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BA ME(30) Priority: **30.06.2010 JP 2010149088**(71) Applicant: **Panasonic Electric Works Co., Ltd.****Kadoma-shi****Osaka 571-8686 (JP)**

(72) Inventors:

- **Yasui, Noriyuki**

Kadoma-shi Osaka 571-8686 (JP)

- **Kodama, Naofumi**

Kadoma-shi Osaka 571-8686 (JP)

- **Miyagawa, Masuo**

Kadoma-shi Osaka 571-8686 (JP)

- **Sekiya, Shotaro**

Kadoma-shi Osaka 571-8686 (JP)

- **Kawamura, Kenichi**

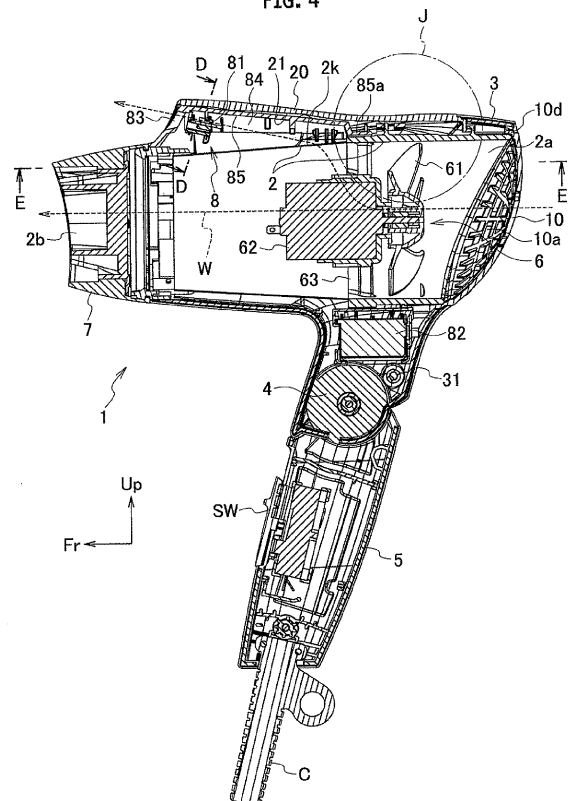
Kadoma-shi Osaka 571-8686 (JP)

- **Ishikawa, Tomoya**

Kadoma-shi Osaka 571-8686 (JP)(74) Representative: **Appelt, Christian W.****Forrester & Boehmert****Pettenkoferstrasse 20-22****80336 München (DE)**(54) **Hair care device**

(57) To an air inlet port 2a of a hair dryer 1, a porous protection frame body 10 that finely divides an opening region of the air inlet port 2a is attached, and further, a mesh-like filter 11 that divides an opening region of the protection frame body 10 more finely is arranged on an outside of the protection frame body 10. In such a way, dust can be made less likely to deposit on the mesh-like filter 11. In addition, even if the dust adheres onto the filter 11, it becomes possible to easily remove the dust from outside, and maintenance of a portion of the air inlet port 2a can be simplified.

FIG. 4

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Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims the benefit of priority from prior Japanese Patent Application P2010-149088 filed on June 30, 2010; the entire contents of which are incorporated by reference herein.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a hair care device.

[0003] For example, in a hair care device such as a hair dryer, air sucked from an air inlet port is allowed to be discharged, from an air blower port, as a cold wind or a hot wind directly or by being heated. At that time, it is general to provide, in the air inlet port, a porous protection frame body, which finely divides an opening region of the air inlet port, in order to inhibit a finger and the like from entering the same by mistake. Moreover, for example as disclosed in Japanese Patent Laid-Open Publication No. 2008-307221, a device is known, in which the opening region of the protection frame body is divided more finely to thereby provide a mesh-like filter so that dirt, dust, hair and the like cannot be drawn therethrough.

SUMMARY OF THE INVENTION

[0004] However, in the above-described conventional hair dryer, the mesh-like filter is arranged in an inside of the protection frame body provided in the air inlet port, and accordingly, the dust becomes prone to accumulate on an edge of the filter. Moreover, in the case where the dust accumulates as described above, the dust deposits on the filter in the inside of the protection frame body, both of which form a step difference. Accordingly, there has been a problem that it is difficult to clean the filter, resulting in a complicated maintenance of a portion the air inlet port.

[0005] In this connection, it is an object of the present invention to provide a hair care device capable of further simplifying the maintenance of the portion of the air inlet port.

[0006] In order to achieve the foregoing object, a hair care device of the present invention includes: a housing in an inside of which an air flow passage is formed; an air inlet port provided on an upstream end portion of the air flow passage, and an air blower port provided on a downstream end portion of the air flow passage; an air blower unit that discharges air, which is sucked from the air inlet port, from the air blower port; a porous protection frame body, which is provided on the air inlet port, and finely divides an opening region of the air inlet port, ; and a mesh-like filter, which is arranged on an outside of the protection frame body, and divides the opening region of the protection frame body more finely.

[0007] In accordance with the hair care device of the

present invention, the mesh-like filter is arranged on the outside of the protection frame body provided on the air inlet port. Accordingly, dust can be made less likely to deposit on an edge of the filter. In addition, even if the dust adheres onto the filter, it becomes possible to easily remove the dust from outside, and maintenance of a portion of the air inlet port can be simplified.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Fig. 1 is a side view of a hair dryer according to a first embodiment of the present invention.

Fig. 2 is a back view of the hair dryer shown in Fig. 1.

Fig. 3 is a plan view of the hair dryer shown in Fig. 1.

Fig. 4 is a cross-sectional view along a line A-A in Fig. 3.

Fig. 5 is a perspective view where a protection frame body and a mesh-like filter, which are attached to an air inlet port of the hair dryer shown in FIG. 1, are arrayed.

Fig. 6 is a cross-sectional view showing a relationship between an ion generation unit cover of an ion generation unit provided in the hair dryer shown in Fig. 1 and a decorative case provided thereon.

Fig. 7 is a cross-sectional view along a line B-B in Fig. 3.

Fig. 8 is an enlarged cross-sectional view of a portion C in Fig. 7.

Fig. 9 is a cross-sectional view along a line D-D in Fig. 4.

Fig. 10 is a cross-sectional view along a line E-E in Fig. 4.

Fig. 11 is a cross-sectional view along a line F-F in Fig. 3.

Fig. 12 is an enlarged cross-sectional view of a portion G in Fig. 11.

Fig. 13 is a cross-sectional view along a line H-H in Fig. 3.

Fig. 14 is an enlarged cross-sectional view of a portion I in Fig. 13.

Fig. 15 is an enlarged cross-sectional view of a portion J in Fig. 4.

Fig. 16 is a side of a hair dryer according to a second embodiment of the present invention.

Fig. 17 is a perspective view where a protection frame body, a mesh-like filter and a support frame body, which are attached to an air inlet port of the hair dryer shown in FIG. 16, are arrayed.

Fig. 18 is a plan view showing a body portion of a brush-added hair dryer according to a third embodiment of the present invention.

Fig. 19 is a cross-sectional view along a line L-L in Fig. 18.

Fig. 20 is a side view where the protection frame body, the mesh-like filter and the support frame body, which are attached to the air inlet port of the hair

dryer shown in Fig. 18, are arrayed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] A description is made below in detail of embodiments of the present invention while referring to the drawings.

[First Embodiment]

[0010] Fig. 1 to Fig. 15 are views showing a first embodiment of a hair care device according to the present invention. In this embodiment, the description is made while taking a hair dryer 1 as an example of the hair care device. Note that reference symbol Fr denotes a forward direction, and reference symbol Up denotes an upward direction.

[0011] As shown in Fig. 1 to Fig. 4, the hair dryer 1 is roughly composed by including: a housing 3 having a wind tunnel portion 2 in an inside of which an air flow passage W is formed; and a grip portion 5 coupled, so as to be freely foldable, to a grip attachment portion 31 protruded from a lower side of a rear end portion of the housing 3 while interposing a freely rotatable coupling portion 4 therebetween. The housing 3 is composed by combining and coupling housing parts, which are divided into right and left halves, to each other.

[0012] In the wind tunnel portion 2, on a rear end portion thereof (that is, an upstream end portion of the air flow passage W: a right side in Fig. 1), an air inlet port 2a is provided, and on a front end portion thereof (that is, a downstream end portion of the air flow passage W: a left side in Fig. 1), an air blower port 2b is provided. In the inside of the wind tunnel portion 2, an air blower unit 6 and a heater (not shown) are arranged in series from the rear toward the front. Moreover, the wind tunnel portion 2 is set to the housing 3 in a state of ensuring the air flow passage W, which is cylindrical, with an inner surface of the housing 3, and these wind tunnel portion 2 and housing 3 are integrated with each other. Note that, in this embodiment, the air blower port 2b serves as a tip end of a nozzle 7 attached to the front end portion of the wind tunnel portion 2; however, in the case where this nozzle 7 is detached, such a tip end of the wind tunnel portion 2 serves as the wind blower port 2b.

[0013] The air blower unit 6 is composed of: a fan 61; a motor 62 that rotates this fan 61; flow adjustment stems 63 which support this motor 62 in the inside of the wind tunnel portion 2 and have a flow adjustment function for the air passing therethrough; and the like. Then, the fan 61 is rotationally driven by the motor 62, whereby the air flow is generated in the wind tunnel portion 2, and the air sucked from the air inlet port 2a is blown out from the air blower port 2b. That is to say, the air blower unit 6 is arranged in the air flow passage W and has a function to blow the air introduced into the air flow passage W. At this time, the above-described heater (not shown) is en-

ergized and heated, whereby the air blown from the air blower port 2b can be turned to a hot wind.

[0014] Moreover, on an upper part of the wind tunnel portion 2, an ion generation unit 8 that generates and discharges negative ions is provided. This ion generation unit 8 includes an ion generation block 81, which generates the negative ions. Then, a high voltage, which is generated in a high voltage generation unit 82 arranged in the grip attachment portion 31, is applied to the ion generation unit 8, and a corona discharge is caused, whereby the negative ions are generated.

[0015] The ion generation unit 8 introduces a part of the air, which flows in the wind tunnel portion 2, from an opening portion 2K formed by partially cutting away the upper part of the wind tunnel portion 2, and together with the introduced air, discharges the generated negative ions forward from an ion discharge port 83. It is known that the negative ions give hair a gloss and a moist feeling, and exert an effect thereof for taking out curl of the hair.

[0016] The ion generation unit 8 is provided with an ion generation unit cover 85, which holds the ion generation block 81 (refer to Fig. 9), and in addition, forms an air introduction passage 84 for introducing the air from the wind tunnel portion 2, and forms the above-mentioned ion discharge port 83. This ion generation unit cover 85 is formed of a synthetic resin material in this embodiment.

[0017] On a front center portion of the grip portion 5, a switch SW is provided so as to be freely switchable among a plurality of up and down stages. By this switch SW, ON/OFF of the motor 62 and the heater and adjustment of a quantity of the air are performed. Moreover, a cord C to be connected to a power supply is attached to a lower end of the grip portion 5.

[0018] As shown in Fig. 1 and Fig. 2, to the air inlet port 2a, a porous protection frame body 10 is attached, which finely divides an opening region of the air inlet port 2a concerned. By this protection frame body 10, a relatively large foreign object such as a finger is prevented from entering the wind tunnel portion 2 by mistake.

[0019] Here, in this embodiment, as shown in Fig. 5, more on the outside of the protection frame body 10, a mesh-like filter 11 is arranged, which divides the opening region of the protection frame body 10 more finely. Note that, in Fig. 1 to Fig. 4, the filter 11 is not illustrated for the sake of convenience. This is in order to illustrate an inside (the flow adjustment stems 63 and the like) of the protection frame body 10 and openings 10a (annular frame portions 10b and linear frame portions 10c, which will be described later) thereof.

[0020] The filter 11 has a function to suppress relatively small foreign objects such as dirt, dust and hair from entering the wind tunnel portion 2, and is formed of metal mesh or mesh composed of fire-resistant resin such as polyester. Preferably, the filter 11 has a mesh width as fine as 300 to 650 μm , in which an aperture ratio ranges from 50 to 90 percent (preferably, 50 to 75 percent). By using the filter 11 with the fine mesh width as described

above, the small dust, hair and the like can be more effectively prevented from entering the fan 61, the motor 62 and the heater portion. Note that, in this filter 11, naturally, the filter 11 concerned is formed so that a thickness thereof can be thinner than a thickness of the protection frame body 10.

[0021] The protection frame body 10 is composed of: a plurality of the annular frame portions 10b arranged concentrically about a substantial center of the air inlet port 2a; and a plurality of the linear frame portions 10c extended radially from the substantial center of the air inlet port 2a so as to intersect the annular frame portions 10b. Hence, a plurality of the openings 10a of the protection frame body 10 are formed of the annular frame portions 10b and the linear frame portions 10c.

[0022] At this time, as shown in Fig. 5, with regard to the linear frame portions 10c, inside linear portions 10cA located in an inside of an annular frame portion 10bA, which serves as the innermost circumferential-side one among the plurality of annular frame portions 10b, and outside linear portions 10cB located on an outside of the annular frame portion 10bA are arranged so as to be shifted from each other with respect to linear directions as diameter directions.

[0023] The protection frame body 10 and the mesh-like filter 11 are molded integrally with each other by a synthetic resin material. At this time, among such synthetic resin materials for use in the molding, it is preferable to use ABS, which has a low melting point, in terms of preventing a deterioration of the filter 11 at the time of the molding. Note that, preferably, the thickness of the protection frame body 10 is approximately 1.5 mm.

[0024] Moreover, with regard to the linear frame portions 10c of the protection frame body 10, in this embodiment, first frames 10c1, which serve as main frames, and second frames 10c2 and third frames 10c3, which serve as sub-frames, are provided, and preferably, a width of the first frames 10c1 is approximately 2 mm, and a width of the second frames 10c2 and the third frames 10c3 is approximately 1.5 mm. At this time, preferably, the number of first frames 10c1, which serve as the main frames and have the largest width, is different from the number of flow adjustment stems 63 and the number of fins of the fan 61 in the air blower unit 6 in consideration also of a problem of noise caused by a resonance. In this embodiment, as shown in Fig. 2 and Fig. 7, the number of flow adjustment stems 63 is set at seven, the number of fins of the fan 61 is set at six, and the number of first frames 10c1 is set at eight.

[0025] Furthermore, the second frames 10c are arranged at intermediate points between the first frames 10c1, whereby strength of the protection frame body 10 can be further increased. The third frames 10c3 are made capable of ensuring strength of the mesh-like filter 11 at the time when the protection frame body 10 is molded integrally with the mesh-like filter 11.

[0026] Note that, in the protection frame body 10, strength of the air inlet port 2a is enhanced by increasing

the arrangement number of bars such as the annular frame portions 10b and the linear frame portions 10c, and a breakage of the air inlet port 2a, which may be caused by droppage and an impact, can be further reduced. Meanwhile, in terms of performance, the quantity of the air is decreased by the increase of the bars. Therefore, in consideration of a balance among these factors, the number of annular frame portions 10b and the number of linear frame portions 10c are decided.

[0027] Moreover, in this embodiment, a shape of each of the openings 10a of the protection frame body 10 is a substantially trapezoidal shape by the annular frame portions 10b and the linear frame portions 10c; however, though not shown, without being limited to this, it is more preferable that the protection frame body 10 be formed, for example, so as to have a honeycomb structure in which each of the openings 10a becomes regular hexagonal.

[0028] Note that the protection frame body 10 of this embodiment is coupled integrally or tightly to the housing 3 so as to be undetachable therefrom. That is to say, in this embodiment, the matter that the protection frame body 10 is made undetachable as described above stands for that the mesh-like filter 11 molded integrally with the protection frame body 10 concerned is also made undetachable from the housing 3. Specifically, as shown in Fig. 4, attachment projections 10d are formed on a plurality of spots or entire circumference of a peripheral edge portion of the protection frame body 10, and the attachment projections 10d are fitted to an outer circumference of the rear end portion of the housing 3. At that time, the attachment projections 10d are adhered onto or inserted with pressure into the housing 3 in advance, whereby the detachment of the protection frame body 10 is not performed easily, and the protection frame body 10 can be made undetachable in a usual operation.

[0029] Incidentally, in the hair dryer 1 of this embodiment, at least a part of the housing 3, that is, a portion, which covers the ion generation unit 8 provided in an upper part of the housing 3 in this embodiment, is composed of a transparent or translucent decorative case 20 in which a decorative portion 21 is provided on a back side (a center direction side of the housing 3). This decorative case 20 is integrally molded of a transparent or translucent synthetic resin material. At this time, the decorative portion 21 provided on the decorative case 20 is formed into a diamond cut-like polyhedral shape formed out by a thickness change of the decorative case 20 as shown in Fig. 10.

[0030] Then, the decorative portion 21 with the polyhedral shape is coated with paint (an opaque material) having metallic gloss. Note that the decorative portion 21 may be subjected to impregnation of metal foil and printing by various colors besides such metallic painting. Moreover, an outer surface of the decorative case 20 may be subjected to such decoration by the printing.

[0031] As described above, the portion that covers the ion generation unit 8 is composed of the transparent or

translucent decorative case 20 in which the decorative portion 21 is provided on the back side. In such a way, when the decorative case 20 is viewed from the outside, light is reflected on the polyhedral shape of the decorative portion 21, whereby light and shade, which are excellent in design, can be generated. In such a way, a profound decorative effect that has not been present heretofore can be produced, an exterior appearance of the hair dryer 1 can be further enhanced, and a commercial value thereof can be thereby further enhanced. Moreover, the decorative portion 21 is not provided separately but provided on the back side of the decorative case 20. Accordingly, the number of parts is reduced, whereby a cost increase, a weight increase and a deterioration of production efficiency can be suppressed.

[0032] As shown in Fig. 7 and Fig. 8, the decorative case 20 is attached to the housing 3 in such a manner that engagement pieces 23 provided on both sides of a substantial center portion thereof in a fore-and-aft direction are engaged with hook pieces 32 protruded from the inside of the housing 3. Moreover, as shown in Fig. 15, an engagement piece 24 provided on a rear end portions of the decorative case 20 is engaged with an engagement portion 2c that is located in the inside of the housing 3 and is protruded from the outside of the wind tunnel portion 2. Furthermore, as shown in Fig. 11 to Fig. 13, hook portions 22 provided on both sides of a front end portion of the decorative case 20 are allowed to sink into insides of connection portions 9, whereby the decorative case 20 is attached to the housing 3. At this time, the engagement pieces 23, the hook portions 22 and the engagement pieces 24 are allowed to individually perform the engagement at positions invisible from the outside.

[0033] Hence, in the transparent or translucent decorative case 20, the engagement portions thereof are adapted to be invisible from the outside, and accordingly, design of the decorative portion 21 of the decorative case 20 can be prevented from being damaged by the engagement portions. In such a way, the exterior appearance of the hair dryer 1 is made favorable, thus making it possible to further enhance the commercial value thereof.

[0034] Moreover, the ion generation unit cover 85 is arranged in the inside of the decorative case 20; however, this ion generation unit cover 85 is adapted not to be engaged with the decorative case 20. Specifically, as shown in Fig. 4 and Fig. 15, an engagement portion (a right end portion in Fig. 4) 85a of the ion generation unit cover 85 is engaged with an engagement piece 33 of the housing 3, and in addition, as shown in Fig. 13 and Fig. 14, engagement portions 85b formed on a front end of the ion generation unit cover 85 are allowed to sink into the insides of the connection portions 9 and to engage therewith. At this time, the engagement portions 85a and 85b of the ion generation unit cover 85 are set to state of being invisible from the outside through the transparent or translucent decorative case 20.

[0035] Hence, the ion generation unit cover 85 is not engaged with the decorative case 20, and the engage-

ment portions of the ion generation unit cover 85 become invisible from the outside of the transparent or translucent decorative case 20. In such a way, the exterior appearance of the portion of the decorative case 20 is made favorable, whereby the commercial value thereof can be further enhanced.

[0036] In the hair dryer 1 with such a configuration, the fan 61 rotates by turning on the switch SW, and the air is introduced into the wind tunnel portion 2. Then, the air introduced from the air inlet port 2a is blown out toward the hair from the air blower port 2b. Note that such a blown wind can be switched between a hot wind and a cold wind by turning on and off the heater, whereby styling and drying of the hair can be arbitrarily performed. Moreover, the ion generation unit 8 is actuated, whereby the negative ions can be discharged toward the hair from the ion discharge port 83 of the ion generation unit 8. In such a way, the gloss and the moist feeling are given to the hair, and the curl of the hair is taken out effectively, and so on.

[0037] As described above in detail, in the hair dryer 1 of this embodiment, on the outside of the porous protection frame body 10 provided on the air inlet port 2a, the mesh-like filter 11 is provided, which divides the opening region (the plurality of openings 10a) of the protection frame body 10 concerned more finely. Therefore, the filter 11 is arranged on the outermost side, whereby the dust can be made less likely to deposit on an edge of the filter 11 concerned. In addition, even if the dust adheres onto the filter 11, it becomes possible to easily remove the dust from the outside, and maintenance of the portion of the air inlet port 2a can be simplified.

[0038] Moreover, in this embodiment, the filter 11 is formed so that the thickness thereof can be thinner than the thickness of the protection frame body 10. Therefore, in comparison with a configuration in which the filter 11 is arranged in the inside of the protection frame body 10 in such a configuration, a step difference between the filter 11 and the protection frame body 10 (in the above-described configuration, a step difference between the protection frame body 10 and the filter 11) can be reduced. Hence, it becomes possible to easily remove, from the outside, dust that accumulates on the step difference, and the dust can be further suppressed from depositing on a portion of the step difference.

[0039] Moreover, the protection frame body 10 of this embodiment is composed of: the plurality of annular frame portions 10b arranged concentrically; and the plurality of linear frame portions 10c extended radially from the substantial center of the air inlet port 2a so as to intersect the annular frame portions 10b concerned. Therefore, the strength of the protection frame body 10 can be enhanced, and in addition, it becomes possible to also ensure the strength of the filter 11 arranged on the outside thereof by ensuring the strength of the protection frame body 10 as described above.

[0040] Furthermore, with regard to the linear frame portions 10c of the protection frame body 10, the inside

linear portions 10cA located in the inside of the annular frame portion 10bA, which serves as the innermost circumferential-side one among the plurality of annular frame portions 10b, and the outside linear portions 10cB located on the outside of the annular frame portion 10bA are arranged so as to be shifted from each other with respect to the linear directions. Hence, an edge is not erected on an intersection of the center portion at the time of the molding, and accordingly, strength of a metal mold can be ensured, and in addition, it becomes possible to arrange the mesh like filter 11 also in the annular frame portion 10bA serving as the innermost circumferential-side one.

[0041] Still further, the honeycomb structure is adopted for the openings 10a of the protection frame body 10, whereby strength of such bar portions can be kept uniform. In addition, a total area of the openings 10a can be further increased. Accordingly, the quantity of the air can be further increased.

[0042] Moreover, in this embodiment, the protection frame body 10 and the mesh-like filter 11 are molded integrally with each other by the synthetic resin material. Accordingly, peeling off of the filter 11 at the time when the cleanup is performed can be prevented more surely. That is to say, in the case where the protection frame body 10 and the mesh-like filter 11 are joined to each other by thermal welding and the like, there is an apprehension that the filter 11 may be peeled off at the time when the cleanup is performed therefor; however, such peeling off can be suppressed in this embodiment. Moreover, the protection frame body 10 and the filter 11 are molded integrally with each other, whereby a sense of togetherness of both thereof is enhanced, thus making it possible to further enhance the exterior appearance thereof.

[0043] Furthermore, in this embodiment, the protection frame body 10 is coupled integrally or tightly to the housing 3 so as to be undetachable therefrom. Accordingly, in comparison with the case where a filter member such as the protection frame body 10 is freely detachably attached to the air inlet port 2a, the number of parts can be reduced, and cost reduction, weight reduction and size reduction can be thereby achieved. That is to say, when the above-described filter member is freely detachably attached to the air inlet port 2a, it is necessary to install still another filter on a depth side in order to prevent the finger and the like from entering the wind tunnel portion 2 in the case of detaching the filter member concerned. In the case where another filter is provided as described above, the filter member adopts a double structure, and accordingly, a cost increase, a weight increase and a size increase, which are caused by an increase of the number of parts, are brought about. However, in this embodiment, these increases can be suppressed. Moreover, the protection frame body 10 is made undetachable, whereby an apprehension is eliminated that the protection frame body 10 concerned may be lost.

[Second Embodiment]

[0044] Next, a description is made of a second embodiment of the present invention with reference to the drawings. Fig. 16 and Fig. 17 are views showing a hair dryer according to this embodiment. Note that, in the description of this embodiment, the same reference numerals are assigned to the same constituent portions as those of the hair dryer 1 of the above-mentioned first embodiment, and a duplicate description is omitted.

[0045] In a similar way to the above-mentioned first embodiment, in a hair dryer 1A of this embodiment, on the outside of the porous protection frame body 10 provided on the air inlet port 2a, the mesh-like filter 11 that divides the protection frame body 10 more finely is arranged.

[0046] Here, a main different point of the hair dryer 1A of this embodiment from the hair dryer 1 of the above-mentioned first embodiment is in that a support frame body 12 with substantially the same shape as that of the protection frame body 10 is further provided on the outside of the mesh-like filter 11. This support frame body 12 sandwiches the mesh-like filter 11 with the protection frame body 10, thereby prevents the filter 11 from being peeled off more surely, and in addition, is located on the outside of the filter 11 and does not allow the filter 11 to be located on the outermost surface, thereby prevents a breakage of the filter 11 owing to rubbing.

[0047] As shown in Fig. 17, with regard to the support frame body 12, openings 12a formed in the support frame body 12 concerned correspond to the openings 10a of the protection frame body 10, and a shape thereof is substantially the same as the shape of the openings 10a. That is to say, the support frame body 12 includes annular frame portions 12b and linear frame portions 12c, which are similar to those of the protection frame body 10. Then, the openings 10a and 12a of these protection frame body 10 and support frame body 12 are arranged so as to be allowed to substantially coincide with an inflow direction of the air.

[0048] In this embodiment, the support frame body 12 is formed of a synthetic resin material in a similar way to the protection frame body 10 and the mesh-like filter 11, and these protection frame body 10, filter 11 and support frame body 12 are adapted to be molded integrally with one another.

[0049] Moreover, the support frame body 12 is formed so that a thickness thereof can be thinner than the thickness of the protection frame body 10, and preferably, the support frame body 12 is formed at a thickness of approximately 0.2 mm while the thickness of the protection frame body 10 is approximately 1.5 mm. That is to say, in the case where the thickness of the support frame body 12 is set at 0.2 mm or less, or the support frame body 12 is not provided, the mesh-like filter 11 becomes prone to be broken owing to the rubbing. Meanwhile, if the thickness of the support frame body 12 is thickened too much, then the dust becomes prone to accumulate on the edge

of the filter 11, and there is an apprehension that it may become impossible to obtain the effect unique to this application, in which the dust is less likely to deposit, and the dust can be easily removed even if the dust adheres. Hence, if the support frame body 12 is formed at the thickness of approximately 0.2 mm, then the hair dryer 1A can be provided, which is capable of obtaining the unique effect, that is, simplifying the maintenance of the portion of the air inlet port 2a while suppressing the breakage of the filter 11.

[0050] Note that, in a similar way to the above-mentioned first embodiment, the protection frame body 10 of this embodiment is coupled integrally or tightly to the housing 3 so as to be undetachable therefrom. That is to say, in this embodiment, the mesh-like filter 11 and the support frame body 12, which are molded integrally with the protection frame body 10, are also made undetachable from the housing 3.

[0051] With the configuration described above, in accordance with the hair dryer 1A of this embodiment, in a similar way to the above-mentioned first embodiment, the mesh-like filter 11 that divides the opening region (the plurality of openings 10a) of the porous protection frame body 10 more finely is arranged on the outside of the protection frame body 10 concerned. Accordingly, the dust can be made less likely to deposit on the edge of the filter 11.

[0052] Moreover, in this embodiment, more on the outside of the mesh-like filter 11, the porous support frame body 12 with substantially the same shape as that of the protection frame body 10 is provided. Accordingly, the protection frame body 10 can be reinforced by the support frame body 12. Then, the openings 10a and 12a of these protection frame body 10 and support frame body 12 are arranged so as to be allowed to substantially coincide with the inflow direction of the air. Accordingly, the quantity of the air can be suppressed from being reduced while increasing the strength of the protection frame body 10.

[0053] Still further, the support frame body 12 is formed so that the thickness thereof can be thinner than the thickness of the protection frame body 10. Accordingly, while suppressing the breakage of the filter 11, it can be facilitated to remove the dust from the outside of the support frame body 12 even if the dust adheres onto the filter 11. That is to say, though the dust deposits on the filter 11 in the inside of the support frame body 12, which becomes the step difference, the step difference concerned can be reduced more than the conventional one by the support frame body 12 formed thinner than the protection frame body 12, and it can be facilitated to remove the dust deposited on the filter 11.

[0054] Moreover, the support frame body 12 is molded integrally with the protection frame body 10 and the mesh-like filter 11, whereby the filter 11 can be prevented from being peeled off more surely. Furthermore, the outside of the filter 11 can be covered with the support frame body 12, and accordingly, the breakage of the filter 11 owing to the rubbing and the like can be suppressed, and

durability of the filter 11 can be enhanced.

[Third Embodiment]

[0055] Fig. 18 to Fig. 20 are views showing a third embodiment of the hair care device according to the present invention. In this embodiment, a description is made by taking a hair dryer 100 as an example of the hair care device. Note that Fig. 18 and Fig. 19 only show a body portion of the hair dryer 100, from which a brush portion is detached, and in Fig. 19, reference symbol Fr denotes the forward direction, and reference symbol Up denotes the upward direction. Moreover, in the description of this embodiment, the same reference numerals are assigned to the same constituent portions as those of the hair dryer 1 of the above-mentioned first embodiment, and a duplicate description is omitted.

[0056] As shown in Fig. 18 and Fig. 19, the hair dryer 100 of this embodiment basically has a similar configuration to that of the hair dryer 1 of the first embodiment; however does not have the grip portion, and is used by being directly gripped. In the body portion, the wind tunnel portion 2 including the air blower unit 6 is provided in the inside of the housing 3, and on the air inlet port 2a provided on the rear end portion of the wind tunnel portion 2 concerned, the protection frame body 10, the mesh-like filter 11 and the support frame body 12 are provided as shown in Fig. 20. Note that these protection frame body 10, mesh-like filter 11 and support frame body 12 are formed into shapes matched with the air inlet port 2a of this embodiment.

[0057] Also in this case, preferably, the protection frame body 10, the mesh-like filter 11 and the support frame body 12 are molded integrally with one another by the synthetic resin material. Moreover, preferably, structures of the protection frame body 10 and the support frame body 12 are also made similar to those of the above-mentioned first embodiment, and further, the protection frame body 10 is made undetachable from the housing 3 in advance.

[0058] Moreover, in this embodiment, the cord C connected to the power supply penetrates the respective center portions of the protection frame body 10, the mesh-like filter 11 and the support frame body 12, and is then connected to the inside of the housing 3. Moreover, in Fig. 19, a heater device H is provided downstream of the air blower unit 6, and the switch SW that controls ON/OFF, the quantity of the air and a temperature of the hot wind is provided on a side surface of the body portion.

[0059] Then, in this embodiment, the air blower port 2b is provided on the front end portion of the wind tunnel portion 2 in a similar way to the above-mentioned first embodiment, and this air blower port 2b serves as an attachment hole to which a brush (not shown) is freely detachably fitted.

[0060] Moreover, also in this embodiment, the ion generation unit 8 is provided on the upper part of the wind tunnel portion 2 in a similar way to the above-mentioned

first embodiment, and the portion that covers this ion generation unit 8 is composed of a decorative case 20A. As shown in the first embodiment, in this decorative case 20A, a decorative portion 21 formed into a diamond cut shape by a thickness change is naturally provided on a back surface thereof. The decorative portion 21 is subjected to metallic painting arbitrarily according to needs.

[0061] Hence, in order to use the brush-added hair dryer 1A of this embodiment, the brush (not shown) is attached to the air blower port 2b, and the switch SW is turned on. In such a way, the wind such as the cold wind and the hot wind is blown out from the air blower port 2b in a similar way to the hair dryer 1 of the first embodiment. The wind thus blown out passes through an inside of the brush, and is blown out from a surface on which bristles of the brush are formed. In such a way, the wind can be blown to the hair while combing the hair by the brush. Also in this case, the negative ions are discharged toward the hair from the ion generation unit 8, whereby the gloss and the moist feeling can be given to the hair, and the curl of the hair can be taken out effectively.

[0062] With the configuration described above, in accordance with the brush-added hair dryer 100 of this embodiment, in a similar way to the hair dryer 1 of the above-mentioned first embodiment, the protection frame body 10, the mesh-like filter 11 and the support frame body 12 are provided on the air inlet port 2a. In such a way, there can be exerted such functions and effects, which are similar to those of the first embodiment, that the dust can be made less likely to deposit, that it becomes possible to easily perform the cleanup, and so on.

[0063] Naturally, also in this embodiment, only the protection frame body 10 and the mesh-like filter 11 may be provided on the air inlet port 2a by excluding the support frame body 12.

[0064] The description has been made above of the preferred embodiments of the present invention; however, the present invention is not limited to the above-mentioned embodiments, and is modifiable in various ways.

[0065] For example, the present invention can also be applied to the hair dryers 1, 1A and 100 in which the ion generation unit 8 is not provided. Moreover, the present invention can be applied to hair care devices other than the hair dryers 1 and 1A and the brush-added hair dryer 100 as long as the hair care devices concerned can perform the styling and maintenance of the hair.

Claims

1. A hair care device (1) comprising:

a housing (3) in an inside of which an air flow passage (W) is formed;
an air inlet port (2a) provided on an upstream end portion of the air flow passage (W), and an air blower port (2b) provided on a downstream end portion of the air flow passage (W) ;

an air blower unit (6) that discharges air from the air blower port (2b), the air being sucked from the air inlet port (2a) ;

a porous protection frame body (10) that finely divides an opening region of the air inlet port (2a), the protection frame body (10) being provided on the air inlet port (2a); and

a mesh-like filter (11) that divides the opening region of the protection frame body (10) more finely, the filter (11) being arranged on an outside of the protection frame body (10) .

2. The hair care device (1) according to claim 1, wherein the filter (11) is formed so that a thickness thereof can be thinner than a thickness of the protection frame body (10).
3. The hair care device (1) according to claim 1, wherein the protection frame body (10) is composed of a plurality of annular frame portions (10b) arranged concentrically, and of a plurality of linear frame portions (10c) extended radially from a substantial center of the air inlet port (2a) to intersect the annular frame portions (10b).
4. The hair care device (1) according to claim 3, wherein, in the linear frame portions (10c), inside linear portions (10cA) located in an inside of the annular frame portion (10bA) serving as an innermost circumferential-side one among the plurality of annular frame portions (10b) and outside linear portions (10cB) located on an outside of the annular frame portion (10bA) are arranged to be shifted from each other with respect to linear directions.
5. The hair care device (1) according to claim 1, wherein the protection frame body (10) is formed so that an opening shape of the protection frame body (10) can adopt a honeycomb structure.
6. The hair care device (1) according to claim 1, wherein the protection frame body (10) and the filter (11) are molded integrally with each other by a synthetic resin material.
7. The hair care device (1A) according to claim 1, wherein a porous support frame body (12) with substantially a same shape as a shape of the protection frame body (10) is provided on an outside of the filter (11), and openings (10a, 12a) of the protection frame body (10) and the support frame body (12) are arranged to be allowed to substantially coincide with an inflow direction of the air.
8. The hair care device (1A) according to claim 7, wherein the support frame body (12) is formed so that a thickness thereof can be thinner than a thick-

ness of the protection frame body (10) .

9. The hair care device (1A) according to claim 7, wherein the protection frame body (10), the filter (11) and the support frame body (12) are molded integrally with one another by a synthetic resin material. 5
10. The hair care device (1) according to claim 1, wherein the protection frame body (10) is coupled integrally or tightly to the housing (3) to be undetachable therefrom. 10

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FIG. 1

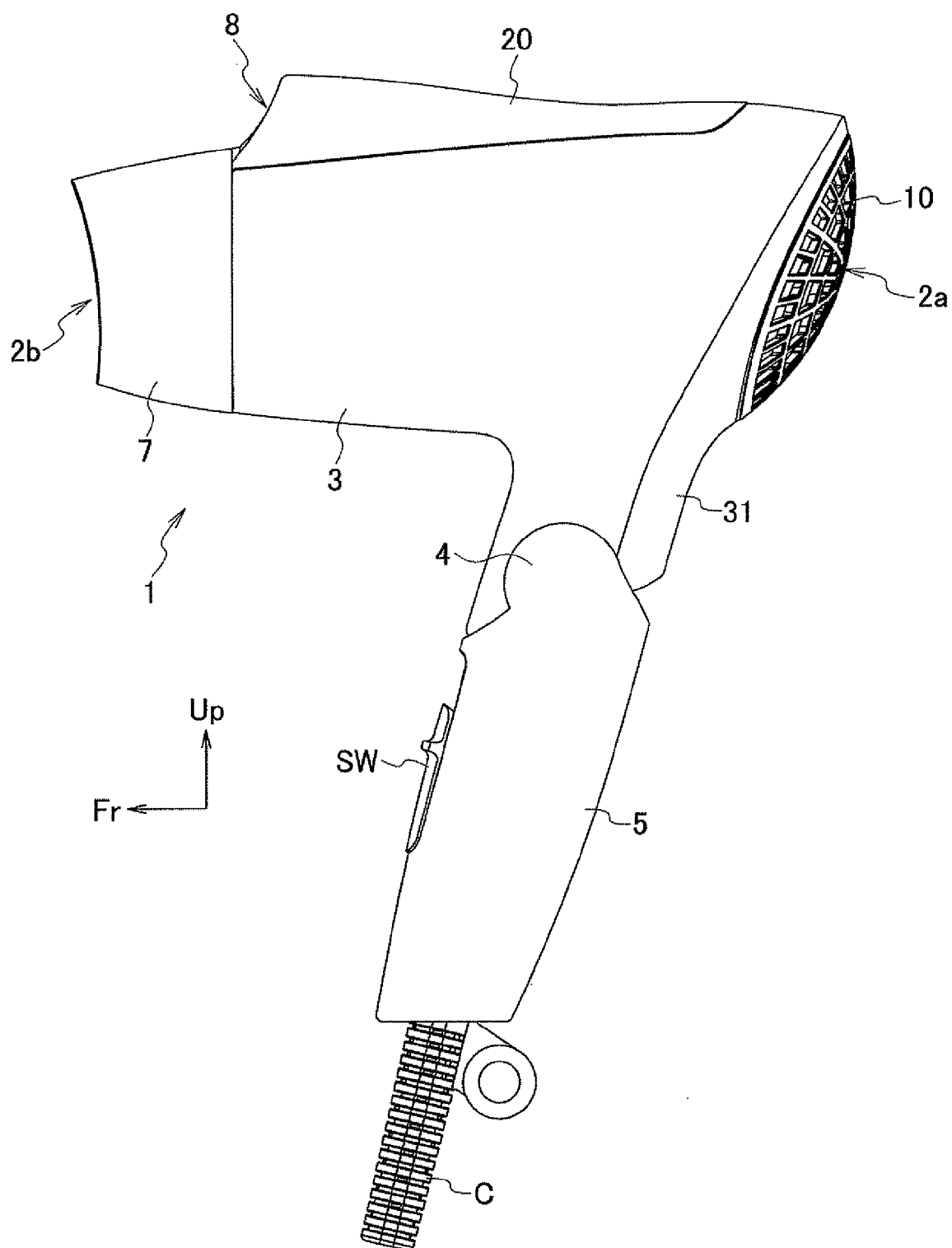


FIG. 2

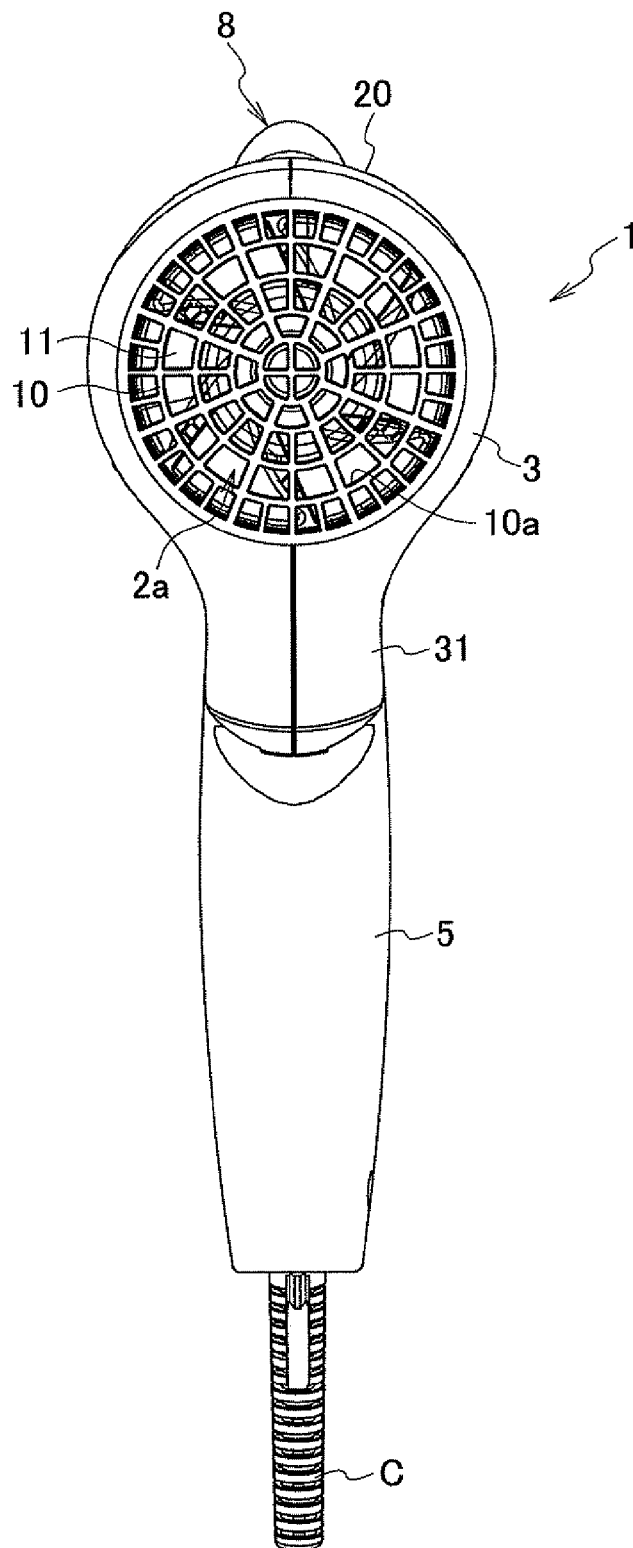


FIG. 3

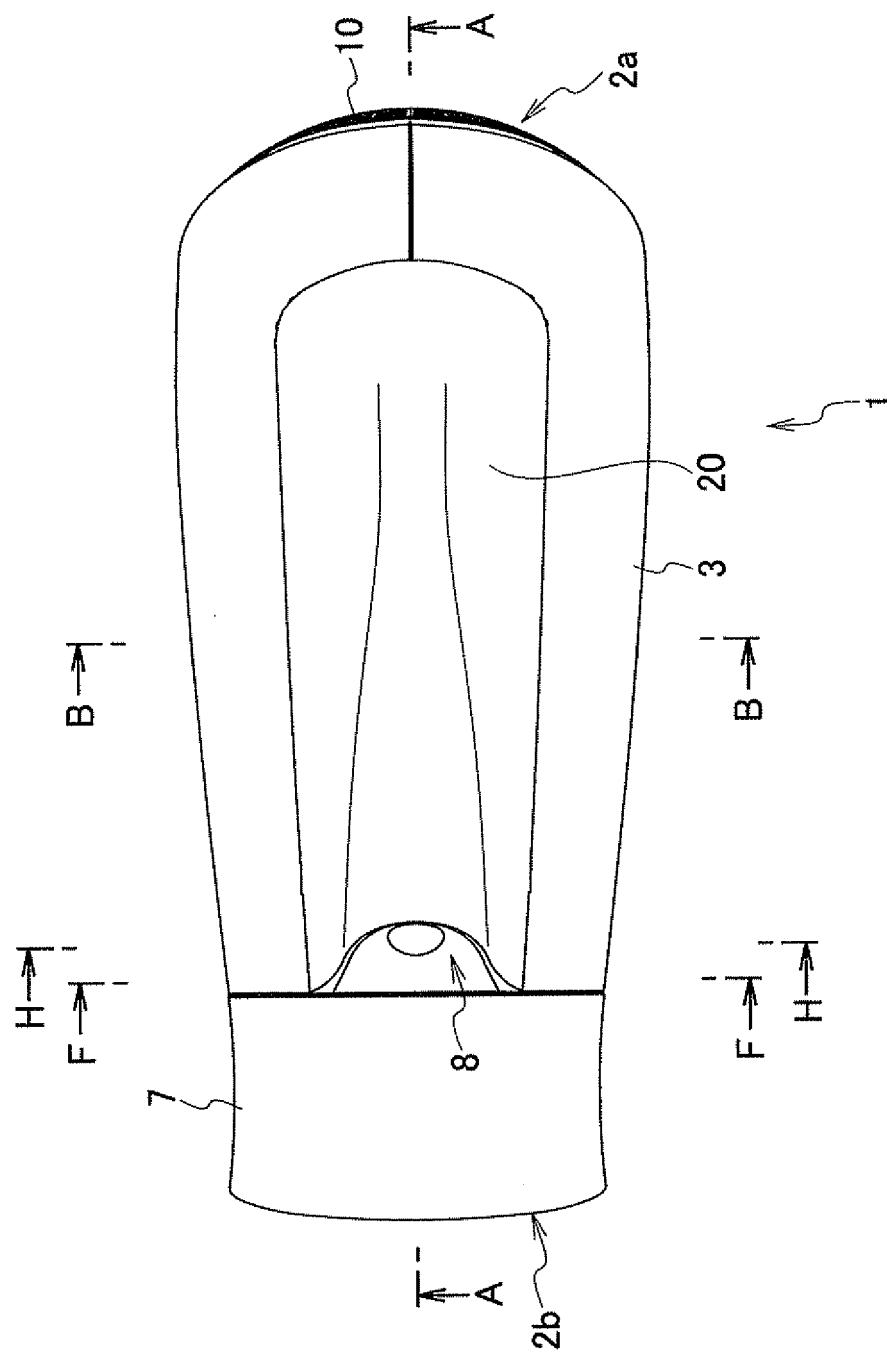


FIG. 4

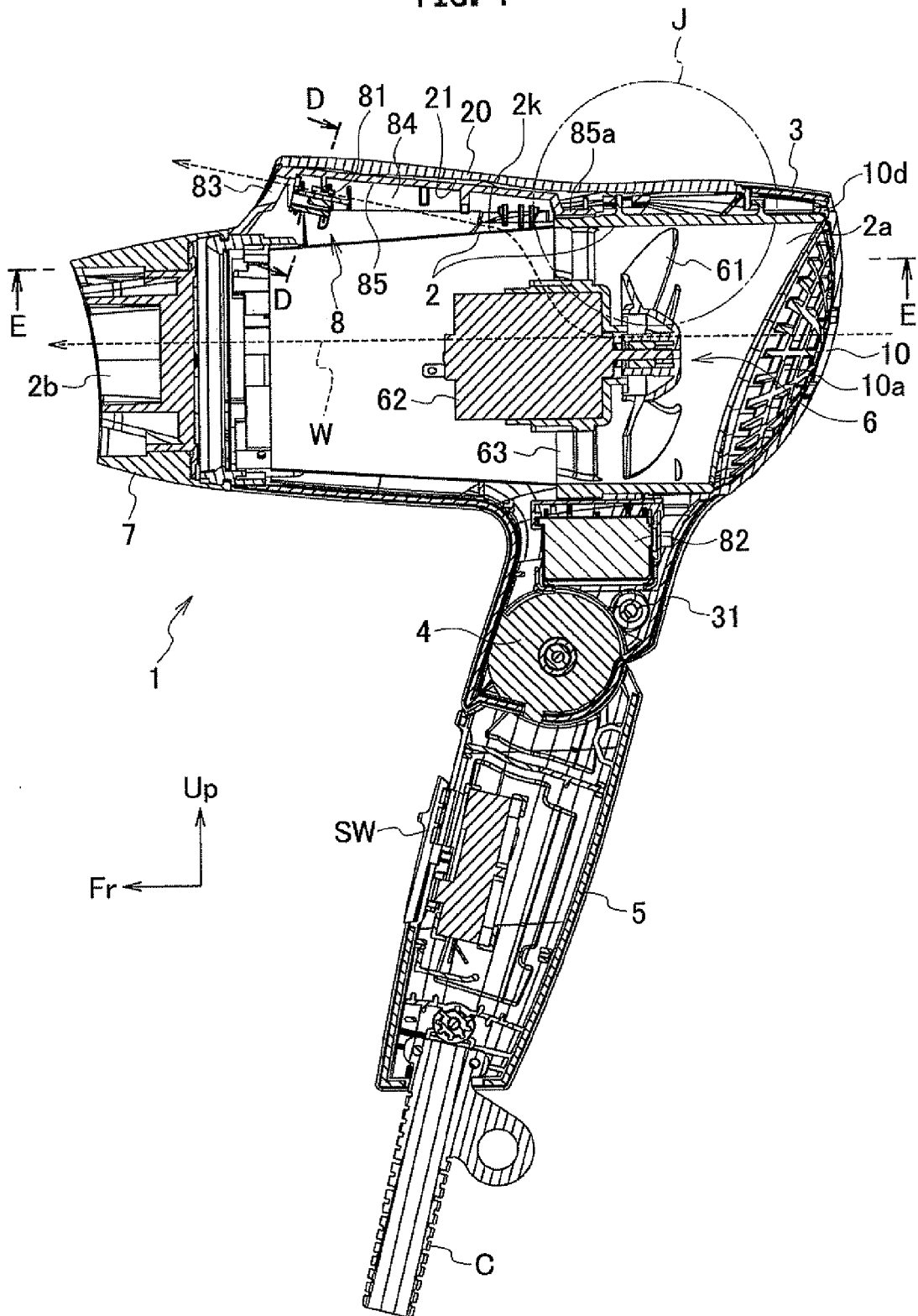


FIG. 5

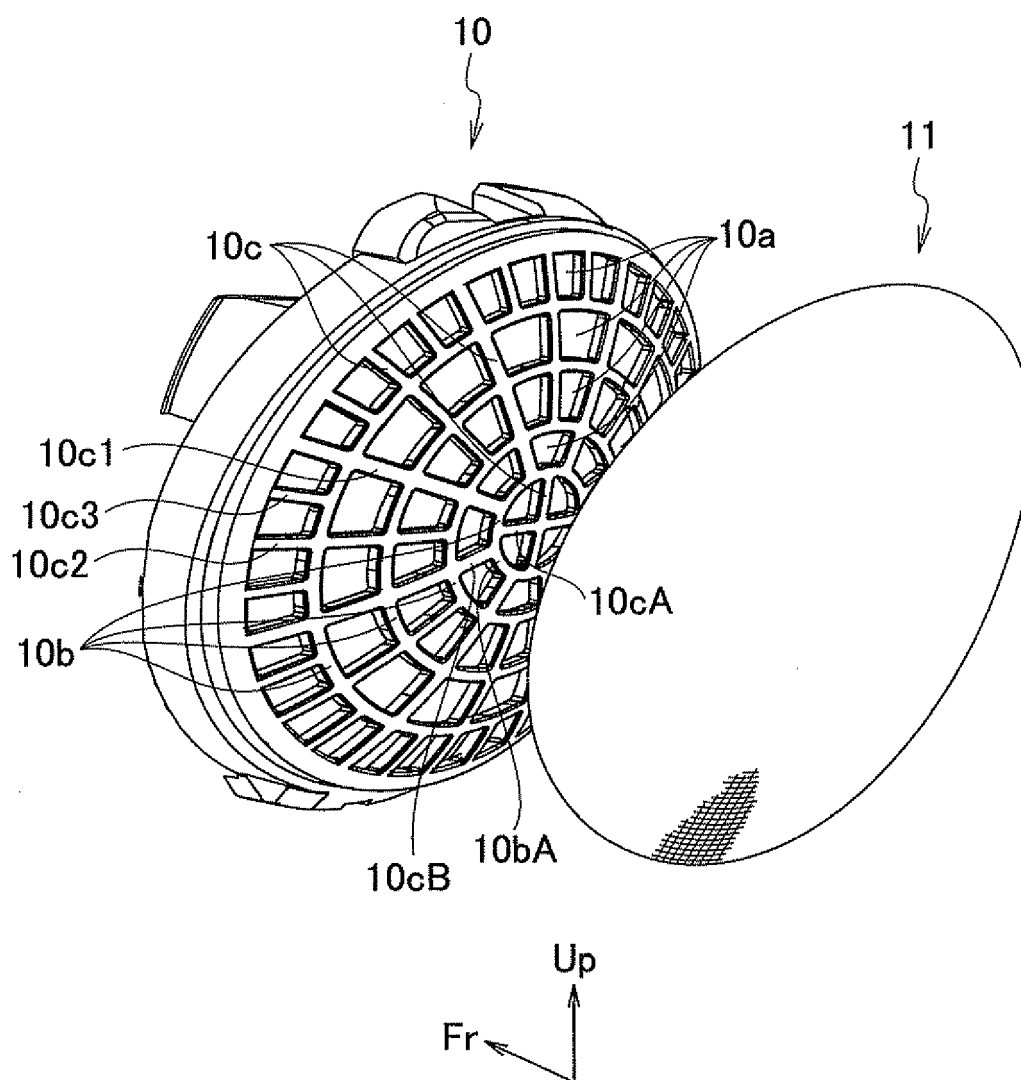


FIG. 6

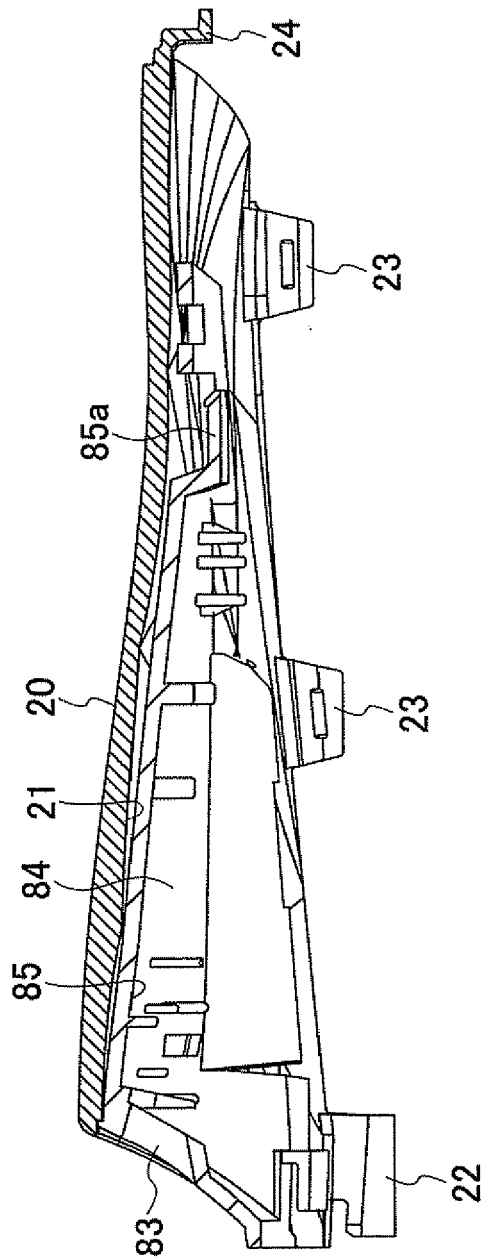


FIG. 7

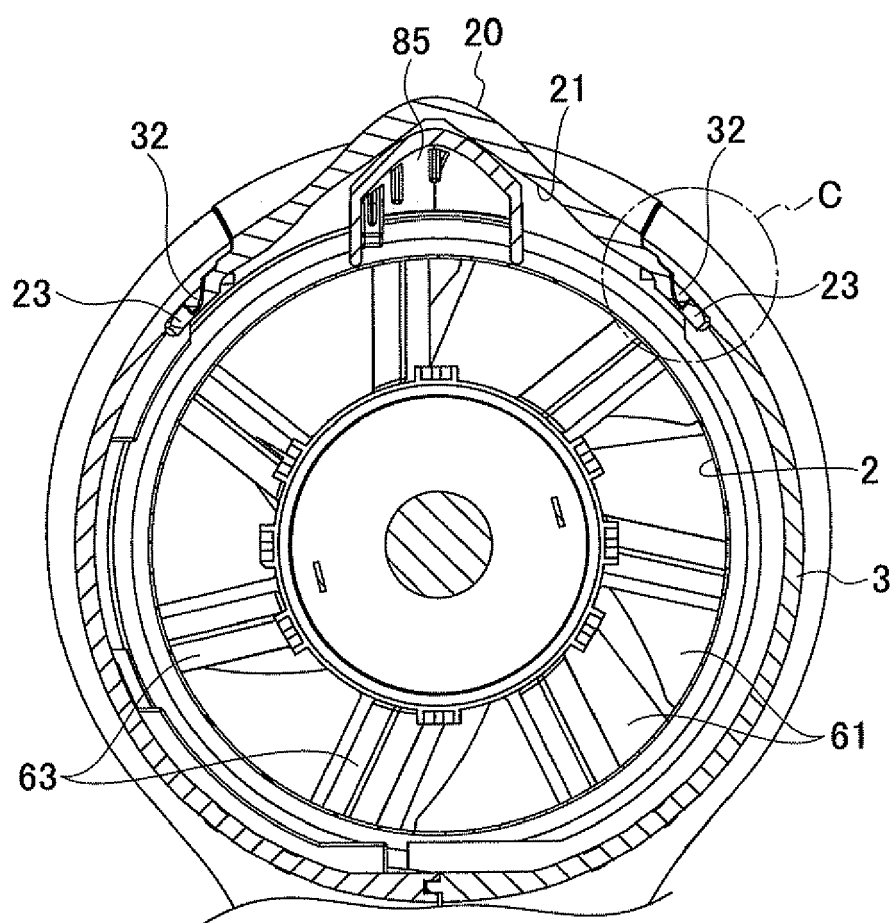


FIG. 8

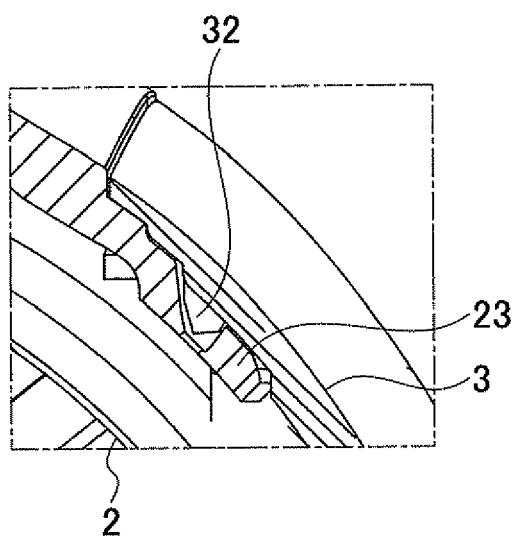


FIG. 9

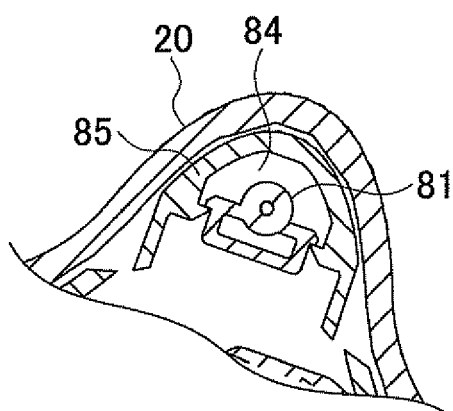


FIG. 10

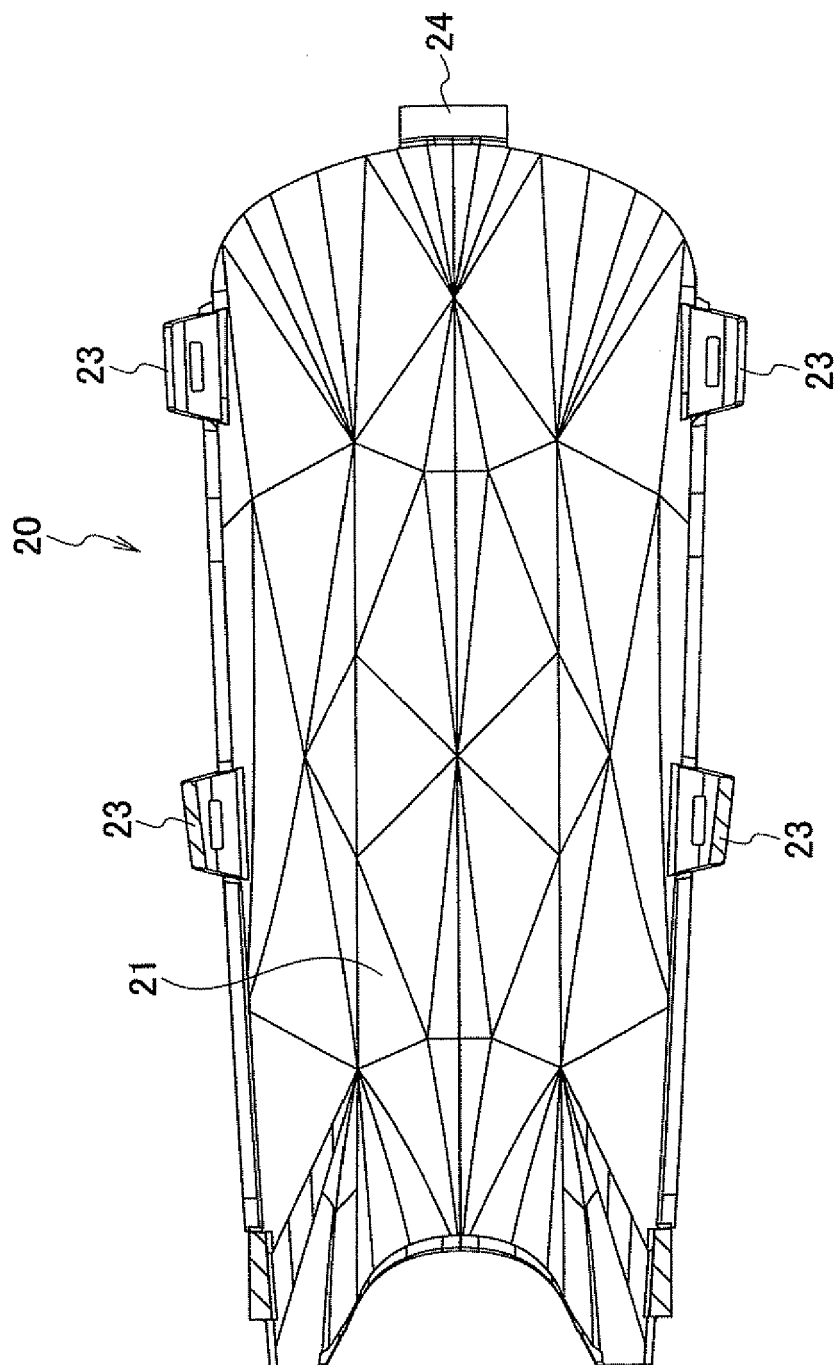


FIG. 11

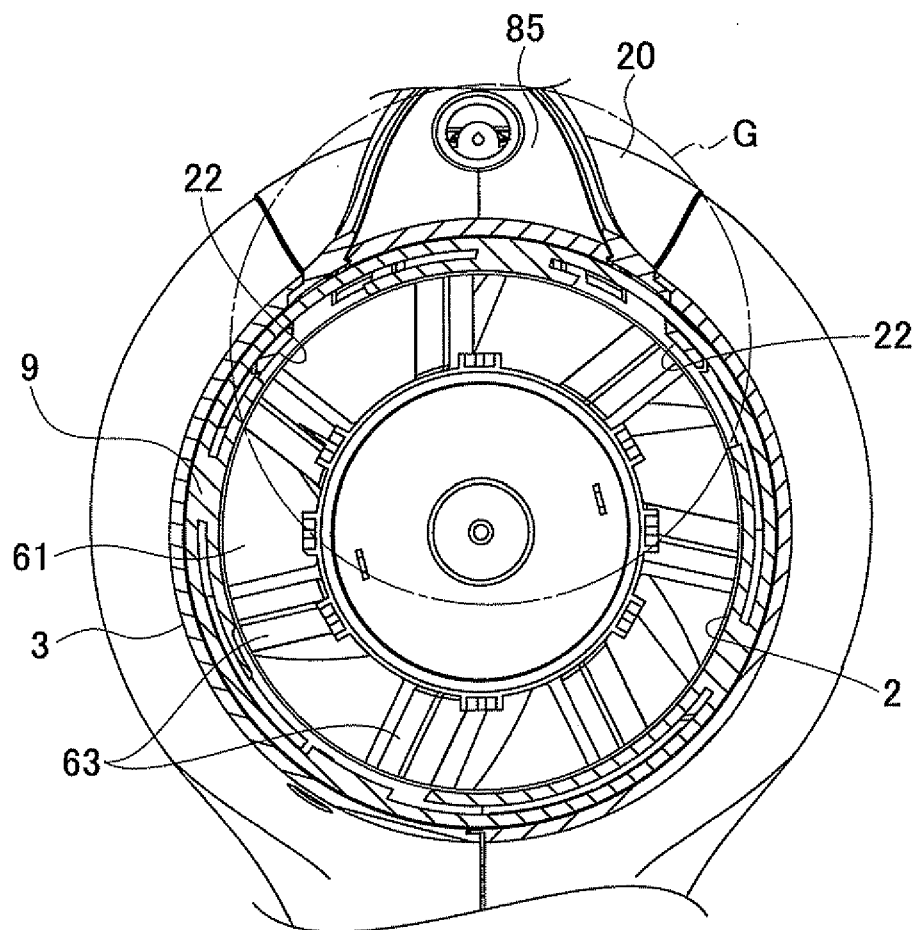


FIG. 12

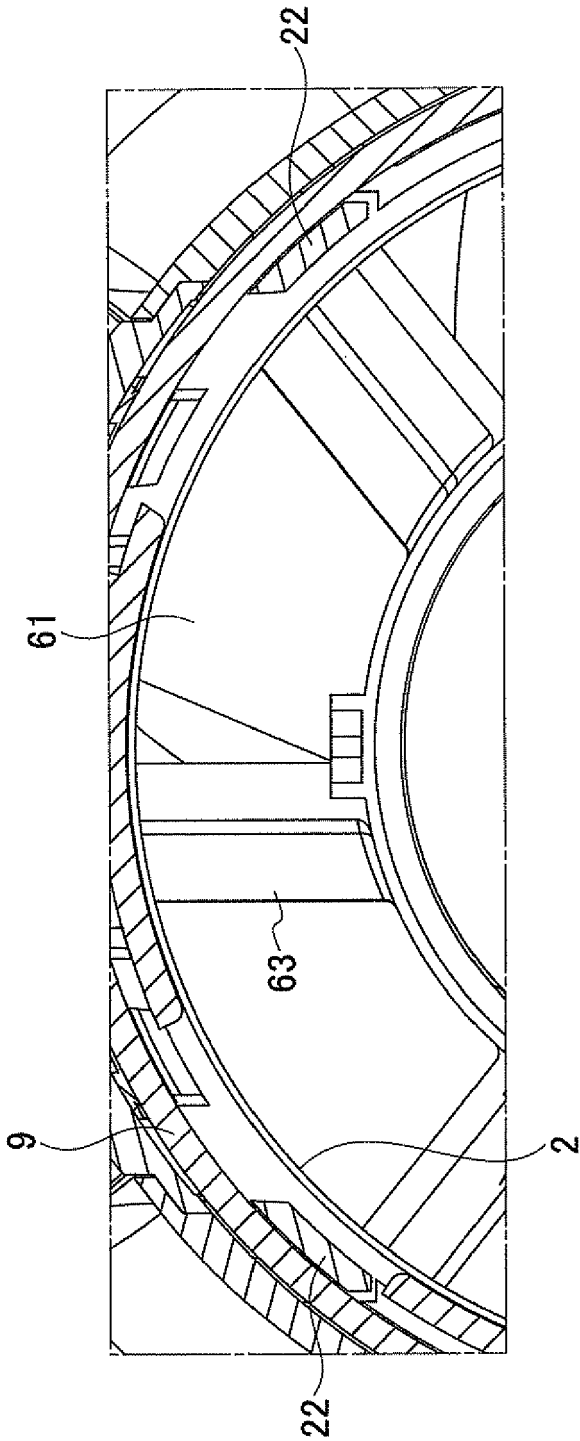


FIG. 13

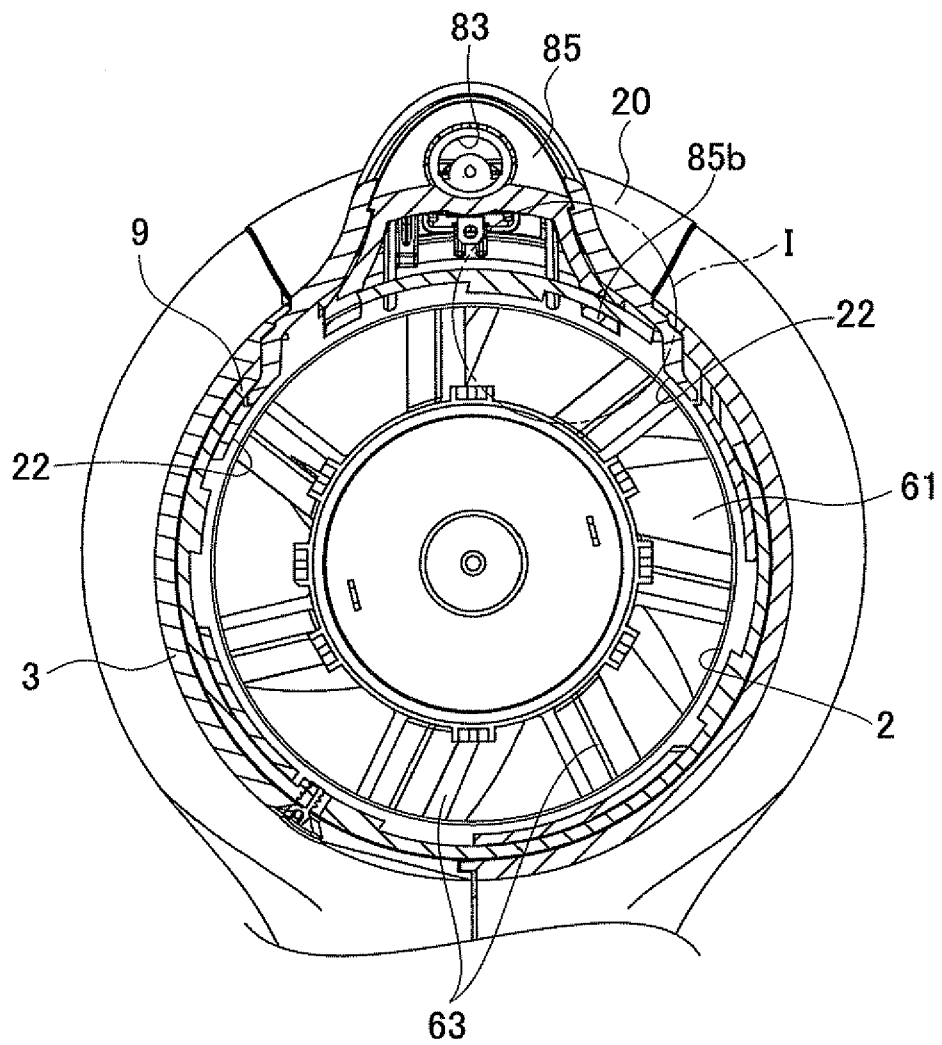


FIG. 14

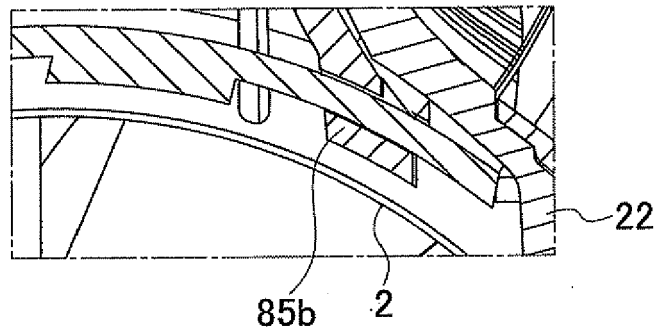


FIG. 15

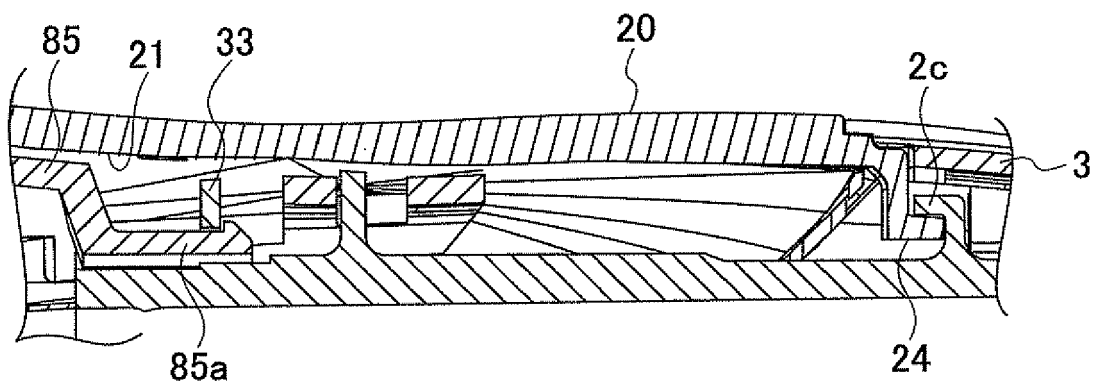


FIG. 16

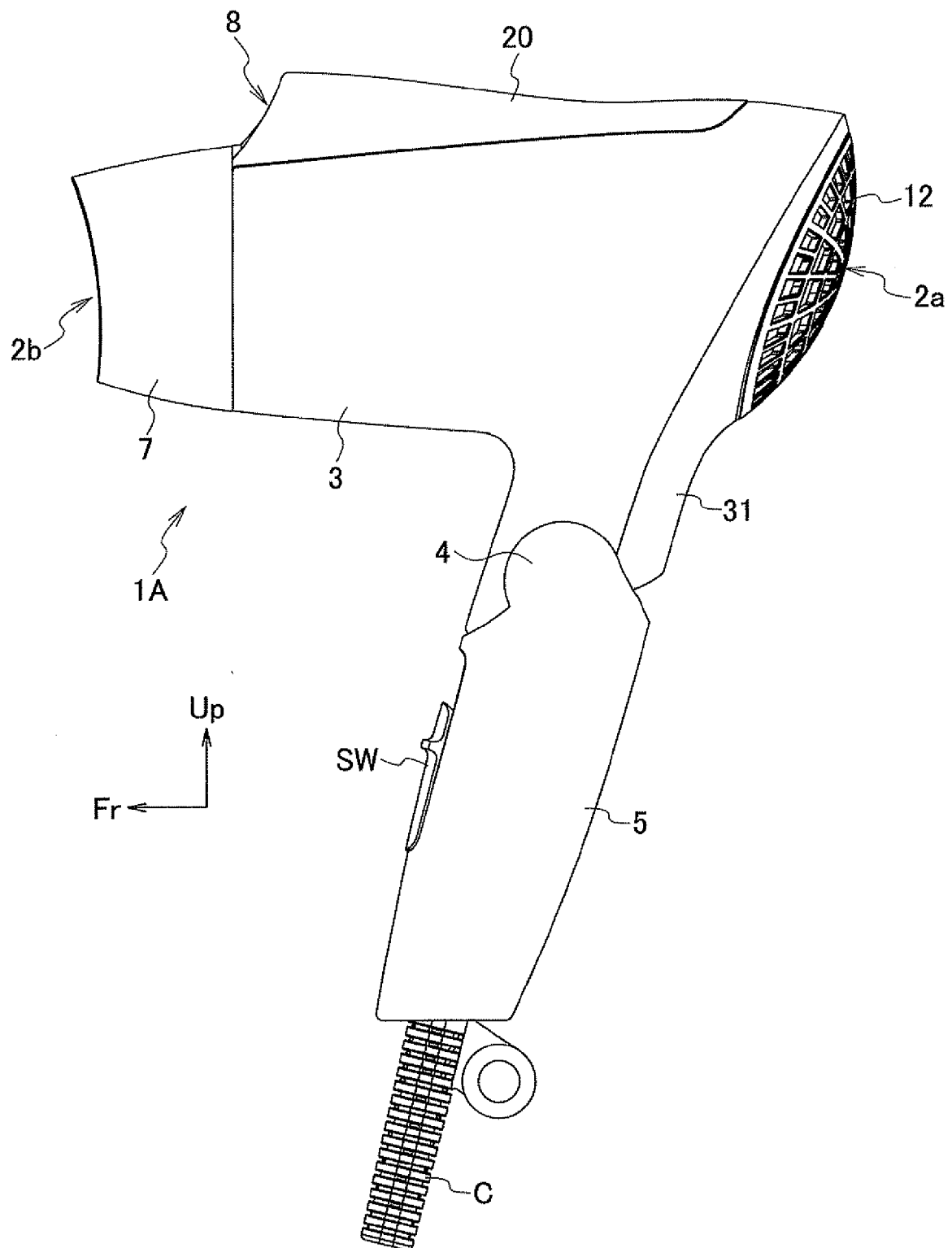


FIG. 17

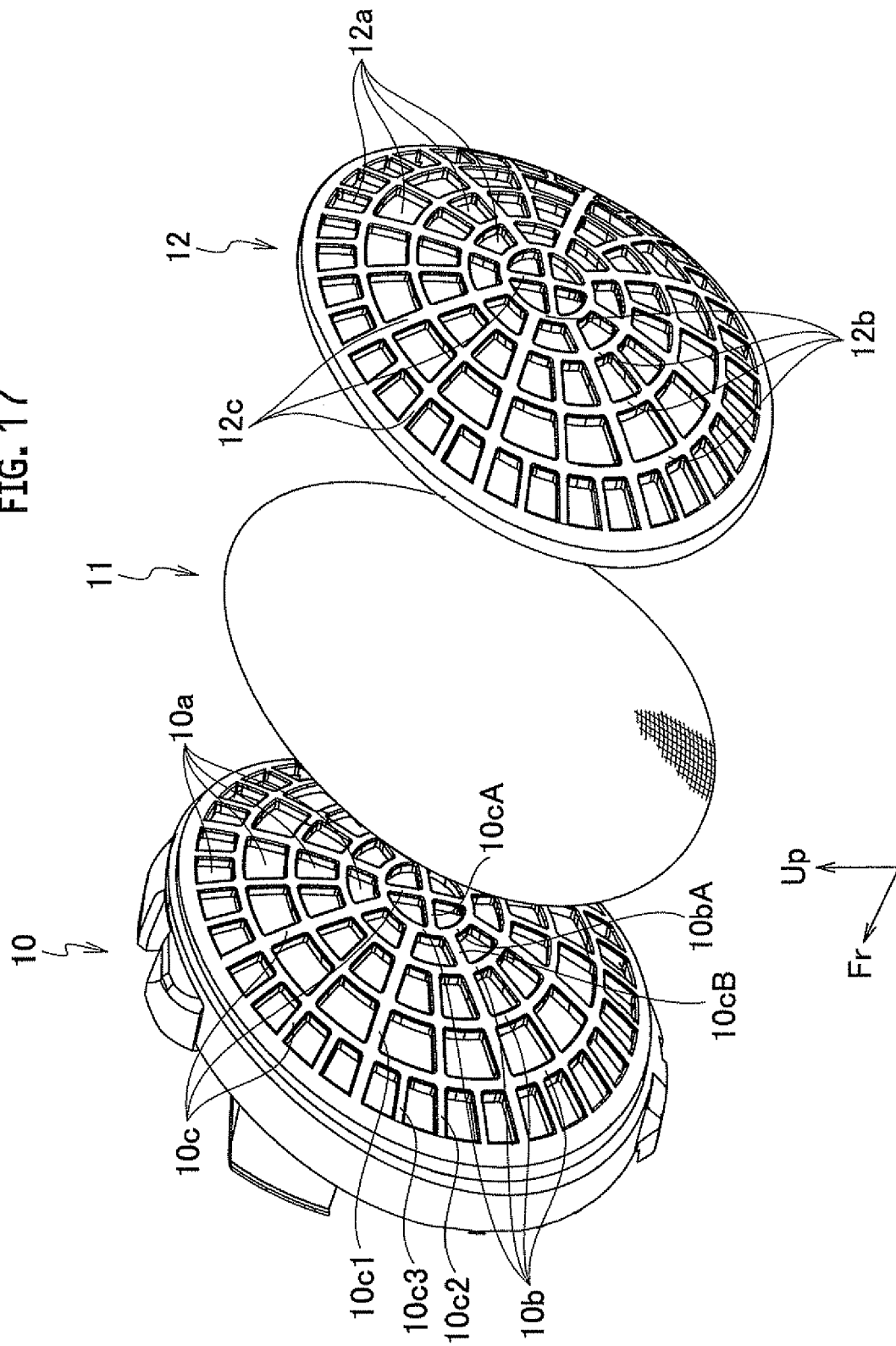


FIG. 18

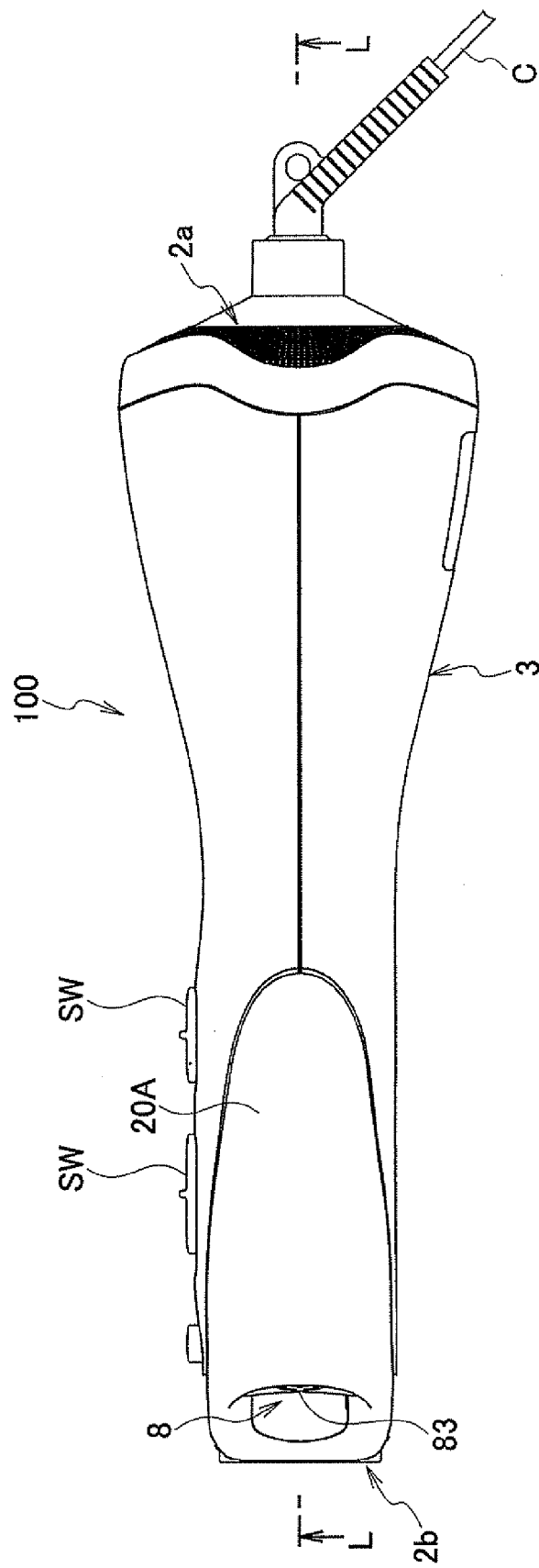


FIG. 19

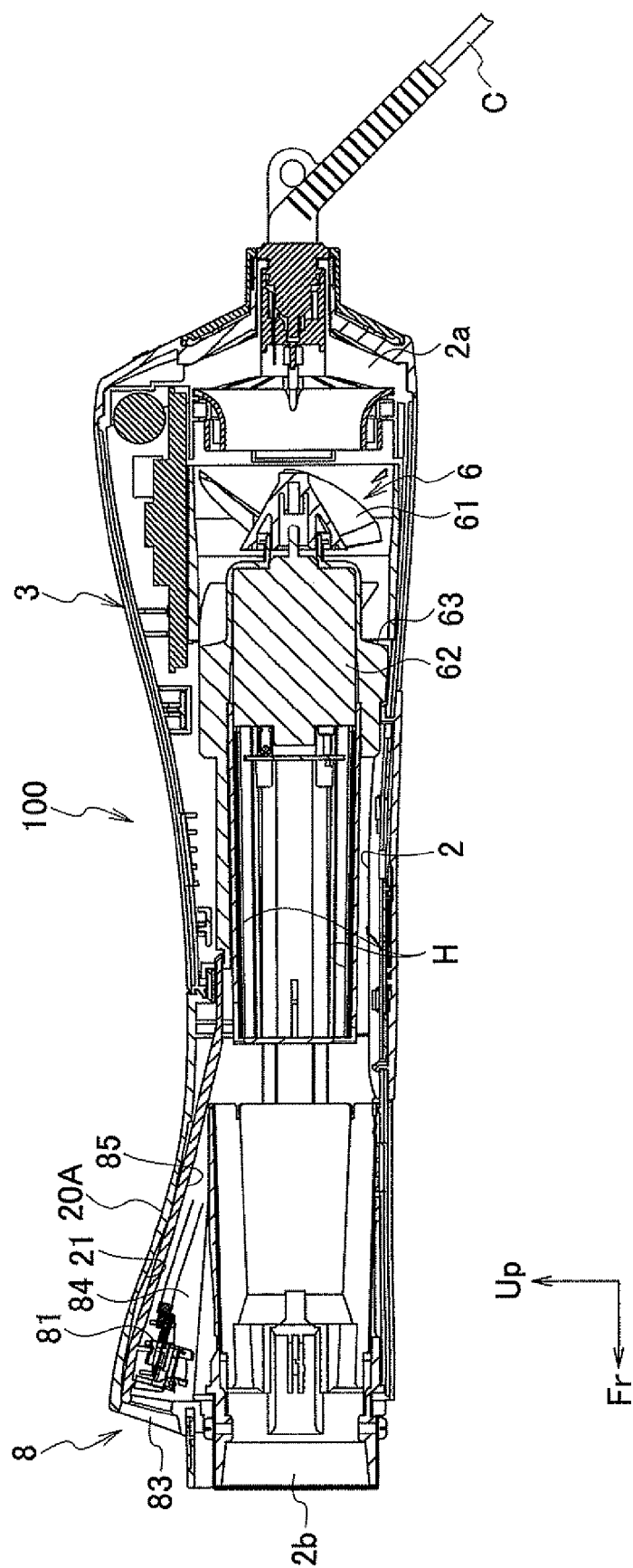
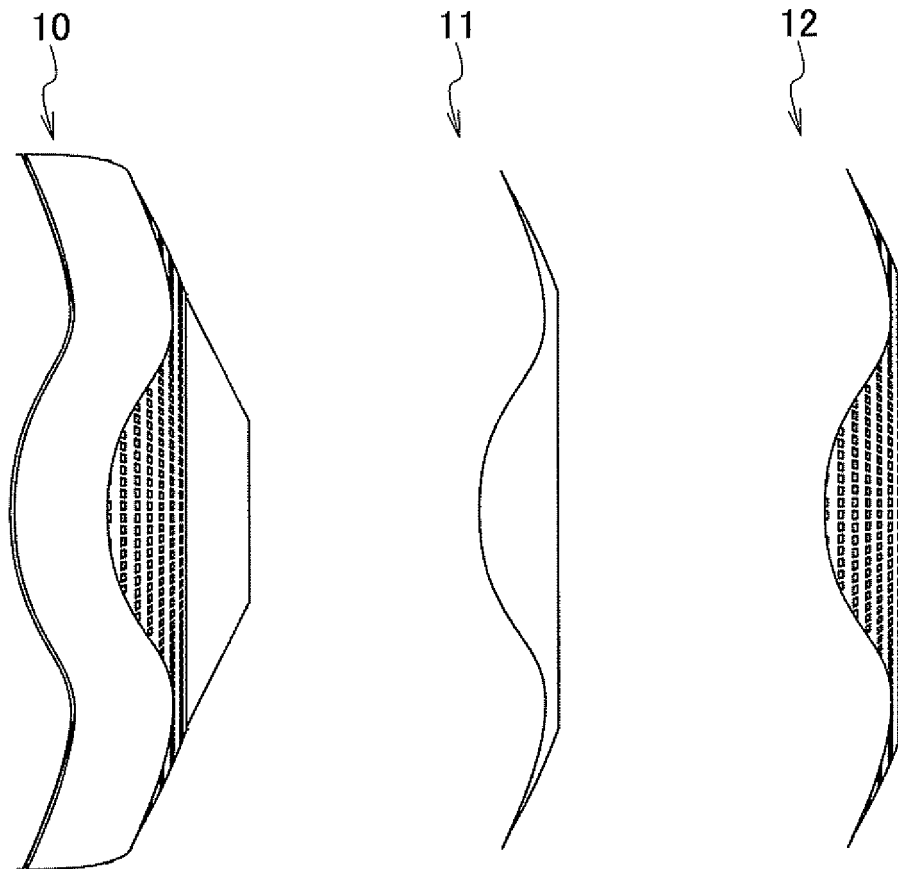


FIG. 20





EUROPEAN SEARCH REPORT

Application Number
EP 11 16 6919

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X	EP 2 002 752 A2 (MATSUSHITA ELECTRIC WORKS LTD [JP] PANASONIC ELEC WORKS CO LTD [JP]) 17 December 2008 (2008-12-17) * paragraphs [0007] - [0015], [0018] - [0020], [0022], [0023], [0028]; figures 1-8 *	1-5,7,8, 10	
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			A45D B01D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 July 2011	Examiner Ionescu, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

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13-07-2011

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