

May 7, 1940.

J. C. DONNELLY

2,200,200

CONTAINER

Original Filed March 25, 1935 2 Sheets-Sheet 1

Fig. 1.

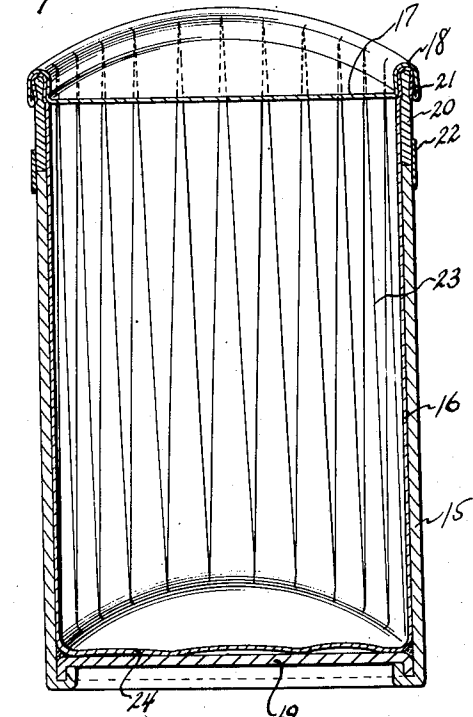


Fig. 2.

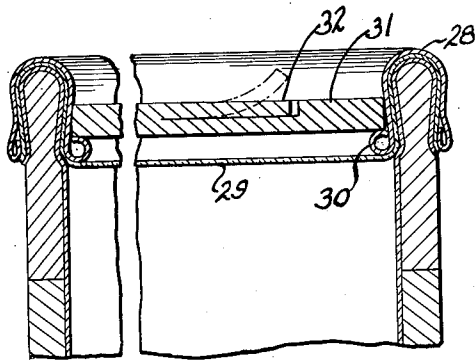


Fig. 3.

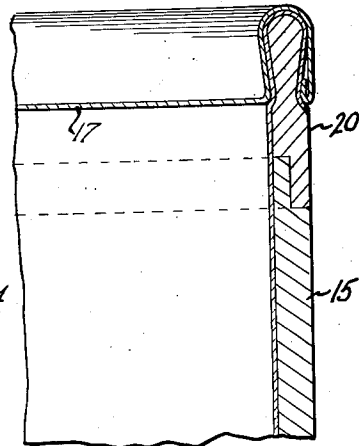


Fig. 4.

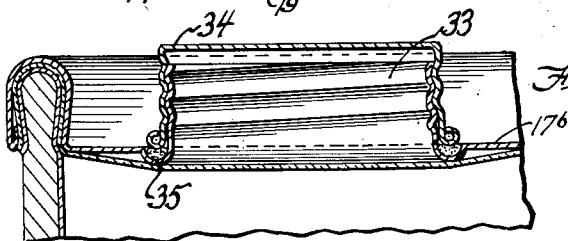
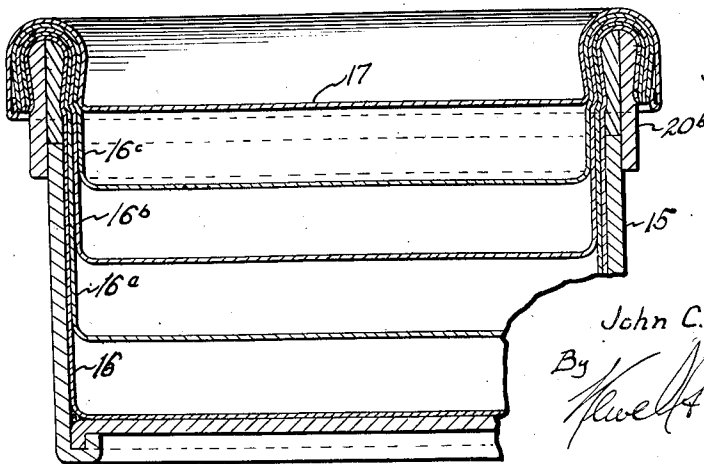


Fig. 5.



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Original Filed March 25, 1935 2 Sheets-Sheet 2

Fig. 6.

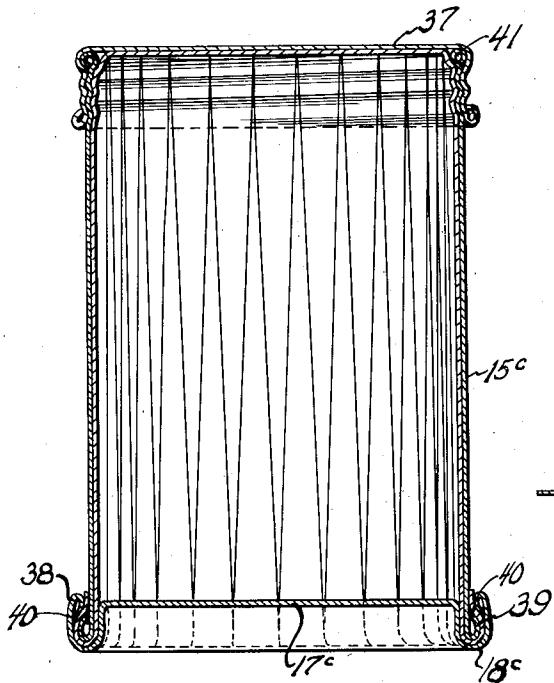


Fig. 7.

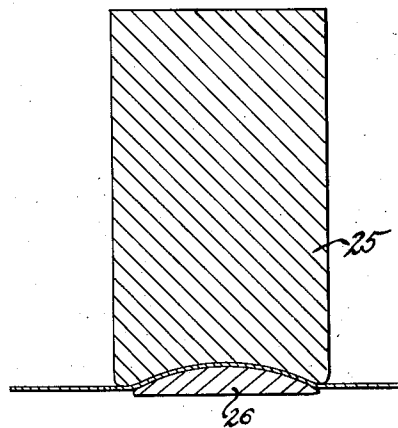
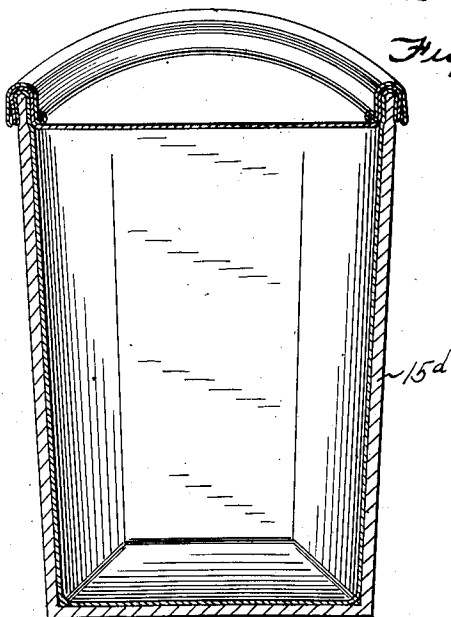


Fig. 8.



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UNITED STATES PATENT OFFICE

2,200,200

CONTAINER

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Application March 25, 1935, Serial No. 12,808

Renewed January 9, 1940

18 Claims. (Cl. 229-14)

This invention relates to containers, and more particularly to sealed containers for packaged goods.

Prior to my invention, goods of the character with which I am concerned had been commonly packaged in tin foil, glass bottles and jars and various other types of containers. One or another of these various types of containers had been chosen for the packaging of particular types of goods accordingly as perfect sealing, ease of opening, disposal of the empty containers, visibility, economy, resistance to rough handling, and assurance against substitution of inferior material in genuine packages is of greatest importance in the particular application.

As will be apparent from the following description and the accompanying drawings, my invention contemplates an hermetically sealed liner, a sealing rim secured thereto and a protective substantially rigid casing in which the liner is mounted. With the several functions of the container thus divided, I choose for each a material best suited to it.

This much, however, had been suggested by others before my invention. The lining of rigid containers with flexible bags, and the sealing of such liners by means of clamping rings were not new conceptions, but a successful hermetically sealed container embodying these conceptions was not known. Certain unrecognized defects in the designs and constructions heretofore suggested prevented their achieving the practical importance which my invention makes possible.

In particular it had been found impossible with such containers to keep their contents hermetically sealed, and especially under conditions of storage and transit.

Oils and oily materials and many liquids could not be packaged in such containers because even minute capillary leaks would eventually disfigure the packages with unsightly oil spots and make a nuisance by spreading oil on the shelves where they are stored. Many dry materials could not be packaged in these containers because the moisture absorbed thru small leaks during transit and storage is objectionable. Most foods were precluded because of the danger of spoilage due to contamination through such leaks, and even materials such as coffee, spices, tobacco, etc., tended to lose flavor and aroma. Being thus limited to uses where hermetic sealing is not essential, such containers were in competition only with cheaper wrappers and cartons and could not compete with tin and glass con-

tainers where an advantage of economy could be shown.

Accordingly it is one object of my invention to so design and construct a container of this type that it will be and remain at all times, until intentionally opened, hermetically sealed.

In such containers as have been suggested prior to my invention, moreover, the liner has served only as a liner and in some cases (by removing or making removable a portion of the casing) as a window to permit partial inspection of the contents.

In contrast to this it is an object of my invention to provide a double container in which the liner not only forms an hermetic seal for the contents, but, together with a handling top, forms a unit which may be removed as such from the protective casing. It is a more particular object of my invention to provide such a container in which the body of this removable unit is transparent to give a full view of the contents of the package.

The advantages of this for counter displays, and for inspection to assure quality and full measure are strikingly apparent. In the merchandising of coffee, for example, the display feature is especially significant because with the perfect sealing of the package, the gases which are given off by the coffee after roasting may be held so as to accumulate a high internal pressure, which when the liner is removed from the casing stretches it taut and gives mute but striking evidence to the complete preservation of the coffee against loss of its volatile flavor constituents. The stretched transparent globe, which results from the internal pressure in the flexible bag, gives, moreover, an especially attractive appearance for counter display.

This removable feature of the package is of great importance also in the merchandising of materials like lubricating oils in which the entire contents of the package are to be emptied out at once and in the presence of the customer. In such cases the liner bag is lifted out of the casing, taken to the place where its contents are to be delivered and then cut near its bottom to let the contents drain out. This procedure not only forms a very simple and efficient way of delivering the material, but it involves necessarily the display of the material in a most attractive form to the customer. Quality and full measure are held up unostentatiously before the customer's eyes. Trade-marks may be displayed on the handling ring, the cover and/or on the bag itself to complete the association of quality and fair-

ness with the particular brand of goods being sold.

A great deal of attention has been given recently to the problem of short measure and of "bootlegging" inferior products under advertised and favorably known trade-marks. This problem has been particularly acute in the sale of lubricating oils. In some localities it has been estimated that more than half the oil sold is either short measure or "bootleg"—both of which conditions tend to destroy the good will attached to the trade-marks prostituted by such sales.

This condition has led to the widespread use of tin cans for delivering oil from original packages into the customer's crank-case at the service station; but tin cans and other containers known before my invention have not solved this problem. The tin cans collect around service stations where they are not only a nuisance, but are readily available to "bootleggers" who trim off the tops and at very small cost refill them and seal on a new top. Thus they are able to sell inferior oil, and in short measure, in genuine trade marked cans.

Even when genuine oil is sold in these cans the problem of short measure is even worse than with oil in bulk. The fact that the customer cannot see the oil nor see whether the container is full to begin with or empty when it is thrown aside, actually increases the temptation to defraud the customer and the oil company.

In contrast to this, the transparent bag of the present invention discloses without possibility of fraud whether the package is full before it is ruptured and whether its contents have been completely drained out before it is thrown aside. Once ruptured the bag of the present invention cannot be refilled even by the most clever bootlegger. Finally, all distinctive parts of the container which could give the impression of genuineness may be made readily combustible so that even if it were possible to refill them, there would be much greater difficulty in obtaining empty containers for the purpose.

Thus the container of the present invention offers the first real protection against fraud.

Another object of my invention is to provide a container in which any desired number of individually sealed compartments may be formed.

This aspect of my invention is important in the packaging of materials which are used together, but must be kept separate until used, as for example, certain ready-mixed baking materials in which the leavening ingredient is kept separate. In such cases a plurality of sheet material bags or liners may be used according to my invention, so that several compartments are formed within the casing.

The same construction may be used for merchandising goods on a free trial basis. A sample may be included in the outermost compartment. If the customer is not satisfied after using the sample, he may return the rest of the package with the principal compartment still sealed and thus the contents may be repackaged and sold. Or a package of an article having a wide popular demand may include a sample of another less widely known product.

This construction lends itself also to packaging of materials which are used only in small quantities and which tend to deteriorate after their package has been opened.

I have found that the failure to produce a perfect seal in containers of this type before my invention was largely due to the necessity for

overlapping the material in forming the liner bag. When the overlapping material is clamped between rigid surfaces as between two metal parts, there will always remain minute passages at the edges of the overlapped portions. This cause of failure is especially important when, as in the case of pleated bags, the overlaps are relatively thick and at frequent intervals.

It has been suggested to use seamless bags for this purpose, but as yet no practicable way has been developed of making seamless impervious bags suitable for this purpose without overlaps.

I have now discovered that this difficulty can be overcome by the use of a deformable material in the seal which serves as a cushion to compress the material of the liner at the overlaps or pleats, and thus to close even the most minute passages and produce a seal which is gas- and liquid-tight. Among the deformable materials which may be used for this purpose, are plastic compositions, including thermoplastics, examples of which are given below. If, however, the casing in which the liner is mounted or the cover to which it is to be secured or the handling ring to which it is to be secured is of felted fibrous material, the cushioning effect of this material alone will be found sufficient to produce a perfect seal, but sufficient clamping pressure must be used in such case to impress the surface irregularities into the fibrous material.

In either case I have found it sufficient to place such a cushion between the liner and the clamping parts. It is not necessary (although it may in some cases be preferable) to use any cement or gasket between the bag part of the liner and the closure for the mouth of the bag (unless the closure is also the clamping means).

More serious leakages occur in the body of the liner bag. Bags which are fabricated by seaming are costly to make and are likely to develop minute leaks at the seams, even when the materials packaged are not such as to deteriorate the seaming cement. It is especially difficult if not impossible to make hermetically tight seams where corners occur in the form of the bag.

Under present conditions the only type of bag which is both inexpensive to manufacture and satisfactory for the purposes of this invention is one in which the sides are formed from the same integral sheet as the bottom by merely folding it into tapering pleats which draw the sides up at the desired angle.

Bags and cups made in this way have been in common use before my invention, and have been suggested for lining containers. Such linings theoretically leave no possibility of leakage except at the seal around the rim of the bag, but actually leaks do appear in the body of the bag, when it is used as heretofore suggested. I have found this to be due to a bulging of the bag with consequent slight shifting of the pleats while under pressure of the contents of the bag. This shifting of a sharp fold may produce minute punctures or small tears which destroy the usefulness of the liner. According to my invention I overcome this difficulty by accurately fitting the liner into the casing leaving enough slack in the liner material to make up for any shrinkage to which the liner is subject and to permit its expansion, to the limit permitted by the casing, without shifting of the pleat ends; and furthermore by the use of rounded corners to reduce the sharpness of the folds at the place where shifting may occur.

In the accompanying drawings I have shown several preferred embodiments of my invention and various modifications thereof chosen for the purpose of illustrating my invention and the principles involved therein and how it may be applied under various conditions and requirements.

Figure 1 is a perspective view of a container embodying my invention, shown in axial section.

Figures 2 to 4 are fragmentary detail views in axial section of various modifications of the construction shown in Fig. 1.

Figures 5 and 6 are views in axial section of other modified forms preferred for special uses.

Figure 7 is a view partly in elevation and partly in axial section of a form used in folding the liner bag according to my invention.

Figure 8 is a perspective view partly in section of another modified embodiment of my invention.

In these drawings the dimensions of the various parts are grossly exaggerated, this being necessary in order to distinguish the various layers of material each or some of which may be not so thick as the lines used in the drawings. Thus the material of the bag may be of the order of thickness of about .001 of an inch and the material of the casing of the order of from .1 to .01 depending upon the type of material used. These dimensions are of course illustrative and not limiting.

As shown in the drawings, the container comprises a protective and supporting casing 15, a liner bag 16, a closure 17 for the mouth of the bag and a sealing means 18 for forming and maintaining a gas- and liquid-tight seal between the bag and its closure.

In the embodiment illustrated in Fig. 1, the casing 15 is in two parts, the lower of which is a typical open ended cylindrical paper board container, e. g., made of a laminated tube built up of oppositely directed spirals of paper, with one end of the tube being turned in to engage the bottom 19. In order to protect the liner against being crowded into the crevice between the bottom and side a bead of paraffin or other suitable material is run into this crevice building it up to a smoothly rounded corner.

The upper part 20 of the protective casing in this case forms a holding or handling ring by which the bag 16 and its contents may be lifted from the principal part 15 of the casing. This ring 20 is sealed to the bag and its closure in order that they may thus be made a unit for removal and handling as described; and in this seal the fibrous material of the ring 20 serves as a cushion between the rim of the bag 16 and the clamping ring 18.

Although this handling ring with the liner sealed to it is the most satisfactory form of my invention I may utilize the advantages of a removable liner in other ways e. g. without sealing the ring to the liner or even without the ring.

In forming this seal the ring 20 is first provided with the bead 21 which allows it to exert a strong localized pressure without cutting the liner material. The liner is then inserted thru the ring 20 and its rim folded back over the outside of the ring. Since in this case the closure 17 is integral with the sealing ring 18 and no liner is used for the closure, the only remaining step is to fit the disk 17-18 over the top of the ring 20 with the bag 16 thereon and turn or roll the edge down securely against the outside of the ring 20 to complete the seal. This step is accomplished in accordance with well known prac-

tice in the manufacture of tin cans. The important consideration in this case however being to make sure that enough pressure is used so that the irregularities resulting from the pleats in the liner are actually molded into the fibrous material of the ring so that it exerts adequate sealing pressure on every minute part of the circumference.

The ring 20 and the main part of the casing 15 in this case meet in a simple butt joint. This would be held in alignment by virtue of the close fit of the liner 16, and due to the fact that the wide pleats near the top of the liner give triple or even greater thickness to the liner this would ordinarily be sufficient. Nevertheless I prefer as an additional protection against injury to the liner to secure this joint by a band of adhesive tape 22.

The liner bag 16 in this case is made from a flat disk of transparent non-fibrous cellulosic film, such for example as that sold under the name "Cellophane". This disk is folded to form substantially triangular pleats 23 starting from the periphery of the bottom portion 24. The forming of these pleats may be effected by hand or by machinery, e. g., as in the well known manufacture of paper cups etc.

In order to make sure that the liner fits tightly against the casing and that there is a little slack left to provide for expansion into or with the casing and/or shrinkage of the liner without necessitating shifting of the pleat ends, I have found it advantageous to give the bottom 24 a slightly domed shape before the pleats are folded. This may be done for example as shown in Fig. 7 by pressing the bottom between the concave-convex dies 25-26 while the pleats are being formed. Or the sheet may be drawn up into the concave die by suction without the use of the convex die. This doming of the bottom permits the liner bag to be preformed just a little smaller than the inside diameter of the casing so that it may be readily slipped into the casing, and then expanded in situ with flattening of the bottom. The pleats are advantageously not ironed out, but their folds are left somewhat rounded so that they may give during this spreading process without injury to the liner material.

The tapering pleats may be cemented with adhesive, but I prefer to leave them free and loose except as subsequently pressed down by the material packed in the container.

In Fig. 2 I have shown a modification in which the closure for the mouth of the bag is a disk 29 of transparent sheet material similar to that used in the bag. In this case a separate sealing ring 28 is required, and in order to protect against cutting the closure disk its inner edge is rolled as shown at 30. A protective cap 31 may be provided over the window closure 29, e. g., like a milk bottle cap with a lifting tab 32 as shown in Fig. 2, or the cap 31a may be of the hood type.

In Fig. 3 I have shown a lap joint between the handling ring 20 and the casing 15 which I prefer to use when a relatively heavy material is used for the casing and especially if the taped joint 22 is objectionable for any reason.

Fig. 4 illustrates a type of container especially adapted for packaging materials where separate ingredients are to be mixed at the time when the contents of the package are used, or for advertising samples as already described above. In this case the closure 17b is formed with a screw top opening 33 closed by a screw cap 34. A trough 35 may be provided in the closure 17b around the

bottom of the screw 33 into which a sealing cement may be run when the top is closed, or a gasket may be used instead of cement.

If the closure 29 is used the space between it and the screw top may serve as a separate compartment, or the screw top may be left loose for inspection and removal of the contents. Ground roasted coffee slowly evolves a gas which in an hermetically sealed container creates a high pressure. If the disk 29 is of rubber permeable to carbon dioxide, and especially if the coffee is packaged in an atmosphere of carbon dioxide, this pressure may escape beneath the cap 34.

In Fig. 5 a plurality of bags 16, 16b, 16c, etc. are provided each progressively shorter than the others. Thus a multiple compartment container is formed.

In this figure I have also shown a modification in the holding ring 20b. Instead of the butt joint of Fig. 1 or the lap joint of Fig. 3, I have used a double ring, the outer ring extending farther down than the inner ring. The inner ring in this construction makes a butt joint as in Fig. 1, and the outer ring serves to hold the inner ring aligned with the main body of the casing 15, thus taking the place of the tape 22 in Fig. 1.

Figure 6 illustrates the use of my invention to give an hermetic seal for an ordinary removable top can. In this case the casing 15c and the closure 17c and the screw cap 37 form a screw top tin can of standard construction except for the rolled edges at 38 and 39 to prevent cutting of the liner in the seal, the plastic cushioning layer 40 in the seal and the fact that the liner 16 is sealed into the corner seam 18c. It is important in this can that the threads pressed into the casing are shallow so that no excessive strain is put on the liner bag, that the top edge at 41 is rolled so as to give a smooth rounded corner, and that the liner is fitted to the casing in every dimension with a slight slack, so that any bulging of the casing which may occur will not cause leaks as already described.

Fig. 8 shows another method of providing the desired slack in the liner bag. Here the bottom of the bag and of the container is polygonal instead of circular. This shape is superior because it is the natural shape which results from the pleating of the sides, and because such bulging as may occur will be by rounding out the sides of the polygon toward a circular shape without affecting the pleat points.

The example illustrated is a window top container with the liner and closure sealed directly to the top of the casing 15d without any handling ring or other provision for removing the bag from the casing. Similarly I have shown, in this figure a molded pulp type of casing. These features, however, are not essentially tied up with the polygonal shape, but may be used in other shaped containers embodying my invention and may be omitted from the polygonal containers of my invention.

As shown in this figure, it is desirable when the polygonal bottom is used, to have it gradually change to a circular cross section at the top, since it will be found simpler to form a perfect seal with a circular than with a polygonal top. Many shapes other than those shown may be used and especially truncated cones and pyramids.

I have mentioned specifically paper board and sheet metal and molded pulp for the casing and non-fibrous transparent cellulosic film for the liner. It should be understood, however, that my

invention is not limited to these materials. These are cited merely as the best examples from a class of which numerous others may be chosen. To mention a few more, glass, wood and molded compositions may be used for the casing, and metal foil, glassine paper, impregnated paper, etc., for the liner. For packaging certain materials, as already discussed for coffee, it is desirable to use for the bag, or for the closure 29, a material which is permeable to certain gases which may thus be vented from the package without affecting its hermetic seal. As the cushioning material for the seal any plastic, thermoplastic or compressible material may be used. A thin layer of rubber may be used if it is not to be subjected to liquids or vapors which disintegrate rubber (especially oils, greases etc.) A composition which I have found particularly suitable for this purpose, especially because it can be applied in liquid form and dried to form the cushioning layer is: a thermoplastic cement such as is known to the art for cementing cellulosic films and especially compositions of nitrocellulose and thermoplastic resins e. g., glyptal resins.

Although I have described above and shown in the accompanying drawings several preferred embodiments of my invention and a number of modifications thereof, these are not exhaustive or limiting of the invention. On the contrary these have been chosen and presented with a view to so explaining my invention, the principles thereof and the practical considerations to be borne in mind that others skilled in the art may without difficulty apply my invention in numerous and varied forms according to varying requirements and practical conditions. Moreover, although I have combined several features in my preferred embodiments, many of these novel features may be used with advantage in other combinations.

What I claim is:

1. An hermetically sealed container which comprises a supporting casing, a bag therein made from impervious sheet material overlapped at the mouth of the bag, an impervious closure extended over the mouth of the bag and overlapping a portion of the bag at the rim thereof, and sealing means comprising a rigid clamping ring which holds the overlapped periphery of the bag and of the closure pressed together in gas- and liquid-tight relation and a cushioning ring of deformable material within said clamping ring and cushioning said bag and closure whereby the pressure is distributed to all minute parts of the periphery not withstanding irregularities of surface.

2. An hermetically sealed container which comprises a substantially rigid casing, a bag therein made from impervious sheet material overlapped at the mouth of the bag, a closure of a transparent, impervious, rupturable sheet material extended across the mouth of the bag and overlapping a portion of the bag at the rim thereof, and sealing means comprising a rigid clamping ring which holds the overlapped periphery of the bag and of the closure pressed together in gas- and liquid-tight relation and a cushioning ring of deformable material within said clamping ring and cushioning said bag and closure whereby the pressure is distributed to all minute parts of the periphery not withstanding irregularities of surface, a substantial part of the area within the clamping ring being covered only by said transparent material whereby to form a window for inspection of the contents of said container.

3. A sealed container which comprises a casing

having one end open, a bag of transparent impervious material inserted into the open end of said casing, a ring secured to the mouth of the bag and adapted to engage the open end of said casing whereby to hold said bag and to form a convenient handling part for lifting the bag from the casing for inspection or opening thereof, a closure extending over the mouth of the bag and pressed into liquid-tight relation therewith and permanently secured to said ring, whereby the ring, closure and bag are removable as a unit from the casing.

4. A container as defined in claim 3 in which the ring and the casing meet edge to edge and present a substantially flush inner surface whereby sharp bending with possible injury to the bag is avoided.

5. A container comprising an outer casing of substantially rigid material having a closed bottom and an open top, a removable closure resting on said casing, and an inner bag of rupturable material fitted in the casing permanently secured to said removable closure, whereby the closure and bag may be removed as a unit from the casing.

6. A container as defined in claim 5 in which the bag is made of transparent flexible non-fibrous cellulosic film.

7. An hermetically sealed container which comprises a substantially rigid casing, a seamless bag fitted therein, made from a single sheet of flexible material by means of tapering pleats therein which serve to give the sides a desired upward angle, the amount of material in the bottom of the bag within the area defined by the ends of the pleats being greater than the corresponding area of the bottom of the casing, whereby any resilient bulging of the container may be accommodated without shifting the pleat ends.

8. An hermetically sealed container which comprises a substantially rigid casing, a seamless bag fitted therein, made from a single sheet of flexible material by means of tapering pleats therein which serve to give the sides a desired upward angle, and the pleats in the bag terminating at the bottom thereof in rounded corrugations.

9. A container as defined in claim 8 in which the bottom of the casing is formed with a smooth rounded corner.

10. An hermetically sealed container which comprises a substantially rigid casing, a seamless bag fitted therein, made from a single sheet of flexible material by means of tapering pleats therein which serve to give the sides a desired upward angle, the bottom of the bag and the corresponding part of the casing being polygonal with the pleat ends near the angles, whereby any resilient bulging of the container may occur in the flat sides of said polygon without shifting of the pleat ends.

11. A container as defined in claim 10 in which the casing and bag are round at the top and the bag is sealed to its closure by a crimped circular metallic ring.

12. A method of lining a container which comprises first doming the bottom upward, forming pleats in the material which forms the sides, fitting the pleated bag into a casing and spreading the bottom of the bag into the bottom of the casing.

13. A container comprising a casing of sub-

stantially rigid, inflammable material having an open top and a closed bottom, a slip ring adjacent and projecting above the top of said casing, a bag of flexible transparent or semi-transparent, rupturable material having its top folded across the top edge of said slip ring, a closure formed of a disk of flexible, transparent or semi-transparent material having its edge folded about the folded edge of the bag, a cover of substantially rigid, inflammable material having an inverted channel adjacent the edge thereof, the folded edge of said closure being formed within said channel, and a clamp ring embracing said channel, whereby the material of said channel and the folded edges of said closure disk and said bag are sealed together.

14. A container comprising an outer casing of substantially rigid, fibrous material open at the top, a slip cover for the casing including a disk portion and a depending flange surrounding the upper end of the casing, an inner bag of thin, flexible material covering substantially the entire surface of said casing, having its upper edge overlying the upper edge of the casing and being permanently secured and attached to the inner side of the flange of the slip cover, whereby the bag and slip cover are removable as a sealed unit from the casing.

15. A container comprising a fibrous casing closed at the bottom and open at the top, a ring of fibrous material frictionally encircling the upper end of the casing, a slip cover for the casing having a depending annular flange encircling said ring, an inner bag of thin, flexible material arranged in the casing covering substantially the entire surface of said casing with the open end of the bag extending over the upper edge of said ring and being attached and sealed between said ring and the flange of the slip cover, whereby the bag, ring and cover are removable as a unit from the casing.

16. A container comprising a cylindrical casing, a ring member complementary in thickness and diameter to said casing and arranged on the upper end thereof, a second ring member encircling said first ring member and the upper portion of the casing, a bag formed of thin, flexible material arranged in the casing with the open end of the bag extending over the upper edge of said first ring member and being secured thereto, a closure for the open end of the bag, said closure being secured to said first ring.

17. A container comprising a cylindrical casing, a ring member mounted upon the upper end of the casing, a second ring member encircling said first ring member and the upper portion of the casing, a bag of thin, flexible material arranged in the casing with the open end of the bag secured to said first ring member, and a closure for the open end of the bag.

18. A container comprising a cylindrical casing, a ring member mounted upon the upper end of the casing and arranged coaxial therewith, a second ring member encircling said first ring member and overlapping the joint between the same and the upper edge of the casing, said first ring member projecting upwardly beyond said second ring member, a bag of thin, flexible material arranged in the open end of the casing with the open end of the bag secured to said first ring member, and a closure for the bag.