

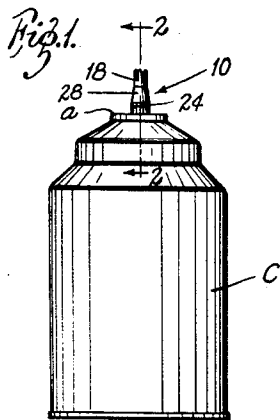
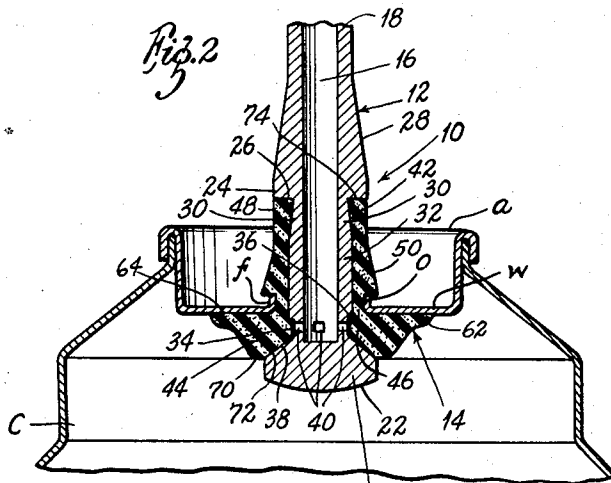
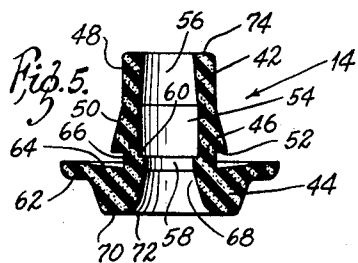
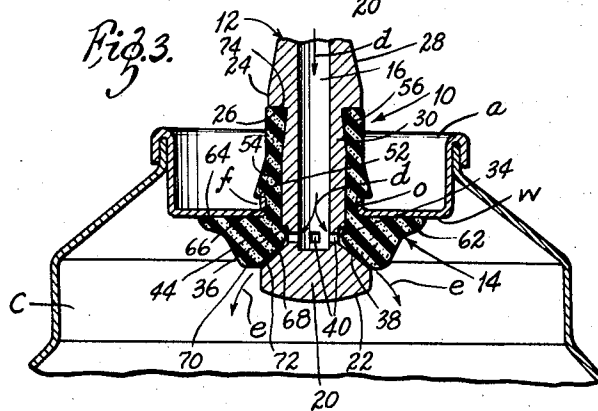
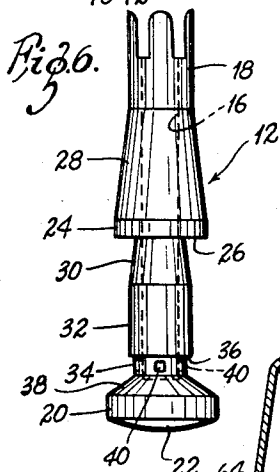
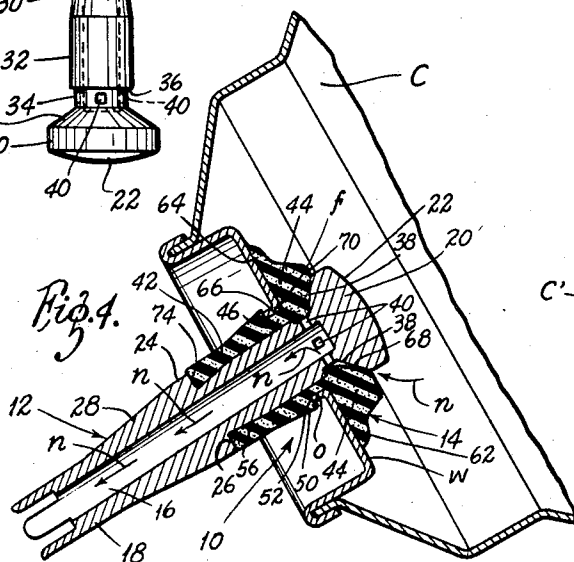
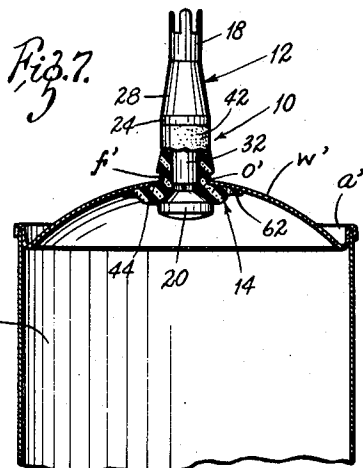
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2,852,168

DISPENSING VALVE ASSEMBLY

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2,852,168

DISPENSING VALVE ASSEMBLY

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3 Claims. (Cl. 222—394)

The present invention relates to a novel and improved valve assembly designed for incorporation in disposable containers of the type that are self-dispensing, and is an improvement of my copending application, Serial Number 595,268, filed July 2, 1956. Primarily, the present invention is directed to a novel and improved valve assembly for dispensing whipped cream, but it will be understood that the invention is not limited to the dispensing of this particular food product.

In the manufacture of whipped cream, a specified quantity of pasteurized cream is first introduced into a sterilized container; thereupon a closure member incorporating a sterilized valve assembly is applied to the upper end of the container; and thereafter the cream thus releasably sealed within the container is agitated or whipped simultaneously with the introduction of a gas under specified pressure into the container via said valve assembly.

In United States Letters Patent No. 2,584,063, granted to me on January 29, 1952, there is set forth in detail a description of said method, and the contemporary apparatus employed in practicing the method. Disclosed in United States Letters Patent No. 2,594,492, granted jointly to Norman J. Pfeiffer and applicant on April 29, 1952, is an improved apparatus for practicing said method. A further improved apparatus for practicing said method is disclosed in United States Letters Patent No. 2,683,558, granted to me on July 13, 1954, and a still further improved apparatus is disclosed in United States Letters Patent No. 2,695,123, granted to me on November 23, 1954.

The present invention contemplates no change in apparatus for practicing the method of manufacturing whipped cream disclosed in these patents. In other words, the present invention is directed solely to an improved valve assembly that may be incorporated in the container as heretofore, but has advantages not found in the valve assemblies illustrated and described or referred to in any of the patents aforesaid.

The present invention is further directed to the provision of an improved valve assembly that may also be incorporated in containers of recent design, as will appear.

Most of the successful valve assemblies of the type under consideration include a light compression spring designed to automatically effectuate sealing of the container against fortuitous escape of the captive gas and whipped cream therefrom. Frequently however, it has been found that this spring arrangement is ineffectual, and for one reason or another fails to function satisfactorily. Thus for example, the spring action has sometimes been found not positive enough to effect a perfect seal, in consequence whereof some or all of the entrapped gas pressure would leak or ooze out of the container in the interim between dispensing intervals. Inclusion of a spring also adds to the cost of the valve assembly, as is understood. At any rate, the whipped cream manufacturing industry has been seeking a dispensing valve as-

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sembly that will function positively and effectively without the inclusion and attendant expense of a spring.

Accordingly, the principal object of the present invention is to provide a novel and improved valve assembly that is effective for the purpose under consideration without requiring the inclusion of any spring means therein.

It is also an object of the invention to provide a novel and improved valve construction that, because of the absence of any spring means, may be assembled more quickly and economically than constructions heretofore in use.

It is a further object to provide a novel and improved valve assembly that requires no change whatever in the construction of the containers, or in the apparatus currently in use for the manufacture of whipped cream.

It is another object of this invention to provide a novel and improved valve assembly adapted for ready incorporation in the closure member of recently designed containers.

The invention consists of but two elements: a generally tubular stem of molded plastic material, and a grommet of molded resilient rubber material. The stem terminates at its lower end in a circular head portion having a diameter larger than that of said stem. The upper end of the stem is open, and may be fluted if desired. Intermediate the ends thereof, the stem has formed thereon an annular shoulder that serves as an abutment or seat for the upper end of the grommet aforesaid, as will appear. Below the shoulder, the stem is provided with an outwardly tapered or conical portion that merges into a therebelow cylindrical portion having a diameter somewhat smaller than the upper end portion of said stem.

Preferably, that portion of the stem between the annular shoulder and the upper end thereof is also conical. An annular groove is formed in the stem between the bottom edge of the cylindrical portion thereof, and the upper face of the lower end head portion of said stem. A circular series radial of ports establishes fluid communication between the bore of the stem and said annular groove, and said bore terminates at its lower end in a plane slightly below that of the groove.

The grommet is hollow and includes a sleeve portion, a circular body portion, and an intermediate connecting or neck portion. The inner peripheral surfaces of the grommet are of substantially cylindrical contour for cooperation in the assembled valve with some of the previously described portions of the stem, as will appear.

The invention is illustrated on a sheet of drawings that accompanies this specification, and a more comprehensive understanding of its features and advantages may be had from the detailed description to follow with reference to said drawings, wherein

Figure 1 is a side elevational view of a conventional disposable self-dispensing whipped cream container incorporating the valve assembly of the present invention;

Figure 2 is an enlarged vertical sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2 demonstrating the condition of the valve assembly during a gas-injection operation;

Figure 4 is a view similar to Figure 2 demonstrating the valve assembly action during a dispensing operation;

Figure 5 is a central vertical sectional view of the grommet element removed from the valve assembly;

Figure 6 is a side elevational view of the stem member removed from the valve assembly; and

Figure 7 is a view similar to Figure 2 illustrating the incorporation of the present novel valve assembly in the top closure member of a dispensing container of recent design.

Illustrated in its entirety in Figure 1, is a conventional whipped cream dispensing container C of a well known type having the valve assembly of this invention incorporated in the top closure member thereof. As shown for example in Figure 2, the upper end of the container C is closed by a cupshaped closure member *a* having a bottom wall *w*, and a central opening *o* that is surrounded by an upstanding circular flange *f*. This closure member *a* is also conventional and well known.

The dispensing valve assembly of the present invention, indicated as a whole by the numeral 10, includes a generally tubular valve stem 12, and a complementary hollow grommet 14. As hereinbefore noted, the stem is of molded plastic material, and the grommet is of molded resilient rubber material.

The stem 12 is provided with a central longitudinal bore or passageway 16 that leads to atmosphere at the top, and terminates at the bottom in a plane below that of an annular groove to be described. The upper end portion 18 of the stem is preferably but not necessarily fluted as illustrated in Figure 6. At its lower end, the stem 12 terminates in a circular flange portion which constitutes the head 20 of said stem. Preferably as shown, the bottom surface 22 of said head is rounded.

Intermediate the ends thereof, the stem 12 is provided with a circular section 24 that defines an annular shoulder 26 for a purpose to appear. A conical section 28 merges at the bottom into the section 24, and at the top into said upper end portion 18 of the stem. Numeral 30 designates a tapered section formed in the stem below the shoulder 26, and said tapered section merges into a cylindrical section 32, as shown.

An annular groove 34 is formed in the stem, being defined by the lower peripheral edge 36 of section 32, and the frustoconical upper surface 38 of the head 20.

A circular series of radial ports 40 establishes fluid communication between the longitudinal bore 16 and the annular groove 34, the lower end of the bore being disposed below the plane of the groove, as best seen in Figures 2 through 4.

The vertical cross-sectional configuration of the grommet 14, as it appears apart from the valve assembly, is illustrated in Figure 5. The grommet 14 includes a sleeve segment 42, a main body 44 having an upwardly and outwardly flared external periphery, and an intermediate or neck segment designated 46. The external periphery 48 of the sleeve segment 42 is slightly greater in diameter than the diameter of the opening *o* in the closure member *a*. Further, in the lower half portion of said sleeve segment, the external periphery 48 thereof is tapered downwardly and outwardly as indicated at 50, and terminates in an annular shoulder 52, as shown.

Internally, the sleeve segment 42 is provided with a lower cylindrical opening 54 below a slightly inwardly tapered upper opening 56. The inner peripheral surface 58 of the neck segment 46 is cylindrical, but of a smaller diameter than that of the opening 54 thereabove, resulting in the formation of an annular ledge designated 60.

The main body 44 of the grommet terminates at its upper end in a laterally extending circular flange segment 62. The upper face 64 of said flange segment is dished slightly, and combines with the shoulder 52 to define an annular recess designated 66.

Internally, the main body 44 of the grommet has formed therein a generally frusto-conical opening 68 that merges at the top into the cylindrical opening 58. Numeral 70 designates the bottom face of the grommet, and as illustrated at 72, the opening 68 merges arcuately into said face. The top face of the grommet is designated 74.

With attention focused on Figures 5 and 6, it will be observed that the diameters of the stem sections 30 and 32 are slightly greater than the diameters of the openings 56 and 54, respectively, of the grommet 14. It will

further be observed, that the diameter of the frusto-conical opening 68 is smaller than that of the similar upper surface 38 of the valve head 20, and that the diameter of the stem groove 34 corresponds with that of the grommet opening 58. Further, with attention directed also to Figure 2, it will be observed that the diameter of the recess 66 corresponds with the internal diameter of the flange *f* of closure member *a*.

As is well understood in the art, a dispensing valve assembly of the type under consideration is first mounted in a container closure such as that typified by the illustrated closure member *a* and then, after the requisite quantity of pasteurized cream has been introduced into a container, the closure member is placed atop the container. Thereupon, the container is subjected to the action of a pneumatic press that affixes the closure member and its incorporated valve assembly to the theretofore open upper end of the container. These operations condition the container for processing.

The valve assembly 10 of the present invention requires no departure from this customary procedure, and in consequence of its simple construction and the non-inclusion of a compression spring, it can easily and quickly be incorporated in such closure member.

It will be remembered that the diameter of the recess 66 corresponds with the diameter of the internal peripheral surface of the upstanding closure member flange *f*. It will also be remembered that the grommet is hollow and formed of resilient and therefore pliant and compressible material, so that the first step in assembling and mounting the valve consists of pressing said sleeve segment 42 of the grommet through the opening *o* until the dished upper surface 64 of the flange 62 engages against the bottom wall *w* of the closure member. In consequence of this procedure, the flange *f* will seat itself snugly in the recess 66 with the shoulder 52 overlying and projecting beyond the upper edge of said flange, as shown in Figures 2, 3, and 4.

Thereupon, the stem 12 would be pushed through the now captive grommet 14 from below, the arcuate formation 72 facilitating entry of the upper end 18, and the compressibility of the grommet readily accommodating passage therethrough of the upper half of said stem. Pressure is applied until the shoulder 26 snaps over and overlies the top face 74 of the grommet.

The resultant disposition of the stem 12 relatively to the grommet, the resultant disposition of the grommet relatively to the closure member *a*, and the resultant compressed condition of said grommet are clearly exhibited in Figure 2.

From an inspection of this view, it should be apparent that the invention provides a valve assembly that will automatically, effectively, and hermetically seal the ultimate processed container against fortuitous escape of its contents, after the closure member *a* has been press-fitted thereon.

In other words, it will be observed that in consequence of the assembling procedure described, the frusto-conical opening 68 will have been distended to conformity with the frusto-conical surface 38 of the valve head 20. Thus, the inherent resiliency of the compressed body 44 of the grommet 14 normally insures a perfect seal about said valve head as should be evident. It should also be evident that the compressed status of the grommet body will have distended the dished surface portion 64 of the flange 62 into conformity with the wall *w* of the closure member, and that the seating of the edge 36 onto the ledge 60 will have at least slightly compressed the grommet neck segment 46 between the stem section 32 and the flange *f*.

Valve action during gas injection

Assuming that the prescribed quantity of cream had been introduced into container C, and that the closure member *a* had been affixed thereto, the container would be in condition for a gas injection and simultaneous agi-

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tation operation. Inasmuch as the means for accomplishing this operation and the manner wherein it is accomplished are set forth in detail in the patents aforesaid, it is not deemed necessary to elaborate thereon.

Figure 2 demonstrates the condition of the valve assembly 10 as the container C is placed in position on the processing apparatus. When gas under pressure is injected from above via bore 16 as indicated by the arrows *d* in Figure 3, it passes through the ports 40 to impinge against the surface 68 whereby to further distend the main body 44 slightly about the frusto-conical upper surface 38 of the valve head as illustrated. Consequently as suggested by the arrows *e*, gas pressure injection during simultaneous agitation of the container continues until terminated in accordance with the whipped cream manufacturing method set forth in the patents aforesaid.

Simultaneously with the termination of the gas injection operation, the inherent resiliency and elasticity of the grommet 14 automatically effects the reversion of the valve assembly 10 to the positive sealing disposition thereof demonstrated in Figure 2.

Valve action during a dispensing operation

The procedure employed to dispense whipped cream from a container such as C is well understood. The container would first be shaken, then held angularly downwardly as illustrated in Figure 4, whereupon finger pressure would be applied to the conical section 28 of the stem. When such pressure is applied, the stem will tilt as shown, thus breaking the theretofore existent seal between the frusto-conical upper surface 38 of the valve head, and the frusto-conical surface 68 in the grommet.

So long as the application of finger pressure on the stem continues, cream under pressure will flow into the annular groove 34, thence through the ports 40 into the bore 16, thence therefrom as indicated by the arrows *n*. The instant that application of finger pressure ceases, the inherent resiliency of grommet 14 will automatically revert the valve assembly 10 to the positively sealed condition thereof exhibited in Figure 2.

In Figure 7, the valve assembly 10 is shown incorporated in a container C' of recent design. The body of this container, (only the upper end portion being shown), is cylindrical throughout its length, and the closure member *a'* is provided with an arcuate wall *w'* that extends above the upper peripheral edge of the container as illustrated. The central opening *o'* and its surrounding flange *f'* correspond precisely with their counterparts of the well known container C. Therefore, the valve assembly 10 may be incorporated in the closure *a'* by following the identical procedure described hereinbefore. Gas injection and dispensing operations would also be performed in the manner described.

The foregoing description augmented by an inspection of the drawings is believed to provide an adequate disclosure for a complete understanding of the present invention, and it should be apparent to those skilled in this art that the present valve assembly is less expensive, yet more efficient in operation than similar assemblies employed hitherto.

It is to be understood as hereinbefore noted, that although the invention has been illustrated and described as primarily for use in the dispensing of whipped cream, it is not limited to such use, but contemplates the dispensing of other food products as well as products that are not in the food category.

What I claim is:

1. In a stem actuatable valve assembly mounted in the upstanding flange surrounded central opening of the top closure member for a pressurized container of the self-dispensing type, a grommet molded of resilient rubber material comprising: a lower main body having a flat bottom face and an upwardly and outwardly flared external periphery; a circular flange having a dished upper face extending laterally from the upper end portion of

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the main body; an upper sleeve segment having a flat top face and a partly cylindrical and partly downwardly and outwardly flared external periphery; a neck segment connecting said main body and said sleeve segment; an annular recess defined externally in the neck segment by the bottom edge of the flared portion of the sleeve segment and the dished upper face of said circular flange; a frusto-conical inner peripheral surface formed centrally in the main body merging at its upper end into a cylindrical inner peripheral surface provided in the neck segment, and at its lower end into the flat bottom face aforesaid of the main body; a lower cylindrical inner peripheral surface merging into a slightly inwardly tapered inner peripheral surface thereabove in the sleeve segment; and an annular internal ledge formed by the juncture of the cylindrical inner peripheral surface aforesaid in the neck segment and the lower cylindrical inner peripheral surface aforesaid in the sleeve segment.

2. In a stem actuatable valve assembly mounted in the upstanding flange surrounded central opening of a top closure member for a pressurized container of the self-dispensing type, a valve stem molded of plastic material comprising: a cylindrical upper end portion; a solid circular lower end valve head portion; a circular section the undersurface of which defines an annular shoulder intermediate said upper and lower end portions; a conical section that merges at the bottom into the circular section and at the top into said upper end portion; a tapered section merging into a cylindrical section below said shoulder; a frusto-conical upper and a rounded lower surface provided on the head portion; an annular groove defined by the bottom peripheral edge of the cylindrical section and the frusto-conical upper surface of the head portion; a longitudinal bore open to atmosphere at the top and terminating at the bottom in said head portion on a plane below that of the annular groove; and a circular series of radial ports each leading from said groove to said bore.

3. In a valve assembly for dispensing the pressurized contents of a container of the type described, said container having a top closure member including a wall provided with a central opening surrounded by an upstanding circular flange, the combination of a resilient rubber grommet interposed in said central opening about a tiltable valve stem, said grommet including: a sleeve segment having an external diameter slightly larger than the internal diameter of the central opening adapted to be pushed through said opening from below whereby to overlie the upper edge of said upstanding flange; a main body having an upwardly outwardly flared external periphery that terminates at the top in a slightly dished laterally extending circular flange adapted to engage the undersurface of said closure wall when said sleeve segment has been pushed through the central opening; a neck segment connecting the sleeve segment and the main body aforesaid, said neck segment having an external annular recess adapted to engage the upstanding circular flange aforesaid when said sleeve segment has been pushed through said central opening; an upper slightly inwardly tapered inner peripheral surface merging at the bottom into a lower cylindrical inner peripheral surface in the sleeve segment; a frusto-conical inner peripheral surface in the main body merging at the top into a cylindrical inner peripheral surface in the neck segment, the diameter of said neck segment cylindrical surface being smaller than that of said lower cylindrical surface in the neck segment whereby to form, in consequence of the juncture of said cylindrical surfaces, an annular internal ledge in the grommet; said valve stem including: an upper end portion having a conical section that terminates at its lower end in an annular shoulder; a first tapered section below said shoulder merging at the bottom into a second cylindrical section having a lower peripheral edge, the diameters of said sections being respectively slightly larger than those of the upper and

lower inner peripheral surfaces aforesaid in the grommet sleeve segment; a circular valve head comprising the lower end of the stem and having a frusto-conical upper face of larger diameter than that of said frusto-conical inner peripheral surface in the grommet main body; an annular groove defined by said lower peripheral edge of the stem second cylindrical section and said frusto-conical upper surface of the valve head, the diameter of said groove corresponding with that of said cylindrical inner peripheral surface in the grommet neck segment; a longitudinal bore open to atmosphere at its upper end and terminating at its lower end in said valve head on a plane slightly below that of said groove; and a circular series of radial ports each in communication with said groove and said bore, said stem being adapted to be pushed through the grommet from below until said annular shoulder of the conical section thereof seats on the upper end of the grommet sleeve segment in consequence whereof the first and second cylindrical sections afore-

said of the stem will sealingly engage respectively said upper and lower inner peripheral surfaces of the grommet sleeve segment, said lower peripheral edge of the second cylindrical section will sealingly engage the annular internal ledge aforesaid in the grommet, said annular stem groove will be in contact with the cylindrical inner peripheral surface in the grommet neck segment, said frusto-conical upper surface of the valve head will have distended into conformity therewith the frusto-conical inner peripheral surface of the grommet main body, and simultaneously will have distended said dished laterally extending circular flange of the grommet into conformity with the undersurface of said closure member wall.

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