

Nov. 22, 1955

C. A. BAUER
BAG SEAL

2,724,543

Filed Feb. 27, 1952

2 Sheets-Sheet 1

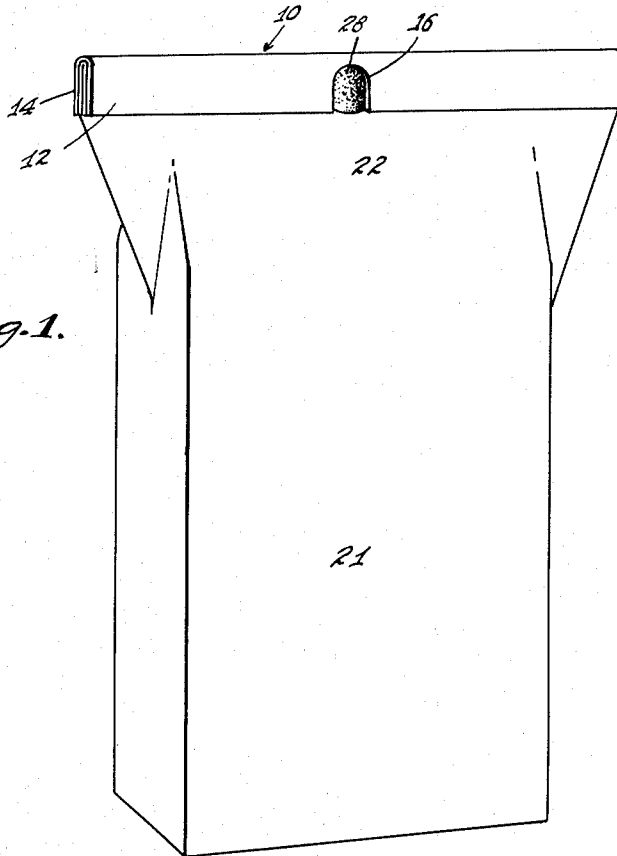
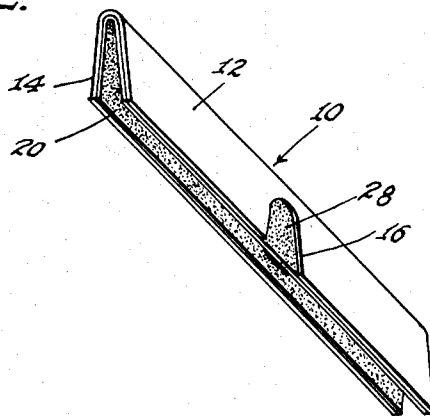


Fig. 2.



INVENTOR.
CHARLES A. BAUER,

BY

Alley and Gulin
ATTORNEYS.

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C. A. BAUER

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2 Sheets-Sheet 2

Fig. 3.

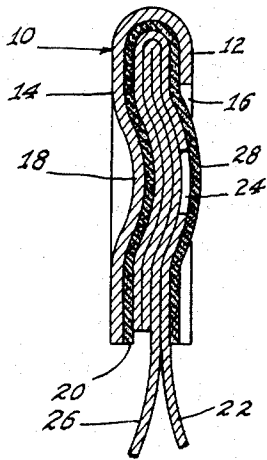


Fig. 4.

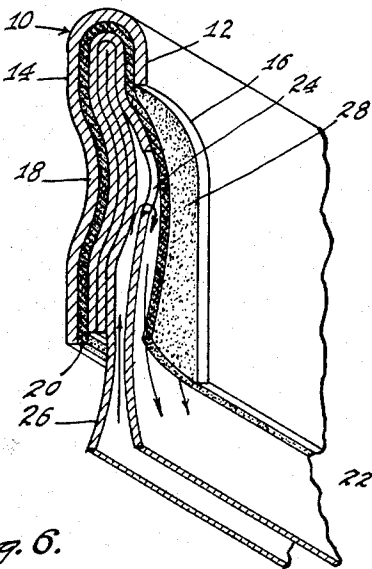


Fig. 5.

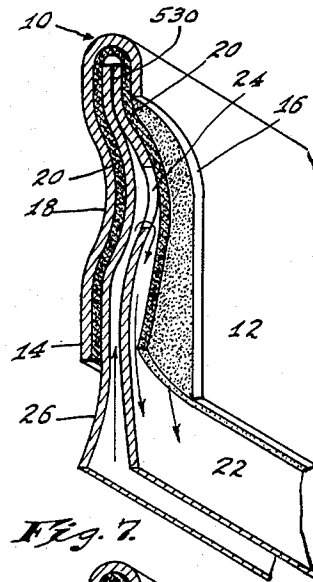


Fig. 6.

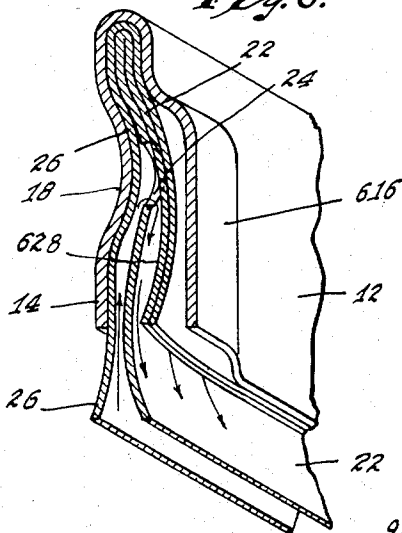


Fig. 7.

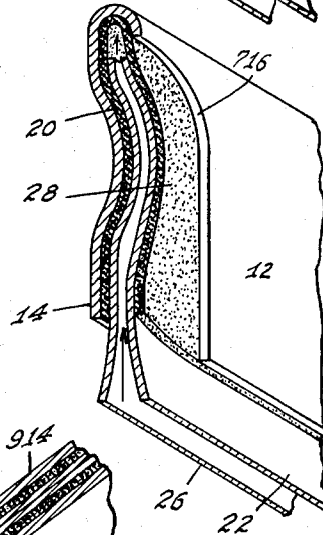


Fig. 8.

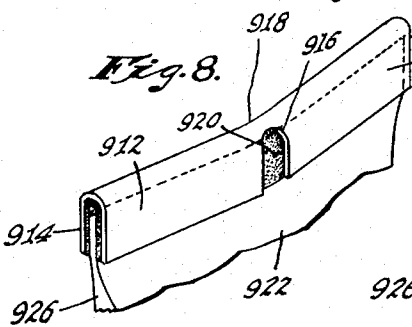
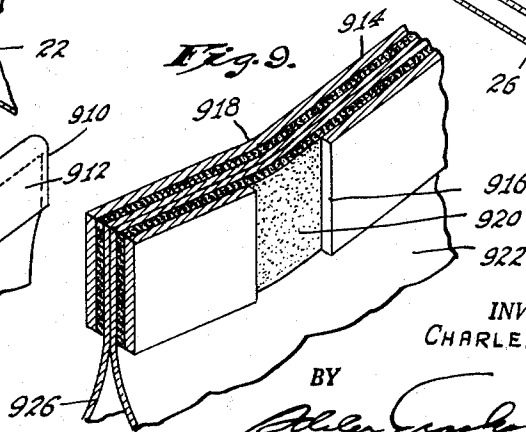


Fig. 9.



INVENTOR.
CHARLES A. BAUER,

BY

Alley, Craythorn & Johnson
ATTORNEYS.

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2,724,543

BAG SEAL

Charles A. Bauer, Woodbridge, Conn.

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14 Claims. (Cl. 229—62.5)

This invention relates to bags of impervious, pliable material provided with a sealing means embodying a valve. It is an object of this invention to provide a bag closure which permits gases within the bag to escape but which prevents entrance of atmospheric air into the bag. It is another object to provide a bag-valve of simple and economical construction, which will be efficient in operation. It is a further object to provide a bag closure which permits a vacuum to be drawn in the bag after the closure is in place. Further objects will become apparent as the description is understood.

In carrying out my invention in its preferred form, the open ends of the bag-walls are brought together and are sealed as by folding over. This sealed bag-top is then clamped between the side walls of a channel-like clamp-strip of sheet metal or equivalent material, which is lined interiorly with a film or liner of compressible elastic material. One side wall of the clamp-strip has a notch, or is otherwise relieved, and the other side wall has an inwardly offset boss aligned with that notch. Also in alignment with the notch is a small bag-opening provided in the bag side-wall which lies adjacent the notched side of the clamp-strip. The boss stretches that portion of the liner which overlies the bag hole and which spans the notch, so as to cause the liner to seat itself tightly against the hole and form an outwardly opening check valve.

The accompanying drawings illustrate my invention: Fig. 1 is an isometric view of the bag with the sealing means and valve in place; Fig. 2 shows the clamp-strip in opened position for reception of the bag walls; Fig. 3 is an enlarged cross-section of the closure, with the valve means in normal sealing operation; Fig. 4 is a further enlarged isometric detail of the closure, with the valve means in pressure-releasing position, directional arrows indicating the escape route of the gas; Figs. 5, 6 and 7 are views similar to Fig. 4, showing modifications of my invention; Fig. 8 is an isometric view of the bag with a modified closure in place; and Fig. 9 is an isometric, horizontal section through the closure of Fig. 8.

As shown in Figs. 1 through 4, the clamp-strip 10 is a U-shaped strip of sheet-metal having opposed walls 12 and 14. Intermediate its length, one of such walls, shown as the wall 12, is provided with a relieved portion such as a notch 16. In alignment therewith, the other wall 14 is provided with an inwardly offset portion 18, such as the boss shown. The clamp-strip 10 is lined with a film or membrane 20 of compressible elastic material, conveniently of thin rubber or some synthetic elastomer. By means yet to be described, the liner-portion 28 which spans the notch 16 is operative as the check-means of the valve.

The bag 21 is formed in any appropriate manner of any suitable impervious material such, for example, as coated paper or plastic film. Near but spaced from its open end, the wall 22 of the bag is provided with a small opening 24 which, when the clamp-strip is applied in the manner hereinafter set forth, provides for venting of the

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interior of the bag. To close and seal the bag, the bag end-walls are pulled outward to bring together the top edges of the bag side-walls 22, 26. These side-walls are then folded over in such a way as to avoid occlusion of the opening 24 and the fold is inserted into the clamp-strip in such a position that the opening 24 will be covered by that portion 28 of the liner 20 which bridges the notch 16. The strip 10 is then subjected to a collapsing pressure sufficient to clamp the bag-edges firmly between the lined walls of the clamp-strip. As the clamp-strip is pressed into the collapsed condition shown in Fig. 3, the boss 18 causes the portion 28 of the liner 20 which spans the notch 16 to be stretched and thus to be held tightly against the adjacent bag-wall, thereby covering and effectively closing the opening 24. For most effective liner-sealing, it is desirable to stretch the liner with components of internal stress in more than a single direction. For this and other reasons, the boss 18 is desirably dome-shaped.

Should pressure be generated within the bag in use—as by some gas-generating chemical change in its contents—or if it is desired to withdraw air from within the bag after closing—as in a vacuum-pack presentation—the valve permits escape of fluid from the bag interior by the valve-action shown in Fig. 4. The relatively higher pressure within the bag will force outwardly that portion of the bag-wall 22 which underlies the notch 16; because at such notch, the bag-wall 22 and the liner-portion 28 are unsupported against outward displacement. Thus, the gas will find its way to the opening 24, will displace the portion 28 of the liner 20 which overlies that opening, and thence escape downwardly between that liner and the exterior surface of the bag-wall. Such escape route is shown by the directional arrows in Fig. 4. Air or other gas under pressure from the outside cannot enter the bag, as the higher exterior pressure would merely seat the liner-portion 28 more firmly over the bag-opening 24.

In Fig. 5 is shown an embodiment in which the folding over of the bag side-walls is omitted. For many applications, the seal obtained by the grip of the clamp-strip satisfactorily seals the bag top without such bag folding. If desired, the top edges of the bag walls may be sealed, as by heat-sealing or gluing, indicated at 530.

If the bag is made with its side-walls of sufficiently resilient material, the above-described liner 20 may be omitted. Such construction is shown in Fig. 6. In this embodiment, the clamp-strip wall 14 with its boss 18 bear directly on the side-wall 26; and the hole-covering function is effected by folding the bag-walls 22, 26 over the end of the wall 22, whereby the folded-over portion 628 of the side-wall 22 operates as a check means in a manner similar to that of the notch-spanning liner-portion 28 of Figs. 3 through 5.

As an alternative to the notch 16, the relief of the inside surface of the clamp-strip wall 12 may be provided by outwardly striking a pocket or area-way 616 in the clamp-strip wall. Such construction is shown in cross-section in Fig. 6.

By extending the notch 716, as shown in Fig. 7, upwardly beyond the limits of the bag side-wall 22, gas escape may be effected without any hole in the bag-wall. In this embodiment, as the gas pressure within the bag forces the bag side-wall 22 outwardly in the region of the notch 716, the top edge of the side-wall 22 parts from contact with the other side-wall 26, and the gas is vented between the juxtaposed bag walls into the passageway formed between the top edges of the side-walls and the inner surface of liner 20 folded about such edges. As this passageway extends to the ends of the clamp-strip 10, the excess gas travels along that passageway and escapes through the open ends thereof.

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In Figs. 8 and 9 is shown another embodiment of the invention. To stretch the liner 920, and thus to cause it to press together the unfolded bag-walls 922, 926 into normally-sealed relationship, the clamp-strip 910, after having been collapsed to clamp the opposed bag-walls together, is bent to stretch that portion of the membrane 920 spanning the notch 916. The bend 918 thus formed in the wall 914 serves in effect as a projection and is thus an equivalent of the projection 18 shown in Figs. 3 to 7. The relief effected by the notch 916 permits gas under bag pressure to force outwardly the bag-wall 922 for gas escape axially of the clamp-strip 910 and out the open ends thereof in a similar manner to the gas escape in the embodiment of Fig. 7 above described. In contradistinction to the internal forces set up in the liner by the afore-mentioned dome-shaped offset, the valve-closing forces here are substantially all in a direction parallel to the top edges of the bag side-walls.

While I have shown specific embodiments of the invention, I intend to cover all changes and modifications of the examples of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. A combined closing and venting device for a pliable bag, comprising a channel-like metal clamp-strip having spaced, opposed side walls for reception of bag sides therebetween, one of said walls being provided with a notch extending to an edge of the wall, the other wall having an inwardly offset portion aligned with said notch, and an elastic membrane lining said clamp-strip and having a portion spanning said notch, said strip being collapsible to permit the edge portions of an open bag-end to be clamped between its walls, said offset portion being adapted when the strip is collapsed to displace into said notch and stretch the membrane portion spanning said notch and permit it to serve as an outwardly opening check valve.

2. A combined closing and venting device for a pliable bag, comprising a collapsible channel-like clamp-strip having opposed side walls for reception of bag sides therebetween, a compressible, elastic lining on the inner walls of said clamp-strip, one wall of said clamp-strip being provided with an inward projection, the other wall of the clamp-strip being relieved opposite said projection whereby when the clamp-strip is collapsed the projection will force outward and stretch that portion of the lining which bridges the relieved portion of the one side wall, the absence of support, provided by the relief opposite the projection, permitting further outward displacement of the lining.

3. The invention set forth in claim 2 with the addition that the relief in the one side wall is provided by a notch which extends inwardly from the edge of such side wall to a point beyond said projection.

4. In combination with a pliable bag having an open end the edges of which are brought together, bag-closing and sealing means comprising first and second opposed walls between which such edges are clamped, a compressible, elastic lining on the inner, bag-engaging faces of said walls, said first wall having an inward projection and said second wall being relieved opposite said projection, the projection distorting the clamped bag-sides and producing a local stretching of the lining, the bag-side engaged by the lining on the relieved wall having an opening in its distorted portion, whereby any fluid pressure generated within the bag will be transmitted through such opening to the wall-lining overlying it, the absence of support, provided by the relief opposite the projection, permitting further outward displacement of the lining under influence of gas pressure within the bag.

5. In combination with a pliable bag having an open end the edges of which are brought together, bag-closing and sealing means comprising first and second opposed

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walls between which such edges are clamped, a compressible, elastic lining on the inner, bag-engaging faces of said walls, said first wall having an inward projection and said second wall being notched opposite said projection, the projection distorting the clamped bag-sides and producing a local stretching of the lining, the bag-side engaged by the lining on the notched wall having an opening in its distorted portion, whereby any fluid pressure generated within the bag will be transmitted through such opening to the wall-lining overlying it.

6. In combination with a pliable bag having an open end the edges of which are brought together, a bag-closing seal clamping such edges together, the bag having in one of its walls an opening located within the extent of said seal, said seal including a flexible, elastic membrane overlying said opening, a projection lying on the opposite side of the clamped bag edges from said opening, and means engaging said membrane at points spaced along the seal from said projection for maintaining tension in the membrane, said projection locally displacing the bag edges and the membrane outwardly to stretch that membrane-portion overlying said opening.

7. The invention set forth in claim 2 in which the inward projection is dome-shaped.

8. The invention set forth in claim 6 in which the bag walls are sealed together at their top edges above said opening.

9. The invention set forth in claim 6 in which the bag walls are folded over, and the closing seal is applied about the line of the fold.

10. In combination with a pliable bag having an open end the sides of which are brought together, one of said sides having a small opening for venting said bag, at least one bag-side being folded over to cover said side-opening, closure means comprising first and second opposed walls between which the bag sides and the folded-over bag-side portion are clamped, said first wall having an inward projection in the region of said bag-side opening, said second wall being relieved opposite said projection, the projection distorting the clamped bag-sides and producing a local stretching of the folded-over bag-side portion, thereby seating said folded-over bag-side portion tightly against the bag opening by initial tensional stress in said folded-over bag-side portion, the absence of support, provided by the relief opposite the projection, permitting further outward displacement of the folded-over portion under influence of gas pressure within the bag.

11. In combination with a pliable bag having an open end the edges of which are brought together, bag closing and sealing means comprising first and second opposed walls forming a clamping zone in which such edges are clamped, said first wall having an inward projection and said second wall having a relieved portion opposite said projection, said projection distorting the clamped bag sides into said relieved portion, the bag projecting into the clamping zone for a distance less than the extent of said relieved portion, the absence of support, provided by the relief opposite the projection, permitting further outward displacement of the bag wall adjacent the second wall under influence of gas pressure within the bag.

12. In combination with a pliable bag having an open end the edges of the sides of which are brought together, a bag closing and sealing means comprising first and second clamping walls having complementary inner faces said first wall having a bend intermediate its length, said second wall lying exteriorly of said bend, a compressible flexible membrane lining the inner face of at least said second wall and engaging one of said bag-sides, said second wall being relieved opposite said bend to permit outward movement of said membrane, said membrane being stretched longitudinally of said walls at the site of the relief in the second wall to force the bag-sides toward the bend in said first wall; said walls at points spaced from said relief clamping the bag sides and membrane

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between them to maintain the membrane in its stretched condition.

13. In combination, a bag having pliable side walls and an opening for the egress of gas, said bag having opposite side walls brought together at said opening, and means including first and second clamp members for clamping said opposite bag-walls together, said first clamp member having an inward projection, said second clamp member being relieved opposite said projection, said projection deforming the bag walls into the relieved portion 10 of said second clamp member at said opening, and an elastic membrane interposed between said second member and the adjacent bag-wall and stretched by said projection to maintain clamping pressure on the bag walls at the relieved portion of the second clamp member and prevent ingress of air into the bag, said membrane in the region of such relief being outwardly deformable 15

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under the influence of excessive fluid pressure within the bag to permit the escape of gas therefrom.

14. The invention set forth in claim 13 with the addition that said opening is provided in one bag wall below the upper end thereof and within the limits of the relieved portion of said second clamp member, the upper end portion of at least one bag wall being folded over to cover the opening and constitute said membrane.

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