

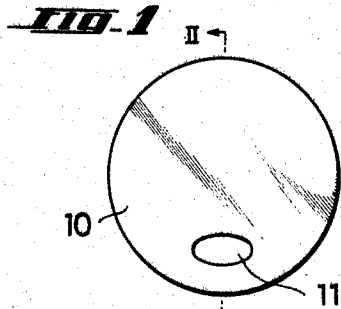
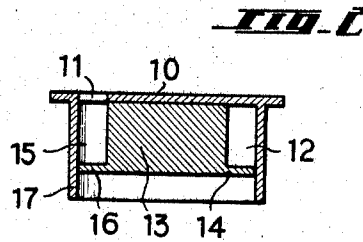
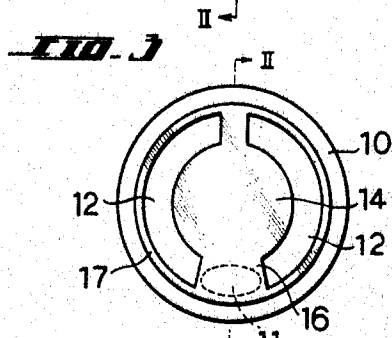
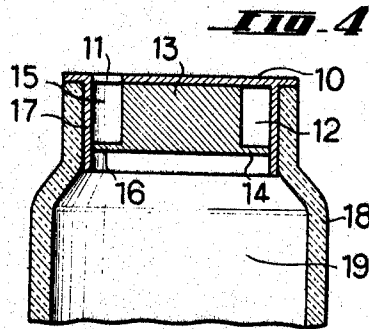
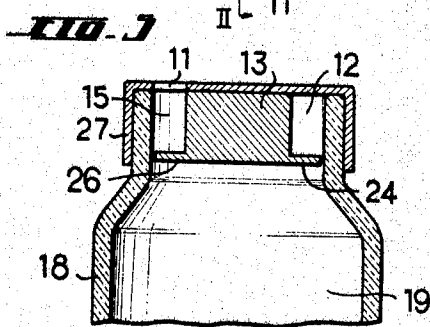
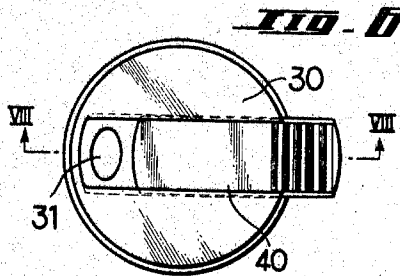
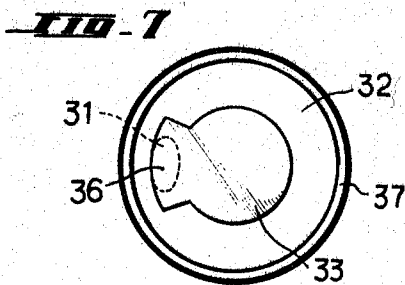
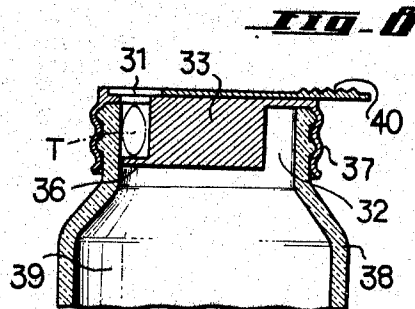
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3,484,818

BOTTLE CAP FOR RELEASING ONE ITEM AT A TIME

Filed July 17, 1968



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**BOTTLE CAP FOR RELEASING ONE ITEM
AT A TIME**Kisaburo Ino, Tokyo-to, Japan, assignor to Hiroko Ino,
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6 Claims

ABSTRACT OF THE DISCLOSURE

A bottle cap useful for taking tablets, including even very small pills, out of a bottle. The outer surface of said cap has an outlet, through which tablets roll out one after another. On the inside of the cap is a channel just wide enough to align tablets within itself along the circumference. In the center of the inside of the cap is a projecting part having a proper diameter, and at the position facing the outlet, a blocking piece is arranged at a certain space from the outlet.

Thus, when tablets roll out of the tipped bottle, they do not rush directly to the outlet, but, after aligned in the channel, they roll out through the outlet in good order.

BACKGROUND OF THE INVENTION

This invention relates to a cap for closing a bottle, especially to a cap for preventing the uncontrolled movement of tablets when they roll out of a bottle.

In the conventional way of taking tablets out of a bottle, first a cap, which is normally closed, is taken off, the bottle is tipped, and then tablets roll out. In this way, it is usually difficult to take just a necessary number of tablets out of a bottle, even if the bottle may be tipped very carefully. When tablets are used for medicine or food, it is undesirable from a sanitary point of view to return unnecessary tablets back into a bottle by hand. Actually, however, such a handling has been repeated without any reflection on its insanitary point. Moreover, the smaller the size of a tablet is, the more difficult it is to remove just a desired number out of a tipped bottle.

It has even been tried to use bottle caps, where an outlet is slightly larger than the size of one tablet for the purpose of removing tablets one by one. Such caps, however, have no means to align tablets toward the outlet or to prevent tablets from rushing directly to the outlet of the tipped bottle. As a result of this, tablets lie one upon another in a tight squeeze even before reaching the outlet. Such a condition prevents the tablets from moving in the bottle and rolling out of the outlet.

In order to avoid all the above disadvantages, a bottle cap might have an elaborate system which can control the movement of tablets. However, in view of the fact that bottles and caps are usually not expensive, the control system must be simple and provided cheaply. Besides, a simple system is useful to prevent troubles and breakage, when it is used.

SUMMARY OF THE INVENTION

It is a primary object of this invention to provide a bottle cap which will avoid the above disadvantages when tablets roll out of a bottle.

Accordingly, it is an object of this invention to provide a bottle cap whereby tablets roll out of a bottle exactly one at a time.

Also, it is an object of this invention to provide a bottle cap, where tablets are aligned in good order in a tipped bottle so that they can roll out of the bottle one after another.

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It is a further object of this invention to provide a bottle cap, which prevents an outlet from being jammed with piled tablets in a tipped bottle.

It is still a further object of this invention to provide a bottle cap a construction of which not only meets all of the above objects, but also is a simple one which will enable caps of this type or bottles with such caps to be manufactured at a low cost in large quantities.

For these purposes, a cap of this invention has a special construction on the inside of it rather than on the outside of it. Said cap has an outlet slightly larger than the size of one tablet so as to control the movement of tablets. Said outlet forms an exit for tablets and, when the cap is set to a bottle, the inside of the outlet is substantially related to the interior of the bottle. However, as described hereafter, the outlet is not directly related to the interior of the bottle but related to it through a channel which aligns tablets within itself in the tipped bottle. Said channel is formed on the inside of the cap and is wide enough to contain a row of tablets but too narrow to admit two rows of them. The channel is related to the outlet at one part of it and is open to the interior of the bottle at the other part. The outlet, which is related to the interior of the bottle through the channel, is isolated from said interior by a blocking piece intervening between the outlet and the interior so as to avoid the direct relation between them. Between said blocking piece and the outlet is a space which is large enough for each tablet to pass it and is related to the channel as a part of it.

When the above cap is set to a bottle and then the bottle is tipped, tablets are aligned and roll out of the outlet one by one.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a plan view of one embodiment of a bottle cap according to the invention;

FIG. 2 is a sectional elevation along the line II—II of FIG. 1 and FIG. 3;

FIG. 3 is a bottom view of FIG. 1;

FIG. 4 shows a sectional elevation of the cap of FIG. 1 and FIG. 3 together with a bottle where the cap is set;

FIG. 5 shows a sectional elevation of another embodiment of a cap according to the invention, together with a bottle where the cap is set;

FIG. 6 is a plan view of a third embodiment of a bottle cap according to the invention;

FIG. 7 is a bottom view of FIG. 6; and

FIG. 8 shows a sectional elevation along the line VIII—VIII of FIG. 6, together with a bottle where the cap is screwed.

**DESCRIPTION OF PREFERRED
EMBODIMENTS**

In the embodiment of the cap shown in FIGS. 1, 2, 3 and 4, an outer surface 10 of the cap has an outlet 11, which is large enough for one tablet to pass through but never permits two tablets to do so at a time. As shown in FIG. 3, the back of the outer surface 10 or the inside of the cap has an annular channel 12 formed along the inside of a cylindrical side wall 17. To form said channel 12 like a ring, a projecting part 13 having a proper diameter is positioned, like an island, in the center of the inside of the cap. Thus, the annular channel 12 is formed between the projecting part 13 and the cylindrical side wall 17, and also, a part of the channel 12 is related to the outlet 11 made through the outer surface 10. Across the projecting part 13 is a blocking piece 14 which extends diametrically from the position just under the outlet. Said blocking piece 14, which is a flat, thin plate, makes an isolated space 15 between the part 16 of the piece 14 and

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the outlet 11. Said isolated space 15 has the same depth as the open part of the channel 12. This means that the part 16 of the blocking piece 14 is placed between the outlet 11 and an interior 19 of a bottle 18 to prevent the direct relation between them. Therefore, the relation between the outlet 11 and the interior 19 of the bottle 18 is kept through the channel 12. The channel 12 is slightly wider than the outside diameter of a tablet so that tablets in the tipped bottle can enter the channel 12 for alignment. Because the side wall 17 of the cap is to fit the inside wall of the bottle neck according to this embodiment, the area for the channel 12 which is slightly wider than the outside diameter of a tablet is given between the inner surface of the side wall 17 and the projecting part 13. When the bottle 18 is tipped, tablets in the interior 19 of the bottle 18 rush into the channel 12, while they are prevented by the part 16 of the blocking piece 14 from rushing directly to the outlet. In this way, the tablets enter the channel 12, are aligned in an annular row due to the width of the channel 12, and then go out of the outlet 11 one after another through the isolated space 15. As already described, the outlet 11 is large enough for one tablet to pass through, and therefore, every time the bottle 18 is tipped, at least about ten tablets aligned in the channel 12 successively roll out of the outlet 11. Thus, a person who is tipping the bottle can count a necessary number of tablets before setting up the bottle again.

According to another embodiment shown in FIG. 5, a side wall 27 of the cap fits the outside wall of the bottle neck. Because of this feature, unlike the embodiment of FIG. 3, the both ends of a blocking piece 24 arranged across the projecting part 13 do not reach the side wall 27, but the space large enough for the bottle neck to enter is given between the blocking piece 24 and the side wall 27. For the same reason, when the width of the annular channel 12 separating the projecting part 13 from the side wall 27 is determined, the thickness of the bottle neck should also be taken into consideration. Therefore, in this embodiment of FIG. 5, the channel 12 wide enough to contain a row of tablets is formed between the inside wall of the bottle neck and the projecting part 13. When the bottle is tipped, a part 26 of the blocking piece 24 prevents tablets from rushing to the outlet 11, and enables the tablets aligned in the channel 12 to easily roll out of the outlet 11 through the isolated space 15 which is protected from the pressure of tablets contained in the interior of the bottle.

A third embodiment of FIGS. 6, 7, and 8 shows a cap, which is set to a screw-threaded bottle neck and has a small part 36 forming a blocking piece for preventing tablets from rushing to the outlet. An outer surface 30 of the cap has a closing piece 40 which can be slid diametrically on said surface 30. When said closing piece 40 is slid outward, there appears an outlet 31 through which tablets roll out. When the closing piece 40 is returned inward and forms a part of the outer surface 30, the outlet 31 is isolated from the outside of the bottle. Of course, this closing piece 40 serves to prevent tablets from rolling out, when a bottle falls down. As clearly shown in FIG. 8, the closing piece 40 has a rugged part which can give friction to the finger and facilitate the sliding operation by hand. The cap of FIGS. 6, 7, and 8 can be set tightly to the bottle neck with a female screw thread which is formed on the side wall 37 so as to be screwed into a screw thread formed on the outside wall of the neck of the bottle 38. To provide an annular channel 32, a projecting part 33 is positioned, like a solitary island, in the center of the inside of the cap. The flat part 36 extends from said projecting part 33 and has its position just under the outlet 31. A blocking piece consists of only this part 36. All the annular area between the side wall 37 and the projecting part 33 is not given to the channel 32 for aligned tablets, because the thickness of the bottle 38 also should be taken into consideration.

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For this reason, when the bottle is capped, said channel 32, which has a width proper for the size of a tablet, is formed between the projecting part 33 and the inside wall of the bottle neck. This channel serves to align tablets which are rolling into it, while the flat part 36 serves to prevent the undesirable happening that a tablet T shown in FIG. 8 may be obstructed from rolling out of the outlet 31 by the load of all the other tablets in the interior 39 of the bottle 38. In this way, when the bottle is tipped, tablets are aligned in the channel 32 formed by both the cap and the bottle neck, and then, they easily roll out of the outlet 31 one after another.

It is thus apparent that with the bottle cap of the invention there is an outer wall 10 which is formed in the region of its outer periphery with a single opening 11 through which only one item can pass at one time. This outer wall 10 is adapted to extend across the mouth of a bottle 18 with the opening 11 communicating with the interior of the bottle. The outer wall 10 of the bottle cap is fixed with an endless side wall of the bottle cap, and this endless side wall is adapted to engage either the interior surface of the bottle neck, as shown in FIG. 4, or the exterior surface of the bottle neck, as shown in FIG. 5. A projecting part 13 is also fixed to the outer wall 10. This part 13 is surrounded by the endless side wall 17 or 27 to define the annular channel 12 which communicates with the opening 11. Finally, a blocking part 16, 26, or 36 is fixed to the projecting part 13 and extends therefrom toward the endless side wall. This blocking part 16 is directly aligned with and situated beneath the opening 11 so that the part of the channel 12 which communicates with the opening 11 is situated between the blocking part 16 and the opening 11. In this way the blocking part 16 will prevent all of items within the bottle from crowding toward and becoming jammed at the opening 11.

What is claimed is:

1. A bottle cap comprising an outer wall forming at least part of an exterior surface of the cap, said outer wall being adapted to extend across the mouth of a bottle and said outer wall being formed with an opening passing therethrough in the region of a peripheral edge of said outer wall at a location where said opening will communicate through a neck of a bottle with the interior thereof, said opening being large enough for only one item within the bottle to pass therethrough at one time, an endless side wall fixed to and projecting from said outer wall to engage a surface of a bottle at the neck thereof, said endless side wall being situated outwardly beyond said opening, a projecting part fixed to and projecting from said outer wall and surrounded and spaced from said endless side wall to define with the latter an annular endless channel, said opening being aligned with and communicating through said channel with the interior of a bottle on which the bottle cap is mounted, and said channel having a width great enough to align items in the channel with said opening, said channel having a connecting portion in said channel communicating directly with said opening, and a blocking part extending from said projecting part across said channel toward said endless side wall and aligned with said opening to separate said connecting portion of said channel from the interior of a bottle so that items in the latter will be prevented by said blocking part from jamming at said opening.

2. The combination of claim 1 and wherein said endless side wall engages an inner surface of the bottle neck and said blocking part extends to the immediate vicinity of said endless side wall.

3. The combination of claim 1 and wherein said endless side wall is adapted to engage an exterior surface of a bottle neck and said projecting part extending toward said endless side wall but terminating short thereof by a distance great enough to accommodate the thickness of the wall of a bottle at the neck thereof.

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4. The combination of claim 3 and wherein said endless side wall has a threaded configuration to be threaded onto an exterior threaded surface of the bottle at the neck thereof.

5. The combination of claim 1 and wherein a closure means slidably engages said outer wall at the exterior thereof for covering and uncovering said opening.

6. The combination of claim 5 and wherein said closure means is in the form of an elongated slide member

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extending diametrically with respect to said outer wall for movement between positions covering and uncovering said opening.

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