ABSTRACT OF THE DISCLOSURE

The disclosure embodies a plastic film bag having opposed walls with pressure interlocking releasable rib and groove elements along the top and heavier flanges extending thereabove with the walls, rib and groove elements and flanges being integral and hand holes formed in the flanges with their upper edges an equal distance from the center of the rib and groove elements.

Background of the invention

The present invention relates to improvements in plastic bags with pressure interlocking releasable rib and groove element closures.

In the development of these plastic film type of containers or pouches with zipper type closures, improvements in the structure of the closures and improvements in plastics and methods of manufacturing the containers have made possible a reduction in thickness of film from which the containers are made, and has increased their field of use. As the amount of plastic required to form a bag is reduced their expense generally decreases so that the fields of utilization increase. In many fields of use it is essential to provide a container which can be more easily handled and carried by the user. In containers which are sold or given with a product in a store the user should be able to conveniently carry the container. Handling and carrying increases the stresses on the fastener at the top of the pouch and it is desirable that the fastener remain closed and not become accidentally opened.

It is accordingly an object of the present invention to provide a bag construction wherein means are provided for easily carrying the bag and wherein the carrying means coacts with the fastener and the rest of the bag structure to maintain the fastener in a closed position even when the container is carried with a substantial amount of contents.

A further object of the invention is to provide an improved overall closable plastic bag construction which is more efficient to use and handle.

Summary of the invention

A feature of the invention by which the above and other objectives are accomplished is the provision of a bag construction wherein opposed walls form a plastic film forming a bag body, pressure interlocking releasable rib and groove elements of plastic in opposed positions along the top edge of the walls being integral therewith, and flanges integral with the walls and with the rib and groove elements with handle openings therein and the upper edge of the handle openings being a uniform distance above the center of the rib and grooves in each of the flanges. Preferably the material of the flanges is either substantially heavier or substantially stiffer than the plastic film of the bag walls so that the flanges coacting with the rib and groove elements form a unitary handle wherein the rib and groove elements are maintained in their relative closed position and are not distorted or pulled to accidentally open, and wherein the weight and size of the contents tends to distort and stretch the bag body material rather than the rib and groove elements or the flanges.

Brief description of the drawing

FIGURE 1 is an elevational view, with parts broken away, of a bag constructed in accordance with the principles of the present invention:

FIGURE 2 is a fragmentary sectional view taken substantially along line II-II of FIGURE 1; and

FIGURE 3 is a fragmentary elevational view illustrating another embodiment of the invention.

Description of the preferred embodiments

As illustrated in FIGURES 1 and 2, the bag construction includes opposed walls 10 and 11 formed of a plastic film such as polyethylene or a like plastic material to form a bag body.

At the upper edges of the walls and integral and being of one piece therewith is a rib element 12 and a groove element 13. The rib and groove elements are formed of plastic and are of the pressure interlocking type which automatically interlock when pressed together by a force on the outside of the bag. This is normally done by running a thumb and forefinger from the end of the rib and groove elements therealong to press them together. When the bag is to be opened, they are separated by forcibly pulling them apart from the top. The rib and groove elements may take various improved forms such as where the rib is arrowhead shaped and the groove element has conforming fingers to firmly grip the arrowhead. The rib 12 is conventionally shown as having a stem 12a with an enlarged beadshaped head 12b. The groove element 13 has a stem 13a with upper and lower continuous grip or finger portions 13a and 13b curved on their inner surfaces to firmly grip the head 12b in locked position. As the rib and groove elements are in locked position, they form a unitary closed fastener which in effect forms a beam along the top of the bag resisting separation with pulls on the bag walls 10 and 11 as are caused by forces on the walls from the contents within the bag.

Above the rib and groove elements and of one piece with the rib and groove 12 and 13 and with the walls 10 and 11 are flanges 14 and 15. These flanges are used to pull apart the rib and grooves but primarily are constructed to provide a carrying handle for the bag.

The bag construction may be formed by various methods although a preferred method is by the continuous extrusion of the plastic film with the plastic moving in a direction so that the rib and groove 12 and 13 are continuous and extruded axially out of the extruder head. A continuous tube may be formed and cut off in lengths to form the bag bodies. The cuts of the tube will appear along lines 22 and 23, FIGURE 1, which are heat sealed together to form the closed sides of the bag. The bag bottom 24 is part of the tube. The flanges 14 and 15 may be separated at their upper edges if the unit is extruded as a sheet, or may be joined if the unit is extruded as a tube, and separated by slitting.

For gripping the flanges 14 and 15 and hand hole openings 16 and 17 are formed. The location of these hand holes is important in that the upper edges 18 and 19 are positioned to be approximately or substantially coincident above respective rib 12 and groove element 13. In other words the distance 21, FIGURE 2, of the upper edge 18 of the opening 16 above the center of the rib is substantially the same as the distance 20, which is the distance of the upper edge 19 of the opening 17 above the center line of the groove element 13.

With this spacing when the bag is picked up vertical forces are exerted at the upper edges 18 and 19 of the openings 16 and 17 and these forces are transmitted along the length of the flanges down to the bag body to carry
the contents thereof. The stresses reach the top edges of the bag walls 10 and 11 fairly uniformly so that distortable stresses are not encountered at a specific location which would tend to separate the rib and groove 12 and 13. Actually when carrying the bag the flanges 14 and 15 lie flat together so that the flanges with the joined rib and groove 12 and 13 form a unit handle coating together to support the walls 10 and 11 uniformly along their top edge.

In a preferred arrangement the flanges 14 and 15 are made of a thicker film than the film of the bag walls 10 and 11. It has been found that if the flange thickness F is at least twice the thickness W of the walls there is a substantial reduced likelihood of the rib and groove fastener elements 12 and 13 becoming separated. With this size relationship it has been found that stresses due to materials within the bag body do not tend to open the bag. That is, when the bag is held by its handle opening and the contents within the bag pull on the walls 10 and 11 and tend to stretch and distort the plastic of these walls, there would be less likelihood of these forces being transmitted directly up to the rib and groove elements at any one concentrated spot (which would tend to separate them and open the bag) if the flanges above the lock, in which the carrying handle has been cut out, are about twice the thickness of the bag. In this way the stress on the lock is more evenly distributed by the heavier gauge of plastic flange and the lock is maintained in straight alignment and thus prevented from buckling. The bag walls are then made as thin as possible and of only sufficient weight to handle the contents of the bag. The flanges 14 and 15 are made of at least double thickness relative to the bag walls to effect the above described coaction with the rib and groove 12 and 13. The bag walls are of a thin light-weight film on the order of 0.001 to 0.003 inch and the flanges 14 and 15 are preferably of a minimum thickness of 0.006 inch and should be heavier.

In the arrangement illustrated in FIGURE 3 the bag walls are shown at 10' with the flanges at 14' and the joined rib and groove elements at 12'. The hand hole opening 16' is divided into two portions 26 and 27. This is obtained by bridging portion 25 which extends vertically between the ends of the opening 16'. The ends of the hand hole are preferably rounded as at 26a and 27a and the edges of the bridging portion 25 are preferably rounded as shown at 25a and 25b. This increases the uniformity of stress distribution through the flange so that it is uniformly carried by the material of the flange 14 by the time it reaches the joined rib and groove 12'.

The stiffness of the flanges 14 and 15 is accomplished by making them thicker than the wall portions 10 and 11 but it is also contemplated that this can be accomplished by utilizing less resilient or more stiff plastic for the flanges 14 and 15 than for the walls 10 and 11. This can be accomplished at the die when the material is initially extruded by selectively providing the flange portions with plastic material that has a less resilient more stiff characteristic.

In operation the rib and groove elements are initially separated to fill the bag and then are joined, and the user grips the flange by placing his hand through the hand hole opening 16 lifting the bag. The lifting force is transmitted uniformly down through the flange and it is preferred that there is a substantial amount of material beneath the hand hole opening and the rib and groove 12 and 13 to accomplish this distribution of force. The hand hole opening 16 also has to be spaced a distance down from the top edge of the flanges 14 and 15 to prevent the material from bending too severely upwardly, inasmuch as this also distorts the flanges and this distortion is transmitted down to the rib and groove 12 and 13. In a preferred arrangement the hand hole opening is substantially equidistant between the top edge of the flanges 14 and 15 and the rib and groove elements 12 and 13.

The drawings and specification present a detailed disclosure of the preferred embodiments of the invention, and it is to be understood that this invention is not limited to the specific forms disclosed, but covers all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by the invention.

1. I claim as my invention:
   1. A bag construction comprising, first and second opposed walls formed of a plastic film providing a bag body, pressure interlocking releasable rib and groove elements of plastic in opposed positions along the top edge of said walls being integral and of one piece with the walls with a rib element being on a first wall and a groove element on a second wall,
   and means forming hand hole openings in each of said flanges with the upper edge of the opening in the first flange element being spaced above the center of the rib a given distance and the opening in the second flange element being spaced above the center of the groove element the same substantially exact distance so that the rib and groove elements are supported at their exact opposite position eliminating vertical carrying stresses which would tend to separate said elements.
   2. A bag construction in accordance with claim 1 wherein the thickness of the film of said flanges is at least twice the thickness of the film of the wall.
   3. A bag construction in accordance with claim 1 wherein a bridging film of plastic extends between the lower and upper edges of the hand hole openings of each of the flanges intermediate the lateral ends of the openings.
   4. A bag construction in accordance with claim 1 wherein said rib element has a stem portion and an enlarged body portion and said groove element has upper and lower arms embracing the body portion of the rib element so that the interlocked rib and groove elements provide a unitary closed element and wherein the film of the flanges is heavier than the film of the walls so that the flanges and interlocked rib and groove elements provide a coating unitary relatively non-distortable portion of the bag and distortions of material in the bag tend to be absorbed by the walls of the bag.
   5. A bag construction in accordance with claim 1 wherein the plastic film of said flanges is of a material having a greater stiffness than the film of said walls so that the flanges provide a relatively rigid support for said rib and groove elements compared with the walls.

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