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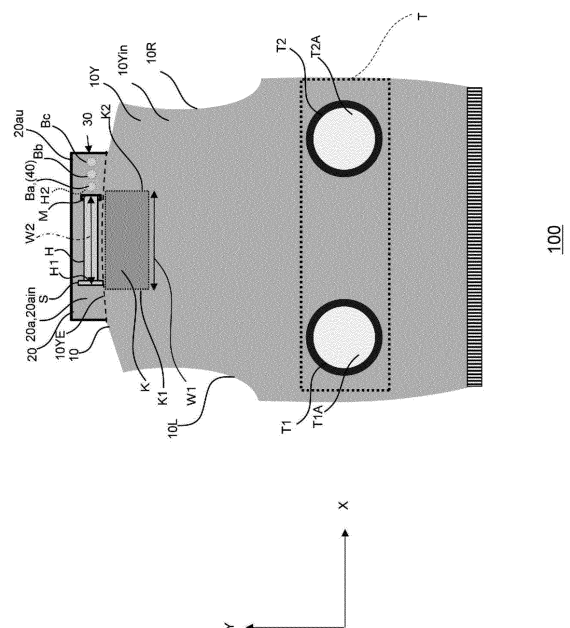
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(54)

AIR-CONDITIONED GARMENT

(57) An air-conditioning clothing includes: a clothing body that configured to be worn by the wearer; an attaching portion provided at the rear portion of the clothing body and having an air-conditioning hole penetrating between the inner and outer surfaces of the clothing body, wherein the attaching portion includes a removable temperature adjustment device that takes outside air into the air-conditioning clothing through the air-conditioning hole; and a collar portion provided at an upper end of the clothing body and covering at least a part of a back of the wearer's neck when worn by the wearer, wherein the collar portion has a ventilation space adjustment portion that adjusts a size of a ventilation space between the back of the wearer's neck and the inner surface of the collar portion.

[FIG. 2]



Description

[Technical field]

[0001] The present invention relates to an air-conditioning an inner space existing between a and air-conditioning clothing when the wearer is wearing the air-conditioning clothing.

[Background technology]

[0002] Conventionally, air-conditioning clothing equipped with an electric air-conditioning fan unit has been known (Patent Document 1). The air-conditioning fan unit is operated to draw outside air into the clothing body to cool the body. Such air-conditioning clothing can suppress the rise in body temperature of workers (wearers) who work indoors or outdoors in high-temperature environments, and is also effective as a measure against heatstroke in the summer.

[0003] Such conventional air-conditioning clothing uses, for example, fabric with low breathability in order to allow airflow to flow through the air-conditioning clothing. Therefore, conventional air-conditioning clothing cannot be used as a regular shirt.

[0004] In addition, in cases where highly breathable fabric is used to use the air-conditioning clothing as a regular shirt, when the wearer wears the air-conditioning clothing and puts on a reflective vest over it, the ventilation portion at the back of the wearer's neck collapses, making it difficult for airflow to flow.

[0005] Additionally, when the wearer is wearing air-conditioning clothing, there is no way to easily switch between the normal mode used as a normal shirt and the air conditioning mode used as an air conditioning shirt.

[0006] As mentioned above, in the above-mentioned conventional technology air-conditioning clothing, in situations where the wearer wears air-conditioning clothing, there is a problem in that it is not possible to easily switch between the normal mode to use as a normal shirt and the air conditioning mode that ensures a desired airflow passage between the air-conditioning clothing and the wearer's back within the air-conditioning clothing.

[Prior art]

[Patent document]

[0007] [Patent Document 1] JP 6715891 B

[Outline of the Invention]

[Means for solving the problem]

[0008] An air-conditioning closing, according to an embodiment of the present invention, for air-conditioning an inner space that exists between a wearer and the air-

conditioning clothing that is worn by the wearer, comprising:

a clothing body that configured to be worn by the wearer, wherein the clothing body includes a front portion located anteriorly to face the wearer's chest and abdomen, and a rear portion located posteriorly to face the wearer's back, in a state worn by the wearer;

an attaching portion provided at the rear portion of the clothing body and having an air-conditioning hole penetrating between the inner and outer surfaces of the clothing body, wherein the attaching portion includes a removable temperature adjustment device that takes outside air into the air-conditioning clothing through the air-conditioning hole; and a collar portion provided at an upper end of the clothing body and covering at least a part of a back of the wearer's neck when worn by the wearer, wherein the collar portion has a ventilation space adjustment portion that adjusts a size of a ventilation space between the back of the wearer's neck and the inner surface of the collar portion,

wherein,

when the air-conditioning clothing is air-conditioned, an airflow passage is formed through which the outside air flows,

the outside air taken into the clothing body through the air-conditioning hole flows, via the rear air-conditioned space existing between the rear portion of the clothing body and the back of the wearer, toward the ventilation space between the inner surface of the first portion of the collar portion and the neck of the wearer.

[0009] In the air-conditioning clothing,

wherein the collar portion includes;

a first portion that has a lower end connected to the upper end of the clothing body, and that extends so as to surround at least a portion of the back of the wearer's neck when worn by the wearer; and a second portion that has a connecting part connected to an upper end of the first portion,

wherein the ventilation space adjustment portion is provided in the first part, and wherein, in the collar portion, in a state where the outer surface of the second portion of the collar portion is bent outward so as to overlap the outer surface of the first portion of the collar portion, with the upper end of the first portion as a border, whereby the ventilation space adjustment portion exposed to the outside from the first portion is covered by the second portion, so that the ventilation space adjustment portion is not visible from the outside of the air-conditioning clothing.

[0010] In the air-conditioning clothing, wherein the ven-

tilation space adjustment portion of the collar portion includes:

an adjustment string that is configured to be inserted into a through hole penetrating the collar portion, wherein the adjustment string has a first end fixed to a fixing portion on an inner surface of the collar portion facing the neck of the wearer, and a second end that is exposed on the outer surface of the collar portion through the through hole formed in the collar portion and is provided with an adjustment locking part;
 a normal locking part that is provided on the outer surface of the collar portion adjacent to the through hole, wherein the normal locking part is for fixing the second end of the adjustment string to the outer surface of the collar portion by engaging with the adjustment locking part;
 an air-conditioning locking part that is provided on the outer surface of the collar portion at a position laterally farther from the through hole than the normal locking part, wherein the air-conditioning locking part is for fixing the second end of the adjustment string to the outer surface of the collar portion by engaging with the adjustment locking part.

[0011] In the air-conditioning clothing,

wherein, in the normal mode of the air-conditioning clothing where the adjustment locking part and the normal locking part engage, the ventilation space between the inner surface of the collar portion and the neck of the wearer has a normal size, and wherein, in the air conditioning mode of the air-conditioning clothing where the adjustment locking part and the air-conditioning locking part engage, the size of the ventilation space between the inner surface of the collar portion and the neck of the wearer is larger than the normal size.

[0012] In the air-conditioning clothing,

wherein, in a state where the air-conditioning clothing is worn by the wearer, the normal mode, in which the adjustment locking part and the normal locking part are engaged, and the air conditioning mode, in which the adjustment locking part and the air-conditioning locking part are engaged are switched, by the wearer operating the adjustment locking part of the ventilation space adjustment portion of the collar portion from outside the air-conditioning clothing near the outer surface of the collar portion with the wearer's hand.

[0013] In the air-conditioning clothing,

wherein the air-conditioning locking part includes a first air-conditioning locking part and a second air-

conditioning locking part that are arranged side by side in the horizontal direction, on the outer surface of the collar portion, at a position laterally farther from the through hole than the normal locking part, and wherein the second air-conditioning locking part is provided at a position laterally farther from the through hole than the first air-conditioning locking part, on the outer surface of the collar portion.

[0014] In the air-conditioning clothing,

wherein, in the air conditioning mode, a size of the ventilation space between the inner surface of the collar portion and the neck of the wearer, by engaging the adjustment locking part and the second air-conditioning locking part, is larger than a size of the ventilation space between the inner surface of the collar portion and the neck of the wearer, by engaging the adjustment locking part and the first air-conditioning locking part.

[0015] In the air-conditioning clothing, wherein the rear portion of the clothing body is provided with a reinforcing member that extends in the lateral direction along the ventilation space adjustment portion of the collar portion near the upper end of the rear portion, and the reinforcing member is for maintaining the shape of the ventilation space adjusted by the ventilation space adjustment portion.

[0016] In the air-conditioning clothing, wherein the reinforcing member is a reinforcing cloth or an interlining.

[0017] In the air-conditioning clothing, wherein a width of the reinforcing member in the lateral direction along the ventilation space adjustment portion is larger than or equal to the distance between the fixing portion and the through hole.

[0018] In the air-conditioning clothing, wherein, when the air-conditioning clothing is viewed in the vertical direction, an area in the lateral direction along the ventilation space adjustment portion of the reinforcing member includes an area in the lateral direction between the fixing portion and the through hole.

[0019] In the air-conditioning clothing, wherein, in the air conditioning mode, the ventilation space includes an area surrounded by the adjustment string of the ventilation space adjustment portion of the collar portion and the inner surface of the rear portion of the clothing body.

[0020] In the air-conditioning clothing, wherein a length of the adjustment string of the ventilation space adjustment portion exposed on the inner surface of the first portion of the collar portion, in the normal mode, is longer than a length of the adjustment string of the ventilation space adjustment portion exposed on the inner surface of the first portion of the collar portion, in the air conditioning mode.

[0021] In the air-conditioning clothing, wherein the attaching portion includes:

a first attaching portion provided at the rear portion of the clothing body and having a first air-conditioning hole passing through between the inner and outer surfaces of the clothing body; wherein the first attaching portion is removable with a first temperature adjustment device that takes outside air into the air-conditioning clothing through the first air-conditioning hole, and

a second attaching portion provided at the rear portion of the clothing body and having a second air-conditioning hole penetrating between the inner and outer surfaces of the clothing body; wherein the first attaching portion is removably attached to a second temperature adjustment device that takes outside air into the air-conditioning clothing through the second air-conditioning hole.

[0022] In the air-conditioning clothing, further comprising:

a first temperature adjustment device attached to the first attaching portion; and

a second temperature adjustment device attached to the second attaching portion.

[0023] In the air-conditioning clothing,

wherein a first heat generating device that generates heat using electric power supplied from a power source is removably attached to the first attaching portion, in a state where the first temperature adjustment device is removed, and

wherein a second heat generating device that generates heat using electric power supplied from the power source is removably attached to the second attaching portion, in a state where the second temperature adjustment device is removed.

[0024] In the air-conditioning clothing, wherein the air-conditioning clothing is a shirt.

[0025] In the air-conditioning clothing, wherein the first temperature adjustment device is a first fan, and the second temperature adjustment device is a second fan.

[Effect of the invention]

[0026] According to the air-conditioning clothing according to one aspect of the present invention, when the wearer is wearing the air-conditioning clothing, it is possible to more easily switch between a normal mode for use as a normal shirt and an air conditioning mode that ensures the desired airflow passage between the wearer's back and the air-conditioning clothing.

[Brief explanation of the drawing]

[0027]

[FIG. 1A] FIG. 1A is a schematic diagram showing an example of the appearance of air-conditioning clothing 100 according to an embodiment of the present invention as viewed from the front.

[FIG. 1B] FIG. 1B is a schematic diagram showing an example of the appearance of air-conditioning clothing 100 according to an embodiment of the present invention as viewed from the rear.

[FIG. 2] FIG. 2 is a schematic diagram showing an example of the configuration of the inner surface 10Yin and collar portion 20 of the rear portion 10Y of the clothing body 10 of the air-conditioning clothing 100 when viewed from the inside.

[FIG. 3A] FIG. 3A is a schematic diagram showing an example of a state in which the collar portion of the air-conditioning clothing 100 shown in FIG. 1B is unfolded upward (the collar portion is erected and not folded).

[FIG. 3B] FIG. 3B is a schematic diagram showing an example of a state in which the collar portion of the air-conditioning clothing 100 shown in FIG. 2 is unfolded upward (the collar portion is erected and not folded).

[FIG. 4] FIG. 4 is a schematic diagram showing an example of the external appearance of the air-conditioning clothing 100 with the first and second temperature adjustment devices FC1 and FC2 attached when viewed from the rear.

[FIG. 5] FIG. 5 is a schematic diagram showing an example of the configuration of the inner surface 10Yin of the rear portion 10Y of the clothing body 10 of the air-conditioning clothing 100 with the first and second temperature adjustment devices FC1 and FC2 installed, and the collar portion 20, as viewed from the inside.

[FIG. 6A] FIG. 6A is a schematic diagram showing an example of the region at the back of the wearer's neck viewed from above, in a state where the wearer is wearing the air-conditioning clothing and is using it as a normal shirt.

[FIG. 6B] FIG. 6B is a schematic diagram showing an example of the region at the back of the wearer's neck viewed from above, in a state where the wearer is wearing the air-conditioning clothing and a desired airflow path is secured between the wearer's back and the air-conditioning clothing within the air-conditioning clothing.

[Mode for carrying out the invention]

[0028] Hereinafter, embodiments according to the present invention will be described based on the drawings.

[Example]

[0029] First, an air-conditioning clothing according to an embodiment will be described with reference to the

drawings. FIG. 1A is a schematic diagram showing an example of the appearance of air-conditioning clothing 100 according to an embodiment of the present invention as viewed from the front. FIG. 1B is a schematic diagram showing an example of the appearance of air-conditioning clothing 100 according to an embodiment of the present invention as viewed from the rear. FIG. 2 is a schematic diagram showing an example of the configuration of the inner surface 10Yin and collar portion 20 of the rear portion 10Y of the clothing body 10 of the air-conditioning clothing 100 when viewed from the inside. FIG. 3A is a schematic diagram showing an example of a state in which the collar portion of the air-conditioning clothing 100 shown in FIG. 1B is unfolded upward (the collar portion is erected and not folded). FIG. 3B is a schematic diagram showing an example of a state in which the collar portion of the air-conditioning clothing 100 shown in FIG. 2 is unfolded upward (the collar portion is erected and not folded). FIG. 4 is a schematic diagram showing an example of the external appearance of the air-conditioning clothing 100 with the first and second temperature adjustment devices FC1 and FC2 attached when viewed from the rear. FIG. 5 is a schematic diagram showing an example of the configuration of the inner surface 10Yin of the rear portion 10Y of the clothing body 10 of the air-conditioning clothing 100 with the first and second temperature adjustment devices FC1 and FC2 installed, and the collar portion 20, as viewed from the inside. FIG. 6A is a schematic diagram showing an example of the region at the back of the wearer's neck viewed from above, in a state where the wearer is wearing the air-conditioning clothing and is using it as a normal shirt. FIG. 6B is a schematic diagram showing an example of the region at the back of the wearer's neck viewed from above, in a state where the wearer is wearing the air-conditioning clothing and a desired airflow path is secured between the wearer's back and the air-conditioning clothing within the air-conditioning clothing.

[air-conditioning clothing]

[0030] The air-conditioning clothing 100 according to the embodiment shown in FIGS. 1A and 1B is, for example, work clothing for air-conditioning the inner space existing between the wearer (not shown) and the wearer when the wearer wears the clothing.

[0031] This air-conditioning clothing 100 is, for example, a vest (work clothes without sleeves), as shown in FIGS. 1A and 1B. However, the air-conditioning clothing 100 may be long-sleeved or short-sleeved work clothing.

[0032] For example, as shown in FIGS. 1A to 5, this air-conditioning clothing 100 includes a clothing body 10, a first attaching portion T1, a second attaching portion T2, a power supply storage portion P2 for, a storage portion P1, a ventilation space adjustment portion H, and a collar portion 20.

[0033] In addition, in FIGS. 2 to 5, for simplicity, a part of the configuration of the air-conditioning clothing 100

shown in FIGS. 1A and 1B may be omitted from the illustrations.

[0034] Hereinafter, each component of the air-conditioning clothing 100 will be explained in detail.

[Clothing body]

[0035] The clothing body 10 can be worn by the wearer. In particular, this clothing body 10 can be worn on the wearer's upper body.

[0036] This clothing body 10 includes: a front portion 10X (FIG. 1A) located in front of the air-conditioning clothing 100 (the front portion 10X is located anteriorly to face the wearer's chest and abdomen) and covering at least the vicinity of the chest of the wearer when worn by the wearer; and a rear portion 10Y (FIG. 1B) located at the rear of the air-conditioning clothing 100 (the rear portion 10Y is located posteriorly to face the wearer's back) and covering at least the vicinity of the wearer's back.

[0037] Furthermore, a reinforcing member K is provided at the rear portion Y of the clothing body 10, and extends in the lateral direction X near the upper end 10YE of the rear portion Y along the ventilation space adjustment portion 30 of the collar portion 20. The reinforcing member K is for maintaining the shape of the ventilation space 300 adjusted by the ventilation space adjustment portion 30. This reinforcing member K is, for example, a reinforcing cloth or interlining.

[0038] Furthermore, the front portion 10X of the clothing body 10 can be closed by closing the zipper G (FIG. 1A). It is noted that instead of this fastener portion G, the front portion 10X of the clothing body 10 may be closed with a member such as a button.

[0039] Additionally, this clothing body 10 includes openings 10L, 10R, 10U, and 10D corresponding to the wearer's shoulders, torso, and neck, respectively.

[0040] Furthermore, the front portion 10X of the clothing body 10 is provided with a storage portion (a storage portion for power supply) P2 and a storage portion P1, which are pockets, for example.

[First and second attaching portions]

[0041] For example, as shown in FIGS. 1B to 3B, the first attaching portion T1 is provided at the rear portion 10Y of the clothing body 10, and the first attaching portion T1 has a first air conditioning hole T1A that penetrates between the inner surface 10Yin and the outer surface 10Yout of the rear portion 10Y of the clothing body 10.

[0042] This first attaching portion T1 is capable of attaching and detaching a first fan, which is a temperature adjustment device that takes outside air into the air-conditioning clothing 100 through the first air-conditioning hole T1A. It is noted that the first fan is an electric fan.

[0043] In addition, as shown in FIGS. 4 and 5, the air-conditioning clothing 100 may further include the first temperature adjustment device (first fan) FC1 attached to the first attaching portion T1.

[0044] On the other hand, for example, the first attaching portion T1 may be configured such that a first heat generating device (not shown) that generates heat using electric power supplied from a power source can be attached and detached, when the first temperature adjustment device FC1 is removed.

[0045] In addition, the second attaching portion T2 is provided at the rear portion 10Y of the clothing body 10, for example, as shown in FIGS. 1B to 3B, and the second attaching portion T2 has a second air conditioning hole T2A that penetrates between the inner surface 10Yin and the outer surface 10Yout of the rear portion 10Y of the clothing body 10.

[0046] This second attaching portion T2 is capable of attaching and detaching an second fan, which is a temperature adjustment device that takes outside air into the air-conditioning clothing 100 through the second air-conditioning hole T2A. As mentioned above, the second fan is an electric fan.

[0047] It is noted that, as shown in FIGS. 4 and 5, the air-conditioning clothing 100 may further include a second temperature adjustment device (the second fan) FC2 attached to the second attaching portion T2.

[0048] On the other hand, the second attaching portion T2 may be such that a second heat generating device (not shown), that generates heat using electric power supplied from the power source, can be attached and detached when the second temperature adjustment device FC2 is detached.

[0049] In addition, in the examples of Figures 1B to 3B, the first attaching portion T1 and the second attaching portion T2 are arranged in the torso region of the rear portion 10Y of the clothing body 10 facing the back side of the torso of the wearer when the air-conditioning clothing 100 is worn by the wearer. However, the first attaching portion T1 and the second attaching portion T2 may be arranged in other regions of the clothing body 10.

[Collar portion]

[0050] For example, as shown in FIGS. 1A to 5, the collar portion 20 is a collar that is provided (connected) to the upper ends 10XE, 10YE of the clothing body 10 and covers at least a portion of the back of the wearer's neck when worn by the wearer.

[0051] More specifically, for example, as shown in FIGS. 1A to 5, this collar portion 20 is continuously provided from the upper end 10YE of the rear portion 10Y of the clothing body 10 to the upper end 10XE of the front portion 10X of the clothing body 10.

[0052] Here, the collar portion 20 includes, for example, a first portion 20a and a second portion 20b, as shown in FIGS. 3A and 3B.

[0053] The first portion 20a has a lower end 20ad connected to the upper end 10YE of the clothing body 10.

[0054] This first portion 20a extends so as to surround at least a portion of the back of the neck 200a of the wearer 200 when the air-conditioning clothing 100 is worn

by the wearer 200 (FIGS. 6A and 6B).

[0055] This collar portion 20 has a ventilation space adjustment portion 30 that adjusts the size of a ventilation space 300 between the back of the neck of the wearer 200 and the inner surface 20ain of the first portion 20a of the collar portion 20. That is, the ventilation space adjustment portion 30 is provided in this first portion 20a.

[0056] Furthermore, the second portion 20b has a connecting portion 20bs connected to the upper end 20au of the first portion 20a.

[0057] For example, as shown in FIGS. 2, 4, and 5, in this collar portion 20, in a state where the outer surface 20bout of the second portion 20b of the collar portion 20 is bent outward so as to overlap the outer surface 20aout of the first portion 20a of the collar portion 20, with the upper end 20au (the connection portion 20bs of second portion 20b) of the first portion 20a as the border, whereby the ventilation space adjustment portion 30 exposed to the outside from the first portion 20a (in the example shown, adjustment string H, normal locking part Ba, first and second air-conditioning locking parts Bb, Bc) is covered by the second portion 20b, so that the ventilation space adjustment portion 30 is not visible from the outside of the air-conditioning clothing 100 (FIG. 2, FIG. 5).

[0058] Thereby, for example, when the air-conditioning clothing 100 is used as a normal shirt, it is possible to prevent the aesthetic appearance from being impaired.

[0059] Then, when air-conditioning clothing 100 is air-conditioned, an airflow passage Q is formed through which the outside air flows (Fig. 5, Fig. 6A, Fig. 6B). The outside air taken into the clothing body 10 through the air-conditioning holes T1A and T2A flows, via the rear air-conditioned space N existing between the rear portion 10Y of the clothing body 10 and the back of the wearer 200, toward the ventilation space 300 between the inner surface 20ain of the first portion 20a of the collar portion 20 and the neck 200a of the wearer 200 located above.

[ventilation space adjustment portion of collar portion]

[0060] Here, for example, as shown in FIGS. 2, 3A, and 3B, the ventilation space adjustment portion 30 of the collar portion 20 described above includes an adjustment string H, a normal locking part Ba, and an air-conditioning locking part Bb, Bc. In addition, the example shown in FIG. 2, FIG. 3A, and FIG. 3B shows the normal mode state of the air-conditioning clothing 100 in which the adjustment locking part 40 and the normal locking part Ba are engaged. However, the air conditioning mode state of the air-conditioning clothing 100 engaged with the adjustment locking part 40 and any of the air-conditioning locking parts Bb and Bc will be similarly explained.

[0061] For example, as shown in FIGS. 2, 3A, and 3B, the adjustment string H is inserted into a through hole M that passes through the first portion 20a of the collar portion 20.

[0062] This adjustment string H includes a first end H1 fixed to a fixing portion S provided on the inner sur-

face 20ain of the first part 20a of the collar portion 20 facing the wearer's neck; and a second end H2 that exposed to the outer surface 20 of the first portion 20a of the collar portion 20 through a through hole M formed in the collar portion 20 and provided with an adjustment locking part 40.

[0063] It is noted that the first end H1 of the adjustment string H is fixed to the fixed part S by, for example, being sewn to the fixed part S.

[0064] Furthermore, the normal locking part Ba is provided on the outer surface 20aout of the first portion 20a of the collar portion 20 adjacent to the through hole M, and the normal locking part Ba is a locking tool for fixing the second end H2 of the adjustment string H to the outer surface 20aout of the first portion 20a of the collar portion 20 by engaging with the adjustment locking part 40.

[0065] In addition, the air-conditioning locking parts Bb and Bc are provided at a position laterally further away from the through hole M than the normal locking part Ba on the outer surface 20aout of the first portion 20a of the collar portion 20, the air-conditioning locking parts Bb and Bc are locking tools for fixing the second end H2 of the adjustment string H to the outer surface 20aout of the first portion 20a of the collar portion 20 by engaging with the adjustment locking part 40.

[0066] In addition, in the examples shown in FIGS. 2, 3A, and 3B, the structure including the ventilation space adjustment portion portion 30 of the collar 20 is shown in the case where there is one set including the through hole M, the fixing portion S, the adjustment string H, the normal locking part Ba, and the air-conditioning locking parts Bb and Bc (in other words, when there is only one adjustment string). However, the structure including the ventilation space adjustment portion 30 of the collar portion 20 may include two sets including the through hole M, the fixing portion S, the adjustment string H, the normal locking part Ba, and the air-conditioning locking parts Bb and Bc (in other words, when there are two adjustment strings). When there are two adjustment strings, these two sets are arranged adjacent to each other in the lateral direction X of the collar portion 20.

[0067] Here, for example, as shown in FIGS. 2, 3A, and 3B, the air-conditioning locking parts Bb and Bc include a first air-conditioning locking part Bb and a second air-conditioning locking part Bc that are arranged side by side in the lateral direction X, at a position further away from the through hole M in the lateral direction X than the normal locking part Ba, on the outer surface 20aout of the first portion 20a of the collar portion 20.

[0068] That is, the first air-conditioning locking part Bb is arranged closer to the through hole M in the lateral direction X than the second air-conditioning locking part Bc. In other words, the second air-conditioning locking part Bc is provided at a position laterally farther away from the through hole M than the first air-conditioning locking part Bb on the outer surface 20aout of the first portion 20a of the collar portion 20.

[0069] In addition, this example shows an example in

which there are two (plural) air-conditioning locking parts Bb and Bc. However, three or more air-conditioning locking parts may be provided, or one air-conditioning locking part may be provided.

[0070] It is noted that the normal locking part Ba and the first and second air-conditioning locking parts Bb and Bc are, for example, buttons that can be locked (engaged), but they may be other locking tools.

[0071] Here, for example, the length of the adjustment string H of the ventilation space adjustment portion 30 (between the fixing portion S and the through hole M) exposed on the inner surface of the first portion 20a of the collar portion 20 (FIG. 6A), in the normal mode of the air-conditioning clothing 100 in which the adjustment locking part 40 and the normal locking part Ba engage, is longer than the length of the adjustment string H of the ventilation space adjustment portion 30 (between the fixing portion S and the through hole M) exposed on the inner surface of the first part 20a of the collar portion 20 (FIG. 6B), in the air conditioning mode of the air-conditioning clothing 100 in which the adjustment locking part 40 and the air-conditioning locking parts Bb and Bc engage.

[0072] As a result, for example, in the normal mode of the air-conditioning clothing 100 where the adjustment locking part 40 and the normal locking part Ba engage, the ventilation space 300 between the inner surface 20ain of the first portion 20a of the collar portion 20 and the neck 200a of the wearer 200 has a normal size (a reference size) (FIG. 6A).

[0073] On the other hand, in the air conditioning mode of the air-conditioning clothing 100 where the adjustment locking part 40 and the air-conditioning locking parts Bb and Bc engage, the size of the ventilation space 300 between the inner surface 20ain of the first portion 20a of the collar portion 20 and the neck 200a of the wearer 200 is larger than the normal size (the reference size) (FIG. 6B).

[0074] In particular, in the air-conditioning mode of the air-conditioning clothing 100, by engaging the adjustment locking part 40 and the first air-conditioning locking part Bb, the size (the first size) of the ventilation space 300 between the inner surface 20ain of the first portion 20a of the collar portion 20 and the neck of the wearer 200 is larger than the normal size (the reference size) of the ventilation space 300 in the normal mode (Fig. 6A, Fig. 6B).

[0075] Furthermore, in the air conditioning mode of the air-conditioning clothing 100, by engaging the adjustment locking part 40 and the second air-conditioning locking part Bc, the size (second size) of the ventilation space 300 between the inner surface 20ain of the first portion 20a of the collar portion and the neck of the wearer 200 is larger than the size (first size) of the ventilation space 300 between the inner surface 20ain of the first portion 20a of the collar portion 20 and the neck of the wearer 200.

[0076] It is noted that this ventilation space 300 in-

cludes an area surrounded by the adjustment string H of the ventilation space adjustment portion 30 of the collar portion 20 and the inner surface 10Yin of the rear portion 10Y of the clothing body 10, in the air conditioning mode of the air-conditioning clothing 100 (FIG. 6B).

[0077] Here, for example, in a state where air-conditioning clothing 100 is worn by the wearer, the wearer manually operates the adjustment locking part 40 of the ventilation space adjustment portion 30 of the collar portion 20 from outside the air-conditioning clothing 100 in the vicinity of the outer surface 20aout of the first portion 20a of the collar portion 20 (for example, the wearer pulls the second end H2 of the adjustment string H, and locks the adjustment locking part 40 at the second end to either the normal locking part Ba or the air-conditioning locking parts Bb and Bc provided on the outer surface 20aout of the first part 20a of the collar portion 20, by hand from outside the air-conditioning clothing 100.).

[0078] As a result, when the wearer is wearing air-conditioning clothing 100, it is possible to easily switch between the normal mode, in which the adjustment locking part 40 and the normal locking part Ba are engaged, and the air conditioning mode, in which the adjustment locking part 40 and the air-conditioning locking parts Bb, Bc are engaged.

[0079] In other words, according to the air-conditioning clothing 100, when the wearer is wearing the air-conditioning clothing, it is possible to more easily switch between a normal mode for use as a normal shirt and an air conditioning mode that ensures the desired airflow passage between the wearer's back and the air-conditioning clothing.

[0080] Also, as mentioned above, the rear portion Y of the clothing body 10 is provided with a reinforcing member K extending in the lateral direction X along the ventilation space adjustment portion 30 of the collar portion 20, near the upper end 10YE of the rear portion Y. The reinforcing member K is for maintaining the shape of the ventilation space 300 adjusted by the ventilation space adjustment portion 30.

[0081] For example, as shown in FIGS. 2 and 3B, the width W1 of the reinforcing member K in the lateral direction X along the ventilation space adjustment portion 30 is larger than or equal to the distance W2 between the fixing portion S and the through hole M.

[0082] In particular, when the air-conditioning clothing 100 is viewed in the vertical direction Y, the area in the lateral direction X along the ventilation space adjustment portion 30 of the reinforcing member K includes the area in the lateral direction X between the fixing portion S and the through hole M.

[0083] In this way, the rear portion Y of the clothing body 10 below the collar portion 20 is configured so that the ventilation space 300 is not easily crushed by some external pressure from a reflective vest or something worn on top, by providing the reinforcing member K near the upper end 10YE of the rear portion Y.

[0084] In particular, in the air conditioning mode of the

air-conditioning clothing 100, the collar portion 20 is rolled in a semicircular shape (FIG. 6A), whereby the reinforcing member K is also rolled in a semicircular shape, and it is considered that the strength is higher than that in the normal mode.

[0085] This makes it possible to prevent the airflow passage Q from collapsing by improving the shape retention of the region near the collar portion 20 of the air-conditioning clothing 100.

[Function of air-conditioning clothing]

[0086] Here, an example of the function of the air-conditioning clothing 100 of this embodiment having the above configuration will be described.

[0087] As mentioned above, according to the air-conditioning clothing 100, in a state where the air-conditioning clothing 100 is worn by the wearer, the wearer manually operates the adjustment locking part 40 of the ventilation space adjustment portion 30 of the collar portion 20 from outside the air-conditioning clothing 100 in the vicinity of the outer surface 20aout of the first portion 20a of the collar portion 20 (for example, the wearer pulls the second end H2 of the adjustment string H, and locks the adjustment locking part 40 at the second end to either the normal locking part Ba or the air-conditioning locking parts Bb and Bc provided on the outer surface 20aout of the first part 20a of the collar portion 20, by hand from outside the air-conditioning clothing 100.).

[0088] As a result, when the wearer is wearing air-conditioning clothing 100, it is possible to easily switch between the normal mode in which the adjustment locking part 40 and the normal locking part Ba are engaged, and the air conditioning mode in which the adjustment locking part 40 and the air-conditioning locking part Bb, Bc are engaged.

[0089] In this way, especially when the air-conditioning clothing 100 is in the air conditioning mode, the continuous airflow passage Q is formed from the rear air-conditioned space of the air-conditioning clothing 100 to the ventilation space 300 between the back of the neck of the wearer 200 and the inner surface 20ain of the first portion 20a of the collar portion 20, thereby, during air conditioning, the shape of the collar portion 20 is maintained and airflow is more reliably guided from the wearer's back to the back of the wearer's head.

[0090] As described above, air-conditioning closing, according to an embodiment of the present invention, for air-conditioning an inner space that exists between a wearer and the air-conditioning clothing that is worn by the wearer, comprises: a clothing body that configured to be worn by the wearer, wherein the clothing body includes a front portion located anteriorly to face the wearer's chest and abdomen, and a rear portion located posteriorly to face the wearer's back, in a state worn by the wearer; an attaching portion provided at the rear portion of the clothing body and having an air-conditioning hole penetrating between the inner and outer surfaces of the

clothing body, wherein the attaching portion includes a removable temperature adjustment device that takes outside air into the air-conditioning clothing through the air-conditioning hole; and a collar portion provided at an upper end of the clothing body and covering at least a part of a back of the wearer's neck when worn by the wearer, wherein the collar portion has a ventilation space adjustment portion that adjusts a size of a ventilation space between the back of the wearer's neck and the inner surface of the collar portion, wherein, when the air-conditioning clothing is air-conditioned, an airflow passage is formed through which the outside air flows, the outside air taken into the clothing body through the air-conditioning hole flows, via the rear air-conditioned space existing between the rear portion of the clothing body and the back of the wearer, toward the ventilation space between the inner surface of the first portion of the collar portion and the neck of the wearer.

[0091] As a result, when the wearer is wearing the air-conditioning clothing, it is possible to more easily switch between a normal mode for use as a normal shirt and an air conditioning mode that ensures the desired airflow passage between the wearer's back and the air-conditioning clothing.

[0092] Additionally, as mentioned above, in the embodiment, the temperature adjustment device is a fan. However, the temperature adjustment device may be a heat generating device that generates heat or other devices that can adjust the temperature.

[0093] While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions. Indeed, the novel methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the methods and systems described herein may be made without departing from the spirit of the inventions. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the inventions.

[Explanation of symbols]

[0094]

100 air-conditioning clothing
10 clothing body
T1 first attaching portion
T2 second attaching portion
P2 power supply storage portion
P1 storage portion
20 collar portion

Claims

1. An air-conditioning clothing, for air-conditioning an

inner space that exists between a wearer and the air-conditioning clothing that is worn by the wearer, comprising:

a clothing body that configured to be worn by the wearer, wherein the clothing body includes a front portion located anteriorly to face the wearer's chest and abdomen, and a rear portion located posteriorly to face the wearer's back, in a state worn by the wearer;
an attaching portion provided at the rear portion of the clothing body and having an air-conditioning hole penetrating between the inner and outer surfaces of the clothing body, wherein the attaching portion includes a removable temperature adjustment device that takes outside air into the air-conditioning clothing through the air-conditioning hole; and
a collar portion provided at an upper end of the clothing body and covering at least a part of a back of the wearer's neck when worn by the wearer, wherein the collar portion has a ventilation space adjustment portion that adjusts a size of a ventilation space between the back of the wearer's neck and the inner surface of the collar portion, wherein,
when the air-conditioning clothing is air-conditioned,
an airflow passage is formed through which the outside air flows,
the outside air taken into the clothing body through the air-conditioning hole flows, via the rear air-conditioned space existing between the rear portion of the clothing body and the back of the wearer, toward the ventilation space between the inner surface of the first portion of the collar portion and the neck of the wearer.

2. The air-conditioning clothing according to claim 1,

wherein the collar portion includes;
a first portion that has a lower end connected to the upper end of the clothing body, and that extends so as to surround at least a portion of the back of the wearer's neck when worn by the wearer; and
a second portion that has a connecting part connected to an upper end of the first portion, wherein the ventilation space adjustment portion is provided in the first part, and wherein, in the collar portion, in a state where the outer surface of the second portion of the collar portion is bent outward so as to overlap the outer surface of the first portion of the collar portion, with the upper end of the first portion as a border, whereby the ventilation space adjustment portion exposed to the outside from the

first portion is covered by the second portion, so that the ventilation space adjustment portion is not visible from the outside of the air-conditioning clothing.

3. The air-conditioning clothing according to claim 2, wherein the ventilation space adjustment portion of the collar portion includes:

an adjustment string that is configured to be inserted into a through hole penetrating the collar portion, wherein the adjustment string has a first end fixed to a fixing portion on an inner surface of the collar portion facing the neck of the wearer, and a second end that is exposed on the outer surface of the collar portion through the through hole formed in the collar portion and is provided with an adjustment locking part; a normal locking part that is provided on the outer surface of the collar portion adjacent to the through hole, wherein the normal locking part is for fixing the second end of the adjustment string to the outer surface of the collar portion by engaging with the adjustment locking part; an air-conditioning locking part that is provided on the outer surface of the collar portion at a position laterally farther from the through hole than the normal locking part, wherein the air-conditioning locking part is for fixing the second end of the adjustment string to the outer surface of the collar portion by engaging with the adjustment locking part.

4. The air-conditioning clothing according to claim 3,

wherein, in the normal mode of the air-conditioning clothing where the adjustment locking part and the normal locking part engage, the ventilation space between the inner surface of the collar portion and the neck of the wearer has a normal size, and

wherein, in the air conditioning mode of the air-conditioning clothing where the adjustment locking part and the air-conditioning locking part engage, the size of the ventilation space between the inner surface of the collar portion and the neck of the wearer is larger than the normal size.

5. The air-conditioning clothing according to claim 4,

wherein, in a state where the air-conditioning clothing is worn by the wearer, the normal mode, in which the adjustment locking part and the normal locking part are engaged, and the air conditioning mode, in which the adjustment locking part and the air-conditioning locking part are engaged are switched, by the wearer operating the adjustment locking

part of the ventilation space adjustment portion of the collar portion from outside the air-conditioning clothing near the outer surface of the collar portion with the wearer's hand.

6. The air-conditioning clothing according to claim 5,

wherein the air-conditioning locking part includes a first air-conditioning locking part and a second air-conditioning locking part that are arranged side by side in the horizontal direction, on the outer surface of the collar portion, at a position laterally farther from the through hole than the normal locking part, and wherein the second air-conditioning locking part is provided at a position laterally farther from the through hole than the first air-conditioning locking part, on the outer surface of the collar portion.

7. The air-conditioning clothing according to claim 6,

wherein, in the air conditioning mode, a size of the ventilation space between the inner surface of the collar portion and the neck of the wearer, by engaging the adjustment locking part and the second air-conditioning locking part, is larger than a size of the ventilation space between the inner surface of the collar portion and the neck of the wearer, by engaging the adjustment locking part and the first air-conditioning locking part.

8. The air-conditioning clothing according to claim 4, wherein the rear portion of the clothing body is provided with a reinforcing member that extends in the lateral direction along the ventilation space adjustment portion of the collar portion near the upper end of the rear portion, and the reinforcing member is for maintaining the shape of the ventilation space adjusted by the ventilation space adjustment portion.

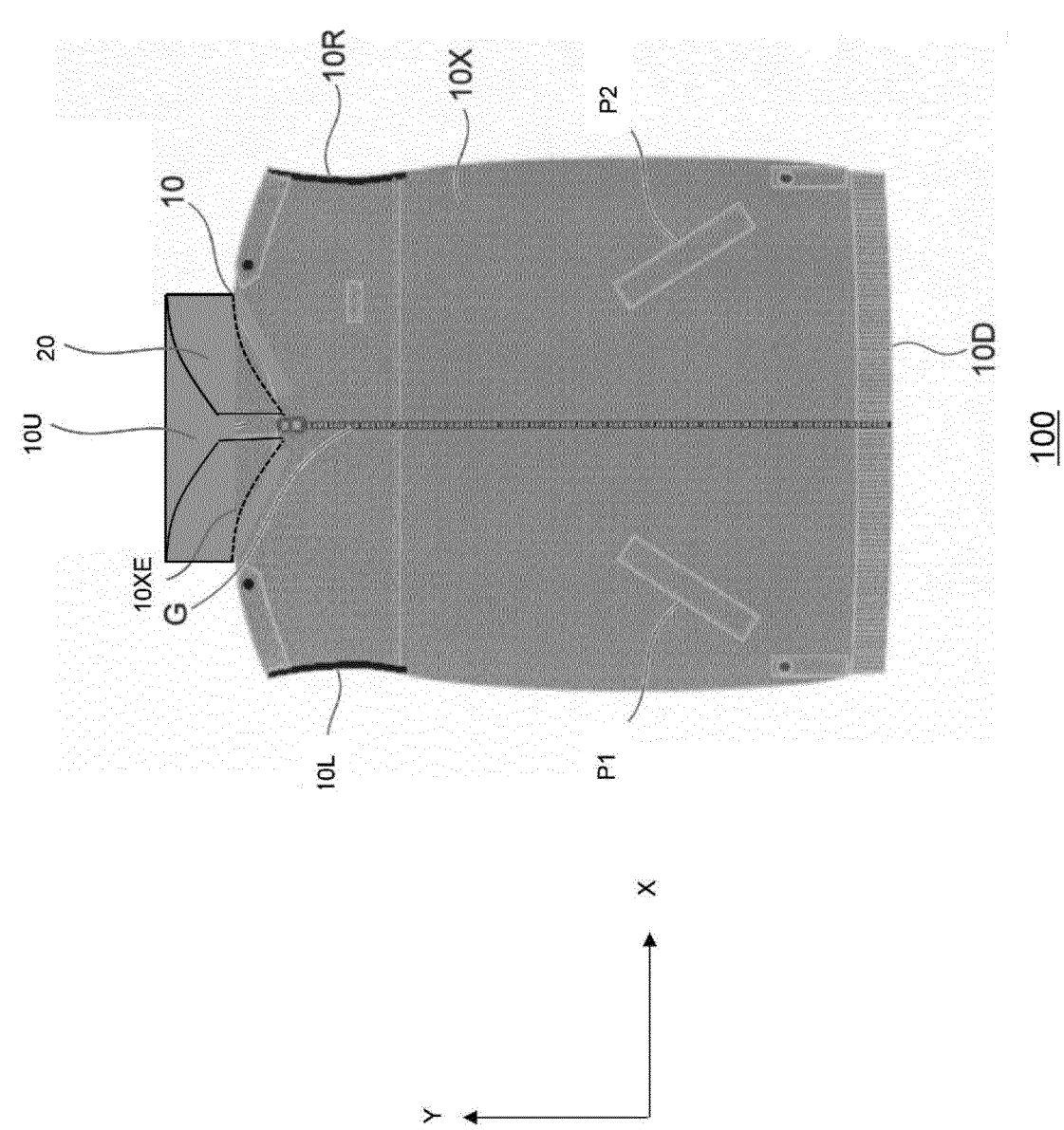
9. The air-conditioning clothing according to claim 8, wherein the reinforcing member is a reinforcing cloth or an interlining.

10. The air-conditioning clothing according to claim 9, wherein a width of the reinforcing member in the lateral direction along the ventilation space adjustment portion is larger than or equal to the distance between the fixing portion and the through hole.

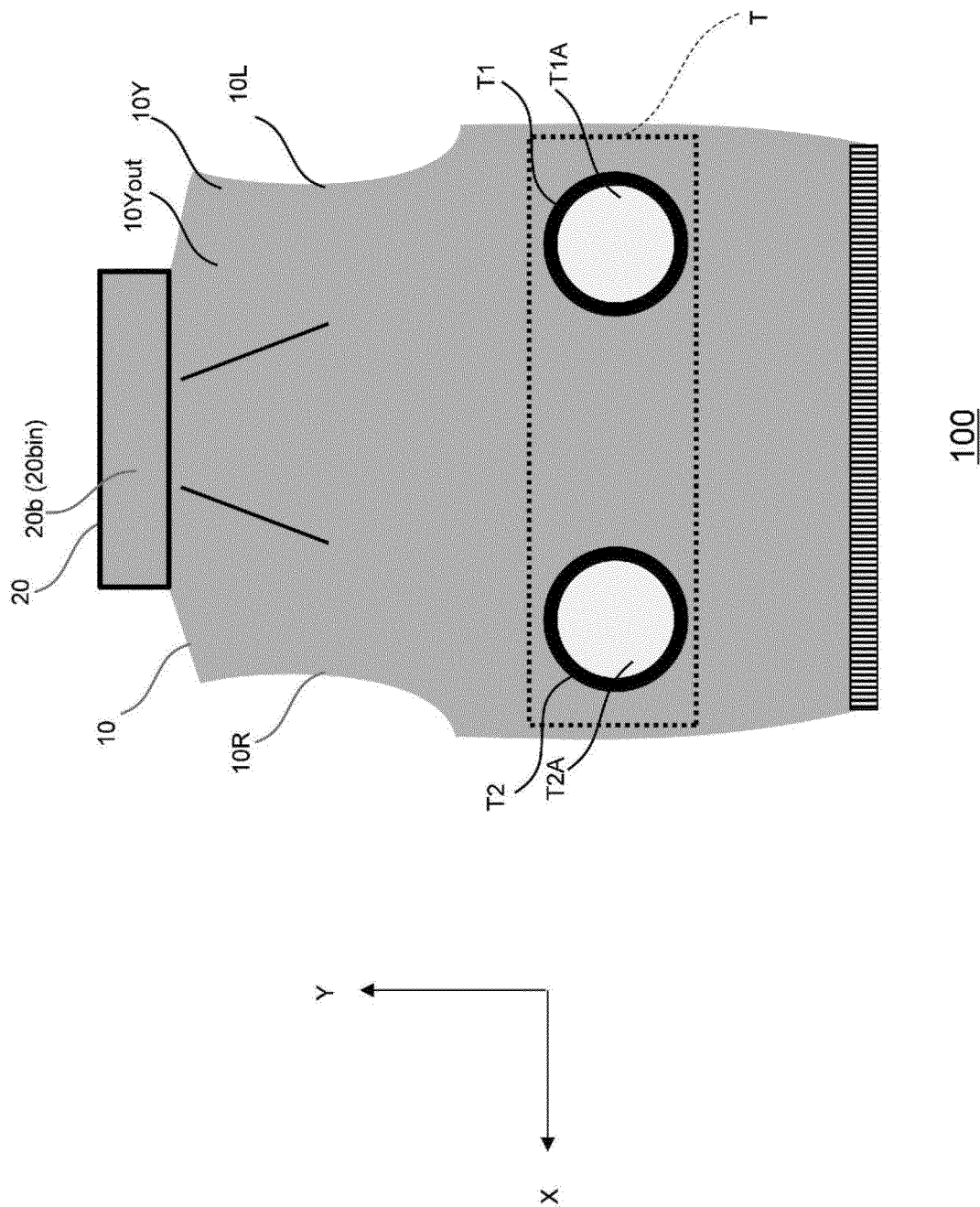
11. The air-conditioning clothing according to claim 10, wherein, when the air-conditioning clothing is viewed in the vertical direction, an area in the lateral direction along the ventilation space adjustment portion of the reinforcing member includes an area in the lateral direction between the fixing portion and the through hole.

12. The air-conditioning clothing according to claim 4, wherein, in the air conditioning mode, the ventilation space includes an area surrounded by the adjustment string of the ventilation space adjustment portion of the collar portion and the inner surface of the rear portion of the clothing body. 5
13. The air-conditioning clothing according to claim 4, wherein a length of the adjustment string of the ventilation space adjustment portion exposed on the inner surface of the first portion of the collar portion, in the normal mode, is longer than a length of the adjustment string of the ventilation space adjustment portion exposed on the inner surface of the first portion of the collar portion, in the air conditioning mode. 10 15
14. The air-conditioning clothing according to claim 4, wherein the attaching portion includes:
- a first attaching portion provided at the rear portion of the clothing body and having a first air-conditioning hole passing through between the inner and outer surfaces of the clothing body; wherein the first attaching portion is removable with a first temperature adjustment device that takes outside air into the air-conditioning clothing through the first air-conditioning hole, and a second attaching portion provided at the rear portion of the clothing body and having a second air-conditioning hole penetrating between the inner and outer surfaces of the clothing body; wherein the first attaching portion is removably attached to a second temperature adjustment device that takes outside air into the air-conditioning clothing through the second air-conditioning hole. 20 25 30 35
15. The air-conditioning clothing according to claim 14, further comprising:
- a first temperature adjustment device attached to the first attaching portion; and a second temperature adjustment device attached to the second attaching portion. 40 45
16. The air-conditioning clothing according to claim 15, wherein a first heat generating device that generates heat using electric power supplied from a power source is removably attached to the first attaching portion, in a state where the first temperature adjustment device is removed, and wherein a second heat generating device that generates heat using electric power supplied from the power source is removably attached to the second attaching portion, in a state where the second temperature adjustment device is removed. 50 55
17. The air-conditioning clothing according to claim 1, wherein the air-conditioning clothing is a shirt.
18. The air-conditioning clothing according to claim 14, wherein the first temperature adjustment device is a first fan, and the second temperature adjustment device is a second fan.

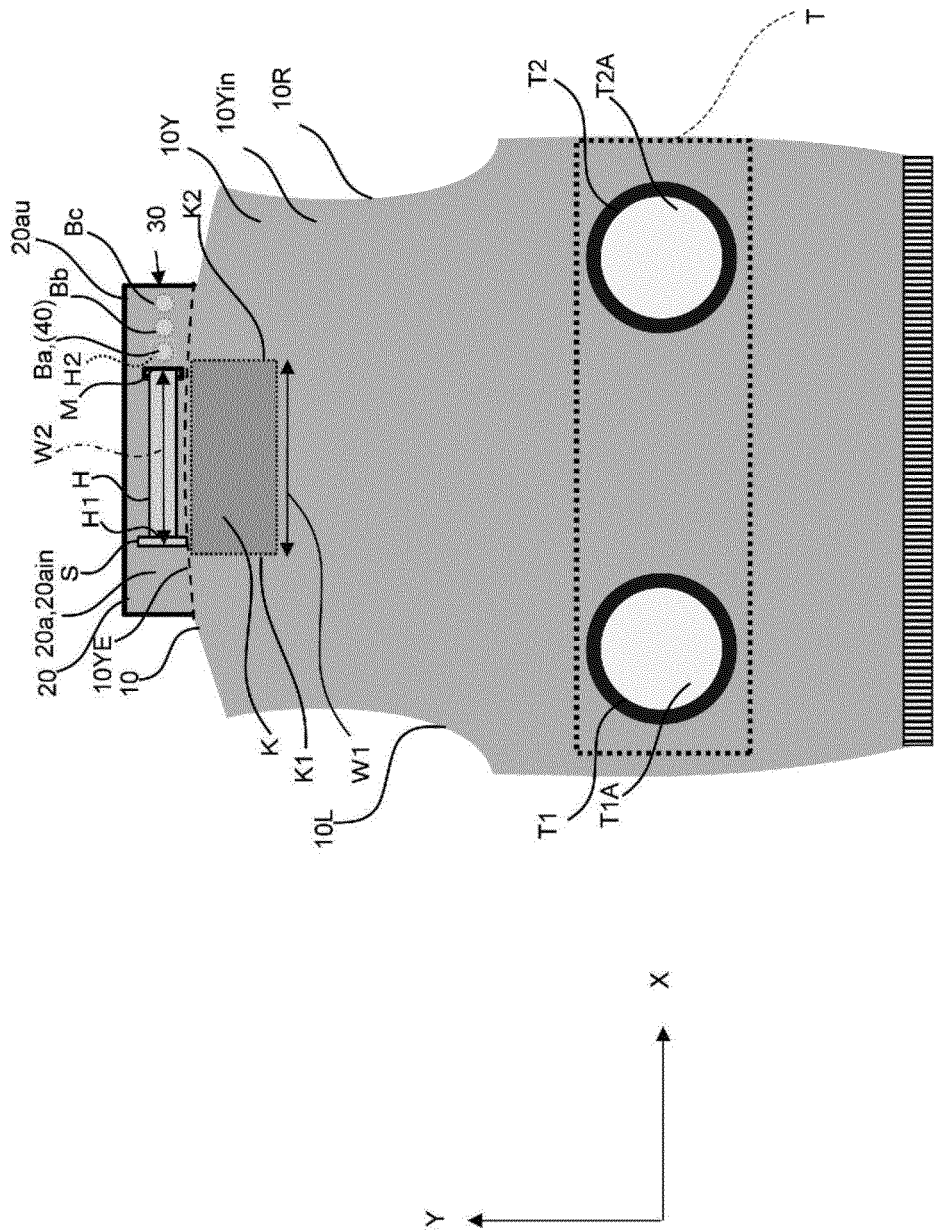
[FIG. 1 A]



[FIG. 1 B]

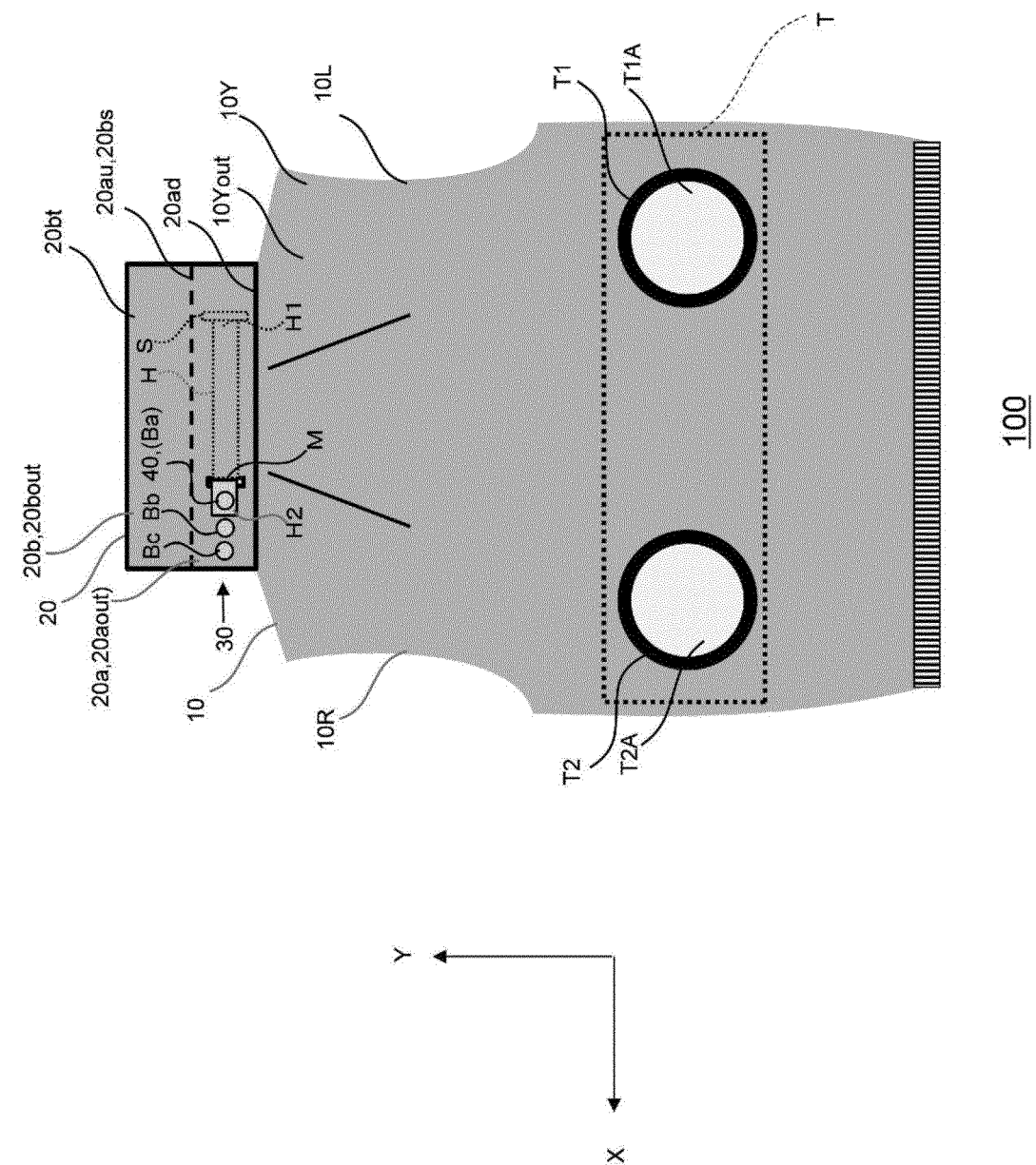


[FIG. 2]

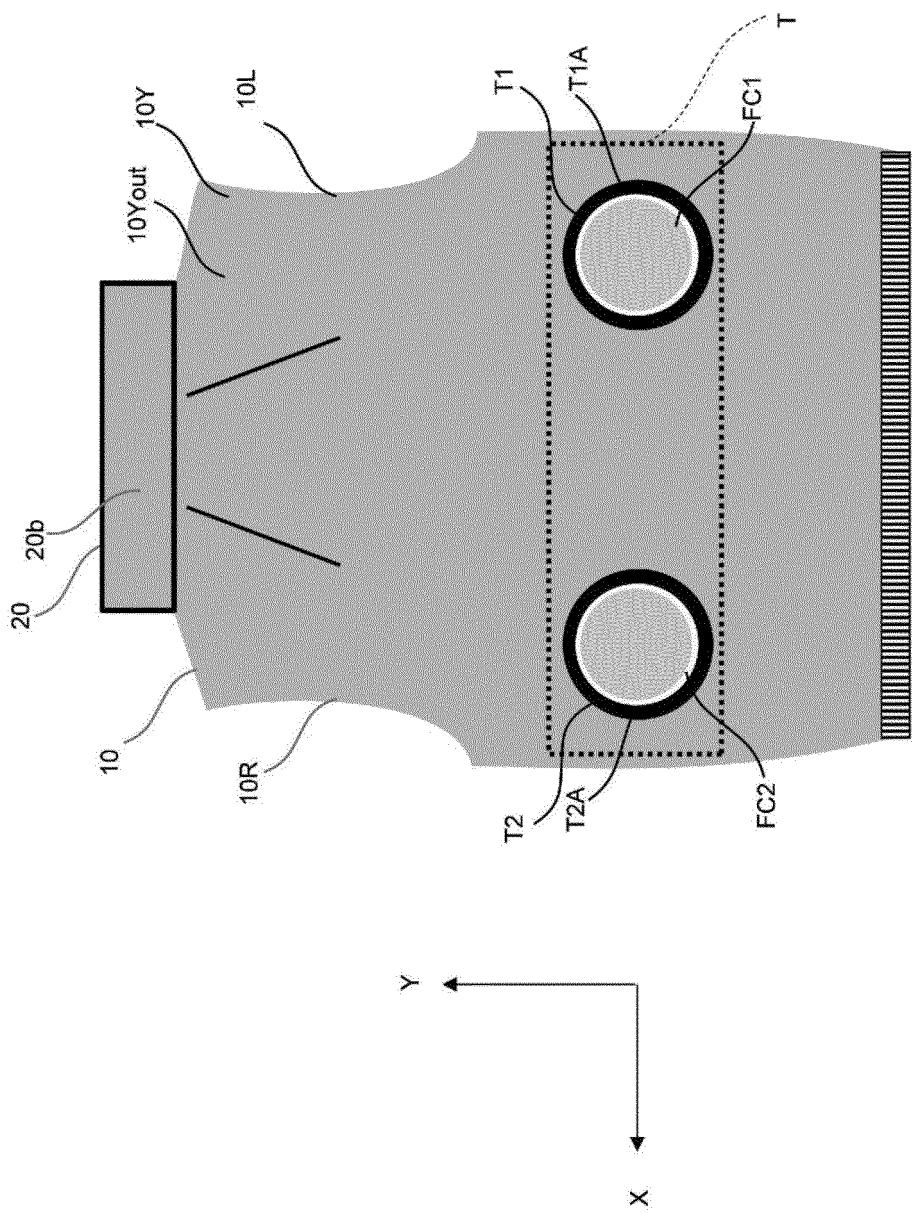


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[FIG. 3 A]

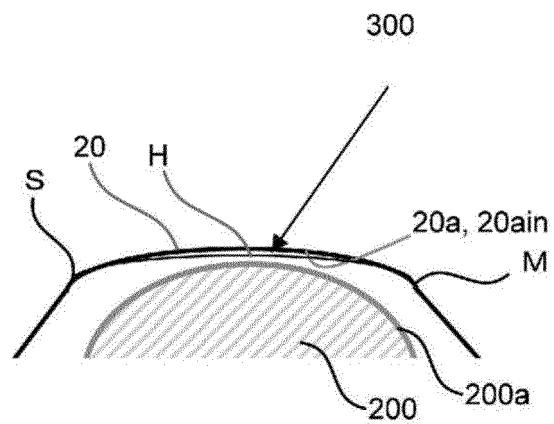


[FIG. 4]

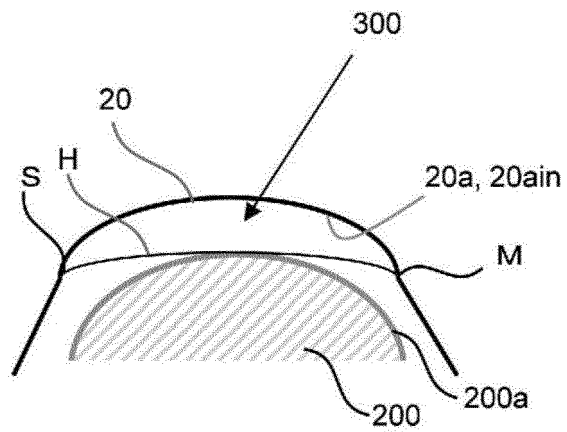


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[FIG. 6 A]



[FIG. 6 B]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2023/039059

A. CLASSIFICATION OF SUBJECT MATTER <i>A41D 1/00</i> (2018.01)i; <i>A41D 13/002</i> (2006.01)i; <i>A41D 27/28</i> (2006.01)i FI: A41D13/002 105; A41D1/00 C; A41D27/28 B 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) A41D1/00; A41D13/002; A41D27/28 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 1971-2023 Registered utility model specifications of Japan 1996-2023 Published registered utility model applications of Japan 1994-2023 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>JP 2021-167494 A (SFT LABORATORY CO., LTD.) 21 October 2021 (2021-10-21) paragraphs [0002], [0018]-[0036], [0049]-[0050], fig. 1-4, 7</td> <td>1-2, 17</td> </tr> <tr> <td>Y</td> <td></td> <td>3-16, 18</td> </tr> <tr> <td>Y</td> <td>JP 3237830 U (SFT LABORATORY CO., LTD.) 09 June 2022 (2022-06-09) paragraphs [0079]-[0084], fig. 12-15</td> <td>3-16, 18</td> </tr> <tr> <td>Y</td> <td>JP 2020-94302 A (RIGHTARM CO., LTD.) 18 June 2020 (2020-06-18) paragraphs [0007], [0010], [0013], [0032], fig. 1-4</td> <td>8-11</td> </tr> <tr> <td>A</td> <td>JP 2018-119230 A (SANESU KK) 02 August 2018 (2018-08-02) entire text, all drawings</td> <td>1-18</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	JP 2021-167494 A (SFT LABORATORY CO., LTD.) 21 October 2021 (2021-10-21) paragraphs [0002], [0018]-[0036], [0049]-[0050], fig. 1-4, 7	1-2, 17	Y		3-16, 18	Y	JP 3237830 U (SFT LABORATORY CO., LTD.) 09 June 2022 (2022-06-09) paragraphs [0079]-[0084], fig. 12-15	3-16, 18	Y	JP 2020-94302 A (RIGHTARM CO., LTD.) 18 June 2020 (2020-06-18) paragraphs [0007], [0010], [0013], [0032], fig. 1-4	8-11	A	JP 2018-119230 A (SANESU KK) 02 August 2018 (2018-08-02) entire text, all drawings	1-18
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A	JP 2018-119230 A (SANESU KK) 02 August 2018 (2018-08-02) entire text, all drawings	1-18																
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Date of the actual completion of the international search 21 November 2023	Date of mailing of the international search report 05 December 2023																	
Name and mailing address of the ISA/JP Japan Patent Office (ISA/JP) 3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915 Japan	Authorized officer Telephone No.																	

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2023/039059

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JP	3237830	U	09 June 2022	(Family: none)	
JP	2020-94302	A	18 June 2020	(Family: none)	
JP	2018-119230	A	02 August 2018	(Family: none)	

REFERENCES CITED IN THE DESCRIPTION

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