Feb. 10, 1948. W. J. GEIMER 2,435,743

WATERPROOF BAG

Filed July 26, 1943 4 Sheets-Sheet 1

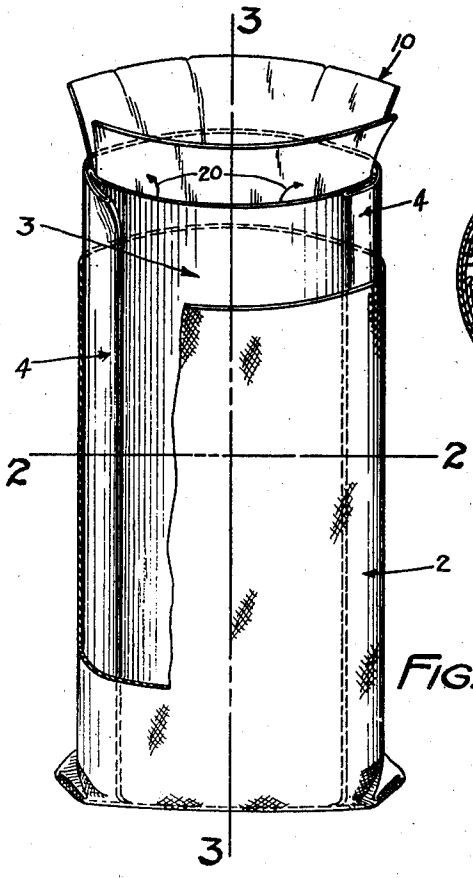


FIG. 1

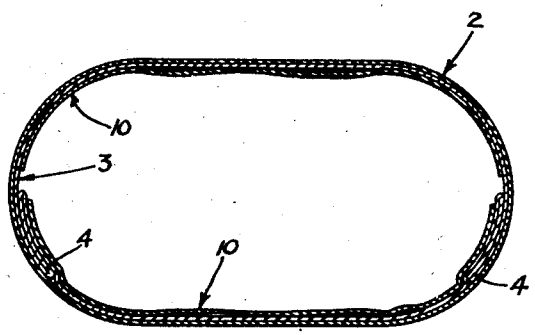


FIG. 2

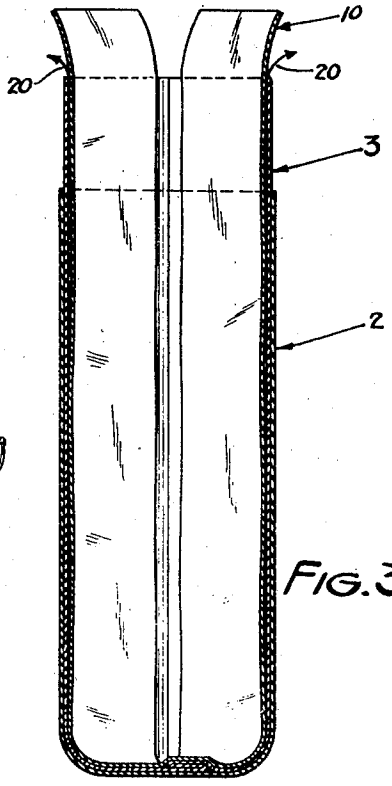


FIG. 3

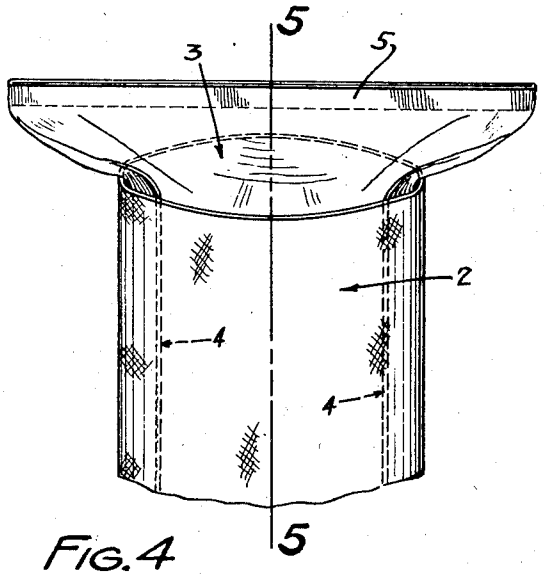


FIG. 4

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WATERPROOF BAG

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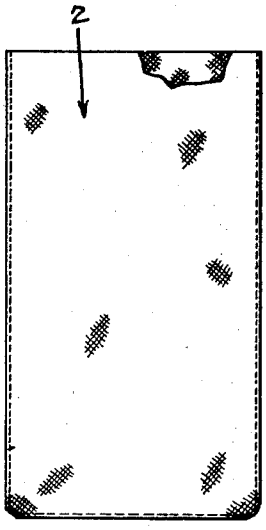


FIG. 8

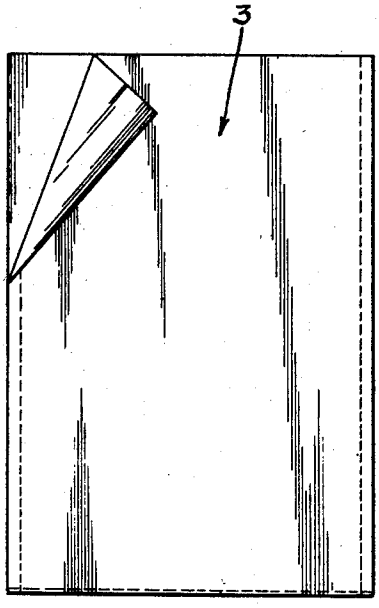


FIG. 9

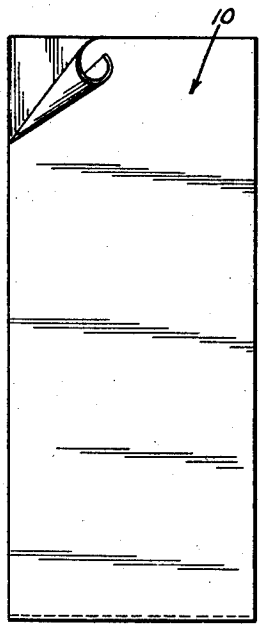


FIG. 10

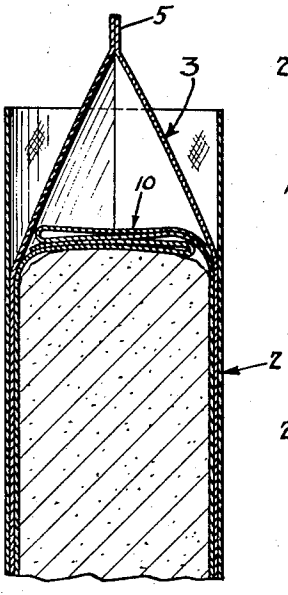


FIG. 5

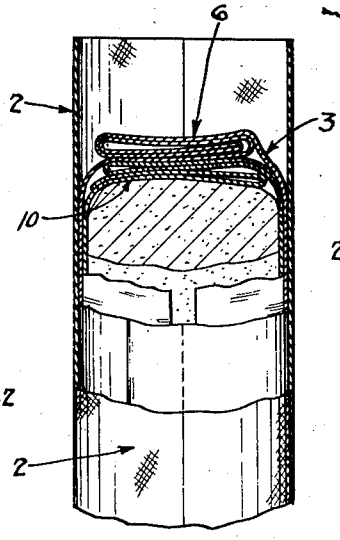


FIG. 6

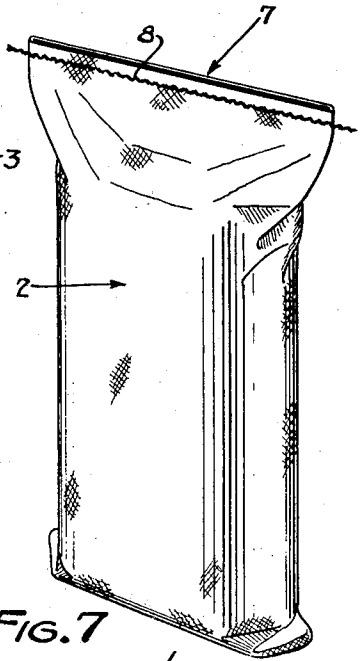


FIG. 7

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WATERPROOF BAG

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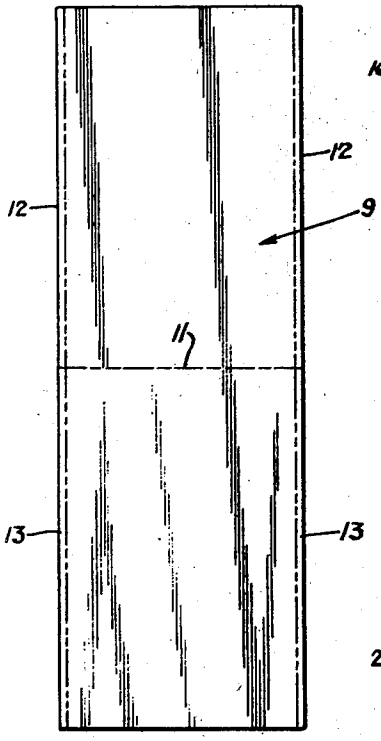


FIG. 11

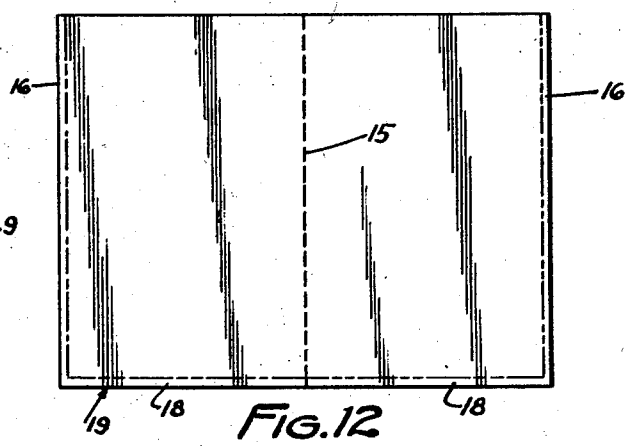


FIG. 12

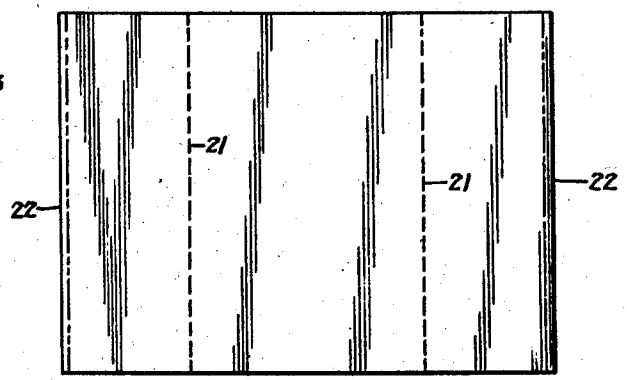


FIG. 13

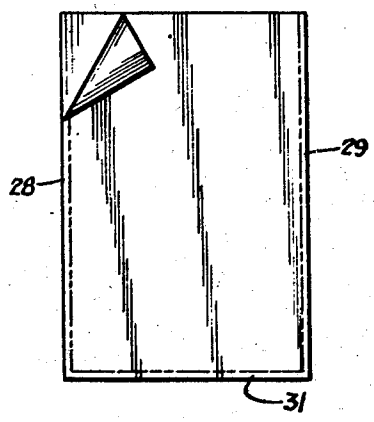


FIG. 14



FIG. 15



FIG. 16

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WATERPROOF BAG

Filed July 28, 1943 4 Sheets-Sheet 4

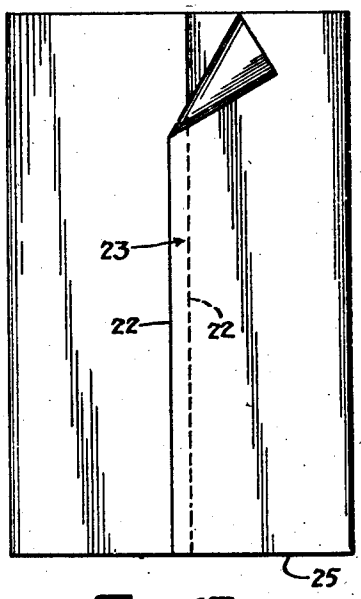


FIG. 17

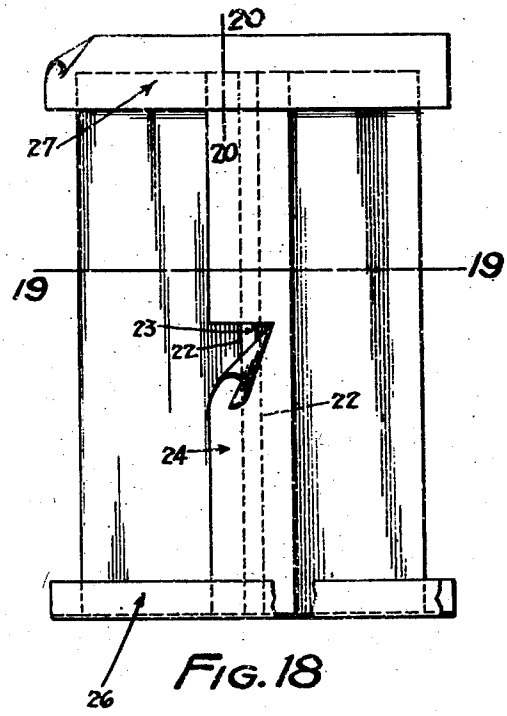


FIG. 18

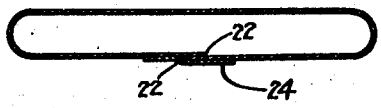


FIG. 19

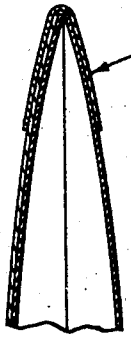


FIG. 20

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Patented Feb. 10, 1948

2,435,743

UNITED STATES PATENT OFFICE

2,435,743

WATERPROOF BAG

William J. Geimer, Minneapolis, Minn., assignor to Bemis Bro. Bag Company, Minneapolis, Minn., a corporation of Missouri

Application July 26, 1943, Serial No. 496,121

3 Claims. (Cl. 229—53)

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This invention relates to new and useful improvements in bag structures and more particularly to waterproof bags.

An object of the present invention is to provide a bag body which when closed and sealed will positively protect its contents against moisture and all other foreign matter which might have a contaminating effect thereon, should the contents come in direct contact therewith, whereby such commodities as may readily be damaged by moisture and other foreign matter may be shipped or transported from place to place with utmost safety, and with the assurance the contents of the bags will not be damaged by moisture and other foreign matter, while the filled bags are in transit, even though the bags may be subjected to shocks and moisture while en route.

A further object is to provide a shipping bag or container which is particularly suitable for transporting such commodities as sugar, salt, flour and various other materials which may readily and quickly be damaged if subjected to moisture, and whereby the novel bag herein disclosed provides a very practical and suitable bag for transporting various food stuffs for the Army, as the construction of the bag is such that should the sealed bag accidentally be exposed to rain, or be temporarily submerged in water, as when accidentally dropped or dumped into the sea, the contents thereof will be thoroughly protected against moisture, whereby little or no damage is done thereto, even though the bag may be submerged or exposed to water for a considerable length of time.

A further object of the invention is to provide a waterproof bag comprising an outer supporting member which preferably is of non-waterproof material, although not necessarily, and a waterproof inner pillow-like bag supported therein in which the contents of the bag is placed, the open top of the inner bag being hermetically sealed by the application of heat and pressure thereto, after which the open top of the outer supporting member is suitably closed to protect the inner member against rough handling.

A further and more specific object of the invention is to provide a waterproof bag comprising an outer supporting member and an inner pillow-like bag of flexible material which is relatively larger in size than the outer supporting member, whereby when the open top of the inner member is closed and sealed, and the open top of the outer member is closed, all strains and stresses exerted on the walls of the filled bag will be taken up entirely by the walls of the outer

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member, the inner pillow-like bag merely functioning as a means for thoroughly and completely protecting the contents of the bag against moisture and other foreign matter during storage, or when the bag is transported from place to place.

A further object is to provide a bag of the character disclosed comprising an outer supporting member preferably constructed of a suitable textile non-waterproof material having an inner waterproof bag supported therein in which the material to be shipped is placed, the inner waterproof bag being constructed of a relatively thin flexible textile material having its walls thoroughly waterproof by coating or impregnating them with a suitable waterproofing agent, such as vinyl resin, and the body of the inner waterproof bag being relatively larger in size than the outer supporting member, both vertically and horizontally, whereby when the open top of the inner bag is subsequently hermetically sealed by bonding together its top wall portions by the application of heat and pressure thereto, and the open top of the outer supporting member is closed to complete the closing of the filled bag, all strains and stresses exerted on the walls of the sealed bag will be taken up entirely by the walls of the outer supporting member, whereby the bag may be roughly handled during shipment without danger of the walls of the inner waterproof bag breaking down or becoming punctured, as the result of dropping the filled bag from a considerable height, and also whereby the packaged commodity may be shipped through all kinds of weather without any possible danger of becoming damaged as a result of moisture or water, or from other foreign matter with which the sealed bag may come in contact while in transit.

A further object is to provide a bag of the class described comprising an outer supporting member having an inner pillow-like bag of flexible waterproof material supported therein, and a paper strip or web being inserted into the inner waterproof bag to act as an air release for releasing air entrained with the material, when the material is delivered into the bag from a feed auger, which is common practice in the milling industry.

Other objects of the invention reside in the relative sizes of the outer supporting member and the inner waterproof bag; in the unique manner of constructing the inner pillow-like bag whereby it may readily be formed from a blank or web of vinyl resin treated material folded upon itself and having its overlying side edges hermetical-

ly bonded together by the application of heat and pressure thereto, whereby the inner bag body is formed with opposed waterproof seams void of stitching and other separable securing elements; in the provision of means for releasing from the inner bag any air which may be entrained with the material being delivered thereinto, which means may be in the form of a light weight paper bag, or simply a web of any suitable porous material such as paper, folded upon itself and inserted into the inner waterproof bag with its upper ends preferably projecting from the open top of the inner bag, but not necessarily; in the provision of a waterproof bag having great strength and durability; in the provision of a waterproof pillow-like bag made from vinyl resin treated material whereby all body seams and also the top and bottom of the bag body may be closed and sealed by the application of heat and pressure thereto, and which inner bag may be utilized for shipping certain articles without being enclosed within an outer supporting member, and in the simple and inexpensive construction of the bag, as a whole, whereby it may be manufactured in quantity production at small cost.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a perspective view of the completed bag with a portion of the wall of the outer member broken away, to more clearly illustrate the position of the inner waterproof bag therein;

Figure 2 is a cross sectional view on the line 2—2 of Figure 1, showing the relative positions of the outer and inner bag members and the air releasing member;

Figure 3 is a vertical sectional view on the line 3—3 of Figure 1;

Figure 4 is a perspective view showing the upper portion of a filled bag with the marginal edges of the top wall portions of the inner waterproof bag pressed into flatwise relation and bonded together;

Figure 5 is a detail sectional view on the line 5—5 of Figure 4;

Figure 6 is a view similar to Figure 5, but showing the sealed top of the inner waterproof pillow-like bag folded transversely upon itself and tucked into the open end of the outer supporting member;

Figure 7 is a perspective view of a filled bag with its top completely closed and sealed;

Figure 8 is a side view of the outer supporting member only;

Figure 9 is a side view of the inner waterproof bag showing the relatively greater width or size thereof as compared to the outer supporting member;

Figure 10 is a side view of the air releasing member or web;

Figure 11 is a view showing the form of blank or web from which the waterproof bag shown in Figure 9 is constructed;

Figure 12 is a view showing a blank adapted to be folded upon itself along a vertical line after which its side and bottom edges are bonded together by the application of heat and pressure to complete the formation of the inner waterproof bag;

Figure 13 is a view showing a blank adapted to be folded upon itself along two vertical fold lines with the marginal portions of its opposite side edges overlying each other and bonded together by the application of heat and pressure thereto, the marginal edges of the bottom of the blank being similarly bonded together to provide the bottom of the bag;

Figure 14 is a view showing a waterproof bag body composed of two sheets or blanks of flexible material having their marginal side and bottom edges bonded together to provide opposed side and bottom seams;

Figure 15 is a cross sectional view of a bag body, made from blanks such as illustrated in Figures 11 and 14;

Figure 16 is a cross sectional view of an inner waterproof bag formed with a blank such as shown in Figure 12;

Figure 17 is a view showing a partially completed bag body formed from a blank such as illustrated in Figure 13;

Figure 18 is a view showing a completed inner waterproof bag whose body is formed from a blank such as shown in Figures 13 and 17, and having the body seam reinforced by the application of a strip of tape thereto, and its top and bottom closed by folding strips of sealing tape thereover;

Figure 19 is a cross sectional view on the line 19—19 of Figure 18; and

Figure 20 is a detail sectional view on the line 20—20 of Figure 18, showing the top sealing tape folded into closing and sealing relation with the upper marginal edges of the bag top walls.

The novel bag structure herein disclosed is shown comprising an outer supporting member, generally designated by the numeral 2, which is preferably made from a comparatively heavy textile material or fabric which, for all general purposes may be porous, the main purpose of the outer member being to provide strength and durability to resist wear and tear and to provide adequate protection for an inner flexible waterproof bag 3, which cooperates with the outer web member 2 to provide the composite bag shown in Figures 1 and 2.

The outer supporting member 2 may be constructed in any suitable manner and of any desired material having adequate strength and durability to resist wear and tear as a result of shocks and rough handling in transit.

One of the important features of the present invention resides in the construction of the inner pillow-like bag 3. This bag is constructed of a suitable flexible material, preferably textile, but not necessarily, as there may be other kinds of material which may adequately serve the purpose. It is of utmost importance, however, that the walls of the inner bag 3 be thoroughly and completely waterproofed, as its sole purpose is to protect the contents of the bag against moisture and other foreign matter which might have a contaminating effect thereon, should the bag be exposed thereto.

To provide the utmost in protection to the contents of the bag, I propose to utilize a material which has been treated or coated with a suitable waterproofing agent which will not tend to harden the bag material, or become more or less brittle in time, which might destroy its char-

acteristics as a waterproofing agent. Vinyl resins are highly desirable as a waterproofing agent, because they have the inherent characteristics of completely and thoroughly waterproofing the material without tending to stiffen it, and without impairing its flexibility and strength, and I therefore prefer to use vinyl resins as a waterproofing agent, but I do not wish to be so limited.

It is important that the walls of the inner pillow-like bag 3 be relatively pliable and flexible at all times so that its top wall portions may readily be tucked into the open top of the outer supporting member, after the bag has been filled, and also whereby the walls of the inner bag 3 may readily expand against the walls of the outer member to permit the walls of the outer member to take up all strains and stresses exerted upon the bag walls as a result of rough handling or shocks, which may be caused by accidently dropping the filled bag, as will be understood.

To thus relieve the walls of the inner pillow-like bag from severe strains and stresses, the inner bag is made relatively larger than the outer supporting member 2, as will be best noted by reference to Figures 8 and 9. These figures illustrate the comparative sizes of the outer and inner members of a given bag. The outer supporting member is, as previously stated, constructed of a strong, sturdy, non-stretchable, wear resistant material such as fabric, having adequate strength to resist shocks and internal pressures which may be imposed against its walls and seams as a result of rough handling.

As clearly shown in Figures 8 and 9, the width of the body of the pillow-like bag 3 is relatively greater than the width of the outer supporting member 2, and in like manner its overall height is relatively greater than that of the outer supporting member 2. By thus making the inner pillow-like bag 3 relatively larger than the outer supporting member 2, when the inner bag 3 is inserted into the outer supporting member 2, as shown in Figures 1 and 3, longitudinally extending folds may be provided in its upright walls as shown at 4 in Figure 1. These folds may extend the full length of the bag body and are preferably disposed at opposite sides thereof so that when the material is introduced into the inner bag 3, the walls of said bag 3 may readily expand against the walls of the outer supporting member without exerting any strains on the walls of the bag 3, as will readily be understood.

When the inner bag 3 has received a charge, its upper wall portions are preferably stretched outwardly, as shown in Figure 4, to permit the marginal edge portions thereof to be pressed into flatwise relation prior to being closed and sealed by the application of heat and pressure thereto. Suitable heated pressure plates or devices, not shown in the drawings, may be utilized for pressing the marginal edge portions 5 of the inner bag top into flatwise relation, whereby the vinyl resin utilized in the process of waterproofing the walls of the inner bag 3 will partially liquefy or sufficiently soften to cause it to thoroughly and completely bond together the contiguous marginal edge portions 5 of the bag top walls, whereby the bag top is hermetically sealed without the use of separate adhesives or securing elements, as will readily be understood.

The closed bag top is then folded together in any suitable manner and tucked into the open top of the outer supporting member 2, as shown at 6 in Figure 6. When the sealed top of the inner pillow-like bag 3 has been tucked into the

open top of the outer member 2, the top wall portions of the outer supporting member may be closed in any suitable manner as, for example, by pressing them into flatwise relation as shown at 7 in Figure 7, and securing them together by a row of stitches 8, or by suitable staples or other securing elements as may be desired. As hereinbefore stated, the outer supporting member 2 has no utility as a waterproofing agent, but merely as a supporting means for the inner pillow-like bag 3.

Some materials may have a tendency to entrain considerable air with it, when fed into a bag by means of a conventional feed auger, which may interfere with the packaging of the material. Such entrainment of air with the material is objectionable, and to prevent it, I insert into the bag before filling, a web of a more or less porous material such as paper, generally designated by the reference character 10, in Figures 1, 2 and 3. The web 10 may be folded upon itself as shown in Figure 3, with its side edges unattached, whereby its opposed walls may be pressed outwardly against the walls of the inner bag 3, when the inner bag receives a charge of material. Air entrained with the material will pass thru the pores in the web 10, and thence upwardly between the said web and the walls of the inner bag 3 and discharge from the top of the bag, as indicated at 20 in Figures 1 and 2.

The inner waterproof pillow-like bag 3 may be made in different ways. The bag body shown in Figure 9, for example, is constructed from a blank 9 illustrated in Figure 11. This blank is rectangular in configuration and is folded transversely upon itself along a fold line 11. The marginal edge portions 12—12 are then united or bonded to their complementary edge portions 13—13 by applying heat and pressure thereto, whereby said marginal edge portions are hermetically bonded together as shown at 14 in Figure 15, by the inherent nature of the vinyl resin coating with which the material from which the blank has been constructed has been treated.

Figure 12 illustrates another form of blank which is folded upon itself along a fold line 15. Its opposed side edge portions 16—16 are then bonded together as shown at 17 in Figure 16 by the application of heat and pressure thereto. In like manner the contiguous edge portions 18—18 of the lower edge 19 of the blank are similarly bonded together to provide the bottom of the bag body.

The inner flexible pillow-like bag body 3 may also be formed from a blank such as shown in Figure 13. This blank corresponds in shape to the one illustrated in Figure 12, but is folded upon itself along two fold lines 21, whereby its opposed edge portions 22 are brought into overlapping relation, as shown at 23 in Figure 17, and bonded together by the application of heat and pressure. A strip of tape 24, preferably of the same material as that from which the bag body 3 is made, may be applied over the seam formed by the overlapping edge portions 22 as shown in Figures 18 and 19. The tape 24 is hermetically bonded to the marginal edge portions of the walls of the blank by the application of heat and pressure thereto, whereby the body seam is rendered leakproof.

The lower edge portions 25 of the blank of the partially completed bag body shown in Figure 17, may be suitably bonded together to form the bottom of the bag by applying a strip of sealing tape 26 over said bottom edge portions and bonding

it to the bag walls by the application of heat and pressure thereto, as will readily be understood by reference to Figure 18.

To facilitate manufacture, the tapes 22, 24, 26 and 27, shown in Figures 17, 18 and 19, may be made from the same vinyl resin coated material utilized in the manufacture of the bag body 3, whereby the tape will have the same waterproofing characteristics as the body of the bag, and also whereby it may readily be bonded to the walls of the bag by the application of heat and pressure as hereinbefore stated. Other sealing tapes applicable for the purpose may of course be utilized without departing from the scope of the invention.

The open top of the bag may also be hermetically sealed by folding a strip of sealing tape 27 over the flattened bag top walls, as shown in Figures 18 and 20. The sealing tape 27 is also preferably made from a vinyl resin coated material whereby it may readily and quickly be bonded to the bag top walls in seal-tight relation by the application of heat and pressure thereto, thereby to complete the formation of the sealed bag top, as shown in Figure 8.

If desired, the body of the inner waterproof pillow-like bag 3 may also be constructed from two blanks placed one on top of the other, as shown in Figure 14, and having their marginal edge portions 28, 29 and 31 suitably bonded together in leak-tight relation by the application of heat and pressure thereto, as hereinbefore described. The novel waterproof bag herein disclosed has been found to have great utility as a waterproof container for shipping various kinds of commodities such as flour, sugar, salt, and numerous other materials, which must be kept in a dry state prior to use. By making the body of the inner pillow-like bag relatively larger than the body of the outer supporting member 2, the walls of the inner waterproof bag are relieved of all strains and stresses to which the bag walls may be subjected as a result of shocks, when the filled bag is dropped, or thrown from one place to another, as is more or less common practice when loading and unloading such commodities, particularly when used by the Army and Navy where such operations must frequently be done with the utmost speed.

By making the inner pillow-like bag relatively larger in size both horizontally and vertically than the outer supporting member 2, the walls of the inner bag are relieved of all strains and stresses as hereinbefore stated, whereby the waterproofing agent applied to the bag walls to seal the pores therein is not likely to lose its waterproofing characteristics, as will be understood.

The outer supporting member or bag 2 serves only as a means for supporting the inner bag and protecting it against damage. The material from which the outer supporting member is made may be of such a nature that the bag body may slightly enlarge when subjected to internal strains, but the inner pillow-like bag is made sufficiently large to allow for such slight variation in the size of the outer supporting member, whereby the walls of the inner pillow-like bag cannot be subjected to strains and stresses as a result of the composite bag being subjected to shocks and other strains.

The body seams of the outer supporting member, as well as the means utilized for closing the bottom and top thereof, must have adequate strength to resist all strains and stresses exerted against the walls of said outer supporting member from the interior thereof.

While I have herein referred to the walls of the inner pillow-like bag 3 as being waterproofed by the application thereto of a vinyl resin, it is to be understood that other waterproofing agents suitable for the purpose may be utilized without departing from the scope of the invention. Vinyl resins are particularly desirable because of their inherent characteristics of also serving as a bonding agent between the marginal wall portions of the blank, when heat and pressure is applied thereto, and in the subsequent closing of the open top of the bag. Vinyl resins, when in their normal state, are not tacky and the blanks from which the bag bodies are made may therefore be readily handled in the operation of forming the bag bodies. The open tops of the filled bags may also be closed and sealed without the necessity of applying a separate adhesive or paste thereto, as the marginal edge portions of the bag tops may readily be bonded together to seal the open tops thereof by simply applying heat and pressure thereto, as hereinbefore stated.

Thus by the use of vinyl resin treated material for constructing the inner pillow-like bag 3, the operation of forming the bags and subsequently closing the open tops thereof may be greatly expedited, and with the assurance that such bag bodies will be completely waterproof when closed and sealed.

While I have herein described the inner waterproof pillow-like bag 3 as being supported within the outer supporting member 2, in some instances it may be found desirable to ship or transport certain commodities in the waterproof bag 3 without enclosing it within the outer member 2, particularly if the bag is not likely to be subjected to severe shocks and rough handling during shipment.

It will be apparent to those skilled in the art that I have accomplished at least the principal objects of my invention, and it will also be apparent to those skilled in the art that the embodiments herein described may be variously changed and modified without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiments are illustrative only, and that my invention is not limited thereto.

I claim as my invention:

1. A bag structure comprising an outer flexible walled supporting member having an inner independently formed liner therein constructed of a suitable non-porous waterproof material, and a web of porous sheet material bent upon itself and inserted into the liner and extending substantially the height or length of the liner, the walls of said web being arranged to be separated and forced into engagement with apposed walls of the liner by a charge of material delivered into the bag, and the width of said web being substantially equal to the width of the empty bag body said web serving to permit air entrapped in the liner by the charge delivered thereinto to escape from the open bag top by passing through the pores in said web and upwardly between the web and the adjacent walls of the liner.

2. A bag structure comprising an outer flexible walled supporting member having an inner liner therein constructed of a suitable non-porous waterproof material, and an elongated web of

a suitable porous material folded upon itself and having its folded end inserted into the liner adjacent to the bottom thereof with the opposite ends of the web terminating adjacent to the top of the liner, said web being arranged to be forced into engagement with the walls of the liner when a charge of material is delivered into the liner and serving to permit air entrained with the charge during the filling operation to escape through the pores in said web and out of the open bag top.

3. A bag having flexible, non-porous waterproof walls, and means insertable in said bag for preventing spouting of pulverized material therefrom when the bag is filled, said means comprising an elongated flat web of porous sheet material folded transversely upon itself and having its folded end inserted into the empty bag and terminating adjacent to the bottom of the bag body, said folded web extending substantially throughout the height of the bag and the width of said folded web being substantially equal to the width of the empty bag body and having its walls adapted to be forced outwardly against the walls of the bag by a charge of material delivered into the bag, whereby air entrained with the material during the filling operation may escape from the open bag top by passing through the pores in said web and upwardly between said web and the adjacent bag walls.

WILLIAM J. GEIMER.

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428,853	McCaffrey et al.	May 27, 1890
2,220,873	Waters	Nov. 5, 1940
2,127,012	Spangler et al.	Aug. 16, 1938
1,702,593	Pierce	Feb. 19, 1929
2,220,873	Waters	Nov. 5, 1940
1,217,820	Peterson	Feb. 27, 1917
2,214,944	Vogt	Sept. 17, 1940
2,373,340	Rohdin	Apr. 10, 1945