US 20140097118A1

(19) **United States**

(12) **Patent Application Publication**

Beer

(10) **Pub. No.: US 2014/0097118 A1**

(43) **Pub. Date: Apr. 10, 2014**

(54) **FLEXIBLE PACKAGING SYSTEM AND METHOD OF USE TO ELIMINATE VALVED COFFEE BAG VACUUMIZATION DUE TO CHANGE IN ATMOSPHERIC PRESSURE**

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(21) Appl. No.: **14/043,179**

(22) Filed: **Oct. 1, 2013**

Related U.S. Application Data

(60) Provisional application No. 61/709,561, filed on Oct. 4, 2012.

Publication Classification

(51) **Int. Cl.**
B65D 81/20 (2006.01)

(52) **U.S. Cl.**
CPC ***B65D 81/2023*** (2013.01)
USPC **206/524.8**; 53/434

(57) **ABSTRACT**

A packaging system and method of use for packaging coffee in individual valved packages is disclosed. The individual valved packages are disposed within a secondary package formed of a flexible material and including a one-way pressure relief valve. The valve of the secondary package is set to open so that the secondary package internal pressure never drops below the operating pressure of the primary package degassing valves. The secondary package is disposed within a rigid container, e.g., a corrugated carton. The system and method enables shipping of the coffee packages permitting them to degass without vacuumization (bricking) irrespective of changes in atmospheric pressure encountered during the transport of the system.

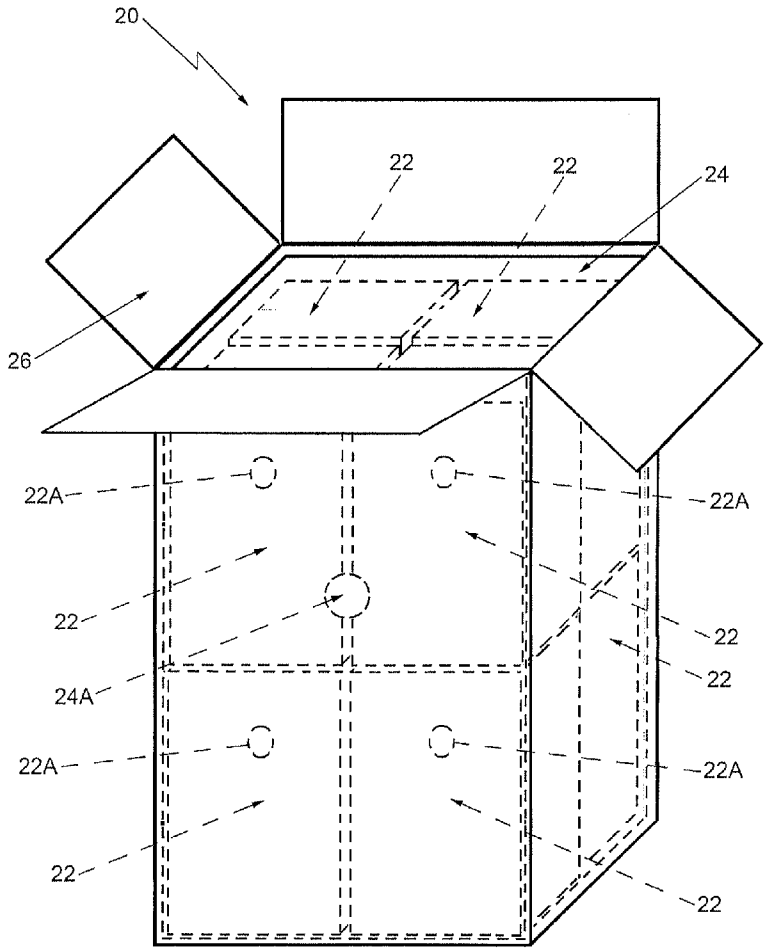
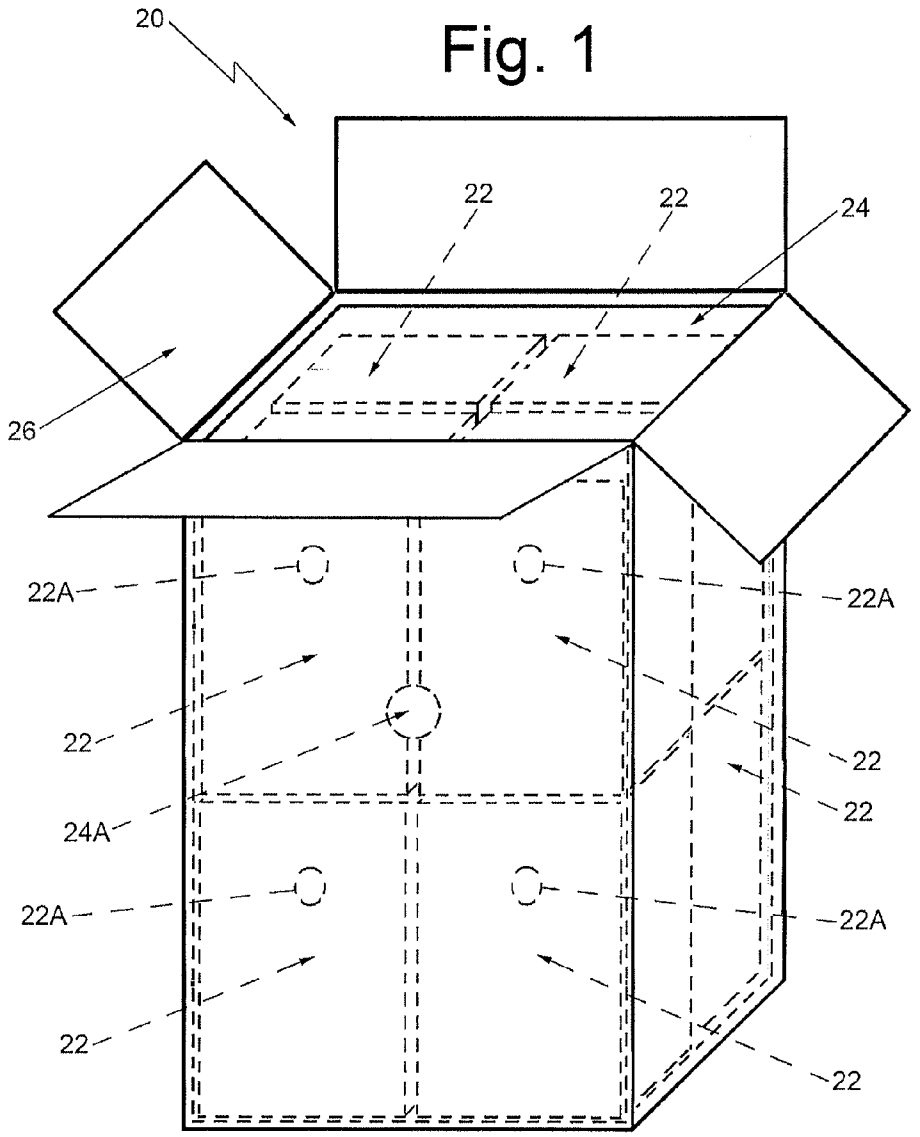


Fig. 1



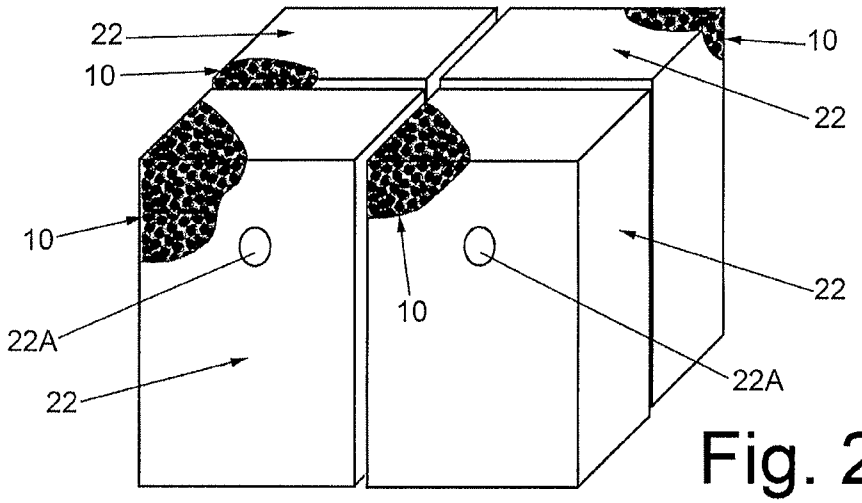


Fig. 2

Fig. 3

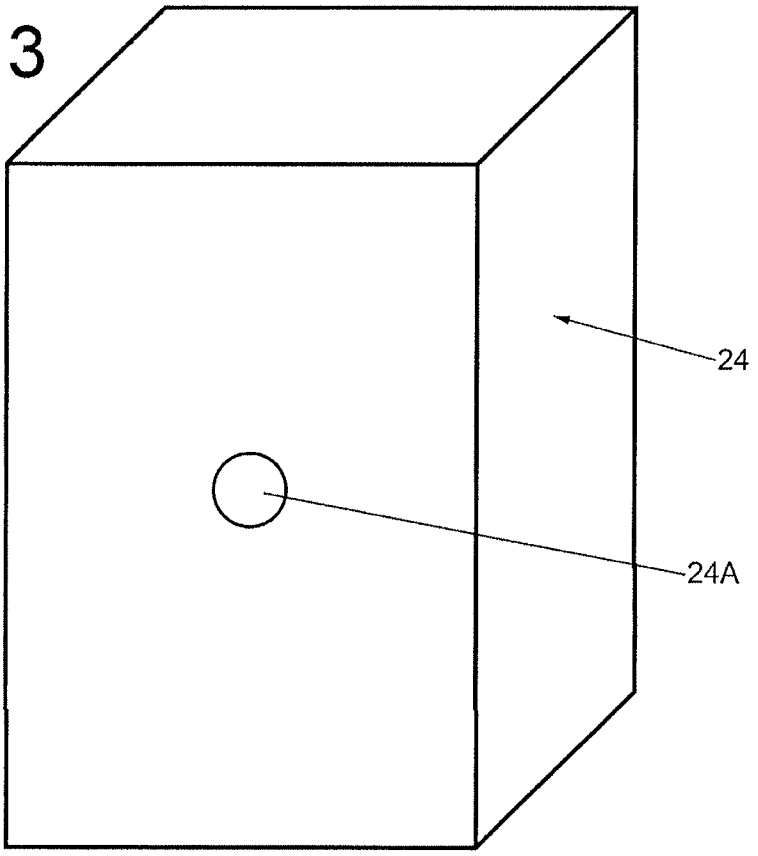
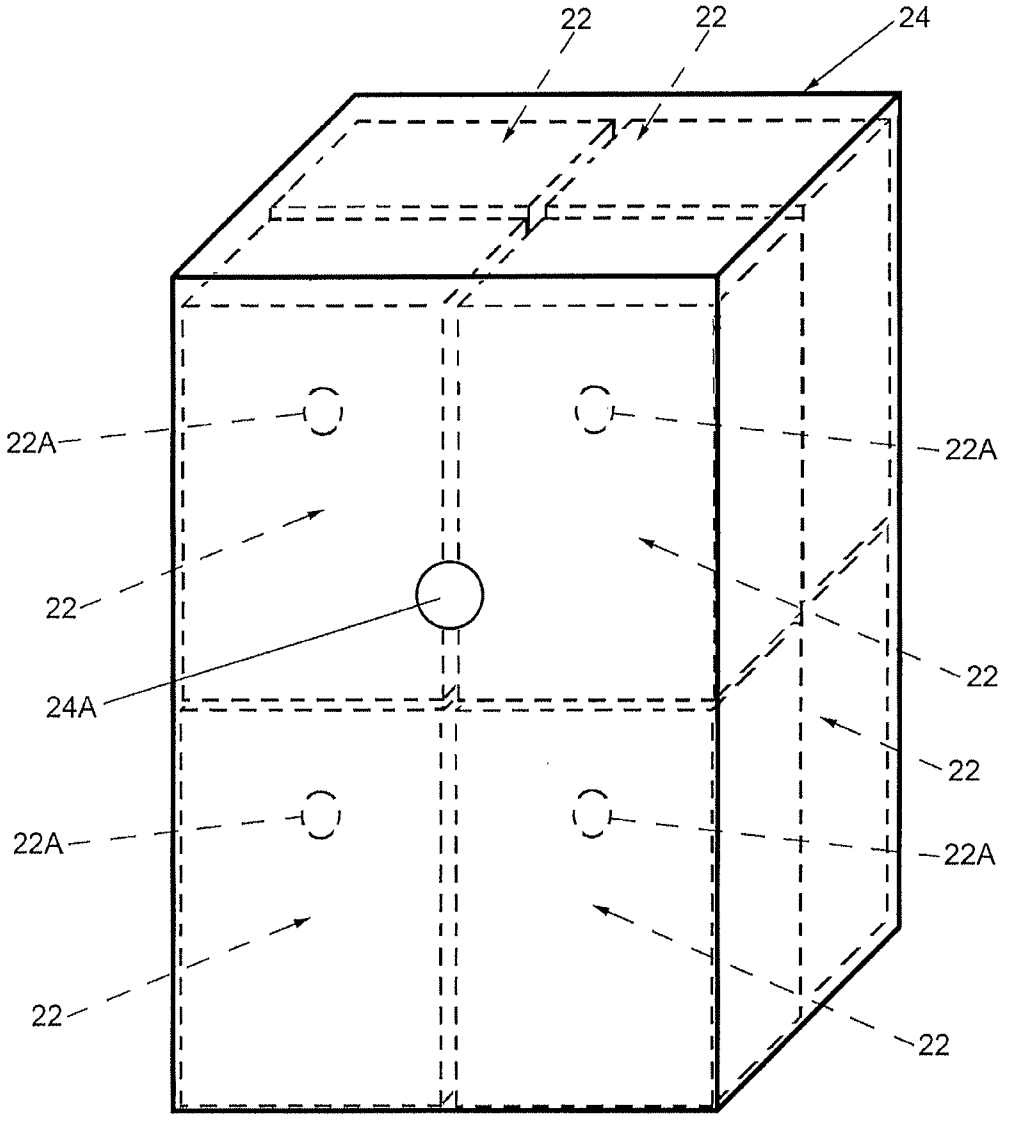


Fig. 4



FLEXIBLE PACKAGING SYSTEM AND METHOD OF USE TO ELIMINATE VALVED COFFEE BAG VACUUMIZATION DUE TO CHANGE IN ATMOSPHERIC PRESSURE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from Provisional Application Ser. No. 61/709,561, filed on Oct. 4, 2012, entitled Flexible Packaging System And Method Of Use To Eliminate Valved Coffee Bag Vacuumization Due To Change in Atmospheric Pressure, which application is assigned to the same assignee as the subject invention and whose disclosure is specifically incorporated by reference herein.

BACKGROUND OF THE INVENTION

[0002] This invention relates to flexible packages and more particularly to valved flexible packages for coffee and method of use to eliminate vacuumization due to changes in atmospheric pressure.

[0003] Roasted coffee is highly sensitive to degradation by oxidation and must be packaged using material with a high barrier to oxygen. The problem is that roasted coffee liberates a large volume of carbon dioxide and other gasses as a result of the roasting process. The hard shell of the coffee bean slows the gas generation rate and therefore gasses can still be liberated for weeks after roasting. It is therefore very important to package roasted coffee immediately after roasting in airtight high oxygen barrier containers fitted with a means of releasing gasses from the container without allowing ingress of air/oxygen. One-way valve packaging for coffee has been utilized for many years and is disclosed in U.S. Pat. No. 3,595,467 (Goglio). Other examples of one-way valves for packages are also found in the following U.S. Pat. Nos. 3,595,467 (Goglio); 4,576,285 (Goglio); and 4,705,174 (Goglio) and many similar one-way valves are currently on the market. These packages with valves allow gas pressure to escape from the package when the internal package pressure exceeds the atmospheric pressure by a predetermined value. Many of these valves operate at approximately 0.1 psi. When the pressure inside of the package exceeds the atmospheric pressure by 0.1 psi the valve opens and releases the excess pressure. The valve should close again prior to reaching equilibrium pressure.

[0004] During shipment coffee packages can be subjected to atmospheric pressure changes due to altitude changes. When atmospheric pressure is reduced the gasses inside of a coffee package will be forced out of the one-way valve on the package. When the same package is subjected to increased atmospheric pressure at lower altitude the one-way valve prevents ingress of air thus causing the lower air pressure package to collapse and appear to be under vacuum. If the coffee has substantially completed degassing the package will remain with a vacuum like appearance (sometimes referred to as being "bricked"). A "bricked" package may be seen as aesthetically objectionable to the consumer.

[0005] There is no known prior art that will prevent bricking of coffee bags with degassing valves without either over pressuring the package causing it to bulge and leak or to allow air back into the package through a two-way valve or other package leak. Bulging packages are not acceptable in that they appear to be spoiled and will not stand well on the retail shelf. Packages with leaks or valves that allow air to enter the package are unacceptable for coffee preservation. An example of a 2-way valve is disclosed in U.S. Pat. No. 5,992,635 (Walters).

[0006] Accordingly, a need exist for valved coffee packaging and a method of packaging coffee in valve bags which prevents bricking irrespective of changes in atmospheric pressure. This invention addresses those needs. Moreover, the subject invention also serves to prevent bricking without allowing external air to enter the package. Further still, the subject invention serves to preserve a substantial quantity of aroma enriched coffee gasses for release during retail display to enrich the retail experience for the consumers.

SUMMARY OF THE INVENTION

[0007] One aspect of this invention entails a packaging system for shipping a product that degasses, e.g., coffee, in packages. The system comprises a plurality of primary flexible packages, a secondary package and a rigid container. Each of the primary flexible packages is formed of a flexible material and encloses the product therein. Each of the primary packages includes a one-way, degassing valve to enable gasses produced by the product to exit the primary package without air entering the primary package through the degassing valve. Each of the degassing valves of the primary flexible packages have a predetermined operating pressure at which the gasses produced by the product are enabled to pass out of the package through the valve.

[0008] The secondary package is formed of a flexible material and is arranged to hold a plurality of the primary flexible packages therein. The secondary package includes a one-way pressure release valve having an appropriate opening pressure to control gas release during the shipment of the primary packages so that the secondary package internal pressure never drops below the operating pressure of the primary package degassing valves.

[0009] The rigid container is arranged to hold the secondary package with the primary packages therein to protect the same during shipment and storage.

[0010] Another aspect of this invention is a method of method of shipping packages of a material that degasses, e.g., coffee. The method entails providing a plurality of primary flexible packages, a secondary package and a container. Each of the primary flexible packages are formed of a flexible material and enclose the product therein, with each of those primary packages including a one-way, degassing valve to enable gasses produced by the product to exit the primary package without air entering into the primary package through the degassing valve. Each of the degassing valves of the primary packages has a predetermined operating pressure at which the gasses produced by the product are enabled to pass out of the primary package through the valve. A plurality of the primary packages is disposed in a secondary package. The secondary package is formed of a flexible material and includes a one-way pressure release valve having an appropriate opening pressure to control gas release during the shipment of the primary packages so that the secondary package internal pressure never drops below the operating pressure of the primary package degassing valves. The secondary package with the primary packages therein is disposed within the interior of a rigid container for shipping the packages and protecting them during shipment or storage.

DESCRIPTION OF THE DRAWING

[0011] FIG. **1** is an isometric view of one exemplary embodiment of a system constructed in accordance with this

invention and composed of a plurality of primary valved coffee-bearing packages, a secondary valved package for holding a plurality of the primary packages, and a shipping container for holding the secondary package with the primary packages therein;

[0012] FIG. **2** is an isometric view, partially broken away, of a plurality of the primary packages holding coffee therein and forming a portion of the system shown in FIG. **1**;

[0013] FIG. **3** is an isometric view of the secondary valved package forming a portion of the system shown in FIG. **1**; and

[0014] FIG. **4** is an isometric view of the secondary package of FIG. **3** shown holding a plurality of flexible packages like that shown in FIG. **2**, after such packages have been disposed in the secondary package and before the secondary package is placed in the shipping carton.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] Referring now to the various figures of the drawing wherein like reference characters refer to like parts, there is shown at **20** in FIG. **1** one exemplary embodiment of a packaging system constructed in accordance with this invention. The system **20** basically comprises a plurality of individual flexible coffee packages **22**, a flexible secondary package **24** and a shipping container **26**.

[0016] Each of the primary packages **22** is a conventional or standard type of package formed of a flexible material and is fitted with a standard one-way degassing valve **22**A. FIG. **2** shows a plurality of such packages. The primary packages **22** are filled with freshly roasted coffee **10** and sealed, as is conventional. The valve **22**A of each package **22** is of any suitable construction, such as disclosed in any of the prior art patents identified above or others that are commercially available, and is arranged to open when the internal pressure within the package, e.g., the pressure produced by the degassing coffee degasses, exceeds the ambient pressure outside the package. Typically degassing valves for coffee are set at approximately 0.1 PSI.

[0017] In accordance with one aspect of this invention a case quantity of the filled and sealed coffee packages **22**, usually four to twelve packages, is placed into the secondary flexible package **24**. If desired other quantities of primary packages **22** can be placed in the secondary package and thus the secondary package will be sized to accommodate the number of primary packages to be placed within it. In any case, the secondary package **24** is fitted with a pressure release valve **24**A. The valve **24**A has an appropriate opening pressure to control gas release during the shipment so that the secondary package internal pressure never drops below approximately 0.1 PSI (the opening pressure of the degassing valves on the primary packages **22**).

[0018] In accordance with one preferred embodiment of this invention the secondary package is produced from a gas barrier material, such as a 5-layer co-extrusion of polyethylene—tie—EVOH—tie—polyethylene in order to prevent escape of the gasses from the package by transmission through the secondary package during storage or shipment.

[0019] The shipping container **26** is best seen in FIG. **1**, where its upper flaps are shown open to enable the secondary package with the primary packages therein to be disposed within the container. The container **26** is a somewhat rigid enclosure, e.g., a conventional corrugated carton, which serves to hold the secondary package and its primary package contents so that they can be shipped to the ultimate retail destination. To that end, the secondary container **24** with the filled primary packages **22** therein, is sealed and then placed into the container **26** for shipping like shown in FIG. **1** and then the flaps of the container closed and the container sealed. It should be noted that the container **26** need not be a corrugated carton, like shown, although that is preferred. Thus, the container **26** can be of any suitable construction to prevent excessive bulging or bursting when pressurized internally by the pressurization of the secondary package. In this regard, the secondary package will become pressurized as the coffee in the primary packages degasses and passes out through the valves **22**A into the interior of the secondary package **24**. However, owing to the presence of the pressure relief valve **24**A of the secondary package the pressure within the secondary package will be limited to the predetermined opening pressure of the secondary valve **24**A. When that pressure is reached the valve **24**A opens to release excess pressure from the secondary package, ensuring that it does not cause the rigid container **26** to burst.

[0020] With coffee packaged in the system **20** as described above, it may be shipped immediately or it may be placed into storage for shipment at a later date even beyond the time of complete degassing. Whenever the coffee is shipped the rigid container **26** will prevent the secondary package **24** from expanding beyond its physical internal dimensions. The degassing coffee will pressurize the secondary package **24** and that pressure will be maintained during the shipment even during altitude changes. Thus, when the coffee arrives at the retailer, the rigid container and secondary packages can be opened. This action will release the volume of coffee gas pressurizing the secondary package **24** thereby producing the pleasing aroma of coffee into the retail environment. Moreover, and quite significantly, since the primary (retail) packages **22** will have an internal pressure equal to the opening pressure of the original valve **22**A, e.g., approximately 0.1 PSI more than atmospheric pressure, they therefore will not exhibit the vacuum like ("bricked") appearance.

[0021] The following is an example of the use of the system **20** of this invention to demonstrate how it achieves its desired results irrespective of changes in atmospheric pressure encountered by the system during its shipment to a retail facility. Assume that coffee is roasted in Salt Lake City, Utah and packaged in standard coffee bags **22** fitted with 0.1 PSI opening pressure one-way degassing valves **22**A. Assume that the packages' destination is Sacramento, Calif. and that the coffee is shipped 30 days after roasting and has completed degassing. As is known Salt Lake City's official elevation is 4,330 feet. Interstate 80 runs between Salt Lake City and Sacramento, crossing the Donner Pass at an elevation of 7,239 feet. Sacramento, Calif., the destination, has an elevation of about 25 feet. During shipment from Salt Lake City to Sacramento the coffee packages will experience a low atmospheric pressure of 11.4 PSI during transit and a high atmospheric pressure of 14.7 PSI at the destination. The difference of 3.3 PSI will require the use of a valve **24**A on the secondary package **24** with a 3.5 PSI opening pressure to prevent bricking. The pressure inside of the secondary package **24** in Salt Lake City will be 3.5 PSI as it has been pressurized with the degassing coffee. During transit along Interstate 80 the 3.5 PSI valve will begin expelling gas as elevation increases. At the Donner Pass, the maximum quantity of gas will have been released and the pressure inside of the secondary package will still be 3.5 PSI. During descent into Sacramento, the secondary valve **24**A will remain closed as atmospheric pressure

increases. In Sacramento, the pressure inside of the secondary package **24** will be 0.2 PSI which is double the opening pressure of the primary valves **22**A. Thus, the primary packages **22** will not have released any gasses during shipment. When the secondary package **24** is opened, the remaining gasses inside of the secondary package will be released and the coffee aroma will be evident.

[0022] It should be pointed out at this juncture that the number of primary packages, the size of the secondary package and the shipping container as disclosed above are merely exemplary. Thus, other sizes, shapes and arrangements are contemplated by this invention. For example, but not by way of limitation, the primary packages can be gusseted packages, stand-up pouches, pillow-shaped packages, or any other shape of package so long as the primary package is formed a flexible material. So too, the secondary package can be of any shape to accommodate the primary packages, so long as the secondary package is formed of a flexible material. Insofar as the materials making up the flexible packages **22** and/or **24** are concerned, the specific examples which are identified above are merely exemplary and thus any suitable material can be utilized. Further still any suitable valve may be used for the secondary package or for the primary packages, for that matter. The operating pressure for the pressure relief valve of the secondary package can be selected to be appropriate for the anticipated shipping conditions the system will experience. Finally, it should be noted that while the discussion of the subject invention has been directed to packaging for coffee, the subject invention can be used for packaging any type of product which degasses, whether a food product or otherwise.

[0023] Without further elaboration the foregoing will so fully illustrate my invention that others may, by applying current or future knowledge, adopt the same for use under various conditions of service.

What is claimed is:

1. A packaging system for shipping packages containing a product which degasses, said system comprising a plurality of primary packages, a secondary package and a rigid container, each of said primary packages being formed of a flexible material and enclosing the product therein and including a one-way, degassing valve to enable gasses produced by the product to exit said primary package without air entering said primary package through said degassing valve, each of said degassing valves of said primary packages having a predetermined operating pressure at which the gasses produced by the product are enabled to pass out of said primary package through said valve, said secondary package being formed of a flexible material and arranged to hold a plurality of said primary packages therein, said rigid container being arranged to hold said secondary package with said primary packages therein, said secondary package including a one-way pressure release valve having an appropriate opening pressure to control gas release during the shipment of said primary packages in said rigid container so that the secondary package internal pressure never drops below the operating pressure of said primary package degassing valves.

2. The packaging system of claim **1** wherein the product is coffee.

3. The packaging system of claim **2** wherein said secondary package is formed of a gas barrier material to prevent escape of gasses from said primary packages by transmission through said secondary package during shipment or storage.

4. The packaging system of claim **3** wherein said secondary package is formed of a 5-layer coextrusion of polyethylene—tie—EVOH—tie—polyethylene.

5. The packaging system of claim **1** wherein said rigid container comprises a corrugated carton.

6. The packaging system of claim **2** wherein said opening pressure of said degassing valves of said primary packages is approximately 0.1 PSI.

7. The packaging system of claim **5** wherein said secondary package is formed of a gas barrier material to prevent escape of gasses from said primary packages by transmission through said secondary package during shipment or storage.

8. The packaging system of claim **7** wherein said secondary package is formed of a 5-layer coextrusion of polyethylene—tie—EVOH—tie—polyethylene.

9. The packaging system of claim **6** wherein said secondary package is formed of a gas barrier material to prevent escape of gasses from said primary packages by transmission through said secondary package during shipment or storage.

10. The packaging system of claim **9** wherein said secondary package is formed of a 5-layer coextrusion of polyethylene—tie—EVOH—tie—polyethylene.

11. The packaging system of claim **1** wherein said primary packages are gusseted packages.

12. A method of packing packages of a product which degasses, said method comprising:

a) providing a plurality of primary flexible packages, each of said primary flexible packages being formed of a flexible material and enclosing the product therein, with each of said primary packages including a one-way, degassing valve to enable gasses produced by the product to exit said primary package without air entering said primary package through said degassing valve, each of said degassing valves of said primary packages having a predetermined operating pressure at which the gasses produced by the product are enabled to pass out of said secondary package through said valve;

b) disposing a plurality of said primary packages in a secondary package, said secondary package being formed of a flexible material and including a one-way pressure release valve having an appropriate opening pressure to control gas release during the shipment of said primary packages so that the internal pressure in said secondary package never drops below the operating pressure of said primary package degassing valves; and

c) disposing said secondary package with said primary packages therein within the interior of a rigid container for protecting said packages during shipment or storage.

13. The method of claim **12** additionally comprising:

d) shipping said packages.

14. The method of claim **12** wherein said product is coffee.

15. The method of claim **12** wherein said secondary package is formed of a gas barrier material to prevent escape of gasses from the primary package by transmission through the secondary package.

16. The method of claim **14** wherein said secondary package is formed of a gas barrier material to prevent escape of gasses from the primary package by transmission through the secondary package during shipment or storage.

17. The method of claim **16** wherein said secondary package is formed of a S-layer coextrusion of polyethylene—tie—EVOH—tie—polyethylene.

18. The method of claim **12** wherein said container comprises a corrugated carton.

19. The method of claim **14** wherein said opening pressure of said degassing valves of said primary packages is approximately 0.1 PSI.

20. The method of claim **18** wherein said opening pressure of said degassing valves of said primary packages is approximately 0.1 PSI.

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