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(71) Applicant: **Toray Industries, Inc.**
Tokyo, 103-8666 (JP)

(72) Inventors:
- **KISHITA, Fumiya**
Osaka-shi, Osaka 530-8222 (JP)
- **MINE, Shingo**
Osaka-shi, Osaka 530-8222 (JP)

(74) Representative: **Mewburn Ellis LLP**
Aurora Building
Counterslip
Bristol BS1 6BX (GB)

(54) STRING AND HAT

(57) Provided is a braid being superior in rigidity and form stability while suppressing distinct glossiness appearance that is to occur when a monofilament is used. The braid is fabricated using a synthetic fiber monofilament A satisfying the following (1) to (3) and/or a covering yarn in which a periphery of a monofilament B satisfying the following (1) is covered with a textured yarn and which satisfies the following (4) to (5),
(1) a fineness is 150 dtex or more and 3000 dtex or less,
(2) a maximum reflection intensity at a light receiving angle of 0 to 80° is 50 or less,
(3) a ratio of the maximum reflection intensity to a minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) is 2.8 or less,
(4) a fineness of the textured yarn is 50 dtex or more,
(5) a ratio of a maximum reflection intensity to a minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) of the covering yarn is 2.8 or less. The braid is preferably used for a hat.

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Description

TECHNICAL FIELD

[0001] The present invention relates to braids and hats.

BACKGROUND ART

[0002] Conventionally, braids prepared using natural fibers such as hemp, Bleeding Heart (Dicentra spectabilis), straw, and raffia or paper-making fibers have superior appearance, and are used in various applications such as hats, bags, baskets, furniture, and seats.
[0003] In particular, hats made using braids are superior in air permeability and widely spread as summer hats.
[0004] However, natural fibers such as straw have a problem in texture and launderability, and in recent years, straw hats have difficulty in obtaining materials of natural grass such as straw, and hemp braids and braids of paper-making yarns occupy a large part of hats. Hemp braids are obtained by flat-braiding a bundle of hemp fibers as an original yarn with a braiding machine. However, although the flexural hardness of hemp is strong among natural fibers, it is not sufficient to maintain a straw hat shape. Therefore, there is a problem in stability at the time of sewing into a hat shape, shape retention of a hat, and form recoverability after storage.
[0005] In addition, natural fibers such as hemp have a problem that daily use is difficult due to poor launderability.
[0006] Many paper hats and the like produced using braids fabricated from the above paper-making yarns are also sold, but the braids fabricated using the paper-making yarns lack lightweight feeling, and the resin coating is peeled off, so that shape retainability after washing may deteriorate.
[0007] In order to solve the above problem of shape retention, a braid containing a shape retention monofilament over the entire length has been proposed. (See, for example, Patent Document 1.)
[0008] In addition, there is a product obtained by shaping a braid in which a monofilament of tenacious chemical fiber is contained in hemp fiber. (See, for example, Patent Document 2.)

PRIOR ART DOCUMENTS

PATENT DOCUMENTS

[0009]

Patent Document 1: Japanese Patent Laid-open Publication No. 2005-15960
Patent Document 2: Japanese Patent Laid-open Publication No. 2000-17553

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0010] As disclosed in Patent Documents 1 and 2, braids comprising a monofilament have stronger flexural hardness and are superior in shape retainability and form recoverability as compared to braids constituted only of natural fibers.
[0011] In the braids described in the patent documents cited above, polyester, polypropylene, nylon 6, etc. having strong flexural rigidity are used for monofilaments, but such monofilaments have strong surface gloss and when used for braids, they glare to deteriorate the appearance quality.
[0012] In addition, there are also described a method in which a hemp fiber and a monofilament are twisted together, a method in which a monofilament is wound around a hemp fiber, and a method in which a monofilament is used as a core and a hemp fiber is twisted on the periphery of the monofilament, but these methods are not sufficient for reducing the glossiness, and when exposed to a strong light source such as storefront lighting, there is a problem that glare is partially generated, so that the surface quality is uneven and the natural fiber feeling is poor. (See, for example, Patent Document 2.)
[0013] The braid fabricated using a paper-making yarn is high in the rigidity of the yarn, but is weak against moisture because it has water absorbency. One having launderability has a problem that lightweight feeling is impaired because the surface thereof is coated with a resin agent such as a water repellent. In addition, there is a problem that flexural recoverability is weak, and when once stored, the form is not recovered and the appearance quality is deteriorated.
[0014] As described above, all the proposals address only the improvement in rigidity and do not specifically venture an attempt to suppress "glare" or "gloss".
[0015] Then, an object of the present invention is to provide a braid and a hat superior in rigidity and form stability

while suppressing a distinct glossiness generated when a monofilament is used.

SOLUTIONS TO THE PROBLEMS

[0016] The present invention has the following configurations in order to attain the above object.

[0017]

- A braid fabricated using a synthetic fiber monofilament A satisfying the following (1) to (3) and/or a covering yarn in which a periphery of a monofilament B satisfying the following (1) is covered with a textured yarn and which satisfies the following (4) to (5),

  (1) a fineness is 150 dtex or more and 3000 dtex or less,
  (2) a maximum reflection intensity at a light receiving angle of 0 to 80° is 50 or less,
  (3) a ratio of the maximum reflection intensity to a minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) is 2.8 or less,
  (4) a fineness of the textured yarn is 50 dtex or more,
  (5) a ratio of a maximum reflection intensity to a minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) of the covering yarn is 2.8 or less.

- The braid mentioned above, wherein the synthetic fiber monofilament A satisfies the following (6),
  (6) a degree of gloss is 20 or less in reflection intensity at a light receiving angle of 0°.
- The braid mentioned above, wherein the synthetic fiber monofilament A is obtained by subjecting a monofilament comprising 0.01 to 10% by weight of titanium oxide and 0.01 to 10% by weight of silica to alkali weight reduction processing.
- The braid mentioned above, wherein the synthetic fiber monofilament A satisfies the following (7) to (8),

  (7) a B value of flexural rigidity is 0.002 (N·cm^2/yarn) or more,
  (8) a flexural hysteresis 2HB value is 0.003 (N·cm/yarn) or less.

- The braid mentioned above, wherein a content of the synthetic fiber monofilament A and/or the monofilament B is 3 to 60% by weight.
- The braid mentioned above, wherein at least the synthetic fiber monofilament A and/or the textured yarn is dyed.
- The braid mentioned above, wherein the synthetic fiber monofilament A and/or the covering yarn is braided with an adjacent multifilament.
- The braid mentioned above, wherein a core yarn is plaited against a plaited yarn to form the braid, the core yarn comprises a spun yarn, and the plaited yarn comprises the synthetic fiber monofilament A and/or the covering yarn.
- The braid mentioned above, wherein the spun yarn is a spun yarn comprising one or more species selected from among polyester fiber, polyamide fiber, acrylic fiber, cotton, and wool.
- The braid mentioned above, wherein the spun yarn has a fineness of 4 to 50 in cotton count.
- The braid mentioned above, wherein the multifilament has a dyeing difference in a longitudinal direction.
- The braid mentioned above, wherein use thereof is a hat.
- A hat constituted of the braid mentioned above.

EFFECTS OF THE INVENTION

[0018] In a braid formed of synthetic fiber, the "glare" drawback, which is the greatest drawback of synthetic fiber braids, is improved and it is possible to obtain a braid superior in rigidity and form stability.

[0019] Furthermore, in the case of using two or more kinds of fibers such as a multifilament and a spun yarn in combination with a synthetic fiber monofilament, the "glare" drawback, which is the greatest drawback of synthetic fiber braids, is particularly improved by combining with the features of the mutual fibers, and a braid superior in form stability and flexural recoverability can be obtained. Furthermore, by using a textured yarn that exhibits a different dyeing difference, it is possible to impart a superior spun-like appearance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Fig. 1 is a photograph substituted for drawing that shows the surface condition of the synthetic fiber monofilament A used in Example 1.

EMBODIMENTS OF THE INVENTION

[0021] The braid of the present invention is a braid fabricated using a specific synthetic fiber monofilament A and/or a specific covering yarn in which the periphery of a monofilament B is covered with a textured yarn, and thanks to this configuration, the surface gloss of the monofilaments is reduced, so that there is a braid in which "glare", which has conventionally been considered to be difficult to suppress, is suppressed.

[0022] The most important means for constructing the braid of the present invention is to use a monofilament and/or a covering yarn with reduced glare.

(Synthetic fiber monofilament A)

[0023] The monofilament with reduced glare is a synthetic fiber monofilament A satisfying the following (1) to (3).

(1) The fineness is 150 dtex or more and 3000 dtex or less. It is preferably 200 to 1000 dtex, and more preferably 300 to 700 dtex.

(2) The maximum reflection intensity at a light receiving angle of 0 to 80° is 50 or less. It is preferably 40 or less, and more preferably 35 or less.

(3) The ratio of the maximum reflection intensity to the minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) is 2.8 or less. It is preferably 2.5 or less, and a smaller ratio is particularly preferable from the viewpoint of less glare of the braid.

[0024] This makes it possible to improve the "glare" drawback, which is the greatest drawback of synthetic fiber braids, and to obtain braids superior in rigidity and form stability.

[0025] In the synthetic fiber monofilament A, the maximum reflection intensity at a light receiving angle of 0 to 80 ° is preferably in the above range in view of the glare of the braid.

[0026] In addition, the degree of gloss is preferably 20 or less, and preferably 18 or less in reflection intensity at a light receiving angle of 0°.

[0027] Thanks to this, even when a braid is fabricated using a monofilament, the braid does not glare even when illuminated with sunlight or LED illumination and the surface quality of the braid fabricated is good.

[0028] In particular, when the monofilament is excessively high in degree of gloss, it glares strongly, and when a braid is fabricated, the glossiness of the monofilament is conspicuous and the appearance quality of the braid fabricated tends to be deteriorated. Such glossiness is unpreferable as a synthetic fiber braid. Therefore, it is preferable to have a feature within the above range.

[0029] The synthetic fiber monofilament A to be used in the present invention preferably has a B value of flexural rigidity of 0.002 (N·cm^2/yarn) or more. This leads to superior shape retainability of a hat. When the B value is less than 0.002 (N·cm^2/yarn), the rigidity of the braid fabricated is low, and when the braid is formed into a shape of a hat or the like, the product is insufficient in bounce, so that it is poor in form stability. In addition, when the flexural rigidity B value exceeds 0.01 (N·cm^2/yarn), the monofilament has an increased fineness, so that the appearance quality of the braid fabricated tends to be significantly deteriorated. More preferred is a monofilament having a flexural rigidity B value of 0.004 to 0.006 (N·cm^2/yarn).

[0030] The synthetic fiber filament A to be used in the present invention preferably has a flexural hysteresis 2HB value of 0.003 (N·cm/yarn) or less. The lower limit is preferably 0.0005 (N·cm/yarn) or more, and more preferably 0.001 (N·cm/yarn) or more. In particular, when the flexural hysteresis 2HB value is 0.001 to 0.003 (N·cm/yarn), the braid fabricated is superior in rigidity, and when the braid is formed into a shape of a hat or the like, it is preferable from the viewpoint of superior bounce and superior form stability.

[0031] In the present invention, the synthetic fiber monofilament A is not particularly limited as long as the above range is satisfied, but preferred is a monofilament of a polyester-based fiber.

[0032] In general, utilizing a polyester-based fiber is advantageous in that it is superior in productivity because in-draw false twist processing and partial fusion processing can be easily performed, a disperse dye is used for dyeing, and multicolor development can be performed. In addition, it is also preferable in that various exhaustion processing such as antibacterial processing, UV cut processing, and water repellent processing can be performed using a cheese dyeing machine as yarn processing and in that it can contribute to product development. Furthermore, it is very advantageous for product development that the synthetic fiber monofilament A to be used for the fabrication of a braid is a polyester-based fiber because of its dyeability and processability as mentioned above and because it can reduce cost, it is superior in launderability such as being superior in shape retainability even by washing from the viewpoint of the rigidity of a monofilament and the heat settability of polyester, or it is superior in drying properties such as quick drying after washing.

[0033] The synthetic fiber monofilament A has fine irregularities on the surface, whereby it can suppress glare and reduce glossiness.

[0034] In order to provide the surface of the synthetic fiber monofilament A with a fine irregular surface, there may be employed a method in which a monofilament is spun with the addition of particles capable of forming a desired irregular surface, then the monofilament is subjected to weight reduction treatment to solve the surface layer of the monofilament and thereby release the particles. At that time, using the particles together with a matting agent makes it possible to further suppress glare and reduce glossiness.

[0035] Examples of the particles and the matting agent include silica, titanium oxide, silicon oxide, alumina, alumina sol, calcium carbonate, organic sulfonic acid metal chloride compounds, sulfate, sodium benzenesulfonate, magnesium dicarboxylate, dibasic potassium phosphate, phosphates, and crosslinked polystyrene. In particular, it is preferable to use silica (especially, colloidal silica is preferable) as the particles and titanium oxide as the matting agent. It is noted that a particulate matting agent such as titanium oxide not only serves as a matting agent, but also leaves to form an irregular surface. Therefore, it is difficult to discuss the matting agent separately from the particles, and thus, in the present invention, such a matting agent and such particles are not clearly distinguished. When two or more kinds of the particles and the matting agent are used, one having a higher matting property imparting effect is treated as a matting agent, and the other is treated as particles. The monofilament can be produced by producing a monofilament spun with particles and/or a matting agent contained, and then subjecting the monofilament to weight reduction processing to release the particles and/or the matting agent exposed on the surface to form irregularities.

[0036] The monofilament having fine irregularities as described above suppresses glossiness due to irregular reflection of light by irregularities when irradiated with light, and reduces "glare" of the braid.

[0037] In order to reduce the brightness of color and reproduce a deep color, it is preferable that the synthetic fiber monofilament A contains a matting agent such as titanium oxide in an amount of 0.01 to 10% by weight with respect to the synthetic fiber monofilament. The content is more preferably 0.01 to 8.0% by weight.

[0038] In addition, it is preferable that the content of the particles such as silica is 0.01 to 10% by weight with respect to the synthetic fiber monofilament A from the viewpoint of forming fine irregularities on the surface of the synthetic fiber monofilament A by weight reduction processing. The content is more preferably 0.01 to 8.0% by weight.

[0039] In particular, it is preferable that the synthetic fiber monofilament A contains 0.01 to 10% by weight of titanium oxide and 0.01 to 10.0% by weight of silica based on 100% by weight of the synthetic fiber monofilament A from the viewpoint of the balance between glare reduction and high order processability.

[0040] In order to obtain a monofilament with reduced glare, it is extremely effective to produce the monofilament by including 0.01 to 10% by weight of the matting agent described above, such as titanium oxide, and 0.01 to 10% by weight of the particles, such as silica, during spinning, and subjecting the monofilament to weight reduction processing and dyeing using a dyeing machine such as a cheese dyeing machine.

[0041] The average particle diameter of the particles, such as silica, is desirably 0.5 to 8 μm. For example, in the case of dry silica particles, there is employed a number average value obtained from primary particle diameters determined with an electron microscope. In the case of the particle diameter of colloidal silica, this is a value obtained by analyzing, by the Mie scattering theory using a particle size distribution analyzer (LA-700) manufactured by HORIBA, Ltd., the scattered light generated when particles present in a fully agitated ethylene glycol slurry containing 20% by mass of silica particles are irradiated with light. The measurement of other particles is performed by selecting a more suitable method among the above methods, and when it is difficult to perform the measurement by any method, there is employed a value obtained by performing the measurement by a method for determining the average particle diameter of primary particles commonly used in the art.

[0042] Particularly preferably, in the method described above, a polyethylene terephthalate monofilament containing particles and a matting agent as described above is produced using polyethylene terephthalate (PET) as the material for constituting the synthetic fiber monofilament A, and then the polyethylene terephthalate monofilament is subjected to weight reduction processing and dyeing by using a cheese dyeing machine to afford the synthetic fiber monofilament A with reduced glare.

[0043] For the weight reduction of a monofilament, a method according to the material constituting the monofilament is employed, and for example, in the case of a polyethylene terephthalate monofilament, there may be employed a method of performing weight reduction processing by dissolving the surface of the monofilament using an alkali solution. The alkali solution to be used for the weight reduction processing is preferably an aqueous solution of sodium hydroxide, potassium hydroxide, or the like. As a method of reducing weight in the state of a yarn, a method of reducing the weight with an alkali solution using a common yarn dyeing facility can be performed. Specifically, there may be used a cheese dyeing machine that treats in the shape of cheese, of a skein dyeing machine, a muff dyeing machine or a star dyeing machine that treats in the shape of a skein. It is particularly preferable to use a cheese dyeing machine in view of the uniformity of weight reduction and the unwinding property of the yarn.

[0044] In addition, the formulation for the weight reduction may sufficiently be under the conditions of common weight reduction processing, but in the case of a monofilament, since the surface area is very small with respect to the weight, it is preferable to set a slow weight reduction rate and use a weight reduction accelerator. The weight reduction rate is usually 3% or more and 98% or less by weight as compared to that before the weight reduction processing. It is possible to reduce glossiness by releasing the particles contained in the monofilament by weight reduction processing to form a lot of craters, and irregularly reflecting light, but if the weight is excessively reduced, yarn breakage may occur during the fabrication of a braid due to lowering of tensile strength and elongation. The weight reduction rate with which the reduction in tensile strength and elongation is minimized while glossiness is reduced is desirably 3 to 30% by weight, more desirably 5 to 30%, and particularly desirably 10 to 30% by weight.

[0045] By the method described above, a monofilament A satisfying the above (1) to (3) can be produced.

(Covering yarn in which periphery of monofilament B is covered with textured yarn)

[0046] The braid of the present invention with suppressed glare can be obtained also by using a specific covering yarn in which the periphery of the monofilament B is covered with a textured yarn.

[0047] The covering yarn is a covering yarn in which the periphery of the monofilament B satisfying the above (1) is covered with a textured yarn and which satisfies the following (4) to (5),

(4) the fineness of the textured yarn is 50 dtex or more,
(5) the ratio of the maximum reflection intensity to the minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) of the covering yarn is 2.8 or less.

[0048] Since the monofilament B is required to have flexural rigidity and form stability, synthetic fiber monofilaments are preferable, and monofilaments of polyester-based fiber, olefin-based fiber such as polypropylene fiber and polyethylene fiber, polyamide fiber, etc. are more preferable. The fineness is 150 dtex or more and 3000 dtex or less, preferably 200 to 1000 dtex, and more preferably 300 to 700 dtex.

[0049] The monofilament B to be used in the present invention preferably has a B value of flexural rigidity of 0.002 (N·cm^2/yarn) or more. This leads to superior shape retainability of a hat. When the B value is less than 0.002 (N·cm^2/yarn), the rigidity of the braid fabricated is low, and when the braid is formed into a shape of a hat or the like, the product is insufficient in bounce, so that it is poor in form stability. In addition, when the flexural rigidity B value exceeds 0.01 (N·cm^2/yarn), the monofilament has an increased fineness, so that the appearance quality of the braid fabricated tends to be significantly deteriorated. More preferred is a monofilament having a flexural rigidity B value of 0.004 to 0.006 (N·cm^2/yarn).

[0050] The synthetic fiber filament B to be used in the present invention preferably has a flexural hysteresis 2HB value of 0.003 (N·cm/yarn) or less. The lower limit is preferably 0.0005 (N·cm/yarn) or more, and more preferably 0.001 (N·cm/yarn) or more. In particular, when the flexural hysteresis 2HB value is 0.001 to 0.003 (N·cm/yarn), the braid fabricated is superior in rigidity, and when the braid is formed into a shape of a hat or the like, it is preferable from the viewpoint of superior bounce and superior form stability.

[0051] The textured yarn is not a drawn yarn having a straight fiber form, and it is limited to a textured yarn. If a drawn yarn is used, since the form of its fiber is straight, glare is strong when a braid is fabricated and the surface quality of the braid fabricated is deteriorated. In the case of a textured yarn, glare can be reduced because the fiber form is partially different.

[0052] As the yarn form of the textured yarn, a multifilament is usually used.

[0053] As the textured yarn, a yarn subjected to false twist processing is preferable in order to sufficiently cover the monofilament B and to reduce glossiness.

[0054] Examples of the material of the textured yarn include polyester, polypropylene, and nylon, and polyester and nylon, which are easy to dye due to their superior multicolor development and color developability, are preferable.

[0055] In the case of polypropylene, it is difficult to dye by a normal method, and there is a problem of lacking versatility, and in the case of nylon, there are restrictions in terms of light resistance and flexural rigidity. Polyester is preferable because of its superior dyeability and moderate flexural rigidity.

[0056] The fineness of the textured yarn is 50 dtex or more, and is preferably 50 dtex to 2000 dtex in terms of successfully imparting a spun-like texture of a braid and in terms of rigidity. In particular, 100 dtex to 1000 dtex, and further 100 dtex to 600 dtex are preferable in terms of further glare reduction and productivity of covering. Furthermore, while increasing the coverage of the monofilament B, the monofilament B maintains lightweight feeling and is superior in high-order processability. In addition, covering the monofilament B with a textured yarn having a small fineness can suppress "glare" thanks to irregular reflection of light.

[0057] The method for covering the monofilament B with a textured yarn is not limited as long as the conditions specified in the present invention are satisfied, but it is preferable to perform double covering or single covering, which can reduce glare, and especially, double covering is preferable.

[0058] The number of turns of the covering yarn is preferably 300 to 3000 T/m. In addition, the number of turns of the textured yarn is preferably 300 T/m to 2000 T/m from the viewpoint of balancing an increased coverage of the monofilament B, a maintained lightweight feeling, and high-order processability.

[0059] By using a multifilament as a textured yarn, the glare of the braid is reduced, so that the quality can be improved.

[0060] The ratio of the maximum reflection intensity to the minimum reflection intensity of the covering yarn (maximum reflection intensity/minimum reflection intensity) is 2.8 or less. In addition, a ratio of 2.5 or less is preferable in view of the less glare of the braid.

[0061] Such a covering yarn can be obtained by a method of covering a monofilament with a textured yarn such as a false twisted yarn using a covering machine.

[0062] Since the glare of the covering yarn is reduced by covering the monofilament B with the textured yarn, it is possible that the degree of gloss is made to have a preferable range of 20 or less in reflection intensity at a light receiving angle of 0°, and in a more preferable embodiment, a more preferable range of 18 or less can be achieved.

[0063] Furthermore, the covering yarn is allowed to have a maximum reflection intensity at a light receiving angle of 0 to 80° within a preferable range of 50 or less because glare is reduced, and in a more preferable embodiment, it is also possible to achieve a more preferable range of 40 or less or a particularly preferable range of 35 or less.

[0064] Using the synthetic fiber monofilament A and/or the covering yarn as described above makes it possible to reduce glare when processed into a braid. Hereinafter, such synthetic fiber monofilament A and covering yarn may be referred to as special monofilament.

(Braid)

[0065] The braid of the present invention can be obtained by fabricating a braid using the special monofilament described above.

[0066] The structure of a braid at the time of fabricating the braid is not particularly limited, and is commonly a flat-braided structure, but is not specified as long as it is in the form of a tape capable of forming a hat by spirally stitching it.

[0067] In the case of flat braiding, a braid can be fabricated using a common flat braiding machine.

[0068] In the fabrication of a braid, the braid can be formed by braiding one or more fibers including the special monofilament, and particularly, it is preferable to form a braid in which plaited yarns (for example, 6 to 16 yarns) are braided with respect to core yarns (for example, 4 yarns) as cores.

[0069] In the present invention, the special monofilament is preferably used for plaited yarns because the effect of suppressing glare can be sufficiently utilized.

[0070] In this case, it is preferable to use a multifilament in combination with a special monofilament. As a mode of the combination, there may be employed either a mode in which a special monofilament and a multifilament are combined beforehand and used in the form of a plaited yarn or a mode in which a special monofilament and a multifilament are used as separate plaited yarns. However, a mode in which a special monofilament and a multifilament are adjacently combined is preferable, and an embodiment in which a special monofilament and a multifilament are combined beforehand and used in the form of a plaited yarn is preferable from the viewpoint of productivity of a braid and unwinding property of a yarn. In particular, it is preferable that the synthetic fiber monofilament A and the multifilament are combined beforehand and then used as a plaited yarn from the viewpoint of the productivity of a braid.

[0071] Examples of such a multifilament preferably include a polyester multifilament and a polyamide multifilament of textured yarns, and a polyester multifilament is particularly preferable from the viewpoint of flexural rigidity and light resistance.

[0072] As the multifilament of the textured yarn, it is preferable to use a textured yarn rather than a drawn yarn having a straight fiber form. When a drawn yarn is used, since the form of the fiber is straight, glare tends to be strong when a braid is fabricated and the surface quality of the braid tends to be deteriorated. In the case of a textured yarn, glare can be reduced because the fiber form is partially different. As the textured yarn, a false twisted yarn, a partially fused yarn, a Taslan textured yarn, a grandrelle yarn, etc. are desirable, and among them, preferred is a yarn capable of imparting a texture like natural fibers to a braid by having a difference in density of dyeing (hereinafter also referred to as a dyeing difference) in the longitudinal direction of the yarn. A partially fused yarn is preferable as such a yarn having a dyeing difference in the longitudinal direction. By dyeing yarns, glare can be further reduced in the case of fabricating a braid, and a natural texture due to a difference in density of dyeing can be imparted.

[0073] Among them, a method is preferable in which a multifilament is spun, then subjected to partial fusion processing of partially fusing, and then dyed using a cheese dyeing machine. This makes it possible to obtain a crispy feeling and a difference in density of dyeing, and as a result, it is possible to obtain a fineness difference and a color difference like natural fibers.

[0074] The multifilament having such a dyeing difference can be produced by controlling drawing conditions, specifically, by forming a weakly drawn part having a relatively low drawing ratio and a strongly drawn part having a relatively high drawing ratio during drawing. Since the melting point of the weakly drawn part is lower than that of the strongly drawn part, the weakly drawn part is fused by heating in a heat setting step after drawing to form a partially fused yarn that is partially fused. When such a partially fused yarn is used, a dyeing difference can be developed. It is preferable in that a difference in color density is produced by partially having a dye adhesion difference and an appearance like natural fiber such as straw and hemp can be obtained. The term "dyeing difference" as used herein refers to a difference in dye attachment, that is, a difference in ease of attachment of a dye to a fiber. This effect is particularly remarkable when a multifilament of polyester such as polyethylene terephthalate is used.

[0075] A difference in fineness and a difference in color like natural fibers can be obtained by developing a crispy feeling and a difference in density of dyeing by spinning a polyester filament, then partially fusing the polyester filament, and further performing false twist processing. Specifically, it is obtained by partially performing fusion processing and performing dyeing using a cheese dyeing machine. In the technique of partial fusion, the model of the device, process, conditions, etc. to be used for the production may not be specially selected, but it is desirable that there are five or more fused parts per meter. When the number of the fused parts is less than five, the dyeing difference is small and the change in hardness is small, so that a monotonous texture is obtained. Conversely, when the number of fused parts is increased, the hardness of the fused parts is noticeable, so that the texture is poor and the rough hardness is increased.

[0076] In the present invention, it is particularly preferable to use a textured yarn prepared by performing yarn processing of partial fusion using a highly oriented undrawn yarn of a normal polyester multifilament, and then performing dyeing and antibacterial processing or UV cut processing using a cheese dyeing machine.

[0077] In the braid of the present invention, a spun yarn is preferably used in combination to prevent the yarn constituting the braid from slipping off during the fabrication of the braid, and especially in a plaited braid, a spun yarn is preferably used in combination to prevent a plaited yarn from slipping off from a core yarn.

[0078] The spun yarn is preferably constituted of dyeable fibers such as polyester fibers, polyamide fibers, acrylic fibers, cotton, and wool. These can be used singly or in combination of two or more species thereof. In the case of an original yarn incapable of being dyed, such as polypropylene fibers, versatility is poor and color development is difficult. Since such an original yarn can be provided with a color by dope dyeing, it can be used and it can be mixed spun with other fibers, but fine adjustment of the color is difficult and the lot is necessarily large, so that it is not suitable for the braid fabrication with a small amount of original yarn used. Among them, polyester fibers and polyamide fibers are preferably used.

[0079] Therefore, as the spun yarn, a polyester spun yarn and a polyamide spun yarn are preferable, and among them, the polyester spun yarn is particularly preferable because it has strong flexural rigidity, increases the width of a braid, and increases the rigidity of the braid. In addition, it is also possible to further increase the rigidity of a braid by using a spun yarn containing a fused polyester or a fused nylon raw cotton and fusing the spun yarn.

[0080] The spun yarn is used as a constituent yarn of a braid, but in a plaited braid, it is suitably used as both a plaited yarn and a core yarn. In particular, the spun yarn is preferably used as a core yarn. If necessary, the spun yarn can be used in the form of a plaited yarn.

[0081] The fineness of the spun yarn is preferably 50 or less in cotton count, and particularly preferably 4 to 50, for form stability in sewing and hats. In particular, when used as a core yarn, the fineness is preferably 20 or less, and particularly preferably 4 or more and 20 or less.

[0082] In addition, if the B value of the flexural rigidity is excessively small, the width of the braid is likely to be irregular and the stability at the time of sewing into a hat is also impaired. Therefore, the B value of the flexural rigidity of the braid is desirably 0.002 ($N \cdot cm^2$/yarn) or more.

[0083] In addition, appropriate flexibility is necessary in consideration of storability and home washing, and therefore, the B value of the flexural rigidity of the plaited braid is preferably 0.025 ($N \cdot cm^2$/yarn) or less, and preferably 0.019 ($N \cdot cm^2$/yarn) or less.

[0084] Since quick shape recovery is required after storage in a bag or the like, the plaited braid preferably has a flexural hysteresis 2HB value of 0.01 (N·cm/yarn) or less. The lower limit is preferably 0.0005 (N·cm/yarn) or more, more preferably 0.001 (N·cm/yarn) or more, and even more preferably 0.003 (N·cm/yarn) or more.

[0085] The spun yarn can be dyed with a dye suitable for the material of the spun yarn such as a disperse dye using a cheese dyeing machine through a common spinning process. Furthermore, those subjected to various types of processing such as antibacterial processing, UV cut processing, and water repellent processing can also be suitably used.

[0086] A method for producing the spun yarn is described below.

[0087] Preferably, spinning is carried out using a common ring spinning machine and twist stopping set is carried out.

[0088] When a spun yarn is formed into a braid, the spun yarn is required to have high flexural rigidity and high tensile strength, and is preferably one having lightweight feeling.

[0089] In order to improve the flexural rigidity and the flexural recoverability of the spun yarn, a two ply yarn or a three ply yarn is desirable. In addition, since lightweight feeling and dyeability when formed into a braid are also important, a hollow polyester is desirable.

[0090] The braid of the present invention can be fabricated using a common braiding machine. Among them, a braid fabricated using a general flat-braiding machine is preferably a set of seven yarns or a set of nine yarns.

[0091] In the present invention, since the width of a plaited braid varies depending on the flexural rigidity of the braid, it is preferable to insert two or more core yarns. When a braid is used for a straw hat, ease of sewing affects the surface quality of the straw hat, and thus it is preferable to appropriately select the width of the braid and the number of yarns plaited.

[0092] The braid width is preferably 5 mm or more, and the number of yarns plaited is preferably 5 or more and 16 or less.

[0093] The braids prepared using synthetic fibers proposed so far have a problem in glossiness because monofilaments having strong flexural rigidity are used, and when no monofilament is used, the braid is insufficient in flexural rigidity and there is a problem in quality as a hat as described above.

[0094] In the present invention, the content of the synthetic fiber monofilament A and/or the monofilament B in the braid is preferably 3 to 60% by weight.

[0095] As an effect required by the present invention, it is possible to suppress the surface gloss of monofilaments by forming fine irregularities on the surface of the synthetic fiber monofilament A by performing weight reduction processing or covering the monofilament B with a bulky textured yarn, to reduce glare peculiar to synthetic fibers and to improve the appearance quality of the braid. By using a special monofilament that is thick and has no glossiness, the rigidity of the braid can be maintained and bounce can be obtained.

[0096] In addition to the above, it is preferable that a textured yarn of a polyester multifilament is used as a textured yarn together with a monofilament and is partially fused because in this case, the fiber surface of the textured yarn is partially fused and, as a result, a difference in color density occurs due to the dyeing difference between the unfused parts and the fused parts, so that when a braid is fabricated, a touch feeling and a hue of the textured yarn that are non-uniform are imparted to the braid and a spun-like texture is obtained.

[0097] The thus-obtained braid of the present invention can reduce the glossiness of a normal monofilament while using a monofilament, has bounce while having the texture and appearance quality of a textured yarn, forms a braid superior in home washing, storability, and lightweight feeling, eliminates the "glare", which has heretofore been believed as a major defect, establishes the surface quality without "glare" or "shininess", and can afford a braid of a textured yarn without the glossiness of synthetic yarns.

[0098] In the production of the synthetic fiber monofilament A, the monofilament B, and the textured yarn, it is preferable that the spinneret in the spinning step is made to have a modified cross section and is varied in cross-sectional form (various forms such as cloud-like form, hollow form, and octofoil form), or particles (titanium oxide and silica such as colloidal silica are preferable) capable of forming fine irregularities by weight reduction processing are included in an original yarn because the gloss of the yarn can be further reduced and a greater effect is given to the present invention.

[0099] Since the braid of the present invention has the above characteristics, it is extremely suitable for hats, but its use is not limited thereto, and can be suitably used for bags, baskets, furniture, and seats.

[0100] In particular, hats using a braid have bounce like that of straw and hemp, and also have launderability, and thus have more practicality than hats made of natural fibers such as straw hats.

EXAMPLES

[0101] Hereinafter, the present invention will be described in detail based on Examples, but the present invention is not necessarily limited thereto.

(Evaluation methods)

[0102] The monofilaments produced according to the present invention were analyzed by the following methods.

[0103] Degree of gloss and reflection intensity:
The degree of gloss and the reflection intensity were measured using a gonio photometer GP-200 (manufactured by MURAKAMI COLOR RESEARCH LABORATORY CO., LTD.).

[0104] Using the gloss meter, when the incident angle was set to 60° and the full scale of a standard white board was set to 200, the light receiving angle was varied, and the reflection intensity at a light receiving angle of 0°, the maximum reflection intensity at a light receiving angle of 0 to 80°, the minimum reflection intensity at a light receiving angle of 0 to 80°, and the ratio of the maximum reflection intensity to the minimum reflection intensity were determined. As for the reflection intensity, the smaller the value thereof, the less the glare and the better the reflection intensity.

[0105] Flexural rigidity, flexural hysteresis:
The flexural rigidity in the present invention was measured using a KES-FB2 pure bending tester (manufactured by KATO TECH CO., LTD.) as an evaluation instrument. Four monofilaments were aligned at equal intervals in a distance of 1 cm, followed by measurement. A flexural rigidity B value and a flexural hysteresis 2HB value at the time of bending were measured.

[0106] The larger the B value, the higher in rigidity and the more tenacious the sample. In addition, the flexural hysteresis 2HB value when the monofilament is bent is measured. The smaller this value, the less in strain, the more in tenacity, and the higher in repulsion the monofilament.

Fineness

[0107] The fineness of monofilaments was measured in accordance with the L 1013: 2010 8.3.1 A method.
[0108] The fineness of textured yarns was measured in accordance with the L 1013: 2010 8.3.1 B method.

Yarn diameter

[0109] b The yarn diameter of monofilaments was measured using an optical microscope BH2 manufactured by Olympus Corporation. The diameter was determined from microscopic observation of the side surface of the monofilament, measured 10 times per level, and the yarn diameter was measured by the arithmetic average value.
[0110] The braids fabricated according to the present invention were analyzed by the following methods.
[0111] Flexural rigidity:
The flexural rigidity in the present invention was measured using a KES-FB2 pure bending tester (manufactured by KATO TECH CO., LTD.) as an evaluation instrument. One braid was set and measured. A flexural rigidity B value and a flexural hysteresis flexural hysteresis 2HB value at the time of bending were measured.
[0112] The larger the B value, the higher in rigidity and the more tenacious the sample. In addition, a flexural hysteresis flexural hysteresis 2HB value at the time of bending a braid is measured. The smaller this value is, the less distorted, the more tenacious, and the more resilient the braid is.
[0113] Evaluation of special monofilament content in braid:
The braid produced was cut into 1 m, and decomposed into a monofilament, a textured yarn, and a spun yarn, and the mass of each of them was measured. The measurement was performed five times, and the average value thereof was determined up to three significant figures and taken as the content.
[0114] Evaluation of hats:
Hats were analyzed by the following methods.
[0115] By sensory evaluation performed by five examiners, the bounce and the degrees of reduced glossiness of the hats were evaluated. The evaluation was performed at 5 levels based on the following criteria. Note that the evaluation supported by the largest number of examiners was adopted, and when there were evaluations supported by the same number of examiners, the lowest evaluation result was adopted.
[0116] Bounce of hat:

5: When a hat is grasped with a hand, it exhibits a tenacious feel and is not crushed.
4: When a hat is grasped with a hand, it exhibits a tenacious feel and is hardly crush.
3: When a hat is grasped with a hand, it exhibits a tenacious feel and is slightly crushed.
2: When a hat is grasped with a hand, it exhibits a limp feel and is slightly easily crushed.
1: When a hat is grasped with a hand, it exhibits a limp feel and is easily crushed.

[0117] Degree of little gloss of hats:

5: The hat does not glitter under natural light.
4: The hat looks slightly glittering under natural light.
3: The hat looks partially glittering under natural light.
2: The hat looks glittering under natural light.
1: The hat looks strongly glittering under natural light.

EXAMPLE 1

[0118] Used was a polyester (PET) monofilament comprising 0.3% by weight of titanium oxide and 1.5% by weight of dry silica and having a yarn diameter before weight reduction of 200 μm (the cross-sectional shape of a cross section perpendicular to the major axis direction: round cross section).
[0119] Using a cheese dyeing machine, polyester monofilament cheese was immersed in an environment of 30% o.w.f of sodium hydroxide at 120°C for 30 minutes to be subjected to weight reduction processing, so that the weight thereof was reduced by 15% in a weight% ratio with respect to that before the processing to form fine irregularities on the surface (the fineness of synthetic fiber monofilament A after the 15% weight reduction = about 386 dtex). The reflection intensity, flexural rigidity and flexural hysteresis of the monofilament were measured. The measurement results are shown in Table 1. The surface condition of the monofilament was observed with a scanning electron microscope (SEM) and shown in Fig. 1. Fig. 1 is a photograph substituted for drawing that shows the surface condition of the synthetic fiber monofilament A used in Example 1. Fine irregularities are formed on the surface of the polyester monofilament which is a synthetic fiber monofilament A1.

[0120] The monofilaments prepared by the method described above and the textured yarn of the polyester multifilament (total fineness: 700 T) were aligned to form a 9-string flat braid plaited yarn. As the polyester textured yarns, partially fused yarns were used. Braid fabrication was performed using polyester spun yarns 10/2S as the four core yarns, so that a flat braid having a width of 8 mm was produced.

[0121] The braid was spirally sewn with a sewing machine and heat-set at 180°C with a mold to prepare a hat. In the hat obtained, the polyester multifilament was partially fused, and the frequency thereof was 50 sites/m.

EXAMPLE 2

[0122] A polyester (PET) monofilament containing only 0.5% by weight of titanium oxide and having a yarn diameter of 200 μm as a core was double-covered at 800 T/m with a polyester (PET) false twisted yarn of 166 dtex. A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except for the above.

EXAMPLE 3

[0123] A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except that a polyester (PET) monofilament containing 0.3% by weight of titanium oxide and 1.5% by weight of dry silica and having a yarn diameter of 300 μm was used.

EXAMPLE 4

[0124] A polyester (PET) monofilament containing only 0.5% by weight of titanium oxide and having a yarn diameter of 150 μm as a core was double-covered at 800 T/m with a polyester (PET) false twisted yarn of 166 dtex. A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except for the above.

COMPARATIVE EXAMPLE 1

[0125] A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except that a polyester (PET) monofilament containing only 0.5% by weight of titanium oxide and having a yarn diameter of 200 μm was used and weight reduction processing was not performed.

COMPARATIVE EXAMPLE 2

[0126] A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except that a polyester (PET) monofilament containing only 3% by weight of titanium oxide and having a yarn diameter of 200 μm was used and weight reduction processing was not performed.

COMPARATIVE EXAMPLE 3

[0127] A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except that a polyester (PET) monofilament containing 0.3% by weight of titanium oxide and 1.5% by weight of dry silica and having a yarn diameter of 100 μm was used.

COMPARATIVE EXAMPLE 4

[0128] A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except that a polyester (PET) monofilament containing only 3% by weight of titanium oxide and having a yarn diameter of 680 μm was used.

COMPARATIVE EXAMPLE 5

[0129] A polyester (PET) monofilament containing only 0.3% by weight of titanium oxide and having a yarn diameter of 200 μm was double-covered at 800 T/m with a polyester (PET) false twisted yarn of 33 dtex. A flat braid having a width of 8 mm and a hat were obtained by the same production methods as in Example 1 except for the above.

[Table 1-1]

		Example 1	Example 2	Example 3	Example 4
Yarn diameter of monofilament [μm]		200 (before weight reduction)	200	300 (before weight reduction)	150
Fineness of monofilament [dtex]		454 (before weight reduction) 386 (after weight reduction)	444	824 (before weight reduction) 700 (after weight reduction)	220
Fineness of textured yarn [dtex]		None	166	None	166
Flexural rigidity B value of monofilament [N ▪ cm^2/yarn]		0.0045	0.0054	0.0321	0.0022
Flexural hysteresis 2HB of monofilament [N • cm/yarn]		0.00118	0.00194	0.0025	0.00155
Special monofilament	Reflection intensity at a light receiving angle of 0°	14.3	17.9	17.9	19.3
	Minimum reflection intensity	14.2	17.7	16.4	19.3
	Maximum reflection intensity	31.5	35.3	38.5	48.5
	Maximum reflection intensity/minimum reflection intensity	2.21	1.99	2.35	2.52

[Table 1-2]

	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5
Yarn diameter of monofilament [μm]	200	200	100 (before weight reduction)	680 (before weight reduction)	200
Fineness of monofilament [dtex]	444	444	110 (before weight reduction) 94 (after weight reduction)	5294 (before weight reduction) 4500 (after weight reduction)	444
Fineness of textured yarn [dtex]	None	None	None	None	33
Flexural rigidity B value of monofilament [N • cm^2/yarn]	0.0055	0.0044	0.0008	0.0792	0.0058
Flexural hysteresis 2HB of monofilament [N • cm/yarn]	0.00185	0.00190	0.00042	0.00012	0.00192

(continued)

		Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5
Special monofilament	Reflection intensity at a light receiving angle of 0°	21.1	37.1	15.3	43.3	43.3
	Minimum reflection intensity	21.1	36.4	15.2	43.3	43.2
	Maximum reflection intensity	115.9	86.8	32.9	138.2	96.2
	Maximum reflection intensity/ minimum reflection intensity	5.49	2.39	2.16	3.19	2.23

[Table 2-1]

	Example 1	Example 2	Example 3	Example 4
Flexural rigidity B value of braid [N • cm^2/yarn]	0.0163	0.0182	0.0892	0.0128
Flexural hysteresis 2HB of braid [N • cm/yarn]	0.0087	0.0092	0.0094	0.0092
Special monofilament content in braid	35	33	40	34
Sensory evaluation of bounce of hat [Five levels]	4	5	5	4
Sensory evaluation of degree of little gloss of hat [Five levels]	5	4	4	4

[Table 2-2]

	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5
Flexural rigidity B value of braid [N • cm^2/yarn]	0.0178	0.0159	0.0024	0.5492	0.0232
Flexural hysteresis 2HB of braid [N • cm/ yarn]	0.0075	0.0082	0.0036	0.0012	0.0094
Special monofilament content in braid	38	38	34	48	33
Sensory evaluation of bounce of hat [Five levels]	4	4	1	5	4
Sensory evaluation of degree of little gloss of hat [Five levels]	1	2	4	1	2

[0130] Table 1 shows the comparison of the monofilaments and the covering yarns obtained by the methods described above.

[0131] As shown in Table 1, there was a significant difference in the maximum reflection intensity, the minimum reflection intensity, and the reflection intensity at 0° between Example 1 using a polyester monofilament with less glare of the present invention and Comparative Examples 1 and 2 using polyester monofilaments obtained by a conventional method. As described above, the lower the reflection intensity, the weaker the glossiness, and the smaller the difference between the maximum degree of gloss and the minimum degree of gloss, the less the gloss.

[0132] Therefore, it can be said that the monofilament of Example 1 is one having a low degree of gloss and less glare while having flexural rigidity and flexural hysteresis equivalent to those of Comparative Examples 1 and 2.

[0133] Example 1 is equivalent in degree of gloss to Comparative Example 3, but has a high flexural rigidity, and a braid obtained therefrom can be said to be a braid superior in shape retainability and storability.

[0134] Examples 1 and 3 have less glare and superior appearance quality as compared to Comparative Example 4. In addition, since these examples have appropriate flexural rigidity, it can be said that the braids obtained therefrom are braids having superior storability as compared to Comparative Example 4.

[0135] In Example 2, the coverage ratio of the false twisted yarn with respect to the monofilament is high while having flexural rigidity equivalent to that of Comparative Example 5, so that a braid that is lower in glossiness and superior in appearance quality than Comparative Example 5 can be obtained. In addition, since the fineness of the false twisted yarn is 166 tex, the productivity of double covering is higher than that of Comparative Example 5.

[0136] As shown in Table 2, comparison was made between Examples 1 to 4 of the braids with less glare of the present invention and Comparative Examples 1 to 5 of the braids obtained by conventional methods. Regarding the flexural rigidity, Example 1 has flexural rigidity and flexural hysteresis equivalent to those of Comparative Examples 1 and 2, but has remarkably superior low gloss.

[0137] The braid of Example 1 is higher in flexural rigidity and flexural hysteresis value than the braid of Comparative Example 3, and can be said to be a braid superior in shape retainability and storability.

DESCRIPTION OF REFERENCE SIGNS

[0138] 1: Synthetic fiber monofilament

Claims

1. A braid fabricated using a synthetic fiber monofilament A satisfying the following (1) to (3) and/or a covering yarn in which a periphery of a monofilament B satisfying the following (1) is covered with a textured yarn and which satisfies the following (4) to (5),

   (1) a fineness is 150 dtex or more and 3000 dtex or less,
   (2) a maximum reflection intensity at a light receiving angle of 0 to 80° is 50 or less,
   (3) a ratio of the maximum reflection intensity to a minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) is 2.8 or less,
   (4) a fineness of the textured yarn is 50 dtex or more,
   (5) a ratio of a maximum reflection intensity to a minimum reflection intensity (maximum reflection intensity/minimum reflection intensity) of the covering yarn is 2.8 or less.

2. The braid according to claim 1, wherein the synthetic fiber monofilament A satisfies the following (6),
   (6) a degree of gloss is 20 or less in reflection intensity at a light receiving angle of 0°.

3. The braid according to claim 1 or 2, wherein the synthetic fiber monofilament A is obtained by subjecting a monofilament comprising 0.01 to 10% by weight of titanium oxide and 0.01 to 10% by weight of silica to alkali weight reduction processing.

4. The braid according to claim 1 to 3, wherein the synthetic fiber monofilament A satisfies the following (7) to (8),

   (7) a B value of flexural rigidity is 0.002 (N·cm^2/yarn) or more,
   (8) a flexural hysteresis 2HB value is 0.003 (N·cm/yarn) or less.

5. The braid according to any one of claims 1 to 4, wherein a content of the synthetic fiber monofilament A and/or the monofilament B is 3 to 60% by weight.

6. The braid according to any one of claims 1 to 5, wherein at least the synthetic fiber monofilament A and/or the textured yarn is dyed.

7. The braid according to any one of claims 1 to 6, wherein the synthetic fiber monofilament A and/or the covering yarn is braided with an adjacent multifilament.

8. The braid according to any one of claims 1 to 7, wherein a core yarn is plaited against a plaited yarn to form the braid, the core yarn comprises a spun yarn, and the plaited yarn comprises the synthetic fiber monofilament A and/or the covering yarn.

9. The braid according to claim 8, wherein the spun yarn is a spun yarn comprising one or more species selected from among polyester fiber, polyamide fiber, acrylic fiber, cotton, and wool.

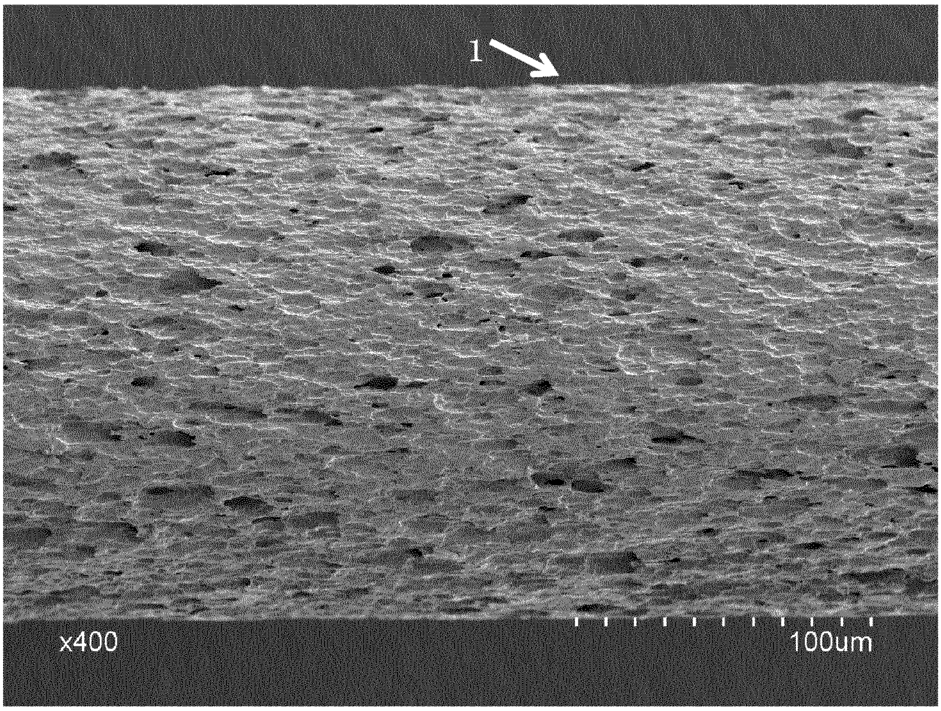
10. The braid according to claim 8 or 9, wherein the spun yarn has a fineness of 4 to 50 in cotton count.

11. The braid according to any one of claims 7 to 10, wherein the multifilament has a dyeing difference in a longitudinal direction.

12. The braid according to any one of claims 1 to 11, wherein use thereof is a hat.

13. A hat constituted of the braid according to any one of claims 1 to 11.

Fig. 1



INTERNATIONAL SEARCH REPORT

International application No. PCT/JP2020/008153

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. D04C1/02(2006.01)i, A42C1/00(2006.01)i, D04C1/06(2006.01)i
FI: D04C1/02, A42C1/00C, D04C1/06Z

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. D04C1/02, A42C1/00, D04C1/06

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	1971-2020
Registered utility model specifications of Japan	1996-2020
Published registered utility model applications of Japan	1994-2020

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.
A	JP 8-158218 A (UNITIKA LTD.) 18.06.1996 (1996-06-18), paragraphs [0004], [0028], claim 1	1-13
A	JP 2018-71017 A (ARTNATURE CO., LTD.) 10.05.2018 (2018-05-10), paragraph [0002]	1-13
A	JP 2009-235591 A (TORAY INDUSTRIES, INC.) 15.10.2009 (2009-10-15), paragraphs [0002], [0003], claims	1-13
A	JP 2005-226169 A (OPELONTEX CO., LTD.) 25.08.2005 (2005-08-25), example 3, claims	1-13
A	JP 2009-301880 A (ASAHI KASEI FIBERS CORPORATION) 24.12.2009 (2009-12-24), example 1, claims	1-13

☐ 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
20.04.2020	28.04.2020

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2020/008153

JP 8-158218 A	18.06.1996	(Family: none)
JP 2018-71017 A	10.05.2018	(Family: none)
JP 2009-235591 A	15.10.2009	(Family: none)
JP 2005-226169 A	25.08.2005	(Family: none)
JP 2009-301880 A	24.12.2009	(Family: none)

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

REFERENCES CITED IN THE DESCRIPTION

Patent documents cited in the description

- JP 2005015960 A **[0009]**
- JP 2000017553 A **[0009]**