AUTOMATIC SAFETY CLOSURE AND CONTAINER

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

FIG. 15.

FIG. 16.

FIG. 17.
This invention relates to containers and the like adapted to be held in the hand, and equipped with closures thereof, and particularly to combined automatic safety closures and containers.

The main object of my invention is to provide a simple, convenient and novel means for opening and automatically closing the same.

Another object of my invention is to provide a containers with a special closure that forms part of the container and is capable of opening and closing according to predetermined manipulation of the container.

An ancillary object of the invention is to produce a container which may be at least partly distorted manually by pressure to cause opening of the closure thereof, and capable upon release from pressure, of resuming its normal original shape and thereby automatically effecting closure of said container.

It is likewise an important object of this invention to have such a special safety container which is equipped with closure means easily opened by a person aware of the proper manner of opening the container, but difficult for both children and adults to open when ignorant of such proper manipulation.

It is in fact an object of my invention with a view to safety to have such a container with the automatic closure that will unfallenly effect closure of the container when it has been opened properly and perhaps then left negligently about within reach of children.

A practical object is, of course to produce a special safety container along the lines already mentioned which can be made and sold at a reasonable figure so as to be in a position to compete on the market with conventional containers of similar goods or contents.

Other objects and advantages of my invention will appear in greater detail as the specification proceeds.

In order to facilitate ready comprehension of this invention for a proper appreciation of the salient features thereof, the invention is illustrated on the accompanying drawings forming part hereof, and in which:

Figure 1 is a perspective view of a container equipped with an automatic safety closure made according to my invention and embodying the same in a practical form;

Figure 2 is a vertical section of the same container as taken on line 2—2 in Figure 1;

Figure 3 is another vertical section of the container as taken on line 3—3 in Figure 2;

Figure 4 is another similar section showing the container in distorted condition with the closure open for dispensing its contents;

Figure 5 is a perspective view of the container as held in the hand with finger pressure applied to distort and thereby open the container as otherwise seen in Figure 4, the near side of the container being removed to disclose the construction and condition of the parts;

Figure 6 is a vertical section of a modification of the container showing a different closure means;

Figure 7 is another vertical section as taken on line 7—7 in Figure 6;

Figure 8 is a similar section to that of Figure 7 showing the container open by distortion caused by pressure upon the sides or bottom thereof;

Figure 9 is likewise a vertical section of a further modification of the container;

Figure 10 is a similar vertical section to that of Figure 9, showing the container open from pressure applied to the sides thereof;

Figure 11 is a still further modification in vertical section, showing a container with a permanently closed top opening and an automatically closed opening according to the invention;

Figure 12 is a similar section of the same container showing the container open by virtue of pressure applied to the sides;

Figure 13 is a vertical section of still another modification;

Figure 14 is also a vertical section of the same container of Figure 13 showing the sides under pressure and the container open;

Figure 15 is yet another modification shown in vertical section;

Figure 16 is another modification with a different top; and

Figure 17 is still another modification with yet another form of top.

Throughout the views, the same reference numerals indicate the same or like parts and features.

In medicine, powders, pills and tablets are frequently sold in small containers adapted to be held in the hand, and which have various conventional closures, such as caps, caps, covers and stoppers. Some containers are either more or less flexibly and are made of flexible materials such as flexible or elastic plastics, while the closures are conventional as mentioned. Such containers are capable of being distorted and squeezed for various purposes, frequently in order to dispense some of their contents under pressure but under control. In such a container, ordinarily it is not possible to open the same with only one hand, and even with both hands such operation may be difficult, although it obviously should be easy and convenient. Furthermore, when a more or less conventional container has been opened, danger is immediately evident if the stopper is overlooked and not promptly and properly replaced and the container securely closed.

Upon considering this problem, it has occurred to me that such a container, especially for tablets and pills, should be provided with a form of closure that is not only captive thereto, but preferably an actual part of the container itself, and capable of presenting an opening when the container is distorted by applying pressure thereto, for dispensing contents from said container at will. As a result, I have succeeded in producing a container along the lines already mentioned, which will now be described in detail in the following.

Hence, in the practice of my invention, and referring again to the drawings, a medicine container is illustrated in Figures 1 through 5, preferably made of more or less flexible and even elastic plastic material, such as polyethylene, polyvinyl chloride, polyvinylidene chloride, polybutene or other similar plastic materials, plasticised or unplasticised, this container being indicated at 18. In general, this container may be rendered flexible in a desirable manner, by making the top 19 and bottom 20 thick and the side panels 21, 22 and/or the front and rear panels 23, 24 relatively thin.

Upon the inner surface of front panel 23 is formed an integral stiffening reinforcement 25 that tends to resist distortion, while immediately beneath it is cut a more or less straight slit 26 in this panel. Other than this, there is no opening whatsoever. When the container 18 is held in the hand and the fingers 27, 28 applied to the
sides 21, 22 as best seen in Figure 5, the front and rear panels 23 and 24 are expanded outward as shown in Figure 4, except the upper reinforced portion 25 which remains relatively undistorted, with the result that a dispensing opening is formed at 29 into which the slit 26 has been changed by the distortion of the container, allowing tablets 30 to be dispensed from this opening.

As soon as the fingers are released from the side panels, these and the front and rear panels resume their original and normal shape, automatically closing slit 26, thus closing the container as a whole.

In the form of container illustrated in Figures 6, 7 and 8, the top 31 and bottom 32 are thick and therefore stiff, while the side panels 33, 34 and rear panel 35 as well as front panel 36 are relatively thin and flexible as in the case of container 18 just described. However, instead of having an integral thick reinforced portion upon the front panel 36, a front to back connecting rod 37 is secured at its ends to the intermediate portions of the front and rear panels. In addition, an arcuate slit 38 is cut in the front panel partly about rod 37, so that when the side panels are pressed as in Figure 5, under pressure, this slit changes into an opening 39, with the lower portions of the front and rear panels expanded as best seen in Figure 8 to allow dispensing of tablets, pellets or pills, as the case may be.

As shown in Figures 9 and 10, the container 40 need not have a connecting rod interconnecting the front and rear panels, for instead, such a rod 41 may connect a front panel 42 in its upper region with a relatively thicker top 43, the side panels 44, rear panel 45 are also relatively thin, while the bottom 46 is thick like the top 43. The slit 47 as shown in Figure 9 becomes the dispensing opening 48 of Figure 10 when the side panels are squeezed to buckle the rear panel 45 and lower portion of front panel 42 outward, the rod 41 preventing the upper portion of the front panel from changing form, as in the case of rod 37 preventing the upper front panel 36 from changing when container panels 33 and 34 are subjected to pressure as shown in Figure 8. Again, in the container 49, the front and rear panels and side panels resume normal shape when the container is relieved from pressure, automatically restoring opening 48 to a mere slit 47 and thus closing the container.

In Figures 11 and 12 is shown a container 49 of somewhat conventional form, in that it has the conventional upper neck 50 which when free from any closing forming opening for introducing the intended contents, after which a permanent cap 51 is fixed in place thereon. The top 52 with the neck 50 is a more or less rigid structure, while the bottom 53 is thick and thus stiff as well, but the side panels 54 and 55 and the front panel 56, with the rear panel (not shown) are all relatively thin and therefore flexible. Front panel 56 has a high slit 57 near top 52 which changes to a dispensing opening 58 when the side panels are subjected to lateral pressure, bulging the front wall outward as indicated at 59. When the pressure is removed, the opening 58 again becomes the mere slit 57 and the container is closed.

The container 60 shown in Figures 13 and 14 is somewhat similar to that shown Figures 11 and 12, except for the upper bottle neck 50 which is omitted. The top 61 and bottom 62 are thick and thus stiff, but the side panels 63 and front panel 64 as well as the rear panel 65's (not shown) are all relatively thin and flexible, so that the slit 65 in front panel 64 is expanded into opening 66 when the panel is bulged outward at 67 upon lateral pressure being applied to the side panels, substantially as already described in connection with container 49 of Figures 11 and 12.

In this case is shown a similar container to 60, but the slit 68 is arcuate instead of straight, all other features being same as in container 60, the arcuate slit becoming a sufficient opening for dispensing some of the contents when the side panels 69, 70 are subjected to lateral pressure, as the top 71 and bottom 72 are thick, while the front panel 73 is, of course thin as the side panels to form a bulging which results in the formation of a dispensing opening being same as in container 60 just described.

The container 74 shown in Figure 16 has a concavely arcuate or curved top 75 which is thick, as is also the bottom 76, while curved slit 77 in front panel 78 is located near the top, the front panel and side panels being relatively thin, the result of lateral pressure upon the side panels 79, 87 bulging the front panel and opening the slit. It is to be noted that the curved form of the top adds to its rigidity.

Finally, the container 80 disclosed in Figure 17 has a concavely truly arcuate top 81, which, like the bottom 82 is thick for stiffness, while the side panels 83, 84 and front panel 85 are thin to be flexible and subject to distortion under pressure to bulge out part of the front panel and enlarge the curved slit 86 near top 81 into a proper dispensing opening, all as generally described in connection with the previous forms of container herein.

From the foregoing, it is clear that a container of flexible plastic may be so formed that lateral pressure will cause a portion of the container to bulge out, forming the dispensing opening which becomes promptly and automatically closed upon release of the container from pressure. In all the forms of container described, a definite pattern of operative novelty emerges, primarily based on the features of having a thick top, similarly thick bottom, relatively thin and therefore flexible side panels and front and rear panels, with means for stiffening a part of the front panel and having a slit in this front panel close to the mentioned stiffening means or the thick top of the container, so that the front panel in any case bulges out, at least in part to expand the slit into a dispensing opening. In every case, the container resumes normal shape and condition when no longer subjected to pressure, thus automatically effecting closure of the container without thought or care on the part of the operator using the container.

It is to be noted that the container, with or without using a thick top and bottom, may nevertheless be stiffened at the top and bottom by any material such as sheet metal, wood, cardboard or even rigid plastic suitably attached, cemented or fused to the walls of the container, but in any case, the side, front and rear panels must be made of flexible material as indicated. This is to be obvious as it is necessary to be flexible enough to illustrate upon mere mention thereof, so that it therefore forms part and parcel of the invention. Other shapes than those shown may, of course be used, so long as the principles of the invention prevail.

I have described what I believe to be the best embodiments of my invention. It is not to be understood, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. A combined automatic safety closure and container including two discrete end portions, a bounding wall of flexible material interconnecting the end portions, said bounding wall having a slit therein adapted to form a dispensing opening upon application of pressure upon the bounding wall and automatically closing upon removal of pressure, and means for preventing part of the bounding wall adjacent the slit from becoming appreciably distorted when pressure is applied to an end of the bounding wall, last-named means being such as to allow the end to the portion of the bounding wall adjacent to the slit and at the other end to another portion of the container.

2. A combined automatic safety closure and container according to claim 1, wherein the slit is disposed close to one end portion.

3. A combined automatic safety closure and container according to claim 1, wherein the slit is arcuate in form.

4. A combined automatic safety closure and container
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5 according to claim 1, wherein the container is a unitary article made of a plastic material selected from the class, consisting of polyethylene, polyvinylidene chloride, polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate, poly butene and butene copolymers, and synthetic elastic polymers.

5. A combined automatic safety closure and container according to claim 1, wherein the slit is positioned substantially adjacent one end portion of the container thereby preventing the portion of the slit adjacent the said end from being distorted when pressure is applied to the bounding wall.

6. A combined automatic safety closure and container according to claim 1, wherein the container has a distinct filling opening sealed upon filling of the container but independent of the slit in the bounding wall which forms the dispensing opening at will.

7. A combined automatic safety closure and container according to claim 1, wherein the bounding wall includes two panels, a front panel and rear panel, said slit being on the front panel and said end portions being made of a flexible plastic material sufficiently thick to be stiff and generally free from distortion when the side panels are subjected to lateral pressure and the rear panel and at least part of the front panel adjacent to the slit are distorted to expand the slit into a dispensing opening, one of the thin end portions being curved from one end to the other.

8. A combined automatic safety closure and container according to claim 7, wherein the thick end portions include a top portion and bottom portion, said top end portion being concavely arcuate in form from one side panel to the other side panel, and wherein the slit is located adjacent to the deeply curved portion.

9. A combined automatic safety closure and container according to claim 1, wherein one end of the connecting rod is fixed to the portion of the bounding wall adjacent the slit and the other end of the connecting rod is fixed to one of the end portions.

10. A combined automatic safety closure and container according to claim 1, wherein one end of the connecting rod is fixed to the portion of the bounding wall adjacent the slit and the other end of the connecting rod is fixed to the bounding wall opposite the slit.

11. A combined automatic safety closure as set forth in claim 1, wherein the dimensions of the slit between the ends thereof and which is formed in the bounding wall, is appreciably smaller than the width of the bounding wall in a plane with the ends of the slit.

12. A combined automatic safety closure and container including top and bottom end portions, a bounding wall interconnecting the top and bottom end portions, said bounding wall including two side panels, a front panel and a rear panel made of flexible plastic material capable of distortion under pressure, said top and bottom end portions made of flexible plastic material sufficiently thick to be stiff and free from distortion when the side panels are subjected to lateral pressure and the rear panel and at least part of the front panel adjacent the slit are distorted to expand the slit into a dispensing opening, a transverse slit in the front panel, a connecting rod fixed at one end to a portion of the bounding wall adjacent the slit on the front panel and fixed at its other end to the rear panel of the bounding wall and a filling opening on the top end portion sealed upon filling of the container but independent of the slit on the front panel.

13. A combined automatic safety closure and container, according to claim 12, wherein the slit is arcuate in form.

14. A combined automatic safety closure and container according to claim 13, wherein the slit is disposed close to the top end portion.

15. A combined automatic safety closure and container including two discrete end portions, a bounding wall of flexible material interconnecting the end portions, said bounding wall being substantially flat and having an elongated opening therein normally traversing only a portion of said wall with opposed edges thereof disposed in substantially abutting relationship and adapted to form a dispensing opening upon application of pressure on the bounding wall and automatically closing upon removal of such pressure, and means for making a first part of the bounding wall adjacent one edge of the opening less resilient than a second part of the bounding wall adjacent the other edge of the opening to retain the first part in an appreciably undistorted condition and keep it less distorted than the second part when pressure is applied to the bounding wall.

16. A combined automatic safety closure and container including two discrete end portions, a bounding wall of flexible material interconnecting the end portions, said bounding wall having one flat surface thereof with an elongated opening therein with the opposed edges thereof being in abutting relationship but spaced from one another normally traversing only a portion of said wall, and means for making a first part of the bounding wall adjacent one edge of the opening stiffer than a second part of the bounding wall adjacent the other edge of the opening to prevent said one edge of said opening from becoming distorted as much in one direction as the opposed abutting edge when pressure is applied to the bounding wall.

17. A flexible container of substantially fixed self sustaining outline including a slit cut into a substantially flat face of the container and normally traversing only a portion of said face, means to maintain one side of said slit in its original container wall configuration, said container being deformable under pressure in the location of the other side of said slit to displace this side and open the container.

18. A flexible container according to claim 17, wherein said slit configuration maintaining means is the top of said container.

19. A flexible container according to claim 17, including a separate fill opening for said container.

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