

Sept. 8, 1970

J. P. MANNING

3,527,372

CONTAINER

Filed Dec. 2, 1968

FIG. 1

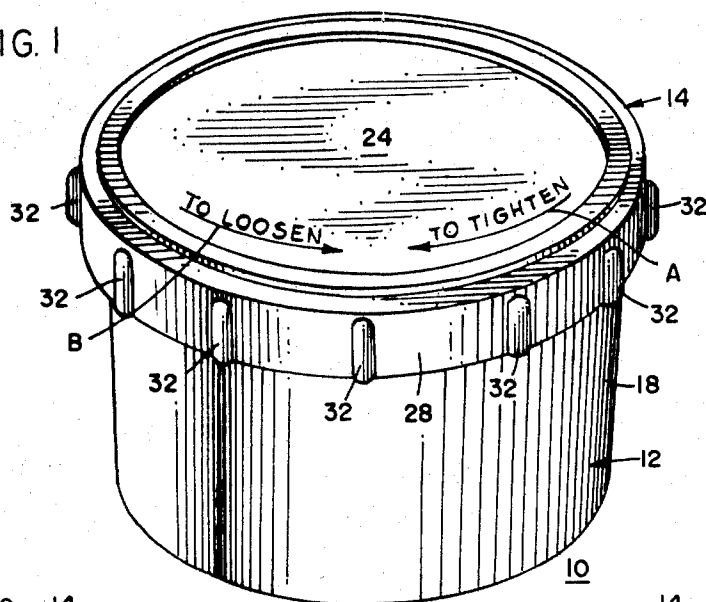


FIG. 2

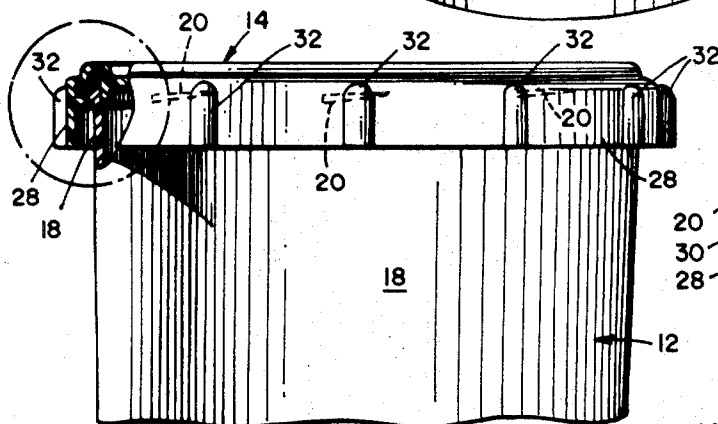


FIG. 3

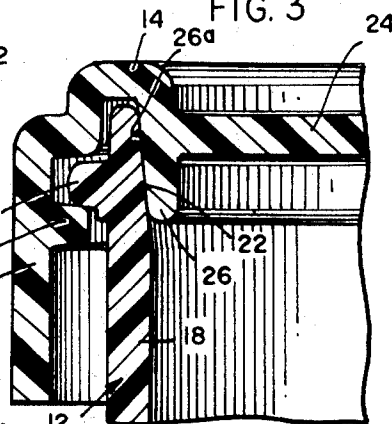


FIG. 4

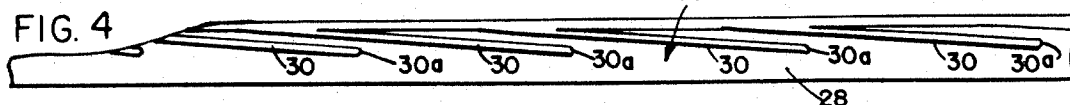


FIG. 5

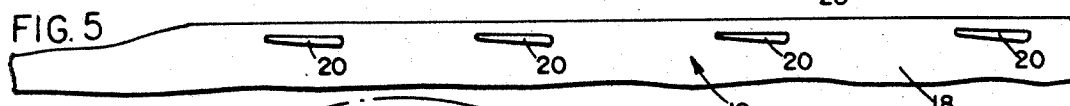
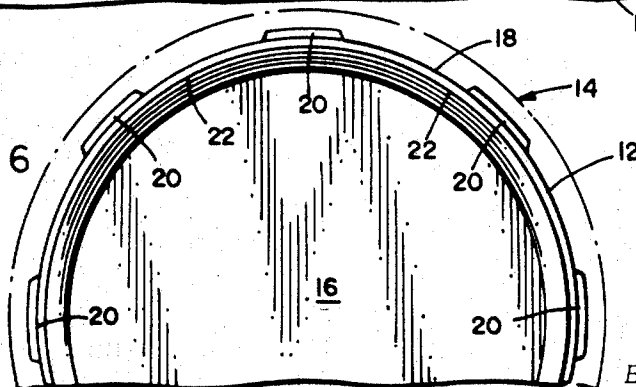


FIG. 6



INVENTOR:

JAMES P. MANNING
BY

Magoy, Kolehmaney, Rathbun, & Co.
ATT'YS

1

3,527,372
CONTAINER

James P. Manning, Deerfield, Ill., assignor to Republic Molding Corporation, Niles, Ill., a corporation of Illinois

Filed Dec. 2, 1968, Ser. No. 780,336
Int. Cl. B65d 41/06

U.S. Cl. 220—40

4 Claims

ABSTRACT OF THE DISCLOSURE

A container of molded plastic material comprising an open top receptacle and a removable cover therefor, said receptacle including a plurality of elongated thread segments and a substantially frustoconical sealing surface extended downwardly of an upper edge portion on the internal sidewall thereof, said cover including a top wall and a pair of inner and outer concentric annular flanges depending therefrom, a plurality of elongated thread segments on the inner side of said outer flange for engagement with the thread segments on said receptacle, and a substantially frustoconical sealing surface formed on an outer side surface of said inner flange for airtight sealing engagement with said sealing surface of receptacle and said cover when the cover is in closed threaded engagement therewith.

The present invention relates to containers formed of molded plastic material and more particularly to containers comprising an open top receptacle and a removable cover, both of which are formed of molded, impact resistant, relatively nonresilient plastic material and which can be sealed together to form an airtight enclosure for foodstuffs and the like.

There have been many attempts to provide airtight containers for foodstuffs and the like which are easy to open and close, and accordingly are well suited for storing foods for long periods of time without contamination. Many of these containers employ resilient lips or flanges around the edges of the container or cover, which lips or flanges must be deflected or snapped into a sealing position or sealing engagement. Consequently, in prior containers it is oftentimes difficult to seal the top or lid in place without spilling the liquid or other contents in the container when the snapping action takes place. In many instances, if the container is stored in a refrigerator, the lower temperature reduces the flexibility of the sealing lips and sometimes makes it difficult for the containers to be opened. Other times the reduction in temperature causes the seal to snap out of the sealed or closed position.

It is an object of the present invention to provide a new and improved container formed of strong, impact resistant, molded plastic material including an open top receptacle and a cover which are threadedly interconnected together to form an airtight enclosure for storing foodstuffs and the like.

Another object of the present invention is to provide a new and improved container of the character described wherein an airtight seal can be easily effected between the receptacle and the cover without the need for deflectable sealing rings and the like.

Yet another object of the present invention is to provide a new and improved container of the character described wherein an excellent airtight seal is obtained be-

2

tween matching frustoconical sealing surfaces on the receptacle and cover upon relative rotation thereof.

Another object of the invention is to provide a new and improved, high quality, molded plastic container for the airtight storage of foodstuffs and the like, which container will maintain an airtight enclosure even though subjected to relatively high and relatively low temperatures.

Another object of the invention is to provide a new and improved molded plastic storage container which is relatively low in cost, easy to produce on a mass production basis, tough and impact resistant, and neat in appearance.

The foregoing and other objects and advantages of the present invention are accomplished in an illustrated embodiment comprising a container formed of molded plastic material and including an open end receptacle and a cover therefor. The receptacle includes a plurality of elongated thread segments and a substantially frustoconical sealing surface extending downwardly of an upper edge portion on an internal sidewall thereof. The cover includes a top wall and a pair of inner and outer concentric annular flanges depending therefrom. A plurality of elongated thread segments are formed on the inner side of the outer flange for engagement with the thread segments on the receptacle and a substantially frustoconical sealing surface is provided on the outer side surface of the inner flange for airtight sealing engagement with the sealing surface on the receptacle when the cover is closed and threadedly engaged therewith. When the cover is put in place on the receptacle and the threads are interlocked by relative rotation, an excellent airtight seal is obtained between the confronting frustoconical sealing surfaces on the receptacle and cover, respectively, and this seal is maintained throughout wide variations in temperature and pressure until the threads are disengaged and the cover removed.

For a better understanding of the present invention reference should be had to the following detailed description taken in conjunction with the drawings, in which:

FIG. 1 is a perspective view from the top side of a new and improved molded plastic container constructed in accordance with the features of the present invention;

FIG. 2 is a fragmentary side elevational view of the container with an upper left-hand corner portion of the container shown in section;

FIG. 3 is an enlarged, detailed, sectional view of the upper left-hand corner portion of FIG. 2;

FIG. 4 is an exploded, peripheral, layout view showing thread segments formed on the cover member;

FIG. 5 is an exploded, peripheral, layout view showing thread segments formed around the periphery of the open top receptacle; and

FIG. 6 is a top plan view looking downwardly from the open upper end of the receptacle.

Referring now more particularly to the drawings, therein is illustrated a new and improved, molded plastic, storage container for foodstuffs and the like constructed in accordance with the features of the present invention and referred to generally by the reference numeral 10. The container 10 includes a cuplike, open top, receptacle or cup 12 and a removable cover or lid 14 adapted to be threadedly engaged with the receptacle to form an airtight, sealed enclosure for holding foodstuffs and the like. The receptacle 12 and the cover 14 are formed of integrally molded plastic material, such as polyethylene

3

and the like, having a high impact strength and relatively low resiliency so that the container is strong and resists breakage, even though it may be subjected to extremes in temperature when placed in a refrigerator or freezer, or when heated.

In accordance with the present invention, the receptacle 12 includes a circular bottom wall 16 (FIG. 6) and a substantially cylindrical or frustoconical upstanding peripheral sidewall 18 open at the upper end. A plurality of relatively short, elongated thread segments 20 are integrally formed on the exterior surface of the sidewall 18 adjacent the upper open end and the threads are spaced a short distance downwardly of the upper edge of the sidewall. As best shown in FIG. 6, the threads 20 are positioned circumferentially around the receptacle, and opposite ends of adjacent thread segments are spaced apart from one another. The inside surface of the receptacle 12 adjacent the upper edge of the sidewall 18 is formed with an upwardly and outwardly tapered frustoconical sealing surface 22 adapted to sealingly engage a downwardly depending, annular, sealing flange 26 formed on the cover 14 so that the cover can seal the upper end of the receptacle to form an airtight enclosure for the storage of foods for long periods of time without contamination.

The cover 14 includes a circular top wall 24 and a pair of integrally formed, concentric inner and outer, downwardly depending, annular flanges 26 and 28, respectively. As shown in FIG. 3, the flanges or rings 26 and 28 are spaced apart forming an annular recess for receiving the upper end portion of the sidewall 18 of the receptacle 12 when the cover 14 is closed over the upper end of the receptacle. The outside surface of the inner flange ring 22 is formed with a downwardly and inwardly tapered frustoconical sealing surface 22a (FIG. 3) adapted to confront and sealingly engage the opposite frustoconically tapered surface 22 formed on the inside of the receptacle wall 18. It should be noted that there is no sealing engagement between the upper end of the receptacle sidewall 18 and the top wall of the cover 14 and that the sealing contact is obtained in a substantially frustoconical contact area between the respective surfaces 22 and 26a. Accordingly, when the cap or cover 14 is rotated relative to the lower receptacle 12, the surfaces 26a and 22 are completely free to seat tightly together and form an enduring airtight seal between the cover and receptacle.

In order to lockingly engage the circumferentially spaced thread segments 20 on the receptacle 12 to hold the cover tightly in place and thereby maintain an airtight seal, the cover is provided with a plurality of elongated thread segments 30 which are formed on the inside surface of the outer flange 28. The threads 20 and 30 are especially adapted for rapid cooperative engagement to hold the receptacle 12 and cover 14 in a tightly closed relationship when the two members are relatively rotated, as indicated by the arrow A in FIG. 1, and for this purpose the threads 30 on the cover are substantially longer than the threads 20 formed on the receptacle. When the cover is placed in registration on the upper end of the receptacle only a relatively low degree of rotation is required before engagement between the thread segments 20 and 30 occurs. As shown in FIG. 4, the outer or lower ends 30a of each thread segment 30 are spaced between the opposite ends of the next adjacent segment in a circumferential sense. The thread pitch is at a relatively low angle so that excellent locking and holding are obtained between the engaged threads, and even though the container is subjected to a wide range of temperature variation, once the cover has been firmly tightened in place it is unlikely that the cover will come loose because of expansion and contractive forces.

When using the container 10, after the food or other items have been placed in the receptacle 12 for storage, the cover 14 is placed in registration on the upper open end of the receptacle. Because of the difference in length

4

between the thread segments 20 and 30, good contact between the threads is established at a plurality of points around the circumference and only a few degrees of rotation of the cover on the receptacle is needed to lock the threads and simultaneously establish an airtight seal between the frustoconical sealing surfaces 26a and 22. The seal is established without appreciable deflection of the components and without the need for deflectable lips or beads formed on either the receptacle 12 or cover 14. Consequently, the container 10 can be built with a heavy, rugged construction, well suited for long, hard usage.

To aid in tightening or loosening the cover 14 on the receptacle 12 by twisting in either direction, as shown by the arrows A or B in FIG. 1, the outer flange 28 on the cover is provided with a plurality of radially spaced, integrally formed downwardly extending ribs 32 which aid in grasping the cover in the hands.

The confronting, frustoconical sealing surfaces 22 and 26a provide an extremely good airtight seal, and the seal is obtained after a few degrees of twisting or rotation of the cover on the receptacle without requiring deformation or deflection of a lip or sealing ring. Because the sealing action does not depend upon the deflectable nature of the material or the use of a thin lip or sealing gasket, the molded cover 14 can be constructed of relatively heavy, strong, durable material and, hence, the containers 10 are suitable for long and useful service and can be subjected to relatively low temperatures in a freezer or refrigerator, or without appreciably affecting the tight seal between the cover and lower receptacle. Moreover, since no snapping or deflection of a sealing lip or ring is required, there is very little chance that spillage of liquid will occur as a seal is established.

While there has been shown and described a single embodiment of the present invention, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the invention in its broader aspects, and it is, therefore, contemplated in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A container of molded plastic material having high impact strength and relatively low resiliency and comprising an open top receptacle and a cover therefor; said receptacle including a plurality of elongated thread segments and a substantially frustoconical sealing surface extending downwardly of an upper edge portion on the internal sidewall thereof; said cover including a top wall and a pair of inner and outer concentric annular flanges depending therefrom, a plurality of elongated thread segments on the inner side of said outer flange for engagement with the thread segments on said receptacle, and a substantially frustoconical sealing surface matching the first mentioned sealing surface and formed on an outer side surface of said inner flange for airtight sealing engagement with said first mentioned sealing surface when said cover is in closed threaded engagement therewith to provide a substantially frustoconical contact area between the respective sealing surfaces, said top wall is integrally formed with said inner concentric annular flange intermediate the length of the second mentioned sealing surface providing rigidity to said inner concentric annular flange.

2. The container of claim 1 wherein said thread segments on said receptacle are substantially shorter than said thread segments on said cover and opposite ends thereof are circumferentially spaced apart around the outer sidewall of said receptacle.

3. The apparatus of claim 2 wherein said thread segments on said cover are in end overlapping arrangement whereby an end of one thread segment is spaced intermediate the ends of an adjacent thread segment.

4. The apparatus of claim 1 wherein said outer flange of said cover is formed with a plurality of circumferentially spaced projections on the outer surface thereof to facilitate rotation of said cover on said receptacle.

References Cited

UNITED STATES PATENTS

770,971	9/1904	Kunkel et al.	215—44
1,443,682	1/1923	Gueritey	220—40
2,370,732	3/1945	Johnson	215—44 XR
2,816,682	12/1957	Brucker	220—40 XR
3,371,817	3/1968	Gasbarra et al.	220—40

5

3,381,845
3,433,380
3,435,975

5/1968
3/1969
4/1969

MacDonald 220—40
Kawchitch 215—40 XR
Weigand 215—44 XR

FOREIGN PATENTS

356,032 9/1961 Switzerland.
224,002 10/1962 Austria.

JOSEPH R. LECLAIR, Primary Examiner

U.S. Cl. X.R.

215—44