Decision on opposition

Opposition No. 2017-700204

Gumma, Japan
Patent Holder O2AID INC.

Tokyo, Japan
Patent Attorney KANEKO, Hiroshi

Chiba, Japan
Opponent NOJO, Akina

The case of opposition to the grant of a patent in Japanese Patent No. 5985006, entitled "SPEAKER," has resulted in the following decision

Conclusion

The patent regarding the inventions according to Claims 1 to 3 of Japanese Patent No. 5985006 shall be revoked

The patent according to Claim 4 of Japanese Patent No. 5985006 is maintained.

Reason

No. 1 History of the procedures

The patent application for Japanese Patent No. 5985006 was filed on May 30, 2015 and the establishment of the patent right for the invention was registered on August 12, 2016. An outline of procedures is as follows.

Opposition to the grant of a patent (all the claims NOJO, Akina): February 28, 2017

Notice of reasons for rescission: May 15, 2017 (drafting date)

Regarding Notice of reasons for rescission dated May 15, 2017, the patentee has not responded within a specified period.

No. 2 Outline of notified reasons for rescission

1. The invention relating to the following Claims of the patent is an invention described in a publication distributed in Japan or abroad before the application was filed or an invention available to the public through electric telecommunication lines. The invention falls under an invention of Article 29(1)(iii) of the Patent Act, and the appellant should not be granted a patent for it, and accordingly the patent regarding the invention shall be revoked.

Note

Cited Documents 1 to 3 to Claims 1 to 3

Cited Document 1: "Piezoelectric Sound Components" catalog issued by Murata

Manufacturing Co., Ltd. (issued on March 29, 2000) (refer to Evidence A No. 1 about description contents)
Cited Document 2: Japanese Unexamined Patent Application Publication No. 2001-339793 (Evidence A No. 2)
Cited Document 3: Chronological Scientific Tables Desktop Version 1996, 69th volume (edited by National Astronomical Observatory of Japan, and issued on November 30, 1995) Pages 448 to 449 (Evidence A No. 3)

2. The invention relating to the following Claims of the patent could have been easily invented by a person having ordinary skill in the technical field of the invention prior to the filing of the application, based on an invention described in a publication distributed in Japan or abroad before the application was filed or an invention available to the public through electric telecommunication lines, and thus the appellant should not be granted a patent for the invention under the provisions of Article 29(2) of the Patent Act, and the patent regarding the invention shall be revoked.

Note

Cited Documents 1 to 3 to Claims 1 to 3
(Cited Documents 1 to 3 are the same as under Reason 1)

No. 3 Regarding notified reason 1 for rescission
1. The patent invention
The inventions relating to Claims 1 to 4 (hereinafter, referred to as the "patent invention 1" to the "patent invention 4") are specified by the matters stated in Claims 1 to 4 of the scope of claims, as follows.

"[Claim 1]
A speaker which sticks a piezoelectric element on a metal plate and makes the metal plate generate flextural vibration by vibration of the piezoelectric element, wherein assuming a modulus of longitudinal elasticity of the metal plate as E (kN/mm^2), density as ρ (g/cm^3), an area of the metal plate on a sticking surface performing the sticking as Sm, and an area of the piezoelectric element as Sp, if the expression of $X = (Sp/Sm)(\rho/E)$ is established, a value of X is 0.01 to 0.08."
[Claim 2]
The speaker according to Claim 1, wherein the value of X is 0.02 to 0.07.
[Claim 3]
The speaker according to Claim 1 or 2, wherein the metal plate and the piezoelectric element have generally similar shapes on the sticking surface, and center of gravity positions of the metal plate and the piezoelectric element generally match each other.
[Claim 4]
The speaker according to any one of Claims 1 to 3, having holes penetrating the piezoelectric element and the metal plate."

2. Cited Documents
In Cited Document 1, there are described the following matters together with a

diagram, regarding "Piezoelectric Sound Components." (The underlines were added by the body.)

(1) "Piezoelectric sound components are now drawing attention widely as suitable components for variouos electronic equipment like as OA equipment, audio equipment, and telephone sets. Also, the application range is expanding friom monitor sound for controller to time signal, alarm, speaker, ringer and receiver for telephone set." (Page 1, "INTRODUCTION")

(2) "1 Material of Piezoelectric Ceramic 2 Material of Metal Plate" (Page 3, "PART NUMBERING")

(3) Dimensions(mm) ϕ D "12.0"
a "9.0" Remarks "Brass Plate " regarding Part Number 7BB-12-9 (Page 3 "EXTERNAL DRIVE TYPE SPECIFICATIONS")
The above-mentioned indicated matters and the description of the drawings result in the following.

(a) In Cited Document 1, a piezoelectric sound component used for a speaker is described (the indicated matter (1)).

(b) Since it is common technical knowledge that a piezoelectric vibrator is obtained by sticking a piezoelectric element applying electrodes on both surfaces of a disc-shaped piezoelectric ceramic plate to a vibration plate made from a metal disc (the indicated matter (5) of the Cited Document 2 described below), it is obvious that a circle of a diameter ϕ D indicated in "DIMENSIONS" on Page 3 shows "the metal plate" of the indicated matter (2) and a circle of diameter a also shows "piezoelectric ceramics."
Therefore, it can be said that "the piezoelectric sound component is a piezoelectric vibration plate which sticks piezoelectric ceramics to the metal plate."

(c) The diameter of metal plate is 12.0 mm, the dimensions of the piezoelectric ceramics are 9.0 mm, and the material of metal plate is brass (the indicated matter (3)).

Taking the above-mentioned matters into general consideration, it is acknowledged that Cited Document 1 describes the following invention (hereinafter, referred to as the "invention of Cited Document 1").

"A piezoelectric sound component applied to a speaker, being a piezoelectric vibration plate which sticks a piezoelectric ceramics to a metal plate, wherein a diameter of metal plate is 12.0 mm, dimensions of the piezoelectric ceramics are 9.0 mm, and the material of metal plate is brass."

In Cited Document 2, there are described the following matters together with drawings, regarding "a piezoelectric acoustic device" (The underlines were added by the body.)

(4) "[0001]

[Field of Industrial Application] The present invention relates to a piezoelectric acoustic device which emits a sound using a piezoelectric vibrator, and particularly relates to a piezoelectric acoustic device which is one of a type called a piezoelectric speaker having a high pressure loudspeaker, with which a sound pressure level and sound quality are improved, and with which high sound quality comparable to that of a dynamic type loudspeaker is acquired."

(5) "[0002]
[Prior Art] A piezoelectric acoustic device in the prior art uses a piezoelectric vibrator which sticks a piezoelectric element applying electrodes on both surfaces of a disc-shaped piezoelectric ceramic plate, on a vibration plate consisting of a metal disc. Drive voltage is applied between the electrodes of the piezoelectric element, displacement in a direction orthogonal to the drive voltage direction is taken out as expansion and contraction in a diametrical direction, and bending is caused on the vibration plate by the expansion and contraction to vibrate the piezoelectric vibrator, thereby taking out acoustically effective vibration. "

(6) "[0027] For example, in the combination of materials shown in Table 1, a more specific example of the piezoelectric acoustic device will be given. A piezoelectric element 12 which applies electrodes by metalizing both surfaces of a disc-shaped piezoelectric ceramics which is made from lead zirconate titanate and is 15 mm in diameter and 0.05 mm in thickness is prepared, and the piezoelectric element 12 is stuck to a vibration plate 11 made from a disc-shaped aluminum plate which is 17 mm in diameter and 0.02 mm in thickness, thereby configuring a piezoelectric vibrator 1."

The above-mentioned indicated matters and the description of the drawings result in the following.

(d) Cited Document 2 describes a piezoelectric acoustic device using a piezoelectric vibrator, which is one of a type called as a piezoelectric speaker (the indicated matter (4)).

(e) A piezoelectric acoustic device uses a piezoelectric vibrator which sticks a piezoelectric element applying electrodes on both surfaces of a disc-shaped piezoelectric ceramic plate, on a vibration plate consisting of a metal disc. Drive voltage is applied between the electrodes of the piezoelectric element, displacement in a direction orthogonal to the drive voltage direction is taken out as expansion and contraction in a diametrical direction, and bending is caused on the vibration plate by the expansion and contraction to vibrate the piezoelectric vibrator, thereby taking out acoustically effective vibration (the indicated matter (5)).

(f) A piezoelectric element 12 which applies electrodes by metalizing both surfaces of a disc-shaped piezoelectric ceramic which is 15 mm in diameter is prepared, and the piezoelectric element 12 is stuck to a vibration plate 11 made from a disc-shaped aluminum plate which is 17 mm in diameter, thereby configuring a piezoelectric vibrator 1 (the indicated matter (6)).

Taking the above-mentioned matters into general consideration, it is acknowledged that Cited Document 2 describes the following invention (hereinafter, referred to as the "invention of Cited Document 2").

"A piezoelectric acoustic device using a piezoelectric vibrator, which is one of a type called a piezoelectric speaker,

the piezoelectric acoustic device using the piezoelectric vibrator which sticks a piezoelectric element applying electrodes on both surfaces of a disc-shaped piezoelectric ceramic plate, on a vibration plate consisting of a metal disc, applying drive voltage between the electrodes of the piezoelectric element, taking out displacement in a direction orthogonal to the drive voltage direction, as expansion and contraction in a diametrical direction, and causing bending on the vibration plate by the expansion and contraction to vibrate the piezoelectric vibrator, thereby taking out acoustically effective vibration, wherein

a piezoelectric element 12 which applies electrodes by metalizing both surfaces of a disc-shaped piezoelectric ceramics which is 15 mm in diameter is prepared, and the piezoelectric element 12 is stuck to a vibration plate 11 made from a disc-shaped aluminum plate which is 17 mm in diameter, thereby configuring a piezoelectric vibrator 1."

3. Comparison/judgment

First, the patent invention 1 and the invention of Cited Document 1 are compared.

(1) Speaker

Since the invention of Cited Document 1 is "a piezoelectric sound component applied to a speaker, being a piezoelectric vibration plate which sticks a piezoelectric ceramic to a metal plate," it is obvious that bending vibration is generated on the metal plate by vibration of the piezoelectric ceramic. Then, it can be said that "the piezoelectric ceramic" is "the piezoelectric element."

Therefore, patent invention 1 and the invention of Cited Document 1 are in correspondence in the point that they are "a speaker which sticks a piezoelectric element to a metal plate and generates bend vibration on the metal plate by vibration of the piezoelectric element."

(2) Value of X

If a value of X described in Claim 1 of the patent is calculated by using a metal plate diameter, dimensions of the piezoelectric ceramics, and the density and a value of Young's modulus of 7/3 brass (C2600), that of 6/4 brass (C2801) described in Cited Document 3, it becomes 0.04 to 0.05 to one significant figure.

Therefore, patent invention 1 and the invention of Cited Document 1 are in correspondence in the point that "assuming a modulus of longitudinal elasticity of the metal plate as E(kN/mm^2), density as $\rho(g/cm^3)$, an area of the metal plate on a sticking surface performing the sticking as Sm, and an area of the piezoelectric element as Sp, if the expression of $X = (Sp/Sm)(\rho/E)$ is established, a value of X is 0.04 to 0.05."

Then, patent invention 1 and the invention of Cited Document 1 are in correspondence in all points, and have no different feature.

Regarding each of 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7 BB -27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7, if a value of X described in Claim 1 of the patent is calculated by using values of ϕ D, a, and value of ρ and E of precipitation of 7/3 brass (C2600), 6/4 brass (C2801), hardening type stainless steel (SUS631), martensitic stainless steel (SUS410), ferritic stainless steel (SUS430) and austenitic stainless steel (SUS304) described in Cited Document 3, it becomes 0.02 to 0.04 to one significant figure.

Therefore, patent invention 1 is the invention described in Cited Document 1 (each of the piezoelectric vibration plates 7BB-12-9, 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7BB-27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7 described in Cited Document 1).

Then, patent invention 1 and the invention of Cited Document 2 are compared.

(1) Speaker

The invention of Cited Document 2 is a piezoelectric acoustic device which is "one of a type called as a piezoelectric speaker," and is a piezoelectric acoustic device "using the piezoelectric vibrator which sticks a piezoelectric element applying electrodes on both surfaces of a disc-shaped piezoelectric ceramic plate, on a vibration plate consisting of a metal disc, applying drive voltage between the electrodes of the piezoelectric element, taking out displacement in a direction orthogonal to the drive voltage direction, as expansion and contraction in a diametrical direction, and causing bending on the vibration plate by the expansion and contraction to vibrate the piezoelectric vibrator, thereby taking out acoustically effective vibration."

Therefore, patent invention 1 and the invention of Cited Document 2 are in correspondence in the point that they are "a speaker which sticks a piezoelectric element on a metal plate and makes the metal plate generate bend vibration by vibration of the piezoelectric element."

(2) Value of X

If a value of X described in Claim 1 of the patent is calculated by using a diameter of the piezoelectric element, a diameter of the vibration plate, and the density and a value of Young's modulus of industrial aluminum (A1085P) described in Cited Document 3, , it becomes 0.03 to one significant figure.

Therefore, patent invention 1 and the invention of Cited Document 2 are in correspondence in the point that "assuming a longitudinal elastic modulus of the metal plate as E(kN/mm^2), density as $\rho(g/cm^3)$, an area of the metal plate on a sticking surface performing the sticking as Sm, and an area of the piezoelectric element as Sp, if the expression of $X = (Sp/Sm)(\rho/E)$ is established, a value of X is 0.03."

Then, patent invention 1 and the invention of Cited Document 2 are in correspondence in all points, and have no different feature.

Therefore, patent invention 1 is the invention described in Cited Document 2 (Table 1 of Cited Document 2 and the piezoelectric vibrator described in [0027]).

Patent invention 2 is one in which the value of X is 0.02 to 0.07 in the speaker of patent invention 1, and thus is the invention described in Cited Document 1 (each of the piezoelectric vibration plates 7BB-12-9, 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7BB-27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7 described in Cited Document 1) and the invention described in Cited Document 2 (Table 1 of Cited Document 2 and the piezoelectric vibrator described in [0027]).

It can be said that in the invention described in Cited Document 1 (each of the piezoelectric vibration plates 7BB-12-9, 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7BB-27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7 described in Cited Document 1), "the metal plate and the piezoelectric element have generally similar shapes on the sticking surface, and center of gravity positions of the metal plate and the piezoelectric element generally match each other," from the DIMENSIONS on Page 3.

Also, it can be said that in the invention described in Cited Document 2 (Table 1 of Cited Document 2 and the piezoelectric vibrator described in [0027]), "the metal plate and the piezoelectric element have generally similar shapes on the sticking surface, and center of gravity positions of the metal plate and the piezoelectric element generally match each other," from Fig. 1.

Therefore, patent invention 3 is the invention described in Cited Document 1 (each of the piezoelectric vibration plates 7BB-12-9, 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7BB-27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7 described in Cited Document 1), and is the invention described in Cited Document 2 (Table 1 of Cited Document 2 and the piezoelectric vibrator described in [0027]).

No. 4 Regarding notified reasons 2 for rescission

In the invention described in Cited Document 1 (each of the piezoelectric vibration plates 7BB-12-9, 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7BB-27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7 described in Cited Document 1), it can be done accordingly by a person skilled in the art to change the respective values of φD and a to one close to that, and to change the material of the metal plate to a similar one.

Therefore, patent inventions 1 to 3 could be easily made by a person skilled in the art on the basis of the invention described in Cited Document 1 (each of the piezoelectric vibration plates 7BB-12-9, 7BB-15-6, 7BB-20-3, 7BB-20-6, 7BB-27-3, 7BB-27-3R5, 7BB-27-4, 7BB-35-3, 7BB-41-2, and 7SB-20-7 described in Cited Document 1).

Also, in Table 1 of Cited Document 2 and the piezoelectric vibrator described in [0027], it can be done accordingly by a person skilled in the art to change the value of the diameter of the piezoelectric element and the diameter of the vibration plate to one close to that, and to change the material of the vibration plate to a similar one.

Therefore, patent inventions 1 to 3 could be easily made by a person skilled in the art on the basis of the invention described in Cited Document 2 (Table 1 of Cited Document 2 and the piezoelectric vibrator described in [0027]).

No. 5 Regarding other reasons for rescission alleged by the opponent

1. Reasons why the appellant should not be granted a patent for the patent invention 4

under the provisions of Article 29(2) of the Patent Act.

The opponent alleged as follows.
(1) Patent invention 4 and the invention described in Evidence A No. 6 (South Korean Registered utility model gazette No. 20-0476280) are in correspondence in the point of "having a hole penetrating the piezoelectric element and the metal plate," and seeking desired sound quality, it is a design matter to select the material and area of the piezoelectric element or the metal plate on the basis of the density and elastic modulus of the piezoelectric element or the metal plate so as to improve sound conduction in the metal plate.
(2) Also, it is well-known art for a person skilled in the art to make the length of the piezoelectric element and the vibration plate differ to generate a plurality of resonance frequencies so as to solve a problem that frequency characteristics are made flat from a low frequency zone to a high frequency zone (Evidence A No. 4 (Japanese Unexamined Patent Application Publication No. 2004-23436)), in the speakers described in Evidence A No. 1 and Evidence A No. 2, and it could be easily conceived by a person skilled in the art to be provided with holes as described in Evidence A No. 6 so as to generate the plurality of resonance frequencies by applying such a well-known art, and to "enable various resonance frequencies due to difference in the length of sections delimited by the holes."
(3) Therefore, patent invention 4 is an invention which could be easily conceived from the inventions described in Evidence A No. 1 and Evidence A No. 2, and the inventions described in Evidence A No. 4 and Evidence A No. 6. (Written objection Pages 23 to 24)

However, the speaker described in Evidence A No. 6 is a speaker which can provide high sound quality by using a dynamic speaker embodying a low sound range and a piezoelectric element embodying high sound range ([0001]), a hole (36) formed at a center of a piezoelectric element (30) and one or a plurality of holes (37) formed along an edge part of the piezoelectric element (30) are holes which are formed so as to enable sound generated from a vibration plate (28) of the dynamic speaker to pass through ([0020]), so that they significantly differ from the holes of patent invention 4.

Therefore, the allegation of the opponent described above cannot be accepted.

2. Reasons for inaccuracies in description

The opponent alleges as follows.
(1) It is acknowledged that the problem of the patent invention is "to provide a speaker sticking a metal plate and a piezoelectric element, which has a distortion factor of output sound." The range described so that a person skilled in the art can recognize that the problem can be solved is a range in which experimental results are shown in the embodiment. That is, only the experimental result without the holes 3 is shown, and there is no mention about the experimental result of producing a speaker actually provided with the holes. Therefore, so as to seek desired sound quality in a speaker provided with the holes, a person skilled in the art is required to practice excessive trial and error, such as selecting the place to bore and size of the holes specifically.

Therefore, since it cannot be said that patent invention 4 is clearly and sufficiently described in the detailed description of the invention so as to enable a person skilled in the art to work the invention, the patent does not meet the requirement

stipulated in Article 36(4)(i) of the Patent Act.
(2) Also, patent invention 4 exceeds the range described in the detailed description of the invention so as to enable a person skilled in the art to recognize that the problem of the invention can be solved, and it cannot said that the inventions relating to Claims and those described in the detailed description of the invention as the invention are substantially correspondence, and thus it does not meet the requirement stipulated in Article 36(6)(i) of the Patent Act (Written objection Pages 24 to 25).

However, since the holes 3 are described in Fig. 1, and there is a description in [0021] "the metal plate 1 and the piezoelectric element 2 may be provided with holes 3. The holes 3 penetrate the metal plate 1 and the piezoelectric element 2. Therefore, the vibration plate has various resonance frequencies due to difference in the length of sections delimited by the holes. The holes 3 penetrates also the piezoelectric element 2, and the resonance frequency of the metal plate 1 (the resonance frequency as a whole of the metal plate 1 and the piezoelectric element 2) varies. The frequency characteristics become flat, and a distortion which is pointed out in a specific frequency is eased," a person skilled in the art, referring to these descriptions, can recognize that it is possible to select the place to bore and size of the holes specifically and that by providing the holes, "The frequency characteristics become flat, and a distortion which is pointed out in a specific frequency is eased."

Therefore, the allegation of the opponent described above cannot be accepted.

No. 6 Closing

As described above, the inventions relating to Claims 1 to 3 are the invention described in Evidence A No. 1 and the invention described in Evidence A No. 2, and thus fall under Article 29(1)(iii) of the Patent Act, falls under Article 113(2) of the Patent Act, and should be invalidated.

Also, since the inventions relating to Claims 1 to 3 could be easily conceived by a person skilled in the art from the invention described in Evidence A No. 1 and could be easily conceived by a person skilled in the art from the invention described in Evidence A No. 2, the patent according to Claims 1 to 3 violates the provisions of Article 29(2) of the Patent Act, falls under Article 113(2) of the Patent Act, and should be invalidated.

Regarding the patent according to Claim 4, the reasons of the opposition to the grant of a patent described in the written opposition cannot revoke the patent according to Claim 4.

Also, no other reason for revoking the patent according to Claim 4 is found.

Therefore, the decision shall be made as described in the conclusion.

September 15, 2017

Chief administrative judge: MORIKAWA, Yukitoshi
Administrative judge: SEKIYA, Ryuichi
Administrative judge: KOKUBU, Naoki