A package having a reclosable pour spout with a slider-operated zipper. The package comprises: a receptacle having an interior volume and a spout that, when in an opened state, allows access to the interior volume, the receptacle having first and second sides, and the spout starting near the first side and extending toward but not coming near the second side; a length of flexible zipper arranged to close the spout when the zipper is closed; and a slider mounted to the zipper, the slider being movable in a closing direction for closing the zipper and movable in an opening direction for opening the zipper.
PACKAGES HAVING RECLOSEABLE POUR SPOUT WITH SLIDER-OPERATED ZIPPER

BACKGROUND OF THE INVENTION

[0001] This invention generally relates to packaging for containing pourable contents such as breakfast cereal, snack food product and the like. More particularly, the invention relates to flexible cereal bags provided with a reclosable pour spout.

[0002] It is known to package breakfast cereal by sealing the dry cereal product inside a plastic bag and then placing the filled bag within a paperboard box or carton. A disadvantage with this type of packaging is that once the sealed bag is opened, it is difficult to reseal the bag in a moisture-tight manner necessary to maintain freshness of the cereal product.

[0003] In order to close a conventional cereal bag after the sealed top end has been opened, the user will typically fold the opened end of the bag over onto itself one or more times. Closing the bag in this way is awkward. Oftentimes the user will simply stuff the opened end of the bag down into the box without regard to properly sealing the opening. As additional serving portions of the cereal product are emptied from the bag, it becomes more difficult to roll up or fold the empty portion of the bag within the depth of the box or carton. However, even when the opened end of the plastic bag is folded or rolled up, an effective seal cannot be assured since the plastic material has a degree of stiffness and does not adhere to itself.

[0004] It is also difficult to open the sealed top end of conventional cereal bags without also ripping or tearing the walls of the bag. An unevenly opened bag may have an overhanging portion that blocks or traps cereal during pouring. In the case where the bag is used as a liner within a box, an overhanging portion of the ripped open bag may also cause spillage of the cereal contents into the crevice space between the bag and the box as the box is returned to the upright position.

[0005] U.S. Pat. No. 6,857,779 proposes to solve the foregoing problems by providing a flexible bag having a reclosable pour spout. The bag has a first closure region comprising a top seal and a second closure region below the first closure region and comprising an inner heat seal that extends across a portion of the width of the bag and a reclosable fastener that extends across the remainder of the width of the bag. The reclosable fastener extends upward at an angle from the end of the inner heat seal. The upper sealed portion of the bag above the inner heat seal and reclosable fastener can be removed by severing at a tear line that extends across the full width of the bag but remains above the inner heat seal and above the angled fastener. When the angled fastener is opened, the opened portion of the bag forms a reclosable spout. Other embodiments show the fastener in horizontal, vertical and downwardly angled positions. The reclosable fastener is a zipper of the type used in sandwich and food storage bags.

[0006] U.S. Patent Application Pub. No. 2004/0208402 also discloses a package having a reclosable spout in the form of a fastener strip that does not extend across the full width of the package. An embodiment is disclosed wherein the bag has side gussets and the fastener is W-shaped.

[0007] Neither of the prior art references discussed above discloses a slider-operated reclosable pour spout. Reclosable bags having slider-operated zippers are generally more desirable to consumers than bags having zippers without sliders because the slider eliminates the need for the consumer to align the interlockable zipper profiles before causing those profiles to engage.

[0008] There is a need for a flexible bag having a slider-operated reclosable pour spout that can be mass produced using conventional packaging equipment.

BRIEF DESCRIPTION OF THE INVENTION

[0009] The present invention is directed to flexible bags having a slider-operated reclosable pour spout.

[0010] One aspect of the invention is a package comprising: a receptacle having an interior volume and a spout that, when in an opened state, allows access to the interior volume, the receptacle having first and second sides, and the spout starting near the first side and extending toward but not coming near the second side; a length of flexible zipper arranged to close the spout when the zipper is closed; and a slider mounted to the zipper, the slider being movable in a closing direction for closing the zipper and movable in an opening direction for opening the zipper.

[0011] Another aspect of the invention is a package comprising: a receptacle having an interior volume and comprising first and second walls, the first wall having a width dimension in a transverse direction when the first wall is in a planar state, the width dimension being the distance between first and second side edges of the first wall; a zipper joined to the receptacle in first and second zones of zipper/receptacle jointer, the zipper comprising first and second zipper strips, the first zipper strip comprising a first closure profile and a first flange having one portion connected to the first closure profile and another portion joined to the first wall in the first zone of zipper/receptacle jointer, and the second zipper strip comprising a second closure profile and a second flange having one portion connected to the second closure profile and another portion joined to the second wall in the second zone of zipper/receptacle jointer; a slider mounted to the first and second closure profiles, the first and second closure profiles being interlockable with each other to close the zipper when the slider is moved in a closing direction and being disengangeable from each other for opening the zipper when the slider is moved in an opening direction; a first slider end stop positioned to stop the slider from moving further in the closing direction; and a second slider end stop positioned to stop the slider from moving further in the opening direction, wherein the distance between the first slider end stop and the first side edge is substantially smaller than the distance between the second slider end stop and the second side edge, the slider being movable between the first and second slider end stops.

[0012] A further aspect of the invention is a package comprising: a piece of bag making film sealed at a top seal of predetermined length, at a bottom seal and at a first vertical seal that extends from the top seal to the bottom seal to form a tube that is closed at both ends, the closed tube having an interior volume; a zipper disposed within the interior volume and comprising first and second mutually interlockable zipper strips joined to confronting portions of the tube; a slider mounted to the zipper, the first and second
zipper strips being interlockable with each other to close the zipper when the slider is moved in a closing direction and being disengagable from each other for opening the zipper when the slider is moved in an opening direction; a first slider end stop positioned to stop the slider from moving further in the closing direction; and a second slider end stop positioned to stop the slider from moving further in the opening direction, wherein the distance between the first slider end stop and one end of the top seal is substantially smaller than the distance between the second slider end stop and the other end of the top seal, the slider being movable between the first and second slider end stops.

[0013] Other aspects of the invention are disclosed and claimed below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a drawing showing a front view of a package having a slider-operated reclosable pour spout and constructed in accordance with one embodiment of the invention. The hatching in FIG. 1 (and other front views) indicates the positions of various seals. The dashed lines indicate seals present in alternative embodiments.

[0015] FIG. 2 is a drawing showing a sectional view of the package depicted in FIG. 1. The section is taken through a vertical plane indicated by section line 2-2 in FIG. 1. Each series of Xs in FIG. 2 (and other sectional views) indicates a respective permanent heat seal.

[0016] FIG. 3 is a drawing showing a front view of a package having a slider-operated reclosable pour spout and constructed in accordance with another embodiment of the invention.

[0017] FIG. 4 is a drawing showing a front view of the package of FIG. 1 after confronting upper corners of the front and rear walls have been torn off to expose the slider and closure profiles. The dashed rectangle surrounding the package represents a cardboard box.

[0018] FIG. 5 is a drawing showing a sectional view of a package that differs from the package shown in FIG. 1 by having side gussets. The section is taken in a horizontal plane that intersects the zipper flanges.

[0019] FIG. 6 is a drawing showing a sectional view of a portion of a gusseted package in accordance with a further embodiment of the invention. The section is taken in a horizontal plane that intersects the zipper flanges.

[0020] FIG. 7 is a drawing showing a sectional view of a portion of a package having a tamper-evident feature below the closure profiles. The section is taken in a vertical plane that intersects the zipper.

[0021] FIG. 8 is a drawing showing a sectional view of a portion of a package having a peel seal above the closure profiles. The section is taken in a vertical plane that intersects the zipper.

[0022] FIG. 9 is a drawing showing a front view of the package partially depicted in FIG. 8.

[0023] Reference will now be made to the drawings in which similar elements in different drawings bear the same reference numerals.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Various embodiments of the invention will now be described. Each of the packages described below may be manufactured on a VFFS machine. Each disclosed embodiment comprises a tube of flexible packaging material, such as thermoplastic bag making film, formed by wrapping the packaging material around a fill tube and then sealing confronting longitudinal edges together, e.g., by conventional conductive heat sealing. Either a lap seal or a fin seal can be formed. The resulting tube is cross sealed to form a bottom seal. The pocket above the bottom seal is then filled with product. Then the tube is again cross sealed at an elevation above the product fill line to form a top seal. The top and bottom cross seals are typically formed by conductive heat sealing using reciprocating heated sealing bars. Other seals are made as will be described in detail below.

[0025] The embodiments disclosed hereinafter also incorporate structure that can be configured to form a pour spout, that pour spout being reclosable by means of a slider-operated zipper-type fastener that starts at one side of the package and extends toward but does not approach or come near the other side of the package. Preferably, the zipper has a length not greater than half of the width of the package.

[0026] The technology for transverse application of slider-operated zippers at spaced intervals on an intermittently advancing web of bag making film (during dwell times) at a station upstream of a VFFS machine is well known. A distal portion of a slider-carrying fastener tape is oriented transversely in overlaying relationship with a tensioned section of a web of bag making film situated upstream of the VFFS machine. A distal section of the fastener tape is then severed from the remainder of the slider-carrying fastener tape to form a slider/zipper assembly that will be joined to the web. The equipment for manufacturing the slider-carrying fastener tape may be placed in line with the zipper application station. Alternatively, the slider-carrying fastener tape may be manufactured at a different site, wound onto a supply reel that is transported to the site of the VFFS machine, and then paid out from that supply reel during operation of the VFFS machine.

[0027] The fastener tape comprises a pair of zipper strips, each zipper strip being formed by extruding thermoplastic material to form a respective closure profile and zipper flange connected thereto. The closure profiles have complementary shapes that interlock, the shapes being constant in the lengthwise direction. The fastener tape may be manufactured using a process involving concurrent formation of slider end stop structures and sealing of zipper flanges at spaced intervals. This forming/sealing operation is typically carried out by applying ultrasonic wave energy to the zipper material. However, instead of ultrasonic wave energy, thermal or conduction heat sealing methods may be used. Sufficient energy (ultrasonic or thermal) is applied to the zipper or closure profiles in a first zone and to the zipper flanges in a second zone to soften and merge the plastic material in both zones, the merged material forming a zone of fusion upon cooling. Each zone of fusion has a plane of symmetry, the planes of symmetry being spaced along the fastener tape at intervals equal to one zipper length. Each zone of fusion is also shaped to form a pair of slider end stops that are joined at their backs until when the fastener
tape is cut along the plane of symmetry at the zipper application station. Alternatively, the zipper strips could be fused together and a pair of clips or other slider end stop devices could be attached to each region of fused zipper strips, a vertical cut being made later through the zone of fusion and between the attached slider end stops.

[0028] To manufacture the embodiments disclosed herein, a distal portion of a fastener tape comprising interlocked zipper strips with sliders mounted thereto is advanced in a transverse direction to a zipper application station. The sliders are spaced at regular intervals along the length of the tape, one slider per zipper-length section of fastener tape. At the zipper application station, a distal zipper-length section of fastener tape with a slider mounted thereto is severed from the remainder of the fastener tape. A flange of one zipper strip of the severed section is joined to the web (e.g., by conductive heat sealing) while the web is stationary. The other zipper strip is held in place only by the interlocking of its closure profile with that of the zipper strip that has been joined to the web. In accordance with the embodiments disclosed hereinafter, the zipper is oriented transversely on the web and has a length and position such that, in the final package, the zipper will not be centered relative to the sides of the package, but rather will start at or near one side and extend part way across the package, i.e., the distance between the far end of the zipper and the far side of the package is greater than the distance between the near end of the zipper and the near side of the package. Preferably the zipper will end at or near a vertical centerline of the package, i.e., preferably the length of the zipper is not greater than half of the width of the final package.

[0029] After zipper application, the zipper-carrying web is pulled through the VFFS machine, i.e., is advanced in the machine direction, by a distance equal to the height of one package. As the zipper-carrying web is advanced intermittently through the VFFS machine, the previously described forming, filling and sealing steps are performed. After forming and filling, the flange of the other zipper strip will be joined to the web. In some embodiments (see the description below of the embodiments shown in FIGS. 1, 3 and 9), a vertical seal that extends from the top seal to at least the zipper flange/web seal is also formed. Optionally, those same embodiments may also include a peel seal. The peel seal may be above or below the slider-operated zipper.

[0030] A package in accordance with one embodiment of the invention is shown in FIGS. 1 and 2. FIG. 1 shows a front view, while FIG. 2 shows a sectional view taken along the plane indicated by line 2-2 in FIG. 1. The package comprises a receptacle 2 that is optionally placed inside a cardboard box or carton, represented in FIG. 1 by the large dashed rectangle 64 surrounding the receptacle 2. In this embodiment, the receptacle 2 comprises a front wall 12 that is connected to a rear wall (not visible in FIG. 1; item 14 in FIG. 2) at respective folds on the opposing sides of the package. The marginal portions at the tops of the front and rear walls are joined by conductive heat sealing to form a top seal 16 (indicated by a band-shaped zone of hatching in FIG. 1 and by Xs in FIG. 2). Similarly, the marginal portions at the bottoms of the front and rear walls are joined by conductive heat sealing to form a bottom seal 18 (also indicated by a band-shaped zone of hatching in FIG. 1 and by Xs in FIG. 2). The rear wall comprises a vertical fin or lap seal (not visible in FIG. 1), where confronting marginal portions of the web of bag making film wrapped around the fill tube of the VFFS machine were heat sealed together to form a tube as previously described.

[0031] The package shown in FIGS. 1 and 2 further comprises a slider/zipper assembly 4 that starts near the left side of the receptacle and has a length not greater than half of the width of the front wall 12. The assembly 4 comprises a pair of zipper strips 6 and 8 and a slider 10 mounted thereto. The slider 10 is of the straddling type, i.e., the slider has no separating finger and thus requires that slider end stops be provided at the ends of the zipper. As seen in FIG. 1, the ends of the zipper strips 6 and 8 are fused together and deformed at their respective ends to form respective slider end stops 38 and 40, the slider being movable along the zipper between the slider end stops. Alternatively, clips or other slider end stop devices could be attached to the ends of the zipper. It should be appreciated, however, that the present invention does not require the use of a straddling-type slider. Alternatively, a slider having a plow or separating finger can be employed, in which case the zipper strip joints at the ends of the zipper can serve as slider end stops.

[0032] As seen in FIG. 2, the zipper comprises a pair of interlockable zipper strips 6 and 8 having respective closure profiles 34 and 30 and respective zipper flanges 36 and 32 having one end connected to and extending from the respective closure profiles. The zipper flange 32 is heat sealed to the front wall 12 in a band-shaped zone of jointer 24 that extends generally parallel to the closure profile 30. Similarly, the zipper flange 36 is heat sealed to the rear wall 14 in a band-shaped zone of jointer 26 that extends generally parallel to the closure profile 34. The closure profiles 30 and 34 have complementary (i.e., interlocking) shapes. Although FIG. 2 shows a rib and groove arrangement, the closure profiles of the zipper strips may take any form. Preferably, the slider/zipper assembly is of the type disclosed in U.S. Pat. No. 6,047,450, in which the slider has no separating finger and the closure profiles provide a moisture-tight, if not airtight, seal when the zipper is fully closed. Alternatively, the zipper may comprise interlocking alternating hook-shaped or ball-shaped closure elements. The zipper strips 6 and 8 are made of thermoplastic material. The preferred zipper material is polyethylene or polypropylene. To facilitate the jointer of the zipper flanges to the receptacle walls, the zipper flanges may have a surface layer of sealant material that melts at a temperature lower than the melting point of the material making up the remainder of the zipper.

[0033] The closure profiles 30 and 34 are engaged, i.e., interlocked, with each other by moving the slider 10 in the closing direction from one end of the zipper to the other. Conversely, the closure profiles 30 and 34 are disengaged from each other by moving the slider 10 in the opposite direction. The slider 10 may be made in multiple parts and welded together or the parts may be constructed to be snapped together. The slider may also be of one-piece construction. The slider can be made using any desired method, such as injection molding. The slider can be molded from any suitable plastic, such as nylon, polypropylene, polystyrene, acetal, polyethylene terephthalate, high-density polyethylene, polycarbonate, or ABS.

[0034] As seen in FIG. 1, the receptacle 2 is provided with a first line of weakened tear resistance 42 (indicated by a dotted line) that extends from the left side edge of the front
wall 12 to the end of the zipper and a second line of weakened tear resistance 44 (also indicated by a dotted line) that extends from the top edge of the front wall to the end of the first line of weakened tear resistance 42. The tear line 42 is disposed generally parallel to and at an elevation slightly below the closure profile 30, whereas the tear line 44 is disposed generally vertically, i.e., in parallel with the side edges of the front wall 12. In the case wherein the zipper is disposed generally horizontally, as depicted in FIG. 1, the tear line 44 is generally perpendicular to the tear 42. The rear wall has tear lines (not visible in FIG. 1) that are the mirror image of the tear lines in the front wall. FIG. 2 shows a horizontal tear line 42 in rear wall 14 disposed at the same elevation as tear line 42 in front wall 12, namely, at an elevation below the closure profiles 30 and 34 and below the lowermost portion of the slider 10. These tear lines in the front and rear walls facilitate the tearing away of the corner of the receptacle (including a portion of top seal 16), thereby exposing the slider 10 and the closure profiles 30 and 34. FIG. 4 shows the same package as the package shown in FIG. 1 except that the corner of the receptacle has been torn away along the tear lines and the box is not shown. To facilitate tearing away of the corner of the receptacle, instead of the horizontal and vertical tear lines meeting at a right angle, a curved or angled tear line connecting segment may be provided in place of the right-angled intersection depicted in FIG. 1. The tear lines can be formed by any conventional means, including lines of spaced perforations, laser scoring, and so forth.

[0035] The exposed zipper seen in FIG. 4 forms a reclosable pouring spout. When the slider is in a position abutting the slider end stop 38 (indicated by the solid rectangle 10 in FIG. 4), the zipper is closed. When the slider is moved to a position abutting the slider end stop 40 (indicated by the dashed rectangle 10 in FIG. 4), the zipper is fully open.

[0036] The receptacle 2 shown in FIGS. 1 and 4 further comprises a generally horizontal peel seal 20 that extends the length of the zipper at an elevation below the zipper flanges and a generally vertical seal 22 that extends from the top seal 16 to the peel seal 20. (Alternatively, the peel seal 20 could be formed between the zipper flanges.) The peel seal 20 is formed by activating a band-shaped strip of peelable seal material, e.g., by applying a predetermined amount of heat and pressure for a duration of time sufficient to activate the peelable seal material without forming a permanent seal. The vertical seal 22 is formed by joining respective portions of the front and rear walls together in a band-shaped zone, e.g., by conductive heat sealing. The peel seal 20 and vertical seal 22, in conjunction with the top seal 16, the bottom seal 18 and the vertical fin or lap seal (not shown in the drawings) by which the tube was formed, provide air-tight boundaries that define the compartment in which the product P (see FIG. 2), such as dry cereal, is contained. Like the top seal 16, the peel seal 20 and vertical seal 22 are formed after the compartment or pocket has been filled with product through the open top of the receptacle. The peel seal 20 also provides additional tamper evidence. Even after the corner of the receptacle has been torn off and the zipper has been opened, the intact peel seal blocks access to the product compartment and must be ruptured by the consumer. The vertical seal 22 blocks product from entering the interior volume above the zipper and the interior volume between the zipper and the seal, except through the ruptured peel seal and opened zipper.

[0037] Optionally, the vertical seal may overlap a portion of the zipper, capturing the slider end stop 40 and corresponding flange portions between the front and rear walls. In accordance with an alternative embodiment, the vertical seal 22 could terminate adjacent the slider end stop 40, with a vertical peel seal being formed that extends from the end of the horizontal peel seal 20 to the end of the shortened vertical seal, the various seals being contiguous so that a seal without gaps is formed.

[0038] In accordance with a further alternative embodiment, the vertical seal 22 can be eliminated and instead, the front and rear walls of the receptacle can be heat sealed together in a band-shaped zone 28 (indicated by dashed lines in FIG. 1) that is an extension of the horizontal band-shaped zone 24 of zipper flange-to-receptacle wall joiner. The horizontal seal 28 can be formed concurrently with the sealing of the second zipper flange to the web after filling the pocket. The horizontal seal 28 extends to the far side of the bag, so that product is blocked from leaving the receptacle except through the open zipper. In conjunction with the formation of the horizontal seal 28, the peel seal 20 can be extended across the full width of the receptacle, the extension 20 of the peel seal being indicated by dashed lines in FIG. 1. In accordance with this variation, after the corner of the receptacle has been torn off and the zipper has been opened, the peel seal 20 can be ruptured part way or all the way across the width of the bag. The horizontal seal 28 will block product, other than product that has passed through the open zipper, from entering the space above the zipper, i.e., from passing around the zipper at the central portion of the receptacle.

[0039] As should be apparent from the foregoing description, initially the receptacle 2 is sealed, the slider 10 is in a park position (seen in FIG. 1) wherein the zipper is closed, and the peel seal 20 is intact. To remove product from the sealed receptacle, first the corner of the receptacle is torn along the tear lines, then the slider is moved to a park position (indicated by the dashed rectangle 10 in FIG. 4) wherein the zipper is open, and lastly the peel seal 20 is ruptured to access the product compartment. Using the exposed open zipper as a pouring spout, the box 64, with the package inside, can then be turned upside-down and the pourable product (e.g., cereal) can be poured out through the ruptured peel seal and then through the open zipper.

[0040] Another embodiment in accordance with the present invention is depicted in FIG. 3. The only difference between the respective embodiments shown in FIGS. 1 and 3 is that in the FIG. 3 embodiment, a fin seal 46 is positioned at one side of the receptacle instead of down the center of the rear wall. The fin seal 46 extends from the top seal 16 to the bottom seal 18.

[0041] In accordance with a further embodiment of the invention, the sides of the receptacle may be gusseted. The technology for making gusseted bags on a VFFS machine is well known and typically involves the use of opposing reciprocating gusset bars to form fold lines at opposing sides of the tube of bag making film before the tube is filled with product. Each side gusset comprises a pair of gusset panels connected to each other at a central fold in the gusset and respectively connected to the front and rear walls at a respective side of the receptacle. FIG. 5 is a sectional view of a gusseted bag wherein the section is taken along a
horizontal plane that intersects the zipper flanges 32 and 36, which are respectively joined to the front and rear walls 12 and 14 of the receptacle, as previously described. The rear wall 14 incorporates a lap seal 21, which was formed by wrapping a web of bag making film around the fill tube of a VFFS machine, the width of the web and the diameter of the fill tube being selected so that the marginal portions of the web overlap and can be joined to each other as shown. In FIG. 5, the sectional plane also passes through a vertical seal 22 formed by joining the front wall 12 to the rear wall 14 in a band-shaped zone in the manner previously described. The gusseted receptacle has side gussets 50 and 52. Side gusset 50 comprises gusset panels 54 and 56, which are connected to each other at a central fold in side gusset 50. Side gusset 52 comprises gusset panels 58 and 60, which are connected to each other at a central fold in side gusset 52. The gusset panels 54 and 58 are also connected to respective side edges of the rear wall 14 by respective folds, while the gusset panels 56 and 60 are also connected to respective side edges of the front wall 12 by respective folds.

[0042] Although not shown in FIG. 5, the uppermost portions of the gusset panels 54, 56 are captured in the top seal of the receptacle at one end thereof and the uppermost portions of the gusset panels 58, 60 are captured in the top seal of the receptacle at the other end thereof. Similarly, the lowermost portions of the gusset panels 54, 56 are captured in the bottom seal of the receptacle at one end thereof and the lowermost portions of the gusset panels 58, 60 are captured in the bottom seal of the receptacle at the other end thereof. In the embodiment depicted in FIG. 5, the zipper differs from the zipper incorporated in the embodiment shown in FIG. 1 in that the ends of the zipper strips adjacent the gusset 50 are not joined together. During manufacturing, the slider-zipper assembly is installed with the slider at a zipper partly opened position, removed from the slider end stop at the side of the package by a sufficient distance to allow the gusset 50 to be folded inward to an intervening position between the ends of the zipper strips, as shown in FIG. 5. However, a slider end stop should be formed or attached to the closure profile at one or each of the unjoined ends of the zipper strips to prevent the slider from sliding off the end of the zipper during reclosure of the pour spout. At the other end of the zipper, adjacent the vertical seal 22, the ends of the zipper strips are joined together and either deformed into the shape of a slider end stop or a slider end stop can be attached to the zone of joiner. A slider-operated zipper having separate slider end stops on respective zipper strips at one end of the zipper for use on a gusseted bag is disclosed in U.S. Patent Application Publ. No. 2004/0146224 entitled “Gusseted Reclosable Package with Slider-Operated Zipper”. Slider end stops having the same or a similar structure can be incorporated in the gusseted package shown in FIG. 5 herein.

[0043] In accordance with a further aspect of the embodiment shown in FIG. 5, the horizontal tear lines (items 42 and 44 in FIG. 2) on the front and rear walls 12 and 14 need to be extended into the side gusset 50. In that event, each of the gusset panels 54 and 56 will have a respective horizontal tear line disposed at an elevation below the closure profiles of the zipper, which tear lines meet at the central fold in the gusset. Thus, when the corner of the receptacle is torn away to expose the slider-zipper assembly, the upper portions of the gusset panels 54 and 56 will also be torn away. As a result, the gusset panels 54 and 56 will not interfere with the slider when it is moved to the zipper fully closed position.

[0044] Optionally, the gusseted bag partly depicted in FIG. 5 may be provided with a peel seal similar to peel seal 20 shown in FIG. 1, with the difference that the peel seal would need to be forked at the end adjacent the side gusset 50, one leg of the forked portion of the peel seal sealing the interstice between a portion of the gusset panel 54 and a confronting portion of the rear wall 14, and the other leg of the forked portion of the peel seal sealing the interstice between a portion of the gusset panel 56 and a confronting portion of the front wall 12. Below the elevation of the internal peel seal, the bag would be fully expandable due to the side gussets, thereby increasing the amount of product that can be contained in the package.

[0045]Alternatively, the ends of the zipper strips adjacent the side gusset can be joined together and placed between the front wall 12 and the gusset panel 56 (as shown in FIG. 6) or between the rear wall 14 and the gusset panel 54 (not shown). In this case, respective portions of the rear wall 14, and the gusset panels 54 and 56 are joined to each other at the elevation of the zone where the zipper flange 36 is joined to the front wall 14, forming a zone 62 where four layers are joined together. This configuration would allow the slider to be located at the zipper fully closed position, i.e., between the gusset panel 54 and front wall 12, in the finished package.

[0046] In accordance with further aspects of the invention, an internal tamper-evident feature other than a peel seal can be provided. A package incorporating a reclosable pour spout and an internal tamper-evident feature different than a peel seal is shown in FIG. 7. The zipper assembly comprises a pair of zipper strips joined at their ends, with a slider mounted on the zipper and movable along the portion of the zipper between the zipper joints at either end. One zipper strip comprises a closure profile 30 and a long flange 32 connected to the closure profile 30; the other zipper part comprises a closure profile 34 and a short flange 36 connected to the closure profile 34. The long and short flanges are formed by cutting a continuous web that has been extruded along with and is connected to the closure profiles.

[0047] As seen in FIG. 7, zipper flange 36 is joined to the rear wall 14 by a permanent heat seal 72. Zipper flange 32, which is longer than flange 36, is joined to the front wall 12 by permanent heat seals 66 and 68. A distal portion of the flange 32 is folded and joined to the rear wall 14 by a permanent heat seal 70, which is located below the seal 72. Each of the seals 66, 68, 70 and 72 is a band of joined, e.g., fused, material that extends the length of the zipper. In this disclosed embodiment, the seals 66 and 68 are generally parallel to each other, and the seals 70 and 72 are generally parallel to each other. Also, seals 66 and 72 are generally opposed to each other at one elevation, and seals 68 and 70 are generally opposed to each other at a lower elevation. The long flange 32 may be provided with a tear line at the fold 74. The distal portion of the flange 32 will be separated from the remainder of flange 32 when the tear line at fold 74 is ruptured. The tear line at the fold 74 may take the form of a scoreline or a line of contamination in the extruded thermoplastic material of the flange or any other form of weakened tear resistance along a line that is not permeable to air. Alternatively, the tear line may comprise a line of
perforations. In the latter case, to maintain the barrier of flange 32, the line of perforations is capped by a frangible strip (not shown in FIG. 7) of lightweight material, as disclosed in U.S. Pat. No. 5,023,122. This frangible strip seals the perforations, but tears readily when the perforated flange is ruptured along the perforations. The sealing strip may be heat sealed to the perforated flange or the sealing strip may be adhesive backed to allow the strip to be bonded to the flange by adhesive. Alternatively, the sealing strip may be provided by extruding a thin layer of material over the perforations. The details of how to manufacture a sealing strip for capping perforations in a substrate are fully disclosed in U.S. Pat. No. 5,023,122. The intact long flange 32 provides hermetic sealing. By bearing down on the flange 32 at the fold 74, the tear line can be ruptured, thereby providing access to the product compartment.

[0048] Although the drawings show a zipper disposed substantially transversely, i.e., parallel with the top and bottom seals of the bag, the zipper could alternatively be disposed at an angle (preferably in the range of 5 to 45 degrees), with the elevation of the zipper increasing as the slider moves from the zipper closed position (e.g., near the side edge of the bag) to the zipper fully opened position (e.g., near the vertical seal). In that event, the zone of web/zipper joiner (e.g., item 24 in FIG. 1) would also be angled, as would be the tear line (e.g., item 42 in FIG. 1).

[0049] In accordance with a further embodiment of the invention shown in FIGS. 8 and 9, a peel seal 20 can be placed on the consumer side of the zipper instead on the product side, as was shown in FIG. 1. As seen in FIG. 8, the opposing sides of a strip of peel seal material are joined to respective portions of the front and rear walls 12 and 14. The front and rear walls 12 and 14 may extend upward to form pull flanges 76 and 78, which can be pulled apart by the consumer in order to cause rupture of the peel seal 20. In this embodiment, the vertical seal 22 need only extend downward to the elevation of the zones (e.g., zone 24 in FIG. 9) where the zipper flanges are joined to the front and rear walls. Preferably, the peel seal 20 is aligned and contiguous with a top seal 16 that extends to the right (as viewed in FIG. 9) of the vertical seal 22. The vertical seal 22 is preferably a permanent heat seal of the type previously described. The top seal 16 may also be a permanent heat seal formed by joining the front and rear walls together in a band-shaped zone. Alternatively, a strip of peel seal material could be applied across the full width of the package and during the manufacturing process, the left-hand portion of the strip of peel seal material could be heated to a temperature at a pressure and for a duration of time that causes the peel seal material to activate, while the right-hand portion of the strip of peel seal material is heated to a temperature at a pressure and for a duration of time that causes the peel seal material to become a permanent heat seal.

[0050] One known method of making a peel seal involves the application of respective laminates on opposing portions of the receptacle. A peel seal is formed by heat sealing the peel seal laminates together. Later, when the consumer pulls the opposing portions of the receptacle or closure apart, the peel seal will rupture. During rupture of the peel seal, one or more layers of one laminate disengage from the other layer or layers of that laminate and remain adhered to the other laminate. As a result, the other laminate will include at least one additional layer after the peel seal has been broken. The disengagement of the one layer from the first laminate is accomplished by using layers composed of different polymeric materials, with the resulting adjacent layers having varying bond strengths between the layers. Rupture will occur between the two layers of the peel seal that have the lowest bond strength.

[0051] Another known method of making a peel seal involves adhering a respective layer of film to opposing portions of the receptacle, wherein one or both of the film layers contains contaminants. When the peel seal is formed by heat sealing the film layers together, the bond between them is weak due to the surface contamination. The film layers detach from each other during rupture of the peel seal.

[0052] One known composition of a heat-sealable peel seal material consists of ethylene vinyl acetate copolymer, polyethylene-based wax and polypropylene. Another known composition is a blend of polybutene and low-density polyethylene. Many other peel seal compositions are known.

[0053] While the invention has been described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for members thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation to the teachings of the invention without departing from the essential scope thereof. Therefore it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

[0054] As used in the claims, the verb “joined” means fused, bonded, sealed, or adhered, whether by application of heat and/or pressure, application of ultrasonic energy, application of a layer of adhesive material or bonding agent, interposition of an adhesive or bonding strip, etc. As used in the claims, the term “wall” is used in a broad sense to include both a discrete piece of packaging material and a portion of a folded piece of packaging material. Further, in the absence of explicit language in any method claim setting forth the order in which certain steps should be performed, the method claims should not be construed to require that steps be performed in the order in which they are recited.

1. A package comprising:
   a receptacle having an interior volume and a spout that, when in an opened state, allows access to said interior volume, said receptacle having first and second sides, and said spout starting near said first side and extending toward but not coming near said second side;
   a length of flexible zipper coextensive with said spout, said spout being closed when said zipper is closed and being opened to the extent that said zipper is opened; and
   a slider mounted to said zipper, said slider being movable in a closing direction and being disengageable from each other for opening said zipper when said slider is moved in an opening direction.

2. The package as recited in claim 1, wherein:
   said receptacle comprises first and second walls, said first wall having a width dimension in a transverse direction when said first wall is in a planar state, said width
dimension being the distance between first and second side edges of said first wall;
said length of zipper is substantially less than said width dimension of said first wall, said zipper comprising first and second zipper strips, said first zipper strip comprising a first closure profile and a first flange having one portion connected to said first closure profile and another portion joined to said receptacle in a first zone of zipper/receptacle joiner, and said second zipper strip comprising a second closure profile and a second flange having one portion connected to said second closure profile and another portion joined to said receptacle in a second zone of zipper/receptacle joiner, and said slider is mounted to said first and second closure profiles, said first and second closure profiles being interlockable with each other to close said zipper when said slider is moved in a closing direction and being disengageable from each other for opening said zipper when said slider is moved in an opening direction,
wherein said portion of said first flange that is joined to said receptacle is joined to a first portion of said first wall, and at least part of said portion of said second flange that is joined to said receptacle is joined to a first portion of said second wall.
3. The package as recited in claim 2, wherein said zipper length is less than half of said width dimension of said first wall.
4. The package as recited in claim 1, further comprising a box surrounding said receptacle.
5. The package as recited in claim 2, wherein a second portion of said first wall is joined to a second portion of said second wall in a first zone of wall joiner that extends from near to the top edges of said first and second walls toward a bottom of said receptacle, said first zipper strip extending from near said first zone of wall joiner to near said first side edge of said first wall, and a third portion of said first wall is joined to a third portion of said second wall in a second zone of wall joiner that is generally parallel to said transverse direction, said second zone of wall joiner being disposed higher than an elevation of an uppermost portion of said zipper and extending at least from said second side edge of said first wall to said first zone of wall joiner.
6. The package as recited in claim 5, further comprising a layer of peel seal material having first and second sides, said layer of peel seal material extending continuously from said first side edge of said first wall to said first zone of wall joiner, wherein a fourth portion of said first wall is joined to said first side of said layer of peel seal material and a fourth portion of said second wall is joined to said second side of said layer of peel seal material to form a peel seal.
7. The package as recited in claim 6, wherein said layer of peel seal material is lower than an elevation of said first and second closure profiles of said zipper.
8. The package as recited in claim 6, wherein said layer of peel seal material is higher than an elevation of said first and second closure profiles of said zipper.
9. The package as recited in claim 2, wherein a second portion of said first wall is joined to a second portion of said second wall in a zone of wall joiner that is generally parallel to said transverse direction, said second portions of said first and second walls being respective extensions of and aligned with said first portions of said first and second walls.
10. The package as recited in claim 9, further comprising a layer of peel seal material having first and second sides and disposed lower than an elevation of said first and second closure profiles of said zipper, said layer of peel seal material extending continuously from said first side edge of said second side edge of said first wall, wherein a third portion of said first wall is joined to said first side of said layer of peel seal material and a third portion of said second wall is joined to said second side of said layer of peel seal material to form a peel seal.
11. The package as recited in claim 1, wherein said receptacle further comprises a first gusset panel connected to said first wall, and a second gusset panel connected to said first gusset panel and to said second wall, a second part of said portion of said second flange that is joined to said receptacle being joined to a portion of said first gusset panel, and said second gusset panel comprising a portion that is joined on one side to a second portion of said second wall and on another side to said portion of said first gusset panel that is joined to said second part of said portion of said second flange.
12. The package as recited in claim 1, wherein said receptacle further comprises a first gusset panel connected to said first wall, and a second gusset panel connected to said first gusset panel and to said second wall, said first and second gusset panels having respective top edges disposed at lower than the elevations of said first and second closure profiles so that no portion of said first and second gusset panels interferes with interlocking of said first and second closure profiles.
13. A package comprising:
a receptacle having an interior volume and comprising first and second walls, said first wall having a width dimension in a transverse direction when said first wall is in a planar state, said width dimension being the distance between first and second side edges of said first wall;
a zipper joined to said receptacle in first and second zones of zipper/receptacle joiner, said zipper comprising first and second zipper strips, said first zipper strip comprising a first closure profile and a first flange having one portion connected to said first closure profile and another portion joined to said first wall in said first zone of zipper/receptacle joiner, and said second zipper strip comprising a second closure profile and a second flange having one portion connected to said second closure profile and another portion joined to said first wall in said second zone of zipper/receptacle joiner,
a slider mounted to said first and second closure profiles, said first and second closure profiles being interlockable with each other to close said zipper when said slider is moved in a closing direction and being disengageable from each other for opening said zipper when said slider is moved in an opening direction;
a first slider end stop positioned to stop said slider from moving further in said closing direction; and
a second slider end stop positioned to stop said slider from moving further in said opening direction,
distance between said second slider end stop and said second side edge, said slider being movable between said first and second slider end stops.

14. The package as recited in claim 13, wherein said first and second slider end stops are separated by a distance that is not greater than half of said width dimension of said first wall.

15. The package as recited in claim 13, further comprising a box surrounding said receptacle.

16. The package as recited in claim 13, wherein respective corners of said first and second walls are connected to the respective remains of said first and second walls by respective lines of weakened tear resistance that facilitate removal of said corners to expose said slider.

17. The package as recited in claim 13, further comprising a top seal that joins said first wall to said second wall and blocks access to said zipper, said top seal comprising a portion made of peelable seal material or a portion that is removable with the aid of lines of weakened tear resistance formed in said first and second walls, said zipper being accessible when said peelable seal material is peeled apart or when said removable portion is removed.

18. The package as recited in claim 17, further comprising a generally vertical seal having one portion that intersects or lies adjacent to said top seal and another portion that intersects or is adjacent to said second slider end stop.

19. The package as recited in claim 17, further comprising a generally transverse seal that extends from one end of said first and second zones of zipper/receptacle joiner to said second side edge of said first wall.

20. A package comprising:

a piece of bag making film sealed at a top seal of predetermined length, at a bottom seal and at a first vertical seal that extends from said top seal to said bottom seal to form a tube that is closed at both ends, said closed tube having an interior volume;

a zipper disposed within said interior volume and comprising first and second mutually interlockable zipper strips joined to confronting portions of said tube;

a slider mounted to said zipper, said first and second zipper strips being interlockable with each other to close said zipper when said slider is moved in a closing direction and being disengageable from each other for opening said zipper when said slider is moved in an opening direction;

a first slider end stop positioned to stop said slider from moving further in said closing direction; and

a second slider end stop positioned to stop said slider from moving further in said opening direction,

wherein the distance between said first slider end stop and one end of said top seal is substantially smaller than the distance between said second slider end stop and the other end of said top seal, said slider being movable between said first and second slider end stops.

21. The package as recited in claim 20, wherein said first and second slider end stops are separated by a distance that is not greater than half of said predetermined length of said top seal.

22. The package as recited in claim 20, wherein said piece of bag making film also sealed at a second vertical seal that extends downward from said top seal to a region adjacent said second slider end stop.

23. The package as recited in claim 20, wherein said tube comprises first and second walls and a side gusset connected to said first and second walls, portions of said gusset being captured between portions of said first and second walls in a portion of said top seal.

24. A method of manufacture comprising the following steps:

(a) inserting a slider on a section of zipper comprising first and second flanged zipper strips;

(b) joining a flange of said first zipper strip to a web of packaging material, said first and second zipper strips being transverse to a machine direction and having a length equal to or less than one quarter of the width of said web;

(c) forming said web into a tube;

(d) cross sealing said tube at an elevation below said first and second zipper strips to form a bottom seal that extends completely across the tube;

(e) cross sealing said tube at an elevation above said first and second zipper strips to form a top seal that extends completely across the tube; and

(f) joining a flange of said second zipper strip to said web.

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