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(71) Applicant: **Uni-Charm Company Limited**
Kawanoe-Shi, Ehime 799-0111 (JP)

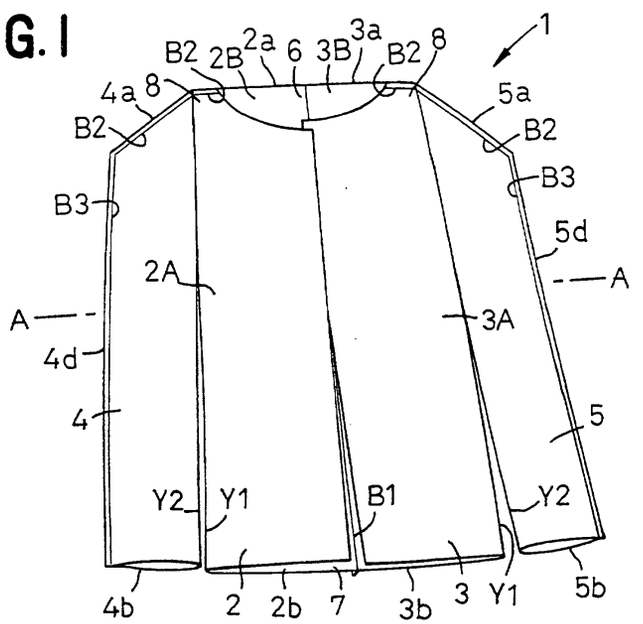
(72) Inventors:
- **MATSUSHITA, Michiyo, UNI-Charm Co., Ltd**
Mitoyo-gun, Kagawa 769-1602 (JP)
- **MURAKAMI, Masaki, UNI-Charm Co., Ltd.**
Mitoyo-gun, Kagawa 769-1602 (JP)
- **KUWASHIRO, Takeo, UNI-Charm Co.,Ltd.**
Mitoyo-gun, Kagawa 769-1602 (JP)

(74) Representative:
Murgatroyd, Susan Elizabeth et al
Baron & Warren
18 South End
Kensington
London W8 5BU (GB)

(54) DISPOSABLE JACKET AND PRODUCTION METHOD THEREOF

(57) An upper garment 1 comprises right- and left-hand sleeve sheets 4, 5 respectively having inner and outer side edges 4c, 4d; 5c, 5d and arm holes 4e, 5e in the vicinity of their upper ends and right- and left-hand body sheets 2, 3 respectively having inner and outer side edges 2c, 2d; 3c, 3d and arm holes 2e, 3e in the vicinity of their upper ends. Each of the right- and left-hand sleeve sheets 4, 5 is folded onto itself along its center lines Y2 extending between its upper and lower ends and bonded along its inner and outer side edges 4c, 4d; 5c, 5d. The right- and left-hand body sheets 2, 3 are bonded together along their inner side edges 2d, 3d. The right- and left-hand sleeve sheets 4, 5 are bonded to the right- and left-hand body sheets 2, 3, respectively, along peripheral edges of their arm holes 4e, 2e; 5e, 3e. The right- and left-hand sleeve sheets 4, 5 have their upper edges are respectively sealed together.

FIG. 1



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Description

FIELD OF THE INVENTION

[0001] This invention relates to a disposable upper garment and a process for making the same.

BACKGROUND ART

[0002] Recently there has been an increased demand for disposable upper garments adapted to be worn not only by medical team including physicians and nurses but also by patients during surgical operation or diagnosis and to be disposable after a single use. Such garments are required to stand at least a duration of surgical operation or diagnosis and to be mass-producible at a lower cost than before. As far as the inventors know, none of the techniques meeting the demand has been disclosed in any documents except for the case of disposable diapers. Considering the fact that the disposable pants-type diaper is exclusively used as the undergarment adapted to absorb and contain body wastes, the techniques for making the usual pants-type diaper can not be helpful in making the foregoing garment.

[0003] It is a principal object of this invention to provide an upper garment to be disposable immediately after a single use and a process enabling such upper garment to be mass-produced at a high productivity per unit time.

SUMMARY OF THE INVENTION

[0004] The object set forth above is achieved, according to an aspect of this invention, by a disposable upper garment having a neckline and a pair of shoulder regions defined by upper end of the upper garment, a hemline defined by lower end of the upper garment, and a pair of sleeves joined to the shoulder regions, respectively, so that the sleeves extend from the upper end to the lower end of the upper garment.

[0005] In such upper garment, this invention is characterized by that the upper garment comprises right- and left-hand sleeve sheets arranged to be bilaterally symmetric to each other, each having inner and outer side edges extending between the upper and lower ends and an arm hole in the vicinity of the upper end and right- and left-hand boy sheets arranged inside the right - and left-side sleeve sheets and also to be bilaterally symmetric to each other, each having inner and outer side edges extending between the upper and lower ends and an arm hole in the vicinity of the upper end; each of the right- and left-hand sleeve sheets is folded onto itself along a center lines extending between the upper and lower ends to bisect a dimension between the inner and outer side edges of this sheet and bonded together along the inner and outer side edges with narrow marginal regions thereof left free while the right- and left-hand body sheets are bonded together along the inner edges of these sheets with narrow marginal regions left free; the right- and left-hand sleeve sheets and the right- and left-hand body sheets are bonded together, respectively, along peripheral edges of the arm holes associated with these sleeve and body sheets.

[0006] According to one preferred embodiment of this invention, the upper ends of the right- and left-hand body sheets and the upper ends of the right- and left-hand sleeve sheets are placed one upon another and bonded together except a region of the neckline.

[0007] According to another preferred embodiment of this invention, the right- and left-hand body sheets and/or the right- and left-hand sleeve sheets are made of a nonwoven fabric.

[0008] The object set forth above is achieved, according to another aspect of this invention, by a process for making a disposable upper garment comprising the steps of:

(a) continuously feeding forward right- and left-hand body sheets in the longitudinal direction, each of the right- and left-hand body sheets having upper and lower surfaces, inner and outer side edges extending in the longitudinal direction and a center line extending in the longitudinal direction to bisect a transverse dimension between the inner and outer side edges, and cutting out portions of the sheets, respectively, along neckline cutting lines convexly curving from the outer edges toward the center lines;

(b) continuously feeding forward right- and left-hand sleeve sheets in the longitudinal direction, each of the right- and left-hand sleeve sheets being narrow than each of the right- and left-hand body sheets and having upper and lower surfaces, inner and outer side edges extending in the longitudinal direction and a center line extending in the longitudinal direction to bisect a transverse dimension between the inner and outer side edges thereof, placing the lower surface of the left-hand sleeve sheet upon the upper surface of the left-hand body sheet while the lower surface of the right-hand sleeve sheet upon the upper surface of the right-hand body sheet so that the center lines of the right- and left-hand body sheets coincide with the center lines of the right- and left-hand sleeve sheets;

(c) bonding the right- and left-hand body sheets to the right- and left-hand sleeve sheets respectively placed one upon another along an arm hole bonding line lying between the inner and outer side edges of the right- and left-hand sleeve sheets slightly ahead of the neckline cutting line as viewed in the sheet feeding direction and describing a convex lotus from the center lines toward the inner and outer side edges;

(d) cutting the right- and left-hand body sheets and the right- and left-hand sleeve sheets respectively bonded one to another along arm hole cutting lines

extending inside and along the arm hole bonding lines;

(e) folding the right-hand body sheet and the right-hand sleeve sheet together along the center lines while folding the left-hand body sheet and the left-hand sleeve sheet together along the center lines so that the upper surfaces of the right-hand body sheet and the right-hand sleeve sheet are placed one upon another while the upper surfaces of the left-hand body sheet and the left-hand sleeve sheet are placed one upon another;

(f) feeding the right-hand body sheet and the right-hand sleeve sheet and simultaneously feeding the left-hand body sheet and the left-hand sleeve sheet in parallel to the right-hand body and sleeve sheets so that the center lines of these sheets coincide one with another and unfolding rear sections of the right- and left-hand body sheets extending between the respective center lines and the respective inner side edges thereof along the arm hole bonding lines, followed by bonding the unfolded rear sections to each other along a back bonding line extending in the longitudinal direction along the inner side edges of the right- and left-hand body sheets;

(g) unfolding front sections respectively extending between the center lines and the outer side edges of the right- and left-hand body sheets along the arm hole bonding lines and bonding the right- and left-hand sleeve sheets respectively folded onto themselves along their sleeve bonding lines extending in the longitudinal direction along the inner and outer side edges of these sleeve sheets;

(h) bonding the right- and left-hand body sheets and the right- and left-hand sleeve sheets along shoulder bonding lines extending between the neck-opening cutting lines defined about the center lines of the right- and left-hand body sheets and the sleeve bonding lines behind the arm bonding line as viewed in the sheet feeding direction or shoulder bonding lines extending the neckline cutting lines defined about the center lines of the right- and left-hand body sheets and the sleeve bonding lines across the arm hole bonding lines; and

(i) cutting the right- and left-hand body sheets and the right- and left-hand sleeve sheets along a shoulder cutting line extending behind and along one of the shoulder bonding lines, then along a line extending through the transversely opposite ends of the neckline cutting line and again behind and along the other shoulder bonding line, on one hand, and along a hemline cutting line transversely extending at a desired distance forward from the arm hole bonding line as viewed in the sheet feeding direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a perspective view of a disposable upper garment made in accordance with the principal of this invention;

Fig. 2 is an exploded plan view of the disposable upper garment shown in Fig. 1;

Fig. 3 is a sectional view taken along a line A-A in Fig. 1;

Fig. 4 is a view similar to Fig. 1 showing a disposable upper garment as an alternative embodiment of this invention; and

Fig. 5 is a diagram schematically illustrating a process for making the upper garment of this invention.

DESCRIPTION OF THE BEST MODE FOR WORKING OF THE INVENTION

[0010] A disposable upper garment and a process for making the same according to this invention will be described hereunder, by way of example, in more details with reference to the accompanying drawings.

[0011] Fig. 1 is a perspective view of a disposable upper garment 1 made in accordance with a principle of this invention. As shown, the upper garment 1 comprises right- and left-hand bodies 2, 3 sealed with each other, and right- and left-hand sleeves 4, 5 sealed with said right- and left-hand bodies 2, 3, respectively, along upper parts of outer side edges of the latters. The right- and left-hand bodies 2, 3 comprise, in turn, front sections 2A, 3A intended to cover a wearer's belly, rear sections 2B, 3B intended to cover the wearer's back, a neckline 6, hemline 7 defined by upper and lower edges of these right- and left-hand bodies 2, 3. Except the region defining the neckline 6, the upper edges of the right- and left-hand bodies 2, 3 cooperate with the upper edges of the right- and left-hand sleeves 4, 5 to form a pair of shoulders 8.

[0012] Fig. 2 is an exploded plan view of the upper garment 1 shown in Fig. 1, in which respective sheets 2, 3, 4, 5 corresponding to the bodies and sleeves arranged in bilateral symmetry. More specifically, the upper garment 1 comprises a pair of body sheets 2, 3 arranged symmetrically with respect to an imaginary center line T of symmetry extending vertically of the upper garment 1 and a pair of sleeve sheets 4, 5 lying transversely outside the pair of body sheets 2, 3 symmetrically with respect to the imaginary center line T of symmetry.

[0013] The right- and left-hand body sheets 2, 3 have inner and outer edges 2d, 2c; 3d, 3c extending in parallel to each other in the longitudinal direction, upper and lower edges 2a, 2b; 3a, 3b extending in the transverse direction which intersects the longitudinal direction, and center lines Y1 extending in the longitudinal direction to bisect transverse dimensions between the inner and

outer edges 2c, 2d; 3c, 3d.

[0014] The right- and left-hand body sheets 2, 3 are formed in the vicinity of their upper edges 2a, 3a with cutouts respectively extending from the outer edges 2c, 3c toward the respective center lines Y1 of these sheets 2, 3 to describe arcs curving downward. These cutouts are intended to form the neckline 6. Along the upper edges 2a, 3a of the right- and left-hand body sheets 2, 3, shoulder bonding lines B2 extend in the transverse direction across the respective center lines Y1. Along the inner edges 2d, 3d of the right- and left-hand body sheets 2, 3, back bonding lines B1 extend in the longitudinal direction. The right- and left-hand body sheets 2, 3 are further formed about points on the respective center lines Y1 lying rather adjacent to the upper edges with substantially rectangular arm holes 2e, 3e. The right- and left-hand body sheets 2, 3 have their inner surfaces bonded to each other along the back bonding lines B1.

[0015] The right- and left-hand sleeve sheets 4, 5 have inner and outer edges 4d, 4c; 5d, 5c extending in parallel to each other in the longitudinal direction, upper and lower edges 4a, 4b; 5a, 5b extending in the transverse direction which intersects the longitudinal direction, and center lines Y2 extending in the longitudinal direction to bisect transverse dimensions between the inner and outer edges 4d, 4c; 5d, 5c.

[0016] The right- and left-hand sleeve sheets 4, 5 are respectively provided with sleeve bonding lines B3 extending in the longitudinal direction along their inner and outer edges 4d, 4c; 5d, 5c. The right- and left-hand sleeve sheets 4, 5 are additionally provided with shoulder bonding lines B2 extending in the transverse direction along their upper edges 4a, 5a. The right- and left-hand sleeve sheets 4, 5 are further provided about points on the respective center lines Y2 lying rather adjacent the respective upper edges with substantially rectangular arm holes 4e, 5e. The right- and left-hand sleeve sheets 4, 5 have their inner surfaces folded along the respective center lines Y2 onto themselves and bonded with themselves along the respective sleeve bonding lines B3 to form the right- and left-hand sleeves 4, 5.

[0017] The left-hand body sheet 3 and the left-hand sleeve sheet 5 are placed one upon another with the center lines Y1, Y2 of these sheets 3, 5 kept in mutual alignment and bonded together along arm hole bonding lines B4 defined by respective peripheries of the associated arm holes 3e, 5e. Similarly, the right-hand body sheet 2 and the right-hand sleeve sheet 4 are placed one upon another with the center lines Y1, Y2 of these sheets 2, 4 kept in mutual alignment and bonded together along the arm hole bonding lines B4 defined by respective peripheries of the associated arm hole 2e, 4e. The right-hand body sheet 2 and the right-hand sleeve sheet 4 are bonded to each other also along parts of their upper edges which overlap each other, i.e., along the shoulder bonding line B2. Similarly, the left-hand body sheet 3 and the left-hand sleeve sheet 5 are bonded to each other also along parts of their upper edges which overlap each other, i.e., along the shoulder bonding line B2. It is also possible to provide these shoulder bonding lines B2 so that they transversely extend in alignment with the upper sides of the respective arm hole bonding lines B4.

[0018] It should be understood that the arm holes 2e, 3e as well as the arm hole 4e, 5e are not limited to those of substantially rectangular shape but may be of the other shape such as circular or oval shape.

[0019] Fig. 3 is a sectional view taken along a line A-A in Fig. 1. The right- and left-body sheets 2, 3 have their inner surfaces bonded to each other along the back sealing line B1. In other words, the inner edges 2d, 3d of these two sheets 2, 3 put flat and bonded together extend outwardly of the upper garment 1. The right- and left-hand sleeve sheets 4, 5 respectively have their inner surfaces put flat and bonded together along the inner and outer edges 4c, 4d; 5c, 5d. Consequently, the inner and outer edges 4c, 4d of the sheet 4 thus bonded to each other as well as the inner and outer edges 5d, 5c of the sheet 5 respectively bonded together extend outwardly of the jacket 1. Accordingly, neither the inner and outer edges 2d, 3d of the right- and left-hand body sheets 2, 3 nor the inner and outer edges 4d, 4c; 5d, 5c come in contact with a wearer's skin. Such manner of the edge bonding is effective to prevent a feeling to wear the upper garment to be adversely affected. Along their upper edges also, the right- and left-hand body sheets 2, 3 and the right- and left-hand sleeve sheets 4, 5 have their inner surfaces put flat and bonded together (not shown).

[0020] Fig. 4 is a view similar to Fig. 2, showing an alternative embodiment of a disposable upper garment according to this invention. This upper garment 1 is similar to the upper garment 1 of Fig. 1 except that the right- and left-hand bodies 2, 3 respectively include elastic members 9 bonded under tension thereto so as to extend transversely thereof and the right- and left-hand sleeves 4, 5 respectively include elastic members 10 bonded under tension so as to extend circumferentially thereof. Contractile force of these elastic members 9, 10 ensures a good fitness of the upper garment 1 around the wearer's trunk and arms, whereby preventing undesirable shift or movement of the upper garment on its wearer.

[0021] While the elastic members 9, 10 are illustrated to be attached to the outer surfaces of the right- and left-hand bodies 2, 3 as well as the right- and left-hand sleeves 4, 5, it is obviously possible to attach the elastic members 9, 10 to the outer surfaces of the right- and left-bodies 2, 3 and the right- and left-hand sleeves 4, 5. It is also possible to cover these elastic members 9, 10 with a nonwoven fabric or to wrap these elastic members 9, 10 before they are attached to the right- and left-hand bodies 2, 3 and to the right- and left-hand sleeves 4, 5.

[0022] The right- and left-hand body sheets 2, 3 and/or the right- and left-hand sleeve sheets 4, 5 are preferably made of a nonwoven fabric formed by thermoplastic fibers such as a spun bond nonwoven fabric or a melt blown nonwoven fabric. Taking account of moisture-holding property and rigidity to be improved, particularly preferable stock material for these sheets includes a spun bond, point bond or melt blown nonwoven fabric having a basis weight of 50 ~ 100 g/m^2 each containing dependently rayon, nylon, pulp or a mixture thereof. Useful stock material for these sheets further includes a nonwoven fabric made porous to improve its moisture-permeability, a nonwoven fabric embossed to generate irregularity and thereby to improve its cushioning property or nonwoven fabric treated to have an elasticity.

[0023] The upper garment 1 is apt to be affected by sweating particularly in the vicinity of the arm holes 2e, 3e and over the rear sections 2B, 3B of the body sheets 2, 3. To alleviate undesirable effect due to sweating, the inner surface of the upper garment is preferably covered, in the vicinity of the arm holes 2e, 3e and over the rear sections 2B, 3B, with separately prepared nonwoven fabric having excellent liquid-absorptivity, moisture-permeability and softness. As the nonwoven fabric meeting such requirements, a nonwoven fabric containing suitable fibers such as rayon or cotton fibers is preferably used.

[0024] Fig. 5 is a schematic diagram illustrating, by way of example, sequential steps of the process for making the disposable upper garment of this invention in a side view (1), (3) and in a plan view (2), (4). So far as first step (a) ~ fifth step (e) are concerned, illustration and description of the right-hand body sheet 2 and the right-hand sleeve sheet 3 are eliminated to avoid complexity. Along a line comprising first step (a) ~ ninth step (i), the upper garment 1 is made from right- and left-hand body sheets 2, 3 each having a given width and right- and left-hand sleeve sheets 4, 5 each having a given width.

[0025] The right- and left-hand body sheets 2, 3 have upper and lower surfaces, inner and outer edges 2d, 2c; 3d, 3c extending in the longitudinal direction and center lines Y1 extending in the longitudinal direction to bisect a width between the inner and outer edges 2d, 2c and a width between the inner and outer edges 3d, 3c, respectively. The right- and left-hand body sheets 2, 3 have a same width and are fed forward at the same rate.

[0026] The right- and left-hand sleeve sheets 4, 5 have upper and lower surfaces, inner and outer edges 4d, 4c; 5c, 5c extending in the longitudinal direction and center lines Y2 extending in the longitudinal direction to bisect a width between the inner and outer edges 2d, 2c and a width between the inner and outer edges 5d, 5c, respectively. The right- and left-hand sleeve sheets 4, 5 have the same width and are fed forward at the same rate as the rate at which the right- and left-hand body sheets 2, 3 are fed forward.

[0027] The first step (a) is a step of continuously feeding the right- and left-hand body sheets 2, 3 of the given width forward in the longitudinal direction and cutting out portions 6a from these sheets 2, 3 along neckline cutting lines K1.

[0028] The second step (b) is a step of continuously feeding the right- and left-hand sleeve sheets 4, 5 of the given width forward in the longitudinal direction and placing the left-hand sleeve sheet 5 upon the left-hand body sheet 3 and simultaneously placing the right-hand sleeve sheet 4 upon the right-hand body sheet 2.

[0029] The third step (c) is a step of bonding the left-hand body sheet 3 to the left-hand sleeve sheet 5 and bonding the right-hand body sheet 2 to the right-hand sleeve sheet 4 along the arm hole bonding lines B4.

[0030] The fourth step (d) is a step of cutting the left-hand body sheet 3 and the left-hand sleeve sheet 5; the right-hand body sheet 2 and the right-hand sleeve sheet 4 respectively along arm hole cutting lines K2.

[0031] The fifth step (e) is a step of folding the left-hand body sheet 3, the left-hand sleeve sheet 5, the right-hand body sheet 2 and the right-hand sleeve sheet 4 along the center lines Y1, Y2 of these sheets 2, 3, 4, 5 onto themselves, respectively.

[0032] The sixth step (f) is a step of unfolding the rear sections 2B, 3B of the left-hand body sheet 3 and the right-hand body sheet 2 and bonding the right-hand and left-hand body sheets 2, 3 together along the back bonding line B1.

[0033] The seventh step (g) is a step of unfolding the front sections 2A, 3A of the left-hand body sheet 3 and the right-hand body sheet 2 followed by bonding the right- and left-hand sleeve sheet 5 along the respective sleeve bonding lines B3.

[0034] The eighth step (h) is a step of sealing the left-hand sheet 3 with the left-hand sleeve sheet 5 and simultaneously bonding the right-hand body sheet 2 with the right-hand sleeve sheet 4 along the respective shoulder bonding lines B2.

[0035] The ninth step (i) is a step of cutting the right- and left-body sheets 2, 3 and the right- and left-hand sleeve sheets 4, 5, which have been bonded together on the precedent steps, along the shoulder cutting line K3 and the hemline cutting line K4 to obtain the individual upper garment.

[0036] The right- and left-hand body sheets 2, 3 and the right- and left-hand sleeve sheets 4, 5 travel through the respective steps (a) ~ (i) as respective rolls are driven by driving means.

[0037] On the first step (a), the left-hand body sheet 3 stored on a delivery roll 100 is continuously fed forward in the longitudinal direction. Cutter means 102 located downstream of said delivery roll 100 cuts out a portion 6a from the left-hand body sheet 3 along a neckline cutting line K1 describing a locus which is convex from the outer edges 3c toward the center line Y1 of the left-hand body sheet 3.

[0038] On the second step (b), the left-hand sleeve sheet 5 stored on a delivery roll 103 is continuously fed

forward in the longitudinal direction and placed upon the left-hand body sheet 3 with the lower surface of the left-hand sleeve sheet 5 facing the upper surface of the left-hand body sheet 3 and the center lines Y1, Y2 of the left-hand body and sleeve sheets 3, 5, respectively, being kept in mutual coincidence.

[0039] On the third step (c), the left-hand body sheet 3 and the left-hand sleeve sheet 5 thus placed one upon another are bonded to each other by sealer means 105 along the neckline sealing line B4. The neckline bonding line B4 lies between the inner and outer edges 5d, 5c slightly ahead of the neckline cutting line K1 in the feed direction of these sheets 3, 5. The neckline bonding line B4 describes a lotus which is convex from the center line Y2 toward the outer edge 5c and toward the inner edge 5d.

[0040] On the fourth step (d), the left-hand body sheet 3 and the left-hand sleeve sheet 5 which have been bonded to each other on the precedent step (c) along the neckline bonding line B4 are cut along a arm hole cutting line K2 to form an arm hole. The arm hole cutting line K2 extends along and inside the neckline bonding line B4.

[0041] On the fifth step (e), the left-hand body sheet 3 and the left-hand sleeve sheet 5 placed upon and bonded to each other are folded along the center lines Y1, Y2 of these sheets 3, 5 to put the upper surfaces of these sheets 3, 5 flat together, respectively.

[0042] While the left-hand body sheet 3 and the left-hand sleeve sheet 5 are travelling through the first step - the fifth step, the right-hand body sheet 2 and the right-hand sleeve sheet 4 are also travelling on the line in parallel to these left-hand body sheet 3 and left-hand sleeve sheet 5 with their center lines Y1, Y2 being opposed to the center lines Y1, Y2 of the left-hand body sheet 3 and left-hand sleeve sheet 5, respectively.

[0043] On the sixth step (f), the rear section 2B, 3B of the right- and left-hand body sheets 2, 3 extending between their center lines Y1 and their inner edges 2d, 3d are unfolded by roll-over means 108 about the arm hole bonding line B4. The rear sections 2B, 3B of the right- and left-hand body sheets 2, 3 thus unfolded are sealed together by sealer means 109 along the back bonding lines B1 which extend along and inside the inner edges 2d, 3d of the right- and left-hand body sheets 2, 3, respectively.

[0044] On the seventh step (g), the front sections 2A, 3A of the right- and left-hand body sheets 2, 3 extending between their center lines Y1 and their outer edges 2c, 3c are unfolded by roll-over means 110 about the arm hole bonding line B4. The left sleeve sheet 5 folded onto itself is sealed by sealer means 111 along the sleeve bonding line B3 and the right-hand sleeve sheet 4 folded onto itself is also sealed by sealer means 111 along the sleeve bonding line B3. The sleeve bonding lines B3 extend in the longitudinal direction along and inside the inner and outer edges 4d, 4c, 5d, 5c of the right- and left-hand sleeve sheets 4, 5.

[0045] On the eighth step (h), the right- and left-hand body sheets 2, 3 are bonded by the sealer means to the right- and left-hand sleeve sheets 4, 5, respectively, along the respective shoulder bonding lines B2. The shoulder bonding lines B2 transversely extend behind the arm hole bonding line B4 as viewed in the machine direction between the neckline cutting line K1 formed about the center lines Y1 of the right- and left-hand body sheets 2, 3 and the sleeve bonding lines B3, respectively. Alternatively, these shoulder bonding lines B2 may transversely extend on the upper side of the arm hole bonding line B4 between the neck-opening cutting line K1 formed about the center lines Y1 of the right- and left-hand body sheets 2, 3 and the sleeve bonding lines B3.

[0046] On the ninth step (i), the right- and left-hand body sheets 2, 3 and the right- and left-hand sleeve sheets 4, 5 which have been assembled on the precedent steps are cut by cutter means 113 along a shoulder cutting line K3 and a hemline cutting line K4. The shoulder cutting line K3 extends behind and along one of the shoulder bonding lines B2, then along a line extending through the transversely opposite ends of the neckline cutting line K1 and behind and along the other of the shoulder bonding lines B2. The hemline cutting line K4 transversely extending at a desired distance forward from the arm hole bonding line B4 as viewed in the longitudinal direction.

[0047] Bonding of the sheets may be carried out using suitable adhesive agent such as hot melt adhesive or suitable sealing technique such as heat- or ultrasonic-sealing. Bonding of the sheets may be achieved in continuous or intermittent mode. Cutting of the sheets may be carried out not only using a cutting die but also using the other cutting technique utilizing laser rays or ultrasonic wave.

[0048] The system described heretofore intends to improve a productivity of the upper garment 1 by continuously running and automating the first step (a) ~ the ninth step (i). These step (a)~ the step (i) may be operatively associated with controller means (not shown) enabling such automation to be smoothly achieved. For example, these controller means may include the controller means serving to correct a misalignment between the center lines Y1, Y2 of the right- and left-hand body sheets 2, 3 and the right- and left-sleeve sheets 4, 5 possibly occurring when these are placed one upon another and the controller means serving to correct the actual feed rate of the right- and left-hand body sheet 2, 3 and the right- and left-hand sleeve sheets 4, 5 possibly deviating from the predetermined feed rate thereof.

[0049] The disposable upper garment and the process for making the same according to this invention improve a feeling to wear by a unique arrangement such that the inner side edges and upper edges of the right- and left-hand body sheets as well as the inner and outer side edges of the right- and left-hand sleeve sheets do not come in contact with wearer's skin.

[0050] By continuously running and automating the sequential steps of the process for making the jacket, a productivity per unit time is improved and a manufacturing cost is correspondingly reduced.

Claims

1. A disposable upper garment having a neckline and a pair of shoulder regions defined by upper end of the upper garment, a hemline defined by lower end of the upper garment, and a pair of sleeves joined to said shoulder regions, respectively, so that said sleeves extend from said upper end to said lower end of the upper garment, said disposable upper garment being characterized by that:

said upper garment comprises right- and left-hand sleeve sheets arranged to be bilaterally symmetric to each other, each having inner and outer side edges extending between said upper and lower ends and an arm hole in the vicinity of said upper end and right- and left-hand boy sheets arranged inside said right- and left-side sleeve sheets and also to be bilaterally symmetric to each other, each having inner and outer side edges extending between said upper and lower ends and an arm hole in the vicinity of said upper end;

each of said right- and left-hand sleeve sheets is folded onto itself along a center lines extending between said upper and lower ends to bisect a dimension between said inner and outer side edges of this sheet and bonded together along said inner and outer side edges with narrow marginal regions thereof left free while said right- and left-hand body sheets are bonded together along said inner edges of these sheets with narrow marginal regions left free;

said right- and left-hand sleeve sheets and said right- and left-hand body sheets are bonded together, respectively, along peripheral edges of said arm holes associated with these sleeve and body sheets.

2. A disposable upper garment according to Claim 1, wherein the upper ends of said right- and left-hand body sheets and the upper ends of said right- and left-hand sleeve sheets are placed one upon another and bonded together except a region of said neck-opening.

3. A disposable upper garment according to Claim 1, wherein said right- and left-hand body sheets and/or said right- and left-hand sleeve sheets are made of nonwoven fabric.

4. A process for making a disposable upper garment comprising the steps of:

(a) continuously feeding forward right- and left-hand body sheets in the longitudinal direction, each of said right- and left-hand body sheets having upper and lower surfaces, inner and outer side edges extending in said longitudinal direction and a center line extending in said longitudinal direction to bisect a transverse dimension between said inner and outer side edges, and cutting out portions of said sheets, respectively, along neckline cutting lines convexly curving from said outer edges toward said center lines;

(b) continuously feeding forward right- and left-hand sleeve sheets in said longitudinal direction, each of said right- and left-hand sleeve sheets being narrow than each of said right- and left-hand body sheets and having upper and lower surfaces, inner and outer side edges extending in said longitudinal direction and a center line extending in said longitudinal direction to bisect a transverse dimension between said inner and outer side edges thereof, placing the lower surface of said left-hand sleeve sheet upon the upper surface of said left-hand body sheet while the lower surface of said right-hand sleeve sheet upon the upper surface of said right-hand body sheet so that said center lines of said right- and left-hand body sheets coincide with said center lines of said right- and left-hand sleeve sheets;

(c) bonding said right- and left-hand body sheets to said right- and left-hand sleeve sheets respectively placed one upon another along an arm hole bonding line lying between said inner and outer side edges of said right- and left-hand sleeve sheets slightly ahead of said neckline cutting line as viewed in the sheet feeding direction and describing a convex lotus from said center lines toward said inner and outer side edges;

(d) cutting said right- and left-hand body sheets and said right- and left-hand sleeve sheets respectively bonded one to another along arm hole cutting lines extending inside and along said arm hole bonding lines;

(e) folding said right-hand body sheet and said right-hand sleeve sheet together along said center lines while folding said left-hand body sheet and said left-hand sleeve sheet together along said center lines so that the upper surfaces of said right-hand body sheet and said right-hand sleeve sheet are placed one upon another while the upper surfaces of said left-hand body sheet and said left-hand sleeve sheet are placed one upon another;

(f) feeding said right-hand body sheet and said

right-hand sleeve sheet and simultaneously feeding said left-hand body sheet and said left-hand sleeve sheet in parallel to said right-hand body and sleeve sheets so that said center lines of these sheets coincide one with another and unfolding rear sections of said right- and left-hand body sheets extending between the respective center lines and the respective inner side edges thereof along said arm hole bonding lines, followed by bonding said unfolded rear sections to each other along a back bonding line extending in said longitudinal direction along the inner side edges of said right- and left-hand body sheets;

(g) unfolding front sections respectively extending between said center lines and said outer side edges of said right- and left-hand body sheets along said arm hole bonding lines and bonding said right- and left-hand sleeve sheets respectively folded onto themselves along their sleeve bonding lines extending in said longitudinal direction along said inner and outer side edges of these sleeve sheets;

(h) bonding said right- and left-hand body sheets and said right- and left-hand sleeve sheets along shoulder bonding lines extending between said neckline cutting lines defined about said center lines of said right- and left-hand body sheets and said sleeve bonding lines behind said arm bonding line as viewed in the sheet feeding direction or shoulder bonding lines extending said neckline cutting lines defined about said center lines of said right- and left-hand body sheets and said sleeve bonding lines across said arm hole bonding lines; and

(i) cutting said right- and left-hand body sheets and said right- and left-hand sleeve sheets along a shoulder cutting line extending behind and along one of said shoulder bonding lines, then along a line extending through the transversely opposite ends of said neckline cutting line and again behind and along the other shoulder bonding line, on one hand, and along a hemline cutting line transversely extending at a desired distance forward from said arm hole bonding line as viewed in the sheet feeding direction.

FIG. 1

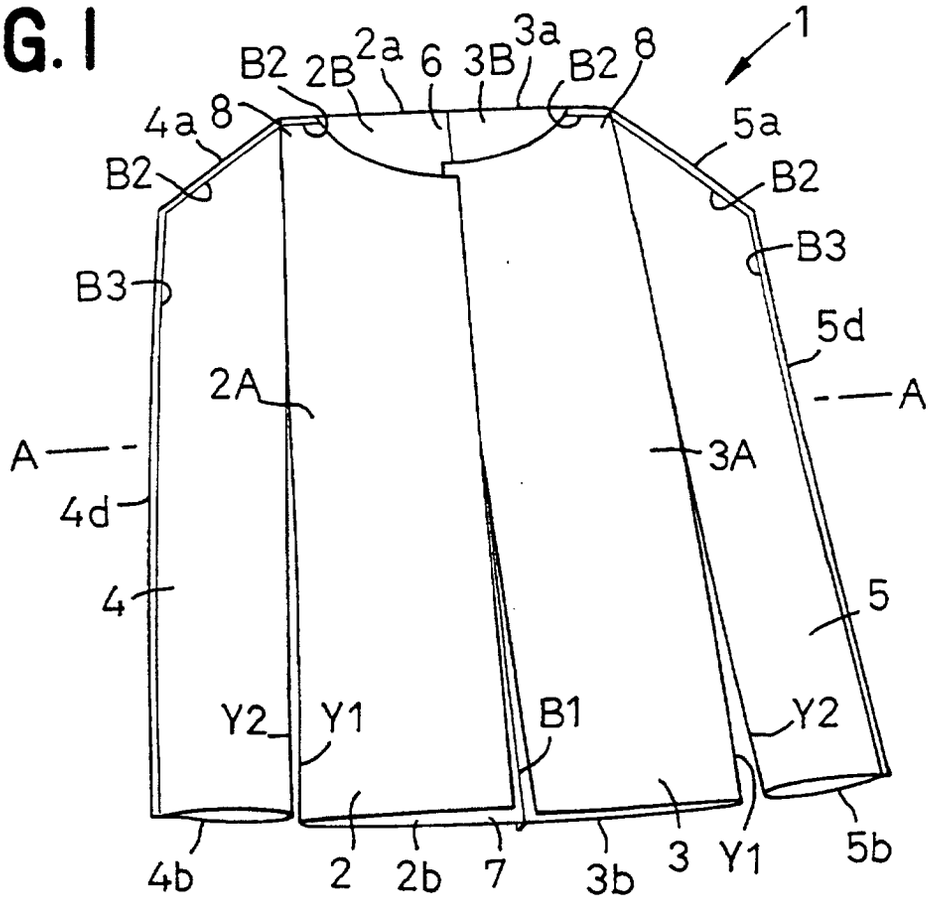

1
B2
2B
2a
6
3B
3a
B2
8
4a
8
5a
B2
B2
B3
B3
5d
2A
A
A
3A
4d
4
5
Y2
Y1
B1
Y2
4b
2
2b
7
3b
3
Y1
5b

FIG. 3

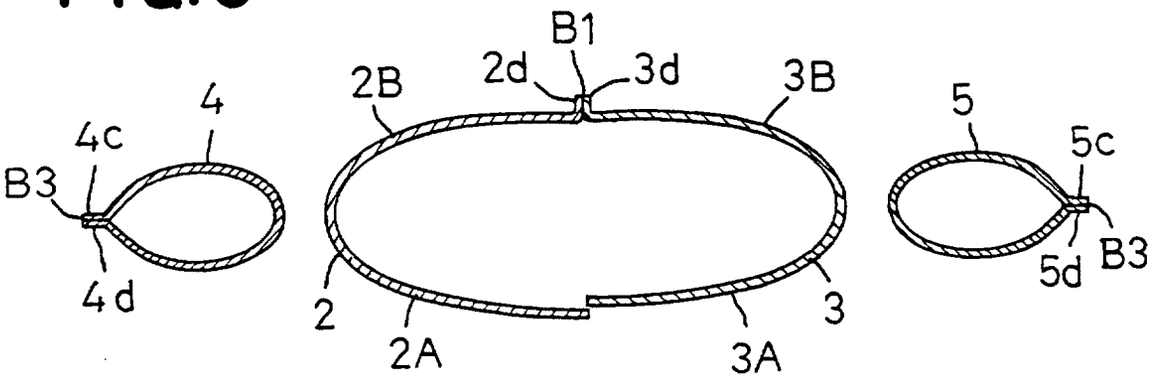

B1
2B
2d
3d
3B
4
4c
B3
4d
2
2A
3A
3
5
5c
5d
B3

FIG.2

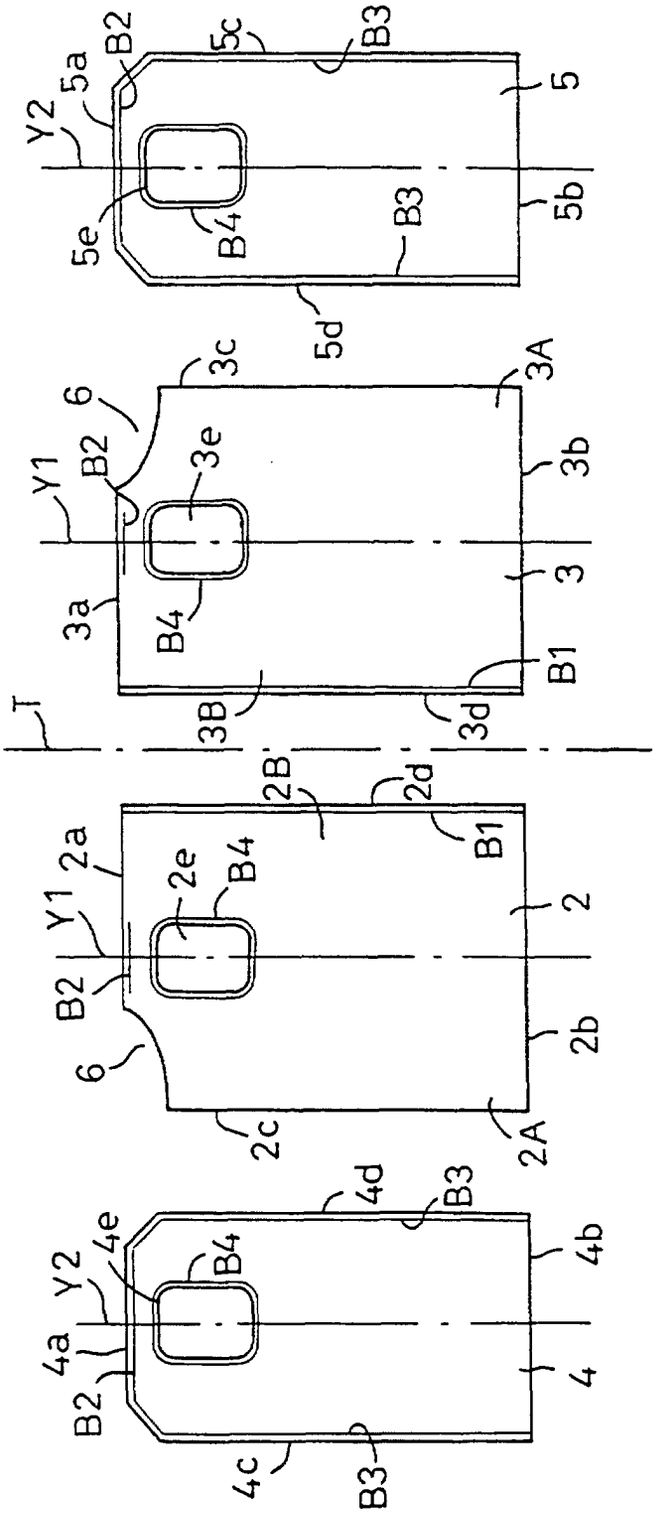

5
5a
5b
5c
5d
5e
B1
B2
B3
B4
Y2
3
3A
3B
3a
3b
3c
3d
3e
6
Y1
T
2
2A
2B
2a
2b
2c
2d
2e
4
4a
4b
4c
4d
4e

FIG.4

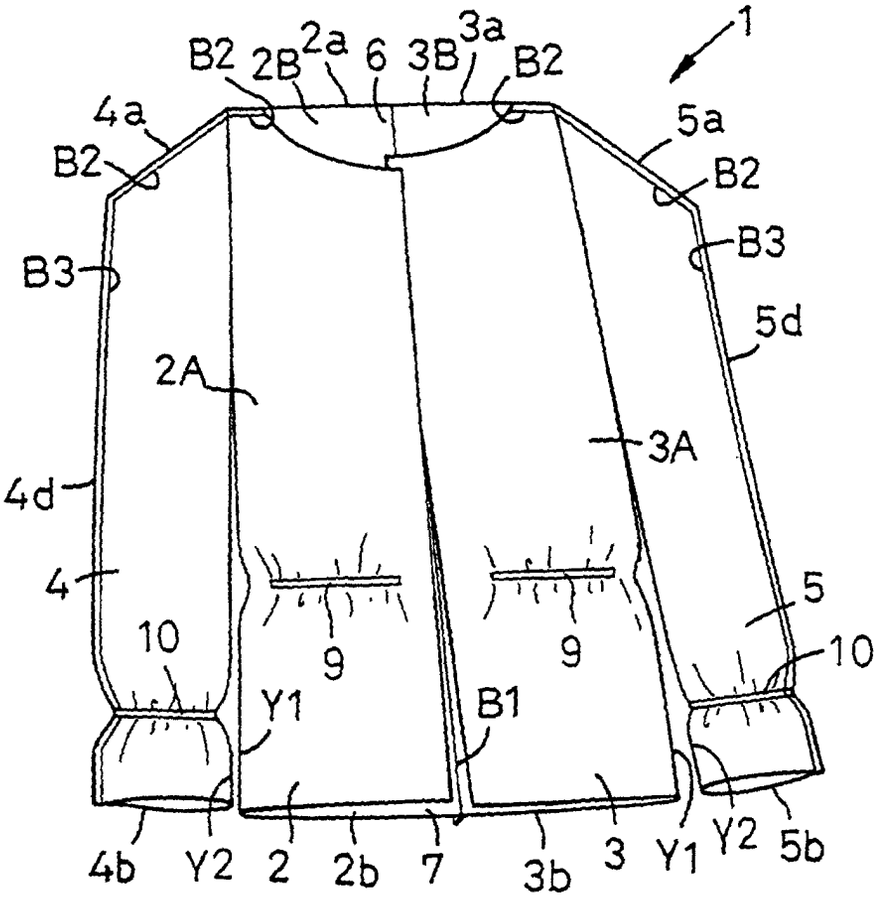
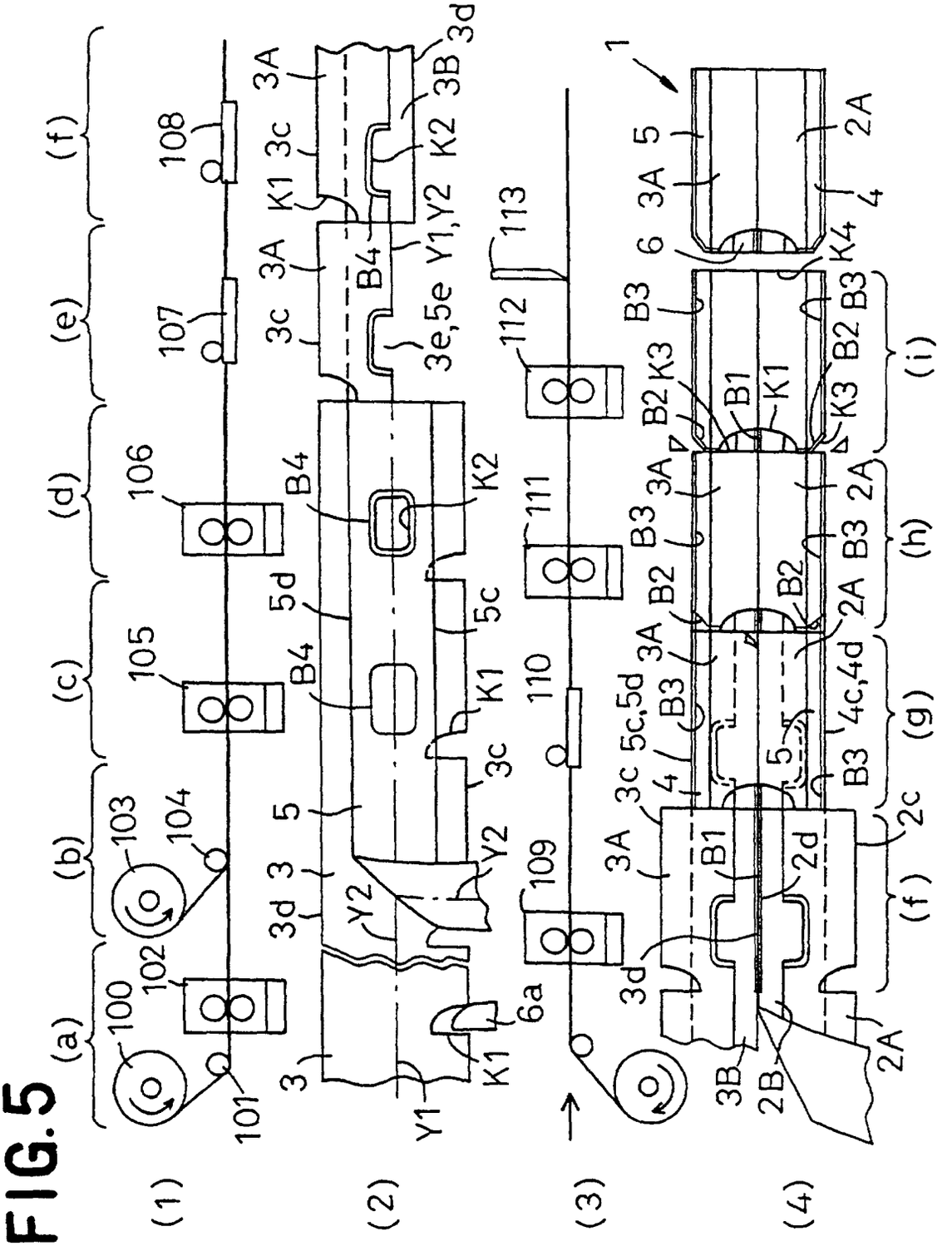

1
B2
2B
2a
6
3B
3a
B2
4a
5a
B2
B2
B3
B3
5d
2A
3A
4d
4
5
10
9
9
10
Y1
B1
4b
Y2
2
2b
7
3b
3
Y1
Y2
5b

FIG.5


(1)
(2)
(3)
(4)
(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
100
101
102
103
104
105
106
107
108
109
110
111
112
113
1
2A
2B
2c
2d
3
3A
3B
3c
3d
3e,5e
4
4c,4d
5
5c,5d
5d
6
6a
B1
B2
B3
B4
K1
K2
K3
K4
Y1
Y2
Y1,Y2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/06923

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] A41D13/12

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)
Int.Cl[7] A41D13/12, 1/00, 31/00, A41H43/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1929-1996 Jitsuyo Shinan Toroku Koho 1996-1999
Kokai Jitsuyo Shinan Koho 1971-1999 Toroku Jitsuyo Shinan Koho 1994-1999

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.
Y	JP, 6-240504, A (Mitsui Petrochemical Ind. Ltd.), 30 August, 1994 (30.08.94)	1-4
Y	JP, 4-50304, A (Sanemu Package K.K.), 19 February, 1992 (19.02.92)	1-4
Y	JP, 4-185702, A (Noboru Kato), 02 July, 1992 (02.07.92)	1-4

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

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 February, 2000 (21.02.00)	29 February, 2000 (29.02.00)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) July 1992)