Decision on opposition

Opposition No. 2018-700207

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The case of opposition against the patented invention of Japanese Patent No. 6191537, entitled "ALIGNMENT DEVICE", has resulted in the following decision.

Conclusion

The patent according to Claims 1 to 3 and 5 of Japanese Patent No. 6191537 shall be revoked.

The patent according to Claim 4 of Japanese Patent No. 6191537 is maintained.

Reason

No. 1 History of the procedures

The application regarding the patent according to Claims 1 to 5 of Japanese Patent No. 6191537 was filed on May 12, 2014, the establishment of the patent right thereof was registered on Aug. 18, 2017, and a gazette containing the patent was issued on Sep. 6, 2017. The history of the opposition to a granted patent regarding that patent is as follows.

On Mar. 6, 2018: Opposition to the granted patent by the Patent Opponent Suzuki Hirokazu

As of Jun. 7, 2018: Written notice of reasons for revocation (hereinafter, referred to as "Reasons for Revocation")

No. 2 The Invention

"[Claim 1]

An alignment device comprising: a device body having a concave spherical surface; and an alignment member having a convex spherical surface fitted to the concave spherical surface, the alignment device being configured to make the concave spherical surface and the convex spherical surface be in a non-contact state by supplying air between the concave spherical surface and the convex spherical surface, and make a work be pressed against a target position in parallel by making the alignment member swing in that state, wherein

the alignment device includes a rotation regulation mechanism to regulate rotation of the alignment member around a Z-axis that passes through the center of the concave spherical surface, wherein

the rotation regulation mechanism includes: a joint frame surrounding the alignment member; a pair of first fitting parts formed in the joint frame in such a way as to occupy positions opposite to each other sandwiching the Z-axis in a direction of an X-axis that is orthogonal to the Z-axis, and having a hole-like shape or a groove-like shape; a pair of second fitting parts formed in the joint frame in such a way as to occupy positions opposite to each other sandwiching the Z-axis in a direction of a Y-axis that is orthogonal to the Z-axis and the X-axis, and having a hole-like shape or a groove-like shape; a pair of X-axis pins formed at positions of the device body opposite to each other sandwiching the Z-axis in the X-axis direction, and fitted with the pair of first fitting parts individually; a pair of Y-axis pins formed at positions of the alignment member opposite to each other sandwiching the Z-axis in the Y-axis direction, and fitted with the pair of second fitting parts individually, wherein

the X-axis pins and the Y-axis pins are columnar pins having a uniform diameter, and wherein

an internal wall of each of the first fitting parts and the second fitting parts includes a slope inclining in a direction such that a lateral width of the slope is gradually enlarged toward a tip side of each of the X-axis pins and the Y-axis pins, and, in an end portion of the slope, an abutment part against which each of the X-axis pins and the Y-axis pins are abutted.

[Claim 2]

The alignment device according to Claim 1, wherein

the X-axis pins are fitted with the first fitting parts from the outside of the joint frame, the Y-axis pins are fitted with the second fitting parts from the inside of the joint frame, the slope of the first fitting parts inclines in a direction such that a lateral width of the first fitting parts is gradually enlarged toward the inside of the joint frame from

the outside of the joint frame, and the slope of the second fitting parts inclines in a direction such that a lateral width of the second fitting parts is gradually enlarged toward the outside of the joint frame from the inside of the joint frame.

[Claim 3]

The alignment device according to Claim 1 or 2, wherein

the X-axis pins support the joint frame by contacting with ends of the first fitting parts in the Z-axis direction, and the Y-axis pins do not contact with an end of the second fitting parts in the Z-axis direction.

[Claim 4]

The alignment device according to any one of Claims 1 to 3, wherein

the slope of the first fitting parts and the second fitting parts is inclining linearly in a direction such that the lateral width is enlarged.

[Claim 5]

The alignment device according to any one of Claims 1 to 4, wherein

the first fitting parts and the second fitting parts are grooves extending in the Z-axis direction, the second fitting parts are opened at rear end faces of the joint frame facing toward the device body side, and the first fitting parts are opened at front end faces of the joint frame in the opposite side of the rear end face."

(Hereinafter, inventions according to Claims 1 to 5 are referred to as "Invention 1" to "Invention 5", respectively)

No. 3 Outline of Reasons for Revocation

The purport of Reasons for Revocation against the patents according to Claims 1 to 3 and 5 notified to the Patentee in the written notice of reasons for revocation dated Jun. 7, 2018 by the body is as follows.

Inventions 1 and 2 could have been invented by a person skilled in the art with ease based on the invention described in Evidence A No. 1, and, therefore, the patents according to Claims 1 and 2 are ones that violate the provisions of Article 29(2) of the Patent Act.

Inventions 3 and 5 could have been invented by a person skilled in the art with ease based on the invention described in Evidence A No. 1 and the descriptions of Evidence A No. 5, and, therefore, the patents according to Claims 3 and 5 are ones that violate the provisions of Article 29(2) of the Patent Act.

Therefore, the patents according to Claims 1 to 3 and 5 should be invalidated.

No. 4 Descriptions in Evidence A

1 Evidence A No. 1

(1) Descriptions in Evidence A No. 1

In Japanese Unexamined Patent Application Publication No. 2007-27516 (hereinafter, referred to as "Evidence A No. 1") noticed in Reasons for Revocation, there are the following descriptions together with drawings. (Underlines were given by the body; the same shall apply hereinafter)

"[Technical field]

[0001]

The present invention relates to a copying apparatus which includes a fixed member and a movable member having a concave hemisphere face and a convex hemisphere face, respectively, and causes the movable member to be pressed against a target product (for example, a substrate) to follow the target product in parallel.

[0002]

For example, there is a copying apparatus for use in a chip mounter and the like that transports semiconductor chips for which dicing has been carried out onto a lead frame of a die bonding apparatus. In such copying apparatus, a swinging body having a convex hemisphere face is rotatably supported by a base having a concave hemisphere face. When a work copying surface of the swinging body disposed in the curvature center of the convex and concave hemisphere faces is made to abut against a specific surface of a semiconductor chip, the swinging body rotates about an X-axis and a Y-axis that are orthogonal to each other in an identical plane. By this rotation, the work copying surface of the swinging body tilts in conformity to the specific surface of the semiconductor chip. By this, the work copying surface of the swinging body comes to be in parallel with the specific surface of the semiconductor chip."

"[0013]

As shown in FIG. 1 to FIG. 3, the copying apparatus 10 of the present embodiment includes, as main component members thereof, a base (fixed member) 11, a spherical base (movable member) 12, a pair of side plates (support member) 13, a rotation-stop ring (rotation-stop member) 14, and a holding member 15. To the base 11, the spherical base 12, the rotation-stop ring 14, and the holding member 15 are attached in a manner piled in sequence, and, to side faces of the base 11 opposite to each other, the pair of side plates 13 are attached.

[0014]

The base 11 is formed into a square block shape in planar view (when seen from

the Z-axis direction). In one face of the base 11, a concave hemisphere face 16 is formed. In the center of the concave hemisphere face 16, a magnet (permanent magnet) M is provided. In addition, in side faces of the base 11 opposite to each other, a plurality of (two each in the present embodiment) screw holes 17 for attaching the side plates 13 are formed. Furthermore, in the base 11, an air port that is not shown is formed. The air port is connected to a pressure supply source that is not shown, and it is arranged in such a way that, from that pressure supply source, pressurized air is supplied as pressurized fluid to the concave hemisphere face 16 through an air route (not shown) formed in the base 11.

[0015]

The spherical base 12 is constituted of a spherical part 18 and a base part 19. In the spherical part 18, a convex hemisphere face 20 is formed. The convex hemisphere face 20 is formed having an identical curvature radius with the concave hemisphere face 16 of the base 11. For this reason, when the spherical base 12 is installed in the base 11, the convex hemisphere face 20 thereof engages with the concave hemisphere face 16.

[0016]

In addition, in the spherical base 12, a base part 19 is formed on a face opposite to the convex hemisphere face 20. The base part 19 is formed in a columnar shape having a diameter smaller than that of the base end side of the spherical part 18. Then, in the outer perimeter of the base part 19, flat surfaces 21 cut in a flat manner are formed. The flat surfaces 21 are formed at two locations opposite to each other.

[0017]

In each flat surface 21, a pin insertion hole 22 is formed. Then, in each pin insertion hole 22 of the base part 19, one rotation regulation pin (a first protruding part (protruding part)) 23 is attached. In the present embodiment, the rotation regulation pin 23 is adhesively fixed to the pin insertion hole 22. In addition, the rotation regulation pin 23 is attached in such a way that its tip protrudes outward from the base part 19. The pair of rotation regulation pins 23 are arranged on an identical axis line along a diameter direction of the base part 19. In the present embodiment, the pair of rotation regulation pins (a second protruding part (protruding part)) 23 are arranged in a linear fashion along X-axis direction. In addition, in the base part 19, a plurality of (four in the present embodiment) screw holes 24 for attaching the holding member 15 are formed.

[0018]

The side plates 13 are formed in a rectangular plate-like shape in planar view

(when seen from the Y-axis direction). In each of the side plates 13, a plurality of (in the present embodiment, two) screw holes 25 are formed. The side plates 13 are fastened and fixed to the base 11 by a fastener such as a bolt that is not shown.

[0019]

In addition, in each side plate 13, a pin insertion hole 26 is formed. Then, to the pin insertion hole 26 of each side plate 13, one rotation regulation pin 27 is attached. In the present embodiment, the rotation regulation pin 27 is fixed to the pin insertion hole 26 by press fitting. Also, the rotation regulation pin 27 is attached in a manner that its tip protrudes outward from the side plate 13. When the side plates 13 are attached to the base 11, the pair of rotation regulation pins 27 are arranged in such a way that their tips face each other on an identical axis line. In the present embodiment, the pair of rotation regulation pins 27 are arranged in a linear fashion along the Y-axis direction.

[0020]

In the copying apparatus 10 of the present embodiment, when the spherical base 12 and the pair of side plates 13 are attached to the base 11, each of the rotation regulation pins 23 and 27 are arranged at the same height position in Z-axis direction, as shown in FIG. 1. That is, the center axis lines of the rotation regulation pins 23 and 27 are arranged at an identical height position. In addition, the rotation regulation pins 23 of the spherical base 12 and the rotation regulation pins 27 of the side plate 13 are arranged orthogonal to each other as shown in FIG. 2. In the present embodiment, these are arranged orthogonal to each other in the XY plane that is formed by the X-axis and the Y-axis. Then, the rotation regulation pins 23 and the rotation regulation pins 27 are arranged one after the other in a manner having a 90 degree interval around the Z-axis.

[0021]

The rotation-stop ring 14 is formed into a ring shape having an outer peripheral surface of an identical diameter with that of the spherical part 18 of the spherical base 12, and an inner peripheral surface of a diameter larger than the diameter of the base part 19. The rotation-stop ring 14 is attached to the spherical base 12 in a manner surrounding the base part 19 of the spherical base 12 by its inner peripheral surface. In the outer periphery of the rotation-stop ring 14, flat surfaces 28 cut in a flat manner are formed. The flat surfaces 28 are formed at four positions. In each flat surface 28, a pin insertion groove 29 is formed. The pin insertion groove 29 is formed into a cross-sectionally concave shape (rectangular groove), and, in conjunction with this, is formed in a manner penetrating through the outer peripheral surface and the inner peripheral

surface of the rotation-stop ring 14. Furthermore, the pin insertion groove 29 is formed having an identical depth along the diameter direction of the rotation-stop ring 14 and in a linear fashion.

[0022]

When the rotation-stop ring 14 is attached to the spherical base 12, the rotation regulation pins 23 of the spherical base 12 and the rotation regulation pins 27 of the side plate 13 are made to slidably engage with each pin insertion groove 29, as shown in FIG. 1 and FIG. 2. Each pin insertion groove 29 is formed in a manner having a groove width and a groove depth slightly larger than the diameters of the rotation regulation pins 23 and 27. That is, each pin insertion groove 29 is formed in such a way that, when the rotation regulation pins 23 and 27 are inserted, a slight gap (10 μm) is provided between the pin insertion groove 29 and the outer peripheral surface of each of the rotation regulation pins 23 and 27.

[0023]

The holding member 15 is formed into a round plate-like shape in planar view (when seen from the Z-axis direction). The outside diameter of the holding member 15 is formed in a manner having an identical diameter with the outside diameter of the rotation-stop ring 14. In the holding member 15, a plurality of (four in the present embodiment) screw holes 30 are formed. The holding member 15 is fixed to the spherical base 12 by fastening using a fastener such as a bolt that is not shown. In addition, in the holding member 15, on a surface opposite to the attaching surface for attaching to the spherical base 12, a tool (not shown) for crimping a semiconductor chip to the upper surface (specific surface) of a target product such as a substrate is attached, for example. In the copying apparatus 10 of the present embodiment, its curvature center exists on an apical surface of a tool (the surface of a target product such as a substrate). Therefore, in the copying apparatus 10 of the present embodiment, the apical surface of the tool becomes a surface that comes into contact with a work; that is, a copying surface. Then, in the present embodiment, a surface of the spherical base 12 in the side of the base part 19 will be a surface that copies the target product in parallel.

[0024]

Next, the constitution of the rotation regulation pins 23 and 27 used in the copying apparatus 10 of the present embodiment will be described in detail.

Each of the rotation regulation pins 23 and 27 of the present embodiment includes, as shown in FIG. 4 (a) and (b), a tip part (engagement portion) 31 and an insertion part 32. In the present embodiment, it is made in such a way that the rotation regulation pins 23 to be attached to the spherical base 12 and the rotation regulation pins

27 to be attached to the side plate 13 are of an identical configuration (a shape and a size). The insertion part 32 is a portion that is inserted to the pin insertion hole 22 of the spherical base 12 and the pin insertion hole 26 of the side plate 13. On the other hand, the tip part 31 is a portion made to protrude outward from each of the spherical base 12 and the side plate 13. The rotation regulation pins 23 and 27 are formed into a spindle shape having a diameter direction cross-section of a round shape. Then, the tip part 31 of each of the rotation regulation pins 23 and 27 is formed in a manner that its center in the axial direction bulges out, and both sides of the center undergo diameter reduction, and the entire shape is made to be a barrel shape. That is, the tip part 31 is formed in such a way that the entire part forms a curved surface. On the other hand, the insertion part 32 is formed in a columnar shape having an identical diameter over the whole axial direction. The rotation regulation pins 23 and 27 are produced by machining using lathe turning and the like in such a way that a tip of a parallel pin having a diameter direction cross-section of a round shape forms a barrel shape.

[0025]

In the copying apparatus 10 of the present embodiment constituted as such, the spherical base 12 and the pair of side plates 13 are attached to the base 11. Then, when the rotation-stop ring 14 is attached to the spherical base 12 in this state, as shown in FIG. 1 and FIG. 2, each of the rotation regulation pins 23 and 27 is inserted to each pin insertion groove 29 and these are engaged. By this, rotation (swinging) of the spherical base 12 relative to the base 11 around X-axis and around Y-axis is allowed. On the other hand, rotation of the spherical base 12 around Z-axis is regulated by each of the rotation regulation pins 23 and 27 being made to engage with each pin insertion groove 29 of the rotation-stop ring 14. In the present embodiment, by the rotation-stop ring 14, the pin insertion groove 29, and the rotation regulation pins 23 and 27, a rotation stop apparatus is constituted.

[0026]

Hereinafter, the action of the copying apparatus 10 of the present embodiment will be described.

In the copying apparatus 10, when pressurized air is supplied from an air port, the pressurized air is jet out to the concave hemisphere face 16. By this, a static pressure is brought to the interfacial surface between the base 11 (the concave hemisphere face 16) and the spherical base 12 (the convex hemisphere face 20), and the spherical base 12 is separated from the base 11. At the same time, the spherical base 12 is pulled to the base 11 by magnetic force of the magnet M. Therefore, the spherical base 12 is supported rotatably in a state that the concave hemisphere face 16

and the convex hemisphere face 20 are not in contact with each other, by the force detaching from the base 11 and the force pulling to the base 11 balancing with each other.

[0027]

In this state, the copying apparatus 10 is pressed against a target product (a substrate and the like). On this occasion, if the target product is inclining along the Y-axis direction, the spherical base 12 rotates around the X-axis in a manner following-up the inclination angle. By this, even if the target product is inclining in the Y-axis direction, the apical surface (copying surface) of the tool copies the target product in parallel. On the other hand, in a target product X-axis direction, the spherical base 12 rotates around the Y-axis in a manner following-up that inclination angle. By this, even if the target product is inclining in the X-axis direction, the apical surface (copying surface) of the tool copies the target product in parallel.

[0028]

In addition, in the copying apparatus 10, in order to allow rotation (swinging) of the spherical base 12 around the X-axis and around the Y-axis, a dimensional difference (10 μm in the present embodiment) is provided between the outer perimeter of the rotation regulation pins 23 and 27 and the inner perimeter of the pin insertion groove 29. Since this dimensional difference has an influence on a rotation amount of the spherical base 12 around the Z-axis; that is, the rotation stop accuracy, that amount is set as a small value. Then, in the copying apparatus 10 of the present embodiment, the rotation regulation pins 23 and 27 are formed in such a way having a curved surface, and, therefore, on the occasion of assembly, adjustment of a relative positional relationship (a position, an angle) between the rotation regulation pins 23 and 27 and the pin insertion groove 29 is unnecessary. That is, in the case of a pin having a corner portion (for example, a rectangular pin), if assembly is not carried out in consideration of a position and an angle of the pin relative to a pin insertion groove into which the pin is inserted, the pin will twist against the pin insertion groove by rotation (swinging) of the spherical base 12. When the pin twists against the pin insertion groove in this way, rotation (swinging) of the spherical base 12 around the X-axis and around the Y-axis is regulated.

[0029]

In contrast, the rotation regulation pins 23 and 27 of the present embodiment have a curved surface, and thus do not twist against the pin insertion groove 29, and the curved surface in question assumes the role of a relief. For this reason, assembly can be performed without setting the assembly accuracy strictly (without adjusting a

position and an angle of the rotation regulation pins 23 and 27 relative to the pin insertion groove 29 with highly accuracy). Therefore, while achieving reduction of assembly man-hours, a rotation amount of the spherical base 12 around the X-axis and around the Y-axis (swinging amount) is secured, and positioning accuracy can be improved. FIG. 5 (a) illustrates a state that the rotation regulation pins 23 and 27 are inserted straight into the pin insertion groove 29 of the rotation-stop ring 14, and FIG. 5 (b) illustrates a state that the rotation regulation pins 23 and 27 are inserted into the pin insertion groove 29 in an inclined manner. Even if the rotation regulation pins 23 and 27 are inserted as shown in FIG. 5 (b), the tip part 31 of the rotation regulation pins 23 and 27 do not twist against the pin insertion groove 29, by virtue of having a curved surface. In the present embodiment, by the tip part 31 having a curved surface, the tip of the tip part 31 in question is relieved without abutting against the inner surface of the pin insertion groove 29, and becomes a contact prevention part for preventing contact.

[0030]

Therefore, according to the present embodiment, the effects shown below can be obtained.

(1) The rotation regulation pins 23 and 27 to be rotation stoppers of the spherical base 12 are formed in such a way that the engagement part 31 thereof has a curved surface. In the copying apparatus 10, by inserting the rotation regulation pins 23 and 27 into the pin insertion grooves 29, rotation of the spherical base 12 around the Z-axis is regulated. Then, in the copying apparatus 10, on the occasion when the spherical base 12 rotates around the X-axis or around the Y-axis, the rotation regulation pins 23 and 27 do not twist in the inner surface of the pin insertion grooves 29. For this reason, it is possible to realize the copying apparatus 10 that is of high accuracy (of improved positioning accuracy). In addition, by the rotation regulation pins 23 and 27 having a curved surface, twisting is not caused in the inner surface of the pin insertion groove 29, and, therefore, there is no need to adjust a relative positional relationship between each of the rotation regulation pins 23 and 27 and the pin insertion groove 29 (a position and an angle) accurately on the occasion of assembly of the copying apparatus 10. Therefore, increase of manufacturing cost can be suppressed.

[0031]

(2) The rotation regulation pins 23 and 27 are fixed to the spherical base 12 and the side plate 13 by press fitting or by adhesive bonding. For this reason, it is possible to simplify assembly of the rotation regulation pins 23 and 27. That is, since the rotation regulation pins 23 and 27 do not twist in the inner surface of the pin insertion groove 29, there is no need to set the assembly accuracy of the rotation regulation pins

23 and 27 strict, and thus it is possible to adopt press fitting fixation and adhesive bonding fixation. Accordingly, the manufacturing process of the copying apparatus 10 can be simplified, and increase in manufacturing cost can be suppressed.

[0032]

(3) The rotation regulation pins 23 and 27 are formed into a barrel shape. For this reason, it is possible to fabricate the rotation regulation pins 23 and 27 easily from a round bar material such as a parallel pin by lathe turning and the like. Therefore, manufacturing cost increase of the copying apparatus 10 can be suppressed.

[0033]

(4) The side plates 13 are fixed to the base 11 by fastening using a bolt and the like. For this reason, it is possible to simplify assembly of the rotation regulation pins 23 and 27. That is, since the rotation regulation pins 23 and 27 do not twist in the inner surface of the pin insertion groove 29, there is no need to set the assembly accuracy of the rotation regulation pins 23 and 27 strict, and thus it is possible to adopt fastening fixation. Accordingly, the manufacturing process of the copying apparatus 10 can be simplified, and increase in manufacturing cost can be suppressed."

"[0035]

○ In the embodiment, the shapes of the rotation regulation pins 23 and 27 and the pin insertion groove 29 may be changed as shown in FIG. 7 and FIG. 8. In another embodiment shown in FIG. 7, the shapes of a rotation-stop ring 40 and a pin insertion groove 41 formed on the rotation-stop ring 40 are identical with the shapes of the rotation-stop ring 14 and the pin insertion groove 29 of the aforementioned embodiment, but the shape of a rotation regulation pin 42 is different. The rotation regulation pin 42 includes a cylindrical insertion part 43 (a portion to be inserted into the spherical base 12 or the side plate 13), and a tip part (cylinder part) 44a having a smaller diameter than that of the insertion part 43. In the tip part 44, there is formed a circular plate part (engagement portion) 45 to be engaged when the rotation regulation pin 42 is inserted to the pin insertion groove 41. In addition, in another embodiment shown in FIG. 8, the shape of a rotation-stop ring 46 is identical with the shape of the rotation-stop ring 14 of the aforementioned embodiment, but the shape of a pin insertion groove 47 formed on the rotation-stop ring 46 differs from that of the aforementioned embodiment. Furthermore, in the embodiment of FIG. 8, a rotation regulation pin 48 is made to be a parallel pin of a cylindrical type (the diameter direction cross-section is a round shape). In the embodiment of FIG. 8, the pin insertion groove 47 is formed having a concave cross-section, and protruding parts (engagement portions) 49 protruding in the groove

are formed in the center in the extending direction of the groove and in both side faces of the groove. The protruding part 49 is made to extend toward the depth direction of the groove in a manner having an identical protrusion width. In these different embodiments, it is preferred that the circular plate part 45 and the protruding part 49 be formed having a thickness X (a thickness along the axial direction of the pin (the extending direction of the pin insertion groove)) of 1 mm or less. By this constitution, the rotation regulation pins 42 and 48 do not twist in the pin insertion grooves 41 and 47, and thus there is no need to accurately adjust a relative positional relationship (a position and an angle) between the rotation regulation pins 42 and 48 and the pin insertion grooves 41 and 47 on the occasion of assembly of the copying apparatus 10. In the embodiment of FIG. 7, by forming the circular plate part 45 having a larger diameter than that of the tip part 44 to the tip part 44 in question, a corner portion (tip) of the tip part 44 is relieved without abutting against the inner surface of the pin insertion groove 41, and the circular plate part 45 becomes a contact prevention part to prevent contact. In the embodiment of FIG. 8, by forming the protruding part 49 protruding into the pin insertion groove 47, a corner portion (tip) of the rotation regulation pin 48 is relieved without abutting against the inner surface of the pin insertion groove 41, and the protruding part 49 becomes a contact prevention part to prevent contact."

(2) Regarding the invention of Evidence A No. 1

According to the above (1), it is recognized that the following invention is described in Evidence A No. 1 (hereinafter, referred to as "Evidence A No. 1 Invention").

"A copying apparatus 10, comprising: a base (fixed member) 11 forming a concave hemisphere face 16; a spherical base 12 constituted of a spherical part 18 forming a convex hemisphere face 20 and a base part 19; a pair of side plates 13; a rotation-stop ring 14; and a holding member 15, attached to the spherical base 12, for attaching a tool on a surface opposite to the attaching surface, in which,

when pressurized air is supplied from an air port, the pressurized air is jetted out to the concave hemisphere face 16, the concave hemisphere face 16 and the convex hemisphere face 20 are rotatably supported in a non-contact state, and the apical surface (a surface that abuts against a work) of the tool copies a target product in parallel, the copying apparatus 10 comprising

the rotation-stop ring 14 that allows, by being attached to the spherical base 12 in

a manner surrounding the base part 19 of the spherical base 12, rotation (swinging) of the spherical base 12 around an X-axis and around a Y-axis relative to the base 11, and regulates rotation around a Z-axis, wherein,

in the outer perimeter of the rotation-stop ring 14, flat surfaces 28 cut in a flat manner are formed at four locations, a pin insertion groove 29 is formed in each flat surface 28, the pin insertion groove 29 is formed into a concave cross-section shape (rectangular groove), and is formed penetrating the outer peripheral surface and the inner peripheral surface of the rotation-stop ring 14, and, in conjunction with this, is formed having an identical depth along the diameter direction of the rotation-stop ring 14 and in a linear fashion, wherein,

in the outer perimeter of the base part 19, flat surfaces 21 cut in a flat manner are formed at two opposite locations in a linear fashion along the X-axis direction, a pin insertion hole 22 is formed in each flat surface 21, and a pair of rotation regulation pins 23 are arranged to the pin insertion holes 22 in a linear fashion along the X-axis direction in a manner their tips protruding outward from the base part 19, wherein

in each of the side plates 13, a pin insertion hole 26 is formed, one piece of rotation regulation pins 27 is attached to each of the pin insertion holes, the pair of rotation regulation pins 27 being arranged, when the side plate 13 is attached to the base 11, in a linear fashion along the Y-axis direction in a manner such that their tips are opposite to each other, wherein

in each of the rotation regulation pins 23 and 27, a tip part 31 of a parallel pin having a round diameter-direction cross-section has a center in the axial direction that bulges out, and diameter reduction is applied to both sides of the center, making the whole shape be a barrel shape, wherein

by each of the rotation regulation pins 23 and 27 being made to engage with each pin insertion groove 29 of the rotation-stop ring 14, rotation around the Z-axis is regulated, and, in conjunction with this, the tip parts 31 of the rotation regulation pins 23 and 27 do not twist against the pin insertion groove 29, by virtue of having a curved surface."

2 Evidence A No. 5

(1) Descriptions in Evidence A No. 5

In Japanese Unexamined Patent Application Publication No. 2002-76030 (hereinafter, referred to as "Evidence A No. 5") notified in Reasons for Revocation, there are the following descriptions together with drawings.

"[0001]
[Field of the Invention] The present invention relates to a rotation-stopping device and profile-following apparatus.
[0002]
[Conventional Art] For example, there is a profile-following apparatus for use in a chip mounter and the like that transports a diced semiconductor chip on a lead frame of a die bonding apparatus. In such a profile-following apparatus, a swinging body having a convex hemisphere face is rotatably supported by a base having a concave hemisphere face. Then, when a work abutting surface (copying surface) of the swinging body existing in the curvature center of the convex and concave hemisphere faces is made to abut against a specific surface of a semiconductor chip, the swinging body rotates centering on an X-axis and a Y-axis that are orthogonal to each other in an identical plane. By this rotation, the work abutting surface of the swinging body tilts in conformity to the specific surface of the semiconductor chip. By this, the work abutting surface of the swinging body becomes parallel to the specific surface of the semiconductor chip.
[0003] In such a profile-following apparatus, since a friction resistance between the base and the swinging body is extremely low, the swinging body ends up rotating not only around the X-axis and the Y-axis but also around a Z-axis that is perpendicular to the plane including the X-axis and the Y-axis. As a result, a negative effect is exerted on the profile-following accuracy."

"[0005]
[Problem to be solved by the invention] However, in a conventional rotation-stopping device, swinging blocks are assembled to each other, and thus a lot of connection members are needed to couple those, and the number of parts becomes large. Furthermore, a lot of screws are used to assemble each block to a support member, a time-consuming effort is required for assembly. Accordingly, there is a problem that, in conjunction with increase in complexity of its structure, manufacturing cost becomes high.
[0006] The present invention has been made in view of the above problems to be solved, and its object is to provide a rotation-stopping device capable of achieving reduction of manufacturing cost by simplifying processing and assembly, and a profile-following apparatus using the device."

"[0048] (Second embodiment) Next, the second embodiment of the Invention will be

described with a focus on the portions different from those of the first embodiment.

[0049] In this second embodiment, as shown in FIG. 6, FIG. 7, FIG. 9, and FIG. 10, to the under surface of the swinging body 20, a support member 51 having a rectangular parallelepiped shape is attached and fixed as a first member by a screw 52. The support member 51 is made to extend along a line that passes through the center of the swinging body 20 in the X-axis direction. In the present embodiment, a tip part of the support member 51 is made to be a first protruding part 51a, and the first protruding part 51a is made to protrude outward relative to the lower end periphery of the swinging body 20.

[0050] The lower periphery of the swinging body 20 is cut, and a ring-shaped member 53 is provided as a second member in the cut portion 20b in question. In the ring-shaped member 53, a first groove part 53a extending along a line that passes through the center of the swinging body 20 in X-axis direction is formed. With the inside of the first groove part 53a, the first protruding part 51a located at an end of the support member 51 is made to slidably engage. Both sides of the first protruding part 51a and both sides of the first groove part 53a are in contact with each other. Then, by the swinging body 20 rotating around X-axis, both the members 51 and 53 rotate integrally with the swinging body 20.

[0051] In Z-axis direction, a space S1 is formed between the first protruding part 51a and the first groove part 53a. Also, between the swinging body 20 and the ring-shaped member 53, a space S3 is formed. The spaces S1 and S3 are spaces for functioning as "relief" so as to prevent, when the swinging body 20 rotates around Y-axis, occurrence of contact between the both members 51 and 53 and between the members 20 and 53, by existence of the spaces S1 and S3. In particular, in the present embodiment, on a surface at which the first protruding part 51a and the first groove part 53a face each other, a spring housing hole 54 is formed, and a first compression spring 55 is housed therein. By existence of the first compression spring 55, the spaces S1 and S3 are held as an appropriate interval. In this connection, the spring constant of the first compression spring 55 is being set within the range of 1-10 gf/mm.

[0052] As shown in FIG. 6, FIG. 7, FIG. 8, and FIG. 10, to both side portions of the base 11, an L-shaped support member 60 is attached and fixed by a screw 61 as a third member. A tip part of the L-shaped support member 60 is made to extend along a line that passes through the center of the swinging body 20 in the Y-axis direction. In the present embodiment, the tip part of the L-shaped support member 60 is made to be a second protruding part 60a, and the second protruding part 60a is arranged in the cut portion 20b of the swinging body 20.

[0053] In the ring-shaped member 53, a second groove part 53b that is made to extend along a line that passes through the center of the swinging body 20 in the Y-axis direction is formed. With the inside of the second groove part 53b, the second protruding part 60a arranged at an end of the L-shaped support member 60 is made to slidably engage. Both sides of the second protruding part 60a and both sides of the second groove part 53b are in contact with each other. Then, by the swinging body 20 rotating around the Y-axis, the support member 51 rotates integrally with the swinging body 20.

[0054] In the Z-axis direction, a space S2 is formed between the second protruding part 60a and the second groove part 53b. This space is for functioning as "relief" so as to prevent, when the swinging body 20 rotates around the X-axis, occurrence of contact between the members 53 and 60 by existence of the space S2. In particular, in the present embodiment, in a surface at which the second protruding part 60a and the second groove part 53b face each other, a spring housing hole 62 is formed, and a second compression spring 63 is housed inside the hole 62. By existence of the second compression spring 63, the space S2 is held as an appropriate interval. In effect, the ring-shaped member 53 is supported by the support member 51 and the L-shaped support member 60 via the compression springs 55 and 63. The spring constant of the second compression spring 63 is set within the range of 1-10 gf/mm that is the same as that of the first compression spring 55.

[0055] The support member 51 and the L-shaped support member 60 are formed of metal, and the ring-shaped member 53 is formed of synthesis resin impregnated with carbon. In other words, the ring-shaped member 53 is of material that is lightweight and has small friction coefficient. By this, it is made in such a way that friction resistance that works when each of the members 51, 53, and 60 undergoes relative movement is reduced.

[0056] Next, working effects of the profile-following apparatus 10 of the second embodiment will be described. As has been already described in the first embodiment, when the profile-following apparatus 10 moves downward as a whole and approaches a substrate K in a state that the swinging body 20 is supported rotatably without contacting with the ring-shaped porous material 12, the apical surface of the tool 21 abuts against the substrate K. Here, when the upper surface of the substrate K is inclining along the Y-axis direction, the swinging body 20 rotates around the X-axis in a manner to follow the inclination angle thereof.

[0057] At this time, the support member 51 and the ring-shaped member 53 rotate around the X-axis integrally with the swinging body 20. This is because, by the space

S2 formed between the ring-shaped member 53 and the L-shaped support member 60, movement of the ring-shaped member 53 is allowed. As above, even if the substrate K is inclining in the Y-axis direction, a work abutting surface 21a of the tool 21 follows the surface of the substrate K in parallel.

[0058] In contrast, if the upper surface of the substrate K is inclining along the X-axis direction, the swinging body 20 rotates around the Y-axis in a manner to follow the inclination angle thereof. At this time, the support member 51 rotates around the Y-axis integrally with the swinging body 20. This is because, by the space S1 formed between the ring-shaped member 53 and the support member 51, and the space S3 formed between the ring-shaped member 53 and the swinging body 20, movement of the support member 51 and the swinging body 20 is allowed. As above, even if the substrate K is inclining in the X-axis direction, the work abutting surface 21a of the tool 21 follows the surface of the substrate K in parallel.

[0059] On the occasion when the tool 21 is made to abut against the substrate K, the swinging body 20 and the tool 21 do not rotate around the Z-axis, and the work abutting surface 21a of the tool 21 follows up the surface of the substrate K in parallel. The reason for this is that, in the Y-axis direction, both sides of the first protruding part 51a and both sides of the first groove part 53a are in contact with each other, and, furthermore, in the X-axis direction, both sides of the second protruding part 60a and both sides of the second groove part 53b are in contact with each other."

(2) Regarding described matters in Evidence A No. 5

According to the above-mentioned (1), it is recognized that the following matter is described in Evidence A No. 5 (hereinafter, referred to as "Evidence A No. 5 Described Matter").

Evidence A No. 5 Described Matter

"That, in a profile-following apparatus,

in order to achieve manufacturing cost reduction by simplifying processing and assembly,

a lower periphery of a swinging body 20 is cut, and a ring-shaped member 53 is provided in a cut portion 20b as a second member,

an L-shaped support member 60 is attached and fixed to both side portions of the base 11 by a screw 61, a tip part of the L-shaped support member 60 is made to be a second protruding part 60a, and the second protruding part 60a is arranged in the cut portion 20b of the swinging body 20,

in a ring-shaped member 53, a second groove part 53b extending along a line that passes through the center of the swinging body 20 in Y-axis direction is formed, and

both sides of the second protruding part 60a and both sides of the second groove part 53b are in contact with each other and slidably engage with each other."

No. 5 Comparison / Judgment

1 Regarding Invention 1

(1) Comparison between Invention 1 and Evidence A No. 1 Invention

A "The copying apparatus 10" of Evidence A No. 1 Invention is an apparatus in which "the apical surface (a surface that abuts against a work) of the tool copies a target product in parallel", and, therefore, it is recognized that it performs an operation identical with the operation to "make a work to be pressed against a target position in parallel" of Invention 1. Therefore, "the copying apparatus 10" of the invention of Evidence A No. 1 corresponds to "alignment device" of Invention 1.

B "The base (fixed member) 11 forming the concave hemisphere face 16" of Evidence A No. 1 Invention corresponds to "a device body having a concave spherical surface" of Invention 1.

C "The convex hemisphere face 20" of "the spherical base 12 constituted of the spherical part 18 forming the convex hemisphere face 20 and the base part 19" of Evidence A No. 1 Invention corresponds to "a convex spherical surface fitted to the concave spherical surface" of Invention 1, because "the concave hemisphere face 16 and the convex hemisphere face 20 are rotatably supported in a non-contact state".

Therefore, "the spherical base 12 constituted of the spherical part 18 forming the convex hemisphere face 20 and the base part 19" of Evidence A No. 1 Invention corresponds to "an alignment member having a convex spherical surface fitted to the concave spherical surface" of Invention 1.

D The matter that "when pressurized air is supplied from an air port, the pressurized air is jetted out to the concave hemisphere face 16, the concave hemisphere face 16 and the convex hemisphere face 20 are" made to be "in a non-contact state" of Evidence A No. 1 Invention corresponds to make "the concave spherical surface and the convex spherical surface be in a non-contact state by supplying air between the concave spherical surface and the convex spherical surface" of Invention 1, and, in addition, "the

concave hemisphere face 16 and the convex hemisphere face 20 are" made rotatable to be "in a non-contact state" of Evidence A No. 1 Invention corresponds to "to make the concave spherical surface and the convex spherical surface be in a non-contact state" and "make the alignment member swing in that state" of Invention 1.

E Since "the rotation-stop ring 14" of Evidence A No. 1 Invention is "attached to the spherical base 12 in a manner surrounding the base part 19 of the spherical base 12", it corresponds to "a joint frame surrounding the alignment member" of Invention 1.

F In "the rotation-stop ring 14" of Evidence A No. 1 Invention, it is made in such a way that "in the outer perimeter", "the flat surface 28 cut in a flat manner is formed at four locations, and the pin insertion groove 29 is formed in each flat surface 28". Then, "the pin insertion grooves 29" formed at four locations are made to engage with "the pair of rotation regulation pins 23" "arranged" "in a linear fashion along the X-axis direction" and "the pair of rotation regulation pins 27" "arranged" "in a linear fashion along the Y-axis direction".

Then, among "the pin insertion grooves 29" formed at four locations of Evidence A No. 1 Invention, "the pin insertion grooves 29" to be made to engage with "the pair of rotation regulation pins 23" "arranged" "in a linear fashion along the X-axis direction" correspond to "a pair of first fitting parts formed" "in such a way as to occupy positions opposite to each other sandwiching the Z-axis in a direction of the X-axis that is orthogonal to the Z-axis, and having a hole-like shape or a groove-like shape" of Invention 1.

In addition, among "the pin insertion grooves 29" formed at four locations of Evidence A No. 1 Invention, "the pin insertion grooves 29" to be made to engage with "the pair of rotation regulation pins 27" "arranged" "in a linear fashion along the Y-axis direction" correspond to, "a pair of second fitting parts formed" "in such a way as to occupy positions opposite to each other sandwiching the Z-axis in a direction of the Y-axis that is orthogonal to the Z-axis and the X-axis, and having a hole-like shape or a groove-like shape" of Invention 1.

Furthermore, "the pair of the rotation regulation pins 23" and "the pair of rotation regulation pins 27" of Evidence A No. 1 Invention respectively correspond to "a pair of X-axis pins formed at positions of the device body opposite to each other sandwiching the Z-axis in the X-axis direction, and fitted with the pair of first fitting parts individually" and "a pair of Y-axis pins formed at positions of the alignment member opposite to each other sandwiching the Z-axis in the Y-axis direction, and fitted with the

pair of second fitting parts individually" of Invention 1.

G "The rotation regulation pins 23 and 27" in which "the tip part 31 of a parallel pin having a round diameter-direction cross-section has a center in the axial direction that bulges out, and diameter reduction is applied to both sides of the center, making the whole shape be a barrel shape" of Evidence A No. 1 Invention, and that "the X-axis pins and the Y-axis pins" are "columnar pins having a uniform diameter" of Invention 1 are common in a point that "the X-axis pins and the Y-axis pins are pins having a diameter direction cross-section of a round-shape".

H From the above-mentioned "A" to "G", Invention 1 and Evidence A No. 1 Invention are identical and different in the following points.

[Corresponding features]
"An alignment device comprising: a device body having a concave spherical surface; and an alignment member having a convex spherical surface fitted to the concave spherical surface, the alignment device being configured to make the concave spherical surface and the convex spherical surface be in a non-contact state by supplying air between the concave spherical surface and the convex spherical surface, and make a work be pressed against a target position in parallel by making the alignment member swing in that state, wherein

the alignment device includes a rotation regulation mechanism to regulate rotation of the alignment member around a Z-axis that passes through the center of the concave spherical surface, wherein

the rotation regulation mechanism includes: a joint frame surrounding the alignment member; a pair of first fitting parts formed in the joint frame in such a way as to occupy positions opposite to each other sandwiching the Z-axis in a direction of an X-axis that is orthogonal to the Z-axis, and having a hole-like shape or a groove-like shape; a pair of second fitting parts formed in the joint frame in such a way as to occupy positions opposite to each other sandwiching the Z-axis in a direction of a Y-axis that is orthogonal to the Z-axis and the X-axis, and having a hole-like shape or a groove-like shape; a pair of X-axis pins formed at positions of the device body opposite to each other sandwiching the Z-axis in the X-axis direction, and fitted with the pair of first fitting parts individually; a pair of Y-axis pins formed at positions of the alignment member opposite to each other sandwiching the Z-axis in the Y-axis direction, and fitted with the pair of second fitting parts individually, and wherein

the X-axis pins and the Y-axis pins are pins having a diameter direction cross-section of a round-shape."

[Different Feature 1]

A point that, in Invention 1, "the X-axis pins and the Y-axis pins are columnar pins having a uniform diameter, and wherein an internal wall of each of the first fitting parts and the second fitting parts includes a slope inclining in a direction such that a lateral width of the slope is gradually enlarged toward a tip side of each of the X-axis pins and the Y-axis pins, and, in an end portion of the slope, an abutment part against which each of the X-axis pins and Y-axis pins are abutted", whereas, in Evidence A No. 1 Invention, it is not specified as such.

(2) Judgment on the different feature by the body

A Regarding [Different Feature 1]

(A) When the above-mentioned [Different Feature 1] is examined, as described in paragraph [0035] of Evidence A No. 1 that "In the embodiment, the shapes of the rotation regulation pins 23 and 27 and the pin insertion groove 29 may be changed as shown in FIG. 7 and FIG. 8.", it is a matter that can be achieved by a person skilled in the art with ease to change the shapes of "the rotation regulation pins 23 and 27" and "the pin insertion groove 29" of Evidence A No. 1 Invention so as not to make an inner surface of "the rotation regulation pins 23 and 27" twist in "the pin insertion groove 29".

(B) On this occasion, it is replacement of equivalents to reverse the relation between the shape of "the rotation regulation pins 23 and 27" and the shape of "the pin insertion groove 29"; that is, instead of: making "the rotation regulation pins 23 and 27" to be ones in which "the tip part 31 of a parallel pin having a round diameter-direction cross-section has a center in the axial direction that bulges out, and diameter reduction is applied to both sides of the center, making the whole shape be a barrel shape"; and making "the pin insertion groove 29" be "formed having an identical depth along the diameter direction of the rotation-stop ring 14 and in a linear fashion", to make "the rotation regulation pins 23 and 27" be of an identical shape along the axial direction and be formed in a linear fashion, and to make, regarding "the pin insertion groove 29", a part corresponding to the tip of "the rotation regulation pins 23 and 27" have the center that bulges along the diameter direction of the rotation-stop ring 14. Therefore, it is nothing but a design change that can be achieved accordingly by a person skilled in the art.

(C) Then, while it is supposed that the effect of Invention 1 is that "processing and manufacturing of the X-axis pin and the Y-axis pin, and the first fitting part and the second fitting part becomes easy, and thus cost reduction can be achieved." (paragraph [0012] of the specification of the Patent), the limitation "inclining linearly" does not exist unlike the case of Invention 4, and, therefore, Invention 1 is an invention that includes ones in which the internal wall in the tip side of the first fitting part and the second fitting part is a curved surface inclining in a direction that the lateral width is enlarged gradually toward the tip side.

In view of the above, while there is disclosed in Evidence A No. 1 Invention a combination of "the rotation regulation pins 23 and 27" having a tip of a "barrel shape", and "the pin insertion groove 29" that is "formed having an identical depth along the diameter direction" "and in a linear fashion", when, instead of this, a combination of "columnar pins having a uniform diameter" and "the first fitting part and the second fitting part" whose "internal wall" corresponding to the tip of "the rotation regulation pins 23 and 27" "includes a slope" is adopted, processing and manufacturing of the pin itself becomes easy indeed. However, in contrast, the pin insertion groove comes to have a complicated shape including a curved surface. For the reason, it is not recognized as a whole combination that "processing and manufacturing becomes easy, and thus cost reduction can be achieved", and it cannot be said that Invention 1 has a particular advantageous effect compared with Evidence A No. 1 Invention.

(D) Accordingly, Invention 1 is an invention that could have been invented by a person skilled in the art with ease based on Evidence A No. 1 Invention, and, therefore, the patent according to Claim 1 is one that was made violation of the provisions of Article 29(2) of the Patent Act.

2 Regarding Invention 2

(1) Comparison between Invention 2 and Evidence A No. 1 Invention

A When Invention 2 and Evidence A No. 1 Invention are compared, in addition to [Different Feature 1] mentioned above, these are different in the following point, and are identical in the other points.

[Different Feature 2]

A point that, in Invention 2, it is made in such a way that "the slope of the first fitting parts inclines in a direction such that a lateral width of the first fitting parts is

gradually enlarged toward the inside of the joint frame from the outside of the joint frame, the slope of the second fitting parts inclines in a direction such that a lateral width of the second fitting parts is gradually enlarged toward the outside of the joint frame from the inside of the joint frame", whereas, in Evidence A No. 1 Invention, it is not specified as such.

(2) Judgment on the different features by the body

A Regarding [Different Feature 1]

The constitution concerning the above-mentioned [Different Feature 1] is, as examined in the above "1(2)A", a constitution that could have been achieved with ease by a person skilled in the art from the descriptions of Evidence A No. 1.

B Regarding [Different Feature 2]

It is obvious that, if the design change of the above-mentioned "1(2)A" is applied to Evidence A No. 1 Invention, Evidence A No. 1 Invention has a constitution similar to the constitution concerning [Different Feature 2].

C Then, as examined in the above "1(2)A(C)", it cannot be said that Invention 2 has a particular advantageous effect compared with Evidence A No. 1 Invention.

D Accordingly, since Invention 2 is an invention that could have been invented by a person skilled in the art with ease based on Evidence A No. 1 Invention, the patent according to Claim 2 is an invention that was made in violation of the provisions of Article 29(2) of the Patent Act.

3 Regarding Invention 3

(1) Comparison between Invention 3 and Evidence A No. 1 Invention

A When Invention 3 and Evidence A No. 1 Invention are compared, in addition to the above [Different Feature 1] and [Different Feature 2], these are different in the following point, and are identical in the remaining points.

[Different Feature 3]

A point that, in Invention 3, "the X-axis pins support the joint frame by contacting with ends of the first fitting parts in the Z-axis direction", whereas, in Evidence A No. 1 Invention, it is not specified as such.

(2) Judgment on the Different features by the body

A Regarding [Different Feature 1] and [Different Feature 2]

The constitutions concerning [Different Feature 1] and [Different Feature 2] are ones that could have been achieved with ease by a person skilled in the art from the descriptions of Evidence A No. 1 as examined in the above "1(2)A" and "2(2)B".

B Regarding [Different Feature 3]

(A) As shown in Evidence A No. 5 Described Matter, in Evidence A No. 5, there is indicated a constitution that "in the ring-shaped member 53, the second groove part 53b extending along a line that passes through the center of the swinging body 20 in the Y-axis direction is formed, and, both sides of the second protruding part 60a and both sides of the second groove part 53b are in contact with each other and slidably engage with each other", "the ring-shaped member 53", "the second groove part 53b", and "the second protruding part 60a" of Evidence A No. 5 Described Matter respectively correspond to "joint frame", "the first fitting part", and "X-axis pin" of Invention 3, and, in Evidence A No. 5, there is shown relation similar to that of "joint frame", "the first fitting part", and "X-axis pin" concerning [Different Feature 3]. Therefore, it can be said that the constitution concerning [Different Feature 3] is a constitution that was publicly known in advance of the application date of the Patent.

(B) Then, in Evidence A No. 1 Invention, it cannot be acknowledged that there is particular difficulty in realizing the constitution concerning [Different Feature 3] by adopting the above-mentioned publicly known constitution instead of "the holding member 15" that supports "the rotation-stop ring 14", "in order to achieve manufacturing cost reduction by simplifying processing and assembly".

C Therefore, the effect of Invention 3 is an effect that can be predicted by a person skilled in the art based on the descriptions of Evidence A No. 1 and Evidence A No. 5, and thus it is not remarkable.

D Accordingly, since Invention 3 could have been invented by a person skilled in the art with ease based on Evidence A No. 1 Invention and the descriptions of Evidence A No. 5, the patent according to Claim 3 is an invention that was made in violation of the provisions of Article 29(2) of the Patent Act.

4 Regarding Invention 4

(1) The Patent Opponent alleges that Patent Invention 4 is easily conceivable from Evidence A No. 1 Invention, and a point of "the slope of the first fitting parts and the second fitting parts is inclining linearly in a direction that the lateral width is enlarged" (hereinafter, referred to as "[Different Feature 4]") is a design-related matter if Evidence A No. 2 is referred to.

(2) However, since "the rotation regulation pins 23 and 27" of Evidence A No. 1 Invention are ones in which "the tip part 31 of a parallel pin having a round diameter-direction cross-section has a center in the axial direction that bulges out, and diameter reduction is applied to both sides of the center, making the whole shape be a barrel shape", even if, as examined in the above "1(2)A", relation between the shapes of "the rotation regulation pins 23 and 27" and "the pin insertion groove 29" is reversed, "the first fitting part and the second fitting part" that "include a slope" of "internal wall" that corresponds to the tip of "the rotation regulation pins 23 and 27" become ones having a curved surface, it does not become the constitution concerning [Different Feature 4].

(3) In addition, there is also no description about the constitution concerning [Different Feature 4] in [FIG. 8] of Evidence A No. 1.

Furthermore, also in Evidence A No. 2, regarding the internal walls of "the first fitting part" and "the second fitting part" formed on "joint frame" in the "alignment device", it is not described that "a slope inclining in a direction that a lateral width of the slope is gradually enlarged toward a tip side of each of the X-axis pins and the Y-axis pins" is made to be "inclining linearly in a direction such that said lateral width is enlarged".

(4) Therefore, from the descriptions of Evidence A No. 1 and Evidence A No. 2, a reason to consider that the constitution concerning [Different Feature 4] is a design-related matter cannot be found, and thus it cannot be said that the constitution concerning [Different Feature 4] could be conceived by a person skilled in the art with ease.

(5) Then, in Evidence A No. 1 Invention, when relation between the shapes of "the rotation regulation pins 23 and 27" and "the pin insertion groove 29" is reversed, the pin insertion groove comes to have a complicated shape including a curved surface, and, therefore, Invention 4 having the constitution concerning [Different Feature 4]; that is, the constitution that "the slope of the first fitting parts and the second fitting parts is

inclining linearly in a direction such that the lateral width is enlarged" has, compared with Evidence A No. 1 Invention, a particular effect as "processing and manufacturing of the X-axis pin and the Y-axis pin, and the first fitting part and the second fitting part becomes easy, and thus cost reduction can be achieved." (paragraph [0012] of the Patent specification).

(6) Therefore, The Invention 4 having the constitution concerning [Different Feature 4] is not an invention that could be conceived by a person skilled in the art with ease from the descriptions of Evidence A No. 1 and Evidence A No. 2, and thus the patent for Claim 4 cannot be revoked by the reason alleged by the Patent Opponent.

5 Regarding Invention 5

(1) Comparison between Invention 5 and Evidence A No. 1 Invention

A When Invention 5 and Evidence A No. 1 Invention are compared, in addition to the above [Different Feature 1] to [Different Feature 3], these are different in the following point, and are identical in the remaining points.

[Different Feature 5]

A point that, in Invention 5, "the first fitting part is opened at a front end face of the joint frame in the opposite side of the rear end face", whereas, in Evidence A No. 1 Invention, it is not specified as such.

(2) Judgment on the different features in the body

A Regarding [Different Feature 1] to [Different Feature 3]

The constitutions concerning [Different Feature 1] to [Different Feature 3] are ones that could have been achieved with ease by a person skilled in the art from the descriptions of Evidence A No. 1 and Evidence A No. 5, as examined in the above "1(2)A", "2(2)B", "3(2)B".

B Regarding [Different Feature 5]

It is obvious that, if the publicly known constitution examined in the above "3(2)B" is adopted in Evidence A No. 1 Invention, Evidence A No. 1 Invention results in having a constitution similar to the constitution concerning [Different Feature 5].

C In addition, the effect of Invention 5 is an effect that is capable of being predicted by a person skilled in the art based on the descriptions of Evidence A No. 1 and

Evidence A No. 5, and is not remarkable.

D Accordingly, since Invention 5 could have been invented by a person skilled in the art with ease based on Evidence A No. 1 Invention and the descriptions of Evidence A No. 5, the patent according to Claim 5 is an invention that was made in violation of the provisions of Article 29(2) of the Patent Act.

No. 6 Closing

As above, Invention 1 and Invention 2 could have been invented by a person skilled in the art with ease based on Evidence A No. 1 Invention, and, in addition, Invention 3 and Invention 5 could have been invented by a person skilled in the art with ease based on Evidence A No. 1 Invention and the descriptions of Evidence A No. 5.

Then, the patents according to Claims 1 to 3 and 5 violate the provisions of Article 29(2) of the Patent Act.

Therefore, the patents according to Claims 1 to 3 and 5 fall under the category of Article 113(2) of Patent Act, and should be invalidated.

The patent according to Claim 4 cannot be revoked by the grounds for opposition to the grant of a patent described in the written opposition to the grant of a patent. Furthermore, there is no other reason discovered to revoke the patent according to Claim 4.

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

Oct. 11, 2018

Chief administrative judge: FUKAZAWA, Masashi
Administrative judge: ODA, Hiroshi
Administrative judge: KAJIO, Seiya