Appeal Decision

Appeal No. 2020-7357

Appellant OILES Corporation

Patent Attorney Sousei International Patent Firm

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2016-83925, entitled "SEISMIC ISOLATION APPARATUS" (the application published on October 26, 2017, Japanese Unexamined Patent Application Publication No. 2017-194098) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The present application is Japanese Patent Application No. 2016-83925 filed on April 19, 2016, and the outline of procedures is as follows.

Dated September 27, 2019 : Notice of reasons for refusal

December 6, 2019 : Written opinion, written amendment

Dated February 28, 2020 : Examiner's decision of refusal (hereinafter, referred to as "the examiner's decision")

May 29, 2020 : Written request for appeal, written amendment (hereinafter, the amendment by the written amendment is referred to as "the Amendment".)

No. 2 Regarding the Amendment

1 Details of the Amendment

(1) Claims 1 to 7 of the scope of claims which are amended by the written amendment submitted on December 6, 2019 (hereinafter, referred to as "Invention 1 before amendment" to "Invention 7 before amendment") are as follows.

"[Claim 1]

A seismic isolation apparatus comprising: a laminated body having alternately

laminated elastic layers and rigid layers; and a vibration damping body which is filled in a hollow portion formed in the laminated body in such a manner as to extend in a laminated direction of the laminated body, wherein the vibration damping body is filled in the hollow portion with a stress of 15 MPa or more and 55 MPa or less under no-load in a laminated direction with respect to the laminated body.

[Claim 2]

A seismic isolation apparatus comprising: a laminated body having alternately laminated elastic layers and rigid layers; and a vibration damping body which is filled in a hollow portion formed in the laminated body in such a manner as to extend in a laminating directed of the laminated body, wherein the vibration damping body is filled in the hollow portion with a stress of 15 MPa or more and 55 MPa or less under a load in a laminated direction with respect to the laminated body.

[Claim 3]

The seismic isolation apparatus according to Claim 2, wherein the vibration damping body is filled in the hollow portion with a stress of 15 MP or more and 55 MPa or less under a load in the laminated direction corresponding to a bearing pressure of 0.5 MPa with respect to the laminated direction.

[Claim 4]

The seismic isolation apparatus according to any one of Claims 1 to 3, wherein the vibration damping body is formed of a damping material which absorbs vibrational energy through plastic deformation.

[Claim 5]

The seismic isolation apparatus according to Claim 4, wherein the damping material is constituted of lead, tin, or a non-lead-based low melting point alloy.

[Claim 6]

The seismic isolation apparatus according to any one of Claims 1 to 5, wherein an inner peripheral surface of the laminated body defining the hollow portion is formed into concave surfaces at positions of elastic layers as the vibration damping body bites into the elastic layers.

[Claim 7]

The seismic isolation apparatus according to any of Claims 1 to 6, wherein the inner peripheral surface of the laminated body defining the hollow portion is formed into convex surfaces at positions of rigid layers as the vibration damping body bites into the elastic layers".

(2) Claims 1 to 6 of the scope of claims after the Amendment (hereinafter, referred to as

"Invention 1" to "Invention 6") are as follows.

"[Claim 1]

A seismic isolation apparatus comprising: a laminated body having alternately laminated elastic layers and rigid layers; and a vibration damping body which is filled in a hollow portion formed in the laminated body in such a manner as to extend in a laminated direction of the laminated body, wherein the vibration damping body is filled in the hollow portion with a stress of 15 MPa or more and 55 MPa or less under a load in a laminated direction with respect to the laminated body.

[Claim 2]

The seismic isolation apparatus according to Claim 1, wherein the vibration damping body is filled in the hollow portion with a stress of 15 MP or more and 55 MPa or less under a load in the laminated direction corresponding to a bearing pressure of 0.5 MPa with respect to the laminated direction.

[Claim 3]

The seismic isolation apparatus according to Claim 1 or 2, wherein the vibration damping body is formed of a damping material which absorbs vibrational energy through plastic deformation.

[Claim 4]

The seismic isolation apparatus according to Claim 3, wherein the damping material is constituted of lead, tin, or a non-lead-based low melting point alloy.

[Claim 5]

The seismic isolation apparatus according to any one of Claims 1 to 4, wherein an inner peripheral surface of the laminated body defining the hollow portion is formed into concave surfaces at positions of elastic layers as the vibration damping body bites into the elastic layers.

[Claim 6]

The seismic isolation apparatus according to any of Claims 1 to 5, wherein the inner peripheral surface of the laminated body defining the hollow portion is formed into convex surfaces at positions of rigid layers as the vibration damping body bites into the elastic layers".

2 Propriety of amendment

The Amendment is to delete Invention 1 before amendment, and changed Inventions 2 to 7 before amendment to Inventions 1 to 6.

Therefore, the Amendment is an amendment aiming at the deletion of a claim or claims stipulated in Article 36(5) of the Patent Act, which is listed in Article 17-2(5)(i)

of the Patent Act.

Accordingly, the Amendment according to Claims 1 to 6 is legitimate.

No. 3 Reasons for refusal stated in the examiner's decision

The reasons for refusal stated in the examiner's decision is that Inventions 1 to 5 before the Amendment could have been easily invented by a person having ordinary skill in the art to which the inventions pertain (hereinafter, referred to as "a person skilled in the art"), on the basis of the invention stated in Cited Document 1 described below which was distributed or made available to the public through electric telecommunication lines in Japan or foreign countries prior to the filing of the present application, and thus the Appellant should not be granted a patent under the provisions of Article 29(2) of the Patent Act. Also, Inventions 6 and 7 before the Amendment could have been easily invented by a person skilled in the art, on the basis of the invention stated in Cited Document 1 and the well-known art described in Cited Document 2 described below which were distributed or made available to the public through electric telecommunication lines in Japan or foreign countries prior to the filing of the present application, and thus the Appellant should not be granted a patent under the provisions of Article 29(2) of the Patent Act.

Cited Document 1: Japanese Patent No. 3360828

Cited Document 2: Japanese Unexamined Patent Application Publication No. 2001-74096 (document showing the well-known art)

No. 4 Description in the Cited Documents and Cited Invention

1 Description of Cited Document 1

Cited Document 1 describes the following matters. (Underlines are added by the body. The same applies hereinafter.)

(1) Column 5, lines 7 to 16

"The energy absorbers of the invention may be used in large structures such as buildings or bridges to reduce the effects of motion induced during earthquakes or from strong winds. They may also be used as shock absorbers or energy absorbing stops for halting railway wagons or other moving objects. They may also be used to damp vibration from industrial machinery or engines or the like or from domestic appliances such as washing machines for example, or in any other application where it is desired to isolate from or damp any motion, vibrations, or the like".

(2) Column 6, lines 25 to 30

"Preferably the hydrostatic pressure applied to the core exceeds the shear yield stress of

the energy absorbing material. Preferably the hydrostatic pressure is 10 MPa or more and most preferably in the range 20-100 MPa".

(3) Column 9, lines 30 to 47

"FIG. 1 shows a typical known energy absorber composed of a bearing made of lead and rubber, such as described in U.S. Patent No. 4,117,637 for example. The bearing is composed of a resilient supporting pad 10 made from rubber layers 1 alternately interleaved in a plurality of layers 2 of steel plates in a sandwich-like structure. The bearing is composed of an energy absorbing core 3 of lead. The bearing is selectively arranged with connector plates 4 on the top and bottom so that the bearing can be fixed to a predetermined position by bolting to structural members of a building, bridge, or the like through the connector plates 4, considering vibration resistance. Instead of the connector plates 4, each member of the structure between which the bearing is interposed may be provided with recesses into which the bearing engages to prevent horizontal movement. In use, when the bearing is deformed, for example, in an earthquake or under wind loading, the bearing is subjected to forces including shear forces. Shear forces are applied to the core 3. As the bearing is subjected to motion, the core is repeatedly deformed back and forth".

(4) Column 10, line 21 to column 11, line 1

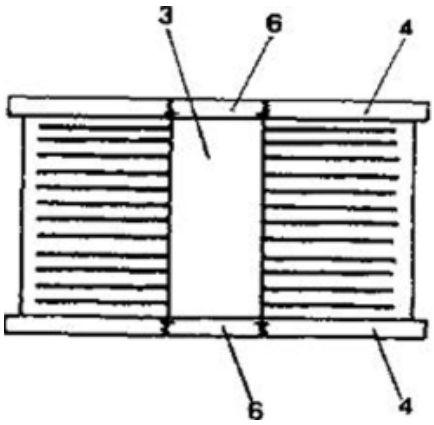
"In the absorber of the invention shown in FIGS. 2 and 3, the core 3 is slightly longer and thicker than the surrounding support structure. When the support structure composed of the elastic body layers is in a stationary state, the core extends into holes 5 in the end plates 4. During manufacture, the support structure is extended approximately perpendicular to the plates as indicated by arrows A until the length of the core 3 is adjusted. End caps 6 are then fixed in a predetermined place in the holes 5 at each end of the core 3, and the stretching force is released. FIG. 2 shows the end caps 6 removed and FIG. 3 shows them in the predetermined place. When the pad is released, hydrostatic pressure is applied to the core 3 by way of elastic retraction in the elastic body layers 1. The forces per unit area of core surface due to vertical and horizontal deformation of a pad are approximately equal.

The core material is prestressed under an approximately hydrostatic pressure until at least approaching and preferably exceeding the shear yield stress of the energy absorbing material of the core so that the core material will generally always be in compression. It has been found that with lead the yield shear stress at ambient temperature is about 10.5 MPa and a pressure of 10 MPa or more is effective. The effect of the hydrostatic pressure may be explained briefly by way of the Mohr circle constructions shown in FIGS. 26 and 27. That is, the property can be represented by a

stress tensor in two dimensions. A hydrostatic pressure applied to a body is then defined as one-third the sum of the three principal stresses which act upon it. In FIG. 26, the hydrostatic pressure is zero, and the principal tensile stress σ_x, the principal compressive stress σ_y, and the maximum shear stresses σ'_{xy}, are all equal in magnitude. In FIG. 27, a hydrostatic pressure P equal to the shear stress σ'_{xy}, is applied. The maximum tensile stress is then zero so that the body is always under compression. Therefore, the body cannot fail in tension".

(5) FIG. 3

"



"

2 Technical matters described in Cited Document 1

From the description of Cited Document 1, the following technical matters can be recognized.

(1) From 1 (3) and (5) above, there is disclosed the configuration in which the hollow portion is formed so as to extend in a laminated direction of the supporting pad 10 having elastic body layers 1 and steel plate layers 2 which are alternately laminated, and the configuration in which the energy absorbing core 3 is filled in the hollow portion.

(2) From 1 (2) to (4) above, under no-load in the laminated direction with respect to the supporting pad 10, the energy absorbing core 3 is subjected to a stress of 20 to 100 MPa in advance under hydrostatic pressure.

3 Invention described in Cited Document 1

Summarizing the technical matters described in Cited Document 1, it can be recognized that Cited Document 1 describes the following invention (hereinafter, referred to as "the Cited Invention").

<The Cited Invention>

"An energy absorber comprising a supporting pad 10 that has elastic body layers 1 and steel plate layers 2 which are alternately laminated, and an energy absorbing core 3 filled in a hollow portion formed so as to extend in a laminated direction of the supporting pad 10 in the supporting pad 10, wherein under no-load in the laminated direction with respect to the supporting pad 10, the energy absorbing core 3 is subjected to a stress of 20 to 100 MPa in advance under hydrostatic pressure and is filled in the hollow portion".

No. 5 Comparison

Invention 1 and the Cited Invention will be compared.

"Elastic body layers" of the Cited Invention correspond to "elastic layers" of Invention 1. "Steel plate layers 2" of the Cited Invention correspond to "rigid layers" of Invention 1. Therefore, "a supporting pad 10" of the Cited Invention corresponds to "a laminated body" of Invention 1.

"A hollow portion" of the Cited Invention corresponds to "a hollow portion" of Invention 1. "An energy absorbing core 3" of the Cited Invention corresponds to "a vibration damping body" of Invention 1. Accordingly, "comprising an energy absorbing core 3 filled in a hollow portion formed so as to extend in a laminated direction of the supporting pad 10 in the supporting pad 10" of the Cited Invention corresponds to "comprising a vibration damping body which is filled in a hollow portion formed in the laminated body in such a manner as to extend in a laminated direction of the laminated body" of Invention 1.

"Under no-load in the laminated direction with respect to the supporting pad 10, the energy absorbing core 3 is subjected to a stress of 20 to 100 MPa in advance under hydrostatic pressure and is filled in the hollow portion" of the Cited Invention is common with "the vibration damping body is filled in the hollow portion with a stress of 15 MPa or more and 55 MPa or less under a load in a laminated direction with respect to the laminated body" of Invention 1, only in the point that "the vibration damping body is filled in the hollow portion with a predetermined stress".

"An energy absorber" of the Cited Invention corresponds to "a seismic isolation apparatus" of Invention 1.

As described above, Corresponding Feature and Different Feature of Invention 1 and the Cited Invention are as follows.

[Corresponding Feature]

"A seismic isolation apparatus comprising: a laminated body having alternately

laminated elastic layers and rigid layers; and a vibration damping body which is filled in a hollow portion formed in the laminated body in such a manner as to extend in a laminated direction of the laminated body, wherein the vibration damping body is filled in the hollow portion with a predetermined stress".

[Different Feature]

Concerning that the vibration damping body is filled in the hollow portion with a predetermined stress, in Invention 1, "the vibration damping body is filled in the hollow portion with a stress of 5 MPa or more and 55 MPa or less under a load in a laminated direction with respect to the laminated body," whereas in the Cited Invention, "under no-load in the laminated direction with respect to the supporting pad 10, the energy absorbing core 3 is subjected to a stress of 20 to 100 MPa in advance under hydrostatic pressure and is filled in the hollow portion," and stress is not applied under a load in a laminated direction with respect to the energy absorbing core 3.

No. 6 Judgment

1 Concerning Different Feature

The above-mentioned Different Feature is examined.

Since the energy absorber of the Cited Invention is "used in large structures such as buildings or bridges" (see No. 4 1 (1) above), it can be said that it is naturally expected that the end plate 4 will be used in a situation in which a load of large structures such as buildings or bridges is applied (under a load).

Then, since the stress applied when the energy absorbing core 3 of the Cited Invention is filled in the hollow portion is "20 to 100 MPa in advance under hydrostatic pressure," in a situation that a load is applied on the energy absorber, it can be said that the stress obtained by adding the load amount to the 20 to 100 MPa is applied to the energy absorbing core 3.

Considering the difficulty and the like of making the energy absorber, which is the Cited Invention, into a structure that can withstand a large stress, as the stress applied to the energy absorbing core 3 of the Cited Invention in advance, 20 MPa can be selected, whereby the energy absorbing core 3 can have a relatively easy pressure resistance structure. However, in the situation that it is used under a load, a predetermined stress will be added to it, and even as a result of the addition, there is no particular difficulty for a person skilled in the art to make this a situation of 55 MPa or less, by setting the stress in the vicinity of 20 MPa in consideration that a relatively easy pressure-resistant structure can be obtained.

Further, in Paragraph [0034] of the specification of the present application, it is

described that "the lead plug 17, which is formed of lead that is a damping material for absorbing vibrational energy through plastic deformation, is press-fitted and filled in the hollow portion 14 defined by the lower surface 44, the inner peripheral surfaces 15 and 16, and the upper surface 64. Through such fitting and filling, even in a state (no-load state) in which a load W in the laminated direction V from the supported superstructure is not being applied to the upper plate 10, the lead plug 17 is disposed without a clearance with respect to the lower surface 44, the outer peripheral surfaces 4 and 5, and the upper surface 64, and slightly bites into the elastic layers 2 by jutting out toward the elastic layers 2 in a horizontal direction (shearing direction) H against the resiliency of the elastic layers 2 to thereby form the inner peripheral surfaces 15 of the elastic layers 2 into concave surfaces 81, and as the result, an inner peripheral surface 82 of the laminated body 7, which is constituted by the inner peripheral surfaces 15 and 16, is formed into the concave surfaces 81 at the positions of the inner peripheral surface 15 of those elastic layers 2 and into convex surfaces 83 at the positions of the rigid layers 3. In a state (under a load) in which the load W in the laminated direction V from the supported superstructure is being applied to the upper plate 10, the elastic layers 2 are compressed in the laminated direction V, so that the thickness t of the elastic layer 2 becomes smaller than 2.5 mm, and the height h of the seismic isolation apparatus 1 becomes lower. As a result, the lead plug 17 press-fitted and filled into the hollow portion 14 further bites into the elastic layers 2 by jutting out toward the elastic layers 2 in the horizontal direction H against the resiliency of the elastic layers 2 to thereby form the inner peripheral surfaces 15 of the elastic layers 2 into the concave surfaces 81 which are more concaved in the horizontal direction (shearing direction) H". It can be understood that "under a load in a laminated direction with respect to the laminated body" of Invention 1 means a state in which the load W in the laminated direction V from the superstructure supported by the laminated body 7 is applied to the upper plate 10.

Here, according to Paragraph [0034] above, it can be understood that "under a load in a laminated direction with respect to the laminated body," "the elastic layers 2 are compressed in the laminated direction," and "the lead plug 17 press-fitted and filled into the hollow portion 14" "forms the inner peripheral surfaces 15 of the elastic layers 2 into the concave surfaces 81 which are more concaved in the horizontal direction (shearing direction) H" as compared with a case under no-load, and under a load in a laminated direction with respect to the laminated body, the lead plug 17 is filled in the hollow portion 14 with the stress higher than the stress under no-load.

In addition, in Paragraph [0013] of the specification of the present application, it

is described that "(omitted) accordingly, there are cases where the seismic isolation apparatus in accordance with the present invention is used under no-load and cases where the seismic isolation apparatus in accordance with the present invention is used under a load. In the seismic isolation apparatus which is used in either case, it suffices if the vibration damping body is filled in the hollow portion with a stress of not less than 8 MPa under no-load or under a load on the laminated body in the laminated direction; i.e., in a preferred embodiment, under a load on the laminated body in the laminated direction corresponding to a bearing pressure of 0.5 MPa with respect to the laminated body". Therefore, it can be understood that the seismic isolation apparatus according to Invention 1 uses the same seismic isolation apparatus under no-load or under load.

2 Regarding effect

The effect of the invention according to the Invention 1 can be predicted by a person skilled in the art from the Cited Invention.

3 Regarding the Appellant's allegation

The Appellant, in "4. Reasons why the Invention should be patented" of the written demand for appeal, alleges that

"(1) (Omitted)

According to the Invention, since the vibration damping body is filled in the hollow portion under no-load, as is clear from FIGS. 4 to 7 of the present application, as compared with a case under no-load, in a case under a load, the history curve showing the relationship between the displacement in the horizontal direction H and the horizontal load is more rectangular, and stable damping performance is shown.

(2) The examiner stated regarding Claim 2 (Note by the body: Amended Invention 1) that 'it could have been appropriately implemented by a person skilled in the art to set stress applied to "the vibration damping body" under a load in a laminated direction corresponding to a bearing pressure of 0.5 MPa with respect to that laminated body to 15 MPa or more and 55 MPa or less'.

However, at least Cited Document 1 does not teach and suggest that the history curve showing the relationship between the displacement in the horizontal direction H and the horizontal load is made rectangular as mentioned above, and the vibration damping body is filled under a load so as to obtain stable damping performance.

Therefore, the Invention cannot be easily invented by a person skilled in the art based on Cited Document 1".

Then, those shown in "FIGS. 4 to 7 of the present application" above correspond

to Examples 1 to 3 and Comparative Example, respectively, and "a load in a laminated direction with respect to the laminated body" in each Example, as described in Paragraphs [0041] to [0044] of the specification of the present application, is a load W=0 (Example 1), a load W=0.5 MPa (Example 2), a load W=12 MPa (Example 3), and a load W=0 (Comparative Example). Then, the stress Pr of the lead plug 17 of each Example is set to stress Pr=8 MPa (Example 1), stress Pr=17 MPa (Example 2), stress Pr=39 MPa (Example 3), and stress Pr=2MPa (Comparative Example).

Accordingly, the part relating to (1) of the Appellant's allegation means that there is no difference depending on the presence/absence of "a load in a laminated direction with respect to the laminated body," but regardless of the presence/absence of the load, within a range where the detected stress Pr of the lead plug 17 is "15 MPa or more and 55 MPa or less," damping performance is superior to Example in which the stress Pr is outside of the numerical value range. Then, since it could have been easily conceived by a person skilled in the art to set the stress Pr out of the numerical value range from the Cited Invention, as described in 1 above, the part relating to (1) of the allegation above cannot be accepted.

In addition, concerning the part relating to (2) of the allegation above, in the Cited Invention, although "the history curve showing the relationship between the displacement in the horizontal direction H and the horizontal load" is not clear, it could have been appropriately implemented by a person skilled in the art to use the energy absorber of the Cited invention under a load, as described in 1 above. Therefore, similarly, it cannot be accepted.

No. 7 Closing

As described above, since Invention 1 could have been easily invented by a person skilled in the art based on the invention described in Cited Document 1, the Appellant should not be granted a patent under the provisions of Article 29(2) of the Patent Act.

Accordingly, the present application should be rejected without examining inventions relating to other claims.

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

May 28, 2021

Chief administrative judge: TAMURA, Yoshiaki
Administrative judge: SUGIYAMA, Kenichi
Administrative judge: UCHIDA, Hiroyuki