DISPENSING VALVES FOR GAS PRESSURE CONTAINERS

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FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

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This invention relates to dispensing containers for fluid foods, that is, for foods, such as whipping cream, into which have been mixed, under pressure, gases such as carbon dioxide and nitrous oxide, the expansion of which on reduction to atmospheric pressure will cause the fluid to expand or "whip." More specifically, this invention relates to dispensing containers simple and inexpensive enough to permit their being discarded after a single use.

Single-use containers have usually been designed for relatively low internal pressures; and for such containers it was convenient to insert the edges of a resilient sealing member, usually an ordinary crown cap to be crimped to the top of the container. Inasmuch as I employ pressures ranging up to 100 pounds per square inch, such a container is not suitable. I find it necessary to utilize a metal container onto which a metal top is spun or otherwise securely attached. A number of problems thus arise as to the method of ensuring a pressure-tight seal while maintaining a simple structure. It is to these problems that this invention is directed.

One object of this invention is to provide a dispensing container capable of resisting high internal pressure and nevertheless simple in design, and having a minimum number of readily assembled, inexpensive parts.

Another object is to provide a container with a resilient sealing member and valve so formed that they lock each other in place in the container top.

Another object is to provide a container with a resilient sealing member and valve so formed that they lock each other in place in a container top. As an embodiment, my invention comprises a container 11 suitable for dispensing whipping cream into which nitrous oxide or other gases have been mixed under pressure, such container having a top wall 12 sealed onto it at pressure-tight edges. Additionally, my invention comprises a neck portion 19 extending through and held tightly in flange 15, and over flange 15, it is pre-stressed and sealed against top 12. It is apparent that changes in both form and method of dispensing action. Its relatively thin-walled neck portion 19 extends through and is held tightly in flange 15 and terminates in an enlarged collar portion 20 which extends over said flange. Below said top wall 12 on the valve seating member has a greatly enlarged body portion 21, which is tapered upward and outward to an extended thin flexible sealing edge 22. As shown in Fig. 4, the upper face 23 of said body portion 21 is slightly concave to facilitate assembly; that is, when it is unstrressed. Its lower face 24 serves as a seat for the head portion 25 of tubular stem valve 26.

Valve 26 has at its lower or inner extremity imperforate head portion 25 of enlarged diameter, from which rises tubular stem 27 with rectangular ports 28 adjacent head portion 25. While circular holes would serve as ports, the rectangular shape permits a greater port area and hence an increased rate of flow. Stem 27 passes through and beyond the body portion 21, neck portion 18 and collar portion 20 of sealing member 16, said stem 27 fitting tightly in and slightly stretching tubular portion 12. Immediately above collar portion 20, stem 27 is sharply enlarged to form external shoulder 29, whose diameter is sufficiently less than that of top wall opening 14 to permit assembly in the manner hereinafter described. Above shoulder 29, stem 27 curves or tapers inward and upward to tip 30, which has an external diameter sufficiently small to permit its insertion through tubular bore 17, and has the tip cross-slotted to shape the dispensed cream in the manner of a confectioner's tip.

The container is readily assembled as follows. Collar portion 20 of sealing member 16 is forced through opening 14 from the inner side until it emerges above flange 15, and neck portion 19 fits in opening 14. Tip 30 of valve 26 is then inserted through enlarged bore 18 of sealing member 16, and pushed by head portion 25 until it seats against lower face 24 of the sealing member, at which point shoulder 29 will have been forced through and emerged out of the upper end of collar portion 20 and be locked in place by it. The container 11 is then filled with cream, the top 12, assembled with valve 26 and sealing member 16, is sealed on at joint 13, and gas is inserted under pressure through the valve stem.

It is obvious that the tubular bore 17 of sealing member 16, fitting tightly against stem 27 of valve 26, will form a pressure tight seal between member and valve. Further, stem 27 so enlarged that portion 10 of the sealing member as to make a seal between it and the annular flange of top wall 12.

Inward acting pressure applied to the valve tip 30 or shoulder 29 will be resiliently resisted by the valve in compression against flange 15. This permits an axial displacement of the valve, required by certain types of equipment employed to inject the gas.

When lateral pressure is applied to the valve stem above shoulder 29, such pressure is resisted by a rotational deflection of the sealing member primarily in the region of its neck and collar portions 19 and 20. The flexible sealing edge 22 is, however, held tightly against the container top 12 by the pressure within the container, and is not puller away regardless of the degree of rotation of the other portions. Thus, one side of valve head portion 25 will be displaced from seat portion 24 of the sealing member as long as the lateral pressure on the valve stem is maintained. The increased diameter of bore 18 at the lower end of the sealing member permits the flow of the food through all the ports 28 simultaneously. Further, this increased bore 18 results in a neck portion 19 of the sealing member subject to flange 15 of the container top. As a result, the rotation of neck portion 19 of the sealing member is largely isolated from and has little effect on the position of body portion 21. Thus, bore 17 inward of the top wall 12 and immediately outward of the increased bore diameter 18 grips tightly to the valve stem under the pressure of the gas on the tapered outer side of the body portion 21.

To give further fixity to body portion 21, I have cupped the upper surface 23 of the sealing member, so that when it is assembled by passing collar 20 through and over flange 15, it is pre-stressed and sealed against top 12.

It is apparent that changes in both form and method...
of construction, arrangement and combination of the several parts of the dispensing container, may be made and substituted for those shown herein, without departing from the nature and principle of the present invention.

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

1. For gas-pressure containers of the type having a rigid tubular discharge valve penetrating an opening in the container wall and adapted to be opened on being tilted, an elastic sealing member adapted to seal such valve within the opening of such container wall, said elastic sealing member comprising an annular valve seat portion, a tubular sleeve portion extending outwardly therefrom and having an outer sealing surface adapted to abut sealingly against such container wall opening and an inner sealing surface adapted to grasp elastically and sealingly around such valve at the level of its passage through the opening in the wall of such container, and an enlarged upwardly presented concavely cupped annular face at the base of said sleeve portion, said face having an unsecured peripheral edge, said face being adapted to be stressed and flattened as a suction cup against the inner side of such container wall and retained in sealed relation therewith by gas pressure within such container, whereby on insertion of such gas pressure its unsecured peripheral edge is held sealed against such container wall regardless of the tilt of its sleeve portion attendant to opening of the valve.

2. For gas-pressure containers of the type having a rigid tubular discharge valve penetrating an opening in the container wall and adapted to be opened on being tilted, an elastic sealing member adapted to seal such valve within the opening of such container wall, said elastic sealing member comprising an annular valve seat portion, a tubular sleeve portion extending outwardly therefrom and having an inner sealing surface adapted to grasp elastically and sealingly around the stem of such valve at the level of its passage through the opening in the wall of such container, and an enlarged upwardly presented concavely cupped annular face at the base of said sleeve, said face having a gradually tapering unsecured peripheral edge, said face being adapted to be stressed and flattened against the inner side of such container wall and retained in sealed relation therewith by gas pressure within such container.

3. For gas-pressure containers of the type having a tubular discharge valve penetrating an opening in the container wall and adapted to be opened on being tilted, an elastic sealing member adapted to seal such valve within the opening of such container wall, said elastic sealing member comprising an annular valve seat portion, a tubular sleeve portion extending outwardly therefrom and having an inner sealing surface adapted to grasp elastically and sealingly around the stem of such valve at the level of its passage through the opening in the wall of such container, the length of the sleeve portion between its base and the collar portion being no greater than the depth of the opening in the container wall, whereby the detension of the collar portion against the outer side of the wall opening maintains the sealing member flattened against the inner side thereof.

4. A tilt-opening valve assembly for gas-pressure containers adapted to be sealedly retained in an opening of a wall thereof, comprising a rigid tubular stem valve member having a discharge spout exterior the container, a valve head within the container, a stem port adjacent said valve head, and an inwardly presented shoulder formed annularly inwardly of said discharge port in combination with an elastic sealing member adapted to seal such valve within the opening of such container wall, said elastic sealing member comprising an annular valve seat portion, a tubular sleeve portion extending outwardly therefrom and having an inner sealing surface adapted to grasp elastically and sealingly around the stem of such valve at the level of its passage through the opening in the wall of such container, an enlarged upwardly presented concavely cupped annular face at the base of said sleeve portion, and a collar portion enlarged radially from the upper portion of said sleeve and having a lower annular margin presented abutting the outer side of the wall of such container, said collar portion further having an upper annular margin presented abutting the inwardly faced shoulder of said tubular stem valve member, whereby a tilting force applied to such valve stem will be elastically resisted by compression in the collar portion.

5. For gas-pressure containers of the type having a rigid tubular discharge valve penetrating an opening in the container wall and adapted to be opened on being tilted, an elastic sealing member adapted to seal such valve within the opening of such container wall, said elastic sealing member comprising an annular valve seat portion, a tubular sleeve portion extending outwardly therefrom and having an inner sealing surface adapted to grasp elastically and sealingly around such valve at the level of its passage through the opening in the wall of such container, whereby said sleeve portion is caused to tilt with the tilting of such valve, the sealing member further having an enlarged, upwardly presented annular face at the base of said sleeve portion, said face having a yieldingly flexible, tapering, free peripheral sealing edge, the said face and edge being adapted to be presented against the container wall and to be held flatly and retained in sealed relation therewith by gas pressure within such container, thereby being substantially isolated from and unaffected by such tilt of the sleeve portion.

6. A tilt-opening valve assembly for gas-pressure containers, said assembly being adapted to be sealedly retained in an opening in a wall of such container, comprising a rigid tubular stem valve member having a discharge spout exterior the container, a valve head within the container, and a stem port adjacent said valve head, in combination with an elastic sealing member as defined in claim 5 and means to urge said valve member restoringly to erect, closed position.

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