

Oct. 18, 1960

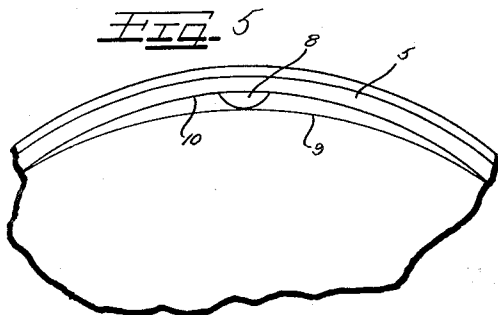
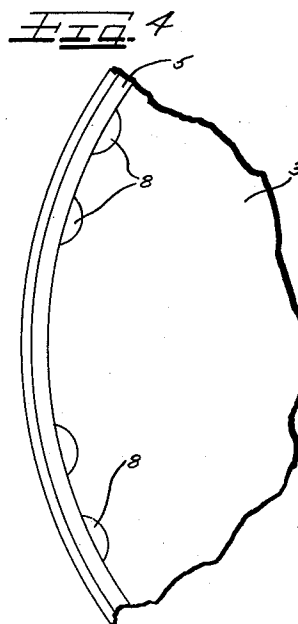
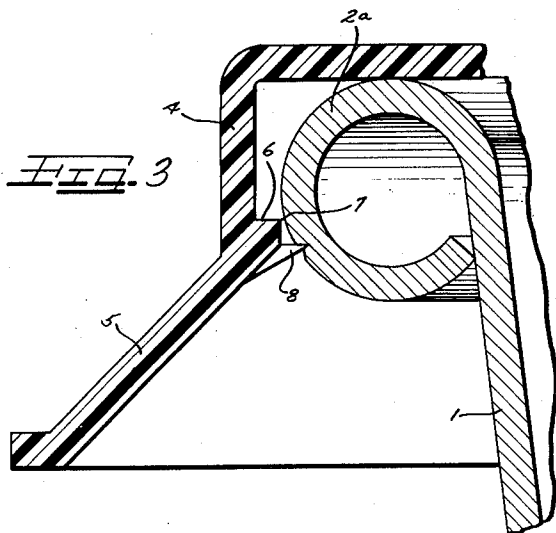
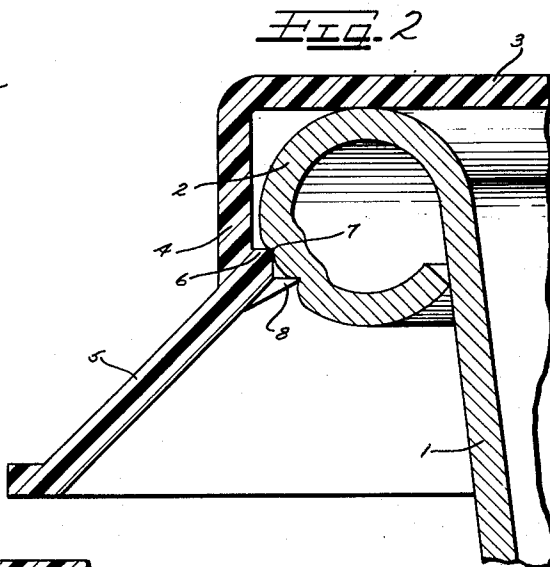
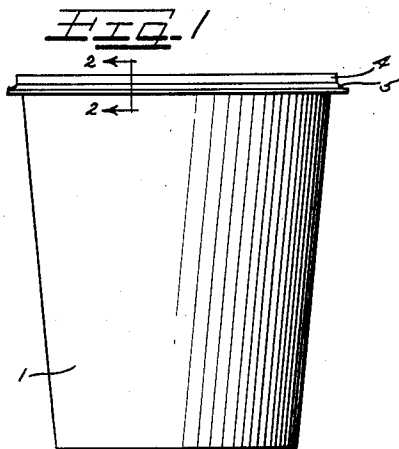
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2,956,721

MOLDED PLASTIC CONTAINER LID

Filed May 31, 1957

2 Sheets-Sheet 1



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MOLDED PLASTIC CONTAINER LID

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2 Sheets-Sheet 2

FIG. 6

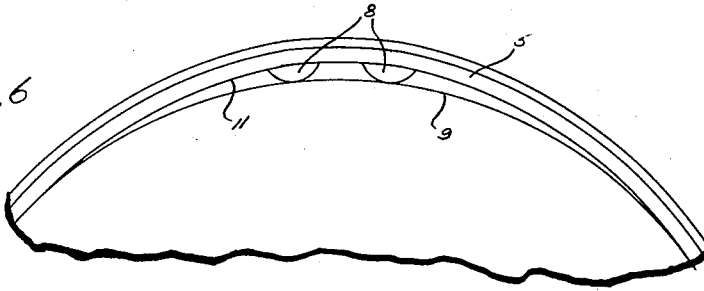


FIG. 7

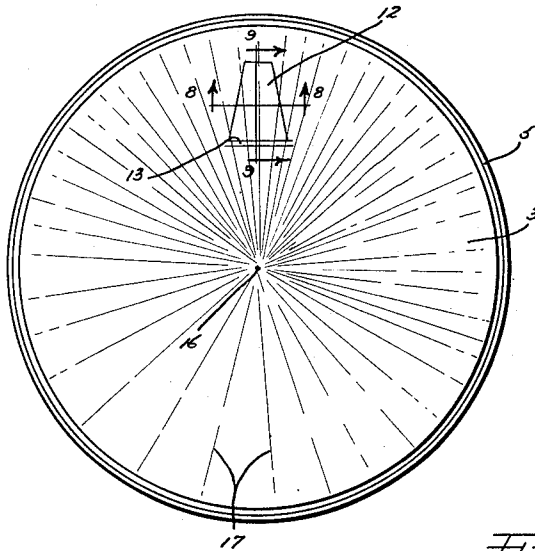


FIG. 8

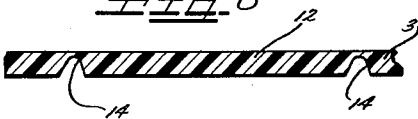


FIG. 9

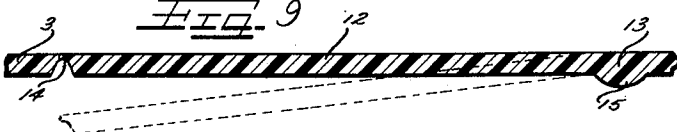
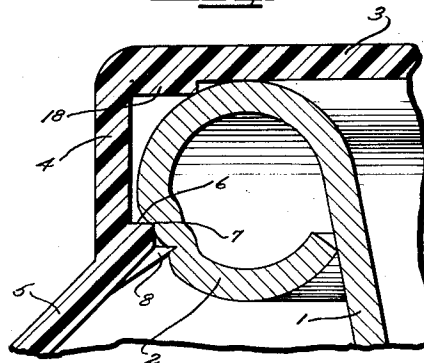


FIG. 10



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MOLDED PLASTIC CONTAINER LID

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10 Claims. (Cl. 229—43)

This invention relates to improvements in a molded plastic container lid, and more particularly to a lid for the secure covering of carry-out soda cups or containers and the like, and is highly desirable for use in connection with paper soda cups, and similar paper containers in which a liquid, solid or semi-solid commodity is purchased and carried out for consumption by the user in a different location or while traveling, although the invention will have other uses and purposes as will be apparent to one skilled in the art.

In the past, many and various forms of lids or closures for temporary containers have been developed. In most cases, lids heretofore made for use with a container having an outwardly turned or rolled rim bead around the mouth thereof have been provided with a relatively deep skirt, and extending inwardly from that skirt was a gripping rib designed to grip the underside of the rim bead, that is engage with the lowest point of the rim bead. However, in the manufacture of paper cups and similar temporary containers, there is considerable, though in most cases slight, variation in the diameters of the rim bead on the containers, resulting from economical manufacture. Consequently, container lids as manufactured heretofore to engage the lowermost point of the rim bead would in some instances effect a very poor engagement, and thus permit liquid contents to spill or splash out of the cup or container, by virtue of those variations in size of the mouth ends of the containers. In other instances, container lids manufactured heretofore were provided with tooth-like projections on the skirt of the lid to provide an added holding or engaging means with the container, but when such teeth or lugs were made heretofore, they were disposed singly and in spaced relationship to each other. Such, however, in the case of a molded thermoplastic lid would result in numerous breakages of the lids when removing them from the molds by virtue of the necessary distortion in order to displace the projecting tooth or lug, unless a split mold were utilized and such procedure is objectionably expensive both as to original cost and as to use. In addition, lids as heretofore made were provided with nothing extra to prevent splashing or leaking of the contents of the container except for whatever engagement was provided in the skirt of the lid, and owing to the variations in sizes of the beads of the containers, leakage frequently resulted from such lids. Further, in no instance of which I am aware has a push-out tab to provide an opening for a straw ever been provided in a molded thermoplastic container lid.

With the foregoing in mind, it is an important object of the instant invention to provide a simple form of molded thermoplastic container lid designed to effect a

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positive closure, regardless of variations in sizes of the rim beads of the containers, and which lid may be extremely economically manufactured.

Another object of the instant invention is the provision of a molded container lid having a relatively shallow skirt with inwardly projecting gripping means on the skirt to engage the rim bead around the mouth end of a container just below the point of maximum diameter of the rim bead, whereby the lid provides an effective closure regardless of a relatively wide range of variations in sizes of the mouth ends of the containers.

It is a further object of the instant invention to provide a relatively shallow skirted lid for soda containers and the like having a relatively sharp edged rib extending inwardly from the skirt for biting engagement in the rim bead of a container just below the maximum diameter of the rim bead.

Also a feature of the instant invention resides in the provision of a relatively shallow skirted container lid, having an inwardly extending gripping rib in the skirt portion thereof, and spaced tooth-like projections just below the rib to provide extra holding power on the lid and to enable the lid to effectively close containers varying through a relatively wide range in size at the mouth end.

Another feature of the invention resides in the provision of a molded thermoplastic container lid having a skirt with an inwardly projecting gripping bead thereon, and tooth-like elements for biting engagement into the rim bead of the container individually defined but arranged in circumferentially spaced pairs, such arrangement greatly facilitating the removal of the lid from a mold without the danger of breakage.

Also an object of this invention is the provision of a molded thermoplastic container lid having a push-out tab therein to provide an opening for a soda straw or the like.

Still another object of the instant invention is the provision of a molded plastic container lid having a molded indentation defining a push-out tab to provide a soda straw opening or the like which tab is hinged at one end to the top of the lid.

It is also a feature of the instant invention to provide a molded plastic container lid having a push-out tab therein hinged at one end, and with the hinge line extending substantially at a right angle to the line of plastic flow during the molding operation.

It is still a further feature of the instant invention to provide a molded thermoplastic container lid having a push-out tab defined by an indentation line molded in the top of the lid, which tab is hinged at one end and with the hinge line substantially normal to the direction of flow of the plastic during molding, and with the portions of the indentation line defining the sides of the tab extending generally in the direction of plastic flow during molding.

Also an object of the invention is the provision of a container lid of the character described herein having a splash rib or flange in the top thereof to insure positive sealing of the container against leakage.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which

Fig. 1 is an elevational view of a soda container or the like covered with a lid embodying principles of the instant invention;

Fig. 2 is a greatly magnified fragmentary sectional view taken substantially as indicated by the line 2—2 of Fig. 1;

Fig. 3 is a view of the same character as Fig. 2, but illustrating the lid associated with the container having a slightly lesser diameter at the mouth end;

Fig. 4 is a greatly enlarged fragmentary bottom plan view of the container lid only;

Fig. 5 is a fragmentary somewhat diagrammatic bottom plan view illustrating the disadvantage of utilizing a single gripping tooth on the skirt of the lid widely spaced from other teeth;

Fig. 6 is a diagrammatic fragmentary view of the same character as Fig. 5, but illustrating the advantage of arranging the gripping teeth in circumferentially spaced pairs for removal from the mold;

Fig. 7 is a plan view of a molded thermoplastic container lid having a hinged push-out tab defined therein, and illustrating the general flow lines of the plastic material during the molding operation and the relationship of those lines to the push-out tab;

Fig. 8 is a greatly magnified vertical sectional view taken substantially as indicated by the line 8—8 of Fig. 7;

Fig. 9 is also a greatly magnified fragmentary vertical sectional view taken substantially as indicated by the line 9—9 of Fig. 7, indicating in dotted lines the movement of the push-out tab when utilized; and

Fig. 10 is a view of the same general character as Figs. 2 and 3, but illustrating a slightly different form of construction for the lid.

As shown on the drawings:

In Figs. 1, 2 and 3 of the drawings, the first illustrated embodiment of the instant invention is shown in operative association with a soda cup 1, or similar form of carry-out container. Usually a container of this character is made of paper, paper board, or the like, and is provided with an outwardly turned or rolled rim bead 2 around the mouth end of the container.

The lid forming the subject matter of the instant invention is preferably injection molded in a single piece from any suitable thermoplastic material. In some cases, thermosetting plastic material may be utilized, and such is, of course, to be considered within the purview of this invention and the appended claims, although a thermoplastic material may be more desirable in most cases, owing to its added flexibility.

The lid or enclosure comprises an imperforate top 3 from which an integral circumferential skirt 4 depends. The skirt is preferably shallower or of less depth than skirts commonly used heretofore on lids for carry-out containers. The lower portion of the skirt 4 preferably flares outwardly as indicated at 5 to facilitate the placing of the lid upon the container. Preferably just above the junction between the straight and flared skirt portions, the skirt is provided with an inwardly extending annular rib 6 having a relatively sharp edge 7 thereon for gripping engagement with the rim bead 2 of the container. With reference to Fig. 2, it will be seen that this rib 6 slightly bites into the flexible rim bead 2 of the container a short distance below the maximum diameter of the rim bead in a horizontal direction. Locating the rib for gripping engagement with the rim bead of the container in that region enables the lid to more effectively close containers throughout a relatively wide range of manufacturing variations in size of the rim bead, and accomplish this to a much greater extent than was possible with lids made heretofore with means for engaging underneath the lowermost point of the rim bead or in an adjacent region.

The instant invention is preferably provided with added holding means, and in the illustrated instance these added means take the form of inwardly extending teeth 8 having sharp edges for biting engagement into the rim bead of the container. These teeth are preferably disposed just

below the aforesaid gripping rib 6. The teeth 8 perform a double function. First, these teeth tend to prevent a carelessly applied lid from popping partially off the container, because the rib 6 was not pushed below the point of maximum diameter of the container rim bead. Secondly, these teeth provide a secure holding grip when there is a considerable variance in diameter of the containers. As seen best in Fig. 3, in some cases a container may have such a manufacturing variance in size of rim bead that the rib 6 will not effectively engage the rim bead. It will be noted that in this instance the rim bead 2a of the container 1 is of less diameter than the rim bead 2 seen in Fig. 2, and the edge 7 of the rib 6 is out of contact with the container bead. However, there is positive biting engagement by the teeth 8 into the rim bead, and the cover is securely held on the container with a line of seal where the cover contacts the top of the container bead.

With reference to Fig. 4, it will be seen that the teeth 8, while being individually defined, are preferably arranged in circumferentially spaced pairs. Such spacing of the teeth provides a definite advantage in the molding of thin walled plastic lids. With the illustrated arrangement, the teeth being in circumferentially spaced pairs, there is no need to utilize an expensive split mold, and there is very little chance of breakage when the molded lid is removed from the mold. I have attempted to diagrammatically illustrate this advantage in Figs. 5 and 6. In Fig. 5, where a single tooth relatively widely spaced from other similar single teeth is utilized, it will be noted that when an attempt is made to expand the lid or force the same outwardly to remove it from a mold diagrammatically indicated at 9, the arc at 10 along which the lid must be bent is considerably sharper than the arc at 11 in Fig. 6 illustrating the bending of the lid to remove it from the mold when the teeth are arranged in pairs. With the structure of Fig. 5, there is imminent danger of cracking the lid in removing it from the mold, while that danger is eliminated by the flattening of the arc as indicated at 11 in Fig. 6.

In Fig. 7, I have illustrated how the container lid of the instant invention may be provided with a push-out tab or the like in order to provide an opening to accommodate a soda straw. The tab is indicated at 12, and is hinged to the top 3 of the lid along one end at 13. The tab is generally defined by a substantially U-shaped indentation line 14 which is a region of lesser thickness, the indentation is preferably made on the underside of the cover and at the bottom of the indentation line 14 the thickness is preferably not over .002 inch thickness. With such a thin region of definition for the tab 12, it may readily be pushed downwardly as indicated by the dotted lines in Fig. 9, and a soda straw inserted through the cover into the container. Preferably the hinge line 13 is thickened as indicated in Fig. 9 by a slight elevation 15 on the underside of the cover to provide a strong hinge not likely to break and permit the tab to fall into the container.

It has been found more efficient to locate the tab 12 relatively to the direction of flow of the plastic in the molding operation. The gate for the injection molding operation is preferably at the center of the underside of the lid, as indicated at 16 in Fig. 7. The plastic then radiates toward the circumference of the lid from the gate 16, as indicated by the dashed lines 17 in Fig. 7. After the lid has been completely molded, it may be split or cracked much easier along a line generally in the direction of flow of the plastic during molding, than it can be split or cracked along a line substantially normal or at a right angle to the direction of flow of the plastic. For convenience, this direction of flow of plastic may be herein referred to as grain direction. Therefore, the hinge line 13 at one end of the lid is preferably disposed substantially at a right angle to the direction of flow of the plastic during molding as seen in Fig. 7, while the

portions of the indentation line 14 defining the side edges of the tab are disposed more generally in line with the direction of flow of the plastic. Thus, the tab is readily snapped free of the remainder of the lid, but will not break off at the hinge. The thickened portion at 15 at the hinge line limits the break when the tab is pushed in to the indentation line 14, so that the lid will not be split beyond the definition of the tab. This particular arrangement is even better than would be the case were the tab reversed with the hinge line nearer the circumference of the lid than the center or gate. If the hinge were disposed in the outermost position, there would be a turbulence in the flow of the plastic during the molding operation by virtue of the plastic striking the thickened line 15 and back-flowing. This would greatly weaken the hinge line of the tab.

In Fig. 10, I have illustrated the same lid construction as above described, but with one added element to further insure against possible leakage from the container, especially when the container is rather roughly handled. To this end, an integral splash rib or flange is molded on the underside of the top of the lid immediately adjacent the junction between the top and skirt, as indicated at 18 in Fig. 10. This splash rib performs the function of preventing splashing of the contents of the container into the region between the container bead and the skirt 4 of the lid if the lid has been rather carelessly applied and does not make contact with the top of the container bead all the way around. As seen clearly in Fig. 10, the splash rib 18 provides an added circumferential point of contact near the top of the container bead which eliminates the likelihood of leakage from the container by splashing.

It will be further noted that in the case of the instant invention, both the push-out tab 12 and the splash rib or flange 18 may be provided in the same molding operation, and without any additional cost except for the relatively negligible amount to provide the necessary added formations on the original mold or die.

From the foregoing, it is apparent that I have provided a highly efficient and yet extremely simple form of molded thermoplastic container lid, which may be readily pressed into position upon a container, even carelessly, and yet will provide an effective closure of the container against leakage. At the same time, the lid may be provided with a push-out tab so that a soda straw may be accommodated and the contents of the container removed without the necessity of removing the lid, thus aiding in protecting against spillage when the contents of the container are consumed in a moving vehicle or the like. It should also be especially noted that the lid automatically and effectively compensates for variations in the size of the container rim beads to a much greater extent than heretofore possible, and the lids may be extremely economically manufactured.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A lid for soda containers and the like, comprising an imperforate top, and an integral skirt depending from said top, an integral inwardly extending rib on said skirt, and circumferentially spaced teeth on said skirt just below said rib and extending inwardly beyond said rib.

2. A lid for soda containers and the like, comprising an imperforate top, and an integral skirt depending from said top, an integral inwardly extending rib on said skirt, and circumferentially spaced teeth on said skirt just below said rib and extending inwardly beyond said rib, and said skirt having an outward flare starting substantially in the plane of said teeth.

3. A lid for soda containers and the like, comprising an imperforate top, and an integral skirt depending from said top, an integral inwardly extending rib on said skirt, and relatively sharp edged teeth arranged in circumfer-

entially spaced pairs projecting inwardly from said skirt below and beyond said rib.

4. A lid for soda containers and the like, comprising an imperforate top, and an integral skirt depending from said top, an integral inwardly extending rib on said skirt, and relatively sharp edged teeth arranged in circumferentially spaced pairs projecting inwardly from said skirt below and beyond said rib, the teeth in each pair being spaced apart sufficiently to be individually defined.

5. A lid for soda cups and the like which cups have a flexible outwardly turned rim bead around the mouth thereof, said lid comprising an imperforate top, an integral skirt depending from said top, and an integral inwardly extending ridge on said skirt to engage the rim bead of the cup shortly below the transverse center line thereof, and circumferentially spaced teeth extending inwardly from said skirt below and beyond said rib whereby said lid compensates for manufacturing variances in sizes of cup rim beads.

6. A lid for soda cups and the like which cups have a flexible outwardly turned rim bead around the mouth thereof, said lid comprising an imperforate top, an integral skirt depending from said top, and an integral inwardly extending ridge on said skirt to engage the rim bead of the cup shortly below the transverse center line thereof, and circumferentially spaced teeth extending inwardly from said skirt below and beyond said rib whereby said lid compensates for manufacturing variances in sizes of cup rim beads, said teeth being individually defined but arranged in circumferentially spaced pairs, and said lid being molded in one piece from thermoplastic material.

7. A molded plastic lid for soda fountain containers or the like comprising a planar imperforate top, a depending skirt at the edge of said top, gripping means carried by the top for grippingly locking with the top edge of a container, and a push out tab defined in said top for being forced downwardly through said top to hingedly pivot about its base, said tab defined by an indentation line molded into said top to provide a separation line of less thickness than the material of the top, and formed with a base line of thickened material along the base of the tab to provide a strong hinge line preventing the tab from breaking free of the lid at its base and falling into the container.

8. A molded plastic lid for a soda fountain container or the like in accordance with claim 7 in which said indentation line is formed by a groove in the bottom surface of the top and said base line material projects downwardly from the lower surface of the cover.

9. An injection molded plastic lid for soda fountain containers or the like molded with plastic inserted into the center of a mold at the center of the cover and flowing outwardly, the lid having a planar imperforate top of plastic having a grain direction formed by the direction of plastic flow during molding extending radially outward from the center of the top, a depending skirt at the edge of said top, gripping means carried by the top for grippingly locking with the top edge of a container, and a push out tab defined in said top and spaced radially from the center of the lid for being forced downwardly through said top to hingedly pivot about its base, said tab defined by an indentation line molded into said top to provide a separation line with the tab extending generally radially and the indentation line extending radially substantially in said plastic grain direction and being of less thickness than the material of the top, the base of said tab extending at substantially right angles to said grain direction to provide a strong hinge line preventing the tab from breaking free of the cover at its base and falling into the container.

10. A lid for soda containers and the like, comprising an imperforate top, an integral skirt depending from said top, an integral inwardly extending rib on said skirt, circumferentially spaced teeth on said skirt just below

said rib and extending inwardly beyond said rib, and an integral splash rib molded on the underside of the top immediately adjacent the junction between the top and the skirt to prevent splashing of the contents of a container between the top of the container and skirt of the lid. 5

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