications in the construction of the dispensing end wall of the container and in a closure element associated with the dispensing opening in such end walls.

In the Figs. 11 through 13, there is shown a container or can member generally indicated at 60 and including a cylindrical or tubular body 61 and an end wall 62 consisting of a flat annular face plate section having a peripheral or in this case circumferential seam 63 which is beaded about the upper edge of the tubular container wall 61 in a usual and conventional manner.

A circular dispensing opening 64 is formed in the top end wall 62 at a point spaced radially from the central axis of the container, and said opening is defined by a downwardly inclined circumferential lip 65.

The closure element, generally designated at 66, which is shown in association with container 60, consists of an elongated bar member 67 formed, for reasons hereinafter enumerated, preferably of a plastic material. This closure bar element, as best seen in Fig. 12, is formed with a pretensioned, bowed configuration in the same manner as described with respect to the previously disclosed closure elements 14 and 30. This provides the bar with opposed surfaces of concavity and convexity along a portion or all of its length with extreme limits of such configurations on each face being reached at a point substantial equidistant from the ends of the element.

In addition to its bowed configuration, the closure ele-

ment 66 is distinguished by the provision centrally of its concave face with a perpendicularly extending button 68 formed integrally with the bar and having an inwardly tapered circumferential lip portion 69 about the extreme end portion thereof. Further, a circular plug portion 70, having an inclined circumferential side edge 71 adapted to conform to the inclined lip 65 of the opening 64, is formed or depressed outwardly from the concave surface of the bar element 67 at a point spaced slightly inward from one end thereof. The plug element is of an equal circular configuration with that of the opening 64 and the center of the plug is radially spaced from the axial center of the button 68 a distance equal to the radial distance from the central axis of the can to the center of dispensing opening 64.

On the convex surface of the bar element 67, there is formed a circular depression 72 which is immediately above and coincides with the plug 70. In normal practice the depression 72 will generally result from the downward extrusion of the plug element 70. Provided transversely of the depression 72 and longitudinally of the bar element 67 is an upstanding rib member 73. The depression 72 and its dividing member 73 combine to form a finger grip on the closure bar for a purpose made obvious hereinafter.

In assembly of the closure structure with the container, the button element 68 is inserted downward from the outer top face of the can through a coinciding central bore, indicated at 74, in the can wall until the normally concave face of the bar is drawn flush to the can wall at which time the button is beaded out and shaped with a circumferential flange 76 beneath the undersurface of the can wall rotatably securing the bar element 67 flush with the outer face of the wall.

When the closure element is affixed to the container in the manner described the plug portion will rotate in radial registry with the opening 64, as in the case of the disclosures of the heretofore enumerated embodiments. When the plug is in registry with the opening and is resiliently urged thereunto, it will be noted that the inclined edge 71 of the plug will be tightly embraced by the inclined lip 65 of the opening, thereby effecting a substantially air-tight closure.

The finger grip construction including depression 72 and rib 73 permit the easy and positive rotation of the bar element 67 to open and close the dispensing opening.

Referring to Fig. 14, there is shown a modified form of the closure bar 67 wherein a similar bar element 80 is provided wherein the rib member 73 is eliminated leaving a bare circular depression 81, and an arcuate portion on opposed sides at each end section of the bar member 80 are knurled or serrated as at 82 to facilitate gripping of the bar for rotation thereof in either direction. In all other details the bar closure element 80 is identical to closure element 66 described above.

From the foregoing it can now be seen that the present invention has numerous advantages offering improvements in the art. First, it should be readily evident that there is in the present invention a great facility in use. To gain access to the powder or other material contained, the tubular can or like container may be held in one hand and the closure bar turned, utilizing the readily accessible handgrips, with the other hand to spring the plug out of and arcuately away from the dispensing opening where it will remain without being held while the contents are dispensed. To close the container, it is only necessary to rotate the closure bar to bring the plug into registry with the opening where it will spring downwardly into the opening to remain until again manually displaced. The closure effected by such operation is substantially air-tight.

Further advantages are made evident in the construction of the container and particularly that end wall of the container in which the dispening opening is provided. The present invention provides a container of the most simplified and readily manufactured design wherein the end walls are crimp-beaded on the tubular container body. The dispensing opening and the bore opening can be provided in one simple punching operation and there is no appreciable metal loss or requirement for an expensively shaped and formed closure cap, both conditions being disadvantages in the manufacture of the containers and closures presently being used. The channel guides shown in Figs. 5, 6 and 7 are easily formed in a single stamping operation.

Turning to the construction of the closure bar elements, as shown and described, it should be apparent that these bars, both the bar 14 shown in Figs. 1, 3 and 4, the modified bar 30 shown in Figs. 8–10, and the bars 67 and 80 may be made of any material which can be inexpensively cut or molded to the desired shape and which can be pretensioned to assume the required bowed configuration with a resiliency in the direction of flex of the bow. With a view to a savings in material cost and in the manufacture of the closure bars it is suggested that a plastic material be used which adapts readily to the required pretensioning and which may be easily and inexpensively worked to enable formation of the finger grips and plug elements thereon.

There are still further advantages in and compelling reasons for the use of plastic in the manufacture of the closure bars illustrated as a dominant feature of the instant invention. Initially, it is important to note that plastic, when formed in a pretensioned configuration, such as is required for the closure bar elements herein, will retain its resiliency and flexibility under extensive use far better and longer than will metallic elements of a similar size and configuration. Additionally, plastic has a lubricated characteristic which is not found in metals which is advantageous when present in an element designed for frictional rotation relative to another element of plastic or metallic makeup.

Still a further and most important advantage inherent in the use of plastic as the closure element for containers for chemicals which form acid or strong alkaline solutions in the presence of water or moisture lies in the fact that the plastic closure element is not prone to react to the action of such chemicals to effect a corrosive freezing of the closuse in its respective dispensing opening. Such freezing of metallic closures in their respective openings is a common and most undesirable occurrence.

Those embodiments of the present invention shown and described herein are not by way of limitation of this invention, but are merely illustrative of the novel features of the invention as are commensurate with the scope of the hereinafter appended claim.

What we claim is:

In a closure construction for a can, a tubular body having a flat metal end wall, the end wall having an inner and outer side and having formed therein an opening, the end wall being secured to the tubular body by a peripheral beaded seam, a pretensioned elongated plastic bar member resiliently bowed along a portion of its length providing opposed concave and convex surfaces along said bowed portion, a plastic closure plug shaped to generally conform to the wall opening formed integrally with the concave surface of the closure bar member and extending from said surface, the portion of said closure plug extending from said concave surface having inwardly tapered sides and a generally flat bottom surface generally parallel to said concave surface, means for rotatably securing the bar member to the outer side of the metal end wall with the ends of said bar member bowed portion in resilient engagement with the outer side of the end wall, the closure plug and the wall opening being equally spaced from the point of attachment of the bar member to the wall to bring said plug into and out of closing registry with said opening with rotation of said bar, the closure plug generally flat bottom surface sliding freely along the flat metal wall outer side with rotation of said

bar when said plug is out of closing registry with the wall opening, the closure plug tapered sides sealing the wall opening substantially air-tight when said plug is in closing registry with said opening, the bar having a depression formed therein in the convex surface thereof above the closure plug, a raised rib formed transversely of and within said depression providing a finger grip for rotating the bar, and no portion of said raised rib extending above the can circumferentially beaded seam when the bar member is mounted on the can end wall.

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