

March 4, 1941.

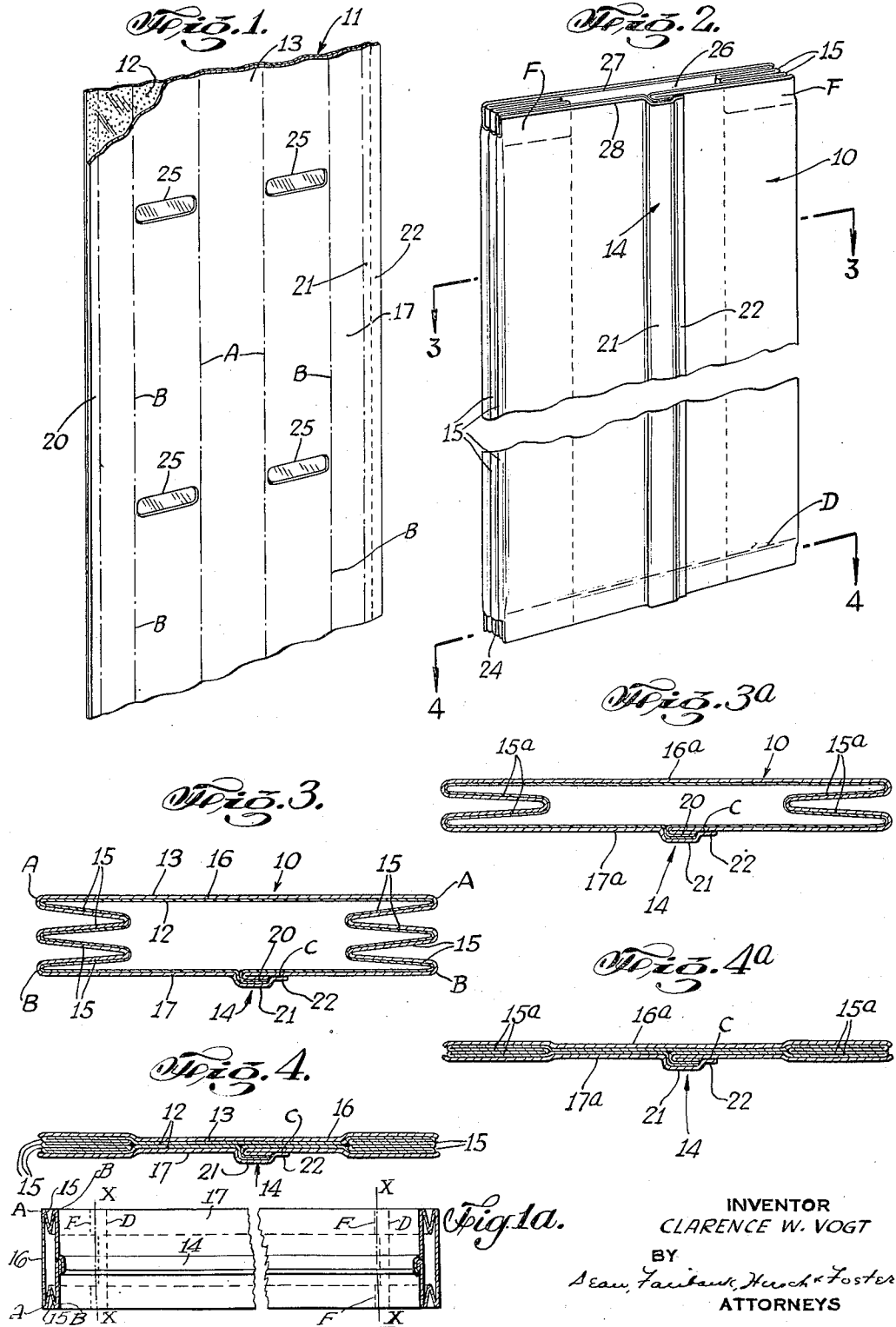
C. W. VOGT

2,234,065

COLLAPSIBLE CONTAINER

Filed April 15, 1936

3 Sheets-Sheet 1



INVENTOR
CLARENCE W. VOGT
BY
Dean, Fairbank, Hurd & Foster
ATTORNEYS

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C. W. VOGT

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3 Sheets-Sheet 2

Fig. 5.

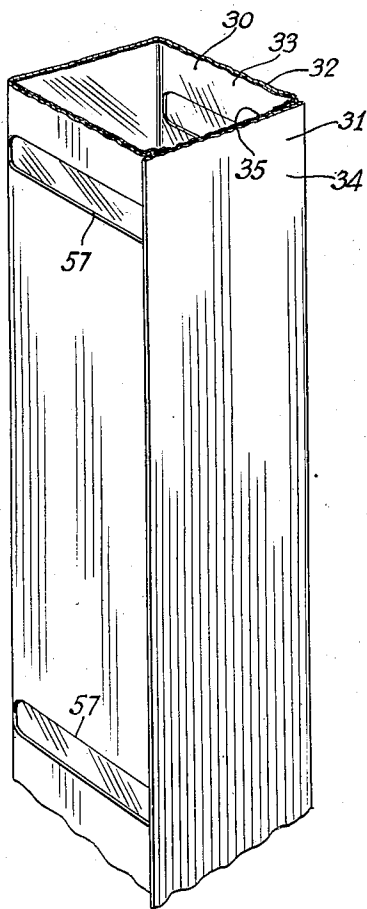


Fig. 6.

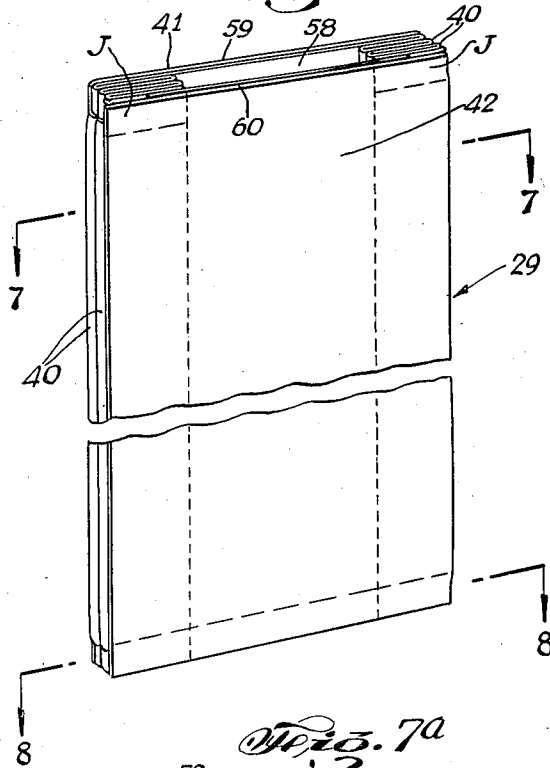


Fig. 7a

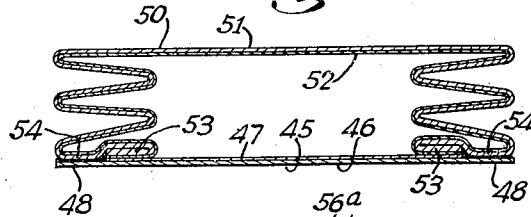


Fig. 7.

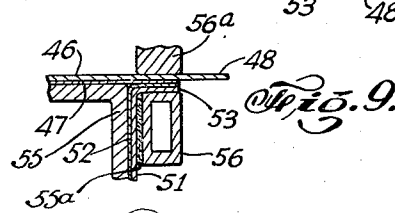
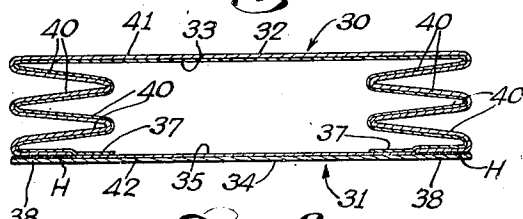


Fig. 8.

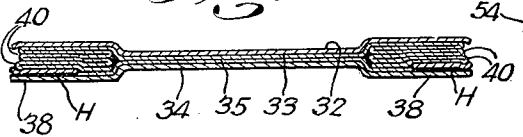
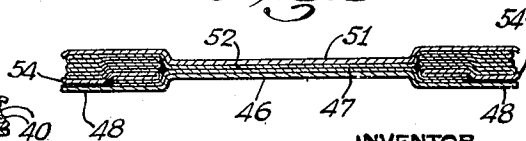


Fig. 8a



INVENTOR
CLARENCE W. VOGT

BY
Dean, Taubert, Hirsch & Foster
ATTORNEYS

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3 Sheets-Sheet 3

Fig. 10.

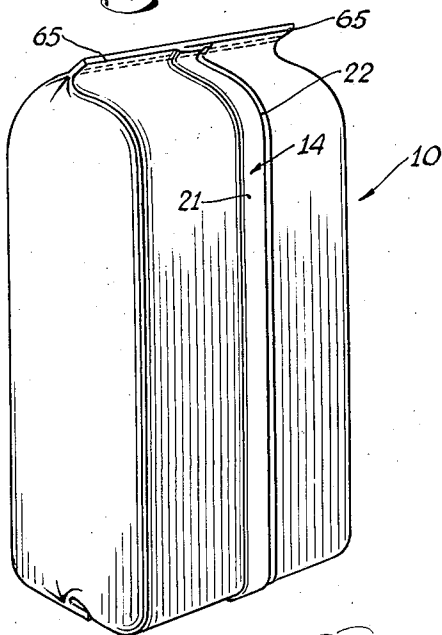


Fig. 12.

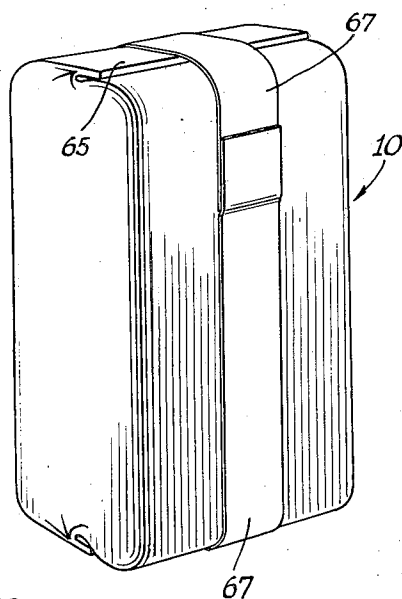


Fig. 13.

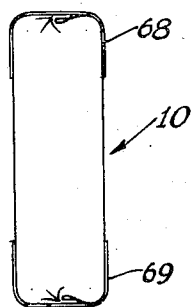


Fig. 14.

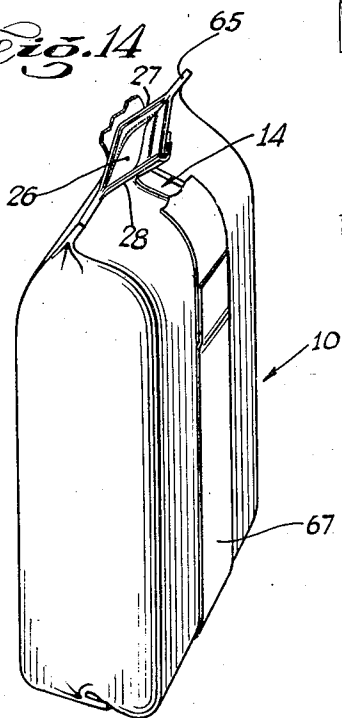
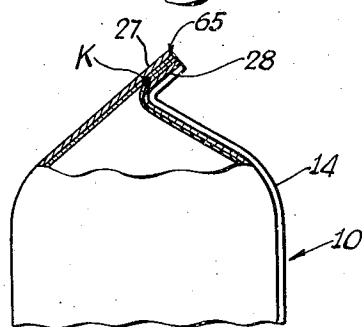


Fig. 11.



INVENTOR
CLARENCE W. VOGT
BY
Dean, Taubert, Hiroch & Foster
ATTORNEYS

UNITED STATES PATENT OFFICE

2,234,065

COLLAPSIBLE CONTAINER

Clarence W. Vogt, New York, N. Y., assignor, by
mesne assignments, to Owens-Illinois Glass
Company, Toledo, Ohio, a corporation of Ohio

Application April 15, 1936, Serial No. 74,424

25 Claims. (Cl. 229—55)

This invention relates to containers which may be made and shipped in flat collapsed form, and which may be readily opened up and employed for the storage, shipment and dispensing of pour-
5 able or spoonable materials such as liquids and solids in powder or granular form. More particularly, the invention relates to that type of container which includes as a primary element an expansible bag made of thin flexible material
10 of such character that the superposed layers thereof may be readily secured or sealed together.

One object of the present invention is to provide a new and improved container of the type referred to.

15 Another object is to provide an expansible bag of the character referred to, having a new and improved type of seam which will more effectively withstand ordinary handling and transportation.

20 A further object is to provide a new and improved outer supporting structure for the flexible bag when said bag is charged.

As a feature of the present invention, the flexible bag is so constructed that when collapsed
25 it comprises a pair of flat walls of substantially equal areas, facing each other and forming a filling and pouring mouth at one end. A portion of this mouth is permanently sealed, and another, preferably the center portion, is unsealed
30 prior to the filling operation and thereafter closed by a seal which may be readily broken without the use of tools, without mutilating the bag, and without in any way contaminating the inner surface of said bag.

35 The present invention is applicable to that type of bag which when collapsed has front and rear flat walls separated by side expansible infolds, and which is closed at its lower end by a transverse seam. Such a bag, when distended,
40 will subject the center portion of the bottom seam to a great deal of stress due to the outward pull at the apex of the side infolds. Furthermore, the wider the side infolds, the more difficult is the outward distension of these infolds while
45 the bag is being charged.

As another feature of the present invention, the bag is so constructed that when collapsed it will comprise a pair of opposed flat wall members separated by narrow infolds on each side,
50 sealed together at the top and bottom of the bag, and when fully expanded it will have a rectangular oblong cross-section, with the infolded sections forming the narrower sides of the rectangle. In such a bag, it may be desirable to
55 have only a single infold on each side.

In case it is desired that the bag have a square cross-section, instead of having a single infold extending from each side, as a feature of the present invention there is provided a multiplicity of narrow infolds extending from each side of the
5 collapsed bag. This feature of having narrow infolds serves to reduce the stress at the center portion of the bottom seam and also causes the bag to be more readily expanded and to receive its full intended charge of material.
10

Various other objects, features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings in
15 which—

Fig. 1 is a perspective view of a portion of a flat laminated continuous sheet prior to being transversely bent into tube shape and prior to being cut into successive sections to form the individual tube sections from which the bag is
20 made.

Fig. 1a is a face view of a portion of a tube from which the individual bags may be made.

Fig. 2 is a perspective view of a collapsed flexible bag made from the laminated sheet shown
25 in Fig. 1, and having a multiplicity of side infolds to form a bag of square cross-section when expanded.

Fig. 3 is a section taken on the line 3—3 of Fig. 2, but showing the bag partially expanded,
30

Fig. 4 is a section taken on the line 4—4 of Fig. 2.

Figs. 3a and 4a are sections similar to those of Figs. 3 and 4, respectively, except that they show a bag having a single infold on each side
35 to form a bag having a rectangular oblong cross-section.

Fig. 5 is a perspective view of a portion of a continuous tube in the process of being fashioned into a bag of another form.
40

Fig. 6 shows a perspective view of another form of collapsed bag fashioned from the tube shown in Fig. 5.

Fig. 7 is a section taken on the line 7—7 of Fig. 6, but showing the bag partially expanded
45 and showing one form of side seams between the laminated sheets.

Fig. 8 is a section taken on the line 8—8 of Fig. 6.
50

Figs. 7a and 8a are sections corresponding to Figs. 7 and 8, respectively, but showing different types of side seams between the two laminated sheets, from those shown in Figs. 7 and 8.

Fig. 9 is a section showing the manner in
55

which the side seams in the construction of Figs. 7a and 8a may be effected,

Fig. 10 is a perspective view of the flexible bag of Fig. 2 after being filled, and after the filling and pouring mouth thereof has been sealed,

Fig. 11 is a side view partly in section of the upper portion of the bag of Fig. 10, and showing the seal at the mouth of the bag,

Fig. 12 is a perspective view showing the bag of Fig. 10 strapped for transportation or storage,

Fig. 13 is a side view of the container of Fig. 10, on a somewhat smaller scale, and showing another form of strapping for said container, and

Fig. 14 shows a perspective view of the container of Fig. 12 after the strap and seal at the mouth have been broken and preparatory to dispensing operations.

It must be understood that the thickness of the various inner layers of the flexible bag is shown in these drawings somewhat exaggerated, and that in practice all of these layers are very thin. This flexible bag is preferably made from a continuous thin strip of flexible material, progressively assembled to form an endwise advanced tube, progressively collapsed, sealed transversely along the successive lengths thereof, and then transversely cut intermediate of the ends of the sealed portion to form a complete hermetically sealed collapsed bag.

The bag may be made of laminated or coated sheet material, the inner layers or coating of which are of such material that when said inner layers are superposed and pressed together under heat, they will weld, vulcanize or hermetically unite. As an example of such material, I may and preferably do employ a type of thin, flexible, transparent, slightly elastic, impervious material sold under the name of "Pliofilm" and made from chlorinated rubber compound. This material has the thermoplastic characteristic of being readily vulcanized or sealed at a temperature of approximately 115° C., so that the overlapping sections thereof may be vulcanized or sealed together by the application of heat and pressure, even though the surfaces have been previously wetted by contact with liquids or moisture-carrying plastic material. Another material which may be satisfactorily used in some constructions and for some material is a moisture-proof cellulosic material of the type sold under the trade name "Heat Sealing Cellophane." As far as some aspects of the invention are concerned, a thin sheet material having a waterproof coating or layer such as that sold under the trade name "Koroseal" may also be used. Also, as far as certain aspects of the invention are concerned, other materials may be used, which may be fabricated into a casing by the use of adhesive or solvents to sealably secure adjacent surfaces of said material together.

The inner layer of the laminated sheet from which the bag is made will hereinafter be referred to as "Pliofilm" although it is to be understood that such a term, for the purpose of this invention, and as far as many aspects of the invention are concerned, may include any material of the type or character hereinbefore referred to.

In Figs. 2 to 4 there is shown a bag 10 fashioned from a flexible laminated sheet 11 (Fig. 1) comprising an inner layer 12 of Pliofilm, and an outer reinforcing paper 13. This outer layer 13 is cemented or otherwise secured to the Pliofilm layer 12 and is made of paper or other similar flexible sheet material which will not be in-

juriously affected by the application of sufficient heat and pressure to effect heating, fusing or vulcanizing of the Pliofilm.

In the process of making the bag 10, the laminated sheet 11 of Fig. 1 is bent transversely over a mandrel of rectangular cross-section, and the opposite longitudinal edges of said sheet are progressively brought together in parallelism to form an endless tube having a longitudinal seam 14. This tube-forming mandrel is so shaped that the laminated sheet 11 will be bent at right-angles along the dot and dash fold lines A shown in Fig. 1 to form one wall of the tube, and at right-angles along the dot and dash fold lines B to form the other walls of said tube and to bring the opposite edges of said sheet together.

After the seam 14 has been formed, the opposed walls of the tube formed between adjacent fold lines A and B are tucked in to form expansible infolds 15 between a flat continuous front wall 16 and a correspondingly flat seamed rear wall 17.

The tube from which the bag 10 of Figs. 2 and 3, is formed, will have a square cross-section when expanded. As a feature of the present invention, instead of providing a single wide infold at each side of the collapsed bag with the resultant abutting or overlapping of the inner edges of these infolds, I provide a multiplicity of narrow infolds 15 on each side of the collapsed bag, two of such infolds on each side being shown. One of the advantages of this construction is that when the bag is charged and thereby expanded, the narrow infolds will permit said bag to be more readily expanded and to receive its full intended charge of material. These narrow infolds have another advantage in that they do not pull at the center of the seal across the bottom of the bag.

As a feature of the present invention, the longitudinal seam 14 of the tube includes an autogenous bond between section of the Pliofilm lining 12, and is so constructed as to overcome any peeling or separating action between said Pliofilm sections due to internal pressure action on said seam. For that purpose, the seal 14 is formed by bringing together the opposite edges of the laminated sheet 11 to form outstanding flanges 20 and 21, and by bonding the Pliofilm linings of said flanges together by heat-sealing. One edge of the outer lamination 13 extends beyond the corresponding edge of the Pliofilm lining 12 to form a marginal extension 22. The flanges 20 and 21 are folded down against the outside surface of the tubing, and the marginal extension 22 is adhesively secured to the outer face of the wall 17 at C. In this manner, the seal 14 not only has an autogenous hermetic bond between the facing juxtaposed Pliofilm linings of the two opposed edges of the sheet, but is substantially reinforced by the adhesive connection referred to, thereby preventing the peeling or separation of the Pliofilm bonded faces due to internal pressures.

After the sheet 11 has been formed into a tube and side portions thereof tucked in to form the infolds 15, the resultant flat tube is heat-sealed transversely at spaced intervals along the tube in accordance with the desired length of the individual bags. Each transversely sealed section includes the permanent side seals F' at the mouth of the bag section and the permanent transverse seal D across the bottom of the adjacent bag section, and the tube is cut transversely across said seal sections on the lines x-x of Fig. 1a to form

the individual bags shown in Figs. 2 to 4. In Fig. 1a, the showing of the laminations of the walls and the preferred number of infolds has been omitted to simplify the showing of the transverse seals and lines of transverse severance of the tube into bags.

Due to the heat-insulating qualities of the outer lamination 13, the sealing heat must be quite substantial to effectively reach the overlapping layers of Pliofilm to be bonded together. In order to facilitate the transmission of heat to the overlapping Pliofilm layers when forming the combined mouth and bottom transverse seals, the paper lining 13 is provided with a pair of slots 25 where the transverse seal is to be effected, these slots extending respectively in the infoldable portions of the sheet 11 between the fold lines A and B, so that when the tube is collapsed, the infolded sections 15 at said sealable section will have no paper backing 13, and will consist merely of a series of overlapping contiguous Pliofilm layers as shown in Figs. 2 and 4. After the tube has been collapsed, and the combined mouth and bottom transverse seals formed, the tube is cut transversely at the seal sections midway between the upper and lower edges of the slots 25, so that the paper backing will be absent from the infolded sections at the outer transverse ends of the upper and bottom seals. The resultant bag 10 formed from the operation will have a bottom transverse seal in which the infolds 15 comprising a series of overlapping continuous Pliofilm layers are autogenously bonded together and the Pliofilm layers along the front and rear walls 16 and 17 between the inner ends of these infolds will be similarly bonded together between the bottom of the seal and the top edge D thereof. The absence of the paper lining 13 in the infolded section of the tube will permit the autogenous bonding of the Pliofilm layers without the use of additional adhesive and will form a substantially strong seal along the bottom section of said bag. The lower edge 24 of the paper lining 13 in the infolds 15 extends below the top edge D of the bottom transverse seal and the inner overlapping Pliofilm surfaces of the infolds 15 between said seal edge D and said lower paper edge 24 are autogenously bonded together in pairs.

The infolded sections at the upper end of the bag 10 are provided with permanent seals F and the central portion is unsealed prior to the filling operation to form a filling opening 26 bounded by a pair of parallel lips 27 and 28. The paper lining at the infolded sections of the side seals F is slotted out in a manner similar to that of the lower seam so that the overlapping Pliofilm layers will be contiguous to each other and autogenously bonded together.

Figs. 3a and 4a are sections corresponding to Figs. 3 and 4, and show the same general type of bag with the same general type of bottom and top permanent seals, except that instead of the bag having a square cross-section when expanded as in Figs. 3 and 4, it has a rectangular oblong cross-section. With this shape of bag, it is not necessary to provide a multiplicity of infolds on each side of the bag, one narrow infold 15a being all that is necessary on each side between the front wall 16a and the rear wall 17a.

In Figs. 5 to 8 is shown a form of bag 29 made from two laminated sheets 30 and 31 secured side to side by a new and improved type of seal. In this construction, the sheet 30 has an outer reinforcing lamination 32 of paper or the like, and

an inner Pliofilm lining 33, and the other laminated sheet 31 has a corresponding outer reinforcing lamination 34 and an inner Pliofilm lining 35. The sheet 30 is wider than the sheet 31 and has its Pliofilm lining 33 extending beyond the corresponding edges of the outer lamination 32 to form marginal extensions 37. These marginal extensions 37 are heat-sealed to the side edges of the Pliofilm lining 35.

The sheet 31 has its outer lamination 34 extending transversely beyond the Pliofilm lining 35 to form marginal extensions 38 which are glued or cemented at H directly to the side edges of the outer lamination 32 of the other sheet 30. By this construction, the autogenous bond between the marginal Pliofilm extensions 37 and the Pliofilm lining 35 forms hermetic seals and the adhesive connection between the marginal paper extensions 38 and the paper 32 reinforces said hermetic seals to prevent the breaking away or peeling apart of the bonded Pliofilm linings.

After the two laminated sheets 30 and 31 have been secured together to form an endless tube as shown in Fig. 5, the side portions of the tube are tucked in to form expandible infolds 40 between a front wall 41 and a rear wall 42. In this construction, a multiplicity of narrow infolds 40 are provided on each side to form a bag having a square cross-section when expanded.

In the construction of Fig. 7, a pressure member is required in the interior of the tube to press on the marginal Pliofilm extensions 37 to form the autogenous weld. The use of such a member is disadvantageous since it gets heated by the heating member of the sealing device and may stick to the thermoplastic Pliofilm extension 37. In Fig. 7a is shown a form of side seal which eliminates the use of an inside sealing device, the autogenous sealing of the overlapping Pliofilm layers being effected from the outside of the tube. In that construction, the narrower laminated sheet 45 has its outside reinforcing sheet 46 extending beyond the sides of the Pliofilm lining 47 to form marginal extensions 48. The wider laminated sheet 50 comprises an outer reinforcing sheet 51 and an inner Pliofilm layer 52 of the same width.

The edges of the laminated sheet 50 are bent outwardly to form flanges 53 and the Pliofilm linings of these flanges are heat-sealed respectively to the sides of the Pliofilm lining 47. The portions of the laminated sheet 50 adjacent to the flanges 53 are reversely bent upon said flanges as shown, and the portions 54 beyond the pleats formed by said reverse folding are adhesively secured respectively to the marginal extensions 48. This construction has the advantage of forming a good strong substantial seal between the two laminated sheets 45 and 50. Furthermore, this seal has the highly desirable advantage of being constructible without the use of a sealing device in the interior of the tube. This advantage is obvious from the process step shown in Fig. 9, in which a heat-sealing shoe 56 engages the flange 53 on the outside of the tube to press and heat-seal the Pliofilm lining of said flange against the Pliofilm lining 47. During this heat-sealing process, the tube is held in rectangular form by an inside mandrel 55, and the sealing shoe 56 is opposed by a backing shoe 56a. It must be understood that Fig. 9 is somewhat diagrammatic and that either or both shoes 56 and 56a may be heated and may be either stationary

with relation to the tube, or rotatable. The heating shoe 56 may be provided with a pad 55a of asbestos or similar heat insulated material so as to protect the sides of the tube against the heating action of said shoe.

In Fig. 8 is shown a bottom seal for the bag 29 having the side seams shown in Fig. 7. In this construction, the laminated sheet 30 is provided with a series of slots 57 (Fig. 5) corresponding to the slots 25 in Fig. 1, and serving to eliminate the outer lamination at the top and bottom seals so that the resultant contiguous overlapping Pliofilm layers of the infolded sections 40 may be readily autogenously bonded together.

In Fig. 8a is shown a section of the bottom seal in a type of bag having the seam of Fig. 7a. This type of seal also is effected by the elimination of the outer layer in the infolded sections of the bag, so that the overlapping Pliofilm layers will be contiguous and autogenously bonded together.

The upper end of the bag 29 is provided at J with permanent side seals which correspond to the bottom seal, and which have the outer paper laminations in the infolded sections of the bag eliminated as already described. These side seals J form therebetween a central opening 58 bounded by a pair of parallel lips 59 and 60.

The seam constructions of Figs. 5 to 8, 7a and 8a are shown applied to a bag in which the filling and pouring lips are formed between a pair of opposed walls of equal size and shape. It must be understood, however, that these seam constructions may be applied to a type of bag formed with a pleat adapted to be cut along its outer edge to form parallel lips as shown in my copending application Serial No. 43,995, filed October 8, 1935.

In Fig. 10 is shown a bag of the type shown in Fig. 2 after it has been filled. This type of bag is self-sustaining and may be used either for liquids or for pourable solids such as coffee, flour, sugar and the like. The package shown in Fig. 10 may be formed by progressively forming the tube, delivering separate and successive charges of dispensable liquid into the tube, sealing together opposite sides of the tube at spaced points to form successive compartments each having a separate charge, and severing the tube intermediate of the opposite sides of the sealed areas to form separate packages as shown in my copending application Serial No. 49,955, filed November 15, 1935. However, the bag may be preformed as shown in Fig. 2 and may be shipped that way to the filler with the opening 26 unsealed. In the case of a preformed bag, the filler fills the bag 10 of Fig. 2 through the opening 26 until it is expanded and fully charged in the condition shown in Fig. 10. In that condition, the upper portion of the bag beyond the bottoms of the seals F will form a flap 65. After the bag has been filled as indicated, the parallel lips 27 and 28 are heat-sealed at K along a narrow strip, preferably while the flap 65 is inclined as shown in Fig. 11, so that the inner Pliofilm layers of said lips will be autogenously bonded together along said narrow strip. This heat-sealing is easily effected by means of a heated pressure member having a knife or V-shaped edge adapted to press along the desired predetermined seal line K on one side of the flap 65, and a platen on the other side of the flap serving as a backing for said heated member. The straightening of the flap 65 into upward position from its sealed position shown in Fig. 11 will set

up stresses in the seal at K, thereby facilitating the breaking of said seal.

After the bag has been sealed as shown in Fig. 11, it may be packed for storage and/or transportation in accordance with the contents thereof. For instance, the packaging of the bag as shown in Figs. 12 to 14 is particularly adaptable for pourable solid materials such as coffee, sugar and the like, and is shown applied to the bag 10 of Fig. 2. It must be understood, however, that any other bag of that general type such as that shown in Fig. 6, may be similarly packaged.

The packaging of the bag shown in Fig. 12 is effected by means of an adhesive tape 67 made of paper or cloth and strapped around the entire periphery of the bag, with the ends of the tape overlapping and adhesively secured together. In cases where a cloth tape is used, this tape is adhesively secured to said bag around its entire periphery and may be removed therefrom by peeling it off said bag or cutting it near the outer edge of the flap 65. In case the tape 67 is made of paper, the portion of the tape extending around the upper flap 65 is not secured to said flap so that a finger may be inserted underneath this portion to break said tape and bring the flap 65 into upstanding position shown in Fig. 14.

The tape 67 serves to firmly hold the head space portion of the bag and the end flaps of said bag against the bulk ends to form a compact package.

In the form shown in Fig. 13 there are provided two adhesive tape sections 68 and 69 secured across the upper and lower ends of the bag respectively, the upper tape section being easily removable or breakable to bring the flap 65 into an upstanding position.

After the flap 65 is brought into upstanding position, the opposed lips of the openings 27 and 28 may be grasped at their outer ends and pulled apart to break the seal K and form a pouring spout. The seal K may be sufficiently weak so that the impact of the material in the bag against the seal K when said bag is inverted into pouring position, will cause said seal to break and the two lips 27 and 28 to separate.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A flexible bag including a pair of opposed walls having their terminal portions at one end directly superposed in parallel planes, the sections of said superposed portions adjacent to opposite edges of said walls and extending transversely of the bag, being directly sealed over a comparatively wide area lengthwise of the bag to form a strong seal, and the intermediate sections of said portions being secured together 60 transversely of said bag over a very much narrower area lengthwise of the bag, to form a weaker and more readily breakable seal.

2. A flexible bag having a pair of opposed panels with their terminal portions at one end directly superposed in parallel planes and directly sealed together along a comparatively wide area extending inwardly from opposite edges to form a strong seal, and having the intermediate portions secured together over a very much narrower area to form a weaker and more readily breakable seal.

3. A bag having a pair of opposed walls of substantially equal size and shape and a pair of connecting walls infolded between said first-

mentioned pair, the folds of one connecting wall being spaced from the folds of the other, and all of said walls at one end of said bag being sealed together across the width of the infolded walls to form a comparatively strong seal, and the central portions of said opposed walls between said infolded walls being secured together with a weaker and more readily breakable seal.

4. A flat distensible bag having a pair of opposed side walls and a pair of connecting walls infolded between said first-mentioned pair, the folds of one connecting wall being spaced from the folds of the other, and all of said walls at one end of said bag being permanently sealed together in direct surface contact from the edges of the side walls across the width of the infolded walls, and the central portions of said side walls between said infolded walls being detachably secured together.

5. A flat bag having a pair of side panels of substantially equal width and a pair of connecting walls infolded between said panels, the folds of the connecting walls being spaced laterally from the medial lines of the panels, said infolded walls and said panels being sealed together at one end across the width of the infolded walls to form a comparatively strong seal, and the portions of said opposed walls between said infolded walls being secured together at said end with a readily breakable seal.

6. A bag having a pair of opposed panels connected together by infolded side walls, each folded portion extending less than half way across the panels, the panels and infolded walls being sealed together across the width of the panels at one end to close the bottom of the bag, and the panels and infolded walls being sealed together across the width of the infolded walls at the top of the bag, the juxtaposed portions of the panels between the infolded portions being unattached to each other, and separable to form a filling opening of less width than the width of the panels.

7. A laminated sheet for forming a tube, one layer of said laminated sheet having a series of pairs of slots spaced lengthwise of said sheet, the slots of each pair being arranged transversely of the sheet and in alignment, whereby upon folding the sheet to form a tube with the slotted layer on the outside, the portions bearing the slots may be infolded and the portions of the inner layer exposed through said slots directly sealed together.

8. A laminated sheet for forming a tube, comprising a layer of paper and a layer of thermoplastic material, said paper layer having a series of pairs of slots spaced lengthwise of said sheet, the slots of each pair being arranged transversely of the sheet and in alignment, whereby upon folding the sheet to form a tube with the paper layer on the outside, the portions bearing the slots may be infolded and the portions of the outer surfaces of the thermoplastic layer exposed through said slots may be directly sealed together.

9. A sheet for forming a tube, and having a series of pairs of slots spaced lengthwise of said sheet, the slots of each pair being arranged transversely of the sheet and in alignment, whereby upon folding the sheet to form a tube the portions bearing the slots may be folded inwardly transversely of the slots and thermoplastic material covering said slots for connecting the folded portions together.

10. A tube for forming bags and having its

wall formed of a laminated sheet, the inner layer being of thermoplastic material, and the outer layer having two rows of transversely extending slots, whereby upon infolding longitudinally extending opposite walls of the tube bearing said slots, the opposite walls of the infolded sections may be directly sealed together through said slots.

11. A tube for forming bags formed of a laminated sheet having the inner layer of sealing material, the outer layer having two rows of transversely extending slots, whereby upon infolding longitudinally extending opposite walls of the tube bearing said slots, the opposite walls of the infolded sections may be directly sealed together through said slots.

12. A tube for forming bags having its wall formed of an inner layer of thermoplastic material and an outer layer having two rows of transversely extending slots, whereby upon infolding longitudinally extending opposite walls of the tube bearing said slots, the opposite walls of the infolded sections may be directly sealed together by said thermoplastic material through said slots.

13. A collapsed tube having flat opposed panels and infolded connecting walls, each extending inwardly from the edges of said panels to less than half the width of the panels, said panels and connecting walls being sealed together transversely of the tube in narrow sections spaced apart lengthwise of the tube, said sections having areas at one edge extending lengthwise of the tube, whereby the tube may be cut transversely through said extended areas to form bags closed at one end and partially closed at the other.

14. A collapsed tube having flat opposed panels and infolded connecting walls, said panels and connecting walls being sealed together transversely of the tube along narrow areas spaced apart lengthwise of the tube, said areas being wider across said infolded walls than between them, whereby the tube may be cut transversely across said wider areas to form bags.

15. A flat distensible bag having a pair of opposed side walls and a pair of connecting walls infolded between said first-mentioned pair, the folds of one connecting wall being spaced from the folds of the other, each of said walls being formed of an inner layer of heat-sealable material and an outer layer of paper, the outer paper layer of the infolded walls terminating short of the ends of the bag and the outer paper layer of the side walls extending the full length of the bag, the inner layers of said opposed side walls at one end of said bag being permanently sealed together and to said infolded walls, across the entire width of said side walls and the inner layer of all of said walls at the other end of the bag being permanently sealed together in direct surface contact across the width of the infolded sections, the central portions of said side walls at said last-mentioned end and between said infolded walls being separable to provide a filling opening.

16. A flat distensible bag having a pair of opposed side walls and a pair of connecting walls infolded between said first-mentioned pair, the infolds of one connecting wall being spaced from the infolds of the other, each of said walls being formed with an inner layer of heat-sealable material and an outer protecting layer, said protecting layers of said side walls extending to one end of the latter and the protecting layers of said infolded walls terminating short of said end

to permit direct contact between the inner layers of opposite portions of the infolded walls at said end, the inner layers of said infolded walls being sealed together and sealed to the inner layers of said opposed side walls at said end, and the inner layers of said opposed side walls being separable between the sealed areas to provide a filling opening.

17. A flat distensible bag closed at the bottom and having a filling opening at the top, said bag being formed of a pair of opposed side walls and a pair of connecting walls infolded between said first-mentioned pair, the infolds of one connecting wall being spaced from the folds of the other, each of said walls being formed with an inner layer of heat-sealable material and an outer protecting layer, said protecting layer extending the full length of said side walls and being cut away adjacent to opposite ends of said infolded walls to permit direct contact between opposite portions of the infolded walls at the ends, the top of said bag having said infolded walls sealed together and sealed to said opposed side walls at said cut-away areas, and said opposed side walls separable between the sealed areas to provide said filling opening.

18. A flat distensible bag having a pair of opposed side walls and a pair of connecting walls infolded between said first-mentioned pair, the infolds of one connecting wall being spaced from the folds of the other, all of said walls being formed with an inner layer of heat-sealable material and an outer protecting layer, said protecting layer extending the full length of said side walls and being cut away adjacent to one of the ends of said infolded walls to permit direct sealing contact between opposite portions of the infolded walls.

19. A bag formed of laminated sheet material, the inner lamination being of heat-sealable material and the outer lamination being of non-fusible reinforcing and protecting material, said laminations being sealed together, said bag having a lengthwise seam formed of two portions of said laminated sheet material, one portion having the edges of the outer and inner layers in registry and the other portion having the outer layer provided with a marginal extension beyond the edge of the inner layer, the inner layers of said portions being secured together with their edges in registry, and said marginal extension being secured to the outer layer of the other portion beyond the sealed areas of the inner layers.

20. A bag formed of laminated sheet material, the inner lamination being of heat-sealable material and the outer lamination being of non-fusible reinforcing and protecting material, said laminations being sealed together, said bag having a lengthwise seam formed of two portions of said laminated sheet material, one portion having the edges of the outer and inner layers in registry and the other portion having the outer layer provided with a marginal extension beyond the edge of the inner layer, the inner layers of said portions being secured together, and said marginal extension being secured to the outer layer of the other portion beyond the sealed areas of the inner layers.

21. A bag comprising a tube of heat-sealable material having a pair of opposed side walls and

intermediate walls infolded between said side walls and extending lengthwise of the tube, all of said walls being heat-sealed together at a sealing area extending across one end of the bag and directly uniting all of the superposed layers of material forming said end of the bag, and a protecting layer of sheet material forming a covering for said walls and cut away at said sealed end of the bag across the infolded sides thereof to permit direct sealing contact between the opposite portions of the infolded walls.

22. A laminated bag of sheet material comprising an inner lamination of heat-sealable material and an outer layer or lamination adhesively secured to said inner lamination and forming a protective coating therefor, said bag comprising opposed side walls and infolded walls connecting said side walls, all of said walls being heat-sealed together at one end of the bag, the infolded portions of said protecting layer being cut away at the sealing area to permit direct sealing contact between the opposite portions of the infolded walls of heat-sealing material.

23. The method of forming a bag which includes forming openings in non-heat-sealable sheet material, assembling said sheet material with heat sealable sheet material covering said openings, forming a tube of the superposed sheets, the first mentioned material being on the outside, infolding opposite sides of the tube to form longitudinally extending pleats between opposite panels with said openings extending transversely of the infolded portions, sealing said panels and said infolded portions together through said openings and across said panels, and cutting said tube transversely adjacent to the sealed areas.

24. The method of forming a bag which includes forming a collapsed tube with opposite panels and infolded connecting side walls, said tube being formed of laminated sheet material including an inner sheet of heat-sealable material and an outer sheet of non-fusible reinforcing and protecting material, said outer sheet having slots extending transversely of the infolded side walls, and sealing said infolded walls together and to said panels by heat and pressure applied through one of said panels in the areas registering with said slots and across the panel.

25. The method of forming a bag which includes forming a collapsed tube with opposite panels and infolded connecting side walls, said tube being formed of laminated sheet material including an inner sheet of heat-sealable material and an outer sheet of non-fusible reinforcing and protecting material, said outer sheet having a plurality of pairs of slots spaced apart lengthwise of said tube and extending transversely of the infolded side walls, sealing all of the superposed layers of said heat-sealable material together across the width of one of said panels and intersecting one pair of slots, and cutting the tube transversely into sections along lines adjacent to said last mentioned slots to form bags, said bags being sealable at the opposite ends by the application of heat and pressure to one of the panels and across a line transversely of the panel and intersecting another pair of said slots.

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