US 20060266494A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2006/0266494 A1**

Tsuji (43) **Pub. Date: Nov. 30, 2006**

(54) **ALIGNING-POSITIONING MECHANISM AND ALIGNING-POSITIONING METHOD**

(75) Inventor: **Kazuya Tsuji**, Hiroshima-shi (JP)

Correspondence Address:
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037 (US)

(73) Assignee: **THE JAPAN STEEL WORKS, LTD.**

(21) Appl. No.: **11/441,019**

(22) Filed: **May 26, 2006**

(30) **Foreign Application Priority Data**

May 26, 2005 (JP) P2005-154119

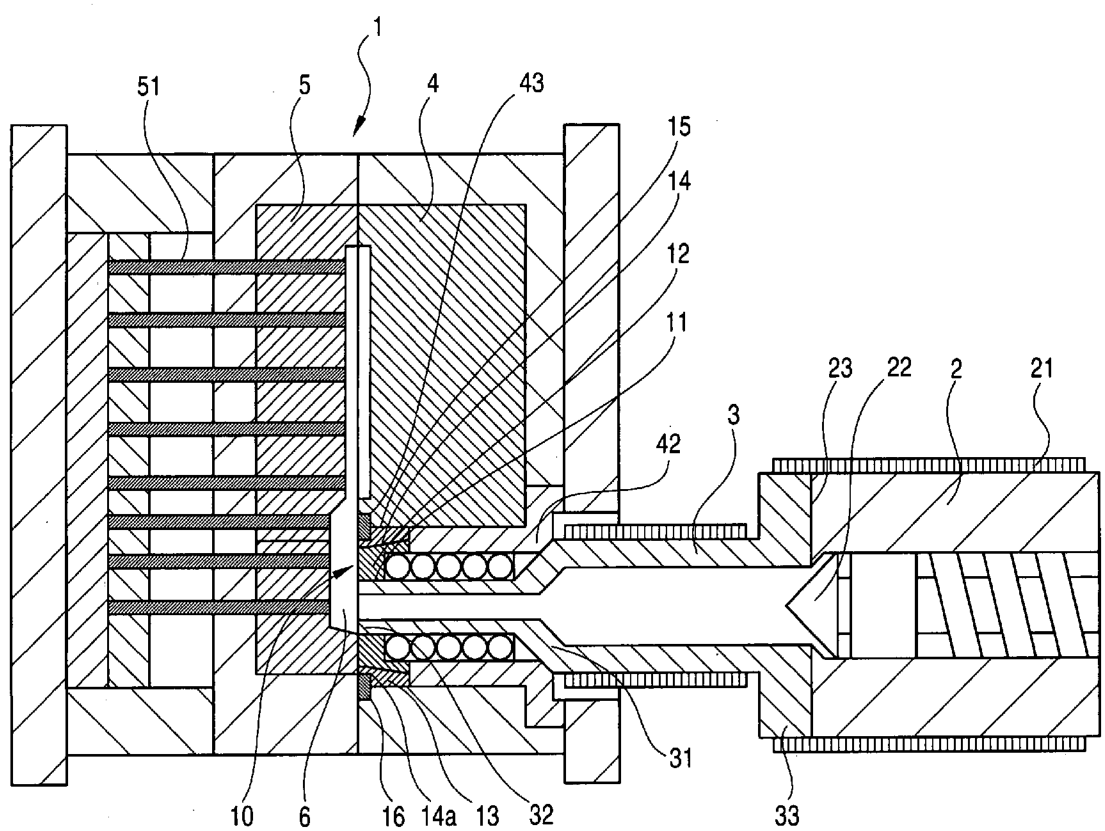
Publication Classification

(51) **Int. Cl.**
B22D 17/10 (2006.01)

(52) **U.S. Cl.** **164/312**; 164/113

(57) **ABSTRACT**

A positioning plate of this invention comprises an outer side plate of a torus shape having an outer side plate hole formed eccentrically of the outer circumference, and an inner side plate of a torus shape having such an inner side plate hole eccentrically of the outer circumference that a leading end portion is fitted. The outer side plate is fitted in a stationary die hole, and the inner side plate is fitted in the outer side plate hole of the outer side plate.



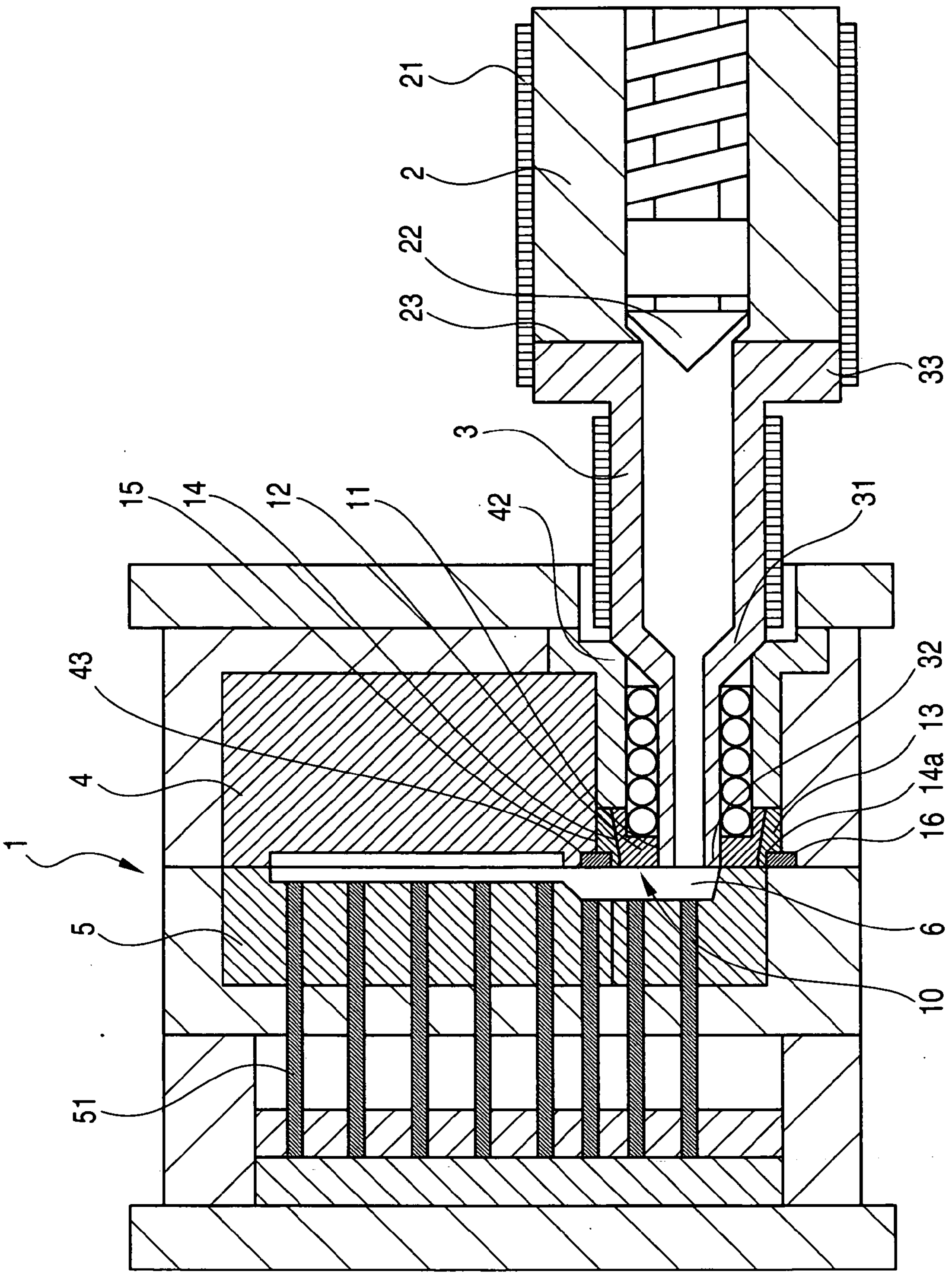


FIG. 1

FIG. 2

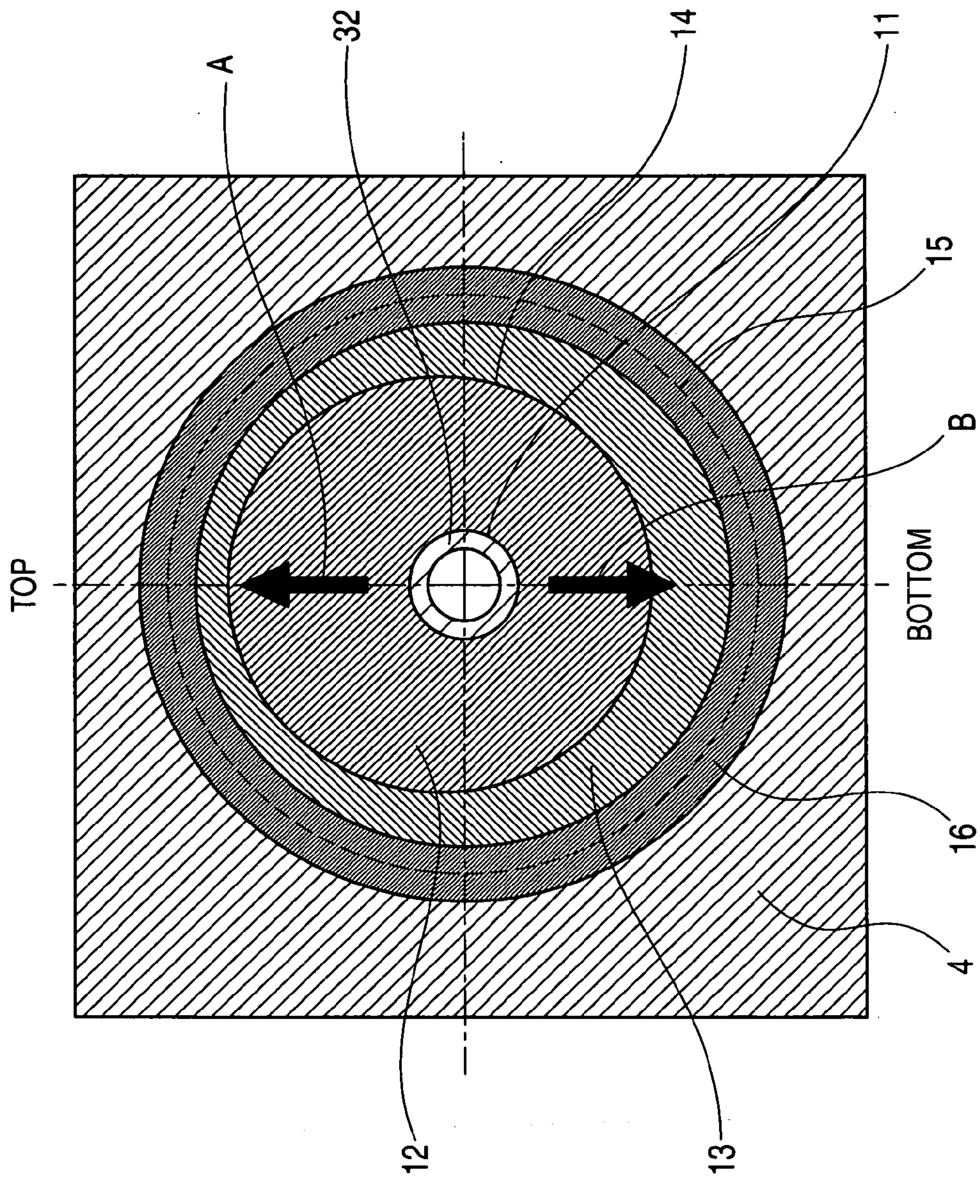


FIG. 3

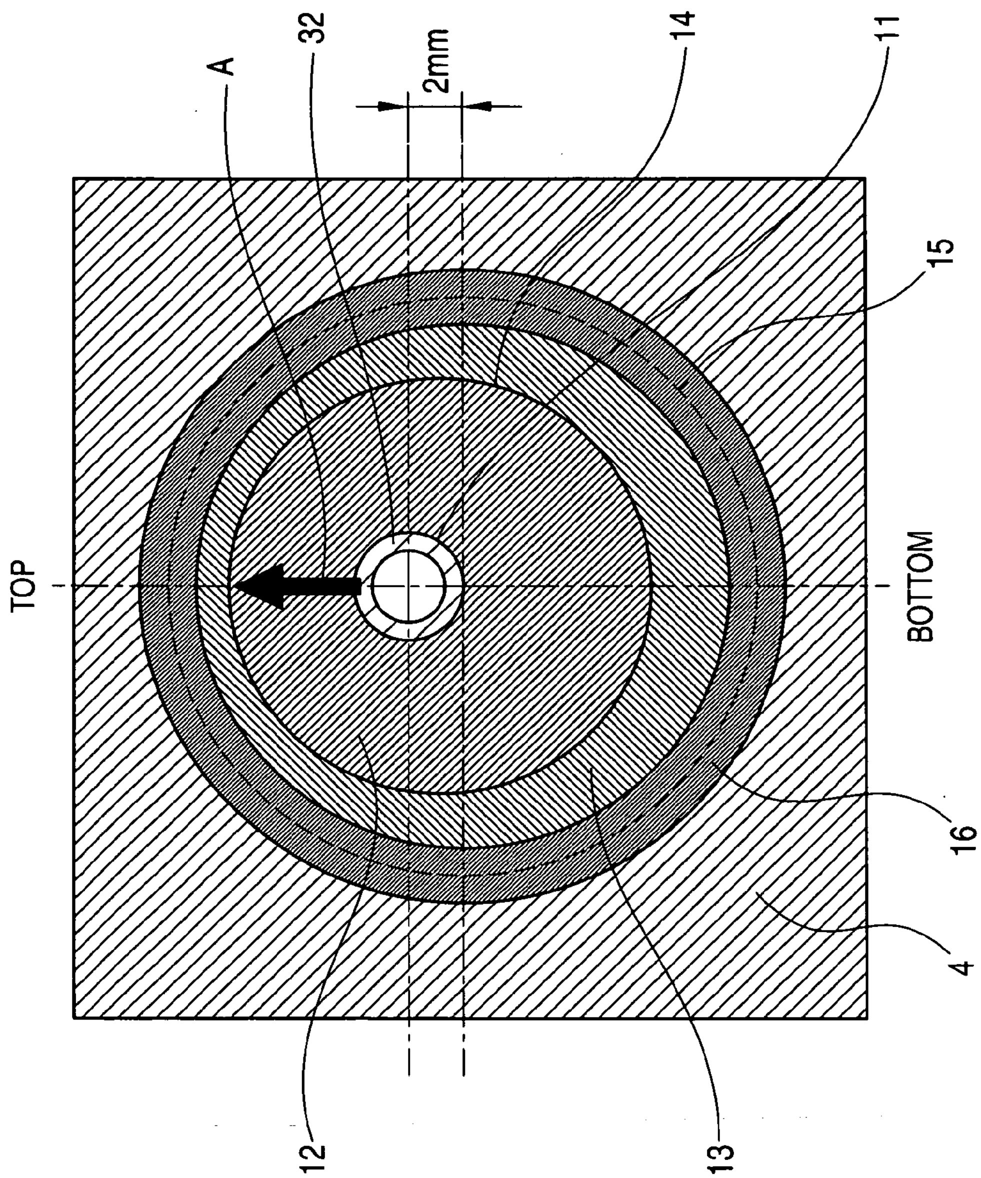


FIG. 4

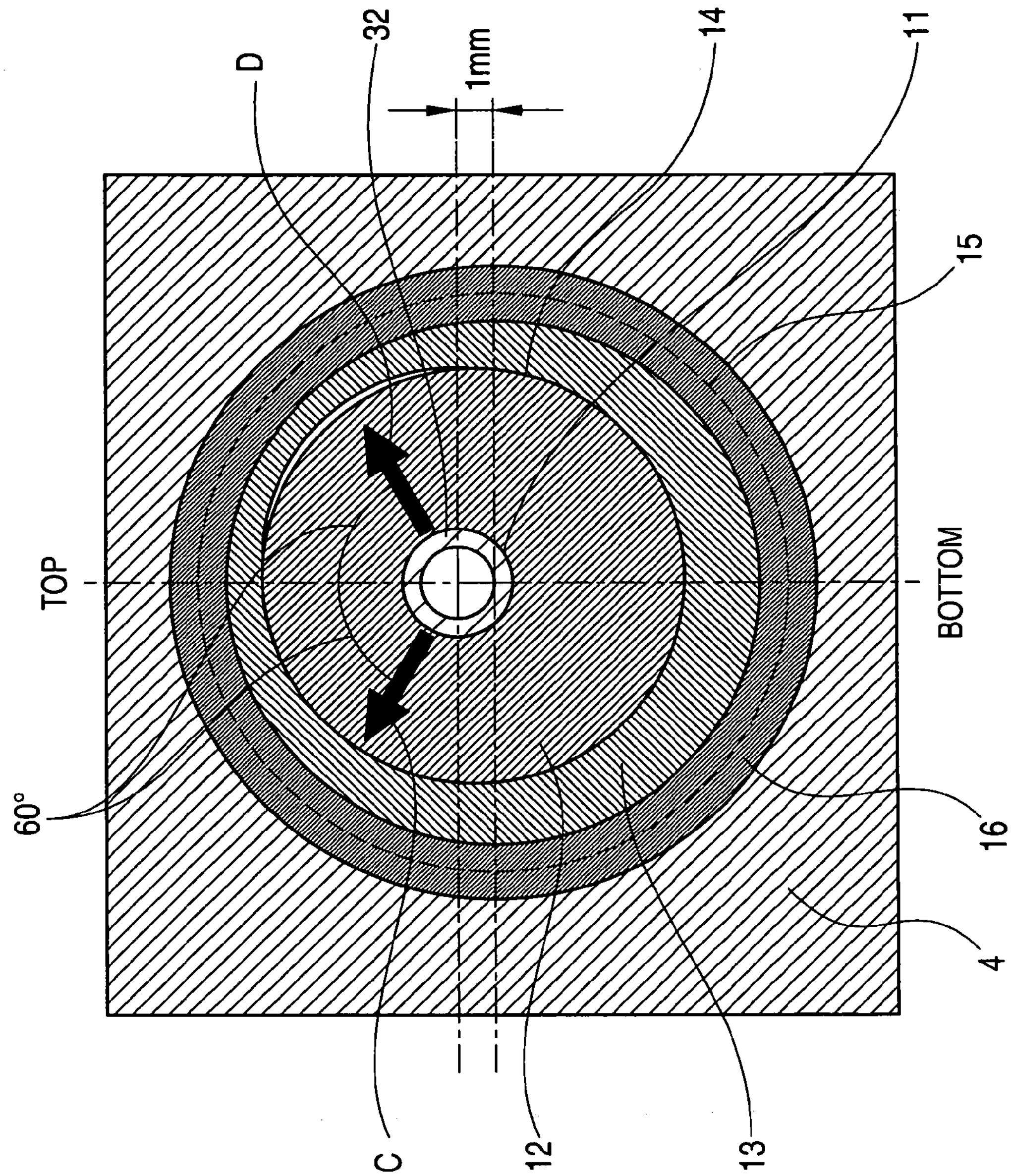
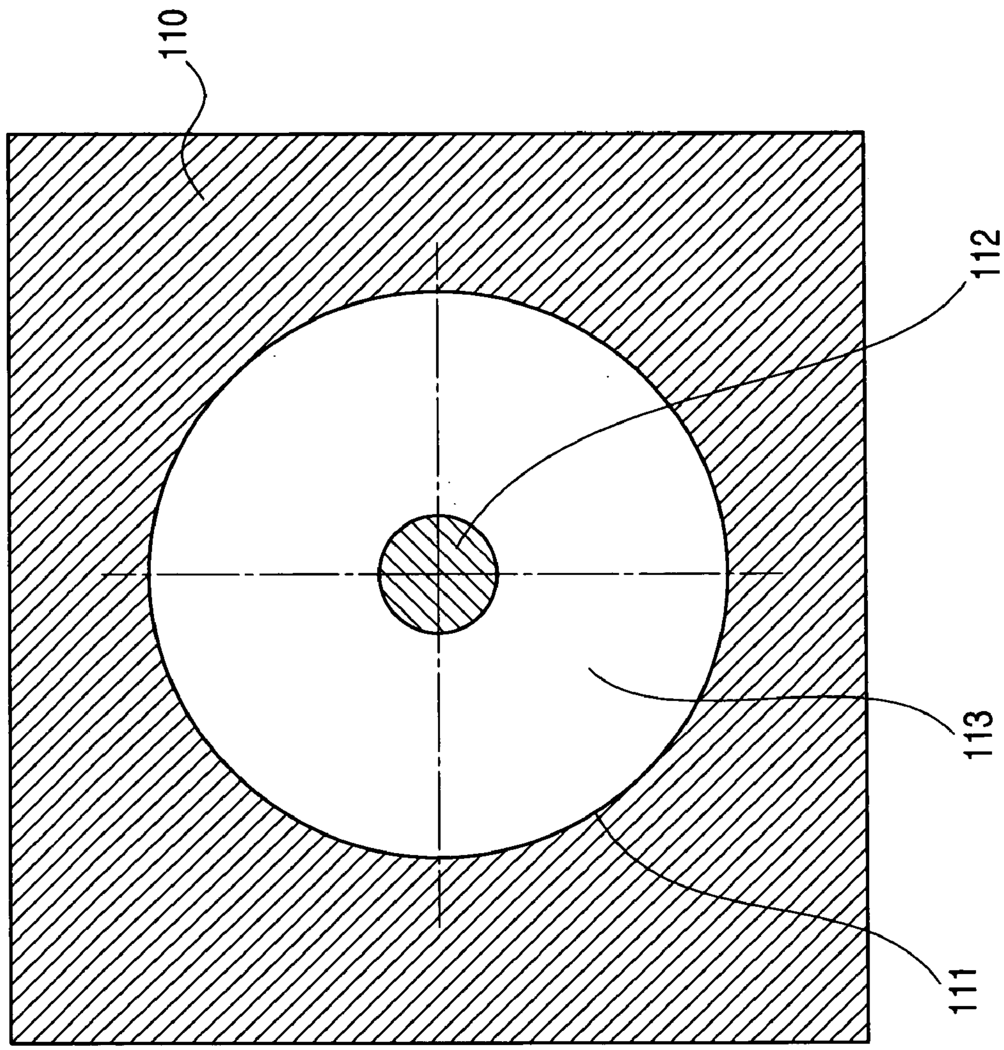


FIG. 5



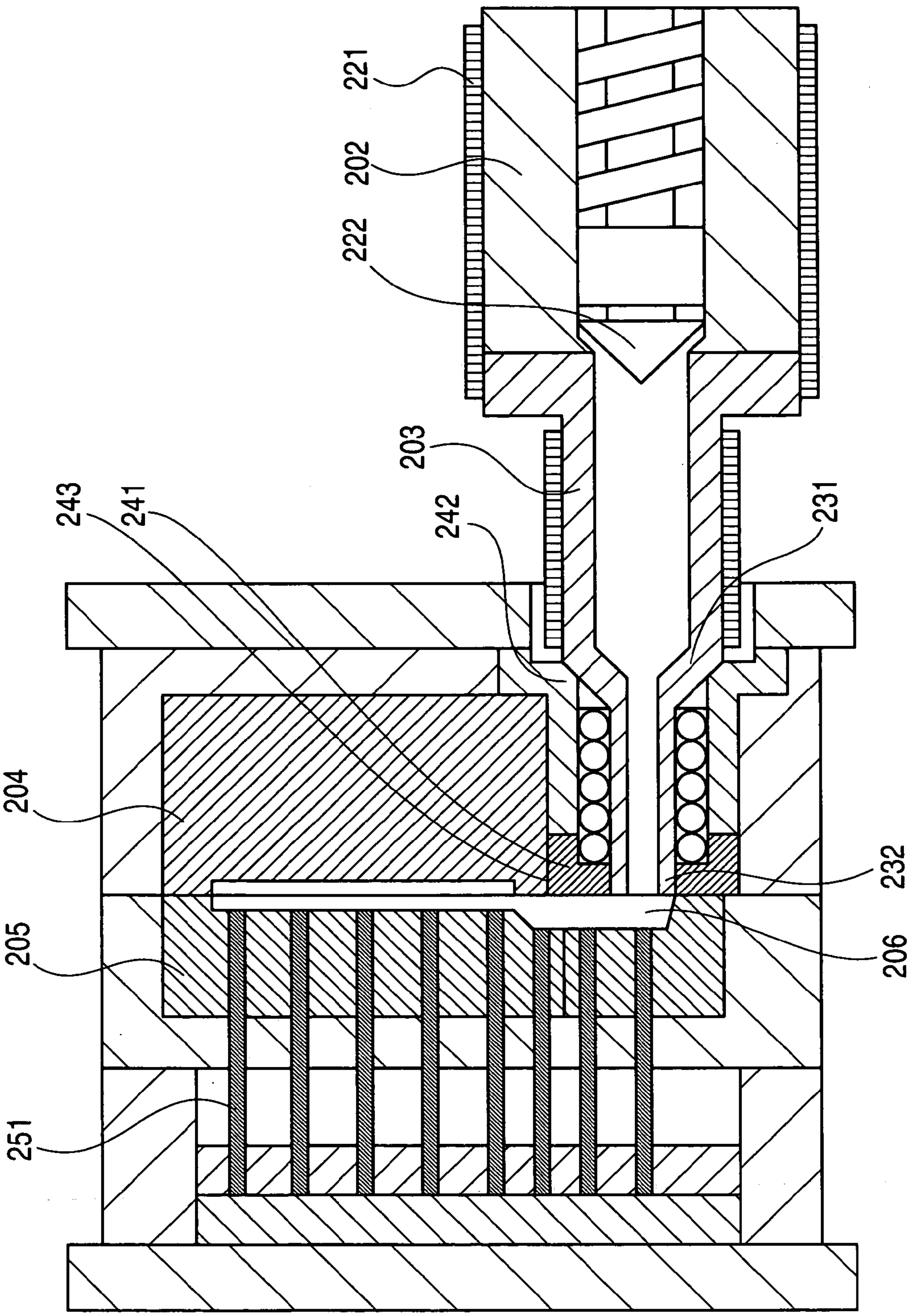


FIG. 6

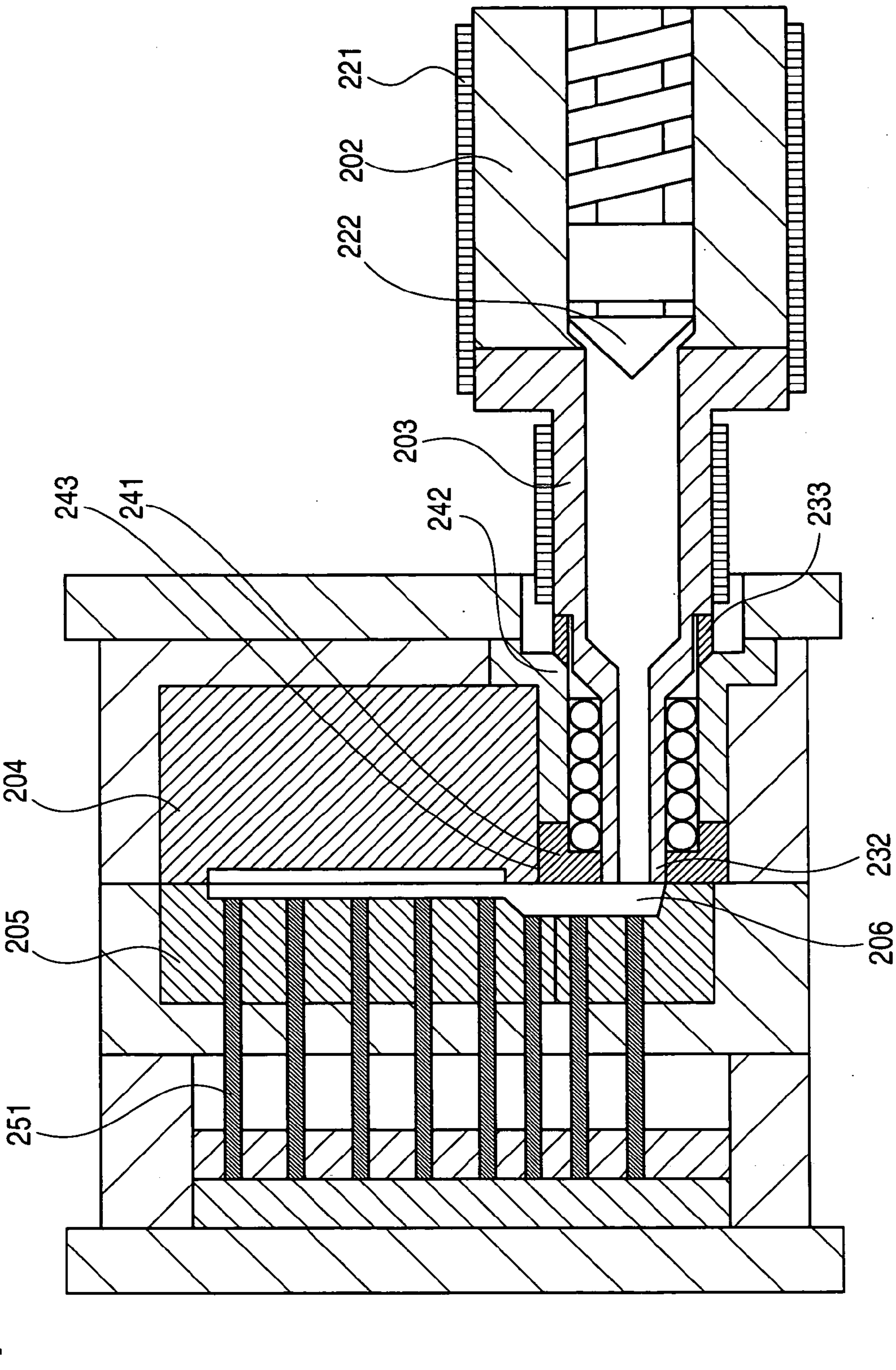


FIG. 7

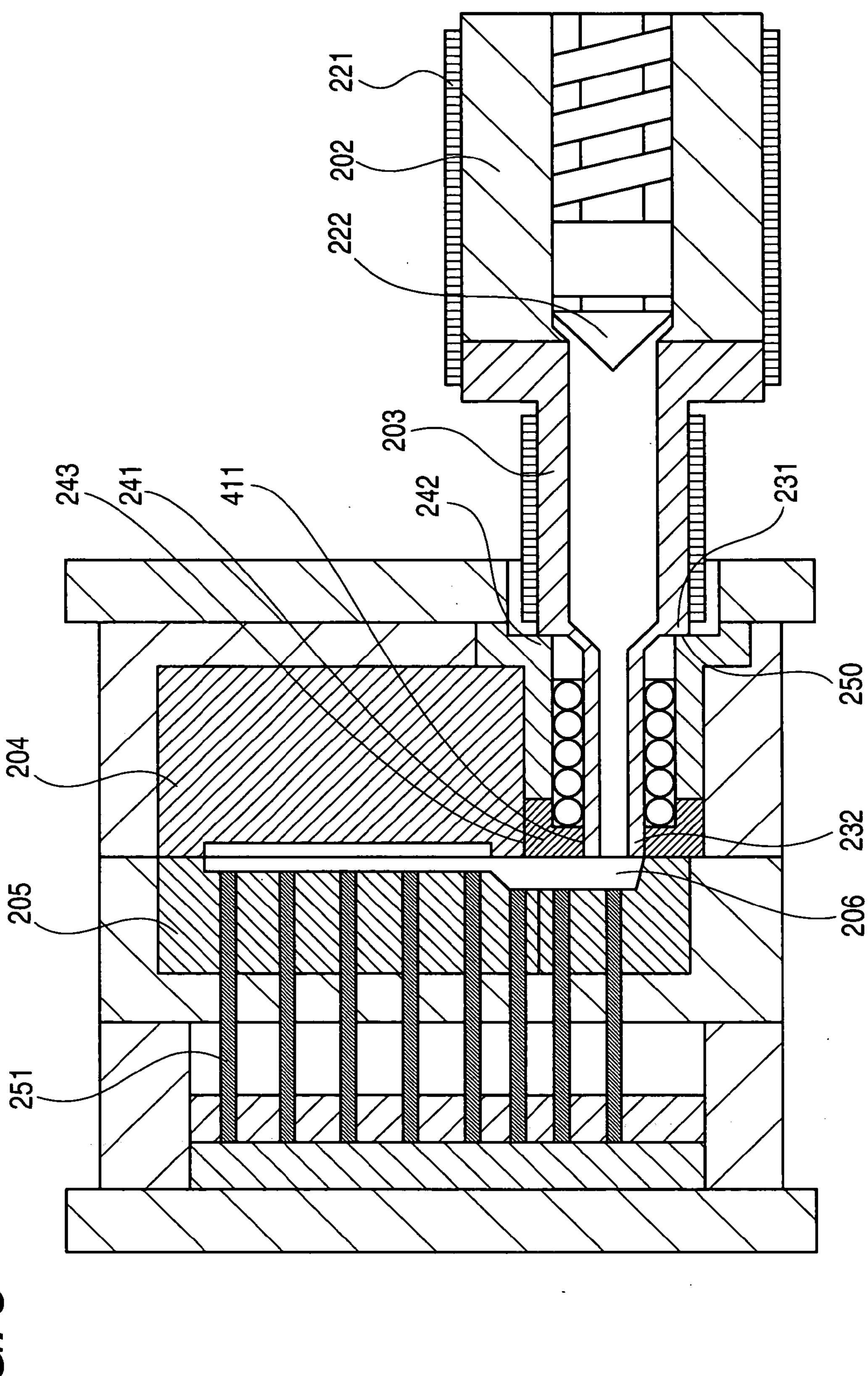


FIG. 8

ALIGNING-POSITIONING MECHANISM AND ALIGNING-POSITIONING METHOD

[0001] This application is based on Japanese Patent Application No. 2005-154119, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an aligning-positioning mechanism and an aligning-positioning method for positioning a pipe or a shaft to be arranged in a circular hole.

[0004] 2. Description of the Related Art

[0005] In the related art, there are many mechanical parts, which need positioning of a pipe or a shaft in a circular hole. **FIG. 5** is a schematic top plan view showing the state, in which a pipe **112** of a circular section is concentrically positioned in a circular hole **111** formed in a block **110** and in which a plate **113** is fitted without any clearance from the hole **111** and the pipe **112** in a space of a torus shape formed by the hole **111** and the pipe **112**.

[0006] This constitution is disclosed in JP-A-2003-94158 as such a nozzle device, for example, in a metallic injection molding machine as minimizes the unnecessary portions other than the product thereby to lower the cost for the metal machining. **FIG. 6** is a schematic section showing one example of the metallic injection molding machine of the related art having the constitution of **FIG. 5**.

[0007] The metallic injection molding machine includes a heating cylinder **202** having a heater **221** disposed on its outer circumference portion, and an extended nozzle **203**, which is mounted on the leading end of the heating cylinder **202** and which can be inserted into the mold. A positioning plate **241** is fitted in a hole **243** formed in a stationary mold **204**. The leading end portion **232** of the extended nozzle **203** is fitted in the positioning plate **241** fitted in that hole **243**.

[0008] The leading end portion **232** of the extended nozzle **203** is inserted in the hole formed by the positioning plate **241**, and the outer circumference clearance of the leading end portion **232** is sealed up due to the thermal expansion difference between the positioning plate **241** and the leading end portion **232** thereby to prevent the outflow and burst of molten metal.

[0009] Against a taper portion **242** formed at the stationary die **204**, there abuts a taper portion **231**, which is formed at an intermediate portion of the extended nozzle **203** thereby to receive the touching force of the metallic injection molding machine.

[0010] Moreover, the positioning plate **241** is mounted on the stationary die **204** from the side of a movable die of the stationary die **204**, on which a product ejecting mechanism **251** is disposed.

[0011] In this constitution, it has to be avoided with a view to preventing the outflow and burst of the molten metal that a clearance more than that for the smooth fitting is formed either between the stationary die **204** and the positioning plate **241** or between the positioning plate **241** and the leading end portion **232** of the extended nozzle **203**. On the other hand, the shape of the positioning plate **241** is seriously influenced by the relative positions of the hole **243** and the leading end portion **232**.

[0012] Here: the hole **243** of **FIG. 6** corresponds to the hole **111** in **FIG. 5**; the leading end portion **232** of **FIG. 6** corresponds to the pipe **112** in **FIG. 5**; and the positioning plate **241** of **FIG. 6** corresponds to the plate **113** in **FIG. 5**.

[0013] In the constitution thus far described, the shape of the positioning plate **241** is influenced by the relative positions of the hole **243** and the leading end portion **232**. In order to avoid preparations of a plurality of positioning plates **241** for the individual eccentricities of the leading end portion **232** from the hole **243**, therefore, it is preferred that the leading end portion **232** is completely concentric to the hole **243**.

[0014] In the metallic injection molding machine, however, due to errors at the time of assembling the heating cylinder **202** or due to the curvature of the heating cylinder **202** by the thermal stress to be caused by the circumferential temperature difference of the heating cylinder **202**, more or less misalignment occurs on the center of the leading end portion **232** of the extended nozzle **203** mounted on the leading end of the heating cylinder **202**. Therefore, the metallic injection molding machine is usually equipped with the nozzle aligning mechanism, which is mostly intended to adjust the deviation at the unit of several millimeters. On the other hand, the maximum clearance permitted to prevent the intrusion of the molten metal from the clearance between the leading end portion **232** and the positioning plate **241** is several tens micrometers. In other words, it is seriously difficult to align the leading end portion **232** and the hole **243** so that the molten metal may be prevented from intruding into the clearance between the leading end portion **232** and the positioning plate **241** by using the ordinary nozzle aligning mechanism.

[0015] Therefore, the positioning for making concentric the hole **243** to be fitted on the outer circumference of the positioning plate **241** of the stationary die **204** and the leading end portion **232** of the extended nozzle **203** is performed by fitting between the taper portion **231** formed at the intermediate portion of the extended nozzle **203** and the taper portion **242** formed at the stationary die **204**. This makes it necessary to work the taper portion **231** on the side of the extended nozzle **203** and the taper portion **242** on the side of the stationary die **204** extremely precisely. A high sizing precision is also required on the components from the individual taper portions **231** and **242** to the fitting portion between the leading end portion **232** and the positioning plate **241**. These being considered, however, it is seriously difficult and not practical to keep the concentricity between the hole **243** and the leading end portion **232** always within a range of several ten micrometers.

[0016] As countermeasures, there has been adopted a method for enlarging the clearance between the hole **243** of the stationary die **204** and the outer circumference of the positioning plate **241**. By mounting the positioning plate **241** in the hole **243** of the stationary die **204** with an offset of the eccentricity of the leading end portion **232**, more specifically, the positioning plate **241** and the leading end portion **232** are fitted.

[0017] According to this method, however, there is established between the stationary die **204** and the positioning plate **241** a clearance which is the sum of the inherent clearance and the eccentricity of the leading end portion **232** from the hole **243**. Therefore, the molten metal does not flow out to the outside of the die but intrudes into the clearance between the stationary die **204** and the positioning plate **241**. As a result, the positioning plate **241** cannot be disassembled from the stationary die **204**, or a molding **206** may be left in the stationary die **204** when the die is opened during the molding operation.

[**0018**] In order to avoid the troubles due to the intrusion of the molten metal, the constitution is modified, as shown in **FIG. 7**, such that the taper portion **231** formed at the intermediate portion of the extended nozzle **203** is made of a bushing **233** different from the extended nozzle **203** thereby to form a clearance between the bushing **233** and the extended nozzle **203**. Alternatively, the constitution is modified, as shown in **FIG. 8**, such that a contacting portion **250** between the intermediate portion of the extended nozzle **203** and the stationary die **204** is formed into a vertically abutting shape so that the alignment may be done by the aforementioned nozzle aligning mechanism. However, this adjusting work is difficult, as has been described hereinbefore, and the working time period for preparing the run may be long.

SUMMARY OF THE INVENTION

[**0019**] Therefore, the present invention has an object to provide an aligning-positioning mechanism and an aligning-positioning method, which can finely adjust the positioning of a pipe or a shaft to be arranged in a circular hole, with ease.

[**0020**] In order to achieve the aforementioned object, according to the invention, there is provided an aligning-positioning mechanism comprising a positioning member arranged between a circular hole and a pipe or a shaft for positioning the pipe or the shaft in the hole, the positioning member comprising a torus member divided into a plurality and each having a torus shape in which an inner circumference thereof eccentrics with respect to an outer circumference thereof, wherein an outer circumference of an outermost torus member is fitted in the hole, and wherein an outer circumference of the pipe or the shaft is fitted in an inner circumference of an innermost torus member.

[**0021**] As described above, the positioning member is divided into plural ones, and the individual torus members have their inner circumferences made eccentric with respect to the outer circumference. By adjusting the angle of the eccentric directions between the individual torus members and the directions, therefore, it is possible to adjust the positions of the inner circumferences of the torus members, in which the pipe or the shaft is fitted. In short, the aligning-positioning mechanism of the invention can adjust the hole positions, in which the pipe or the shaft is fitted, with respect to the circular hole so that it can have an easy fine adjustment.

[**0022**] In the aligning-positioning mechanism of the invention, the positioning member may have its divided faces formed in a taper shape.

[**0023**] According to the invention, there is provided an aligning-positioning method, which uses the aligning-positioning mechanism of the invention, comprising adjusting an eccentricity of a center of the inner circumference of the innermost torus member to a center of the hole by adjusting the angle made by the eccentric direction between the individual torus members, and adjusting an eccentric direction by turning the individual torus members.

[**0024**] According to the invention, there is provided an aligning-positioning mechanism including a stationary type positioning plate, comprising an outer side plate having a torus shape in which an outer side plate hole formed eccentrically of the outer circumference thereof, and an inner side plate having a torus shape in which an inner side plate hole, into which a leading end portion of an extended nozzle mounted on a cylinder leading end portion of a metallic injection molding machine is fitted, is formed eccentrically of the outer circumference thereof, wherein the outer side plate is fitted in a stationary die hole formed in a stationary die, and wherein the inner side plate is fitted in the outer side plate hole of the outer side plate.

[**0025**] In the aligning-positioning mechanism of the invention, as described above, the positioning plate includes the two plates of the outer side plate and the inner side plate of the torus shape, and the individual plates have eccentric holes. Moreover, the outer side plate is fitted in the stationary die hole, and the inner side plate is fitted in the outer side plate hole. According to the turning angles of the individual plates, therefore, the hole position of the inner side plate hole, in which the leading end portion of the extended nozzle is fitted, can be finely adjusted with ease with reference to the stationary die hole. Moreover, the constitution does not need such a clearance between the stationary die hole and the positioning plate as matches the eccentricity of the leading end portion of the extended nozzle with respect to the stationary die hole, so that the molten metal will not intrude into the clearance. Moreover, the individual plates are fitted without the clearance for permitting the molten metal to intrude, so that the molten metal will not intrude between the individual plates.

[**0026**] According to the invention, as has been described hereinbefore, the hole positions to fit the pipe or the shaft are adjusted by adjusting the angles made by the eccentric directions of the plural eccentric torus members and the eccentric directions, so that their fine adjustments are facilitated.

[**0027**] In the positioning plate of the invention, moreover, the molten metal does not intrude between the stationary die hole and the positioning plate so that the hole position of the inner plate hole, in which the leading end portion is fitted, can be finely adjusted with ease with respect to the stationary die hole.

BRIEF DESCRIPTION OF THE DRAWINGS

[**0028**] **FIG. 1** is a side section view showing a constitution of a metallic injection molding machine and a stationary die, to which one embodiment of the invention is applied;

[**0029**] **FIG. 2** is a partially enlarged view, as seen from the side of the movable die, of a positioning plate mounted on the stationary die, and a top plan view for explaining the fitting of the positioning plate of the case, in which the leading end portion of an extended nozzle and a stationary die hole are made concentric;

[**0030**] **FIG. 3** is a top plan view for explaining the fitting of the positioning plate of the case, in which the center position of the leading end portion of the extended nozzle is eccentric toward the top by 2 mm from the center position of the stationary die hole;

[0031] **FIG. 4** is a top plan view for explaining the fitting of the positioning plate of the case, in which the center position of the leading end portion of the extended nozzle is eccentric toward the top by 1 mm from the center position of the stationary die hole;

[0032] **FIG. 5** is a schematic top plan view showing a constitution, in which a shaft is arranged on a concentric circle in a circular hole and in which the plate is fitted in a space of a torus shape formed of the hole and the shaft;

[0033] **FIG. 6** is a schematic section of one example of a metallic injection molding machine of the related art having the constitution shown in **FIG. 5**;

[0034] **FIG. 7** is a schematic section of one example of the metallic injection molding machine of the related art, in which the concentric adjustment is made with a nozzle aligning mechanism by forming a clearance between a bushing and an extended nozzle; and

[0035] **FIG. 8** is a schematic section of one example of the metallic injection molding machine of the related art, in which the concentric adjustment is made with a nozzle aligning mechanism by forming the stationary die and the extended nozzle into a vertically abutting shape.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0036] An embodiment of the invention is described in the following with reference to the accompanying drawings.

[0037] **FIG. 1** is a side section showing a constitution of a metallic injection molding machine and a stationary die, to which one embodiment of the invention is applied.

[Metallic Injection Molding Machine]

[0038] The metallic injection molding machine includes: a heating cylinder **2** having a heater **21** disposed on its outer circumference; an extended nozzle **3** mounted on the leading end portion **23** of the cylinder such that it can be inserted into the die; and a screw **22** rotatably housed in the heating cylinder **2**. The extended nozzle **3** is composed of: a leading end portion **32** fitted in an inner side plate hole **11** of a later-described inner side plate **12**; a mounted end **33** mounted in abutment on the cylinder leading end portion **23**; and a taper portion **31** formed between the leading end portion **32** and the mounted end **33**.

[Die]

[0039] The die **1** is composed of a stationary die **4** having a stationary die hole **15** formed therein, and a movable die **5** made movable relative to the stationary die **4**. In the stationary die hole **15** of the stationary die **4**, there are fitted a positioning plate **10** which has the inner side plate **12** and an outer side plate **13**, and a stationary die side taper portion **42**, which is tapered at a position matching the taper portion **31** of the extended nozzle **3**. The positioning plate **10** is fitted in the stationary die hole **15** on the side of the movable die **5**, and the stationary die side taper portion **42** is fitted on the side, into which the extended nozzle **3** of the stationary die hole **15** proceeds. The end portion of the positioning plate **10** and the end portion of the stationary die side taper portion **42** abut against each other in the stationary die hole **15**. On the side of the stationary die hole **15** to face the movable die **5**, on the other hand, there is formed a stepped portion **43**, on which is fitted a holding plate **16** for holding the positioning plate **10**.

[0040] The movable die **5** is provided with an ejecting mechanism **51** for ejecting a molding **6** prepared.

[Positioning Plate]

[0041] **FIG. 2** is a partially enlarged view, as taken from the side of the movable die, of the positioning plate mounted on the stationary die.

[0042] The positioning plate **10** includes the outer side plate **13** and the inner side plate **12**, the latter of which is fitted in an outer side plate hole **14** formed in the outer side plate **13**. In other words, the positioning plate **10** is radially divided into the outer side plate **13** and the inner side plate **12**.

[0043] The outer side plate **13** has a shape of an annulus ring, i.e., a torus shape, and the outer side plate hole **14** forming the hole portion is made eccentric, in this embodiment, by 1 mm with respect to the outer circumferential portion of the outer side plate **13**.

[0044] Moreover, the outer side plate hole **14** has a taper face formed to expand toward the inside of the stationary die hole **15**, when the outer side plate **13** is mounted in the stationary die hole **15**. Specifically, the taper face of the outer side plate hole **14** is directed in such a direction that the inner side plate **12** to be fitted therein is pushed onto the stationary die side taper portion **42**. In other words, while the outer side plate is being mounted in the stationary die hole **15**, the outer side plate hole **14** is arranged at its radially smaller side on the side of the movable die **5** and at its radially larger side on the stationary die side taper portion **42**.

[0045] On the radially smaller side of the outer side plate hole **14** of the outer side plate **13**, moreover, there is formed a receiving portion **14***a* for mounting the holding plate **16**.

[0046] The inner side plate **12** also has a torus shape like the outer side plate **13**, and the inner side plate hole **11** for the hole portion is made eccentric, in this embodiment, by 1 mm with respect to the outer circumferential portion of the inner side plate **12**. The inner side plate hole **11** made eccentric has a straight shape, in which the leading end portion **32** of the extended nozzle **3** is fitted. On the other hand, the outer circumferential portion of the inner side plate **12** is formed into a taper face. Specifically, the inner side plate **12** is fitted, when used, in the outer side plate hole **14** so that it has a taper face matching the taper face of the outer side plate hole **14**.

[0047] The outer circumference of the outer side plate **13** is so closely fitted in the stationary die hole **15** as to have no clearance permitting intrusion of molten metal. Therefore, this molten metal will not intrude between the outer side plate **13** and the stationary die hole **15**.

[0048] Moreover, the inner side plate **12** is also fitted in the outer side plate hole **14** of the outer side plate **13** so that the molten metal will not intrude between the inner side plate **12** and the outer side plate **13**.

[0049] As will be described hereinafter, moreover, the leading end portion **32** of the extended nozzle **3** is fitted in the inner side plate hole **11** of the inner side plate **12** so that the molten metal will not intrude between the leading end portion **32** and the inner side plate **12**.

[Fittings of Stationary Die, Outer Side Plate and Inner Side Plate]

[0050] In the positioning plate **10** of this embodiment, the outer side plate hole **14** of the outer side plate **13** and the inner side plate hole **11** of the inner side plate **12** are individually made eccentric. According to the manner to make the fittings in the stationary die hole **15**, therefore, the position of the inner side plate hole **11** can be changed and adjusted relative to the leading end portion **32** of the extended nozzle **3**.

[0051] The manners to fit the positioning plate **10** in the stationary die **4** will be described with reference to **FIG. 2** to **FIG. 4**. Of **FIG. 2** to **FIG. 4** presenting partially enlarged views, as seen from the side of the movable die, of the positioning plate mounted on the stationary die: **FIG. 2** shows the case, in which the leading end portion of the extended nozzle and the stationary die hole are made concentric; **FIG. 3** shows the case, in which the center positions are made eccentric by 2 mm toward the top; and **FIG. 4** shows the case, in which the center positions are made eccentric by 1 mm toward the top. Here in **FIG. 2** to **FIG. 4**, the "top" indicates the direction toward the top at the time when the metallic injection molding machine is installed, and the "bottom" indicates the direction toward the face of installation, i.e., toward the ground.

[0052] At first, the fitting case, in which the leading end portion **32** of the extended nozzle **3** and the stationary die hole **15** are concentric, is described with reference to **FIG. 2**. In this case, the outer side plate **13** is so fitted in the stationary die hole **15** that the eccentricity of the outer side plate hole **14** with respect to the stationary die hole **15** is directed in the direction of arrow A (toward the top). Moreover, the inner side plate **12** is so fitted in the outer side plate hole **14** in this state that the eccentricity is directed in the direction of arrow B (toward the bottom, i.e., in the opposite direction to arrow A). Since the outer side plate hole **14** and the inner side plate **12** are thus fitted with their eccentric directions being deviation by 180 degrees, the inner side plate core **11** is concentric to the stationary die hole **15**. As a result, the leading end portion **32** of the extended nozzle **3** can be fitted without any clearance in the inner side plate hole **11** thereby to prevent the molten metal from intruding between the leading end portion **32** and the inner side plate **12**.

[0053] Next, the fitting case, in which the leading end portion **32** of the extended nozzle **3** and the stationary die hole **15** are eccentric by 2 mm toward the top, is described with reference to **FIG. 3**. In this case, the outer side plate **13** is so fitted in the stationary die hole **15** that the eccentricity of the outer side plate hole **14** with respect to the stationary die hole **15** is directed in the direction of the arrow A. Moreover, the inner side plate **12** is so fitted in the outer side plate hole **14** in this state that the eccentricity is also directed in the same direction of the arrow A. Since both the outer side plate hole **14** and the inner side plate **12** are thus fitted in the same direction toward the top, the inner side plate core **11** becomes eccentric by 2 mm from the stationary die hole **15**. As a result, the leading end portion **32** of the extended nozzle **3** can be fitted without any clearance in the inner side plate hole **11**.

[0054] Next, the fitting case, in which the leading end portion **32** of the extended nozzle **3** and the stationary die hole **15** are eccentric by 1 mm toward the top, is described with reference to **FIG. 4**. In this case, the outer side plate **13** is so fitted in the stationary die hole **15** that the eccentricity of the outer side plate hole **14** with respect to the stationary die hole **15** is directed in the direction of arrow D turned clockwise by 60 degrees from the top direction. Moreover, the inner side plate **12** is so fitted in the outer side plate hole **14** in this state that the eccentricity is directed in the direction of arrow C turned counter-clockwise by 60 degrees from the top direction. As shown in **FIG. 4**, the eccentric positions of the individual holes **11** and **14** are individually displaced symmetrically of each other by 60 degrees so that the inner side plate core **11** becomes eccentric by 2 mm from the stationary die hole **15**. As a result, the leading end portion **32** of the extended nozzle **3** can be fitted without any clearance in the inner side plate hole **11**.

[0055] Here, it is needless to say that the invention should not be limited to the combination example of the eccentric directions of the outer side plate hole **14** and the inner side plate hole **11**, as has been described with reference to **FIG. 2** to **FIG. 4**. Specifically, if the eccentric directions of the individual inner side plate hole **11** and the outer side plate hole **14** are changed according to the eccentric extents and directions of the leading end portion **32** of the extended nozzle **3** and the stationary die hole **15**, the leading end portion **32** of the extended nozzle **3** can be fitted without any clearance between the stationary die hole **15** and the positioning plate **10**.

[0056] Moreover, the eccentricities of the holes formed in the individual plates have been individually described to be 1 mm in the embodiment. However, the eccentricities should not be limited thereto but may be less than 1 mm, or 1 mm or more. If less than 1 mm, it is easy to finely adjust the eccentric extents and directions. In case the eccentricity is 1 mm or more, on the other hand, it is possible to easily cope with the case, in which the eccentricity is large.

[0057] Moreover, the individual holes should not have any equal eccentricity but may have different eccentricities.

[0058] In this embodiment, moreover, the positioning plate **10** is divided into two plates of the outer side plate **13** and the inner side plate **12**. However, the invention should not be limited thereto, but the positioning plate may be divided into three or more.

[0059] As has been described hereinbefore, the positioning plate **10** of this embodiment is composed of the plural torus plates having the eccentric holes formed therein. Specifically, the outer side plate **13** having the outer side plate hole **14** eccentrically formed is fitted in the stationary die hole **15**, and the inner side plate **12** having the inner side plate hole **11** eccentrically formed is fitted in the outer side plate hole **14**. Even in case, therefore, the leading end portion **32** of the extended nozzle **3** mounted on the leading end of the heating cylinder **2** is eccentric from the stationary die hole **15** of the stationary die **4**, the position of the inner side plate hole **11** for fitting the leading end portion **32** can be finely adjusted with ease with respect to the stationary die hole **15** by adjusting the angle and the direction between the eccentric directions between the individual plates **12** and **13**. Unlike the constitution, in which the clearance is formed, by the eccentricity of the leading end portion from the stationary die hole, between the stationary die hole and the positioning plate, the molten metal will not intrude into the clearance.

What is claimed is:

1. An aligning-positioning mechanism comprising:

a positioning member arranged between a circular hole and a pipe or a shaft for positioning the pipe or the shaft in the hole, the positioning member comprising a torus member divided into a plurality and each having a torus shape in which an inner circumference thereof eccentrics with respect to an outer circumference thereof,

wherein an outer circumference of an outermost torus member is fitted in the hole, and

wherein an outer circumference of the pipe or the shaft is fitted in an inner circumference of an innermost torus member.

2. The aligning-positioning mechanism according to claim 1, wherein a divided face of the positioning member comprises a taper shape.

3. An aligning-positioning method using an aligning-positioning mechanism according to claim 1, comprising:

adjusting an eccentricity of a center of the inner circumference of the innermost torus member to a center of the hole by adjusting the angle made by the eccentric direction between the individual torus members, and

adjusting an eccentric direction by turning the individual torus members.

4. An aligning-positioning mechanism including a stationary type positioning plate, the positioning plate comprising:

an outer side plate having a torus shape in which an outer side plate hole is formed eccentrically of the outer circumference thereof; and

an inner side plate having a torus shape in which an inner side plate hole, into which a leading end portion of an extended nozzle mounted on a cylinder leading end portion of a metallic injection molding machine is fitted, is formed eccentrically of the outer circumference thereof,

wherein the outer side plate is fitted in a stationary die hole formed in a stationary die, and

wherein the inner side plate is fitted in the outer side plate hole of the outer side plate.

* * * * *