

METHOD OF PACKING SHEET-LIKE FOOD FOR BUSINESS

Technical Field

The present invention relates to a packing method of
5 sheet-like food for business use.

Background Art

Sheet-like food for business use is raw materials of
food which is molded into a sheet-like shape by raw
material makers and delivered to food manufactures for
10 further processing. It contributes to labor saving of
molding in food manufactures because of molding beforehand.

Examples of such food include a sheet-like water-in-
oil type emulsified composition (e.g., sheet margarine), a
sheet-like oil-in-water type emulsified composition, a
15 sheet-like flour paste, sheet-like chocolate, and the like.
Sheet margarine is used by rolling it in dough in mainly
manufacturing pie, Danish pastry, croissant, and the like.

One sheet of the above-mentioned sheet margarine has,
for example, such a size that one side is 20 to 40 cm long
20 and a thickness is approximately 0.5 to several cm.

Usually, its weight is 500 to 2500 g and, sometimes about
10 kg. When shipping a sheet-like emulsified composition
as a product, in a widely employed packing method, a
flexible resin film somewhat larger than each sheet
25 margarine is placed between respective sheets of sheet

margarine to prevent adhesion of sheets and a pile of about 10 to 20 sheets are then put into a cardboard box.

Incidentally, horizontal pillow type packaging of sheet margarine has been known as disclosed in Patent

5 Document 1, and products with such packaging were marketed a pretty long time ago. However, since it was necessary to tear each packaging, a severe work of unsealing by hands was forced to perform in major food manufacturers wherein ten thousand packages or more should be unsealed a day. In

10 order to facilitate such unsealing, for example, Patent Document 2 has proposed to provide a notch, etc. on one side of a package to tear off it in the shape of a tape (Patent Document 2). However, this was not spread because there was a possibility of causing a serious problem of
15 inclusion of foreign objects due to accidental inclusion of small pieces of a torn packaging film into products. Then, it is considered that this would be a reason why the above current system has been widely employed. As another

problem in a method such as that described in the above
20 Patent Document 1, a processing speed is limited due to the necessity of drawing the packaging by a separating device to fully taken out contents from the packaging, resulting in a disadvantage to mass processing and an unclean cut of the product.

25 When using sheet-like food packed by the above

currently spread packing method, a cardboard box is opened to take out the pile of sheet-like food together with films, and then films are peeled off. In this case, there would be a problem of inclusion of foreign objects because paper dust, etc. in a cardboard box adheres to sheets through the opening parts of the sheet ends until the cardboard box is opened. Further, there would be another problem that side parts of the sheet-like food cause color change due to drying.

10 Although it has been conceived that a cardboard box with no paper dust could be used in order to solve the above-mentioned problem, such a cardboard box has not been known and it is easily supposed that the cardboard box would be expensive even though it could be realized.

15 Alternatively, also conceived is to put several sheets of sheet-like food each of which has been sandwiched between films into a plastic bag, and the plastic bag is further packed in a cardboard box. However, still, there would be a problem of inclusion of foreign objects due to fragments of the plastic bag. As described above, the pillow type packaging of each sheet of sheet-like food in a conventional manner is not practical. It is also conceived that sheet-like food is sealed so as to be capable of unsealing without tearing packaging films (easy peel).

25 However, this requires the use of an expensive multilayered

film, and is not practical, either.

Patent Document 3 discloses an easily unsealable pouch comprising a laminate film in which a substrate layer and an easily peelable sealant layer are laminated.

5 Patent Document 1: JP 50-95441 A

Patent Document 1: JP 2003-72773 A

Patent Document 2: JP 11-130145 A

Disclosure of the Invention

Problem to be solved by the Invention

10 An object of the present invention is to provide a packing method of sheet-like food for business use, which hardly causes inclusion of foreign objects such as paper dust, at low costs.

Means for solving the Problem

15 The present inventors have studied intensively and unexpectedly found that easy peel can be simply realized by modifying heat sealing to subject sheet-like food to horizontal pillow type packaging sheet by sheet with a comparatively inexpensive single-layer film made of
20 polyethylene, thereby also solving the problem of inclusion of foreign objects. Thus, the present invention has been completed.

That is, the present invention provides:

(1) A packing method of sheet-like food for business
25 use which comprises continuously supplying sheet-like food

sheet by sheet onto a packaging film which is fed in a horizontal direction while being molded into a cylindrical shape with a bag making machine by overlapping both side edge parts of the film in a longer direction and heat-sealing (center sealing) the overlapped part so as to be capable of unsealing the packaging film without tearing the film during unsealing, and further being sealing and cutting said molded film containing sheet-like food therein sheet by sheet in a traverse direction by heat-sealing (end sealing) so as to be capable of unsealing the packaging film without tearing during unsealing;

(2) The packing method of sheet-like food for business use according to the above (1), wherein the packaging film is a single-layer film made of polyethylene;

(3) The packing method of sheet-like food for business use according to the above (1) or (2), wherein the center sealing and/or the end sealing are heat sealing by heating elements one having at least one row of projections and the other having at least one row of recesses or at least one groove corresponding to the projections;

(4) The packing method of sheet-like food for business use according to any one of the above (1) to (3), wherein the center sealing and/or the end sealing are spotted partial fusing;

(5) The packing method of sheet-like food for

business use according to any one of the above (1) to (4), wherein both side edge parts of the film is overlapped in a longer direction so that fringes of the film being different in width are formed along the center sealing part;

(6) The packing method of sheet-like food for business use according to any one of the above (1) to (5), wherein the center sealing and/or the end sealing are partially performed;

(7) The packing method according to any one of the above (1) to (6), wherein the sheet-like food is sheet margarine; and

(8) The packing method of sheet-like food for business use according to the above (1), wherein the packaging film is a single-layer film made of polyethylene comprising a mixture of HDPE and LLDPE.

Effect of the Invention

According to the packing method of the present invention, adhesion of foreign objects such as paper dust, etc. to sheet-like food for business use can be prevented. The method of the present invention is excellent in that a widespread horizontal bag-making, filling and packing machine can be employed to performing packing at a high speed and further an inexpensive film can be used, thereby reducing the production cost.

Best Mode for Carrying Out the Invention

In the present invention, sheet-like food for business use includes sheet-like water-in-oil type emulsifying composition (sheet margarine), sheet-like oil-in-water type emulsifying composition, sheet-like flour paste and sheet-like chocolate. The method of the present invention is hardly applicable to food having fluidity.

The packing method of sheet-like food for business use of the present invention is characterized in that sheet-like food is continuously supplied sheet by sheet onto a packaging film which is fed in a horizontal direction while being molded into a cylindrical shape with a horizontal bag-making, filling and packing machine (horizontal pillow type packaging machine) by overlapping both side edge parts of the film in a longer direction and heat-sealing (center sealing) the overlapped part so as to be capable of unsealing the packaging film without tearing the film during unsealing, and further being sealing and cutting said molded film containing sheet-like food therein sheet by sheet in a traverse direction by heat-sealing (end sealing) so as to be capable of unsealing the packaging film without tearing during unsealing.

The bag making machine to be used in the present invention may be any known horizontal bag-making, filling and packing machine (horizontal pillow type packaging

machine), and is not specifically limited as far as the desired packing can be performed.

5 In the present invention, the center sealing and the end sealing need to be sealed so that they can be unsealed without tearing the packaging film during unsealing, i.e., to be sealed in the manner of so-called "easy peel". When they are not "easy peel", there is a possibility that inclusion of the film torn by unsealing in products is caused, and this does not satisfy the objective of the present invention. Any known methods can apply to sealing of "easy peel". However, a multilayered film is unsuitable for the objective of the present invention because it raises material costs, and is problematic in piling of the resulting packages as described hereinafter, while a 10 multilayered film enhances sealability because its sealing is complete. 15

It has been found that "easy peel" can be readily realized by using a single-layer film made of polyethylene and modifying heat sealing.

20 That is, in the present invention, spotted partial fusion is sufficient for the heat sealing. More specifically, two parts of the film to be subjected to the center sealing or the end sealing is sandwiched in and pressurized between two heating elements one having at 25 least one row of projections and the other having at least

one row of recesses or at least one groove corresponding to the projections with adjusting temperature, pressure and pressing time of both heating elements so that only a part of the film contacting with the tip end section of the projection and the corresponding part of the film contacting with the corresponding recess or groove are melted to fuse or adhere to each other. Thus, the adhesion of these parts of the film can easily be peeled and unsealed without tearing the packaging film (easy peel).

Although the reason is not necessarily clear, it is considered that only a part of film contacting with the tip end section of the projection and the corresponding part of the film contacting with the corresponding recess or groove are melted to fuse or adhere each other because, for example, the parts of the film contacting with the tip end section of the projection are somewhat extended more thinly than other parts due to pressure and heat by the projection, and the temperature of the bottom of the corresponding recess or groove is somewhat higher than that of the tip end section of the projection. For this purpose, the adjustment of optimum temperature, pressure and pressing time of both heating elements is unexpectedly and relatively easy in case of using a single-layer film made of polyethylene as compared with using a multilayered film.

As far as the desired spotted partial fusion of the

center sealing and the end sealing is obtained, the shape, number and position of the rows of recesses or the groove(s) are not specifically limited. For example, one element has a plurality of rows of projections and each
5 projection may be a pyramidal shaped projection whose tip end is horizontally cut off, or a pyramidal shaped projection whose tip end corners are rounded. The other element has a plurality of rows of recesses and each recess can be designed so that it engages with each projection.
10 Alternatively, the other element has a plurality of grooves and each groove can be designed so that it engages with one row of the projections. In any case, the projection is preferably formed into such a shape that the bottom of the recess or the groove contacts with its tip end section when
15 both heating elements engage with each other.

As the heating elements, for example, a pair of metallic rolls (wherein at least one row of projections is formed on one surface, and at least one corresponding row of recesses or groove is formed on the other surface; the
20 typical size of the projection is 2 by 2 mm square with the height of about 0.2 to 0.7 mm; preferably, the projections are provided by 5 to 6 rows, for example, within an area of 1 cm wide of the roll.) can be used. The rolls are heated to higher than the fusing point of the film to be used by a
25 heating means such as a heating wire. The parts of the

film to be subjected to the center sealing or the end sealing are sandwiched in between the rolls, and the rolls are rolled in a longitudinal direction for the center sealing and in a lateral direction for the end sealing, thereby performing heat sealing. Alternatively, for example, a pair of metallic plates each having the same length as a sealing length (at least one row of projections is formed on one element, and at least one corresponding row of recesses or groove is formed on the other) can also be used. The parts of the film is sandwiched in between the plates and pressurized to performing heat sealing.

Examples of the film to be used include a single-layer film made of polyethylene, preferably a single-layer film made of HDPE or LLDPE because the above-mentioned temperature in heat sealing can be adjusted within a broader range. More preferably, a single-layer film is made of a mixture of HDPE and LLDPE mixed, further more preferably a mixture of HDPE and LLDPE in the ratio of 50 : 50 to 95 : 5, and most preferably a mixture of HDPE and LLDPE in the ratio of 85 : 15 to 95 : 5.

The film thickness is preferably 40 to 80 μm , more preferably 55 to 65 μm . For packing sheet-like food for business use, when a film is less than 40 μm thick, the resulting bag itself does not have sufficient strength and is hardly applicable to easy peel". On the other hand,

when a film is more than 65 μm thick, the package is apt to be streaked, which is not preferable.

When performing the center sealing, both side edge parts of the film can be overlapped in a longer direction so that fringes of the film having different width are formed along the center sealing part, rather than aligning both side edges of the film, thereby forming a flap or a tab for easy unsealing. For example, when fringes of center sealing part formed by a conventional bag making machine is folded to make them flat in the subsequent end sealing step, the wider fringe serves as the flap or the tab for unsealing. More specifically, assuming that the difference in width of the fringes is about 10 mm, e.g., the narrower fringe is 5 mm wide and the wider fringe is 15 mm wide, the wider fringe part forms a side edge part of 10 mm wide consisting of only one sheet of the film along the center sealing part and this can serve as the flap or the tab which can be easily picked and renders unsealing easier when a user unseals. The film having color different from that of food as the contents (for example, colored in green in case where the contents are conventional sheet margarine) is preferably used in view of confirming whether inclusion of foreign objects is present.

The center sealing and/or end sealing can partially be performed as far as inclusion of foreign objects can be

avoided. For example, non-seal parts of about 10 mm long can be provided at several positions in the end sealing part, and such non-seal parts can maintain close adhesion of the films to each other, thereby avoiding a possibility
5 of inclusion of foreign objects.

By providing such non-seal parts, air present in the packaging bag can be easily exhausted to the outside while preventing inclusion of foreign objects. In particular, the provision of such non-seal parts in the end sealing
10 part is favorable because the non-seal parts can exhaust air present in the bag through the side of the bag during piling 10 to 20 sheets and placing into a box when shipping the packed sheet-like food for business use obtained by the method of the present invention as a product.

15 The package of the sheet-like food for business use obtained as described above is excellent in that it allows compatibility between proper seal strength and easy peelability, easy unsealing without tearing and prevention of inclusion of foreign objects such as paper dust, with
20 low cost

Examples

Example 1

The present invention will be illustrated in more detail by the following Examples.

25 A film made of LLDPE (100%) of 60 μ m in thickness

(colored in green by kneading a colorant thereinto) was molded into a cylindrical shape by overlapping both edge parts of the film in a longer direction, and heat-sealing the overlapped part in a longer direction with a

5 conventional horizontal pillow type packing machine (a bag making machine) having a pair of metallic rolls (5 rows of projections per 1 cm wide were provided in the entire surface of one roll. Each projection was 2 by 2 mm square with the height of about 0.5 mm. Grooves were provided on

10 the surface of the other roll so as to correspond to the projections) at a heating temperature as shown in Table 1 (center sealing temperature). The above overlapping was performed without aligning both side edges of the film so that fringes having different in width were formed along

15 the center sealing part, in which one fringe which was faced to the inside by folding in end sealing was wider than the other fringe which was faced to the outside by 1 cm. The film was sequentially fed in a horizontal

20 direction, while one sheet of sheet margarine (300 mm long, 150 mm wide, 450 g and 10 mm in thickness) prepared by a conventional method was supplied onto the film, and then subjected to heat-sealing in a transverse direction with a pair of metallic plates having corresponding length (the same projections and grooves as those of the metallic rolls

25 were provided, and non-seal parts of about 10 mm long, in

which the hot plates do not contact with the film, were provided by several portions. The shape of the projections is shown in Fig. 2) at a heating temperature as shown in Table 1 (end sealing temperature) and cutting. By

5 continuously performing the above operation, sheet margarine packed by each sheet was obtained (see Fig. 1). While the test was performed at the end sealing temperature and the center sealing temperature shown in Table 1, it was confirmed that 110°C was the most suitable for both
10 temperatures, thereby giving proper seal strength, and allowing the film to be easily unsealed without tearing. The results are shown in Table 1. The heat seal was spotted partial fusion in such a manner that the film contacting with the tip end section of convex and the film
15 contacting with corresponding concave fuse (adhere). Sheet-like margarine packed by each sheet thus obtained was laminated by 20 sheets, put into a corrugated box and subject to aging to obtain a product.

Example 2

20 The test was performed in the same manner as that of Example 1 except that a film made of HDPE : LLDPE = 1 : 1 was used. The center sealing temperature was 120°C and the end sealing temperature was 115°C, thereby allowing compatibility between proper seal strength and easy
25 peelability.

Example 3

The test was performed in the same manner as that of Example 1 except that a film made of HDPE : LLDPE = 9 : 1 was used. The center sealing temperature of 130°C and the end sealing temperature of 120°C, thereby allowing compatibility between proper seal strength and easy peelability. Although seal strength was somewhat inferior, the center sealing temperature of 125°C and at the end sealing temperature of 115°C also allowed compatibility with easy peelability, and this made possible it to employ a wider sealing temperature range as compared with Examples 1 and 2.

Example 4

The test was performed in the same manner as that of Example 1 except that a film made of HDPE (100%) was used. The center sealing temperature of 130°C and the end sealing temperature of 120°C allowed compatibility between proper seal strength and easy peelability. However, too much force during unsealing in the end sealing occasionally caused tearing, and the range of allowable temperature of sealing was narrow as compared with Examples 1 to 3. The film was so hard that wrinkles easily appeared on the package.

Comparative Example 1

The test was performed in the same manner as that of

Example 1 by using a two-layered film made of OPP (oriented polypropylene)/LLDPE (the thickness was 20/40 μm in turn) as the film. In this film, LLDPE layers were adhered to each other. Too low seal temperature caused weak seal strength and too high seal temperature caused so high seal strength as to tear the film. Then, it was difficult to find out a suitable temperature range.

Table 1

Film material	Thickness	Evaluation	End sealing temperature (°C)					Center sealing temperature (°C)					Remarks		
			105	110	115	120	125	130	105	110	115	120		125	130
Example 1 LLDPE 100%	60 μ	Δ	Δ Weak seal strength	○	So high seal strength as to tear			Δ Weak seal strength	○	So high seal strength as to tear			×	The film was so soft as to cause a little swarf of the cutter	
Example 2 HDPE:LLDPE = 1:1	60 μ	○Δ	Δ Weak seal strength	○	So high seal strength as to tear			Δ Weak seal strength	○	So high seal strength as to tear			×	More favorable bag process-ability than Examples 1 and 2	
Example 3 HDPE:LLDPE = 9:1	60 μ	○	Δ Weak seal strength	○Δ Somewhat weak seal strength	○	So high seal strength as to tear			Δ Weak seal strength	○	So high seal strength as to tear			×	So wide range of allowable temperature of seal as to be easily used
Example 4 HDPE 100%	60 μ	Δ	Δ Weak seal strength	Too much force causes tearing			×	Δ Too much force causes tearing	Weak seal strength			○	×	The film was so hard that wrinkles easily appeared on the package	
Comparative Example 1 OPP/LLDPE (20 μ/ 40 μ)	60 μ	×	Δ Weak seal strength	×	So high seal strength as to tear			×	×	Weak seal strength			×	Easily torn though bag can be produced.	

Brief Description of the Drawings

Fig. 1 is a perspective view schematically illustrating the sheet-like food obtained by the method of the present invention.

5 Fig. 2 is a perspective view of convex parts.

Explanation of Symbols

1: center sealing, 2: end sealing, 3: sheet-like food

CLAIMS

1. A packing method of sheet-like food for business use which comprises continuously supplying sheet-like food sheet by sheet onto a packaging film which is fed in a horizontal direction while being molded into a cylindrical shape with a bag-making machine by overlapping both side edges of the film in a longer direction and heat-sealing (center sealing) the overlapped part so as to be capable of unsealing the packaging film without tearing the film during unsealing, and further being sealing and cutting said molded film containing sheet-like food therein sheet by sheet in a traverse direction by heat-sealing (end sealing) so as to be capable of unsealing the packaging film without tearing during unsealing, wherein

said packaging film is a single-layer film made of polyethylene; and wherein

said center sealing and/or the end sealing are spotted partial fusing.

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2. The packing method of sheet-like food for business use according to claim 1, wherein the center sealing and/or the end sealing are heat seal by heating elements one having at least one row of projections and the other having at least one row of recesses or at least one groove corresponding to the projections.

3. The packing method of sheet-like food for business use according to claim 1 or 2, wherein both side edge parts of the film is overlapped in a longer direction so that fringes of the film being different in width are formed
5 along the center sealing part.

4. The packing method of sheet-like food for business use according to any one of claims 1 to 3, wherein the center sealing and/or the end sealing are partially
10 performed.

5. The packing method according to any one of claims 1 to 4, wherein the sheet-like food is sheet margarine.

15 6. The packing method of sheet-like food for business use according to claim 1, wherein the packaging film is a single-layer film made of polyethylene comprising a mixture of HDPE and LLDPE.