Oct. 16, 1956 J. D. THOMPSON 2,766,926

FLEXIBLE WALLED CONTAINERS

Filed April 18, 1952

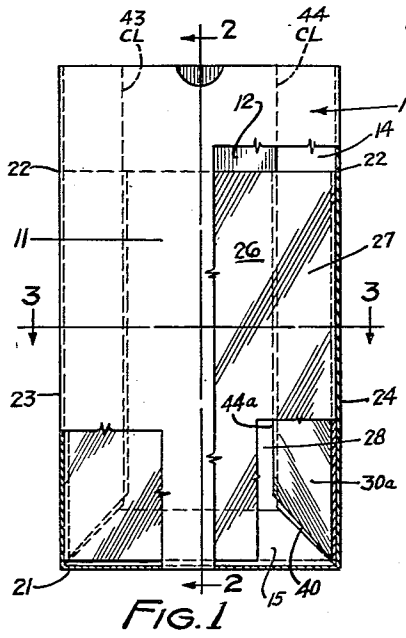


FIG. 1

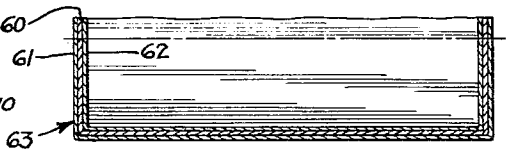


FIG. 7

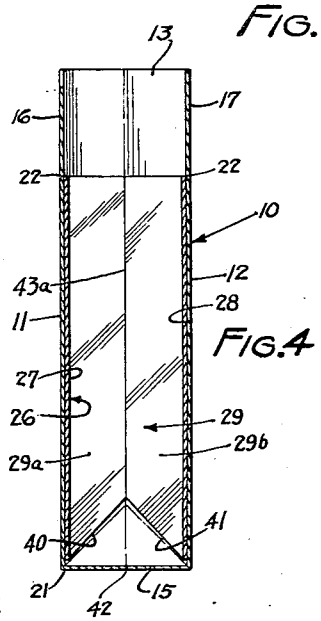


FIG. 4

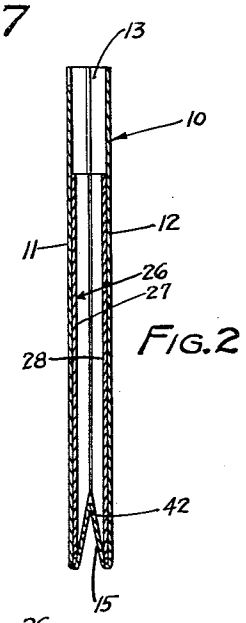


FIG. 2

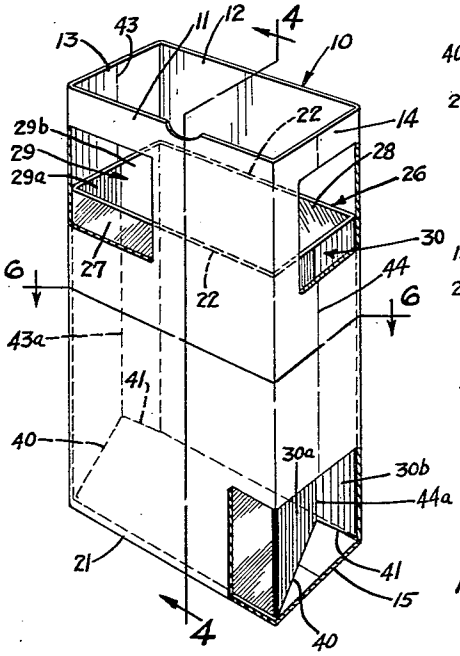


FIG. 5

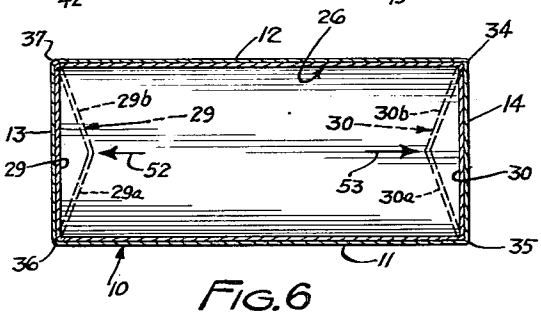


FIG. 6

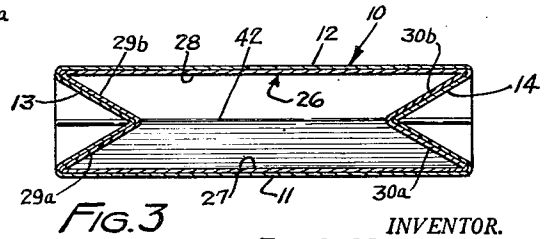


FIG. 3

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United States Patent Office 2,766,926 Patented Oct. 16, 1956

2,766,926

FLEXIBLE WALLED CONTAINERS

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Application April 18, 1952, Serial No. 283,101

4 Claims. (Cl. 229—55)

This invention relates to improvements in the construction of containers made of paper, light cardboard, cloth and other flexible materials that are used for the packaging and display of bulk material, such as flour, cereal, sugar, soap powders and other like commodities.

This application is a continuation-in-part of my copending application Serial No. 266,122 filed January 12, 1952.

The present invention relates to improvements in foldable merchandise containers, which are made and shipped in a flat condition and are then filled and closed at the plant, factory or mill producing the commodity to be sold. The containers, more usually called "bags," are of rectangular parallelepipedon shape and have a pair of major walls (front and back), a pair of minor walls (sides), a bottom and a top closure. Such containers or "bags" are economical to make and use since they can be shipped and stored in a small space. They may be constructed in accordance with the "flat-fold" or "in-tucked" principle. The bags are shipped in collapsed ("flat-folded" or "in-tucked") condition from the bag manufacturer to the commodity producer or packager, and he stores these bags in collapsed form until they are needed. At that time the commodity producer or packager will "set up" (open) the containers, fill them with merchandise, close them and ship them on for ultimate sale to the consumer.

Bags of this type are used for bulk granular solids such as sugar, salt, rice, barley, breakfast foods, etc. These commodities, by their nature flow in a manner much like a liquid. When a bag of this commonly accepted type is filled the bulk granular solid exerts an internal pressure which causes the containers to become somewhat rounded at the corners and edges. This is undesirable because it uses more space for transporting in boxes and more especially because of the poor display features of such containers when placed on the merchant's shelf for ultimate display and sale to the consumer. Thus, a somewhat rounded-off bag does not present neat, wide, flat front and back surfaces for the display of trademarks, manufacturer's name, etc.

It is desirable for economy to use containers which fold flat before filling, but for merchandising purposes the container should retain substantially the form of a rectangular parallelepipedon after filling, so as to present flat or nearly flat walls, as well as neat edges and corners. However, this objective has not been possible to attain in practice.

In the design of bags the greater the difference between the width of the front (and back) as compared with the width (front-to back dimension) of the sides in the theoretical bag shape, the more pronounced will be the bulging and rounding effects due to the aforesaid "pressure" when the bag is filled. Stated another way, a very "flat" theoretical bag shape will exhibit a greater tendency of the "flat" front and back walls to bulge and

the edges and corners to round, than one in which the front (and back) panels are the same or nearly the same width as the sides. Therefore, the foldable bag designer has had to keep the sidewalls nearly as "wide" as the front and back walls, especially for very "flowable" materials, such as coffee, rice and beans. Accordingly, there have been practical limits beyond which the bag designer could not usually go and as a result the front and back walls of usual flexible walled bag designs have usually had to have a side-to-side width which does not much exceed 1½ to 2 times the front-to-back (width) dimension of the side walls and even then the aforesaid bulging and rounding has had to be tolerated as a problem heretofore incapable of economical solution.

From the merchandising standpoint in competitive markets it is desirable to have as much space as possible on the front and back of the bag so as to allow prominent display of trademarks, etc., but provision of such space has been rendered impossible in packaged goods except by the use of rigid boxes made of strong paperboard having inherent stiffnesses sufficient to withstand the aforesaid distorting "pressure" of the commodity within the package or for very low density commodities such as cornflakes. However, use of such rigid packages is limited, since when empty they cannot be shipped economically after being "set up" because of the large space they occupy, and hence are usually fabricated by uarge and expensive machinery at the place where they are to be filled with the commodity. In addition, the cost of rigid cardboard generally exceeds the cost of paper. Smaller mills cannot afford machinery to make boxes at the place of filling.

It is an object of the present invention to overcome the aforesaid disadvantages of the prior art and to provide an improved flexible walled container, which is economical to make and ship, capable of being folded flat when empty, constructed so as to resist bulging and rounding, and resembles a box in appearance when it is filled and closed.

It is a further object of this invention to provide an improved flexible walled container capable of being folded flat for storage and yet capable of being set up into a relatively flat rectangular package presenting flat walls with neat appearing edges and corners.

It is a further object of the invention to provide an improved bag structure having reinforcement capable of maintaining selected walls of the filled bag in flat neat condition.

It is a further object of the invention to provide an improved bag structure capable of being set up and filled to provide a package of substantially rectangular parallelepipedon configuration wherein the front and back walls are relatively much greater in width as compared to the side walls, than has heretofore been possible in such bag structures.

It is a further object of the invention to provide a flexible walled bag structure of parallelepipedon shape wherein reinforcements are provided throughout substantially the entire extent of the front, back and side walls of the bag when it is filled and closed.

It is another object of the invention to provide flexible walled bags having stiffening panels designed to reinforce the entire surface of the major and minor walls of a bag.

It is a further object of the invention to provide an improved in-tuck bag structure including a stiffening liner so folded that it will operate on the principle of a toggle to stretch and hold the flexible bag wall until it takes the form of a rectangular parallelepipedon when it is opened for filling and when closed and used.

It is a further object of the invention to provide a foldable stiffening panel for foldable intuck flexible walled

bags, the panel acting, during use to maintain the bag in open position after opening and to reinforce and maintain its shape and particularly the edges and corners thereof.

Other and further objects of the invention are those inherent and apparent in the apparatus herein illustrated, described and claimed.

The invention is illustrated with reference to the drawings in which corresponding numerals refer to the same parts and in which

Figure 1 is a front elevational view partially broken away showing a flexible walled container of the intucked type, with the bag and stiffening panel therein in partially folded position;

Figure 2 is a vertical sectional view taken along the lines 2—2 of Figure 1;

Figure 3 is a horizontal sectional view taken along the lines 3—3 of Figure 1;

Figure 4 is a vertical sectional view taken along the plane of lines 4—4 of Figure 5 showing the bag open and ready to be filled;

Figure 5 is a perspective view partially broken away showing the bag in open position ready to be filled, with the stiffening panel in operative position therein;

Figure 6 is a vertical sectional view taken along the plane of lines 6—6 of Figure 5;

Figure 7 is a fragmentary horizontal sectional view partially broken away of a modified form of the invention utilizing a multi-ply bag body with the stiffening panel structure mounted between the plies.

In accordance with the invention herein disclosed in Figures 1–6 there is shown a flexible walled bag body having substantially the form of a rectangular parallelepipedon with a stiffening panel mounted therein for reinforcement of the major and minor walls of the bag body. In Figure 7 there is shown a flexible walled bag made of a plurality of plies wherein the stiffening panel is mounted between the plies.

According to this illustrative embodiment of the invention, a stiffening sleeve is provided, this being of cardboard, paperboard, pulpboard, stiff plastic sheet or the like. The sleeve has the same height as the bag when closed, and the sleeve has a rectangular cross section such that it slightly stretches the bag wall when opened.

In the illustrated embodiment of the invention shown in Figures 1–6, there is shown an in-tuck flexible bag generally designated **10** of usual form, having a front **11**, a back **12**, sides **13** and **14**, a bottom **15** and top closure portions **16** and **17** adapted to be folded one over the other to form a top for the bag when it is filled and closed. The bag **10** is in every respect of usual flexible sheet construction; it is formed from a flat sheet of flexible material which is folded and cemented to form a tube, which is then cut to length. To minimize complications in the drawings, illustration of the bag tube seam has been omitted since it is of usual form and is placed where desired by usual bag forming machinery. The bag tube may be of diverse flexible sheet materials; it may be single or multiple ply. It is preferably of the intucked pattern, although not essentially so.

The front **11** is theoretically rectangular and extends from the bottom edge **21** to the fill line **22—22** and from the left edge **23** to the right edge **24**. The back **12** has the same size and shape. The sides **13** and **14** are likewise rectangular and are creased (folded) in at their centerlines CL, when the intuck form is used.

Within the bag body **10** is placed the stiffening insert generally designated **26**. The insert **26** is essentially in the form of a sleeve and has a front face **27**, a back face **28** and side faces **29** and **30**. The stiffening insert **26** may be considered as a tube of rectangular cross section, open on both ends. Its face portions are substantially geometrically commensurate with the corresponding wall of the bag body **10**.

In service the faces of the stiffening insert **26** register with the corresponding bag walls as shown in Figure 5, thus reinforcing each of the major and minor walls (front, back and sides respectively) of the bag body **10**, as well as the corners (or edges, however designated) **34**, **35**, **36** and **37**, and also the lower edge **21** of the front and back and the upper edge at fill line **22—22**. This reinforcing and stabilizing makes a much neater and more useful package than would be otherwise possible.

In the illustrated form of the invention the bag body **10** is of the infold (or "in-tuck") type, with the sides **13** and **14** folded in at their respective vertical centerlines **43** and **44**. Similarly, the bottom **15** is folded up along its center line **42**. The stiffening insert **26** is notched along the lines **40—41** at each side so as to accommodate the bottom **15** when it is folded up as shown in Figures 1 and 3.

The sleeve **26** is constructed so that its periphery slightly exceeds the inner periphery of the bag body and its sides **29** and **30** are creased so as to infold in conformance with the sides **13** and **14**, respectively, of the bag. The two halves **29***a* and **29***b* of side **29** (of the stiff insert) thus fold in along line **43***a* and the two halves **30***a* and **30***b* of side **30** (of the stiff insert) also fold in along line **44***a*. The two halves **29***a* and **29***b* act as a toggle hinged at line **43***a*; similarly the two halves **30***a* and **30***b* act as a toggle hinged at line **44***a*. When the whole bag (and the stiff insert) is folded in (as in Figures 1 and 3) the toggle side **29***a*—**29***b* and the toggle side **30***a*—**30***b* will exert no tension to stretch the periphery of the bag tube, but as the bag is opened from the Figure 1 position, a certain position, as indicated by the dotted lines of Figure 6, is reached at which the toggling action begins to take up the slack in the bag periphery composed of left side **13**, back **12**, right side **14** and front **11**. Then as additional pressure is exerted on the side **29** (composed of halves **29***a* and **29***b*) and on the side **30** (composed of halves **30***a* and **30***b*) the final straightening of halves **29***a* and **29***b* into line and the final straightening of lines **30***a* and **30***b* into line produces a toggling action which imposes a condition of neat tautness in the entire bag body **10**, at least in a peripheral direction. This pulls the bag body neatly around corners **34**, **35**, **36** and **37**, and as the halves **29***a* and **29***b* and the halves **30***a* and **30***b* go slightly "over-center" the bag is "snapped" into open position. Often the pressure of the bulk solid material is relied upon to exert the needed final opening and holding force in the direction of arrows **52** and **53**. It is not desirable that the tubular insert **26** exert undue force but simply enough to straighten out wrinkles in the bag and give it a neat appearance.

The insert **26** may be secured to the bag body **10** by any suitable means, for example adhesives. It is helpful that precautions be taken to prevent material from finding its way between the insert **26** and bag body **10** since material in such location causes unsightly bulges on the surface of the unit. Therefore, it is desirable to use a continuous adhesive fastening between the inside of the bag front **11** and at least the upper and lower edges of the reinforcing sleeve. This adhesive should preferably remain sufficiently plastic so as to allow a slight but desirable creepage of the side **13** of the bag relative to side **29** of the stiffener and a similar creepage between side **14** of the bag and side **30** of the stiffener. Adhesives, such as latex or permanently plastic non-drying adhesives are desirable for this purpose because they permit the desired slight creepage.

In Figure 7 is shown a modification of the invention wherein the stiffening panel **60** is placed between separate layers **61—62** of a multi-ply bag **63**. Where there are more than two plies, it is preferable to mount the stiffening panel between the innermost and the next innermost plies. There is an advantage in this in that very low grade cardboard, which may possess some odor or a dark appearance, may be utilized, the inner ply of the bag being composed of slick paper, moisture impervious paper, plastic sheet or the like.

Throughout the illustrations herein, because of limitations of draftmanship, it has been necessary to exaggerate the thickness of the material of the bag proper as compared with the thickness of the stiffener insert. In actual practice the bag **10** or plies **61** and **62** are made of suitable bag paper, foil, cloth, plastic, etc. of one or more plies and of customary strength and thickness for the service intended. Thus, for example, a 3-pound sugar or rice bag may be made of paper .003 inch to .009 inch thick in one or several plies, the lesser dimension being for single ply and the greater dimension being (usually) for multiple plies. Other sizes of bags for other services require flexible papers of different weights and grades. The stiffening insert is usually of stiff paperboard, boxboard, such as pulpboard .025 inch to .100 inch thick or even thicker. It is therefore proper to consider the flexible bag proper as being of thin flexible and tough sheet material, whereas the reinforcing insert is relatively much thicker and far less flexible than the bag material.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments disclosed herein.

What I claim is:

1. A tubular bag of flexible material adapted to be infolded to the flat condition, said bag having a front and a back, a pair of sides, bottom and top closure portions of the front, back and sides adapted to be folded over each other to form a top when the bag is filled and closed, said bag when closed forming a theoretical container space shaped substantially as a rectangular parallelepipedon, a stiff reinforcement within said bag, said reinforcement being of a material substantially thicker and stiffer than the flexible material of which the bag is composed, said reinforcement also being in the form of a tube of substantially the same horizontal rectangular cross-sectional shape as that of the bag, and having a front face, a back face and a pair of side faces, said faces registering with and being substantially geometrically commensurate with the inner surfaces of the corresponding walls of the bag when said insert is within the bag body, the horizontal cross-sectional peripheral dimension of said tubular insert being very slightly in excess of the corresponding peripheral dimension of the inside of the bag body when said insert and bag body are opened to the filling condition, each of the side faces of said insert being creased along a vertical center line extending from the bottom to the top and foldable inwardly with the bag body when the bag is collapsed to flat condition, the bottom of the bag being creased along a transverse center line extending from one side to the other side of the bag and foldable upwardly when the bag is collapsed to flat condition, each side face of the insert being notched to accommodate said upward fold of the bottom.

2. The bag structure set forth in claim 1 further characterized in that said insert is adhesively secured to the inside of the bag body.

3. A tubular bag of flexible material adapted to be infolded to flat condition, said bag having a front and a back, a pair of sides, bottom and top closure portions on the front, back and sides adapted to be folded over each other to form a top when the bag is filled and closed, said bag when closed forming a container space shaped substantially as a rectangular parallelepipedon, a stiff reinforcement insert within said bag, said reinforcement insert being made of a material substantially thicker and stiffer than the flexible material of which the bag is composed, said reinforcement insert also being in the form of a tube of substantially the same horizontal rectangular cross-sectional shape as that of the bag, and having a front face, a back face and a pair of side faces, said faces registering with and being substantially geometrically commensurate with the inner surfaces of the corresponding walls of the bag when said insert is within the bag body, said reinforcement insert being secured to said bag body by means of an adhesive which is sufficiently plastic so as to allow the reinforcement insert to creep slightly with reference to the bag body when the bag is opened, each of the side faces of said reinforcement insert being creased along a vertical centerline extending from the bottom to the top and foldable inwardly with the bag body when the bag is collapsed in flat condition, the bottom of the bag being creased along a transverse centerline extending from one side to the other side of the bag and foldable upwardly when the bag is collapsed to flat condition, each side face of the insert being notched to accommodate said upward fold of the bag bottom.

4. The bag structure of claim 3 in which the horizontal cross-sectional peripheral dimension of said insert is slightly in excess of the corresponding peripheral dimension of the inside of the bag body when said insert and bag body are opened to the filling condition.

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