been used for, for example, coats, blousons, golf wear, and outdoor wear for sports.

[0004]

Patent Document 1 discloses, as a means for solving the problem of high strength and reduction in weight and thickness, a fabric comprising a synthetic multifilament, wherein by subjecting the fabric to calender processing on at least one surface, monofilaments are pressed overlapped each other in at least a part of the synthetic multifilament, the synthetic multifilament having a fineness of 7 dtex to 44 dtex, wherein the monofilaments have a Y-shaped or cruciform cross section, the fabric having a cover factor of 1300 to 2200.

Prior Art Documents

Patent Documents

[0005]

Patent Document 1: JP 2010-196213 A

Summary ~~of the Invention~~

Problems to be Solved ~~by the Invention~~

[0006]

The fabric obtained by the method disclosed in Patent Document 1, however, has a gloss with glitter and streaks because of uniformly reflected light, and is unsatisfactory in appearance, such as glossiness of products, as well as functionality. As described above, there are fabrics satisfying the required properties such as high strength, reduced weight, and reduced thickness in the prior art, but glossiness has not been considered sufficiently, and there has been no fabric having a delicate and elegant gloss. Furthermore, in the prior art, a sufficiently lasting function has not been provided: e.g., a fabric shows a significant decrease in air permeability after repeated washing, and suffers from slipping-out of downs, for example, when used as a shell of a down jacket.

[0007]

The present ~~invention~~ disclosure aims to solve such problems of the prior art and provide a fabric that is lightweight and thin, has high strength, low air permeability, and excellent glossiness, and can be suitably used for a ticking of sportswear, casual wear, and women's and men's wear represented, for example, by down jackets, windbreakers, golf wear, and rainwear; a sewn product obtained by using the fabric at least in part; and a down shell and a down jacket obtained by using the fabric at least in part.

Means for Solving the Problems

[0008]

To achieve the above object, the fabric of the present ~~invention~~ disclosure mainly has the following constitution.

(1) In a first aspect, there is provided ~~A~~a fabric subjected to calender processing on one or both surfaces, comprising a polyamide fiber used as warp or/and woof having, after calender processing of the fabric, a single filament fineness of 0.5 to 2.5 dtex and a total fiber fineness of 5 to 50 dtex, the single filament having a cross-sectional shape that is flat multifoliar with 6 to 10 lobe parts and has a flat ratio (W) (α/β) of 1.5 to 3.0, wherein α is a length of a line segment A, which is a longest line segment connecting any two apexes of convex portions of the flat multifoliar shape, and β is a length of a line segment B of a circumscribed quadrangle formed by lines that are parallel to the line segment A and are tangent lines containing outermost apexes (the angle between adjacent sides is 90°), the line segment B being other than the lines that are parallel to the line segment A, the fabric having a cover factor of 1200 to 2500.

[0009]

(2) The fabric according to (1) above, wherein the polyamide fiber has, before calender processing of the fabric, a single filament fineness of 0.4 to 2.2 dtex and a total fiber fineness of 4 to 44 dtex, the single filament having a cross-sectional shape that is flat multifoliar with 6 to 10 leaves and satisfies both equations below:

Flat ratio (F) (a/b) = 1.5 to 3.0

Modified shape ratio (F) (c/d) = 1.0 to 8.0

wherein *a* is a length of a longest line segment A connecting any two apexes of convex portions of the flat multifoliar shape; *b* is a length of a line segment B of a circumscribed quadrangle formed by lines that are parallel to the line segment A and are tangent lines containing outermost apexes (the angle between adjacent sides is 90°), the line segment B being other than the lines that are parallel to the line segment A; *c* is a length of a line segment C connecting the apexes of adjacent convex portions of the largest concavity and convexity among concavities and convexities formed by the flat multifoliar shape; and *d* is a length of a perpendicular D drawn from the bottom of a concave portion between the convex portions to the line segment C connecting the apexes of the convex portions.

(3) The fabric according to (1) or (2) above, having a tear strength of 5.0 N or more and an initial air permeability of 1.0 cc/cm^2/s or lower.

[0010]

(4) The fabric according to any one of (1) to (3) above, having an air permeability after fifty washing of 1.0 cc/cm^2/s or lower.

[0011]

(5) The fabric according to any one of (1) to (4) above, wherein the difference between the initial air permeability and the air permeability after fifty washing is 0.4 cc/cm^2/s or less.

[0012]

(6) In a second aspect, there is provided ~~A~~a sewn product obtained by using the fabric according to any one of (1) to (5) as defined above at least in part.

[0013]

(7) In a third aspect, there is provided ~~A~~a down shell or a down jacket obtained by using the fabric according to any one of (1) to (5) as defined above at least in part.

Effects ~~of the Invention~~

[0014]

The present ~~invention~~ disclosure provides a fabric that is lightweight and thin and has high strength, low air permeability, and excellent glossiness with no glitter or streaks. The ~~invention~~ disclosure further provides a fabric that can be suitably used for a ticking of, for example, sportswear, casual wear, and women's and men's wear represented, for example, by down jackets, windbreakers, golf wear, and rainwear. The present ~~invention~~ disclosure also provides a sewn product obtained by using the fabric ~~of the present invention~~as defined above in part. The ~~invention~~ disclosure further provides a down shell and a down jacket obtained by using the fabric as defined above~~of the present invention~~ in part.

Brief Description of the Drawings

[0015]

FIG. 1 is a SEM photograph of a fabric transverse cross section illustrating the fabric of the present invention;

FIG. 2 is a cross-sectional view illustrating the outline of the cross-sectional shape of a single filament constituting the fabric of the present invention;

FIG. 3 is a schematic cross-sectional view illustrating the shape of the spinneret outlet port used in Examples of the present invention;

FIG. 4 is a schematic cross-sectional view illustrating the shape of the spinneret outlet port used in Comparative Examples; and

FIG. 5 is a schematic cross-sectional view of the fabric including fibers having a Y-shaped cross section obtained in Comparative Example.

Mode for Carrying Out the Invention

[0016]

The polyamide constituting the fabric of the present invention is what is called a polymer in which hydrocarbon groups are linked by amide bonds to the main