

Decision on Opposition

Opposition No. 2019-700092

Kyoto, Japan

Patentee KYOCERA Corporation

Tokyo, Japan

Opponent HASHIMOTO, Kiyoshi

The case of an opposition to the grant of a patent regarding the invention of Japanese Patent No. 6374279, entitled "MULTI-PIECE WIRING BOARD, WIRING BOARD, AND MANUFACTURING METHOD FOR MULTI-PIECE WIRING BOARD", has resulted in the following decision.

Conclusion

The patents according to Claims 1 to 6 of Japanese Patent No. 6374279 are maintained.

Reason

No. 1 History of the procedures

The application regarding the patents according to Claims 1 to 6 of Japanese Patent No. 6374279 was filed on Sep. 24, 2014, the establishment of the patent right was registered on Jul. 27, 2018, and a gazette containing the patent was issued on Aug. 15, 2018. After that, against that patent, the patent opponent Hashimoto Kiyoshi filed an opposition to the grant of a patent on Feb. 7, 2019.

No. 2 The Patent Invention

Each of the inventions according to Claims 1 to 6 of Japanese Patent No. 6374279 (hereinafter, referred to as "Patent Invention 1" to "Patent Invention 6"), is as follows as specified by the matters described in Claims 1 to 6 of the scope of claims thereof.

"[Claim 1]

A multi-piece wiring board, comprising:

a mother board in which a plurality of wiring board regions are arrayed,

which includes a first principal surface, and a second principal surface at an opposite side of the first principal surface, and which includes a dividing groove along a boundary of the wiring board regions on the first principal surface;

a first hole part which is formed over the boundary of the wiring board regions on the first principal surface; and

a side surface conductor which is attached on an inner side surface of the first hole part, wherein

at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface.

[Claim 2]

The multi-piece wiring board according to claim 1, wherein

the mother board includes a second hole part in the second principal surface, the second hole part communicates with the first hole part, and an aperture in the side of the second principal surface is larger than an aperture in the side of the first principal surface.

[Claim 3]

The multi-piece wiring board according to Claim 1 or Claim 2, wherein

the side surface conductor is thicker at its end in the side of the second principal surface than at its end in the side of the first principal surface.

[Claim 4]

The multi-piece wiring board according to any one of Claims 1 to 3, further comprising:

a wiring conductor formed inside the mother board; and an auxiliary conductor formed inside the mother board, wherein

the auxiliary conductor is connected to an end of the side surface conductor in the side of the second principal surface and to the wiring conductor.

[Claim 5]

A wiring board formed by dividing the multi-piece wiring board according to any one of Claims 1 to 4 for each of the wiring board regions.

[Claim 6]

A manufacturing method of a multi-piece wiring board, comprising:

a step of forming, after preparing a ceramic greensheet including a first principal surface, a penetration hole extending entirely through the ceramic greensheet in a thickness direction;

a step of applying metal paste on an inside surface of the penetration hole; and

a step of forming a dividing groove passing through the penetration hole on the first principal surface of the ceramic greensheet by laser processing, wherein,

in the step of forming the penetration hole, an inner side surface of the penetration hole is formed in a manner being narrowed inwardly from an end in the opposite side of the first principal surface to an end in the side of the first principal surface."

No. 3 Outline of grounds for opposition

1. Grounds for opposition 1 (inventive step)

The patent opponent submitted the following Evidence A No. 1 to A No. 6 as evidences, and alleges that the patents according to Claims 1 to 6 were made in violation of the provisions of Article 29(2) of the Patent Act, and thus the patent according to Claims 1 to 6 should be revoked.

Note (List of evidences)

Evidence A No. 1: Japanese Unexamined Patent Application Publication No. 2006-5035

Evidence A No. 2: Japanese Unexamined Patent Application Publication No. 2003-282795

Evidence A No. 3: Japanese Unexamined Patent Application Publication No. 2001-252784

Evidence A No. 4: Japanese Unexamined Patent Application Publication No. 2008-55466

Evidence A No. 5: Japanese Unexamined Patent Application Publication No. H5-55402

Evidence A No. 6: Japanese Unexamined Patent Application Publication No. H5-206592

2. Grounds for opposition 2 (requirements for support)

The patent opponent alleges that the patent according to Claims 1 to 5 was granted to a patent application that does not meet the requirement stipulated in Article 36(6)(i) of the Patent Act, and thus the patent according to Claims 1 to 5 should be revoked.

3. Grounds for opposition 3 (clarity)

The patent opponent alleges that, since the patent according to Claim 2 was

granted to a patent application that does not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act, the patent according to Claim 2 should be revoked.

No. 4 Judgment by the body

1. Regarding grounds for opposition 1 (inventive step)

(1) The described matters in Evidence A No. 1 to A No. 6 and the like

A. Evidence A No. 1 (Japanese Unexamined Patent Application Publication No. 2006-5035)

Evidence A No. 1 describes the following matters together with drawings relating to "CERAMIC PACKAGE ASSEMBLY FOR STORING ELECTRONIC COMPONENT AND CERAMIC PACKAGE".

(The underlines were applied by the body)

(A) "[0004]

FIG. 2 (A) indicates a schematic diagram of an example of a ceramic package, which has a shape in which a frame body 2 is joined to a substrate 1 having a conductor pattern such as an electronic component element connecting land 3. Such wiring board or ceramic package is usually produced in a form of a wiring board assembly as shown in FIG. 2 (B), and this is divided into individual packages. FIG. 3 (A) and (B) show a case where this ceramic package and the assembly thereof are seen upside down in a manner of the under surface being turned up."

(B) "[0006]

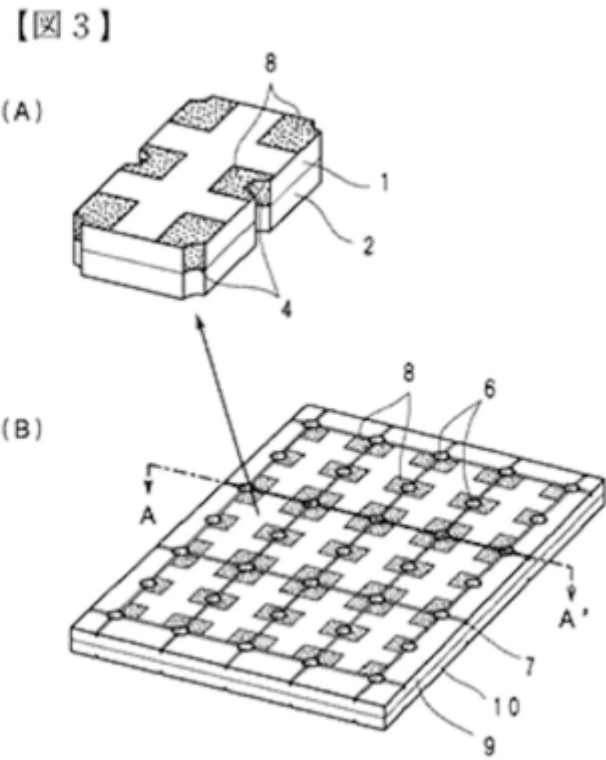
FIG. 5 shows an example of a manufacturing process of such a wiring board assembly and wiring board such as a package and the like. First, a penetration hole 6 that is to become a castellation 4 is made into a greensheet formed to a predetermined thickness, and a paste such as tungsten that is to become a conductor film is printed on the internal wall surface of this penetration hole by a through-hole printing method. Next, in a manner being connected to the conductor film, a conductor paste of a connecting land pattern is printed on the upper surface. In addition, by a sheet to be laminated, also on the under surface, a conductor pattern and the like as a land for a terminal for connecting to a mother print circuit board and the like are printed. In the case of a multi-layered wiring board, greensheets that have the same penetration hole positions, and on which different conductor patterns or via holes for connecting upper and lower layers are formed are fabricated respectively, and these are laminated. In addition, if needed, a frame body is crimped.

[0007]

After the lamination, as indicated in FIG. 2 (B) or FIG. 3 (B), a groove 7 for

use in dividing is formed on the upper and lower surfaces and at positions orthogonal to a penetration hole, and then burning for integration is carried out. After the burning, nickel plating and gold plating for improving conductivity are applied to a circuit pattern exposed on a surface and a conductor film of the internal wall of a penetration hole. By dividing the wiring board assembly manufactured in this way into pieces along dividing grooves at positions of penetration holes, a wiring board (ceramic package) of FIG. 2 (A) or FIG. 3 (A) is completed. By this, the penetration hole 6 having a conductive material film formed on its inner surface becomes the castellation 4 of a side wall of a package or a wiring board."

(C) "



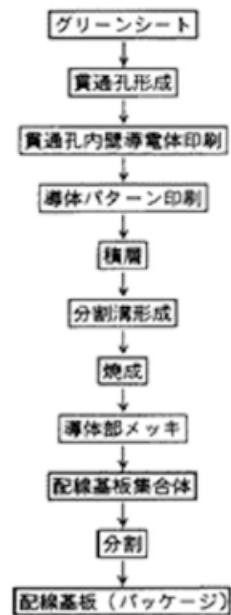
【図 3】

[FIG. 3]

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(D) "

【図 5】



【図 5】 [FIG. 5]

グリーンシート Greensheet

貫通孔形成 Forming penetration hole

貫通孔内壁導電体印刷 Printing conductive material of penetration hole internal wall

導体パターン印刷 Printing conductor pattern

積層 Laminating

分割溝形成 Forming dividing groove

焼成 Burning

導体部メッキ Plating conductor part

配線基板集合体 Wiring board assembly

分割 Dividing

配線基板 (パッケージ) Wiring board (package)

"

According to the above (A), a wiring board is manufactured by dividing a wiring board assembly.

In addition, according to the above (B) and (D), the penetration hole 6 is provided in the wiring board assembly, a conductor film is formed in the internal wall surface of the penetration hole 6, and, further, the groove for dividing 7 is formed at

positions orthogonal to the penetration hole 6 on upper and lower surfaces of the wiring board assembly.

Then, from FIG. 3 (A) and (B) (refer to the above (C)) that are diagrams in the case that the wiring board and the wiring board assembly are seen from the under surface side, it can be seen that a plurality of areas that are to become the wiring boards after dividing are arranged in the wiring board assembly, the penetration hole 6 and the groove for dividing 7 are formed on the under surface of the wiring board assembly, and the penetration hole 6 straddles the groove for dividing 7.

Therefore, when the described matters of the above (A) to (D) are integrated focusing attention on the structures of a wiring board assembly before being divided into wiring boards and the under surface thereof, the following invention is described in Evidence A No. 1.

"A wiring board assembly on which a plurality of areas that are to become wiring boards after dividing are arranged, which has upper and lower surfaces, the under surface including a penetration hole and a groove for dividing formed thereon, wherein

the penetration hole straddles the groove for dividing, and wherein
a conductor film is formed on a surface of an internal wall of the penetration hole."

B. Evidence A No. 2 (Japanese Unexamined Patent Application Publication No. 2003-282795)

Evidence A No. 2 describes the following matters together with drawings relating to "WIRING BOARD". (Note that the underlines were applied by the body)

(A) "[0001]

[Field of the Invention] The present invention relates to a wiring board for mounting an electronic component such as a solid state element and a capacity element, and, more specifically, relates to a wiring board that can be obtained by, after burning a multi-piece substrate, dividing it into individual substrates by so-called chocolate break."

(B) "[0004] Along with recent miniaturization of electronic devices, such a wiring board is becoming extremely small to a degree that its size is several millimeters square, and, on the occasion of its fabrication, a large number of pieces are fabricated intensively (as multi pieces) by: arranging areas to become a plurality of insulating bases in a crisscross pattern on a ceramic greensheet laminated body of wide area that is to become a mother

board for use as an insulating base after burning to form the areas in an integrated fashion; forming dividing grooves for partitioning to the areas to become each insulating base on the upper and lower surfaces of the laminated body at a predetermined depth in advance; and dividing (chocolate break) the assembly of the plurality of the wiring boards obtained by burning along the dividing grooves."

(C) "[0031] Next, an example of a manufacturing method of the wiring board 4 will be described in detail based on FIG. 4 (a) to FIG. 4 (e). Note that, in FIG. 4 (a) to (e), to portions that are identical with those of FIG. 1 to FIG. 3, identical reference characters are given.

(Omitted)

[0034] Next, as shown in FIG. 4 (b), the plurality of the ceramic greensheets 21 are sectioned into areas to become the insulating base 1 of the wiring board 4, predetermined punching processing is applied in each section to provide the opening 23 and the like for forming the mounting part 1a for the solid state device 3, and the penetration hole 22 is formed in such a way straddling between sections by mechanical drilling using a metal pin, laser processing, or the like.

[0035] Next, as shown in FIG. 4 (c), on a surface of the ceramic greensheets 21, the conductive paste 24 to become the outside connecting conductor 2 is applied by printing as a predetermined pattern, and, after that, the ceramic greensheets 21 are laminated one above the other, and the conductive paste 24 is applied by printing on the internal wall surface of the penetration hole 22 of the laminated body."

According to the above (A) and (B), it is described that, by dividing an assembly of a plurality of wiring boards along dividing grooves, multiple pieces of wiring boards are manufactured intensively, and, according to the above (C), as a part of the manufacturing method thereof, into a plurality of ceramic greensheets before lamination, the penetration hole 22 is formed by mechanical drilling using a metal pin, laser processing, or the like.

Accordingly, when the described matters of the above (A) and (B) are integrated focusing attention on the step of forming a penetration hole into a ceramic sheet, the following technical matter is described in Evidence A No. 2.

"On the occasion of manufacturing an assembly of a plurality of wiring boards, forming penetration holes in a plurality of ceramic greensheets before lamination by mechanical drilling using a metal pin, laser processing, or the like."

C. Evidence A No. 3 (Japanese Unexamined Patent Application Publication No. 2001-252784)

Evidence A No. 3 describes the following matters together with drawings relating to "LASER PROCESSING DEVICE". (Note that, the underlines were applied by the body.)

(A) "[0006] In a conventional laser processing device, there is a possibility that, in processing of an electronic circuit substrate such as the hole making processing of a ceramic greensheet, on the occasion of processing the ceramic greensheet 2 by the laser light 1 as shown in FIG. 1, if the work hole 3 is located over a glass tube or a work receiving pin, by being in contact with the glass tube or the work receiving pin, an explosion 4 of the processing lower hole is generated, causing an uneven hole diameter or a nonuniform hole shape, or, due to existence of the glass tube or the work receiving pin under the work hole, it is difficult to remove processing residues from the work hole, causing a hole-making defect by generation of the clogging 5. Furthermore, since, on the occasion of processing an electronic circuit substrate, laser light is collected to have an energy density sufficient to process work holders, there is a possibility that such work holders are damaged by the laser light, and labor and cost are taken for replacement of these."

(B) "

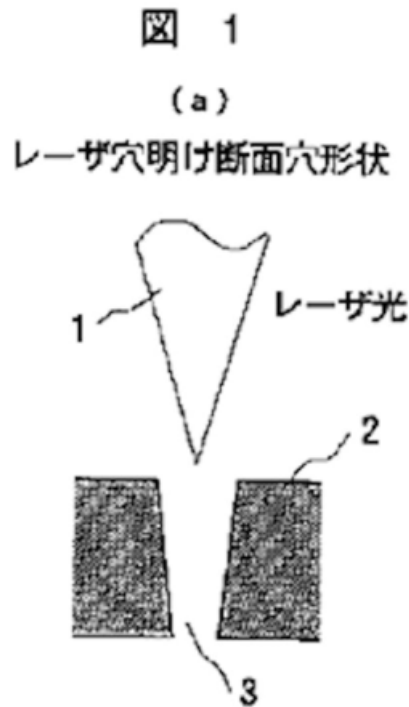


図 1 FIG. 1

レーザ穴明け断面穴形状 Cross-section hole shape in laser hole-making

レーザ光 Laser light

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According to the above (A), FIG. 1 is a diagram when hole-making processing of the ceramic greensheet 2 is carried out by the laser light 1, and, from FIG. 1 (a) shown in the above (B), it can be seen that the shape of the hole narrows inward from the surface in the side of laser light radiation to the surface on the opposite side.

D. Evidence A No. 4 (Japanese Unexamined Patent Application Publication No. 2008-55466)

In Evidence A No. 4, the following matters are described together with drawings relating to "THROUGH-HOLE MACHINING METHOD, THROUGH-HOLE MACHINING SYSTEM, AND MASK". (Note that, the underlines were applied by the body.)

(A) "[0001]

The present invention relates to a through-hole machining method of

processing a through-hole by pulsed laser, to a through-hole machining system, and to a mask used therein."

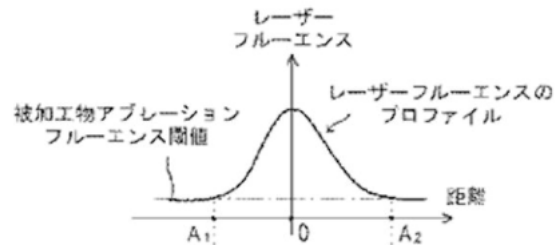
(B) "[0018]

Next, embodiments of the present invention will be described using drawings.
(Principle of the present invention - the reason of a taper caused in a through-hole -)

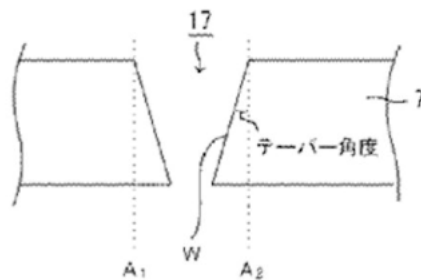
The laser fluence (energy density) of a pulsed laser beam is of, as shown in FIG. 1, a space distribution that is high in the middle part and low in the peripheries, and generally takes approximately a Gaussian distribution. Therefore, assuming that O is a beam center position, A₁ and A₂ are positions that are equal to the threshold of ablation fluence, approximately OA₁=OA₂, and the distribution has approximately axial symmetry. In the center side where laser fluence is larger than the threshold for causing ablation of a workpiece, a hole is gradually dug by the ablation, and there is a tendency that, in the center side, the hole is dug more deeply because the nearer to the middle, the higher the fluence. For this reason, the wall surface of a hole becomes a slope W as shown in FIG. 2. FIG. 2 is a sectional view indicating a workpiece 7 immediately after a hole 17 has been opened. After the hole 17 has penetrated from the surface of the workpiece 7 to the rear surface, even in an outer perimeter end of a laser beam at which fluence is low, ablation is caused at portions of fluence larger than the ablation threshold, and, therefore, it is considered as the hole is gradually dug when a pulse shot count is made larger, and, with time, a taper angle become 0 degree (straight). However, it is not so in reality, and, even if a pulse shot count is increased, the taper angle does not reach 0 degree, and a certain amount of taper angle is maintained."

(C) "

【図 1】



【図 2】



【図 1】 [FIG. 1]

レーザーフルーエンス Laser fluence

被加工物アブレーションフルーエンス閾値 Workpiece ablation fluence threshold

レーザーフルーエンスのプロファイル Profile of laser fluence

距離 Distance

【図 2】 [FIG. 2]

テーパ角度 Taper angle

"

According to the above (A) to (C), by processing a through-hole by pulsed laser, the wall surface of the hole becomes the slope W.

E. Evidence A No. 5 (Japanese Unexamined Patent Application Publication No. H5-

55402)

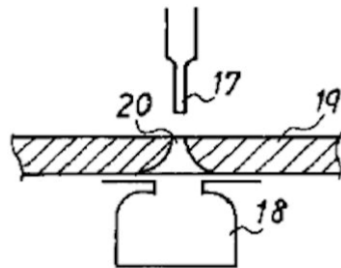
Evidence A No. 5 describes the following matters together with drawings relating to "STRUCTURE OF CERAMIC SUBSTRATE AND MANUFACTURING METHOD THEREOF". (Note that, the underlines were applied by the body.)

(A) "[0003] In addition, when insulator layers having a through hole are multilayered, a structure having a layer configuration in which a punch insertion surface of a through hole is arranged in the component mounting surface side of a multilayer ceramic substrate, or arranged facing the side of the I/O joint surface, is used generally in a manner common to all layers and in a unified manner. By doing so, the processing becomes most efficient, and risk of lamination deviation and the like can be suppressed to the minimum. A multilayer ceramic substrate is formed by laminating greensheets, and hole making for through holes is performed to those greensheets. That is, on the occasion of hole making of a greensheet, as shown in FIG. 4 (a), a greensheet 19 is arranged between punches 17 and die bushes 18 that are arranged to the number of through holes, and, by dropping all the punches 17, all holes are made on the greensheet 19. In such a case, a hole diameter in the side of the punch insertion surface into which the punches 17 is inserted is small (the hole diameter is 100-120 μm), whereas, a hole diameter in the side of punching through side of a punch that is the die bush 18 side becomes large (a hole diameter is 120-160 μm). In this way, since a hole diameter in the punching through side of a punch is larger than that in the punch insertion side by 20-40 μm , when adjacent layers are contacted having large hole diameters together, there is a risk that patterns of adjacent layers come into electrical short contact with each other if lamination deviation and the like is caused. Accordingly, usually, as shown in FIG. 4 (b), the component mounting surface sides or the I/O joint surface sides are arranged in a same direction to realize efficient lamination. As a document associated with this type of structure, there is Japanese Unexamined Patent Application Publication No. S62-158398, for example."

(B) "

【図 4】

(a)



(b)



層 Layer

"

According to the statements of the above (A), a multilayer ceramic substrate is constituted by laminating greensheets, hole making for through holes is performed on those greensheets, and hole diameters of holes made by dropping the punches 17 are small in the punch insertion surface side, whereas, hole diameters become large in the punching through side of the punches.

Then, from FIG. 4 (a) of the above (B), it can be seen that the shape of the hole narrows inward from the surface in the punching through side of the punch toward the punch insertion surface.

Furthermore, from FIG. 4 (b) of the above (B), it can be seen that holes of the above shape are made on each of the laminated greensheets.

F. Evidence A No. 6 (Japanese Unexamined Patent Application Publication No. H5-206592)

Evidence A No. 6 describes the following matters together with drawings

relating to "Ceramic substrate and manufacturing method of ceramic wiring board".
(Note that, the underlines were applied by the body)

(A) "[0014]

[Examples] Hereinafter, examples of the present invention will be described. As a matter of course, it goes without saying that this invention is not limited to the following examples.

-Example 1-

As a ceramic substrate, there was used an alumina substrate (length and breadth 10 cm each, thickness 0.5 mm) in which a V groove for dividing and a through hole (for a conductor circuit) are provided, and a portion where the V groove adjacent to a terminal of the conductor circuit is made discontinuous by a penetration hole of a round shape. The V groove, the through hole, and the penetration hole are formed by laser processing."

(B) "[0018]

[Advantage of the Invention] As has been described above, in the case of a ceramic substrate of the present invention and a manufacturing method of a ceramic wiring board using this, process for dividing ceramic substrates is simple and it is suitable for simultaneous formation of multiple ceramic wiring boards because the groove for dividing is provided, and, even when a metal film or solder remains within a groove for dividing in the manufacturing process of the wiring board, a short between circuits does not occur because the discontinuous portion of a groove is in the state of breaking of wire. Furthermore, forming of a discontinuous portion is simple, too, and thus manufacturing of a ceramic substrate itself is easy. Therefore, it can be said that this invention is very useful."

According to the above-mentioned (A) and (B), a V groove for dividing that is discontinuous by a penetration hole is formed on a ceramic substrate by laser processing.

(2) Regarding Present Invention 1

Since the patent opponent alleges to the effect that Patent Invention 1 is an invention that could have been invented by a person skilled in the art with ease based on the invention described in Evidence A No. 1, the technical matter described in Evidence A No. 2, and the well-known art described in Evidence A No. 3 to A No. 5, this allegation will be discussed below.

A. Invention described in Evidence A No. 1

In Evidence A No. 1, there is described the following invention (hereinafter, referred to as "Invention A-1"), as mentioned in the above (1)A.

"A wiring board assembly on which a plurality of areas that become wiring boards after dividing are arranged, which has upper and lower surfaces, the lower surface including a penetration hole and a groove for dividing formed thereon, wherein the penetration hole straddles the groove for dividing, and wherein a conductor film is formed on a surface of an internal wall of the penetration hole."

B. Comparison

Patent Invention 1 and Invention A-1 will be compared.

(A) Since "wiring board assembly" in Invention A-1 is one by which a plurality of wiring boards are manufactured by dividing it into pieces, it corresponds to "multi-piece wiring board" of Patent Invention 1.

(B) "Areas that are to become wiring boards after dividing" in Invention A-1 correspond to "wiring board regions" in Patent Invention 1. Then, "wiring board assembly" in Invention A-1 and "multi-piece wiring board" of Patent Invention 1 are common in a point of "a plurality of wiring board regions are arrayed".

(C) Since "groove for dividing" in Invention A-1 is formed in order to divide a substrate before dividing; that is, a mother board, into a plurality of wiring boards, it corresponds to "dividing groove" that is included in "mother board" of Patent Invention 1. In addition, for the reason that, as stated in the above (A), a plurality of wiring boards are obtained by dividing along a groove for dividing, it can be said that "groove for dividing" in Invention A-1 is one that is formed "along a boundary of the wiring board regions".

(D) Since, in Patent Invention 1, a surface having a dividing groove is called "the first principal surface", "lower surface" on which a groove for dividing is formed out of "upper and lower surfaces" in Invention A-1 corresponds to "the first principal surface" in Patent Invention 1, and a surface in the opposite side thereof (upper surface) corresponds to "the second principal surface" in Patent Invention 1.

Therefore, when the above (A) to (D) are integrated, Patent Invention 1 and Invention A-1 are common in a point of including "a mother board in which a plurality of wiring board regions are arrayed, which includes a first principal surface and a second principal surface at an opposite side of the first principal surface, and which includes a dividing groove along a boundary of the wiring board regions on the first principal surface".

(E) "Penetration hole" in Invention A-1 and "conductor film" formed on the internal wall surface thereof respectively correspond to "the first hole part" and "side surface conductor" of Patent Invention 1. Then, a penetration hole in Invention A-1 straddles a groove for dividing, and, as described in the above (C), the groove for dividing in Invention A-1 is formed along the boundary of a wiring board region, and, therefore, Patent Invention 1 and Invention A-1 are common in a point that these include "a first hole part which is formed over the boundary of the wiring board regions on the first principal surface, and a side surface conductor which is attached on an inner side surface of the first hole part".

In this regard, however, in Patent Invention 1, "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface", whereas there is a difference in a point that, in Invention A-1, such specification is not made.

When the above matters are summarized, Patent Invention 1 and Invention A-1 are identical and different in the following points.

<Corresponding feature>

"A multi-piece wiring board, comprising:

a mother board in which a plurality of wiring board regions are arrayed, which includes a first principal surface, and a second principal surface at an opposite side of the first principal surface, and which includes a dividing groove along a boundary of the wiring board regions on the first principal surface;

a first hole part which is formed over the boundary of the wiring board regions on the first principal surface; and

a side surface conductor which is attached on an inner side surface of the first hole part."

<The different feature>

In Patent Invention 1, "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface", whereas, in Invention A-1, such specification is not made.

C. Judgment

The above-mentioned different feature is examined.

The patent opponent alleges to the effect that, although there is no description about a specific forming method of the penetration hole 6 in Evidence A No. 1, there is described in Evidence A No. 2 that a penetration hole is formed on a ceramic greensheet by mechanical drilling using a metal pin, or laser processing, and it is well known that, as described in Evidence A No. 3 to A No. 5, for example, when a penetration hole is formed by mechanical drilling using a metal pin, or laser processing, the shape of the penetration hole becomes one that narrows inward from an end in the side of one surface to an end in the side of the other surface unless special processing is applied, and, therefore, also in the invention described in Evidence A No. 1, if the penetration hole 6 is formed by mechanical drilling using a metal pin, or laser processing as described in Evidence A No. 2, the shape of the penetration hole becomes one that narrows inward from an end in the side of one surface to an end in the side of the other surface, and, on this occasion, it is nothing but a design-related matter that, from which one of the upper and lower surfaces (the first principal surface and the second principal surface) to the other, the shape is made to narrow.(Page 16, line 29 to page 19, line 21 of the written opposition to the grant of a patent)

Therefore, when, regarding a penetration hole of Invention A-1, the descriptions of Evidence A No. 1 related to the forming process thereof are examined, according to statements of paragraphs [0006] to [0007] and FIG. 5 summarized in the above (1)A(B) and (D), a wiring board assembly before burning is fabricated by laminating a plurality of greensheets after making penetration holes into the greensheets. In addition, although there is no description regarding how to make a penetration hole into a greensheet, as instructed in the above (1)B, it is described in Evidence A No. 2 that penetration holes are formed on a plurality of ceramic greensheets before lamination by mechanical drilling using a metal pin, laser processing, or the like, and, therefore, it is a matter that can be made by a person skilled in the art accordingly to make a hole by mechanical drilling using a metal pin, laser processing, or the like.

In this regard, however, since timing to make a penetration hole into a greensheet is before lamination of a plurality of greensheets, even if the shape of penetration holes made into one greensheet narrows inward from an end in the side of one surface to an end in the side of the other surface as described in Evidence A No. 3 to A No. 5, it is understood as the entire shape of the penetration hole 6 formed by laminating a plurality of greensheets becomes a shape in which a plurality of holes of an identical shape narrowing inward are stacked as described in FIG. 4 (b) of Evidence A No. 5 summarized in the above (1)E(B), and thus, it is recognized that it does not

become a shape that narrows inward from an end in the side of one surface of a wiring board assembly fabricated by laminating a plurality of greensheets to an end in the side of the other surface.

Therefore, on the occasion of forming the penetration hole 6 of Invention A-1, even if the above-mentioned technical matter described in Evidence A No. 2 and the above-mentioned technical matters described in Evidence A No. 3 to A No. 5 are applied, "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface" that is the matter specifying the invention of Patent Invention 1 concerning the aforementioned different feature cannot be elicited, and, therefore, the above-mentioned allegation of the patent opponent cannot be adopted.

Accordingly, Patent Invention 1 could not have been easily invented by a person skilled in the art based on the invention described in Evidence A No. 1, the technical matter described in Evidence A No. 2, and the well-known art described in Evidence A No. 3 to A No. 5.

(3) Regarding Patent Inventions 2 to 5

Patent Inventions 2 to 4 are ones that include all the matters specifying the invention of Patent Invention 1, and further, the matter specifying the invention of "the mother board includes a second hole part in the second principal surface, the second hole part is in communication with the first hole part, and an aperture in the side of the second principal surface is larger than an aperture in the side of the first principal surface" is added in Patent Invention 2, the matter specifying the invention of "the side surface conductor is thicker at its end in the side of the first principal surface than at its end in the side of the second principal surface" is added in Patent Invention 3, and the matter specifying the invention of "a wiring conductor formed inside the mother board; and an auxiliary conductor formed inside the mother board, wherein the auxiliary conductor is connected to an end of the side surface conductor in the side of the second principal surface and to the wiring conductor" is added in Patent Invention 4. Therefore, by a reason similar to the reason instructed in the above (2), Patent Inventions 2 to 4 are not ones that could have been easily invented by a person skilled in the art based on the invention described in Evidence A No. 1, the technical matter described in Evidence A No. 2, and the well-known art described in Evidence A No. 3 to A No. 5.

In addition, since Patent Invention 5 is an invention of a wiring board "formed

by dividing the multi-piece wiring board for each of the wiring board regions" of Patent Inventions 1 to 4, and the shape of the first hole part concerning the different feature examined in the above (2) is reflected on the shape of the wiring board in question, by a reason similar to the reason instructed in the above (2), Patent Invention 5 is not one that could have been easily invented by a person skilled in the art based on the invention described in Evidence A No. 1, the technical matter described in Evidence A No. 2, and the well-known art described in Evidence A No. 3 to A No. 5.

(4) Regarding Patent Invention 6

Patent Invention 6 is an invention of a manufacturing method of a multi-piece wiring board, and has the matter specifying the invention of "in the step of forming the penetration hole, an inner side surface of the penetration hole is formed in a manner being narrowed inwardly from an end in the opposite side of the first principal surface to an end in the side of the first principal surface". Then, for a reason similar to that instructed in the above (2), the above-mentioned matter specifying the invention of Patent Invention 6 cannot be elicited even if, in the manufacturing process of a wiring board assembly described in Evidence A No. 1, the above-mentioned technical matter described in Evidence A No. 2 and the above technical matters described in Evidence A No. 3 to A No. 5 are applied on the occasion of forming the penetration hole 6. In addition, as summarized in the above (1)F, since it is described in Evidence A No. 6 only regarding laser processing of a V groove for dividing, the above-mentioned matter specifying the invention of Patent Invention 6 cannot be elicited even if the technical matter described in Evidence A No. 6 is taken into consideration.

Accordingly, Patent Invention 6 is not one that could have been easily invented by a person skilled in the art based on the invention described in Evidence A No. 1, the technical matter described in Evidence A No. 6, the technical matter described in Evidence A No. 2, and the well-known art described in Evidence A No. 3 to A No. 5.

2. Regarding grounds for opposition 2 (requirements for support)

The patent opponent alleges to the effect that, since a dividing groove has been already formed on the first principal surface of a mother board as viewed from the matter specifying the invention of Patent Invention 1 of "a mother board in which a plurality of wiring board regions are arrayed, which includes a first principal surface, and a second principal surface at an opposite side of the first principal surface, and which includes a dividing groove along a boundary of the wiring board regions on the

first principal surface", laser is never be irradiated again to "multi-piece wiring board" of Patent Invention 1 in order to form a dividing groove, and that, since, even if The Patent Invention 1 includes the matter specifying the invention of "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface", laser is never irradiated, the matter specifying the invention in question does not work as a means for solving the problems, and, therefore, a means for solving the problem is not reflected in Patent Invention 1, and Patent Invention 1 exceeds the scope stated in the detailed description of the invention.

Whether or not descriptions of the scope of claims conform to the requirements for support should be judged by comparing the scope of claims and the statements of the detailed description of the invention and examining whether or not an invention described in the scope of claims is an invention described in the detailed description of the invention, and whether or not it is within a range in which is recognized that a person skilled in the art can solve the problem to be solved of the invention in question by that description, and, in addition, whether or not it is within a range that is recognized to be a range in which a person skilled in the art could solve the problem of the invention by means of referring to the technical common sense upon filing the application even in the absence of the descriptions or the suggestions.

Examining whether or not the description of Claim 1 of the scope of claims of the present application conforms to the requirements for support based on the above matter, regarding the problem to be solved, it is described in the column of [Problem to be solved by the invention] (paragraph [0007]) of the Patent specification that "However, regarding a conventional multi-piece wiring board, there has been a possibility that the following defect is caused. That is, when a dividing groove is formed to a boundary of each wiring board region of a mother board by laser processing, there is a possibility that a part of a side surface conductor in this penetration hole is cut. In this case, at the time when electrolytic plating is applied after the groove has been formed, for example, there is a possibility that, in at least a part of a plurality of wiring board regions, a problem that a plating layer is not plated on a wiring conductor is caused.", and, therefore, taking also descriptions of the column of [Advantage of the Invention] (paragraph [0011]) into consideration, it is recognized that the problem to be solved by Patent Invention 1 is "to suppress cutting of a part of a side surface conductor in this penetration hole when a dividing groove is formed to a boundary of each wiring board region of a mother board by laser processing".

In addition, regarding a means for solving the problem to be solved in question, in the column of [Means for solving the problem] (paragraph [0008]) of the Patent specification, there are described the matters specifying the invention of Patent Invention 1 in just proportion as "A multi-piece wiring board of one embodiment of the present invention includes a mother board in which a plurality of wiring board regions are arrayed, which includes a first principal surface, and a second principal surface at an opposite side of the first principal surface, and which includes a dividing groove along a boundary of the wiring board regions on the first principal surface, a first hole part which is formed over the boundary of the wiring board regions on the first principal surface, and a side surface conductor which is attached on an inner side surface of the first hole part, in which at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface." Furthermore, it is described in paragraphs [0011], and [0034] to [0037] that, among the above-mentioned matters specifying the invention, the structure that "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface" is a structure that "when seen from the first principal surface side, a side surface conductor within the first hole part is difficult to see in a manner hiding in the side of the first principal surface of the mother board", and, therefore, "when a dividing groove is formed straddling a hole part to be a castellation formed on a boundary of each wiring board region of a mother board by laser processing, laser is difficult to irradiate to the side surface conductor in the first hole part, suppressing breaking wire of the side surface conductor."; that is, by the matter specifying the invention of Patent Invention 1 that "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface" can solve the above-mentioned problem to be solved.

Accordingly, Patent Invention 1 is an invention described in the detailed description of the invention, and it can be recognized by a person skilled in the art that, by the matter specifying the invention that "at least a portion of the first hole part to which the side surface conductor is attached on the inner side surface is narrowed inward from an end portion closer to the second principal surface to an end portion closer to the first principal surface", the problem to be solved of "to suppress cutting of a part of a side surface conductor in this penetration hole when a dividing groove is

formed to a boundary of each wiring board region of a mother board by laser processing" can be solved, and, therefore, the description of Claim 1 of the scope of claims conforms to the requirements for support.

In addition, as described above, the problem to be solved by Patent Invention 1 is to solve a problem that occurs on the occasion of forming a dividing groove on the boundary of each wiring board region of a mother board by laser processing, and the laser that is the cause of the problem is laser that is irradiated when a dividing groove is formed on a mother board in a state that there are no dividing grooves. From this, the above-mentioned allegation of the patent opponent on the premise that laser is not irradiated again on the ground that a dividing groove has already been formed on the mother board cannot be adopted because it is not an allegation conforming to the problem to be solved by Patent Invention 1.

Accordingly, it cannot be said that Patent Invention 1 is not an invention described in the detailed description of the invention. In addition, it cannot be said that Patent Inventions 2 to 5 including the whole matters specifying the invention of Patent Invention 1 are not inventions described in the detailed description of the invention, for a reason similar to that of Patent Invention 1.

3. Regarding grounds for opposition 3 (clarity)

The patent opponent allege that Patent Invention 2 is unclear because, in the description of Claim 2 of the scope of claims of the Patent, whether or not the size of the second hole part is larger than the size (spot diameter) of laser irradiated from the second principal surface side on the occasion of forming a dividing groove on the second principal surface of a mother board is not clear, and, if the size of the second hole part is smaller than the size (spot diameter) of laser irradiated from the second principal surface side, the laser cannot be led to the far side of the second hole part.

However, as is obvious as viewed from the descriptions of each figure of Evidence A No. 1, it is generally the case that the width of a dividing groove is smaller than the size of a hole for castellation, and, therefore, if laser is used for forming a dividing groove, it is natural to make the thickness (spot diameter) of laser be smaller than the hole, and, even if the thickness (spot diameter) of laser is larger than the size of the hole, taking into consideration that a part of laser enters inside the hole when the laser is irradiated to that hole, it cannot be said that Patent Invention 2 is unclear just from the reason that the magnitude relation between the size of the second hole part and the thickness (spot diameter) of laser irradiated from the second principal surface side when forming a dividing groove on the second principal surface of the mother board is

not specified in the statements of Claim 2.

Furthermore, the patent opponent also alleges that, in the description of Claim 2 of the scope of claims of the Patent, the constitution between an aperture in the side of the second principal surface and an aperture in the side of the first principal surface is not specified at all, and, for example, when an aperture of an intermediate portion existing between the aperture in the side of the second principal surface and the aperture in the side of the first principal surface is smaller than the aperture in the side of the first principal surface (that is, in the case that the intermediate portion of the second hole part is narrowed), the laser cannot be led up to the far side of the second hole part. However, neither Claim 2 nor the Patent specification contains a description or suggestion to make an intermediate portion of the second hole part be of a narrowed shape, and, the shape is a special shape that a person skilled in the art cannot assume usually, and, therefore, it cannot be said that it is appropriate to judge clarity on the premise of being a shape alleged by the patent opponent in the first place. Even if the aperture in an intermediate portion existing between the aperture in the side of the second principal surface and the aperture in the side of the first principal surface is smaller than the aperture in the side of the first principal surface, and, the thickness (spot diameter) of laser is larger than the size of the aperture of the intermediate portion of the hole, when the laser is irradiated to the aperture, a part of that laser enters deeper than the aperture of the intermediate portion, and, thus, it cannot be said that Patent Invention 2 is unclear just because the magnitude relation between the size of the aperture in an intermediate portion of the second hole part and the thickness (spot diameter) of laser irradiated from the second principal surface side when forming a dividing groove on the second principal surface of the mother board is not specified.

Accordingly, the above-mentioned allegation of the patent opponent cannot be adopted.

No. 5 Closing

As described above, the patent for Claims 1 to 6 cannot be revoked by the reasons and evidences of the opposition to the grant of a patent.

Also, no other reason for revoking the patent according to Claims 1 to 6 is found.

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

May 24, 2019

Chief administrative judge: SAKAI, Tomohiro
Administrative judge: KOKUBU, Naoki
Administrative judge: YAMASAWA, Hiroshi