AUSTRALIA

PATENTS ACT 1990

670936

PATENT REQUEST : STANDARD PATENT

I/We being the person(s) identified below as the Applicant(s), request the grant of a patent to the person(s) identified below as the Nominated Person(s), for an invention described in the accompanying standard complete specification.

Full application details follow:

[71/70] Applicant(s)/Nominated Person(s):

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[54] Invention Title:

Snap fastener and packaging bag with the same

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[31] Application Number	[33] Country	Code	[32] Date of Application
4-97918	Japan	JP	17 April 1992

DATED this FIFTEENTH day of APRIL 1993

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a member of the firm of
DAVIES COLLISON CAVE for
and on behalf of the
applicant(s)

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NOTICE OF ENTITLEMENT

We, **Idemitsu Petrochemical Co., Ltd.**, the applicant/Nominated Person named in the accompanying Patent Request state the following:-

The Nominated Person is entitled to the grant of the patent because the Nominated Person derives title to the invention from the inventors by assignment.

The Nominated Person is entitled to claim priority from the basic application listed on the patent request because the Nominated Person made the basic application, and because that application was the first application made in a Convention country in respect of the invention.

DATED this FIFTEENTH day of APRIL 1993

.....

a member of the firm of
DAVIES COLLISON
CAVE for and on behalf
of the applicant(s)

(DCC ref: 1584380)

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(54) Title
SNAP FASTENER AND PACKAGING BAG WITH THE SAME

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(57) Claim

1. A snap fastener comprising a welding portion to be welded to an object to be provided therewith, the welding portion of said snap fastener comprising a linear chain low-density polyethylene.

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COMPLETE SPECIFICATION

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INVENTION TITLE:

Snap fastener and packaging bag with the same

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to a snap fastener and a packaging bag having the snap fastener and, more particularly, is available in several fields such as the food industry, pharmaceutical preparations, and haberdashery.

2. DESCRIPTION OF THE RELATED ART

Several packaging bags which have, on an opening side thereof, a web-like snap fastener consisting of a male snap fastener half-member (herein after referred to as "male half-member") and a corresponding female snap fastener half-member (herein after referred to as "female half-member") capable of intermeshing each other so that the opening side of the packaging bag can be shut and opened repeatedly have been used in the food industry, pharmaceutical preparations, and haberdashery. It is noted that there have been some proposed method of producing such packaging bag.

One of the known general methods to produce the packaging bag is to extrude a cylindrical film with the male half-member as well as the corresponding female half-member through an extruding die and the other is to first produce a two-piece type snap fastener tape of which one is used as the male half-member and other is used as the corresponding female half-member and to adhere/weld the tape on a base film as the packaging bag body be means of a thermal adhesion method or an adhesive agent.

The former method involves some problems such that there is a limit to the variety of applicable resins, it is inapplicable to laminated films, it can not be adapted to needed sizes of the packaging bag, and it can not be printed easily, so that this method is restricted to producing general-purpose packaging bags. As the latter method has some advantages in applications to different size bags, as well as in handling and costs because the packaging bag can be produced by a combination with the tape with snap fastener and the base film, this method is more popular than the former method.

The qualities of the material for the snap fastener are preferably low-density polyethylene (LDPE), polypropylene (PP) or the like so that the snap fastener can be adhered

to a base film made from the same resin. Therefore, if an outer layer of the base film where the snap fastener is attached is made from LDPE, the snap fastener should be produced from LDPE, too.

However, the snap fastener made from LDPE or PP tends to be insufficient to obtain enough adhesion to the bag body at a low heating temperature. When the packaging bag with the snap fastener made from LDPE is sterilized by boiling, some problems to be avoided will take place.

SUMMARY OF THE INVENTION

A snap fastener according to the present invention is characterized to have a welding portion to be welded to an object to be provided with the snap fastener, the welding portion of said snap fastener comprising a linear chain low-density polyethylene.

Also provided according to the present invention is a packaging bag capable of opening-and-closing repeatedly comprising: a bag body; and a snap fastener having a welding portion welded to an open end of the bag body, the welding portion of said snap fastener comprising a linear chain low-density polyethylene.

It has been found that a snap fastener having a welding portion comprising linear chain low density polyethylene (L-LDPE) can be fused to a bag at a lower temperature than a snap fastener of low density polyethylene (LDPE) even though the melting point of L-LDPE is higher than that of LDPE. Furthermore, the snap fastener having a welding portion of L-LDPE has been found to provide a stronger seal to the bag, particularly when it is fused to L-LDPE, and to be resistant to boiling.

The welding portion of the snap fastener may be made of a compound resin of the linear chain low-density polyethylene (L-LPDE) and a low-density polyethylene (LPDE) as a sub-ingredient. The compound resin of the linear chain low-density polyethylene and the low-density polyethylene is preferably set in a ratio of 95-60wt% : 5-40wt%.

The resin forming the welding portion preferably has a melt index (MI) of from 1-15g/10 minutes, more preferably from 2-8g/10 minutes. A MI beyond this range causes a poor shape of the snap fastener after boiling so that the performance of open-and-close

becomes bad.

The recommended thickness of the welding portion is 80-220 micrometers, preferably 130-170 micrometers because the hot-welding temperature tends to fall within a decrease of the thickness of the welding portion.

The method of producing the snap fastener is not limited particularly but can advantageously be conducted by being molded by means of a corresponding die and cooling the molded article in water.

The shape of the snap fastener according to the present invention need not be limited to one shape comprising a pair of half-members intermeshing with each other. Other known shapes capable of intermeshing with each other may alternatively be adopted.

The hot-welding between the snap fastener and the object such as the bag body can be conducted by means of heat, high-frequency energy, ultrasonic energy, or the like.

The preferable resins for at least an inner side layer of the bag body of the packaging bag according to the invention comprise, for example, LPDE, ethylene-vinyl acetate copolymer (EVA), ethylene-methacrylic acid copolymer (EMAA), ionomer (IO), L-LPDE or the like. The most preferable material is L-LDPE considering its thermal properties. The packaging bag of the invention may have a bag body which is laminated. An outer side layer contacting with the inner side layer is preferably nylon, polyethylene terephthalate (PET), PP, biaxially oriented nylon finished with vinylidene chloride (KON) or biaxially oriented polypropylene finished with vinylidene chloride (KOP), or the like.

Furthermore, the snap fastener can include one or more general compounding ingredients, if necessary, such as a coloring agent, stabilizing agent, anti-oxidizing agent, slipping agent, chemical destaticizer, or the like. The slipping agent, as one of the known compounding ingredients, may be added to the materials to produce the snap fastener in an amount of 0.05-0.5wt% in order to obtain smooth intermeshing between the male half-member and the female half-member. The slipping agent may comprise an oleic acid amide, erucic acid amide, stearic acid amide, behenic acid amide, oleyl palmitamide, calcium sterate, talc, kaolin, silica, polysiloxane, and so on, but oleic acid amide and erucic acid amide are popular among them. When either oleic acid amide or erucic acid amide is used, the mentioned addition ratio should be maintained to obtain a preferably performance of open-

and-close. As anti-oxidizing agent, a phenolic, phosphorus, or sulfur type can be applied. As chemical destaticizer, an amount of 0.05-0.5wt%, preferably 0.1-0.2wt%, stearic acid monoglyceride or the palmitinic acid monoglyceride is preferred.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiment of snap fastener and packaging bag in accordance with the present invention will now be described by way of example only with reference to the drawings, in which:

Figure 1 is a sectional view of a pair of male and female half-members of the snap fastener;

Figure 2 is a sectional view of the snap fastener in an intermeshing state;

Figure 3 is the front view of a packaging bag with the snap fastener welded thereto; and

Figure 4 is a sectional view of the packaging bag with the snap fastener depicted in Figure 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

1ST EXPERIMENTAL EXAMPLE

A snap fastener 11 comprising a pair of a male half-member 12 and a female half-member 13 formed into shapes as shown in Figures 1 and 2 can be manufactured from a linear chain low-density polyethylene (L-LDPE) as a feed stock, while extruding and cooling successively the L-LDPE through an extruder. Incidentally, the L-LDPE has a melt index of 6 g/10 minutes.

The male half-member 12 is integrated with a web-like base section 14 as a welding portion to be welded to a bag body, a sectionally heart-shaped head section 15 and a joint section 16 to connect both sections 14 and 15 with each other.

The female half-member 13 is integrated with a web-like base section 17 to be welded to a bag body, a semi-circular first hook 18 fixed in relation to the base section 17 and a second hook 19 symmetrical to the first hook 18. There is provided a gap 21 between edges 18A and 19A of both hooks 18 and 19. Incidentally, the base sections 14 and 17 have a thickness of 150 micrometers.

An intermeshing between the male and female half-members 12, 13 can be performed by closing both half-members 12, 13 to each other to hold the head portion 15 of the male half-member 12 at the gap 21 between the edges 18A and 19A of the female half-member 13 and continuously closing to each other while parting the hooks 18, 19 to right and left until the head section 15 will be completely located in a space between the hooks 18, 19.

Figures 3 and 4 are related drawings depicting a packaging bag 24 with the above-mentioned snap fastener 11 consisting of the male half-member 12 and the female half-member 13. The packaging bag 24 can be fabricated by heat-welding both base sections 14 and 17 of the male and female half-members 12 and 13 to a base film 23 forming a bag body 22 by means of a heat seal bar at a temperature of 143°C and further heat-sealing three sides of the bag body 22 except for an opening side where the snap fastener 11 is disposed.

The base film 23 has two layers; a nylon-6 layer (15 micrometers)/a L-LDPE layer (120 micrometers), wherein the L-LDPE layer is used as an inside layer of the bag body 22 and adapted to be heat-welded with the male half-member 12 or the female half-member 13.

The applicant conducted several experimental examples and control examples to confirm the thermal properties of the produced packaging bag with the snap fastener 24 under a boiling temperature of 90, 95 or 99°C for 45 minutes. Each result of the experimental examples and control examples is shown in an attached Table 1. At a thermal properties evaluation column in this table, a legend "Circle" explains a state of the bag with no problem after boiling, a legend "Cross" explains a presence of tear and/or abnormal appearance in the bag after boiling so that a preferable performance of open-and-close on the opening side of the bag become worse. The presence of "Tear" means, when opening the packaging bag, the bag ripped where the heat seal bar acted to heat-weld the base sections 14, 17 to the inside layer of the body 22. The "Abnormal appearance" means a malfunction of the snap fastener 11 because of its thermal deformation, or a state that the packaging bag looks unattractive

because of creases thereon caused by different melt properties of the snap fastener 11 and the base film 23. Furthermore, at a column for the evaluation on shape retainment of the snap fastener in Table 1, a legend "Double-circle" explains a preferable shape of the both half-members, a legend "Circle" explains a state that unfavourable deformation of the half-members can be seen, but can be still put to practical use, and a legend "Cross" explains a state that the deformation of the both half-members is too great to intermesh to each other. However, it should be noted, in Table 1, that a description of 100 wt% of L-LDPE may not mean its pure state for making the snap fastener 11. Thus, the L-LDPE can contain very little and general formulating ingredients.

According to the result of Table 1, the snap fastener 11 can be preferably heat-welded with the bag body 22 at a low temperature of 143°C, which results in high productivity of the packaging bag with the snap fastener.

Since the manufactured packaging bag 24 with the snap fastener 11 has excellent high-temperature resistance at 99°C, the preferable open-and-close condition of the bag can be maintained and the appearance of the bag will not be deteriorated, too. The user can expect wide application of the packaging bag with a fine shape of the packaging bag, because of the wide range of temperature available when boiling and cooking.

2ND-6TH EXPERIMENTAL EXAMPLES

The 2nd-6th experimental examples in Table 1 have been conducted to confirm whether other snap fastener compounded L-LDPE and LDPE by various composition ratios are useful.

Respective composition ratios in the 2nd-6th experimental examples are as follows; L-LDPE:LDPE=95wt%:5wt% in the experimental example 2, L-LDPE:LDPE=90wt%:10wt% in the experimental example 3, L-LDPE:LDPE=80wt%:20wt% in the experimental example 4, L-LDPE:LDPE=70wt%:30wt% in the experimental example 5, L-LDPE:LDPE=60wt%:40wt% in the experimental example 6.

First, the each snap fastener 11 in respective experimental examples is prepared as in the mentioned 1st experimental example. The test packaging bags with the thus prepared snap

fasteners 24 can be prepared for each experimental example.

The hot-welding temperature is set at a temperature of 142°C in the 2nd experimental example and 140°C in the 3rd-6th experimental examples.

The results shown in Table 1 are obtained in the same way as the 1st experimental example. Observations of the test packaging bags used in the 2nd-6th experimental examples are that enough hot-weldability can be obtained at a temperature of from 140-142°C, which is lower than that in the 1st experimental example, and that the thermal properties when boiling at a temperature of 99°C are extremely good. Furthermore, each of the test packaging bags used in the 2nd-6th experimental examples shows a good property to keep its original shape as in the 1st experimental example.

7TH-11TH EXPERIMENTAL EXAMPLES

A packaging bag used in the 7th-11th experimental examples has a snap fastener 11 made of L-LDPE and having a different value of Melt Index (herein after referred to as MI).

The MI of L-LDPE is set as follows; 2g/10 minutes in the 7th experimental example, 8g/10 minutes in the 8th experimental example, 1g/10 minutes in the 9th experimental example, 9g/10 minutes in the 10th experimental example, and 15g/10 minutes in the 11th experimental example.

First, each snap fastener 11 in respective experimental examples 7 to 11 is prepared as in the mentioned 1st experimental example. The test packaging bags 24 with the thus prepared snap fasteners can be prepared for each experimental example.

The hot-welding temperature is set at a temperature of 143°C in the 7th-9th experimental examples and 142°C in the 10th and 11th experimental examples. The results shown in Table 1 are obtained in the same way as the 1st experimental example.

An observation of the test packaging bags used in the 7th-11th experimental examples is that the thermal properties when boiling at a temperature of 99°C are extremely good. Furthermore, each of the test packaging bags used in the 7th-8th experimental examples shows a good property to keep its original shape as in the 1st experimental example so that the good open-and-close performance is not damaged.

The packaging bags in the 9th-11th experimental examples does not show a perfect shape of the snap fastener but such state will not be a problem in view of the actual performance of open-and-close.

12TH-14TH EXPERIMENTAL EXAMPLES

The 12th-14th experimental examples in Table 1 have been conducted to confirm whether other snap fastener compounded L-LDPE and LDPE by various composition ratios are useful. Incidentally, the values of MI in the respective experimental examples are also varied.

Respective composition ratios in the 12th-14th experimental examples are as follows; L-LDPE:LDPE=95wt%:5wt% in the experimental example 12, L-LDPE:LDPE=80wt%:20wt% in the experimental example 13, L-LDPE:LDPE=60wt%:40wt% in the experimental example 14. The MI of L-LDPE is set as follows; 1g/10 minutes in the 12th experimental example, 9g/10 minutes in the 13th experimental example, and 15g/10 minutes in the 14th experimental example.

First, each snap fastener 11 in respective experimental examples 12 to 14 is prepared as in the mentioned 1st experimental example. The test packaging bags 24 with the thus prepared snap fasteners can be prepared for each experimental example.

The hot-welding temperature is set at a temperature of 142°C in the 12th experimental example and 140°C in the 13th and 14th experimental examples.

The results shown in Table 1 are obtained in the same way as the 1st experimental example.

An observation of the test packaging bags used in the 12th-13th experimental examples is that thermal properties when boiling at a temperature of 99°C are extremely good. The test packaging bag used in the 14th experimental example has good thermal properties when boiling at a temperature of 95°C. Furthermore, each of the packaging bags in the 12th-14th experimental examples does not show a perfect shape of the snap fastener compared with that in the 2nd-6th experimental examples but such state will not be a problem in view of the actual performance of open-and-close.

15TH EXPERIMENTAL EXAMPLE

The snap fastener 11 used in this experimental example is made of L-LDPE and the thickness of the base film 23 forming the bag body 22 is varied.

The base film 23 consists of two layers, one being of the nylon-6 layer having 15 micrometers thickness and the other being of the L-LDPE layer having 100 micrometers thickness which is thinner than the L-LDPE layer in the 1st experimental example by 20 micrometers.

First, the snap fastener 11 is prepared as in the mentioned 1st experimental example. The test packaging bag 24 with the thus prepared snap fastener can be prepared.

The hot-welding temperature is set at a temperature of 141°C. The result shown in Table 1 is obtained in the same way as in the 1st experimental example.

An observation in this experimental example is that the heat-welding temperature is lower than that in the 1st experimental example by 2°C but other results are almost the same as in the 1st experimental example.

16TH-19TH EXPERIMENTAL EXAMPLES

The 16th-19th experimental examples are conducted to confirm whether the packaging bags compounded with other ingredients making the base film 23 are useful or not.

Respective ingredients of the base film 23 are as follows: two layers with a 12-micrometer thickness polyethylene terephthalate (PET) layer and a 6-micrometer thickness LDPE layer in the 16th experimental example; two layers with a 15-micrometer thickness nylon-6 layer and a 60-micrometer thickness LDPE layer in the 17th experimental example; two layers with a 20-micrometer thickness biaxially oriented polypropylene finished with vinylidene chloride (KOP) and a 40-micrometer thickness LDPE layer in the 18th experimental example; and three layers with a 15-micrometer thickness biaxially oriented nylon finished with vinylidene chloride (KON), a 15-micrometer thickness LDPE layer and a 50-micrometer thickness ethylene-vinyl acetate copolymer (EVA) layer in the 19th experimental example. Incidentally, the respective inner layers of these base films 23 are the

LDPE layer in each of the 16th-18th experimental examples and the EVA layer in the 19th experimental example.

First, each snap fastener 11 in respective experimental examples 16-19 is prepared as in the mentioned 1st experimental example. The test packaging bags 24 with the thus prepared snap fasteners can be prepared for each experimental example.

The hot-welding temperature is set at a temperature of 135°C in the 16th and 17th experimental examples, 133°C in the 18th experimental example, and 126°C in the 19th experimental example. The results shown in Table 1 are obtained in the same way as the 1st experimental example.

An observation in the 16th-19th experimental examples is that the hot-welding temperature is lower than in the 1st experimental example and the state of the snap fastener shape is fine as in the 1st experimental example but the thermal properties shows a boiling temperature of 95°C inferior to 99°C in the 1st experimental example by 4°C.

1ST-3RD CONTROL EXAMPLES

First, each snap fastener in respective control examples 1-3 is prepared as in the mentioned experimental examples. The comparative packaging bags with the thus prepared snap fasteners can be made for the following control examples.

It will be mentioned, however, that material resins for the snap fastener and a temperature of hot-welding in these control examples are varied.

The material resins used are as follows; the compound resin with 40wt% L-LDPE and 60wt% LDPE in the 1st control example, LDPE in the 2nd control example, and FVA in 3rd control example.

The respective set temperature for hot-welding are 140°C in the 1st control example, 145°C in the 2nd control example, and 128°C in the 3rd control example.

The results shown in Table 1 are obtained in the same way as the 1st experimental example.

An observation in the 1st control example is that the sort of resin for the snap fastener is included in the scope of the present invention but does not have L-LDPE as a main

ingredient, so that the hot-weldability at a low temperature is fine but the thermal properties when boiling are poor.

The snap fastener according to the 2nd control example is not made of the same resin as in this invention, whereby the thermal properties when boiling are limited at a temperature of upto 90°C, which is poor in view of the actual use.

The snap fastener according to the 3rd control example is not made of the same resin as in this invention, so that the hot-weldability at a low temperature is fine but the thermal properties when boiling are limited at a temperature of upto 90°C, which is poor in view of the actual use.

4TH CONTROL EXAMPLE

The material resin used for the snap fastener 11 is PP in this control example, but a packaging bag with this snap fastener can not be obtained as the snap fastener 11 is not hot-welded to the base film 23.

5TH AND 6TH CONTROL EXAMPLES

The snap fasteners used in these control examples are made of L-LDPE and the value of MI are varied.

First, the snap fastener 11 is prepared as in the mentioned 1st experimental example. The control packaging bag with the thus prepared snap fastener can be prepared.

As can be seen from Table 1, the Mi value of L-LDPE is 16g/10 times in the 5th control example and 25g/10 minutes in the 6th control example.

The fine hot-welding state can be obtained in the control examples 5, 6 at a temperature of 143°C.

The result shown in Table 1 is obtained in the same way as in the 1st experimental example.

According to the 5th and 6th control examples, it is noted that acceptable thermal properties when boiling the packaging bag can be obtained at a temperature of upto 99°C as

in the 1st experimental example, but the shape of the snap fastener is deformed so that the preferably performance of open-and-close is spoiled.

7TH AND 8TH CONTROL EXAMPLES

In these control examples, a compound rate of L-LDPE and LDPE is changed as 60wt%:40wt% and the MI values are also changed, respectively.

The MI value is 16g/10 minutes in the 7th control example and 20g/10 minutes in the 8th control example.

First, the snap fastener is prepared as in the mentioned 1st experimental example. The control packaging bag with the thus prepared snap fastener can be made.

The hot-welding can be conducted preferably at a temperature of 140°C in both control examples.

The result shown in Table 1 is obtained in the same way as in the 1st experimental example.

When reviewing these control examples 7 and 8, it is noted that the fine thermal properties when boiling can be obtained at a temperature of upto 95°C which is similar level to that in the 1st experimental example. However, the shape of the snap fastener is not kept in its original state, so that the performance of open-and-close is poor.

According to the above-mentioned experimental and control examples, the following results can be understood.

The snap fastener 11 made of L-LDPE or the composition of L-LDPE and LDPE can achieve fine hot-welding condition at a lower temperature than that in the 2nd control example by from 2-5°C. The snap fastener compounded with independent L-LDPE and L-LDPE and LDPE at a composition ratio of 95wt%-60wt%:5wt%-40wt% can obtain the practical thermal properties at a temperature of at least 95°C. When the inner layer of the bag body uses L-LDPE, acceptable thermal properties at a temperature of upto 99°C can be expected. If the mixing ratio of L-LDPE and LDPE to produce the snap fastener is outside the mentioned range, the thermal properties at a temperature of 95°C can not be expected as shown in the 1st control example.

When the value MI is set at from 1g/10 minutes-15g/10 minutes, the shape of the snap fastener can be kept in its original state, and particularly, from 2g/10 minutes-8g/10 minutes, the shape can be kept in an extremely good state. While, as in the 5th-8th control examples, when the value MI is above 15g/10 minutes, the shape of the snap fastener can not be kept in an ideal state.

As shown in the 1st and 15th experimental examples, the thinner L-LDPE layer is effective to lower the hot-welding temperature.

As has been mentioned, the snap fastener according to the present invention may be superior in hot-welding to the bag body at a lower temperature than the conventional fastener, and in the thermal properties. The packaging bag produced according to the present invention may have fine thermal properties and maintain good state of performance of open-and-close.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Table 1

	Composition of Snap Fastener (wt%)	Composition and Thickness (μm) of Bag Body Outer Layer/Inner Layer	* °C	Thermal Properties °C			MI **	State of Shape
				90	95	99		
Ex. Exam. 1	L-LDPE(100)	NY6(15)/L-LDPE(120)	143	○	○	○	6	◎
Ex. Exam. 2	L-LDPE(95)+LDPE(5)	"	142	○	○	○	8	◎
Ex. Exam. 3	L-LDPE(90)+LDPE(10)	"	140	○	○	○	5	◎
Ex. Exam. 4	L-LDPE(80)+LDPE(20)	"	140	○	○	○	4	◎
Ex. Exam. 5	L-LDPE(70)+LDPE(30)	"	140	○	○	○	8	◎
Ex. Exam. 6	L-LDPE(60)+LDPE(40)	"	140	○	○	○	2	◎
Ex. Exam. 7	L-LDPE(100)	"	143	○	○	○	2	◎
Ex. Exam. 8	"	"	143	○	○	○	8	◎
Ex. Exam. 9	"	"	143	○	○	○	1	○
Ex. Exam. 10	"	"	142	○	○	○	9	○
Ex. Exam. 11	"	"	142	○	○	○	15	○
Ex. Exam. 12	L-LDPE(95)+LDPE(5)	"	142	○	○	○	1	○

Ex. Exam. 13	L-LDPE(80)+LDPE(20)	"	140	○	○	○	9	○
Ex. Exam. 14	L-LDPE(60)+LDPE(40)	"	140	○	○	○	15	○
Ex. Exam. 15	L-LDPE(100)	NY6(15)L-LDPE(100)	141	○	○	○	6	◎
Ex. Exam. 16	"	PET(12)/LDPE(60)	135	○	○	×	6	◎
Ex. Exam. 17	"	NY6(15)/LDPE(60)	135	○	○	×	6	◎
Ex. Exam. 18	"	KOP(20)/LDPE(40)	133	○	○	×	6	◎
Ex. Exam. 19	"	KON(15)/LDPE(15)/ EVA(50)	126	○	○	×	6	◎
Con. Exam. 1	L-LDPE(40)+LDPE(60)	NY6(15)/LDPE(120)	140	○	×	×	7	◎
Con. Exam. 2	LDPE(100)	"	145	○	×	×	2	◎
Con. Exam. 3	EVA(100)	"	128	○	×	×	3	◎
Con. Exam. 4	PP(100)	"	-	-	-	-	7	◎
Con. Exam. 5	L-LDPE(100)	"	143	○	○	○	16	×
Con. Exam. 6	L-LDPE(100)	"	143	○	○	○	25	×
Con. Exam. 7	L-LDPE(60)+LDPE(40)	"	140	○	○	×	16	×
Con. Exam. 8	L-LDPE(60)+LDPE(40)	"	140	○	○	×	20	×

NOTE: Ex. Exam. = Experimental Example
Con. Exam. = Control Example
* = Hot-welding temperature
** = g/10 Minutes

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A snap fastener comprising a welding portion to be welded to an object to be provided therewith, the welding portion of said snap fastener comprising a linear chain low-density polyethylene.

2. The snap fastener according to claim 1, wherein the welding portion of said snap fastener is made of a compound resin of the linear chain low-density polyethylene and a low-density polyethylene as a sub-ingredient.

3. The snap fastener according to claim 2, wherein the compound resin of the linear chain low-density polyethylene and the low-density polyethylene is set in a ratio of 95-60wt%:5-40wt%.

4. The snap fastener according to any one of claims 1 to 3, wherein the linear chain low-density polyethylene has a melt index of from 1-15g/10 minutes.

5. The snap fastener according to claim 2 or any claim dependent therefrom, wherein the compound resin of the linear chain low-density polyethylene and the low-density polyethylene has a melt index of from 1-15g/10 minutes.

6. A snap fastener substantially as hereinbefore described with reference to the Experimental Examples.

7. A packaging bag capable of opening-and-closing repeatedly comprising: a bag body; and a snap fastener having a welding portion welded to an open end of the bag body, the welding portion of said snap fastener comprising a linear chain low-density polyethylene.

8. The packaging bag according to claim 7, wherein the snap fastener is in accordance with any one of claims 2 to 6.

9. The packaging bag according to either of claims 7 and 8, wherein said bag body has an inner side layer to which said snap fastener is welded, at least the inner side layer comprising a linear chain low-density polyethylene.

10. The packaging bag according to claim 9, wherein said bag body has plural laminated layers of which an outer side layer adhered to the inner side layer comprises a nylon.

DATED this 11th day of June, 1996.

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ABSTRACT

A snap fastener 11 having a base section 14, 17 to be welded to a bag body 22 which is made of a liner chain low-density polyethylene (L-LDPE) or a compound resin of the liner chain low-density polyethylene and a low-density polyethylene (LDPE) as a sub-ingredient. A packaging bag fabricated with the snap fastener from the bag body 22 and the pair of snap faster half-members. When the snap fastener 11 is made of a compound resin of L-LDPE and LDPE, the composition ratio between them is set in 95-60wt% : 5-40wt%. The melt index (MI) of the compound resin is set in a range of 1-15g/10minutes. The packaging bag body 22 is adapted to have an inner side layer made of L-LDPE. An outer side layer adhered to the inner side layer may be made of Nylon so as to form the multilayered bag body.

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FIG. 1

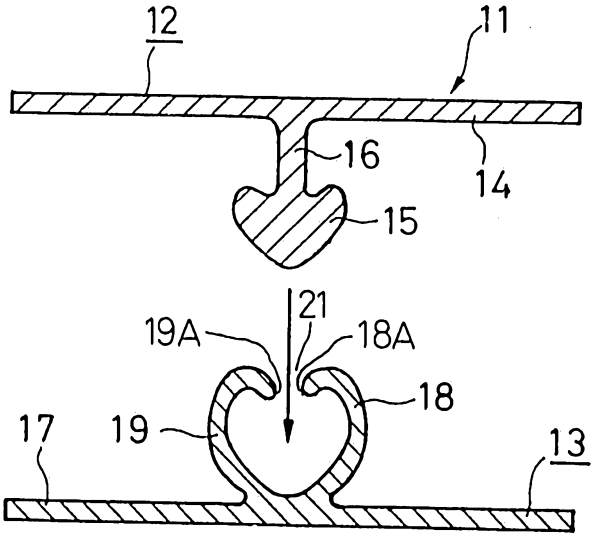

FIG. 2

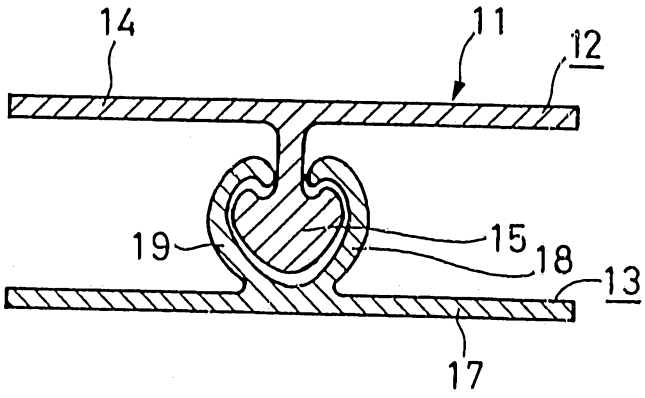

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FIG. 3

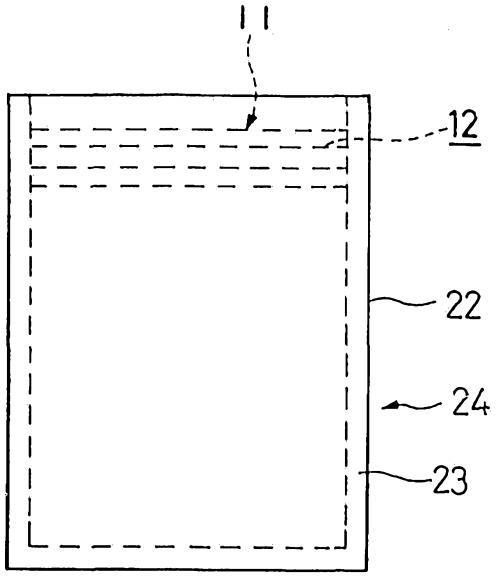

FIG. 4