SLIDER ZIPPER WITH HINGED SECONDARY LOCKING PROFILE

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ABSTRACT

The zipper assembly for a reclosable package or bag includes a zipper with exterior interlocking elements and flanges, and typically includes a slider. Additionally, a hinged secondary zipper formed from interior interlocking elements. A first interior interlocking element is hinged by an interior flange with respect to the first flange while the second interior interlocking element is attached to the second flange. The hinging of the secondary zipper causes forces or loads from within the reclosable package or bag to configure the secondary zipper in a shear configuration, rather than a peeling configuration, thereby increasing the interior burst strength of the package or bag.
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BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention
[0002] The present invention relates to a slider zipper with a hinged secondary locking profile. This slider zipper is particularly applicable to large packages or bags which require a high burst strength.

[0003] 2. Description of the Prior Art
[0004] Large packages, bags or pouches, such as those used for pet food, charcoal, cat litter and similar items are typically filled and sealed shut, with no reclosure mechanism. These packages may be formed by form fill and seal (FFS) or by other methods. Prior attempts to incorporate a zipper reclosure mechanism have been unsatisfactory due to the unique requirements of a large bag with a relatively heavy load. In particular, filling from the bottom places all of the load on the reclosure during filling. This load can cause the zipper reclosure to fail and open. Similarly, dropping a filled bag onto a pallet or similar rough handling during transportation, as well as exposing a bag to elevated temperatures during transportation, can cause the zipper reclosure to fail.
[0005] The prior art has addressed these deficiencies by folding over the end of the package, particularly a multi-wall package, using an expensive label as tape thereby allowing successful filling and transport. Similarly, the prior art has addressed these deficiencies by using a liner peel seal below the zipper and a solid tear line in the zipper flange to provide a fill and transport system that does not rupture and spill the contents. However, these methods have slow rates of production, as well as increased costs of production, and frequently do not result in a satisfactory product for the consumer.

[0006] Some further examples of the prior art which are not entirely satisfactory are found in U.S. Pat. No. 6,979,482 entitled “Multiwall Bag with Zipper and Fun” issued on Dec. 27, 2005 to Hartzell et al. and U.S. Pat. No. 7,090,904 entitled “Enhanced Slider Zipper Multiwall Bag and Associated Methods” issued on Aug. 15, 2006 to Hartzell et al.


OBJECTS AND SUMMARY OF THE INVENTION

[0008] It is therefore an object of the present invention to provide a zipper assembly for reclosable packages, particularly large bags, formed by form fill and seal or other methods, which provides for high burst strength in order to accommodate bottom or top filling as well as to allow the bags to withstand dropping or shock loading without the zipper reclosure bursting open.

[0009] It is therefore a further object of the present invention to provide such a zipper assembly without significant increases in manufacturing and related costs.

[0010] It is therefore a still further object of the present invention to provide a method of manufacture for a product achieving the above objects.

[0011] These and other objects are attained by providing a zipper assembly for reclosable packages, particularly large bags, wherein the flanges are joined to each other by a hinged secondary zipper. The hinging of the secondary zipper causes the external forces on a bag from bottom filling or shock loading (or forces from within the bag, typically created when the bag is dropped on its top or side) to redirect the forces so as to reconfigure the secondary zipper from a peel position to a shear position. As the force required to separate the secondary zipper in a shear position is much greater than the force required to separate the secondary zipper in a peelable position, the load-bearing capacity of the package or bag is increased.

DESCRIPTION OF THE DRAWINGS

[0012] Further objects and advantages of the invention will become apparent from the following description and from the accompanying drawings, wherein:
[0013] FIG. 1 is a perspective view of a typical reclosable package incorporating the zipper assembly of the present invention.
[0014] FIG. 2 is a cross-sectional view along the upper portion of plane 2-2 of FIG. 1, showing the cross section of the zipper assembly of the present invention.
[0015] FIG. 3 is a cross-sectional view along the upper portion of plane 2-2 of FIG. 1, showing the cross section of a first alternative embodiment of the zipper assembly of the present invention.
[0016] FIG. 4 is a cross-sectional view along the upper portion of plane 2-2 of FIG. 1, showing the cross section of a second alternative embodiment of the zipper assembly of the present invention.
[0017] FIG. 5 is a cross-sectional view of the zipper assembly of FIG. 3, shown with the zipper assembly under load so as to apply a shear force to the secondary zipper.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0018] Referring now to the drawings in detail wherein like numerals indicate like elements throughout the several views, one sees that FIG. 1 is a perspective view of a typical reclosable package 100, such as a large bag, which incorporates the zipper assembly 10 of the present invention. Reclosable package 100 may be formed by form fill and seal or by other methods. Reclosable package 100 includes a front wall 102 and a rear wall 104. Front and rear walls 102, 104 may be separate polymeric or multi-sheet panels sealed together at edges 106, 108. Alternatively, front and rear walls 102, 104 may be provided as a single tube. Front and rear walls 102, 104 may be formed from virtually any substrate in the packaging art—laminate films, plain poly films, multi-wall paper, and polypropylene woven layer bags or any combination or hybrid thereof. Additionally, gussets (not shown) may be provided between front and rear walls 102, 104 at edges 106, 108, or similarly at bottom 110.

[0019] Bottom 110 may be sealed shut, or folded over and then glued. Reclosable package 100 is typically bottom filled, so that the seal or glued fold may be formed after filling. However, other methods of filling, such as top filling before the application of zipper assembly 10, are equally applicable to the present invention.
Mouth 112 is formed at the top of the reclosable package 100 of FIG. 1, and is reclosably sealed by zipper assembly 10.

As shown in FIGS. 1-4, zipper assembly 10 is formed from polymeric materials and includes first interlocking profile 12, second interlocking profile 14 and optional slider 15 (see FIG. 1). First profile 12 includes first exterior interlocking element 16 and first flange 18. Similarly, second profile 14 includes second exterior interlocking element 20 and second flange 22. Optional slider 15 is mounted on first and second profiles 12, 14 and operates in a conventional manner by interlocking first and second exterior interlocking elements 16, 20 of respective first and second profiles 12, 14 when moved in a closing direction and separating first and second exterior interlocking elements 16, 20 of respective first and second profiles 12, 14 when moved in an opening direction.

The interior of first flange 18 is glued, sealed or otherwise attached to the exterior of front wall 102 and the interior of second flange 22 is glued, sealed or otherwise attached to the exterior of rear wall 104.

In the embodiments illustrated in FIGS. 2-4, secondary zipper 30, comprising first and second interior interlocking elements 32, 34, in a press-to-close configuration, joins the interior faces of first and second flanges 18, 22.

In the embodiment of FIG. 2, first interior interlocking element 32 includes engaging element 36 with teeth 38 extending therefrom, which is joined to second flange 40 by stem 42. Second flange 40 is sealed or otherwise joined to the interior of first flange 18 directly adjacent to secondary zipper 30. Additionally, first interior interlocking element 32 and other various elements of first profile 12 may be simultaneously extruded as a single piece. Second interior interlocking element 34 likewise includes teeth 48 extending therefrom which interlock with teeth 38 of engaging element 36. Second interior interlocking element 34 is sealed or otherwise joined to the interior of second flange 22. Additionally, second interior interlocking element 34 and the other various elements of second profile 14 may be simultaneously extruded as a single piece.

The embodiment of FIG. 3 includes the various elements of FIG. 2, except that secondary flange 40 extends from engaging element 36 to a portion of first flange 18 immediately below or proximate to first exterior interlocking element 16 thereby eliminating (or incorporating) stem 42. In the embodiments of FIGS. 2 and 3, the separation of engaging element 36 from first flange 18 by the use of secondary flange 40 provides a hinged arrangement wherein forces or loads on walls 102, 104 and hence first and second flanges 18, 22 (particularly forces or loads from within the package or bag 100) are redirected thereby causing the secondary zipper 30 to be subjected to shear forces, as shown in FIG. 5, rather than peeling forces, thereby greatly increasing the strength of the zipper assembly 10, and hence the strength of the bag 100. This can likewise be viewed as forces being directed to a location above the secondary zipper 30.

Similarly, FIG. 4 discloses an alternative embodiment wherein the secondary zipper 30 includes first and second interior interlocking elements 50, 52. First interlocking element 50 includes a male profile 54 with an arrowhead shape and first internal flange 56. First interior flange 56 can be sealed to first flange 18. Alternatively, male profile 54, first interior flange 56 and first flange 18 can be simultaneously extruded. Second interior interlocking element 52 includes a female profile 60 for receiving male profile 54. Female profile 60 is formed by opposed walls 62, 64 terminating in respective detent hooks 66, 68 for engaging the arrowhead shape of male profile 54. Second interior interlocking element 52 further includes second interior flange 70 extending therefrom. Second interior flange 70 further includes stem 72 and connecting portion 74 which is sealed to the interior of second flange 22, thereby forming a hinging relationship. Alternatively, second flange 22, second interior flange 70 (including stem 72 and connecting portion 74) and female profile 60 may be simultaneously extruded (in which case connecting portion 74 may be optional).

The resulting hinged configuration reacts to an internal load in the package or bag 100 by exerting a shear force against secondary zipper 30.

Those skilled in the art will recognize a broad range of possible contents for the packages 100, including, but certainly not limited to, charcoal, pet food, livestock or other animal food, cat litter, fertilizer, seeds, plant bulbs, rock salt, and foodstuffs.

Thus the several aforementioned objects and advantages are most effectively attained. Although preferred embodiments of the invention have been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

What is claimed is:
1. A zipper assembly for a reclosable package, including:
   a first profile with a first flange and a first exterior interlocking element;
   a second profile with a second flange and a second exterior interlocking element;
   a secondary zipper including a first interior interlocking element and a second interior interlocking element;
   an interior flange joining the first interlocking element to an interior face of the first flange; and
   the second interior interlocking element joined to an interior face of the second flange.
2. The zipper assembly of claim 1 wherein a load on the first and second flanges applies a shear force to the secondary zipper.
3. The zipper assembly of claim 1 wherein a load on the first and second flanges is redirected away from the secondary zipper to a location above the secondary zipper.
4. The zipper assembly of claim 1 further including a slider mounted on the first and second profiles, whereby movement of the slider in an opening direction separates the first and second exterior interlocking elements from each other and movement of the slider in a closing direction interlocks the first and second exterior interlocking elements together.
5. The zipper assembly of claim 1 wherein the secondary zipper is a press-to-close zipper.
6. The zipper assembly of claim 2 wherein the interior flange is joined to an interior of the first flange proximate to the first exterior interlocking element.
7. The zipper assembly of claim 6 wherein the first profile, the interior flange and the first interior interlocking element are extruded as a first single piece.
8. The zipper assembly of claim 7 wherein the second profile and the second interior interlocking element are extruded as a second single piece.
9. The zipper assembly of claim 2 wherein the interior flange is joined to an interior of the first flange adjacent to the secondary zipper.
10. The zipper assembly of claim 9 wherein the first profile, the interior flange and the first interior interlocking element are simultaneously extruded as a first single piece.

11. The zipper assembly of claim 10 wherein the second profile and the second interior interlocking element are extruded as a second single piece.

12. The zipper assembly of claim 9 further including a stem between the first interior interlocking element and the interior flange.

13. The zipper assembly of claim 12 wherein the first profile, the interior flange, the stem and the first interior interlocking element are simultaneously extruded as a first single piece.

14. The zipper assembly of claim 13 wherein the second profile and the second interior interlocking element are extruded as a second single piece.

15. A zipper assembly for a reclosable package, including: a first profile with a first exterior flange and a first exterior interlocking element; a second profile with a second exterior flange and a second exterior interlocking element; a secondary zipper including a first interior interlocking element attached to an interior of the first flange by a first interior flange and a second interior interlocking element attached to an interior of the second flange by a second interior flange.

16. The zipper assembly of claim 15 wherein the first profile, the first interior flange and the first interior interlocking element are simultaneously extruded as a first single piece.

17. The zipper assembly of claim 16 wherein the second profile, the second interior flange and the second interior interlocking element are simultaneously extruded as a second single piece.

18. The zipper assembly of claim 15 further including a slider mounted on the first and second profiles, whereby movement of the slider in an opening direction separates the first and second exterior interlocking elements from each other and movement of the slider in a closing direction interlocks the first and second exterior interlocking elements together.

19. The zipper assembly of claim 15 wherein the first interior interlocking element is one of a male and female profile and the second interior interlocking element is another of a male and a female profile.

20. The zipper assembly of claim 15 further including a stem formed between the second interior flange and the second exterior flange.

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