July 13, 1965 C. CASTELLI 3,194,455

CONTAINER WITH SIFTER TOP

Original Filed April 6, 1961

Fig. 1.

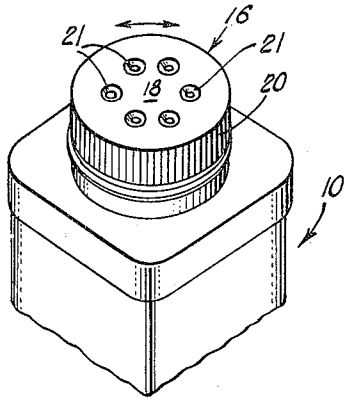


Fig. 2.

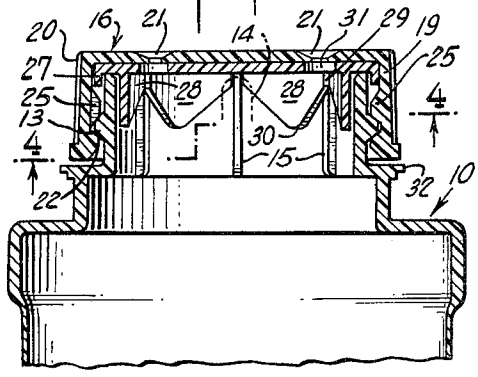


Fig. 3.

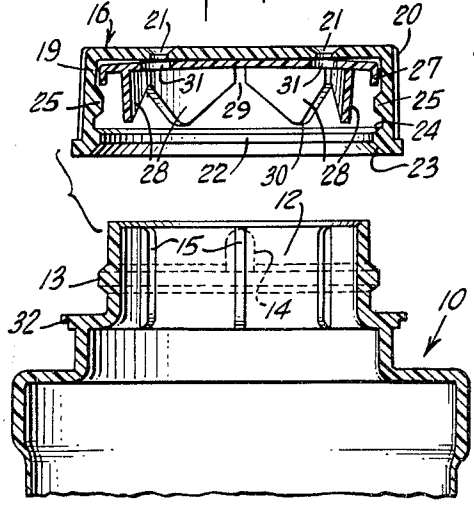


Fig. 5.

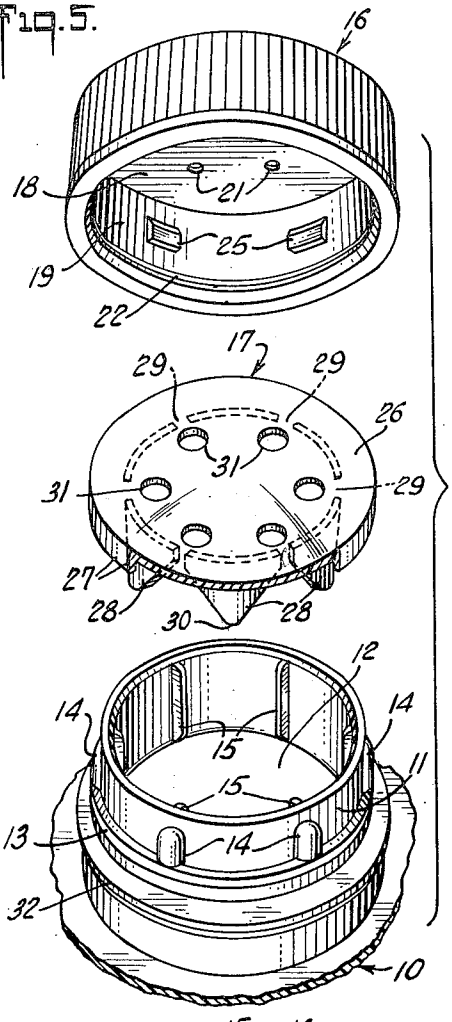
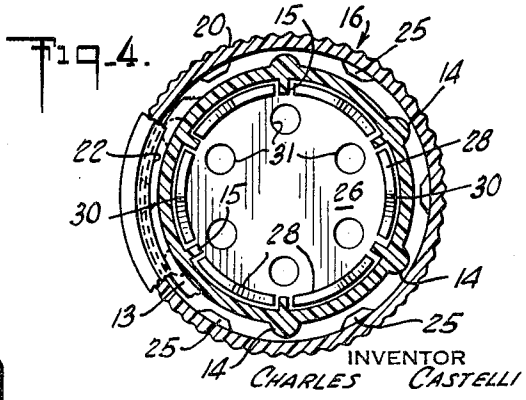


Fig. 4.



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United States Patent Office 3,194,455 Patented July 13, 1965

3,194,455
CONTAINER WITH SIFTER TOP

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Continuation of application Ser. No. 101,101, Apr. 6, 1961. This application Nov. 22, 1963, Ser. No. 333,249
4 Claims. (Cl. 222—545)

This invention relates to an improvement in a container and more particularly to a container with a sifter top for dispensing materials such as powder and is a continuation of my application Serial No. 101,101, filed April 6, 1961, now abandoned.

The improved container has a neck with filler opening adapted to be closed by a sifter cap which fits over the neck. The sifter cap includes inner and outer members having circular neck spanning and closing portions which are disposed coaxially and in face-to-face contact when the sifter cap is assembled and in position on the container. The inner cap member nests within the outer cap mmember and the parts are normally held in this position preparatory to capping the container by embossments protruding from the inner side of the outer cap member and which engage below the edge of the hole closing portion of the inner cap member. This nesting is effected during the assembly of the parts by placing the inner cap member inside the outer cap member and pressing the two together in an axial direction under force sufficient to snap the inner member past the protrusions on the outer member. With the parts thus nested, they are free for relative rotation about their common axis. The inner and outer neck closing portions are equipped with dispensing holes and are adapted by their relative rotation in one direction to move the holes into registry to dispense the contents of the container and by relative rotation in the opposite direction to move the holes out of registry to close the container.

In accordance with the invention, the previously assembled inner and outer cap members are positioned on the container to close the neck opening therein and the inner cap member, regardless of its position relatively to the outer cap member, is turned automatically into a position where it is locked against rotation with respect to the container neck so that relative rotation of the outer cap member with respect to the container will insure relative rotation of the outer cap member with the inner cap member, thereby positively to effect movement of the dispenser openings in the cap members into and out of registry.

Also in accordance with the invention, the neck closing portion of the inner member cambers upwardly toward the center in its relaxed condition but when the outer cap member is forced fully downwardly to its neck closing position the camber on the inner member flattens out to effect a tight seal under pressure all around the edge of the container.

A better understanding of the invention may be had from the following description read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of the upper portion of a container closed by a cap embodying the present invention;

FIG. 2 is a vertical sectional view through the upper portion of the container taken on the center line of the cap;

FIG. 3 is a vertical sectional view similar to FIG. 2, but showing the cap assembly and container just prior to assembly;

FIG. 4 is a horizontal sectional view on line 4—4 of FIG. 2; and

FIG. 5 is an exploded perspective view of the container

top portion and the cap assembly showing the parts all separated but in the same order along their common axis as will occur when assembly of the parts is completed.

In its preferred form, the invention contemplates a container 10 with side walls and a bottom wall, not shown, and with a top including a vertical cylindrical neck 11 defining an opening 12 giving access to the interior of the container (FIGS. 1, 2, 3 and 5). The neck, somewhat below its top edge, presents on its outer cylindrical surface a horizontal circumferential ridge 13 and just above the ridge a series of vertically disposed protrusions 14 equally spaced around the neck. These protrusions extend upwardly from the ridge but terminate at their upper ends just short of the top edge of the neck 11. The neck 11 also presents on its inner cylindrical surface a series of vertical ribs 15 equally spaced around the neck and which terminate at their upper ends approximately at the top edge of the container neck. These ridges are substantially the same width and thickness throughout their vertical length. The purpose of the outer circumferentially disposed ridge 13 and spaced protrusions 14 and the inner circumferentially spaced vertical ridges 15 will be evident as the description of the invention proceeds.

The opening 12 in the container neck is adapted to be closed by outer cap member 16 and inner cap member 17. Outer cap member 16 has a flat horizontal circular top 18 formed at its peripheral edge with a depending cylindrical apron or flange 19 adapted to fit over and around the neck of the container and whose outer surface presents a series of closely spaced vertical ridges 20 which provide a grip to facilitate turning the cap. The circular top portion 18 of the cap is formed with a series of dispenser apertures 21 equally spaced angularly about the center of the cap on a common pitch line. Apertures 21 have sections of small diameter near the under side of the cap and sections which flare outwardly from the small sections toward the top surface of the cap. The smaller sections of the apertures control the amount of material dispensed but the depth of the smaller sections is kept to a minimum consistent with required strength in order to diminish tendency to clog.

Outer cap member 16 presents, near the lower edge of its inner wall surface, a circumferential ridge or lip 22 trapezoidal in vertical cross section and with the trapezoid's base coinciding with the inner wall of the cap. For a purpose later made clear, lip 22 presents a lower inclined wall 23 which preferably makes an angle of somewhat more than 45 degrees with the horizontal and a top wall 24 which preferably makes an angle of somewhat less than 45 degrees with the horizontal.

Outer cap member 16 also presents a series of circumferentially spaced protrusions 25 on its inner surface about midway between lower lip 22 and the top of the cap member. Such protrusions in number preferably equal the number of spaces between the vertical protrusions 14 on the outer cylindrical surface of the container neck and in circumferential length are substantially less than the spacing between protrusions 14. Protrusions 22 also have a trapezoidal area in vertical cross section about equivalent to that of the underlying lip 22.

Inner cap member 17 has a circular top section 26 cambered upwardly toward its center and whose outer diameter is somewhat less than the inner diameter of the outer cap member to provide clearance for relative rotation. Circular top section 26 has a small depending flange 27 at its periphery which, when the parts are in container closing position, is disposed just outside the outer cylindrical surface of the container neck 11 (FIG. 2). Circular top section 26 also presents a series of vertically depending flanges 28 on its bottom surface, arcuate in horizontal cross section and whose outer radii are slightly less than the internal radius of the container neck.

Flanges 28 are circumferentially spaced to provide a plurality of notches 29 to accommodate each one of the vertical disposed ribs 15 presented on the inner surface of the container neck. The opposite surfaces of each of the arcuate flanges 28 which define the notches 29 are vertical for a short distance but for the remainder of their vertical dimension, they converge toward each other into a somewhat dull apex 30. The slope of the converging edges preferably is between 45 and 90 degrees with the horizontal.

Inner cap member 17 also is provided with a series of dispensing holes 31 on a pitch line of substantially the same radius as the pitch line of the holes 21 in the outer cap member and the angular spacing of the holes along the pitch line corresponds to the angular spacing of the holes in the outer cap member. Dispensing holes 31 are substantially larger than the smaller sections of dispensing holes 21, again to discourage clogging.

The container and the inner cap member may be metal or any other suitable substance, but a plastic material is preferred of which the parts can be molded. The outer cap member, however, must have a certain degree of yield and on this account the selection of material from which it can be made is more limited than is the selection of materials for the other parts of the container. The outer cap member preferably may be made of a high density polyethylene or any other suitable material that will provide equivalent yieldability.

In closing the container, a subassembly is first made of the inner and outer cap members. To this end, inner cap member 17 is first pressed up into nesting relationship with outer cap member 16 and in performing this operation outer cap member 16 will yield to a degree necessary to permit the flange 27 and the circular top section 26 of the inner member to move up past the lower lip 22 and the protrusions 25 presented on the inner surface of the outer cap member (FIG. 3). When nesting is completed, the center only of the inner cap member will, because of its camber, engage at the center of the outer cap member but its outer flange 27 will overlie the protrusions 25 on the inner wall of the outer cap member which, having yielded to permit insertion of the inner cap member, will have returned to normal position to hold the cap members against separation preparatory to closing the container.

To close the container, the cap assembly is pushed downwardly on the neck of the container along their common axis in which relationship the inner arcuate shaped depending flange members 28 on the inner cap member are located just inside the neck of the container. Now, regardless of the relative angular relationship between the inner cap member and the container and assuming the parts are not already in perfect alignment, the sloping edges of such arcuate shaped flange members 28 engage the vertical ribs 15 on the inner wall of the container neck and, as the cap assembly continues to move downwardly, the inner cap member rotates automatically until the notches 29 between the arcuate shaped flange elements register with said vertical ribs 15. This adjustment permits the inner cap member in the annular portion thereof which is between the arcuate shaped flanges 28 and the outer smaller peripheral flange 27 to seat upon the upper edge of the container neck and, when the inner cap member is thus seated, relative rotation between it and the container is prevented by the interengagement of the opposite surfaces of vertical ribs 15 in and with the opposite surfaces of the notches 29 between the arcuate shaped flanges.

Continued movement of the cap assembly downwardly, ultimately causes the lip 22 at the bottom of the outer cap member to engage below the circumferential ridge 13 on the outer surface of the container neck. As the outer cap member is pressed home, it yields to permit the lip 22 to engage beneath the ridge 13 whereupon substantial difficulty would be experienced to separate the parts because the angular relationship between the top surface 24 of the lip 22 and the underlying surface of the ridge 13 is one that will discourage movement of the cap in a direction to open the container. On the other hand, the angular relationship between the under surface 23 of the lip 22 and the upper surface of the ridge 13, encourages distention of the outer cap as the parts are pushed one past the other during closing of the container.

The cap assembly is held in its normal container closing position by the engagement of underlying lip member 22 with overlying ridge member 13 on the container neck. In arriving in this position, the camber at the top of the inner cap member is flattened out and is held in its flattened out condition by a force exerted by the outer cap member whose strength for this purpose may be obtained by making its thickness sufficiently greater (assuming the materials are the same) than the thickness of the inner member as to permit the latter to yield without the former. And when the inner cap member has been forced flat, a relatively tight seal around the upper edge of the container neck will result. If the parts are not made of the same material, other considerations may dictate the dimensions that must be used to obtain the type of seal just mentioned.

When the container is closed by the cap assembly, the protrusions 25 on the inner wall of the outer cap member are located between the vertical protrusions 14 on the outer wall of the container neck so that rotation of the outer cap member with respect to the container is limited to an extent which permits the dispensing holes 21 in the outer cap member to be rotated into registry with the holes 31 in the inner cap member to permit dispensing material from the container and out of registry with such holes so that the latter are completely closed to prevent dispensing material from the container. Relative rotation of the outer cap member with respect to the inner cap member is, of course, insured by the fact that the inner cap member is locked against rotational movement with respect to the container in manner previously described.

As previously stated, the container itself and the inner cap member may be made of relatively rigid material while the outer cap member must, to a certain degree, be yieldable. It is preferred, however, that the container and all its parts be made of the same material throughout. In such cases, the material of the container will be yieldable too. Accordingly, to facilitate capping, the container is provided adjacent the lower end of its neck with a laterally extending flange 32 adapted to accommodate beneath it a rigid tool or backing element so as to give the container neck a degree of rigidity sufficient to permit the container to be capped without difficulty.

The invention has been described in connection with one embodiment thereof, but many modifications are included within its spirit. It is to be limited, therefore, only by the scope of the appended claims.

What is claimed is:

1. A container with sifter top comprising a neck member presenting a filling opening and including a vertical wall with a smooth-edged top, an inner cap member having a top portion equipped with first dispensing aperture means and which seats on said smooth-edged top, and an outer cap member accommodating the inner cap member and having a top portion equipped with second dispensing aperture means, said cap members, in their assembled positions, covering the filling opening and being in axial alignment with each other and with the axis of the neck member and being relatively rotatable about their axes to move the first and the second aperture means into and out of registry respectively to permit and prevent dispensing material from said container, a plurality of interlocking means presented one by the neck member on one surface of the wall thereof and the other by means depending from the top portion of the inner cap member adjacent said wall surface, said interlocking means being adapted by interlocking en-

gagement when the cap members are in their assembled positions on the container neck, to lock the inner cap member against relative rotation in either direction with respect to the neck member, and means associated with one of said interlocking means for guiding them into interlocking engagement, said guide means being so shaped and disposed as to locate the interlocking means for movement into operative position upon movement of the neck and inner cap members toward each other longitudinally along their axes when said members are coaxially disposed and regardless of their relative angular dispositions about their axes, the shape and disposition of said guide means being such as to rotate said neck and said inner cap member relatively with respect to each other about their common axes to effect operative engagement of the interlocking means as said members are moved into their assembled positions, and means including the outer cap member for holding the inner cap member and the neck member in their assembled positions.

2. A container with sifter top according to claim 1 wherein the top portion of the inner cap member is cambered outwardly and wherein the outer closing cap member in its assembled position engages the cambered portion of the inner cap member in a manner to effect a seal under pressure between the top portion of the inner cap member and the smooth-edged top of the container.

3. A container with sifter top comprising a neck member presented a filling opening and including a vertical wall with a smooth-edged top, an inner cap member having a top portion equipped with first dispensing aperture means and which seats on said smooth-edged top, and an outer cap member accommodating the inner cap member and having a top portion equipped with second dispensing aperture means, said cap members, in their assembled positions, covering the filling opening and being in axial alignment with each other and with the axis of the neck member and being relatively rotatable about their axes to move the first and the second aperture means into and out of registry respectively to permit and prevent dispensing material from said container, interlocking rib means and notch means presented one by the neck member on one surface of the wall thereof and the other by means depending from the top portion of the inner cap member adjacent said wall surface, said rib means and notch means being adapted when the cap members are in their assembled positions on the container neck, to lock the inner cap member against relative rotation in either direction with respect to the neck member, means on that member which presents the notch means for guiding the rib means and the notch means into interlocking engagement, said guiding means being so shaped and disposed as to enter between the rib means upon movement of said neck and inner cap members toward each other longitudinally along their axes when said members are coaxially disposed and regardless of their relative angular dispositions about their axes, the shape and disposition of said guiding means being such as automatically to rotate said neck and said inner cap members relatively with respect to each other about their common axes to effect the interlocking engagement of the rib means and notch means as said members are moved into their assembled positions, and means including the outer cap member for holding the inner cap member and the neck member in their assembled positions.

4. A container with sifter top comprising a neck member presenting a filling opening and including a vertical wall with a smooth-edged top, an inner cap member having a top portion equipped with first dispensing aperture means and which seats on said smooth-edged top, and an outer cap member accommodating the inner cap member and having a top portion equipped with second dispensing aperture means, said cap members, in their assembled positions, covering the filling opening and being in axial alignment with each other and with the axis of the neck member and being relatively rotatable about their axes to move the first and the second aperture means into and out of registry respectively to permit and prevent dispensing material from said container, means protruding from the neck member on one surface of the wall thereof and recess means presented by flange means depending from the top portion of the inner cap member adjacent said wall surface, said protruding means and said recess means being adapted when the cap members are in their assembled positions on the container neck to lock the inner cap member against relative rotation in either direction with respect to the neck member, means on the flange means of the inner cap member for guiding the protruding means and the recess means into interlocking engagement, said guiding means being so shaped and disposed as to enter between the protruding means upon movement of said neck and inner cap members toward each other longitudinally along their axes when said members are coaxially disposed and regardless of their relative angular dispositions about their axes, said shape and disposition of said guiding means being such as to rotate said neck and inner cap members relatively with respect to each other about their common axes to effect the interlocking engagement of the protruding means and the recess means as said members are moved into their assembled positions, and means including the outer cap member for holding the inner cap member and the neck member in their assembled positions.

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