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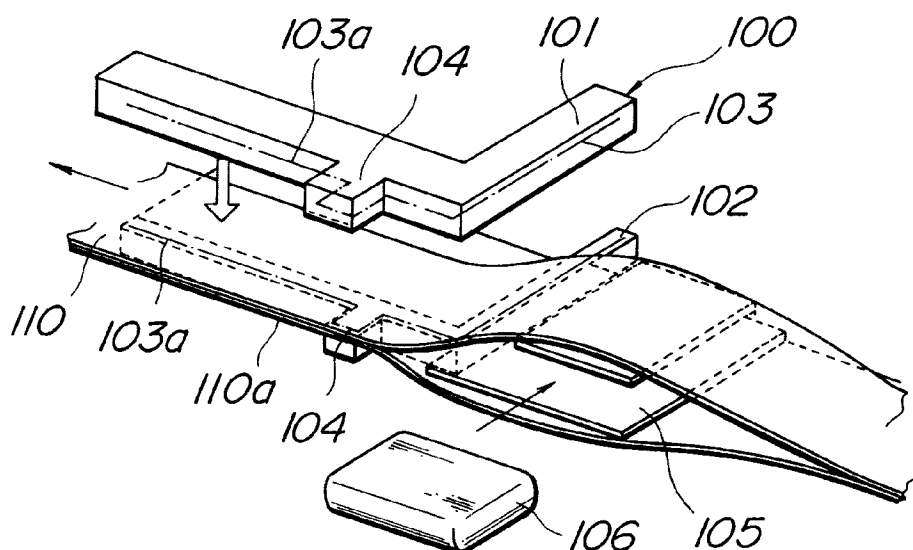
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(54) **Easy-to-unwrap heat shrink wrapped articles, wrapping method and apparatus thereof**

(57) An easy-to-unwrap heat shrink wrapped article using heat shrinkable wrapping film is proposed, together with a wrapping method and an apparatus for providing the wrapped article. The wrapped article can be characterized by placing an arbitrary item (106) to be wrapped between an upper and a lower fringes (110a) of the heat shrinkable wrapping film (110), storing the item to be wrapped in a bag-like body formed by welding and melt-severing the upper and the lower film fringes overlapping with each other, and covering the entire

item to be wrapped by heat shrink of the bag-like body causing the wrapping film to be in tight contact with the item to be wrapped, wherein the wrapped article has a pick-up tab for unwrapping formed so as to project from a welded fringe using a portion of the film fringe when forming the bag-like body by welding and melt-severing of the wrapping film. The pick-up tab has a slit, at a base portion, which will be a tearing point of the wrapped article. With the above mentioned composition, problems with regard to prior arts such as tearing of the wrapping film or the like can be overcome.

*Fig. 1*

## Description

### Field of the Invention

[0001] The present invention relates to heat shrink wrapped articles, which are easy to unwrap, entirely covered by the heat shrink of heat shrinkable wrapping film, and to a wrapping method and an apparatus thereof.

### Background Art

[0002] Heat shrink wrapped articles are wrapped articles in tight contact with wrapping film which is heat-shrunk by a heat shrink apparatus, after the steps of unwinding, in a two-fold state, the heat shrinkable wrapping film having been wound into a roll, placing an item consisting of arbitrary commodities to be wrapped between the two-fold wrapping film, and welding and melt-severing the open fringe of the wrapping film by a heat sealer to form a bag-like body including the item to be wrapped. The above mentioned wrapped articles are widely used today because of the advantages such that commodity value can be enhanced by displaying the commodities beautifully and with clarity, or that commodities having complicated shapes can be easily wrapped by placing the wrapping process on an automated line.

[0003] A general concept of heat shrink wrapping is, as shown in Fig.6, such that wrapping film is firstly unwound by a wrapping film drive roller 4 from a roll 1 of two-fold wrapping film which is put on a pair of wrapping film placement rollers 2. A separating board 3 is usually disposed between the wrapping film placement roller 2 and the wrapping film drive roller 4, and the two-fold wrapping film is separated by the separating board 3. Then, the separated wrapping film is sent out through a wrapping film feeding roller 7.

[0004] Next, the wrapping film, one end of which is opened by a former 9 and the item to be wrapped is put in between from the open end thereof, is sent to a heat welding apparatus 12 in which the film fringe and the film surface, overlapping at the open end, are welded and melt-severed by a heat sealer for L-shaped seals to form, together with the other fringe previously welded and melt-severed, a bag-like body.

[0005] The bag-like body is sent by a discharge conveyor 11 into a hot air tunnel 13, where the wrapping film is heat-shrunk to complete a wrapped article with the wrapping film in tight contact with the item to be wrapped.

### Problems to be solved by the Invention

[0006] Although heat shrink wrapped articles can be tightly wrapped regardless of shapes of the commodities included, there is a problem that the wrapping film is difficult to unwrap, because wrapping is completed

with the wrapping film tightly in contact with the commodities.

[0007] In order to overcome the above mentioned difficult-to-unwrap problem and make it easier to unwrap the wrapping of articles after the heat shrink, a method of providing perforation in course of the wrapping process in a predetermined location of the wrapping film has been adopted in prior arts.

[0008] Although the means of perforation makes unwrapping easier regardless of the material of the wrapping film, another problem arises that tight wrapping becomes difficult by the necessity of controlling the extent of heat shrink because straining the wrapping film strong during heat shrink may expand the holes of perforation of the wrapping film or tear off the wrapping film at the perforation.

[0009] Besides, air leakage through the perforation may deteriorate finishing quality of wrapping after the heat shrink, or wrapping film is vulnerable to tearing at the perforation when commodities are being handled for transportation, display or the like, which also brings about a problem that careful handling of wrapped commodities is required.

[0010] Another method for making it easier to unwrap a heat shrink wrapping, has been proposed, the method comprising the steps of incising a portion of the wrapping film, pasting an adhesive label on the portion, and pulling off the label to unwrap the wrapping film.

[0011] However, the method brings about a problem of increased cost, because individual wrapped articles are required to have labels pasted on, thus increasing necessary wrapping materials and making the wrapping process more complicated.

[0012] As a solution to such problems, the inventors of the present invention have proposed a method to make the unwrapping easier by forming a projecting tab for unwrapping by incising the fringe of the wrapping film in the welding and melt-severing process before the heat shrink process (see Japanese Patent Laid-Open Publication No. Hei 9-165015). However the method still bears a problem that the location at which the projecting tab is formed is limited to a corner of the end of the film fringe.

[0013] It is an object of the present invention, having been made to solve the above mentioned problems with regard to the difficulty in unwrapping heat shrink wrapped articles, to provide a heat shrink wrapped article which is easy to unwrap by pulling off a pick-up tab projecting at the side of the heat shrink wrapped article, which easily causes tearing of wrapping film having been heat-shrunk and in tight contact with the item to be wrapped, and a wrapping method and apparatus thereof.

### Summary of the Invention

[0014] The easy-to-unwrap heat shrink wrapped article of the present invention according to the above men-

tioned object is characterized by placing an arbitrary item to be wrapped between an upper and a lower fringes of heat shrinkable wrapping film, storing the above mentioned item to be wrapped in a bag-like body formed by welding and melt-severing the upper and the lower film fringes overlapping with each other, and covering the entire item to be wrapped by heat shrink of the bag-like body causing the wrapping film to be in tight contact with the item to be wrapped, wherein the above mentioned wrapped article has a pick-up tab for unwrapping formed so as to project from a welded fringe using a portion of the film fringe when forming the bag-like body by welding and melt-severing of the wrapping film, the above mentioned pick-up tab having a slit, at a base portion, to be a tearing point of the side film including the welded fringe, and the above mentioned slit of the pick-up tab being incised in a length running through a range of 5 to 50% of the width of the pick-up tab.

**[0015]** With the above mentioned composition, a heat shrink wrapped article, having an easy-to-unwrap pick-up tab according to the shape or size of the item to be wrapped at the side of the article, can be obtained because tearing of wrapping film from the holes or difficulty in tight wrapping, which may occur in the case with perforation, are solved, as well as the limitation with regard to the location of the slit at the film fringe.

**[0016]** Besides, the wrapping method of the easy-to-unwrap heat shrink wrapped article characterized by the present invention comprises the steps of placing an arbitrary item to be wrapped between an upper and a lower fringes of heat shrinkable wrapping film, storing the above mentioned item to be wrapped in a bag-like body formed by welding and melt-severing the upper and the lower film fringes overlapping with each other, and covering the entire item to be wrapped by heat shrink of the bag-like body causing the wrapping film to be in tight contact with the item to be wrapped, wherein a pick-up tab for unwrapping is formed in one piece so as to project from a welded fringe using a portion of the above mentioned film fringe when forming the above mentioned bag-like body, a slit being incised, simultaneously with the projection forming of the above mentioned pick-up tab, at a base portion to be a tearing point of the side film including the welded fringe, and welding and melt-severing of the upper and the lower film fringes overlapping with each other being performed by crimping the upper and the lower fringes of the film at a portion where the above mentioned pick-up tab is to be formed.

**[0017]** The wrapping apparatus of the easy-to-unwrap heat shrink wrapped article characterized by the present invention comprises an arbitrary item to be wrapped placed between an upper and an lower fringes of heat shrinkable film, and a heat sealer, for L-shaped seals, for forming a bag-like body including the above mentioned item to be wrapped in a sealed state by welding and melt-severing at least two edges of the overlapping fringes of the wrapping film, wherein the heat sealer has, at an arbitrary position of a seal heater for welding

and melt-severing the film fringe along the longitudinal direction of the wrapping film, a forming section to form, in one piece, a pick-up tab for unwrapping which is projecting from a welded fringe using a portion of the above mentioned film fringe when forming the above mentioned bag-like body by the heat sealer, the above mentioned forming section being formed by bending outward a part of the seal heater for welding and melt-severing the film fringe and having a projecting tab connected to one side of the bent edge of the seal heater for incising the above mentioned slit at the pick-up tab simultaneously with the forming of the above mentioned pick-up tab, the above mentioned heat sealer including the above mentioned seal heater the upper portion of which is fastened by insertion into a heat-resistant insulator at a lower portion of a L-shaped or a T-shaped holder, and the seal heater, with mounting terminals of individual edges of the seal heater screwed into a receiving tab made of a heat-resistant insulator at the internal edge of a supporting axis passing through a supporting arm of the holder edge, being constantly strained by an appropriate repulsion generated by pressing the above mentioned supporting axis outward by a coil spring around the axis disposed across the above mentioned supporting arm and the external edge so as to respond to the extension caused by thermal expansion when electricity is applied.

#### Brief Description of the Drawings

**[0018]** Fig. 1 is a perspective view illustrating the concept of the wrapping apparatus according to an embodiment of the present invention.

**[0019]** Fig. 2 is a perspective view illustrating the concept of the wrapping apparatus according to another embodiment of the present invention.

**[0020]** Fig. 3 is a perspective view illustrating seal heater applicable to the wrapping apparatus of the present invention.

**[0021]** Fig. 4 is a perspective view of a heat sealer having the seal heater of Fig. 3 built in.

**[0022]** Fig. 5 is a diagram illustrating in sequence the process, according to the present invention, of heat shrink wrapping of the item to be wrapped.

**[0023]** Fig. 6 is a conceptional diagram of a general heat shrink wrapping method.

#### Description of the Preferred Embodiments

**[0024]** The present invention will be described hereafter in detail with reference to embodiments shown in Figs. 1 to 5.

**[0025]** A welding and melt-severing apparatus shown in Fig. 1 includes a heat sealer 100 for L-shaped seals. The heat sealer 100 comprises an upper component member 101 and a lower component member 102, to either one or both of which a seal heater 103 made of nichrome wire, heat block, or ribbon wire is, as shown

by the alternate dashed line in the figure, disposed in an L-shape to weld and melt-sever a wrapping film 110 along both its longitudinal and lateral directions simultaneously.

**[0026]** Besides, a portion of a seal heater 103a, disposed along the longitudinal direction of the wrapping film 110, is partially bent outward to be formed as a rectangular forming section 104, which is used, in turn, to form a pick-up tab 202 projecting from a welded fringe 201 at a side of a heat shrink wrapped article 200 described later (see Fig.5), by melt-severing the film fringe 110a, simultaneously with the forming of a bag-like body 203 by the heat sealer 100. Here unit 105 shows a former for separating the film, and unit 106 shows an item to be wrapped.

**[0027]** Fig.2 shows a welding and melt-severing apparatus having a heat sealer 100 composed by connecting, in a T-shape, two seal heaters 103 composed of conductive heating wires such as ribboned nichrome wires by spot welding. The seal heater 103, disposed only under the upper component member 101, forms a bag-like body by welding and melt-severing the two-fold film 110 into an L-shape and, at the same time, melt-severs the film fringe 110a too.

**[0028]** Fig.3 shows a disposition of a projecting piece 112, connected to the seal heater 103, which incises, simultaneously with the forming of the pick-up tab, a slit 204 to be the tearing point of the welded fringe 201 of the above mentioned heat shrink wrapped article 200 shown in Fig.5 at one side of the inner bent of the above mentioned forming section 104, wherein mounting terminals 107 are disposed at individual edges of the seal heater 103.

**[0029]** Fig.4 shows a built-in state of the above mentioned seal heater 103, wherein the upper portion of the seal heater 103 is fastened by insertion into a long-sized heat-resistant insulator 114 disposed at the lower surface of a receiving board 113 under a holder 109, and attached under the holder with the above mentioned mounting terminals 107 of individual edges screwed into a receiving tab 117 at the internal edge of a supporting axis 116 passing through a supporting arm 115 of the edge of the receiving board 113. The receiving tab 117, composed of a heat-resistant insulator in order to prevent current leakage or a short circuit, provides electrical insulation between the seal heater 103 and the supporting arm 115.

**[0030]** Besides, since the seal heater 103 extends by thermal expansion when electricity is applied, the above mentioned supporting axis 116 is pressed outward by a coil spring 118 around the axis disposed across the supporting arm 115 and the external edge, constantly straining the seal heater 103 by an appropriate repulsion so as to respond to the extension.

**[0031]** Thus the seal heater 103 built in the holder 109, the figure of which is not shown, is disposed to be freely movable along the vertical direction at the upper portion of the wrapping apparatus together with the

holder 109. The seal heater is electrically connected to an impulse generator provided to the wrapping apparatus and set to a state at which it can be powered on by electrical impulse.

**[0032]** The wrapping process of the heat shrink wrapped article according to the above mentioned welding and melt-severing apparatus will be described next with reference to Figs. 1 and 2.

**[0033]** As shown in Fig.1, after the upper and the lower film fringes 110a of the two-fold wrapping film overlapping with each other, are separated as usual by the former 105, the item 106 to be wrapped, being an arbitrary commodity, is inserted from the opening. Then the item 106 to be wrapped is sent onto a conveyer 111 of the welding and melt-severing apparatus, as shown in Fig.5(a), still being placed between the fringes of the wrapping film, together with the wrapping film 110.

**[0034]** In the welding and melt-severing apparatus the upper component member 101 descends after recognizing the position of the item 106 to be wrapped, sandwiches the two edges along the lateral and the longitudinal directions of the wrapping film 110 between the upper component member 101 and the lower component member 102, and performs welding and melt-severing of the wrapping film, forming it into an L-shape.

**[0035]** In this case, since the other edge of the wrapping film 110 has already been welded in the previous wrapping process, the two-fold wrapping film 110 is formed into a bag-like body 203 including the above mentioned item to be wrapped 106, as shown in Fig.5 (b), by the newly performed welding and melt-severing of the two longitudinal and lateral edges.

**[0036]** Besides, in the film fringe 110a, the partial welding and melt-severing by the above mentioned forming section 104 punches a portion of the film fringe to form a rectangular pick-up tab 202 for unwrapping to be projecting from the welded fringe, and, at the same time, the above mentioned projecting piece 112 incises, at the base portion of the pick-up tab, the above mentioned slit 204 which will be the tearing point of the welded fringe.

**[0037]** The bag-like body 203 formed by the above mentioned is sent to a heat shrink apparatus (see Fig. 6) by the conveyer 111 as usual, and heat shrink processing of the wrapping film 110 is performed. The bag-like body 203, shrunk by the heat shrink process, becomes the heat shrink wrapped article 200 wherein the wrapping film 110 is in tight contact with the item 106 to be wrapped. The above mentioned pick-up tab 202 is projecting from the welded fringe 201 at the side of the heat shrink wrapped article. Although the pick-up tab 202 is also shrunk by heating, it preserves the unwrapping function. Besides, at the base portion of the welded fringe 201, the above mentioned slit 204 remains as the film tearing point at the side of the heat shrink wrapped article including the welded fringe 201. The slit 204 has a length in the range of 5 to 50%, or preferably 5 to 25%, of the width of the pick up tab 202, and the position and

size of the pick-up tab 201 to be formed can be arbitrary determined according to the heat shrink wrapped article, thus giving a better outlook after the heat shrink wrapping process and ensured ease of unwrapping.

[0038] As the seal heater 103 in the present invention, an arbitrary type used in conventional wrapping film welding and melt-severing apparatuses. For example, an impulse seal type or a heat block type using nichrome wire, as described above, can be used, when nichrome wire is used with the seal heater 103, not only ribbon wire but also round wire can be used, wherein the surface of the nichrome wire may be in the state of raw material, or surface processing such as teflon coating or the like may be performed in order to prevent the wrapping film from sticking on.

[0039] As the heat shrinkable wrapping film, single-layer wrapping films such as polypropylene, polyethylene, vinyl chloride, or laminated wrapping films composed of these resins can be recommended.

[0040] Furthermore, as the wrapping machine to which the apparatus according to the present invention is applicable, the so-called L-shaped wrapping machine can be recommended, either an automatic type or a manual type of which is applicable to the apparatus of the present invention.

## Claims

1. An easy-to-unwrap heat shrink wrapped article, said wrapped article being prepared by placing an arbitrary item to be wrapped between an upper and a lower fringes of heat shrinkable wrapping film, storing said item to be wrapped in a bag-like body formed by welding and melt-severing the upper and the lower film fringes overlapping with each other, and covering the entire item to be wrapped by heat shrink of the bag-like body causing the wrapping film to be in tight contact with the item to be wrapped, characterized in that said wrapped article has a pick-up tab for unwrapping formed so as to project from a welded fringe using a portion of the film fringe when forming the bag-like body by welding and melt-severing of the wrapping film.
2. The easy-to-unwrap heat shrink wrapped article according to claim 1, wherein said pick-up tab is characterized by having a slit, at a base portion, to be a tearing point of the side film including the welded fringe.
3. The easy-to-unwrap heat shrink wrapped article according to claim 1, wherein said pick-up tab is characterized by being incised in a length running through a range of 5 to 50% of the width of the pick-up tab.
4. A wrapping method of an easy-to-unwrap heat

shrink wrapped article, said wrapping method comprising the steps of placing an arbitrary item to be wrapped between an upper and a lower fringes of heat shrinkable wrapping film, storing said item to be wrapped in a bag-like body formed by welding and melt-severing the upper and the lower film fringes overlapping with each other, and covering the entire item to be wrapped by heat shrink of the bag-like body causing the wrapping film to be in tight contact with the item to be wrapped, wherein a pick-up tab for unwrapping is formed in one piece so as to project from a welded fringe using a portion of said film fringe when forming said bag-like body.

5. The wrapping method of an easy-to-unwrap heat shrink wrapped article according to claim 4, wherein a slit is incised, simultaneously with the projection forming of said pick-up tab, at a base portion to be a tearing point of the side film including the welded fringe.
6. The wrapping method of an easy-to-unwrap heat shrink wrapped article according to claims 4 or 5, wherein welding and melt-severing of the upper and the lower film fringes overlapping with each other are performed by crimping the upper and the lower fringes of the film at a portion where said pick-up tab is to be formed.
7. A wrapping apparatus of an easy-to-unwrap heat shrink wrapped article, said wrapping apparatus comprising an arbitrary item to be wrapped placed between an upper and an lower fringes of heat shrinkable film, and a heat sealer, for L-shaped seals, for forming a bag-like body including said item to be wrapped in a sealed state by welding and melt-severing at least two edges of the overlapping fringes of the wrapping film, wherein the heat sealer has, at an arbitrary position of a seal heater for welding and melt-severing the film fringe along the longitudinal direction of the wrapping film, a forming section to form, in one piece, a pick-up tab for unwrapping which is projecting from a welded fringe using a portion of said film fringe when forming said bag-like body by the heat sealer.
8. The wrapping apparatus of an easy-to-unwrap heat shrink wrapped article according to claim 7, wherein said forming section being formed by bending outward a part of the seal heater for welding and melt-severing the film fringe and having a projecting tab connected to one side of the bent edge of the seal heater for incising said slit at the pick-up tab, simultaneously with the forming of said pick-up tab.
9. The wrapping apparatus of an easy-to-unwrap heat shrink wrapped article according to claims 7 or 8, wherein said heat sealer includes said seal heater

the upper portion of which is fastened by insertion into a heat-resistant insulator at a lower portion of an L-shaped or a T-shaped holder, and the seal heater, with mounting terminals of individual edges of the seal heater screwed into a receiving tab made of a heat-resistant insulator at the internal edge of a supporting axis passing through a supporting arm of the holder edge, is constantly strained by an appropriate repulsion generated by pressing said supporting axis outward by a coil spring around the axis disposed across said supporting arm and the external edge so as to respond to the extension caused by thermal expansion when electricity is applied.

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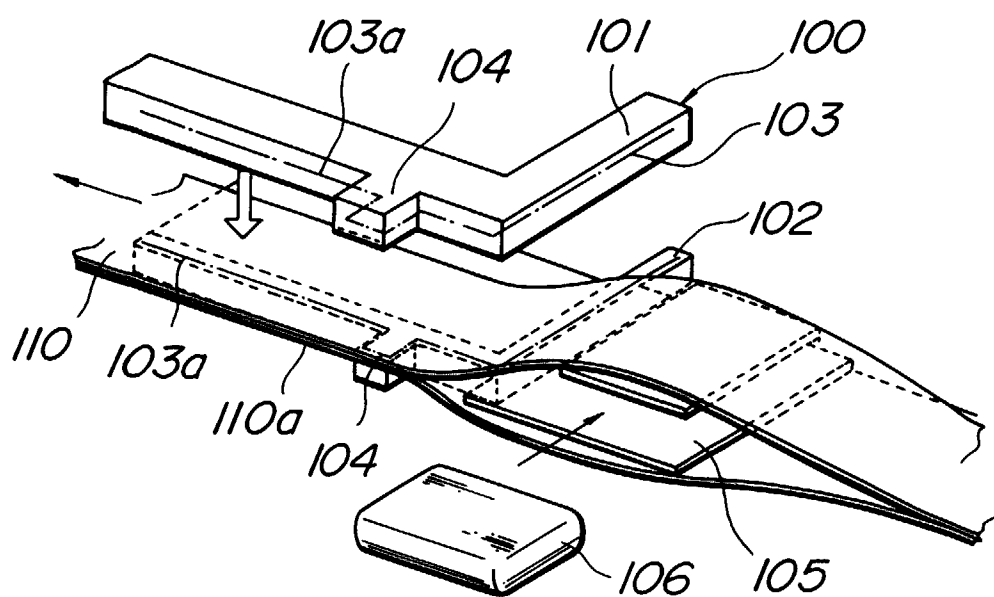
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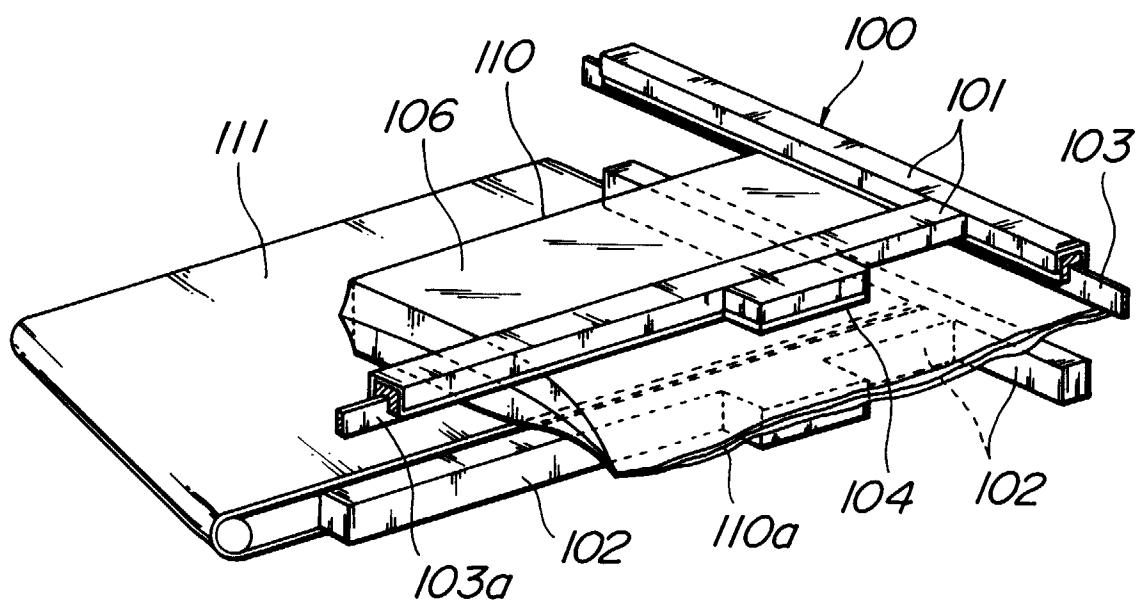
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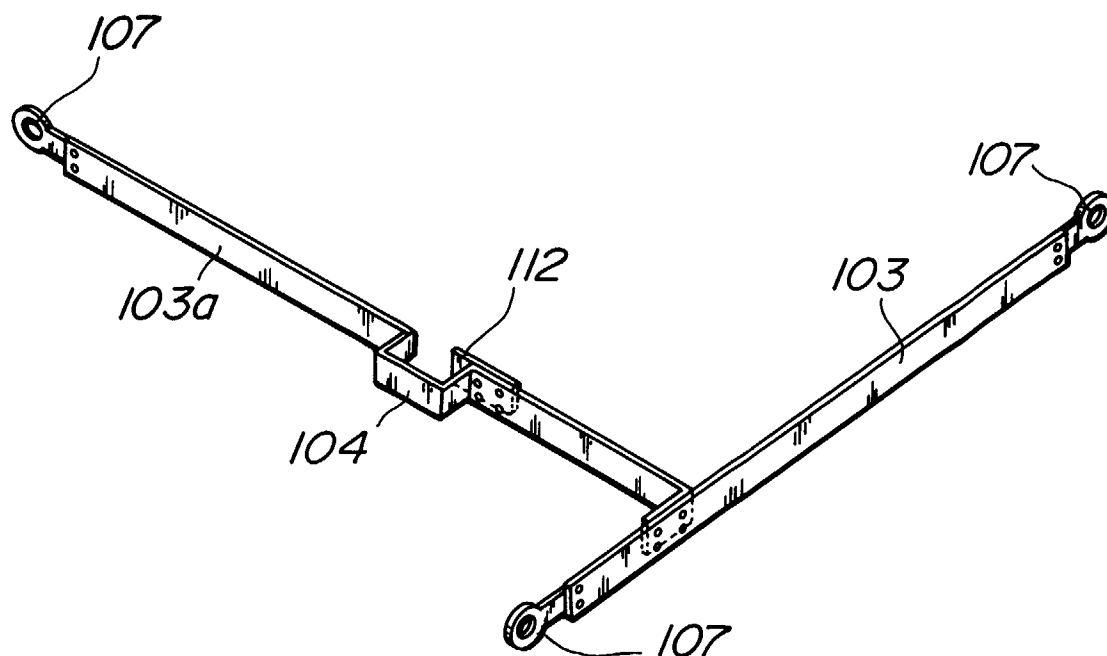
*Fig. 1*



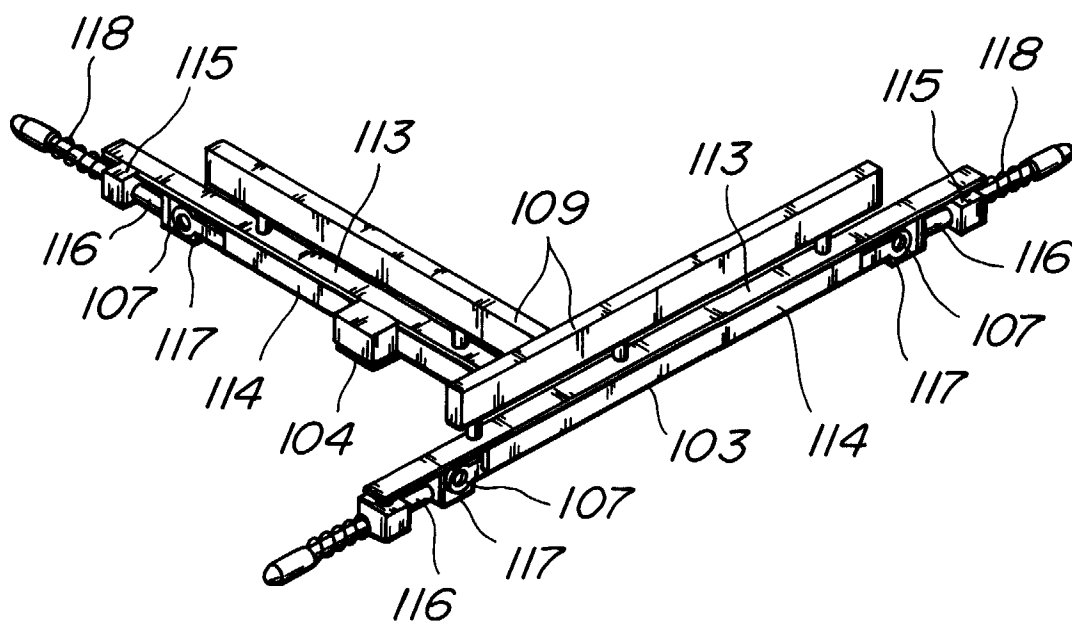
*Fig. 2*



*Fig. 3*

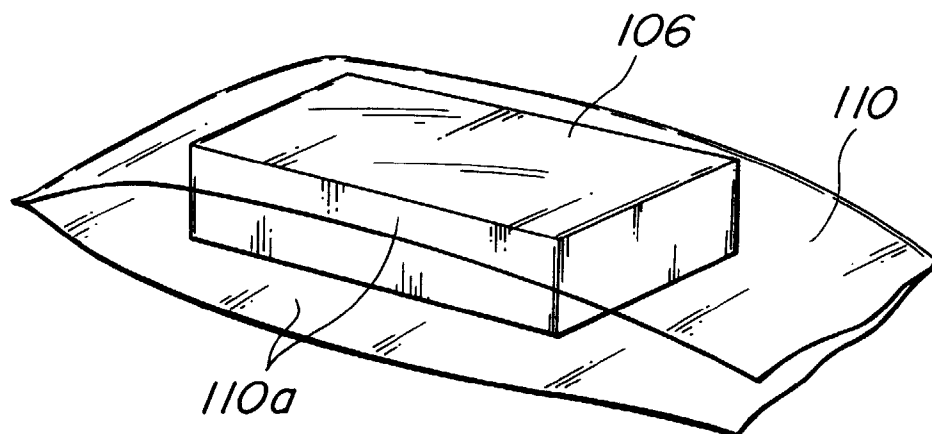


*Fig. 4*

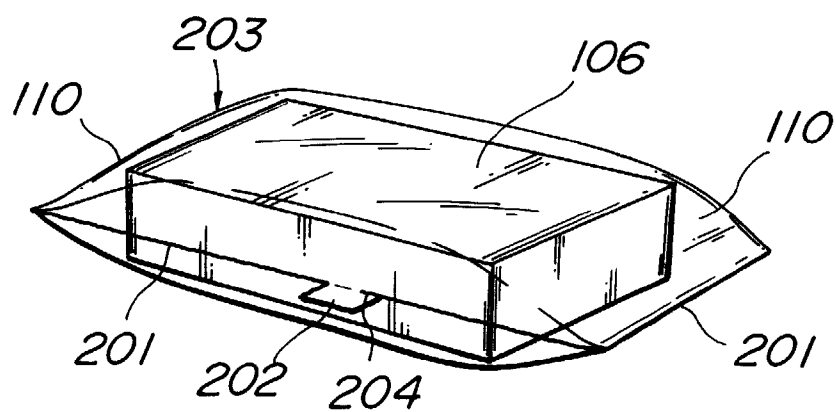




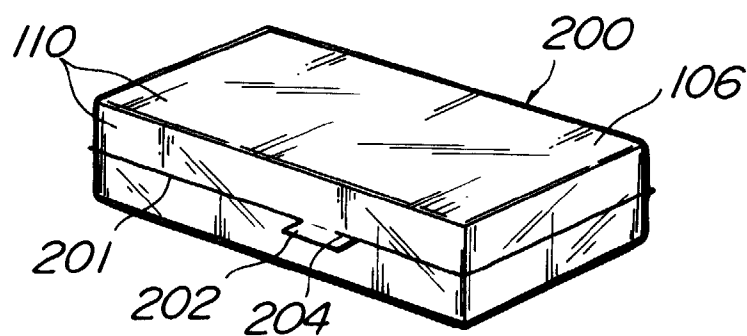
*Fig. 5(a)*



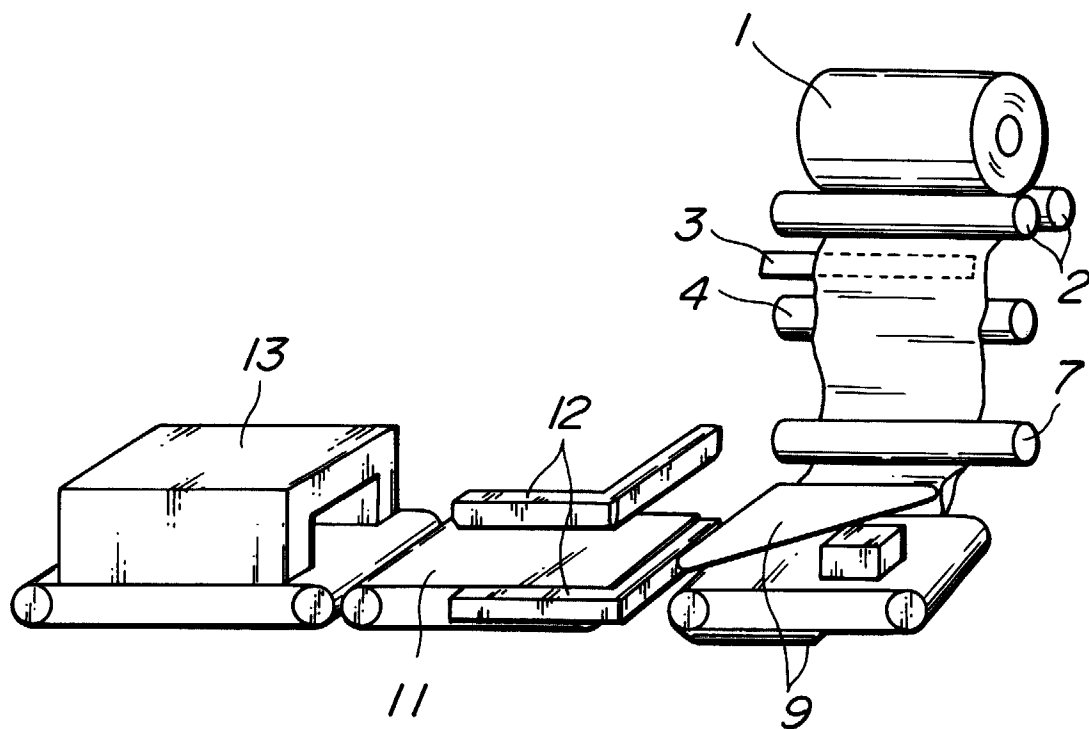
*Fig. 5(b)*



*Fig. 5(c)*



*Fig. 6*





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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 40 2630

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |   |  |
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|   |   |   | B65B<br>B65D                                     |
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| Place of search<br>THE HAGUE  |   | Date of completion of the search<br>1 February 1999 | Examiner<br>Jagusiak, A                          |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |   |   |  |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 98 40 2630

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