(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 151 786 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
22.03.2023 Bulletin 2023/12

(21) Application number: **21834280.6**

(22) Date of filing: **24.06.2021**

(51) International Patent Classification (IPC):
D02G 3/42 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
D02G 3/42

(86) International application number:
PCT/JP2021/024010

(87) International publication number:
WO 2022/004557 (06.01.2022 Gazette 2022/01)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **29.06.2020 JP 2020111180**

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

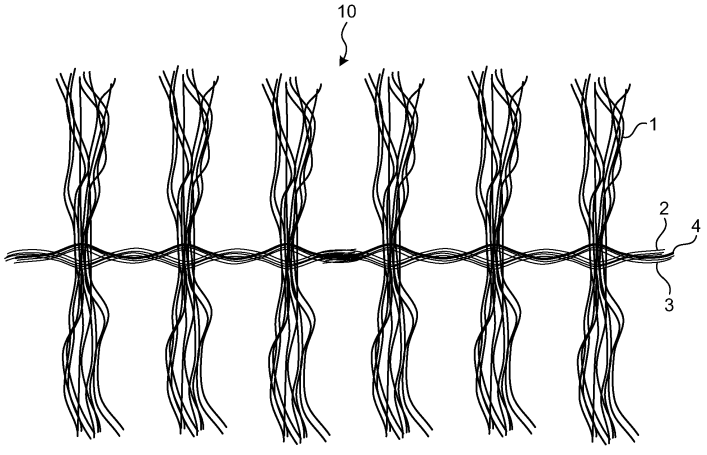
(72) Inventors:
- **SHIBATA, Takashi**
  Otsu-shi, Shiga 520-8558 (JP)
- **KAJIWARA, Kentaro**
  Otsu-shi, Shiga 520-8558 (JP)
- **FUNATSU, Yoshitsugu**
  Otsu-shi, Shiga 520-8558 (JP)

(74) Representative: **Prüfer & Partner mbB**
Patentanwälte · Rechtsanwälte
Sohnckestraße 12
81479 München (DE)

(54) **CHENILLE YARN, FIBER PRODUCT, GARMENT, AND BEDDING**

(57) An object of the present invention is to provide a chenille yarn having a superior bulkiness suitable as a stuffing material for clothing and bedding, and a textile product including this yarn. This object can be achieved by a chenille yarn including a twisted yarn formed of a core yarn and a pressing yarn, in which a decorative yarn is fused and fixed between the core yarn and the pressing yarn, and the decorative yarn has a crimp having a radius of curvature of 0.5 mm or more to 5.0 mm or less.

FIG.1



EP 4 151 786 A1

Description

Field

[0001] The present invention relates to a chenille yarn having a superior bulkiness suitable as a stuffing material for clothing and bedding, as well as to a textile product, clothing, and bedding.

Background

[0002] It is not overstatement to say that a technological innovation in a new synthetic fiber technology has been motivated by imitation of a natural material, and various technical proposals have been made to express the functions derived from a complex structural form of a natural material.

[0003] The Natural down is widely used, because of its excellent balance of properties, as a high-functionality padding in a wide range of products, including fiber bedding such as a comforter and a pillow, and clothing such as a winter cloth.

[0004] On the other hand, in various material forms such as felt padding, fiberballs, and filament type padding, there have also been many technical proposals in a synthetic fiber padding that requires functionality and stable supply, which are the characteristics unique to synthetic fibers. In order to achieve both the mechanical properties such as bulkiness and compression recovery of down and a soft texture unique to down, there have been several technical proposals in the form of filament type padding that is obtained by bundling bulky processed yarns having a large loop.

[0005] However, the filament type padding having such a large loop is prone to snag due to the interlocking of the loops between the processed yarns that make up the padding.

[0006] When the filament type padding is filled into a product, it is difficult to use the method in which an air is blown as in the case of the down, so in many cases, the method in which sewing is done after the filament type padding is arranged on a fabric in advance is used. However, when the padding is taken out from a packing case, a process trouble such as thread breakage is prone to occur, so that there has been a need to improve the handling property of a bulky yarn that constitutes the filament type padding.

[0007] As for the form of a bulky yarn that constitutes the filament type padding to solve such problem, besides the processed yarn in which a core yarn and a sheath yarn are intertwined and fixed by a fluid processing, there is a chenille yarn in which the core yarn and a pressing yarn are twisted together, and a decorative yarn is sandwiched between the core yarn and the pressing yarn.

[0008] Patent Literature 1 proposes the chenille yarn in which a yarn strip for a decorative yarn having a predetermined length is sandwiched between the core yarn and the pressing yarn, and then, cutting of the yarn strip for the decorative yarn and twisting of the core yarn with the pressing yarn are conducted; and a woven knitted fabric using this chenille yarn. However, the chenille yarn described in Patent Literature 1 was a chenille yarn mainly applicable to a woven knitted fabric, so that the radius of curvature of the decorative yarn was small and the bulkiness thereof was insufficient.

[0009] Patent Literature 2 proposes a filter material obtained by cutting a chenille yarn that is obtained by the method in which after a chenille yarn is formed, a fusing component is melted out during thermal welding to form voids, which is then followed by fluffing up twisted yarns. The chenille yarn used in Patent Literature 2 is the chenille yarn using, in a core yarn, a pressing yarn, and a decorative yarn, the twisted yarn of a high-melting point polyester short fiber that is blended with a core-sheath composite short fiber using a high melting point polyester as the core yarn and a low-melting point polyester as the sheath yarn; here, the short fiber formed of the high melting point polyester that constitutes the twisted yarn of the chenille yarn is fluffed to ensure a superior void property thereby enabling to efficiently capture a suspended substance in the effluent. However, the purpose of Patent Literature 2 is the filter material in which the decorative yarn also contains a fusing component, and the twisted yarn is used to fluff the constituent yarns; thus, this chenille yarn is high in density and low in bulkiness.

[0010] Patent Literature 3 proposes the chenille yarn, in which a synthetic fiber is used as a decorative yarn to which a pigment whose color is reversibly changeable by heat, having an average particle diameter of 0.1 to 30 um with a ratio of 0.1 to 30% by weight is adhered in the state of dispersion. Here, the color changes reversibly in the ambient temperature range of life, and the thermal color-changing function can be sustainably expressed even when repeated, and at the same time, the soft texture that is unique to the chenille yarn can be retained. In Patent Literature 3, it is essential to contain the pigment whose color is reversibly changeable by heat, and in addition, this is used as a design yarn; thus, this chenille yarn was insufficient in the bulkiness as the stuffing material for clothing and bedding.

[0011] Patent Literature 4 proposes a chenille yarn that is obtained by a known processing method using a spun yarn, which is obtained by blending nylon with a parallel composite yarn of polypropylene and polyethylene or with a composite yarn of polypropylene and polyethylene, as the core yarn, and a nylon spun yarn, a worsted yarn, a polyacrylonitrile spun yarn, or a cotton spun yarn as the decorative yarn. Patent Literature 4 is a chenille yarn that contains a certain amount of a thermally adherable composite fiber in order to strengthen the fixation of the decorative yarn by fusion in order that the decorative yarn is made difficult to come out. Because the decorative yarn is difficult to come out, the

materials that have been difficult to be used in the past can be used for the decorative yarn; but these are the chenille yarn used for conventional uses so that they are insufficient in bulkiness as the stuffing material for clothing and bedding.

Citation List

Patent Literature

[0012]

Patent Literature 1: Japanese Patent Application Laid-open No. 2018-048412
Patent Literature 2: International Patent Application Laid-open No. 2012/077402
Patent Literature 3: Japanese Patent Application Laid-open No. 2003-278044
Patent Literature 4: Japanese Patent Application Laid-open No. H02-014035

Summary

Technical Problem

[0013] According to the conventional technologies, the bulkiness required for the use as the chenille yarn for an ornamental yarn, a mop, a mat, or the like, can be obtained, but for the use as a stuffing material for clothing and bedding, in all of them, the density has been too high and the bulkiness has been insufficient.

[0014] Thus, the present invention has an object to provide: a chenille yarn that has a high bulkiness and a low density thereby making this yarn to be usable as the stuffing material for clothing and bedding, and that is excellent in handling properties when filling as the stuffing material or in other occasions; and a textile product, clothing, and bedding, in which this yarn is used. Solution to Problem

[0015] To solve the problem described above, a chenille yarn, a textile product, clothing, and bedding according to the present invention includes the following configurations (1) to (9).

(1) A chenille yarn including a twisted yarn formed of a core yarn and a pressing yarn, in which a decorative yarn is fused and fixed between the core yarn and the pressing yarn, and the decorative yarn has a crimp having a radius of curvature of 0.5 mm or more to 5.0 mm or less.
(2) The chenille yarn according to (1), in which the decorative yarn is a hollow cross-section fiber including a hollow portion.
(3) The chenille yarn according to (1) or (2), in which the decorative yarn is a fiber composed of a single component.
(4) The chenille yarn according to any one of (1) to (3), in which a distance between points at which decorative yarns are fused and fixed is 1.0 mm or more to 4.0 mm or less.
(5) The chenille yarn according to any one of (1) to (4), in which a length of the decorative yarn is 20 mm or more to 40 mm or less.
(6) The chenille yarn according to any one of (1) to (5), in which the chenille yarn has a bulkiness of 90 cm^3/g or more.
(7) A textile product including the chenille yarn according to any one of (1) to (6).
(8) Clothing including a stuffing material including the chenille yarn according to any one of (1) to (6).
(9) Bedding including a stuffing material including the chenille yarn according to any one of (1) to (6). Advantageous Effects of Invention

[0016] According to the present invention, it is possible to provide: a chenille yarn that is high in bulkiness, low in density, and easy to handle when filling as the stuffing material or in other occasions; and textile products such as clothing and bedding using this chenille yarn.

Brief Description of Drawings

[0017]

FIG. 1 is a schematic drawing illustrating the composition of the chenille yarn according to the present invention.
FIG. 2 is a schematic drawing illustrating the measurement method of the radius of curvature of the decorative yarn.
FIG. 3 is a schematic drawing illustrating the distance between points at which the decorative yarns are fused and fixed.

Description of Embodiments

[0018] Hereinafter, the present invention will be specifically described together with the preferred embodiments.

[0019] As illustrated in FIG. 1, a chenille yarn 10 according to the present invention is the chenille yarn in which a decorative yarn 1 is sandwiched between a core yarn 2 and a pressing yarn 3 while being twisted together, and the decorative yarn is fused and fixed.

[0020] Here, the chenille yarn 10 is the processed yarn formed by sandwiching the decorative yarn 1 between the core yarn 2 and the pressing yarn 3 while being twisted together.

[0021] The core yarn 2 and the pressing yarn 3 in the present invention may be formed of the same yarn or different yarns. For example, when the same yarn is used for both the core yarn 2 and the pressing yarn 3, in the present invention, any one of them is the core yarn 2 and the other is the pressing yarn 3. The core yarn 2 and the pressing yarn 3 each may be a combination of multiple yarns.

[0022] In the present invention, the decorative yarn 1 is fused and fixed between the core yarn 2 and the pressing yarn 3. Here, the decorative yarn may be fused and fixed by the method using any one or both of the core yarn 2 and the pressing yarn 3 that is/are fusible, or using another fusing yarn 4 together with the core yarn 2 and the pressing yarn 3 when both the core yard 2 and the pressing yarn 3 are not fusible, as illustrated in FIG. 1.

[0023] In some parts of the specification of the present invention, when describing the composition of the chenille yarn 10, the state in which the core yarn 2, the pressing yarn 3, and the fusing yarn 4 are twisted together is described as the core yarn.

[0024] It is preferable that the core yarn 2, the pressing yarn 3, and the decorative yarn 1, which constitute the chenille yarn according to the present invention, be composed of a synthetic fiber.

[0025] The synthetic fiber is the fiber formed of a polymer; here, a fiber produced by melt spinning or solution spinning of a thermoplastic polymer may be used. A single fiber that constitutes the synthetic fiber may be either a fiber composed of a single component, or a composite fiber in which two or more polymers are arranged in the cross-section of the fiber.

[0026] Illustrative examples of the thermoplastic polymer that constitutes the synthetic fiber include melt-moldable polymers such as polyethylene terephthalate or a copolymer thereof, polyethylene naphthalate, polybutylene terephthalate, polytrimethylene terephthalate, polypropylene, polyolefins, polycarbonates, polyacrylates, polyamides, polylactic acid, and thermoplastic polyurethane. Among these thermoplastic polymers, polycondensation polymers such as polyester and polyamide are preferable because these are crystalline and have relatively high melting points, thereby allowing the bulky yarns to be resistant to deterioration or to fatigue even when they are heated at a relatively high temperature in a heat-treatment process such as in post-processing or in an actual use (for example, cleaning). From a viewpoint of the heat resistance, the melting point of the thermoplastic polymer is preferably 165°C or higher.

[0027] These thermoplastic polymers may contain various additives such as an inorganic substance including a titanium dioxide, a silica, a barium oxide, a carbon black, a colorant such as a dye and a pigment, a flame retardant, a fluorescent whitening agent, an antioxidant, and a UV absorber, the amount of these being to the extent not impairing the advantageous effects of the present invention.

[0028] As for the core yarn 2 and the pressing yarn 3 to be used in the chenille yarn 10 according to the present invention, a polymer having a superior tensile strength is preferable in order to make the chenille yarn easy to be handled, such as to prevent thread breakage from occurring when this is taken out from a bobbin or a packing bag upon filling into a textile product, which is the filling body. Illustrative examples of the thermoplastic polymer having a superior tensile strength include polyethylene terephthalate and polyamides such as nylon 6, nylon 66, and nylon 610. In addition to the tensile strength, from a viewpoint of providing flexibility as the chenille yarn, polyamide is more preferable, while nylon 66 is still more preferable from a viewpoint of heat resistance upon fusing and fixing the decorative yarn.

[0029] As for the decorative yarn 1 to be used in the chenille yarn 10 according to the present invention, it is preferable to use a fiber having a superior rigidity in order to have a sufficient bulkiness as the stuffing for clothing, bedding, and the like. Polyesters including polyethylene terephthalate are more preferable as the material by which rigidity can be easily obtained, while polyethylene terephthalate is still more preferable from a viewpoint of a heat resistance, similarly to the core yarn and the pressing yarns.

[0030] In the chenille yarn 10 according to the present invention, the cross-section of the synthetic fiber used for the core yarn 2, the pressing yarn 3, and the decorative yarn 1 may have any shape. Illustrative examples thereof include a round type, a triangular type, a cross-like type, a Y type, a polyphyllous type, a flat type, a multifin type, and those having a hollow portion. The synthetic fiber may be a single component fiber formed of a single polymer or a composite fiber formed of two or more polymers.

[0031] In particular, as for the decorative yarn 1 to be used in the present invention, from a viewpoint to ensure the bulkiness, the shape thereof is preferably the one that can increase the volume per fineness; thus, it is preferable that the fiber have a hollow portion in the cross-section that is perpendicular to the fiber length direction and that the hollow portion be continuous in the fiber length direction. The shape of the cross-section of the fiber having the hollow portion may be circular; and from a viewpoint of fine fineness, i.e., a light weight and easy to increase a volume, the fiber having

the hollow portion with the cross-section shape of a Y type, a polyphyllous type, a flat type, a multifin type, or the like is preferable.

[0032] In order to increase the bulkiness of the chenille yarn 10, when using the hollow cross-section fiber containing the hollow portion as the decorative yarn 1, it is preferable to use a synthetic fiber formed of a single component fiber. As going to be discussed below, the radius of curvature, which indicates the degree of crimp of the decorative yarn 1, is important to increase the bulkiness. The fiber composed of a single component is preferable not only from the viewpoint of increasing the fiber rigidity as mentioned above, but also because it is easier to adjust the radius of curvature by the spinning conditions such as the temperature of a cooling air and an air velocity as well as by the heat treatment conditions at the time of heat-treatment of the chenille yarn.

[0033] In the chenille yarn 10 according to the present invention, the decorative yarn 1 is fused and fixed between the core yarn 2 and the pressing yarn 3. When the chenille yarn 10 is woven, knitted, or the like in accordance with the product form in advance, this prevents the coming out of the decorative yarn 1 from occurring and improves not only the easiness in taking out of the chenille yarn 10 upon filling into a textile product as the stuffing material, but also the handling property of the chenille yarn 10.

[0034] As for the core yarn 2 and the pressing yarn 3, when the core yarn 2 is fusible or the pressing yarn 3 is fusible, it is necessary that they remain in the chenille yarn 10 as the core yarn 2 or as the pressing yarn 3 even after fusion-fixation, and that they sandwich the decorative yarn 1; thus, it is preferable to use a core-sheath composite fiber in which the core is composed of a high melting point component and the sheath is composed of a low melting point component. When the core yarn 2 and the pressing yarn 3 do not contain a fusible component, it is preferable to feed the fusing yarn 4 to a twisting machine along with any one or both of the core yarn 2 and the pressing yarn 3. In this case, illustrative examples of the preferable fusing yarn 4 include a single-component fusing yarn consisting of the afore-mentioned core-sheath composite fiber, a polyester-based low melting-point polymer, and a polyamide-based low melting-point polymer. In order to increase the strength in the adhesive fixation of the decorative yarn 1, a single-component fusing yarn 4 consisting only of a fusible component is more preferable. In order to ensure the bulkiness of the chenille yarn 10 as in the case of the present invention, it is preferable to avoid excessive shrinkage of the decorative yarn 1 itself; thus, the fusing yarn that can achieve fusion-fixation at a low temperature and in a short time is preferable. From this viewpoint, a single-component fusing yarn 4 formed of a polyamide-based polymer having a low melting point is still more preferable.

[0035] It is preferable that the decorative yarn 1 in the chenille yarn 10 according to the present invention have a crimp and be at least partially open.

[0036] This crimp indicates that the decorative yarn 1 has a spiral structure; thus, the fiber having a spiral structure, similarly to a spring, has a recovery and repulsion force to an elongation deformation and to a compression deformation. This structure makes it easy for the decorative yarn 1 to repel to each other also between the single fibers of the decorative yarn 1 thereby facilitating to open each single fiber, and thereby the tips of the decorative yarn 1 tend to flutter to all directions in the transverse plane that is perpendicular to the longitudinal direction of the chenille yarn 10. This increases the excluded volume as the chenille yarn 10 thereby leading to increase in the bulkiness when used as the stuffing material.

[0037] The decorative yarn 1 is a multifilament, and it is preferable to use the multifilament having the filament number of 2 or more to 300 or less. It is more preferable that the filament number of the decorative yarn 1 be 4 or more to 100 or less. Within this range, the decorative yarn 1 having the crimp does not overlap excessively and is moderately intertwined with the core yarn 2 under the open state between the single fibers, resulting in a superior bulkiness and a moderate resilience against compression. To facilitate opening between the single fibers of the decorative yarn 1, it is more preferable that the filament number of the decorative yarn 1 be 8 or more to 50 or less.

[0038] The single fiber fineness in the decorative yarn 1 is preferably 0.01 dtex or more to 20 dtex or less. It is more preferable that the single fiber fineness in the decorative yarn 1 be 1 dtex or more to 15 dtex or less. Within this range, a superior bulkiness, a moderate resilience against compression, and a soft tactile feel will be resulted. From this viewpoint, it is still more preferable that the single fiber fineness in the decorative yarn 1 be 2 dtex or more to 8 dtex or less.

[0039] When used as the stuffing material to be filled in a textile product, from a viewpoint of suppressing the fatigue, the bundled yarn of the chenille yarns 10 according to the present invention is preferable, because this can express an excellent tactile feel due to the resilience of the chenille yarn 10 according to the present invention, and because the decorative yarn 1 recovers like a spring even when the compression recovery is repeated.

[0040] In the present invention, the radius of curvature, which indicates the magnitude of the crimp of the decorative yarn 1, is preferably in the range of 0.5 mm or more to 5.0 mm or less.

[0041] The radius of curvature of the decorative yarn 1 is more preferably 0.8 mm or more to 4.0 mm or less. When the radius of curvature is within this range, the yarn can exhibit a sufficient bulkiness and have a moderate resilience against compression. From this viewpoint, the radius of curvature of the decorative yarn 1 is still more preferably 1.0 mm or more to 3.0 mm or less.

[0042] The radius of curvature here is the one that is evaluated using an image that is two-dimensionally observed by a digital microscope or the like; and this is the radius of the curvature formed by the single fiber that constitutes the decorative yarn 1 having the spiral structure as illustrated in FIG. 2. Specifically, at 10 randomly selected locations in

the longitudinal direction of the chenille yarn 10, 10 or more single fibers that constitute each decorative yarn 1 are collected, and each single fiber is observed using a digital microscope with a magnification that allows confirmation of the crimp morphology. Using this observation image, the radius of curvature of the decorative yarn 1 can be obtained by measuring the radius of the curved portion formed by the single fiber having the spiral structure.

[0043] To increase the bulkiness of the chenille yarn 10 according to the present invention, as mentioned before, the fiber having the hollow portion in the fiber cross-section is preferably used as the decorative yarn 1. By asymmetric cooling during spinning, the fiber having the hollow portion described above can readily generate the difference in the fiber orientation due to the cooling difference in the single fiber cross-section, so that the fiber having an obviously recognizable crimp can be readily obtained even with a single component. In this case, the obvious crimp is a loose crimp with the order of several mm to several tens of mm as the below-described radius of curvature; so, at the time of chenille processing, the single fibers of the decorative yarn 1 can readily open to each other due to the loose crimp form. When the chenille yarn is further crimped by heat treatment to bring the radius of curvature, which indicates the magnitude of the crimp of the decorative yarn 1, into the range of 0.5 mm or more to 5.0 mm or less, the bulkiness of the final chenille yarn 10 can be effectively increased.

[0044] The crimp obtained by such asymmetric cooling can be controlled as appropriate especially by changing the cooling conditions immediately after ejection at the time of spinning and the drawing ratio.

[0045] As for the control of the cooling air velocity, which is one of the cooling conditions, for example, in the case when the spinning is carried out under the condition of the spinning rate of 1000 to 2000 m/min using a 12-holes spinneret for a hollow fiber, it is preferable that the cooling air whose temperature adjusted at 20°C is blown from one side at the air velocity of 20 to 100 m/min for cooling and solidification. Increasing the air velocity makes the ejected yarn strip more prone to swaying, which can cause a decrease in the operational stability; so, the air velocity is preferably in the range of 25 to 80 m/min, while more preferably in the range of 30 to 70 m/min.

[0046] The cooling air temperature, the fiber diameter immediately after ejection at the time of spinning, the number of spun filaments, the arrangements of the spinneret and the ejection holes, etc., all affect the way how the cooling air hits each single fiber as well as the difference in the cooling speeds at the surface receiving the cooling air and the opposite surface; thus, the proper cooling air velocity condition is also variable with these conditions. Therefore, for example, in the case of a large number of filaments, it readily causes uneven cooling in each single fiber, and the radius of curvature thereof tends to increase in the single fiber that is insufficient in cooling; thus, it is preferable to set the air velocity faster. On the other hand, in the case of a smaller number of the filament, it is preferable to set the cooling air velocity slower because the radius of curvature tends to decrease due to a higher cooling efficiency. With regard to the raw yarn that has been rolled up after spinning and drawing, it is preferable to control as appropriate the cooling conditions with confirming the crimp morphology by conducting a heat treatment test under the desired conditions assuming the heat treatment of the chenille yarn.

[0047] In the chenille yarn 10 according to the present invention, it is preferable that the distance between points at which the decorative yarns 1 sandwiched between the core yarn 2 and the pressing yarn 3 are fused and fixed be 1.0 mm or more to 4.0 mm or less. When the distance between the decorative yarns 1 is within the above range, without excessive overlapping, the decorative yarn having the crimp is moderately entangled with the core yarn 2 under the open state between the single fibers, thereby allowing the tips of the decorative yarn 1 to protrude more in the circumferential direction in the cross-section of the chenille yarn 10. When the chenille yarn 10 according to the present invention is used as the bundle of the decorative yarn 1, this arrangement allows the chenille yarn 10 to repel against the adjacent chenille yarn 10 to all directions in the yarn cross-section, thereby leading to increase in the bulkiness as the stuffing material or the like.

[0048] From this viewpoint, the distance between the points at which the decorative yarns 1 are fused and fixed is more preferably in the range of 1.3 mm or more to 3.5 mm or less, while still more preferably in the range of 1.5 mm or more to 3.0 mm or less.

[0049] As can be seen in FIG. 3, the decorative yarn 1 that is entangled with the core yarn 2 in the chenille yarn 10 is unraveled followed by turning this toward perpendicular to the core yarn 2, then, the observation is conducted with the magnification with which the distance between the points at which the decorative yarns 1 are fused and fixed is observable using a digital microscope or the like at least two points where the decorative yarn 1 is sandwiched between the core yarn 2 and the pressing yarn 3. Using this observation image, the distance between the two points is measured from the center of the fused point of one decorative yarn 1 to the center of the fused point of the other decorative yarn 1 to confirm the distance between these points.

[0050] In the chenille yarn 10 according to the present invention, the length of the decorative yarn 1 is preferably 20 mm or more to 40 mm or less.

[0051] The length of the decorative yarn 1 within the above-described range allows the crimped decorative yarn 1 to be moderately entangled with the core yarn 2 and to be arranged such that the tips of the decorative yarn 1 may flatter to all directions in the chenille yarn cross-section.

[0052] From the viewpoint of good balance with the degree of crimp of the decorative yarn 1 and in order to effectively

contribute to the increase in the bulkiness, the length of the decorative yarn 1 is more preferably 25 mm or more to 35 mm or less, while still more preferably 27 mm or more to 33 mm or less.

[0053] Similarly to the case of confirming the distance between the points at which the decorative yarns 1 are fused and fixed, the length of the decorative yarn 1 can be confirmed in such a way that the decorative yarn 1 that is entangled with the core yarn 2 in the chenille yarn 10 is unraveled followed by turning this toward perpendicular to the core yarn 2, and the decorative yarn 1 is stretched and fixed, and then, the length of the decorative yarn 1 is measured.

[0054] In the chenille yarn 10 according to the present invention, the bulkiness is preferably 90 cm^3/g or more.

[0055] When the bulkiness of the chenille yarn 10 is 90 cm^3/g or more, that is, the yarn is high in bulkiness and low in density, thereby also having an excellent recovery from deformation, this can be suitably used as the stuffing material and the like. The higher the bulkiness, the greater the amount of the air that can be taken in as the stuffing material, and thus, the better the heat retention can be ensured. From this viewpoint, the bulkiness of the chenille yarn 10 is more preferably 150 cm^3/g or more, while still more preferably 200 cm^3/g or more. The actual upper limit of the bulkiness in the processed yarn such as in the form of the chenille yarn 10 according to the present invention, is about 300 cm^3/g.

[0056] With regard to the bulkiness of the chenille yarn, 10 g of the chenille yarn is weighed into a container placed on an electronic balance; then, the chenille yarn thus weighed is put in a cylindrical container having an inner diameter of 15 cm, and a circular plate whose mass has been adjusted to 0.15 g/cm^2 relative to the cross-sectional area inside the cylinder is placed on the chenille yarn, and after this is allowed to be left for 1 minute, the height of the chenille yarn (L0) is measured. From this height, the volume of the chenille yarn per unit mass (= bulkiness) was calculated by the following equation.

$$\text{Bulkiness } (cm^3/g) = \text{cross-sectional area of cylinder} \times L0 / \text{mass of chenille yarn}$$

[0057] The chenille yarn 10 according to the present invention has a superior handling property when taking out the product form upon filling this as the stuffing material. Here, in order to achieve the superior handling, among the mechanical properties in the chenille yarn 10, especially the tensile strength is important. From a viewpoint that the chenille 10 may be handled without breaking even if there is some snagging, the tensile strength is preferably 100 cN or more, more preferably 300 cN or more, while still more preferably 500 cN or more.

[0058] The tensile strength is higher the better, but an excessively high tensile strength reduces elongation; so, when this is used as the stuffing material for clothing and bedding, the tactile feel of the core yarn 2 in the chenille yarn 10 becomes more eminent so that a discomfort due to a foreign body in the filling may be felt. Therefore, the actual upper limit of the tensile strength is preferably 1000 cN as the range in which the chenille yarn 10 can be handled stably without affecting its tactile feel as the stuffing material.

[0059] The tensile strength here is the strength at the time of breaking upon evaluating in accordance with the standard time test method for the tensile strength described in JIS L1013: 2010.

[0060] The chenille yarn 10 according to the present invention may be produced using a chenille yarn twisting machine that has been known in the past. For example, the chenille yarn twisting machine as described in Japanese Patent Application Laid-open No. S53-6642 may be used.

[0061] The decorative yarn 1 is fed to the flyer section of the chenille yarn twisting machine, and the core yarn 2 and the pressing yarn 3 are fed from two directions with the fusing yarn 4 being fed along with one of the core yarn 2 and the pressing yarn 3.

[0062] The chenille yarn 10 according to the present invention has the characteristic that the decorative yarn 1 is long in order to express the bulkiness; thus, the decorative yarn 1 is fed more as compared with the core yarn 2 and the pressing yarn 3. The ratio of the feeding speed of the core yarn 2, or the pressing yarn 3, to the decorative yarn 1 (core yarn: decorative yarn) is preferably 1:3 or more. This feeding speed ratio is controlled by each feeding roll of the chenille twisting machine. The feeding speed ratio of the core yarn 2, or the pressing yarn 3, to the decorative yarn 1 is more preferably 1:5 or more; from the viewpoint of efficiently producing the bulky chenille yarn without significant reduction in the production speed, the ratio is still more preferable 1:10 or more.

[0063] After having been rolled up around the guide piece, the decorative yarn 1 is divided into two portions by the cutter arranged in the bottom of the guide piece; then, the two separated decorative yarns 1 each are sandwiched between the core yarn 2 and the pressing yarn 3, and they are rolled up while being twisted to each other.

[0064] Here, in order to make the distance between the decorative yarns 1 each of which is sandwiched between the core yarn 2 and the pressing yarn 3 in the range of 1.0 mm or more to 4.0 mm or less, the feeding speeds of the core yarn 2, of the pressing yarn 3, and of the decorative yarn 1, as well as the number of the twist and the rolling-up speed, these being set by the rotation number of the rolling-up spindle, are controlled as appropriate.

[0065] In order to make the length of the decorative yarn 1 to 20 mm or more to 40 mm or less, the cutting position is controlled as appropriate by adjusting the width of the lower end of the guide piece and the height of the installed cutter.

[0066] Next, the rolled-up chenille yarn is heat-treated to fuse the fusing yarn 4 thereby fusing and fixing the decorative yarn 1 between the core yarn 2 and the pressing yarn 3.

[0067] The chenille yarn 10 that has been chenille-processed is rolled up to a skein by a skein winder with a predetermined mass, and multiple skeins are hooked onto the bars of a transport cart equipped with the skein-hooking bars. The transport cart is placed in a pressurized steam-heating furnace, for example, heated at 98°C for 10 minutes or longer (steam pressure of approx. 0.07 MPa), or put into a dry heat-treatment furnace for the dry heat-treatment to melt the fusing yarn 4 thereby fusing and fixing the decorative yarn 1 between the core yarn 2 and the pressing yarn 3.

[0068] The heat treatment temperature and time may be controlled so as to achieve the desired fusion and fixation state of the decorative yarn 1; so, these are controlled as appropriate in accordance with the fusible component to be used such that the fusible component can be sufficiently melted thereby penetrating into the core yarn 2. Here, in order to avoid an excessive shrinkage of the decorative yarn 1 upon producing the chenille yarn 10 according to the present invention, the heat treatment temperature is preferably 200°C or lower, more preferably 150°C or lower, while still more preferably 120°C or lower.

[0069] The untreated chenille yarn that are rolled up to the skein is subjected to the pressurized steam treatment while being hooked to the bar; so, the heavier the weight of the skein, the more easily the chenille yarn 1 is crushed in the hooking part. Therefore, the amount of the rolled skein is preferably 400 g or less. When the amount of the chenille yarn that is rolled up to the skein is set to 400 g or less, the puffy feeling of the decorative yarn 1 in the hooked part can be maintained even when the weight of the skein is added by the pressurized steam treatment, thereby allowing to obtain a satisfactory bulkiness. The amount of the rolled skein is more preferably 300 g or less, while still more preferably 200 g or less.

[0070] The chenille yarn 10 according to the present invention may be used in a variety of forms, such as a skein obtained by heat processing, a package obtained by rolling-back of this, a yarn bundle formed by drawing multiple yarns together, a cut fiber, and a woven and knitted fabric; in addition, this may also be made to various textile products. Illustrative examples of the textile product include general clothing, sportswear, materials for clothing, a comforter and a mattress, bedding such as a thin blanket, a sleeping bag, interior products such as a carpet, a sofa, and a curtain, and vehicle interiors such as a car seat. Among these, the use as the stuffing material for clothing and bedding is preferable.

[0071] In particular, the chenille yarn 10 according to the present invention is excellent in the taking-out property during filling and in the handling property during weaving and knitting process yet having an excellent bulkiness; in addition, this may be used as a bundle of several to several tens of yarns, or as the stuffing material after having been woven and knitted in advance. The chenille yarn 10 according to the present invention can also be used in conjunction with other padding materials that can be used for the stuffing material; thus, it is possible to make the stuffing material also having the features of the material other than the chenille yarn 10 according to the present invention.

[EXAMPLES]

[0072] Hereinafter, with referring to the following Examples, the chenille yarn according to the present invention as well as the advantageous effects thereof will be specifically described.

[0073] In Examples and Comparative Examples, the following evaluations were performed.

A. Fineness

[0074] The mass of 100 m of the fiber was measured, and this was multiplied by 100 to calculate the fineness. This was repeated 10 times, and the simple average value, rounded to the second decimal place, was used as the fiber fineness (dtex).

B. Radius of Curvature of Decorative Yarn

[0075] The decorative yarn entangled with the core yarn was unraveled so as to make the point pinched by the core yarn to a visible state, and the single fibers constituting the decorative yarn were collected by cutting at about 1 mm from the point pinched by the core yarn. Ten single fibers were collected from each of 10 randomly selected locations in the longitudinal direction of the chenille yarn, and each single fiber was observed using the VHX-6000 microscope manufactured by Keyence Corp. with a magnification that allowed observation of the crimp morphology; then, by using the observed image thus obtained, the radius of the curvature formed by the fiber having a spiral structure was measured. The radius of curvatures of a total 100 yarns were measured, and the simple average thereof, rounded to the second decimal place, was used as the radius of curvature of the decorative yarn (mm).

C. Distance between Points at which Decorative Yarns are fused and fixed

[0076] The chenille yarn was attached to a black paper, and the decorative yarn entangled with the core yarn was unraveled and turned to a direction perpendicular to the core yarn, and then, the sample was prepared such that the point where the decorative yarn was sandwiched between the core yarn and the pressing yarn could be observed. This sample was observed using the VHX-6000 microscope manufactured by Keyence Corp. with the magnification of 50 times to measure the distance between the decorative yarn fixation points adjacent to each other. This was repeated at 10 locations, and the simple average value, rounded to the second decimal place, was used as the distance (mm) between the points at which the decorative yarns are fused and fixed.

D. Length of Decorative Yarn

[0077] The chenille yarn was attached to a black paper, and the decorative yarn entangled with the core yarn was unraveled and stretched to a direction perpendicular to the core yarn, and then fixed. The length of the decorative yarn was measured. This was repeated at 10 locations, and the simple average value, rounded to the first decimal place, was used as the length of the decorative yarn (mm).

E. Bulkiness

[0078] The chenille yarn (10 g) was weighed in the container put on an electronic balance. The chenille yarn thus weighed was placed in a cylindrical container having an inner diameter of 15 cm, and a circular plate whose mass had been adjusted to 0.15 g/cm^2 relative to the cross-sectional area inside the cylinder was placed on the chenille yarn. Then, after this is allowed to be left for 1 minute, the height of the chenille yarn was measured and read to the first decimal place to obtain L0 as the height of the chenille yarn. From this height, the volume of the chenille yarn per unit mass (= bulkiness) was calculated from the following equation as an integer value by rounding off the first decimal place.

$$\text{Bulkiness } (\text{cm}^3/\text{g}) = \text{cross-sectional area of cylinder} \times L0 / \text{mass of chenille yarn}$$

Example 1

[0079] One nylon 66 fiber (trade name "PROMILAN" 44T-34f manufactured by Toray Industries, Inc.) was used as both the core yarn and the pressing yarn, and a polyamide-based fusing yarn (copolymerized polyamide fiber; trade name "Elder" 22T-10f) was used as the fusing yarn.

[0080] Also, after polyethylene terephthalate (PET: IV value = 0.6 dl/g, crystallization temperature = 150°C) was melted at 290°C, this was measured by a gear pump, fed into a spinning pack, and ejected through the hollow cross-section ejection hole having three slits (0.1 mm wide) that were concentrically arranged. A cooling air with the temperature of 20°C was blown to the ejected yarn strip from one side thereof at the flow rate of 30 m/min to cool and solidify the ejected yarn, and then the undrawn yarn was rolled up with a spinning oil at the spinning rate of 1500 m/min. Subsequently, the polyethylene terephthalate hollow fiber (40 T-12f, 30% hollow content) that was obtained by drawing the rolled-up undrawn yarn between the rollers heated at 90°C and 140°C with the drawing rate of 800 m/min was used as the decorative yarn.

[0081] Using a conventional chenille yarn twisting machine, the decorative yarn was fed to the flyer section thereof, and the pressing yarn attached with the fusing yarn and the core yarn were fed from two directions with the feeding speed ratio of 1:13, the ratio of the feeding speed of the core yarn and of the pressing yarn to the feeding speed of the decorative yarn. The decorative yarn was rolled up around a guide piece whose lower end width was 30 mm, the decorative yarn was cut with a cutter, and the decorative yarn was sandwiched between the core yarn and the pressing yarn, and twisted such that the number of the twist per 1 meter was made 250 turns (T/m), and then, this was rolled up by a spindle.

[0082] Next, every 200 g of the chenille yarn was rolled up to a skein using a skein winder, and the skein was hooked onto the bar of the transport cart equipped with the skein-hooking bar, and then, this was placed in a pressurized steam-heating furnace whereby carrying out the pressurized steam treatment (steam pressure of approximately 0.07 MPa) at 98°C for 20 minutes to melt the fusing yarn to obtain the chenille yarn having the decorative yarn fused and fixed.

[0083] The obtained chenille yarn was cut to 1 m length, its mass was measured, and the mass was multiplied by 10000 to calculate the fineness. The same measurement was repeated 10 times and the simple average value was rounded off to the first decimal place. The fineness of the chenille yarn thus obtained was 1765 dtex.

[0084] In Example 1, the radius of curvature of the decorative yarn was 1.7 mm and the distance between the points

at which the decorative yarns were fused and fixed was 2.1 mm. The decorative yarn was moderately entangled with the core yarn with the single fibers being open to each other, and the tips of the decorative yarn were visible in almost all circumferential directions in the chenille yarn cross-section.

[0085] The chenille yarn had a bulkiness of 203 cm^3/g; so, this had a superior bulkiness. The chenille yarn was soft to a tactile feel when a bundle of 10 chenille yarns thus formed was held by hands and was also good in the deformation recovery, allowing this to be suitably used as the stuffing material for clothing and bedding. The results are described in Table 1.

Example 2

[0086] In the hollow fiber formed of polyethylene terephthalate used for the decorative yarn, the ejection rate at the time of spinning was changed to provide 80T-12f. The chenille yarn was obtained in the same way as in Example 1, except that the feeding speed of the decorative yarn was changed such that the chenille yarn fineness might match with that of Example 1. The chenille yarn thus obtained had the fineness of 1774 dtex.

[0087] In Example 2, although the radius of curvature of the decorative yarn was 2.4 mm, the crimp state relative to the fiber diameter was more significant than in Example 1, because the single fiber fineness was large.

[0088] The bulkiness was 176 cm^3/g, so that the bulkiness was good. The tactile feel was a little bit hard when a bundle of 10 chenille yarns thus formed was held by hands, and the repulsion was strong, but this was good enough for the use as the stuffing material. The results are described in Table 1.

Example 3

[0089] Polyethylene terephthalate fiber of a multifin type (trade name: "Octa" 44T-12f, manufactured by Teijin Ltd.) was used as the decorative yarn. The chenille yarn was obtained in the same way as in Example 1, except that the feeding speed of the decorative yarn was changed such that the chenille yarn fineness might match with that of Example 1. The chenille yarn thus obtained had the fineness of 1745 dtex.

[0090] In Example 3, the radius of curvature of the decorative yarn was 1.2 mm, and the distance between the points at which the decorative yarns were fused and fixed was 1.9 mm. Similarly to Example 1, the decorative yarn was moderately entangled with the core yarn with the single fibers being open to each other, and the tips of the decorative yarn were visible in almost all circumferential directions in the chenille yarn cross-section.

[0091] The chenille yarn had a bulkiness of 211 cm^3/g; so, this had a superior bulkiness. The chenille yarn was very soft in a tactile feel when a bundle of 10 chenille yarns thus formed was held by hands, and was also good in the deformation recovery, allowing this to be suitably used as the stuffing material for clothing and bedding. The results are described in Table 1.

Examples 4 and 5

[0092] The chenille yarn was obtained using the same yarn composition as Example 1 and in the same way as in Example 1, except that in the hollow fiber formed of polyethylene terephthalate used for the decorative yarn, the cooling air velocity under the ejection during spinning was changed such that the degree of crimp after the heat treatment might become as described in Table 1.

[0093] In Example 4, the cooling air velocity during spinning was set to 80 m/min so as to obtain a finer crimp. Here, the radius of curvature of the decorative yarn was 1.0 mm, and the decorative yarn was moderately entangled with the core yarn, but there were some portions where the single fibers of the decorative yarn were entangled to each other and bunched together. The chenille yarn thus obtained had the fineness of 1760 dtex.

[0094] The bulkiness of Example 4 was 145 cm^3/g. When a bundle of 10 chenille yarns thus formed was held by hands, there were some portions where the tactile feel was a little bit hard, but this was good enough for the use as the stuffing material. The results are described in Table 1.

[0095] In Example 5, the crimp was increased by setting the cooling air velocity to 20 m/min during spinning; as a result, the radius of curvature of the decorative yarn was 4.8 mm, and the entanglement of the decorative yarn with the core yarn was less as compared with Example 1. Therefore, unevenness was observed in the directions to which the tips of the decorative yarn protruded. The chenille yarn thus obtained had the fineness of 1768 dtex.

[0096] The bulkiness of Example 5 was 110 cm^3/g. When a bundle of 10 chenille yarns thus formed were held by hands, there was unevenness in the tactile feel, but the overall tactile feel was soft; so, this was good enough for the use as the stuffing material. The results are described in Table 1.

[Table 1]

[0097]

Table 1

			Example 1	Example 2	Example 3	Example 4	Example 5
Core yarn	Polymer		N66	N66	N66	N66	N66
	Fiber (Fineness-Filament number)		44T-34f	44T-34f	44T-34f	44T-34f	44T-34f
Pressing yarn	Polymer		N66	N66	N66	N66	N66
	Fiber (Fineness-Filament number)		44T-34f	44T-34f	44T-34f	44T-34f	44T-34f
Fusing yarn	Polymer		Copolymer Ny	Copolymer Ny	Copolymer Ny	Copolymer Ny	Copolymer Ny
	Fiber (Fineness-Filament number)		22T-10f	22T-10f	22T-10f	22T-10f	22T-10f
Decorative yarn	Polymer		PET	PET	PET	PET	PET
	Cross-section shape		Hollow	Hollow	Multifin hollow	Hollow	Hollow
	Fiber (Fineness-Filament number)		40T-12f	80T-12f	44T-12f	40T-12f	40T-12f
Chenille processing	Processing rate	m/min	3	3	3	3	3
	Guide piece length	mm	30	30	30	30	30
	Number of twist	T/m	250	250	250	250	250
	Heat-treatment condition	-	98°C x 20 min	98°C x 20 min	98°C x 20 min	98°C x 20 min	98°C x 20 min
Chenille yarn characteristics	Radius of curvature of decorative yarn	mm	1.7	2.4	1.2	1.0	4.8
	Distance between points at which decorative yarns are fused and fixed	mm	2.1	2.9	1.9	1.8	1.7
	Length of decorative yarn	mm	32	31	32	28	33
	Bulkiness	cm^3/g	203	176	211	145	110

Comparative Example 1

[0098] After polyethylene terephthalate (PET: IV value = 0.6 dl/g, crystallization temperature = 150°C) was melted at 290°C and weighed, this was fed into a spinning pack and ejected from a spinneret having the ejection holes with the aperture ϕ of 0.30 mm arranged concentrically. A cooling air with the temperature of 20°C was blown to the ejected yarn strip from one side thereof at the flow rate of 15 m/min to cool and solidify the ejected yarn, and then, after the undrawn yarn was attached with a spinning oil, this was rolled up at the spinning rate of 1500 m/min. The chenille yarn was obtained in the same way as Example 1, except that the solid fiber (40T-12f, round cross-section) obtained by drawing the rolled-up undrawn yarn between the rollers heated at 90°C and 140°C with the drawing rate of 800 m/min was used as the decorative yarn. The chenille yarn thus obtained had the fineness of 1766 dtex.

[0099] In the chenille yarn of Comparative Example 1, the decorative yarn was straight without the crimp (the radius of curvature in Table 2 is described 50.0 mm or more) and was not twined around the core yarn, so that the chenille yarn had a flat cross-section.

[0100] The length of the decorative yarn was 30 mm, but the bulkiness was low, as it was 51 cm^3/g. Even when a plurality of the chenille yarns was made a bundle, the puffy feeling was hardly perceptible; so, this was insufficient for the use as the stuffing material. The results are described in Table 2.

Comparative Example 2

[0101] Polytrimethylene terephthalate (3GT: IV value = 1.2 dl/g) as A polymer and a low-viscosity polyethylene terephthalate (PET: IV value = 0.5 dl/g) as B polymer were prepared; and then, after melted at 280°C and weighed, they were flowed into a spinning pack equipped with a composite spinneret, and ejected so as to form a side-by-side composite cross-section consisting of A polymer and B polymer (polymer composite ratio: A polymer/B polymer = 50/50). A cooling air with the temperature of 20°C was blown to the ejected yarn strip from one side thereof at the flow rate of 20 m/min to cool and solidify the ejected yarn, and then, after the undrawn yarn was attached with a spinning oil, this was rolled up at the spinning rate of 1500 m/min. The rolled-up undrawn yarn was drawn between the rollers heated at 90°C and 140°C with the drawing rate of 800 m/min to obtain the 3GT/PET side-by-side composite fiber (75T-24f). By using this fiber as the decorative yarn, the chenille yarn was obtained in the same way as in Example 1, except that the feeding speed of the decorative yarn was changed such that the chenille yarn fineness might match with that of Example 1. The chenille yarn thus obtained had the fineness of 1770 dtex.

[0102] The chenille yarn in Comparative Example 2 had a very fine crimp having 0.2 mm (average measured value of 0.16 mm) as the radius of curvature of the decorative yarn. In addition, the opening between the single fibers of the decorative yarn was insufficient, and there were some portions where the decorative yarn was not present in the core yarn axial direction of the chenille yarn, resulting in uneven arrangement of the decorative yarn.

[0103] The length of the decorative yarn was 22 mm, but the bulkiness thereof was low, as it was 82 cm^3/g. When a bundle of a plurality of the chenille yarns thus formed was held by hands, there was no puffy feeling in the tactile feel; so, this was insufficient for the use as the stuffing material. The results are described in Table 2.

Example 6

[0104] The chenille yarn was obtained in the same way as in Example 1, except that the width of the lower end of the guide piece to which the decorative yarn was rolled-up was changed as described in Table 2. The chenille yarn thus obtained had the fineness of 1761 dtex.

[0105] In Example 6, the width of the lower end of the guide piece was 20 mm, and the length of the decorative yarn was 19 mm. Although the decorative yarn was entangled with the core yarn, the length thereof was a little bit short; thus, there were also some portions where the number of the decorative yarn twined around the core yarn in the longitudinal direction of the core yarn was small.

[0106] The bulkiness of Example 6 was 96 cm^3/g. When a bundle of 10 chenille yarns thus formed was held by hands, there were some portions where the tactile feel was a little bit hard and lacked the puffing feeling a bit, but this was good enough for the use as the stuffing material. The results are described in Table 2.

Example 7

[0107] The chenille yarn was obtained in the same way as in Example 1, except that the number of the twist upon twisting the chenille yarn was changed as described in Table 2. The chenille yarn thus obtained had the fineness of 1765 dtex.

[0108] In Example 7, the number of the twist was set to 350 T/m. The distance between the points at which the decorative yarns were fused and fixed was 0.9 mm, and the density of the decorative yarn was a little bit high, and there

were observed some portions where the single fibers of the decorative yarn were entangled with each other and bundled.

[0109] The bulkiness of Example 7 was 91 cm^3/g. When a bundle of 10 chenille yarns thus formed was held by hands, there were some portions where the tactile feel was a little bit hard, and this lacked a puffing feeling a bit, but this was good enough for the use as the stuffing material. The results are described in Table 2.

Comparative Example 3

[0110] After polyethylene terephthalate (PET: IV value = 0.6 dl/g) was melted at 290°C and measured by a gear pump, this was fed into a spinning pack and ejected through the hollow cross-section ejection holes having three slits (0.1 mm wide) that were concentrically arranged. A cooling air with the temperature of 20°C was blown to the ejected yarn strip from one side thereof at the flow rate of 10 m/min to cool and solidify the ejected yarn, and then the undrawn yarn was rolled up with a spinning oil at the spinning rate of 1500 m/min. Subsequently, the chenille yarn was obtained in the same way as Example 1, except that the polyethylene terephthalate hollow fiber (40 T-12f, 27% hollow content) that was obtained by drawing the rolled-up undrawn yarn between the rollers heated at 90°C and 140°C with the drawing rate of 800 m/min was used as the decorative yarn. The chenille yarn thus obtained had the fineness of 1769 dtex.

[0111] The chenille yarn in Comparative Example 3 had a loose crimp having 10.5 mm as the radius of curvature of the decorative yarn, resulting in a nearly straightly protruding form as the decorative yarn of the chenille yarn. In addition, the opening between the single fibers of the decorative yarn was insufficient, and there were some portions where the decorative yarn was not present in the core yarn axial direction of the chenille yarn, resulting in uneven arrangement of the decorative yarn.

[0112] The length of the decorative yarn was 32 mm, but the bulkiness thereof was low, as it was 75 cm^3/g. When a bundle of a plurality of the chenille yarns thus formed was held by hands, there was no puffy feeling in the tactile feel; so, this was insufficient for the use as the stuffing material. The results are described in Table 2.

[Table 2]

[0113]

Table 2

			Comparative Example 1	Comparative Example 2	Example 6	Example 7	Comparative Example 3
Core yarn	Polymer		N66	N66	N66	N66	N66
	Fiber (Fineness-Filament number)		44T-34f	44T-34f	44T-34f	44T-34f	44T-34f
Pressing yarn	Polymer		N66	N66	N66	N66	N66
	Fiber (Fineness-Filament number)		44T-34f	44T-34f	44T-34f	44T-34f	44T-34f
Fusing yarn	Polymer		Copolymer Ny	Copolymer Ny	Copolymer Ny	Copolymer Ny	Copolymer Ny
	Fiber (Fineness-Filament number)		22T-10f	22T-10f	22T-10f	22T-10f	22T-10f
Decorative yarn	Polymer		PET	3GT/PET	PET	PET	PET
	Cross-section shape		Solid	Side-by-side	Hollow	Hollow	Hollow
	Fiber (Fineness-Filament number)		40T-12f	75T-24f	40T-12f	40T-12f	40T-12f
Chenille processing	Processing rate	m/min	3	3	3	3	3
	Guide piece length	mm	30	30	30	30	30
	Number of twist	T/m	250	250	250	350	250
	Heat-treatment condition	-	98°C × 20 min	98°C × 20 min	98°C × 20 min	98°C × 20 min	98°C × 20 min
Chenille yarn characteristics	Radius of curvature of decorative yarn	mm	50.0 or more	0.2	1.6	1.7	10.5
	Distance between points at which decorative yarns are fused and fixed	mm	2.3	1.6	2.0	0.9	2.5
	Length of decorative yarn	mm	30	22	19	31	32
	Bulkiness	cm^3/g	51	82	96	91	75

Reference Signs List

[0114]

1 Decorative yarn

2 Core yarn
3 Pressing yarn
4 Fusing yarn
5 Distance between points at which decorative yarns are fused and fixed

Claims

1. A chenille yarn comprising a twisted yarn formed of a core yarn and a pressing yarn, wherein a decorative yarn is fused and fixed between the core yarn and the pressing yarn, and the decorative yarn has a crimp having a radius of curvature of 0.5 mm or more to 5.0 mm or less.

2. The chenille yarn according to claim 1, wherein the decorative yarn is a hollow cross-section fiber including a hollow portion.

3. The chenille yarn according to claim 1 or 2, wherein the decorative yarn is a fiber composed of a single component.

4. The chenille yarn according to any one of claims 1 to 3, wherein a distance between points at which decorative yarns are fused and fixed is 1.0 mm or more to 4.0 mm or less.

5. The chenille yarn according to any one of claims 1 to 4, wherein a length of the decorative yarn is 20 mm or more to 40 mm or less.

6. The chenille yarn according to any one of claims 1 to 5, wherein the chenille yarn has a bulkiness of 90 cm^3/g or more.

7. A textile product comprising the chenille yarn according to any one of claims 1 to 6.

8. Clothing comprising a stuffing material including the chenille yarn according to any one of claims 1 to 6.

9. Bedding comprising a stuffing material including the chenille yarn according to any one of claims 1 to 6.

FIG.1

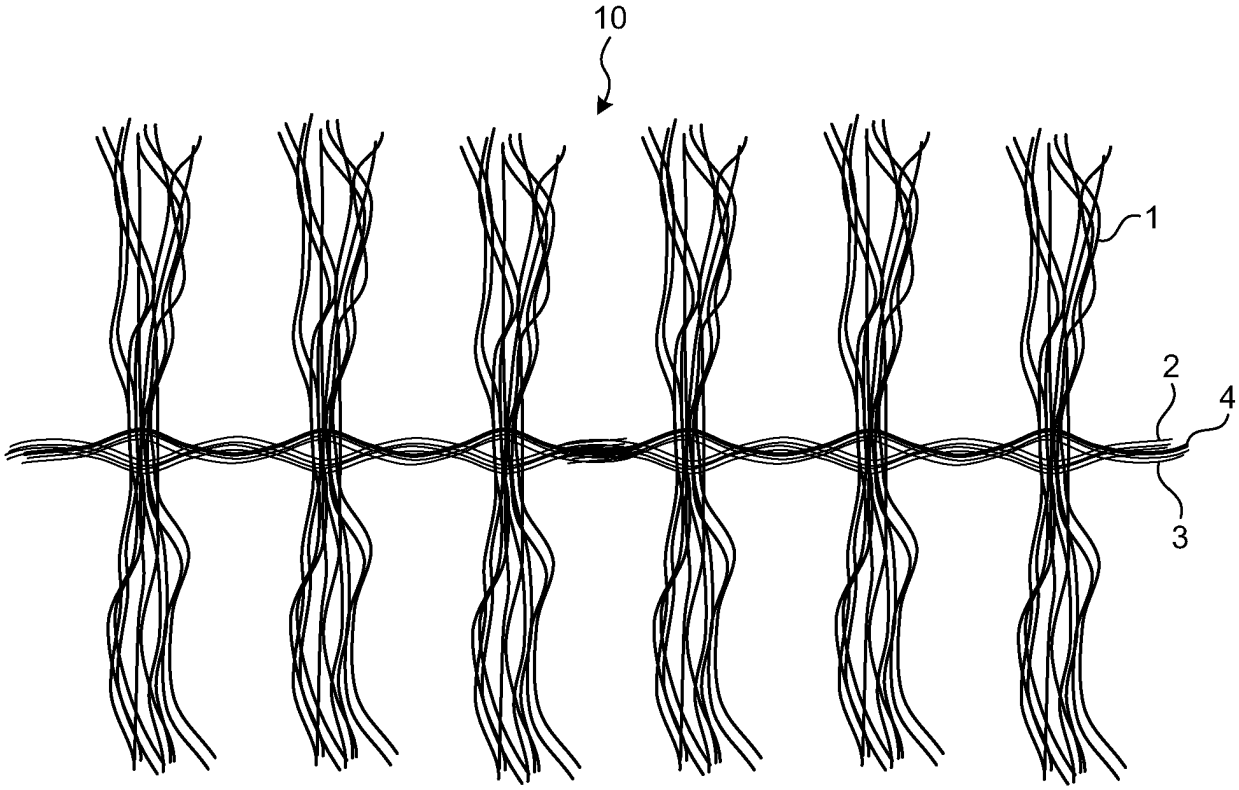


FIG.2

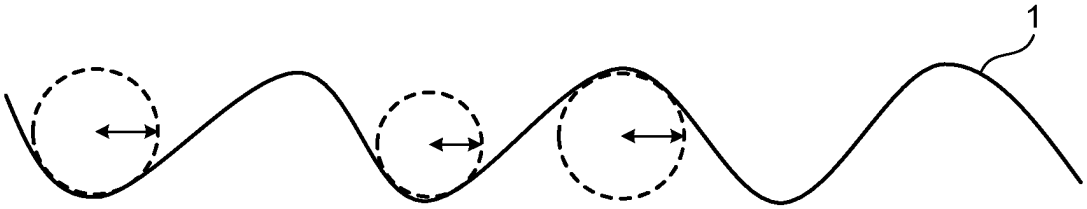
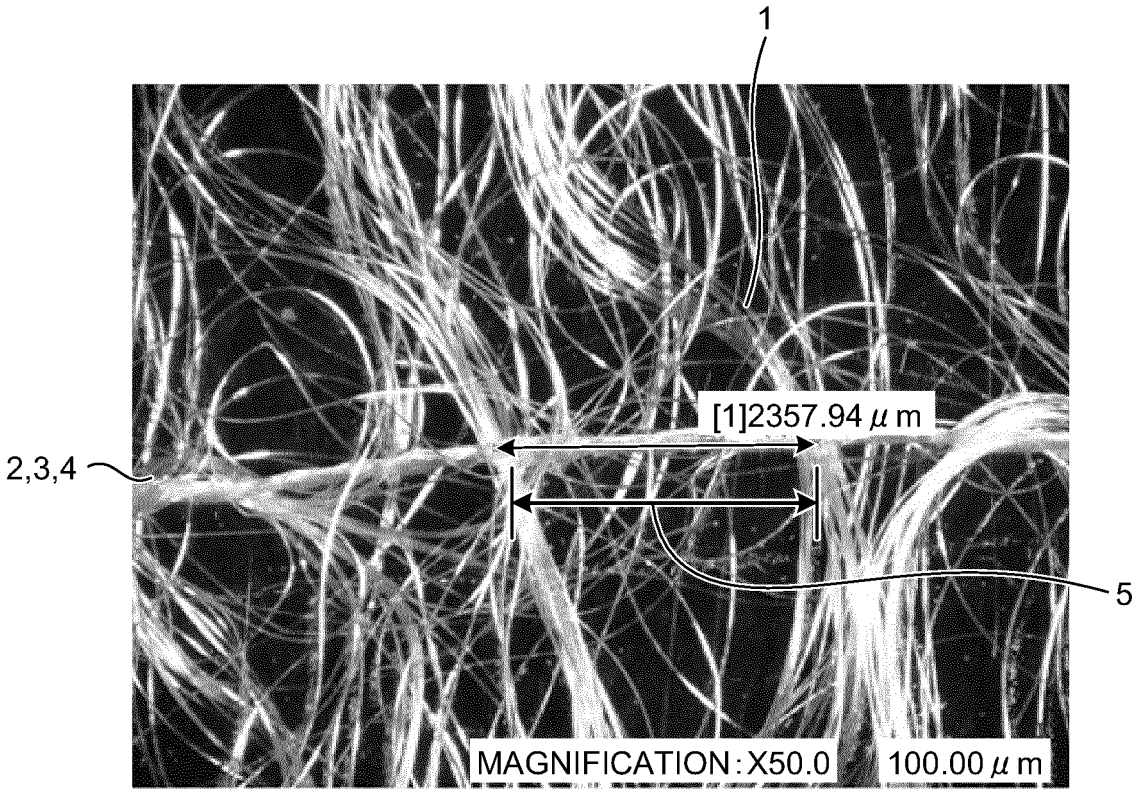


FIG.3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/024010

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. D02G3/42(2006.01)i
FI: D02G3/42

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. D02G1/00-3/48, D02J1/00-13/00

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 1971-2021
Registered utility model specifications of Japan 1996-2021
Published registered utility model applications of Japan 1994-2021

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 4-333632 A (TORAY INDUSTRIES, INC.) 20 November 1992 (1992-11-20), claim, example 1	1-9
A	JP 59-36684 B2 (TORAY INDUSTRIES, INC.) 05 September 1984 (1984-09-05), claims, example 1	1-9
A	JP 57-22789 A (KURARAY CO., LTD.) 05 February 1982 (1982-02-05), claims, example 1	1-9
A	JP 2004-76225 A (KURARAY CO., LTD.) 11 March 2004 (2004-03-11), claims, example 1	1-9

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 August 2021	07 September 2021

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

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/024010

JP 4-333632 A	20 November 1992	(Family: none)	
JP 59-36684 B2	05 September 1984	JP 56-169831 A	
JP 57-22789 A	05 February 1982	(Family: none)	
JP 2004-76225 A	11 March 2004	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2018048412 A **[0012]**
- WO 2012077402 A **[0012]**
- JP 2003278044 A **[0012]**
- JP H02014035 A **[0012]**
- JP S536642 A **[0060]**