Dec. 17, 1935. F. L. DARLING 2,024,511

VACUUM SEALING CAN

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Fig. 1.

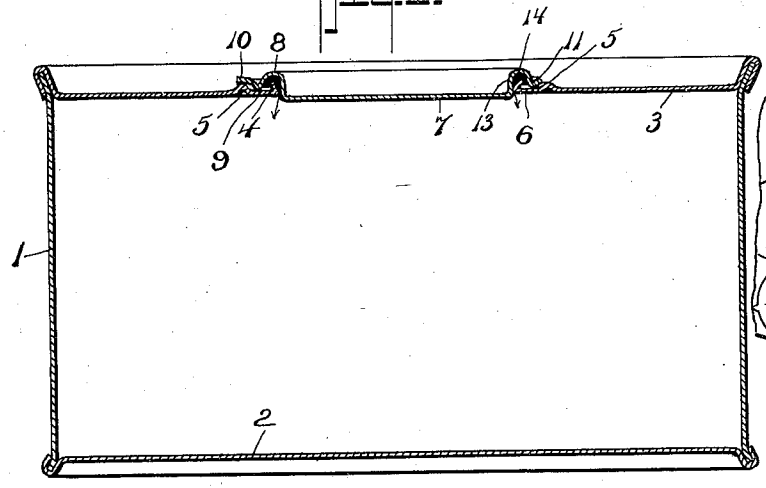


Fig. 5.

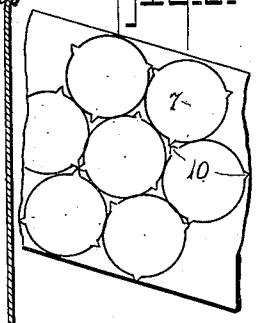


Fig. 2.

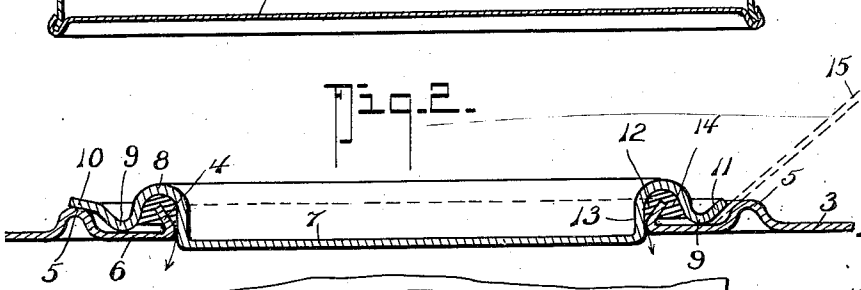
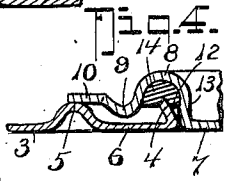


Fig. 4.



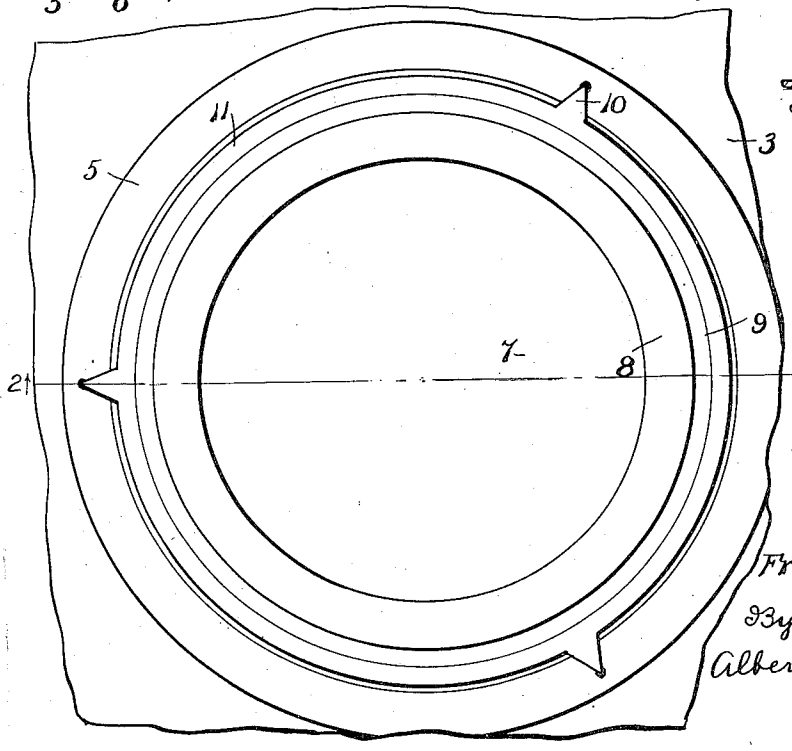


Fig. 3.

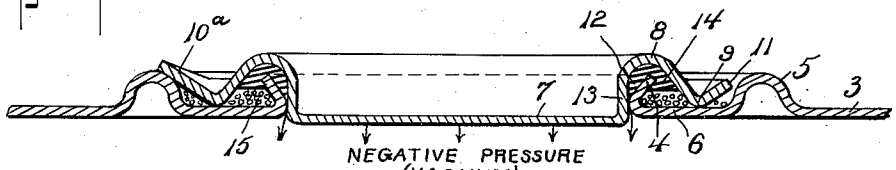
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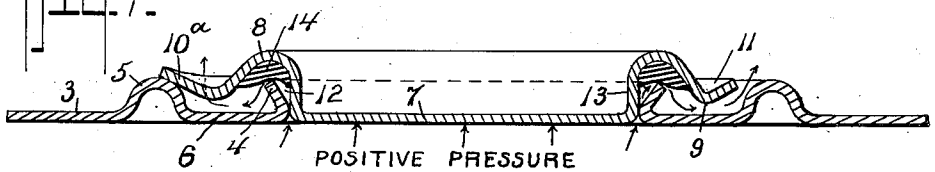
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Fig. 6.



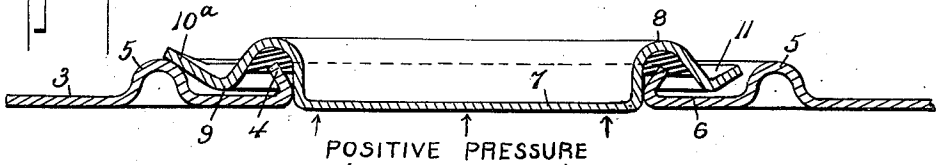
NEGATIVE PRESSURE
(VACUUM)
SEALED

Fig. 7.



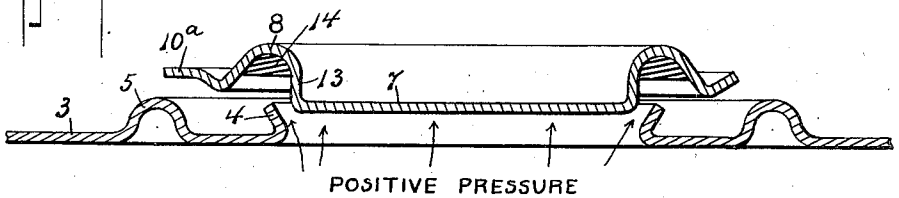
POSITIVE PRESSURE
(5 to 9 POUNDS ±)
VENTING

Fig. 8.



POSITIVE PRESSURE
(LESS THAN 5 Lbs.)
RE-SEALED

Fig. 9.



POSITIVE PRESSURE
(OVER 9 POUNDS)
PLUG BLOWN OFF

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Patented Dec. 17, 1935 2,024,511

UNITED STATES PATENT OFFICE

2,024,511

VACUUM SEALING CAN

Frank L. Darling, Douglaston, N. Y., assignor, by mesne assignments, to Glen-Dar Can Co., a corporation of Delaware

Application May 10, 1935, Serial No. 20,838

17 Claims. (Cl. 220—44)

My invention relates to certain new and useful improvements in cans for packing coffee, malted milk and other food products.

Primarily the invention has for its object to provide a simple, effective and inexpensive construction that can be manufactured at a minimum cost and will readily and fully serve its intended purposes.

Further, it is an object to provide a can with a plug-type closure which can be used again as a temporary closure after it has been initially removed from the can in order to preserve the remaining contents of the can, should the contents not all be removed or consumed at the same time.

Further, it is an object to provide a can with a plug-type closure held in hermetically sealed relation to the can body by the partial vacuum existing in the can.

Further, it is an object to provide a can with a plug-type closure so attached to the can body that when once the closure has been removed that fact will be clearly indicated, thereby enabling one to detect a can that has been tampered with.

Further, it is an object to provide a can with a closure having a plastic sealing compound held in a channel which cooperates with the cut edge of the flange of the can that surrounds the can opening, in such manner that the suction due to the vacuum within the can tends to wedge the plastic compound between the closure and the can flange into a tight hermetic seal.

Further, it is an object to provide a can with a plug-type closure having a plastic sealing ring, and so to design the closure that it may never seat down on the can so far that the mouth flange of the can can cut entirely through the plastic, but the flange must remain with its cut edge embedded in and protected by the plastic, regardless of the degree of vacuum in the can.

Further, it is an object to provide a can with a plug-type closure having triangular points for uniting the closure to the can when the closure is in place, the points being so located as not to require the use of more sheet metal from which the closures are stamped than is required for the ordinary circular discs, a portion of the former waste material being utilized for the triangular points.

Further, it is an object to provide a can with a closure of the plug-type, having points at its periphery for contacting with a bead on the can top, which bead surrounds—but is spaced from—the mouth flange of the can, the structure being such that the presence of a partial vacuum in the can is utilized to hold the points down in tight engagement with the can top's bead while the points are being united to the bead.

Further, it is an object to provide a can with a top having an opening bounded by an upwardly and outwardly flared mouth ring or flange to be received in a groove of a plug-type closure in which groove plastic sealing compound is carried in such manner that the compound will interlock with the flange when the plug-type closure is in place.

Further, it is an object to provide a can with a closure which is so constructed that the can will be self-venting, should pressure be built up in the can above a predetermined amount.

Further, it is an object to provide a can with a closure which, while permitting automatic venting of the can, will effect a resealing of the can automatically when the internal pressure falls below the predetermined amount.

Further, it is an object to provide a can with a plug-type closure so designed as to act, within predetermined approximate limits, as a pressure releasing valve, and when an excess pressure builds up the closure will be thereby detached from the can to open the can and prevent bursting thereof.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be fully described in the following detail description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1 is a vertical longitudinal section of a can to which the invention is applied.

Figure 2 is an enlarged detail vertical longitudinal section on line 2—2 of Figure 3.

Figure 3 is a top plan view of the parts shown in Figure 2.

Figure 4 is a detail vertical section similar to Figure 2 of a portion of the structure showing the position of the plug-type closure when first set into place and before it has been brought down to its final position.

Figure 5 is a diagrammatic view showing how the closures are stamped from a strip or sheet of metal in an economical manner.

Figures 6 to 9, inclusive, are views similar to Figure 2, showing a slightly modified form of the

invention, and illustrating the different positions of the closure with respect to the can top.

While my invention has been especially designed for use with cans for packaging coffee, malted milk and other granular or powdered substances, the invention may also be used wherever vacuum packed food stuffs are canned. The size and shape of the can may vary to suit the user.

In the drawings, in which like numerals of reference indicate like parts in all the figures, 1 represents a can having a bottom 2 and a top 3, the latter having an opening or mouth bound by an upwardly and outwardly flared flange 4. Surrounding the flange 4 and spaced a suitable distance therefrom is an outwardly stamped annular bead 5, the top 3 between the bead 5 and the flange 4 constituting a flat seat surface 6 on which the annular supporting portion 9 of the plug-type closure member seats.

The plug-type closure member has an annular wall 13 and an annular crown or upstanding bead 8 constituting on its under side a groove to receive a suitable plastic sealing substance 14. The outer edge of the closure is extended upwardly and is outwardly flared to provide a rim 11 from the edge of which extends a plurality (preferably three) of preferably diamond-shaped points 10 which overlie and rest on the bead 5 when the plug is in place.

When the closure plug 7 is placed in the hole in the top 3 of the can and is drawn down by reason of the partial vacuum in the can (or is forced down by pressure from above), the points 10 will be bent upwardly slightly as they contact the bead 5 and, as is shown in Figure 2, the plastic 14 will be compacted in the V-shaped annular space between the wall 13 and the flange 4 (see Figure 2), and act somewhat as a wedge to effect a tight or hermetic seal between the closure and the can top.

When the closure 7 is first placed in position the parts are located as indicated in Figure 4, but as soon as the plug is drawn in by reason of the vacuum within the can (forced in by atmospheric pressure from above) the parts assume the position shown in Figures 1 and 2. The depth of the supporting portion 9 of the plug is such that it will come to rest before the edge of the flange 4 passes entirely through the plastic. This insures the edge of the flange being always covered and protected by the plastic compound and the edge will never come into contact with the metal of the closure.

In practice the lid 3 and closure 7 are heavily tinned so that the points 10 may be united to the bead 5 at their points of contact by spot heating treatment, heat being applied until the tin of the lid and that of the points flows together and thereby secures the closure to the can without the use of solder. Of course, solder may be used, if desired.

This renders the can safe against tampering with, for if the adhesion between the points 10 and the bead 5 be broken, that will indicate at once the fact that the can has been tampered with.

As the points 10 are preferably only secured at their extremities, they offer very little resistance to the renewal of the closure. To remove the closure it is only necessary to insert the blade 15 of a knife between the rim or flange 11 and the bead 5, and use the blade as a lever to prize up the closure. The closure having once been removed from the can top opening, it may be replaced as a temporary closure in the event that all the contents of the can are not emptied out or used in the first place. The plasticity of the compound 14 is such that it will yield to re-embed the flange 4 when the closure is pressed down.

To stamp the closures from sheet metal they may be economically stamped out in the manner indicated in Figure 5, the points 10 lying in what is usually waste metal when ordinary circular discs only are stamped out. Therefore it will require no more stock to make these plug-type closures with the points 10, than is required without them.

By reason of the facts that the flange 4 flares outwardly, the bottom of the plug lies below the plane of the top 3 when the plug is in place, and the wall 13 is slightly resilient, the plug will fit the mouth or opening of the can with a snug frictional engagement that prevents the plastic 14 being sucked into the can by the vacuum.

Practice has demonstrated that fresh coffee, vacuum packed, does not hold the vacuum because the gases given off by the coffee often build up a positive pressure within the can. Unless this pressure is relieved it causes the ends of the cans to bulge and sometimes results in the explosion of the can. Ordinarily the pressure which builds up in canned fresh coffee does not go beyond the limits of from three to five pounds. The lower pressures are not harmful, but pressures around five pounds bulge the can ends too much, so they will not set flat. By my construction the area of the plug opposed to internal pressure and the tenacity of the union between the points 10—10*a* and the bead 5 are so designed that only pressures above a danger point (say, nine pounds) will cause the plug to blow out and become detached from the can.

In practice a closure plug 7 having a diameter of approximately two inches with three points 10*a* attached to the bead 5 in the manner before described will permit venting at five pounds and will blow off at about nine pounds internal can pressure. The resiliency of the material of the plug is sufficient to restore the plug to a position (Figure 8) to reseal the can after venting (Figure 7) has reduced the internal pressure to less than five pounds.

The pressures above mentioned are illustrative only, as by varying the resiliency of the material of the closure points and the tenacity of their union to the bead 5 different pressure values may be taken care of.

The form of the invention shown in Figures 6 to 9 inclusive differs from that shown in Figures 1 to 4 inclusive only in that in stamping the closure plugs the points 10*a* are stamped straight from the edge rim 11 instead of being bent over somewhat at an angle, as shown in Figure 4. The straight points give greater resistance to the lifting of the plug in the can opening than the bent points do.

In Figure 6 is shown the normal position of the parts when a negative pressure (so-called vacuum) is established in the can.

Figure 7 shows the approximate position of the closure plug during slow venting when pressure in the can has been built up to, say, five pounds.

Figure 8 shows the approximate position of the closure plug after venting, the plastic 14 again receiving the cut edge of the flange 4, which edge is angled as shown so as to enter the plastic somewhat as a wedge i. e., it is an inverted V.

Figure 9 shows how the plug is blown off should a pressure of approximately the prede-

termined maximum build up in the can; the points in being pulled loose may be somewhat bent, as indicated.

By providing the channel at 6 between the bead 5 and flange 4, should some of the material be spilled in filling the can, this material will not collect in the space between the flange 4 and the wall 13 of the plug but will drop into the channel 6. Thus, none of the material will prevent a tight metal-to-metal contact between the wall 13 and the bend of the flange 4 (see Figure 6) throughout the entire circumference of the wall 13, or between the compound and the cut edge of the can. Thus spilled material can not prevent an air-tight seal being effected. In the present day practice, where the cans are filled and then the heads are put on by rolling, it frequently happens that some of the material gets rolled into the seam and when that occurs the can often leaks. With my invention this objectionable feature is eliminated.

In virtue of my invention it will be seen that a simple, effective and inexpensive closure has been provided which is economical to manufacture and operate and will readily serve its intended purposes.

The cans can be made up complete with the closures separate, filled at the place where the coffee, malted milk or other food stuffs are put into the cans, and the closures put into place and sealed down by simple apparatus at the factory where the cans are packed, making it unnecessary to provide expensive seam rolling machines, as has heretofore been the case.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the complete construction and advantages of the invention will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, and means to arrest the insertion of said closure before the edge of said flange can pass through the plastic sealing substance.

2. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said closure having an annular supporting portion surrounding said channel to engage the can before the edge of said flange passes through the plastic whereby said edge is always protected by the plastic.

3. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said can having an annular outwardly projecting bead surrounding said flange and spaced from the same, and said closure having a rim with points projecting therefrom, the points overlying said bead, and means to unite said points and bead.

4. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said closure having an annular supporting portion surrounding said channel to engage the can before the edge of said flange passes through the plastic whereby said edge is always protected by the plastic, said can having an annular outwardly projecting bead surrounding said flange and spaced from the same, and said closure having a rim with points projecting therefrom, the points overlying said bead, and means to unite said points and bead.

5. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared cut-edge flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, and means to arrest the insertion of said closure before the edge of said flange can pass through the plastic sealing substance, said plug having an annular wall fitting within said opening in proximity to said flange and constituting with said flange a V-shaped plastic receiving channel for the purposes specified.

6. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said closure having an annular supporting portion surrounding said channel to engage the can before the edge of said flange passes through the plastic whereby said edge is always protected by the plastic, said plug having an annular wall fitting within said opening in proximity to said flange and constituting with said flange a V-shaped plastic receiving channel for the purposes specified.

7. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said can having an annular outwardly projecting bead surrounding said flange and spaced from the same, and said closure having a rim with points projecting therefrom, the points overlying said bead, and means to unite said points and bead, said plug having an annular wall fitting within said opening in proximity to said flange and constituting with said flange a V-shaped plastic receiving channel for the purposes specified.

8. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said closure having an annular supporting portion surrounding said channel to engage the can before the edge of said flange passes through the plastic whereby said edge is always protected by the plastic, said can having an annular outwardly projecting bead surrounding said flange and spaced from the same, and said closure having a rim with points projecting therefrom, the points overlying said bead, and

means to unite said points and bead, said plug having an annular wall fitting within said opening in proximity to said flange and constituting with said flange a V-shaped plastic receiving channel for the purposes specified.

9. In a can having a filling opening bounded by an upstanding flange and having an upstanding annular bead surrounding but spaced from said flange to leave a bearing surface between the flange and the bead and to constitute with the flange a collection space for spilled material, a closure fitted in said opening and having a curved portion overlying said flange and having a seating annulus engaging said bearing surface to space said curved portion from the edge of said flange, a plastic sealing substance in said curved portion for embedding the edge of said flange and sealing the closure and can against passage of air between them.

10. In a can having a filling opening bounded by an upstanding flange and having an upstanding annular bead surrounding but spaced from said flange to leave a bearing surface between the flange and the bead, a closure fitted in said opening and having a curved portion overlying said flange and having a seating annulus engaging said bearing surface to space said curved portion from the edge of said flange, a plastic sealing substance in said curved portion for embedding the edge of said flange and sealing the closure and can against passage of air between them, and means for lightly securing portions of said closure to said bead substantially as and for the purposes described.

11. In a can having a filling opening bounded by an upstanding flange and having an upstanding annular bead surrounding but spaced from said flange to leave a bearing surface between the flange and the bead, a closure fitted in said opening and having a curved portion overlying said flange and having a seating annulus engaging said bearing surface to space said curved portion from the edge of said flange, a plastic sealing substance in said curved portion for embedding the edge of said flange and sealing the closure and can against passage of air between them, said closure having a rim provided with points that overlie said annular bead, and means to unite said bead and points.

12. In a can having a filling opening bounded by an upstanding flange and having an upstanding annular bead surrounding but spaced from said flange to leave a bearing surface between the flange and the bead, a closure fitted in said opening and having a curved portion overlying said flange and having a seating annulus engaging said bearing surface to space said curved portion from the edge of said flange, a plastic sealing substance in said curved portion for embedding the edge of said flange and sealing the closure and can against passage of air between them, said closure having a rim provided with points that overlie said annular bead, and means to unite said bead and points, said rim being spaced from the adjacent parts of the can to enable the insertion of a prying implement therebetween.

13. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange having a cut edge, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said closure having points, and means to unite said points to said can for purposes described.

14. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange having a cut edge, a plug-type closure fitting into said opening and having an annular channel containing a plastic sealing substance to fit over said flange and embed the edge of said flange in the sealing substance, said closure having an annular supporting portion surrounding said channel to engage the can before the edge of said flange passes through the plastic whereby said edge is always protected from corrosion by the plastic.

15. In combination with a can having a metallic top provided with a filling opening, a plug-type closure for said opening, and non-stretchable flexible means operatively engaging and connecting the periphery of said closure to said metallic top to seal the can against ingress of air while permitting said closure itself to function as a pressure relief valve to relieve pressure up to a given degree and thereafter to reseal the can.

16. In a vacuum sealing can having a filling opening bounded by an upwardly and outwardly flared flange, a plug-type closure fitting into said opening and having an annular channel containing a sealing element to fit over said flange and embed the edge of said flange in the sealing element, and means to arrest the insertion of said closure before the edge of said flange passes through the sealing element.

17. In combination with a can having a metallic top provided with a filling opening, a plug-type closure for said opening, a sealing element located between said top and said closure and means to secure said closure directly to the upper face of said metallic top in a manner in virtue of which said closure will by and of itself function as a pressure relief valve to relieve pressure up to a given degree and thereafter reseal the can.

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