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E. LJUNGSTRÖM

2,029,328

CONTAINER

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Fig. 1.

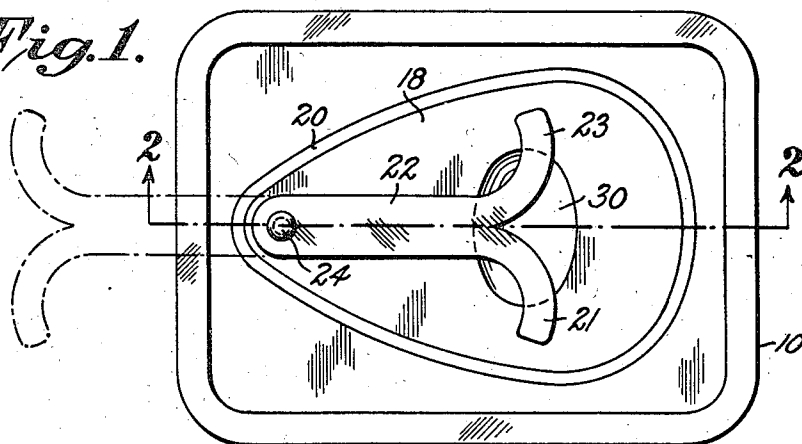


Fig. 2.

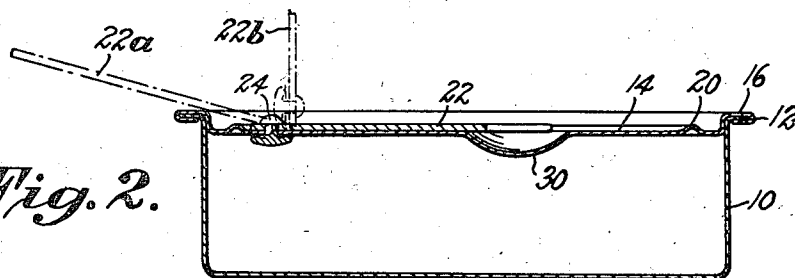


Fig. 3.

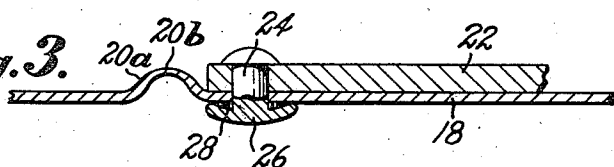
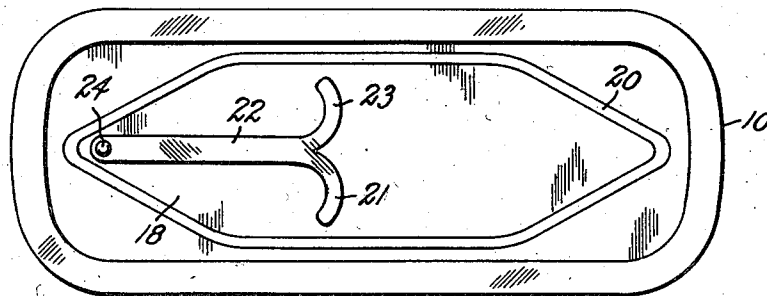


Fig. 4.



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CONTAINER

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14 Claims. (Cl. 220—48)

The present invention relates to containers and has particular reference to means for opening metal containers such as preserve cans and the like of the type adapted to be opened by tearing a portion of the wall of the container, usually the cover, along a scored or otherwise weakened line hereinafter termed a tearing line.

According to the invention a tearing member, preferably in the form of a bar or the like, is permanently secured to the portion of the wall of the container to be torn to effect opening thereof, and one of the principal objects of the invention is to provide a novel arrangement of parts whereby initial rupturing of the tearing line may be readily and positively effected upon manipulation of the tearing member without requiring the exercise of an undue amount of force. Another of the objects of the invention is to provide improved means for attaching the tearing member to the wall portion of the container so as to insure the desired positive clamping to the tearing member of the part of the container wall to which the tearing member is attached. Still another object of the invention is to provide a novel form of tearing member which may be cheaply manufactured and which may be permanently secured to the container wall without materially increasing the cost of production thereof.

The nature of the invention and the manner in which the above and other and more detailed objects thereof are attained may best be understood from the ensuing description of a preferred example of apparatus for carrying the invention into effect, taken in connection with the accompanying drawing forming a part of this specification.

In the drawing:

Fig. 1 is a plan view of a container embodying the invention and showing the tearing member in full lines in one position and in dotted lines in a second position;

Fig. 2 is a section taken on the line 2—2 of Fig. 1 and indicating in broken lines various positions of the tearing member;

Fig. 3 is a section on an enlarged scale showing a part of the container illustrated in Fig. 2, the thickness of the container wall being exaggerated; and

Fig. 4 is a plan view showing the application of the invention to a container of different shape than that shown in Fig. 1.

Turning now more particularly to Figs. 1 and 2 of the drawing, the container illustrated is of the type usually employed for packing sardines and the like, and comprises a sheet metal body portion 10 which may be an integral stamping or which may be made up from different parts soldered together in the usual manner. The body 10 is provided with an outturned flange 12 at its upper perimeter. The cover 14 of the container

comprises an edge portion 16 above the level of the plane of the cover and the edge portion 16 is bent around the flange 12 to form the usual joint, which may be hermetically sealed by soldering the parts together or by providing a suitable packing strip between the cover and the body in the usual manner.

The wall portion 18 adapted to be torn away to open the container is in the present instance located in the center of the cover 14 and is defined by a weakened or tearing line 20, the specific nature of which will be hereinafter described. In the embodiment illustrated the tearing line 20 extends completely around the portion 18, but it will be evident that this portion may be defined only in part by such weakened line so as to provide a tongue or strip which may remain attached to the cover of the container at its base, instead of being completely detachable therefrom. A tearing member or key 22, which in the present embodiment is in the form of a flat bar of metal, is attached at one of its ends to the portion 18 of the cover adjacent to the tearing line 20 by means passing through the cover of the container and having a headed portion on the under side of the cover providing a reinforcement between which and the tearing member a substantial part of the cover portion is tightly gripped or clamped. In the specific form illustrated the means for attaching the tearing member comprises a rivet 24 (see also Fig. 3) having an enlarged head 26 between which and the inner surface of the cover portion 18 there is located rubber or other suitable packing 28 for maintaining a seal to prevent ingress of air to the container. The edge of the head 26 is situated in close proximity to the tearing line 20.

As will be observed from Figs. 2 and 3, the tearing member 22 is held by the rivet flat against the outer surface of the cover, and the free end of the tearing member, which can be considered as a lever, is bifurcated to provide arms 21 and 23 which are bent in opposite directions to provide a firm grip for grasping the tearing member to manipulate the same. Preferably the cover of the container is provided with a depression 30 under the free end of the lever so as to facilitate grasping the grip formed by arms 21 and 23.

In the present example, the tearing line is formed by a corrugation or rib 20a (see Fig. 3) projecting upwardly from the plane of the cover and at the top of the corrugation pressed or scored to provide a weakened line 20b of metal of diminished thickness. Ordinarily, the thickness of the cover is from .2 to .4 millimeters, averaging .3 millimeters, and the weakened or tearing line is made as thin as is practically possible without unduly weakening the container, so

as to render as easy as possible the tearing of the container along the tearing line.

In accordance with one phase of the invention, the tearing member 22 is clamped to the container, as by means of the rivet 24 in the present embodiment, so as to be turnable about the means clamping it to the container as a pivot, and when constructed in this manner the apparatus functions as follows to effect opening of the container.

As will be observed from Fig. 1, the normal position of the member 22 before opening of the container is as indicated in full lines, with the free end of the tearing member situated inside of the perimeter or edge of the container. To open the container the tearing member is turned about the rivet 24 as a pivot from the position shown in full lines to a second position in which the free end of the member is brought outside of the edge of the container. This turning movement takes place in a plane roughly parallel to the wall portion 18. Preferably the member is moved through 180° to the position shown in dotted lines in Fig. 1, in which position the member lies in the line of symmetry of the wall portion 18 through the rivet 24. Due to the fact that the edge of the container is higher than the plane of the cover, the free end of the tearing member, in order to pass this edge, must be lifted, and if the tearing member is moved to the position shown in dotted lines in Fig. 1, this position in elevation will be as indicated at 22a in Fig. 2. This movement of the tearing member will, due to the fact that a part of the wall portion 18 at the secured end of the tearing member is tightly clamped thereto, deflect or distort the part of the wall portion which is adjacent to the weakened section 20c of the tearing line and cause initial rupture of the tearing line adjacent to the point of attachment of the tearing member, which section may be termed the rupturing section of the line providing a place of rupture thereof. It will be apparent that tearing member 22 acts as a lever cooperating with the edge portion of the container to apply a deflecting force on the cover portion as the lever is moved from its first position to its second position. It will further be evident that as the lever is moved from the first position to the second position the distance from the pivot to the point of contact between the lever and the edge of the container decreases, and the distance between the finger grip and the point of contact between the lever and the edge of the container increases. The point of contact between the lever and the edge of the container constitutes the fulcrum of the lever and consequently, as the lever is progressively turned, the leverage and consequently the force exerted to rupture the tearing line, increases. Ordinarily the amount of twist applied to the gripped cover part is sufficient to cause rupture of the tearing line by the time the tearing member has been moved 90° from the full line position. After the lever has been moved to the position shown at 22a, and initial rupture of the tearing line has been effected, opening of the container may then be readily effected by turning the tearing member to the position shown at 22b, and by continued pulling in the direction of the arrow shown in Fig. 2.

It will be evident that opening means according to the present invention may be applied to containers of a variety of forms and provided with opening portions of various shapes.

In Fig. 4, I have illustrated an elongated form of container in which the opening portion of

the cover is of generally triangular shape at its ends, the tearing lines at the sides of this portion extending generally longitudinally of the container.

It will be apparent that the invention may be embodied in numerous different forms of apparatus; for example, headed means other than a rivet may be employed for clamping a part of the wall portion of the container to the tearing member, and projections on the container other than the edge thereof may be employed to cooperate with the tearing member to lift the same to effect the distortion or twisting for initial rupture of the tearing line. It will further be apparent that the tearing off of the opening portion after the initial rupturing of the tearing line need not necessarily be effected by a pulling motion longitudinally of the container. As noted above, initial rupture of the tearing line usually occurs by the time the tearing member has been moved to a position at right angles with respect to the position shown in full lines in Fig. 1. In this position of the tearing member, the free end thereof projects beyond the edge of the container, and subsequent tearing of the cover to effect opening may then be effected by twisting the tearing member in the manner of the usual form of key, although a straight pulling movement to effect opening is more rapid and is usually to be preferred.

What I claim is:

1. A container having a wall portion to be displaced to provide the opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, an opening key, and attaching means pivotally mounting said key on said wall portion adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the container and being pivotally movable to an operating position with a part of the key between the attached and the free ends thereof overlying a place of rupture in said tearing line and with the free end of the key outside the edge of the container, said attaching means being constructed and arranged to cause lifting of the material of said wall portion adjacent to said place of rupture upon lifting of the free end of said key when the key is in operating position, and said key being freely manipulable in said operating position by lifting of the free end of the key to break said tearing line at said place of rupture essentially by shearing.

2. A container having a wall portion to be displaced to provide the opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, an opening key, and attaching means pivotally mounting said key on said wall portion adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the container and being pivotally movable to an operating position with the key extending over a place of rupture in said tearing line and with the free end of the key outside the edge of the container, said attaching means comprising a portion extending inwardly of the general plane of said wall portion formed and arranged to cause deflection of the material of said wall portion adjacent to said place of rupture in a direction imposing shear stress on the tearing line at said place upon movement of the free end of the key in a direction away from said plane

when the key is in operating position and said key being freely manipulable in said operating position to permit the free end thereof to be pulled in a direction away from said plane.

3. A container having a wall portion defined at least in part by a tearing line, a key, and attaching means pivotally mounting said key on said wall portion adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the container and being pivotally movable to an operating position with the key extending over a place of rupture in said tearing line and with the free end of the key outside the edge of the container, said attaching means comprising a rivet passing through an opening in said wall portion adjacent to said place of rupture and having an enlarged head on the inside of the container, said head gripping a part of the material of said wall portion adjacent to said tearing line and said key being freely manipulable in said operating position by pull of the free end thereof away from the general plane of said wall portion to cause said rivet head to impose shear stress on said place of rupture.

4. A container having a wall portion defined at least in part by a tearing line, a key, and attaching means pivotally mounting said key on said wall portion adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the container and being pivotally movable to an operating position with the key extending over a place of rupture in said tearing line and with the free end of the key outside the edge of the container, said attaching means being constructed and arranged to cause deflection of the material of said wall portion adjacent to said place of rupture in a direction imposing shear stress on the tearing line at said place upon movement of the free end of the key in a direction away from the general plane of said wall portion, and means comprising a part of the container arranged to cooperate with the key during its pivotal movement from its position before use to its operating position to force the free end of the key in a direction away from said plane, whereby to impose shear stress on the tearing line at said place of rupture due to said movement.

5. A container having a cover including a portion to be displaced to provide the opening through which the contents of the container are to be removed, said portion being defined at least in part by a tearing line in the material of the container, an opening key, and attaching means pivotally mounting said key on said cover adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the cover and being pivotally movable to an operating position with a part of the key between the attached and free ends thereof overlying a place of rupture in said tearing line and with the free end of the key outside the edge of the cover, said attaching means being constructed and arranged to deflect the material of the cover adjacent to said place of rupture in an upward direction upon pull in upward direction of the free end of the key away from the general plane of the cover to cause the attached end portion of the key to act as a fulcrum and said key being freely manipulable in said operating position for pulling the free end of the key upwardly away from said plane.

6. A container having a cover defined at least in part by a tearing line, a key, attaching means

pivotally mounting said key on said cover adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the cover and being pivotally movable to an operating position with the key extending over a place of rupture in said tearing line and with the free end of the key outside the edge of the cover, said attaching means being constructed and arranged to deflect the material of the cover adjacent to said place of rupture in an upward direction whereby to impose shear stress on the tearing line at said place upon movement in upward direction of the free end of the key away from the general plane of the cover, and means comprising a portion of the container extending above the general plane of the cover cooperating with said key during its movement from its position before use to its operating position to force the free end of the key upwardly away from said plane due to said movement.

7. A container having a cover defined at least in part by a tearing line, a key, and attaching means pivotally mounting said key on said cover adjacent to said tearing line, said key having a position before use with the free end of the key inside the edge of the cover and being pivotally movable to an operating position with the key extending over a place of rupture in said tearing line and with the free end of the key outside the edge of the cover, said attaching means being constructed and arranged to deflect the material of the cover adjacent to said place of rupture in an upward direction whereby to impose shear stress on the tearing line at said place upon pull in upward direction of the free end of the key away from the general plane of the cover, said container having a raised edge portion cooperating with said key to force the free end of the key upwardly away from said plane due to movement of the key from its position before use to its operating position.

8. A container having a cover defined at least in part by a tearing line having a place of rupture in the vicinity of the edge of the cover, a key and attaching means pivotally mounting said key on said cover adjacent to said place of rupture, the free end of said key comprising a gripping portion adapted to be grasped to enable the key to be pulled and said key having a position before use with the free end of the key inside the edge of the cover and being pivotally movable to an operating position with the key extending over said place of rupture and with the free end of the key outside the edge of the cover, said attaching means being constructed and arranged to cause lifting of the material of said cover adjacent to said place of rupture upon lifting of the free end of the key, said container having a raised edge extending above the plane of the cover and said raised edge cooperating with said key in its movement from its position before use to operating position to lift the free end of the key and thereby cause said attaching means to lift the material of the cover adjacent to said place of rupture to effect rupture of said tearing line due to said movement.

9. A container having a cover adapted to be substantially entirely removed by tearing along a tearing line having a place of rupture in the vicinity of the edge of the cover and tearing sections extending away from said place of rupture at either side thereof and generally adjacent the edges of the cover, a key, and a rivet pivotally mounting said key on said cover adjacent to said place of rupture, said rivet extending through

an opening in the cover and having an enlarged head on the inner side of the cover for gripping between itself and a portion of said key a part of the cover adjacent to said place of rupture, said key having a free end providing a gripping portion adapted to be grasped to enable the key to be pulled and said key having a position before use with the free end of the key inside the edge of the cover and being pivotally movable to an operating position with the key extending over said place of rupture and with the free end of the key outside the edge of the container in a position such that a line passing through the free end of the key and the rivet extends between the tearing sections of said tearing line, said container having a raised edge portion extending above the plane of the cover and said edge portion cooperating with said key during movement of the key from its position before use to its operating position to force the free end of the key upwardly away from the plane of the cover and to thereby impose shear stress on the cover at the place of rupture due to said movement of the key, said cover being adapted to be torn by pull of the free end of the key in a direction upwardly away from the plane of the cover and laterally over the container along a line extending between the tearing sections of said tearing line.

10. A container having a wall portion to be displaced to provide the opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, an opening key, and means for attaching one end portion of said key to said wall portion adjacent to a place of rupture in said tearing line, said key having an operating position with a portion of the key which is between the attached end and the free end thereof and which is adjacent to said attached end overlying said place of rupture and with the free end of the key in a position to be freely manipulated by pull on the free end away from said container to cause the attached end portion of the key to act as a fulcrum.

11. A container having a wall portion to be displaced to thereby provide the opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, an opening key, and means for pivotally attaching one end portion of said key to said wall portion adjacent to a place of rupture in said tearing line, said key being pivotally movable to an operating position with a portion of the key which is between the attached end and the free end thereof and which is adjacent to said attached end overlying said place of rupture and with the free end of the key in a position to be freely manipulated by pull on the free end away from said container to cause the attached end portion of the key to act as a fulcrum upon said pull.

12. A container having a wall portion to be displaced to thereby provide an opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, said tearing line having a place of rupture and tearing sections diverging away from said place of rupture to either side thereof, an opening key, and attaching means for pivotally attaching one end portion of said key to said wall portion adjacent to said place of rupture,

the free end of said key comprising a gripping portion adapted to be grasped to enable said key to be pulled, and said key having an operating position with a portion of the key which is between the attached end and the free end thereof and which is adjacent to said attached end overlying said place of rupture, said attaching means being constructed to deflect the material of said wall portion adjacent to said place of rupture in a direction outwardly of the container upon movement of the free end of the key in a direction away from the container whereby to effect initial breaking of said tearing line, the free end of the key when in operating position being in a position to be freely pulled away from the container in a direction causing the attached end portion of the key to first act as a fulcrum, and the connection between the attached end portion of the key and said wall portion causing said tearing sections to be torn upon continued pull of the key in a direction away from the container.

13. A container having a wall portion to be displaced to thereby provide the opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, an opening key, and means for attaching one end portion of said key to said wall portion adjacent to a place of rupture in said tearing line, said attaching means cooperating with the attached end portion of the key upon outward movement of the free end of the key in a direction away from the container to cause the material of the wall portion adjacent to said place of rupture to be displaced outwardly of the container to thereby break said tearing line at said place of rupture, and said key having an operating position with a portion of the key which is between the attached end and the free end thereof and which is adjacent to the attached end overlying said place of rupture and with the free end of the key in a position to be freely manipulated by pull of the free end away from the container to displace said wall portion and effect substantial opening of the container due to such pull.

14. A container having a wall portion to be displaced to thereby provide the opening through which the contents of the container are to be removed, said wall portion being defined at least in part by a tearing line in the material of the container, an opening key, and means for attaching one end portion of said key to said wall portion adjacent to a place of rupture in said tearing line, said attaching means extending inwardly of the container and cooperating with the attached end portion of the key upon outward movement of the free end of the key in a direction away from the container to cause the material of said wall portion adjacent to said place of rupture to be displaced outwardly of the container to thereby break said tearing line at said place of rupture, and said key having an operating position with a portion of the key which is between the attached end and the free end thereof and which is adjacent to the attached end overlying said place of rupture and with the free end of the key in a position to be freely manipulated by pull of the free end away from the container to displace said wall portion and effect substantial opening of the container due to such pull.