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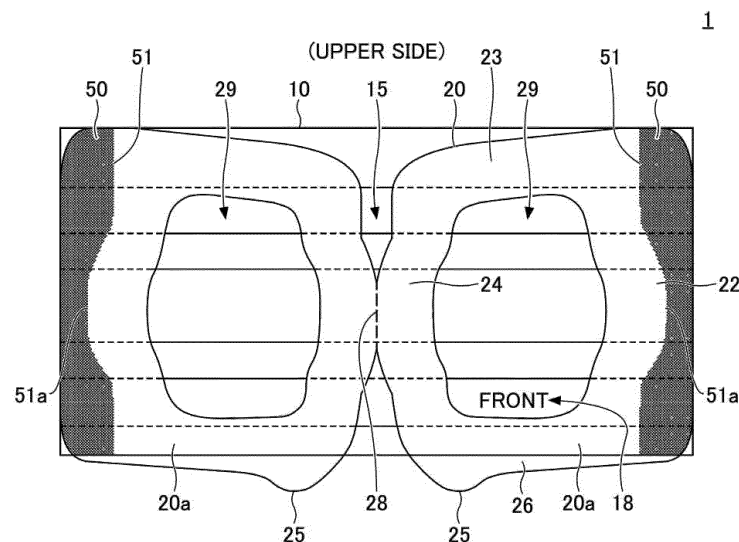
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(54) **MASK**

(57) A mask includes a mask body and a pair of annular sheet-shaped ear hook portions. The ear hook portions are respectively joined with lateral direction-facing end portions of the mask body, on a surface of the mask body that is opposite to a face-facing surface of the mask

body, and joined portions across a vertical direction are formed. Outlines of inner edges of the joined portions in the lateral direction have a shape that is recessed outward in the lateral direction.

FIG.1



Description

[Technical Field]

[0001] The present invention relates to a mask.

[Background Art]

[0002] A known configuration of a mask to be worn on the face includes: a mask body that at least partially covers the face of a wearer, and a pair of ear hook portions each bonded to the mask body; i.e., a pair of members that can be hung around the ears of the wearer in order to keep the mask body at a wearing position.

[0003] In recent years, in order to reduce the burden on the ears during the wearing of a mask, it has been studied to use sheet-shaped ear hook portions rather than string-shaped ones. For example, PTL 1 describes a mask including a first ear hook portion and a second ear hook portion that are formed from one or a plurality of sheet pieces. In the described mask, the first ear hook portion and the second ear hook portion are respectively joined with one face of a mask body at a first joined portion and a second joined portion along a second direction (vertical direction). This mask is configured such that, at least upon putting the mask on, the first ear hook portion is turned over at the first joined portion along a first direction (lateral direction) and the second ear hook portion is turned over at the second joined portion along the first direction.

[Citation List]

[Patent Literature]

[0004] [PTL 1] Japanese Patent No. 5436262

[Summary of Invention]

[Technical Problem]

[0005] Upon putting a mask on, a user usually deforms a mask body so as to fit the mask body to the three-dimensional shape of his or her face. Along with this deformation, the end portions in a lateral direction of the mask body are also three-dimensionally curved, and joined portions between ear hook portions and the mask body are also curved. More specifically, both the joined portions can be respectively curved so that a middle region at least in the vertical direction projects at a middle region in the lateral direction. This curving leads to three-dimensional distortion in the turned-over part of the ear hook portion at the joined portion. Here, when the ear hook portion is joined on the outer face of the mask body (the surface of the mask body that is opposite to a face-facing surface of the mask body), the ear hook portion may locally rise from the mask body due to the above distortion. Such a projected part of the ear hook portion

may disturb behaviors of a wearer during the wearing of the mask, and also degrade the outer appearance.

[0006] In one aspect of the present invention in view of the foregoing, it is an object to provide a mask in which a sheet-shaped ear hook portion does not readily rise from a mask body upon putting the mask on.

[Solution to Problem]

[0007] One aspect of the present invention is a mask including a mask body and a pair of annular sheet-shaped ear hook portions. The ear hook portions are respectively joined with lateral direction-facing end portions of the mask body, on a surface of the mask body that is opposite to a face-facing surface of the mask body, and joined portions across a vertical direction are formed. Outlines of inner edges of the joined portions in the lateral direction have a shape that is recessed outward in the lateral direction.

[Advantageous Effects of Invention]

[0008] According to one aspect of the present invention, it is possible to provide a mask in which a sheet-shaped ear hook portion does not readily rise from a mask body upon putting the mask on.

[Brief Description of Drawings]

[0009]

[FIG. 1] FIG. 1 is a plan view of a mask according to one embodiment of the present invention, as viewed from an outer face side.

[FIG. 2] FIG. 2 is a plan view of the mask as illustrated in FIG. 1, as viewed from an inner face side (face side).

[FIG. 3] FIG. 3 is a partial plan view of a state where an ear hook portion is opened laterally.

[FIG. 4] FIG. 4 is a view of a conventional mask.

[FIG. 5] FIG. 5 is a partial view of a state where a conventional mask is worn.

[FIG. 6] FIG. 6 is a partial view of a state where a mask according to the present embodiment is worn.

[FIG. 7] FIG. 7 is an enlarged view of a joined portion in FIG. 1.

[FIG. 8] FIG. 8 is a modified example of a joined portion.

[FIG. 9] FIG. 9 is another modified example of a joined portion.

[FIG. 10] FIG. 10 is another modified example of a joined portion.

[FIG. 11] FIG. 11 is a plan view of a mask according to another embodiment of the present invention, as viewed from an outer face side.

[FIG. 12] FIG. 12 is a cross-sectional view of FIG. 11, as taken along line X-X.

[Description of Embodiments]

[0010] Hereinafter, embodiments of the present invention will be described with reference to the drawings. Note that, unless otherwise specified, the same or corresponding components across the drawings are given the same symbols, and the description thereof may be omitted.

(Basic configuration of mask)

[0011] A mask according to the present embodiment may be a mask that is capable of covering the face of a wearer, and more specifically at least the nose and mouth of the wearer. The mask according to the present embodiment may have functions of preventing foreign matter from reaching the face and preventing scattering of droplets from the wearer. This mask is also called a hygiene mask or surgical mask. The mask may be disposable, or reusable by, for example, washing the mask.

[0012] FIG. 1 is a plan view of a mask 1 according to the present embodiment. FIG. 1 is a view of the mask 1 as viewed from an outer side thereof (or an outer face side thereof); i.e., from a face that is not facing towards the face upon being worn, but is exposed to the outer side thereof. Also, FIG. 2 is a plan view of the mask as viewed from an inner side (a face that is towards the face).

[0013] As illustrated in FIG. 1, the mask 1 according to the present embodiment includes: a mask body 10 disposed at the front of the face of a wearer upon putting the mask 1 on and capable of mainly covering the nose and mouth of the wearer; and a pair of ear hook portions 20a and 20a bonded to the mask body 10. The mask 1 (mask body 10) extends in an up-and-down direction (vertical direction) D1 corresponding to an up-and-down direction of the face of a wearer upon putting the mask 1 on and in a left-and-right direction (lateral direction) D2 corresponding to a left-and-right direction of the face of a wearer upon putting the mask 1 on. The vertical direction D1 is orthogonal to the lateral direction D2. The pair of ear hook portions 20a and 20a are joined with both end portions in the lateral direction D2 of the mask body 10 at joined portions 50 and 50 that are formed along the vertical direction D1.

[0014] The mask body 10 as illustrated in FIG. 1 and FIG. 2 has a rectangular shape in the plan view thereof, the rectangular shape having a longer side in the lateral direction D2. However, the shape of the mask body 10 in the plan view thereof is not limited to the illustrated shape. Also, as illustrated in FIG. 1 and FIG. 2, the mask body 10 has a pleated structure 15 made of a plurality of pleats that are juxtaposed in the vertical direction D1. The pleats of the pleated structure 15 are formed by folding a sheet for the mask body 10 at fold lines along the lateral direction D2. In a state where the plurality of pleats are formed, both end portions of the mask body 10 in the lateral direction D2 are fixed through, for example, heat sealing. Therefore, upon use of the mask 1, by opening

the pleats of the pleated structure 15 in the vertical direction D1, a middle portion in the lateral direction D2 of the mask body 10 can be deformed and specifically curved so as to project towards the outer face side of the mask 1 and fit to the three-dimensional shape of the face. The pleated structure 15 is not particularly limited to any specific structure, and may be a publicly known structure formed in a mask body. However, as illustrated in FIG. 1 and FIG. 2, when box pleats are formed at a middle portion in the vertical direction D1, the middle portion of the mask body 10 in the vertical direction D1 is readily projected in a direction that becomes apart from the face upon putting the mask on, which is preferable.

[0015] The mask body 10 may have a multi-layered structure in which a plurality of layers are laminated on top of one another. For example, the mask body 10 may have a structure including at least three layers: an outer layer, an inner layer, and an intermediate layer therebetween. The intermediate layer has an enhanced function of capturing foreign matter (e.g., dust, pollens, bacteria, and virus particles). Each of the layers forming the mask body 10 preferably contains a fiber-containing layer such as nonwoven fabric, woven fabric, or knit fabric, and more preferably contains nonwoven fabric. Examples of the nonwoven fabric include spunbonded nonwoven fabric, spunlace nonwoven fabric, meltblown nonwoven fabric, air-through nonwoven fabric, and point bond nonwoven fabric. Also, the intermediate layer preferably uses meltblown nonwoven fabric that can contain thin fibers. The fiber of the fiber-containing layer is preferably a resin fiber. Examples of the resin of the resin fiber include polyethylene, polypropylene, polyethylene terephthalate, and nylon. The basis weight of the outer layer or the inner layer may be from 10 through 50 g/m², and preferably from 15 through 50 g/m². The basis weight of the intermediate layer having a high ability to capture foreign matter is preferably from 10 through 100 g/m², and more preferably from 15 through 50 g/m².

[0016] The pair of ear hook portions 20a and 20a may be annular (or be a closed annular band) in the plan view. Upon putting the mask on, the ear hook portion 20a can be hung around the wearer's ear, with the wearer's ear being put in the ring of the ear hook portion 20a; i.e., a middle opening 29 of the ear hook portion 20a. As illustrated in FIG. 1 and FIG. 2, the pair of ear hook portions 20a and 20a are not formed in the form of a string or thread but in a sheet shape. By the pair of ear hook portions 20a and 20a being made in the sheet shape, when a wearer has the ear hook portion 20a hung around his or her ear upon putting the mask on, the ear hook portion 20a can make surface contact with the back of the ear or the back face of the earlobe. This makes it possible to reduce the burden on the ear. Thus, it is possible to reduce discomfort even in the long-term use.

[0017] Also, the annular shape of the ear hook portion 20a may be a circular shape, an elliptical shape, etc. As illustrated in FIG. 1 and FIG. 2, the annular shape of the ear hook portion 20a may be a shape that is close to a

tetragon (or a rectangle). As illustrated in FIG. 1, the ear hook portion 20a may include: a base portion 22 that extends along the vertical direction D1 and is fixed to the mask body 10 along the vertical direction D1; an ear backward placement portion 24 that is positioned at the back of the ear of a wearer upon putting the mask on; an upper extending portion 23 that extends at an upper side between the base portion 22 and the ear backward placement portion 24; and a lower extending portion 26 that extends at a lower side between the base portion 22 and the ear backward placement portion 24.

[0018] In the embodiment as illustrated in FIG. 1 and FIG. 2, the pair of ear hook portions 20a and 20a are formed as a single sheet shape in which the pair of ear hook portions 20a and 20a are bonded in a separable manner at a middle portion in the lateral direction D2; i.e., as an ear hook portion sheet 20. Here, the single sheet refers to a form of one sheet that is continuous. This one sheet may be a single layer, or a laminated body of a plurality of layers that are laminated on top of one another. When the pair of ear hook portions 20a and 20a are in the single sheet shape, it is possible to simultaneously determine the positions of the ear hook portions 20a and 20a during the production. This makes the production of the mask easier. However, the pair of ear hook portions 20a and 20a are not necessarily bonded together.

[0019] When the pair of ear hook portions 20a and 20a are formed as the ear hook portion sheet 20, the ear hook portion sheet 20 may be configured so that the ear hook portion sheet 20 can be torn at a predetermined position to form a pair of separated ear hook portions 20a and 20a. In the embodiment of FIG. 1, the pair of ear hook portions 20a and 20a are bonded at a bond portion 28. No particular limitation is imposed on the bonding manner of the bond portion 28. However, it is preferable that the bond thereof be separable by being pulled apart with normal amount of force by a user. For example, as illustrated in FIG. 1, the bond portion 28 may be formed as a perforated line. Alternatively, the bond portion 28 may be formed by reducing the thickness of the sheet or by other means so as to embrittle the boundary between the pair of ear hook portions 20a and 20a, and make the boundary subjectable to stress. Also, the bond portion 28 may be formed so as to be cut by a user with a tool such as scissors.

[0020] The ear hook portions 20a and 20a (or the ear hook portion sheet 20) may be formed from a material having stretchability, specifically a material having stretchability in at least the lateral direction. When the ear hook portions 20a and 20a have stretchability, a user can easily pull the ear hook portions 20a and 20a to the back of the ear and then hang the ear hook portions 20a and 20a around the ears, upon putting the mask on. Also, during the wearing of the mask, the mask body 10 can be fitted to the face by tensile stress occurring in the ear hook portions 20a and 20a.

[0021] The ear hook portion 20a may be a single-lay-

ered sheet made of a material having stretchability, or a multi-layered sheet of a plurality of layers that include a layer made of a stretchable material and are laminated on top of one another. The stretchable material may be stretchable nonwoven fabric, a stretchable film, or a thread- or string-form stretchable member such as a rubber thread. The stretchable nonwoven fabric includes stretchable fibers. When the stretchable nonwoven fabric is included, the nonwoven fabric may develop the stretchability by, for example, the material itself of the fibers having the stretchability, or the fibers being crimped fibers. Alternatively, the stretchability may be developed by a predetermined physical structure, for example, recesses and projections in the surface thereof. Specific examples of the stretchable nonwoven fabric include stretchable air-through nonwoven fabric, stretchable spunbonded nonwoven fabric, stretchable spunlace nonwoven fabric, stretchable needle-punched nonwoven fabric, and stretchable chemical bond nonwoven fabric. The basis weight of the nonwoven fabric used may be from 5 through 50 g/m², and more preferably from 8 through 35 g/m².

[0022] When the ear hook portion 20a is made of a multi-layered sheet of a plurality of layers of nonwoven fabric that are laminated on top of one another, for example, the ear hook portion 20a may be a structure of spunbonded nonwoven fabric/meltblown nonwoven fabric/spunbonded nonwoven fabric. The stretchable nonwoven fabric can be used for at least one layer thereof. When the ear hook portion 20a is made of a multi-layered sheet including a stretchable film, the ear hook portion 20a is, for example, a structure of nonwoven fabric/stretchable film or a structure of nonwoven fabric/stretchable film/nonwoven fabric (e.g., a structure of spunbonded nonwoven fabric/stretchable film/spunbonded nonwoven fabric, or a structure of air-through nonwoven fabric/stretchable film/air-through nonwoven fabric). In the case of a sheet of two layers that are laminated on top of each other and include a stretchable layer, the other layer can be laminated and fixed at intervals on the stretchable layer being stretched, followed by loosening and returning to the natural state, to obtain a sheet for the ear hook portion 20a. Also, in the case of a sheet of three layers that are laminated on top of one another, the layers that are to sandwich the intermediate layer can be laminated and fixed at intervals on both faces of the intermediate layer being stretched, followed by loosening and returning to the natural state, to obtain a sheet for the ear hook portion 20a.

[0023] Of the above structures, the structure using the stretchable film, especially the structure including the stretchable film and nonwoven fabric on both faces thereof is preferable because this structure is readily produced and high stretchability is obtained. Examples of the material of the stretchable film include polyolefins such as polyethylene and polypropylene; and polyurethanes. The stretchability of the stretchable film is preferably from 3.5 through 4.0 in terms of the maximum stretch rate (the

stretch rate at the time of tensile break) as measured by a tensile tester. Also, the stretchable film may have the function of passing moisture therethrough. When the stretchable film is used, nonwoven fabric can be joined, through, for example, ultrasonic welding, at intervals on the stretchable film being stretched by a predetermined number of times the natural length thereof, followed by loosening and returning to the natural state, to obtain a sheet for the ear hook portion 20a. By the stretchable film being loosened, non-joined portions of the nonwoven fabric rise. Thus, the resulting sheet has a large number of wrinkles that extend along a direction almost orthogonal to the stretch direction.

[0024] Note that, the sheet for the ear hook portion 20a may be formed by sandwiching a rubber string being stretched between nonwoven fabric materials each having low or no stretchability. Also, the above materials may be pasted together via stretchable or non-stretchable hot-melt nonwoven fabric (nonwoven fabric that can adhere to other members via fibers thereof being softened or melted by application of heat).

[0025] The basis weight of the ear hook portion 20a (the ear hook portion sheet 20) may be from 20 through 150 g/m². Also, the thickness of the ear hook portion 20a may be from 100 through 3,000 μm.

(Use of mask)

[0026] When the mask 1 according to the present embodiment is to be used for the first time, a user opens the ear hook portions 20a and 20a laterally in the lateral direction D2 before putting the mask 1 on. As described above, when the pair of ear hook portions 20a and 20a are bonded together in a separable manner, the user tears the bond before spreading out to separate the ear hook portions 20a and 20a from each other.

[0027] FIG. 3 illustrates a right-hand portion of a state where the ear hook portions 20a and 20a of the mask 1 are spread out. After the ear hook portion 20a is spread out outward in the lateral direction D2, the ear hook portion 20a is turned over, and the face of the ear hook portion 20a having previously faced the mask body 10 is exposed. Also, the outer face of the mask body 10 is almost entirely exposed.

[0028] As illustrated in FIG. 1 to FIG. 3, in the present embodiment, the pair of ear hook portions 20a and 20a are disposed on the outer face of the mask body 10. Therefore, when separating and opening the pair of ear hook portions 20a and 20a outward in the lateral direction D2, it is possible to reduce or eliminate possibility of touching the inner face of the mask body 10. From a hygienic viewpoint, the above structure is preferable.

[0029] The mask 1 according to the present embodiment can be used, for example, in the following manner. Specifically, in a state where the mask 1 is placed with the outer face of the mask body 10 facing upward, a user grasps and opens the pair of ear hook portions 20a and 20a with his or her hands outward in the lateral direction

D2. Then, the user moves the mask 1 to the face of another person (wearer) while grasping the pair of ear hook portions 20a and 20a. After applying the mask body 10 at a desired position on the face of the other person, the user can hang the pair of ear hook portions 20a and 20a around the ears of the other person without changing the way of holding the mask 1. Therefore, the mask 1 according to the present embodiment can be suitably used for those who cannot readily put a mask on by themselves, such as children and the sick.

[0030] Note that, the pair of ear hook portions 20a and 20a may be provided with pinch portions 25 and 25 (FIG. 1). A user can pinch the pinch portions 25 and 25 when separating and opening the pair of ear hook portions 20a and 20a outward in the lateral direction D2. The pinch portions 25 and 25 may be formed at the lower extending portion 26, and preferably project from the edge of the mask body 10 in the plan view thereof, preferably from the bottom end of the mask 1 (or the bottom end of the mask body 10). In this case, a user can pinch the pinch portions 25 and 25 with his or her hands without or substantially without touching the mask body 10 itself; i.e., both the outer face and the inner face of the mask body 10. Thereby, the user can separate and spread out the pair of ear hook portions 20a and 20a without or substantially without touching the mask body 10. Therefore, even in a situation where a user cannot sufficiently take care of hygiene of his or her hands and fingers, the user can put the mask 1 on or can have another person put the mask 1 on under good hygienic conditions.

[0031] Also, by the pinch portions 25 and 25 of the ear hook portion 20a, the user can readily adjust the ear hook portions with the pinch portions 25 and 25 upon or after hanging the ear hook portion 20a around the ear of the wearer. Specifically, with the pinch portions 25 and 25, it is possible to make a positional adjustment by shifting the ear hook portion 20a in a circumferential direction of the ear hook portion 20a relative to the ear, or to adjust the degree of tension of the ear hook portion 20a by pulling the ear hook portion 20a backward or loosening the ear hook portion 20a.

[0032] Moreover, in the present embodiment, the pair of ear hook portions 20a and 20a are joined with both the lateral portions of the outer face of the mask body (FIG. 1 to FIG. 3). Thus, during the wearing of the mask 1; i.e., in a state where the ear hook portions 20a and 20a are opened laterally and hung around the ears, both the lateral portions of the mask body 10 are pushed towards the face from the outer face side by the ear hook portion 20a. Thereby, it is possible to reduce gaps between the mask body 10 and the face at both the lateral portions of the mask body 10, and to improve the functions as a mask, such as the function of blocking foreign matter and the function of preventing scattering of droplets from a wearer. Also, since the ear hook portion 20a is not disposed on the inner face side (face side) of both the lateral portions of the body, the ear hook portion 20a does not directly contact the face of the wearer at both

the lateral portions of the mask body 10 during the wearing of the mask 1, and discomfort is reduced.

[0033] Note that, the mask body 10 may be provided with a mark 18 by embossing, printing, sewing, etc. The mark 18 allows for distinction between the outer face and the inner face of the mask body 10 visually or by sense of touch with hands. The mark 18 may be any form as long as a user can identify the mark 18 visually. As illustrated in, for example, FIG. 1, the mark 18 may be a letter, a number, a symbol, a figure, a logo, etc.

(Joined portion)

[0034] As illustrated in FIG. 1, in the present embodiment, the sheet-shaped ear hook portions 20a and 20a (or ear hook portion sheet 20) are superposed on the outer face of the mask body 10, and joined at both end portions in the lateral direction D2 by the joined portions 50 and 50 (the regions indicated in gray). The joined portions 50 and 50 can be formed, for example, by application of pressure and/or heat with a means for joining opposing faces of the ear hook portion 20a and the mask body 10 with each other, such as heat sealing, ultrasonic sealing, or embossing in a non-heating manner. When the material of the ear hook portion 20a and the mask body 10 is a synthetic resin, heat sealing is preferably used because the ear hook portion 20a and the mask body 10 are melted and fused together to allow for more reliable joining therebetween.

[0035] As illustrated in FIG. 1, the joined portion 50 may be formed along the vertical direction D1, preferably continuously from the upper end to the lower end of the ear hook portion 20a in the vertical direction D1. The joined portion 50 may be formed in the form of a line along the vertical direction D1. From the viewpoint of increasing adhesion strength, the joined portion 50 preferably has a width to some extent.

[0036] As illustrated in FIG. 1, in the present embodiment, the joined portions 50 and 50 have such a shape that the outlines of inner edges 51 in the lateral direction D2 are recessed outward in the lateral direction D2. In the example of FIG. 1, the recessed portion formed on the outline of the inner edge 51 of the joined portion 50 in the lateral direction D2 is a trapezoid having a short upper side outward in the lateral direction D2.

[0037] Hereinafter, an advantage will be described by virtue of the joined portions 50 and 50 having such a shape that the outlines of the inner edges 51 in the lateral direction D2 are recessed outward in the lateral direction D2. To do this, first, change in the shape of a conventional mask upon being worn will be described. FIG. 4 is a plan view of a conventional mask 1' as viewed from the outer face side of the mask body 10. The conventional mask 1' has the same basic structure as the mask 1 according to the present embodiment as illustrated in FIG. 1. However, the conventional mask 1' is different from the mask 1 in that joined portions 50' and 50' of the conventional mask 1' extend in the form of straight lines along the

vertical direction D1.

[0038] FIG. 5 is a partial perspective view of a state where the conventional mask 1' as illustrated in FIG. 4 is worn. As illustrated in FIG. 5, upon putting the mask 1' on, the pleated structure 15 of the mask body 10 of the mask 1' is widened in the vertical direction D1 at a middle portion in the lateral direction D2 so as to fit to the three-dimensional shape of the face. Also, the mask 1' is deformed so that the middle portion of the mask body 10 in the lateral direction D2 projects towards the outer face side. Along with the deformation of the middle portion of the mask body 10, the end portions of the mask body 10 in the lateral direction D2 are also deformed. Thus, the joined portions formed at the end portions thereof in the lateral direction D2 are also deformed. More specifically, the joined portion 50 formed on the end portion of the mask body 10 in the lateral direction D2 is deformed so that a middle portion of the joined portion 50 in the vertical direction D1 becomes closer to the middle portion of the mask body 10 in at least the lateral direction D2 (so as to project towards the middle portion of the mask body 10 in the lateral direction D2). By the deformation of the joined portion 50' as described above, a turned-over part of the ear hook portion 20a at the joined portion 50', especially the base portion 22 of the ear hook portion 20a, can be also curved and deformed to cause distortion. For example, in the vicinity of the middle portion of the base portion 22 in the vertical direction D1, a part where the base portion 22 is apart from the mask body 10 (rising r) can be formed (FIG. 5). The rising r of the base portion 22 may become a fold or wrinkle.

[0039] Meanwhile, FIG. 6 is a partial perspective view of a state where the mask 1 according to the present embodiment (FIG. 1 and FIG. 2) is worn. FIG. 6 is a drawing that corresponds to FIG. 5, and similarly to the case of the mask 1' (FIG. 5), the mask body 10 is deformed to fit to the three-dimensional shape of the face. Along with the deformation of the mask body 10, the end portion itself of the mask body 10 in the lateral direction D2 is deformed so that the middle portion in at least the vertical direction D1 becomes closer to the middle portion of the mask body 10 in at least the lateral direction D2. However, in the present embodiment, the outlines of the inner edges 51 in the lateral direction D2 are recessed outward in the lateral direction D2 in a state before being worn (FIG. 1). Thus, in a state where the mask body 10 is deformed upon putting the mask on, the middle portions in the vertical direction D1 of the outlines of the inner edges 51 do not project and can be a straight line or a similar shape along the vertical direction D1. Therefore, the turned-over part of the ear hook portion 20a at the joined portion 50, especially the base portion 22 near the joined portion 50 is neither considerably deformed by being curved, nor distorted. This suppresses a phenomenon in which the ear hook portion 20a, especially the base portion 22 rises from the mask body 10 (a phenomenon in which the base portion 22 becomes apart and projected from the outer face of the mask body 10). The

rising of the ear hook portion 20a towards the outer face side may disturb behaviors of a wearer, but such an inconvenience can be avoided. For example, when an additional protective means such as a face shield is worn on the mask, it is possible to prevent the risen part of the ear hook portion 20a from being hung on the parts of the protective means. Moreover, since the ear hook portion 20a upon putting the mask on becomes closer to the mask body 10, the outer appearance of the mask 1 becomes better.

[0040] FIG. 7 is an enlarged view of the right-hand joined portion 50 and the vicinity thereof in FIG. 1. As described above, the outline of the inner edge 51 of the joined portion 50 in the lateral direction D2 is recessed outward in the lateral direction D2. In the illustrated example, the recessed portion (recess) is a trapezoid having a short upper side outward in the lateral direction D2. However, the recessed portion (recess) may be, for example, a tetragon (a rectangle or a square). Like in the case where the shape of the recess is a trapezoid, when the outline of the edge 51 becomes smoothly or stepwise closer to the outer end in the lateral direction D2 as the outline thereof becomes closer to the middle region in the vertical direction D1, the resulting outline gradually changes in the vertical direction D1 and the lateral direction D2. This makes it possible to prevent stress concentration on positions at which the direction of the outline changes, and to prevent breakage of the joined portion 50.

[0041] FIG. 7 also illustrates an upper region UR, a middle region MR, and a lower region LR of the mask body 10. The lengths of these regions in the vertical direction D1 can be those obtained by nearly equally dividing, into three, the whole length at the end portion of the mask 1 in the lateral direction D2 (the whole length in the vertical direction D1). A bottom portion 51a of the recessed portion of the outline of the inner edge 51 of the joined portion 50 in the lateral direction D2 is preferably included in the middle region MR. Upon putting a mask on, the middle region MR at the end portion of the mask body 10 in the lateral direction D2 is the most readily curved, and the part of the base portion 22 of the ear hook portion 20a where the part is joined in the middle region MR is the most readily distorted. When the inner edge 51 of the joined portion 50 in the lateral direction D2 is positioned more outward in the lateral direction D2 in the middle region MR, it is possible to better prevent rising of the base portion 22 (FIGS. 5 and 6).

[0042] Regarding the inner edge 51 of the joined portion 50 in the lateral direction D2, a distance d_1 between the innermost position of the inner edge 51 in the lateral direction D2 and the outermost position of the inner edge 51 in the lateral direction D2 may be from 2 through 18 mm. By the distance d_1 falling within the above range, it is possible to improve the above-described effect that the joined portion 50 is not readily curved upon putting the mask on. In addition, this prevents excessive nonuniformity in the distribution in the vertical direction D1 of

a tensile force applied to the joined portion 50, and prevents occurrence of unwanted stress on the mask 1.

[0043] Moreover, the maximum width $w_{\max}$ of the joined portion 50 may be from 3 through 20 mm. When the maximum width $w_{\max}$ thereof is in the above range, it is possible to increase the joined strength between the mask body 10 and the ear hook portion 20a, and also to prevent degradation in comfortable feelings during the wearing of the mask 1 due to the excessive hardness of the end portion in the lateral direction D2 of the mask 1 where the joined portion 50 is formed. Meanwhile, the minimum width $w_{\min}$ of the joined portion 50 may be from 1 through 18 mm. When the minimum width $w_{\min}$ thereof is in the above range, it is possible to readily form a shape that is recessed outward in the lateral direction D2 in the inner edge 51 in the lateral direction D2, and also to suppress increase in the hardness of the joined portion 50. The maximum width $w_{\max}$ may be in the upper region UR and/or the lower region LR of the mask body 10, and the minimum width $w_{\min}$ may be in the middle region MR of the mask body 10.

[0044] FIG. 8 to FIG. 10 illustrate modified examples of the joined portion 50. No particular limitation is imposed on the shape of the joined portion 50 as long as the outline of the inner edge 51 in the lateral direction D2 has a shape that is recessed outward in the lateral direction D2. Therefore, for example, as illustrated in FIG. 8, the recess may not be a trapezoid or another tetragon but may be a shape in which the bottom portion 51a of the recess is a bottom point. In other words, the outline of the inner edge 51 of the joined portion 50 in the lateral direction D2 may have a shape of a triangle having a base inward in the lateral direction D2.

[0045] As illustrated in FIG. 9, the outline of the inner edge 51 of the joined portion 50 in the lateral direction D2 may be a curve. More specifically, as illustrated, the outline of the inner edge 51 may be part of a circle having the center of a radius of curvature inward in the lateral direction D2. Moreover, as illustrated in FIG. 10, part of the outline of the inner edge 51 of the joined portion 50 in the lateral direction D2 may be a curve. More specifically, the outline of the inner edge 51 of the joined portion 50 may include a recess having a bottom (bottom point) 51a in the middle region MR of the mask body 10, and may be a straight line along the vertical direction D1 at the upper side and the lower side of the recess.

[0046] Note that, in the joined portion 50, the ear hook portion 20a and the mask body 10 may be joined together continuously in the whole region of the joined portion 50. Alternatively, the joined portion 50 may include: joined small portions where the ear hook portion 20a and the mask body 10 are microscopically joined together; and non-joined small portions where the ear hook portion 20a and the mask body 10 are not microscopically joined together. Like in the latter, according to the joined portion 50 including the joined small portions and the non-joined small portions, it is possible to ensure a balance between flexibility and adhesion strength, which is preferable. The

above joined small portions may be formed as, for example, dots that are sparsely located in the region of the joined portion 50, or a plurality of lines that extend in the vertical direction D1 or the lateral direction D2, a lattice, a cross hatch, etc.

(Auxiliary material-including mask)

[0047] FIG. 11 is a plan view of a mask 101 according to another embodiment of the present invention, as viewed from the outer face side thereof. Also, FIG. 12 is a cross-sectional view of FIG. 11, as taken along line X-X. A basic structure of the mask 101, obtainable effects, etc. are similar to those for the mask 1 (FIG. 1). However, the mask 101 is different from the mask 1 (FIG. 1) in that the ear hook portion 20a is not directly joined with the mask body 10 and is joined therewith via a sheet-shaped auxiliary material 130.

[0048] As illustrated in FIG. 11 and FIG. 12, the auxiliary materials 130 and 130 are respectively provided on the end portions of the mask body 10 in the lateral direction D2. The auxiliary materials 130 and 130 are disposed at the side of the mask body 10 where the pair of ear hook portions 20a and 20a are superposed. In other words, in the end portions of the mask body 10 in the lateral direction D2, the mask body 10, the ear hook portion 20a, and the auxiliary material 130 are superposed on top of one another.

[0049] The auxiliary material 130 is joined with the mask body 10 outward in the lateral direction D2, and joined with the ear hook portion 20a inward in the lateral direction D2. Thereby, the ear hook portion 20a is indirectly joined with the end portion of the mask body 10 in the lateral direction D2 via the auxiliary material 130, and the joined portion 150 entirely extending in the vertical direction D1 is formed. The joined portion 150 is a joined portion that is formed by directly joining the auxiliary material 130 and the mask body 10 together. Meanwhile, the auxiliary material 130 and the ear hook portion 20a are directly joined together by a second joined portion 160.

[0050] As described above, by the ear hook portion 20a being indirectly joined with the mask body 10 via the auxiliary material 130 rather than being directly joined with the mask body 10, various advantages can be obtained. For example, the mask body 10 and the ear hook portion 20a are usually made from different materials that are respectively suited for the purposes (e.g., materials having different levels of stretchability). In this case, the mask body 10 and the ear hook portion 20a cannot be directly joined together to at a sufficient strength in some cases. However, by the auxiliary material 130 being intervened as in the present embodiment, the difference in the level of stretchability is reduced between the ear hook portion 20a and the mask body 10. This makes it possible to firmly bond the ear hook portions 20a and 20a and the mask body 10 together. Also, by using the auxiliary material 130, the ear hook portions 20a and 20a

can more freely deform or move relative to the mask body 10. This makes it possible to fit the mask to the various faces of users.

[0051] When the mask 101 is used, a wearer tears the bond of the bond portion 28 between the ear hook portions 20a and 20a and opens the ear hook portions 20a and 20a outward in the lateral direction D2, and the ear hook portions 20a and 20a are hung around the ears of the wearer. At this time, the ear hook portion 20a and the auxiliary material 130 joined together at the second joined portion 160 are integrally spread out. Once the ear hook portion 20a is spread out, the auxiliary material 130 is turned over at the joined portion 150. Therefore, the auxiliary material 130 can be said to be a part or extension of the ear hook portion 20a.

[0052] In the mask 101, the outline of an inner edge 151 of the joined portion 150 in the lateral direction D2 has a shape that is recessed outward in the lateral direction D2. Similar to the joined portion 50 of the mask 1 as illustrated in FIG. 1, the shape of the joined portion 150 as illustrated in FIG. 11 is a shape of a trapezoid having a short upper side outward in the lateral direction D2. Therefore, in the mask 101, it is possible to reduce deformation or distortion of the ear hook portion 20a along with deformation of the mask body 10 upon putting the mask 1 on, and to prevent rising of the ear hook portion 20a from the mask body 10. More specifically, it is possible to prevent projection (rising) of the turned-over part of the auxiliary material 130 directly joined with the mask body 10, and hence to prevent rising of the ear hook portion 20a.

[0053] As illustrated in FIG. 11, the auxiliary material 130 may entirely extend in the vertical direction D1 of the mask 1. Also, the length (width) of the auxiliary material 130 in the lateral direction D2 is preferably from 15 through 35 mm although the length (width) thereof is varied with the entire size and configuration of the mask 1, and the sizes, shapes, and materials of the mask body 10 and the ear hook portion 20a. The basis weight of the auxiliary material 130 may be from 5 through 100 g/m². Also, the thickness of the auxiliary material 30 may be from 100 through 1,000 μ m.

[0054] The auxiliary material 130 may be formed from a material having no or low stretchability, or from a material having stretchability to some extent. The auxiliary material 30 may include, for example, stretchable non-woven fabric. In this case, although the auxiliary material 130 has stretchability in at least the lateral direction D2, the stretchability of the auxiliary material 130 is preferably lower than the stretchability of the ear hook portion 20a. Note that, the auxiliary material 130 may be formed from a material that is irreversibly deformable in the shape thereof by application of a force.

[0055] Hereinafter, specific aspects of the present invention will be described.

(Supplementary Note 1)

[0056] An aspect according to Supplementary Note 1 is a mask including: a mask body; and a pair of annular sheet-shaped ear hook portions, wherein the ear hook portions are respectively joined with lateral direction-facing end portions of the mask body, on a surface of the mask body that is opposite to a face-facing surface of the mask body, and joined portions across a vertical direction are formed, and outlines of inner edges of the joined portions in the lateral direction have a shape that is recessed outward in the lateral direction.

[0057] In the aspect according to the Supplementary Note 1, the sheet-shaped ear hook portions are respectively joined with the lateral direction-facing end portions of the mask body, and the joined portions across the vertical direction are formed. Upon putting this mask on, the sheet-shaped ear hook portions are respectively opened in the lateral direction, and turned over at the joined portions in use. Here, when the mask body is three-dimensionally deformed to fit to the shape of a face, the joined portions, between the mask body and the ear hook portions, that are formed on both end portions of the mask body in the lateral direction are also curved. For example, the joined portions can have such a curved shape that middle regions and the vicinities thereof of the joined portions in the vertical direction become closer to the middle region in the lateral direction. This curving of the joined portions leads to curving and deformation in turned-over parts of the ear hook portions at the joined portions, and can cause distortion. Since the ear hook portions are joined on the outer face of the mask body (the surface of the mask body that is opposite to a face-facing surface of the mask body), the turned-over parts of the ear hook portions and parts in the vicinity thereof readily become apart and rise from the mask body.

[0058] Meanwhile, according to the present embodiment, the outlines of the inner edges of the joined portions, between the ear hook portions and the mask body, in the lateral direction have a shape that is recessed outward in the lateral direction. Therefore, upon putting the mask on, even if the end portions in the lateral direction of the mask body deform so as to project inward in the lateral direction, the deformation of the outlines of the inner edges of the joined portions is cancelled by the recessed shape that is intrinsically included in the outline. Thus, the degree of curving of the outline upon putting the mask on becomes smaller. This makes it possible to reduce or prevent the distortion of the turned-over parts of the ear hook portions at the joined portions, and to suppress rising of the turned-over parts of the ear hook portions from the mask body. Therefore, according to the mask of the present embodiment, it is possible to prevent the possibility that the rising of the ear hook portions from the mask body disturb behaviors of a wearer. For example, when an additional protective means such as a face shield is worn on the mask, it is possible to prevent the ear hook portion from being hung on the parts of the

protective means. Moreover, since there is no rising in the ear hook portion, the outer appearance of the mask during the wearing of the mask becomes better.

5 (Supplementary Note 2)

[0059] In an aspect according to Supplementary Note 2, a bottom portion of the recessed shape is positioned in a middle region in the vertical direction of the mask body.

10 **[0060]** According to the aspect according to the Supplementary Note 2, it is possible to more reliably prevent the distortion of the middle portion in the vertical direction that is the most severely distorted, of the parts of the ear hook portions that are turned over.

15 (Supplementary Note 3)

[0061] In an aspect according to Supplementary Note 3, the outlines of the inner edges of the joined portions in the lateral direction extend outward in the lateral direction smoothly or stepwise as the outlines thereof become closer to the middle region in the vertical direction.

20 **[0062]** According to the aspect according to the Supplementary Note 3, any position in the inner edge of the joined portion in the lateral direction changes gradually and smoothly. This can prevent stress concentration on a predetermined portion in the outline of the edge. Thereby, the joined portion is not readily broken even when a strong force is applied to the ear hook portion.

25 (Supplementary Note 4)

[0063] In an aspect according to Supplementary Note 4, the maximum width of the joined portion in the lateral direction is from 3 through 20 mm.

30 **[0064]** According to the aspect according to the Supplementary Note 4, it is possible to increase the joined strength between the mask body and the ear hook portion, and also to prevent degradation in comfortable feelings during the wearing of the mask due to the excessive hardness of the end portion in the lateral direction of the mask where the joined portion is formed.

35 **[0065]** The present application claims priority to Japanese Patent Application No. 2021-042093, filed with the Japan Patent Office on March 16, 2021, the contents of which are incorporated herein by reference in their entirety.

40 [Description of the Reference Numeral]

[0066]

1 mask

55 1' conventional mask

10 mask body

15 pleat

tions, wherein:

18 mark

20 ear hook portion sheet

5

20a ear hook portion

22 base portion

10

23 upper extending portion

24 ear backward placement portion

25 pinch portion

15

26 lower extending portion

28 separable bond portion

20

29 opening

30 auxiliary material

50,150 joined portion

25

50' conventional joined portion

51,151 inner edge of joined portion in the lateral direction

30

51' inner edge of conventional joined portion in the lateral direction

51a bottom portion of the recessed portion of the inner edge

35

130 auxiliary material

160 second joined portion

40

D1 vertical direction (up-and-down direction)

D2 lateral direction (left-and-right direction)

45

LR lower region

MR middle region

UR upper region

50

Claims

1. A mask, comprising:

55

a mask body; and
a pair of annular sheet-shaped ear hook por-

the ear hook portions are respectively joined with lateral direction-facing end portions of the mask body, on a surface of the mask body that is opposite to a face-facing surface of the mask body, and joined portions across a vertical direction are formed; and
outlines of inner edges of the joined portions in the lateral direction have a shape that is recessed outward in the lateral direction.

2. The mask according to claim 1, wherein a bottom portion of the recessed shape is positioned in a middle region in the vertical direction of the mask body.

3. The mask according to claim 1 or 2, wherein the outlines of the inner edges of the joined portions in the lateral direction extend outward in the lateral direction smoothly or stepwise as the outlines thereof become closer to the middle region in the vertical direction.

4. The mask according to any one of claims 1 to 3, wherein a maximum width of the joined portion in the lateral direction is from 3 through 20 mm.

FIG.1

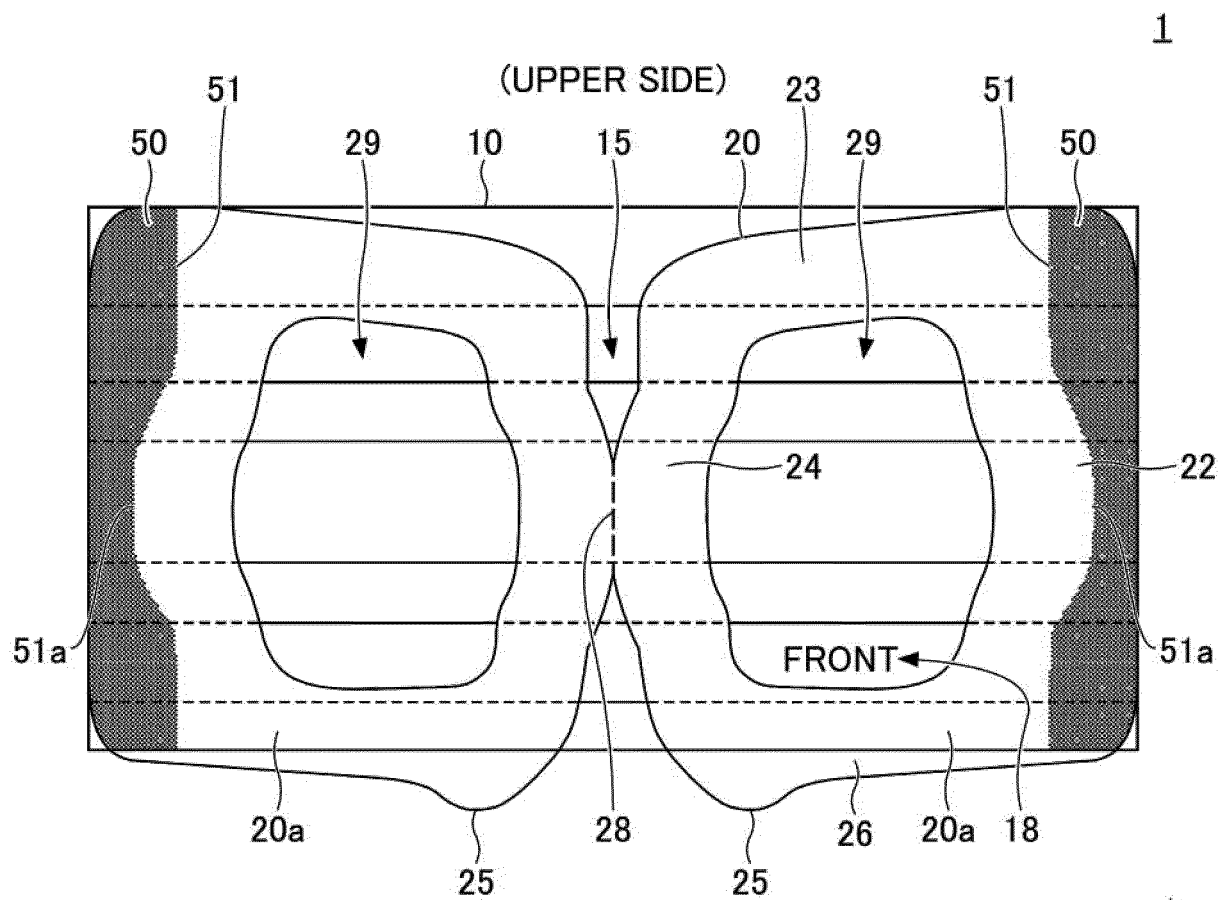


FIG.2

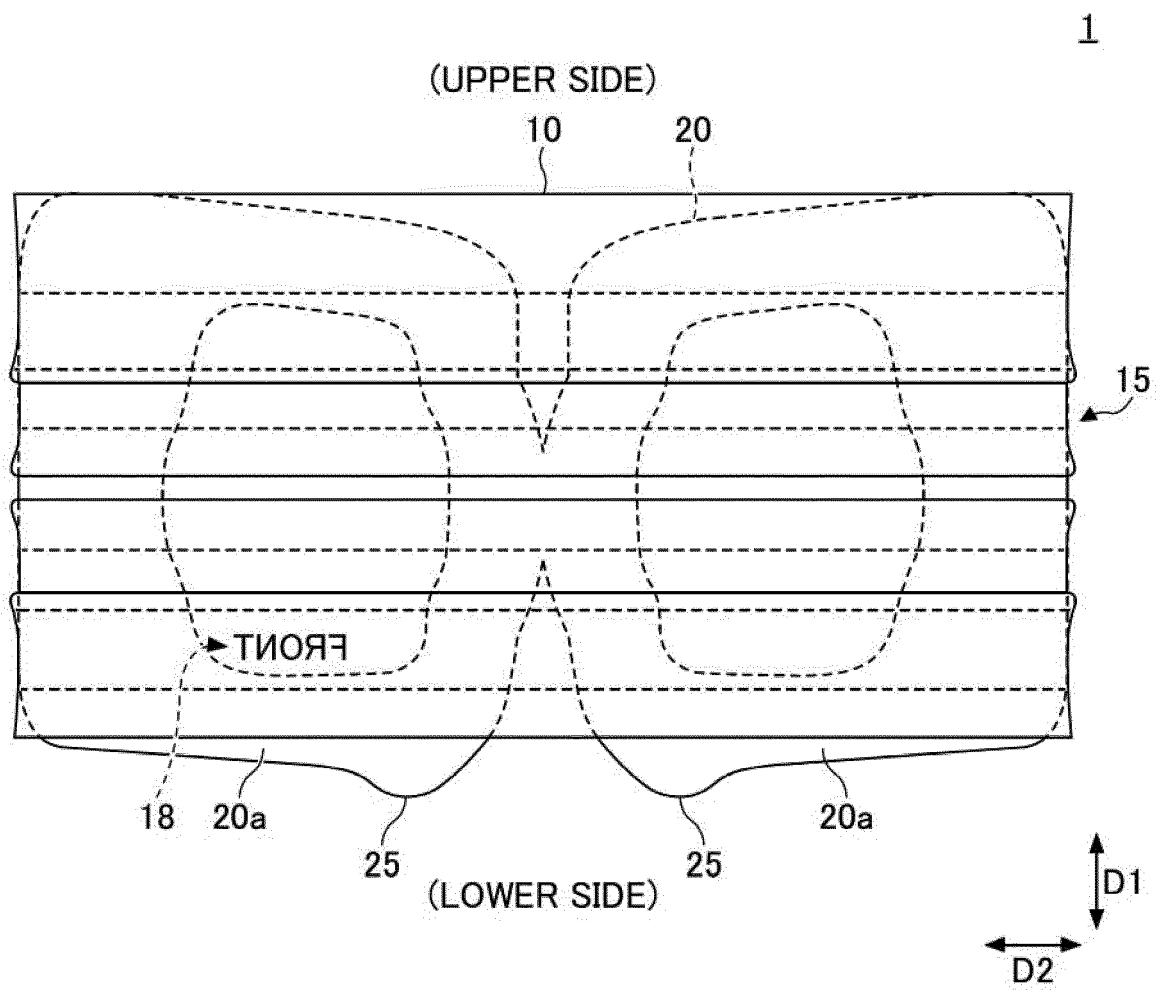


FIG.3

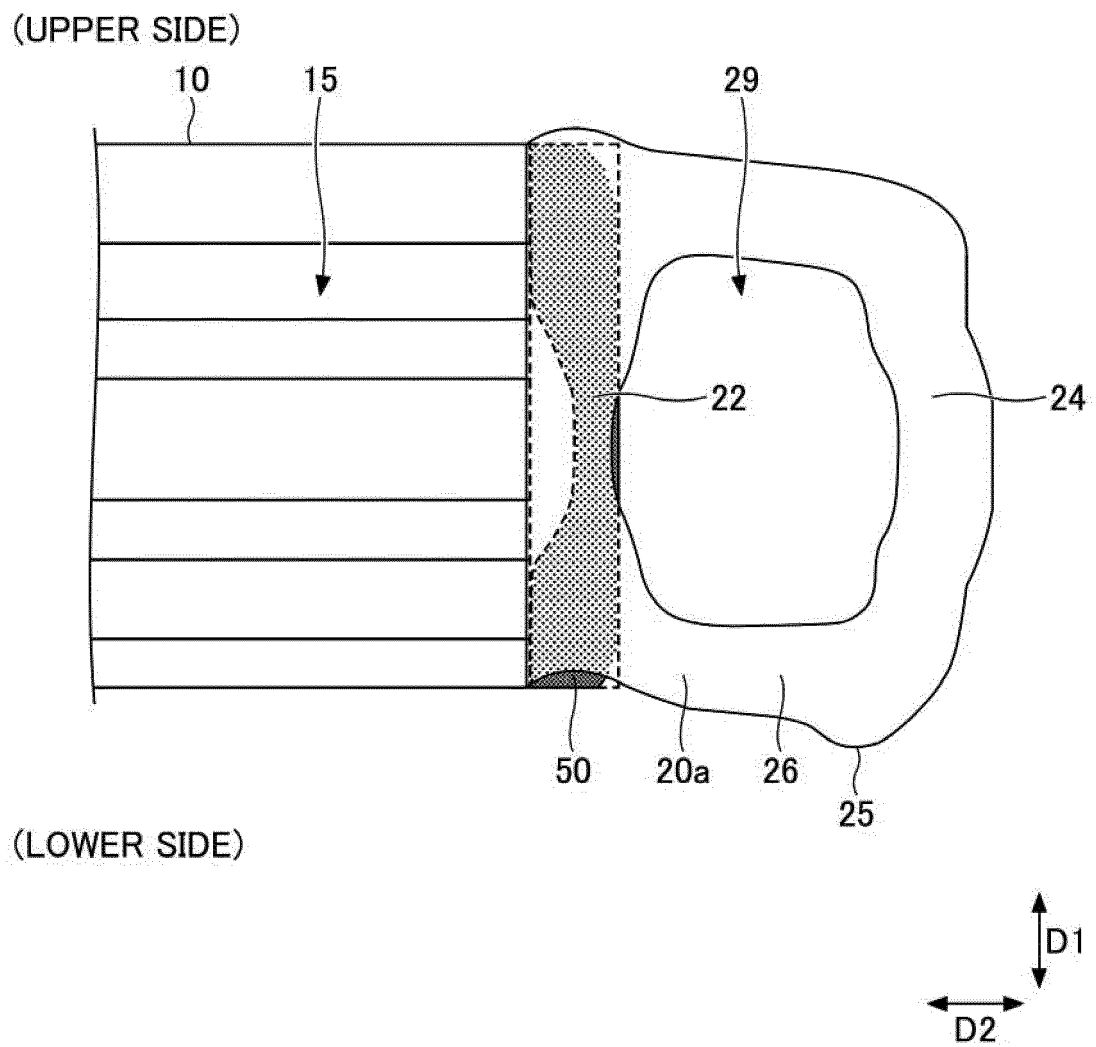


FIG.4

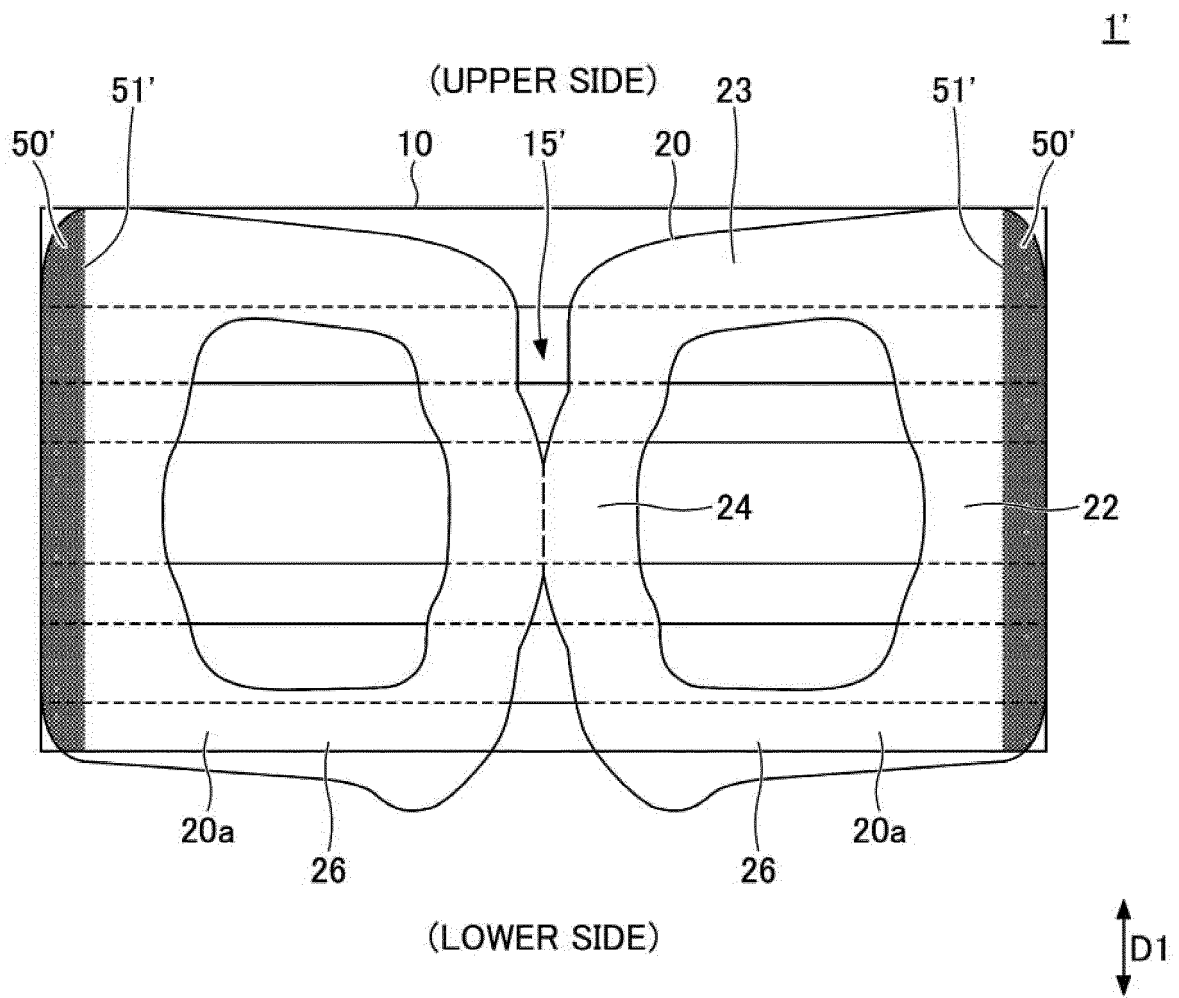


FIG.5

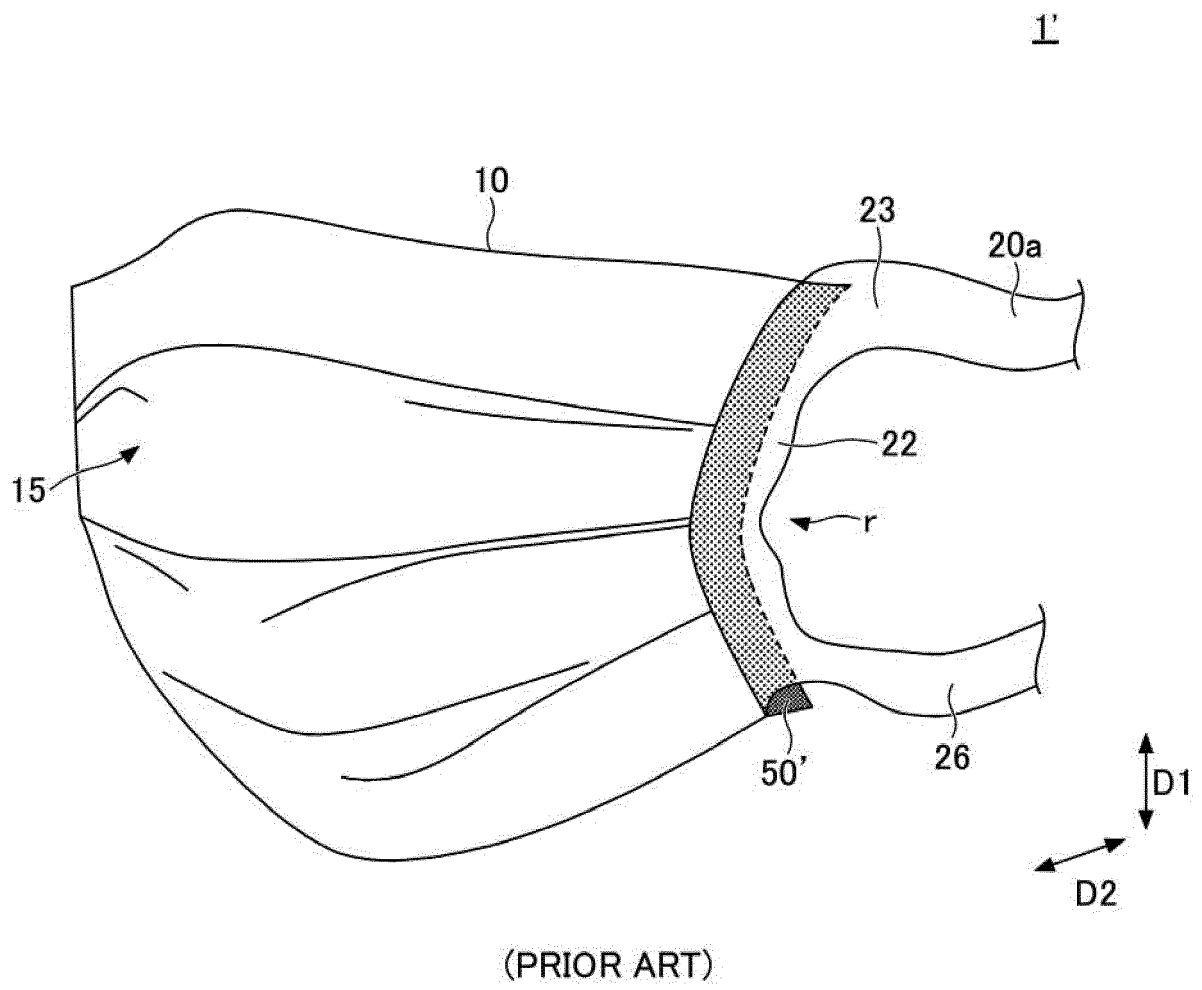


FIG.6

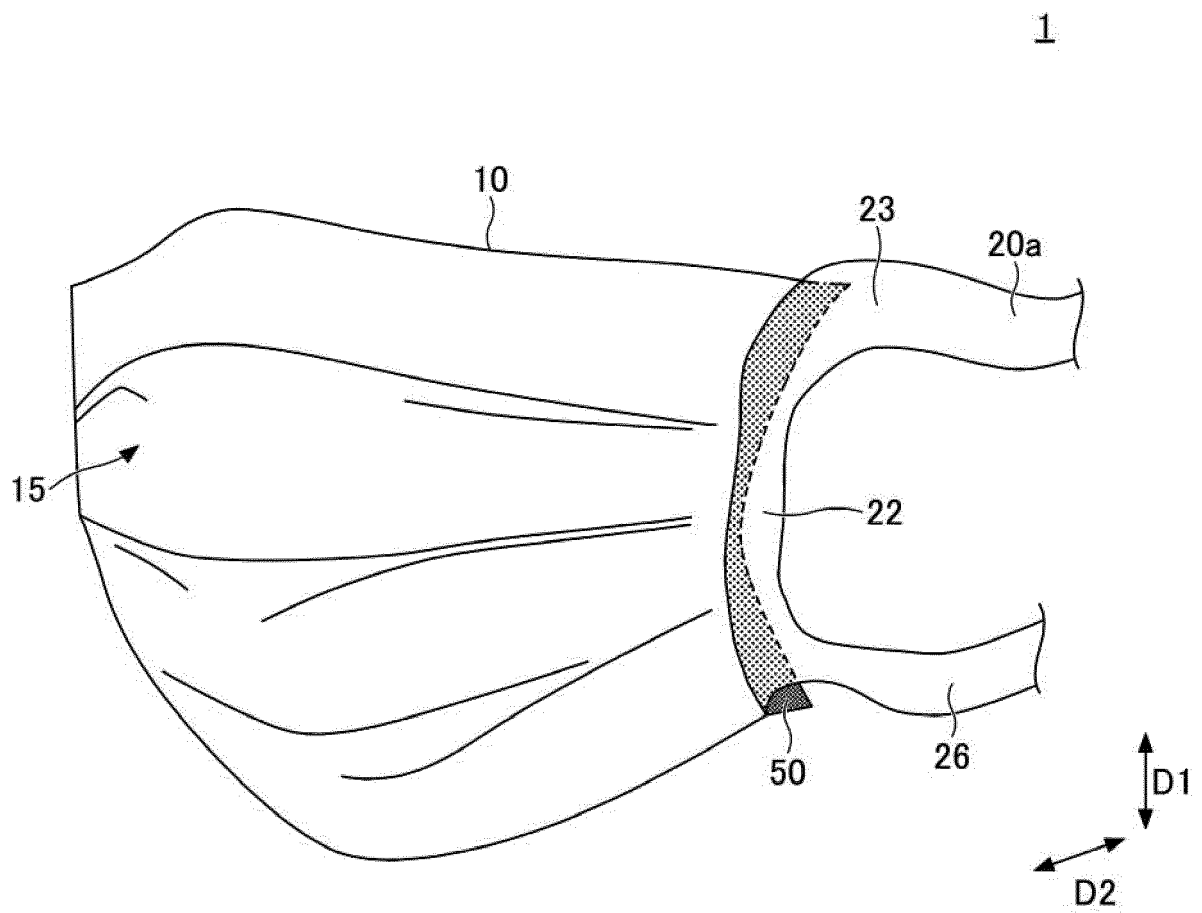


FIG. 7

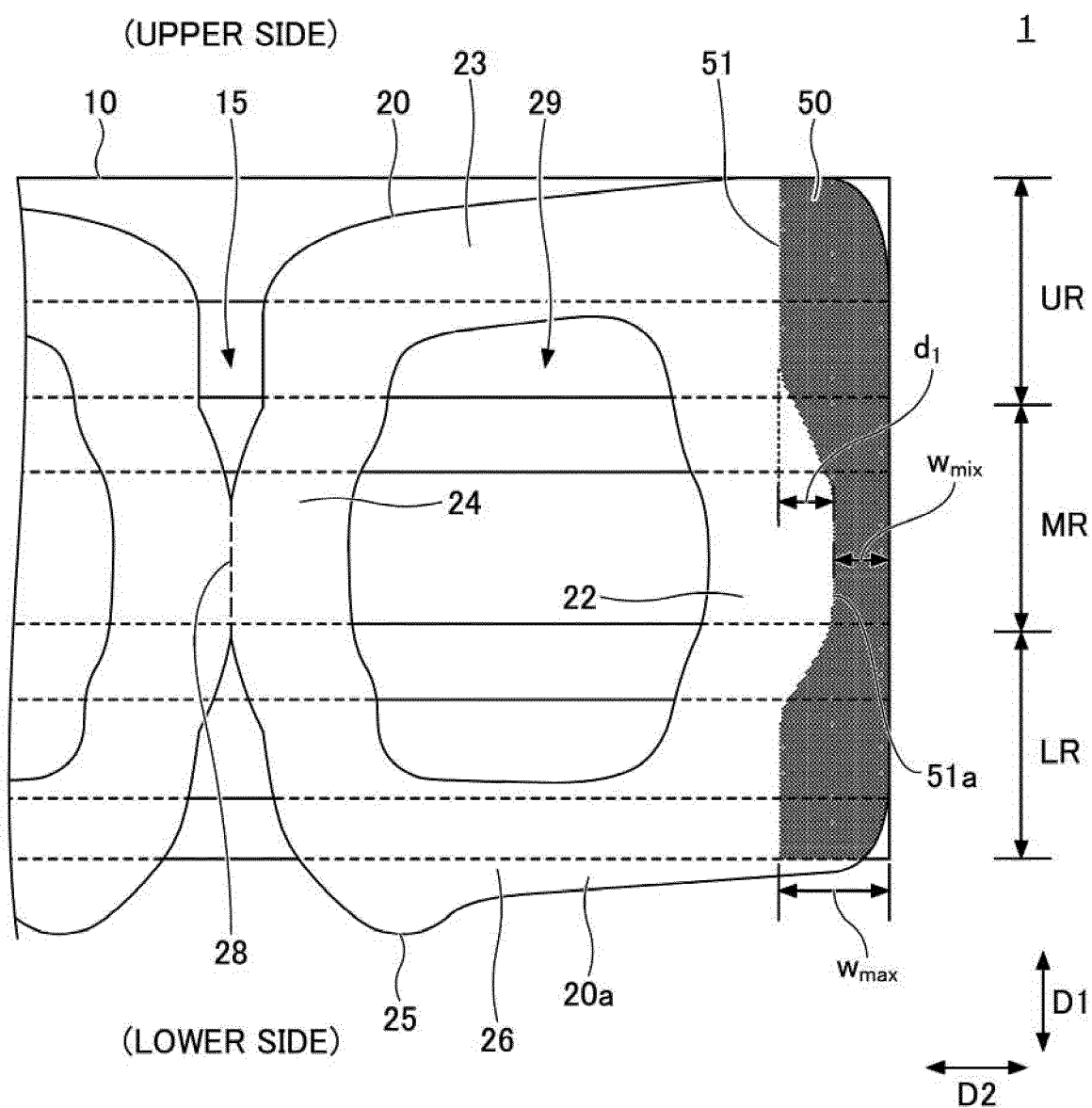


FIG.8

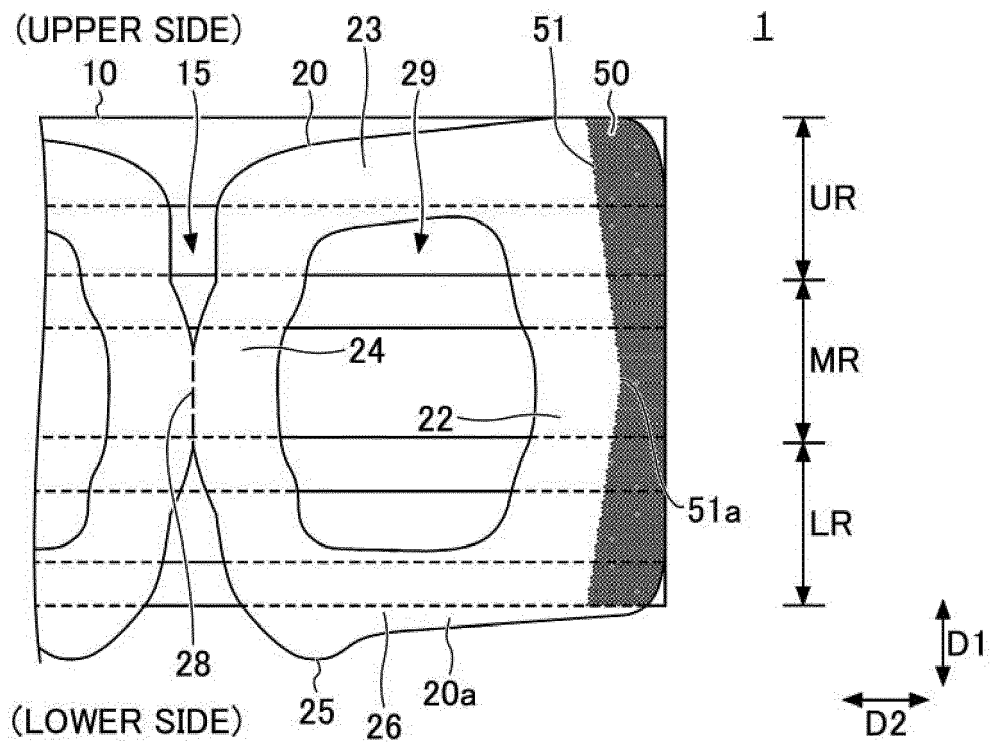


FIG.9

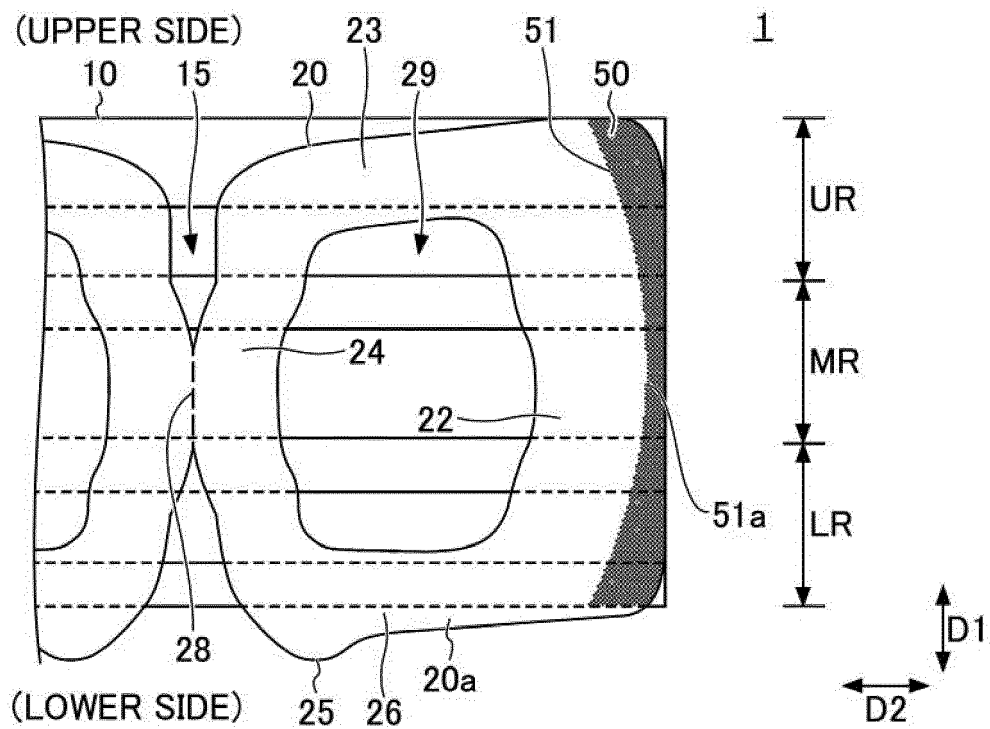


FIG.10

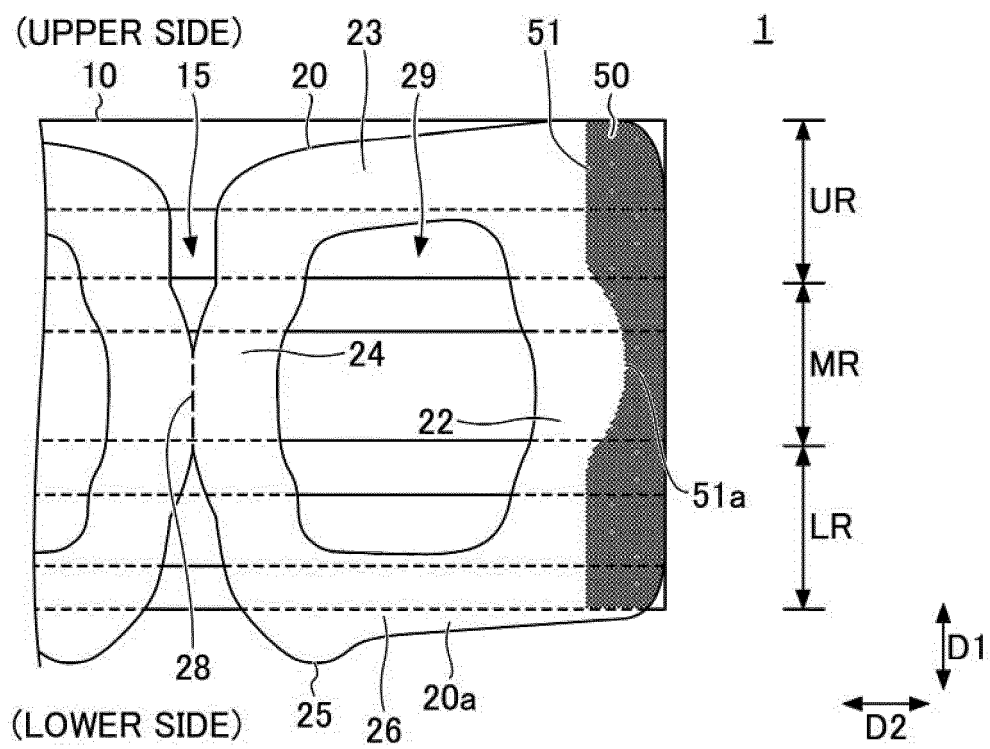


FIG.11

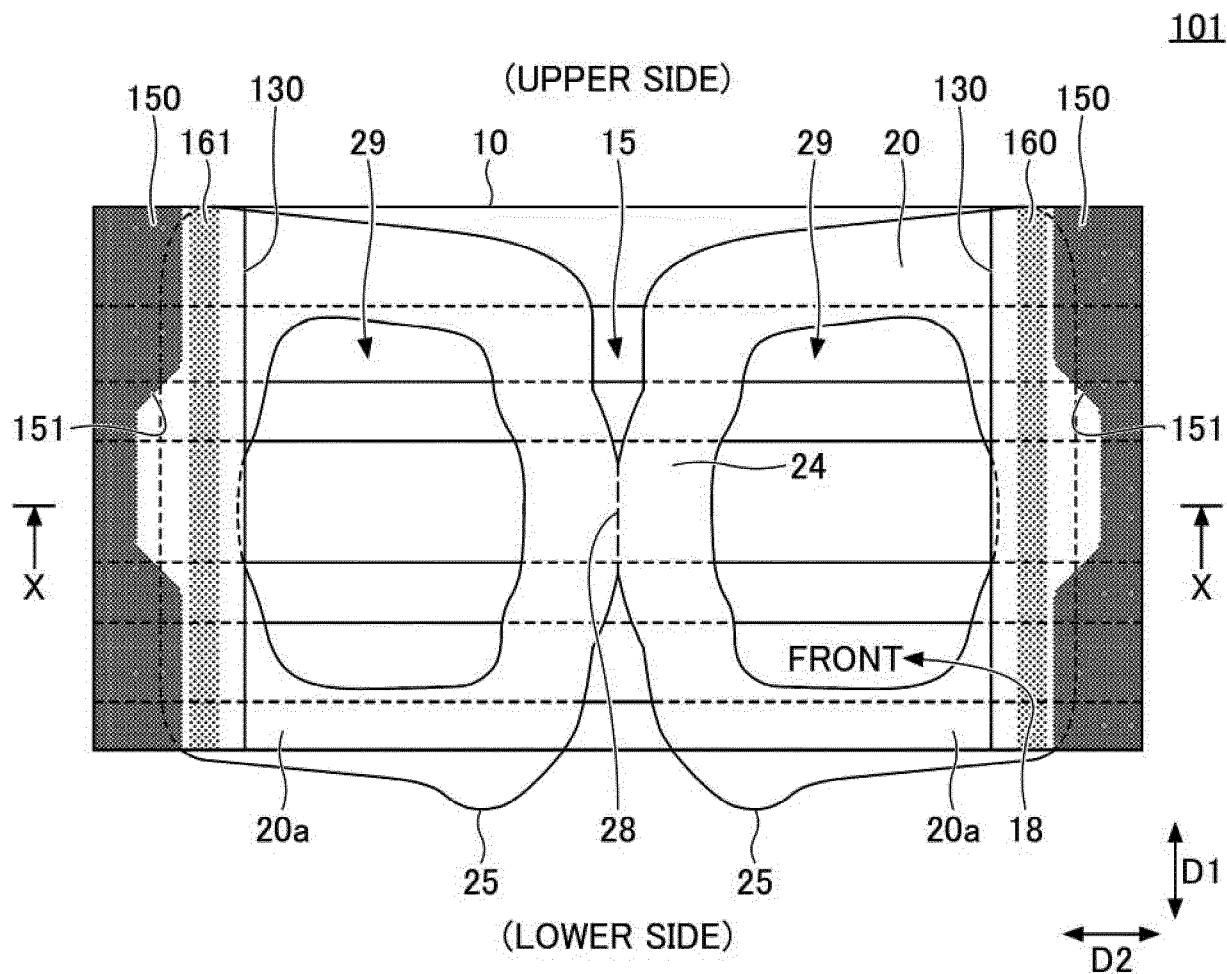
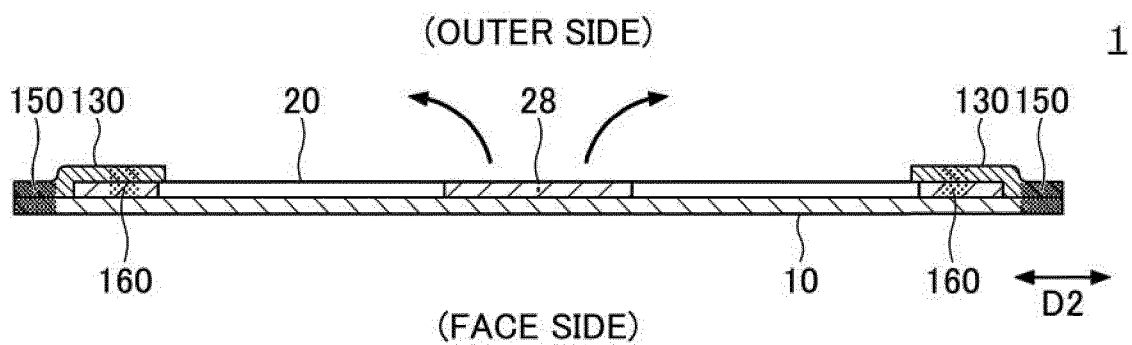


FIG.12



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2022/003802

A. CLASSIFICATION OF SUBJECT MATTER**A41D 13/11**(2006.01)i

FI: A41D13/11 H

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)

A41D13/11, A62B18/02

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

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2022
 Registered utility model specifications of Japan 1996-2022
 Published registered utility model applications of Japan 1994-2022

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 2008-191 A (KAO CORP.) 10 January 2008 (2008-01-10) paragraphs [0013]-[0018], fig. 1, 2	1-4
Y	JP 2017-197885 A (UNICHARM CORP.) 02 November 2017 (2017-11-02) paragraphs [0043]-[0049], fig. 1, 2	1-4
Y	CN 111227374 A (SHENZHEN TENOCO TECH CO., LTD.) 05 June 2020 (2020-06-05) paragraphs [0041]-[0044], fig. 9-11	1-4
Y	JP 2011-167418 A (UNICHARM CORP.) 01 September 2011 (2011-09-01) paragraphs [0027]-[0033], fig. 13, 14	1-4
A	JP 4528881 B1 (SUGIYAMA KK) 25 August 2010 (2010-08-25)	1-4

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

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“&” document member of the same patent family

Date of the actual completion of the international search

17 March 2022

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Name and mailing address of the ISA/JP

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Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/JP2022/003802

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CN 111227374 A	05 June 2020	(Family: none)	
JP 2011-167418 A	01 September 2011	US 2013/0037032 A1 paragraphs [0084]-[0106], fig. 13, 14 WO 2011/102489 A1 EP 2537558 A1 CN 102770185 B KR 10-1617914 B1	
JP 4528881 B1	25 August 2010	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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- JP 2021042093 A [0065]