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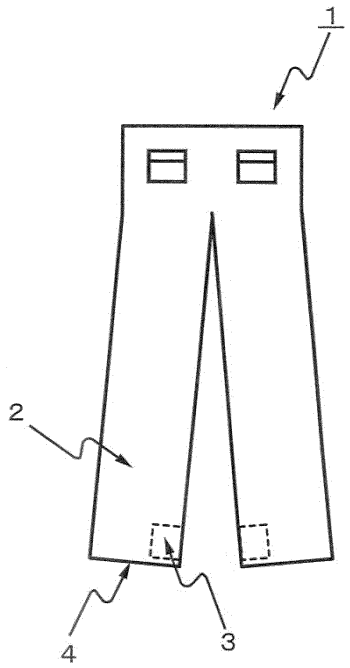
(54) **SKI PANTS**

(57) It is an object of the invention to provide ski pants comprising an edge guard that does not hinder movement when the user is gliding on skins. The invention relates to ski pants 1 comprising an edge guard 3 on the inner thigh side of the bottom section 2 between the bottom edge of the bottom 4 and the area below the knee, the edge guard 3 being a shock absorbing body such as an elastic solid or viscoelastic body.

Fig.1



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Description

[Technical field]

[0001] The invention relates to ski pants provided with an edge guard.

Background Art

[0002] When gliding with skis, the edges of the skis often touch the bottoms of ski pants, at times resulting in tearing of the bottoms. In order to prevent this, ski pants are known in the prior art which comprise edge guards that protect the bottom sections from the outer sides (PTLs 1 and 2, for example). In PTL 1, the edge guards are composed of disposable parts that can be replaced when necessary. The edge guards are made of a hard synthetic resin, such as hard urethane resin. In PTL 2, each of the edge guards constructed in a half-folded manner by a member with a size suited for the bottom opening of the inside bottom on the outer side of ski pants, is attached by piercing through the fabric of the ski pants, with multiple protrusions extending from the inside member of the edge guard and fitting with a receiving hole of the outer side member, and it is anchored by a self-locking structure that forms a protrusion. This edge guard is formed by a thin synthetic resin, and preferably a semi-rigid synthetic resin.

[Citation List]

[Patent Literature]

[0003]

[PTL 1] Japanese Unexamined Patent Publication No. 2007-23456
[PTL 2] Japanese Unexamined Patent Publication No. 2002-180306

Summary of the Invention

Technical Problem

[0004] The edge guard of the invention is not intended for general skiers (users). A conventional edge guard employs a hard material, against potential tearing of ski pants on the edges of skis due to error by the skier. The present invention, on the other hand, is designed to counter phenomena that occur during gliding by advanced skiers such as professional skiers, and it prevents rupture of the bottoms of ski pants caused by strong impacts from the edges of skis, and also prevents ripping, since there is no anchoring to the ski pants. As mentioned above, hard materials such as hard synthetic resins or semi-rigid synthetic resins are used as edge guard materials. Edge guards that are rigidly anchored can therefore constitute a hindrance to maneuvering by skiers, for whom even a delay of less than 0.1 second is crucial during gliding with skis. Moreover, if the edge guard is instead provided on the back fabric side of the ski pants for reasons of design, this eliminates the effect of preventing the phenomenon of tearing by the edges of skis.

Solution to Problem

[0005] In order to solve the aforementioned problems, the invention employs the following construction.
Specifically, the invention relates to ski pants comprising an edge guard on the inner thigh side of the bottom section between the bottom edge of the bottom and the area below the knee, the edge guard being a shock absorbing body such as an elastic solid or viscoelastic body. The bottom section is provided with shock absorbing body-attachment means, to attach the shock absorbing body. The shock absorbing body-attachment means is a shock absorbing body-housing section that houses the shock absorbing body inside it. Preferably, the shock absorbing body-housing section allows removable of the shock absorbing body. In addition, the shock absorbing body-housing section is provided with fall-off preventing means that prevents the shock absorbing body from falling off. The shock absorbing body-housing section may also be one that does not allow removable of the shock absorbing body. The shock absorbing body-housing section is further provided with water removable means that eliminates water that has entered the shock absorbing body-housing section. Preferably, the water removable means is a slit opening to allow removable of water, and is provided in the shock absorbing body-housing section. The shock absorbing body-attachment means may also be bonding means by which the shock absorbing body is bonded to the bottom section. The ski pants of the invention are provided with a shock absorbing body on the back side of each of the bottom sections. When the ski pants of the invention have bottom sections composed of multiple different fabrics, they may be provided with a shock absorbing body between the different fabrics, or between the different fabrics and on the back side of the bottom sections.

Advantageous Effects of Invention

[0006] According to the invention, the edge guard is flexible so that maneuvering is not impeded by the edge guard when the user is gliding on skis. Even if an edge guard is provided on the back side of the bottom section or, when the bottom section is composed of multiple different fabrics, between those different fabrics or between the different fabrics and on the back sides of the bottom sections, it is possible to prevent tearing of the ski pants by impact from the edges of skis.

Brief Description of Drawings

[0007]

Fig. 1 is an illustration showing ski pants according to an embodiment of the invention.

Fig. 2(A) is an illustration showing an edge guard provided in ski pants according to an embodiment of the invention, and Fig. 2(B) is a cross-sectional view along A-A in Fig. 2(A).

Description of Embodiments

[0008] Ski pants 1 according to an embodiment of the invention will now be described with reference to Fig. 1 and Fig. 2. The ski pants 1 comprise edge guards 3 to prevent tearing of the ski pants 1 by impact from the edges of skis. The "edge" of a ski is an angle formed by the gliding surface of the ski and the normal to the gliding surface.

[0009] Fig. 1 is an illustration showing ski pants 1 according to this embodiment of the invention. The ski pants 1 of this embodiment are especially suited for use by an advanced skier. An "advanced skier" is a skier who participates in skiing athletic competitions, including slalom skiing, super giant slalom skiing, and downhill skiing. Thus, the ski pants 1 are most preferably used for skiing competition.

[0010] As shown in Fig. 1, the ski pants 1 are provided with edge guards 3 on the inner thigh side of each bottom section 2 between the bottom edge of the bottom 4 of the ski pants 1 and the area below the knee. The edge guard 3 is most preferably provided near the bottom edge of the bottom 4, where the edge guard 3 is most likely to contact with the ski pants 1. For an improved design property and to prevent impairing the appearance of the ski pants 1 by the edge guard 3, the edge guard 3 is provided on the back side (back fabric side) of the ski pants 1. Here, the fabric of the ski pants 1 that can be seen from the outer side of the ski pants 1 is referred to as the "front fabric", and the fabric on the back side with respect to the front fabric is referred to as the "back fabric".

[0011] The edge guard 3 is a shock absorbing body that absorbs impacts incurred when the edge of a ski contacts the ski pants 1. The "shock absorbing body" is a material that disperses and absorbs impact force by elastic deformation of the material, or by elastic deformation and viscous flow of the material. Therefore, the shock absorbing body is preferably an elastic solid or viscoelastic body. The shock absorbing body according to this embodiment of the invention includes not only shock absorbing bodies composed of shock absorption materials, but also shock absorbing bodies comprising both shock absorbing materials and non-shock absorbing materials. Such shock absorbing bodies do not include hard materials such as hard synthetic resins, for example hard urethane resins, or semi-rigid synthetic resins. The shock absorbing body used in the edge guard 3 is not particularly restricted so long as it absorbs impacts by the edges of skis, and shock absorbing bodies include polyurethane-based resins, silicon-based resins, acrylic-based resins, polyethylene-based resins, vinyl-based resins, styrene-based resins, rubber, shock-absorbing gels, polypropylene-based resins, polyolefin-based resins, polystyrene resins, and combinations of the foregoing. Particularly preferred are shock-absorbing resins, shock-absorbing rubber and shock-absorbing gels, which have excellent ability to disperse and absorb impact force through elastic deformation and viscous flow.

[0012] The edge guard 3 provided on the back side of the ski pants 1 absorbs shearing stress generated when the edge of a ski contacts with the ski pants 1, potentially tearing the ski pants 1. During gliding on skis, therefore, it is possible to prevent contact of the edges of the skis with the ski pants 1 from tearing the ski pants 1 by impact. The present inventors have confirmed this by experimentation. The experimentation that was conducted is described below.

[0013] An edge guard 3 provided on ski pants 1 according to an embodiment of the invention will now be described in detail with reference to Fig. 2(A) and (B). Fig. 2(A) is an illustration showing an edge guard 3 provided on ski pants 1 according to this embodiment of the invention, and Fig. 2(B) is a cross-sectional view along A-A in Fig. 2(A).

[0014] As shown in Fig. 2(A) and (B), a pocket is formed by a pocket fabric 51 and the back fabric 22 of the ski pants 1, the rectangular edge guard 3 being housed in the pocket. In order to prevent the edge guard 3 from falling from the pocket, a covering fabric 52 is provided to seal the opening of the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1. The pocket fabric 51 and covering fabric 52 are sewn onto the back fabric 22 of the ski pants 1.

[0015] As shown in Fig. 2(B), the covering fabric 52 partially overlaps with the pocket fabric 51, and the edge guard 3 can be removed from the pocket while widening the overlapping section and folding the edge guard 3, or the edge guard 3 can be housed in the pocket through that section.

[0016] In order to prevent the edge guard 3 from moving in the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1, the pocket is constructed to match the size of the edge guard 3. That is, the size of the edge guard 3 is a size such that the edge guard 3 cannot move when the edge guard 3 is housed in the pocket.

[0017] The materials of the pocket fabric 51 and covering fabric 52 are selected from the group consisting of mesh fabrics, woven fabrics, knitted fabrics, leather, and combinations of the same, although there is no limitation to these. The material of the pocket fabric 51 may be the same as or different from the material of the covering fabric 52. The materials of the pocket fabric 51 and covering fabric 52 may also be the same as or different from the material of the ski pants 1.

[0018] As shown in Fig. 2(B), slit openings for water removable 53 are formed at the two corners on the bottom edge of the bottom 4 side of the pocket fabric 51. These

sections of the pocket fabric 51 are not sewn, and snow that has entered into the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1 can be eliminated as water through each slit opening for water removable 53.

Examples

Test to confirm prevention of tearing of ski pants

1. Test method

[0019]

(1) A tester had both legs covered with ski pants, and then ski boots were worn on both feet. The ski boots were covered by the ski pants from the shin section to the bottom section. The ski pants had the following cross-sectional structure: front fabric, filling cotton, back fabric.
(2) At the overlapping section of the ski pants and ski boots, a shock absorbing body pad made of soft urethane foam was attached to the back side of the right leg of the ski pants. That is, the right leg of the ski pants had a structure in which a shock absorbing body pad was sandwiched between the fabric of the ski pants and the ski boots. No shock absorbing body pad was attached on the left leg of the ski pants.
(3) The tester held one ski in both hands, and forcefully struck the ski boots on both legs 40 times each with the edge of the ski, from above the ski pants. During this time, the striking force of the edge of the ski against the ski pants was considerably stronger than normally expected force.
(4) The damage to the ski pants covering the ski boots was compared between the right leg (with a shock absorbing body pad) and the left leg (without a shock absorbing body pad).

2. Test results

(1) Right leg of ski pants (with shock absorbing body pad)

[0020] Scuffing produced by abrasion with the edge of the ski was observed. Impact-caused cuts (holes) of approximately 3 mm were observed at two locations in the front fabric.

(2) Left leg of ski pants (without shock absorbing body pad)

[0021] Scuffing caused by abrasion with the edge of the ski was observed. Impact-caused cuts (holes) of approximately 20 mm were observed at 12 locations in the front fabric. Cuts of approximately 3 mm were observed at 9 locations. Of the 20 mm-sized cuts, 6 were found to be deep enough to reach the filling cotton section.

(3) Discussion

[0022] By comparing test results (1) and (2), it was confirmed that attaching an edge guard 3 to the back side of ski pants 1 has an effect of inhibiting contact of the edge of skis with ski pants 1, and tearing of the ski pants 1. In this experiment, the ski was impacted with a much stronger force than expected when the edge of a ski contacts with ski pants during ski gliding, and therefore no tearing is to be expected even when the edge of a ski contacts with ski pants during ski gliding.

[0023] The following functions and effects are exhibited by the ski pants 1 of the embodiment described above. (1) The edge guard 3 is a shock absorbing body composed of an elastic solid or viscoelastic body. Since the edge guard 3 is therefore flexible, maneuvering is not impeded by the edge guard 3 when the user is gliding on skis. The effect is particularly notable for advanced skiers, for whom a delay of even less than 0.1 second is crucial during gliding on skis.

[0024] (2) The edge guard 3 is housed in a pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1. This allows the edge guard 3 to be easily attached to the back side of the bottom section 2 of the ski pants 1. In addition, the front side of the edge guard 3 is simply in contact with the back fabric 22 of the ski pants 1, without being anchored to it. This allows deformation of the front side of the edge guard 3 without it being constrained by the back fabric 22, so that reduction in the shock absorbing force of the edge guard caused by attachment of the edge guard 3 to the ski pants 1 can be minimized. Furthermore, since the front fabric 21 and the edge guard 3 shift slightly when the edge of a ski has contacted the ski pants, it is possible to further inhibit rupture of the ski pants caused by impact of the edge guard.

[0025] (3) The edge guard 3 can be removed from the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1. This allows the edge guard 3 to be replaced in accordance with the skiing skill level and preference of the user.

[0026] (4) A covering fabric 52 is provided, to prevent falling out of the edge guard 3, on the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1. This can prevent the edge guard 3 from falling out while the user is gliding on skis.

[0027] (5) Slit openings for water removable 53 are provided in the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1, through which water entering the pocket is eliminated. This can prevent melted water from collecting in the pocket even when snow has entered the pocket.

[0028] (6) The edge guard 3 is provided on the back side of the bottom section 2 of the ski pants 1. This can prevent impairment of the appearance of the ski pants 1 by the edge guard 3, while also avoiding tearing of the ski pants by the edges of skis. With conventional hard edge guards, however, providing them on the back sides

of bottom sections 2 results in easy tearing of the ski pants by the edges of skis, similar to how paper is easily cut on a hard cutter mat.

[0029] The ski pants 1 of the embodiment described above may also be modified, in the following manner.

(1) So long as the edge guard 3 can be attached to the bottom section 2 of the ski pants 1, the means of attachment is not limited to one that houses the edge guard 3 in the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1. For example, bonding means such as a hook-and-loop fastener may be provided on the front fabric 21 (see Fig. 2(B)) or the back fabric 22 of the ski pants 1 and on the edge guard 3, the edge guard 3 being attached to the bottom section 2 of the ski pants 1 by the bonding means. This also allows the edge guard 3 to be easily attached to the bottom section 2 of the ski pants 1. Also, if the bonding means is one such that the edge guard 3 is detachable, replacement of the edge guard 3 becomes possible.

[0030] Furthermore, if the front fabric 21 and edge guard 3 are slightly shifted when the edge of a ski has contacted with ski pants, it will be possible to further inhibit rupture of the ski pants by impact of the edge guard, and therefore in cases where the attachment means is one such that the front fabric 21 and edge guard 3 are slightly shifted when the edge of the ski has contacted with the ski pants, the attachment means is not limited to one in which the edge guard 3 is housed in the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1.

[0031] (2) Housing of the edge guard 3 is not limited to housing in the pocket, so long as the edge guard 3 can be housed. For example, the edge guard 3 on the back fabric 22 of the ski pants 1 may be covered by a prescribed fabric, the fabric being sewn without open sections, for attachment of the edge guard 3. That is, the edge guard may be housed and attached in a closed pouch that is unremovable.

[0032] (3) The fall- off preventing means provided by the covering fabric 52 is not limited so long as it can prevent falling off of the edge guard from the pocket. For example, a fastener may be provided on the opening of the pocket formed by the pocket fabric 51 and the back fabric 22 of the ski pants 1, to prevent the edge guard from falling out from the pocket.

[0033] (4) So long as it is possible to eliminate water that has entered the pocket housing the edge guard 3, the water removable means is not limited to water- eliminating slit openings 53 provided in the pocket. For example, it may be means allowing water to be eliminated by forming the pocket fabric 51 or covering fabric 52 from mesh fabric.

[0034] (5) The edge guard 3 was provided on the back side (back fabric 22 side) of the ski pants 1, but it may instead be provided on the front side (front fabric 21 side) of the ski pants 1. In this case as well, the edge guard 3 will be able to absorb impacts from the edges of skis, and prevent tearing of the ski pants 1. When the ski pants 1 comprise multiple different fabrics (for example, the front fabric 21 and back fabric 22 in Fig. 2 (B)), the edge guard 3 may be provided between the multiple different fabrics (for example, between the front fabric 21 and back fabric 22 in Fig. 2 (B)) . This can also prevent impairment of the appearance of the ski pants 1 by the edge guard 3, while also avoiding tearing of the ski pants 1 by the edges of skis. An edge guard may also be provided on the back side of the ski pants 1 and between the multiple different fabrics. This can likewise prevent impairment of the appearance of the ski pants 1 by the edge guard 3, while also avoiding tearing of the ski pants 1 by the edges of skis.

[0035] (6) The shape of the edge guard 3 was rectangular, but there is no limitation to this embodiment. For example, it may be circular, semicircular, triangular or the like.

[0036] (7) The size of the edge guard 3 is not limited to the size in this embodiment. Most notably, since the edge guard 3 of the ski pants for this embodiment of the invention can reduce the degree of hindrance the user feels from the edge guard 3, it can therefore be made larger. For example, the edge guard may be provided on half of the inner thigh around the bottom section of the ski pants, the edge guard may be provided on half of the bottom edge side of the bottom section, or the edge guard may be provided on half of the inner thigh and half of the bottom edge side of the bottom. Since the edge guard can thus be increased in size, it is possible to more reliably prevent tearing of the bottom of ski pants when the edge of a ski contacts with the bottom.

[0037] (8) If the ski pants 1 of the invention are provided with an edge guard on the bottom section, such as across roughly the entire bottom edge side of the bottom at the bottom section, tearing of the ski pants 1 can be avoided even when the edge of the ski of another person contacts with the ski pants 1. As explained above, the edge guard 3 can be increased in size in the ski pants 1 of the invention, thereby allowing this modification to be made. In the case of snowboarding as well, since snowboarding pants can also tear when contacted with the edge of the snowboard of another person, the ski pants of the invention are suitable as pants for snowboarding.

[0038] The aforementioned embodiments may be applied in combination with one or more of these modifications. The modifications may also be applied in combination with each other.

[0039] The explanation provided above is merely for illustration, and the invention is in no way restricted to the construction of the described embodiments.

Explanation of Symbols

[0040]

1 Ski pants
2 Bottom section
3 Edge guard

4 Bottom edge of bottom
21 Front fabric
22 Back fabric
51 Pocket fabric
52 Covering fabric
53 Slit opening for water removable

Claims

1. Ski pants comprising an edge guard on the inner thigh side of the bottom section between the bottom edge of the bottom and the area below the knee, the edge guard being a shock absorbing body such as an elastic solid or viscoelastic body.

2. The ski pants of claim 1, comprising a shock absorbing body-attachment means for attachment of the shock absorbing body to the bottom section.

3. The ski pants of claim 2, wherein the shock absorbing body-attachment means is a shock absorbing body-housing section that houses the shock absorbing body inside it.

4. The ski pants of claim 3, wherein the shock absorbing body-housing section allows removable of the shock absorbing body.

5. The ski pants of claim 4, wherein the shock absorbing body-housing section comprises fall-off preventing means that prevents the shock absorbing body from falling off.

6. The ski pants of claim 3, wherein the shock absorbing body-housing section does not allow removable of the shock absorbing body.

7. The ski pants of any one of claims 3 to 6, wherein the shock absorbing body-housing section comprises water removable means that eliminates water that has entered the shock absorbing body-housing section.

8. The ski pants of claim 7, wherein the water removable means is a slit opening for water removable provided in the shock absorbing body-housing section.

9. The ski pants of claim 2, wherein the shock absorbing body-attachment means is bonding means that bonds the shock absorbing body to the bottom section.

10. The ski pants of any one of claims 1 to 9, which comprises the shock absorbing body on the back side of the bottom section.

11. The ski pants of any one of claims 1 to 9 which comprises, in cases where the bottom section is composed of multiple different fabrics, a shock absorbing body between the different fabrics or between the different fabrics and on the back side of the bottom section.

Fig.1

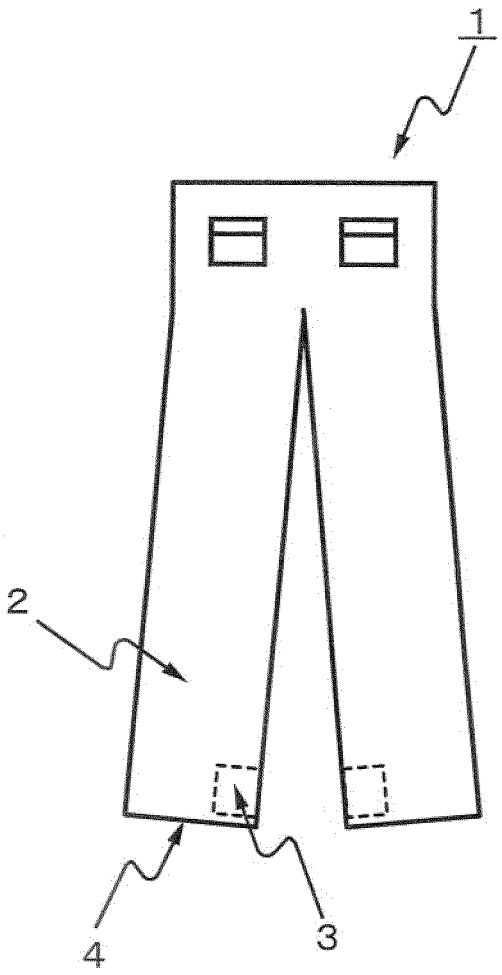
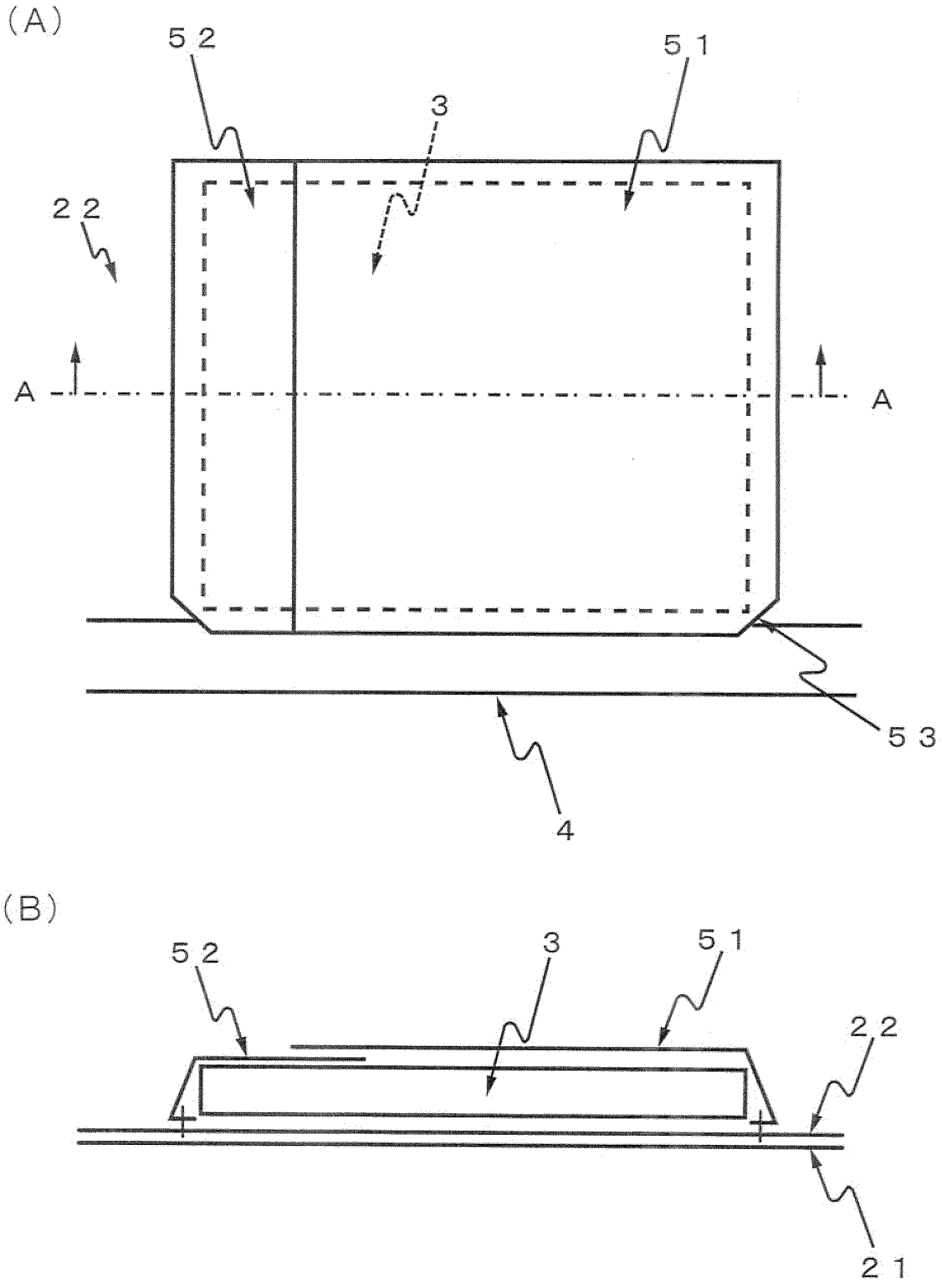


Fig.2



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/072275

A. CLASSIFICATION OF SUBJECT MATTER
A41D1/08(2006.01)i

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)
A41D1/08, A41D13/00

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 1996-2011
Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011

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 2007-23456 A (Morito Co., Ltd.), 01 February 2007 (01.02.2007), entire text; all drawings (Family: none)	1-11
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 15439/1984(Laid-open No. 132408/1985) (Descente, Ltd.), 04 September 1985 (04.09.1985), page 1, lines 5 to 9; page 4, lines 9 to 18 (Family: none)	1-11

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

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
05 January, 2011 (05.01.11)	18 January, 2011 (18.01.11)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/072275

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 59887/1988(Laid-open No. 164713/1989) (Goldwin Inc.), 17 November 1989 (17.11.1989), entire text; all drawings (Family: none)	1-11
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 49907/1984(Laid-open No. 161111/1985) (Mitsui Bussan Sports Yohin Hanbai Kabushiki Kaisha), 26 October 1985 (26.10.1985), page 3, lines 14 to 16 (Family: none)	1-11
Y	JP 2006-233359 A (Daiwa Seiko Inc.), 07 September 2006 (07.09.2006), page 4, lines 30 to 43 (Family: none)	7-8

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2007023456 A **[0003]**
- JP 2002180306 A **[0003]**