Jan. 6, 1959 C. W. BAARS ET AL 2,867,342

SAFETY LOCKING MECHANISM FOR A ROTATIVELY MANIPULATED MEMBER

Filed May 9, 1957 2 Sheets-Sheet 1

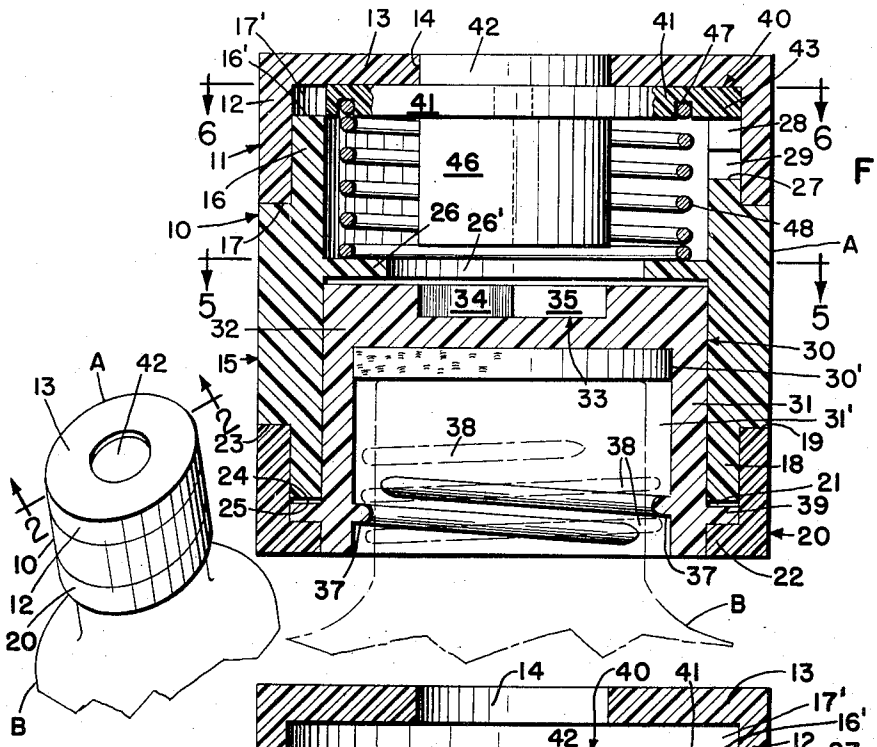


FIG. 1

FIG. 2

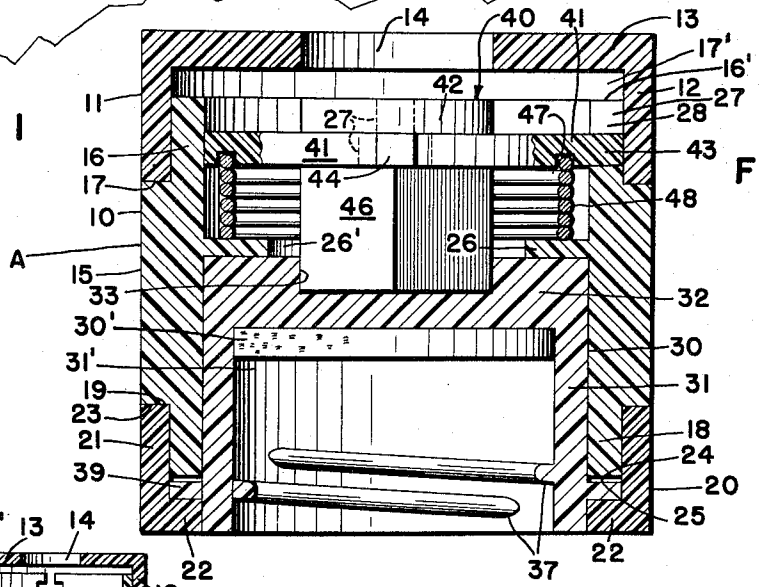


FIG. 3

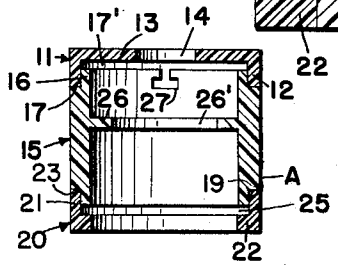


FIG. 4

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2 Sheets-Sheet 2

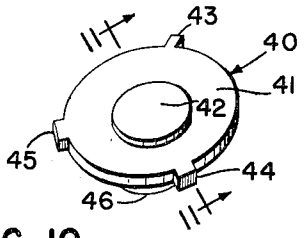


FIG. 10

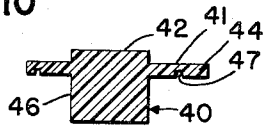


FIG. 11

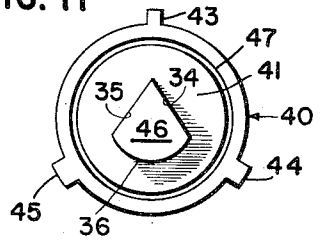


FIG. 12

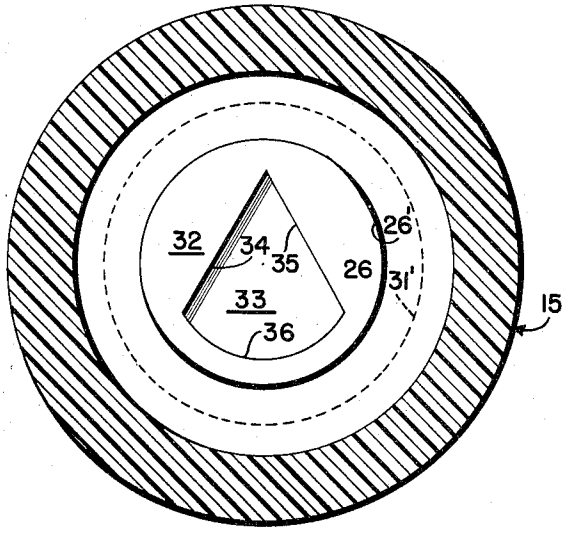


FIG. 5

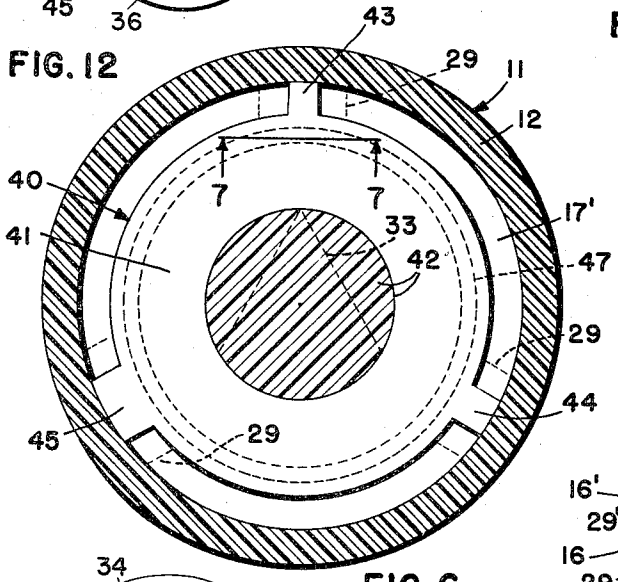


FIG. 6

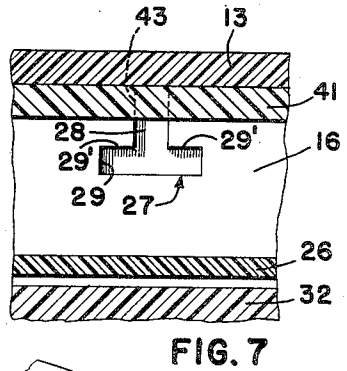


FIG. 7

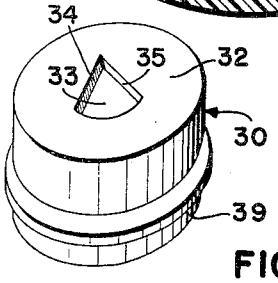


FIG. 9

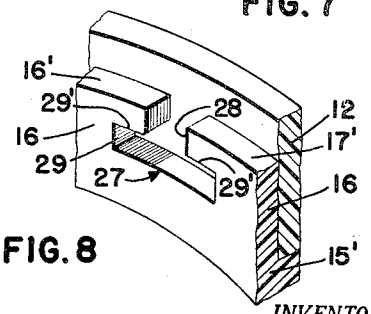


FIG. 8

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SAFETY LOCKING MECHANISM FOR A ROTATIVELY MANIPULATED MEMBER

Conrad W. Baars and Jorge A. Lazarte, Rochester, Minn.

Application May 9, 1957, Serial No. 658,136

3 Claims. (Cl. 215—9)

Our invention relates to an improvement in locking mechanisms and more particularly to a locking mechanism for incorporation in a bottle cap, doorknob, or other member which is rotatively manipulated whereby the same cannot be removed without correct manipulation. Many children's deaths each year are due to easy access to a bottle containing poison or other harmful substance. Many home appliances having knobs are damaged by repeated use of the same by children.

It is an object of our invention to provide a locking mechanism for a rotatably manipulated member which allows the same to be rotated for removal only when the device is manipulated correctly.

It is a further object to provide a locking mechanism for a cap or the like having an outer cap member which rotates freely with the same in an unlocked position.

It is also an object to provide a locking mechanism which is simply and easily placed in a locked or unlocked position when the correct manipulation is used.

We shall not here attempt to set forth and indicate all of the various objects and advantages incident to our invention, but other objects and advantages will be referred to in or else will become apparent from that which follows.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing by way of example a preferred embodiment of the inventive idea wherein like numerals refer to like parts throughout.

In the drawings forming part of this application:

Figure 1 is a perspective view of a cap embodying our invention mounted on the threaded neck of a bottle which is only partially shown.

Figure 2 is a sectional view of our cap on the line 2—2 of Figure 1 with the parts in the unlocked position.

Figure 3 is a view similar to Figure 2 but with the parts in locked position and the bottle not shown.

Figure 4 is a sectional view of the outer cap in reduced scale.

Figure 5 is a sectional view on the line 5—5 of Figure 2.

Figure 6 is a sectional view on the line 6—6 of Figure 2.

Figure 7 is a partial sectional view on the line 7—7 of Figure 6.

Figure 8 is an enlarged detailed perspective view of the locking inverted T slot with the top of the outer cap removed.

Figure 9 is a perspective view of the inner cap member.

Figure 10 is a perspective view of the locking disc member.

Figure 11 is a sectional view of the disc on the line 11—11 of Figure 10.

Figure 12 is a plan view of the lower surface of the disc.

Referring to the drawings in detail our safety locking mechanism is shown as incorporated in a cap for a bottle having a threaded neck. It is apparent that the mechanism may be incorporated in knobs used on various devices such as radio and television sets, doors and other manipulative members, and we do not desire to be limited to the construction shown.

The safety locking cap A includes the cylindrical outer cap member 10 which is formed of the upper cylindrical cup-like portion 11 composed of the annular outer wall 12 and the circular end portion 13. The end portion 13 has formed therein the centrally disposed opening 14 through which the tip of the finger of the operator is inserted as hereinafter set forth.

Further included in the outer cap 10 is the centrally disposed cylindrical portion 15 formed with the upper reduced end portion 16 thereby forming the annular shoulder 17. The upper cup-like portion 11 is fitted and cemented on the reduced portion 16 with the lower edge thereof in abutment with the shoulder 17. The upper edge 16' of the reduced portion 16 is short of the end 13 thereby forming the annular channel 17'. The portion 11 is secured in place only after certain inner members are in position as hereinafter described.

The cylindrical portion 15 is also formed with the lower reduced end portion 18 thereby forming the annular shoulder 19. The lower cylindrical cup-like portion 20 is formed of the annular outer wall 21 and the annular shoulder portion 22 extending at a right angle thereto. The lower cup-like portion 20 is fitted and cemented on the reduced portion 18 with the upper edge 23 in abutment with the shoulder 19. The width or extent of the annular wall 21 is such that when in position the right angular shoulder 22 is spaced from the lower edge 24 of the member 15 thereby forming an annular recess 25. The lower cup-like portion 20 is cemented in place only after certain inner members hereinafter described are in place.

Formed on the internal wall surface of the central cylindrical portion 15 of the outer cap 10 is the annular shoulder 26 which defines the circular opening 26'. Also formed in the internal wall surface of the reduced portion 16 at the upper edge thereof are three equally spaced inverted T-shaped slots 27 each of which is formed with the upright slot portion 28 connecting with both the annular channel 17' and the horizontal slot portion 29. In each of the three T-formations or slots 27, the upright slot portion 28 thereof is of a different width for the purpose hereinafter described, only one width being shown in Figures 7 and 8 but with the different widths indicated in Figure 6.

We further provide the cylindrical inner cap 30 which is positioned concentrically within the outer cap 10. The inner cap 30 includes the cylindrical wall portion 31 forming the cavity 31' which is closed at the top by the circular end portion 32. The gasket 30' is positioned in the cavity 31' and is contacted by the top of the neck of the bottle B. Formed in the upper surface of the end portion 32 is the depressed area or recess 33 having the angularly disposed diverging side walls 34 and 35 and the connecting arcuate wall 36 which is concentric with the circular top portion 32. The cylindrical wall portion 31 of the inner cap has formed on the inner surface thereof the thread formations 37 which engage with the external threads 38 of the neck of the bottle B. The inner cap 30 has formed on the outer surface of the wall portion 31 the annular rim 39 which is adjacent the lower open end of the cap. When the entire cap A is assembled, the rim 39 permanently and slidably operates in the annular recess 25 hereinbefore described.

The numeral 40 indicates a disc member which is composed of the flat circular body portion 41 having formed on the upper surface thereof the concentrically formed circular protrusion 42. Formed on the outer periphery

of the circular body portion 41 and extending radially therefrom are the three projections 43, 44, and 45 which are spaced the same as the T-slots 27. Also formed on the circular body 41 is the depending lug formation 46 having an outer contour similar to but slightly smaller than the recess 33 formed in the top of the inner cap 30 into which the lug 46 engages as hereinafter set forth. The projections 43, 44, and 45 are of different widths which correspond with the three different width upright slots 29, and the projections slip into the upright slots 28 and down into the horizontal slots 29 when the corresponding projections and slots are opposite each other. The projections 43, 44 and 45 slidably rest on the upper edge 16' of the reduced portion 16 and extend into the annular channel 17'.

The circular body portion 41 of the disc member 40 has formed on the under surface thereof the circular groove 47. The circular groove 47 receives the uppermost convolution of the coil spring 48, and the lowermost convolution of the spring is positioned against the permanent annular shoulder 26 thus urging the disc 40 upwardly with the upper surface of the body portion 41 against the underside of the end portion 13 and the protrusion 42 extending into the opening 14 of the outer cap 10, particularly as illustrated in Figures 1 and 2.

The inner cap 30 has an outside diameter whereby the outer cap 11 can freely rotate on the same when the parts are in the position illustrated in Figure 2, and let it be assumed that the inner cap 30 has been securely screwed onto the threaded neck of the bottle B.

To remove the entire cap A from the bottle B, the operator presses downwardly on the protrusion 42 positioned in the opening 14 and rotates the protrusion at the same time thereby rotating the projections 43, 44 and 45 until the projections slip down into the upright recess portions 28 of the corresponding size. These projections 43, 44 and 45 cannot slide into the horizontal connecting recesses 29 of the T-shaped slots until, by further rotation of the now functionally united disc 40 and outer member 10, the disc 40 is connected to the inner cap 30 by the moving down of the lug 46 through the opening 26' against the action of the spring 48 and into the depression 33 existing on the upper surface of the end portion 32 of the inner cap 30. It is apparent that when the projections 43, 44 and 45 of the disc 40 are positioned in the horizontal slot portions 29 and under either of the edge portions 29' thereof, depending upon the direction of rotation, the disc 40 is maintained in its lower position and the lug 46 maintained in contact with the recess 33. As a result the outer cap 10 is locked to the disc 40 by means of the projections 43, 44 and 45 in the recesses 29 of the T-slots 27, and the disc 40 is connected to the inner cap 30 by means of the lug 46 positioned in the depression 33 thereof. Further, there can be no relative motion between the outer cap 10 and the inner cap 30, and the parts actually become a single unit. With this condition further rotation of the outer cap 10 will rotate and remove the entire cap unit A from the bottle B allowing access thereto. Thus the cap A can only be removed when the disc 40 is rotated to a particular position relative to the outer cap 10 whereby the projections 43, 44 and 45 coincide with the same size recesses 28 and slide down into the same. Further rotative movement of the disc 40 and the outer cap 10, now interlocked and working jointly, will bring the lug 46 downwardly and into register with the depression 33 of the inner cap 30, allowing at the same time the projections 43, 44 and 45 of the disc 40 to slide down into the horizontal connecting slots 29 of the T-shaped slots 27 thus allowing the inner cap 30 to be rotated off the bottle. To place the cap A again on the bottle in the position of Figure 2 the same is screwed on the bottle neck by manipulating the cap portions as hereinbefore described whereby the projections 43, 44 and 45 of the disc 40 engage the T-slots 27 and the lug 46 engages the depressed area or recess 33. In such condition the cap A is as a single unit and may be screwed onto the bottle.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, that which we claim as new and desire to secure by Letters Patent is:

1. In a rotatively manipulated member, an outer cylindrical member having an end portion, said end portion having an opening formed therein, a disc member mounted concentrically within said outer member, means for urging said disc toward said opening of said end portion of said outer member, an inner cylindrical member having an end portion and concentrically and rotatably mounted in said outer member, equally spaced slot means formed on said outer member, equally spaced projections formed on said disc member adapted to engage said slot means, means for engaging said disc member with said inner member simultaneously with the engagement of said projections with said slot means of said outer member to thereby rotate said inner member by rotating said outer member.

2. In a safety cap member for bottles and the like, an inner cap member adapted to engage the threads of the neck of a bottle, an outer cap rotatably mounted on said inner cap and having an open lower end and a top member, said top member having an opening formed therein, a disc member rotatably mounted within said outer cap and formed with a protrusion on the top surface thereof extending through said opening of said top member, spaced projections of different widths formed on the edge of said disc, inverted T-slot formations formed in the inner wall surface of said outer cap each having upright slot portions of different widths corresponding to the widths of said projections, a lug member formed on the under surface of said disc, spring means positioned within said outer cap member urging said disc against said top member of said outer cap with said lug out of engagement with said depression of said inner cap member, said inner cap member having a depression formed in the top thereof adapted to receive said lug of said disc member to rotate the inner cap when said disc is depressed and rotated with said lug in engagement with said depression and said projections of said disc are in engagement with said T-formations of said outer cap member.

3. In a rotatively manipulated member, an outer cylindrical member having an end portion formed with an opening, a disc member mounted concentrically within said outer member, means for urging said disc toward said opening of said top portion, an inner cylindrical member having an end portion and concentrically and rotatably mounted in said outer member, the inner surface of said outer member having inverted T-slots formed therein, the upright portions of each of said T-slots having a width different from the others, said disc having projections on the outer periphery thereof spaced the same as said T-slots and of widths equal to the upright portions of said T-slots, means for engaging said disc with said end portion of said inner member, means for urging said disc member toward said opening of said end portion of said outer member, said inner member rotated by said outer member when said disc is depressed against the action of said spring and the projections of said disc are in engagement with said T-slots and said disc is engaged with said end portion of said inner member.

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