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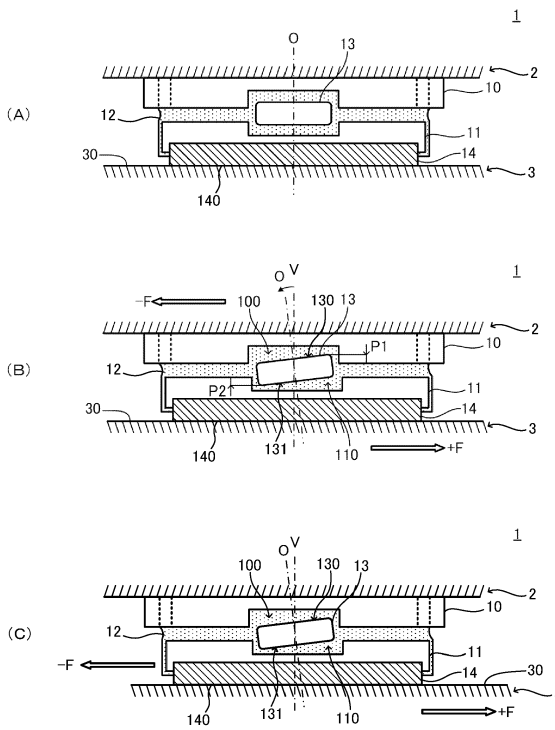
(54) BEARING DEVICE

(57) Provided is a bearing device designable more compactly and capable of bearing a high load.

The slide bearing (1) has a flange (10) configured to be arranged close to a superstructure segment (2) of a structure, such as building or bridge; a bearing plate (11) facing the flange (10) and configured to be arranged close to the substructure segment (3); the elastic component (12) bonded to the flange (10) and to the bearing plate (11) and intervening between the flange (10) and the bearing plate (11); and a shear key (13) in the form of round plate, configured to restrain the elastic component (12) from undergoing shear deformation. For the shear key (13), one end (130) is situated inside a hold section (100) formed on an undersurface (101) of the flange (10), and another end (131) is situated inside a hold section (110) formed on the top surface (111) of the bearing plate (11). The shear key (13) is placed inside the elastic component (12) to allow an axis (O) to be inclinable (rotatable) with respect to a stacking direction (V) of the flange (10) and the bearing plate (11).

Fig 2



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Description

Technical Field

[0001] The present invention relates to a bearing device suitable for use as a seismic isolation device intended for a structure, such as a building or a bridge.

Background Art

[0002] A bearing device, which is known as a seismic isolation device intended for a structure, such as a building or a bridge, is installed between a superstructure segment and a substructure segment of the structure, thereby bearing the superstructure segment while allowing reduction of transfer of vibration of the substructure segment due to an earthquake or the like to the superstructure segment.

[0003] For example, Patent Literature 1 discloses a bearing device that has no steel plate layer to be laminated alternating with elastic layers, thereby being overall reduced in resultant size, and the bearing device is capable of bearing a high load on a small area. This bearing device has an upper plate (a first rigid component) including a through hole; a lower plate (a second rigid component) placed facing the upper plate; an elastic component placed between the upper plate and the lower plate; a shear key (core) fixed to the lower plate by screw jointing or the like and placed through the elastic component so as to position its end inside the through hole; and a filler filled in the through hole so as to be in contact with the end of the shear key.

[0004] According to the bearing device disclosed in Patent Literature 1, the elastic component can become shear deformed to absorb transferred vibration from the substructure segment of the structure to the lower plate, thereby ensuring against transfer of vibration to the superstructure segment of building though the upper plate. The end of the shear key fixed to the lower plate is placed inside the through hole formed in the upper plate, therefore limiting relative excessive movement between the upper plate and the lower plate in horizontal direction; and this protects against damage which otherwise would be caused to the elastic component by excessive shear deformation.

Citation List

Patent Literature

[0005] Patent Literature 1: Japanese Patent No. 5646383

Summary of Invention

Technical Problem

[0006] Recently, further downsized bearing device has been awaited. However, for the bearing device disclosed in Patent Literature 1, the shear key is fixed to the lower plate by screw jointing or the like, and the ability of restraining shear deformation of the elastic component is dependent on the overlapping amount between the through hole formed in the upper plate and the end of the shear key placed inside the through hole. Therefore, ensuring restraint of shear deformation of the elastic component requires an increase of this overlapping amount or installation of a mechanism of preventing the end of the shear key from dropping out of the through hole formed in the upper plate, which makes it difficult to design the bearing device to be short in height.

[0007] The present invention has been made in view of the above situation, and an object of the invention is to provide a bearing device designable more compactly and capable of bearing a high load.

Solution to Problem

[0008] In response to the above issue, for a bearing device according to the present invention, a shear key in the form of round plate is placed inside an elastic component intervening between a top plate and a base plate in such a manner that one end of the shear key is situated in a hold section formed in a surface (facing the base plate) of the top plate and another end in a hold section formed in a surface (facing the top plate) of the base plate and so that an axis of the shear key can be inclined with respect to a stacking direction of the top plate and the base plate.

[0009] For example, the present invention provides a bearing device configured to be installed between a superstructure segment and a substructure segment of a structure and capable of bearing the superstructure segment while minimizing a transferred vibration from the substructure segment to the superstructure segment, and the bearing device has the following:

a top plate configured to be arranged in a position closer to the superstructure segment than to the substructure segment;

a base plate facing the top plate and configured to be arranged in a position closer to the substructure segment than to the superstructure segment;

an elastic component bonded to the top plate and to the base plate and intervening between the top plate and the base plate; and

a shear key having a form of round plate and restraining the elastic component from shear deforming;

wherein the top plate includes a first hold section formed in a surface facing the base plate, and a first end of the shear key is situated inside the first hold section;

the base plate includes a second hold section formed in a surface facing the top plate, and a second end of the shear key is situated inside the second hold section; and

the shear key is placed inside the elastic component while situating the first end inside the first hold section of the top plate and the second end inside the second hold section of the base plate and while allowing an axis of the shear key to be inclinable with respect to a stacking direction of the top plate and the base plate.

Advantageous Effects of Invention

[0010] According to the present invention, shear deformation of the elastic component due to a relative horizontal movement between the top plate and the base plate causes one end of the shear key situated inside the hold section of the top plate to be pushed in a moving direction of the top plate and another end of the shear key situated inside the hold section of the base plate to be pushed in a moving direction of the base plate, which is opposite direction to the moving direction of the top plate, thereby rotating the shear key so as to incline the axis of the shear key with respect to the stacking direction of the top plate and the base plate. This results in increases both in the overlapping amount between one end of the shear key and the hold section of the top plate and in the overlapping amount between another end of the shear key and the hold section of the base plate, and therefore even shortening the shear key in height allows the elastic component to be restrained from undergoing shear deformation. The shear key can not only restrain the elastic component from undergoing shear deformation, but also bear a vertical load between the top plate and the base plate. Consequently, according to the present invention, provided is a bearing device designable more compactly and capable of bearing a high load.

Brief Description of Drawings

[0011]

Fig. 1(A) and Fig. 1(B) are respectively a plan view and a bottom view of a slide bearing 1 according to one embodiment of the present invention, and Fig. 1(C) is an A-A cross sectional view of the slide bearing 1 as illustrated in Fig. 1(A).

Fig. 2(A) to Fig. 2(C) are schematic diagrams for explanation about operation of the slide bearing 1 as illustrated in Fig. 1.

Fig. 3(A) is a view equivalent to Fig. 1(C), for explanation about a modification 1A of the slide bearing 1 according to one embodiment of the present invention, and Fig. 3(B) is a view equivalent to Fig. 1(C), for explanation about a modification 1B of the slide bearing 1 according to one embodiment of the present invention.

Description of Embodiments

[0012] In the following, one embodiment of the present invention will be described.

[0013] Fig. 1(A) and Fig. 1(B) are respectively a plan view and a bottom view of a slide bearing 1 according to one embodiment of the present invention, and Fig. 1(C) is an A-A cross sectional view of the slide bearing 1 as illustrated in Fig. 1(A).

[0014] The slide bearing 1 according to the present embodiment, is to be installed between superstructure and substructure segments of a structure, such as building or bridge, thereby bearing the superstructure segment while ensuring that a vibration of the substructure segment to be caused by an earthquake or the like is prevented from being transferred to the superstructure segment.

[0015] As illustrated in the figures, the slide bearing 1 according to the present embodiment has a flange 10; a bearing plate 11 arranged to face the flange 10; an elastic component 12 intervening between the flange 10 and the bearing plate 11; a shear key 13 restraining the elastic component 12 from undergoing shear deformation; and a slide plate 14 attached to an undersurface (a surface to face the substructure segment of the structure) 112 of the bearing plate 11.

[0016] The flange 10 is a plate member to act as a top plate arranged in a position (which is closer the superstructure segment than to the superstructure segment) within the structure and is to be fixed to the superstructure segment with a bolt (not illustrated) inserted in each bolt hole 102. A hold section 100 in cylindrical shape with bottom is formed in an undersurface (one surface facing the bearing plate 11) 101 of the flange 10 so as to hold one end 130 of the shear key 13 within. The flange 10 is made of any of the following: metals, including steel materials, such as SS400; ceramics; hard resins; reinforced plastics; and composites of these materials.

[0017] The bearing plate 11 is a member in the form of round plate to act as a base plate arranged in a position (which is closer to the substructure segment than to the superstructure segment) within the structure. A hold section 110 in cylindrical shape with bottom is formed in a top surface (a surface facing the flange 10) 111 of the bearing plate 11 so as to hold the other end 131 of the shear key 13 within, and the hold section 110 has a diameter equal to or substantial equal to that of the hold section 100 of the flange 10 and is in a position facing this hold section 100. An attachment recess 113 for attachment of the slide plate 14 is formed in the undersurface 112 of the bearing plate 11. The bearing plate 11, as with the flange 10, is made of any of the following:

Metals, including steel materials, such as SS400; ceramics; hard resins; reinforced plastics; and composites of these materials. The bearing plate 11 is covered with the elastic component 12, except for the attachment recess 113 for attachment of the slide plate 14.

[0018] The elastic component 12 is bonded to both the undersurface 101 of the flange 10 and the top surface 111 of the bearing plate 11 through vulcanization bonding process or the like and intervenes between the flange 10 and the bearing plate 11. This allows shear deformation to occur due to relative movement between the flange 10 and the bearing plate 11, resulting in minimization of the transferred vibration from the bearing plate 11 to the flange 10. The elastic component 12 is made of natural rubber, synthetic rubber, thermoplastic elastomer, or thermosetting elastomer.

[0019] For the elastic component 12, a thickness T1 between the undersurface 101 of the flange 10 and the top surface 111 of the bearing plate 11, a thickness T2 between one end 130 of the shear key 13 and a top interior surface 103 of the hold section 100, and a thickness T3 between the other end 131 of the shear key 13 and a bottom surface 114 inside the hold section 110 are preferably set to meet a relation: $T1 \leq (T2+T3)$, more preferably a relation: $T3 = T1*(1/2)$ and $T2 \geq T3$. Meeting the relation $T1 \leq (T2+T3)$ makes the elastic component 12 capable of elastically deforming more easily in the central portion of the slide bearing 1, thereby reducing a compressive stiffness. This reduces concentration of compressive stress of the elastic component 12 in the central portion of the slide bearing 1, under a compressive load in a vertical direction (in a stacking direction of the flange 10 and the bearing plate 11) V, thereby allowing below-mentioned inclination (rotation) of the shear key 13 with respect to the vertical direction V to be more smooth. Furthermore, meeting the relation $T3 = T1*(1/2)$ and $T2 \geq T3$ ensures adequate thickness of the elastic component 12 between one end 130 of the shear key 13 and the top interior surface 103 of the hold section 100 of the flange 10 and enables reduced depth of the hold section 110 of the bearing plate 11, thereby enabling more compact design of the slide bearing 1.

[0020] The elastic component 12 has an outer peripheral surface 120 placed between the flange 10 and the bearing plate 11, which is formed to have a radially inwardly curved shape in cross section.

[0021] The shear key 13, which is a member in the form of round plate with a diameter smaller than that of the hold section 100 of the flange 10 and than that of the hold section 110 of the bearing plate 11, is placed inside the elastic component 12 in such a manner that one end 130 is situated inside the hold section 100 of the flange 10 and the other end 131 inside the hold section 110 of the bearing plate 11. The shear key 13 is placed through the elastic component 12 to situate respectively its both ends 130 and 131 inside the hold section 100 of the flange 10 and the hold section 110 of the bearing plate 11, thereby limiting relative movement between the flange 10 and the bearing plate 11 to restrain the elastic component 12 from undergoing shear deformation. The shear key 13 is arranged to be inclinable (rotatable) with respect to the vertical direction V, inside cylindrical space defined by the hold section 100 of the flange 10 and the hold section 110 of the bearing plate 11.

[0022] A corner 134 of the shear key 13 may be preferably chamfered. This avoids the occurrence of stress concentration at the corner 134 of the shear key 13 and allows the shear key 13 to incline (rotate) more easily.

[0023] The slide plate 14, which is a member in the form of round plate having a sliding surface 140 slidable over a placement surface 30 (e.g. a surface of a stainless steel plate) provided on the substructure segment 3 of the structure, is attached to the attachment recess 113 of the bearing plate 11 with the sliding surface 140 projecting downward from the undersurface 112 of the bearing plate 11. When shear force of the elastic component 12 subjected to shear deformation due to the relative movements between the flange 10 and the bearing plate 11 overcomes static friction force between the sliding surface 140 of the slide plate 14 and the placement surface provided on the substructure segment 3 of the structure, the sliding occurs between the sliding surface 140 and the placement surface 30.

[0024] Here, the thickness T1 of the elastic component 12 between the undersurface 101 of the flange 10 and the top surface 111 of the bearing plate 11 is designed to be equal to or substantial equal to one thirtieth of the diameter D3 of the slide plate 14, for example. In case of T1 larger than $D3*(1/30)$, the sinking amount of the slide bearing 1 becomes excessive correspondingly. Conversely, in case of T1 smaller than $D3*(1/30)$, the slide bearing 1 becomes correspondingly hard to incline and the distribution of stress acting on the slide plate 14 subjected to inclination becomes uneven.

[0025] For example, respective diameters D1 of the hold section 100 of the flange 10 and the hold section 110 of the bearing plate 11 each are set to 284mm when the diameter D3 of the slide plate 14 is 700mm, and 56mm when the diameter D3 of the slide plate 14 is 200mm.

[0026] Next, an operation of the slide bearing 1 will be described.

[0027] Fig. 2(A) to Fig. 2(C) are schematic diagrams for explanation about the operation of the slide bearing 1 as illustrated in Fig. 1.

[0028] As illustrated in Fig. 2(A), the slide bearing 1 is arranged on the substructure segment 3 in such a manner that the flange 10 is fixed to the superstructure segment 2 of the structure with bolts not illustrated and that the bearing plate 11 keeps the sliding surface 140 of the slide plate 14 in contact with the placement surface 30 provided on the substructure segment 3 of the structure, thereby bearing the superstructure segment 2 of the structure.

[0029] For the slide bearing 1 as illustrated in Fig. 2(A), when vibration due to an earthquake or the like is transferred from the substructure segment 3 of the structure to the bearing plate 11 through the slide plate 14, the elastic component 12 becomes shear deformed due to relative movement between the flange 10 and the bearing plate 11, thus minimizing transferred vibration from the bearing plate 11 to the flange 10. Under such circumstances, as illustrated in Fig. 2(B), one end 130 of the shear key 13 placed inside the hold section 100 of the flange 10 becomes pushed in a moving direction -F of the flange 10 and the other end 131 of the shear key 13 placed inside the hold section 110 of the bearing plate 11 becomes pushed in a moving direction +F of the bearing plate 11, which is opposite direction to the moving direction -F of the flange 10; therefore the shear key 13 starts rotation so that an axis O of the shear key 13 can incline with respect to the vertical direction (the stacking direction of the flange 10 and the bearing plate 11) V. This causes increases both in the overlapping amount P1 between one end 130 of the shear key 13 and the hold section 100 of the flange 10 and in the overlapping amount P2 between the other end 131 of the shear key 13 and the hold section 110 of the bearing plate 11, thus ensuring restraint of shear deformation of the elastic component 12.

[0030] For the shear key 13, its size and arrangement position are set so that the overlapping amounts P1, P2 can be obtained which are adequate to ensure restraint of shear deformation of the elastic component 12 upon inclination (rotation) of its axis O with respect to the vertical direction V. When a diameter D2 and a thickness T4 of the shear key 13 are large, the adequate overlapping amounts P1, P2 are ensured even if an inclination angle of the axis O of the shear key 13 with respect to the vertical direction V is small; whereas, when the diameter D2 and the thickness T4 of the shear key 13 are small, the inclination angle of the axis O of the shear key 13 with respect to the vertical direction V needs increasing so that the adequate overlapping amounts P1, P2 are ensured.

[0031] For example, when the respective diameters D1 of the hold section 100 of the flange 10 and the hold section 110 of the bearing plate 11 are 284mm, setting the diameter D2 and the thickness T4 of the shear key 13 to 260mm and 59. 5mm respectively allows the axis O of the shear key 13 to rotate up to the maximum of about 5 degrees with respect to the vertical direction V and therefore ensures, upon rotation of the shear key 13, the overlapping amounts P1 and P2 adequate to ensure restraint of shear deformation of the elastic component 12 are ensured. When the respective diameters D1 of the hold section 100 of the flange 10 and the hold section 110 of the bearing plate 11 are 56mm, setting the diameter D2 and the thickness T4 of the shear key 13 to 50mm and 26.5mm respectively allows the axis O of the shear key 13 to rotate up to maximum of about 7 degrees with respect to the vertical direction V and therefore ensures, upon rotation of the shear key 13, the overlapping amounts P1 and P2 adequate to ensure restraint of shear deformation of the elastic component 12.

[0032] Here, in the event that shear force of the elastic component 12 subjected to shear deformation due to relative movement between the flange 10 and the bearing plate 11 overcomes static friction force between the sliding surface 140 of the slide plate 14 and the placement surface 30 formed on the substructure segment 3 of the structure, the sliding occurs between the sliding surface 140 and the placement surface 30 provided on the substructure segment 3 of the structure, as illustrated in Fig. 2(C). This reduces transferred vibration of the substructure segment 3 to the slide bearing 1.

[0033] Hereinabove, one embodiment of the present invention has been described.

[0034] In the present embodiment, shear deformation of the elastic component 12 due to relative movement between the flange 10 and the bearing plate 11 causes the shear key 13 to rotate such that the axis O of the shear key 13 inclines with respect to the vertical direction V. This results in respective increases in the overlapping amount P1 between one end 130 of the shear key 13 and the hold section 100 of the flange 10 and in the overlapping amount P2 between the other end 131 of the shear key 13 and the hold section 110 of the bearing plate 11, thereby enabling restraint of the elastic component 12 from undergoing shear deformation even if the shear key 13 of short height is used. Therefore, according to the present embodiment, the bearing device has a more compact design and enables a high load to be borne.

[0035] In the present embodiment, the attachment recess 113 is formed in the undersurface 112 of the bearing plate 11, and the slide plate 14 is attached to this attachment recess 113 with the sliding surface 140 projecting from the undersurface 112 of the bearing plate 11. Consequently, when the elastic component 12 becomes shear deformed due to relative movement between the flange 10 and the bearing plate 11 and thereby shear force of the elastic component 12 overcomes static friction force between the sliding surface 140 and the placement surface 30 formed on the substructure segment 3 of the structure, the slide occurs between the sliding surface 140 and this placement surface 30, thereby minimizing transferred vibration from the substructure segment 3 to the slide bearing 1.

[0036] According to the present embodiment, the elastic component 12 covers the bearing plate 11, except for the attachment recess 113 for attachment of the slide plate 14, therefore being effective in corrosion prevention for the bearing plate 11 even without additional rust proof treatment against the bearing plate 11.

[0037] In the present embodiment, the hold section 100 of the flange 10 and the hold section 110 of the bearing plate 11, each have a cylindrical shape with bottom. In comparison with if replacing these hold sections 100 and 110 to through holes, the present embodiment causes compressive stress of the elastic component 12, which otherwise would be imposed outside through the through holes, to be more effectively imposed on the shear key

13. This ensures restraint of shear deformation of the elastic component 12.

[0038] In the present embodiment, the elastic component 12 has the outer peripheral surface 120 between the flange 10 and the bearing plate 11, which is formed to have a radially inwardly curved shape in cross section. Consequently, when the slide bearing 1 is subjected to compressive load in the vertical direction V, the outer peripheral surface 120 of the elastic component 12 is prevented from expanding and resultantly increasing surface area, and this ensures against occurrence in ozone cracking into the elastic component 12. The outer peripheral surface 120 of the elastic component 12 can be formed into a radially inwardly curved shape in cross section so that the resultant cross-sectional shape after installation of the slide bearing 1 onto the structure is flat or slightly inwardly curved.

[0039] The present invention can include, but is not limited to, the above embodiments: it will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention.

[0040] For example, as exemplified by a modification 1A of the slide bearing 1 illustrated in Fig. 3(A), end faces 132 and 133 of both ends 130 and 131 of the shear key 13 each may be shaped into a recess with a top portion on the axis O of the shear key 13. Under such circumstances, the elastic component 12 is thicker in the central portion of the flange 10 and the bearing plate 11 than otherwise would be, and therefore compressive stress to be imposed on the elastic component 12 in this central potion is reduced. This results in decrease in unevenness of distribution of compressive stress of the elastic component 12 to act on the slide plate 14 through the bearing plate 11, thereby achieving improved sliding performance of the slide plate 14.

[0041] While the both ends 130, 131 of the shear key 13 herein have the respective end faces 132, 133 each shaped into a recess, the shear key 13 may be used as far as at least one of the end faces 132, 133 is shaped into a recess.

[0042] As exemplified by a modification 1B of the slide bearing 1 illustrated in Fig. 3(B), the top interior surface 103 of the hold section 100 of the flange 10 and the bottom surface 114 inside the hold section 110 of the bearing plate 11, each may be shaped into a recess with a top portion in corresponding central portion. Even in this case, as with the modification 1A illustrated in Fig. 3(A), the elastic component 12 is thicker in central portion of both the flange 10 and the bearing plate 11 and therefore compressive stress of the elastic component 12 is lower in the central portion; this results in decrease in unevenness of distribution of compressive stress of the elastic component 12 to act on the slide plate 14 through the bearing plate 11, thereby achieving improved sliding performance of the slide plate 14

[0043] While both the top interior surface 103 of the hold section 100 of the flange 10 and the bottom surface 114 inside the hold section 110 of the bearing plate 11 herein are shaped into a recess, at least one of the surfaces 103, 114 may be shaped into a recess.

[0044] In the above embodiments, the slide bearing 1 is arranged in the structure in such a manner that the flange 10 is fixed to the superstructure segment 2 of the structure and that the slide plate 14 is in contact with the placement surface 30 formed on the substructure segment 3 of the structure. The scope of the present invention, however, is not limited in this respect. The slide bearing 1 may be installed in the structure in such a manner that the slide plate 14 is in contact with a flat surface provided on the superstructure segment 2 of the structure and that the flange 10 is fixed to the substructure segment 3 of the structure, namely upside down.

[0045] The above embodiments have been described taking the examples of the slide bearing 1 in which the slide plate 14 is mounted onto the undersurface 112 of the bearing plate 11; however, the scope of the present invention is not limited in this respect. The present invention is widely available for any type of bearing device such that the bearing plate 11 is to be mounted on the substructure segment 3 of the structure without the slide plate 14 to be mounted on the undersurface 112 of the bearing plate 11.

Reference Signs List

[0046] 1, 1A, 1B: slide bearing; 2: superstructure segment of structure; 3: substructure segment of structure; 10: flange; 11: bearing plate; 12: elastic component; 13: shear key; 14: slide plate; 30: placement surface; 100: hold section of the flange 10; 101: undersurface of the flange 10; 102: bolt hole in the flange 10; 103: top interior surface of the hold section 100; 110: hold section of the bearing plate 11; 111: top surface of the bearing plate 11; 112: undersurface of the bearing plate 11; 113: attachment recess of the bearing plate 11; 114: bottom surface inside the hold section 110; 120: outer peripheral surface of the elastic component 12; 130, 131: end of the shear key 13; 132, 133: end face of the shear key 13; 134: corner of the shear key 13; 140: sliding surface of the slide plate 14

Claims

1. A bearing device configured to be installed between a superstructure segment and a substructure segment of a structure and capable of bearing the superstructure segment while minimizing a transferred vibration from the substructure segment to the superstructure segment, the bearing device comprising:

a top plate configured to be arranged in a position closer to the superstructure segment than to the substructure segment;
a base plate facing the top plate and configured

to be arranged in a position closer to the substructure segment than to the superstructure segment;
an elastic component bonded to the top plate and to the base plate and intervening between the top plate and the base plate; and
a shear key having a form of round plate and restraining the elastic component from shear deforming;
characterized in that the top plate includes a first hold section formed in a surface facing the base plate, and a first end of the shear key is situated inside the first hold section;
the base plate includes a second hold section formed in a surface facing the top plate, and a second end of the shear key is situated inside the second hold section; and
the shear key is placed inside the elastic component while situating the first end inside the first hold section of the top plate and the second end inside the second hold section of the base plate and while allowing an axis of the shear key to be inclinable with respect to a stacking direction of the top plate and the base plate.

2. A bearing device according to Claim 1,
wherein the shear key has, in at least one of the surfaces facing the top plate or the base plate, a recess with a top portion on the axis.

3. A bearing device according to Claim 1 or 2,
wherein at least one of the first and second hold sections has a bottom surface including a recess with a top portion in a central portion.

4. A bearing device according to any one of Claims 1 to 3, further comprising a slide plate attached to a surface of the base plate to face the substructure segment or to a surface of the top plate to face the superstructure segment, the slide plate having a sliding surface.

5. A bearing device according to Claim 4,
wherein the base plate includes an attachment recess for attachment of the slide plate, which is formed in the surface facing the substructure segment; and the slide plate is attached to the attachment recess with the sliding surface projecting from the surface of the base plate facing the substructure segment.

6. A bearing device according to Claim 4 or 5,
wherein the base plate is covered by the elastic component, except for an area to which the slide plate is attached.

7. A bearing device according to any one of Claims 1 to 6,
wherein the elastic component has an outer peripheral surface placed between the top plate and the base plate, and the outer peripheral surface in absence of compressive load in vertical direction has a radially inwardly curved shape in cross section.

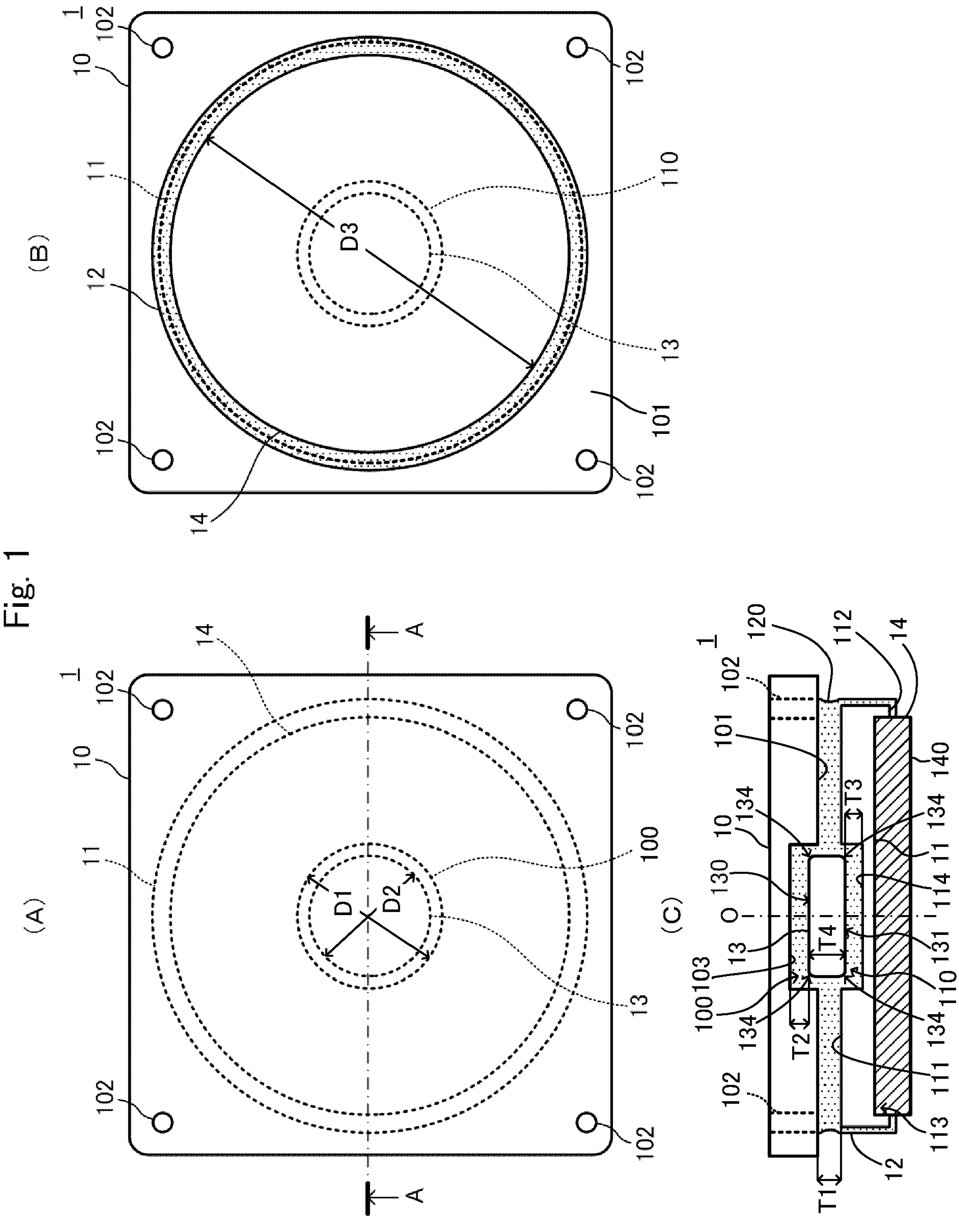
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Fig. 1

Fig 2

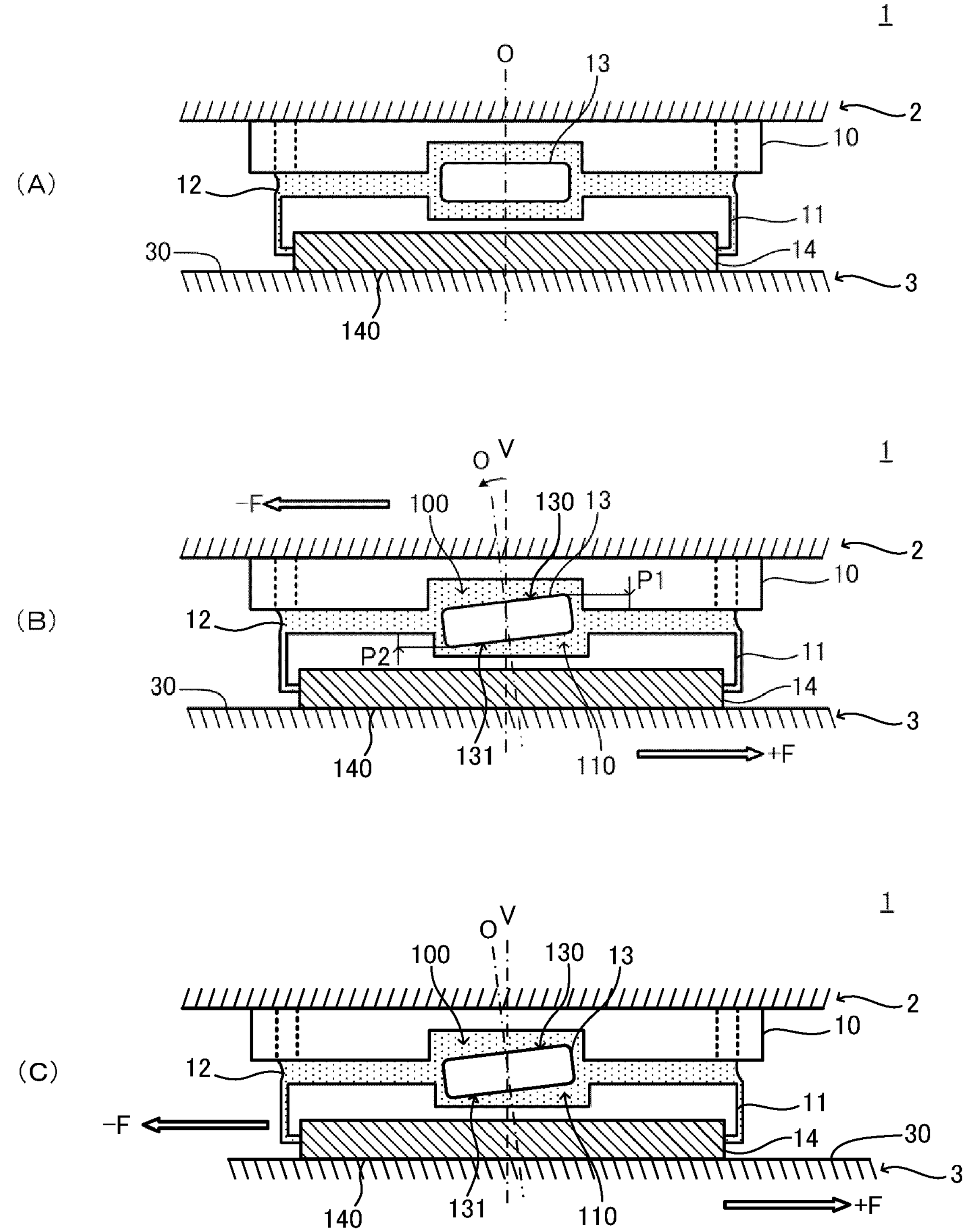
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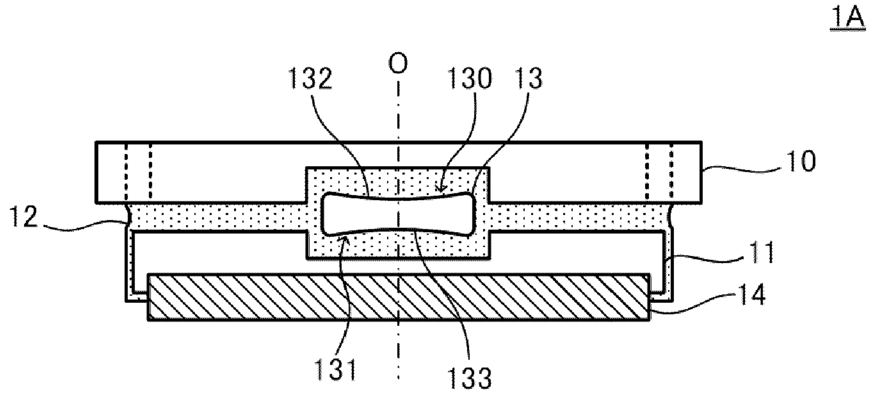
Fig. 3

(A)



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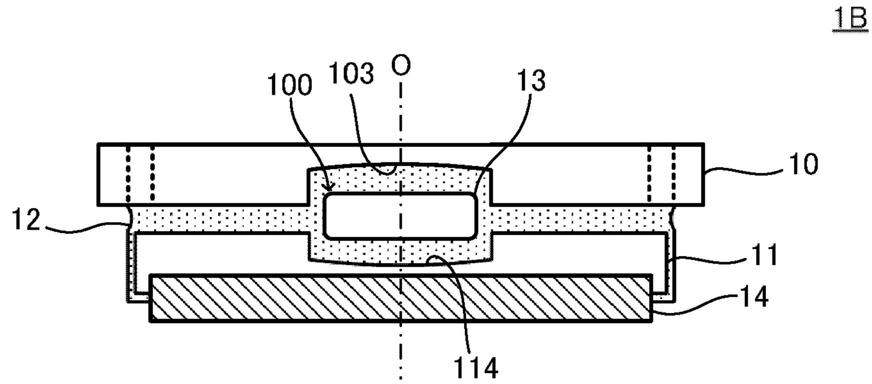

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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 0735

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	JP 2001 234977 A (TOKAI RUBBER IND LTD) 31 August 2001 (2001-08-31) * paragraph [0025] - paragraph [0054]; figures 1-9 * -----	1-7	INV. E04H9/02 E01D19/04
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Place of search	Date of completion of the search	Examiner
Munich	26 August 2021	Stefanescu, Radu

CATEGORY OF CITED DOCUMENTS

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