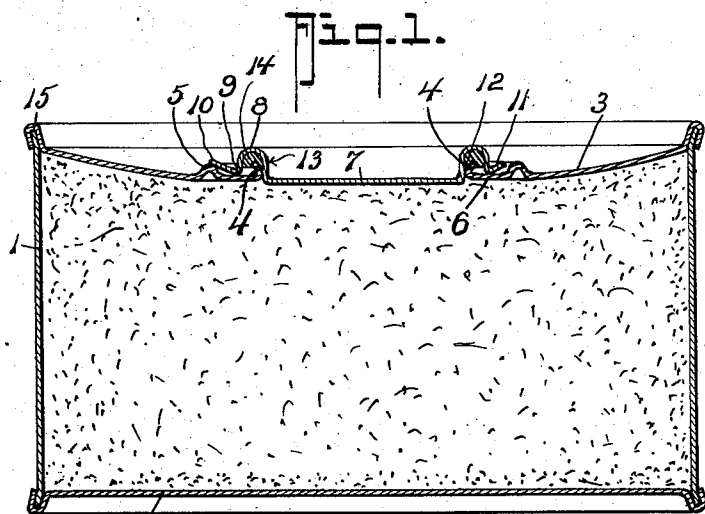
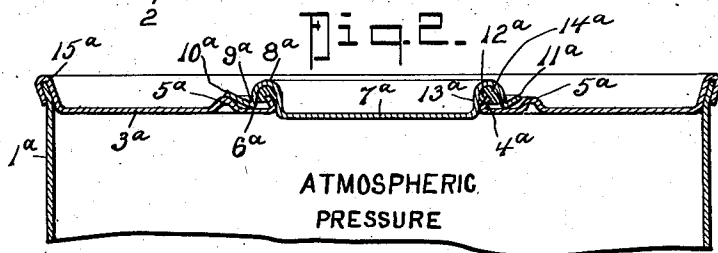
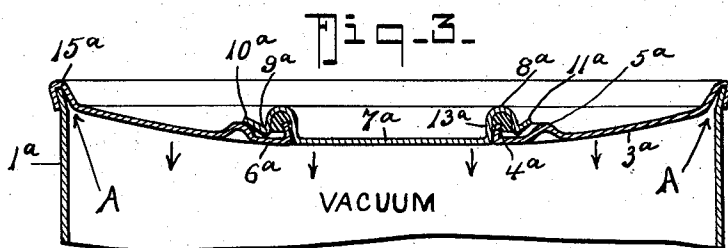
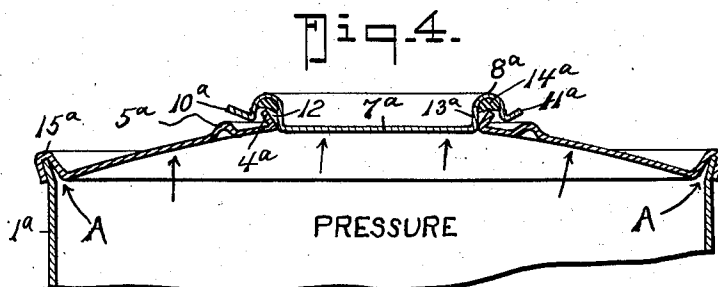


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VACUUM SEALING CAN  
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## UNITED STATES PATENT OFFICE

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## VACUUM SEALING CAN

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mesne assignments, to Glen-Dar Can Co., a cor-  
poration of Delaware

Application May 29, 1935, Serial No. 24,124

5 Claims. (Cl. 220—44)

My present invention relates to certain new and useful improvements in vacuum sealing cans, especially useful for packing coffee, malted milk, and other granular or powdered substances.

More especially, the present invention has for its object to provide certain improvements in the can described in and comprising the subject matter of my application Serial No. 20,838. Experiments have shown that in vacuumized cans whose heads are stamped initially flat, i. e., as plane discs, and as such are secured to the can body, the heads draw inwardly under atmospheric pressure when vacuumizing (see, for instance, Figures 3 and 4 of the drawings of the patent to Williams No. 812,968, issued February 20, 1906). This not only tends to loosen the head from the annular can body so that leaks may occur in the joint, but it also tends to produce leaks at the plug-closure. I find that these deficiencies or defects can be overcome by what I term "pre-forming" the heads by stamping or otherwise giving to them substantially the form that the straight discs would assume on vacuumizing and sealing the can.

Further, with the straight or flat can heads such as shown in my application aforesaid, when the plugs are being inserted by applied pressure the heads are forced to bow inwardly, since the plugs are made to fit tightly the can head opening; this adds to the tendency to pull and open the annular joint between the body and the head of the can, and consequently increases the danger of leakage.

Experiments have shown, however, that when the head is pre-formed, i. e., stamped to its "set" concavity before it is secured to the body, the head will withstand the plug-closure applying forces to a far greater degree than is the case with initially flat heads; in fact the plug-closure applying forces do not substantially increase the concavity of the pre-formed head.

Again, by forming the head dished to its ultimate degree the periphery of the head necessarily becomes a fixed annulus against the can wall; force within the can (as generated by gas pressure from fresh coffee) will tend, not to loosen, but to tighten the peripheral joint between the can head and the can body and further, because of the peculiar formation of the head opening and the fixed diameter of the plug forced therein, there will be a tendency to tighten the grip of the can head flange on the plug itself when internal pressures become established and thereby tend to increase the sealing effect.

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 detailed description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which:—

Figure 1 is a vertical longitudinal section of a can embodying my present invention with the plug-closure in place, sealed.

Figure 2 is a detail diagrammatic vertical sectional view of a flat head can showing the position of the upstanding flange before inserting the plug-closure, the plug-closure being indicated in dotted lines.

Figure 3 is a view similar to Figure 2 after vacuumizing, and after the plug-closure has been inserted.

Figure 4 is a similar view showing the same can after the head is popped out by accumulated pressure within the can and before the plug-closure blows off.

In the drawing, 1 represents a can having a bottom 2 and a top or head 3 the latter, in the present case, being stamped or otherwise shaped to the final form of a flat head disc under vacuumizing and plug-closure inserting pressures, i. e., it is pre-formed as a concaved or disked plate whose periphery 15 is tightly secured to the can body by the usual rolling or seaming process.

The head 3 has 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 contact the bead 5 and the plastic 14 will be compacted in the V-shaped annular space 12 between the wall 13 and the flange 4 and act somewhat as an elastic wedge to effect a tight or hermetic seal between the closure and the can head. 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 the 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 removal of the closure. To remove the closure it is only necessary to insert the blade 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 been once 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.

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 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 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 to reseal the can after venting 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.

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 throughout the entire circumference of the wall 13, or between the compound and the cut edge of the can. Thus the 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.

A comparison of Figures 1 and 3 of the accompanying drawing will illustrate the difference between a can head that is pre-formed and one which assumes its final shape under stress. As will be seen by reference to Figure 1, the plastic material is not squeezed out by a narrowing of the V-shaped recess 12, as is the case in Figure 3. In Figures 2, 3, and 4, which represent the can head of my application aforesaid, those parts which correspond to similar parts in my present invention (Figure 1) bear the same reference numerals, plus the index letter a.

With the can head of my previous application aforesaid the dishing under vacuumizing and closure applying pressures (see Figure 3) or under excessive internal pressures (see Figure 4), there is a tendency to pull the seam 15a at the places marked with the arrows A, whereas with the pre-formed head (see Figure 1) of my present application this tendency is absent.

When in this application I make reference to a "pre-formed head" I desire that term to be construed as having reference to a head stamped or otherwise formed to the shape which a flat head would assume upon vacuumizing (to the extent necessary for the product) and sealing the can, or, in other words, a head which has been dished or concaved to the form or shape where it will remain constant after being secured in place to the can body.

By pre-forming the can head or top by dies, before rolling it into the can body, I am enabled to get a perfect seal at the point indicated by the arrows A, and the plug is enabled to assume its proper relation to the sealing compound and the soldering points under action of the vacuum; pre-forming the can head has a hardening effect on the material thereof, tending to stiffen it considerably and forming a brace against the can body at the point indicated by the arrows A. Actual tests show that the head will not push through the center under the normal gas pressures built up by the gases of the coffee when the head is pre-formed. In addition to these many advantages, I find that the head will withstand a pressure of 150 pounds while inserting the plug without depressing to a noticeable degree, whereas in inserting the plug with a flat top, the top will press down at least one-fourth of an inch under thirty pounds pressure, a pressure not sufficient to effect a good seal between the plug and the head, and at the same time the head will co-

operate to a considerable degree, this cooperation giving no opportunity for leakage to occur.

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

What I claim is:

1. In a can, a metallic head having an 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 passes through the plastic, said head being pre-shaped to its normal form under vacuum.

2. In a can, a metallic head having an 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 head being pre-shaped to its normal form under vacuum.

3. In a can, a metallic head having an 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 said bead, said head being pre-shaped to its normal form under vacuum.

4. In a can, a metallic head 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, said head being pre-shaped to its normal form under vacuum.

5. In combination with a can having a metallic head provided with a filling opening, a plug-type closure for said opening, and means cooperative with said closure to seal the can against ingress of air while permitting said closure itself to function as a pressure-relief valve to relieve pressures up to a given degree, and thereafter to re-seal the can, said head being pre-shaped to its normal form under vacuum said means being wholly located below a plane containing the top edge of the can.

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