

Aug. 6, 1957

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2,801,577

MOISTURE RESISTANT CARTON

Filed May 3, 1954

3 Sheets-Sheet 1

Fig. 1.

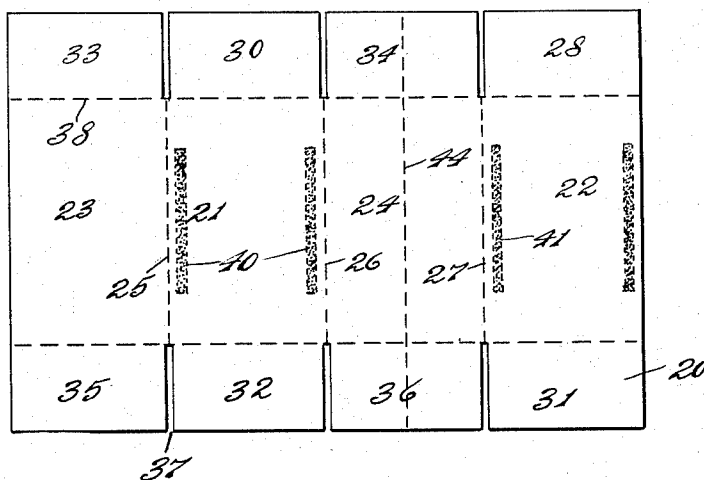
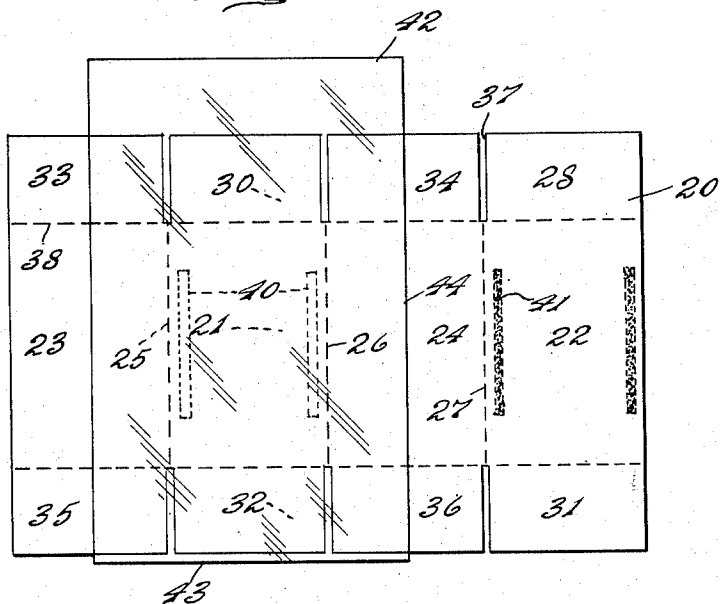
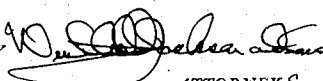


Fig. 2.



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Fig. 3.

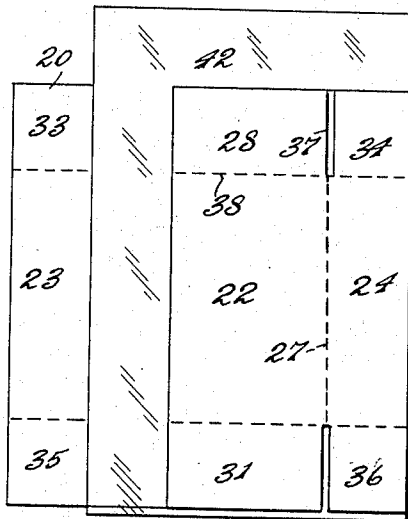


Fig. 4.

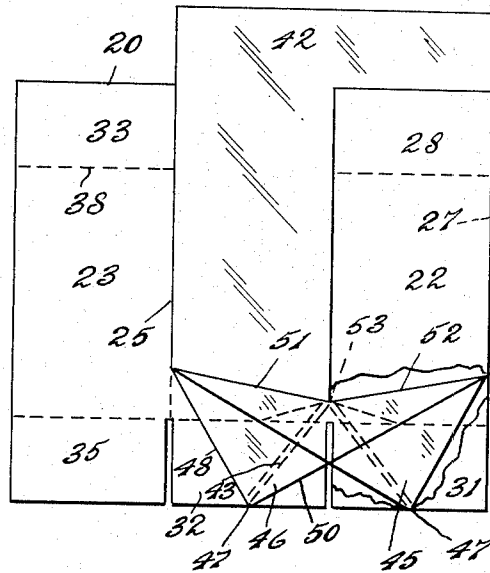


Fig. 6.

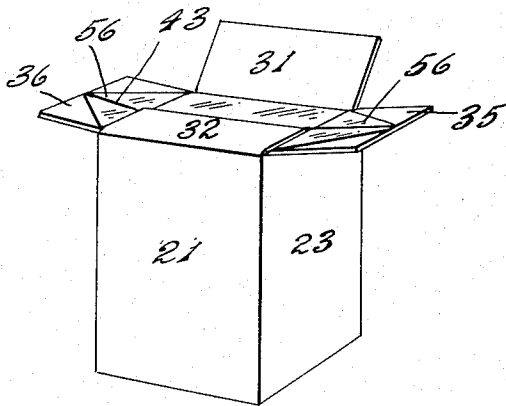
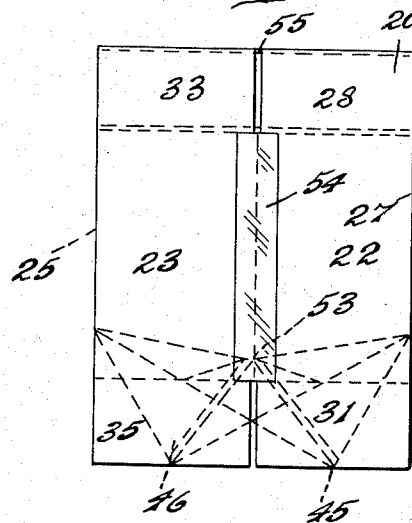


Fig. 5.



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Fig. 7.

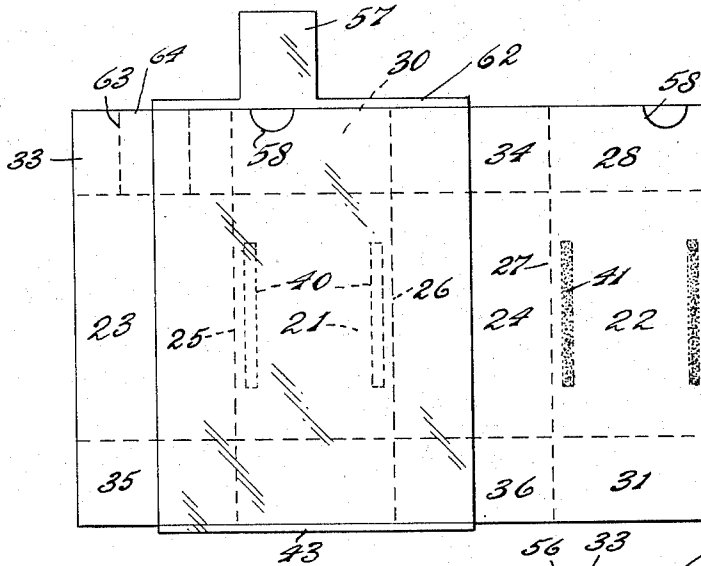


Fig. 9.

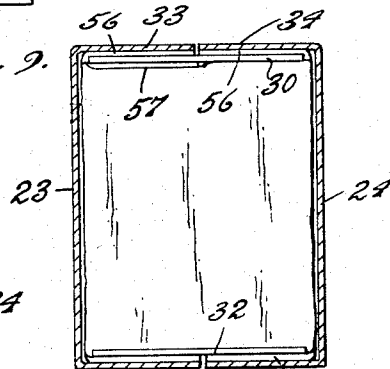


Fig. 8.

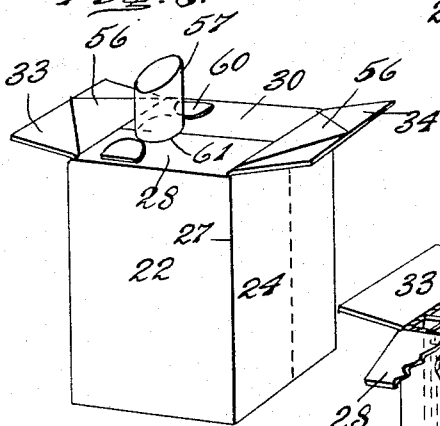
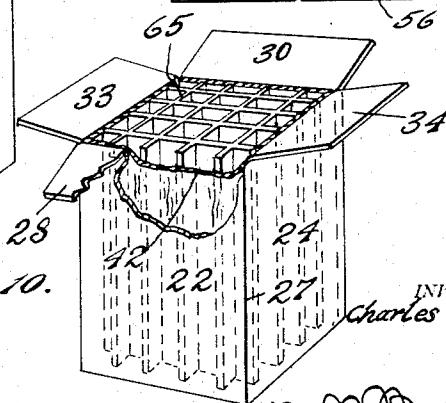


Fig. 10.



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MOISTURE RESISTANT CARTON

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3 Claims. (Cl. 93—36.01)

The present invention relates to sift-proof or liquid tight cartons, and particularly those which are capable of receiving and retaining hygroscopic products and liquids or materials which are initially liquid at the time that they are charged.

A purpose of the invention is to produce a flat folded sift-proof or liquid tight carton having increased strength when erected.

A further purpose is to avoid waste of material packed in sift-proof or liquid tight cartons by avoiding exposed recesses which will receive and retain substantial quantities of the material contained in the liquid tight carton, and especially by stretching the end of an interior envelope flat and taut and squeezing any pockets flat and rendering them inaccessible to the content of the container.

A further purpose is to provide a liquid tight container which is hinged at the corners and erects by pivoting about the corners, but which automatically pulls the interior liquid tight envelope open and forms it into a shape convenient for filling.

A further purpose is to fold diagonal end flaps of one or both ends of the envelope around the sides of side flaps of the carton and thus stretch the envelope taut across the inside of the side flaps and secure triangular end flaps of the envelope in the space between the side flaps and the end flaps of the carton.

A further purpose is to provide a desirably integral spout extension on one end of the envelope and to make the spout extension accessible through flap openings.

A further purpose is to make the spout extension accessible even when the container is partially emptied.

A further purpose is to break up the solidified contents of a liquid tight container into units and support the container by a grid inserted in the top after or before filling.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate a few only of the numerous embodiments in which my invention may appear, selecting the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figures 1 to 6 inclusive are stepwise illustrations of the construction of the liquid tight carton of the invention in a simple form.

Figure 1 shows the glued blank in plan.

Figure 2 illustrates the envelope glued to one side of the blank, also in plan.

Figure 3 is a plan view showing the blank folded at the middle of one end panel and gluing a side panel to the opposite side of the envelope.

Figure 4 shows the partially completed carton of Figure 3 which has been refolded about a corner, and illustrates the preferred folding of the sealed end of the envelope.

Figure 5 shows the completed flat carton, with the opposite end panel folded over the envelope and joined to the side panel next to it.

Figure 6 shows the erected carton, in process of forming the bottom.

Figure 7 illustrates in plan a modified blank in the position of Figure 2, with the envelope partially inserted, and a spout extension or a smaller diameter tube provided at what is to be the top of the envelope.

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Figure 8 is a perspective showing the erected carton constructed from the blank and envelope of Figure 7 according to the principles of Figures 1 to 6, with the spout extension carried through the side flaps of the carton.

Figure 9 is a central vertical section of the completed carton of Figure 8 showing the content in place.

Figure 10 is a fragmentary perspective showing the insertion of a grid in the open end of the carton after or before the contents have been introduced, in order to separate the contents and brace the top of the carton against overhead load.

Describing in illustration but not in limitation and referring to the drawings:

There is a substantial need, particularly in the chemical and food industry, for liquid tight cartons which will permit the shipment of powders and granular materials which are hygroscopic, and also of liquids, pastes, and materials which should be charged into the container in liquid or paste form and will subsequently solidify. In many cases it is undesirable to employ bottles or drums because of container storage space required prior to filling, because of freight cost, because of the expense of the container, because of the fragile quality of bottles and because of the necessity of returning drums. It is decidedly preferable in many instances to ship a material which requires a liquid tight container in a container which can be thrown away after use, and which need not be stored, reshipped, cleaned and refilled.

The present invention is designed primarily to provide a liquid tight carton for chemical, food and other industries, which can be shipped and stored flat, and then erected at the point of filling, filled, shipped to the destination and then stored until the material is to be used.

One of the difficulties in liquid tight cartons in the prior art, as for example that shown in Bergstein U. S. Patent 2,250,249, granted July 22, 1941, for Container, is the relative weakness of the containers due to the fact that they have in many instances been hinged about fold lines at the middle of both ends, thus tending to reduce the crushing strength of the erected container. A further difficulty in prior art liquid tight cartons has been that the interior envelope has included recesses into which the content of a paste or the like will deposit, but from which it is impractical to remove, thus frequently involving waste of material. Another difficulty in the prior art practice has been that filling and sealing has often been troublesome and it has likewise been troublesome to discharge part of the contents and then close the container.

In accordance with the present invention, the end formation of the envelope is straight and taut, free from bulging recesses into which quantities of the content can be deposited, and from which it will be difficult for the material to be withdrawn.

Furthermore the liquid tight carton of the present invention is much stronger than prior art liquid tight cartons, and in particular it is free from mid-panel folds except at one end.

Furthermore the carton of the invention is much easier to fill, and likewise will permit partial discharge of materials which will pour, followed by resealing.

The invention is applicable to the transportation and storage of relatively small or relatively large quantities of liquids, slurries, pastes, materials which solidify from liquid or paste form, powders and granular materials which should be protected from moisture, and materials which under certain conditions tend to exude or discharge liquid, insofar as the content does not attack or dissolve the material of the envelope.

In accordance with the invention, I employ a carton blank 20 which may be of fiberboard, or any suitable

sheet material, preferably corrugated fiberboard, and divided into side panels 21 and 22 and end panels 23 and 24 separated by corner fold lines 25, 26 and 27. At opposite ends the respective side panels have side flaps 28, 30, 31 and 32 preferably of the type which extend half way across the end of the erected carton, and likewise the end panels have end flaps 33, 34, 35 and 36 which likewise are of the type which preferably extend half way across the erected end.

It will of course be understood that in a square carton of the character with which we are here specially concerned the designation of particular panels and flaps as side or end is purely arbitrary, and used for convenience, but where the carton is rectangular but not square in cross section this will not be the case.

The side and end flaps are of course separated from one another by cut lines 37 which extend in as far as the panels. The flaps also have flap fold lines 38 across the ends of the panels.

After the blank of Figure 1 is formed, glue is applied to side panel 21 and to side panel 22 in a pattern as shown in lines 40 and 41. However, this glue application can take the form of bars, spots or solid areas in any one of many patterns so long as it is confined to panels 21 and 22. The glue should also permit some freedom of the envelope with respect to the side panels at the top and bottom, so that the envelope will not be prevented from folding as shown in Figure 4, and will not be pulled out sharply at the top and bottom corners as the carton is erected. The envelope 42 consists of a flattened or gusseted tube which at the present stage is open at the top and heat sealed at 43 adjacent the bottom edge. The envelope material may be any one of a wide variety, suitable materials being sheet polyethylene, polyvinyl chloride, polyvinylidene chloride, rubber, synthetic rubber, or the like. It will in some cases be possible to employ moisture resistant paper such as wax paper, glassine paper, cellophane, and the like, although the elastomers are preferred.

The envelope 42 is pressed against the glue lines 40 on panel 21, thus gluing one side of the envelope to the side panel 21. The envelope overlaps each end panel 23 and 24 approximately half way and overlaps the flaps at the bottom fully and preferably extends a little beyond, while it overlaps the flaps at the top and preferably extends somewhat beyond the same.

In the next step as shown in Figure 3, the blank is folded about a fold line 44 which extends lengthwise about the middle of end panel 24 and along the corresponding end flaps 34 and 36. This fold line is merely used in manufacturing the carton and is not employed subsequently. This permits folding over side panel 22 opposite side panel 21 and causing glue lines 41 to unite to the opposite side of the envelope. The glue is then allowed to set. The important feature of this step is to obtain an opposed relation between the gluing attachment points to the envelope on the side panels.

After the gluing has been completed in Figure 3, the lateral folds of the envelope and of the carton are changed. This is accomplished by folding the carton blank on fold line 27, and this automatically causes the envelope to refold along its sides on new fold lines which correspond to fold lines 25 and 27 of the blank. The formation of the bottom of the envelope is then automatically changed to conform to a pattern as shown in Figure 4 whereby the two flutes 45 and 46 which have oppositely disposed peaks 47 and in each instance a short diagonal fold line 48 and a long diagonal fold line 50 and a pair of intermediate fold lines 51 and 52 which join with the opposite flute. The heat seal 43 now extends across the flutes in a diagonal converging direction to a central apex 53.

In the next step the end panel 23 is folded over about fold line 25 on top of the envelope 42, and the end panel 23 is joined to the side panel 22 as shown in Figure 5 suitably by a tape hinge 54. It will of course be understood that it is immaterial from the standpoint of the

present invention whether a separate hinge or a lapped panel or another form of fastening is used at this corner.

Also desirably the upper end of the envelope is folded back and tucked inside the upper end and side flaps at 55 in Figure 5.

The product of Figure 5 is a completed carton ready for shipment to the point of filling.

When the carton arrives at the point of filling it is opened up in the usual way by hinging around fold lines 25 and 27 and it automatically opens the interior envelope due to the pull of the gluing engagement of the side panels with the envelope. When the carton is erected in open condition, the heat sealed bottom forms as shown in Figure 6 with the heat seal extending straight across the middle of the ends. This is desirably pulled taut, forming triangular flaps 56 at opposite ends. The side flaps of the carton are then folded over the envelope, joining at the center, and the envelope end flaps 56 are folded over the sides of the side flaps and held in the space between the side flaps and the end flaps when the end flaps are folded down over. The flaps are held together by glue, tape or other means.

It will be evident that the construction of the end as here illustrated closes access to the pockets inside the triangular flaps 56 and prevents depositing of considerable quantities of material in an inaccessible position. Furthermore, the pulling of the triangular flaps 56 holds the bottom of the envelope taut and straight.

Exactly the same construction may be used at the top as at the bottom, first heat sealing across the top after filling to form a seal similar to the seal 43 and cutting off any excess material not required. The end flaps 56 at the top can then be held in the same way stretched around the sides of the side flaps of the carton and sandwiched between the side flaps and the end flaps of the carton when the end flaps of the carton are folded down and secured.

If a heat sealed top closure is not desirable, a suitable closure can be made by gathering and/or twisting the liner extension and securing with cord, rubber band or any one of many types of bag ties manufactured expressly for this purpose.

In some instances it is preferable to use a spout for filling or discharge or both. In the form shown in Figures 7 to 9, the envelope has a spout extension or a separately inserted sleeve 57 at the top, and the side flaps at the top are scored out at 58 at positions opposite to the spout, so that in the assembled carton semicircular portions 60 can be folded back in the side flaps to leave a spout opening 61 through which the spout can be pulled out. The spout is incapable of dropping to an inaccessible position and can always be reached by the fingers because the side panels of the carton always engage the envelope close to the top. In this case the same arrangement can be adopted by pulling the heat sealed portions 62 of the envelope taut against the side flaps, and bending the end flaps 56 of the envelope over the side flaps and holding them in place.

The carton can be filled through the spout 57 using standard sleeve filling methods, after which the spout is heat sealed or closed by other suitable methods and tucked down preferably inside the opening 61, the folded portions 60 then being restored to position to close the opening. The end flaps 33 and 34 are then sealed down over the side flaps and the triangular flaps 56 of the envelope. If desired, the end flap 33 will be scored at 63 to permit pulling up a portion 64 of the end flap and pulling aside the flap 56 to gain access to and pull out the spout 57. This portion 64 can be held down by tape or glue. The spout 57 can then be opened and the contents discharged.

The final form of the container of Figures 7 and 8 as shipped is illustrated in Figure 9.

In some cases contents are filled and subsequently solidify and must be used in solid form. For this purpose it is sometimes desirable to provide separation lines to

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permit breaking of the content into segments. For this purpose I illustrate in Figure 10 a grid 65 suitably of fiberboard, coated or plain, similar to the separator grid in an egg crate entirely filling inside of the envelope. This is inserted as shown in the top of the envelope before or after the container is filled.

The separation lines formed by the grid aid in breaking apart the solidified content when the carton is opened. The container is then closed by closing the top of the envelope and the side flaps and end flaps on top of the grid 65, and this provides extra support against top loading as in palletizing while the product is still in molten form. Where the content is continuously a liquid, the grid will provide support indefinitely to the top of the container.

While reference has been made herein to heat sealing of the envelope, it can of course be sealed in other suitable ways as by fastenings or by tin ties.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure and process shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

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

1. The method of forming a liquid tight carton which will erect as it is opened to assume a form ready for filling, which comprises forming a blank having side panels, end panels, and top and bottom side flaps and end flaps from the respective panels, forming a liquid tight envelope sealed at one end, securing the envelope to a side panel which is remote from the ends of the blank with the envelope overlapping adjoining end panels on both

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sides, folding the blank longitudinally at an intermediate position of the end panel which is remote from the ends of the blank around an overlapping portion of the envelope, and thus bringing the opposite side panel to a position directly opposed to the side panel to which the envelope is secured, securing the opposite side panel to the opposite side of the envelope, folding the blank at a corner between the side panel just secured and the adjoining end panel and thereby shifting the longitudinal folds of the envelope to positions adjoining the lines of demarcation between side panels and end panels on the blank, folding the end panel adjoining the end of the blank and joining together the side panel and end panel which are at the ends of the blank.

2. The method according to claim 1, which comprises folding the sealed end of the envelope into two flutes having peaks at opposite positions prior to folding over the end panel adjoining the end of the blank on the envelope.

3. The method according to claim 1, in which the envelope overlaps the adjoining end panels to the middle of each end panel.

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