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(54) **AIR SEALABLE CONTAINER WITH
AUTOMATICALLY ACTUABLE PRESSURE
EQUALIZING VALVE**

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(57) **ABSTRACT**

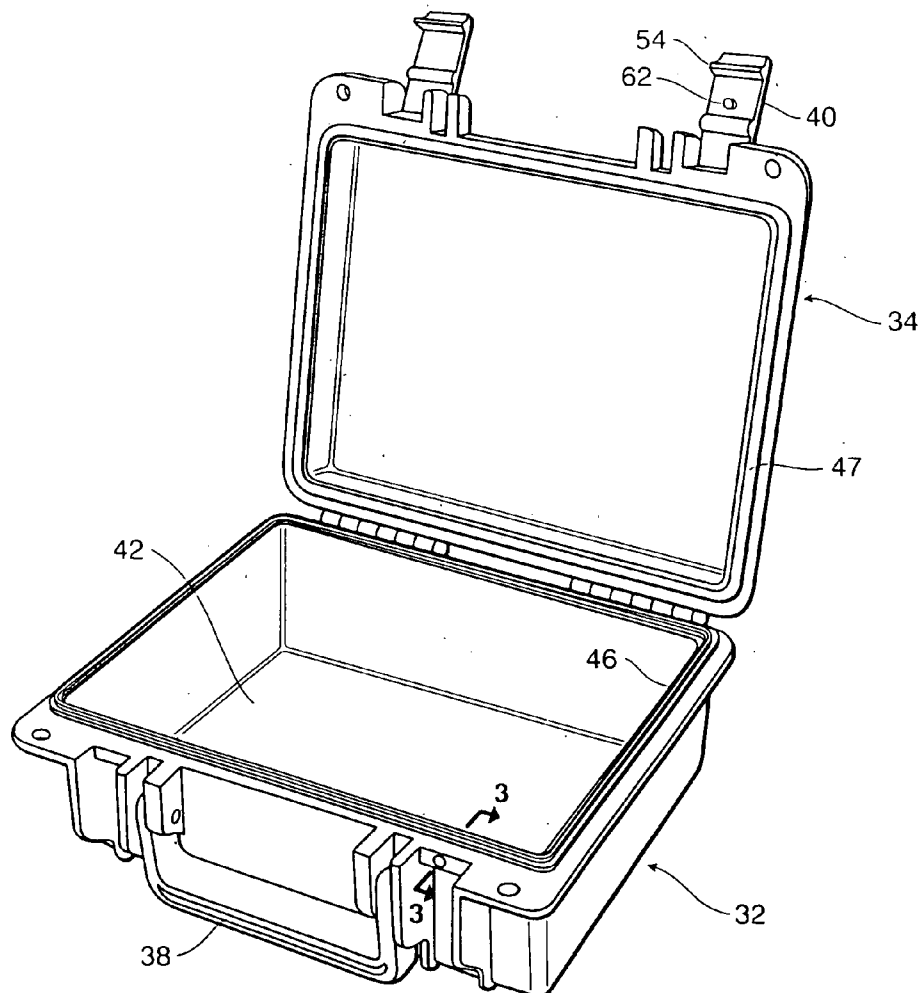
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(63) Continuation of application No. 10/027,571, filed on Dec. 19, 2001, now abandoned.

An air sealable and preferably air and water sealable container having an automatically actuatable pressure equalizing valve primarily adapted for operation upon opening and closing of the container. The pressure equalizing valve, which is in the nature of a pressure relief valve, is automatically actuatable to allow air pressure in the container to equalize with an ambient pressure to enable easy opening of a lid of the container.



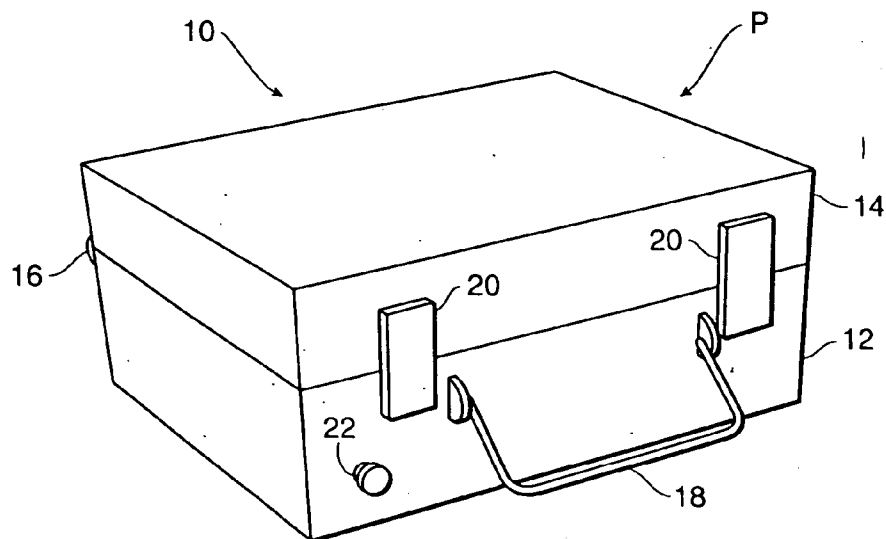


FIG. 1
(Prior Art)

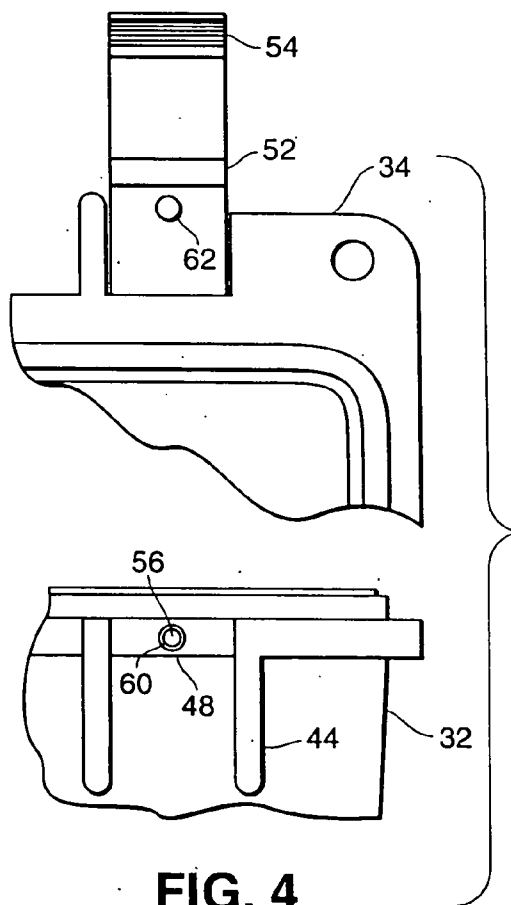


FIG. 4

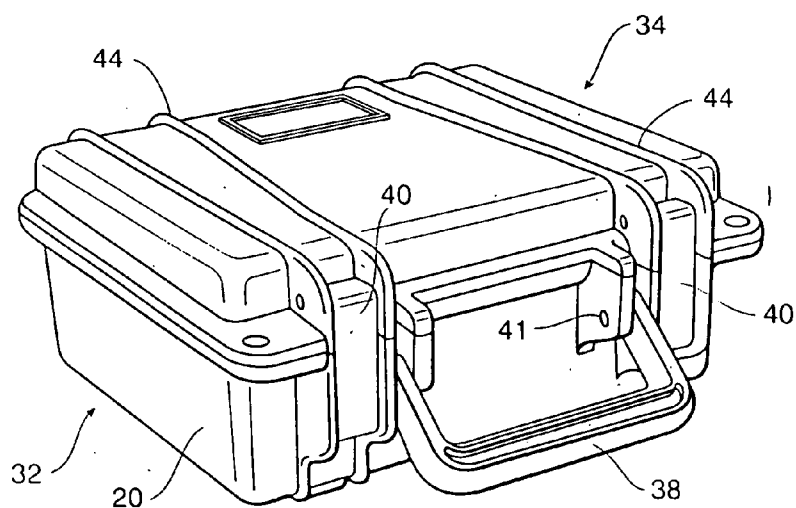


FIG. 2

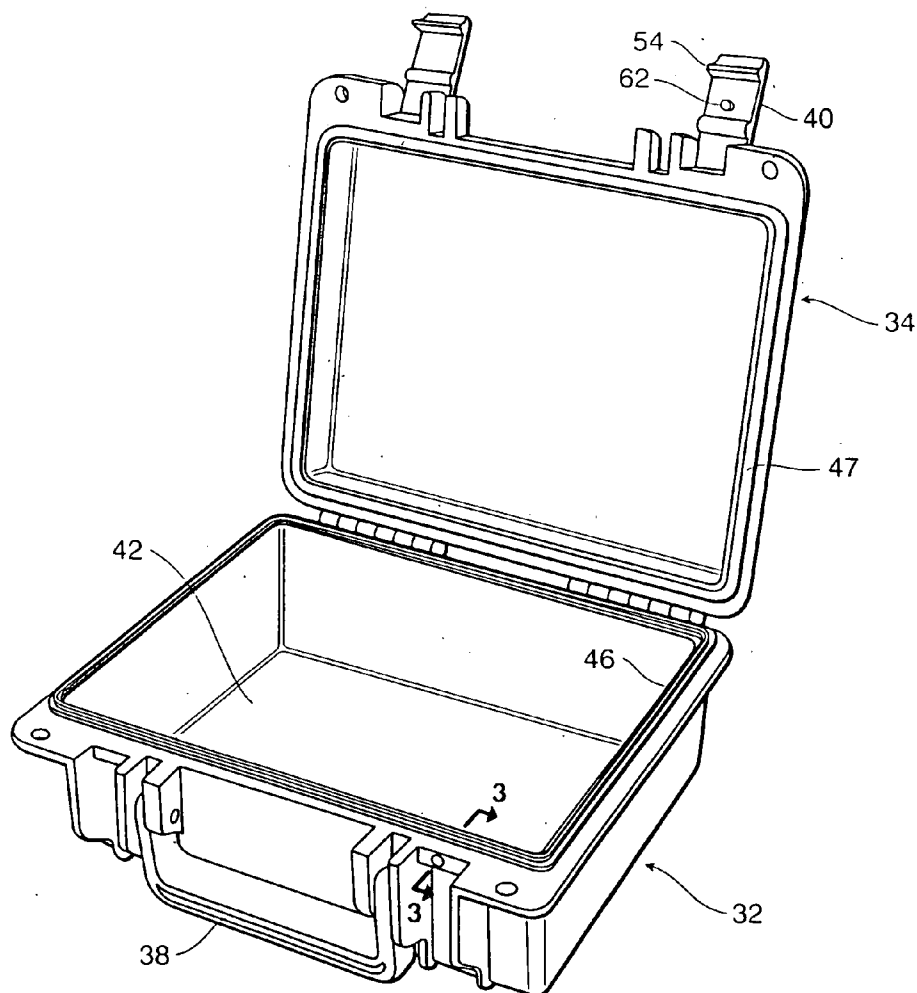


FIG. 3

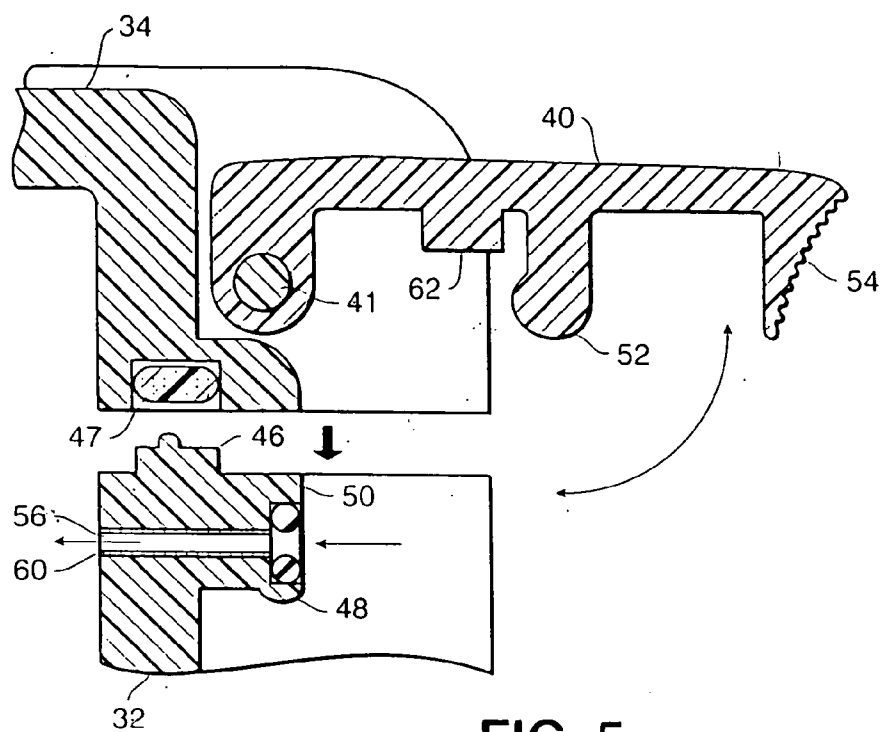


FIG. 5

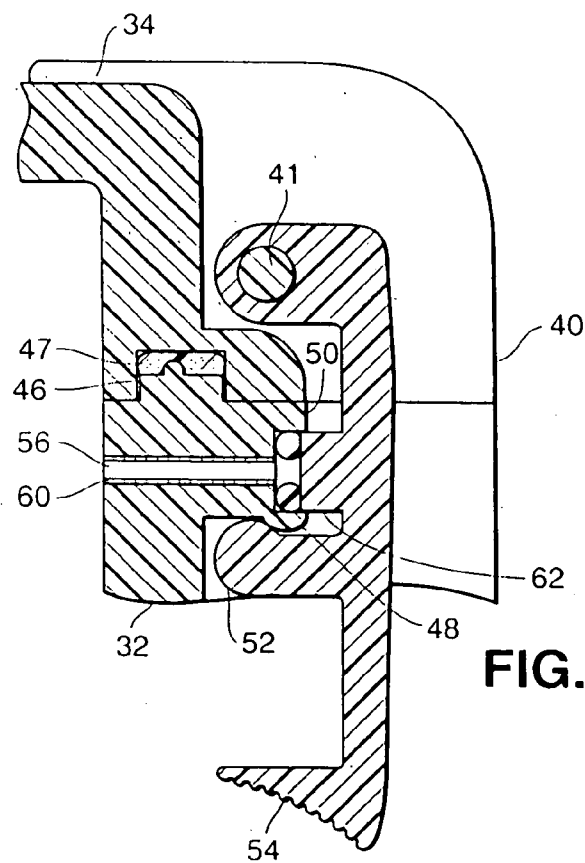


FIG. 6

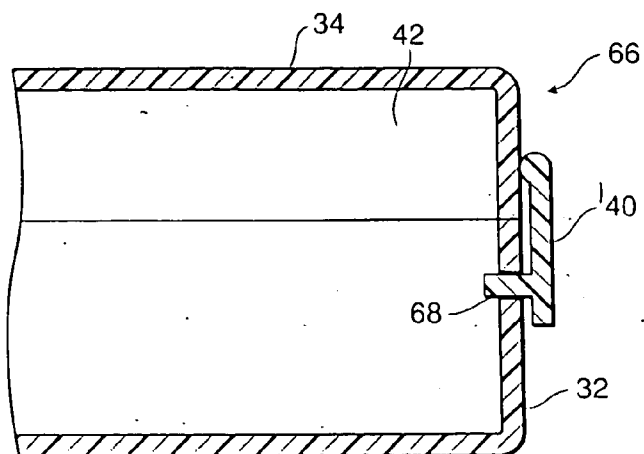


FIG. 7

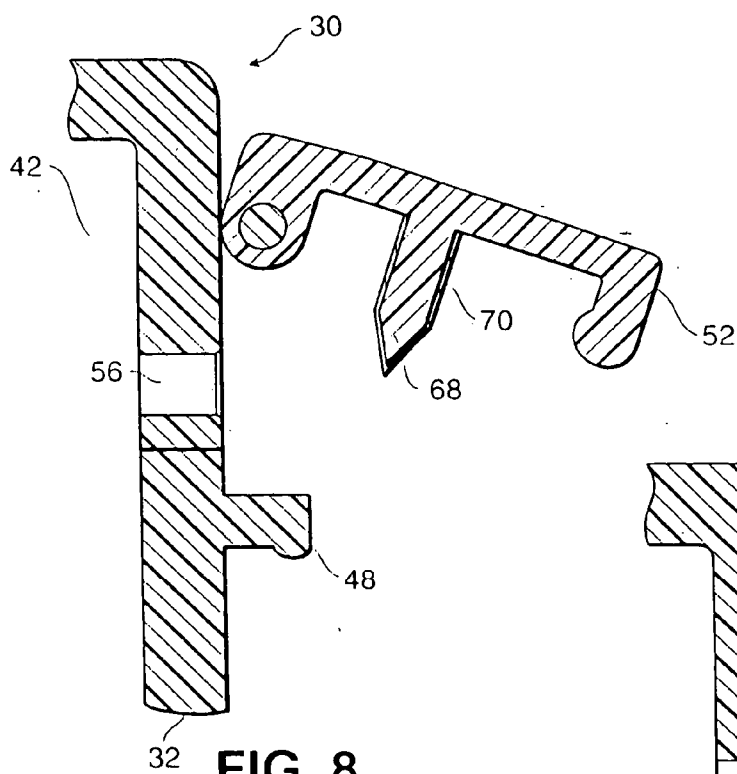


FIG. 8

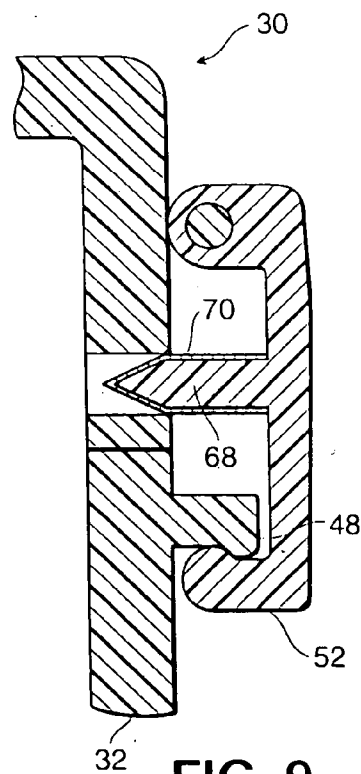


FIG. 9

**AIR SEALABLE CONTAINER WITH
AUTOMATICALLY ACTUABLE PRESSURE
EQUALIZING VALVE**

RELATED APPLICATION

[0001] This application extends from and assumes the filing date of the applicant's earlier filed provisional patent application Serial No. _____, filed _____, and entitled Air Sealable Container with Automatically Actuable Pressure Equalizing Valve.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates in general to certain new and useful improvements in hand engageable carrying containers which are provided with an automatically actuable valve capable of equalizing pressure on the inside of the container with respect to an exterior ambient pressure upon opening a member forming part of the container.

[0004] 2. Brief Description of Related Art

[0005] Conventional carrying cases such as briefcases, satchels, purses and the like which are not fluid sealed have no need for any type of pressure relief valve or pressure equalizing valve. Generally, the interior of these types of containers will assume the same pressure which exists as the ambient exterior pressure.

[0006] In many carrying cases, and particularly those which are fluid sealed, such as air sealed, or even more so, air sealed and water sealed, a pressure differential can exist between the interior and the exterior of the container. As a simple example, if a container is closed and in a city which has a relatively high altitude with lower ambient pressure, and then transported to a city having a much lower altitude and higher ambient pressure, a substantial vacuum will exist on the interior of the container. Thus, one who attempts to open the container may not be able to do so because of the force on the lid of the container created by the vacuum in that container.

[0007] There are many commercially available hand engageable carrying containers which are used in differing environments and therefore require some means to vent the interior of the container, or to at least expose the interior of the container to the ambient atmospheric pressure. Generally, all of the commercially available containers of this type which employ a fluid tight seal between the lid and the base of the container also provide some form of manually actuable valve. Generally, this manually actuable valve will adopt the form of a simple valve mechanism built into the side of the case or the lid, and which permits turning or moving of a handle to open or close the valve. Thus, when the handle is moved as for example, by the rotation in one direction the valve will open, and when rotated in the opposite direction the valve will close.

[0008] While these conventional manually actuable valves may constitute an effective means to vent the interior of a carrying case to the external ambient atmosphere, they nevertheless require the manual intervention of the user. One of the main problems which exists is that the user will frequently open the valve and forget to close the valve thereafter. If the container is introduced into another envi-

ronment in which it must be fluid sealed, as for example, in an underwater environment, the valve in the open position will permit introduction of water into the interior of the container. This introduction of water could seriously damage the contents carried on the interior of the container.

[0009] Another one of the drawbacks of these manually actuable valves is the fact that they are usually of a relatively simple and concomitantly low cost construction. This is due to the fact that any expensive valve mechanism would materially add to the overall cost of the container and would not be commercially feasible. Frequently, after a period of use, these valves will break or wear out with no convenient means of repairing same. Thus, the entire carrying case, which can be a moderately expensive item, must then be discarded.

[0010] It would be desirable to provide a carrying case which has an automatically actuable valve which actuates upon opening or closing of the carrying case. It would also be desirable to provide a valve of this type which is relatively simple in construction and which is not capable of readily wearing out after limited use thereof.

OBJECTS OF THE INVENTION

[0011] It is, therefore, one of the primary objects of the present invention to provide a carrying case which is capable of being fluid sealed and which includes a valve which is automatically actuable upon moving a movable member on that carrying case.

[0012] It is another object of the present invention to provide a carrying case of the type stated in which the automatically actuable valve can be constructed into or form a part of a movable lid or lock mechanism on the carrying case, and which does not require the need of manual actuation by a user.

[0013] It is a further object of the present invention to provide a carrying case of the type stated which is provided with an automatically actuable valve of the type utilizing an opening in the case, and which is automatically sealable upon shifting a lid or latch on the case to a closed position.

[0014] It is an additional object of the present invention to provide a carrying case of the type stated which can be constructed with an automatically actuable valve at a relatively low cost, and which is simple in operation but highly effective in use.

[0015] It is another salient object of the present invention to provide a method of allowing for pressure equalization between an interior of a carrying case and an exterior ambient atmosphere with respect to that, carrying case, and which automatically allows for such pressure equalization upon moving a portion of the carrying case.

[0016] It is still a further object of the present invention to provide a method of the type stated which automatically allows for venting of the interior of the carrying case to allow easy opening thereof, regardless of the pressure differential which may exist across that carrying case.

[0017] With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement and combination of parts and components presently described and pointed out in the claims.

BRIEF SUMMARY OF THE INVENTION

[0018] The present invention relates to a container which is capable of being air sealed and preferably air sealed and water sealed. Moreover, this container is provided with an automatically actuatable valve means forming part of or associated with the container and which automatically allows for equalization of any pressure differential across the interior of the container and the external ambient atmosphere, all in a manner as hereinafter described in more detail.

[0019] The container of the present invention generally includes a container base having a closure which forms an interior compartment. A lid is closeable and openable with respect to the container base, and when the lid is shifted to the closed position, the container is completely sealed with respect to the external ambient atmosphere. As indicated, for a fluid tight container, the container is both water and air sealed when the lid or other closure member is moved to a closed position.

[0020] In a more preferred embodiment of the invention, the container has a lid which is hingeably mounted over the base. Thus, the lid can be raised about its hinges to open the container and can be shifted to a closed position with respect to the container. Generally, an upper lip on the periphery of the container base mates with a corresponding portion on the lid to create a fluid tight seal between the two when the lid is moved to the closed position. The seal is even further amplified when the lid is locked in this closed position to the container base, as for example, by latches on the container or the like. For this purpose, any form of locking means is typically employed.

[0021] In accordance with the preferred embodiment of the invention, latches are provided on the lid and are engageable with hooks on the base when the latches are shifted to a locked position. Thus, when the lid is moved to a closed position the latches can be shifted to their locked position and thereby retentively hold the lid on the container base in this locked position.

[0022] Although this type of construction is conventional, the prior art relied upon a manually actuatable valve which was usually constructed into the body or the lid of the container. Usually, this valve relied upon a knob which was engageable by the user to obtain this mechanical actuation. As a simple example, a knob could be rotated in one direction to open the valve and rotated in an opposite direction to close the valve. This allowed for pressure equalization in the event that the container was moved from one ambient atmospheric condition to another.

[0023] One of the main problems with these prior art containers is that breakage of the valve before the same was shifted to an opened condition could preclude the actual opening of the lid on the container because the overall pressure on the inside as a result of pressure differential was too great to allow for manual opening of the lid. As also indicated, previously, failure of the user to remember to close valve could result in serious damage to the contents of the case if the case were introduced into water or a similar environment.

[0024] The present invention obviates these and similar problems by the use of the automatically actuatable valve, as aforesaid. In this case, the automatically actuatable valve is

actuated by moving one or more components on the carrying case itself. Thus, and in a preferred embodiment, an opening is formed in a sidewall of either the base or the lid and thereby provides communication between the interior of the carrying case and the external ambient atmosphere.

[0025] In a more preferred embodiment, that opening can be closed upon movement of some moveable member forming a part of the carrying case. As a simple example, closing of a lid or a latch can cause a member associated with that lid or latch to extend over the opening and thereby completely seal the same. In still a more preferred embodiment of the present invention, one of the latches on the carrying case of the invention is provided with a protrusion which extends over and abuts against the exterior surface of that opening to thereby constitute a seal for that valve opening. Thus, if the latch is shifted to the locked position on the carrying case, the protrusion will extend over the opening and thereby completely seal the same.

[0026] If there were a pressure differential across the carrying case which precluded an opening of the carrying case, the mere release of the latch will cause a venting and allow the pressure in the carrying case to equalize with the external ambient atmospheric pressure.

[0027] In another embodiment of the invention, a movable portion of the carrying case, as for example, one or both of the latches, is provided with a protrusion which extends into the opening. For this purpose, the opening can be provided with a grommet or the protrusion could be provided with a cylindrical sealing means, if desired.

[0028] This invention possesses many other advantages and has other purposes which may be made more clearly apparent from a consideration of the forms in which they may be embodied. These forms are shown in the drawings forming a part of and accompanying the present specification. They will not be described in detail for purposes of illustrating the general principles of the invention, but it is to be understood that such detailed description and accompanying drawings are not to be taken in a limiting sense.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] Having thus described the invention in general terms, reference will now be made to the accompanying drawings in which:

[0030] **FIG. 1** is a perspective view of a prior art case having a valve means for equalizing pressure with respect to an ambient condition;

[0031] **FIG. 2** is a perspective view of an air sealable case in accordance with the present invention and having the automatically actuatable pressure equalizing valve therein;

[0032] **FIG. 3** is a perspective view, similar to **FIG. 2**, and showing a lid forming a part of the container of **FIG. 2** in an opened condition;

[0033] **FIG. 5** is an enlarged fragmentary sectional view showing a locking latch on a container lid in an opened condition;

[0034] **FIG. 6** is an enlarged fragmentary sectional view, similar to **FIG. 5**, except that it shows the locking latch in a closed position;

[0035] FIG. 7 is a fragmentary vertical sectional view of a modified form of container in accordance with the present invention;

[0036] FIG. 8 is an enlarged vertical sectional view, similar to FIG. 7, and showing a modified form of locking latch in an opened condition; and

[0037] FIG. 9 is a vertical sectional view similar to FIG. 8 and showing the locking latch in a fully locked position.

DETAILED DESCRIPTION OF A PRACTICAL EMBODIMENTS

[0038] Referring now in more detail and by reference characters to the drawings which illustrate practical embodiments of the present invention, P designates a typical prior art fluid sealed container 10, having a base 12 along with a lid 14 hingedly mounted thereon through conventional hinges 16. The carrying case may be conventionally provided with a handle 18 for grasping by the hands of the user. Moreover the lid 10 is capable of being locked to the base in a fluid sealed condition, through the use of latches 20, all as best shown in FIG. 1.

[0039] The prior art containers which were fluid sealed typically included some valve to allow for pressure equalization between the interior of the container and the ambient atmosphere. In this case, a conventional pressure type relief valve 22 was provided. This pressure relief valve could be of relatively simple construction and frequently relied upon a screw which was partially unthreaded from an opening through the containing wall, thereby allowing for air passage into the interior of the container. The screw was provided with a knob, as shown in FIG. 1, for manual engagement by a user.

[0040] However, as indicated previously, the user of the container case oftentimes overlooked the need for sealing the container and there was no means on the knob to indicate whether or not the valve was opened or closed.

[0041] The present invention provides a container 30 having a container base 32 and a lid 34 hingedly mounted thereon by means of hinges (not shown). The carrying case is also provided with a handle 38 on the container base and locking latches 40 associated with the lid, and mounted therein through latch pins 41, as hereinafter described in more detail. When the lid is in a closed position, as shown in FIG. 2 for example, an interior compartment 42 (seen in FIG. 3) is air sealed. The base 32 may also be provided with a peripheral upwardly struck protrusion 46 which (extends into a peripheral groove 7 on the lid to further provide an effective locking seal.

[0042] The container lid 34 is provided with two pairs of spaced apart ribs 44 and 46 which extend from the front side of the container to the rear side thereof. These ribs are designed to not only provide further structural integrity, but they also serve as a means to mount each of the latches 40, also as best shown in FIGS. 2 and 3 of the drawings. Thus, it can be seen that one latch 40 on one side of the container is mounted on one pair of ribs 44 and the other latch 40 is mounted on the opposite pair of ribs 46.

[0043] Each latch 40 cooperates with a locking tab 48 on the exterior of the base and which exists in the form of an outwardly extending peripheral flange 50. Thus, each latch

40 is provided with an inwardly struck tab 52 which faces external wall of the container base, and is engaged on the underside of each locking tab 48. Moreover, by pressing the latch against the locking tab 48, the flange 52 becomes retentively locked thereunder to create a fluid tight seal between the lid and the container base. Moreover, and for this purpose, a thumb engaging extension 54 may also be formed on the latch 40, in the manner as shown in FIGS. 3 and 4 of the drawings.

[0044] A pressure equalizing valve arrangement is also constructed directly into the container itself. In this case, an opening 56 forming part of a pressure equalizing valve 58 is provided and communicates with the interior of the container in the manner as best shown in FIGS. 5 and 6 of the drawings. In this case, the opening 56, if desired, could be provided with a grommet or similar sealing material 60. At least one of the latches 40 is provided with an inwardly struck protrusion 62 which is adapted to extend over the front face of the opening 56. Thus, when the latch 40 is moved to the locked position as shown in FIG. 6, it can be observed that the protrusion 62 fits over the front face of, the opening 56 and thereby completely seals the same. Inasmuch as there is a tight locking pressure created by the inwardly struck tab 52 engaging the locking flange 48, there is a fluid tight seal created between the face of the protrusion 62 and the opening 56.

[0045] This type of valve mechanism, although simple in its construction, has been found to be not only quite reliable, but very effective in maintaining a sealing pressure against the opening, and thereby maintains a complete air tight seal in the interior chamber 42. Thus, this device has proved to be effective, capable of being produced at a low cost, and is highly reliable in operation.

[0046] FIGS. 7-9 illustrate a modified form of container 66 in accordance with the present invention. The container 66 uses common parts to the container 30 and therefore, like components forming part of the container 30 as found in the container 66 will have the same reference numbers.

[0047] The container 66 comprises a latch 40, similar to the latch illustrated in FIGS. 2-6 of the drawings. However, in this case, as opposed to a protrusion 62 which bears against the outface of the front wall of the container and extending over the opening 56, the latch 40 includes an elongate round protrusion 68 which literally fits within the opening 56. In this case, the protrusion 68 may also be provided with a cylindrically shaped sealing sheath 70 on its exterior face. Thus, when the exterior sheath 70 bears against the wall of the opening 56, a fluid tight seal is created therebetween.

[0048] The valve mechanism as shown in the embodiment of FIGS. 7-9 has also proved to be effective in providing a fluid tight seal and thereby operates as an effective valve arrangement.

[0049] The container and the various components thereof may be formed of any of a number of known plastic materials. Thus, the container may be conveniently molded in a thermoforming operation, blow molding, injection molding, or the like. Any of a number of suitable plastic materials may be usable for this purpose including, for example, polyethylene, polypropylene, etc. In addition, and for that matter, the container could also be formed of

reinforced plastic composite materials, such as fiberglass-epoxy resin combinations. Also, and in like manner, the container could be formed of metal materials. However, for purposes of creating the automatically actuable valve, some type of sealing material may be necessary if the protrusion 62, or for that matter, the protrusion 68 is to create a fluid tight seal.

[0050] Thus, there has been illustrated and described a unique and novel air sealable container with an automatically actuable pressure equalizing valve and which thereby fulfills all of the objects and advantages which have been sought therefore. It should be understood that many changes, modifications, variations and other uses and applications will become apparent to those skilled in the art after considering this specification and the accompanying drawings. Therefore, any and all such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention.

Having thus described the invention, what I desire to claim and secure by Letters Patent is:

1. A container capable of having an interior sealed with respect to an ambient atmospheric condition and having a valve which is automatically actuable thereon, said container comprising:

- a) a container housing;
- b) openable cover means on said housing and which is openable providing access to an interior compartment;
- c) locking means for holding said cover means in a closed position with respect to said container housing and enabling a seal of the interior compartment; and
- d) valve means associated with said cover means or flocking means and being actuable in response to an action of opening or closing the cover means or locking same.

2. The container of claim 1 further characterized in that said valve means is located to be actuated by locking of said locking means.

3. The container of claim 2 further characterized in that said locking means comprises at least one locking latch and said valve means is located to be engaged and actuated by locking of said locking latch.

4. The container of claim 3 further characterized in that said valve means comprises a valve actuator located on said

locking latch and closes said valve when locked and moved to cause an opening of said valve means when said latch is unlocked.

5. The container of claim 4 further characterized in that said actuator comprises a projection on said latch.

6. The container of claim 5 further characterized in that said valve means comprises an opening in said container and which is engaged by said projection when said locking latch is locked.

7. The container of claim 6 further characterized in that said projection has a face which extends over and covers said opening in sealing contact therewith.

8. The container of claim 6 further characterized in that said projection extends into said opening in sealing contact therewith.

9. A container capable of having an interior compartment sealed with respect to an ambient atmospheric condition and for equalizing pressure conditions in a different ambient atmosphere, an improvement comprising:

- a) an opening on a housing of the container between said housing interior compartment and an external atmosphere;
- b) locking means for holding said housing in a closed position and enabling a seal of the interior compartment; and
- c) valve projection means associated with said locking means and being actuable in response to an action of opening or closing the locking means.

10. The improvement in the container of claim 1 further characterized in that said valve projection means is located to extend with respect to and engage said opening when said locking means is locked.

11. The container of claim 3 further characterized in that a valve projection engages a face of said opening in sealing contact therewith when said locking means is locked.

12. The container of claim 10 further characterized in that said projection has a face which extends over and covers said opening in sealing contact therewith.

13. The container of claim 10 further characterized in that said projection extends into said opening in sealing contact therewith.

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