

[54] **PRECISION NECK CONSTRUCTION FOR CENTER LOCK CAPTIVE CLOSURE**

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2,591,231	4/1952	Boadway222/521
2,907,489	10/1959	Taylor222/541 X
3,434,620	3/1969	Laurizio222/541 X

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FOREIGN PATENTS OR APPLICATIONS

184,866	3/1956	Austria222/521
169,532	8/1934	Switzerland222/521

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[22] Filed: **Jan. 25, 1971**

[21] Appl. No.: **109,482**

Related U.S. Application Data

[62] Division of Ser. No. 576,420, Aug. 31, 1966, abandoned.

[52] U.S. Cl.222/521

[51] Int. Cl.B67d 3/00

[58] Field of Search.....222/521, 525, 541

[57] **ABSTRACT**

A neck element for collapsible tubes or the like wherein the neck is formed as by injection molding to maintain precise dimensional tolerances thereof in a configuration to receive a centerlock captive closure wherein the neck central plug is suspended by circumferentially spaced radial webs within a hollow neck body thereby to define a plurality of precisely formed dispensing apertures between the tubular member and the plug and terminating in orifices bounded by a sheared planar upper terminal surface.

[56] **References Cited**

UNITED STATES PATENTS

1,597,665 8/1926 Baltzley.....222/521

3 Claims, 4 Drawing Figures

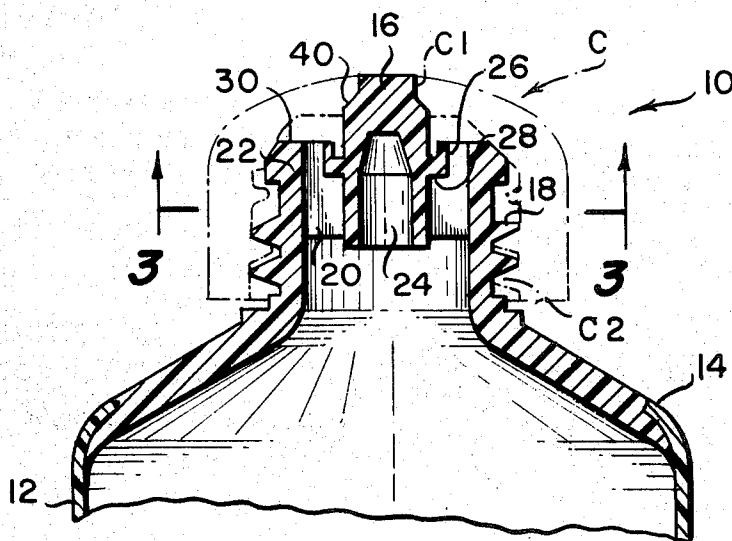


Fig. 1

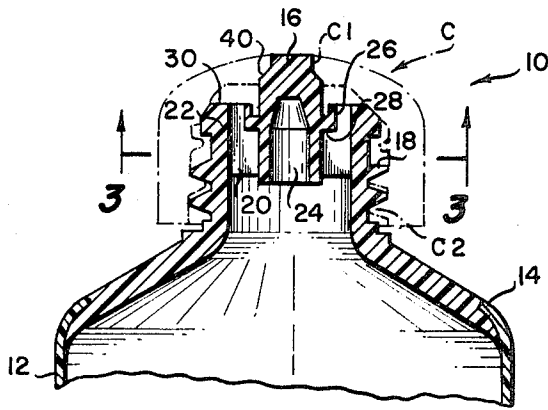


Fig. 2

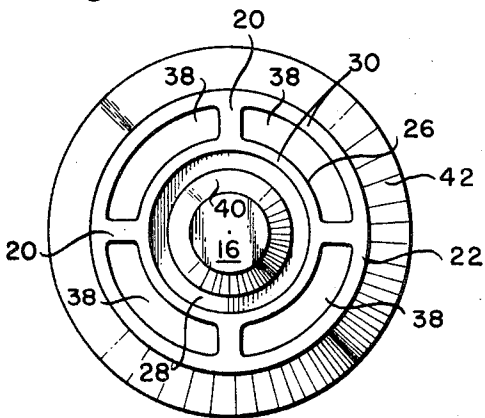


Fig. 3

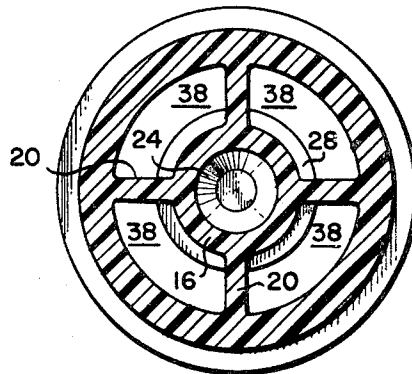
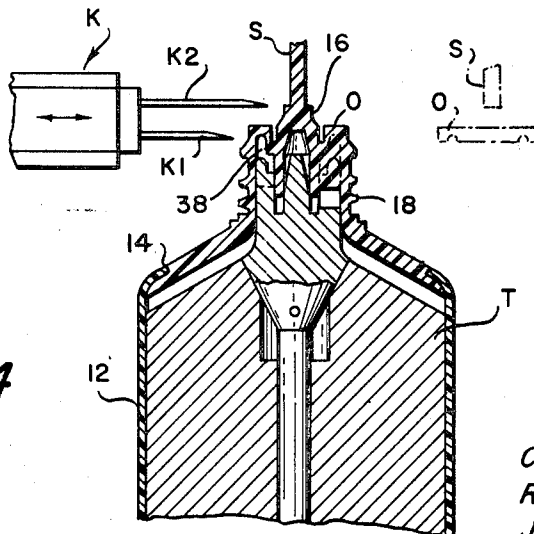


Fig. 4



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PRECISION NECK CONSTRUCTION FOR CENTER LOCK CAPTIVE CLOSURE

REFERENCE TO RELATED APPLICATIONS

This application is a division of our application Ser. No. 576,420, filed Aug. 31, 1966, now abandoned in favor of continuation-in-part application Ser. No. 869,675, filed Oct. 27, 1969.

BACKGROUND OF THE INVENTION

Center lock closure assemblies are well known in the art and presently enjoy extensive use with plastic squeeze containers such as bottles and collapsible tubes for dispensing a wide variety of viscous products. One typical closure of this character is set forth in U.S. Pat. No. 3,263,851 to A. K. Grimsley.

The neck construction of the closure is molded from plastic and may be formed integrally with the container body, such as the collapsible tube in the aforementioned U.S. patent, or the neck element may be molded as a separate component which is subsequently associated with the container body in another manner, as is well known in the art.

As is typical of the "center lock" closure construction, the neck element includes a hollow tubular body and a central sealing plug disposed within the body and carried by circumferentially spaced radial webs, the spaces between which provide the apertures through which the contents of the container are dispensed.

Although simple in mechanical operation, complexly contoured closures of this type present a relatively difficult molding problem. Tight dimensional control and accurate neck finish surfaces are essential for leakproof operation, yet the neck element must be simple in construction to enable economical production thereof as well as effect proper dispensing of the ultimate container contents.

BRIEF SUMMARY OF THE INVENTION

The present invention provides an improved precision-formed neck element for center lock or captive plug closures characterized by a plurality of precisely formed dispensing orifices of arcuate configuration as viewed in plan and disposed in spaced relation to the center plug. Further, the terminal portions of the neck element bounding the dispensing orifices define a planar sheared surface of precise and controlled character so as to insure uniformity of the dispensing passages.

DESCRIPTION OF THE DRAWINGS

Further features and advantages of the neck member of the invention will be apparent from the appended drawing disclosing an embodiment thereof.

In the drawings:

FIG. 1 is a sectional view of the neck element of the present invention, further showing a fragmentary container body associated therewith;

FIG. 2 is a top plan view of the neck element of the invention;

FIG. 3 is a sectional view taken along the lines 3—3 of FIG. 1; and,

FIG. 4 illustrates a partially formed neck member according to the invention and prior to final fabrication thereof.

DETAILED DESCRIPTION OF THE INVENTION

With particular reference to FIG. 1, the neck element

of the present invention is shown generally at 10 and may be associated in conventional manner with a tubular container body 12 secured thereto at a joint 14 adjacent the lower shoulder of the neck element. As indicated, the neck 10 may be formed integrally with the container body 12 if desired.

Associated with the neck element 10 is a closure C shown in dashed lines which per se does not form a part of the present invention. The closure C is, however, centrally apertured at C1 for reception therethrough of the center plug 16 of the instant neck element and wherein also the closure may conventionally have threads C2 or other interengaging means for cooperation with means such as threads 18 provided on the instant neck member. Retaining means are provided whereby the closure C is not normally removed from the neck element during dispensing, all as shown more fully in the aforesaid patent to Grimsley et al. U.S. Pat. No. 3,263,851.

As aforesaid, the neck element 10 includes the central plug 16 which is suspended as by a plurality of integrally formed radial webs 20, shown as four in number, within the tubular body portion 22 of neck 10.

The plug 16 is imperforate and usually molded with an indented aperture 24 to minimize wastage of material. The plug 16 further includes a circumambient wall portion 24 in spaced relation thereto and connected to the plug 16 by a short radial flange 28, whereby the plug 16, flange 28 and wall portion 26 together define an annular recess or groove about the plug 16.

It is a feature of the present invention that the top or upper terminal portions of the tubular body 22, webs 24, and the wall 26 together define a common planar surface 30 on the neck 10.

The aforesaid top planar surface 30 thereby defines several dispensing orifices 36 which in the preferred embodiment of the invention partake of an arcuate configuration. The orifices 36 inwardly thereof comprise elongated flow passages 38 or dispensing ports through which the product is expelled upon collapse of the container body portion 12 in usual manner.

As aforesaid, the upper surface is planar, and in particular comprises a sheared surface thereby to define a positive and precise planar relation between the neck element portions and the dispensing orifices 36.

This will be better understood in connection with FIG. 4 which relates to certain steps in the fabrication of the neck element of the present invention. A full disclosure of the novel forming and fabricating technique will be found in our aforesaid copending application Ser. No. 869,675.

Thus, as initially formed by injection molding, the neck 10 includes an obturation portion O which blocks the dispensing passages 38 between the webs 20. Further, as initially formed, the center plug 16 includes an undesirable sprue extension S. The unwanted portions O and S are removed from the neck and at the same time the desired planar sheared surface 30 is formed on the neck 10 as by means of a reciprocable and rotatable knife assembly K which includes lower knife K1 and upper knife K2. As seen in FIG. 4, the molded neck element 10 (which may at this time have been associated with container body 12) is elevated from the tool member T, after which the knife member K is laterally translated to cause the upper knife K2 to sever the sprue extension S as seen in phantom lines to the right in FIG. 4. Likewise, lateral advance of knife K1 causes the

same to cleanly pierce the neck member 10 and there-
after relative rotation between knife K1 and the neck
member 10 causes shearing severance of the annular
obturator portion O as also seen in phantom lines to
the right in FIG. 4.

In this manner there will be simultaneously provided
the planar sheared surface 30 as aforesaid to positively
open the passages 38 between webs 20 and define pre-
cisely formed right-angular dispensing orifices 36,
thereby promoting smooth flow of the product in pres-
sure dispensing from the container.

In this regard and as above indicated, the neck ele-
ment 10 of the invention is formed by injection molding
which permits the precision of contour and dimen-
sional tolerance which cannot be achieved by other
molding techniques, such as blow molding, thermo-
forming, etc.

Accordingly, the neck element 10 comprises an in-
jection formed member of precise dimensional charac-
teristics having the sheared surface 30, which defines
the dispensing orifices 36 and which by virtue of the
spacing of the dispensing orifices as above discussed,
insures the cleanly formed and planar characteristics of
the neck construction thereat.

The neck as formed further includes the conical sur-
face 40 surrounding the upper narrow portion of the
center plug 16 as well as a comparable conical portion
42 at the upper end of the tubular portion 22 of neck
element 10. As is well known, these conical surfaces
cooperate with the closure C to insure a positive and
leakproof seal when the cap or closure is in its closed
and sealed position.

What is claimed is:

1. A neck element for a center-lock captive closure,
said neck element comprising:

injection-molded thermoplastic material, thereby to
insure precise dimensional tolerances thereof,

a tubular body portion terminating in an orifice adja-
cent the upper end thereof,

an imperforate plug disposed centrally of said orifice
and extending above and below said body portion
upper end,

an annular wall portion disposed in circumambient
spaced relation to said plug, said wall portion at its
lower end being inturned toward said plug interme-
diate the plug length and integrally connected
therewith, thereby to support said wall portion in
spaced relation to said plug and define an annular
recessed area therebetween, and,

a plurality of webs extending substantially radially
between and interconnecting said plug and sur-
rounding wall portion with said tubular body por-
tion, thereby to define a plurality of elongated dis-
pensing passages,

the upper end of said tubular body portion, the upper
end of said circumambient wall portions, and the
top surfaces of said webs (constituting sheared pla-
nar surfaces) lying in a common plane.

2. The neck element of claim 1 further including an
integrally formed shoulder flaring outwardly from the
lower end of said tubular portion.

3. The neck element of claim 2 wherein said shoulder
merges into a tubular container body formed from plas-
tic material.

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