A bag-like flexible package is provided which is made of a flexible sheet capable of preventing unintended breakage, has good packing operation workability and a good stability of holding shock-absorbing materials, and exhibits a good workability for operations of suspended ceiling installation and wall mounting installation. The flexible package is made of flexible sheet and has a bag-like configuration having opening at one end thereof whereby it can receive goods therein that are inserted through opening. The flexible package has outwardly convex ridges, outwardly concave valleys, and notches formed on opening. Ridges and valleys are alternately arranged on flexible sheet, and extend in a direction that is orthogonal to or that is oblique to opening.
FLEXIBLE PACKAGE AND A METHOD OF TEARING THE SAME APART

TECHNICAL FIELD

[0001] The present invention relates to a flexible package and a method of tearing the same apart.

BACKGROUND ART

[0002] A flexible sheet is widely used in order to pack a wide variety of goods. Packaging goods by wrapping a flexible sheet around them has the problem in which packaging operation is characterized by low workability. Packaging shock-absorbing materials together with goods for protecting the latter from shocks due to falling etc. presents a problem in which it is difficult to stably hold the shock-absorbing materials together with goods. To address these problems, a flexible package has been developed in which a flexible sheet has a bag-like configuration with an opening at one end thereof whereby a wide variety of goods can be placed in the flexible package (Patent documents 1 to 3). Such a bag-like flexible package can reduce the risk of damage to goods therein due to vibrations, shocks, etc. during transportation of the goods.

[0003] One example of a flexible sheet for packaging goods is a non-cross-linked, high porosity polyethylene foam sheet (for example, Mirimat™ manufactured by JSP, Ltd.). When the non-cross-linked, high porosity polyethylene foam sheet is used as is to pack goods, however, it tends to get ripped, thus creating the risk that damage of goods due to vibrations, shocks, etc. during transportation of the goods cannot be fully prevented. For this reason, a flexible sheet in which a polyethylene film is laminated on the non-cross-linked, high porosity polyethylene foam sheet for increasing strength, is sometimes used for packaging goods. This flexible sheet has tear resistance which reduces unintended breakage. When the abovementioned packing workability operation and stability, in which the goods are held together by shock-absorbing materials, are taken into consideration, it is preferable to form a bag-like flexible package using this flexible sheet, and to receive goods using this bag-like flexible package. A bag-like flexible package, which is made of a flexible sheet in which a polyethylene film is laminated on a non-cross-linked, high porosity polyethylene foam sheet to increase strength, can reduce the risk of damage of goods therein due to vibrations, shocks, etc. during transportation of the goods. Therefore, the bag-like flexible package is used for packing home electric appliances such as projectors, television sets, etc.

PRIOR ART DOCUMENTS

Patent Documents


SUMMARY OF THE INVENTION

Problems to be solved by the Invention

[0007] When installing home electric appliances such as projectors, television sets, etc., other than floor installation in which the appliances are installed on a floor so that they stand on their own feet, suspended ceiling installation in which the appliances are suspended from a ceiling, and a wall mounting installation in which the appliances are hung on a wall may be carried out. When the suspended ceiling installation or the wall mounting installation is carried out, goods are mounted on a ceiling through a ceiling suspending unit or on a wall through a wall hanging unit, respectively. Specifically, parts of the ceiling suspending unit or parts of the wall hanging unit are fixed to the goods themselves and to the ceiling or to the wall, and then the part that is fixed to the goods and the part that is fixed to the ceiling or to the wall are coupled with each other. The suspended ceiling installation or the wall mounting installation is thus completed.

[0008] In such an installation method, part of the ceiling suspending unit or part of the wall hanging unit needs to be fixed either after the goods are fully taken out from the bag-like flexible package or after part of the bag-like flexible package is torn apart to partially expose the goods.

[0009] When goods are fully taken out from the bag-like flexible package, in order to prevent damage to the goods, it is preferable to fold the bag-like flexible package so that it becomes thin after the goods are taken out, and to carry out an operation to fix parts of the ceiling suspending unit or parts of the wall hanging unit with the folded bag-like flexible package as an underlay for the goods. However, this operation is problematic in that workability is poor because it includes operations to remove goods and to fold the flexible package in order to form an underlay for the goods. On the other hand, when part of the bag-like flexible package is torn apart, problems exist in that the tearing operation is not easy because the flexible sheet in which a polyethylene film is laminated on a non-cross-linked, high porosity polyethylene foam sheet to increase strength, resists being torn apart, as mentioned earlier.

[0010] Only workability, when parts of the ceiling suspending unit or parts of the wall hanging unit is now considered. If the flexible sheet is not formed in a bag-like configuration and is used as is to pack goods, workability of the suspended ceiling installation and workability of the wall mounting installation are, of course, good because the goods can be easily removed. However, this is problematic in that workability of packing operation and the stability when goods are held together by the shock-absorbing materials are low, as mentioned earlier. Further, if a non-cross-linked, high porosity polyethylene foam sheet on which a polyethylene film is not laminated is used, then a tearing operation, when parts of the ceiling suspending unit or parts of the wall hanging unit are fixed, is easy, but problems exist in that the flexible sheet tends to be torn apart, readily causing an unintended breakage of the package.

[0011] It is therefore an object of the present invention to remedy the aforementioned problems, to provide a bag-like flexible package which is made of a flexible sheet whose unintended breakage can be prevented, and that has good packing operation workability, a good stability of holding shock-absorbing materials, and a good workability for operations of the suspended ceiling installation and the wall mounting installation, and to provide a method of tearing the bag-like flexible package apart.

MEANS TO SOLVE THE PROBLEMS

[0012] A bag-like flexible package of the present invention is made of a flexible sheet, has a bag-like configuration having an opening at one end thereof whereby it can receive goods therein that are inserted through the opening, and characterized in that it has a notch formed on the opening. The bag-like flexible package may further comprise outwardly convex
ridges and outwardly concave valleys, wherein the ridges and the valleys are alternately arranged on the flexible sheet, and extend in a direction that is orthogonal to or that is oblique to the opening.

EFFECTS OF THE INVENTION

According to the present invention, the user can easily start to tear the flexible sheet apart by designating the notch provided on the opening as a start point. Further, when ridges and valleys are provided on the flexible sheet, the user can easily and linearly tear the flexible sheet apart to reach the desired position, by continuing tearing operation either along the ridge or along the valley.

BRIEF EXPLANATION OF THE DRAWINGS

FIG. 1 is a perspective view of a flexible package according to an exemplary embodiment of the present invention.

FIG. 2 is a perspective view illustrating a method of tearing apart the flexible package shown in FIG. 1.

FIGS. 3a and 3b are enlarged views illustrating variants of notches on the flexible package of the present invention.

EXEMPLARY EMBODIMENT

An exemplary embodiment of the present invention will now be explained with reference to the drawings.

A flexible package of the present invention shown in FIGS. 1 and 2 has a bag-like configuration in which it is made of a flexible sheet 1 and has opening 2 at one end thereof. Flexible sheet 1 in the present exemplary embodiment is a sheet in which a polyethylene film is laminated on a non-cross-linked, high porosity polyethylene foam sheet. Flexible sheet 1 has outwardly convex ridges 3 and outwardly concave valleys 4. Ridges 3 and valleys 4 are alternately arranged on flexible sheet 1, are parallel to each other, and extend linearly in a direction that is orthogonal to opening 2. However, they may extend in a direction that is oblique to opening 2. Ridges 3 and valleys 4 are schematically illustrated by dashed-dotted lines and dashed-dotted lines, respectively, on portions of FIGS. 1 and 2. In fact, a definite crease as shown in the drawings is not put in flexible sheet 1. Flexible sheet 1 has a wave-like configuration in which curved convex portions (ridges 3) and curved concave portions (valleys 4) are alternately arranged thereon. Flexible sheet 1, which has a wave-like configuration, may have a thickness that partially changes according to the arrangement of ridges 3 and valleys 4, or may have a constant thickness. However, a configuration in which ridges 3 and valleys 4 are definitely creased so that they may have clear apexes, is also not precluded from the present invention.

Opening 2 has a plurality of (two in the exemplary example shown) semi-circular notches 5 formed thereon having a radius in the order of 10 mm

The flexible package of the present exemplary embodiment can receive goods 7 therein (which are schematically illustrated in FIGS. 1 and 2) that are inserted through opening 2, and can reduce the risk of damage to goods 7 due to vibrations, shocks, and the like during transportation of goods 7. Further, because of its bag-like configuration, the flexible package can stably hold together goods 7 with shock-absorbing materials. Furthermore, because of its configuration in which a polyethylene film is laminated on a non-cross-linked, high porosity polyethylene foam sheet, the flexible package of the present exemplary embodiment is tear resistant, thus preventing the flexible package from unintentionally being damaged.

In order to fix part (attachment member) 8 (which is schematically illustrated in FIG. 2) of a ceiling suspending unit or a wall hanging unit (not shown) to goods 7 that has been received in the flexible package, part (fixed section) of goods 7 may be exposed from the flexible package. At that time, the user can expose the fixed section of goods 7 by easily tearing flexible sheet 1 apart. Specifically, as shown in FIG. 2, the user starts to tear flexible sheet 1 apart by designating notch 5 (in particular, a substantially central portion of the semicircle) provided on opening 2 as a start point, and extends torn-apart portion 6 either along ridge 3 or along valley 4 to linearly tear flexible sheet 1 apart until the fixed section of goods 7 is sufficiently exposed.

The non-cross-linked, high porosity polyethylene foam sheet is formed through extrusion, and has ridges 3 and valleys 4 to provide moderate expansibility. The polyethylene sheet has a property in which the tensile strength falls to a low level at positions adjacent to ridges 3 and valleys 4, that is, positions between ridges 3 and valleys 4, thus causing the polyethylene foam sheet to be easily torn apart. Accordingly, when the user intentionally tears flexible sheet 1 apart, then the user can easily and substantially linearly tear flexible sheet 1 apart without using a blade, such as a knife, and the like, owing to the difference in the tensile strength at positions adjacent to ridges 3 and valleys 4 of flexible sheet 1. In addition, since notches 5 are provided on opening 5, the user can easily start to tear flexible sheet 1 apart with notch 5 as a start point. In particular, when notches 5 are formed at positions on opening 2 where the notches intersect with ridges 3 and valleys 4, the user can easily and linearly tear flexible sheet 1 apart from the start point to the desired position.

Therefore, it is possible to easily fix part 8 of the ceiling suspending unit or the wall hanging unit to a predetermined position (fixed section) of goods 7, without fully removing goods 7 from the bag-like flexible package. Goods 7 can then be removed from the flexible package with part 8 of theses units being mounted. As a result, workability for suspended ceiling installation or for wall mounting installation is increased. This is effective especially when the suspended ceiling installation or the wall mounting installation of goods 7, which are large in mass and requires complicated handling, is carried out. Goods 7 include display units such as, for example, liquid crystal monitors, plasma monitors, projectors, and the like. Attachment member 8 of the display unit includes ceiling suspending units, wall hanging units, and the like.

When flexible sheet 1 has perforation-like section lines that have interruptedly divided sections or has section lines that have continuous or interrupted weakened resin layers, there is a likelihood that flexible sheet 1 tends to be torn apart, thus causing an unintended damage, even if flexible sheet 1 has a configuration in which a polyethylene film is laminated on a non-cross-linked, high porosity polyethylene foam sheet. However, since the present invention provides only ridges 3 and valleys 4 on flexible sheet 1, there is a little likelihood that flexible sheet 1 will experience unintended damage. That is, in the present invention, ridges 3 and valleys 4 themselves are not low in strength, but the difference in the tensile strength at positions adjacent to ridges 3 and valleys 4 is utilized. Accordingly, as compared with a configuration...
that has section lines with low strength, such as perforation-like section lines or section lines that have weakened resin layers, the present invention can maintain a certain degree of strength, thus reducing the likelihood that flexible sheet 1 will experience an unintended breakage. Instead, the user can easily start to tear apart the package because notches 5 are provided. After tearing is thus easily started, the user can easily tear flexible sheet 1 apart along ridges 3 and valleys 4 owing to the aforementioned difference in the tensile strength and can reach the desired position linearly. Since flexible sheet 1 can be easily torn apart linearly along ridges 3 and valleys 4, torn-away portion 6 will not tear further in an unintended direction, therefore, excessive damage will not occur, and parts of goods 7 will not be unnecessarily exposed.

In the present exemplary embodiment, since notches 5 formed on opening 2 have a semicircular shape, excessive stress concentration does not occur, thus making unintended tearing unlikely. However, as shown in FIGS. 3a and 3b, notches 5 that do not have a semicircular shape, but have a semieliptical or semi-polygonal shape (a semi-hexagonal shape in the illustrated example) may be formed. In any of these cases, such a shape that will not cause excessive stress concentration is preferable. Accordingly, even if the flexible package is strongly pulled when a packaging operation to receive goods 7 in the flexible package is carried out, stress concentration on notches 5 can be avoided, thus preventing the flexible package from being damaged during the packaging operation.

Notch 5 not only facilitates start of tearing of flexible sheet 1, as mentioned, but also serves to indicate to the user a tearing position that is necessary for exposing a predetermined location (for example, the fixed section to which part 8 of a ceiling suspending unit or a wall hanging unit is fixed) of goods 7. In other words, notches 5 are preferably formed at tearing positions that are necessary to expose a predetermined location (for example, the fixed section) of goods 7.

Either one or plural notches 5 may be formed, as required. Plural notches 5 may be formed on only one side that forms opening 2, as shown in FIGS. 1 and 2, or alternatively, may be formed on both sides that form opening 2.

The same number of ridges 3 and valleys 4 may be formed as that of notches 5. However, when a concavo-convex shape, that is formed in order to provide moderate expansibility when flexible sheet 1 is extruded, is utilized, a multitude of ridges 3 and valleys 4 may be formed on the entire surface of flexible sheet 1. This requires no special operation to form ridges 3 and valleys 4 on flexible sheet 1 after it is shaped, and therefore the production process is less complicated.

When a plurality of ridges 3 and a plurality of valleys 4 are formed, ridges 3 and valleys 4 are preferably parallel to each other in order to avoid a situation in which the direction of travel of torn-apart portion 6 is not limited to one direction because ridges 3 and valleys 4 intersect with each other. In that case, ridges 3 and valleys 4 may extend in directions such that they intersect opening 2 at right angles or obliquely.

EXPLANATION OF REFERENCE CHARACTERS

[0032] 3 ridge
[0033] 4 valley
[0034] 5 notch
[0035] 6 torn-apart portion
[0036] 7 goods
[0037] 8 attachment member (part of a ceiling suspending unit or a wall hanging unit)

What is claimed is:

1. A flexible package made of a flexible sheet comprising a bag-like configuration with an opening at one end thereof, and a notch being formed on said opening, said package being capable of receiving goods therein that are inserted therein through said opening.

2. The flexible package according to claim 1, further comprising outwardly convex ridges and outwardly concave valleys, wherein said ridges and said valleys are alternately arranged on said flexible sheet, and extend in a direction that is orthogonal to or that is oblique to said opening.

3. The flexible package according to claim 2, wherein said ridges and said valleys are parallel to each other.

4. The flexible package according to claim 2, wherein said notch is formed at positions on said opening where said opening intersects with said ridges or said valleys.

5. The flexible package according to claim 1, wherein said flexible sheet comprises a sheet in which a polyethylene film is laminated on a non-cross-linked, high porosity polyethylene foam sheet.

6. A method of partially tearing a flexible package apart, said flexible package being made of a flexible sheet, and having a bag-like configuration with an opening at one end thereof, the method comprising starting said tearing from a notch formed on said opening as a start point.

7. The method of partially tearing a flexible package apart according to claim 6, further comprising extending a torn-apart portion that is started from said notch as a start point either along outwardly convex ridges or along outwardly concave valleys, wherein said ridges and said valleys are alternately arranged on said flexible sheet, and extend in a direction that is orthogonal to or that is oblique to said opening.

8. A method of removing goods from a flexible package, said flexible package being made of a flexible sheet and having a bag-like configuration with an opening at one end thereof, the method comprising:

- starting tearing from a notch formed on said opening as a start point;
- fixing an attachment member for said goods to a predetermined position of said goods without fully removing said goods from said flexible package; and
- removing said goods to which said attachment member is fixed, from said flexible package.

9. The method of removing goods from a flexible package according to claim 8, wherein said goods comprise a projector.

10. The flexible package according to claim 3, wherein said notch is formed at positions on said opening where said opening intersects with said ridges or said valleys.