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(54) **GARMENT HAVING EXCEPTIONAL WEARING COMFORT**

(57) There is provided a garment comprising a fabric at least partially including a hygroscopic fiber, the fabric having an air permeability of 50 to 500 cm³/cm²·s, the garment having a power source unit and an air blowing fan unit having an outside diameter of 80 mm or less. The garment of the present invention suppresses a stuffy feeling and a heatful feeling inside the garment to keep

the environment inside the garment comfortable, and has excellent wearing comfortability and an excellent wearing feeling. Also, the garment can be suitably used in a high temperature and/or high humidity environment and in various wearing scenes such as offices and homes where comfortability is required.

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Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to a garment having excellent wearing comfortability and an excellent wearing feeling.

BACKGROUND ART

10 **[0002]** As a measure against global warming, increasing the preset temperature of an air conditioner in summer or lowering the preset temperature of an air conditioner in winter to reduce an air conditioning load is one of effective means for reducing carbon dioxide emissions. For example, in winter, it is possible to lower the preset temperature of an air conditioner by increasing the amount of clothing or wearing a garment made of a warm material having an excellent hygroscopic and exothermic property and a heat retaining property for winter. On the other hand, in summer, since there
15 is a limit to reduce the amount of clothing in social life, various proposals have been made so far about a comfortable material and a garment for summer.

PRIOR ART DOCUMENTS

20 PATENT DOCUMENTS

[0003] For example, Patent Document 1 proposes a woven/knitted fabric that includes a conjugated yarn including two types of yarns, wherein the yarns have different changes of the yarn length in a dry state and when absorbing water or moisture, and the air permeability changes according to the humidity inside a garment. According to this proposal,
25 when the humidity inside the garment is high, the fiber absorbs moisture to extend, so that the air permeability is improved, and when the humidity inside the garment is low, the fiber releases moisture to shrink, so that the air permeability is deteriorated. Therefore, the environment inside the garment can be kept comfortable.

[0004] Patent Document 2 proposes a garment (a so-called air conditioning clothing) in which an air blowing fan is attached to a fabric having low air permeability. In this proposal, outside air is taken inside the garment by the air blowing fan attached to both sides of a waist on a back of a body of the garment to obtain a cool feeling.
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Patent Document 1: International Publication No. 2007-004589

Patent Document 2: International Publication No. 2017-006481

35 SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0005] In the method described in Patent Document 1, specifically a hygroscopic cellulose fiber is used to have a considerable effect in reducing a stuffy feeling inside the garment, and in addition, when the humidity inside the garment is high, the air permeability is improved. Therefore, the method is slightly effective in reducing a heatful feeling inside the garment, but is not so effective that drastic improvement effects on comfortability are obtained.
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[0006] In addition, the garment described in Patent Document 2 is effective to prevent heat stroke in wearing scenes such as an outdoor construction site in summer or an indoor of a factory where an air conditioning is not working. However, since the garment is made of the fabric having low air permeability, and the garment is greatly inflated by the outside air taken inside the garment through the air blowing fan, the garment is not suitable for the wearing scenes such as offices and homes. Furthermore, a weighty feeling or an uncomfortable feeling is strong when the garment is worn due to the large size of the air blowing fan, and it is necessary to increase the air volume in order to reduce the stuffy feeling or the heatful feeling inside the garment due to the low air permeability of the fabric. As a result, the sound emitted
45 from the air blowing fan may become loud, which is a main reason why the garment is not suitable for the wearing scenes such as offices and homes.

[0007] An object of the present invention is to solve the problem of the above-mentioned conventional techniques and to provide a garment that suppresses the stuffy feeling and the heatful feeling inside the garment, can keep the environment inside the garment comfortable, and has excellent wearing comfortability and an excellent wearing feeling.
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55 SOLUTIONS TO THE PROBLEM

[0008] In order to solve the above-mentioned problem, the garment of the present invention has the following structure.

That is, the present invention is a garment comprising a fabric at least partially including a hygroscopic fiber, the fabric having an air permeability of 50 to 500 cm³/cm²-s, the garment having a power source unit and an air blowing fan unit having an outside diameter of 80 mm or less.

[0009] The garment of the present invention preferably has the air blowing fan unit having an outside diameter of 30 mm or less.

[0010] Also, in the garment of the present invention, it is preferable that the air blowing fan unit is provided at a site inside the garment, the site being at least one site selected from the group consisting of a site near a collar, a site near a sleeve opening, and a site near a bottom opening.

[0011] Furthermore, in the garment of the present invention, it is preferable that the hygroscopic fiber has a moisture absorption difference (ΔMR) of 2.0 to 10.0%.

EFFECTS OF THE INVENTION

[0012] Since the present invention can provide a garment that suppresses the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable and has excellent wearing comfortability and an excellent wearing feeling, the garment can be suitably used in an environment of a high temperature and/or a high humidity and in various wearing scenes such as offices and homes where comfortability is required.

EMBODIMENTS OF THE INVENTION

[0013] The garment of the present invention is a garment comprising a fabric at least partially including a hygroscopic fiber, the fabric having an air permeability of 50 to 500 cm³/cm²-s, the garment having a power source unit and an air blowing fan unit having an outside diameter of 30 mm or less.

[0014] The feeling temperature is the quantification of the sense of temperature felt by the human skin, and is an important indicator when the wearing comfortability of a garment is considered. Many studies have been conducted so far on factors affecting the feeling temperature and mathematical expressions of the feeling temperature. Among others, the following formula (1), which is proposed by Gregorczyk and expresses the net effective temperature with the temperature, the relative humidity and the velocity of wind as variables, is currently widely used because it has a wide application range.

[0015] [Math 1]

$$NET = 37 - \frac{37 - T}{0.68 - 0.0014H + \frac{1}{1.76 + 1.4v^{0.75}}} - 0.29T \times \left(1 - \frac{H}{100}\right) \dots (1)$$

[0016]

NET (°C): Feeling temperature (Net effective temperature)

T (°C): Temperature

H (%): Relative humidity

v (m/s): Velocity of wind

[0017] Here, according to the above formula (1), in an environment of a high temperature and/or a high humidity such as the outdoors in summer or the interior where an air conditioning is not working, it is effective to lower the temperature and the relative humidity and to increase the velocity of wind in order to lower the feeling temperature to improve the wearing comfortability.

[0018] Hereinafter, the present invention is described in detail.

[0019] The garment of the present invention comprising the fabric at least partially including the hygroscopic fiber. Specific examples of the hygroscopic fiber include a polyester hygroscopic fiber, a polyamide fiber, a polyacrylic fiber, a rayon fiber, an acetate fiber, cotton, hemp, silk and wool, but are not limited to these. Among others, the polyester hygroscopic fiber and the polyamide fiber are used preferably as the hygroscopic fiber because they have excellent mechanical properties and durability.

[0020] In the present invention, the moisture absorption difference (ΔMR) of the hygroscopic fibers is preferably 2.0 to 10.0%. The moisture absorption difference (ΔMR) of the hygroscopic fiber in the present invention refers to the value measured by the method described in examples. ΔMR is a difference between the moisture absorption at a temperature of 30°C and a humidity of 90%RH assuming the temperature and the humidity inside the garment after light exercise,

and the moisture absorption at a temperature of 20°C and a humidity of 65%RH as the outside temperature/humidity. That is, ΔMR is an indicator of hygroscopicity, and the higher the ΔMR value, the lesser the stuffy feeling and the sticky feeling during sweating and the better the wearing comfortability of the garment. The ΔMR value of the hygroscopic fiber is preferably 2.0% or more because the stuffy feeling and the sticky feeling inside the garment are less during sweating and the wearing comfortability is improved when the garment of the present invention is worn. The ΔMR value of the hygroscopic fiber is more preferably 3.0% or more, and further preferably 4.0% or more. On the other hand, the ΔMR value of the hygroscopic fiber is preferably 10.0% or less, because the process passability and the handleability are good during the production of the fabric or the garment, and the durability is excellent during use of the garment. The ΔMR value of the hygroscopic fiber is more preferably 9.0% or less, and further preferably 8.0% or less.

[0021] In the present invention, as a specific example of the polyester hygroscopic fiber that has a ΔMR value being within the above range, a sea-islands type composite fiber described in International Publication No. 2018/012318 can be preferably adopted. The sea-islands type composite fiber described in the publication includes a polyester polymer having a hydrophobic sea component and a hygroscopic polymer as an island component. Therefore, both a hygroscopic property of the hygroscopic polymer of the island component and a dry feeling of the polyester polymer of the sea component can be achieved, and the garment in which the stuffy feeling and the sticky feeling during sweating and a cold feeling after sweating are reduced and that has excellent wearing comfortability can be obtained. Hence, the sea-islands type composite fiber is preferable as the polyester hygroscopic fiber.

[0022] Further, in the present invention it is also preferable to obtain the hygroscopic fiber by applying a hygroscopic compound to a fiber surface of the hydrophobic fiber, or by forming a coating film of the hygroscopic compound on the fiber surface of the hydrophobic fiber.

[0023] In the present invention, as long as the fabric at least partially includes the hygroscopic fiber, the hygroscopic fiber may be mixed, mixedly spun, interwoven, or knitted with other fibers. Specific examples of other fibers include a polyester fiber, a polyamide fiber, a polyacrylic fiber, a polyolefin fiber, and a polyurethane fiber, but are not limited to these.

[0024] In the present invention, the hygroscopic fiber and the other fibers are not particularly limited as to the form of the fiber, and may be any of a monofilament, a multifilament, a staple, and a spun yarn, and may be treated into a false twisted yarn or a twisted yarn.

[0025] In the present invention, the total fineness of the hygroscopic fiber and the other fibers as a multifilament is not particularly limited and can be appropriately selected according to the application and required characteristics, but a total fineness of 10 to 500 dtex is preferable. A total fineness of 10 dtex or more is preferable because yarn breakage is reduced, the process passability is good, and additionally, generation of fluff is reduced during use of the garment, and the durability of the garment is excellent. The total fineness is more preferably 30 dtex or more, and further preferably 50 dtex or more. On the other hand, a total fineness of 500 dtex or less is preferable because the flexibility of the garment is not impaired. The total fineness is more preferably 400 dtex or less, and further preferably 300 dtex or less.

[0026] In the present invention, the single fiber fineness of the hygroscopic fiber and the other fibers is not particularly limited and can be appropriately selected according to the application and required characteristics, but a single fiber fineness of 0.5 to 4.0 dtex is preferable. The single fiber fineness in the present invention refers to the value obtained by dividing the total fineness by the number of single fibers. A single fiber fineness of 0.5 dtex or more is preferable because yarn breakage is reduced, the process passability is good, and additionally, generation of fluff is reduced during use of the garment, and the durability of the garment is excellent. The single fiber fineness is more preferably 0.6 dtex or more, and further preferably 0.8 dtex or more. On the other hand, a single fiber fineness of 4.0 dtex or less is preferable because the flexibility of the garment is not impaired. The single fiber fineness is more preferably 2.0 dtex or less, and further preferably 1.5 dtex or less.

[0027] In the present invention, the strength of the hygroscopic fiber and the other fibers is not particularly limited and can be appropriately selected according to the application and required characteristics, but a strength of 2.0 to 5.0 cN/dtex is preferable from the viewpoint of mechanical properties. A strength of 2.0 cN/dtex or more is preferable because generation of fluff is reduced during use of the garment, and the durability of the garment is excellent. The strength is more preferably 2.5 cN/dtex or more, and further preferably 3.0 cN/dtex or more. On the other hand, a strength of 5.0 cN/dtex or less is preferable because the flexibility of the garment is not impaired.

[0028] In the present invention, the elongation percentage of the hygroscopic fiber and the other fibers is not particularly limited and can be appropriately selected according to the application and required characteristics, but an elongation percentage of 10 to 60% is preferable from the viewpoint of durability. An elongation percentage of 10% or more is preferable because the wear resistance of the garment is good, generation of fluff is reduced during use of the garment, and the durability of the garment is good. The elongation percentage is more preferably 15% or more, and further preferably 20% or more. On the other hand, an elongation percentage of 60% or less is preferable because the dimensional stability of the garment is good. The elongation percentage is more preferably 55% or less, and further preferably 50% or less.

[0029] In the present invention, the cross-sectional shapes of the hygroscopic fiber and the other fibers are not particularly limited, and may be appropriately selected according to the application and required characteristics. The fibers

may have a circular cross-section of a perfect circle or a non-circular cross-section. Specific examples of the non-circular cross-section include a multifoil shape, a polygon, a flat shape, and an oval, but are not limited to these.

[0030] In the present invention, the air permeability of the fabric is 50 to 500 cm³/cm²-s. The air permeability of the fabric in the present invention refers to the value measured by the method described in examples. When the air permeability of the fabric is less than 50 cm³/cm²-s, the fabric is inferior in the transpiration property of sweat is, and in the case where the fabric is used as the garment, it is impossible to reduce the stuffy feeling, the sticky feeling, and the heatful feeling during sweating. The air permeability of the fabric is more preferably 70 cm³/cm²-s or more, further preferably 90 cm³/cm²-s or more, and particularly preferably 100 cm³/cm²-s or more. On the other hand, when the air permeability of the fabric exceeds 500 cm³/cm²-s, the mechanical properties of the fabric are poor, the process passability and the handleability during the production of the fabric or the garment are poor, and the durability is also poor during use of the garment. Since the fabric is too thin, the garment has an uncomfortable feeling when worn. The air permeability of the fabric is more preferably 450 cm³/cm²-s or less, further preferably 400 cm³/cm²-s or less, and particularly preferably 350 cm³/cm²-s or less.

[0031] In the present invention, the form of the fabric is not particularly limited, and the fabric can be a woven fabric, a knitted fabric, a pile fabric, a nonwoven fabric or the like. The fabric of the present invention may have any woven or knitted structure. A plain weave, a twill weave, a satin weave, a double weave or a modified weave of these weaves, or warp knitting, weft knitting, circular knitting, lace knitting, or a modified knitting structure of these knitting structures can be suitably employed.

[0032] In the present invention, the fabric may be dyed as needed. A dyeing method is not particularly limited, and a cheese dyeing machine, a liquid flow dyeing machine, a drum dyeing machine, a beam dyeing machine, a jigger, a highpressure jigger, and the like can be suitably employed according to a known method. In the present invention, the concentration of the dye and the dyeing temperature are not particularly limited, and a known method can be suitably employed.

[0033] The garment of the present invention comprises the above-mentioned fabric, and may be composed only of the above-mentioned fabric, or may partially include a fabric other than the above-mentioned fabric (that is, a fabric without the hygroscopic fiber).

[0034] The garment of the present invention has the power source unit and the air blowing fan unit having an outside diameter of 80 mm or less.

[0035] In the present invention, the power source unit supplies power to the air blowing fan unit, and is connected to the air blowing fan unit via wiring such as a power source cable having connection terminals at both ends (Illustration omitted). As the power source in the present invention, a battery such as a primary battery, a secondary battery or a solar cell may be used, or a commercial power source via a power source adapter may be used.

[0036] In the present invention, the air blowing fan unit can be appropriately selected as to its attachment position in accordance with the form of garment and the wearing scene, but it is preferable that the air blowing fan unit is provided at a site inside the garment, the site being at least one site selected from the group consisting of a site near a collar, a site near a sleeve opening, and a site near a bottom opening. In a human body, the skin is thin and close to the blood vessel near the neck, wrists, and ankles. Therefore, at least one of the neck, wrists, and ankles is cooled by the air blowing from the air blowing fan unit provided at a site inside the garment, the site being at least one site selected from the group consisting of the site near the collar, the site near the sleeve opening, and the site near the bottom opening to circulate and spread the cooled blood throughout the body. Since the feeling temperature can be efficiently lowered to reduce the heatful feeling and to improve the wearing comfortability, the attachment position is preferable. In the present invention, the "site near" in the site near the collar, the site near the sleeve opening, and the site near the bottom opening means the position where the shortest distance from the edge of the fabric to the air blowing fan unit is 50 mm or less.

[0037] In the present invention, the air blowing fan unit has the air blowing fan inside the air blowing fan unit.

[0038] In the present invention, the air blowing fan unit has an outside diameter of 80 mm or less. When the outside diameter of the air blowing fan unit exceeds 80 mm, the air blowing fan unit is comparable to the air blowing fan unit in the air conditioning clothing proposed conventionally as represented by Patent Document 2. Therefore, the garment has a weighty feeling and an uncomfortable feeling when worn, the wearing feeling cannot be improved, and the garment cannot be suitably used in various wearing scenes such as offices and homes where comfortability is required. In addition, the degree of freedom of the attachment position to the garment is low. Therefore, it is difficult to attach the air blowing fan unit to a narrow part such as the collar, the sleeve opening, or the bottom opening, and to design the garment in accordance with the form of the garment and the wearing scene. The outside diameter of the air blowing fan unit is preferably 30 mm or less, more preferably 25 mm or less, further preferably 20 mm or less, and particularly preferably 10 mm or less.

[0039] In the present invention, the outside diameter of the air blowing fan is preferably 75 mm or less. When the outside diameter of the air blowing fan is 75 mm or less, the air blowing fan unit can be made much smaller than the air blowing fan unit in the air conditioning clothing proposed conventionally as represented by Patent Document 2. Therefore,

there is not the weighty feeling and the uncomfortable feeling when the garment is worn, the wearing feeling can be significantly improved, and the garment can be suitably used in various wearing scenes such as offices and homes where comfortability is required. Further, since the air blowing fan unit is different from the air blowing fan unit proposed conventionally as represented by Patent Document 2 and can be made very small, the degree of freedom of the attachment position to the garment is high, and for example, it is possible to attach the air blowing fan unit to a narrow part such as the collar, the sleeve opening, or the bottom opening, and to design the garment according to the form of the garment and the wearing scene. The outside diameter of the air blowing fan is more preferably 25 mm or less, further preferably 20 mm or less, particularly preferably 15 mm or less, and most preferably 8 mm or less.

[0040] In the present invention, the thickness of the air blowing fan unit is preferably 10 mm or less. When the thickness of the air blowing fan unit is 10 mm or less, the air blowing fan unit is much smaller than the air blowing fan unit in the air conditioning clothing proposed conventionally as represented by Patent Document 2. Therefore, there is not the weighty feeling and the uncomfortable feeling when the garment is worn, the wearing feeling can be significantly improved, and the garment can be suitably used in various wearing scenes such as offices and homes where comfortability is required. Further, since the air blowing fan unit is different from the air blowing fan unit proposed conventionally as represented by Patent Document 2 and is very small, the degree of freedom of the attachment position to the garment is high, and for example, it is possible to attach the air blowing fan unit to a narrow part such as the collar, the sleeve opening, or the bottom opening, and to design the garment in accordance with the form of the garment and the wearing scene. The thickness of the air blowing fan unit is more preferably 8 mm or less, further preferably 6 mm or less, and particularly preferably 4 mm or less.

[0041] In the present invention, the weight of the air blowing fan unit is preferably 5 g or less. When the weight of the air blowing fan unit is 5 g or less, the air blowing fan unit is much lighter than the air blowing fan unit in the air conditioning clothing proposed conventionally as represented by Patent Document 2. Therefore, there is not the weighty feeling and the uncomfortable feeling when the garment is worn, the wearing feeling can be significantly improved, and the garment can be suitably used in various wearing scenes such as offices and homes where comfortability is required. Further, since the air blowing fan unit is different from the air blowing fan unit proposed conventionally as represented by Patent Document 2 and is very light, the degree of freedom of the attachment position to the garment is high, and for example, it is possible to attach the air blowing fan unit to a narrow part such as the collar, the sleeve opening, or the bottom opening, and to design the garment in accordance with the form of the garment and the wearing scene. The weight of the air blowing fan unit is more preferably 4 g or less, further preferably 3 g or less, and particularly preferably 2 g or less.

[0042] In the garment of the present invention, the number of air blowing fan units is not particularly limited, and the air blowing fan units of a number decided depending on the outside diameter and the thickness of the air blowing fan unit can be attached to the garment as long as the wearing feeling is not impaired.

[0043] The form of the garment of the present invention is not particularly limited, and may be either an upper garment or a lower garment. The upper garment may be of a long sleeve or a short sleeve, the lower garment may be of a long hem or a short hem. In the present invention, the upper garment is a garment worn on the upper half of the body, and the lower garment is a garment worn on the lower half of the body. Specific examples of the upper garment in the present invention include underwear such as inner shirts, tank tops, and camisoles; general clothing such as T-shirts, polo shirts, clothes made from jersey cloth, pajamas, blouses, blousons, and workwear; and sports clothing such as sports inner shirts and sports shirts, but are not limited to these. Specific examples of the lower garment in the present invention include underwear such as inner pants; general clothing such as slacks, pants, skirts, pajamas, and workwear; and sports clothing such as sports pants, but are not limited to these.

[0044] The garment of the present invention suppresses the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and has excellent wearing comfortability and an excellent wearing feeling. Therefore, the garment can be suitably used in a high temperature and/or high humidity environment and in various wearing scenes such as offices and homes where comfortability is required.

EXAMPLES

[0045] Hereinafter, the present invention is described in more detail with reference to examples. Each characteristic value in the examples was obtained by the following method.

[0046] A. Moisture absorption difference (ΔMR) of hygroscopic fiber

[0047] The hygroscopic fiber used in the examples as a sample was first dried with hot air at 60°C for 30 minutes to produce a dried sample, then the dried sample was left to stand in a constant temperature and humidity machine LHU-123 from ESPEC CORP. controlled at a temperature of 20°C and a humidity of 65%RH for 24 hours, and then the weight W_1 (g) of the sample was measured. Then, the sample was left to stand for 24 hours in the constant temperature and humidity machine controlled at a temperature of 30°C and a humidity of 90%RH, and then the weight W_2 (g) of the sample was measured. Then, the sample was dried with hot air at 105°C for 2 hours, and the weight W_3 (g) of the sample after absolute drying was measured. The moisture absorption MR_1 (%) was calculated by the following formula using

the weights W_1 and W_3 of the sample. The moisture absorption MR_1 (%) is the moisture absorption of the sample when the absolutely dried sample was left to stand for 24 hours in an atmosphere at a temperature of 20°C and a humidity of 65%RH. The moisture absorption MR_2 (%) was calculated by the following formula using the weights W_2 and W_3 of the sample. The moisture absorption MR_2 (%) is the moisture absorption of the sample when the absolutely dried sample was left to stand for 24 hours in an atmosphere at a temperature of 30°C and a humidity of 90%RH. Then, the moisture absorption difference (ΔMR) was calculated by the following formula.

$$MR_1 (\%) = \{ (W_1 - W_3) / W_3 \} \times 100$$

$$MR_2 (\%) = \{ (W_2 - W_3) / W_3 \} \times 100$$

[0048] Moisture absorption difference (ΔMR) (%) = $MR_2 - MR_1$

[0049] The weight of the sample was measured 5 times per sample, and the average value was taken as the moisture absorption difference (ΔMR).

B. Air permeability

[0050] The air permeability was calculated according to JIS L 1096:(2010) (Testing methods for woven and knitted fabrics) 8.26.1 (A method) using the fabrics obtained in examples as the sample. The air permeability of the sample was measured 5 times per sample, and the average value was taken as the air permeability ($\text{cm}^3/\text{cm}^2\cdot\text{s}$).

C. Stuffy feeling

[0051] For the wearing test of the stuffy feeling, 20 subjects wore the garment produced according to each of the examples and a cotton long sleeve outing shirt over the garment. Next, the subjects evaluated the condition inside the garment as follows after sitting on a chair and resting for 2 hours in a room with a temperature of 30°C and a humidity of 90%RH assuming an indoor environment in summer where the air conditioning was not working. The subjects gave score 5 when "they do not feel stuffy at all", score 4 when "they hardly feel stuffy", score 3 when "they slightly feel stuffy", score 2 when "they feel stuffy", and score 1 when "they strongly feel stuffy". The average of the scores given by the 20 subjects was calculated, and an average score of 3.0 or more was defined as the acceptable level. In the wearing test of Example 12, the subjects wore the garment produced according to the example and cotton long hem slacks over the garment.

D. Heatful feeling

[0052] For the wearing test of the heatful feeling, 20 subjects wore the garment produced according to each of the examples and a cotton long sleeve outing shirt over the garment. Next, the subjects evaluated the condition inside the garment as follows after sitting on a chair and resting for 2 hours in a room with a temperature of 30°C and a humidity of 90%RH, assuming an indoor environment in summer where the air conditioning was not working. The subjects gave score 5 when "they do not feel the heatful feeling at all", score 4 when "they hardly feel the heatful feeling", score 3 when "they slightly feel the heatful feeling", score 2 when "they feel the heatful feeling", and score 1 when "they strongly feel the heatful feeling". The average of the scores given by the 20 subjects was calculated, and an average score of 3.0 or more was defined as the acceptable level. In the wearing test of Example 12, the subjects wore the garment produced according to the example and cotton long hem slacks over the garment.

E. Cold feeling after sweating

[0053] For the wearing test of the cold feeling after sweating, 20 subjects wore the garment produced according to each of the examples and a cotton long sleeve outing shirt over the garment. Next, the subjects sat on a chair and rested for 2 hours in a room with a temperature of 30°C and a humidity of 90%RH assuming an indoor environment in summer where the air conditioning was not working. Then, the subjects quickly moved to a room with a temperature of 25°C and a humidity of 65%RH assuming an indoor environment in summer where the air conditioning was working, and sat on a chair and rested for 30 minutes. Then, the subjects evaluated the condition inside the garment as follows. The subjects gave score 5 when "they do not feel the cold feeling after sweating at all", score 4 when "they hardly feel the cold feeling after sweating", score 3 when "they slightly feel the cold feeling after sweating", score 2 when "they feel the cold feeling

after sweating", and score 1 when "they strongly feel the cold feeling after sweating". The average of the scores given by the 20 subjects was calculated, and an average score of 3.0 or more was defined as the acceptable level. In the wearing test of Example 12, the subjects wore the garment produced according to the example and cotton long hem slacks over the garment.

F. Wearing feeling

[0054] For the wearing feeling, 20 subjects wore the garment produced according to each of the examples. The subjects evaluated the garment as follows. The subjects gave score 5 when "they do not feel the weighty feeling, the uncomfortable feeling when wearing the garment, and the discomfort feeling due to the noise of the air blowing fan at all", score 4 when "they hardly feel all of the weighty feeling, the uncomfortable feeling when wearing the garment, and the discomfort feeling due to the noise of the air blowing fan", score 3 when "they slightly feel any of the weighty feeling, the uncomfortable feeling when wearing the garment, and the discomfort feeling due to the noise of the air blowing fan", score 2 when "they feel any of the weighty feeling, the uncomfortable feeling when wearing the garment, and the discomfort feeling due to the noise of the air blowing fan", and score 1 when "they strongly feel any of the weighty feeling, the uncomfortable feeling when wearing the garment, and the discomfort feeling due to the noise of the air blowing fan". The average of the scores given by the 20 subjects was calculated, and an average score of 3.0 or more was defined as the acceptable level. In the wearing test of Example 12, the subjects wore the garment produced according to the example and cotton long hem slacks over the garment.

Example 1

[0055] A nylon fiber (a false twisted yarn of 50 dtex-98 f) was used as the hygroscopic fiber, and a fabric with a jersey stitch was made by a circular knitting machine with a caliber of 86.36 cm (34 inches) and a gauge of 28 pieces/2.54 cm (inch). After that, the fabric was sewn to produce a short sleeve inner shirt. Next, three air blowing fan units with an outside diameter of 18.0 mm and a thickness of 4.0 mm were attached to a site near the collar inside the short sleeve inner shirt and at equal intervals in the circumferential direction. After that, the power source unit was connected to all the air blowing fan units using the power source cable. After that, the air flow rate from the air blowing fan unit was set to 0.02 m³/min-piece, and the wearing test was conducted. Table 1 shows the results of evaluating the obtained fabric and garment. The garment of Example 1 was suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Examples 2 to 6

[0056] A garment was produced in the same manner as in Example 1 except that the hygroscopic fiber in Example 1 was changed to the following. In Example 2, the false twisted yarn of "QUUP" (registered trademark) 33 dtex-26 f manufactured by Toray Industries, Inc. was used as a hygroscopic nylon, in Example 3, the sea-islands type composite fiber (the false twisted yarn of 66 dtex-72 f) described in Example 3 of International Publication No. 2018/012318 was used as a hygroscopic polyester, in Example 4, the false twisted yarn of "Lynda" (registered trademark) 84 dtex-20 f manufactured by Mitsubishi Chemical Corporation was used as an acetate fiber, in Example 5, the spun yarn of English cotton count 60 S was used as cotton, and in Example 6, "Bemberg" (registered trademark) 84 dtex-45 f manufactured by Asahi Kasei Corp. was used as a rayon fiber. Table 1 shows the results of evaluating the obtained fabric and garment. The garments of Examples 2 to 6 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Examples 7 to 9 and Comparative Examples 1 to 3

[0057] A garment was produced in the same manner as in Example 3 except that the air permeability in Example 3 was changed as shown in Table 2. Table 2 shows the results of evaluating the obtained fabric and garment. The garments of Examples 7 to 9 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

[0058] In Comparative Examples 1 and 2, the heatful feeling was reduced by air blowing from the air blowing fan units, but the fabric had a low air permeability, so that the garment had a low transpiration property of sweat and a stuffy feeling. In Comparative Example 3, since the fabric had a high air permeability, the garment hardly had a stuffy feeling, a heatful feeling, and a cold feeling after sweating, but the fabric was thin so that the garment had an uncomfortable feeling when worn to lack practicality.

Example 10

[0059] A garment was produced in the same manner as in Example 3 except that the three air blowing fan units were attached to a site near each right and left sleeve opening inside the short sleeve inner shirt and at equal intervals in the circumferential direction in Example 3, and after that, the power source unit was connected to all the air blowing fan units using the power source cable. Table 3 shows the results of evaluating the obtained fabric and garment. The garment of Example 10 was suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Example 11

[0060] A garment was produced in the same manner as in Example 3 except that the three air blowing fan units were attached to a site near the bottom opening on the inner side of the short sleeve inner shirt and at equal intervals in the circumferential direction in Example 3. Table 3 shows the results of evaluating the obtained fabric and garment. The garment of Example 11 was suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Example 12

[0061] A garment was produced in the same manner as in Example 3 except that the fabric was made and was sewn to produce long hem inner pants, the three air blowing fan units were attached to a site near each right and left sleeve opening inside the long hem inner pants and at equal intervals in the circumferential direction in Example 3, and after that, the power source unit was connected to all the air blowing fan units using the power source cable. Table 3 shows the results of evaluating the obtained fabric and garment. The garment of Example 12 was suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Comparative Example 4

[0062] A garment was produced in the same manner as in Example 3 except that two air blowing fan units with an outside diameter of 120.0 mm and a thickness of 40.0 mm were attached to a site near the bottom opening on the inner side of the short sleeve inner shirt and at equal intervals in the circumferential direction in Example 3, and after that, the power source unit was connected to all the air blowing fan units using the power source cable. Table 3 shows the results of evaluating the obtained fabric and garment.

[0063] In Comparative Examples 4, the heatful feeling was reduced by air blowing from the air blowing fan units, but the outside diameter and thickness of the air blowing fan units were large, so that the weighty feeling and the uncomfortable feeling were strong when the garment was worn, and the garment was not suitable for wearing scenes such as offices and homes.

Comparative Example 5

[0064] A garment was produced in the same manner as in Example 3 except that the air blowing fan unit was not attached in Example 3. Table 3 shows the results of evaluating the obtained fabric and garment.

[0065] The garment used in Comparative Example 5 was a garment that included the hygroscopic fiber and had a high air permeability, but the garment had a stuffy feeling, a heatful feeling, and a cold feeling after sweating and had inferior wearing comfortability.

Examples 13 to 15

[0066] Garments were produced in the same manner as in Example 3 except that the fabrics were produced by changing the fibers as follows. The hygroscopic polyester used in Example 3 and the cotton used in Example 5 were used in Example 13, the hygroscopic polyester used in Example 3 and "LYCRA" (registered trademark) T-327C (22 dtex) manufactured by Toray Opelontex Co., Ltd. as the polyurethane fiber were used in Example 14, the cotton used in Example 5 and the false twisted yarn of "TETRON" (registered trademark) 84 dtex-36 f manufactured by Toray Industries, Inc. as a polyethylene terephthalate fiber were used in Example 15, and these fibers were knitted at the mixing ratios shown in Table 4 to make the fabric. Table 4 shows the results of evaluating the obtained fabric and garment. The garments of Examples 13 to 15 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an

excellent wearing feeling.

Comparative Example 6

- 5 **[0067]** A garment was produced in the same manner as in Example 3 except that the false twisted yarn of "TETRON" (registered trademark) 84 dtex-36 f manufactured by Toray Industries, Inc. was used as the polyethylene terephthalate fiber in place of the hygroscopic fiber in Example 3. Table 4 shows the results of evaluating the obtained fabric and garment.
- 10 **[0068]** In Comparative Example 6, the heatful feeling was reduced by air blowing from the air blowing fan units, but the fabric was made of the polyethylene terephthalate fiber that was not the hygroscopic fiber, so that the garment had a stuffy feeling and a cold feeling after sweating and had inferior wearing comfortability.

Examples 16 to 18

- 15 **[0069]** Garments were produced in the same manner as in Example 3 except that the outside diameters of the air blowing fan units were changed as shown in Table 5 in Example 3. Table 5 shows the results of evaluating the obtained fabric and garment. The garments of Examples 16 to 18 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

20 Examples 19 to 22

- 25 **[0070]** Garments were produced in the same manner as in Example 19 except that the thickness of the air blowing fan unit was changed as shown in Table 5 in Example 19. Table 5 shows the results of evaluating the obtained fabric and garment. The garments of Examples 19 to 22 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Examples 23 to 27

- 30 **[0071]** Garments were produced in the same manner as in Example 19 except that the thickness of the air blowing fan unit was changed as shown in Table 6 in Example 19. Table 6 shows the results of evaluating the obtained fabric and garment. The garments of Examples 23 to 27 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

35 Example 28

- 40 **[0072]** A garment was produced in the same manner as in Example 2 except that a long sleeve inner shirt was produced in Example 2. Table 6 shows the results of evaluating the obtained fabric and garment. The garment of Example 28 was suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

Examples 29 and 30

- 45 **[0073]** Garments were produced in the same manner as in Examples 10 and 11 except that long sleeve inner shirts were produced using a false twisted yarn of "QUUP" (registered trademark) 33 dtex-26 f manufactured by Toray Industries, Inc. as a hygroscopic nylon in place of the hygroscopic fiber in Examples 10 and 11. Table 6 shows the results of evaluating the obtained fabric and garment. The garments of Examples 29 and 30 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.
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Examples 31 to 35 and Comparative Examples 7 and 8

- 55 **[0074]** Garments were produced in the same manner as in Comparative Example 4 except that the outside diameter and thickness of the air blowing fan units were changed as shown in Table 7 in Comparative Example 4. Table 7 shows the results of evaluating the obtained fabric and garment. The garments of Examples 31 to 35 were suppressed in the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and had excellent wearing comfortability and an excellent wearing feeling.

[0075] In Comparative Examples 7 and 8, the heatful feeling was reduced by air blowing from the air blowing fan units, but the outside diameter of the air blowing fan units was large, so that the weighty feeling and the uncomfortable feeling were strong when the garment was worn, and the garment was not suitable for the wearing scenes such as offices and homes.

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[Table 1]

Fabric	Type	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6
	Moisture Absorption Difference (Δ MR) [%]	Nylon	Hygroscopic Nylon	Hygroscopic Polyester	Acetate	Cotton	Rayon
Garment	Air Permeability [$\text{cm}^3/\text{cm}^2\cdot\text{s}$]	152	148	154	151	147	150
	Outside Diameter [mm]	18.0	18.0	18.0	18.0	18.0	18.0
	Thickness [mm]	4.0	4.0	4.0	4.0	4.0	4.0
Garment	Air Blowing Fan Unit	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment
	Attached Units [Numbers]	3	3	3	3	3	3
	Air Flow Rate [$\text{m}^3/\text{min. Unit}$]	0.02	0.02	0.02	0.02	0.02	0.02
Wearing Test	Stuffy Feeling	4.3	4.6	4.5	4.5	4.6	4.8
	Heatful feeling	4.4	4.6	4.5	4.6	4.7	4.7
	Cold Feeling after Sweating	4.4	4.3	4.6	4.0	3.8	3.6
Wearing Comfortability	Wearing Comfortability	4.3	4.2	4.4	4.2	4.1	4.2

[Table 2]

Fabric	Type	Example 7	Example 8	Example 9	Comparative Example 1	Comparative Example 2	Comparative Example 3
		Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester
Fabric	Moisture Absorption Difference ($\Delta M R$) [%]	3.1	3.1	3.1	3.1	3.1	3.1
	Air Permeability [$\text{cm}^3/\text{cm}^2\cdot\text{s}$]	60	250	470	18	45	515
	Outside Diameter [mm]	18.0	18.0	18.0	18.0	18.0	18.0
Garment	Thickness [mm]	4.0	4.0	4.0	4.0	4.0	4.0
	Attached Position	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment
	Attached Units [Numbers]	3	3	3	3	3	3
	Air Flow Rate [$\text{m}^3/\text{min. Unit}$]	0.02	0.02	0.02	0.02	0.02	0.02
	Stuffy Feeling	3.2	4.6	4.7	2.3	2.5	4.8
	Heatful feeling	4.2	4.5	4.6	3.8	3.9	4.6
	Cold Feeling after Sweating	4.4	4.6	4.7	3.9	3.9	4.7
	Wearing Comfortability	3.9	4.2	3.6	3.3	3.4	1.7
	Wearing Test						

[Table 3]

Fabric	Type		Example 10	Example 11	Example 12	Comparative Example 4	Comparative Example 5
	Hygroscopic Fiber	Moisture Absorption Difference (ΔMR) [%]	3.1	3.1	3.1	3.1	3.1
		Air Permeability [$\text{cm}^3/\text{cm}^2\cdot\text{s}$]	155	149	152	147	154
Garment	Air Blowing Fan Unit	Outside Diameter [mm]	18.0	18.0	18.0	120.0	-
		Thickness [mm]	4.0	4.0	4.0	40.0	-
		Attached Position	A Site Near the Sleeve Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	-
	Wearing Test	Attached Units [Numbers]	6 (=3x2)	3	6 (=3x2)	2	-
		Air Flow Rate [$\text{m}^3/\text{min. Unit}$]	0.02	0.02	0.02	0.02	-
		Stuffy Feeling	4.4	4.2	4.3	3.7	1.9
	Wearing Comfortability	Heatful feeling	4.4	4.3	4.3	3.9	2.2
		Cold Feeling after Sweating	4.6	4.3	4.5	3.8	2.0
		Wearing Comfortability	4.5	4.4	4.6	1.4	4.8

[Table 4]

			Example 13	Example 14	Example 15	Comparative Example 6
Fabric	Hygroscopic Fiber(1)	Type	Hygroscopic Polyester	Hygroscopic Polyester	Cotton	-
		Moisture Absorption Difference (Δ MR) [%]	3.1	3.1	4.1	-
	Hygroscopic Fiber(2)	Type	Cotton	-	-	-
		Moisture Absorption Difference (Δ MR) [%]	4.1	-	-	-
	Other Fiber	Type	-	Polyurethane	PET Note)	PET>Note)
	Mixing Ratio	Hygroscopic Fiber(1) [wt%]	70	90	30	-
		Hygroscopic Fiber(2) [wt%]	30	-	-	-
		Other Fiber [wt%]	-	10	70	100
	Air Permeability [cm ³ /cm ² ·s]		150	148	153	151
Garment	Air Blowing Fan Unit	Outside Diameter [mm]	18.0	18.0	18.0	18.0
		Thickness [mm]	4.0	4.0	4.0	4.0
		Attached Position	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment
		Attached Units [Numbers]	3	3	3	3
		Air Flow Rate [m ³ /min. Unit]	0.02	0.02	0.02	0.02
	Wearing Test	Stuffy Feeling	4.6	4.4	3.2	2.7
		Heatful feeling	4.6	4.4	3.0	3.2
		Cold Feeling after Sweating	4.1	4.6	3.1	2.4
		Wearing Comfortability	4.3	4.5	4.2	4.3
	Note) PET: Polyethylene terephthalate					

[Table 5]

Fabric	Type	Example 16	Example 17	Example 18	Example 19	Example 20	Example 21	Example 22
	Hygroscopic Fiber	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester
Garment	Moisture Absorption Difference (ΔMR) [%]	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	Air Permeability [$\text{cm}^3/\text{cm}^2\cdot\text{s}$]	152	148	153	151	154	150	149
	Outside Diameter [mm]	10.0	22.0	30.0	30.0	30.0	30.0	30.0
	Thickness [mm]	4.0	4.0	4.0	4.5	6.0	8.0	10.0
	Air Blowing Fan Unit	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment
	Attached Units [Numbers]	3	3	3	3	3	3	3
	Air Flow Rate [$\text{m}^3/\text{min. Unit}$]	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Stuffy Feeling	4.3	4.5	4.6	4.6	4.5	4.6	4.5
	Heatful feeling	4.2	4.5	4.6	4.6	4.6	4.5	4.5
	Cold Feeling after Sweating	4.7	4.6	4.5	4.6	4.5	4.6	4.6
	Wearing Comfortability	4.6	4.2	4.0	4.0	3.9	3.7	3.5

[Table 6]

Fabric	Type	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28	Example 29	Example 30
	Hygroscopic Fiber	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Polyester	Hygroscopic Nylon	Hygroscopic Nylon	Hygroscopic Nylon
Garment	Moisture Absorption Difference (ΔMR) [%]	3.1	3.1	3.1	3.1	3.1	3.9	3.9	3.9
	Air Permeability [$\text{cm}^3/\text{cm}^2 \cdot \text{s}$]	155	151	149	153	150	149	152	153
	Outside Diameter [mm]	30.0	30.0	30.0	30.0	30.0	18.0	18.0	18.0
	Thickness [mm]	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0
	Attached Position	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Collar of Upper Garment	A Site Near the Sleeve Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment
	Attached Units [Numbers]	3	3	3	3	3	3	6 (=3x2)	3
	Air Flow Rate [$\text{m}^3/\text{min. Unit}$]	0.01	0.04	0.06	0.08	0.10	0.02	0.02	0.02
	Stuffy Feeling	4.3	4.7	4.7	4.8	4.9	4.5	4.8	4.2
	Heatful feeling	4.2	4.7	4.8	4.9	4.9	4.5	4.8	4.4
	Cold Feeling after Sweating	4.2	4.6	4.7	4.8	4.8	4.3	4.5	4.3
	Wearing Comfortability	4.3	3.9	3.8	3.7	3.5	4.1	4.5	4.4

[Table 7]

Fabric	Type		Example 31	Example 32	Example 33	Example 34	Example 35	Comparative Example 7	Comparative Example 8
	Hygroscopic Fiber	Moisture Absorption Difference (ΔMR) [%]	3.1	3.1	3.1	3.1	3.1	Hygroscopic Polyester	Hygroscopic Polyester
		Air Permeability [$\text{cm}^3/\text{cm}^2\cdot\text{s}$]	148	152	150	147	151	153	149
Garment	Air Blowing Fan Unit	Outside Diameter [mm]	30.0	40.0	52.0	60.0	80.0	85.0	100.0
		Thickness [mm]	10.0	10.0	10.0	10.0	10.0	10.0	10.0
		Attached Position	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment	A Site Near the Bottom Opening of Upper Garment
	Wearing Test	Attached Units [Numbers]	2	2	2	2	2	2	2
		Air Flow Rate [$\text{m}^3/\text{min. Unit}$]	0.02	0.02	0.02	0.02	0.02	0.02	0.02
		Stuffy Feeling	4.0	4.0	3.9	3.8	3.8	3.7	3.7
	Wearing Test	Heatful feeling	4.0	3.9	3.9	3.9	3.8	3.8	3.7
		Cold Feeling after Sweating	3.9	3.9	3.9	3.8	3.9	3.7	3.8
		Wearing Comfortability	3.5	3.4	3.3	3.2	3.0	2.7	1.9

INDUSTRIAL APPLICABILITY

[0076] The garment of the present invention suppresses the stuffy feeling and the heatful feeling inside the garment to keep the environment inside the garment comfortable, and has excellent wearing comfortability and an excellent wearing feeling. Therefore, the garment can be suitably used in a high temperature and/or high humidity environment and in various wearing scenes such as offices and homes where comfortability is required.

Claims

1. A garment comprising a fabric at least partially including a hygroscopic fiber, the fabric having an air permeability of 50 to 500 cm³/cm²·s, the garment having a power source unit and an air blowing fan unit having an outside diameter of 80 mm or less.
2. The garment according to claim 1, comprising the air blowing fan unit having an outside diameter of 30 mm or less.
3. The garment according to claim 1 or 2, wherein the air blowing fan unit is provided at a site inside the garment, the site being at least one site selected from the group consisting of a site near a collar, a site near a sleeve opening, and a site near a bottom opening.
4. The garment according to any one of claims 1 to 3, wherein the hygroscopic fiber has a moisture absorption difference (ΔMR) of 2.0 to 10.0%.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/013963

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. A41D13/002 (2006.01) i

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. A41D13/002, D01F8/04

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	1971-2019
Registered utility model specifications of Japan	1996-2019
Published registered utility model applications of Japan	1994-2019

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2005/0278817 A1 (DOHENY, R.) 22 December 2005, paragraphs [0019]-[0028], fig. 1, 3, 3A, 3B (Family: none)	1-4
Y	WO 2018/012318 A1 (TORAY INDUSTRIES, INC.) 18 January 2018, paragraph [0061] & CN 109415846 A & EP 3483312 A1, paragraph [0028] & KR 20190028643 A	1-4
Y	JP 2017-155392 A (FAST RETAILING CO., LTD.) 07 September 2017, paragraphs [0013], [0043], [0044], fig. 10, 11 (Family: none)	1-4



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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2017-222944 A (SO-WA TEXTILE CO., LTD.) 21 December 2017, paragraph [0018], table 2 (Family: none)	1-4
Y	WO 2002/067708 A1 (SFT LABORATORY CO., LTD.) 06 September 2002, column 6, lines 13-21, column 8, line 14 to column 9, line 9, fig. 1, 11 & US 2004/0083526 A1, paragraphs [0035], [0041], fig. 1, 11 & WO 2002/067707 A1	1-4

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2007004589 A [0004]
- WO 2017006481 A [0004]
- WO 2018012318 A [0021] [0056]