

Appeal decision

Appeal No. 2015- 3540

Osaka, Japan

Appellant

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The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2011-62604, entitled "ULTRASONIC SENSOR" (the application published on October 18, 2012, Japanese Unexamined Patent Application Publication No. 2012-198106) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The patent application (hereinafter, referred to as "the Application") related to the case of appeal is an application dated March 22, 2011, and the outline of history of the procedures is as follows.

November 19, 2014: Examiner's decision of refusal (delivered on November 25, 2014)

February 25, 2015: Submission of request for appeal and

written amendment

March 20, 2015:

Reconsideration report

Dated on October 30, 2015:
November 4, 2015)

Notice of reasons for refusal (dispatched on

December 28, 2015:
amendment

Submission of written opinion and written

No. 2 The Invention

The inventions relating to Claims 1 to 10 of the Application are specified by matters described in Claims 1 to 10 according to the scope of claims for patent amended by the written amendment submitted on December 28, 2015. The invention relating to Claim 1 of the invention (hereinafter, referred to as "the Invention") is as follows.

"An ultrasonic sensor, comprising: a transmitting and receiving block storing a transmitting and receiving element for transmitting and receiving ultrasonic waves; a circuit board mounted with an electronic circuit for processing ultrasonic signals transmitted and received through the transmitting and receiving element; a housing provided with an opening, through which the circuit board is stored in a board storing part, to which the transmitting and receiving block is mounted; conduction means for electrically connecting the transmitting and receiving element and the electronic circuit of the circuit board through an insertion hole provided at the housing; means for closing the opening; and a filler filling an inside of the transmitting and receiving block, wherein

the insertion hole is encapsulated with the filler, and the board storing part is not filled with the filler."

No. 3 Reasons for refusal by the body

One of the reasons for refusal notified by the body on October 30, 2015 is as follows (hereinafter, referred to as "the body's reasons for refusal").

"1 Since the inventions relating to the following claims described below of the patent application (hereinafter, referred to as "the Application") related to the case of appeal could have been easily provided before the application was filed by a person skilled in the art based on inventions described in the publications below distributed in Japan or abroad or inventions that became available to the public through an electric telecommunication line, the appellant should not be granted a patent under the provisions of Article 29(2) of the Patent Act.

Note (Concerning the cited documents, refer to the list of cited documents)

(1) Claims 1, 2

Cited Documents 1, 2

Remarks:

The Cited Document 2 (paragraph 0007, refer mainly to the description in FIG. 2) discloses

an ultrasonic sensor (a preamplifier module using a ultrasonic transmitting and receiving device), comprising: a transmitting and receiving block (a piezoelectric element 1, a bottomed cylindrical case 2) storing a transmitting and receiving element for transmitting and receiving ultrasonic waves; a circuit board (a board 11) mounted with an electronic circuit for processing ultrasonic signals transmitted and received through the transmitting and receiving element; a housing (9), provided with an opening, through which the circuit board is stored in a board storing part, to which the transmitting and receiving block is mounted; conduction means for electrically connecting the transmitting and receiving element and the electronic circuit of the circuit board through an insertion hole provided at the housing; and a sealant 12 for encapsulating the board storing part, wherein the insertion hole is encapsulated with a filler (sealant 14) filling an inside of the transmitting and receiving block.

The conduction means is formed by connecting pin terminals (metal terminals 16a, 16b) electrically connected to one end of the electronic circuit of the circuit board and lead wires (input and output leads 5a, 5b), the other end of which is connected to the transmitting and receiving element.

Next, the Cited Document 1 discloses a method related to an ultrasonic sensor as means for securing water resistance of the board storing part, by using a lid member 7 (refer to descriptions in paragraphs 0082 to 0085, 0092, 0093) for covering at an opening, instead of a configuration (refer to the description of paragraph 0003) of filling with a filler, thereby suppressing increase in weight and cost, preventing generation of distortions in the circuit board, and shortening manufacturing time.

When manufacturing an ultrasonic sensor, suppressing increase in weight and cost, preventing generation of distortions in the circuit board caused by a filler, and shortening manufacturing time are all obvious problems.

Therefore, in the ultrasonic sensor disclosed in the Cited Document 2, there exists no particular difficulty in configuring to use a lid member for covering at an opening; namely, means for covering the opening instead of the configuration of encapsulating the board storing part with the sealant 12 in order to suppress increase in weight and cost, prevent generation of distortions in the circuit board, and shorten manufacturing time."

" A list of cited documents

1. Japanese Unexamined Patent Application Publication No. 2011-053109
2. Japanese Unexamined Patent Application Publication No. 2010-118958

No. 4 Described matters in the cited documents

1 Cited Document 2

(1) Description of the Cited Document 2

Japanese Unexamined Patent Application Publication No. 2010-118958 (application published on May 27, 2010, hereinafter, referred to as "Cited Document 2"), cited in the body's reasons for refusal, which is a publication distributed before the filing of the Application, has the following description along with the drawings. (Underlines were added by the body.)

"Technical Field

[0001]

The present invention relates to a preamplifier module using an ultrasonic transmitter/receiver for transmitting and receiving an ultrasonic frequency band."

"[0007]

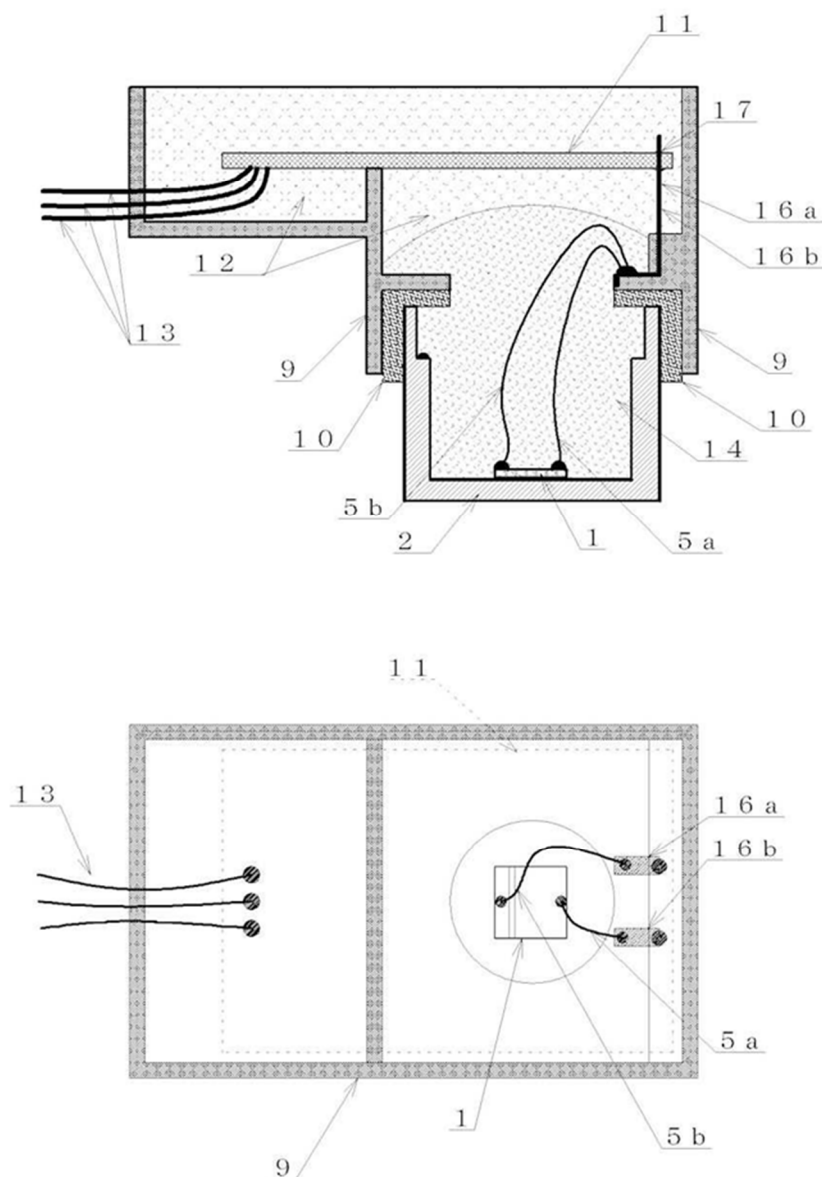
(Omitted)

FIG. 2 illustrates a schematic sectional view of a preamplifier module using another ultrasonic transmitter/receiver associated with an embodiment of the present invention in an upper part, and illustrates a sketch viewed from an upper surface by seeing through a board 11 mounted with an electronic component in a lower part. In FIG. 2, inside a bottom surface of a bottomed cylindrical case 2 composed of an aluminum material and the like, a piezoelectric element 1 is fixed and a unimorph vibrator is formed. The piezoelectric element 1 is so configured that a silver electrode is extracted to a front from a rear face in a folded structure and two electrodes are installed on one surface, which are fixed with a cushion 10 composed of an elastic resin to a housing 9 composed of a PBT resin and the like. The silver electrode of the

piezoelectric element is extracted by soldering output and input leads 5a, 5b. These output and input leads are connected to metal terminals 16a, 16b buried in the housing 9 by soldering and the like. This is, for instance, filled with a sealant 14 formed by mixing a formable silicone material, a formable urethane agent 15, or crushed form and the like and an elastic agent. A board 11 mounted with an electronic circuit provided in advance with a through-hole is mounted at positions of buried metal terminals 16a, 16b provided at the housing and electrically connected by soldering and the like. A terminal for connecting to a controller with a wire 13 and the like is provided, and is encapsulated with a sealant 12 composed of urethane and the like to construct a preamplifier module. (remainder omitted.)"

[FIG. 2]

【 図 2 】



整理番号 T A 0 0 4 2 Reference number TA0042

【 図 2 】 [FIG. 2]

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(2) Technical matters that can be understood from the Cited Document 2

a From a description of paragraph 0001, it is understood that, in the Cited Document 2, a technical matter of "a preamplifier module using an ultrasonic transmitting and

receiving apparatus for transmitting and receiving an ultrasonic frequency band" is described.

b From a description of paragraph 0007, there can be read a technical matter, "Inside a bottom surface of a bottomed cylindrical case 2, a piezoelectric element 1 is fixed, which is fixed to a housing 9 with a cushion 10. The silver electrode of the piezoelectric element 1 is extracted by soldering output and input leads 5a, 5b, or the like. These input leads 5a, 5b are connected to metal terminals 16a, 16b by soldering or the like."

c From a description of paragraph 007 and FIG. 2, there can be read a technical matter, "An inside of a bottomed cylindrical case 2 is filled with a sealant 14."

d From a description of paragraph 007, there can be read a technical matter, "A board 11 on which an electronic circuit provided in advance with a through-hole at positions of the metal terminals 16a, 16b is mounted and electrically connected by soldering or the like."

e From a description of paragraph 007 and FIG. 2, there can be read a technical matter, "A board 11 is stored through an opening included in the housing 9 and a portion of the housing 9 storing the board 11 is encapsulated with a sealant 12."

f From FIG. 2, there can be recognized a technical matter, "The output and input leads 5a, 5b pass through an insertion hole provided at the housing 9."

g From FIG. 2, there can be recognized a technical matter, "The insertion hole provided at the housing 9 is encapsulated with a sealant 14."

(3) By collectively considering the above-described technical matters a to g, it can be recognized that, in the Cited Document 2, the following invention (hereinafter, referred to as "the Cited Invention") is described.

" A preamplifier module using an ultrasonic transmitter/receiver for transmitting and receiving an ultrasonic frequency band, wherein, inside a bottom surface of a bottomed cylindrical case 2, a piezoelectric element 1 is fixed, which is fixed to a housing 9 with a cushion 10, a silver electrode of the piezoelectric element 1 is

extracted by soldering output and input leads 5a, 5b, or the like, the output and input leads 5a, 5b are connected to metal terminals 16a, 16b by soldering or the like, an inside of the bottomed cylindrical case 2 is filled with a sealant 14, and a board 11 on which an electronic circuit provided in advance with a through-hole at positions of the metal terminals 16a, 16b is mounted and electrically connected by soldering or the like, wherein

the board 11 is stored through an opening included in the housing 9 and a portion of the housing 9 storing the board 11 is encapsulated with a sealant 12,

the output and input leads 5a, 5b pass through an insertion hole provided at the housing 9, and

the insertion hole is encapsulated with the sealant 14."

2 Cited Document 1

(1) Description of the Cited Document 1

Japanese Unexamined Patent Application Publication No. 2011-053109 (application published on March 17, 2011, hereinafter referred to as "the Cited Document 1"), cited in the body's reasons for refusal, which is a publication distributed before the filing of the Application, has the following descriptions along with the drawings. (Underlines were added by the body.)

"[0001]

The present invention relates to an ultrasonic sensor that is mounted on a motor vehicle to be used for obstacle detection or the like.

BACKGROUND OF THE INVENTION

[0002]

Conventionally, there is available an ultrasonic sensor that includes, as shown in FIG. 13, a hollow housing 101 having an opening on one surface thereof, a transceiver device 102 having a wave transmitting and receiving surface for transmitting and receiving ultrasonic waves, the wave transmitting and receiving surface exposed on the other surface of the housing 101, a circuit board 103 arranged within the housing 101 and mounted with an electronic circuit for processing an ultrasonic signal transmitted and received through the transmitting and receiving element, a wiring line 104 electrically interconnecting the transceiver device 102 and the circuit board 103, a cover member 105 installed to cover the opening of the housing 101, and a terminal 106 connected at one end to the circuit board 103 by welding or other methods and at the other end to a power supply terminal (not shown).

[0003]

When used in a motor vehicle, the ultrasonic sensor is installed in a portion highly susceptible to drenching and severe vibration; e.g., a bumper or a front grill. In many conventional ultrasonic sensors, therefore, a filler material 107 (such as silicone or the like) having hydrophobicity and elasticity is filled in the housing 101 accommodating the circuit board 103 and so forth. It is a typical configuration to secure a required increased waterproof property and a high vibration resistance in this manner (see, e.g., Japanese Patent Application Publication No. 2005-24351)."

"The problem to be solved

[0005]

In the conventional example stated above, however, the weight and cost of the ultrasonic sensor are proportionately increased as the filler material 107 is filled in the housing 101. In addition, there is a possibility that, due to the existence of the filler material 107, distortions are generated in the circuit board 103 arranged within the housing 101. It is also likely that cracks are generated in the solder portions between the circuit board 103 and the electronic parts mounted on the circuit board 103. There is also the likelihood that the sensing area characteristics of the sensor are changed before and after filling the filler material 107. Other causes of generating distortions in the circuit board 103 include, e.g., an external load generated by the thermal expansion and shrinkage of the filler material 107. Examples of the change in the sensing area characteristics before and after filling the filler material 107 include the narrowing of a sensing area of the sensor. There is also a problem in that a great deal of time is required in the drying process. In this viewpoint, there remains room for improvement.

[0006] In view of the above, the present invention provides an ultrasonic sensor capable of suppressing an increase in weight and cost while securing a waterproof property, capable of preventing generation of distortions in a circuit board, and capable of shortening a manufacturing time."

"[0060]

(Omitted)

FIG. 8 is a sectional view showing an ultrasonic sensor according to a second embodiment of the present invention;

(Omitted)

FIG. 13 is a sectional view illustrating a conventional ultrasonic sensor."

"[0062]

(First Embodiment)

Referring to FIG. 1, the ultrasonic sensor of the present embodiment includes: a transceiver device 1 for transmitting and receiving ultrasonic waves; a cover 2 covering the surface of the transceiver device 1 except for the wave transmitting and receiving surface thereof; a circuit board 3 mounted with an electronic circuit for processing ultrasonic signals transmitted and received through the transceiver device 1; a housing 4 having a device storing portion 41 for accommodation of the transceiver device 1 and a board storing portion 42 for accommodation of the circuit board 3, the board storing portion 42 having an opening 42a, the housing 4 having a communication hole 43 through which the device storing portion 41 and the board storing portion 42 communicate with each other; and a seal plate 5 closing the communication hole 43; an outer connection terminal 6 connected at one end to the circuit board 3 and at the other end to an external terminal (not shown); and a cover member 7 installed to cover the opening of the board storing portion 42."

"[0069]

The circuit board 3 is stored into the board storing portion 42 through the opening 42a and is connected to the connector terminals 14 extending through the communication hole 43.

[0070]

The housing 4 includes: the substantially hollow box-like board storing portion 42 having the opening 42a on one surface thereof; the substantially cylindrical device storing portion 41 adjoining to the board storing portion 42 with the other surface (a partition wall 44) of the board storing portion 42 interposed therebetween, the device storing portion 41 having an opening 41a formed on one surface thereof; and the communication hole 43 extending through the partition wall 44 to bring the other surface of the board storing portion 42 and the other surface of the device storing portion 41 into communication with each other."

"[0082]

The cover member 7 includes a substantially rectangular flat top plate 71 made of white (light-transmitting) polybutylene terephthalate and an extension portion 72 extending from the peripheral edge of the top plate 71 in a substantially perpendicular relationship with respect to the top plate 71. The cover member 7 is installed to cover the opening

42a of the board storing portion 42 with the top plate 71 facing toward the bottom surface of the board storing portion 42. The top plate 71 of the cover member 7 and the peripheral edge portion of the opening 42a of the board storing portion 42 are hermetically bonded to each other by ultrasonic welding or laser welding. The welding method is not limited to the ultrasonic welding or the laser welding but may be vibration welding and the like. In place of the welding, bonding may be performed through the use of an adhesive agent.

[0083]

As a result, the gap between the cover member 7 and the housing 1 is closed. This makes it possible to prevent moisture from infiltrating into the board storing portion through the opening 42a of the board storing portion 42.

[0084]

In the ultrasonic sensor of the present embodiment described above, the seal plate 5 is welded to the housing 4 and the transceiver device 1 to thereby close the communication hole 43. The cover member 7 is welded to the housing 4 to thereby close the opening 42a of the board storing portion 42. Thus, the board storing portion 42 has a sealed waterproof structure.

[0085]

With the ultrasonic sensor of the present embodiment, it is therefore possible to, while securing a waterproof property, eliminate the need to fill a filler material into the board storing portion 42, which would otherwise be needed to prevent the circuit board 3 from getting wet. This makes it possible to suppress an increase in weight and cost. Moreover, it is possible to prevent generation of distortions in the circuit board 3 and to shorten a manufacturing time.

[0086]

A sealing material may exist in at least one of a gap between the seal plate 5 and the housing 4 and a gap between the seal plate 5 and the transceiver device 1. In addition, a sealing material may exist in a gap between the cover member 7 and the housing 4. This makes it possible to further enhance the waterproof property of the board storing portion 42."

"[0089]

(Second Embodiment)

The ultrasonic sensor of the present embodiment differs from the ultrasonic sensor of the first embodiment in that the seal plate 5 is omitted and the communication hole 43 is closed by only an adhesive agent 9. Other configurations remain the same as those of

the first embodiment and therefore will be designated by like reference symbols with no description thereof provided.

[0090]

In the present embodiment, the ultrasonic sensor does not include the seal plate 5. Thus, the base 13 is exposed to the board storing portion 42 through the insertion hole 2a of the cover 2 and the communication hole 43.

[0091]

The adhesive agent 9 is injected into the pit portion 42b having a relatively large opening. Thus, the adhesive agent 9 flows from the pit portion 42b into the communication hole 43 having a small opening. This makes it possible to easily and reliably fill the adhesive agent 9 from the pit portion 42b to the base 13. As a result, the gap between the board storing portion 42 and the device storing portion 41 is closed. This prevents moisture from infiltrating from the device storing portion 41 into the board storing portion 42 through the communication hole 43.

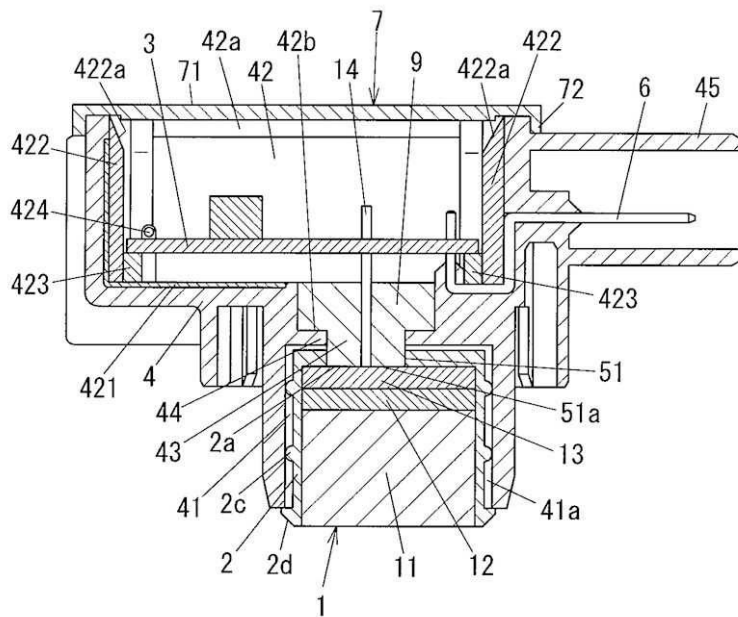
[0092]

Just as in the first embodiment, the opening 42a of the board storing portion 42 is covered with the cover member 7 and is closed by welding the cover member 7 to the housing 4. This makes it possible to prevent moisture from infiltrating into the board storing portion 42 through the opening 42a.

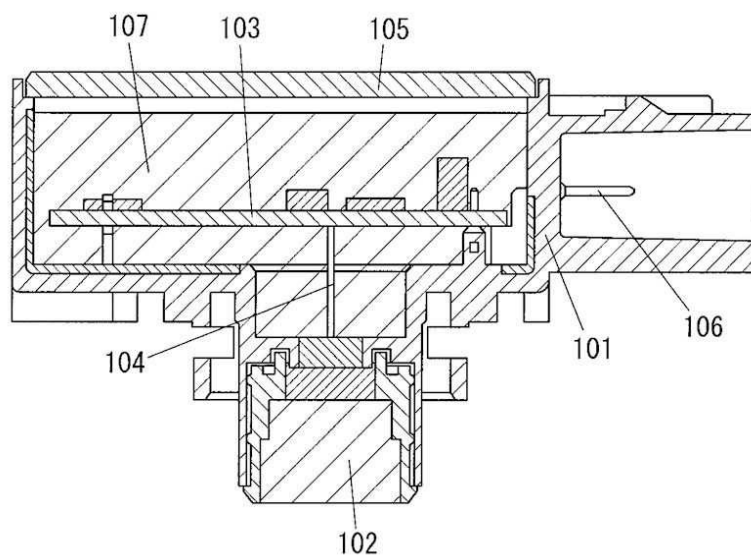
[0093]

In the ultrasonic sensor of the present embodiment, therefore, the board storing portion 42 has a waterproof structure sealed by the cover member 7 and the adhesive agent 9."

[FIG. 8]



[FIG. 13]



(2) Technical matters readable from the Cited Document 1

From the description above, the following technical matters (hereinafter, referred to as "Technical Matters described in the Cited Document 1") can be read.

" An ultrasonic sensor so configured that, since the cover member 7 to cover the opening of the board storing portion 42 is welded to the housing 4 to thereby close the

opening of the board storing portion 42, the board storing portion 42 has a sealed waterproof structure, and the need to fill a filler material into the board storing portion 42 is eliminated, which would otherwise be needed to prevent the circuit board 3 from getting wet, while securing a waterproof property, whereby an increase in weight and cost can be suppressed, generation of distortions in the circuit board 3 can be prevented, and a manufacturing time can be shortened."

No. 5 Comparison and judgment

1 Comparison

The Invention and the Cited Documents are compared.

A The Cited Invention performs transmission and reception of an ultrasonic frequency band. Therefore, "piezoelectric element 1" of the Cited Invention corresponds to "transmitting and receiving element" (for transmitting and receiving an ultrasonic wave) of the Invention.

B It is understandable for a person skilled in the art from a common sense that, in the Cited Invention, an electronic circuit mounted on the "board 11" is used for processing an ultrasonic signal. Therefore, "the board 11" of the Cited Invention corresponds to "the circuit board" (on which an electronic circuit for processing an ultrasonic signal transmitted or received through the transmitting and receiving element are mounted) of the Invention.

C It is obvious that "input and output leads 5a, 5b" and "metal terminals 16a, 16b" of the Cited Invention electrically connects "the piezoelectric element 1" and an electronic circuit mounted on "the board 11."

Therefore, "the input and output leads 5a, 5b" and "the metal terminals 16a, 16b" of the Cited Invention correspond to "conduction means" (electrically connecting the transmitting and receiving element and an electronic circuit of the circuit board) of the Invention.

D According to the description of paragraphs 0021 and 0022 in the specification of the Invention, a "transmitting and receiving block" is constituted of a transmitting and receiving element 10 composed of a piezoelectric element and a case 11 storing inside the transmitting and receiving element 10. Then, it is reasonable to recognize that "the transmitting and receiving block" of the Invention is constituted of "a transmitting and

receiving element" and a case storing inside the transmitting and receiving element.

On the other hand, the Cited Invention includes: "a piezoelectric element 1" and "a bottomed cylindrical case 2," inside which the piezoelectric element 1 is fixed. Here, it can be said that "the bottomed cylindrical case 2" stores inside the piezoelectric element 1.

Therefore, "the piezoelectric element 1" and "the bottomed cylindrical case 2" of the Cited Invention correspond to "the transmitting and receiving block" of the Invention (storing the transmitting and receiving element for transmitting and receiving an ultrasonic wave).

E "The housing" of the Invention includes an opening, through which a circuit board is stored in a board storing part, to which the transmitting and receiving block is mounted, and is provided with an insertion hole through which a conduction means passes.

On the other hand, "the housing 9" of the Cited Invention includes an opening through which "a board 11" (corresponding to "the circuit board") is stored, to which "the piezoelectric element 1" and "the bottomed cylindrical case 2" (corresponding to "the transmitting and receiving block") are fixed, and includes an insertion hole through which input and output leads 5a, 5b (corresponding to "the conduction means") passes.

Therefore, "the housing 9" of the Cited Invention corresponds to "the housing" of the Invention, at the same time, "the input and output leads 5a, 5b passes an insertion hole provide at the housing 9" of the Cited Invention corresponds to "the conduction means" "passes through an insertion hole provided at the housing" of the Invention.

Here, in the Cited Invention, a portion of the housing 9 in which the board 11 is stored is encapsulated with a sealant 12. Then, in "the housing 9," a portion encapsulated with a sealant 12 can be recognized as "a portion in which the board 11 is stored." The "portion in which the board 11 is stored" corresponds to "the board storing part" of the Invention.

F "The filler" of the Invention fills an inside of "the transmitting and receiving block," and encapsulates the insertion hole provided at the housing.

On the other hand, "the sealant 14" of the Cited Invention" "fills an inside of the bottomed cylindrical case 2," and encapsulates the insertion hole provided at the housing 9.

Here, by considering "the bottomed cylindrical case 2" to correspond to "the transmitting and receiving block" of the Invention, "the sealant 14" of the Cited

Invention corresponds to "the sealant" of the Invention.

G "the preamplifier module" (using an ultrasonic transmitting and receiving device for transmitting and receiving an ultrasonic frequency band) of the Cited Invention corresponds to "the ultrasonic sensor" of the Invention.

2 Corresponding features and different features

As described above, corresponding features and different features of the Invention and the Cited Invention are as follows.

(Corresponding features)

" An ultrasonic sensor comprising: a transmitting and receiving block for storing a transmitting and receiving element for transmitting and receiving an ultrasonic wave; a circuit board on which an electronic circuit for processing an ultrasonic wave signal transmitted and received through the transmitting and receiving element is mounted; a housing, including an opening through which the circuit board is stored in a board storing part, to which the transmitting and receiving block is mounted; conduction means for electrically connecting the transmitting and receiving element and the electronic circuit of the circuit board through an insertion hole provided at the housing; and a filler filling an inside of the transmitting and receiving block, wherein the insertion hole is encapsulated with the filler."

(The different features)

While the Invention includes "means for closing the opening" and "the board storing part is not filled with the filler," the Cited Invention does not include "means for closing the opening" and "a portion in which the board 11 is stored is encapsulated with the sealant 12."

3 Judgment

Next, the different features will be examined.

A From the technical matters described in the Cited Document 1, it can be understood by a person skilled in the art who reads the description of the Cited Document 1 that, concerning an ultrasonic sensor, by including a closing member for closing an opening instead of a configuration of filling the board storing part with a filler, increase in weight and cost can be suppressed, generation of distortions in the

circuit board is prevented, and manufacturing time is shortened.

Here, when manufacturing the ultrasonic sensor, to suppress increase in weight and cost, to prevent generation of distortions in the circuit board caused by a filler, and to shorten manufacturing time are all obvious challenges.

Therefore, it could have been easily conceived by a person skilled in the art, for the purpose of suppressing increase in weight and cost, preventing generation of distortions in the circuit board and shortening manufacturing time, to make, in the preamplifier module (ultrasonic sensor) of the Cited Invention, a configuration in which a closing member for closing the opening, in other words, means for closing the opening is included, and as a result, the board storing part is not filled with a filler, instead of a configuration in which a portion in which the board 11 is stored (board storing part) is encapsulated with a sealant 12, in other words, the board storing part is filled with a filler.

B Furthermore, even when the above-described different features are comprehensively taken into account, function and effect exerted by the Invention is nothing more than within a range predicted from the function and effect exerted by the Cited Document and the technical matters described in the Cited Document 1, and cannot be said to be anything prominent.

C Accordingly, the Invention could have been easily invented by a person skilled in the art on the basis of the Cited Invention and the technical matters described in the Cited Document 1.

No. 6 Closing

As described above, the Invention could have been easily invented by a person skilled in the art on the basis of the Cited Invention and technical matters described in the Cited Document 1, and thus the appellant should not be granted a patent for the Invention in accordance with the provisions of Article 29(2) of the Patent Act.

Therefore, the Application shall be rejected even without examining the inventions associated with the other claims.

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

February 15, 2016

Chief administrative judge: MORI, Ryosuke

Administrative judge: HORI, Keiji
Administrative judge: NAKATSUKA, Naoki