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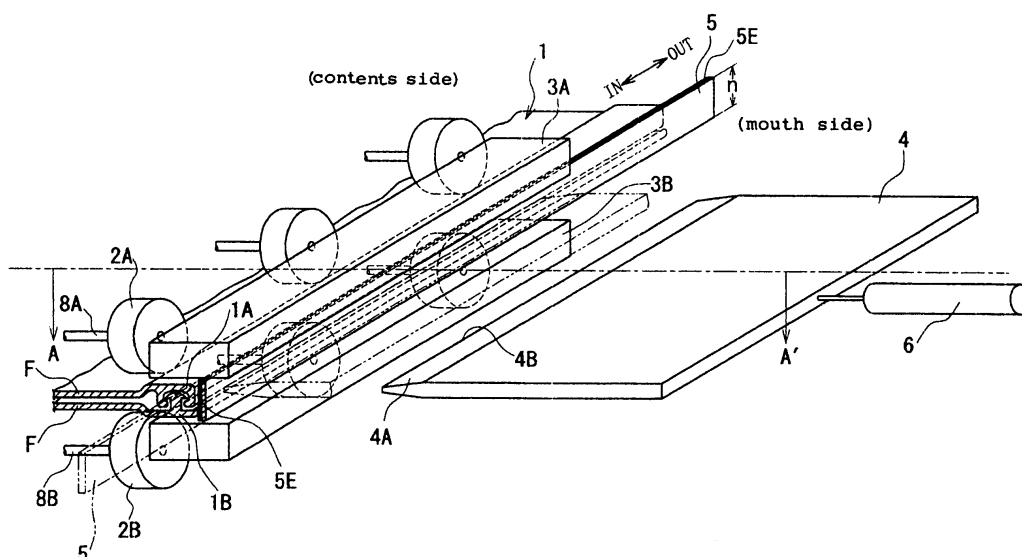
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(54) **A PLASTIC ZIPPER HAVING PREVENTING FUNCTION AGAINST UNFAIRLY UNSEALING, AND THE MANUFACTURING METHOD AND MANUFACTURING APPARATUS THEREOF**

(57) In a plastic zipper 1 having a pair of engaging portions 1A and 1B formed on surfaces of plastic films F, a plastic zipper having preventing function against unfairly unsealing is provided wherein a tear tape 5 is detachably welded to the top surfaces at mouth side of the plastic zipper in a longitudinal direction of the plastic zipper, and thus, it can be ascertained at a glance that it is unsealed unfairly or erroneously.

The plastic zipper is guided between two guide rails 3A and 3B, disposed in parallel to each other and forming a space therebetween, and pairs of guide rollers 2A and 2B, and a tear-tape having easily peelable plastic layer formed on one surface thereof is guided to the space between the guide rails 3A and 3B, and then, both of them are welded together by hot stamping by means of a heating member.

FIG.1



Description

TECHNICAL FIELD

[0001] The present invention relates to prevention against unfairly unsealing of a plastic zipper, of a plastic zipper with a slider, and of a bag equipped with the plastic zipper, which are easily opened and re-closable while they keep hermetic sealing, and which are used as packaging materials of foods, medicines, electronic products, etc.

BACKGROUND ART

[0002] Bags equipped with plastic zippers are widely used as packing materials for foods, medicines, electronic products and other goods. Especially, bags equipped with plastic zippers with sliders are widely used as packing materials which are easily opened and resealable.

[0003] However, with diversification of contents of packages, further more advanced air tightness has been required for a package, and an additional function of a package wherein broken seal can be detected after it has been hermetically sealed is desired because the sealed package which has been opened by wrong purpose or by an inaccurate error may cause various troubles such as mixing of foreign substances or spoiling of quality of contents in the package.

[0004] The inventor of the present application disclosed conventionally known examples of plastic zippers with the sliders having preventing function against unfairly unsealing in Figs. 14 to 19 of WO 2005/048763 A1 (Patent document 1).

[0005] In the example illustrated in Fig. 14 (a partially sectioned perspective view) and in Fig. 15 which is a sectional view taken along arrows A-A' in Fig. 14 of the above-mentioned Patent document 1, in a bag body having a zipper with a slider, the zipper and the slider fitted at the upper portion of the bag body are covered by a perforated covering film. Since a system is applied in this example wherein when a new bag is opened first, the zipper is opened or closed by the slider after the covering film is torn along the perforations, the system is simple and has a good operability. However, there is a disadvantage that the bag has bad appearance and inferior industrial productivity.

[0006] In the example illustrated in Fig. 16 (a partially sectioned perspective view) and in Fig. 17 which is a sectional view taken along arrows B-B' in Fig. 16 of the above-mentioned Patent document 1, in a bag body having a zipper with a slider, a partitioning film having perforations is disposed inside the bag. A system is applied in this example wherein when a new bag is opened first, the perforations of the partitioning film are opened after the zipper is opened by the slider, and therefore, the bag has good appearance and productivity. However, when contents of the bag are fine particles such as powder, there causes a problem that the fine particles are clogged

on a portion of the partitioning film and cannot be discharged smoothly.

[0007] Fig. 18 of the above-mentioned Patent document 1 discloses a system applied to a bag body having a zipper with a slider, wherein an upper portion of the zipper is spot welded under a condition wherein the slider is in a closed position, and the spot welded portion of a new bag body is cut off by the slider at the first cut. However, in this example, since the films at the upper portion of the zipper are closely in contact with each other, it is hard to judge from appearance whether or not the spot welded portion is cut off when the zipper is in a closed state.

[0008] In the example illustrated in Fig. 19 of the above-mentioned Patent document 1, perforations are formed at the upper portion of the zipper, i.e., at the portion above the engaging portion, and while the zipper is in a closed state, a part of the upper portion of the zipper is partially cut off, and then, a slider is disposed at the cut off portion. This example applies a system wherein the upper portion of the zipper is cut off from the perforations by means of the slider when it is opened, however, sometimes cutting off may not be done well. Further, this system can be adopted only such a type of zipper as having an (upper) flange portion projecting upward from the engaging portion.

[0009] The systems illustrated in Fig. 14 and Fig. 16 of the above-mentioned Patent document 1 have advantage that the hermetic seal of the bag can be secured even if the bag uses perforations, but the systems illustrated in Fig. 18 and Fig. 19 cannot be applied to usage requiring a long preservation such as retorted foods because sealing ability of the bag depends on the sealing ability of the zipper.

[0010] Further, the inventor of the present application proposed in Japanese Patent Application Laid-open No. 2004-026193 (Patent document 3) that in order to prevent unfairly unsealing of a zipper, at a mouth side end of one of a plastic zipper having a pair of male and female hooks, a covering piece covering up a mouth side end of the other hook is disposed and that the covering piece and the mouth side are welded together. However, the Patent document 3 discloses in concrete neither an apparatus nor a method for industrially carrying out such welding.

[0011] Further, in WO 03/022697 A1 (Patent document 2), the inventor of the present application disclosed a slider which is applicable to a hermetic plastic zipper wherein engaging portions are welded with each other via an easily peelable plastic layer. Although such a hermetic zipper has a high opening intensity, the slider disclosed in Patent document 2 can open the plastic zipper having high opening intensity such as disclosed in Patent document 2 while the slider is small and strong.

[0012] Furthermore, in the Patent document 1, the inventor of the present application disclosed a method for continuously producing a hermetic zipper, the plastic zipper having easily peelable plastic layer extending in a

longitudinal direction of the plastic zipper, wherein the easily peelable plastic layer is welded by ultrasonic waves and which has a peeling intensity in a certain constant level.

Patent document 1: WO 2005/048763 A1
 Patent document 2: WO 03/022697 A1
 Patent document 3: JP 2004-026193
 Patent document 4: JP 2004-209841
 Patent document 5: JP 2004-196321

DISCLOSURE OF THE INVENTION

THE PROBLEMS TO BE SOLVED BY THE INVENTION

[0013] An object of the present invention is to provide a plastic zipper which solves the above-described problems inherent to the conventional plastic zippers, unsealing of which can be known at once from its appearance when the plastic zipper is unfairly or erroneously unsealed so that unfairly unsealing can be prevented, and which can be produced effectively.

[0014] Other objects of the present invention are to provide a manufacturing apparatus and a manufacturing method for manufacturing such a plastic zipper having preventing function against unfairly unsealing.

MEANS TO SOLVE THE PROBLEMS

[0015] The present invention is mainly characterized in that a tear tape having an easily peelable plastic layer is detachably welded on top surfaces of a plastic zipper located at its mouth side, or that top surfaces of the plastic zipper located at its mouth side are detachably welded in a longitudinal direction. In the present invention, the phrase "top surfaces of a plastic zipper located at its mouth side" means the portions which comprise two fringes extending in a longitudinal direction of the plastic zipper and located at the mouth side of two plastic films on which a pair of engaging portions are formed, and it is not limited to a plane.

[0016] According to the present invention, the above-described object is achieved by an apparatus for manufacturing a plastic zipper having preventing function against unfairly unsealing characterized in that:

two long and slender guide rails are disposed in parallel to each other so as to guide outer surfaces located at an open end of the plastic zipper which has a pair of engaging portions and which is located on surfaces of plastic films;
 multiple sets of guide rollers, a set of which consists of two pieces of rollers, are disposed facing to said guide rails so as to sandwich the plastic films located at contents side and near the engaging portions of the plastic zipper, an axis of each guide roller being positioned perpendicular to the guide rails,
 a heating member is disposed facing to a space

formed between the two guide rails at a position opposite to the guide rollers relative to the guide rails; and

a moving means for causing approaching and departing movements to said heating member relative to the guide rails is disposed so as to heat up the top surface located at the mouth side of the plastic zipper.

[0017] Further, a tear tape can be welded detachably to the top surfaces of a plastic zipper located at its mouth side by disposing a tear tape supply device for supplying a tear tape into the space formed between the guide rails in the above-described manufacturing apparatus, and thus, the above-described object can be achieved.

[0018] In the manufacturing apparatus, the heating member may be a plate member having an edge parallel to the guide rails, and a fringe of said edge may be straight or uneven. Alternatively, a rotatable circular disk having a rotating axis perpendicular to the longitudinal direction of guide rails and to the moving direction of the heating member may be used as the heating member.

[0019] Further, in the manufacturing apparatus, the two guide rails may be provided with at least one connecting portion, by which they are connected to each other, at the side of said heating member. In this case, the heating member has an edge which is formed in a concave shape at a portion facing to the connecting portion in order to avoid collision with connecting portion when the heating member advances toward the guide rails.

[0020] According to the present invention, the above-described object is achieved by a method for manufacturing a plastic zipper having preventing function against unfairly unsealing characterized in that:

supplying a plastic zipper, which has a pair of engaging portions and which is located on surfaces of plastic films, to two long and slender guide rails disposed forming a space therebetween and in parallel to each other and to multiple sets of guide rollers, a set of which consists of two pieces of rollers, disposed facing to said guide rails so as to guide outer surfaces located at an open end of the plastic zipper into the space located between said guide rails and so as to sandwich the plastic films located at contents side and near the engaging portions of the plastic zipper by means of said sets of guide rollers;
 stopping movement of the plastic zipper in a sandwiched condition; and
 hot stamping and detachably welding the top surfaces located at the mouth side of the stopped plastic zipper by means of a heating member having an edge parallel to the guide rails.

[0021] Further, according to the present invention, the above-described object is achieved by a method for manufacturing a plastic zipper having preventing function

against unfairly unsealing characterized in that:

supplying a plastic zipper, which has a pair of engaging portions and which is located on surfaces of plastic films, and a tear tape having easily peelable plastic layer formed on one surface thereof to two long and slender guide rails disposed forming a space therebetween and in parallel to each other and to multiple sets of guide rollers, a set of which consists of two pieces of rollers, disposed facing to said guide rails, said easily peelable plastic layer of said tear tape being supplied in a condition wherein it is capable of in contact with the top surfaces located at the mouth side of the plastic zipper;

guiding the outer surfaces located at an open end of the plastic zipper into the space located between said guide rails, and guiding said tear tape into said space, and at the same time, sandwiching the plastic films located at contents side and near the engaging portions of the plastic zipper by means of said sets of guide rollers;

stopping movement of the plastic zipper and the tear tape in a sandwiched condition;

inserting a heating member having an edge parallel to the guide rails into said space between said guide rails; and

hot stamping the top surfaces located at the mouth side of the stopped plastic zipper and said tear tape by means of a heating member so as to detachably weld the top surfaces located at the mouth side of the plastic zipper with said easily peelable plastic layer of said tear tape.

[0022] In the above-described manufacturing method, although the welding is performed by using a heating member having an edge parallel to the guide rails while the plastic zipper, or the plastic zipper and the tear tape are in a stopped condition, the welding may be performed in a moving condition. In this latter case, in the above-described manufacturing apparatus, welding may be performed by continuous hot stamping by using rotatable heated circular disk having a rotating axis perpendicular to the longitudinal direction of guide rails and to the moving direction of the heating member.

[0023] According to the present invention, the above-described object is achieved by a plastic zipper having preventing function against unfairly unsealing characterized in that the plastic zipper has a pair of engaging portions and is located on surfaces of plastic films, and a tear tape is detachably welded to the top surfaces of the plastic zipper at the mouth side thereof along a longitudinal direction of the plastic zipper.

[0024] In this case, it is preferred that width of the detachable tear tape is in a range between not less than 0.5 mm and the amount which is obtained by adding 4 mm to the thickness of the zipper. The detachable tear tape may be welded continuously in a direction of the plastic zipper or may be welded along a dotted line ex-

tending in a longitudinal direction of the plastic zipper.

[0025] It is preferred that the plastic zipper of the present invention is provided with a slider.

[0026] Further, according to the present invention, the above-described object is achieved by a bag body equipped with a plastic zipper having preventing function against unfairly unsealing characterized in that the plastic zipper, which has a tear tape detachably welded on top surfaces thereof located at its mouth side or which has top surfaces located at its mouth side continuously welded thereto, is fitted at a mouth portion of the bag body.

ADVANTAGES OF THE INVENTION

[0027] According to the manufacturing apparatus and the manufacturing method of the present invention, the plastic zipper, the top surfaces of which located at the mouth side is detachably welded in a longitudinal direction, or which has a tear tape having easily peelable plastic layer detachably welded at the top surfaces located at the mouth side thereof, can be produced industrially and effectively.

[0028] Since the plastic zipper of the present invention has the tear tape having the easily peelable plastic layer detachably welded at the top surfaces located at the mouth side thereof, the tear tape will be peeled off when the plastic zipper is subjected to unfair or erroneous unsealing. Under such a condition, even if a person who has performed unfair action tries to return it to its former condition, the former condition cannot be returned any more. Further, the fact wherein the unsealing operation has been done can be understood at a glance from its appearance. Especially when the tear tape is used, even if a part of the tear tape has been peeled off, the fact wherein the unsealing operation has been done can be understood at a glance, since the peeled off portion flutters. Further, in the event wherein the tear tape has cuts made from the side edge thereof and a plurality of slits are formed, the tear tape will be cut off, when the tear tape is subjected to a peeling off operation from the side edge, and accordingly, it can be understood that it has been subjected to an unfair unsealing operation. In the case of the plastic zipper with the slider, if such slits are obliquely cut towards the closed end of the zipper, the tear tape will be cut off or peeled off when the slider is moved with the tear tape adhered thereto, and accordingly, it can be understood that it has been subjected to an unfair or erroneous unsealing operation.

[0029] Also in the case of the plastic zipper which has the top surfaces at the mouth side continuously welded to each other in a longitudinal direction, the welded portion of the top surfaces at the mouth side will be cut off or broken when the plastic zipper is unfairly or erroneously unsealed, and accordingly, the fact wherein the unsealing operation has been done can be understood at a glance.

[0030] As described above, because everyone can understand easily that unsealing operation has been done

from the appearance, an intention to try to unfairly unseal is ceased. Therefore, it can prevent unfair unsealing.

[0031] Since the plastic zipper of the present invention can be produced industrially by using a manufacturing apparatus, it can be produced effectively.

[0032] Further, when the function of the present invention for preventing unfairly unsealing is added to such a hermetic plastic zipper as disclosed in Patent document 1 or 2 wherein engaging portions comprise a pair of male and the female hooks and which has a continuous tightening wall inside one of the hooks and a continuous pressing rib inside the other hook, a bag with slider can be provided which is used with assumption of long time preservation and hermetical re-seal after unsealing.

BEST MODE FOR CARRYING OUT THE INVENTION

[0033] The present invention will now be explained in detail based on the embodiments illustrated in the drawings.

[0034] The plastic zipper, which is an object of the present invention, may have engaging portions formed in any shape as long as it has a pair of engaging portions 1A and 1B formed on surfaces of two plastic films F and F, and it may have or may not have flange portion extending outward from the engaging portion.

[0035] In the present invention, the phrase "top surface located at the mouth side of the plastic zipper" means the portion located at the edge of the mouth side, and the engaging portion may be the edge, and alternatively, the flange portion may be the edge, and further, the edge may be in a flat surface or in a curved surface, and its shape is not limited particularly.

[0036] The engaging portions of the plastic zipper 1 in the embodiment illustrated in Figs. 1 and 2 comprise a pair of male and female hooks 1A and 1B and do not have any flange portions, and the edges TA and TB (please refer to Fig. 2.) of the engaging portion located at mouth side are the top surfaces located at the mouth side of the plastic zipper.

[0037] In Figs. 1 and 2, a pair of long and slender guide rails 3A and 3B are disposed in parallel to each other and forming a space therebetween. These guide rails 3A and 3B are used to guide two outer surfaces 1C and 1C of the edges located at the mouth side of the plastic zipper 1, and the edges located at the mouth side are inserted into the space between the guide rails 3A and 3B. Further, in this embodiment, a tear tape 5 is also inserted into the space between the guide rails TA and TB. The tear tape 5 has easily peelable plastic layer 5E on one surface thereof, and this easily peelable plastic layer 5E is so inserted that it becomes in contact with the top surfaces TA and TB located at mouth side of the plastic zipper 1.

[0038] As illustrated in Fig. 1 and Fig. 2, multiple sets of guide rollers 2A and 2B, a set of which consists of 2 pieces of rollers, are disposed facing to guide rails 3A and 3B and spacing in a longitudinal direction of the guide rails 3A and 3B. The guide rollers 2A and 2B are used

to sandwich the plastic films F and F near the engaging portion of the plastic zipper 1 located at the side of the contents. The axes 8A and 8B of the guide rollers 2A and 2B are positioned perpendicular to the guide rails 3A and 3B. It is preferred that each guide roller 2A or 2B is supported on the rotating axis 8A or 8B via bearing, respectively.

[0039] A heating member 4 is disposed facing to a space formed between the two guide rails 3A and 3B at a position opposite to the guide rollers 2A and 2B relative to the guide rails 3A and 3B. The heating member 4 is connected to a moving means 6, for example, an actuator, which can cause the heating member 4 its approaching and departing movements relative to the guide rails 3A and 3B. The heating member 4 is used for heating the top surfaces TA and TB at the mouth side of the plastic zipper 1 which is sandwiched by the guide rails 3A and 3B, and it is advanced by means of the moving means 6 towards the space formed between the guide rails 3A and 3B to a position which is indicated by an alternate long and two short dashes line in Figs. 1 and 2, and it heats up the tear tape 5 and the top surfaces TA and TB at the mouth side of the plastic zipper 1, in the embodiment illustrated in Figs. 1 and 2.

[0040] In the embodiment illustrated in Figs. 1 and 2, the heating member 4 is a plate member having an edge 4A parallel to the guide rails 3A and 3B, and the fringe 4B of the edge 4A is straight. When the fringe 4A of the heating member 4 is straight, it can form a continuous welded portion. Although it is not illustrated in the drawings, the fringe 4B of the edge 4A of the heating member 4 may be uneven, and in this case, it can form welded portions along a dotted line.

[0041] In the embodiment illustrated in Figs. 1 and 2, the welding operation of the tear tape 5 to the top surfaces at the mouth side of the plastic zipper 1 is done as follows.

[0042] The plastic zipper 1 and the tear tape 5 are forwarded between the guide rails 3A and 3B and between the guide rollers 2A and 2B from a plastic zipper supply device and the tear tape supply device, which are not illustrated in the drawings. In this case, they are forwarded in such a condition that the easily peelable plastic layer 5E on the tear tape 5 is able to be in contact with the top surfaces TA and TB at the mouth side of the plastic zipper 1, and the outer surfaces 1C and 1C of the mouth side ends of the plastic zipper 1 are guided into the space between the guide rails 3A and 3B, and simultaneously, the tear tape 5 is also guided into the space.

At the same time, the plastic films F and F located near the engaging portions 1A and 1B of the plastic zipper 1 are sandwiched by each set of the guide rollers 2A and 2B. Then, under this condition, the movements of the plastic zipper 1 and the tear tape 5 are stopped. Under this stopped condition, the top surfaces TA and TB at the mouth side of the plastic zipper 1 sandwiched by the guide rails 3A and 3B and the easily peelable plastic layer 5E of the tear tape 5 are in a condition wherein they keep their contact. In the present invention, the phrase "in a

condition wherein they keep their contact" means that they are in a condition wherein the tear tape 5 and the top surfaces TA and TB at the mouth side of the plastic zipper 1 are in parallel to each other and become close so that they are in contact with each other or slightly away from each other.

[0043] Then, the actuator 6 is operated, and the plate shaped heating member 42 which has been positioned at the waiting position is advanced to a position illustrated in an alternate long and two short dashes line, and is inserted into the space between the guide rails 3A and 3B. The plate shaped heating member 4 is pressed to the stopped top surfaces TA and TB at the mouth side of the plastic zipper 1 and the tear tape 5 to hot stamp them. The easily peelable plastic layer 5E of the tear tape 5 is melt by the hot stamping, and the tear tape 5 is detachably welded to the top surfaces TA and TB at the mouth side of the plastic zipper 1. In this occasion, the welded pattern is determined by the shape of the fringe 4B of the edge 4A of the plate shaped heating member 4. In other words, when the fringe 4B is straight, it is welded in a strait line, and when the fringe 4B is uneven, it is welded along a dotted line. Thereafter, the actuator is operated again, and the plate shaped heating member 4 returns to its waiting position.

[0044] After the welding operation has been finished, the plastic zipper 1 and the tear tape 5 are transferred in a direction of an arrow indicated by OUT in Fig. 1, and in the space between the guide rails 3A and 3B, the plastic zipper 1 and the tear tape 5, both of which have not been welded yet, are transferred from a direction indicated by arrow IN to a direction indicated by an arrow OUT.

[0045] By repeating the above-described welding operation, plastic zippers 1, which have tear tapes 5 welded to the top surfaces TA and TB at mouth side thereof, can be produced continuously.

[0046] As described above, according to the embodiment illustrated in Figs. 1 and 2, the plastic zipper 1, which comprises a pair of male and female hooks 1A and 1B, of the present invention, which has preventing function against unfairly unsealing and which has tear tape 5 welded to the top surfaces TA and TB at mouth side thereof, is produced.

[0047] Fig. 3 illustrates another embodiment of the plastic zipper which can be produced by the apparatus illustrated in Figs. 1 and 2. In the embodiment illustrated in Fig. 3, no tear tape 5 is used, but the welded portion TS which continuously extends in a longitudinal direction of the zipper is formed by welding the top surfaces TA and TB at mouth side of the zipper 1 with other.

[0048] Such a welded portion TS is formed as follows. In the apparatus illustrated in Figs. 1 and 2, a plastic film F with a long sized plastic zipper having a pair of engaging portions 1A and 1B is supplied between the guide rail 3A and 3B and between the guide rollers 2A and 2B. The outer surface 1C of the top surfaces at the mouth side of the plastic zipper is guided to the space between the guide rails 3A and 3B, and the plastic film F located near

the engaging portions 1A and 1B at the contents side of the plastic zipper is sandwiched by each set of the guide rollers 2A and 2B. Then, in the sandwiched condition, the movement of the plastic film F is stopped. The heating member 4 having a straight fringe 4B at the edge 4A is inserted into the space between the guide rail 3A and 3B, and the top surfaces TA and TB at mouth side of the stopped plastic zipper are hot stamped by the straight fringe 4B, and thus, a welded portion TS which continuously extends in a longitudinal direction of the zipper is formed.

[0049] Thereafter, the plastic film F is transferred in a direction indicated by OUT, and a slider is fitted therewith. Then, heat sealing HS is done perpendicular to a longitudinal direction of the plastic film F, and the open mouth for filling is sealed off after the contents have been filled up, and cutting off operation is carried out at the heat sealed portion HS. According to the above-described steps, bag bodies filled up with the contents and having plastic zippers which provide a preventing function against unfairly unsealing are produced.

[0050] In order to produce a product which has the welded top surfaces TA and TB at the mouth side of the plastic zipper as illustrated in Fig. 3, at least a part of the top surfaces TA and TB at the mouth side of the engaging portion is made overlapped. It is preferred that easily peelable plastic layer is formed on one of the overlapped portions at top surfaces TA and TB at the mouth. When the above-described steps have been carried out, the welded portion TS extending in a longitudinal direction of the zipper can be easily cut off by the slider.

[0051] Fig. 4, which is a perspective view similar to Fig. 1, shows another embodiment of an apparatus for manufacturing a plastic zipper of the present invention, which has a preventing function against unfairly unsealing, and Fig. 5 is a cross sectional view taken along lines B-B' in Fig. 4. In the above-described embodiment illustrated in Figs. 1 and 2, the welding operation was performed in a condition wherein the plastic zipper 1 and the tear tape 5 were stopped. Contrary to this, the embodiment illustrated in Figs. 4 and 5 is an apparatus for welding a moving tear tape to a the plastic zipper. The guide rollers 2A and 2B and the guide rails 3A and 3B are the same as those disposed in the apparatus illustrated in Figs. 1 and 2. In the embodiment illustrated in Figs. 4 and 5, the heating member 4 is a rotatable circular disk. The heating circular disk 4 is rotatably supported around the rotating axis 7, and it is connected to a moving means 6, for example, an actuator, which causes approaching and departing movements relative to the guide rail 3A and 3B. The rotating axis 7 is disposed perpendicular to a longitudinal direction of the guide rails and a transferring direction of the heating disk 4. When the fringe of the heating circular disk 4 is in a smooth round shape, a continuous welded portion can be formed, and when the fringe of the heating rotating disk 4 is formed in a cogwheel shape, dotted welding portions can be formed.

[0052] In order to weld the tear tape 5 to the top sur-

faces at mouth side of the plastic zipper 1 in the embodiment illustrated in Figs. 4 and 5, the following operation is carried out.

[0053] The plastic zipper 1, which has a pair of engaging portions 1A and 1B, and the tear tape 5, which has the easily peelable plastic layer 5E on one side, are supplied from the plastic zipper supplying device and from the tear tape supplying device, both of which are not illustrated, between the long and slender guide rails 3A and 3B which are positioned in parallel to each other forming a space therebetween and between multiple sets of guide rollers 2A and 2B, each of which consists of two pieces. Upon this supplying operation, similar to that explained with reference to Figs. 1 and 2, while the easily peelable plastic layer 5E of the tear tape 5 is made in a condition wherein it is in contact with the top surfaces TA and TB at the mouth side of the plastic zipper 1, the outer surfaces 1C and 1C of the top surfaces at the mouth side of the plastic zipper are guided to the space between the guide rails 3A and 3B, and the tear tape 5 is also guided into the space. At the same time, the plastic films F and F which are near the engaged portions 1A and 1B of the plastic zipper 1 located at the contents side are sandwiched by each set of guide rollers 2A and 2B. Then, without stopping the plastic zipper 1 and the tear tape 5 while they are moving, the rotatable heating circular disk 4 is advanced to a position illustrated in an alternate long and two short dashes line, and it is inserted into the space between the guide rails 3A and 3B. The heating circular disk 4 at the advanced position presses the tear tape 5 against the top surfaces TA and TB at the mouth side of the plastic zipper 1, and it performs hot stamping operation together with the movements of the plastic zipper 1 and the tear tape 5 while it is rotating in a transferring direction. Thus, the top surfaces TA and TB at mouth side of the plastic zipper 1 and the easily peelable plastic layer 5E of the tear tape 5 are detachably welded with each other.

[0054] In this embodiment, because the heating circular disk 4 can move between the advanced position illustrated in an alternate long and two short dashes line and a waiting position illustrated in a continuous line, by continuously moving the plastic zipper 1 and the tear tape 5 while the heating circular disk 4 is stopped at the advanced position, the welding can be done continuously. Further, while the plastic zipper 1 and the tear tape 5 are moving continuously, the welding can be done intermittently by reciprocating the heating circular disk 4 between the advanced position and the waiting position.

[0055] Also in the apparatus illustrated in Figs. 4 and 5, by performing hot stamping without using tear tape 5, such a plastic zipper 1 as illustrated in Fig. 3, wherein the top surfaces TA and TB at the mouth side of the plastic zipper 1 has been welded, can be manufactured.

[0056] In order to sandwich the plastic films F and F near the engaging portion located at contents side of the plastic zipper 1, the inventor of the present application has conducted an investigation wherein the guide rails

similar to the guide rails 3A and 3B are used in place of the disposition of the sets of guide rollers 2A and 2B. However, if such guide rails are used, the base portion at the engaging portion in the zipper strongly gnaws into the guide rails when the heating member 4 is pressed to the top surfaces TA and TB at the mouth side of the plastic zipper, and accordingly, when the plastic zipper moves in a lengthwise direction, the frictional resistance in a moving direction is generated, and the frictional resistance fluctuates widely with lapse of time, i.e., frictional resistance highly increases or decreases with lapse of time. Thus, there is a risk that at a velocity of about 30 m/min, which is required to a conventional bag producing machine, the zipper tape may be prolonged, or it may be deformed by heat caused by the frictional resistance or by prolongation. Therefore, it is not so practical to use guide rails for sandwiching plastic films at the contents side.

[0057] On the contrary, when the guide rollers are used like the present invention, even if the base portion at the engaging portion of the zipper strongly gnaws into the guide rails, when the plastic zipper moves in a lengthwise direction, the frictional resistance in a moving direction is extremely small. Especially, in the case of rollers with bearings, the frictional resistance is scarcely generated.

[0058] As for the frictional resistance, taking into consideration the thickness of edge portion at mouth side of the plastic zipper, the frictional resistance can be decreased by adjusting the space between the guide rails 3A and 3B, which guide two outer surfaces 1C and 1C of the top surfaces at the mouth side of the plastic zipper 1, at an appropriate value.

[0059] Further, in order to guide the two outer surfaces 1C and 1C at the mouth side of the plastic zipper 1 and the tear tape 5, the inventor of the present invention has conducted an investigation, wherein guide rollers similar to the guide rollers 2A and 2B are used instead of disposition of the guide rails 3A and 3B. When such guide rollers are used, the velocity of the tear tape changes abruptly upon start or stop of supply of the tear tape, and if the tape undulates, there causes problems that the tear tape is caught in the space between the guide rollers or that it entangles around the guide roller. On the contrary, when the guide rails 3A and 3B are used like the present invention, such problems do not occur.

[0060] Another embodiment of guide rails 3A and 3B and the plastic zipper is illustrated in Fig. 6. Although Figs. 6(a) and 6(b) are views corresponding to the cross sectional view taken along A-A' in Fig. 1, respectively, they show different embodiments, respectively.

[0061] In the embodiment illustrated in Fig. 6(a), though each guide rail 3A or 3B is formed in a long and slender parallelepiped shape as a whole, it is provided with grooves 3C and 3C extending in a longitudinal direction at their surfaces facing each other. The upper and lower edges of the tear tape 5 enters in these grooves 3C and 3C and is guided thereby. The plastic zipper 1 of

this embodiment is of a type wherein the flange portions FLA and FLB projecting from the engaging portions 1A and 1B. The thickness of both flange portions FLA and FLB is smaller than the thickness of the engaging portions 1A and 1B. Therefore, the space between the guide rails 3A and 3B at the portion where the flange portions FLA and FLB are guided is narrower than that in the embodiment illustrated in Figs. 1 and 2, however, the space between the guide rails 3A and 3B located at the side where the heating member 4 is inserted is wider so that inserting operation can be done easily.

[0062] When such guide rails 3A and 3B as illustrated in Fig. 6(a) are used, the tear tape 5 can be surely guided, and the contact between the tear tape 5 and the top surfaces at the mouth side of the plastic zipper, i.e., the flange portions FLA and FLB in this embodiment, can be kept. Further, when the velocity of the tear tape 5 changes suddenly, the tape may undulate, however, if the guide rails 3A and 3B illustrated in Fig. 6(a) are used, such problem does not occur because the edges of the tear tape 5 are guided by the grooves 3C and 3C.

[0063] In the embodiment illustrated in Fig. 6(b), the plastic zipper 1 has flange portions FLA and FLB, and the edges of the flange portions have protrusions FPA and FPB formed thereon. The engaging portions 1A and 1B are different from those illustrated in Figs. 1 to Fig. 6 (a) and comprise a pair of hooks, the female hook of which has a continuous pressing rib, and the male hook of which has a continuous tightening wall. In this embodiment, the guide rails 3A and 3B have thin thickness, and they sandwich and guide the flange portions FLA and FLB at a position near the protrusions FPA and FPB. Since the guide rails 3A and 3B of this embodiment do not have any portion for guiding the tear tape, they can not be utilized in the case of using the tear tape, however, when the top surfaces TA and TB at the mouth side of the plastic zipper 1, i.e., the protrusions FPA and FPB in this embodiment, have easily peelable plastic layer formed thereon, they are suitable for welding with each other.

[0064] Further, in the embodiment illustrated in Figs. 6(a) and 6(b), the guide rollers 2A and 2B and the heating member 4 are similar to those of the above-explained embodiments illustrated in Figs. 1 and 2 and in Figs. 4 and 5, and also the welding method can be carried out along the lines explained with regard to these embodiments.

[0065] Figs. 7(a) and 7(b) are perspective views of a plastic zipper according to another embodiment of the present invention, and Fig. 7(a) shows the situation wherein the tear tape is welded, and Fig. 7(b) shows the situation wherein a part of the tear tape is peeled off. Similar to the plastic zipper illustrated in Fig. 6(a), the plastic zipper 1 of this embodiment has the flange portions FLA and FLB extending outward from the engaging portions 1A and 1B, and the tear tape 5 is welded to the top surfaces TA and TB at mouth side along a broken line. When welding has been done along such a broken

line, since concentrated stress acts on the peeled off portion TS when it is peeled off, there is an advantage that the tear tape 5 can be easily peeled off even if the peel off intensity is strong.

[0066] In the present invention, the phrase "weld along a broken line" means that the shape of the welded portion TS is formed by short straight lines which continue intermittently, it is a dotted line comprising a plurality of dots and formed in a round shape, a square shape or a designed pattern, or it is a mixture of short straight lines and dot lines, and it is not limited to the case wherein a tear tape is used, but it also includes the case wherein the top surfaces at mouth side of the zipper are directly welded, too.

[0067] It is preferred that the tear tape 5 has slits 5A cut from the edge thereof and spaced in a lengthwise direction thereof as illustrated in Figs. 7(a) and 7(b). When such slits 5A are formed, the tear tape 5 will be cut off on its way because of the slits 5A, if it is tried to peel off the tear tape 5 from the side, namely from the edge. Therefore, unfair peeling off can become clear.

[0068] Furthermore, it is preferred that the tear tape 5 is cut obliquely, namely forming an angle of less than 90°, from the side edge toward the closed end of the plastic zipper. When such slits 5A are formed, the tear tape 5 can be peeled off continuously without cutting off on its way, when the tear tape 5 is pulled and peeled off from the opening end of zipper towards its closing end.

[0069] In the case of a plastic zipper with a slider, when the slider is forcibly moved, under a condition wherein a tear tape is adhered thereto, from the closing end of the zipper towards its opening end, since the tear tape 5 is cut off or torn off by the movement of the slider, unfairly unsealing can be known at a glance. In this case, it is preferred that the angle of the slit is in a range from 20° to 60°. When the angle θ is below 20°, since the length of the slit 5A becomes too long, there occurs a risk that the slit portion hangs down and that its appearance becomes bad. When the angle θ is more than 60°, since the peeling strength at the easily peelable portion TS of the tear tape 5 becomes weaker than the cutting off strength of the tear tape 5, only the easily peelable portion TS is peeled off while the tear tape 5 is not cut off, and therefore, there is a risk that unfair peeling off is unclear.

[0070] The position of the slits 5A in the tear tape 5, i.e., the space between the slits, and the number of the slits 5A are not particularly limited, as long as they are in ranges wherein unfair peeling off can be understood, and they may be formed uniformly in a lengthwise direction, and alternatively, they may be formed at a part of the lengthwise direction. Preferably, they are formed on both the sides of the tear tape as illustrated.

[0071] It is preferred that the width n (in mm) of the tear tape 5 is within a following range of inequality wherein the thickness of the top surfaces at the mouth side stands for m (in mm). $0.5 \leq n \leq m+4$ (in mm)

Namely, if the width n (in mm) of the tear tape 5 is less than 0.5 mm, there is a possibility that the tear tape 5

may be cut off when it is peeled off, and contrary to this, when the width n is beyond $(m+4)$ mm, there is a possibility that the tear tape may bulge out from the slider at the slider disposing position and may cause bad appearance. Further when the slits 5A are formed in the tear tape 5, it is preferred that the width of the remaining portion where the slit 5A exists, i.e., the portion which is not cut, is not less than 0.5 mm.

[0072] Fig. 8 is a perspective view showing another embodiment of the guide rails of the present invention, and the guide rollers and the heating member are omitted their illustration. The guide rails 3A and 3B in this embodiment have the cross sectional shapes similar to those illustrated in Fig. 6(a). The two guide rails 3A and 3B have at least one connecting portion 3D, preferably two or more than two connecting portions, which connects them to each other at the heating member side which is not illustrated. When such a connecting portion 3D is disposed, even if the velocity of the tear tape 5 may change suddenly, and the tape may undulate so that it tends to come out from the grooves 3C formed on the guide rails 3A and 3B, the connecting portion 3D can restrict such movement of the tear tape 5 and can prevent its coming out from the grooves 3C. Therefore, the producing speed, i.e., moving velocities of the plastic zipper 1 and the tear tape 5, can be enhanced.

[0073] When the bag body provided with the plastic zipper of the present invention and having contents filled therein is manufactured, any one of the following methods may be accepted.

[0074] After contents are filled in conventional bags, the zippers are closed, and then, the top surfaces TA and TB at the mouth side are welded directly or using the tear tape by mean of the methods of the present invention. Thus, the bag bodies having the preventing function against unfairly unsealing are obtained.

[0075] Alternatively, before contents are filled, the top surfaces TA and TB at the mouth side are welded directly or using the tear tape so that the bag bodies having the preventing function against unfairly unsealing are obtained, and then, contents are filled in the bag bodies through the mouth which has been open at the bottom or the side in accordance with the known method, thereafter, the filling open mouth is closed by the heat sealing. Thus, the bag bodies having the preventing function against unfairly unsealing are obtained.

[0076] Comparing with the former and latter producing methods, the latter method is more preferable since it has high productivity.

[0077] Furthermore, by carrying out the method of the present invention during the bag manufacturing process, bag bodies filled with contents which have been packed automatically can be produced.

[0078] Based on Fig. 9, process for manufacturing bag bodies filled with contents which have been packed automatically during the bag manufacturing process will now be explained, as one embodiment of the method according to the present invention.

[0079] Two sheets of films which will constitute the bag body are withdrawn from film rolls Y1 and Y2, and they are supplied with a bag manufacturing machine through a dancer roll Y4.

5 On the other hand, a hermetic zipper having male and female hooks welded at an engaging portion of the zipper via easily peelable plastic layer is withdrawn from a zipper roll Y3, and the zipper is intermittently welded to the films by means of a heat sealing machine Y9 after the zipper
10 is set on a predetermined position on the film, and thus, the films having hermetic zipper fitted therewith are formed.

[0080] After a point seal has been done at the portion which will be an end portion of the bag with zipper by means of an ultrasonic heat sealing machine Y9, the films having hermetic zipper fitted therewith are introduced into a zipper guide Y10 which comprises two parallel guide rails 3A and 3B and multiple sets of guide rollers 2A and 2B in an apparatus of the present invention illustrated in
15 Figs. 1 and 2. On the other hand, a tear tape having easily peelable plastic layer formed thereon is withdrawn from a tear tape roll Y7 and is introduced into the zipper guide Y10 through a dancer roll Y8 while the tension therein is kept constant. In the zipper guide Y10, the tear tape and the top surfaces at the mouth side of the hermetic zipper
20 are hot stamped intermittently by means of the welding device Y11 which comprises the heating member 4 and the moving means 6 of the apparatus according to the present invention and illustrated in Figs. 1 and 2, while they are kept in contact with each other. Thus, the portion for preventing unfairly unsealing wherein the tear tape is welded to the top surfaces at the mouth side of the zipper is formed.

[0081] In this case, the depth of the hot stamping can be set arbitrarily by adjusting the stroke of the moving means 6, i.e., actuator, of the welding device Y11, and is preferably in a range between 0.1 mm and 0.5 mm. Although depending on the size preciseness of the zipper, in the case of less than 0.1 mm, there are possibilities
25 to cause unevenness in the peeling strength of the tear tape or to form portions which are welded insufficiently, and in the case of more than 0.5 mm, there are possibilities to cause too strong peeling strength, to break the tear tape while it is being peeled off when its width is narrow, or to deform the zipper.

[0082] The films with the plastic zipper which have been fitted with the unfair unsealing preventing portions added thereto are subjected to unsealing preventing operation, such as forming slits at a predetermined positions at the closed end of the zipper, by means of a closed end manufacturing device Y12, and the slider is installed at the positions, where the unsealing preventing operation has been done, by means of an automatic slider installing device Y13. In this case, the slider is supplied
35 from the automatic slider supplying device Y14.

[0083] Thereafter, contents are filled in the bag body from its bottom by means of the filling machine Y16, after the zipper and the films of the bag body are heat sealed

in a direction perpendicular to the zipper at a position which will become the edge of the bag body, by means of a vertical heat sealing machine Y15. Then, after the bottom is closed by means of the heat sealing machine Y17, the heat sealed portion of the zipper and the bag body is cut off by means of the guillotine cutter Y18 at the position which will become the edge of the bag body. As a result, the bag body Y19, i.e., the product, having filled contents therein and having the hermetic zipper with the slider which has a portion for preventing unfairly unsealing, can be produced.

[0084] Further, in the case wherein the heat sealed portion of the zipper and the films of the bag body are cut off at a position which will be the edge of the bag body by means of the guillotine cutter Y18 without using the heat sealing machine Y17 nor the filling machine Y16, a bag body, having an open mouth at its bottom and having the hermetic zipper with the slider which has a portion for preventing unfairly unsealing, is obtained.

[0085] Furthermore, the method about which the inventor of the present application previously explained in detail in Patent document 4 (Japanese Patent Laid-open No. 2004-209841) may be used as a method for automatically setting slider, and the method about which the inventor of the present application previously explained in detail in Patent document 5 (Japanese Patent Laid-open No. 2004-196321) may be used as a method for processing the closed end of the zipper.

[0086] Another embodiment of the process which produces the plastic zipper having the preventing function against unfairly unsealing of the the present invention is explained based on the process diagram illustrated in Fig. 10.

[0087] A tape-like plastic zipper wherein a hook of an engaging portion has not been welded is withdrawn from a zipper roll Y30, and the portion corresponding to easily peelable plastic layer on the hook of the plastic zipper is inserted between an ultrasonic horn H-1 and an anvil A-1 which are spaced at a constant distance, and then, the plastic zipper is passed through between the ultrasonic horn H-1 and the anvil A-1 at a constant velocity, and the easily peelable plastic layer on the hook is welded continuously by means of the ultrasonic wave. Subsequently, the plastic zipper having the hook welded thereto is fed into a zipper guide Y10 of the present invention, and while the tear tape is also supplied with from a tear tape roll Y7, hot stamping is done continuously by means of the welding device Y11 which comprises the rotatable heating plate 4 and the moving means 6 as illustrated in Figs. 4 and 5. As a result, a hermetic zipper which has a portion for preventing unfairly unsealing can be continuously manufactured. Then, it is wound up into a zipper roll Y33.

[0088] When such a zipper roll Y33 which has a portion for preventing unfairly unsealing is fed into the process of the bag producing machine illustrated in Fig. 9, the tear tape roll Y7, the zipper guide Y10 and the welding device Y11 are not used in the process of Fig.9.

[0089] Further, the inventor of the present application

previously explained in detail the producing process of the hermetic zipper having hooks whose engaging portions are welded together through the easily peelable plastic layer in Patent document 1 (WO 2005/048763 A1).

EXAMPLE

[0090] A concrete embodiment of the present invention will now be explained based on Fig. 9. Dry laminated films were wound into film rolls Y1 and Y2, respectively, which films comprised linear low density polyethylene (L-LDPE) having a thickness of 40 micron at inside thereof and PET having a thickness of 20 micron at outside thereof. These films, used for constituting the bag body, were withdrawn from the film rolls Y1 and Y2, and were supplied with the bag manufacturing machine through the dancer roll Y4.

[0091] On the other hand, the hermetic zipper was wound onto the zipper roll Y3. This hermetic zipper was the plastic zipper like that illustrated in Fig. 6(b), and it had a pair of engaging portions formed on the surface of the plastic film F formed in a tape shape and made of linear low density polyethylene (L-LDPE), the flange portion having protrusions at the edge thereof was disposed at the mouth side of the engaging portion, and the hook portions of the engaging portions were welded together through easily peelable plastic layer. The protrusions at the flange portions were required when they were opened by the slider, and the thickness of the protrusions which served as the top surfaces at the mouth side was 1.5 mm.

[0092] This hermetic zipper was withdrawn from the zipper roll Y3, and was set on a predetermined position on the films used for bag bodies which were fed from the film rolls Y1 and Y2, and then, the zipper was welded intermittently to the films by means of the heat sealing machine Y5 and Y6. In this manner, the films with the hermetic zipper were formed.

[0093] After the zipper portion which would be the end of the bag body with the zipper was point sealed by means of the ultrasonic heat sealing machine Y9, these films with the hermetic zipper were guided to the zipper guide Y10 wherein such guide rails as illustrated in Fig. 8 were disposed. The guide rails had a length of 400 mm and had two long and slender parallelepiped shapes which were spaced and positioned in parallel to each other, and had grooves, the depth q of which was 1 mm and width p of which was 1 mm, formed therein as illustrated in Fig. 8, and the thickness S obtained by summing up that at the portion for holding the flange portion and that of the groove was 2 mm, and thickness t from the groove to the side near the heating member was 1 mm, and it was connected at nine places by means of the connecting portions 3D formed in a square pillar shape and having a thickness of 1 mm. Further, a set of two guide rollers in the zipper guide Y10 had a diameter of 12 mm, and 8 sets of such guide rollers were disposed. As illustrated in Fig. 6(a), the outer surfaces of the edges of the flange portions were sandwiched between the guide rails, and

the plastic films at mouth side located near the engaging portion of the hermetic zipper were sandwiched between the guide rollers.

[0094] On the other hand, the tear tape, the width of which was 3 mm and the material of which was lamination of the polyethylene terephthalate (PET) resin having a thickness of 15 micron and the easily peelable resin having a thickness of 30 micron, was withdrawn from the tear tape roll Y7, and while the tension was kept at 60 gf, it was introduced into the groove of the guide rails of the zipper guide 10 through the dancer roll Y8. In a condition wherein the easily peelable plastic layer of the tear tape and the top surfaces at the mouth side of the hermetic zipper were kept in contact with each other, hot stamping in the depth of 0.3 mm was carried out intermittently by means of the welding device Y11, the temperature of which was kept at 190 °C, the unfair unsealing preventing portions, where the tear tape was welded along a dotted line to the top surfaces at the mouth side of the zipper, were formed. The hot stamping portion, i.e., the shape of the edge, of the heating member in the welding device Y11 was constituted by the rectangles, which have a size of 0.8 mm X 0.3 mm and which were aligned in a dotted line at an interval of 5 mm in a longitudinal direction, and the stamped shape was in a broken line.

[0095] The films fitted with the plastic zipper having the unfair unsealing preventing portion were further transferred, and were added the preventing operation against unsealing, such as the cutting, at a predetermined position of the closed end of the zipper, and then, the slider was installed at the position, where the preventive operation against unsealing was performed, by means of the automatic slider setting device Y13. In this case, the slider was supplied from the automatic slider supplying device Y14.

[0096] Subsequently, after the zipper and the films of the bag body were heat sealed in a direction perpendicular to the zipper at the position which would be the edge portion of the bag body, by means of the vertical heat sealing machine Y15, the heat sealed portion of the zipper and the films of the bag body was cut off at the position which would be the edge portion of the bag body by means of the guillotine cutter Y18. As a result, the bag body, having the hermetic zipper with the slider, which was provided with the preventing portion against unfairly unsealing, the length of whose zipper portion was 180 mm and whose depth was 260 mm, was obtained. (In this embodiment, the heat sealing machine Y17 and the filling machine Y 16, both of which were illustrated in Fig. 9, were not used.)

[0097] Such bag bodies could be produced at a speed of 50 bags per a minute. When twenty bags were extracted as samples from the produced bag bodies and the tear tapes were peeled off from the closed end of the zipper, the peeling intensity at 90 degree peeling off was 224 gf in the average and 41.9 gf in the standard deviation, respectively.

[0098] Consequently, it was concluded that anybody

could peel the tear tape off readily. Further, the tear tape which had been peeled off could not be resumed, and therefore, the prevention against unfairly unsealing was effective was confirmed, too.

[0099] When the slider was slidably moved from the closed end towards the open end after the tear tape was peeled off, the plastic zipper which had been welded through the easily peelable plastic layer was easily peeled off, and the mouth was opened. Further, when the slider was slidably moved from the open end towards the closed end, the plastic zipper could be resealed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0100]

[Fig. 1]

It is a perspective view showing one embodiment of an apparatus for manufacturing a plastic zipper of the present invention with preventing function against unfairly unsealing together with a long plastic zipper and a long tear tape processed in this apparatus, and the long plastic zipper and the long tear tape are cross sectioned.

[Fig. 2]

It is a cross sectional view taken along A-A' in Fig. 1, wherein the hatching lines showing the cross section are partly omitted.

[Fig. 3]

It is a perspective view of one embodiment showing a bag body of the present invention which is equipped with a plastic zipper with preventing function against unfairly unsealing, and a part of which is illustrated in cross section.

[Fig. 4]

It is a view showing another embodiment of an apparatus for manufacturing a plastic zipper of the present invention with preventing function against unfairly unsealing, and it is a perspective view similar to Fig. 1.

[Fig. 5]

It is a cross sectional view taken along B-B' in Fig. 4, wherein the hatching lines showing the cross section are partly omitted.

[Fig. 6]

Although Figs. 6(a) and 6(b) are cross sectional views correspond to the cross section views taken along A-A' in Fig.1, wherein the hatching lines showing the cross section are partly omitted, they show other embodiments, respectively.

[Fig. 7]

Figs. 7(a) and 7(b) are cross sectional views showing other embodiments of the plastic zipper of the present invention, and Fig. 7(a) shows the state wherein the tear tape is welded, and Fig. 7(b) shows the state wherein a part of the tear tape is peeled off.

[Fig. 8]

It is a perspective view showing another embodiment

of a guide rail of the present invention.

[Fig. 9]

It is a process flow diagram showing one embodiment of a process for producing the bag body having a plastic zipper with the slider and with function of preventing unfairly unsealing at the mouth portion of the present invention.

[Fig. 10]

It is a process flow diagram showing another embodiment of the producing process for producing a bag body of the present invention having a plastic zipper with function of unfairly unsealing.

EXPLANATION OF REFERENCE NUMERALS

[0101]

1	plastic zipper
1A, 1B	engaging portion of a plastic zipper
2A, 2B	guide roller
3A, 3B	guide rail
4	heating member
5	tear tape
6	moving means
F	film

Claims

1. An apparatus for manufacturing a plastic zipper having preventing function against unfairly unsealing **characterized in that:**

two long and slender guide rails are disposed in parallel to each other so as to guide outer surfaces located at an open end of the plastic zipper which has a pair of engaging portions and which is located on surfaces of plastic films; multiple sets of guide rollers, a set of which consists of two pieces of rollers, are disposed facing to said guide rails so as to sandwich the plastic films located at contents side and near the engaging portions of the plastic zipper, an axis of each guide roller being positioned perpendicular to the guide rails, a heating member is disposed facing to a space formed between the two guide rails at a position opposite to the guide rollers relative to the guide rails; and a moving means for causing approaching and departing movements to said heating member relative to the guide rails is disposed so as to heat up the top surface located at the mouth side of the plastic zipper.

2. An apparatus for manufacturing a plastic zipper having preventing function against unfairly unsealing **characterized in that:**

two long and slender guide rails are disposed in parallel to each other so as to guide outer surfaces located at an open end of the plastic zipper which has a pair of engaging portions and which is located on surfaces of plastic films; multiple sets of guide-rollers, a set of which consists of two pieces of rollers, are disposed facing to said guide rails so as to sandwich the plastic films located at contents side and near the engaging portions of the plastic zipper, an axis of each guide roller being positioned perpendicular to the guide rails, a heating member is disposed facing to a space formed between the two guide rollers at a position opposite to the guide rollers relative to the guide rails; a moving means for causing approaching and departing movements to said heating member relative to the guide rails is disposed so as to heat up the top surface located at the mouth side of the plastic zipper; and a tear tape supply device for supplying a tear tape into the space formed between the guide rails is disposed.

3. An apparatus for manufacturing a plastic zipper having preventing function against unfairly unsealing according to claim 1 or 2, **characterized in that** said heating member is a plate member having an edge parallel to the guide rails, and a fringe of said edge is straight or uneven.
4. An apparatus for manufacturing a plastic zipper having preventing function against unfairly unsealing according to claim 1 or 2, **characterized in that** said heating member is a rotatable circular disk, and said circular disk has a rotating axis perpendicular to the longitudinal direction of guide rails and to the moving direction of the heating member.
5. An apparatus for manufacturing a plastic zipper having preventing function against unfairly unsealing according to claim 1 or 2, **characterized in that** said two guide rails are provided with at least one connecting portion, by which they are connected to each other, at the side of said heating member.
6. A method for manufacturing a plastic zipper having preventing function against unfairly unsealing **characterized in that:**

supplying a plastic zipper, which has a pair of engaging portions and which is located on surfaces of plastic films, to two long and slender guide rails disposed forming a space therebetween and in parallel to each other and to multiple sets of guide rollers, a set of which consists of two pieces of rollers, disposed facing to said

guide rails so as to guide outer surfaces located at an open end of the plastic zipper into the space located between said guide rails and so as to sandwich the plastic films located at contents side and near the engaging portions of the plastic zipper by means of said sets of guide rollers;

stopping movement of the plastic zipper in a sandwiched condition; and

hot stamping and detachably welding the top surfaces located at the mouth side of the stopped plastic zipper by means of a heating member having an edge parallel to the guide rails.

7. A method for manufacturing a plastic zipper having preventing function against unfairly unsealing **characterized in that:**

supplying a plastic zipper, which has a pair of engaging portions and which is located on surfaces of plastic films, and a tear tape having easily peelable plastic layer formed on one surface thereof to two long and slender guide rails disposed forming a space therebetween and in parallel to each other and to multiple sets of guide rollers, a set of which consists of two pieces of rollers, disposed facing to said guide rails, said easily peelable plastic layer of said tear tape being supplied in a condition wherein it is capable of in contact with the top surfaces located at the mouth side of the plastic zipper;

guiding the outer surfaces located at an open end of the plastic zipper into the space located between said guide rails, and guiding said tear tape into said space, and at the same time, sandwiching the plastic films located at contents side and near the engaging portions of the plastic zipper by means of said sets of guide rollers; stopping movement of the plastic zipper and the tear tape in a sandwiched condition;

inserting a heating member having an edge parallel to the guide rails into said space between said guide rails; and

hot stamping the top surfaces located at the mouth side of the stopped plastic zipper and said tear tape by means of a heating member so as to detachably weld the top surfaces located at the mouth side of the plastic zipper with said easily peelable plastic layer of said tear tape.

8. A method for manufacturing a plastic zipper having preventing function against unfairly unsealing **characterized in that:**

supplying a plastic zipper, which has a pair of engaging portions and which is located on surfaces of plastic films, to two long and slender

guide rails disposed forming a space therebetween and in parallel to each other and to multiple sets of guide rollers, a set of which consists of two pieces of rollers, disposed facing to said guide rails so as to guide outer surfaces located at an open end of the plastic zipper into the space located between said guide rails and so as to sandwich the plastic films located at contents side and near the engaging portions of the plastic zipper by means of said sets of guide rollers; and

hot stamping and detachably welding the top surfaces located at the mouth side of the stopped plastic zipper by means of a rotatable heated circular disk having a rotating axis perpendicular to the longitudinal direction of guide rails and to the moving direction of the heating member while the plastic zipper is moving.

9. A method for manufacturing a plastic zipper having preventing function against unfairly unsealing **characterized in that:**

supplying a plastic zipper, which has a pair of engaging portions and which is located on surfaces of plastic films, and a tear tape having easily peelable plastic layer formed on one surface thereof to two long and slender guide rails disposed forming a space therebetween and in parallel to each other and to multiple sets of guide rollers, a set of which consists of two pieces of rollers, disposed facing to said guide rails, said easily peelable plastic layer of said tear tape being supplied in a condition wherein it is capable of in contact with the top surfaces located at the mouth side of the plastic zipper;

guiding the outer surfaces located at an open end of the plastic zipper into the space located between said guide rails, and guiding said tear tape into said space, and at the same time, sandwiching the plastic films located at contents side and near the engaging portions of the plastic zipper by means of said sets of guide rollers; inserting a rotatable heated circular disk having a rotating axis perpendicular to the moving direction of the heating member into said space between said guide rails; and

hot stamping the top surfaces located at the mouth side of the plastic zipper and said tear tape by means of said heated circular disk while the plastic zipper and the tear tape are moving so as to detachably weld the top surface located at the mouth side of the plastic zipper and said easily peelable plastic layer of said tear tape.

10. A plastic zipper having preventing function against unfairly unsealing **characterized in that** the plastic zipper has a pair of engaging portions and is located

on surfaces of plastic films, and a tear tape is detachably welded to the top surfaces of the plastic zipper at the mouth side thereof along a longitudinal direction of the plastic zipper.

5

11. A plastic zipper having preventing function against unfairly unsealing according to claim 10, **characterized in that** the width of the detachable tear tape is in a range between not less than 0.5 mm and the amount which is obtained by adding 4 mm to the thickness of the zipper. 10
12. A plastic zipper having preventing function against unfairly unsealing according to claim 10 or 11, **characterized in that** the detachable tear tape has slits spaced in a longitudinal direction thereof by cutting from a side edge thereof. 15
13. A plastic zipper having preventing function against unfairly unsealing according to claim 12, **characterized in that** the slits of said tear tape is formed in a state wherein they are cut obliquely towards a closed end of the plastic zipper. 20
14. A plastic zipper having preventing function against unfairly unsealing according to any one of claims 10 to 13, **characterized in that** the detachable tear tape is welded along a dotted line extending in a longitudinal direction of the plastic zipper. 25
15. A plastic zipper having preventing function against unfairly unsealing according to any one of claims 10 to 14, **characterized in that** the plastic zipper is equipped with a slider. 30
16. A bag body equipped with a plastic zipper having preventing function against unfairly unsealing according to any one of claims 10 to 15, **characterized in that** the plastic zipper is fitted at a mouth portion of the bag. 35

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FIG.1

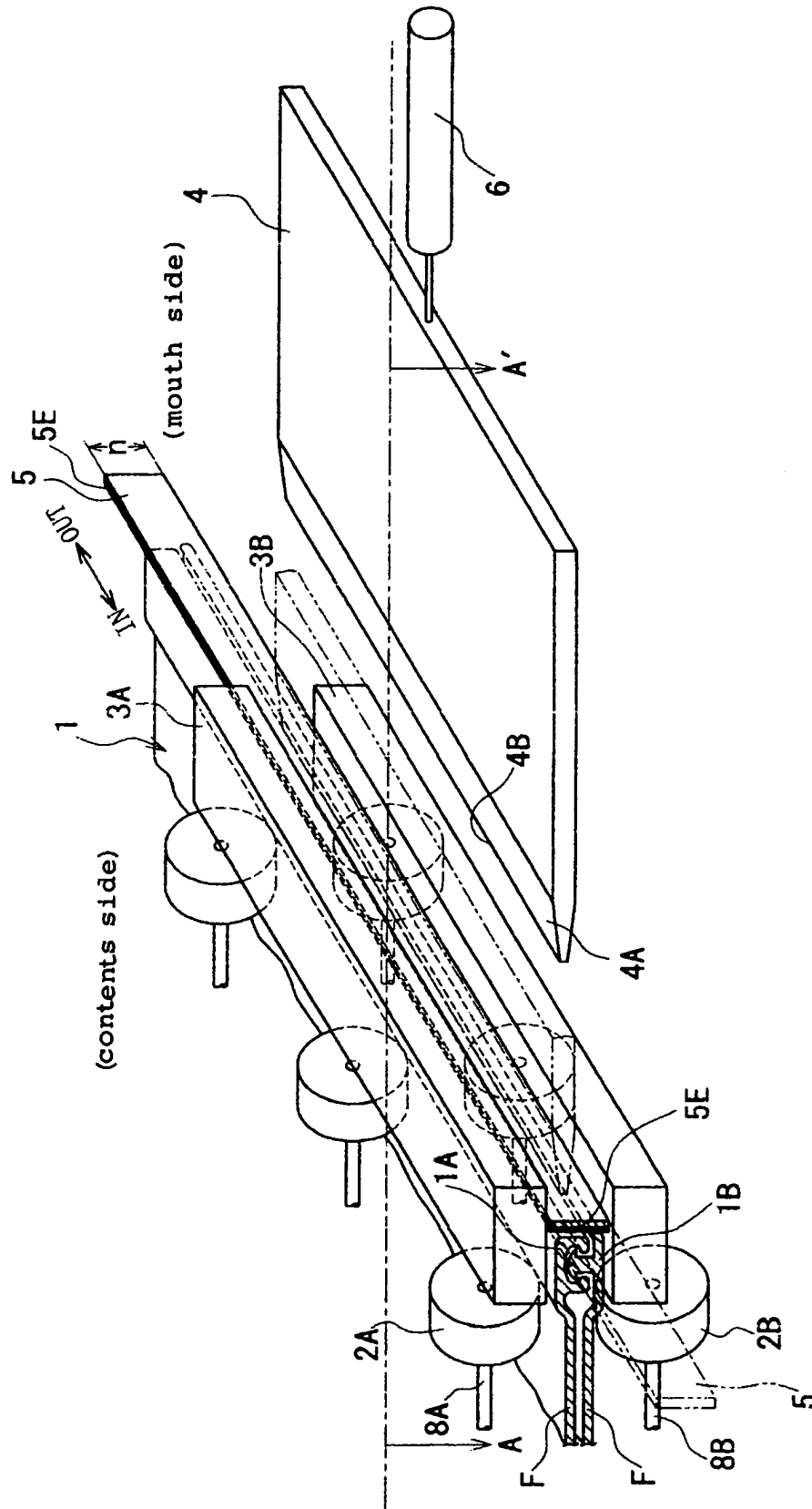


FIG.2

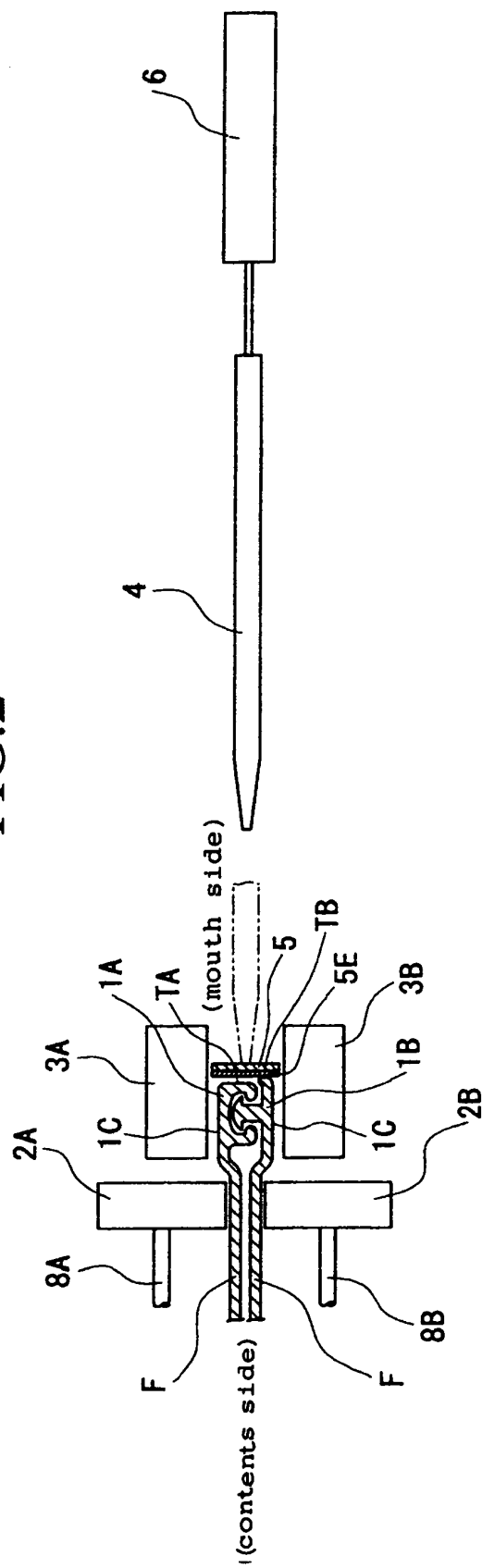


FIG.3

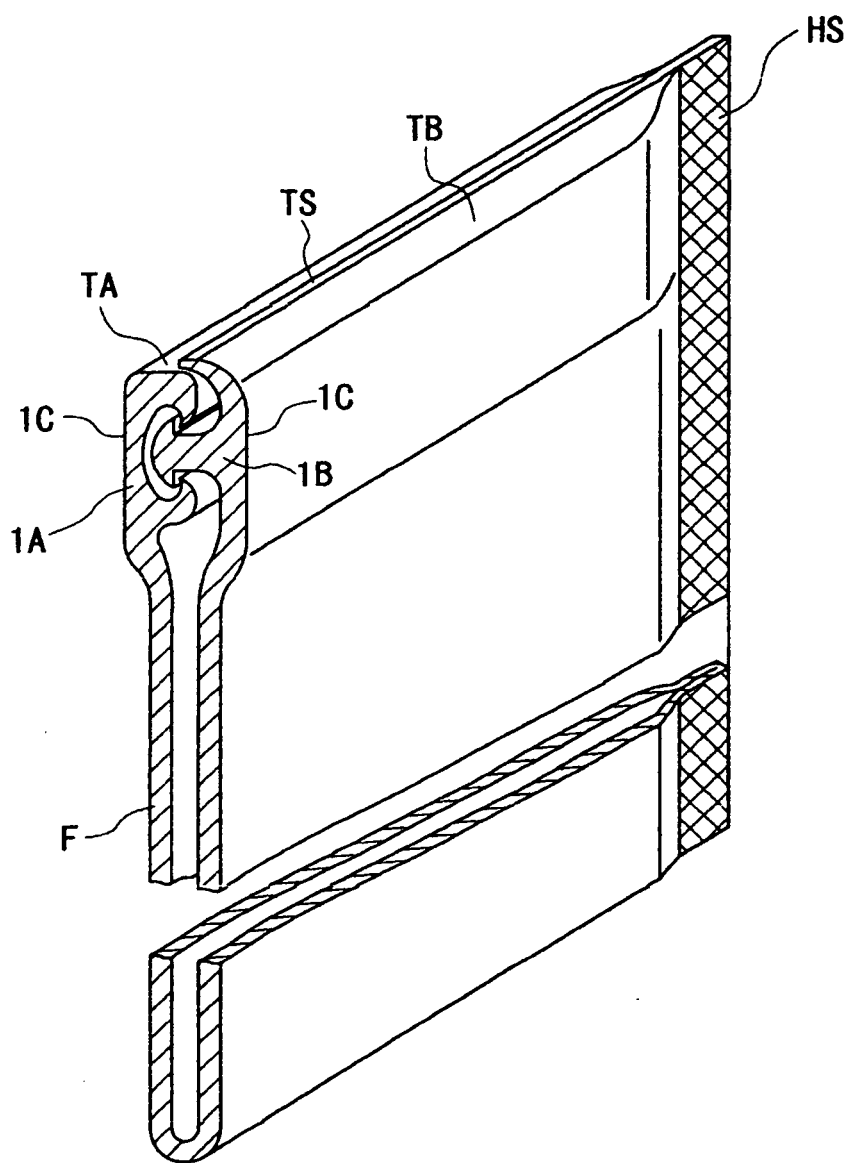


FIG.4

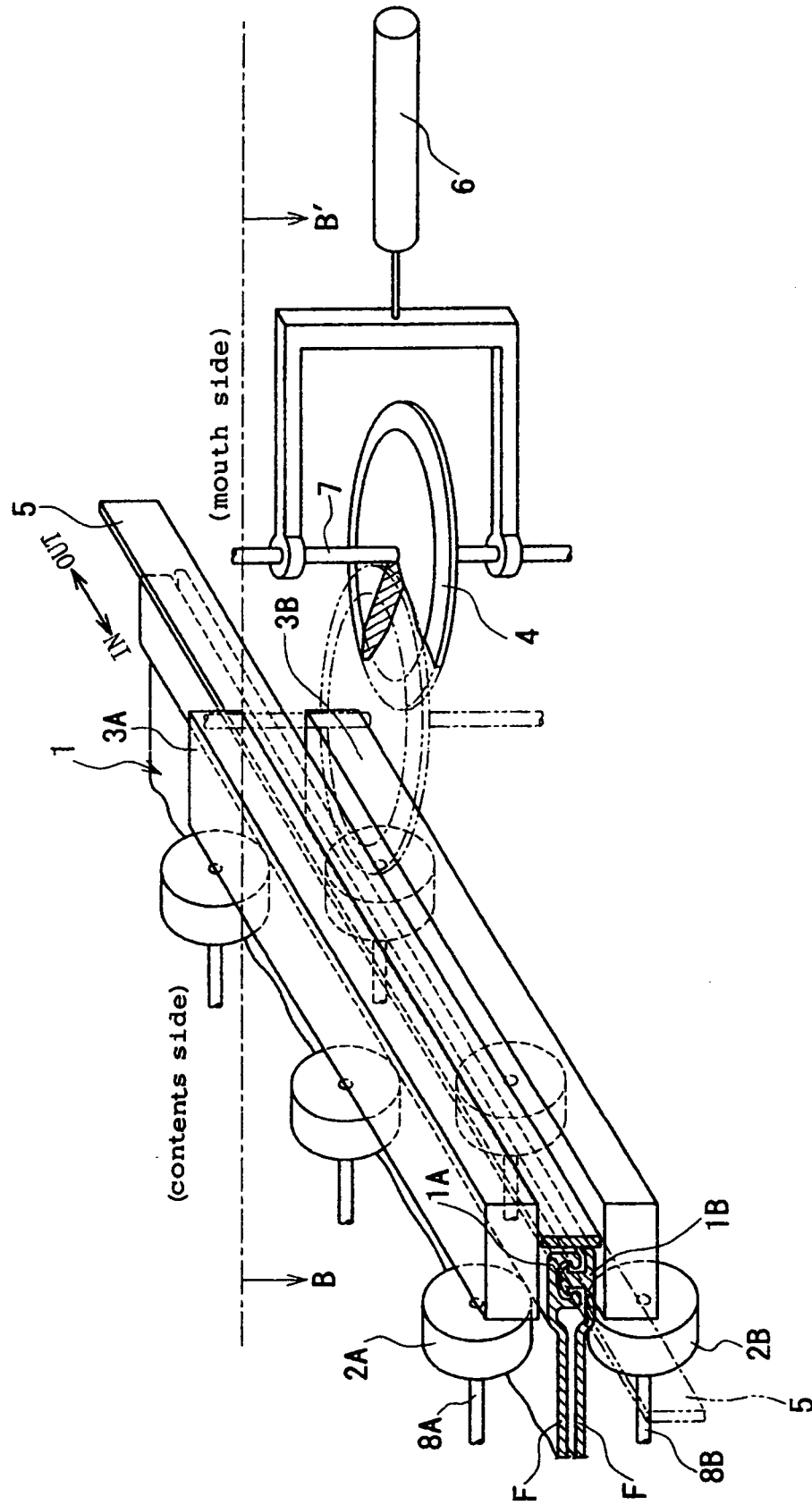


FIG.5

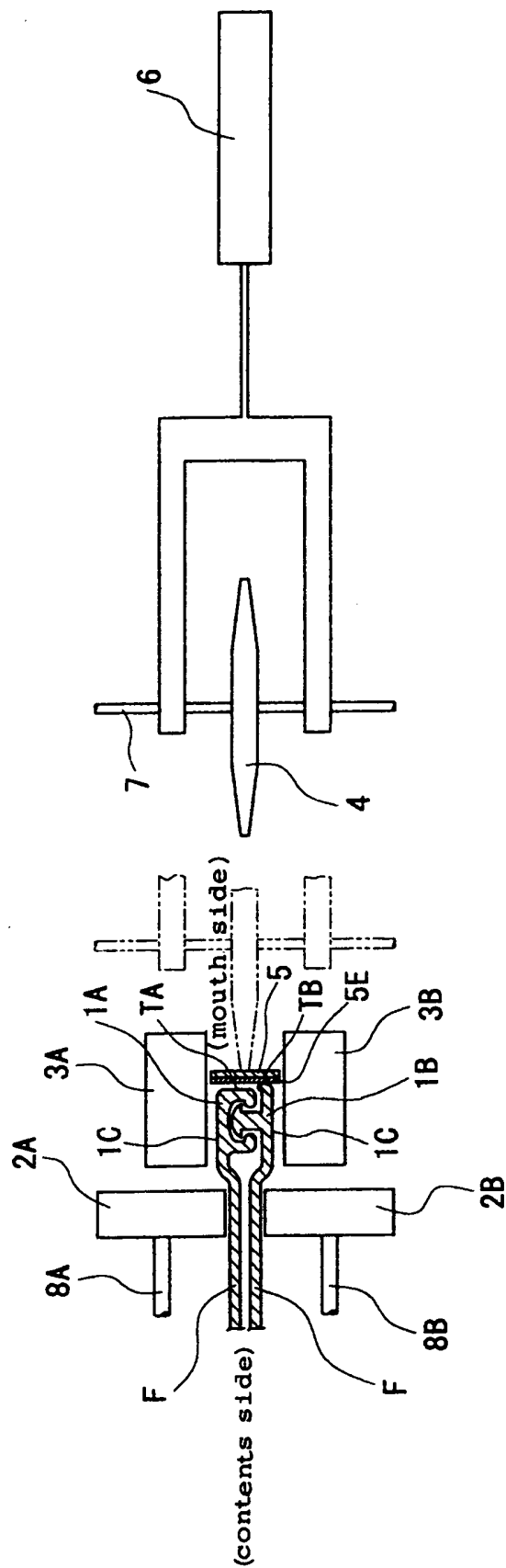


FIG.6

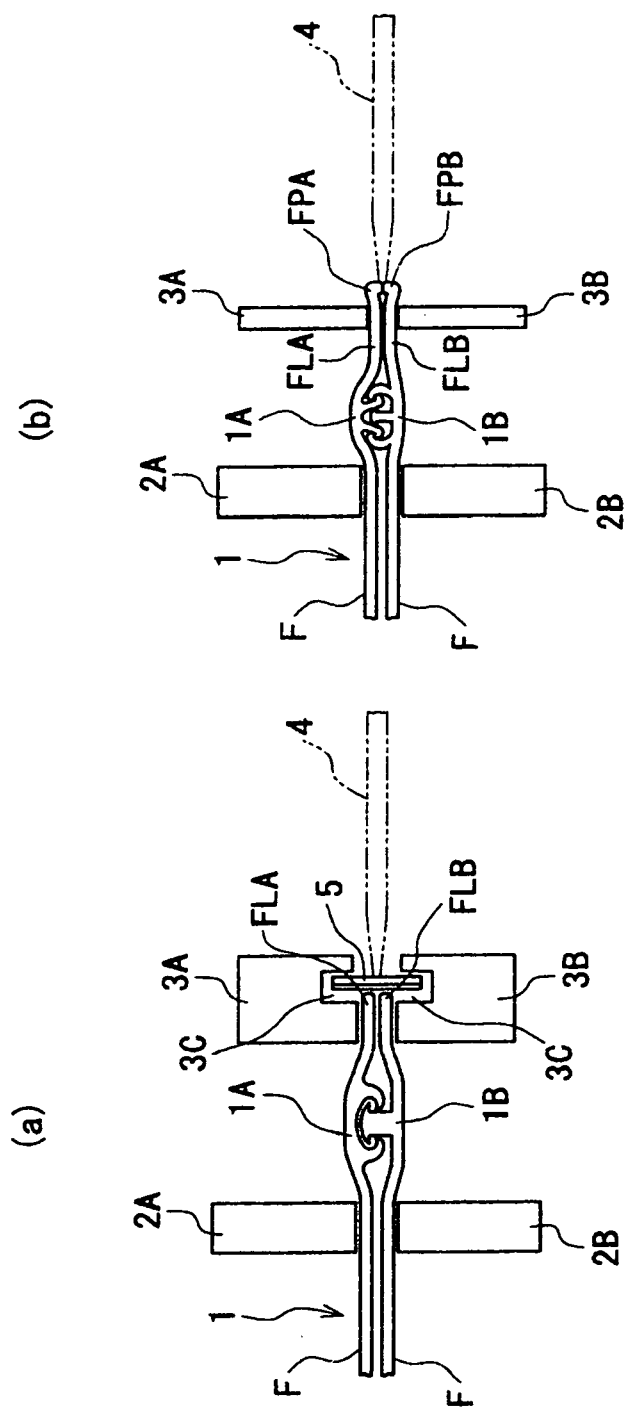


FIG.7

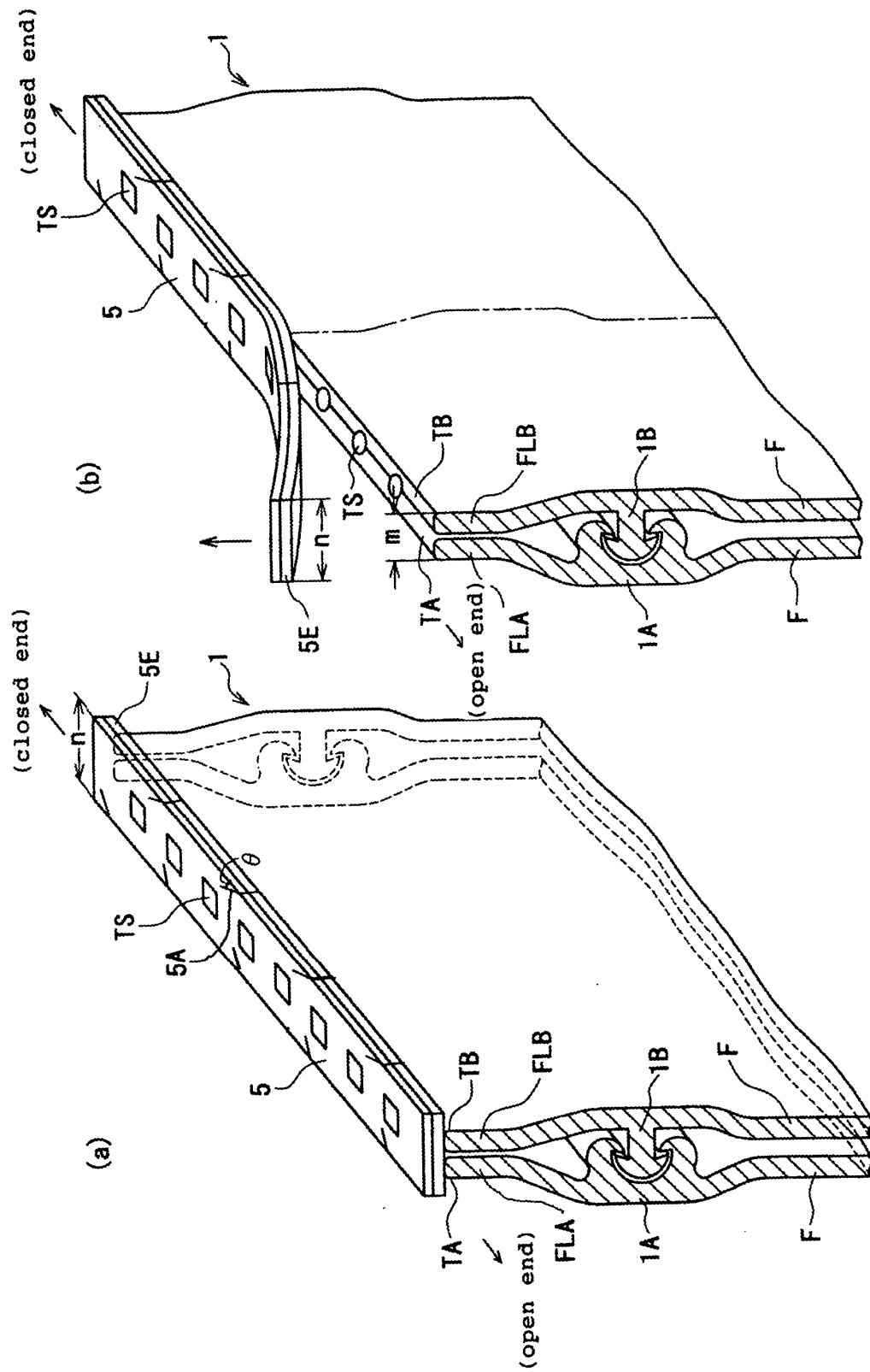


FIG.8

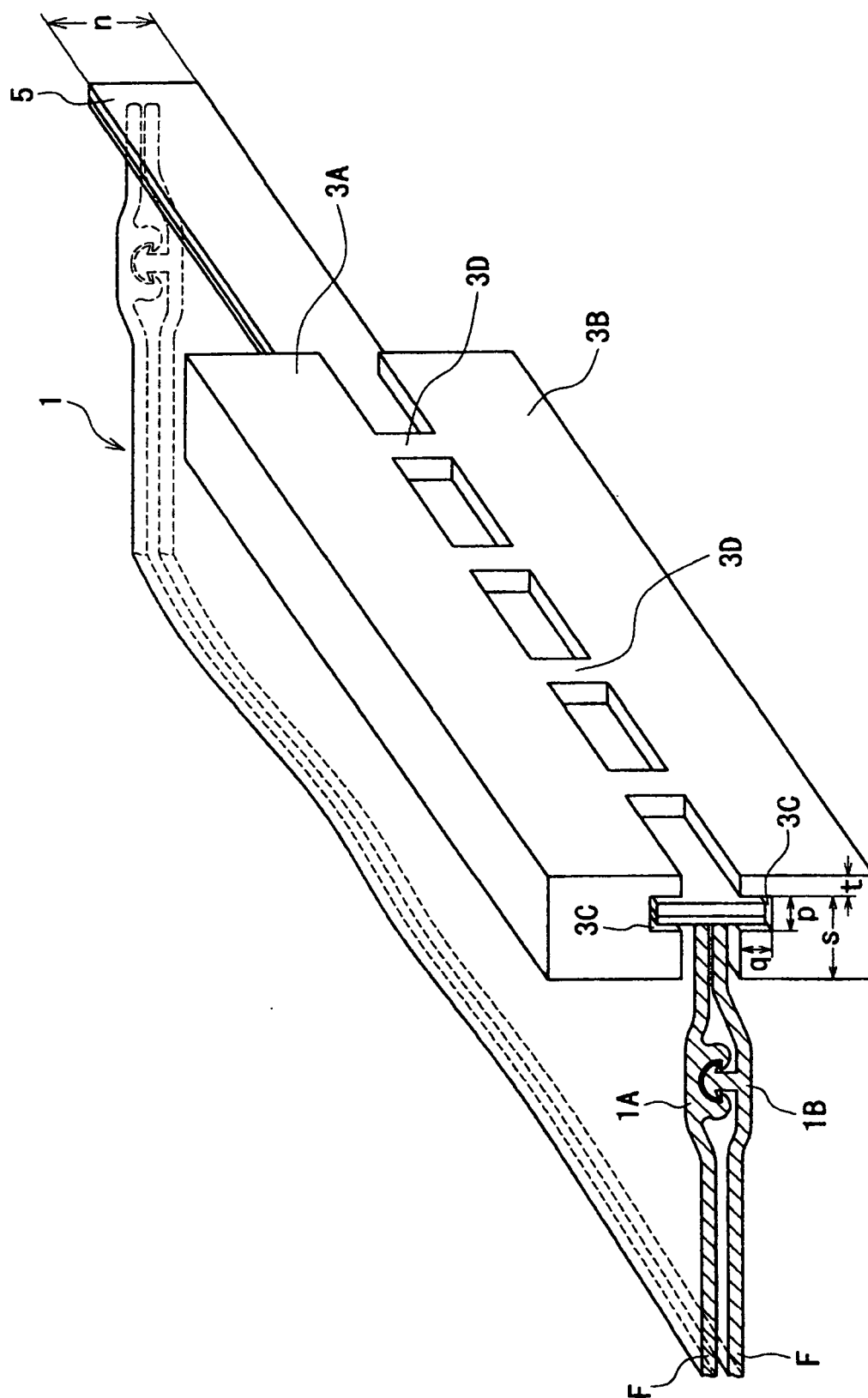


FIG. 9

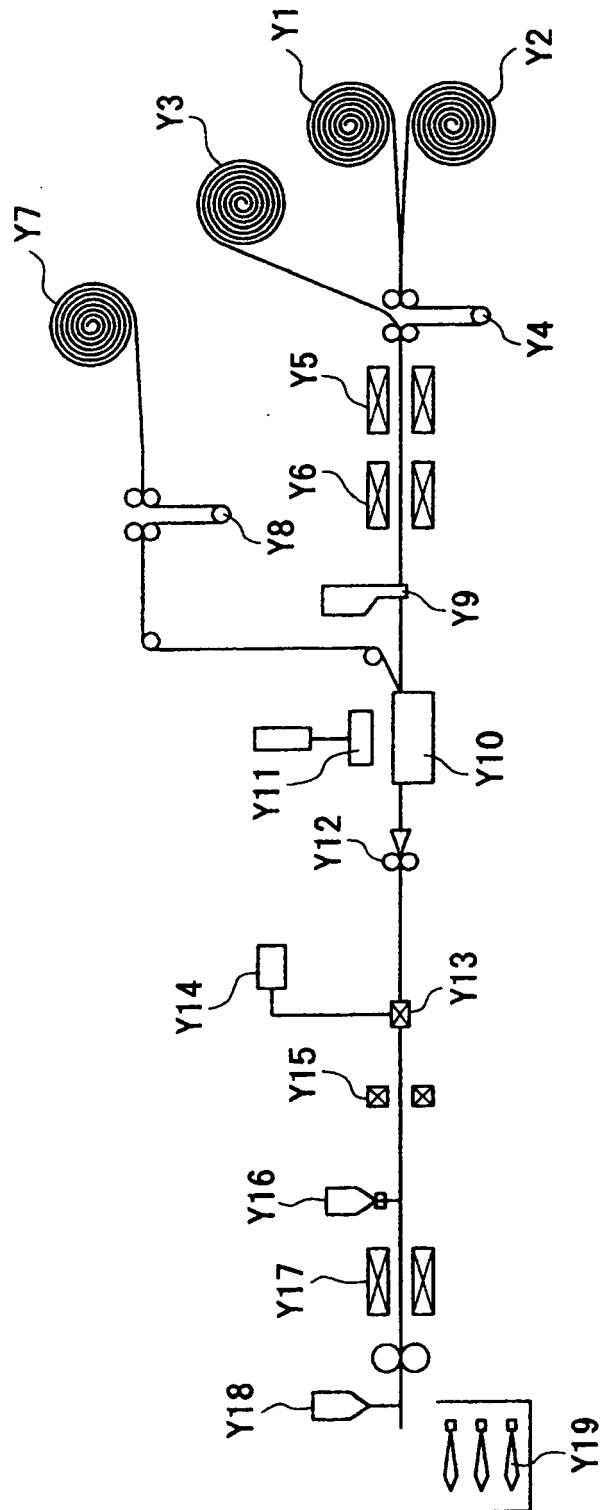
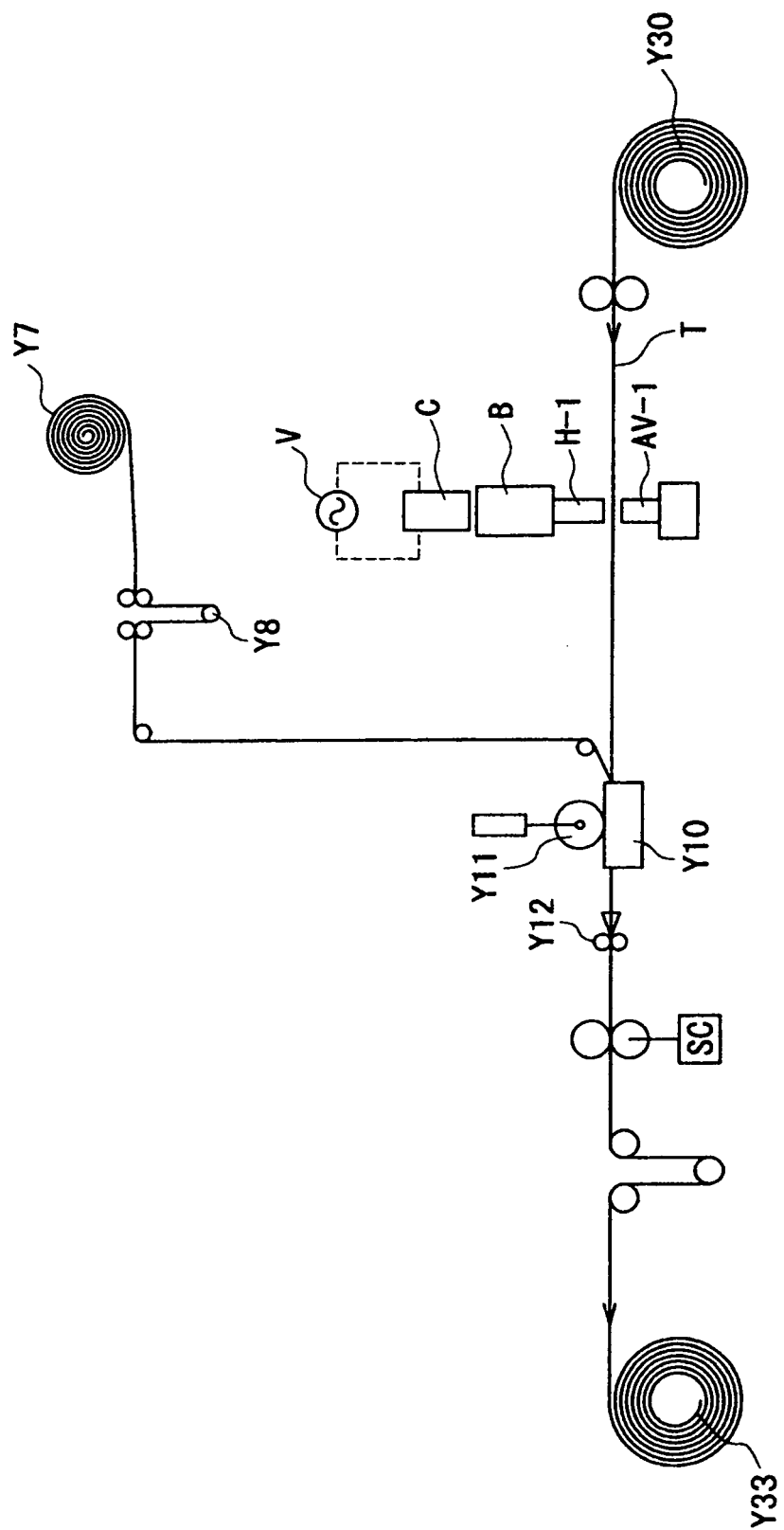


FIG.10



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/017586

A. CLASSIFICATION OF SUBJECT MATTER

B31B1/90 (2006.01), **A44B19/16** (2006.01), **B65D33/25** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B31B1/90 (2006.01), **A44B19/16** (2006.01), **B65D33/25** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2005
Kokai Jitsuyo Shinan Koho	1971-2005	Toroku Jitsuyo Shinan Koho	1994-2005

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 2000-516182 A (PACTIV CORP.), 05 December, 2000 (05.12.00), Pages 12, 13; Figs. 4, 5 & US 005669715 A & EP 000921987 A & WO 1998/006635 A1 & DE 069704207 T & AU 000719880 B & AT 000199527 T & DK 000921987 T & ES 002157083 T & PT 000921987 T	10, 11, 14-16 1-9, 12, 13
X A	JP 2004-026193 A (Showa Highpolymer Co., Ltd.), 29 January, 2004 (29.01.04), Par. No. [0020] (Family: none)	10, 11, 14-16 1-9, 12, 13

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search
08 December, 2005 (08.12.05)Date of mailing of the international search report
20 December, 2005 (20.12.05)Name and mailing address of the ISA/
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Authorized officer

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Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/017586

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2002/38459 A1 (Showa Highpolymer Co., Ltd.), 16 May, 2002 (16.05.02), Claim 1 & WO 2002/038459 A1 & AU 001275702 A & CN 001474771 T	1-16

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

REFERENCES CITED IN THE DESCRIPTION

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- JP 2004209841 A [0012] [0085]
- JP 2004196321 A [0012] [0085]