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SELF OPENING TIN CAN LID

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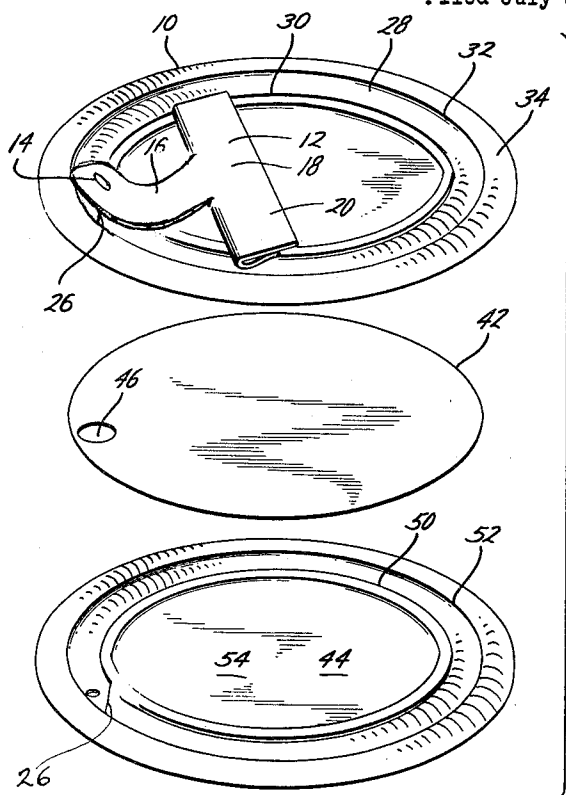


Fig. 1

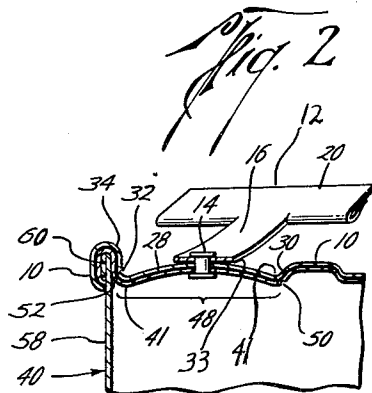


Fig. 2

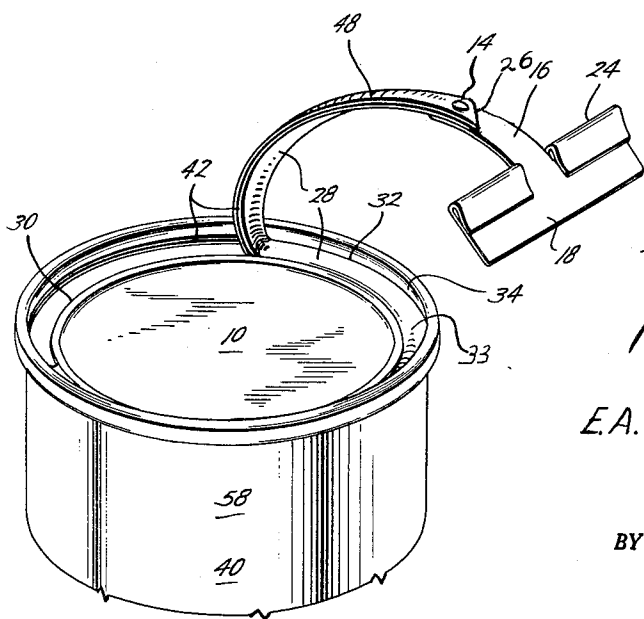


Fig. 3

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This invention pertains to means of opening permanently sealed metal vessels, commonly known as tin cans; in particular, to those which are adapted to be self opening or otherwise openable without resort to additional tools or utensils.

Although tin cans have found uses too numerous to mention, there is not, at the present time, a suitable type of pressure containing tin can that may be opened without the use of additional tools such as can openers, punches, knives, keys or other puncturing or tearing utensils. Threaded or clamped type closure elements or lids for these cans are not practicable primarily because of cost, and because of other factors such as can structural strength.

The main object of the invention is to provide a tin can closure element, lid, or top, that includes a structure adapted to and means for the opening of the sealed can without resort to additional tools or utensils.

Generally, the subject device comprises a special type of lid adapted to be used by existing can sealing machinery and to be used in the same way as the metal disc type lid is used on the millions of tin cans presently used. However, the subject invention is a "sandwich" or laminated type lid comprising thinner than usual upper and lower metal discs or laminas, having sandwiched and cemented therebetween a lamina of soft plastic material which has high tensile and low shear strength, being soft and easily cut by a sharp metal edge. Such upper and lower metal discs or laminas have a strip formed by concentric scoring near their periphery to form circular strips or tabs. Exterior to these strips are partially rolled flanges adapted to fit over and form the bead of the sealed can. The configuration of the end closure portion or center of the subject lid has at least one concentric raised portion or strengthening ring interior the bead portion, the curved surfaces necessary to form these as well as associated concentric troughs are made use of to place the scoring lines on the lower circular strips so that the sharp edges thereof after tearing, are turned upward, and those of the upper metal layer after the removal of the upper circular strip is removed, are turned down, making more effective the "scissoring" action between the edges of the lower circular strip and the edges of the inner and outer upper metal lamina residue. The scoring lines in the upper and lower laminas when in their final relationship with the plastic lamina therebetween, are offset, that is, not in register, so there will not be a weakened area of the lid against which pressure from the inside of the sealed can can act such as would probably be the case if the scored lines were in register. The plastic lamina has only one small hole therethrough prior to assembly, and the same is sealed around the contiguous metal parts by heat in the process of assembly and fabrication. The integrity and tensile strength of the plastic lamina is preserved for resistance to stretching which would allow bulging of the can top, yet is easily cut by the sharp, upturned edges of the lower circular strip as it is pulled upward when the can is opened and the scissoring action resulting from the cooperation between such lower strip edges and edges of the upper lamina residue forming the top of the bead and the center of the lid.

Conventional types of tin can lids cannot be scored if used for containers of carbonated drinks because of the inability of the scored metal lid to withstand internal pres-

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ures exerted upon it by the carbonic acid in solution in such drinks and the free carbon dioxide present therein as well as the other gases present in some alcoholic beverages such as beer for which cans are very much in use, but which require the use of punches to open.

All known conventional means for removing fixed can lids without the use of additional tools or utensils are dependent upon the weakening of the can top material or an unwieldy use of keys or other means of removing strips in and around the outer can wall or actually the cutting of the can wall or top. None of the known methods have proved economically feasible for tin cans which must resist internal pressures.

The object of the invention is to provide a can closure element or lid which is adapted to be opened without resort to external tools or devices, which closure element or can lid when removed leaves no sharp edges which might cause injury to a person drinking therefrom and which closure element or lid can withstand fairly high internal pressures.

Another object of the invention is to provide a can lid or container closure element having an integral self-opening means which completely removes the part of the lid covering the original opening, leaving the basic container or can usable as a drinking vessel for beverages.

Another object of the invention is to provide a metal container or tin can closure element adapted to be opened without tools, with strength for resisting internal pressures and external abuse and abrasion, comparable or superior to the closure elements or tops now used on tin cans or other sealed metal containers, in strength and resistance to abrasion.

Other objects and advantages of the invention will appear from the following description of the preferred embodiment thereof, reference being made to the accompanying drawings where:

FIGURE 1 is an exploded view of the three laminas or layers of the sandwich type closure element.

FIGURE 2 is a cross sectional view of a sealed tin can using one of the invention's laminated lids in place as formed by normal can sealing machinery.

FIGURE 3 is a perspective view of the top of a tin can using one of the subject inventive laminated lids with the can top having been partially opened by the use of the integral can opening means.

Referring now to FIGURES 1, 2 and 3, the upper metal lamina 10 has a T handle 12 attached thereto at weld or rivet 14 such T handle 12 having a rigid shank 16 curved slightly towards the center of upper layer 10 and having cross piece 18 comprising lateral extensions 20 and 22 having their lower edges folded upward forming finger guards 24. Handle 12 is attached to upper metal lamina 10 by weld or rivet 14 which is near the angled, substantially peripheral scoring line 26 forming the "front" end of upper circular strip 28, the latter being defined by inner concentric scoring line 30 and outer concentric scoring line 32. Outer scoring line 32 continues around the entire circumference of raised annular strengthening ring 33 of upper lamina 10, central of and leaving to the outside thereof, only bead or flange portion 34 which also forms the visible portion of the vertical exterior annular bead 34 on tin can 40 when sealed thereupon by regular can sealing machinery. Intermediate plastic lamina 42 comprises soft plastic material having high tensile and low shear strength, being easily cut, is of the same diameter as upper lamina 10 and lower lamina 44, and is cemented to each and therebetween. The only opening in plastic layer 42 is a hole 46. Lower metal lamina 44 has a circular strip 48 formed near the periphery thereof by inner concentric scoring line 50 and outer

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concentric scoring line 52, which outer scoring line 52 continues completely around the circumference of lower metal lamina 44 although inner concentric scoring line 50 does not, leaving circular strip 48 connected to the inner or center portion 54 of lower metal lamina 44. The front end of circular strip 48 is formed as part of an oval, or spoon shaped, for cutting up through plastic lamina 42 if necessary. Weld point or rivet 14 is disposed so that when upper and lower metal laminas 10 and 44 respectively, are cemented to plastic lamina 42, upper circular strip 28 and lower circular strip 48 are joined by welding or riveting through rivet hole 46 in plastic lamina 42.

Referring now to FIGURES 2 and 3, a vertical section of tin can 40 is shown with can wall 58 forming an upper can wall bead 60 of the open can 40 and is folded back against wall 58. The subject laminated lid is in place on can 40 and is attached to said upper can bead 60 by having its peripheral bead or flange portions 34 formed around and locked on the upper can bead 60, said upper lamina flange portion 34 comprising then the uppermost surface of the upper bead around the top of closed can 40. In cross section, outer scoring line 52 of lower metal lamina 44 is shown close to the inner surface of can wall 58 and the inner scoring line 30 of upper metal lamina 10 is shown disposed slightly spaced centrally to the trough 41 formed by ring 33 in the laminated closure element and not in register with inner scoring line 50 of lower layer metal layer, such scoring lines being located in the walls of trough 41 or ring 33 so that breaks along the scoring lines will form sharp edges facing downward on the upper metal lamina 10 and upward on lower metal lamina 44. Inner scoring line 50 of lower metal lamina 44 is shown disposed under a portion of circular strip 28 of upper metal lamina 10 and not in register with inner scoring line 30 of upper metal lamina 10, thereby preventing the internal pressures in sealed can 40 from acting upon scoring lines in register. Actually the scoring lines need not be placed in the exact relation shown so long as they are not in register and this disclosure intends to cover all such possible locations and relationships. As shown in FIGURE 2, plastic lamina 42 maintains its integrity because of its high tensile strength and low coefficient of elasticity, and because it is firmly held in place between the flange portions of upper and lower metal laminas 10 and 44; resists bulging of the tin can lid or laminated closure element, contributing significantly to the ability of the subject inventive can lid to resist internal pressures, and therefore leaking, bulging or buckling.

Referring now to FIGURE 3, the lower circular strip 48 has been pulled up through rivet hole 46 by T handle 12 and rivet or weld 14 joining upper circular strip 28 and lower circular strip 48 at their respective "front ends," and the sharp edges of lower circular strip 48 having cut through plastic lamina 42 at hole 46 and having exerted an angled, scissoring action thereupon against the depending sharp edges left by tearing strip 28 at outer and inner scoring lines 32 and 30 in upper metal lamina 10.

In operation, T handle 12 is lifted off the top of upper metal lamina 10. The fingers are placed around and under finger guards 24 of cross member 18 of T handle 12 and an upward force aided by leverage through rigid shank 16 is exerted through rivet or weld 14 on upper circular strip 28 at its "front" end which, because of angled scoring line 26 and inner and outer concentric scoring lines 30 and 32, begins to pull up and separate upper circular strip 28 from the rest of upper metal lamina 10. The upward force exerted through weld or rivet 14 through the hole 46 in the plastic lamina 42, on the "front end" of lower circular strip 48 of lower metal lamina 44 causes said lower circular strip 48 to pull up through said hole 46 and its sharp edge cut or "scissor" the soft plastic lamina 42 at the extreme outer circumference of the end closure portion of the can top as well as

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centrally thereto, the outer edge of lower circular strip 48 being pulled upwardly and inwardly by the T handle 12 which forces said sharp outer edge to cut through plastic layer 42 and forces the plastic against the depending sharp edge formed by the tearing of the upper circular strip 28 along upper, outer scoring line 32, "scissoring" or cutting plastic layer 42 around the entire periphery of the sealed can top. When the tearing of the upper and lower strips along their respective inner and outer concentric scoring lines reaches the points where the inner scoring lines end, the outer scoring lines continue to tear, thereby removing the entire center of the can top and leaving the center portions of said upper and lower metal laminas 10 and 44, and plastic layer 42, attached to the "rear" ends of all circular strips and are removed therewith. Thus it may be seen that the flange portions of said laminated can top remain on the can, forming the bead thereof, but with no inwardly extending sharp edges. In fact, the "scissored" plastic layer remaining in the bead portion actually tends to flow inwardly and downwardly to mask or cover any sharp edges formed by the severing of the lid along the outer scoring lines of both top and bottom metal layers. This is true because in the process of sealing, the flanged portions of said sandwich lid has been put under considerable compression and when this compression is relieved, at least as to plastic lamina 42, when the same is cut and a center or sealing portions of the lid are removed.

While a preferred embodiment of the invention has been described and disclosed herein, many modifications thereof may be made by a person skilled in the art without departing from the spirit of the invention, and it is intended to protect by Letters Patent all forms of the invention falling within the scope of the following claims.

I claim:

1. In the field of sealed containers having means for the opening thereof combined therewith, the combination of a sealable container having an opening therein bounded by a peripheral flange and a closure element adapted to be a part of said sealable container and to close and form therewith a sealed container comprising a laminated closure element having means integral therewith for the removal of the center portion thereof and means attached thereto for grasping and exerting the necessary force for such removal, and means for attachment of said closure element to said container; said closure element comprising structural means and for retaining pressures which may be contained in said container comprising outer abrasion resistant and stiffening lamina, an inner abrasion resistant and stiffening lamina, and a medial soft plastic sealing lamina having high tensile strength interposed between and cemented to aforesaid laminas, said means for attachment of said closure element to said container body comprising an outer peripheral flange portion of said closure element adapted to be fixedly clamped over the peripheral flange of the opening in said sealable container, said integral means for removing the remaining center portion of said laminated closure element comprising a scoring line in said outer lamina defining the entire inner boundary of said attaching flange means portion of said closure element, a second scoring line parallel thereto inwardly spaced apart therefrom, continuing around only the substantial part of the periphery of said central portion defined by the first said scoring line, and said inner lamina having a scoring line therein parallel and adjacent to the outer edge of the position of the line which would be in register with the first said scoring line of said outer lamina proceeding around the entire inner boundary of said flange portion of said inner lamina, and a second scoring line in said inner lamina parallel and inwardly spaced apart from the last said scoring line disposed in a similar relation to the second said scoring line in said outer lamina as the first described scoring lines in the respective laminas, except that said inner scoring line of

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said inner lamina is displaced inwardly relative the center of said closure element adjacent the position of the line which would be in register with the inner scoring line of said upper lamina, and a short scoring line in each of the upper and lower laminas respectively, connecting the beginning of said inner scoring lines with said outer scoring lines in the same lamina, and said grasping means attached to the scored tear strip means, comprising the portions of said lamina disposed between the said parallel scoring lines of said laminas, near the beginning of said scored tear strip means, and a communicating hole through said medial plastic lamina at the place of attachment of said grasping means to said scored tear strip means.

2. The combination of claim 1 wherein said scoring lines are impressed into the upper and lower surfaces of said upper and lower laminas, respectively, said scoring lines comprising narrow, shallow grooves in said laminas wherein metal is removed from the deepest por-

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tion of said grooves and the lamina thinned and weakened thereby, wherein said grasping means is attached to said upper and lower lamina at near the beginning of said tear strip means, being attached to said lower lamina through said hole in said medial plastic lamina.

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