Appeal Decision

Appeal No. 2020-6497

Appellant HITACHI METALS LTD.

Patent Attorney Shin-Ei Patent Firm, P.C.

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2019-3185, entitled "Dissimilar metal joined material and method of manufacturing same" (the application published on November 14, 2019, Japanese Unexamined Patent Application Publication No. 2019-196543) has resulted in the following appeal decision:

Conclusion

The examiner's decision is revoked.

The Invention of the present application shall be granted a patent.

Reason

No. 1 History of the procedures

This application was filed on January 11, 2019 (the claim of priority on May 2, 2018), reasons for refusal were notified on November 23, 2019, a written opinion and a written amendment were submitted on December 20, 2018, an examiner's decision of refusal was issued on February 14, 2020, and an appeal against the examiner's decision of refusal was requested on May 13, 2020.

No. 2 Outline of the examiner's decision

The outline of the examiner's decision (the examiner's decision of refusal dated February 14, 2020) is as follows:

The inventions recited in the Claims 1 and 2 of the present application are identical with an invention disclosed in the specification, the scope of claims, or the drawings originally attached to the written application (hereinafter, referred to as "the originally attached specification etc.") for the following Patent Application 1, which is a patent application filed before the filing of the present application and for which the publication containing the patent was issued or the application was laid open after the filing of the

present application, (hereinafter, referred to as "Prior Application 1"), and the inventors for the present application are not identical with a person who made the invention for the patent application before to the present application, and at the time of the present application, the applicant is not identical with the applicant of the above patent application. Therefore, the present application cannot be granted a patent under the provision of Article 29-2 of the Patent Act.

In addition, it is noted in the examiner's decision of refusal that there are reasons mentioned in the decision, as noted bellow, which cannot constitute the ground for the reason for decision of refusal because no reason for refusal was issued.

Since the description in the Detailed Description of the Invention in the present application are not clear and sufficient to enable a person skilled in the art to carry out the inventions recited in Claims 1 to 3, the present application does not meet the requirements stipulated in Article 36(4)(i) of the Patent Act.

<List of Cited Documents, etc.>
1. Japanese Patent Application No. 2017-25079 (Japanese Unexamined Patent Application Publication No. 2018-133171)
2. Japanese Unexamined Patent Application Publication No. 2-40986 (document describing the well-known art)
3. Japanese Patent Publication No. 3-57438 (document describing the well-known art)

No. 3 The Invention

The inventions recited in Claims 1 to 3 of the present application (hereinafter, referred to as "Invention 1" to "Invention 3," respectively, and collectively referred to as "the Invention") are specified by the matters recited in Claims 1 to 3 of the scope of claims amended by the written amendment submitted on December 20, 2019. It should be noted that underlined parts are amended.

"[Claim 1]

A dissimilar metal joined material comprising:

a clad material comprising a high thermal expansion layer composed of an alloy containing Mn, and a low thermal expansion layer composed of an alloy containing Ni, the low thermal expansion layer being joined directly to the high thermal expansion layer or joined via an intermediate layer, and

an Ni plating layer provided on at least a surface of the high thermal expansion layer, the Ni plating layer having a thickness of 10 nm or more and 120 nm or less and the clad material without the Ni plating layer having a total thickness of 50 μm or and 1 mm or less, wherein

variation in volume resistivity due to the presence of the Ni plating layer falls within ±5% as compared with volume resistivity in the absence of the Ni plating layer, and variation in curvature coefficient due to the presence of the Ni plating layer falls within ±5% as compared with curvature coefficient in the absence of the Ni plating layer.

[Claim 2]

The dissimilar metal joined material according to Claim 1, further comprising an identification mark provided on a surface thereof.

[Claim 3]

A method of manufacturing a dissimilar metal joined material, the method comprising the successive steps of:

degreasing surfaces of a clad material comprising: a high thermal expansion layer composed of an alloy containing Mn and a low thermal expansion layer composed of an alloy containing Ni, the low thermal expansion layer being joined directly to the high thermal expansion layer or joined via an intermediate layer;

washing at least the surface of the high thermal expansion layer of the clad material;

carrying out Ni plating of at least the surface of the high thermal expansion layer of the clad material with a plating solution at a pH of 4.5 or more and 6.0 or less;

removing the plating solution from the surface of the high thermal expansion layer; and

drying the clad material, wherein

an Ni plating layer having a thickness of 10 nm or more and 120 nm or less is provided on at least a surface of the high thermal expansion layer, and the clad material without the Ni plating layer has a total thickness of 50 μm or and 1 mm or less, and

variation in volume resistivity due to the presence of the Ni plating layer falls within ±5% as compared with volume resistivity in the absence of the Ni plating layer, and variation in curvature coefficient due to the presence of the Ni plating layer falls within ±5% as compared with curvature coefficient in the absence of the Ni plating layer."

No. 4 Cited Documents and Cited Inventions

1. Regarding Prior Application 1

1-1. Described matter in originally attached specification, etc. of Prior Application 1

Prior Application 1 cited in the examiner's decision is Japanese Patent Application No. 2017-25079 filed on February 14, 2017, which is before the date of claim of priority of the present invention, and disclosed on August 23, 2018 after filing of the present invention (Japanese Unexamined Patent Application Publication No. 2018-133171), and the originally attached specification, etc. thereof include the following described matters for "THERMOSENSITIVE ACTUATING UNIT" (Title of the invention) (note that "..." indicates the omission of words, and underlines are added by the body. The same applies to the followings.).

"[Claim 1]

A thermosensitive actuating unit comprising:

a thermosensitive actuating element which has a manganese-containing surface; and

a plating layer which covers the manganese-containing surface.

[Claim 2]

The thermosensitive actuating unit according to Claim 1, wherein the thermosensitive actuating element includes two or more metal layers which have different thermal expansion coefficients.

[Claim 3]

The thermosensitive actuating unit according to Claim 1, wherein the thermosensitive actuating element is a bimetallic element.

[Claim 4]

The thermosensitive actuating unit according to Claim 2, wherein at least one of the layers is an alloy layer containing manganese.

...

[Claim 7]

The thermosensitive actuating unit according to Claim 1, wherein the plating layer is a nickel plating layer."

"[0007]

The purpose of the present invention is to provide a thermosensitive actuating unit including an alloy layer containing manganese, wherein the manganese contained therein is corrosion resistant."

"[0030]

In the preferred embodiment, the thermosensitive actuating element described above is a bimetallic element in which an Ni-Fe alloy layer is provided as a layer having a low thermal expansion coefficient and an Ni-Mn-Fe alloy or Mn-Ni-Cu alloy layer is

provided as a layer having a high thermal expansion coefficient."

"[0035]

In order to preserve the function of the thermosensitive actuating element, it is preferable that the thickness (in the case of multiple layers, the total thickness) of the plating layer be as small as possible. However, in order to effectively protect the manganese from corrosive substances, it is preferable that the thickness is adequately large. The thickness (in the case of multiple layers, the total thickness) of the plating layer described above is preferably set in the range of 0.001 μm or more and 10 μm or less, further preferably 0.01 μm to 1.0 μm, further preferably 0.05 μm to 0.8 μm."

"[0053]

The thermosensitive actuating unit of the present invention has a high curvature coefficient and high environmental resistance. Therefore, the unit can be suitably used in a protection device of an electronic component. The present invention also provides a protection device which is constituted to have the thermosensitive actuating unit of the present invention."

"[Examples]

[0059]

Example 1: Manufacture of thermosensitive actuating unit of the Present Invention

The bimetallic element described below is prepared as the thermosensitive actuating element.

- BR-1 (manufactured by Neomax Engineering Co., Ltd)

High thermal expansion coefficient side: Mn-containing alloy (thickness: about 30 μm)

Low thermal expansion coefficient side: Non-Mn alloy (thickness: about 30 μm)

[0060]

The bimetallic element described above is punched to 2.9 mm in length and 2.9 mm in width to obtain a bimetallic piece. The obtained bimetallic piece is subjected to degreasing.

[0061]

Next, the bimetallic piece is cleaned with a mixed solution of hydrochloric acid and sulfuric acid (temperature: 20°C) and the rust of the surface of the bimetallic piece is cleaned.

[0062]

Next, the nickel strike plating treatment is performed under the conditions described below.

Woods nickel strike bath

Main ingredient: nickel chloride 240 g/l
Additive: hydrochloric acid 125 g/l
Bath temperature: 20 to 25°C
Current density: 2 to 5 A/dm^2
[0063]

Next, the main plating treatment is performed under the conditions described below.
Sulfamic acid bath for nickel strike
Main ingredient: nickel chloride 30 g/l
sulfamic acid 400 g/l
nickel bromide 40 g/l
boric acid 30 g/l
Bath temperature: 40 to 60°C
Current density: 2 to 5 A/dm^2
[0064]

By the processing described above, the thermosensitive actuating unit of the present invention in which a nickel plating layer is provided over the entirety of the bimetallic piece is obtained."

1-2. Invention disclosed in originally attached specification, etc. of Prior Application 1

According to the statements in [00059] to [0064] in the above 1-1, it is recognized that the originally attached specification, etc. of Prior Application 1 discloses the following invention (hereinafter, referred to as "the Prior Invention").
"A thermosensitive actuating unit comprising a nickel plating layer provided over the entirety of the bimetallic piece obtained by punching a bimetallic element having a high thermal expansion coefficient side: Mn-containing alloy (thickness: about 30 μm) and a low thermal expansion coefficient side: Non-Mn alloy (thickness: about 30 μm)."

2. Regarding Cited Document 2

Japanese Patent Application No. 2-40986, which is Cited Document 2 cited in the examiner's decision, includes the following described matters for "Laminated board for electronic materials" (Title of the invention):

2 A "[Scope of Claims]
1
A laminated board for electronic materials comprising a laminated board having an

identification pattern formed on at least one surface at a depth of R_{max} of 10 μm or less and composed of two or more regions having different flat area ratios."

3. Regarding Cited Document 3

Japanese Patent Publication No. 3-57438, which is Cited Document 3 cited in the examiner's decision, includes the following described matters for "Method for producing bimetal" (Title of the invention):

3 A "[Scope of Claims]

1 A method for producing a bimetal, comprising:

finishing by pressure welding a two-layer or three-layer bimetal plate having a high expansion side alloy plate made of an Fe alloy containing one of 3.1 wt% to 12 wt% Cr, 5 wt% to 6 wt% Mn, and 4 wt% to 6 wt% Mo in 17.5 wt% to 26 wt% Ni on one side and a low expansion side alloy plate made of an Fe alloy containing 35 wt% to 50 wt% Ni or 13 wt% to 18 wt% Cr on the other side; and then,

before or after applying the identification etching mark on either one side of the bimetal plate,

immersing the bimetal plate in a passivation film forming liquid."

No. 5 Regarding the inventors and the applicants

The inventor represented in Prior Application 1 is "Arata Tanaka", which does not completely match the inventor of the Invention, "Ayako Nishimura." Therefore, the inventors are not identical. Further, at the time of filing the present application, the applicant of Prior Application 1, "Littelfuse Japan G.K." and the applicant of the present application, "Hitachi Metals, Ltd.," are not completely the identical. Therefore, the applicants are not identical.

No. 6 Comparison / judgment

1. Regarding Invention 1

1-1. Comparison between Invention 1 and the Prior Invention

A The matters in the Prior Invention, "high thermal expansion coefficient side: Mn-containing alloy (thickness: about 30 μm)," "low thermal expansion coefficient side: Non-Mn alloy (thickness: about 30 μm)," "bimetallic piece, "thermosensitive actuating unit," and "comprising a nickel plating layer" "over the entirety of the bimetallic piece" respectively correspond to the matters in the Invention 1, "a high thermal expansion layer composed of an alloy containing Mn", "a low thermal expansion layer composed of an

alloy," "clad material," "dissimilar metal joined material," and "comprising ... an Ni plating layer" "provided on at least a surface of the high thermal expansion layer."

B In addition, the thickness of the "bimetallic piece" in the Prior Invention is recognized as about 60 μm in total of the thickness of the "high thermal expansion coefficient side: Mn-containing alloy (thickness: about 30 μm)" and the thickness of the "low thermal expansion coefficient side: Non-Mn alloy (thickness: about 30 μm)". Thus, it corresponds to the clad material without the Ni plating layer having a total thickness of 50 μm or and 1 mm or less in the Invention 1.

C Therefore, the corresponding and different features between Invention 1 and the Prior Invention are as follows:

<Corresponding Feature>
"A dissimilar metal joined material comprising: a clad material comprising a high thermal expansion layer composed of an alloy containing Mn and a low thermal expansion layer composed of an alloy, the low thermal expansion layer being joined directly to the high thermal expansion layer or joined via an intermediate layer, wherein

an Ni plating layer is provided on at least a surface of the high thermal expansion layer, and the clad material without the Ni plating layer has a total thickness of about 60 μm."

<Different Feature 1>

In Invention 1, the alloy constituting the low thermal expansion layer contains Ni. In the Prior Invention, however, it is unclear whether the layer contains Ni.

<Different Feature 2>

In Invention 1, the Ni plating layer has a thickness of "10 nm or more and 120 nm or less." In the Prior Invention, however, the thickness of the Ni plating layer is unclear.

<Different Feature 3>

In the dissimilar metal joined material of Invention 1, variation in volume resistivity due to the presence of the Ni plating layer falls within ±5% as compared with volume resistivity in the absence of the Ni plating layer, and variation in curvature coefficient due to the presence of the Ni plating layer falls within ±5% as compared with curvature coefficient in the absence of the Ni plating layer. In the Prior Invention, however, it is unclear whether the dissimilar metal joined material has such characteristics.

1-2. Judgement on different features

Taking the case in consideration, first, Different Feature 2 will be examined.

A Regarding the thickness of the nickel plating layer for Different Feature 2, as stated in the above No. 4, 1, 1-1, [0035] and [0053] of the originally attached specification, etc. of Prior Application 1, the nickel plating layer in the Prior Invention is preferably as thin as possible from the viewpoint of reducing an influence on the functions (e.g., curvature coefficient) of the dissimilar metal joined material; and, on the other hand, from the viewpoint of protecting manganese from corrosive substances, it is preferable to make the nickel plating layer sufficiently thick, specifically to a thickness of 0.001 μm (i.e., 10 nm) or more, or "0.05 μm to 0.8 μm" (i.e., 50 nm to 800 nm). Specifically, therefore, the originally attached specification, etc. of Prior Application 1 is recognized to substantially describe that the nickel plating layer in the Prior Invention is formed to a thickness of 10 nm or more and 800 nm or less. Although the numerical range in the Prior Invention overlaps with "a thickness of 10 nm or more and 120 nm or less" of the Ni plating layer in Invention 1, the upper limit is different.

B From the described matters in [0051] to [0057] of the specification of the present application and Figures 5 to 7, it is recognized that Invention 1 focuses both a volume resistivity and a curvature coefficient as characteristics of a dissimilar metal joined material and, in order that variations in properties of both (in particular, volume resistivity) fall within ±5%, from the relation between the thickness of an Ni plating layer provided for the purpose of imparting corrosion resistance and the both properties, specifies the upper limit of the thickness of the Ni plating layer to "120 nm or less" to exert a particular effect of the Invention, providing a dissimilar metal joined material having sufficient corrosion resistance and having a small difference from the original characteristics.

Then, even if there is an overlapped portion between the numerical ranges of Ni plating layer thickness, the difference between the upper limit thickness of the Ni plating layer, "120 nm or less," in Invention 1 and the upper limit thickness of the nickel plating layer, 800 nm or less, in the Prior Invention cannot be said to be a very minor difference in the means for solving the problem.

Therefore, since Different Feature 2 is a substantial difference, Invention 1 cannot be said to be the same as the Prior Invention, with no need to examine Different Feature 1 and Different Feature 3.

1-3. Summary

Therefore, it cannot be said that Invention 1 is substantially identical to the Prior Invention. Thus, the present application cannot be rejected based on Invention 1 being identical to the invention disclosed in the originally attached specification of Prior Application 1.

2. Regarding Invention 2

Invention 2 includes all of the specified matters stated in Invention 1 by quoting Invention 1. Even if it is a well-known art from Cited Documents 2 to 3 to provide an identification mark on a bimetal, it cannot be said that it is substantially the same as the Prior Invention, for the same reason as that examined in the above 1 for Invention 1. Therefore, the present application cannot be rejected on the basis that Invention 2 is identical to the invention disclosed in the originally attached specification, etc. of Prior Application 1.

3. Regarding Invention 3

Invention 3 has not been rejected by the examiner's decision. In addition, Invention 3 includes all the specified matters stated in Invention 1 as a dissimilar metal joined material to be produced by a method for producing a dissimilar metal joined material. Even if it is a well-known art from Cited Documents 2 to 3 to provide an identification mark on a bimetal, it cannot be said that it is substantially the same as the Prior Invention, for the same reason as that examined in the above 1 for Invention 1. Therefore, the present application cannot be rejected on the basis that Invention 3 is identical to the invention disclosed in the originally attached specification, etc. of Prior Application 1.

4. Reasons for refusal (Article 36(4)(i) of the Patent Act) added to examiner's decision

4-1. Reasons for refusal (Article 36(4)(i) of the Patent Act) added to examiner's decision

Consideration is given to the following: "in the Detailed Description of the Invention, the condition shown as having a curvature coefficient close to that of a bimetal having no plating layer by which 'the corrosion resistant plating layer has a thickness of 10 nm or more and 120 nm or less' is only the case that an Ni plating layer is formed on the surface of a high thermal expansion layer of a bimetal having 'a high thermal expansion layer' composed of 'a Cu-Mn-Ni based metal (Cu-72 Mn-10 Ni)' and 'a low thermal expansion layer' composed of 'an Fe-Ni based metal (Fe-36 Ni),' and there is no mention of satisfying the above specification by satisfying any condition of satisfying that

'the corrosion resistant plating layer has a thickness of 10 nm or more and 120 nm or less' other than the above condition." Consideration is also given to that "the common general knowledge that the displacement amounts (D_1, D_2) are determined by the elastic modulus, linear expansion coefficient, and thickness of each layer forming the laminated body as stated in this statement." Based on the above considerations, it can be said that it is determined not only by "the thickness, elastic modulus, and linear expansion coefficient of the high thermal expansion layer and the thickness, elastic modulus, and linear expansion coefficient of the low thermal expansion layer, which make up the test piece" but also by the overall structure of the laminate including the "Ni plating layer." Then, for allowing a dissimilar metal joined material, which comprises a clad material comprising a high thermal expansion layer formed of an Ni plating layer having a thickness of 10 nm or more and 120 nm or less and composed of any of alloys including Mn and a low thermal expansion layer composed of any of alloys including Ni, the low thermal expansion layer being joined directly to the high thermal expansion layer or joined via an intermediate layer, to satisfy the "variation in volume resistivity due to the presence of the Ni plating layer falls within ±5% as compared with variation in volume resistivity due to the absence of the Ni plating layer, and variation in curvature coefficient due to the presence of the Ni plating layer falls within ±5% as compared with variation in curvature coefficient due to the absence of the Ni plating layer," a person ordinarily skilled in the art to which the invention pertains (hereinafter, referred to as "a person skilled in the art") would need undue trial and error to determine the combination of materials and thicknesses of the high and low thermal expansion layers.

Therefore, the description in the Detailed Description of the Invention for the present application are not clear and sufficient to enable a person of ordinary skill in the art to carry out the inventions recited in Claims 1 to 3.

4-2. Judgment

As specified in Claims 1 to 3, the Invention is an invention relating to a dissimilar metal joined material in which the ratio of variation in the properties (volume resistivity and curvature coefficient) of the dissimilar metal joined material with the Ni plating layer to the properties (volume resistivity and curvature coefficient) of the dissimilar metal joined material without the Ni plating layer falls within ±5%.

Here, if there is need to know each of the properties of the dissimilar metal joined material without the Ni plating layer and the properties of the dissimilar metal joined material with the Ni plating layer, the materials and thicknesses of the high thermal expansion layer and the low thermal expansion layer are required. However, in the

equations used to calculate the ratio of the properties of the dissimilar metal joined material with the Ni plating layer to the properties of the dissimilar metal joined material without the Ni plating layer, the materials and thicknesses of the high thermal expansion layer and the low thermal expansion layer are cancelled and do not appear. Thus, it is not necessary to specify the material and thickness of the high thermal expansion layer and the low thermal expansion layer. A person skilled in the art could verify the invention only by testing a plurality of bimetals having different thicknesses of the Ni plating layer and would not require excessive trial and error.

Therefore, the present application cannot be rejected due to the reason that "it cannot be said that the description in the Detailed Description of the Invention in the present application are clearly and sufficiently stated as to enable a person ordinarily skilled in the art to work the inventions recited in Claims 1 to 3."

No. 7 Closing

As stated above, the present application cannot be rejected due to the reasons of the examiner's decision.

In addition, beyond that, no additional reasons for refusal were found.

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

July 5, 2021

Chief administrative judge: HIRATSUKA, Masahiro
Administrative judge: ISOBE, Kaori
Administrative judge: TSUCHIYA, Tomohisa