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Elrod et al.

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[54] **SAFETY LATCH**

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[51] **Int. Cl.** **E05c 19/16**

[58] **Field of Search** ..... 292/130, 131, 136, 251.5, 292/238, DIG. 14, DIG. 15, DIG. 30; 220/55.3, DIG. 17

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[57] **ABSTRACT**

A safety latching device pivotally connected to the periphery of a cover closing a pressurized container for providing an increment of free displacement of the cover to thereby facilitate depressurization of the container. The latching device includes a latch pivotally suspended from the cover, such latch further including a weight bias distal the pivot when normally disposed to suspend an inwardly extending projection into engaging alignment below a cooperating catch formed on the container. Further included on the container is a permanent magnet aligned in opposition to the latch for maintaining the latch in engaging alignment. The pivotal motion of the latch is limited to form a handle in an extended position and to preclude any impact of the latch against the magnet.

7 Claims, 4 Drawing Figures

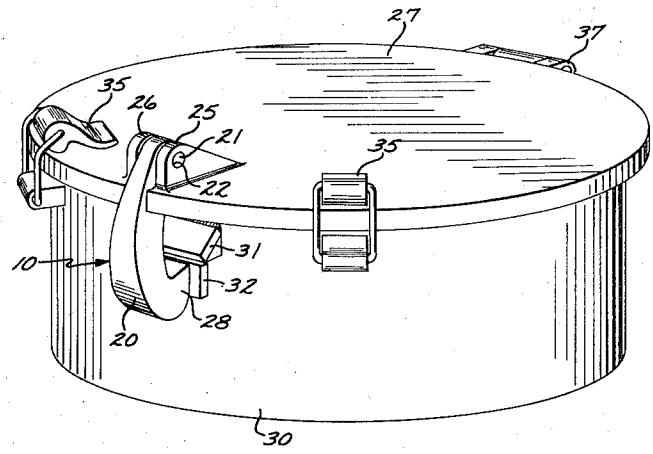
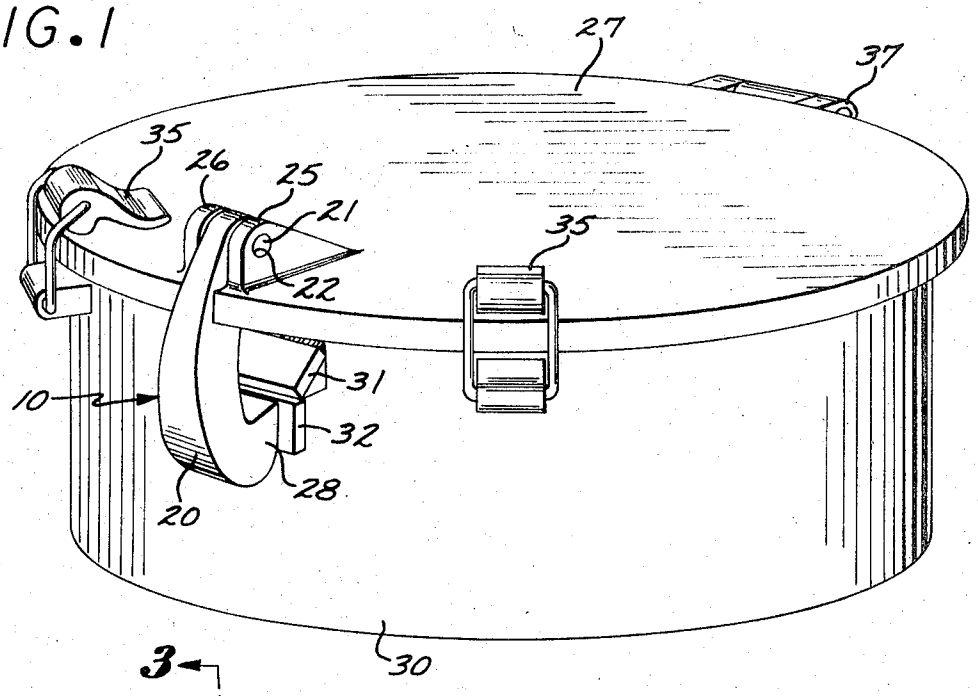


FIG. 1



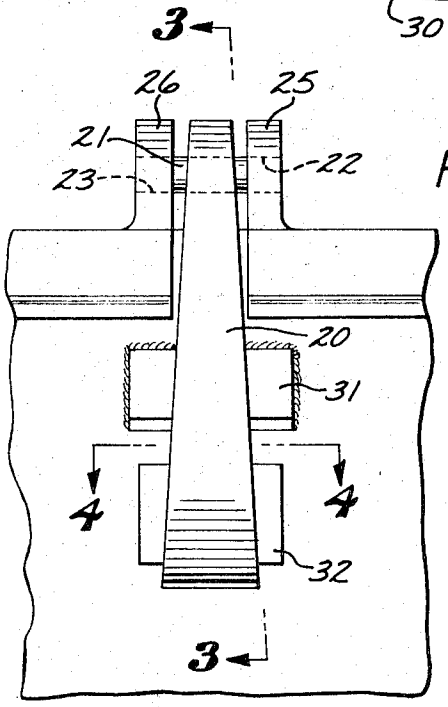
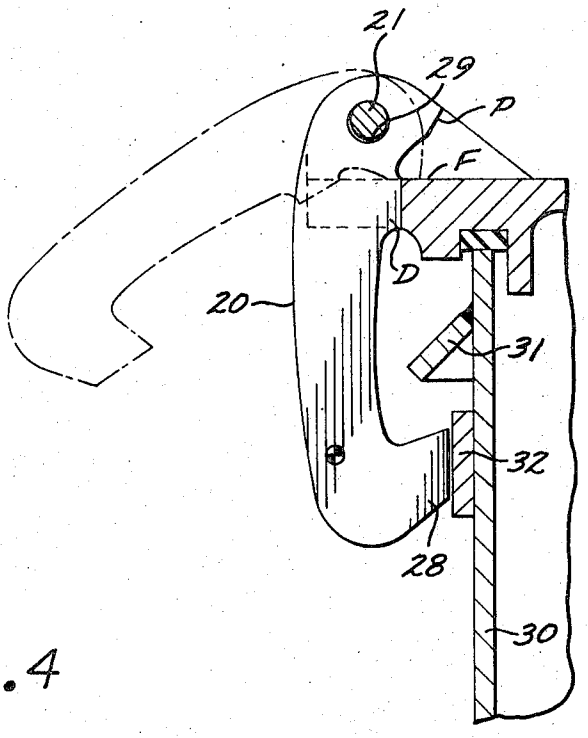


FIG. 2

FIG. 3



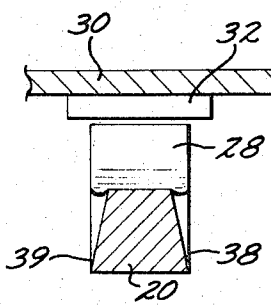


FIG. 4

SAFETY LATCH

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to safety latches, and more particularly to safety latches mounted on horizontally disposed access covers containing pressurized gases.

2. Description of the Prior Art

In pressurized containers, and particularly in containers supported on mobile platforms such as container railroad cars, relatively large access covers are necessary in order to accommodate various loading chute alignment tolerances. Such covers, or hatches, are typically circular in planform closed in sealing engagement by a plurality of over-center latches to form a seal around the periphery thereof with the edges of the loading port of the container. The relative size of the cover is usually such that even small pressure differentials thereacross sum up to large force levels and such large force levels, particularly on release, provide a source of hazard to loading personnel. Heretofore, prior hatch covers of this kind usually included pressure release devices, either of the vent type or of the latch type, where the latch type permitted a partial opening of the cover-to-port interface, releasing the pressure stored therein and thereby facilitating convenient and safe opening. Particularly the latter, i.e., the latch type releases, most always included biasing springs for maintaining a latching alignment of the latch providing an increment of free displacement between the latch and the cooperating catch. The operation of the springs biasing such prior art latches therefore had to be reliable since the whole safety feature functioning of the latch was dependent on the structural and elastic integrity thereof. Particularly when considered with the typical handling and environment abuse that such a latch is exposed to, the inclusion of a bias spring presented a reliability consideration as well as a continuing safety hazard.

SUMMARY OF THE INVENTION

Accordingly, it is the general purpose and object of the present invention to provide a safety latch disposed to accommodate an increment of free displacement between the latching surface thereof and a cooperating catch, such latch being maintained in a latching position by the weight bias thereof. Other objects of the invention are to provide a safety latch normally imbalanced to hang in a vertical position in engaging alignment with an associated catch, the motion of the latch being limited around a pivot to form a handle when extended from its engaging position, and to provide magnetic structure opposite the latch for attracting the latch to an engaging position during transit.

Briefly, these and other objects are accomplished within the present invention by providing a safety latch pivoted at one end thereof from intermediate two hinge ears formed to extend from the periphery of a pressurized container cover, the weight distribution of the latch about the pivot being such as to bias the normal suspended position thereof from the hinge pin in a cooperating alignment with a catch formed on the peripheral side of the container. To assure further continued alignment of the latch during transit vibrations and during transients associated with any stationing and loading manipulations, a permanent magnet is attached to the exterior surface of the container in opposing proximity with the free end or engaging portion of the latch, such magnet maintaining the latch in position until manually withdrawn from such position. The latch furthermore includes on the pivotal or upper end thereof a radial extension terminating in a bearing surface whereby the pivotal motion of the latch about the hinge pin is limited to a substantially horizontal position thus providing a handle for manipulating the cover. The inward travel of the latch is further limited by an abutting structure protruding therefrom such that direct impact of the latch against the magnet is precluded.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a pressurized container constructed according to the present invention;

FIG. 2 is a front section view of an inventive latch constructed according to the present invention;

FIG. 3 is a side view, in partial cross-section, taken along the line 3—3 of FIG. 2; and

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 2.

DESCRIPTION OF THE SPECIFIC EMBODIMENT

The present invention is generally directed at a gravity aligned safety latch device mounted on an access cover closing a pressurized container, such device providing an increment of free displacement in the opening of the cover to facilitate pressure relief. More specifically, a latch assembly, generally designated **10**, includes a latching lever **20** pivotally suspended at one end from the periphery of a horizontal access cover **27** to align the free end thereof for engagement of a projection **28** extending therefrom below a cooperating catch **31**, formed on a container **30**, allowing a predetermined increment of separation of the cover **27** from the container **30**. The latching lever **20** is pivotally secured to a hinge pin **21** received within two opposed axial bores **22** and **23** extending across two vertically aligned hinge ears **25** and **26** formed on the periphery of cover **27**, the hinge pin **21** engaging therebetween a pivot bore **29** formed in the one end of the latching lever **20**. The paired ears **25** and **26** project from the periphery of the horizontal access cover **27** closing the pressurized container **30** at a point substantially diametrically opposite to a cover hinge **37** about which the cover pivots. As described in more detail hereinbelow, the pivotal freedom of motion of latching lever **20** about the hinge pin **21** is limited to angular rotation of substantially one quadrant, between a vertically hanging position and a substantially horizontal or extended position. Thus the latching lever **20** provides a handle structure when extended to a horizontal position for facilitating articulation of the cover **27** about hinge **37** after such cover is released from a sealing engagement with container **30** upon release of a plurality of over-center latches **35**. When released, the latch lever **20** falls to a vertical hanging position to align the projection **28** in latching alignment below catch **31** such that engagement is effected at a predetermined separation of the cover from the cooperating edges of the container **30**.

More specifically, as shown in FIGS. **2** and **3**, the upper end of the latching lever **20** is extended along a radius substantially transverse to the longitudinal axis

thereof from the hinge pin **21** to provide a bearing surface P which abuts a cooperating surface F on the exterior of the cover **27** when such latch is extended to a horizontal position. In this manner the angular motion of the latching lever **20** is restricted in one direction to provide handling convenience for raising the cover **27.** The amount of the inward rotation of the latching lever **20** about hinge pin **21** is also limited by a projection D extending, again transversely inward from the lever **20,** below the central axis of the hinge pin to abut an opposed cooperating peripheral edge of cover **27.** The relative dimension of the projection D is such that direct impact of the free end of lever **20** against the adjacent side of the container **30** is precluded. Thus the lever **20** is free to articulate between a horizontal position and a vertical or hanging position being biased in the hanging position by the weight distribution thereof around the hinge pin **21** to provide a steady state moment thereabout, urging the free end of the lever towards the adjacent side of container **30** for latching alignment. More specifically, the exterior edge of the latching lever **20,** or the edge distal of pin **21,** is expanded to form laterally opposed ribs **38** and **39** providing a large weight concentration distal of a vertical plane intersecting the hinge pin **21,** and thereby providing a weight bias distally lateral of the hinge pin axis for biasing the latching lever into an engaging alignment for latching with the catch **31** mounted on the exterior of container **30.** The interior edge of the latching lever **20** extends transversely at the free end thereof towards the opposing container surface to form the projection **28,** such projection extending upwardly along an interior edge adjacent to pin **21** to terminate in an engaging surface a predetermined increment below the catch **31** when the cover **27** is in a closed position. This distance between the cooperating surfaces of projection **28** and catch **31** provides for a partial opening of cover **27** before engagement, whereby any interior pressurized gases are allowed to escape, releasing the force built up on the cover. To further assure continued alignment of latching lever **20** in a cooperating state between the end of projection **28** and catch **31** a permanent magnet **32** is affixed, again to the exterior of container **30,** in opposing relationship with the free end of projection **28.** It is to be noted that the dimensioning of projection D is such that no direct contact is made between the free end of projection **28** and the magnet **32,** thus preventing direct impacts on the permanent magnet.

In this manner, a pressure release latch is provided which allows for a partial opening of the cover to release any gases retained thereby, such opening being possible only after the other closure devices on the cover are opened. Thus, an operator is assured that the hatch, on opening, will not be thrown open beyond the catching dimensions provided in the latch assembly **10.**

In operation, the cover **27** is normally secured to the peripheral edge of the container **30** by the plurality of conventional over-center latching devices. When the last latching device **35** is released, the pressure collected below the cover forces the cover away from the container at which time the projection **28** extending from the latching lever **20** limits the amount or the displacement of the cover. Once the pressurized gases are released, the cover then falls back onto the peripheral edges of the container **30** and can be freely opened by grasping the latching lever **20** and rotating such latching lever about the hinge pin **21** to its horizontal extended limit, thus forming a handle for manipulation of the cover.

Some of the many advantages of the present invention should now be readily apparent. The inventive latch provides for means of limiting the amount of displacement of a pressurized cover after the release thereof, such means being both positive, reliable and not depending on the continued integrity of elastic elements like springs or other similar biasing devices. Furthermore, the latch provides a convenient handle for manipulating the cover after the pressure is released from within the container.

Obviously, many modifications and variations of the present invention may be made with regard to the foregoing detailed description without departing from the spirit of the invention.

We claim:

1. A latching apparatus for providing an increment of free displacement of a container cover, comprising:
- a latching lever pivotally suspended at the upper end thereof from the periphery of the cover;
- a catch formed on the container in opposing alignment with said latching lever;
- a projection formed on the lower end of said lever extending a predetermined increment below said catch for engagement therewith at a predetermined increment of opening of the cover;
- weight bias means formed on said lever horizontally distal of the pivotal connection at the periphery of the cover for urging by gravity said projection into engaging alignment with said catch; and
- limit means formed on said lever proximate the upper end thereof for limiting the pivotal rotation thereof between a substantially horizontal extended position and a vertical suspended position.

2. Apparatus according to claim **1** wherein:
- said limit means including a first projecting structure extending radially from the pivot connection of said lever for abutting against an opposing surface of the cover when said lever is extended to a horizontal position and a second projecting structure extending transversely from said lever to oppose a peripheral edge of the cover when said lever is in a vertically suspended position.

3. Apparatus according to claim **2** further comprising:
- a permanent magnet formed on the exterior of the container in opposing relationship with said projection.

4. Apparatus according to claim **3** wherein:
- said second projecting structure is dimensioned to oppose the inward rotation of said lever at an angular position maintaining the adjacent end of said projection at a predetermined increment of separation from the opposing surface of said magnet.

5. Apparatus for providing a pressure release opening in a container, comprising:
- a cover pivotally mounted on the container for closing a horizontal opening formed therein;
- releasable securing means attached to said container for selectively sealably securing said cover to said opening;
- a latching lever pivotally suspended at the upper end thereof from the periphery of the cover at a point substantially opposite to the pivotal connection of said cover;

a catch formed on the container in opposing alignment with said latching lever;

a projection formed on the lower end of said lever extending a predetermined increment below said catch for engagement therewith at a predetermined increment of opening of the cover;

weight bias means formed on said lever horizontally distal of the pivotal connection at the periphery of the cover for urging by gravity said projection into engaging alignment with said catch; and

a first projecting structure extending radially from the pivot connection of said lever for abutting against an opposing surface of the cover when said lever is extended to a horizontal position and a second projecting structure extending transversely from said lever to oppose a peripheral edge of the cover when said lever is in a vertically suspended position.

6. Apparatus according to claim **5** further comprising:

a permanent magnet formed on the exterior of the container in opposing relationship with said projection.

7. Apparatus according to claim **6** wherein:

said second projecting structure is dimensioned to oppose the inward rotation of said lever at an angular position maintaining the adjacent end of said projection at a predetermined increment of separation from the opposing surface of said magnet.

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