A package bag may be made from a sheet of flexible packaging material that has been folded along a longitudinal direction with the edges of the sheet brought together and sealed to form a longitudinal rear seam. A starter cut has been formed only in the longitudinal seam to facilitate opening the package bag. The package bag may be opened by pulling in opposite directions on the longitudinal seam at points on either side of the starter cut. Such package bags may be made from a sheet of flexible roll stock having one or more notches formed at spaced apart locations along one or more edges of the sheet. When the sheet is folded such that the edges meet and are sealed to form a longitudinal rear seam of a package bag, the notches provide a starter cut for opening the package bag.
FIG. 4
EASY OPENING REAR SEAM BAGS AND PACKAGING METHODS

FIELD OF THE INVENTION

[0001] This invention relates to packaging and more particularly to easy open bags and methods of manufacturing such bags.

BACKGROUND OF THE INVENTION

[0002] Modern packaging for food and other products often uses sealed bags having seams at one or more ends of the bag and an exposed seam that usually runs the entire length of the rear of the bag. Such bags have been conventionally made of a packaging material, such as a synthetic resin film or a laminated material formed by laminating the synthetic resin film and an aluminum foil or the like. The package bag is filled with a material to be packed, such as liquids, powders or viscous materials, before being hermetically sealed.

[0003] To open the package bag, therefore, it is common practice for a user of the products stored in the bag to cut a sealed portion of the package film as the packaging material with a knife or scissors or break it open with a fingertip. When the package bag is to be cut with a knife or scissors, the opening procedure is troublesome, as it requires a tool. When the package film is to be ruptured with a fingertip, the opening of the package film may not be accomplished easily. Unfortunately, the material from which these bags are made and the sealing of the seams can make the bag difficult to open.

[0004] There have been several attempts in the prior art to address the problem of opening sealed package bags. For example, U.S. Pat. No. 6,352,364 issued Mar. 5, 2002 to Mobs starts a tear on the side of the bag and then has the longitudinal seal cut to ease the tear through it. This requires that two cuts be aligned and also requires modification of the end seal.

[0005] Similarly, U.S. Pat. No. 6,343,876 issued Feb. 5, 2002 to Takahashi et al describes starting the tear on the side of a pouch that has seams running down each side and no rear seam.

[0006] U.S. Pat. No. 6,102,571 issued Aug. 15, 2000 to Motoki et al also initiates the tear from the side of the bag then has a second tear-able zone for tearing through the rear seam.

[0007] U.S. Pat. No. 5,371,997 issued Dec. 13, 1994 to Kopp et al describes a long and narrow bag with a longitudinal seam on one side of the bag with the tear being initiated from the side of the bag.

[0008] U.S. Pat. No. 5,067,306 issued Nov. 26, 1991 to Umezawa describes making micro cuts on the sides of the bag material as it is being packaged, but makes no mention of the problem tearing through the rear seam of the bag.

[0009] U.S. Pat. No. 4,725,329 issued Feb. 16, 1998 to Tani it uses a tear string to tear through the rear seam of a package bag. However, a tear string could be hard to manage on large bags like potato chips.

[0010] Thus, there is a need in the art, for an easy opening package bag and a method for manufacturing it.

SUMMARY OF THE INVENTION

[0011] According to an embodiment of the invention, a package bag may be made from a sheet of flexible packaging material that has been folded along a longitudinal direction with the edges of the sheet brought together and sealed to form a longitudinal rear seam. A starter cut is formed only in the rear seam to facilitate opening the package bag. The package bag may be opened by pulling in opposite directions on the longitudinal seam at points on either side of the starter cut.

[0012] According to another embodiment of the invention a composition of matter is provided for forming a package bag. This composition of matter includes a sheet of flexible roll stock having one or more notches formed at spaced apart locations along one or more edges of the sheet. When the sheet is folded such that the edges meet and are sealed to form a longitudinal rear seam, the notches provide a starter cut only in the rear seam for opening package bags formed from the sheet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

[0014] FIGS. 1A-1C are three-dimensional diagram of package bags according to an embodiment of the present invention;

[0015] FIG. 2 is a three-dimensional schematic diagram illustrating the manufacture and filling of bags according to another alternative embodiment of the present invention.

[0016] FIGS. 3A-3B are three-dimensional diagrams of rolls of material for forming a package bags according to an alternative embodiment of the present invention and

[0017] FIG. 4 is a three-dimensional schematic diagram illustrating the manufacture and filling of bags according to another alternative embodiment of the present invention.

DESCRIPTION OF THE SPECIFIC EMBODIMENTS

[0018] Although the following detailed description contains many specific details for the purposes of illustration, anyone of ordinary skill in the art will appreciate that many variations and alterations to the following details are within the scope of the invention. Accordingly, the exemplary embodiments of the invention described below are set forth without any loss of generality to, and without imposing limitations upon, the claimed invention.

[0019] FIG. 1A depicts a package bag 100 according to an embodiment of the present invention. The bag depicted in FIG. 1A is a relatively simple type of bag known as a pillow bag or pillow pouch. The bag 100 is generally made from a sheet of flexible packaging material that has been folded along a longitudinal direction. The side edges of the sheet have been brought together and sealed to form a longitudinal rear seam 102 disposed between the sides of the bag. A starter cut 104 has been formed in the rear seam 102 to facilitate opening the package bag. End seams 106, 108 close the ends of the package bag 100 to seal products within it. As a result of the starter cut 104, the package bag 100 may
be opened by pulling in opposite directions on the longitudinal seam at points on either side of the starter cut.

[0020] The rear seam 102 usually lies flat against the package bag 100 but can easily be lifted to provide finger grab points on both sides of the starter cut 104. Embodiments of the present invention work with any bag that has a seam that can be lifted from the bag. During manufacturing of the bag the rear seam 102 may be formed perpendicular to the rear surface of the bag and then folded over to lay flat against the bag. This makes it very handy to pull the seam up and use it to provide finger grab points for tearing the bag open.

[0021] In some embodiments, one or more guide strips 105, 107 are placed laterally across the package bag near the starter cut 104 to guide the tear that results when the rear seam 102 is pulled. The guide strips are made of tear resistant material, such as plastic that are formed onto or into the material of the bag 100. A single guide strip may be used or, as shown in FIG. 1A, two guide strips may be placed close together on either side of the starter cut to contain the tear between the two guide strips.

[0022] Embodiments of the present invention may be used with other types of bags having a longitudinal rear seam. Examples of such bags include a gusseted bag 110 and a flat bottom bag 120, respectively depicted in FIG. 1B and FIG. 1C. The gusseted bag 110 includes a rear longitudinal seam 112, starter cut 114 and end seams 116, 118 and special folds or gussets that give the bag a substantially rectangular cross-section. The flat bottom bag 120 includes a rear longitudinal seam 122 and starter cut 124 an end seal 126 and folds and seals that provide both a rectangular cross section and a flat bottom 128. Such package bags are well known within the packaging arts. Guide strips, such as those described above, may also be used with the gusseted bag 110 and/or the flat bottom bag 120.

[0023] Package bags of the type described herein may be used to store any type of products commonly stored in sealed bags. Such products include, but are not limited to snacks, such as potato chips and pretzels, coffee, cheese, produce, candy, frozen foods, sealed medical products such as bandages, tape medicine, detergent, chemical powders, cosmetics among many others.

[0024] Package bags of the type described herein can be fabricated by a number of different techniques. Products are often packaged in bags using vertical form-fill machines or horizontal form-fill machines. Such machines form the bags from a continuous sheet of roll stock and fill them as the bags are fabricated. FIG. 2 illustrates one example, among others, of a technique for packaging products in bags of the type described above. In this example, a vertical form-fill system 200 forms the bags from a sheet of material 202. The sheet may made of any suitable flexible material used in the packaging industry, examples of which include, but are not limited to, polyethylene (e.g. low density polyethylene (LDPE) or linear low density polyethylene (LLDPE), polypropylene, metallocene or laminated film. Examples of suitable laminated films include polyester/poly, paper/poly, glassine/poly, Bopp/oil/poly and the like. The sheet 202 may be in the form of a roll stock, e.g., a laminated film roll stock or surface printed roll stock. Materials for making bags are available, e.g., from Duralam, Inc. of Appleton, Wisc. and other commercial suppliers.

[0025] The sheet 202 is drawn from a roll 204 over a series of rollers to a vertical form-fill tube 206. The sheet 202 wraps around the form-fill tube 206 and the edges of the sheet 202 are brought together to form the sheet 202 into a tube. A longitudinal sealer device 207 seals the edges of the sheet 202 together to form the rear seam 208 of a bag 210. An end sealer 211 then seals one end of the bag 210. Typically the edges and ends are sealed by some combination of heat and pressure. After the end is sealed, the bag 210 is filled through the form-fill tube 206. Then the second end is sealed to close the bag 210. A shearing device 212 cuts the sheet 202 along the end seal to separate the bag from the subsequent bag that is formed from the same sheet material 202. The shearing device 212 may leave part of the end seal on the bag 210 and part on the subsequent bag.

[0026] The starter cut described above can be made in the rear seam at any point in this procedure. For example a notch-cutting device 214, e.g., a sliding knife can cut a notch 215 in the rear seam 208 to form the starter cut. In FIG. 2, the notch-cutting device 214 is located between the longitudinal sealer device 207 and the end sealer 211. Alternatively, the notch-cutting device may be located after the end sealer 211 or at some other convenient point in the system 200.

[0027] In an alternative embodiment, the starter cut may be made as part of the production of the roll stock used to form the bags. This is particularly advantageous in that such a roll stock can be used in an existing form-fill machine without having to modify the machine to make the starter cut in the rear seam. FIG. 3A depicts an example of a sheet of material 300 for forming bags that can be used to make package bags according to an embodiment of the present invention. The material 300, e.g., any of the flexible materials described above, may be in the form of a sheet 302 of flexible roll stock which may be wound into a roll 304 suitable for use in a form-fill machine. The sheet 302 has first and second surfaces 301, 303. One surface 301 typically has no printing and serves as the inside of a bag. The other surface 303, which may have printing on it, serves as the outside of the bag. The printing may be done by conventional equipment, such as that provided by Paper Converting Machine Company of Green Bay Wisc. The sheet is cut along lines indicated by D during forming and filling to separate individual bags from the sheet 302. The sheet 302 may or may not be perforated along the lines D to facilitate separate of the bags.

[0028] One or more notches 306 are formed at spaced apart locations along one or more edges 308 of the sheet 302. When the sheet 302 is folded such that the edges 308 meet and are sealed to form a longitudinal rear seam, the notches 306 provide a starter cut for opening package bags formed from the sheet 302. In some embodiments a single notch is formed along one edge. In other embodiments, aligned notches 306 are formed in both edges 308 of the sheet 302. The aligned notches 306 overlap at least partially to form a starter cut all the way through the rear seam.

[0029] FIG. 3B depicts a material 310 that is a variation on the material 300 of FIG. 3A. The material 310 may be in the form of a sheet 312 and may be wound into a roll 314. The sheet 312 may be made from any suitable flexible bag making material. The sheet 312 includes guide strips 318 formed laterally across the sheet proximate notches 316.
In the example depicted in FIG. 3B pairs of guide strips 318 are placed close together with a notch 316 between the two guide strips in each pair. Alternatively a single guide strip may be placed such that the notches lie between a guide strip and a location D where the sheet 312 is to be cut to separate one bag from another.

[0030] FIG. 4 illustrates one example, among others, of a technique for packaging products in bags of the type described above using the pre-notched roll stock of the types described in FIGS. 3A-3B. In this example, a vertical form-fill system 400 forms the bags from a sheet of material 402. By way of example, the system 400 may be a Model VPK vertical/form/fill machine from Rovema Packaging USA of Lawrenceville, Ga. In this case, the sheet 402 already has notches 403 in its edges as described above with respect to FIG. 3A as well as lateral guide strips 405 as described above with respect to FIG. 3B. The sheet 402 is drawn from a roll 404 over a series of rollers to a vertical form-fill tube 406. The sheet 402 wraps around the form-fill tube 406 and the edges of the sheet 402 are brought together to form the sheet 402 into a tube. The notches on opposite edges of the sheet 402 align and overlap to form the start cut 401. A longitudinal sealer device 407 seals the edges of the sheet 402 together to form the rear seam 408 of a bag 410. An end sealer 411 then seals one end of the bag 410 along the line indicated at D, the bag is filled through the form-fill tube 406 and the second end is sealed to close the bag 410. A shearing device 412 may cut the sheet 402 along the end seal to separate the bag from subsequent bag that is formed from the same sheet material 402.

[0031] Embodiments of the present invention provide for easy opening bags with only minor modifications to existing packaging equipment and processes. Such easy open bags are more desirable for consumers and relatively inexpensive to manufacture compared to other types of easy open bags. Although the above discussion mentions vertical form-fill-seal systems, embodiments of the invention are not limited to such systems for making and filling bags. Other bag filling and sealing systems, such as horizontal fill machines and those that use pre-made bags, may be adapted to implement embodiments of the present invention.

[0032] While the above is a complete description of the preferred embodiment of the present invention, it is possible to use various alternatives, modifications and equivalents. Therefore, the scope of the present invention should be determined not with reference to the above description but should, instead, be determined with reference to the appended claims, along with their full scope of equivalents. In the claims that follow, the indefinite article “a”, or “an” refers to a quantity of one or more of the item following the article, except where expressly stated otherwise. The appended claims are not to be interpreted as including means-plus-function limitations, unless such a limitation is explicitly recited in a given claim using the phrase “means for.”

What is claimed is:

1. A package bag, comprising a sheet of flexible packaging material that has been folded along a longitudinal direction, wherein first and second edges of the sheet have been brought together and sealed to form a longitudinal rear seam along the longitudinal direction, wherein a starter cut has been formed only in the rear seam to facilitate opening the package bag, whereby the package bag may be opened by pulling in opposite directions on the longitudinal seam at points on either side of the starter cut.

2. The package bag of claim 1 wherein a first end of the folded sheet has been sealed to close a first end of the bag.

3. The package bag of claim 2 wherein a second end of the folded sheet has been sealed to close a second end of the bag.

4. The package bag of claim 1 wherein the longitudinal seam is substantially free to be pulled up and used to provide one or more finger grab points for opening the package bag.

5. The package bag of claim 1 further comprising one or more guide strips running laterally across the bag proximate the starter cut.

6. The package bag of claim 5 wherein the one or more guide strips include two guide strips disposed such that the starter cut lies between the two guide strips.

7. The package bag of claim 1 wherein the sheet of flexible packaging material has been folded to form a pillow bag, gusseted bag or flat bottom bag.

8. A composition of matter for forming a package bag, comprising:

a sheet of flexible roll stock having one or more notches formed at spaced apart locations along one or more edges of the sheet, wherein, when the sheet is folded such that the edges meet and are sealed to form a longitudinal rear seam, the notches provide a starter cut only in the rear seam for opening package bags formed from the sheet of flexible roll stock.

9. The composition of matter of claim 8 wherein the one or more notches include one or more pairs of aligned notches that overlap at least partially when the sheet is folded such that the edges meet.

10. The composition of matter of claim 8, further comprising one or more guide strips formed onto the sheet of roll stock, wherein the guide strips run laterally across the sheet proximate the one or more notches.

11. The composition of matter of claim 8 wherein the one or more guide strips include pairs of two closely-spaced guide strips disposed such that the starter cut lies between the two guide strips.

12. A packaging method, comprising the steps of:

folding a sheet of flexible packaging material along a longitudinal direction first to bring first and second edges of the sheet together;

sealing the first and second edges to form a longitudinal rear seam along the longitudinal direction; and

forming a starting cut only in the longitudinal seam to facilitate opening the package bag.

13. The method of claim 12 wherein forming the starter cut includes, before folding the sheet of flexible packaging material, forming one or more notches in the sheet of flexible packaging material at spaced apart locations along one or more edges of the sheet, wherein, when the sheet is folded to bring the first and second edges together and are sealed to form the longitudinal seam, the notches provide the starter cut.

14. The method of claim 12, further comprising the step of forming one or more guide strips onto the sheet of flexible packaging material, wherein the guide strips run laterally across the sheet proximate the starter cut.
15. The method of claim 14, wherein the one or more guide strips include two closely spaced guide strips disposed such that the starter cut lies between the two guide strips.

16. The method of claim 12, further comprising the step of, after folding the sheet of flexible packaging material, sealing a first end of the folded sheet to close a first end of a bag.

17. The method of claim 16 wherein the starter cut is formed before sealing the first end of the folded sheet.

18. The method of claim 16, further comprising the step of, after sealing the first end of the folded sheet to close the first end of the bag, filling the bag with one or more products.

19. The method of claim 18 further comprising, the step of, after filling the bag with one or more products, sealing a second end of the folded sheet to close a second end of the bag.

20. The method of claim 18 wherein forming the starter cut takes place before sealing the second end of the sheet or before filling the bag.

21. A package bag, comprising:

a sheet of flexible packaging material that has been folded along a longitudinal direction,

wherein first and second edges of the sheet have been brought together and sealed to form a longitudinal rear seam along the longitudinal direction, wherein a starter cut has been formed in the rear seam to facilitate opening the package bag;

and one or more guide strips running laterally across the bag proximate the starter cut,

whereby the package bag may be opened by pulling in opposite directions on the longitudinal seam at points on either side of the starter cut.

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