United States Patent [19]

Hill

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[54] **CONTAINER CLOSURE**

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[52] **U.S. Cl.** ..... **220/52 R,** 220/54
[51] **Int. Cl.** **B65d 17/26**
[58] **Field of Search** 220/47, 48, 52, 53, 54

[56] **References Cited**

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1,689,627	10/1928	Graham	220/52 R
2,017,077	10/1935	Schoettel	220/52 R
2,070,881	2/1937	Brawn	220/52 R
2,313,198	3/1943	Haustrup	220/52 R
2,978,140	4/1961	Walsh	220/52 R
3,273,234	9/1966	Henchert	220/52 R
3,568,875	3/1971	Olan	220/54
3,643,833	2/1972	Fraze	220/54

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Assistant Examiner—Ro E. Hart
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[57] **ABSTRACT**

An easily removable closure plate for a container, the plate having a first annular line of weakness extending about its peripheral area, and second and third lines of weakness meeting at an initial tear area located between the center and peripheral area of the plate. The second line of weakness extends outwardly along an arc from the initial tear area to the first line of weakness while the third line of weakness extends inwardly along an arc to and around the center of the plate. To sever and remove the plate, an elongated generally triangular flat tab is rotatably mounted to the plate at the initial tear area. The tab is raised to initially sever the plate at the initial tear area, then the tab is rotated to extend outwardly beyond the periphery of the plate with the narrower end of the tab generally aligned with the center of the plate, and then the tab is rotated about its longitudinal axis while revolved about the periphery of the plate to progressively sever the plate along the lines of weakness with the severed portions being progressively wound about the tab. An annular reinforcing rib is provided about the center of the plate while a plurality of radially extending straight reinforcing ribs are also provided in the plate. Indicia is provided on the plate and the tab to indicate the proper rotated position of the tab prior to continued severance and winding of the severed plate portions on the tab. Additionally, the tab is provided with a recess along one side for guiding the severed wound portions thereon. Also, the opposite ends of the tab are bent upwardly away from the plate to facilitate rotation of the tab without obstruction.

16 Claims, 6 Drawing Figures

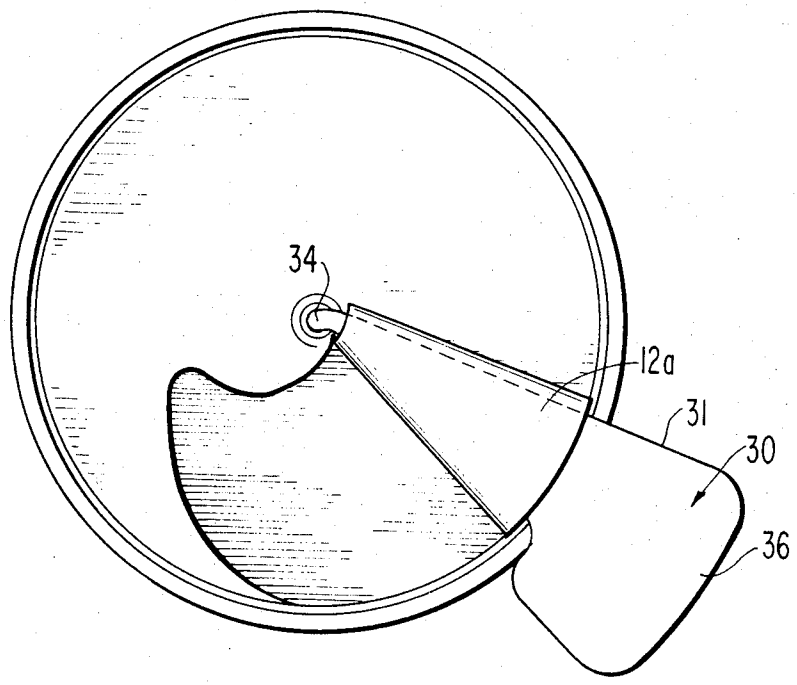


FIG. 1

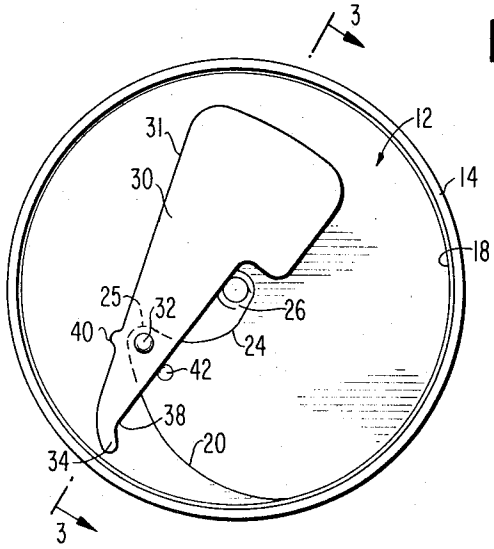


FIG. 2

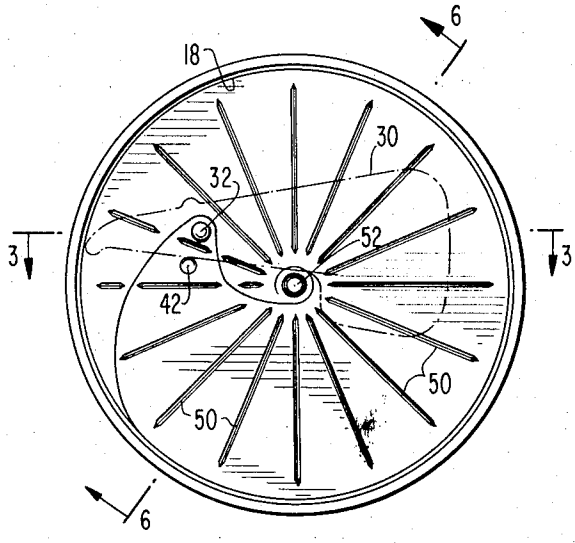
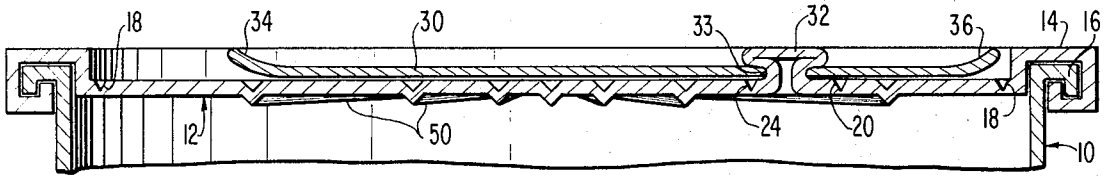


FIG. 3



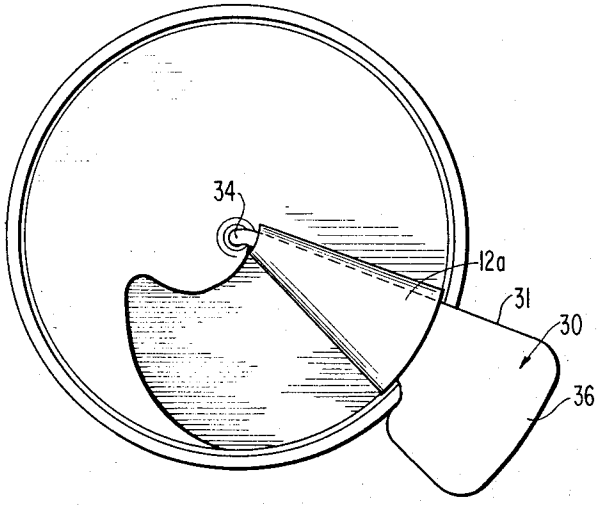


FIG. 4

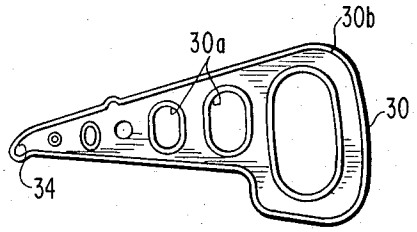
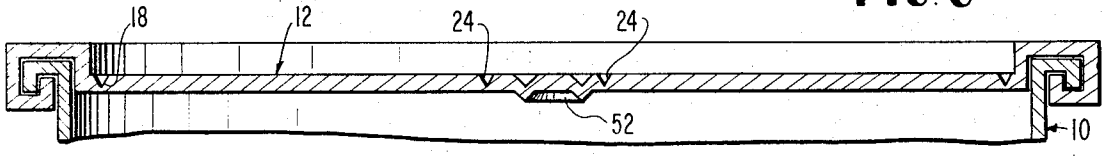


FIG. 5

FIG. 6



CONTAINER CLOSURE

BACKGROUND OF INVENTION

It is well-known in the prior art to provide a container closure in the form of a plate having certain weakened areas, and a tab attached to the plate for severing the same along the weakened areas. In some of the closures of the prior art, only a portion of the plate is severed and removed on the tab leaving a central isolated portion which is free to fall into the interior of the container. This is illustrated in U.S. Pat. Nos. 1,689,627 and 2,978,140.

More recent container closures have incorporated a pull tab for pulling and severing the closure plate along weakened lines, such being illustrated, for example, in U.S. Pat. Nos. 3,643,833 and 3,568,875. Certain pull tab opening devices such as illustrated in U.S. Pat. No. 3,568,875 suffer from the drawback that at the last moment of severance of the closure plate, the severed plate tends to recoil and is thereby free to sling the container contents outwardly of the container. The same objectionable result of accidentally dispensing the contents of the container can also result by virtue of the final force required to finally sever the plate from the remainder of the container.

Another drawback of container closures of the prior art such as those mentioned above, is that the closure must be completely severed before the contents of the container can be dispensed as intended. Furthermore, the prior art container closures utilizing a pull tab often require relatively soft material such as aluminum to be employed in their construction, this being exemplified, for example, in U.S. Pat. No. 3,643,833. The disadvantage here is that not only is the strength of the container limited but furthermore materials such as aluminum are more expensive in commercial production than stronger materials such as steel or those employed in what is often termed "tin cans."

OBJECTS OF INVENTION

It is a primary object of the present invention to provide a closure for a container which may be quickly and easily opened and yet does not suffer from the drawbacks of conventional or prior art closures mentioned above. Included herein is a provision of such a container closure which may be severed and entirely removed from the associated container in one operation or, in the alternative, may be partially opened to permit dispensing of the container contents without obstruction from the severed portions of the closure. Further included herein is the provision of such a container closure which minimizes exposure of sharp or loose edges during opening of the closure to avoid injury to the user.

A further object of the present invention is to provide such a container closure which may be feasibly incorporated into new or conventional container constructions employing standard materials where it will effectively operate to provide an effective closure for the container during transportation or storage and yet may be easily removed when it is desired to dispense the contents of the container.

SUMMARY OF INVENTION

The above and other objects are achieved according to one embodiment of the present invention, in a circular closure plate which may be made from relatively

strong material such as sheet steel and incorporated as the top of a cylindrical metal container to close the interior of the container after it has been charged with its contents which may be edible matter. In this embodiment, the plate has a first circular line of weakness such as may be formed by scoring, about the periphery of the plate adjacent the rim of the associated container.

An opening device which may be termed a "tab" or a "key" is rotatably mounted to the plate by means of a suitable rivetlike fastener at a location between the center of the plate and the periphery of the plate. The fastener which may be formed conventionally as an integral upstanding extension of the plate, is located at what will be termed an initial "tear" or "severance" area. In the specific embodiment, the tab is generally flat and has a generally triangular outline, the length of the tab traversing a substantial distance across the plate approximately three-fourths to seven-eighths the distance. In the idle or storage position, the broader end of the tab is positioned inwardly from the initial tear area with the narrow or convergent end located adjacent the periphery of the plate.

The plate is additionally scored by what will be termed a "second line of weakness" extending outwardly from the initial tear area along an arc and terminating at the periphery of the plate at the first circular line of weakness; and a "third line of weakness" extending from the initial tear area where it joins the second line of weakness, and extends inwardly towards and around the center of the plate along an arc extending in the same general angular direction of the arc of the second line of weakness.

To sever and remove the closure, the tab is first raised from the plane of the plate to initially sever the plate at the initial tear area. Then the tab is rotated in a plane generally parallel to the plane of the plate to position the broader end of the tab outwardly beyond the periphery of the plate with the narrow end of the tab positioned generally at the center of the plate. The tab is then rotated around its longitudinal axis while revolved about the container top to continuously sever the plate along the first, second and third lines of weakness while causing the severed portions of the plate to be progressively wound about the tab. Continued revolution of the tab in this manner will eventually cause the entire plate to be wound about the tab for complete removal from the container.

In order to facilitate severance and winding of the plate on the tab in a smooth and unimpeded manner free from unwanted distortions in the plate, the plate is provided with reinforcement means which in the specific embodiment includes a plurality of straight ribs radiating in the plate between the center and periphery thereof. Additionally, a circular reinforcing rib is provided about the center of the plate (inwardly of the third line of weakness) to reinforce the same.

In the preferred embodiment, the tab is provided with a recess in at least one of its sides for receiving and thereby guiding the severed portions of the plate to be wound thereon during removal of the closure. Additionally, in the preferred embodiment, indicia is provided on the tab and the plate indicating the proper rotated position of the tab subsequent to initial severance at the initial tear area and prior to winding on the tab during continued severance of the plate. For example, one suitable indicia may be constituted by a projection

on the tab and an identation or other marking on the plate to be aligned with each other to indicate the proper rotated position of the tab. It is further preferred that the opposite ends of the tab be bent or otherwise raised upwardly above the main plane of the tab and away from the plate to avoid obstruction with the plate which could impede rotation of the tab into the proper position.

DRAWINGS

Other objects and advantages of the present invention will become apparent from the following more detailed description taken in conjunction with the attached drawings in which:

FIG. 1 is a plan view of a container top incorporating a closure embodying the present invention but omitting certain reinforcement ribs for purposes of clarity;

FIG. 2 is a view similar to FIG. 1 but showing a tab included in the closure in phantom lines while additionally showing reinforcement ribs;

FIG. 3 is an enlarged cross-sectional view taken generally along lines 3—3 of FIG. 1;

FIG. 4 is a view generally similar to FIG. 1 but showing the closure in a partially opened position;

FIG. 5 is a plan view of one preferred tab which may be incorporated in the closure of the present invention; and

FIG. 6 is an enlarged cross-sectional view taken generally along lines 6—6 of FIG. 2 with the tab omitted.

DETAILED DESCRIPTION

Referring now to the drawings in detail, there is illustrated for illustrative purposes only a container generally designated **10** having a generally cylindrical shape and incorporating in one end thereof, a closure generally designated **12** embodying the present invention. In the specific embodiment, closure **12** is incorporated as the top or end wall of container **10** by means of crimping the outer peripheral flanges **14** of plate **12** about the circular rim **16** of the container. It will, of course, be understood that any other method of attachment may be employed and furthermore plate **12** may be incorporated as an integral part of the container wall if desired. Container **10** may be employed to store matter such as food, however, it will be obvious that any other matter or material may be stored in the container.

In one preferred embodiment, closure plate **12** may be made from a suitable relatively strong sheet material such as sheet steel, however, other materials may be used depending upon the use or other conditions to which the container and closure top will be subjected.

In accordance with the present invention, closure plate **12** is scored so as to permit portions of the plate to be continuously and progressively severed from other portions of the plate and coiled about a tab or key until the entire plate **12** is coiled on the tab and removed from the container in one operation.

In the specific embodiment shown, the scoring includes a first line of weakness **18** which extends along a continuous circular path at the peripheral area of plate **12** adjacent connecting flange **14.** Additional scoring is provided by what will be termed for the sake of description, a "second line of weakness" **20** and a "third line of weakness" **24** which join at **25** to define an initial tear area and which extend away from the initial tear area along arcs in the same general angular direction along closure plate **12.** The second line of weakness **20** extends from the initial tear area along an arc outwardly in counterclockwise direction (as viewed in the drawings) and terminates at the first line of weakness **18** at the periphery of plate **12.** The third line of weakness **24** extends from the initial tear area along an arc in the counterclockwise direction, however, the arc extends inwardly towards the center of the plate and furthermore extends in a circular path around the center of the plate terminating short of itself before area **26** in the plate which is unweakened for a purpose to be described. The curvature of line of weakness **20** may be a combination of an arc and spiral; however it is preferably such as would lead, upon initial severance, to outer line of weakness **18** so as to maximize opening. But it should not so abruptly lead to line of weakness **18** that it becomes excessively difficult to rotate the tab which will now be described.

In order to sever portions of plate **12** along the lines of weakness or score lines **18, 20** and **24,** a key or tab generally designated **30** is provided. Tab **30** is connected to plate **12** at the initial tear area midway between the center and periphery of plate **12,** and in the specific embodiment shown this is effected by a rivet-like fastener **32** which may be formed to integrally project upwardly from plate **12** to be received in an aperture **33** formed in tab **30** as best indicated in FIG. **3.** This permits tab **30** to be positioned in an idle or storage mode such as illustrated in FIG. **1** wherein tab **30** lies completely within the confines of plate **12.**

In order to remove closure **12,** tab **30** is initially raised from plate **12** to initially sever the plate at the initial tear area adjacent rivet fastener **32.** Then, tab **30** is rotated about fastener **32** in a plane generally parallel to plate **12** to position the broad end **36** of tab **30** beyond the periphery of the plate as shown in FIG. **4** and with the narrow end **34** of tab **30** generally positioned over the center of plate **12.** Tab **30** may then be rotated about its longitudinal axis to revolve tab **30** about and relative to the rim of the container to continuously sever portions of plate **12** along score lines **18, 20** and **24** as indicated in FIG. **4.** Because of the configuration of score lines of **20** and **24,** continued revolution of tab **30** in the counterclockwise direction as viewed in the drawings, will cause plate **12** to be severed throughout the first line of weakness **18,** the second line of weakness **20** and the third line of weakness **24** which extends about the center of plate **12** and terminating just short of area **26** which is unweakened. By the time the third line of weakness **24** is completely severed just short of area **26,** the first line of weakness **18** and, of course, the second line of weakness **20** will have been totally severed such that the entire plate **12** may be removed without leaving any portions of plate **12** to fall into the container or otherwise become dislodged from the severed portions.

It should also be apparent that as severance of the plate **12** proceeds along lines **18, 20** and **24,** the severed plate portions **12*a*** will be wound continuously on tab **30** as shown in FIG. **4.** In order to facilitate winding of severed plate portions **12*a*** on tab **30** in a uniform coiled manner, one side edge of tab **30** is recessed along **38** for receiving and guiding the severed portions **12*a*** thereon in a controlled uniform manner.

In the preferred embodiment, tab **30** is made with a generally triangular shape including opposite converg-

ing side edges as shown in the drawings to facilitate winding of the severed portions 12*a* of the plate thereon. Additionally, it is preferred that tab **30** have a generally flat or planar body including sufficiently broad portions so as to optimize the amount of severed plate portions 12*a* wound thereon per rotation of the tab. It is further preferred that the length of the tab be no less than the radius of plate **12**, and in the specific embodiment shown, the overall length of the tab is approximately three-fourths to seven-eighths the diameter of plate **12**. Additionally, in the preferred embodiment, the opposite ends **34** and **36** of tab **30** are bent or otherwise raised upwardly or outwardly away from the plane of tab **30** and plate **12** so as to avoid any obstruction with plate **12** during rotation of tab **30** from the idle position shown in FIG. **1** to the operative position shown in FIG. **4**. It should be apparent that tab **30** may be made from any suitable metallic or other material. Furthermore, as shown in one preferred emobidment in FIG. **5**, tab **30** may be formed with apertures **30***a* to reduce the weight thereof. At the same time, tab **30** may be reinforced by crimping about apertures **30***a* as well as about the periphery of the tab at **30***b*.

In the embodiment shown, when tab **30** is rotated into the operative position shown in FIG. **4**, the unrecessed side edge **31** of tab **30** should be positioned so as to be aligned with the center of plate **12** in the manner of a diametrical or radial line. This ensures proper positioning of tab **30** to facilitate severance of the plate along lines **20** and **24**. It is preferred that suitable indicia be provided to indicate the proper rotated position of tab **30**. In the specific embodiment shown, this indicia takes the form of a projection **40** formed on the edge **31** of tab **30** and a mark such as in the form of a depression or indentation **42** formed in plate **12** as indicated in FIGS. **1** and **2**. When projection **40** is aligned with indentation **42**, the tab will be in the proper rotated position with its edge **31** on a line passing through the center of plate **12**. It will be apparent that any other suitable indicia may be provided for this purpose.

In order to provide reinforcement to plate **12** to strengthen the same as well as to ensure that the severed portions 12*a* may be easily severed and uniformly wound about tab **30** in a smooth unimpeded manner, a plurality of radial reinforcing ribs **50** are formed in plate **12** integrally therewith. Ribs **50** radiate outwardly from central area of plate **12** as clearly shown in FIGS. **1** and **2**. Furthermore, ribs **50** are formed on the underside of plate **12** to avoid any obstruction between tab **30** and the top surface of plate **12**. Additionally, a circular reinforcing rib **52** is provided about the center of plate **12** inwardly of line of weakness **24** as best shown in FIGS. **2** and **6**. Rib **52** prevents the center portion of plate **12** from curling or distorting prior to final severance of plate along third line of weakness **24**. Circular reinforcing rib **52** is similarly placed on the underside of plate **12** to avoid obstruction with tab **30**.

It will be seen from the above that relatively few turns of tab **30** are required to completely sever plate **12** from the container. Furthermore, if desired, plate **12** may be severed only partially such as shown in FIG. **4** to permit dispensing of the container contents without obstruction from the severed portions 12*a* which are neatly wound upon tab **30** out of the path of dispensing. Inasmuch as when the circular first line of weakness **18** becomes completely severed, the third line of weakness **24** will have been severed short of area **26** so that the entire plate **12** may be removed by means of tab **30**, that is, without leaving any portions of plate **12** to be free to drop into the container or otherwise. Additionally, it will be seen that the closure of the present invention may be made from either aluminum or stronger materials such as steel which material for commercial purposes is less costly than aluminum.

What is claimed is:

1. For use on a container; a movable closure plate adapted to be incorporated as a wall or other part of a container to close the interior thereof, said plate having a first line of weakness spaced from and extending continuously around a peripheral area of said plate, an initial tear area located on the plate between the central portion of the plate and the first line of weakness, said plate having a second line of weakness extending from said initial tear area outwardly to said first line of weakness, said plate having a third line of weakness extending from said initial tear area to the central area of the plate and terminating at said central area of said plate, and a tab attached to said closure plate at said initial tear area for severing portions of said plate at said initial tear area upon raising the tab from the plate, said second and third lines of weakness being configured such that after initially severing the plate at said initial tear area the tab may then be wound about a longitudinal axis of the tab and revolved about the closure to sever additional portions of the plate along said first, second and third lines of weakness and to progressively wind said severed portions of the plate about said tab.

2. The closure plate defined in claim **1** wherein said second line of weakness extends on an arc from said initial tear area outwardly to said first line of weakness, and said third line of weakness extends on an arc from said initial tear area generally inwardly to said center area in the same general angular direction as said second line of weakness.

3. The closure plate defined in claim **2** wherein said third line of weakness extends around said central area of the plate.

4. The closure plate defined in claim **3** wherein said plate contains radially extending reinforcement means at angularly spaced locations about said plate, and reinforcement means extending around and in close proximity to the center of the plate inwardly of said third line of weakness.

5. The closure plate defined in claim **3** wherein said third line of weakness extends approximately 360° about the center of the plate and terminates in closely spaced relation to a portion of said third line of weakness.

6. The closure plate defined in claim **4** wherein said radially extending reinforcement means are straight ribs formed in the plate and wherein said reinforcement means about the center is a circular rib, said straight ribs and circular ribs being located on the underside of said plate.

7. The closure plate defined in claim **1** wherein said plate contains reinforcement means extending radially at angularly spaced locations on the plate.

8. The closure plate defined in claim **7** including means rotatably mounting said tab to said closure plate at said initial tear area and wherein said tab initially extends transversely across the plate such that after the closure is initially opened, at said initial tear area, the tab is rotatable about said means in a plane generally

parallel to said plate to project a portion of the tab beyond the plate to be gripped for winding the tab to continue opening of the closure plate as aforesaid.

9. The closure plate defined in claim **1** wherein said tab is defined along its length by opposite side edges converging beyond the point of attachment of said tab to said closure plate.

10. The closure plate defined in claim **9** wherein at least one of the side edges of said tab is recessed for receiving and guiding thereon in coiled arrangement severed portions of said plate.

11. The closure plate defined in claim **9** wherein said tab has a length at least equal to the greatest distance between the center of the plate and the first line of weakness.

12. The closure plate defined in claim **11** wherein said tab has an overall length greater than one-half the diametrical distance of said plate between said first line of weakness.

13. The closure plate defined in claim **1** further including means rotatably mounting said tab to said closure plate at said initial tear area and wherein said tab initially extends transversely across the plate such that after the closure is initially opened, the tab is rotatable about said means in a plane generally parallel to said plate to project a portion of the tab beyond the plate to be gripped for winding the tab to continue opening of the closure plate along said first, second and third lines of weakness as aforesaid.

14. The closure plate defined in claim **13** further including indicia means on said tab and said closure plate for indicating the proper rotated position of said tab about said first means for continuing severance of the plate along said first, second and third lines of weakness as aforesaid.

15. The closure plate defined in claim **14** wherein said indicia means includes a protrusion on said tab and an indentation on said closure plate adapted to be placed in registry to indicate the proper rotated position of said tab.

16. For use on a container; a removable closure adapted to be incorporated as a wall or other portion of a container comprising a closure plate having a first line of weakness spaced from and extending continuously around a peripheral area of the plate, an initial tear area located on the plate between the center of the plate and the first line of weakness, said plate having a second line of weakness extending from said initial tear area outwardly to said first line of weakness, said plate having a third line of weakness extending from said initial tear area towards the center of the plate and then around the center of the plate and terminating short of an unweakened area on the plate, and a tab attached to said closure plate at said initial tear area for severing portions of said plate at said initial tear area and subsequently along said first, second and third lines of weakness, said first, second and third lines of weakness being arranged such that should the plate be severed throughout said first line of weakness, the entire plate may be removed as a unit by said tab by virtue of the discontinuance of said third line of weakness and the unweakened portion of the plate.

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