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(54) **AIR CLEANER**

LUFTREINIGER

EPURATEUR D'AIR

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(73) Proprietor: **Midori Anzen Co., Ltd.**
Tokyo 150-0012 (JP)

(72) Inventors:
- **TOIDA, Kiyoshi**
  Shibuya-ku, Tokyo 150 (JP)
- **NOZAWA, Makoto**
  Shibuya-ku, Tokyo 150 (JP)
- **TAKAHASHI, Daisuke**
  Shibuya-ku, Tokyo 150 (JP)

(74) Representative: **Bibby, William Mark et al**
Mathisen, Macara & Co.,
The Coach House,
6-8 Swakeleys Road
Ickenham Uxbridge UB10 8BZ (GB)

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Description

Field of the Invention

[0001] The present invention relates to an air cleaning apparatus for collecting electrically particles floating in an air such as dusts, bacteria and odor substances.

Brief Description of the Drawings

[0002]

Fig. 1 is a cross sectional view showing a known air cleaning apparatus.
Fig. 2 is a cross sectional view illustrating another known air cleaning apparatus.
Fig. 3 is a lateral cross sectional view depicting a first embodiment of the air cleaning apparatus according to the invention.
Fig. 4 is a perspective view showing a casing.
Fig. 5 is a perspective view depicting a discharge electrode member.
Fig. 6 is a perspective view illustrating a counter electrode member.
Fig. 7 is a perspective view showing a high-tension electrode member.
Fig. 8 is a lateral cross sectional view depicting a second embodiment of the air cleaning apparatus according to the invention.
Fig. 9 is a perspective view illustrating ionizer and collector.
Fig. 10 is a perspective view depicting a discharge electrode member.
Fig. 11 a perspective view showing a counter electrode member.
Fig. 12 is a perspective view illustrating a high-tension electrode member.
Fig. 13 is a perspective view explaining an application of the air cleaning apparatus according to the invention.
Fig. 14 is a side view representing the application.
Fig. 15 is a side view showing an application.
Fig. 16 is a perspective view illustrating an application.
Fig. 17 is a perspective view showing an application.
Fig. 18 is a perspective view depicting an application.

Background Technique

[0003] In a conventional air cleaning apparatus, air inlet openings 1a are formed in one side wall of an elongated casing 1 and air outlet openings 1b are formed in a top wall of the casing as shown in Fig. 1. Within the casing 1, there is provided a fan 2 for making an air stream introduced from the air inlet openings 1a and exhausted from the air outlet openings 1b. A charging and collecting section 3 for electrostatically charging particles in the air stream and collecting the thus charged particles is arranged at a lower portion of the casing. Further, behind the charging and collecting section 3, is arranged a duct 4 for introducing an air into the fan 2.

[0004] As illustrated in Fig. 2, there has been another known air cleaning apparatus, in which air inlet openings 5a are formed in a bottom wall of an elongated casing 5 and air outlet openings 5b are formed in a top wall of the casing 5. Also in this air cleaning apparatus, a fan 6 is provided in an upper portion of the casing 5 and a charging and collecting section 7 is arranged in a bottom portion of the casing.

[0005] In the known air cleaning apparatus shown in Fig. 1, the duct 4 is provided behind the charging and collecting section 3, and therefore a miniaturization is difficult. Moreover, a direction of the air stream is abruptly changed by the duct 4, there is also a problem that a pressure loss is large. In the known air cleaning apparatus illustrated in Fig. 2, since a width of the air inlet openings 5a is small, an air flow rate is limited. In these known apparatuses, since the elongated casing 1, 5 is used and the fan 2, 6 and charging and collecting section 3, 7 are arranged in the upper and lower portions of the elongated casing, respectively, the apparatus is liable to be turned and the miniaturization is difficult.

[0006] JPA2181094 describes an air cleaning apparatus comprising a first inlet opening and a second inlet opening, an outlet opening communicating with these inlet openings, a casing forming an airflow path extending from said first inlet opening to said outlet opening for cleaning air and an airflow path extending from said second inlet opening to said outlet opening for causing airflow, a fan provided in between said individual airflow path, an air cleaner provided in said airflow path, and a shutter provided between said airflow path for cleaning air and said air flow path for causing air flow. US 4,344,776 describes an electrostatic air filter comprising a housing, an air inlet and an air outlet in the housing, air transfer means for transferring air from the inlet to the outlet through an airflow path, air ionizing means located in the air path for generating and introducing charged ions into the throughflowing air and a disposable, electrically conductive air filter mat located and replaceably supported adjacent the outlet.

[0007] It is an object of the present invention to provide an air cleaning apparatus, in which the above mentioned problems can be removed by making the apparatus compact and by flowing the air stream in a smooth manner.

Disclosure of the Invention

[0008] According to the invention, there is provided an air cleaning apparatus comprising a casing having air inlet openings and air outlet openings, a fan provided within said casing and flowing an air stream from said air inlet openings to said air outlet openings; and a

charging section arranged between said air inlet openings and said fan for charging particles in the air stream; and a collecting section arranged at a downstream position with respect to said charging section; wherein said charging section consists of a plurality of discharge electrode plates (21 b) and a plurality of the first counter electrode plates (22b), said collecting section consists of high-tension electrode plates (23b) and the second counter electrode plates (22c), a lateral cross section of said charging section and said collecting section are arranged to surround said fan in a substantially arcuate configuration, said high-tension electrode plates (23b) and said second counter electrode plates (22c) of said collecting section are formed in the direction perpendicular to the axis of rotation of said fan, and these electrode plates are arranged alternatively in parallel with each other in the direction parallel to the axis of rotation of said fan.

Best Mode of Carrying out the Invention

[0009] The present invention will be explained in detail with reference to embodiments shown in Figs. 3-18.

[0010] Fig. 3 is a lateral cross section showing a first embodiment of the air cleaning apparatus 10 according to the invention. Within a casing 11 having a semicircular cross section and a substantially semi-cylindrical shape as a whole, there are arranged an ionizer 12 constituting a charging section, a collector 13 constituting a collecting section, an ozone decomposing filter 14 divided into a plurality of parts and a fan 15 including a driving motor not shown, said parts being arranged in this order viewed from an upper portion. The ionizer 12 and collector 13 are connected to a voltage applying means not shown, and the ionizer 12, collector 13 and voltage applying means are connected to a controlling means also not shown. The ionizer 12 is constructed by a combination of a discharge electrode member 21 and a counter electrode member 22, and the collector 13 is composed of a combination of the counter electrode member 22 and a high-tension electrode member 23 and is arranged to surround the fan 15. The ozone decomposing filter 14 is also arranged to surround the fan 15, but it may be constructed as a single integral curved body.

[0011] As illustrated in a perspective view of Fig. 4, the casing 11 comprises a flat bottom plate 11a, a semicircular top plate 11b and side plates 11c, and a height of the top plate 11b is smaller than a shorter width of the bottom plate 11a. Air inlet openings 11d are formed in the top plate 11b such that a total area of the openings is larger than a half of a surface area of the top plate. In the top plate 11b, there are further formed air outlet openings 11e. On an outer surface of the casing 11, there is provided an electric operating section 11f, by means of which the ionizer 12, collector 13, fan 15, voltage applying means and controlling means can be operated by a user. Furthermore, within the casing 11, there are provided stabilizer 11g, rear guide 11h and diffuser 11i to surround the fan 15.

[0012] The fan 15 serves to introduce an air stream from the air inlet openings 11d and exhaust the air stream from the air outlet openings 11e via the ionizer 12, collector 13 and ozone decomposing filter 14. During this circulation, the ionizer 12 produces a corona discharge and particles in the air are charged, the collector 13 collects the thus charged particles by Coulomb's force, and the ozone decomposing filter 14 serves to decompose an ozone gas produced by the ionizer 12 without leaking the ozone gas out of the apparatus. It should be noted that a pre-filter may be arranged in an upstream position to the ionizer 12, and then relatively large particles may be collected by the pre-filter.

[0013] As shown in a perspective view of Fig. 5, the discharge electrode member 21 constituting the ionizer 12 is constructed by pressing a conductive metal plate. The discharge electrode member 21 comprises a frame plate 21a which is arranged along the top plate 11b at an inner side of the air inlet openings 11d of the casing 11, a plurality of discharge electrode plates 21b extending in parallel with each other perpendicularly to the frame plate 21a, a plurality of needle-like projections 21c provided on lower edges of said discharge electrode plates 21b, and a plurality of air passing openings 21d formed in the flame plate 21a at positions between successive discharge electrode plates 21 b.

[0014] As illustrated in a perspective view of Fig. 6, the counter electrode member 22 constituting both the ionizer 12 and collector 13 is made of an electrically conductive resin having a hygroscopic property and a volume specific resistance not larger than 10^7 Ωcm. The counter electrode member 22 comprises a frame plate 22a which is arranged underneath the frame plate 21a of the discharge electrode member 21 such that the frame plate 22a extends along the frame plate 2 1a, a plurality of first counter electrodes plates 22b extending upward from the frame plate 22a such that the first counter electrodes plates 22b extend in parallel with the discharge electrode plates 21b of the discharge electrode member 21, a plurality of arcuate second counter electrodes plates 22c extending downward from the frame plate 22a such that the second counter electrode plates 22c are perpendicular to the first counter electrode plates 22b, and air passing openings 22d formed between successive first counter electrode plates 22b.

[0015] As depicted in a perspective view of Fig. 7, the high-tension electrode member 23 constituting the collector 13 is made of a semi-conductive resin having a hygroscopic property and a volume specific resistance of 10^8-10^{13} Ωcm, particularly 10^{10}-10^{13} Ωcm. The high-tension electrode member 23 comprises a frame plate 23a which is arranged along the ozone decomposing filter 14 along the inner surface of the frame plate 22a of the counter electrode member 22, a plurality of arcuate high-tension electrode plates 23b extending between successive second counter electrode plates 22c of the counter electrode member 22, and a plurality air

passing openings 23c formed in the frame plate 22a between successive high-tension electrode plates 23b.

[0016] The above mentioned discharge electrode member 21, counter electrode member 22 and high-tension electrode member 23 are assembled such that the discharge electrode plates 21b of the discharge electrode member 21 and first counter electrode plates 22b of the counter electrode member 22 are arranged alternatively in parallel with each other, and the second counter electrode plates 22c of the counter electrode member 22 and high-tension electrode plates 23b of the high-tension electrode member 23 are arranged alternatively in parallel with each other. When the discharge electrode member 21, counter electrode member 22 and high-tension electrode member 23 are connected to the voltage applying means, the ionizer 12 producing corona discharge between the needle-like projections 21c of the discharge electrode member 21 and the first counter electrode plates 22b of the counter electrode member 22 and the collector 13 generating an electrostatic field between the second counter electrode plates 22c of the counter electrode member 22 and the high-tension electrode plates 23b of the high-tension electrode member 23 are constructed.

[0017] In order to prevent waste of the needle-like projections 21c, it is preferable to apply negative voltages to the discharge electrode member 21 and high-tension electrode member 23 and to connect the counter electrode member 22 to the earth. The voltage applying means is constructed to apply a high DC voltage of 3-6 kV, more preferably 4.5 kV (280 μA) to the ionizer 12 as well as to apply a high DC voltage of 2-4 kV, more preferably 2.2 kV to the collector 12.

[0018] Upon operating the air cleaning apparatus of the present embodiment, the operating section 11f is operated to start the fan 15 and at the same time negative voltages are applied to the discharge electrode member 21 and high-tension electrode member 23 from the voltage applying means. Then, an air steam is introduced from the air inlet openings 11d of the casing 11, flows through the air conduit openings 21d of the discharge electrode member 21, air conduit openings 22d of the counter electrode member 22, air conduit openings 23c of the high-tension electrode member 23, and is exhausted to the external through the air outlet openings 11e of the casing 11.

[0019] During this circulation, the corona discharge is produced between the needle-like projections 21c of the discharge electrode member 21 and the first electrode plates 22b of the counter electrode member 22 in the ionizer 12, and particles in the air such as dusts, bacteria and odor substances are charged. At the same time, an ozone gas is produced. The charged particles are captured by a Coulomb's force within the collector 13 due to an electrostatic field generated between the high-tension electrode plates 23b of the high-tension electrode member 23 and the second counter electrode plates 22c of the counter electrode member 22. In this manner, the air stream introduced from the air inlet openings 11d is cleaned and the thus cleaned air is exhausted from the air outlet openings 11e.

[0020] Fig. 8 is a perspective view showing a second embodiment of the air cleaning apparatus 40 according to the invention. Within a casing 41, there are arranged a pre-filter 42, an ionizer 43, a collector 44, an ozone decomposing filter 45 and a fan 46. The pre-filter 42, ionizer 43, collector 44 and ozone decomposing filter 45 have a substantially arcuate lateral cross section surrounding the fan 46. The casing 41 comprises a bottom plate 41 a, side plates not shown, air inlet openings 41d, air outlet openings 41e, an operating section not shown, a rear guide 41 h and a diffuser 41 i like as the previous embodiment.

[0021] As shown by a perspective view of Fig. 9, the ionizer 43 is constructed by a combination of a discharge electrode member 51 and a counter electrode member 52, and the collector 44 is formed by a combination of the counter electrode member 52 and a high-tension electrode member 53.

[0022] The discharge electrode member 51 is formed by an electrically conductive metal plate like as the first embodiment, and includes a plurality of arcuate discharge electrode plates 51a surrounding the fan 46, connecting plates 5 1b connecting respective ends of the discharge electrode plates 51a, a number of needle-like projections 51c provided on upper edges of the discharge electrode plates 51a, and a plurality of air conduit openings 51d provided between successive discharge electrode plates 51a.

[0023] The counter electrode member 52 is made of an electrically conductive resin like as the first embodiment, and includes a plurality of arcuate first counter electrode plates 52a which are arranged between successive discharge electrode plates 51a of the discharge electrode member 51 in parallel with each other within the air conduit openings 51d, connecting plates 52b connecting respective ends of these first counter electrode plates 52a, arcuate second counter electrode plates 52c whose number is identical with or larger than that of the first counter electrode plates 52a and which extend downwardly from lower edges of the first counter electrode plates 52a, and air conduit openings 52d formed between successive first counter electrode plates 52a as illustrated in Fig. 11.

[0024] The high-tension electrode member 53 is also made of a semiconductive resin like as the first embodiment, and comprises a plurality of substantially arcuate high-tension electrode plates 53a arranged in parallel with the second counter electrode plates 52c of the counter electrode member 52, connecting plates 53b connecting respective ends of these high-tension electrode plates 53a, and air conduit openings 53c formed between successive high-tension electrode plates 53a as shown in Fig. 12.

[0025] It should be noted that the air cleaning apparatus 40 of the second embodiment has similar function

to that of the first embodiment.

[0026] The above explained embodiments have the following advantageous effects. It should be noted that the following explanation will be referred to the first embodiment, but the same is applied to the second embodiment.

(a) Since the ozone decomposing filter 14 is arranged to surround the fan 15, the upper surface of the ionizer 12 is formed to extend along the casing 11 and the lower surface of the collector 13 is formed to extend along the ozone decomposing filter 14, a dead space within the casing 11 can be reduced and the apparatus can be compact.

(b) Since the bottom plate 11a of the casing 11 is flat and a height of the top of the top plate 11b is smaller than a shorter width of the bottom plate 11a, a dead space within the casing 11 be saved, the apparatus can be compact and is not liable to be turned.

(c) Since the top plate 11b is formed to be arcuate and the air inlet and outlet openings 11d and 11e are formed in the top plate 11b, the air can be flown smoothly from the air inlet openings 11d to the air outlet openings 11e and a loss of the air stream can be reduced.

(d) Since the relatively heavy fan 15 and its driving motor are arranged at a lower portion of the collector 13, the apparatus is hardly turned when the apparatus is installed such that the bottom plate 11a is directed downward.

(e) Since the needle-like projections 21c of the discharge electrode member 21 can be formed from an electrically conductive metal plate by a press as an integral unit body and the counter electrode member 22 and high-tension electrode member 23 can be made of a synthetic resin, a manufacturing cost can be reduced.

(f) Since the high-tension electrode member 23 is made of a semiconductive resin having a hygroscopic property, even if electrically conductive particles are contained in an air, a displacement of electrostatic charge on the high-tension electrode member 23 can be limited by a resistance and a generation of spark can be prevented.

(g) By applying a voltage of 2-4 kV to the high-tension electrode member 23, a decrease in its resistance can be suppressed such that a high voltage can be applied and a generation of spark can be prevented and a collection can be performed effectively.

(h) The known air cleaning apparatus is liable to be fallen down and thus it is quite dangerous to place it on a locker. The air cleaning apparatus 10 of the embodiment of the present invention can be stably placed on an upper surface 61a of a locker 61 as shown in Fig. 13 and a space can be utilized effectively.

(i) When the apparatus is installed at a level slightly lower than the level of vision L of a user H sitting on a chair as depicted in Fig. 14, the cleaned air can be effectively supplied to the user H sitting on a chair without disturbing a sight of the user H and a circulation of air in a room.

(j) As shown in Fig. 15, even if the air cleaning apparatus is placed on an upper surface of a relatively tall locker 62, it is still stable, and therefore the clean air can be spread over a wide range in a room without disturbing a circulation within a room.

(k) By providing a flange 63 or legs 64 extending from one end plate 11c of the casing 11 as illustrated in Fig. 16, the air cleaning apparatus can be installed such that the bottom plate 11a is perpendicular to floor 65 or two apparatuses can be arranged such that their sides are faced to each other.

(l) As shown in Fig. 17, by proving hooks 66, 67 extending from the bottom plate 11a or end plate 11c of the casing 11, the air cleaning apparatus can be hung from a partition.

(m) As illustrated in Fig. 18, the air cleaning apparatus can be installed on a wall of a room by securing its bottom plate 11a of the casing 11 to the wall.

Industrial Applicability

[0027] As explained above, in the air cleaning apparatus according to the invention, the charging and collecting section is arranged to surround the fan, and therefore the apparatus can be compact and the air stream can be smoothly flown from the air inlet openings to the air outlet openings.

Claims

1. An air cleaning apparatus comprising a casing (11) having air inlet openings (11d) and air outlet openings (11e), a fan (15) provided within said casing (11) and flowing an air stream from said air inlet openings to said air outlet openings; and a charging section (12) arranged between said air inlet openings and said fan for charging particles in the air stream; and a collecting section (13) arranged at a downstream position with respect to said charging section; wherein sad charging section (12) consists of a plurality of discharge electrode plates (21b) and a plurality of the first counter electrode plates (22b), said collecting section consists of high-tension electrode plates (23b) and the second counter electrode plates (22c), a lateral cross section of said charging section (12) and said collecting section (13) are arranged to surround said fan (15) in a substantially arcuate configuration, said high-tension electrode plates (23b) and said second counter electrode plates (22c) of said collecting section are formed in the direction perpendicular to the axis of rotation of

said fan (15), and these electrode plates are arranged alternatively in parallel with each other in the direction parallel to the axis of rotation of said fan (15).

2. An air cleaning apparatus as claimed in claim 1, wherein said discharge electrode plates (21b) and said first counter electrode plates (22b) of said charging section (12) are arranged in the direction parallel to the axis of rotation of said fan (15) and these electrode plates are arranged alternatively in parallel with each other in the direction perpendicular to the axis of rotation of said fan (15) and these electrode plates are arranged to surround the axis of rotation of said fan.

3. An air cleaning apparatus as claimed in claim 1, wherein said charging section (12) and said collecting section (13) consist of a plurality of polygonal segments and the lateral cross section of these segments are arranged to surround said fan (15) in a substantially arcuate configuration.

4. An air cleaning apparatus as claimed in claim 1, wherein said charging section (12) and collecting section (13) have an arcuate lateral cross section.

5. An air cleaning apparatus as claimed in claim 1, wherein said air inlet openings (11d) and air outlet openings (11e) are formed in a top plate (11b) of said casing (11).

6. An air cleaning apparatus as claimed in claim 1, wherein said casing (11) includes a flat bottom plate (11a) and a top plate (11b) whose lateral cross section is substantially arcuate such that the casing (11) has a semi-cylindrical configuration as a whole, and said discharging section and collecting section (13) have an outer configuration which follows a substantially arcuate top plate of the casing (11).

7. An air cleaning apparatus as claimed in claim 1, wherein each of said charging section (12) and collecting section (13) is constructed by a combination of a discharge electrode member, a counter electrode member including said counter electrode plates and a high-tension electrode member including said high-tension electrode plates, said counter electrode member is made of an electrically conductive resin having a specific volume resistance not higher than 10^7 Ωcm, and said high-tension electrode member is made of a semi-conductive resin having a specific volume resistance of 10^{10}-10^{13} Ωcm.

8. An air cleaning apparatus as claimed in claim 1, wherein said fan (15) is formed by a lateral flow fan.

Patentansprüche

1. Luftreinigungsvorrichtung, die ein Gehäuse (11) mit Lufteinlassöffnungen (11d) und Luftauslassöffnungen (11e), ein Gebläse (15), das in dem Gehäuse (11) vorhanden ist und einen Luftstrom von den Lufteinlassöffnungen zu den Luftauslassöffnungen leitet, und einen Ladeabschnitt (12), der zwischen den Lufteinlassöffnungen und dem Gebläse angeordnet ist, um Teilchen in dem Luftstrom zu laden, sowie einen Auffangabschnitt (13) umfasst, der an einer Position nach dem Ladeabschnitt angeordnet ist, wobei der Ladeabschnitt (12) aus einer Vielzahl von Entladeelektrodenplatten (21 b) und einer Vielzahl der ersten Gegenelektrodenplatten (22e) besteht, der Auffangabschnitt aus Hochspannungselektrodenplatten (23b) und den zweiten Gegenelektrodenplatten (22c) besteht, ein Querschnitt des Ladeabschnitts (12) und des Auffangabschnitts (13) so angeordnet sind, dass sie das Gebläse (15) in einer im Wesentlichen bogenartigen Form umgeben, die Hochspannungselektrodenplatten (23b) und die zweiten Gegenelektrodenplatten (22c) des Auffangabschnitts in der Richtung senkrecht zu der Drehachse des Gebläses (15) ausgebildet sind und diese Elektrodenplatten abwechselnd parallel zueinander in der Richtung parallel zur Drehachse des Gebläses (15) angeordnet sind.

2. Luftreinigungsvorrichtung nach Anspruch 1, wobei die Entladeelektrodenplatten (21 b) und die ersten Gegenelektrodenplatten (22b) des Ladeabschnitts (12) in der Richtung parallel zu der Drehachse des Gebläses (15) angeordnet sind und diese Elektrodenplatten abwechselnd parallel zueinander in der Richtung senkrecht zu der Drehachse des Gebläses (15) angeordnet sind und diese Elektrodenplatten so angeordnet sind, dass sie die Drehachse des Gebläses umgeben.

3. Luftreinigungsvorrichtung nach Anspruch 1, wobei der Ladeabschnitt (12) und der Auffangabschnitt (13) aus einer Vielzahl vieleckiger Segmente bestehen und der Querschnitt dieser Segmente so angeordnet ist, dass sie das Gebläse (15) in einer im Wesentlichen bogenartigen Form umgeben.

4. Luftreinigungsvorrichtung nach Anspruch 1, wobei der Ladeabschnitt (12) und der Auffangabschnitt (13) einen bogenartigen Querschnitt haben.

5. Luftreinigungsvorrichtung nach Anspruch 1, wobei die Lufteinlassöffnungen (11d) und die Luftauslassöffnungen (11e) in einer oberen Platte (11e) des Gehäuses (11) ausgebildet sind.

6. Luftreinigungsvorrichtung nach Anspruch 1, wobei das Gehäuse (11) eine plane untere Platte (11a)

und eine obere Platte (11b) enthält, deren Querschnitt im Wesentlichen bogenartig ist, so dass das Gehäuse (11) insgesamt eine halbzylindrische Form hat, und der Entladeabschnitt sowie der Auffangabschnitt (13) eine äußere Form haben, die einer im Wesentlichen bogenartigen oberen Platte des Gehäuses (11) folgt.

7. Luftreinigungsvorrichtung nach Anspruch 1, wobei der Ladeabschnitt (12) und der Auffangabschnitt (13) jeweils aus einer Kombination aus einem Entladelektrodenelement, einem Gegenelektrodenelement, das die Gegenelektrodenplatten enthält, und einem Hochspannungs-Elektrodenelement, das die Hochspannungs-Elektrodenplatten enthält, aufgebaut ist und das Gegenelektrodenelement aus einem elektrisch leitenden Harz besteht, das einen spezifischen Durchgangswiderstand von nicht mehr als 10^7 Ohm cm hat, und das Hochspannungs-Elektrodenelement aus einem halbleitenden Harz besteht, das einen spezifischen Durchgangswiderstand von 10^{10} - 10^{13} Ohm cm hat.

8. Luftreinigungsvorrichtung nach Anspruch 1, wobei das Gebläse (15) durch ein Querstromgebläse gebildet wird.

Revendications

1. Appareil d'épuration de l'air comprenant un corps (11) muni d'ouvertures d'admission d'air (11d) et d'ouvertures d'évacuation d'air (11e), un ventilateur (15) disposé à l'intérieur dudit corps (11) et qui fait circuler un flux d'air entre lesdites ouvertures d'admission d'air et lesdites ouvertures d'évacuation d'air ; et une section de chargement (12) disposée entre lesdites ouvertures d'admission d'air et ledit ventilateur pour charger les particules dans le flux d'air ; et une section de collecte (13) disposée au niveau d'une position en aval par rapport à ladite section de chargement ; dans lequel ladite section de chargement (12) comprend une pluralité de plaques-électrodes émissives (21b) et une pluralité de premières plaques contre-électrodes (22b), ladite section de collecte comprend des plaques-électrodes à haute tension (23b) et les secondes plaques contre-électrodes (22c), une section transversale de côté de ladite section de chargement (12) et une section transversale de côté de ladite section de collecte (13) sont agencées de façon à entourer ledit ventilateur (15) selon une configuration sensiblement en arc, lesdites plaques-électrodes à haute tension (23b) et lesdites secondes plaques contre-électrodes (22c) de ladite section de collecte sont formées dans la direction perpendiculaire à l'axe de rotation dudit ventilateur (15), et ces plaques-électrodes sont agencées de façon alternée parallèlement les unes aux autres dans la direction parallèle à l'axe de rotation dudit ventilateur (15).

2. Appareil d'épuration de l'air selon la revendication 1, dans lequel lesdites plaques-électrodes émissives (21b) et lesdites premières plaques contre-électrodes (22b) de ladite section de chargement (12) sont agencées dans la direction parallèle à l'axe de rotation dudit ventilateur (15) et ces plaques-électrodes sont agencées de façon alternée parallèlement les unes aux autres dans la direction parallèle à l'axe de rotation dudit ventilateur (15) et ces plaques-électrode sont agencées de façon à entourer l'axe de rotation dudit ventilateur.

3. Appareil d'épuration de l'air selon la revendication 1, dans lequel ladite section de chargement (12) et ladite section de collecte (13) comprennent une pluralité de segments en forme de polygone, et les sections transversales de côté de ces segments sont agencées de façon à entourer ledit ventilateur (15) selon une configuration sensiblement en arc.

4. Appareil d'épuration de l'air selon la revendication 1, dans lequel ladite section de chargement (12) et ladite section de collecte (13) ont une section transversale de côté en arc.

5. Appareil d'épuration de l'air selon la revendication 1, dans lequel lesdites ouvertures d'admission d'air (11d) et lesdites ouvertures d'évacuation d'air (11e) sont formées dans une plaque de dessus (11b) dudit corps (11).

6. Appareil d'épuration de l'air selon la revendication 1, dans lequel ledit corps (11) comprend une plaque de fond (11a) et une plaque de dessus (11b) dont la section transversale de côté est sensiblement en arc de telle sorte que le corps (11) présente une configuration semi-cylindrique globalement, et ladite section de déchargement et ladite section de collecte (13) ont une configuration externe qui épouse une plaque de dessus sensiblement en arc du corps (11).

7. Appareil d'épuration de l'air selon la revendication 1, dans lequel chacune de ladite section de chargement (12) et de ladite section de collecte (13) est constituée par une combinaison d'un élément formant électrode émissive, d'un élément formant contre-électrode comprenant lesdites plaques contre-électrodes et un élément formant électrode à haute tension comprenant lesdites plaques-électrodes à haute tension, ledit élément formant contre-électrode est fait en une résine conductrice d'électricité ayant une résistance de volume spécifique de pas plus de 10^7 Ωcm, et ledit élément formant électrode à haute tension est fait en une résine semiconduc-

trice ayant une résistance de volume spécifique de 10^{10} à 10^{13} Ωcm.

8. Appareil d'épuration de l'air selon la revendication 1, dans lequel ledit ventilateur (15) est constitué par un ventilateur à écoulement latéral.

Fig.1

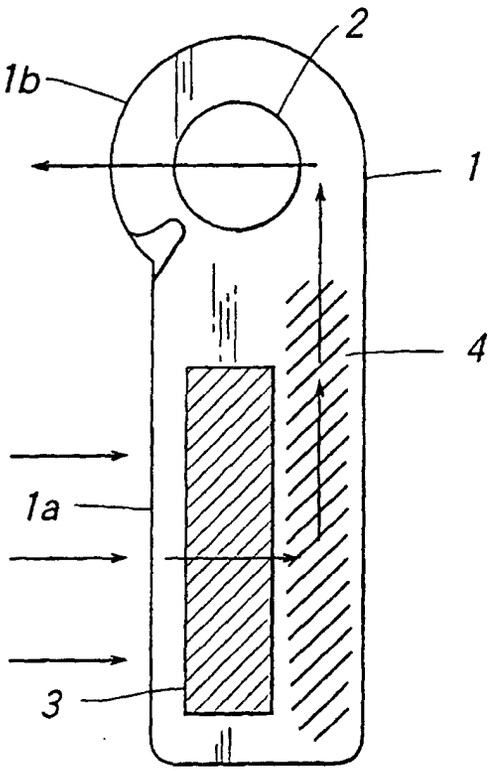

Fig.2

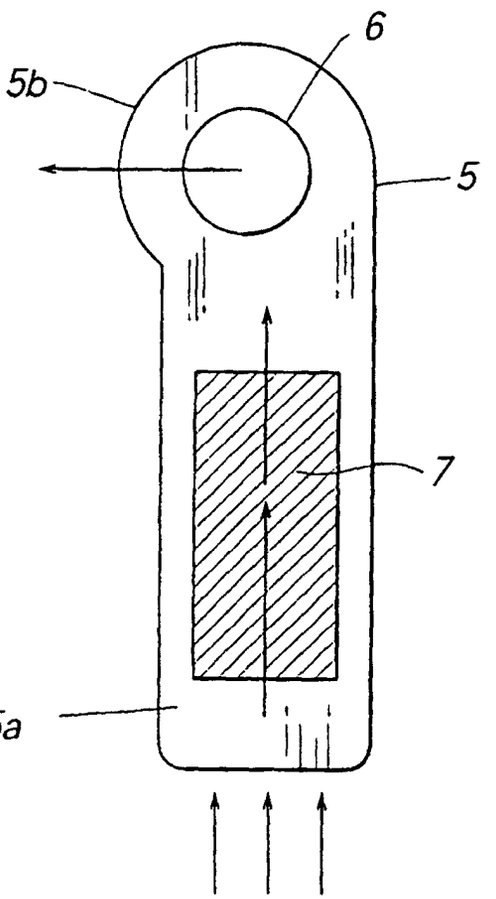

Fig.3

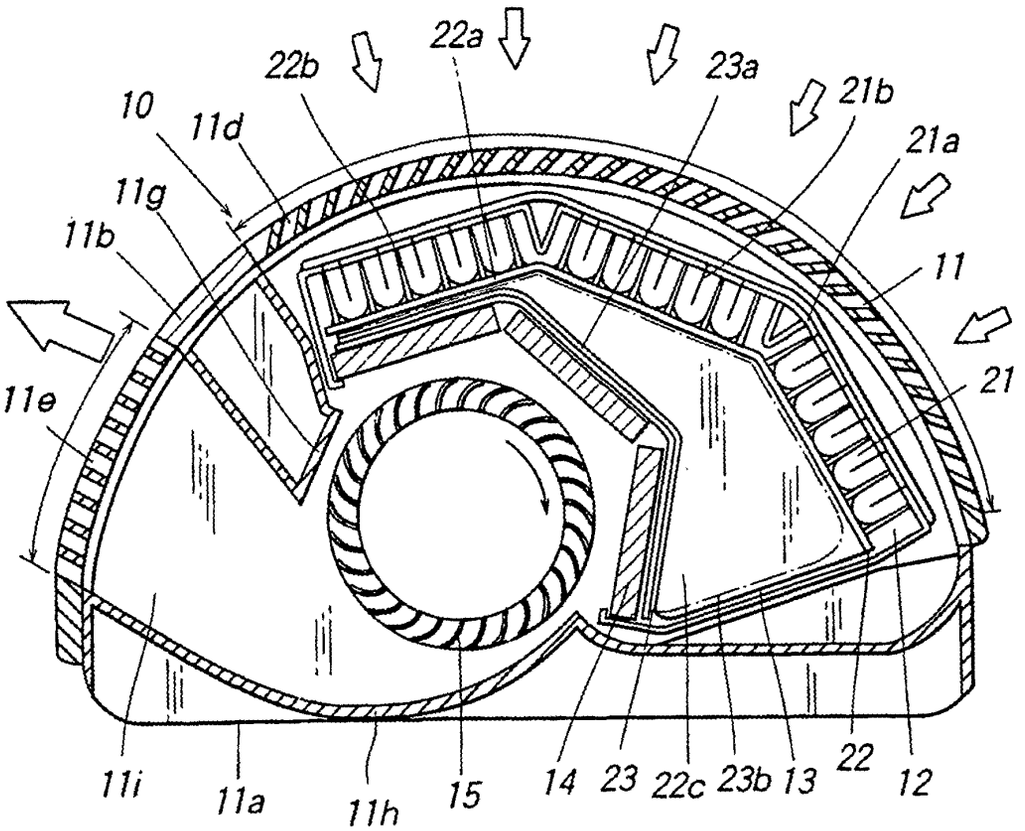
22a
22b
23a
21b
21a
10
11d
11g
11b
11
21
11e
11i
11a
11h
15
14
23
22c
23b
13
22
12

Fig.4

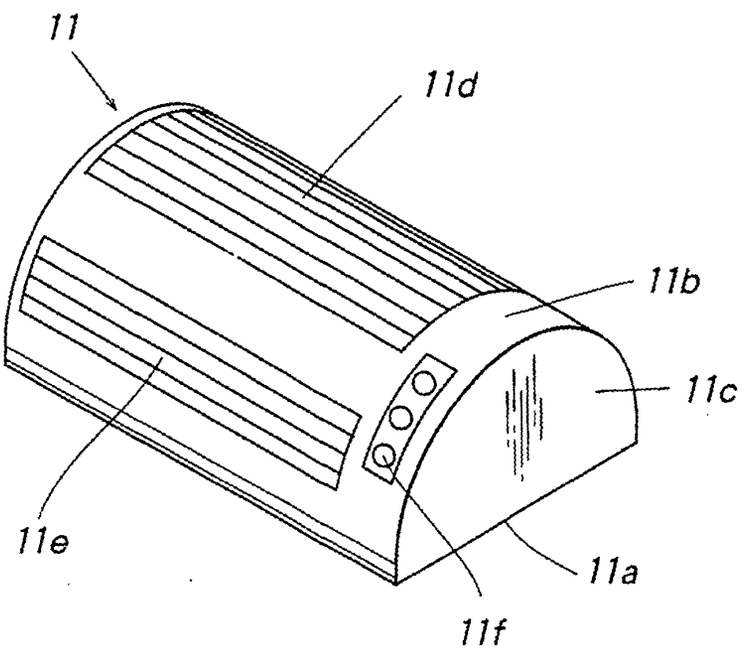
11
11d
11b
11c
11e
11a
11f

Fig.5

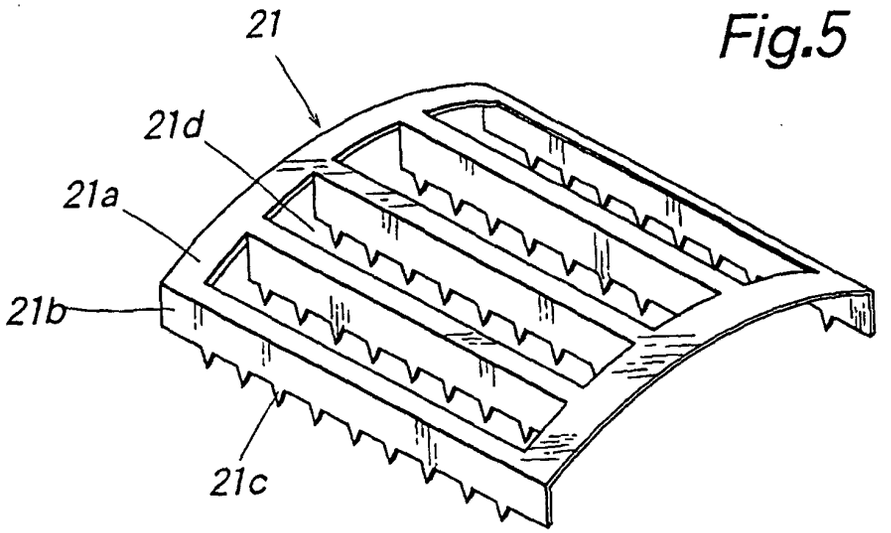

Fig.6

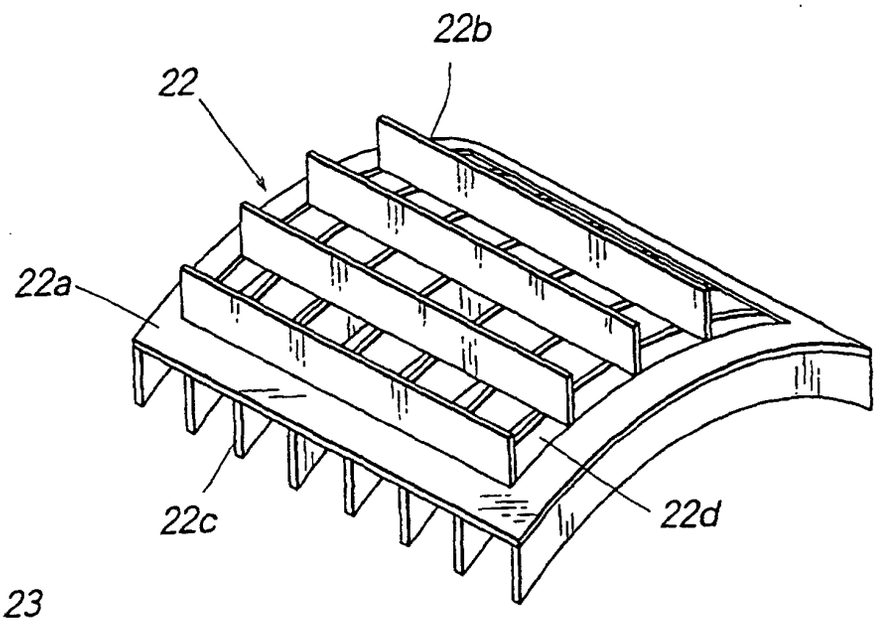

Fig.7

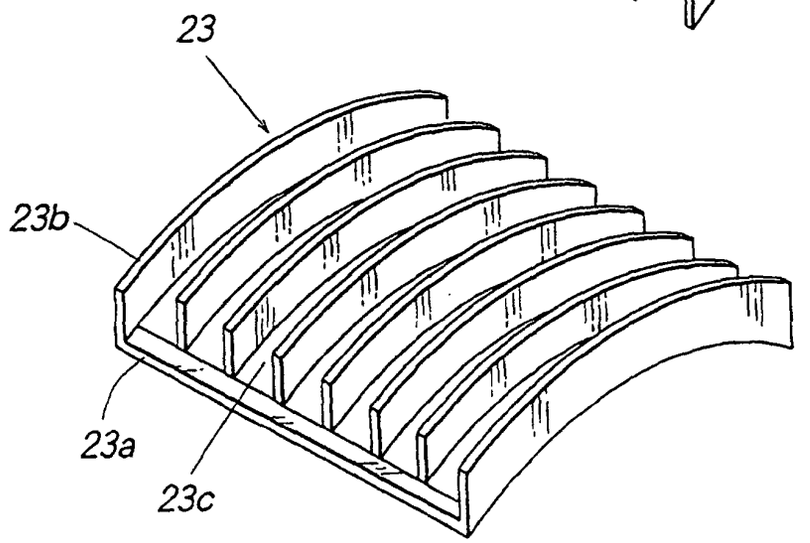

Fig.8

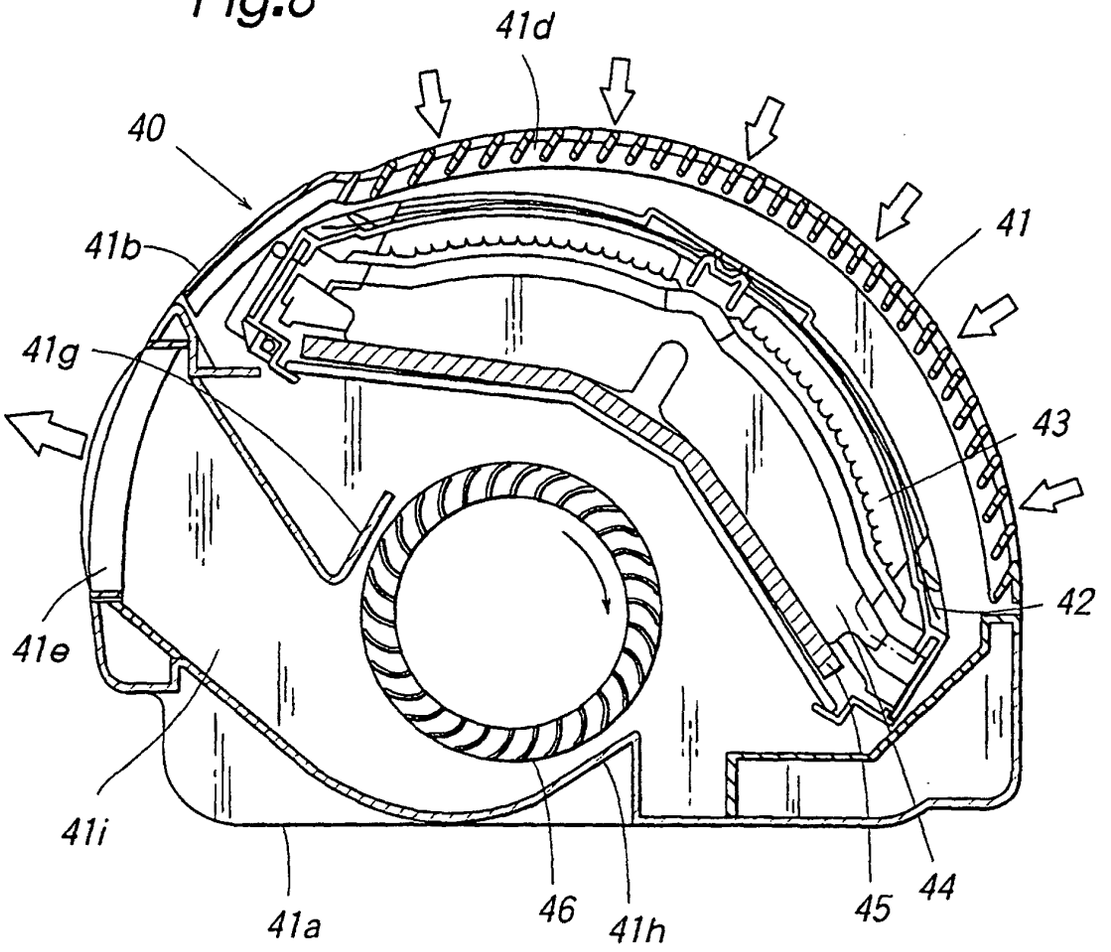

Fig.9

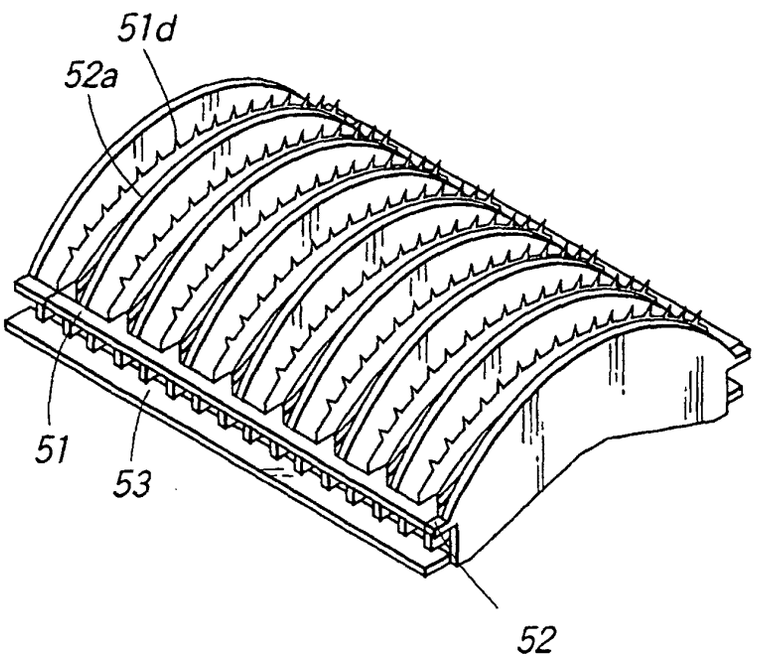

Fig.10

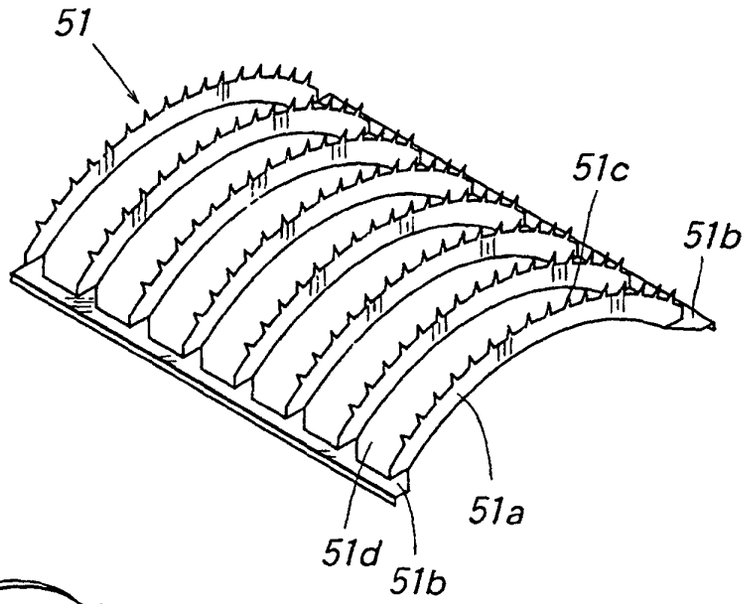

Fig.11

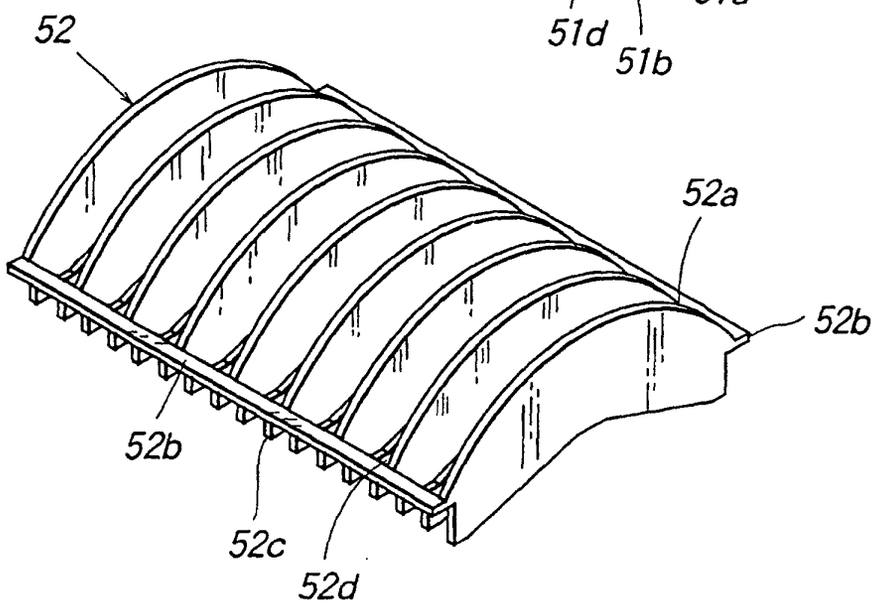

Fig.12

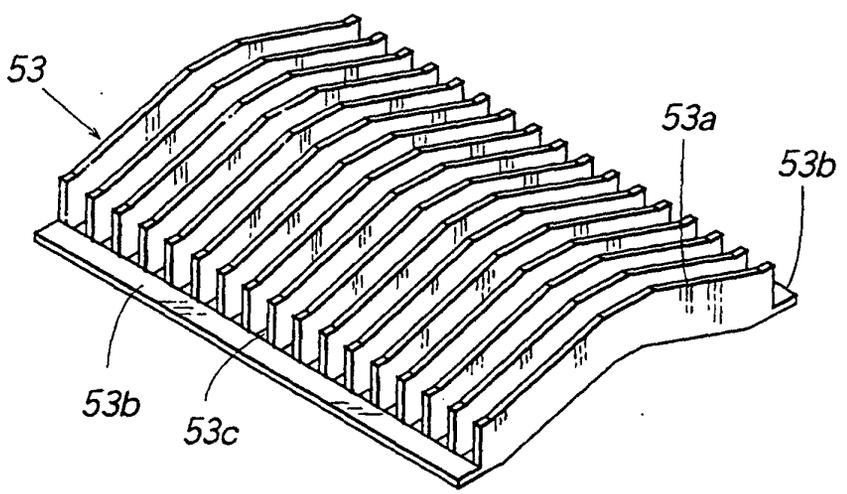

Fig.13

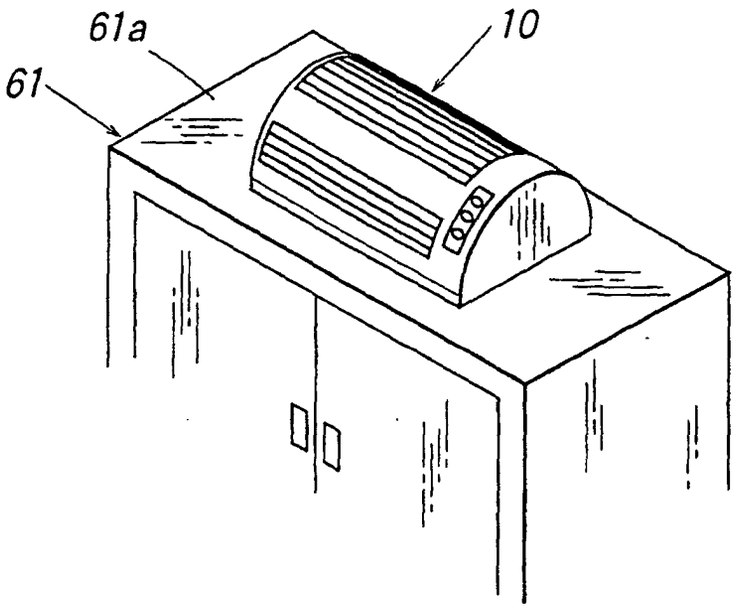

Fig.14

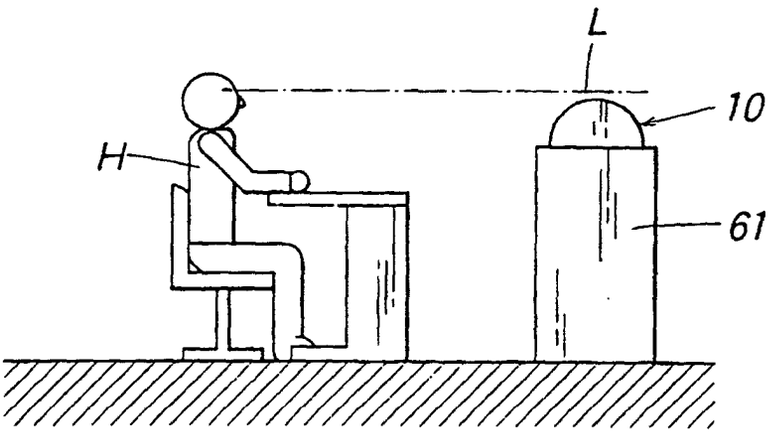

Fig.15

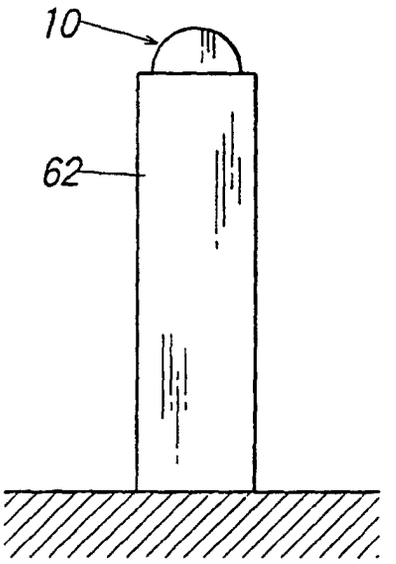

Fig.16

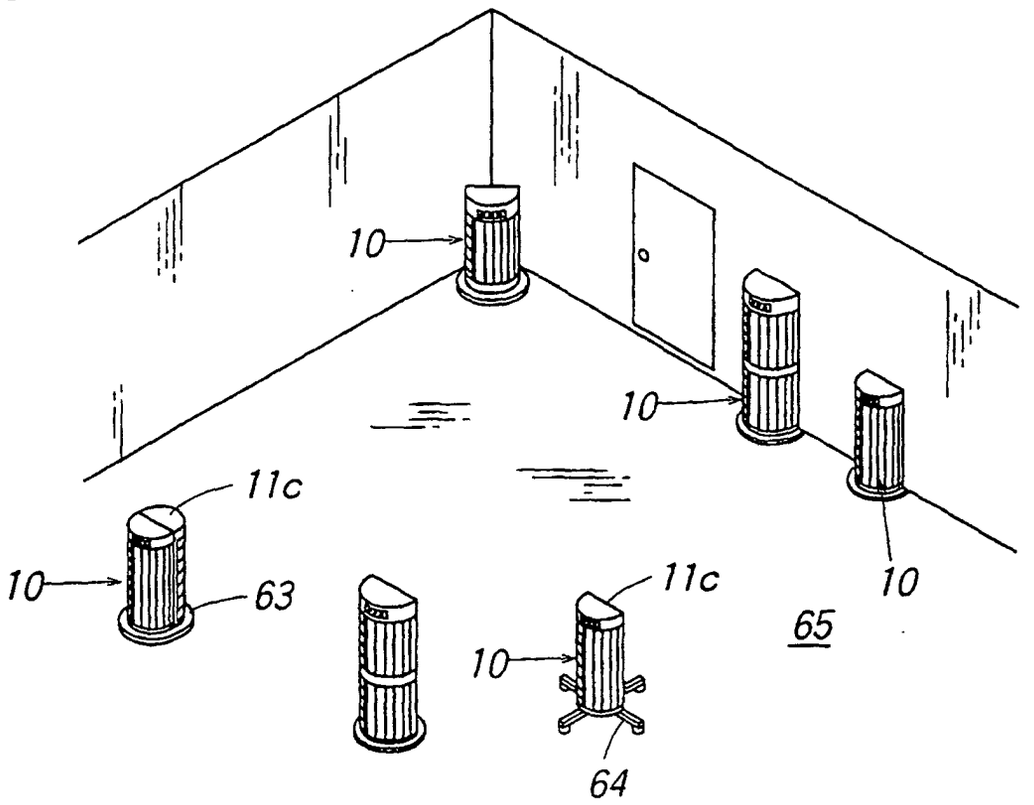

Fig.17

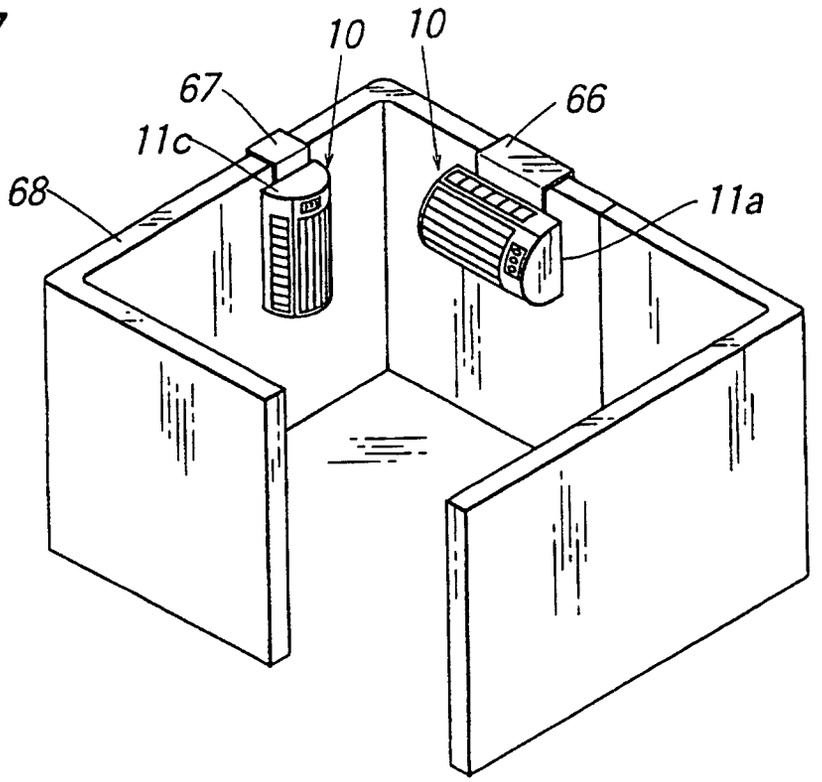

Fig.18