Snap zipper and bag with the same
Komplementärer Profilverchlussstreifen und Beutel mit demselben
Bande de fermeture à profils d’accouplement et sachet muni de celle-ci

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• PATENT ABSTRACTS OF JAPAN vol. 015, no. 416 (M-1172), 23 October 1991 & JP-A-03 176365
(IDEMITSU PETROCHEM CO), 31 July 1991,

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Description

[0001] This invention relates to a snap zipper and a bag with snap zipper, which can be utilized in the fields of foods, medical products and grocery.

[0002] Bags with zipper are used in many fields such as those of foods, medical products and grocery. In the bag with snap zipper, a strip-like snap zipper comprising a male and a female member is provided on the bag in a sealing portion thereof. Therefore, various methods of producing bags with snap zipper have been proposed.

[0003] Among the proposed methods, there are (1) one, in which a cylindrical film with a male and a female portion of a snap zipper is extrusion formed as a one-piece molding by using extrusion dies, and (2) one, in which a tape with a snap zipper is produced and is thermally fused to a base film for forming a bag body.

[0004] In the former method (1), the bag with snap zipper, which is produced as a one-piece molding from the outset, takes space due to the shape of the snap zipper. Its storage and handling therefore, are rather inconvenient. In addition, restrictions are imposed on the structure of the base film. Accordingly, the latter method (2) which is free from the above drawbacks is recently becoming a general method.

[0005] EP-A-0371402 discloses a fastener, and a bag to which the fastener is welded, in which at least the portion of the fastener to be welded to the bag body is mainly made of ethylene vinyl acetate copolymer resin containing 1 to 9% vinyl acetate and having a melt index of 0.5 to 6.0 g/10 minutes.

[0006] The snap zipper is usually made of low density polyethylene (LDPE) or polypropylene (PP). In many cases, a sealant layer (which forms the innermost layer of the bag body, and to which the snap zipper is fused), is applied to a base film of the same material. For example, with a base film sealant layer LDPE, the snap zipper is made of the same LDPE.

[0007] With a sealant layer of the same material as the snap zipper, the snap zipper can be sealed to the sealant layer without any trouble.

[0008] Meanwhile, polyester resins are excellent in their heat resistance and odour retention property, and thus they are used suitably as the material of the sealant layer of the bag body.

[0009] However, with a sealant layer of a polyester type resin which is a different material from LDPE or PP of the snap zipper, sufficient adhesion for fusing the snap zipper can not be obtained. Therefore, it has been difficult to use polyester type resin for the sealant layer.

[0010] According to a first aspect of the present invention, a snap zipper which has at least its portion for fusion mainly composed of a composition comprising (1) polyester type elastomer and a polyolefin type resin or (2) polybutylene terephthalate (PBT) resin and a polyolefin type resin, wherein the content of the polyolefin type resin in the composition is 3 to 50% by weight.

[0011] In the snap zipper according to the invention, at least the portion for fusing need have the above composition. Of course, the entire snap zipper including the portion for fusion may be composed of (1) polyester type elastomer and a polyolefin type resin or (2) the PBT resin and a polyolefin type resin.

[0012] The polyolefin type adhesion resin has a structure, in which a mixture of one or more different varieties of polyolefin are partly graft coupled to an unsaturated carboxylic acid.

[0013] Among the polyolefin varieties are low density polyethylene (LDPE), linear low density polyethylene (L-LDPE), high density polyethylene (HDPE), ethylene-vinyl acetate copolymer (EVA), polypropylene (PP), ethylene-butene-1 copolymer, ethylene-propylene copolymer, polybutadiene (PBd), etc.

[0014] The content of the polyolefin type resin in the snap zipper is 3 to 50% by weight, suitably 10 to 40% by weight. If the content is below 3% by weight, the shape retention is deteriorated. If the content is above 50% by weight, on the other hand, thermal fusion becomes difficult.

[0015] The snap zipper may, if necessary, contain suitable additives (such as coloring agent, stabilizing agent, anti-oxidation agent, slip agent, anti-static agent, anti-blocking agent, etc). Slip agent are added usually.

[0016] According to a second aspect of the invention, there is provided a bag with a snap zipper, in which the snap zipper according to the first embodiment of the invention noted above is fused via the portion for fusion to a bag body.

[0017] The snap zipper according to the invention permits use of the polyester type resin for the bag body sealant layer, to which the snap zipper is fused. In this case, the snap zipper can be fused to the sealant layer without trouble. Besides, a sufficient strength of fusion between the bag body and the snap zipper is obtainable.

[0018] For the snap zipper according to the invention, it is particularly suitable to use the polyester type resin as the material of the sealant layer.

[0019] Examples of the polyester type resin are polyester (PET), polybutylene terephthalate (PBT) resin, polyester type elastomer, polycarbonate, etc. It is possible to use a blend of resins composed of polyester and polyolefin type resins.

[0020] Such polyester type resins are excellent in heat resistance, odor retention and low drug absorption property, with the possibility of using this type of resins as the material of the sealant layer the following effects are obtainable.

[0021] Regarding the prior art snap zipper, aluminum has been used as the material of the bag body in order to pro-
vide the odor retention and low drug absorption property. However, it is possible to permit cost reduction of the bag body by using polyester type resins in lieu of aluminum. Further, the bag may be made transparent by dispensing with aluminum layer. By so doing, it is possible to obtain a bag, through which the content can be seen while it provides the odor retention and low drug absorption properties.

5 [0022] The bag which can be produced by using such polyester type resin, is suitable for fields, in which heat resistance such as boil and retort is required.

[0023] As the material for the sealant layer may be used any resin other than the polyester type resins as well so long as it can be fused to the snap zipper. Examples of such resin are LDPE, L-LDPE, PP, ethylene-vinyl acetate copolymer (EVA), ethylene-methacrylic acid copolymer (EMAA), ionomer (IO), etc.

[0024] As the outer layer material, nylon, PET, PP, cellophane, paper, etc. may be used as desired depending on desired characteristics.

[0025] The snap zipper according to the invention may be fabricated by any method. Usually, it is produced using extrusion dies having sectional profiles corresponding to its shape for molding it and then cooling the resultant molding in water.

[0026] Further, the shape of the snap zipper according to the invention is not limited to what comprises a male and a female member capable of chucking together, and any well-known shape may be adopted so long as it is capable of sealing and unsealing.

[0027] The snap zipper may be fused to the bag body with well-known means such as heat, high frequency waves, ultrasonic waves, etc.

[0028] In the accompanying drawings:

Fig. 1 is a sectional view showing a male and a female member of an embodiment of the zipper according to the invention in a unchucked state;

Fig. 2 is a sectional view showing the same embodiment of the zipper in the chucked state;

Fig. 3 is a front view showing an embodiment of the bag with snap zipper according to the invention; and

Fig. 4 is a sectional view showing the same embodiment of the bag with the snap zipper according to the invention.

EXAMPLES 1 to 16

[0029] A strip-like male and a strip-like female member 12 and 13 of each of snap zippers 11 in the individual examples, as shown in Figs. 1 and 2, were produced by extrusion molding using a material, which was composed of polyester type elastomer as a main material and polyolefin type resin as an auxiliary material, with an extruder, followed by water cooling. The kinds and proportions of the polyolefin type resins that were used in the individual examples are as in Table 1.

[0030] The shape retention of the snap zippers 11 of the individual examples was evaluated. Also, the heat seal temperature was measured. The results are shown in Table 1.

[0031] The shape retention was evaluated such that the snap zipper 11 was B (Good) if it was satisfactory in the shape of the head portion 15 and hooks 18 and 19 and substantially free from twist in the stem portions (tape portions) 14 and 17, C (Fairly Good) if it had slight twist in the stem portions 14 and 17, and F (Fail) if it had much twist in the stem portions 14 and 17.

[0032] The thermal fusion performance was evaluated as follows. It was A, i.e., satisfactory, if a strength of 300 g or above with a width of 15 mm was measured by using the thermal gradient tester noted above. It was F, i.e., defective, if the strength in the same measurement was below 300 g.

[0033] In the evaluation column in the Table, B stands for a snap zipper, which is B or C in the shape retention and a heat seal strength of 15 mm width of 300 g or above, and F stands for a zipper, which is C or F in the shape retention and has a heat seal strength of 15 mm width of 300 g or below.

[0034] As shown in Figs. 3 and 4, the stem portions 14 and 17 of the male and female members 12 and 13 were then heat sealed to base films (70 μm thick) 23 of the bag body 22, and then the base films were heat sealed on three sides, thus obtaining the bag 21 with snap zipper in these examples.

[0035] The base film 23 had a three-layer structure with two inner layers, i.e., a polyester type resin layer (53 μm) and an adhesive layer (5 μm) and an outer layer, i.e., PET layer (12 μm), the innermost polyester type resin layer being a sealant layer of the bag body 22, to which the male or female 12 or 13 was fused.

[0036] The product names and manufacture companies of the main and auxiliary materials used in the examples and comparative examples are as follows.

Polyester type elastomer: One-to-one blend of "HYTREL 6347" and "HYTREL 2551"
PBT resin: "BZ11" (by DUPONT-TORAY Co., Ltd.)
LDPE: "ACEPOLYETHY F151" (by Acepolymer Co., Ltd.)
### COMPARATIVE EXAMPLES 1 to 5

[0037] As in Examples 1 to 16, snap zippers in the individual comparative examples were produced. Then, by using these zippers bags with zipper in the individual comparative examples were produced.

[0038] The kinds and proportions of the polyolefin type resins used in the individual comparative examples are shown in Table 1.

[0039] As in the above examples, the shape retention of the snap zipper of the individual comparative examples were evaluated. Also, the heat seal temperature was measured. The results are shown in Table 1.

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<tr>
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<th>MAIN MATERIAL</th>
<th>KINDS AND PROPORTIONS OF THE MAIN AND AUXILIARY MATERIALS (wt%)</th>
<th>SHAPE RETENTION</th>
<th>HEAT SEAL TEMPERATURE</th>
<th>EVALUATION</th>
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<tr>
<td>*</td>
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</table>

* is EXAMPLES  ** is COMPARATIVE EXAMPLES

### EXAMPLES 17 TO 32

[0040] A strip-like male and a strip-like female member of each of snap zippers in the individual examples were produced by using a material, which was composed of polybutylene terephthalate as a main material and polyolefin type resin as an auxiliary material as Examples 1 to 16. Then, by using these zippers bags with zipper in the individual
Examples were produced.

[0041] The kinds and proportions of the polyolefin type resins that were used in the individual examples are as in Table 2.

[0042] The shape retention of the snap zippers 11 of the individual examples was evaluated. Also, the heat seal temperature was measured. The results are shown in Table 2.

**COMPARATIVE EXAMPLES 6 TO 9**

[0043] As in Examples 17 to 32, snap zippers in the individual comparative examples were produced. Then, by using these zipper bags with zipper in the individual comparative examples were produced.

[0044] The kinds and proportions of the polyolefin type resins used in the individual comparative examples are shown in Table 2.

[0045] As in the above examples, the shape retention of the snap zipper of the individual comparative examples were evaluated. Also, the heat seal temperature was measured. The results are shown in Table 2.

**TABLE 2**

<table>
<thead>
<tr>
<th>*</th>
<th>MAIN MATERIAL</th>
<th>KINDS AND PROPORTIONS OF THE MAIN AND AUXILIARY MATERIALS (wt%)</th>
<th>SHAPE RETENTION</th>
<th>HEAT SEAL TEMPERATURE</th>
<th>EVALUATION</th>
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</table>

* is EXAMPLES
** is COMPARATIVE EXAMPLES

[0046] From Tables 1 and 2, it will be seen that in the snap zipper 11 in each of Examples 1 to 16, in which the male and female members 12 and 13 are made of a material composed of (1) polyester type elastomer and polyolefin type resin, or (2) polybutylene terephthalate resin and polyolefin type resin, the composition containing 3 to 50% by weight of the polyolefin type resin, the stem portions (tape portions) 14 and 17 of the male and female members 12 and 13 have only very slight twist, thus indicating satisfactory shape retention.
Also, it will be seen that these bags 24 twist snap zippers 11 have no problem in the fusion strength between the snap zippers 11 and bag body 22. Thus, the bag body 24 is excellent in the sealing and unsealing of the snap zipper 11 and is satisfactory in appearance.

The snap zipper in Comparative Example 1 had defective shape retention because it did not contain polyolefin type resin although it contained polyester type elastomer.

The snap zippers in Comparative Examples 2 to 5 had some twist in the stem portion (tape portion) because their polyolefin type resin, although contained, exceeded the scope according to the invention in the content. Further, bags with snap zipper produced by using these snap zippers had problems in the mechanical strength of fusion between the snap zipper and bag body.

The snap zippers in Comparative Examples 6 to 9 had some twist in the stem portion because their polyolefin type resin content exceeded the scope according to the invention although they contained polybutylene terephthalate resin and polyolefin type resin. In addition, in this case the bag with snap zipper had problems in the fusion strength between the snap zipper and bag body.

As has been shown in the above examples, with the snap zipper and the bag with snap zipper according to the invention it is possible to obtain fusion of the snap zipper to the polyester type resin sealant of the bag body without any trouble and also obtain sufficient mechanical strength of fusion.

Claims

1. A snap zipper, in which at least a portion to be fused is mainly composed of a composition comprising polyester type elastomer or polybutylene terephthalate resin, and polyolefin type resin, the composition containing 3 to 50 % by weight of the polyolefin type resin.

2. A snap zipper according to claim 1, wherein the composition contains 10 to 40 % by weight of the polyolefin type resin.

3. A snap zipper according to claim 1 or claim 2, wherein the polyolefin is selected from the group consisting of low density polyethylene, linear low density polyethylene, high density polyethylene, ethylene-vinyl acetate copolymer, polypropylene, ethyl-butene-1 copolymer, ethylene-propylene copolymer and polybutadiene.

4. A bag, to which a snap zipper according to any one of the preceding claims, has been fused.

Patentansprüche


2. Ein Schnapp-Profilverschlußstreifen gemäß Anspruch 1, in dem die Zusammensetzung 10 bis 40 Gew.-% des Harzes vom Polyolefin-Typ enthält.


4. Ein Beutel, an dem ein Schnapp-Profilverschlußstreifen gemäß einem der obigen Ansprüche angeschweißt ist.

Revendications

1. Bande de fermeture a profits d'accouplement, dans laquelle au moins une portion à fusionner est composée principalement d'une composition comprenant un élastomère de type polyester ou une résine de poly(téréphlate de butyle) et d'une résine de type polyoléfine, la composition contenant 3 à 50% en poids de résine de type polyoléfine.

2. Bande de fermeture à profits d'accouplement selon la revendication 1, dans laquelle la composition contient 10 à 40% en poids de résine de type polyoléfine.
3. Bande de fermeture à profils d'accouplement selon l'une des revendications 1 ou 2, dans laquelle la polyoléfine est choisie dans le groupe formé par le polyéthylène basse densité, le polyéthylène linéaire basse densité, le polyéthylène haute densité, le copolymère éthylène/acétate de vinyle, le polypropylène, le copolymère éthylène/butène-1, le copolymère éthylène/propylène et le polybutadiène.

4. Sachet, auquel une bande de fermeture à profils d'accouplement selon l'une des revendications précédentes, a été fusionnée.