

- [54] SAFETY MECHANISM FOR A
LIQUID-DISPENSING CONTAINER
- [75] Inventor: William James Landen, Cheshire,
Conn.
- [73] Assignee: Eyelet Speciality Company,
Wallingford, Conn.
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- [58] Field of Search ... 222/153, 534, 536, 538, 531,
222/532, 533, 555, 556

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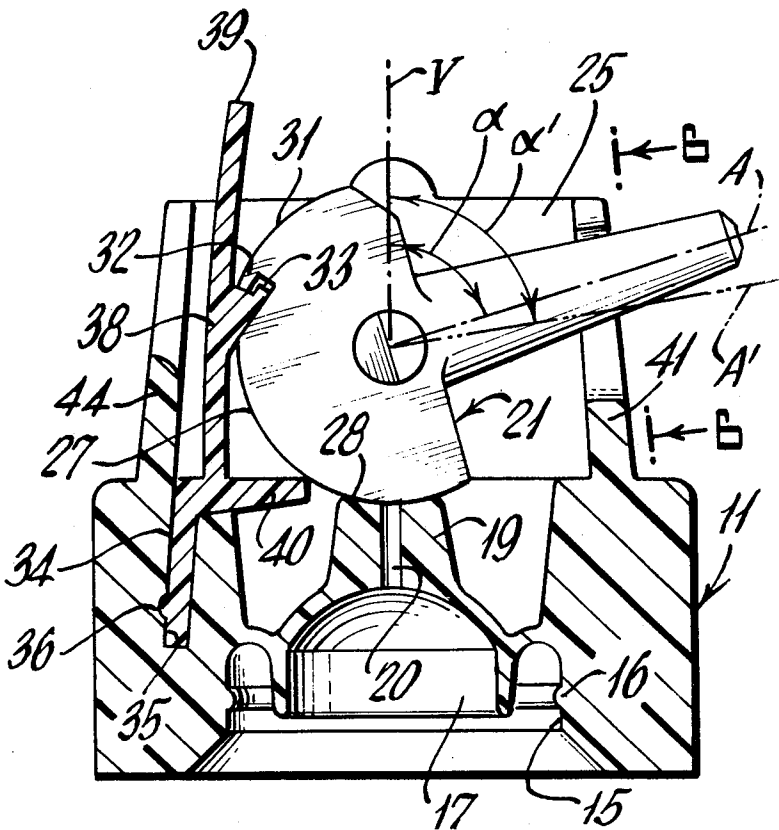
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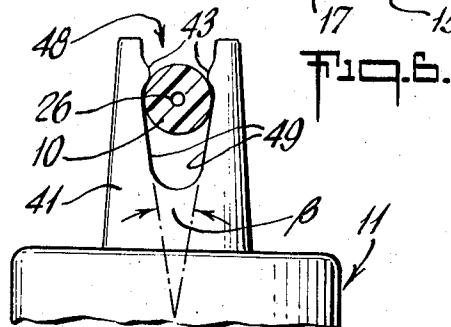
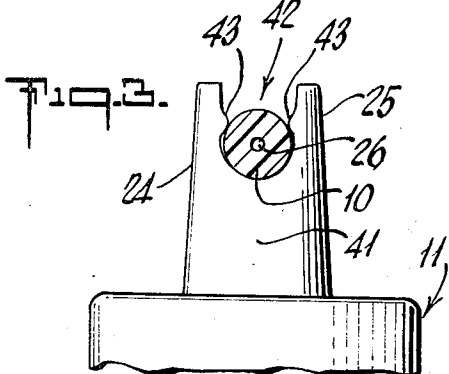
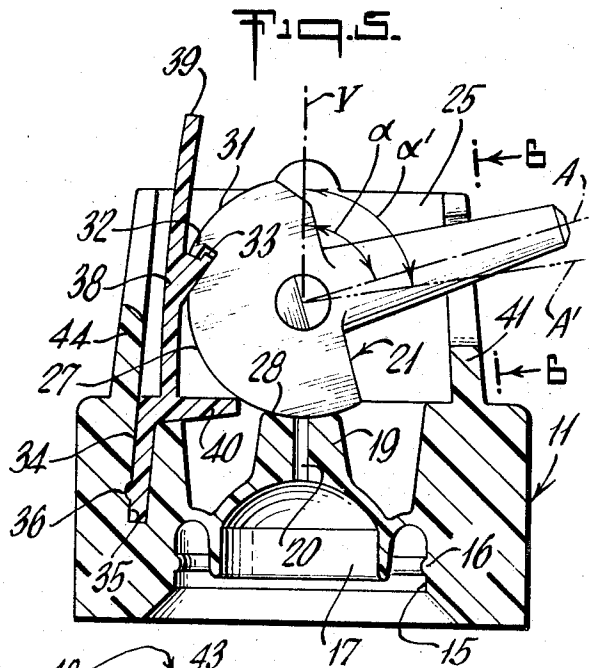
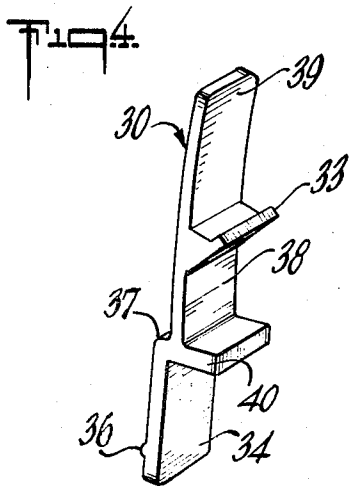
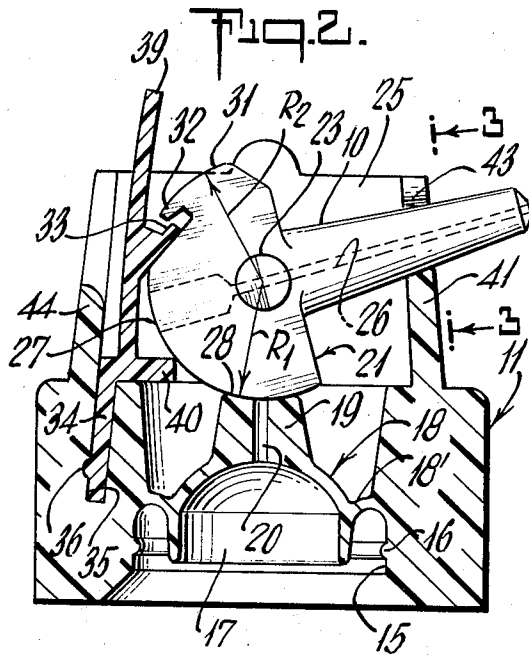
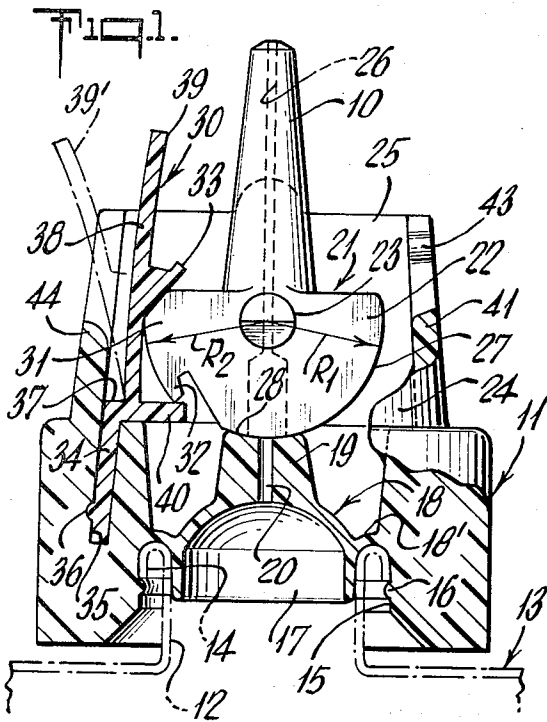
Primary Examiner—Stanley H. Tollberg
Assistant Examiner—Larry H. Martin
Attorney, Agent, or Firm—Sandoe, Hapgood and
Calimafde

[57] ABSTRACT

The invention contemplates application to liquid-dispensing closures of the type in which a dispensing nozzle is rotatable between a first or liquid-dispensing position and a second or container-closing position. Safety features are provided by latch or dogging elements which automatically set a dogged condition of the nozzle at the second or container-closing position, and a deliberate and totally separate manual actuation of the latch mechanism is required to disengage the dogged condition, in order to permit nozzle actuation to the first or liquid-dispensing position.

12 Claims, 6 Drawing Figures





SAFETY MECHANISM FOR A LIQUID-DISPENSING CONTAINER

The invention relates to safety-closure devices for containers having potentially harmful or dangerous liquid contents, such as lighter fluid used by smokers.

An object of the invention is to provide improved means of the character indicated.

Another object is to provide child-resistant safety protection in such a closure device.

A specific object is to meet the above objects in a movable-spout dispensing structure having discrete first and second positions, respectively determining the the liquid-dispensing and the fully closed conditions of the container.

Another specific object is to meet the above objects with a construction in which two different independent actuations of the parts are necessary in order to gain liquid-dispensing access to the contents of the container.

A still further specific object is to achieve the above objects for dispensing structure which closely corresponds to conventional mechanism, with minimum modification of parts and appearance.

A general object is to meet the above objects with structure that is readily and stoutly constructed, with minimum parts, and which lends itself to repeated recycling in use without impairment of the safety feature.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, preferred forms of the invention:

FIG. 1 is a vertical sectional view through a dispensing closure incorporating features of the invention, the mechanism being shown in the liquid-dispensable position;

FIG. 2 is a similar view to show a second relation of parts, for the container-closed condition of the mechanism;

FIG. 3 is a fragmentary sectional view, taken at the plane 3—3 in FIG. 2;

FIG. 4 is a perspective view of a latch part in the mechanism of FIG. 1;

FIG. 5 is a view similar to FIG. 2 to show a modification; and

FIG. 6 is a fragmentary sectional view, taken at the plane 6—6 in FIG. 5.

Referring first to the form of FIGS. 1 to 4, the invention is shown in application to a closure having a dispensing spout 10 pivotally carried by a base 11, which in turn is adapted for permanent fit to a neck, mouth or other projecting formation 12 of a container body 13. As shown, the neck 12 is an open cylindrical projection from the flat top of a metal container, such as a container for lighter fluid, and the upper rim or lip 14 of neck 12 is radially outwardly and then backwardly rounded to define an extensive smooth and continuous sealing surface contact with the adjacent wall surface of annular cavity in the base 11. The base 11 is preferably a single injection-molded plastic part, characterized by a relatively thick annular outer body having a mounting bore 15 with a radially inward bead 16, for locked retention of the neck lip 14, the annular cavity (for receiving neck 12) being defined

between the bore 15 and a downwardly extending cylindrical skirt 17. Skirt 17 integrally depends from a closure wall 18 of the base 11, being connected to the thick outer body by an axially compliant annular-bridge portion 18' of wall 18. A central upwardly projecting part 19 of wall 18 has a restricted passage 20 to communicate liquid contents to spout 10 from the container 13.

Spout 10 is shown as the elongate free end of nozzle means 21 which integrally includes a hub 22 with laterally projecting pivot means 23, engaged at apertures (not shown) in the front and back walls 24—25 of upstanding pivot-support structure integrally formed with base 11. A through passage 26 extends the full length of nozzle means 21 and aligns with the base passage 20 when in the dispensing position. An extensive convex arcuate surface 27 (of radius R_1) on hub 22 has constant mating contact with the concave upper surface 28 of projection 19 so as to assure integrity of the connection of passages 20—26 when in the FIG. 1 position and to assure integrity of the sealed closure of passage 20 when in the container-closed position of Fig. 2. Preferably, the proportioning of parts and selection of materials (preferably, medium density polyethylene for both parts 11 and 21) is such that when assembled to container 13, the projection 19 is axially resiliently loaded into firm and constant riding contact with the arcuate surface 22, via the axially compliant annular portion 18' of the closure wall 18, thus assuring the desired liquid-seal relation regardless of tolerance variations or wear in the pivot fit.

In accordance with a feature of the invention, latch means formed with or carried by base 11 includes interlocking formations coacting with formations on nozzle means 21 to automatically ensure locked or dogged retention of the container-closed condition (FIG. 2) unless and until deliberate manual actuation of the latch means to remove the locked or dogged condition. As shown, a single additional latch part 30 provides this function, in cooperation with a special projecting formation 31 integral with hub 22. Formation 31 extends to a radius R_2 greater than R_1 and presents an angularly directed hooked end or offset 32 to an oppositely directed hooked projection or offset 33 forming part of the latch means 30, such presentation occurring when clockwise pivoted rotation of spout 10 brings nozzle means 21 to the container-closed position in FIG. 2.

The latch part 30 is preferably injection-molded of a plastic material having good spring qualities, such as nylon or polysulphone. It is shown as an elongate upstanding stem having a mounting end 34 inserted in a molded socket 35 in the body of base 11, with coacting detent means 36 to permanently retain the assembled relation. A lateral offset 37 enables an assembly tool to drive home the mounting assembly 35—36—37. Above this point, the upper stem portion 38 projects to a free end 39 which is accessible for manual actuation; a phantom outline 39' suggests the outward displacement for such manual actuation, the same being sufficient to enable latch end 33 to radially clear the latch formation 30 of nozzle means 21. In unstressed condition (see FIG. 3), the stem portion 38 is slightly arched toward the axis of pivot means 23, so that, when assembled, latch part 30 will always be resiliently loaded against a part of hub 22, regardless of the en-

gaged or disengaged condition of the latch means, as will be understood.

A further lateral offset 40 projects into the path of counter-clockwise movement of projection 31, to provide a stop which determines the liquid-dispensing position (FIG. 1); offset 40 is seen in FIG. 2 to clear and thus not to interfere with the arcuate hub surface 27. To determine the container-closed position (FIG. 2), the end wall 41, which integrally connects first corresponding ends of the front and back walls 24-25, is provided with an upwardly open channel 42, shown with detent projections 43 which yieldingly and transiently interfere with spout 10 just prior to achieving the FIG. 2 position; these detents merely give a snap-closed "feel" when the nozzle is thus manipulated. At substantially the same time, the latch-hook formations clear each other and stem 38 is allowed to respond to its preloaded condition, thus setting the latch, with hooked ends 32-33 in hub-dogging register.

In the latched condition (FIG. 2), it is evident that no amount of manipulation of spout 10 can be effective to align the passages 20-26, for liquid dispensing. In fact, any attempt to raise spout 10 serves only to interlock the hooked ends 32-33, thus frustrating any effort to actuate the exposed latch end 39. The only successful formula for access is to fully actuate the latch end 39, to the point of arrest by the remaining end wall 44 (connecting the other corresponding ends of the front and back walls 24-25), at which point the hooked ends 32-33 first clear each other; such latch actuation must be performed with spout 10 fully seated in channel 42, and any actuation of end 39 less than full actuation will still be operative to deny elevating displacement of spout 10, by reason of interference between the hooked ends 32-33.

The arrangement of FIGS. 5 and 6 is in most respects similar to what has already been described, and so corresponding parts are given the same reference numbers. The principal difference in FIGS. 5 and 6 is in the use of a modified channel 48 in end wall 41. Channel 48 is characterized by convergent walls 49 which interfere with the local section of spout 10, beneath detents 43. The convergence angle β is chosen, in the context of low-friction engagement at 10-49, to allow forced manipulation of spout 10 down from the fully locked orientation A (angle α from the liquid-dispensing position) to a latch-releasable location A' (larger angle α' from the liquid-dispensing position). This forced displacement will locally spread walls 24-25 as walls 49 diverge in a compliant deformation, so as to permit means 32-33 to snap into the latched position (or to be actuated at 39 out of the latched position); and if left in the latched position, the deformed walls will restore themselves to their FIG. 6 condition while camming spout 10 to the A-axis orientation. Manifestly, at this orientation, the hooked ends 32-33 are so interlocked as to frustrate actuation at 39, and as to also frustrate elevation of spout 10. The only successful formula for such elevation to the FIG. 1 position requires, first, spout depression to the lower orientation A', then full manual actuation and holding of latch end 39, followed by spout 10 elevation.

It will be seen that the invention meets all stated objects. Essentially, the basic spout action, manipulative procedure and appearance of conventional dispensers are retained, subject only to the further independent manipulative procedure occasioned by the latch fea-

ture. A major deterrent is achieved with regard to child-tampering and to accidental opening of the container (as by dropping or fumbling in a drawer with other articles).

While the invention has been described in detail for the preferred forms shown, it will be understood that modifications may be made without departure from the scope of the invention.

What is claimed is:

1. Safety dispensing mechanism for a container having an opening to be closed by said mechanism, comprising a base including means adapted to be permanently secured to the container in peripherally sealed relation at the container opening, said base including a closure wall having an upwardly directed restricted passage therethrough, said base further including nozzle-support structure above said wall and offset from the upper end of the passage, nozzle means including a hub and spout with a restricted passage extending through said hub and spout, means pivotally connecting said hub to said support structure such that in a first pivoted nozzle position the nozzle passage communicates with the base passage and in the second pivoted position said hub closes the base passage, resilient latch means movably carried by said base and including an externally accessible manually actuatable member, said latch means and said hub having dog means interengageable at said second pivoted position to dog said nozzle means against rotation from said second position, and said latch means being resiliently biased in the direction of dog engagement, whereby to move said nozzle means from said second position to said first position said manually actuatable member must first be independently actuated against the resilient bias to free the dog engagement.

2. Mechanism according to claim 1, in which said hub includes a continuous convex arcuate surface in constant slidable contact with the part of the closure wall surrounding the upper end of the base passage, the latch-engageable region of said hub being angularly offset from said arcuate surface.

3. Mechanism according to claim 2, in which the latch-engageable region of said hub includes a portion at greater radius than the arc of said surface about the pivot axis, and in which said means is of single injection-molded plastic construction and integrally includes a stop portion located in interfering relation with said greater-radius portion when said nozzle means is in said first position.

4. Mechanism according to claim 2, in which the dog means of said latch means rides a portion of said surface in the course of movement of said nozzle means between said first and second positions.

5. Mechanism according to claim 1, in which said latch means comprises a resiliently bendable stem upstanding from said base and integrally including both said manually actuatable member and a hub-engageable latch element.

6. Mechanism according to claim 5, in which said latch means is of single single-piece injection-molded plastic construction and integrally includes a downwardly projecting mounting portion of said stem, said base having an insertion mounting opening in which said mounting portion is secured.

7. Mechanism according to claim 6, in which said mounting portion and the mounting opening include

coacting detent formations securing the mounted assembly of said latch means to said base.

8. Safety dispensing mechanism for the selective handling of liquids, comprising a container having an upwardly directed restricted liquid-dispensing passage to be closed by said mechanism, said container including nozzle-support structure adjacent to and offset from the outer end of the passage, nozzle means including a base and spout with a restricted passage extending through said base and spout, means movably connecting said base to said support structure such that in a first nozzle position the nozzle passage communicates with the container passage and in a second position said base closes the container passage, resilient latch means including an externally accessible manually actuatable member and further including dog means interengaging said container and nozzle means at said second position to dog said nozzle means against displacement from said second position, said latch means being resiliently biased in the direction of dog engagement, whereby to move said nozzle means from said second position to said first position said manually actuatable member must first be independently actuated against the resilient bias to free the dog engagement.

9. Safety dispensing mechanism for a container having an opening to be closed by said mechanism, comprising a base including means adapted to be permanently secured to the container in peripherally sealed relation at the container opening, said base including a closure wall having an upwardly directed restricted passage therethrough, said base further including nozzle-support structure above said wall and offset from the upper end of the passage, nozzle means including a hub and spout with a restricted passage extending through said hub and spout, said base including upstanding structure having an upwardly open channel into which said spout enters upon approach to said second position from said first position, means pivotally connecting said hub to said support structure such that in a first pivoted nozzle position the nozzle passage communicates with the base passage and in a second pivoted position said hub closes the base passage, resilient latch means movably carried by said base and including an externally accessible manually actuatable member, said latch means and said hub having means interengageable at said second pivoted position to dog said nozzle means against rotation from said second position, whereby to move said nozzle means from said second position to said first position said manually actuatable member must first be actuated to free the

latched engagement, and means resiliently reacting between said base and spout for incrementally pivotally displacing said spout upwardly to a third position angularly offset from but adjacent to said second position, said interengaging means being locked in dogging relation with both said hub and said latch means when said nozzle means is in said third position.

10. Mechanism according to claim 9, in which the upstanding structure of said base is relatively stiffly yieldable and said resiliently reacting means is integral with said upstanding structure.

11. Mechanism according to claim 10, in which said resilient reacting means includes convergent channel walls having greater interference with said spout at said second position than at said third position, at least one of the materials of said spout and base being selected to provide a relatively low-friction sliding engagement of said spout with the channel walls in the region of contact in said second and third positions.

12. Safety dispensing mechanism for the selective handling of liquids, comprising a container having an upwardly directed restricted liquid-dispensing passage to be closed by said mechanism, said container including nozzle-support means adjacent to and offset from the outer end of the passage, nozzle means including a base and spout with a restricted passage extending through said base and spout, said container including upstanding structure having an upwardly open channel into which said spout enters upon approach to said second position from said first position, means movably connecting said base to said support structure such that in a raised first nozzle position the nozzle passage communicates with the container passage and in a lowered second position said base closes the container passage, resilient latch means including an externally accessible manually actuatable member and further including dog means interengaging said container and nozzle means at said second pivoted position to dog said nozzle means against displacement from said second position, said latch means being resiliently biased in the direction of dog engagement, whereby to move said nozzle means from said second position to said first position said manually actuatable member must first be independently actuated against the resilient bias to free the dog engagement, and means resiliently reacting between said base and spout for incrementally pivotally displacing said spout upwardly to a third position angularly offset from but adjacent to said second position, said interengaging means being locked in dogging relation with both said base and said latch means when said nozzle means is in said third position.

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