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(72) Inventors:
• **HASHIMOTO, Satoshi**
Fuji-shi, Shizuoka 416-0943 (JP)
• **SEKI, Katsuhiko**
Fuji-shi, Shizuoka 416-0201 (JP)

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(74) Representative:
Weber, Thomas, Dr.Dipl.-Chem. et al
Patentanwälte von Kreisler-Selting-Werner,
Postfach 10 22 41
50462 Köln (DE)

(71) Applicant: **Asahi Kasei Kabushiki Kaisha**
Osaka-shi, Osaka 530-8205 (JP)

(54) **PLUSHED FABRIC AND STUFFED TOY USING THE SAME**

(57) A plushed fabric comprising piles having a single-fiber fineness in a range from 0.1 to 4 dtex, with the proviso that 80 to 100% by weight of single fibers constituting the piles having a fineness in a range from 0.1 to 2.2 dtex; and a stuffed toy using the plushed fabric. The plushed fabric has a unique soft feeling of touch, which is different from that of a natural fur and has never

known up to now, that is, the plushed fabric is soft and gentle and soft feeling of touch, is free from see-through property in use, is good in flexibility parallel with curved surface, is less prone to the coming-off of the fibers, and is capable of having a clear color development and has a good property in the opening of a pile yarn.

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Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to a plush fabric having the unique soft feeling of touch and a stuffed toy using the same.

BACKGROUND ART

10 **[0002]** Plush fabrics are often used not only for outer clothing, lining and collars of coats or the like but also for stuffed toys or others. Most of the fabrics have been processed and manufactured to simulate animal furs.

[0003] One of the particularly necessary characteristics of a plush fabric is the feeling of touch.

[0004] In the prior art, it has been appreciated that natural furs have the best feeling of touch, and various improvements have been done to obtain a soft feeling of touch, such as that of a natural fur, while using synthetic fibers. For example, to simulate the natural fur, flat thick synthetic fibers have been used as hairs, and further a tip end of the thick synthetic fiber has been tapered to improve the feeling of touch.

[0005] In Japanese Unexamined Utility Model Publication (Kokai) No. 56-15799, a boa-like plush fabric for a toy is disclosed, wherein a back surface of a base sheet with short fibers planted on a front surface thereof is coated with an adhesive, and a part of the base sheet to be a tail of an animal is planted with long fibers and heated from the back surface to prevent the long fibers from coming off. In Japanese Unexamined Patent Publication (Kokai) No. 61-50584, an animal-shaped stuffed toy is disclosed, wherein fibers or filaments for a wig are sewn or adhered to a base sheet for the stuffed toy. Also, in Japanese Unexamined Patent Publication (Kokai) No. 63-11190, a method for producing a fabric for an animal-shaped toy is disclosed, wherein long fibers are directly fastened to a high-pile fabric used as a lining by a manual sewing system. Further, in Japanese Unexamined Patent Publication (Kokai) No. 10-235765, a flocked article used for a toy, furniture, clogs or ornaments is disclosed, wherein piles of polyester fiber having a length in a range from 0.1 to 10 mm and a fineness in a range from 0.33 to 7.8 dtex thick are flocked to a substrate.

[0006] In the plush fabric for a toy disclosed in Japanese Unexamined Utility Model Publication (Kokai) No. 56-15799, however, since the adhesive is coated on the back surface of the base sheet after the short fibers have been planted, the fabric itself becomes hard and this deteriorates the feeling of touch of the animal-shaped toy using this fabric. There is also a problem in that a hard portion such as the hardened adhesive is often exposed from a seam of the toy to worsen the feeling of touch.

[0007] The stuffed toy disclosed in Japanese Unexamined Patent Publication (Kokai) No. 61-50584 looks more like an actual animal because the fibers or filaments for a wig are sewn or adhered thereto. Similarly, the fabric disclosed in Japanese Unexamined Patent Publication (Kokai) No. 63-11190 is intended to provide a toy looking more like an animal. A flocked article disclosed in Japanese Unexamined Patent Publication (Kokai) No. 10-235765 is formed of a plush fabric wherein after piles are statically flocked and the piles are fixed to the fabric with an adhesive. This plush fabric is hard in the feeling of hand touch due to the adhesive. Accordingly, if this plush fabric is used for a toy, there is a problem in that the feeling of hand touch is rough and hard and this degrades the quality of the toy. Also, when this fabric is used, a hard portion of the fabric is often exposed from a frayed section of a sewn area to significantly deteriorate the feeling of hand touch of the resultant toy.

[0008] As described above, there have been many efforts for producing toys having a shape, and a natural, smooth feeling of touch, resembling an animal, whereby stuffed toys having a feeling of hand touch more closely simulating natural fur is obtainable.

[0009] However, there has also been a demand for a stuffed toy having the feeling of hand touch never known up to now or different from that of the natural fur because of the variety of consumer's tastes. It is impossible to satisfy such a demand by the conventional improvements directed to natural fur. In Japanese Unexamined Patent Publication (Kokai) No. 54-156686, a plush fabric is described, using fibers having a fineness in a range from 0.11 to 1.7 dtex. However, the plush fabric manufactured by the disclosed method lacks the voluminous feeling, and is unfavorable for a clothing or a stuffed toy because of the lack of plush. It is surmized that the sea-component is removed from sea-island type fiber.

[0010] Also, generally speaking, a fabric using fibers having a small single-fiber fineness is poor in color development. For example, the plush fabric disclosed in Japanese Unexamined Patent Publication (Kokai) No. 54-156686 is problematic in that sufficient color development is not obtainable and, to solve such a drawback, it is usual to cause an excessive amount of dye to be exhaustively adsorbed.

55 **[0011]** Accordingly, there has been no plush fabric for a stuffed toy at present fabric has a unique soft feeling of touch never known up to now and improved in drapeability when used for a clothing and in flexibility parallel with curved surface when used for a stuffed toy, as well as free from the shedding of pile fibers and enhanced in the opening of pile fibers.

DISCLOSURE OF THE INVENTION

[0012] An object of the present invention is to provide a plush fabric and a stuffed toy using the same, which fabric has a unique soft feeling of touch different from that of a natural fur and never known up to now, free from a see-through property when used for clothing and excellent in flexibility parallel with curved surface when used for a stuffed toy and clear in color development, as well as free from the shedding of pile fibers and enhanced in the opening of pile fibers.

[0013] The present inventors have made diligent studies directed to a plush fabric having the feeling of touch never known up to now and found that it is possible to obtain a plush fabric having the unique soft feeling of touch never known up to now if a fabric containing fibers having a small single-fiber fineness is mixed with fibers having a somewhat larger single-fiber fineness, to complete the present invention.

[0014] Thus, the present invention is as follows:

1. A plush fabric wherein piles constituting the fabric are formed of single fibers having a single-fiber fineness in a range from 0.1 to 4 dtex, in which 80 to 100% by weight of the single fibers have a single-fiber fineness in a range from 0.1 to 2.2 dtex.

2. A plush fabric as defined by claim 1, wherein each of the piles is formed of 300 to 2000 single fibers in which those having a root-crimpability $a\%$ (a is 0 to 7) or less is in a range from 20 to 80% by weight and those having a root-crimpability $(a + 3)\%$ or more is in a range from 20 to 80% by weight, and a compressive work done to a pile surface of the pile fabric is in a range from 5 to 50 cN/cm².

3. A plush fabric as defined by claim 1 or 2, wherein the plush fabric is a circular knit pile fabric.

4. A plush fabric as defined by claim 1, 2 or 3, wherein the pile has a spun yarn of acrylic type synthetic fibers as a component thereof.

5. A plush fabric as defined by any one of claims 1 to 4, wherein the pile is formed of the single fibers having γ (a ratio of major axis / minor axis of the cross-section thereof) in a range from 1.0 to 1.2 contained in a range from 30 to 70% by weight, and those having γ in a range from 2 to 7 contained in a range from 70 to 30% by weight.

6. A stuffed toy using the plush fabric defined by any one of claims 1 to 5.

[0015] The present invention will be described in more detail below.

[0016] The pile constituting the plush fabric according to the present invention is formed of single fibers having a single-fiber fineness in a range from 0.1 to 4 dtex, in which the single fibers in a range from 80 to 100% by weight have a single-fiber fineness in a range from 0.1 to 2.2 dtex. When the pile is formed of the single fibers having the single-fiber fineness within this range, it is possible to obtain a stuffed toy of the unique soft feeling of touch.

[0017] At least one end of the pile referred to in the present invention is not fixed but free. However, the piles statically flocked are not included.

[0018] If the single-fiber fineness is less than 0.1 dtex, the fiber easily yields to an external force, and when used as an outer fabric for a clothing or an external cloth for a stuffed toy, the piles are liable to bend down and are not recoverable. If the single fibers having a single-fiber fineness exceeding 2.2 dtex are more than 20% by weight, the feeling of touch becomes harder. The pile containing 80 to 100% by weight of single fibers having a single-fiber fineness in a range from 0.55 to 1.7 dtex is more preferable.

[0019] A single-fiber fineness of the remaining single fibers constituting the pile preferably exceeds 2.5 dtex but is 3 dtex or less. If it exceeds 3 dtex, the feeling of touch is liable to be harder.

[0020] The number of single fibers constituting the respective pile is preferably in a range from 300 to 2000. If the number is less than 300, a firm pile is not obtainable, while if exceeding 2000, it is difficult to obtain a soft feeling of touch because the relative movements of the respective single fibers are constrained. In this regard, the number of single fibers constituting the pile is represented by that of single fibers in one half of a V-shaped pile.

[0021] According to the present invention, the pile is preferably composed of single fibers having a smaller root-crimpability and those having a root-crimpability larger by 3% or more than the former.

[0022] In other words, according to the present invention, the respective pile is preferably composed of single fibers having a root-crimpability of $a\%$ (a is in a range from 0 to 7) or less in a range from 20 to 80% by weight and those having a root-crimpability $(a + 3)\%$ or more in a range from 20 to 80% by weight. If the single fibers having a root-crimpability of $a\%$ or less are 20% by weight, it is difficult to obtain a soft feeling of touch. In this regard, the measurement of the root-crimpability will be described later.

[0023] A compressive work done onto the pile surface of the plush fabric is preferably in a range from 5 to 50 cN/cm². If it is less than 5 cN/cm², the bulky feeling of the resultant fabric is hardly obtained, and it is difficult to obtain a soft feeling of touch in both clothing and toy uses. Contrarily, if it exceeds 50 cN/cm², the feeling of hand touch becomes harder and, therefore, it is also difficult to obtain a soft feeling of touch.

[0024] In the plush fabric for clothing or stuffed toy use, the flexibility parallel with curved surface is important. For example, a warp knit fabric such as a Meyer pile fabric, which is one type of plush fabric, has a low stretchability in

the warp direction, whereby when used for a clothing, it is poor in flexibility parallel with curved surface; i.e., the drapability is unfavorable from the aesthetic viewpoint. If used for a stuffed toy, there is a problem in that this fabric cannot reproduce a round three-dimensional shape.

[0025] In the prior art, when single fibers having a low root-crimpability are used for a pile to achieve the gentle and soft feeling of touch, there is a problem in that many fibers come off because the single fibers easily slip out. In this respect, if the circular knit pile fabric is used for this purpose, the flexibility parallel with curved surface is improved and the fibers hardly slip off. Such an advantage of the circular knit pile fabric has been found by the present inventors for the first time.

[0026] Although warp knit fabrics or woven fabrics may be used for the present invention, the flexibility parallel with curved surface somewhat deteriorates in such a case.

[0027] In the present invention, a spun yarn is preferably used for a pile because the pile is firmly defined whereby a clearly cut cross-section is prominent to result in a clear color. Particularly, if a spun yarn of acrylic fiber is used, a more vivid color development is obtainable. When using polyester or polyamide fibers, the color clarity becomes sometimes inferior. It is surmised that this phenomenon is derived from the unfavorable cut surface. However, the use of polyester and polyamide fibers is included within a scope of the present invention.

[0028] While a spun yarn is preferably used for a pile as described above, a filament yarn may be used for this purpose. In this regard, if a bulky textured yarn is used, a plushed fabric rich with a bulky feeling is obtainable, but this fabric lacks the gentle feeling of touch because low-crimped fibers are hardly contained therein due to uniform crimp of single filament. Alternatively, if a straight yarn other than the textured yarn is used, the bulky feeling is hardly felt to result in a hard feeling of touch.

[0029] In the plushed fabric according to the present invention, the pile is preferably composed of single fibers having a γ (a ratio of major axis / minor axis of the cross-section thereof) in a range from 1.0 to 1.2 contained in a range from 30 to 70% by weight, and those having γ in a range from 2 to 7 contained in a range from 70 to 30% by weight, because the single fibers of the pile are more openable. In such a case, 40% or less by weight of single fibers having a γ exceeding 1.2 but less than 2 may be contained in the pile. In this regard, the present invention may include aspects other than those falling into the above-mentioned scope of γ values and content ratios, although the opening of fibers in the pile is somewhat inferior. In this respect, it is difficult at present to produce a sufficiently thin single fiber having a γ value exceeding 7.

BEST MODES FOR CARRYING OUT THE INVENTION

[0030] The present invention will be described below with reference to the preferred embodiments.

[0031] The estimation and measurement used in the embodiments are as follows:

(1) Estimation of soft feeling of touch

[0032] A sensory test was carried out on the soft feeling of touch by ten experts in the textile industry in accordance with the following five-grade estimation system:

- grade 1: hard
- grade 2: somewhat hard
- grade 3: somewhat soft
- grade 4: significantly soft
- grade 5: extremely soft

[0033] If five experts or more determine that the feeling of touch of a test fabric belongs to the grade 5, it is defined that the fabric is very soft in the feeling of touch.

(2) Qmax

[0034] A test piece prepared by cutting the plushed fabric to be a square of 7 cm $\times$ 7 cm is subjected to the measurement by using a Thermolabo II (manufactured by Kanto TECH K.K.).

[0035] That is, the test piece is placed on a sample table made of foamed polystyrene. A hot plate maintained at 30°C is laid thereon. A quantity of heat transferred from the hot plate to the test piece is read as a heat absorption rate per unit area, and the maximum value thereof is represented by Qmax.

(3) Root crimpability

[0036] A test piece is prepared from a pile pulled off from a plushed fabric. A root (a joint portion to a ground knit fabric) of the pulled-off pile and a point 2 mm away from the root are marked with a felt pen. The pile is detwisted to be single fibers which are then placed on a velvet sheet and pressed from above with a glass plate. An enlarged photograph is taken under this condition.

[0037] A linear distance and a distance along crimps of the fiber between the two points marked with the felt pen; i. e., the root and the 2 mm point; on the photograph. The linear distance L1 is measured by a rule, and the distance L2 along the crimps is measured by a digital curve Meter (PJ manufactured by K.K. UCHIDA YOHKOH).

$$\text{Root crimpability (\%)} = [(L2 - L1) / L1] \times 100$$

(4) Compressive work done

[0038] A compression measurement device KES-G5 manufactured by KATOH TECH K.K. is used.

[0039] A work done when the plushed surface is compressed with a circular presser member of 2 cm diameter with a 200 g load, which is the maximum load, is referred to as the compressive work done.

(5) Drapeability

[0040] A drape coefficient is measured in accordance with a method F of JIS-L1018-6.22.6.

(6) Bulkiness

[0041] An expert determines whether the plushed fabric is bulky (○) or not (×).

(7) Coverage ability

[0042] Stuffed toys are prepared, on which a sensory test is carried out by experts to determine grades of the coverage ability at an ear portion in accordance with the following criteria:

grade 1: a ground yarn is significantly conspicuous.

grade 2: a ground yarn is conspicuous.

grade 3: a ground yarn is somewhat conspicuous.

grade 4: a ground yarn is not conspicuous.

grade 5: a ground yarn is not conspicuous at all.

(Examples 1 to 10 and Comparative examples 1 to 5)

[0043] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, and then the obtained polymer was dissolved into nitric acid to be a dope. The dope was wet-spun to result in non-shrink type acrylic staple fibers having a circular cross-section and a single-fiber fineness in a range from 0.1 to 1.7 dtex. Also, in the same manner as described above, shrink type acrylic staple fibers were obtained, which have a circular cross-section and a single-fiber fineness after being dyed in a range from 1.0 to 4.5 dtex.

[0044] Next, the non-shrink staple fibers and the shrink staple fibers described above were mixed at ratios shown in Table 1, from which are obtained spun yarns of 2/36 metric count. The spun yarns were dyed with a cationic dye while using a circulating type hank dyeing machine to result in brown dyed yarns.

[0045] By using these yarns as a pile yarn and polyester multifilamentary false-twist textured yarns of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0046] The softness of these fabrics was estimated by a sensory test, the results of which are shown together in Table 1.

[0047] From Table 1, it is apparent that the plushed fabrics in which piles are composed of single fibers having a fineness in a range from 0.1 to 4 dtex exhibit the soft feeling of touch, and, further, those in which piles are composed

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of 80% by weight or more of single fibers having a fineness in a range from 0.1 to 2.2 dtex are softer.

Table 1

	Non-shrink type fiber /shrink type fiber		Estimation of touch
	Single-fiber fineness (dtex)	Mixing ratio (%)	Number of experts who determined as grade 5
Example 1	0.1/2.0	60/40	7
Example 2	0.1/2.3	80/20	7
Comparative example 1	0.1/2.3	60/40	4
Example 4	1.7/2.0	80/20	8
Example 5	1.7/2.0	60/40	7
Example 6	1.7/1.0	80/20	10
Example 7	1.7/1.0	60/40	10
Example 8	1.7/3.0	80/20	6
Comparative example 2	1.7/3.0	60/40	4
Comparative example 3	1.7/4.5	80/20	3
Comparative example 4	1.7/4.5	60/40	2
Example 9	0.5/3.0	80/20	6
Comparative example 4	0.5/3.0	60/40	4
Comparative example 5	0.5/4.5	80/20	3
Example 10	1.0/1.0	80/20	10

(Examples 11 to 23 and Comparative example 6)

[0048] Shrink type acrylic staple fibers and non-shrink type acrylic staple fibers were obtained in the same manner as in Example 1, which have a circular cross-section and a single fiber fineness as shown in Table 2.

[0049] The non-shrink and shrink fibers, each having a fineness shown in Table 2, were mixed at ratios as shown in Table 2 and spun to result in spun yarns of 2/36 metric count. The spun yarns were dyed with a cationic dye while using a circulating type hank dyeing machine to result in brown dyed yarns.

[0050] By using these yarns as a pile yarn and polyester multifilamentary false-twist textured yarns of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened, by a polisher, and cut, by a shearing machine, to result in a final plushed fabric having 10 mm long cut piles. The root crimpability and the compressive work done of the piles were measured, and shown in Table 2.

[0051] Qmax was also measured on the plushed fabrics thus obtained, and shown in Table 2.

[0052] From Table 2, it is apparent that the plushed fabrics in which the number of single fibers constituting the pile is in a range from 300 to 2000 have a larger Qmax and exhibit a gentle and soft feeling of touch. Further, it is apparent that when the content of fibers in the pile, having the root crimpability of 7% or less, is 20% by weight or more, Qmax becomes high and a soft feeling of touch is obtainable. Also, the plushed fabrics having the work done in a range from 5 to 50 cN/cm² have a high value of Qmax and exhibit a gentle and soft feeling of touch.

Table 2

	Non-shrink type fiber/shrink type fiber		Number of fibers	Content of fibers having root crimpability of 7% or less	Compressive Work done	Qmax
	Single-fiber fineness (dtex)	Mixing ratio (%)		(%)	(cN/cm ²)	
Example 11	0.1/0.1	60/40	6940	21	3	38
Example 12	0.3/0.3	60/40	2313	25	5	45
Example 13	1.3/1.3	60/40	534	24	31	47
Example 14	1.0/1.0	60/40	680	25	40	50
Example 15	2.2/2.2	60/40	315	23	43	47
Example 16	3.3/3.3	60/40	210	21	61	37
Comparative example 6	5.6/5.6	60/40	124	20	72	31
Example 17	1.7/1.0	60/40	489	22	45	54
Example 18	1.7/1.0	60/40	489	41	30	58
Example 19	1.7/1.0	60/40	489	60	21	61
Example 20	1.7/1.0	60/40	489	76	18	62
Example 21	1.7/1.0	60/40	489	98	12	70
Example 22	1.7/1.0	60/40	489	5	60	37
Example 23	1.7/1.0	60/40	489	11	58	39

(Examples 24 to 26)

[0053] Shrink type acrylic staple fibers having a circular cross-section and a single-fiber fineness of 1.0 dtex after being dyed and shrink type acrylic staple fibers having a dog-bone type cross-section and a single-fiber fineness of 1.7 dtex were obtained in the same manner as in Example 1.

[0054] These fibers were mixed together and spun to result in spun yarns of 2/36 metric count. The spun yarns were dyed with a cationic dye while using a circulating type hank dyeing machine to result in brown dyed yarns.

[0055] By using these yarns as a pile yarn and polyester multifilamentary false-twist textured yarns of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0056] A double warp knit fabric was formed by a double raschel machine while using the same spun yarns as a pile yarn. The resultant fabric was divided by a center cutter. After being printed, the fabric was brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0057] After the same spun yarns were dyed, pile fabrics were formed therefrom by a double weave loom, and plushed fabrics were obtained.

[0058] The drapeability was measured for these plushed fabrics. The results were shown in Table 3.

[0059] From Table 3, it is apparent that the plushed fabric obtained from the circular knit fabric has a good drapeability and is excellent in flexibility parallel with curved surface.

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Table 3

	Knit stitch	Drapeability
Example 24	Circular knit fabric	41
Example 25	Double raschel knit fabric	60
Example 26	Double woven fabric	58

(Examples 27 to 35)

[0060] Acrylic staple fibers having a circular cross-section and a single-fiber fineness of 1.0 dtex were obtained in the same manner as in Example 1. Spun yarns were prepared from the staple fibers, and polyester spun yarns and polyamide spun yarns were also prepared, all of which have a 2/36 metric count. Separately, a polyester multifilamentary yarn of 700 dtex and a false-twist textured yarn thereof, a polyamide multifilamentary yarn of 700 dtex and a false-twist textured yarn, and an acrylic multifilamentary yarn of 700 dtex and a false-twist textured yarn were dyed with a blue dye.

[0061] By using these dyed yarns as pile yarns, and polyester multifilamentary false-twist textured yarns of 170 dtex/72 f as ground yarns, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final pushed fabric having 10 mm long cut piles.

[0062] The bulkiness and Qmax were measured on the pushed fabrics thus obtained, and shown in Table 4.

[0063] From Table 4, it is apparent that the pushed fabric in which the spun yarns composed of acrylic staple fibers were used has a high value of Qmax and is bulky in the feeling of touch as well as clear in color development.

Table 4

	Material	Yarn configuration	Qmax	Bulkiness
Example 27	Acrylic fiber	Spun yarn	58	○
Example 28	Polyester fiber	Spun yarn	43	○
Example 29	Nylon fiber	Spun yarn	41	○
Example 30	Acrylic fiber	Multifilamentary yarn	71	×
Example 31	Polyester fiber	Multifilamentary yarn	66	×
Example 32	Nylon fiber	Multifilamentary yarn	63	×
Example 33	Acrylic fiber	False-twist textured yarn	33	○
Example 34	Polyester fiber	False-twist textured yarn	32	○
Example 35	Nylon fiber	False-twist textured yarn	31	○

(Example 36 to 46)

[0064] Staple fibers were obtained in the same manner as in Example 1, having a cross-sectional shape defined by a major axis / a minor axis (γ) and a single-fiber fineness as shown in Table 5. The resultant staple fibers were mixed at ratios shown in Table 5 and spun to be acrylic fiber spun yarns of 2/28 metric count. The spun yarns were dyed with a cationic dye while using a circulating type hank dyeing machine to result in brown dyed yarns.

[0065] By using these dyed yarns were used as a pile yarn, and polyester multifilamentary false-twist textured yarns of 150 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final pushed fabric having 10 mm long cut piles.

[0066] The coverage ability of the obtained pushed fabrics was estimated and shown in Table 5.

[0067] From Table 5, it is apparent that the pushed fabric composed of 30 to 70% by weight of single fibers having the γ value in a range from 1.0 to 1.2 and 70 to 30% by weight of single fibers having the γ value in a range from 2 to 7 is excellent in coverage ability.

Table 5

	Non-shrink type fiber/shrink type fiber		Coverage ability
	γ value	Mixing ratio (%)	
Example 36	3.0/1.0	20/80	3
Example 37	3.0/1.0	30/70	4
Example 38	3.0/1.0	60/40	5
Example 39	3.0/1.0	70/30	4
Example 40	3.0/1.0	80/20	3
Example 41	6.0/1.0	60/40	5
Example 42	7.0/1.0	60/40	4
Example 43	8.0/1.0	60/40	3
Example 44	3.0/1.1	60/40	5
Example 45	3.0/1.2	60/40	4
Example 46	3.0/1.3	60/40	3

(Examples 47 to 51)

[0068] Staple fibers were obtained, in the same manner as in Example 1, having a single-fiber fineness in a range from 0.09 to 3.3 dtex, from which were prepared acrylic fiber spun yarns of 2/36 metric count as shown in Table 6.

[0069] By using these spun yarns as shown in Table 6, plush fabrics were obtained in the same manner as in Example 1. Then, the plush fabrics were sewn to prepare stuffed toys. The feeling of touch of the resultant stuffed toys was estimated and shown in Table 6.

(Comparative example 7)

[0070] Non-shrink type acrylic staple fibers having a single-fiber fineness of 3.3 dtex and shrink type acrylic staple fibers having a single-fiber fineness of 0.044 dtex were obtained in the same manner as in Example 1. From these staple fibers, acrylic fiber spun yarns having 2/36 metric count were obtained in the same manner as in Example 1.

[0071] By using these spun yarns, plush fabrics were obtained in the same manner as in Example 1. Then, the plush fabrics were sewn to prepare stuffed toys. The feeling of touch of the resultant stuffed toys was estimated and shown in Table 6.

(Comparative example 8)

[0072] Non-shrink type acrylic staple fibers having a single-fiber fineness of 3.3 dtex and shrink type acrylic staple fibers having a single-fiber fineness of 3.7 dtex were obtained in the same manner as in Example 1. From these staple fibers, acrylic fiber spun yarns having 2/36 metric count were obtained in the same manner as in Example 1.

[0073] By using these spun yarns, plush fabrics were obtained in the same manner as in Example 1. Then, the plush fabrics were sewn to prepare stuffed toys. The feeling of touch of the resultant stuffed toys was estimated and shown in Table 6.

Table 6

		Single-fiber fineness of raw fiber (dtex)	Single-fiber fineness of fiber in stuffed toy (dtex)	Mixing ratio of raw fibers (%)	Basis weight of fabric (g/m ²)	Estimation of touch (number of experts who determined so)				
						grade 5	grade 4	grade 3	grade 2	grade 1
Example 47	Non-shrink type fiber	3.3	3.3	60	488	9	1	0	0	0
	Shrink type fiber	0.09	0.11	40						
Example 48	Non-shrink type fiber	3.3	3.3	60	491	9	1	0	0	0
	Shrink type fiber	0.44	0.6	40						
Example 49	Non-shrink type fiber	3.3	3.3	60	484	8	2	0	0	0
	Shrink type fiber	0.78	1.0	40						
Example 50	Non-shrink type fiber	3.3	3.3	60	484	8	2	0	0	0
	Shrink type fiber	1.3	1.7	40						
Example 51	Non-shrink type fiber	3.3	3.3	60	486	6	4	0	0	0
	Shrink type fiber	2.2	2.8	40						
Comparative example 7	Non-shrink type fiber	3.3	3.3	60	482	9	1	0	0	0
	Shrink type fiber	0.044	0.06	40						
Comparative example 8	Non-shrink type fiber	3.3	3.3	60	489	3	5	2	0	0
	Shrink type fiber	3.7	4.4	40						

[0074] The following will be apparent from Table 6:

[0075] The feeling of touch of the stuffed toys obtained from Examples 47 and 48, in which shrink type acrylic fibers have a single-fiber fineness of 0.11 and 0.6 dtex, respectively, was estimated as grade 5 (extremely soft) by nine experts, which means that the stuffed toy has an extremely soft feeling of touch.

[0076] The feeling of touch of the stuffed toys obtained from Examples 49 and 50, in which shrink type acrylic fibers have a single-fiber fineness of 1.0 and 1.7 dtex, respectively, was estimated as grade 5 (extremely soft) by eight experts, which means that the stuffed toy has an extremely soft feeling of touch.

[0077] The feeling of touch of the stuffed toy obtained from Example 51, in which shrink type acrylic fibers have a single-fiber fineness of 2.8 dtex, was estimated as grade 5 (extremely soft) by six experts, which means that the stuffed toy has the extremely soft feeling of touch.

[0078] While the feeling of touch of the stuffed toy obtained from Comparative example 7 was estimated as grade 5 by as many as nine experts, the piles were liable to fall down and were not recoverable, which was unsuitable for a stuffed toy.

[0079] The feeling of touch of the stuffed toy obtained from Comparative example 8 was estimated as grade 5 by as few as three experts, and as grade 3 (somewhat soft) by two experts, which means that it lacks a soft feeling of touch.

(Examples 52 to 54 and Comparative example 9)

[0080] Shrink type acrylic staple fibers and non-shrink type acrylic staple fibers were obtained in the same manner as in Example 1, which have a single fiber fineness in a range from 0.77 to 3.3 dtex as shown in Table 7, and dyed to have a single-fiber fineness of 1 dtex and 3.3 dtex, respectively, when they are processed to be a stuffed toy. These staple fibers were mixed at various ratios to result in acrylic fiber spun yarns of 2/36 metric count as shown in Table 7.

[0081] Flushed fabric were prepared from these spun yarns in the same manner as in Example 1. Then, the plush fabrics were sewn to be stuffed toys. The estimation of the resultant stuffed toys is shown also in Table 7.

[0082] The following will be apparent from Table 7:

[0083] The feeling of touch of the stuffed toy obtained from Example 52, in which the mixture ratio of shrink type acrylic staple fibers having a single-fiber fineness of 2.8 dtex or less (1.0 dtex) when being formed into the stuffed toy is 20% by weight, was estimated as grade 5 by six experts, which means that the stuffed toy had an extremely soft feeling of touch.

[0084] The feeling of touch of the stuffed toy obtained from Example 53, in which the mixture ratio of acrylic staple fibers having a single-fiber fineness of 2.8 dtex or less (1.0 dtex) when being formed into the stuffed toy is 100% by weight, was estimated as grade 5 by all of the experts, which means that the stuffed toy had an extremely soft feeling of touch.

[0085] The feeling of touch of the stuffed toy obtained from Example 54, in which thin non-shrink type acrylic staple fibers having a single-fiber fineness of 1.0 dtex when being formed into the stuffed toy is used, was estimated as grade 5 by eight experts, which means that the stuffed toy had an extremely soft feeling of touch.

[0086] The feeling of touch of the stuffed toy obtained from Comparative example 9, in which the mixture ratio of shrink type acrylic staple fibers having a single-fiber fineness of 2.8 dtex or less (1.0 dtex) when being formed into the stuffed toy is 15% by weight, was estimated as grade 5 by as few as four experts, and as grade 3 by one expert, which means that it lacks a soft feeling of touch.

Table 7

		Single-fiber fineness of raw fiber (dtex)	Single-fiber fineness of fiber in stuffed toy (dtex)	Mixing ratio of raw fibers (%)	Basis weight of fabric (g/m ²)	Mixing ratio of fibers of 2.2 dtex or less (%)	Estimation of touch (number of experts who determined so)			
							grade 5	grade 4	grade 3	grade 2 grade 1
Example 52	Non-shrink type fiber	3.3	3.3	60	479	20	6	4	0	0
	Shrink type fiber	2.6	3.3	20						0
	Shrink type fiber	0.77	1.0	20						
Example 53	Non-shrink type fiber	1.0	1.0	60	487	100	10	0	0	0
	Shrink type fiber	0.77	1.0	40						
Example 54	Non-shrink type fiber	1.0	1.0	40	477	100	8	2	0	0
	Shrink type fiber	2.6	3.3	60						
Comparative example 9	Non-shrink type fiber	3.3	3.3	60	471	15	4	5	1	0
	Shrink type fiber	2.6	3.3	25						
	Shrink type fiber	0.77	1.0	15						

(Examples 55 to 60)

[0087] Shrink and non-shrink type acrylic staple fibers having various values of single-fiber thickness and shapes of cross-section as shown in Table 8 were obtained in the same manner as in Example 1. These staple fibers were mixed at various ratios as shown in Table 8 to result in acrylic fiber spun yarns of 2/36 metric count. Plushed fabrics were obtained from these spun yarns in the same manner as Example 1. Then, stuffed toys were prepared by sewing the plushed fabrics.

[0088] The estimation of the feeling of touch of the resultant stuffed toys was shown in Table 8.

[0089] From Table 8, the following will be apparent:

[0090] The feeling of touch of the stuffed toys obtained from Examples 55, 56, 57 and 60 was estimated as grade 5 by ten experts. That is, it is apparent that if the pile of the plushed fabric contains 20% by weight or more of acrylic staple fibers having a single-fiber fineness of 2.8 dtex or less when used in the stuffed toy, it has the extremely soft feeling of touch even though the fiber cross-sectional shape is either flat, circular or dog-bone.

[0091] The feeling of touch of the stuffed toys obtained from Examples 58 and 59 was estimated as grade 5 by as many as nine experts, which means that the stuffed toy had an extremely soft feeling of touch.

Table 8

		Single-fiber fineness of raw fiber (dtex)	Single-fiber fineness of fiber in stuffed toy (dtex)	Mixing ratio of raw fibers (%)	Fiber cross-section	Basis weight of fabric (g/m ²)	Estimation of touch (number of experts who determined so)				
							grade 5	grade 4	grade 3	grade 2	grade 1
Example 55	Non-shrink type fiber	2.2	2.2	60	flat	485	10	0	0	0	0
	Shrink type fiber	0.66	0.88	40	circular						
Example 56	Non-shrink type fiber	0.88	0.88	60	circular	479	10	0	0	0	0
	Shrink type fiber	0.66	0.88	40	circular						
Example 57	Non-shrink type fiber	1.7	1.7	60	dog-bone	484	10	0	0	0	0
	Shrink type fiber	0.66	0.88	40	circular						
Example 58	Non-shrink type fiber	1.7	1.7	60	circular	482	9	1	0	0	0
	Shrink type fiber	1.3	1.7	40	circular						
Example 59	Non-shrink type fiber	2.2	2.2	60	dog-bone	481	9	1	0	0	0
	Shrink type fiber	1.8	2.2	40	circular						
Example 60	Non-shrink type fiber	0.9	0.88	40	circular	477	10	0	0	0	0
	Shrink type fiber	2.6	3.3	20	dog-bone						
	Shrink type fiber	0.66	0.88	40	circular						

(Comparative example 10)

[0092] Non-shrink type acrylic fibers having a circular cross-section and a single-fiber fineness of 1.7 dtex were obtained in the same manner as in Example 1. The fibers were arranged in parallel to each other to form a tow of 62 dtex thick which was then dyed in a package dyeing machine, dried and cut into piles of 1 mm long.

[0093] A plain-weave fabric composed of polyester multifilamentary yarns of 170 dtex/72 f having a warp density of 150 end/2.54 cm and a weft density of 150 end/2.54 cm was coated with a self-crosslinking type acrylic emulsion adhesive, and statically flocked with the piles. After being dried, a static flocking product was obtained.

[0094] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric (static flocking product) so that the pile surface is outside. The estimation result is shown in Table 9. According to Table 9, it is apparent that eight experts were determined that the feeling of touch of the stuffed toy belongs to grade 1 (hard) because of the rough feeling of touch caused by the adhesive on the pile surface.

Table 9

		Single-fiber fineness of raw fiber (dtex)	Single-fiber fineness of fiber in stuffed toy (dtex)	Mixing ratio of raw fibers (%)	Kind of fabric	Basis weight of fabric (g/m ²)	Estimation of touch (number of experts who determined so)				
							grade 5	grade 4	grade 3	grade 2	grade 1
Comparative example 10	Non-shrink type fiber	1.7	1.7	100	statically flocked fabric	224	0	0	0	2	8

(Example 61)

[0095] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, which was then dissolved into nitric acid to be a dope. The dope was wet-spun to result in shrink type acrylic staple fibers having a circular cross-section, a single-fiber fineness of 1.0 dtex (when used for a stuffed toy) and a hot water shrinkage of 26%.

[0096] A spun yarn of 2/36 metric count was obtained from the acrylic staple fibers of 40% by weight and nylon staple fibers imparted with crimps by a gear crimper (having a circular cross-section and a single-fiber fineness of 3.3 dtex) of 60% by weight. The spun yarn was dyed with a cationic dye in a circulating type hank dyeing machine to obtain a brown dyed yarn (in which the shrink type acrylic fibers solely were dyed).

[0097] By using this yarn as a pile yarn and a polyester multifilamentary false-twist textured yarn of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0098] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric so that the pile surface is outside. The estimation result is shown in Table 10.

(Example 62)

[0099] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, which was then dissolved into nitric acid to be a dope. The dope was wet-spun to result in shrink type acrylic staple fibers having a circular cross-section, a single-fiber fineness of 1.0 dtex (when used for a stuffed toy) and a hot water shrinkage of 26%.

[0100] A spun yarn of 2/36 metric count was obtained from the acrylic staple fibers of 40% by weight and polyester staple fibers imparted with crimps by a gear crimper (having a circular cross-section and a single-fiber fineness of 3.3 dtex) of 60% by weight. The spun yarn was dyed with a cationic dye in a circulating type hank dyeing machine to obtain a brown-dyed yarn (in which the shrink type acrylic fibers solely were dyed).

[0101] By using this yarn as a pile yarn and a polyester multifilamentary false-twist textured yarn of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having cut piles of 10 mm long.

[0102] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric so that the pile surface is outside. The estimation result is shown in Table 10.

(Example 63)

[0103] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, which was then dissolved into nitric acid to be a dope. The dope was wet-spun to result in shrink type acrylic staple fibers having a circular cross-section, a single-fiber fineness of 1.0 dtex (when used for a stuffed toy) and a hot water shrinkage of 26%.

[0104] A spun yarn of 2/36 metric count was obtained from the acrylic staple fibers of 40% by weight and viscose rayon staple fibers imparted with crimps by a gear crimper (having a circular cross-section and a single-fiber fineness of 3.3 dtex) of 60% by weight. The spun yarn was dyed with a cationic dye in a circulating type hank dyeing machine to obtain a brown-dyed yarn (in which the shrink type acrylic fibers solely were dyed).

[0105] By using this yarn as a pile yarn and a polyester multifilamentary false-twist textured yarn of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0106] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric so that the pile surface is outside. The estimation result is shown in Table 10.

(Example 64)

[0107] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, which was then dissolved into nitric acid to be a dope. The dope was wet-

spun to result in shrink type acrylic staple fibers having a circular cross-section, a single-fiber fineness of 1.0 dtex (when used for a stuffed toy) and a hot water shrinkage of 26%.

[0108] A spun yarn of 2/36 metric count was obtained from the acrylic staple fibers of 40% by weight and cuprammonium rayon staple fibers imparted with crimps by a gear crimper (having a circular cross-section and a single-fiber fineness of 3.3 dtex) of 60% by weight. The spun yarn was dyed with a cationic dye in a circulating type hank dyeing machine to obtain a brown-dyed yarn (in which the shrink type acrylic fibers solely were dyed).

[0109] By using this yarn as a pile yarn and a polyester multifilamentary false-twist textured yarn of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0110] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric so that the pile surface is outside. The estimation result is shown in Table 10.

(Example 65)

[0111] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, which was then dissolved into nitric acid to be a dope. The dope was wet-spun to result in shrink type acrylic staple fibers having a circular cross-section, a single-fiber fineness of 1.0 dtex (when used for a stuffed toy) and a hot water shrinkage of 26%.

[0112] A spun yarn of 2/36 metric count was obtained from the acrylic staple fibers of 40% by weight and wool fibers having a circular cross-section and a single-fiber fineness of 4.0 dtex of 60% by weight. The spun yarn was dyed with a cationic dye in a circulating type hank dyeing machine to obtain a brown-dyed yarn (in which the shrink type acrylic fibers solely were dyed).

[0113] By using this yarn as a pile yarn and a polyester multifilamentary false-twist textured yarn of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having cut piles of 10 mm long.

[0114] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric so that the pile surface is outside. The estimation result is shown in Table 10.

(Example 66)

[0115] Acrylonitrile of 94.5% by weight, methylacrylate of 5.0% by weight and sodium methallylsulfonate of 0.5% by weight were copolymerized with each other, which was then dissolved into nitric acid to be a dope. The dope was wet-spun to result in shrink type acrylic staple fibers having a circular cross-section, a single-fiber fineness of 1.0 dtex (when used for a stuffed toy) and a hot water shrinkage of 26%.

[0116] A spun yarn of 2/36 metric count was obtained from the acrylic staple fibers of 40% by weight and cotton fibers having a circular cross-section and a single-fiber fineness of 3.5 dtex of 60% by weight. The spun yarn was dyed with a cationic dye in a circulating type hank dyeing machine to obtain a brown-dyed yarn (in which the shrink type acrylic fibers solely were dyed).

[0117] By using this yarn as a pile yarn and a polyester multifilamentary false-twist textured yarn of 170 dtex/72 f as a ground yarn, boa fabrics having piles of 10 mm long were knit by a seal rib knitting machine. Then, a backing was formed on a pile back surface, and the piles were brushed to open individual fibers. Thereafter, tip ends of the piles were straightened by a polisher, and cut by a shearing machine to result in a final plushed fabric having 10 mm long cut piles.

[0118] A stuffed toy of a bear was prepared by stuffing polyester staple fibers into a bag made of this fabric so that the pile surface is outside. The estimation result is shown in Table 10.

Table 10

	Kind of fiber	Single-fiber fineness of raw fiber (dtex)	Single-fiber fineness of fiber in stuffed toy (dtex)	Mixing ratio of raw fibers (%)	Basis weight of fabric (g/m ²)	Estimation of touch (number of experts who determined so)				
						grade 5	grade 4	grade 3	grade 2	grade 1
Example 61	Nylon fiber	3.3	3.3	60	492	8	2	0	0	0
	Shrink type acrylic fiber	0.77	1.0	40						
Example 62	Polyester fiber	3.3	3.3	60	481	7	3	0	0	0
	Shrink type acrylic fiber	0.77	1.0	40						
Example 63	Viscose rayon	3.3	3.3	60	485	9	1	0	0	0
	Shrink type acrylic fiber	0.77	1.0	40						
Example 64	Cuprammonium rayon	3.3	3.3	60	479	9	1	0	0	0
	Shrink type acrylic fiber	0.77	1.0	40						
Example 65	Wool	3.1	3.2	60	484	7	3	0	0	0
	Shrink type acrylic fiber	0.77	1.0	40						
Example 66	Cotton	2.8	3.0	60	490	7	3	0	0	0
	Shrink type acrylic fiber	0.77	1.0	40						

[0119] The following will be apparent from Table 10:

[0120] The feeling of touch of the stuffed toy obtained from Example 61, in which nylon fibers of 60% by weight and acrylic fibers of 40% by weight are combined, was estimated as grade 5 by eight experts, which means that the stuffed toy has an extremely soft feeling of touch.

[0121] The feeling of touch of the stuffed toy obtained from Example 62, in which polyester fibers of 60% by weight and acrylic fibers of 40% by weight are combined, was estimated as grade 5 by seven experts, which means that the stuffed toy has an extremely soft feeling of touch.

[0122] The feeling of touch of the stuffed toys obtained from Example 63, in which viscose rayon fibers of 60% by weight and acrylic fibers of 40% by weight are combined, and from Example 64, in which cuprammonium rayon fibers of 60% by weight and acrylic fibers of 40% by weight are combined, were estimated as grade 5 by nine experts, which means that the stuffed toy has an extremely soft feeling of touch.

[0123] The feeling of touch of the stuffed toys obtained from Example 65, in which wool fibers of 60% by weight and acrylic fibers of 40% by weight are combined, and from Example 66, in which cotton fibers of 60% by weight and acrylic fibers of 40% by weight are combined, were estimated as grade 5 by seven experts, which means that the stuffed toy has an extremely soft feeling of touch.

[0124] It is apparent from Examples 61 to 66 that, even if mixed with nylon fibers, polyester fibers, viscose rayon fibers, cuprammonium rayon fibers, wool fibers or cotton fibers, stuffed toys having extremely soft feeling of touch are obtained.

CAPABILITY OF EXPLOITATION IN INDUSTRY

[0125] A plushed fabric according to the present invention is one having the unique soft feeling of touch different from that of a natural fur and never known up to now, free from see-through property when used for a clothing and excellent in flexibility parallel with curved surface when used for a stuffed toy and clear in color development, as well as free from the shedding of pile fibers and enhanced in the opening of pile fibers. By using such a plushed fabric, it is possible to obtain a stuffed toy, excellent in soft feeling of touch, never known up to now.

Claims

1. A plushed fabric wherein piles constituting the fabric are formed of single fibers having a single-fiber fineness in a range from 0.1 to 4 dtex, in which 80 to 100% by weight of the single fibers have a single-fiber fineness in a range from 0.1 to 2.2 dtex.
2. A plushed fabric as defined by claim 1, wherein each of the piles is formed of 300 to 2000 single fibers in which those having a root-crimpability $a\%$ (a is 0 to 7) or less is in a range from 20 to 80% by weight and those having a root-crimpability $(a + 3)\%$ or more is in a range from 20 to 80% by weight, and a compressive work done to a pile surface of the pile fabric is in a range from 5 to 50 cN/cm².
3. A plushed fabric as defined by claim 1 or 2, wherein the plushed fabric is a circular knit pile fabric.
4. A plushed fabric as defined by claim 1, 2 or 3, wherein the pile has a spun yarn of acrylic type synthetic fibers as a component thereof.
5. A plushed fabric as defined by any one of claims 1 to 4, wherein the pile is formed of the single fibers having γ (a ratio of major axis / minor axis of the cross-section thereof) in a range from 1.0 to 1.2 contained in a range from 30 to 70% by weight, and those having γ in a range from 2 to 7 contained in a range from 70 to 30% by weight.
6. A stuffed toy using the plushed fabric defined by any one of claims 1 to 5.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP00/03416

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl.⁷ D04B1/02, A63H9/00, A63H3/02

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.⁷ D04B1/00-1/28, D04B21/00-21/20, D03D27/00-27/18

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

Jitsuyo Shinan Koho	1940-1996	Jitsuyo Shinan Toroku Koho	1996-2000
Kokai Jitsuyo Shinan Koho	1971-1996	Toroku Jitsuyo Shinan Koho	1994-2000

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.
X	JP, 62-191539, A (Toray Industries, Inc.), 21 August, 1987 (21.08.87) (Family: none)	1, 4
Y		2, 3, 5, 6
X	JP, 60-194147, A (Kanebo, LTD.), 02 October, 1985 (02.10.85) (Family: none)	1
Y		2-6
X	JP, 62-132189, U (Sumie Orimono K.K.), 20 August, 1987 (20.08.87) (Family: none)	1, 3
A		2, 4, 5, 6
X	JP, 7-116661, B (UNITIKA Ltd.), 13 December, 1995 (13.12.95) (Family: none)	1, 3
A		2, 4, 5, 6

☐ 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
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Date of the actual completion of the international search
07 August, 2000 (07.08.00)Date of mailing of the international search report
15 August, 2000 (15.08.00)Name and mailing address of the ISA/
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