The reclosable package or bag includes a zipper which allows for high burst strength while maintaining easy opening capability. The zipper includes first and second profiles which include respective first and second exterior flanges which are glued or heat sealed to corresponding first and second panels of the package or bag. The first profile further includes an interior flange. A peel seal is formed between the interior flange and the second exterior flange. In this configuration, a high load on the panels puts the peel seal into a shear mode, which results in greatly increased strength of the peel seal and therefore of both the zipper and the package or bag. After the high load subsides, the peel seal returns to the configuration in which it can be separated by a much lower peel force, such as is applied by a consumer during ordinary opening.
HIGH-BURST, EASY-OPENING SLIDER ZIPPER FOR RECLOSEABLE PACKAGES OR BAGS

BACKGROUND OF INVENTION

[0001] 1. Field of the Invention
[0002] The present invention relates to a slider zipper which has a high burst strength, allowing the zipper to withstand dropping or shock loading without the zipper opening, while retaining an easy opening capability for the user.
[0003] 2. Description of the Prior Art
[0004] The prior art of high-burst easy-opening of reclosable packages or bags, has become well-developed, particularly in view of commonly assigned U.S. patent application Ser. No. 11/728,477 entitled “High Burst Zipper Assembly for Large Reclosable Packages”; U.S. patent application Ser. No. 11/728,405 entitled “Method of Producing High Burst Zipper Assemblies for Large Reclosable Packages” and application Ser. No. 11/728,413 entitled “Hot melt Adhesive Systems for Zipper Assemblies on Large Bag Constructions of Various Substrates”, all filed on Mar. 26, 2007. In particular, these references relate to large reclosable packages or bags which are bottom filled and which have a zipper with high burst resistance which further maintains relative ease in manual opening.
[0005] Further improvements are always sought in the art of reclosable packages or bags, particularly in achieving a high burst capability while maintaining relative ease in manual opening in reclosable packages or bags.

OBJECTS AND SUMMARY OF THE INVENTION

[0006] It is therefore an object of the present invention to provide a reclosable package or bag, including a reclosable zipper, wherein the zipper maintains a high burst strength.
[0007] It is therefore a further object of the present invention to provide a reclosable package or bag, including a reclosable zipper, wherein the zipper retains a relative ease in manual opening.
[0008] These and other objects are attained by providing a reclosable package, bag or other packaging, including a reclosable zipper. The reclosable zipper includes three distinct flanges in which one face of the middle or interior zipper flange is coated with a peel seal material. The peel seal is activated to seal the interior flange to the exterior flange of the opposing profile so as to render the top of the package or bag closed. This takes advantage of the characteristic of a peel seal having a much higher (as much as ten times) shear separating force than a peel separating force. To this end, a load placed on the package puts the seal into a shear mode thereby increasing the burst strength of the package or bag.
[0009] The zipper is configured and arranged to be sealed to the inside faces of the package or bag. Therefore, the external surfaces of the two exterior zipper flanges include a coextruded material that is heat activated to adhere to the substrate. Alternatively, the external surfaces of the zipper flanges may be adhered to the substrate with glue.
[0010] Typically, the zipper assembly is designed to be “post-applied” by insertion into the package or bag. The zipper assembly would typically be sealed to one interior face of the package or bag at the converter, to allow for subsequent filling at another site. The zipper assembly can be applied to one package or bag surface behind the gussets, which will allow for a full mouth opening, or the zipper can be applied over the gussets, which creates an elliptical opening for the filling operation.

[0011] The second face of the package or bag substrate is sealed to the zipper assembly after the filling operation.

[0012] However, it is likewise envisioned that this zipper assembly could be applied using other methods, such as, but not limited to, an in-line process using a converter’s pouch machine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Further objects and advantages of the invention will become apparent from the following description and from the accompanying drawings and claims, wherein:
[0014] FIG. 1 is a plan view of a package or bag, with the gussets shown in phantom, and further including the zipper of the present invention.
[0015] FIG. 2 is a cross-sectional view along plane 2-2 of FIG. 1.
[0016] FIG. 3 is an alternative cross-sectional view along plane 2-2 of FIG. 1, illustrating the peel seal being put into shear mode by a load on the walls of the package or bag.
[0017] FIG. 4 is a first alternative cross-sectional view along a plane similar to that of plane 4-4 of FIG. 1, but prior to the attachment of the second exterior flange and the completion of the package or bag.
[0018] FIG. 5 is a second alternative cross-sectional view along a plane similar to that of plane 4-4 of FIG. 1, but prior to the attachment of the second exterior flange and the completion of the package or bag.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] Referring now to the drawings in detail wherein like numerals indicate like elements throughout the several views, one sees that FIG. 1 is a plan view of a typical package or bag 100, including the zipper 10 of the present invention.
[0020] Package or bag 100 includes first and second coextensive panels of web or film 102, 104, respectively, which are typically formed of polymeric material, multi-wall paper or similar packaging material. The package or bag 100 may be envisioned to be dimensioned to hold between three and thirty-three pounds of product, but can certainly be provided in a range of other sizes.
[0021] First and second panels 102, 104 are joined at the bottom 106 (typically square pre-made) and the sides 108, 110 thereby forming a mouth 112 between the upper edges of the first and second panels 102, 104. Gussets 114, 116 are shown in phantom and are further formed at sides 108, 110, respectively (also see FIGS. 4 and 5 for the details of the gussets 114, 116).
[0022] Zipper 10 is sealed to the interior of the upper edges of the first and second panels 102, 104 thereby making mouth 112, and hence package or bag 100, reclosable.
[0023] Zipper 10 is shown in detail in the cross-sectional view of FIG. 2. Zipper 10 includes first profile 12 and second profile 14. First profile 12 includes first interlocking element 16 from which stem 18 descends. First exterior flange 20 and interior flange 22 descend from stem 18 in a Y-shaped configuration. The interior face 26 of first exterior flange 20 is (optionally) provided with first layer of heat-resistant coating 28 while the interior face 30 of interior flange 22 is (option-
ally) provided with second layer of heat-resistant coating 32. The optional first and second layers of heat resistant coating 28, 32, typically of nitrocellulose, face each other and are intended to prevent or minimize any sealing of first exterior flange 20 to interior flange 22 during any heat sealing or other processes involving heat.

[0024] Second profile 14 includes second interlocking element 40 from which second exterior flange 42 descends. Peel seal 44 is formed between the exterior face 46 of interior flange 22 and the interior face 43 of second exterior flange 42. This is typically done by coating the exterior face 46 of interior flange 22 with peel seal material and activating the peel seal so as to join the interior face 43 of second exterior flange 44. As peel seal 44 is typically not resalable after the initial opening by the consumer, this provides a tamper-evident quality.

[0025] Additionally, as shown in FIG. 1, a slider 50 is typically mounted on first and second profiles 12, 14 of zipper 10 and operates in the conventional manner of separating the first and second interlocking elements 16, 40 when moved in an opening direction and interlocking the first and second interlocking elements 16, 40 when moved in a closing direction (opposite the opening direction).

[0026] The exterior faces of first and second exterior flanges 20, 42 are sealed, glued, or otherwise joined to the interior of respective first and second co-extensive panels 102, 104 of web or film. In the case of heat sealing, the exterior faces of first and second exterior flanges 20, 42 are provided with a material, typically coextruded, that is heat activated to adhere zipper 10 to the first and second co-extensive panels 102, 104.

[0027] Packages or bags 100 of this configuration are typically top filled prior to the attachment, or the completion of the attachment of zipper 10 to package or bag 100. Typically, one of the first and second exterior flanges 20, 42 is sealed to the interior of the corresponding first or second co-extensive panel 102, 104 at the converter to allow for filling with product at another site. The selected exterior flange (illustrated as second exterior flange 42 in FIGS. 4 and 5) can be sealed to one co-extensive panel (illustrated as second panel 104 in FIGS. 4 and 5) behind the gussets 114, 116 as shown in FIG. 5, which will allow for a full opening of mouth 112. Alternatively, the selected exterior flange can be sealed to one co-extensive panel over the gussets 114, 116, which will create an elliptical opening as shown in FIG. 5.

[0028] The remaining exterior flange is typically sealed to the corresponding panel after the filling process.

[0029] In the resulting configuration, a load or force on first and second co-extensive panels 102, 104, such as might be caused by dropping the full package or bag 100, will extend the panels 102, 104 as shown in FIG. 3, thereby exerting a shear force on peel seal 44 and generally directing the load away from the interlocked first and second interlocking elements 16, 40. As a peel seal can typically withstand many times more force in the shear configuration than in the peel configuration, this provides a zipper 10, and hence a package or bag 100, which can withstand high burst forces (with peel seal 44 in the shear mode) while maintaining the easy open characteristics of the operation of the slider 50 (thereby separating the first and second interlocking elements 16, 40) and opening the peel seal 44 in the peel mode, with substantially reduced force, such as is typically manually done by a consumer after the high burst forces have subsided.

[0030] 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.

1. A method for manufacturing reclosable packages, comprising the steps of:
   - providing a zipper assembly, the zipper assembly including interlocking elements and a separable connection, wherein a load on the zipper assembly causes a shear force on the separable connection;
   - providing material for walls of the reclosable packages;
   - applying a hot melt adhesive to the zipper assembly or the walls of the reclosable package; and
   - bringing the zipper assembly and the walls of the reclosable package together whereby the hot melt adhesive forms a bond therebetween.

2. The method for manufacturing reclosable packages of claim 1 wherein the applying step is performed by a nozzle.

3. The method of manufacturing reclosable packages of claim 2 wherein the nozzle applies the hot melt adhesive in a downward direction.

4. The method of claim 1 further including the step of temporarily applying pressure the zipper assembly to the walls of the reclosable package.

5. The method of claim 3 wherein the step of applying a hot melt adhesive is performed by a station which is parallel to the step of bringing the zipper assembly and the walls of the reclosable package together.

6. The method of claim 1 wherein the step of applying a hot melt adhesive performed by a station which is divergent with the step of bring the zipper assembly and the walls of the reclosable package together.

7. The method of claim 1 further including the steps of filling the package with contents through a bottom of the package and sealing the bottom of the package.

8. The method of claim 1 further including the step of filling the package with contents through the top of the package.

9. The method of claim 1 further including the step of forming gussets between the walls of the package.

10. The method of claim 1 further including the step of modifying the surface energy of at least a portion of the zipper assembly and the walls of the reclosable packages.

11. The method of claim 1 wherein the material for walls of the reclosable package is a multi-wall paper laminate.

12. The method of claim 1 wherein the material for walls of the reclosable package is a woven polypropylene.

13. The method of claim 1 wherein the material for walls of the reclosable package is a laminate construction.

14. A method for manufacturing reclosable packages, comprising the steps of:
   - providing a zipper assembly;
   - providing material for walls of the reclosable packages;
   - applying a hot melt reactive adhesive to the zipper assembly or the walls of the reclosable package; and
   - bringing the zipper assembly and the walls of the reclosable package together whereby the hot melt reactive adhesive forms a bond therebetween.

15. The method for manufacturing reclosable packages of claim 14 wherein the applying step is performed by a nozzle.
16. The method of manufacturing reclosable packages of claim 15 wherein the nozzle applies the hot melt reactive adhesive in a downward direction.

17. The method of claim 14 further including the step of temporarily applying pressure the zipper assembly to the walls of the reclosable package.

18. A method for manufacturing reclosable packages, comprising the steps of:
   providing a zipper assembly;
   providing material for walls of the reclosable packages;
   applying a hot melt cross-linkable reactive adhesive to the zipper assembly or the walls of the reclosable package; and
   bringing the zipper assembly and the walls of the reclosable package together whereby the hot melt cross-linkable reactive adhesive forms a bond therebetween.

19. The method for manufacturing reclosable packages of claim 18 wherein the applying step is performed by a nozzle.

20. The method of manufacturing reclosable packages of claim 19 wherein the nozzle applies the hot melt cross-linkable reactive adhesive in a downward direction.

21. The method of claim 18 further including the step of temporarily applying pressure the zipper assembly to the walls of the reclosable package.

22. A method for manufacturing reclosable packages, comprising the steps of:
   providing a zipper assembly;
   providing material for walls of the reclosable packages;
   applying a hot melt cross-linkable polyurethane reactive adhesive to the zipper assembly or the walls of the reclosable package; and
   bringing the zipper assembly and the walls of the reclosable package together whereby the hot melt cross-linkable polyurethane reactive adhesive forms a bond therebetween.

23. The method for manufacturing reclosable packages of claim 22 wherein the applying step is performed by a nozzle.

24. The method of manufacturing reclosable packages of claim 23 wherein the nozzle applies the hot melt cross-linkable polyurethane reactive adhesive in a downward direction.

25. The method of claim 22 further including the step of temporarily applying pressure the zipper assembly to the walls of the reclosable package.

26. A method for manufacturing reclosable packages suitable for packaging a rated load, comprising the steps of:
   providing a zipper assembly;
   providing material for walls of the reclosable packages;
   providing an adhesive chosen to maintain adhesion between the walls of the reclosable package and the zipper assembly for at least 72 hours at 140 degrees Fahrenheit, with at least 2.5 times the rated load applied to the zipper assembly;
   applying the adhesive to the zipper assembly or the walls of the reclosable package; and
   bringing the zipper assembly and the walls of the reclosable package together whereby the adhesive forms a bond therebetween.

27. The method for manufacturing reclosable packages of claim 26 wherein the applying step is performed by a nozzle.

28. The method of manufacturing reclosable packages of claim 27 wherein the nozzle applies the adhesive in a downward direction.

29. The method of claim 26 further including the step of temporarily applying pressure the zipper assembly to the walls of the reclosable package.

30. The method of claim 1 further comprising the step of applying surface energy to a portion of the walls or zipper assembly.

31. The method of claim 30 wherein the step of applying surface energy comprises the step of corona discharge or plasma treatment.

32. The method of claim 18 further comprising the step of applying surface energy to a portion of the walls or zipper assembly.

33. The method of claim 32 wherein the step of applying surface energy comprises the step of corona discharge or plasma treatment.

34. The method of claim 22 further comprising the step of applying surface energy to a portion of the walls or zipper assembly.

35. The method of claim 34 wherein the step of applying surface energy comprises the step of corona discharge or plasma treatment.

36. The method of claim 26 further comprising the step of applying surface energy to a portion of the walls or zipper assembly.

37. The method of claim 36 wherein the step of applying surface energy comprises the step of corona discharge or plasma treatment.

38. The method of claim 1 wherein a bottom of the package is formed opposite from the zipper assembly and further including the steps of filling the package with contents through the bottom and subsequently closing the bottom.

39. The method of claim 18 wherein a bottom of the package is formed opposite from the zipper assembly and further including the steps of filling the package with contents through the bottom and subsequently closing the bottom.

40. The method of claim 22 wherein a bottom of the package is formed opposite from the zipper assembly and further including the steps of filling the package with contents through the bottom and subsequently closing the bottom.

41. The method of claim 26 wherein a bottom of the package is formed opposite from the zipper assembly and further including the steps of filling the package with contents through the bottom and subsequently closing the bottom.

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