

[54] CHILD-RESISTANT CLOSURE USING A PLURALITY OF ROTATABLE CLOSURE MEMBERS 3,313,441 4/1967 Fadden 215/9 X

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[57] ABSTRACT

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A child resistant dispensing closure can be constructed so as to include a base having a first closure member and a structure attached to said first closure member for securing the base to a container. Such a closure is used with a plurality of additional closure members which are rotatably mounted adjacent to one another so as to be capable of being rotated about the same axis. All of these closure members are provided with openings which are offset with respect to this axis. Seals are provided on the closure members between the adjacent surfaces of adjacent closure members. The closure members are capable of being independently rotated so as to either bring the openings in them into or out of alignment with one another.

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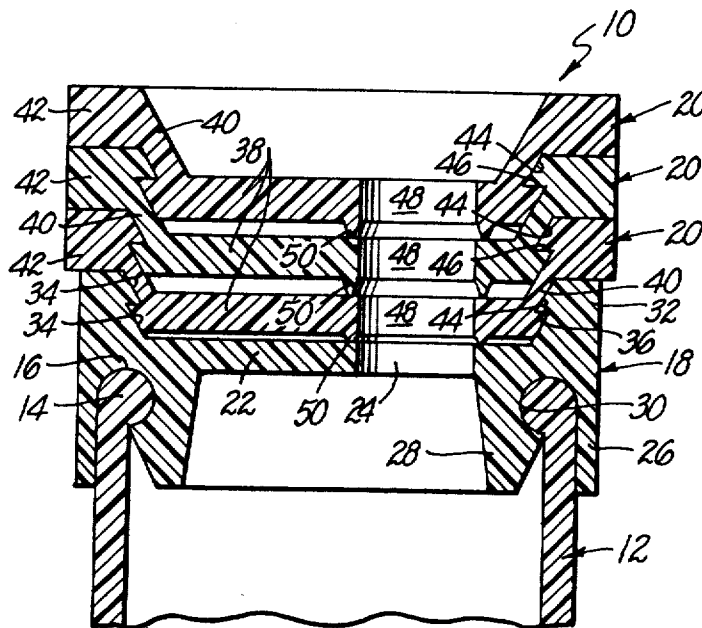
[58] Field of Search 215/9; 221/265, 277, 298; 222/370, 444, 450, 545, 548, 48

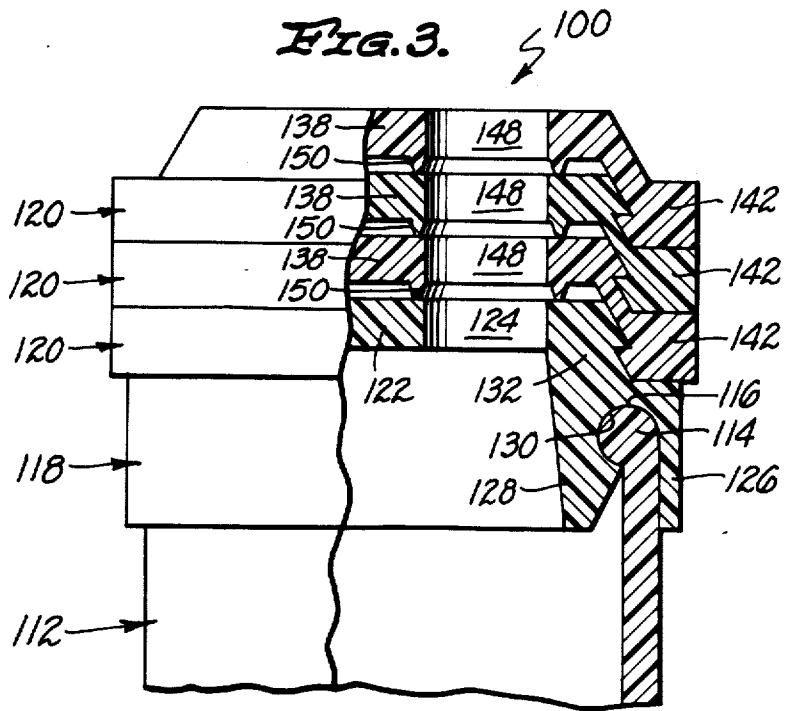
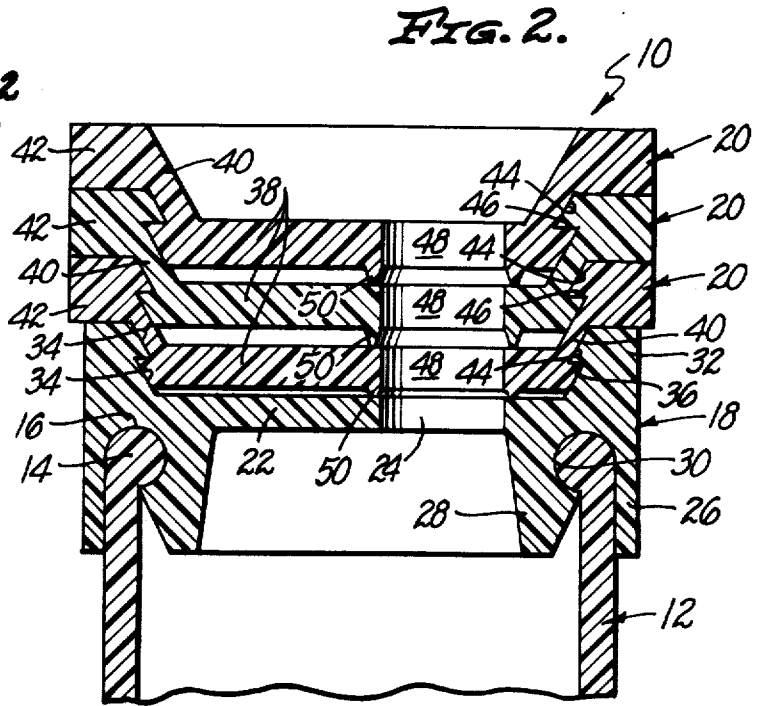
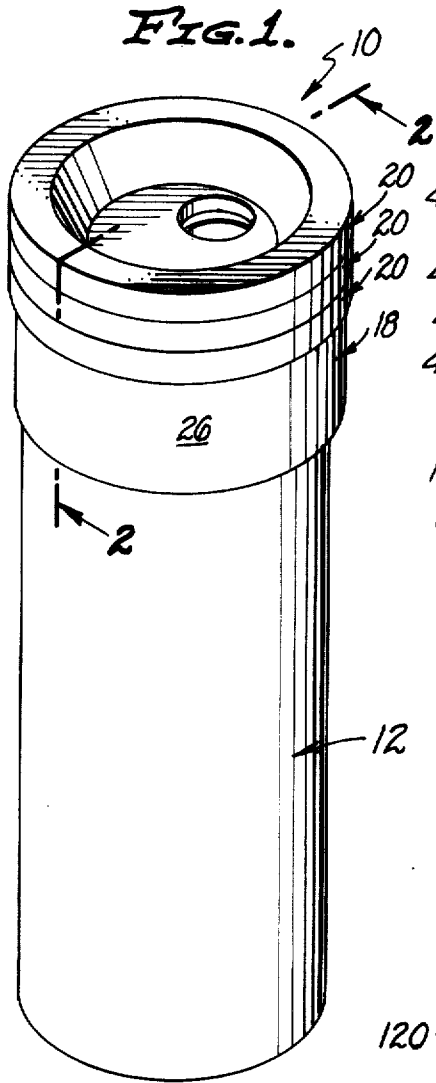
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2 Claims, 3 Drawing Figures





1

**CHILD-RESISTANT CLOSURE USING A
PLURALITY OF ROTATABLE CLOSURE
MEMBERS**

BACKGROUND OF THE INVENTION

The recognition of the desirability of using closures which are child resistant in the sense that they are hard to open in packaging various damaging or hazardous materials has led to the development of a number of structures for this purpose. Such structures are of a wide variety of different types. They utilize many different indexing, holding and related mechanisms. To a large extent all of such structures require a certain amount of manual dexterity for their actuation or operation.

For a dispensing closure to be acceptable for use by aged and infirm individuals having significantly less than normal physical exerty and strength is is considered that such a closure should be of such a character that very little physical dexterity and strength is required to open it. Although certain prior dispensing closures have been constructed so that comparatively little physical strength or dexterity is required for their operation it is considered that such prior closures have been commercially undesirable for any one of a variety of reasons which are unimportant for an understanding of the invention described in this specification.

SUMMARY OF THE INVENTION

The invention set forth in this specification is directed towards providing dispensing closures which do not require significant physical dexterity and strength to be opened but which are still sufficiently difficult to open so that they may be classified or considered as child resistant in character. Further objectives of the invention are to provide closures as indicated which may be manufactured at a comparatively nominal cost, which may be easily installed upon containers and which are capable of providing prolonged, reliable performance. The invention is specifically directed towards providing dispensing closures as indicated which can be easily utilized by comparatively aged or infirm individuals who, although lacking in physical strength and dexterity, possess normal adult mental capabilities.

In accordance with this invention these objectives are achieved in the dispensing closure having a base including a first closure member and a dependent means for attaching the base to a container and also having a second closure member rotatably mounted on said first closure member so as to be capable of being rotated about an axis, said first and second closure members having openings extending therethrough which are offset from said axis, the second closure member being capable of being rotated so as to bring the opening it into alignment with the opening of the first closure member by the improvement which comprises: at least one additional closure member rotatably mounted adjacent to the second closure member, each additional closure member being capable of being rotated about said axis and having an opening formed therein which is offset with respect to said axis, said second and each additional closure member being capable of being independently rotated so that the openings in all of said closure members are in alignment with one another.

The action here involves the use of a plurality of closure members all of which except the first are capable

2

of being independently rotated with respect to one another and the first closure member. By virtue of the fact that these closure members are used as described the use of a dispensing closure in the present invention involves what may be referred to as a "combination lock" type of effect requiring alignment of all of the openings in the closure members. Because of the nature of this manner of operation a dispensing closure as herein described may easily be operated by an individual having less than normal physical strength and dexterity but having normal mental capabilities.

BRIEF DESCRIPTION OF THE DRAWING

Further details of structures in accordance with the invention are best indicated with reference to the accompanying drawing in which:

FIG. 1 is an isometric view of a presently preferred embodiment or form of a dispensing closure of the present invention installed on a container;

FIG. 2 is a partial cross-sectional view taken at line 2—2 of FIG. 1; and

FIG. 3 is a partial cross-sectional view corresponding to FIG. 2 in which portions of the closure are shown in elevation.

The closures illustrated utilize the features or concepts of the present invention which are defined or summarized in the appended claims forming a part of this specification. These features or concepts may be easily used in a wide variety of differently constructed and differently appearing dispensing closures through the use or exercise of routine skill in the dispensing closure industry.

DETAILED DESCRIPTION

In FIGS. 1 and 2 of the drawing there is shown a dispensing closure 10 of the present invention installed upon a conventional cylindrical container 12 having a bead 14 located at its top 16. The closure itself includes a base 18 and three closure members 20. This base 18 and the closure members 20 are preferably all constructed or formed of a somewhat resilient material such as a common commercial grade of polyethylene or a similar polyolefin so that these parts may be snapped together.

The base 18 includes a flat, disc like first closure member 22 having an opening 24 formed therein which is offset slightly with respect to the center of this closure member 22. The periphery of this closure member 22 carries a conventional skirt 26 and a conventional plug 28 formed with an internal groove 30. It will be noted that this skirt 26 and this plug 28 fit around the top 16 so that the bead 14 is located within the groove 30. This structure of this skirt 26 and the plug 28 is merely a mounting structure and various other functional equivalent mounting means may be used with the closure 10.

Around the periphery of the closure member 22 above the skirt 26 an upstanding flange 32 is formed on the base 18. This flange 32 has two beveled, annular walls 34 which are separated by a flat annular wall 36. Each of the closure members 20 is of a more or less disclike shape and includes a flat central portion 38 connected by a beveled wall 40 to a peripheral ring 42. Notches 44 are provided on the exterior of the beveled wall 40 between the central portions 38 and the rings 42. Similarly projecting beads 46 are provided on the interiors of the rings 42 adjacent to the tops of the rings

42. The bead 46 is, however, preferably omitted from the uppermost of the closure members 20. These closure members 20 also all include openings 48 which are offset relative to their centers. The undersurface of each of the central portions 38 of each of the closure members 20 also preferably carries an annular, dependent resilient sealing ring 50 extending around the opening in it.

This structure is designed so that the closure members 20 may be assembled and slipped or popped together in stacked, parallel relationship on the base 18 above the closure member 22 as shown so that each of the closure members 20 is capable of being independently rotated. The closure member 22 is, however, not intended to be rotated since it forms a part of the base 18 which is attached to the container 12. As assembled the sealing rings 50 on the rotatable closure members 20 resiliently engage the adjacent surfaces of the next adjacent closure members so as to form seals therewith at all times. With this type of structure the closure members 20 may be independently rotated so as to place the opening 24 and the openings 48 either out of or into alignment with one another. When they are out of alignment with one another a combination lock type of action is required to locate all of the closure members 20 so that the openings 24 and 48 are in alignment. This action may be easily achieved by a person with less than normal physical strength or dexterity having normal mental capability.

In FIG. 3 of the drawing there is shown a dispensing closure 100 which in many respects is substantially the same as the closure 10. For this reason various parts of the closure 100 are not separately described herein and are indicated in the accompanying drawing and where necessary for explanatory purposes herein by the numerals previously employed to designate such parts preceded by the numeral 1.

The dispensing closure 100 differs from the closure 10 in that it is essentially of an inverted type of character in that the flange 132 is located between the closure member 122 and the skirt 126 and the plug 128 so that the closure member 122 is elevated above and spaced from the skirt 126. Similarly the closure members 120 are constructed so that the central portions 138 extend upwardly from the rings 142 instead of extending downwardly beneath these rings 142. As a consequence of this the uppermost closure member 120 has an almost spout-like appearance.

If desired a separate spout may be used to extend from the opening 48 in the closure 10 or the opening 148 in the dispensing closure 100 in the uppermost of the closure members noted. Similarly knurling may be provided on the rings 42 and 142 or these rings may be imprinted with numbers, lines or other indicia to facilitate the use of the closures 10 and 100.

It will be realized that the closure members 20, 120, 22 and 122 are flat and parallel so that the sealing rings 50 and 150 will always be effective to form seals between the adjacent closure members and the complete closures 10 and 100 described. Similar results can be achieved if the surfaces of these closure members are all within a uniform shape of a surface of revolution so long as these closure members are located parallel to

one another.

I claim:

1. A dispensing closure having a base including a first closure member and a dependent means for attaching said base to a container located around the periphery of said first closure member, said closure also having a second closure member rotatably mounted on said first closure member so as to be capable of being rotated about an axis, said first and said second closure members having openings extending therethrough which are offset from said axis, said second closure member being capable of being rotated so as to bring the opening therein into alignment with the opening in said first closure member in which the improvement comprises:

at least one additional closure member rotatably mounted adjacent to said second closure member, each additional closure member also having an opening formed therein which is offset with respect to said axis,

each of said closure members having integral interlocking means for securing said second and said additional closure member together on said first closure member so as to form a stack of said closure members, said interlocking means holding said members against axial movement away from one another,

all of said closure members being of a resilient material permitting said interlocking means on said closure members to be popped together,

the adjacent surfaces of all of said closure members being parallel surfaces of revolution,

one of each of the two adjacent surfaces between adjacent of said closure members carrying an integrally formed sealing means for forming a seal between the two adjacent closure members,

said interlocking means holding said second and said additional closure members so that each of said sealing means resiliently engages the adjacent surface of the next adjacent closure member,

said interlocking means holding said second and said additional closure members so that each of them can be independently rotated completely around said axis,

the exteriors of all of said closure members being exposed to the exterior of said dispensing closure so that said closure members are capable of being manually engaged,

said closure members being capable of being independently rotated so that the openings of all of said closure members are in alignment in order for material to be moved through said closure.

2. A dispensing closure as claimed in claim 1 wherein:

all of said closures have flat central portions, said openings being located so as to extend between the surfaces of said flat portions,

said adjacent surfaces are the surfaces of said central portions,

and said second and said additional closure members are formed so that said sealing means are sealing rings.

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