TWO-PIECE CONTAINER FOR CARRYING HEAVY LOADS

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TWO-PIECE CONTAINER FOR CARRYING HEAVY LOADS

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The present invention relates to a container particularly designed for the carrying of heavy loads and which is composed primarily of inexpensive material.

The problem of producing an inexpensive folded blank container capable of carrying heavy loads has long plagued the industry. Such containers are used in great numbers for the packaging and shipping of various items, such as fruits and vegetables. The contents of the containers must be sold at low prices, and shipping costs must be held to a minimum. Since containers for such goods cannot be reused, they must be inexpensive. A material commonly employed for such containers is corrugated fibreboard. This material is fairly inexpensive, but unfortunately does not have sufficient strength so that a simple folding blank container may be made therefrom which is capable of supporting with security the comparatively heavy loads involved. Solid fibreboard is also available, and folding blank boxes may be made therefrom, but the cost of solid fibreboard is so much greater than that of corrugated fibreboard that it is economically unfeasible to attempt to produce a low-cost container from the solid board.

Attempts have been made in the past to utilize corrugated fibreboard for the purposes under discussion, those attempts revolving around the formation of multiply containers of complicated construction. Such expedients are wasteful of material, result in boxes which are bulky and heavy, thus adding to shipping costs, and such boxes can be erected by the user only with considerable difficulty.

The present invention relates to the production of a simply constructed and easily erected container which avoids the above disadvantages and which at the same time will reliably support extremely heavy loads. A first important feature of the structure of the present invention resides in using inexpensive corrugated fibreboard for the body of the container, where the weight of the contents is not ordinarily directly supported, and using stronger solid fibreboard for the bottom of the container, where the weight of the contents is ordinarily supported. The amount of more expensive solid fibreboard used in this construction is minimized, the production of strong containers at a sufficiently low cost as to be economically feasible.

To this end the container is formed from two blanks, usually preassembled before delivery to the customer, one blank foldable to define the side walls of the container and formed of corrugated fibreboard, the other blank, primarily defining the bottom walls of the container but also including side walls of greatly abbreviated height adapted to be secured to the lower ends of the body side walls, being formed of solid fibreboard.

The container, with the two blanks secured to one another, is shipable in knocked-down condition, to be erected at the point of use whenever desired. The bottom walls of the container are defined by flaps which form a part of the solid fibreboard blank and which are foldably secured to the lower edges of selected side walls of abbreviated height, the flaps being foldable across the open bottom of the container body so as to define the bottom walls therefor. These flaps are provided with structure engaging the lower portion of the container so that they may be reliably held in position.

The means by which these flaps are held in place constitutes a second important feature of the present invention. The body side walls, and the side walls of abbreviated height secured thereon, toward which the bottom closure flaps extend are provided with registering slots through which solid fibreboard extensions integral with the bottom closure flaps are adapted to pass. These extensions are of a length such that when once passed through those slots they may be bent down substantially parallel to the side walls of the container so as to define saddles which serve to reliably support the end closure flaps and retain them in position. The thus defined saddles involve contact between solid fibre and solid fibre, thus strongly retaining the flaps in folded condition, and since the flaps themselves are formed of solid fibre, they will strongly resist deformation. Hence although the body of the container is formed of relatively weak corrugated fibreboard, the end closure is defined by relatively strong fibreboard held in position by an interlock between similarly strong material, thus imparting great weight-supporting properties to the box even though the major portion of the box is formed of comparatively weak material.

The extensions which define the saddles holding the flaps in bottom-closing position, when folded down parallel to the side walls of the container, are normally held in that position by the contents of the container, after the container has been packed. As further insurance against the accidental or unwanted disengagement of an extension from a slot through which it has been passed, the extensions are provided with tabs which, when folded close to and over the extensions, can pass through the slots and which, when released, will assume a position substantially in line with the extensions or angularly related thereto, thus positively preventing withdrawal of the extensions from the slots. Since these tabs are integral with the extensions and hence formed of strong solid fibreboard, they perform their function in an extremely reliable manner.

Because the weight of the contents of the container is supported by solid fibreboard flaps held in place by an interlock of solid fibre with solid fibre and the container is so designed that only the very minimal amount of solid fibreboard is employed, an inexpensive and commercially feasible container results which is capable of carrying much greater weights than has formerly been thought feasible.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the box construction as defined in the appended claims and as described in this specification, taken together with the accompanying drawings in which:

Fig. 1 is a top plan view of the corrugated fibreboard blank from which the body of the container is formed;
Fig. 2 is a similar view of the solid fibreboard blank from which the end closure portion of the container is formed;
Fig. 3 is a top plan view showing the manner in which the two blanks are secured together;
Fig. 4 is a three-quarter perspective view showing the container in condition ready to be erected;
Fig. 5 is a similar view showing a first stage in the erection of the container;
Fig. 6 is a similar fragmentary view showing a subsequent stage in erection;
Fig. 7 is a view similar to Fig. 6 but showing a still further stage of erection;
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Fig. 8 is a cross sectional view taken along the line 8-8 of Fig. 7; and Fig. 9 is a top plan view of a fully erected container.

The container of the present invention comprises a body portion generally designated 2 and an end closure portion generally designated 4. The body portion is formed from a somewhat flexible or corrugated tubular body 2, the flaps 28 overlap so as to define a tubular container body. Some of the side walls, here shown as the alternate side walls 6, have laterally extending slots 16 positioned near the bottom edges thereof, the other alternate side walls 6' being unslotted.

The blank defining the end closure portion 4, shown in Fig. 2, is made of a material stronger than the material of which the body portion blank of Fig. 1 is made, such as, for example, solid fibreboard. It includes a plurality of side walls 18 and 18' separated by foldlines 20, the width of the side walls 18 and 18' being the same as the width of the body portion side wall 6 and 6' but the height of the end closure side walls 18 and 18' being greatly abbreviated in comparison with the body portion side walls 6 and 6'. Alternate end closure side walls 18 and 18' are provided with slots 22 of substantially the same size and extent as the slots 16, the other alternate end closure side walls being unslotted. The end closure side walls 18 and 18' are adapted to be placed over the outside of the lower portions of the body portion side walls 6 and 6' respectively, the lower edges of those side walls being aligned and the slots 22 registering with the slots 16. Stitching 24 or the like may be employed to secure the two blanks together.

Extending from the lower edges of the end closure side walls 18', and connected thereto by means of foldlines 26, are elongated flaps 28, each flap being of a length such as to extend from its connected side wall 18' to the slotted side wall 18 on the opposite side of the erected container. A connecting portion 30 is secured to the free end of the flap 28 by means of foldline 32, and an extension 34 is secured to the free end of the connecting portion 30 by means of foldline 36. The width of the extension 34 is closely comparable to the width of the slots 16 and 22. The height of the extension 34 is of substantially the same order of magnitude as the distance from the slots 16 and 22 to the bottom edges of the side walls 6 and 18 in which those slots are formed. Tabs 38 are secured to opposite sides of the extensions 34 by means of foldlines 40.

At the point of manufacture the blanks of Figs. 1 and 2 are secured together by means of the stitching 24, as shown in Fig. 3, and the body portion 2 is bent into tubular shape, the securing flap 10 being fastened to the last body portion side wall 6' by means of the stitching 14, as shown in Fig. 4. The end closure flaps 28 extend downwardly from the container body 2, and the container may be flattened by bending along opposite foldlines 8 so that it may be shipped and stored in flat, ready for use whenever desired.

When the box is to be erected at the point of use, the flattened container is expanded to the position shown in Fig. 4. The end closure flaps 28 are then bent one by one about their respective foldlines 26 so as to extend across the open bottom of the tubular body 2, thus assuming the position shown in Fig. 5. While each of the end closure flaps 28 is narrower than the open bottom of the tubular body 2, the flaps 28 overlap so as to define a complete closure for that bottom, as may best be seen from Fig. 9.

Next the tabs 38, which are initially formed in line with the extensions 34, are bent around the foldlines 40 so as to lie over the extensions 34, as shown in Fig. 5. This is done in order to permit the extensions 34 to pass through the registering slots 16 and 22, the length of those slots being sufficient to permit the extensions 34 to pass therethrough, but their length and height being insufficient to permit the extensions 34 and the tabs 38 to pass therethrough when the tabs 38 are in line with or extending angularly out from the extensions 34. The height of the slots 22 and 16 is slightly greater than twice the thickness of the thin side wall 6 of the end closure portion 4 is formed, so that the extensions 34 with the tabs 38 folded thereover may be passed through the slots, as shown in Fig. 6. The extensions 34 reach the slots by bending the connecting portions 30 about the foldlines 32, while at the same time the extensions 34 are bent about the foldlines 36. The tabs 38 will have a tendency to spring out from the extensions 34 but may be held against the extensions 34 by the fingers until the combined extensions 34 and tabs 38 are partially inserted into the slots 22 and 16, the slots themselves thereafter retaining the tabs 38 in proper position until the extension 34 has passed completely through the slots. Then the tabs 38, no longer retained against the extensions 34, will spring outwardly and will thus positively prevent the extensions 34 from being withdrawn through the slots 16 and 22. Various stages in the movement of the extensions 34 through the slots 16 and 22 are shown in Figs. 6 and 7.

Any tendency of the extensions 34 to withdraw from the slots 16 and 22, either because of the inherent semi-rigidity of the material of which the end closure portion 4 is formed or because of the weight of the contents of the container acting against the extension flaps 28 and tending to move them downwardly, will be resisted by the tabs 38 which, because they are formed of solid fibreboard or other strong material, will act reliably to withstand very strong forces. The weight of the contents of the container, acting on the end closure flaps 28 and tending to move them downwardly, will in addition cause pressure to be exerted between the extension 34 and the lower edges of the slots 16 and 22. If both of those lower edges were defined by corrugated fibreboard or similar material of only moderate strength, it is very likely that they would become deformed and perhaps burn. However, the lower edge of the slot 22 is defined by solid fibreboard, a material of appreciably greater strength, and consequently no distortion or damage will result even when great weights are supported by the end closure flaps 28.

The weight of the contents of the container is thus seen to be supported by an engagement of solid fibreboard against solid fibreboard at the slot 22, and any tendency of the solid fibre tabs 38 to pull out through the corrugated fibreboard side walls 6 is effectively prevented by the reinforcing solid fibreboard side walls 18.

In order that an even greater degree of security be achieved insofar as the sustaining of great weight is concerned, the extensions 34, prior to the filling of the container, may be bent down parallel to and alongside the inner surfaces of the body portion side walls 6, as shown in Figs. 8 and 9, the extensions 34 and the connecting portions 30, all of solid fibreboard, thus defining a saddle which extends over the lower solid fibreboard edge of the slot 22. With this mode of use the tabs 38 are preferably restored to their original in-line position with respect to the extensions 34, the extensions 34 being retained in these positions by the contents of the container as the container is filled. Maximum strength is thus imparted to the bottom of the container without any added complexity of construction or any added difficulty in manufacture.

The container of the present invention can support weights hitherto considered feasible only with containers made entirely of solid fibreboard or other strong ma-
material, yet only the least amount possible of such strong but inexpensive material is here employed. Moreover, the specific structure employed for securing the end closure flaps in place, although simple, provides for maximum strength and security.

While but one embodiment of the present invention has been here specifically illustrated, it will be apparent that many variations will be made therein, as to size, shape and specific design, without departing from the spirit of the invention as defined in the following claims.

I claim:

1. A container comprising separate body and end closure portions adapted to be fastened to one another, each of said portions being formed from a separate blank, said body portion blank being formed from corrugated board and said end closure portion blank being formed from solid board, said body portion blank comprising a plurality of foldably related side walls, a plurality of said side walls having slots spaced upwardly from and parallel to the lower edges thereof, said end closure portion blank comprising foldably related side walls of abbreviated height adapted to be secured over the lower parts of said body side walls, those of said end closure side walls overlying the slotted body portion side walls having a height such as to extend above said slots and having lateral slots adapted to register with the slots in said body side walls, and flaps foldably secured to the lower edges of a plurality of said end closure side walls and adapted to extend across the open bottom of said body portion to opposed slotted end closure side walls, said flaps having leaves at their free ends adapted to be bent up alongside said slotted end closure side walls, extensions of a size such as to be passable through said slots being foldably secured to the free ends of said leaves.

2. The container of claim 1, in which said extensions are of a height of the same order of magnitude as the distance from said slots to the lower edges of said body side walls, said extensions being folded down inside said container alongside said body side walls after being passed through said slots so as to define saddles securely holding said end closure portion in place and reliably supporting the weight of the contents of said container.

3. The container of claim 1, in which said extensions are of a height of the same order of magnitude as the distance from said slots to the lower edges of said body side walls, said extensions being folded down inside said container alongside said body walls after passing through said slots so as to define saddles securely holding said end closure portion in place and reliably supporting the weight of the contents of said container, and in which the sides of said extensions are provided with foldably secured tabs, the combined length of said extensions and said tabs being greater than the length of said slots, said tabs when folded out from said extensions thus positively preventing said extensions from escaping from said slots after having been passed therethrough.

4. A container comprising separate body and end closure portions adapted to be fastened to one another, each of said portions being formed from a separate blank, said body portion blank being formed from corrugated board and said end closure portion blank being formed from solid board, said body portion blank comprising an even plurality of foldably related side walls, alternate ones of said side walls having slots spaced upwardly from and parallel to the lower edges thereof, said end closure portion blank comprising the same even plurality of foldably related side walls of abbreviated height adapted to be secured over the lower parts of said body side walls, those alternate ones of said end closure side walls overlying the slotted body portion side walls having a height such as to extend above said slots and having lateral slots adapted to register with the slots in said body side walls, and flaps foldably related to the other alternate end closure side walls and adapted to extend across the open bottom of said body portion to opposed slotted end closure side walls, said flaps having leaves at their free ends adapted to be bent up alongside said slotted end closure side walls, extensions of a size such as to be passable through said slots being foldably secured to the free ends of said leaves.

5. The container of claim 4, in which said extensions are of a height of the same order of magnitude as the distance from said slots to the lower edges of said body side walls, said extensions being folded down inside said container alongside said body side walls after being passed through said slots so as to define saddles securely holding said end closure portion in place and reliably supporting the weight of the contents of said container.

6. The container of claim 4, in which said extensions are of a height of the same order of magnitude as the distance from said slots to the lower edges of said body side walls, said extensions being folded down inside said container alongside said body side walls after being passed through said slots so as to define saddles securely holding said end closure portion in place and reliably supporting the weight of the contents of said container, and in which the sides of said extensions are provided with foldably secured tabs, the combined length of said extensions and said tabs being greater than the length of said slots, said tabs when folded out from said extensions thus positively preventing said extensions from escaping from said slots after having been passed therethrough.

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