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## DESCRIPTION

### METHOD OF FORMING AN OPTICAL DISC AND METAL MOLD DEVICE FOR FORMING AN OPTICAL DISC USED FOR THE METHOD

#### BACKGROUND OF THE INVENTION

##### 1. Field of the Invention

The present invention relates to a method of forming an optical disc such as a compact disc (CD) or digital video disc (DVD), and a metal mold device for forming an optical disc that is used for that method.

##### 2. Description of the Related Art

The substrates of DVD and other optical discs are typically injection molded from a resin. A known example of a metal mold device used for this injection molding is described in Japanese Unexamined Patent Application, First Publication No. 11-70529. In this metal mold device, a pair of mold bodies in the form of a fixed mold (fixed side assembly) and movable mold (movable side assembly) are closed, a product cavity (cavity space) is formed between the fixed mold and movable mold, a molding material in the form of a molten resin is filled into this product cavity, and after the resin inside this product cavity, namely an optical disc, has solidified, the fixed mold and movable mold are opened and the molded optical disc is removed. Resin is injected into the product cavity from a sprue at location corresponding to its central portion. In addition, by moving a gate cutting member in the form of a cutting punch provided on the side of the movable mold to the side of the fixed mold, and allowing to penetrate into an indented portion (die) of a sprue bushing provided on the side of the fixed mold, together with forming an opening hole located in the central portion of the optical disc, the resin within the sprue and resin within the product cavity are severed. Moreover, positioning rings (guide rings) respectively fixed on the fixed mold and movable mold are taper-fitted when the mold bodies are closed.

In the molding of an optical disc in this manner, there is the risk of the occurrence of resin orientation due to residual stress remaining in the portion close to

the center of the optical disc. Since this resin orientation impairs the properties of the optical disc, although not described in detail in Japanese Unexamined Patent Application, First Publication No. 11-70529, in the molding of an optical disc, injection compression molding is carried out. In this injection compression molding, the fixed mold and movable mold are first closed with a weak clamping force, and resin is filled into the product cavity in this state. At this time, the fixed mold and movable mold open slightly by, for example, about 0.1-0.3 mm due to the pressure of the resin inside the product cavity. Next, after severing the sprue and product cavity with the cutting punch, the clamping force on the mold bodies is increased, the fixed mold and movable mold are completely closed, and the resin is compressed inside the product cavity.

As has been described above, in the metal mold device for forming optical discs of the prior art, although a fixed mold and movable mold are centered by, for example, taper-fitting positioning rings, when the fixed mold and movable mold are opened, since the fixed mold and movable mold lower slightly due to their own weight causing misalignment between the fixed mold and movable mold, the tapered surfaces of the positioning rings are easily damaged. In addition, although the cutting punch on the movable mold side fits into the indented portion on the fixed ring side in the state in which the fixed mold and movable mold are opened slightly due to the pressure of the resin filled into the product cavity, when the fixed mold and movable mold are opened, misalignment occurs between them and the cutting punch no longer fits into the indented portion in an accurately centered state. As a result, the formed opening hole becomes eccentric relative to the entire optical disc or burrs are easily formed on the punching marks left on the opening hole of the optical disc.

In contrast, in Japanese Unexamined Patent Application, First Publication No. 11-70529, a constitution is proposed in which, together with, for example, allowing the positioning ring on the fixed mold side to be supported so as to slide freely relative to a cavity forming member (mirrored surface plate), force is applied to the movable mold side by a compression spring. As a result, the positioning rings of the fixed mold and movable mold are mutually taper-fitted and the fixed mold and movable mold are

centered even in the state in which the fixed mold and movable mold are opened to a certain degree. However, if the positioning rings are allowed to slide freely in this manner, there is the risk of misalignment of the positioning rings occurring relative to the cavity forming member, thereby decreasing the centering accuracy between the fixed mold and movable mold that uses the cavity forming member as a reference.

In order to solve the above problems, an object of the present invention is to provide a metal mold device for forming an optical disc, which together with being able to reliably and accurately center a pair of mold bodies when they are closed, is also able to center these mold bodies with a certain degree of accuracy even in the state in which the pair of mold bodies are opened.

### SUMMARY OF THE INVENTION

The method of forming an optical disc as claimed in the present invention is provided with a filling step in which a first mold body and second mold body are closed, a product cavity that forms an optical disc is formed between these mold bodies, and a molding material is filled into the product cavity from a material pathway formed in the first mold body; a gate cutting step in which an opening hole of the optical disc is formed and the material pathway and product cavity are severed by fitting a gate cutting member provided in the second mold body into an indented portion formed in the first mold body; and a compression step in which the molding material inside the product cavity is compressed by increasing the clamping force on both mold bodies and closing both mold bodies that have been opened by the pressure of the molding material inside the product cavity; wherein, by fitting a guide pin provided one of the two mold bodies into a guide pin receiver provided on the other mold body while allowing to slide freely in the directions of opening and closing of both mold bodies, both mold bodies are centered in the filling step, gate cutting step and compression step, and at the point when the compression step is completed, both mold bodies are centered by mutually taper-fitting positioning members respectively fixed to mutually opposing surfaces of both mold bodies.

According to this method of forming an optical disc, by fitting together a guide

pin and guide pin receiver, a pair of mold bodies are centered in the filling step, gate cutting step and compression step even when they are opened slightly. Thus, when the gate cutting member on the second mold body side is fit into the indented portion of the first mold body side in the gate cutting step, the gate cutting member is reliably and accurately fit into the indented portion. In addition, following completion of the compression step, namely after the product cavity has reached the final product shape, although both mold bodies are centered by mutually taper-fitting of the positioning members respectively fixed on both mold bodies, this centering is more reliable and accurate than centering by a guide pin and guide pin receiver. As a result, the opening hole of the optical disc is accurately formed at a prescribed location, and the formation of burrs in the opening hole is prevented.

The metal mold device for forming an optical disc as claimed in the present invention is provided with a pair of mold bodies that open and close by mutually moving and form between them a product cavity that forms an optical disc when they are closed, positioning members respectively fixed on mutually opposing surfaces of these mold bodies that respectively have tapered surfaces that taper-fit together, a guide pin provided one of the pair of mold bodies, and a guide pin receiver provided on the other mold body in which the guide pin fits while allowing to slide freely along the direction of opening and closing of the mold bodies.

When forming an optical disc, the pair of mold bodies are closed and a molding material is filled into the product cavity formed between them. After the molding material that has been filled into the product cavity, namely an optical disc, has solidified, both mold bodies are opened and the formed optical disc is removed. In this case, as was previously described, in the state in which both mold bodies are closed, the mold bodies are centered by mutual taper-fitting of the tapered surfaces of positioning members respectively fixed on these mold bodies. On the other hand, in the state in which both mold bodies are open, although the positioning members of both mold bodies are mutually separated, both mold bodies are centered by a guide pin and guide pin receiver into which the guide pin fits while allowing to slide freely along the opening and closing direction of the mold bodies. As a result, the pair of mold

bodies are reliably and accurately centered in the state in which they are closed, and are centered with a certain degree of accuracy even in the state in which they are open.

In addition, in the metal mold device for forming an optical disc as claimed in the present invention, the guide pin and guide pin receiver are preferably provided only at two corner portions located on a nearly diagonal line on the mold bodies.

Namely, as was previously described, since the final centering of both mold bodies is performed by positioning members, and the positioning by the guide pin and guide pin receiver is of an auxiliary nature, it is adequate to provide the guide pin and guide pin receiver at two corner portions of the mold bodies. In addition, although a removal robot and so forth is inserted into both mold bodies when opening the mold bodies and removing the formed optical disc, by inserting and withdrawing the removal robot at those corner portions where the guide pin and guide pin receiver are not formed in the mold bodies at that time, the guide pin and guide pin receiver does not obstruct removal of the optical disc.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view showing one embodiment of a metal mold device for forming an optical disc of the present invention.

FIG. 2 is a cross-sectional view of a guide pin and guide pin receiver of the metal mold device for forming an optical disc shown in FIG. 1.

FIG. 3 is an overhead view of a fixed mold of the metal mold device for forming an optical disc shown in FIG. 1.

FIG. 4 is an enlarged cross-sectional view of the area near the gate of the metal mold device for forming an optical disc shown in FIG. 1.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following provides an explanation of an embodiment of the method of forming an optical disc of the present invention and a metal mold device for forming an optical disc used for that method with reference to the drawings.

First, an explanation is provided of the constitution of a metal mold device for

forming an optical disc. Reference symbol 1 indicates a first mold body in the form of a fixed mold, reference symbol 2 indicates a second mold body in the form of a movable mold, and this fixed mold 1 and movable mold 2 mutually open and close by moving in the upward and downward directions (directions of opening and closing of the mold bodies) in FIGS. 1, 2 and 4, and when they are closed, form a product cavity 3 that forms an optical disc between them. Furthermore, although fixed mold 1 and movable mold 2 are depicted to be arranged vertically in FIGS. 1, 2 and 4, normally forming is carried out in the state in which fixed mold 1 and movable mold 2 are arranged horizontally. However, forming can also be carried out in the state in which they are arranged vertically as shown in the drawings.

Fixed mold 1 is provided with a fixed side template 6 and a fixed side bottom plate 7 fixed to the surface on the opposite side of the movable mold 2. This fixed side bottom plate 7 is attached to a fixed side platen of an injection molding machine not shown. Furthermore, reference symbol 7a shown in FIG. 3 indicates through holes formed in fixed side bottom plate 7 for allowing the passage of bolts for fastening to the fixed side platen.

A sprue bushing 8 to which is connected a nozzle of an injection molding machine is fixed by bolt 9 to the central portion of fixed side bottom plate 7. A material pathway in the form of a sprue 10 is composed within this sprue bushing 8, and sprue 10 passes through fixed side bottom plate 7 and protrudes to the side of fixed side template 6. Moreover, a locating ring 11 is fixed by bolt 12 to the surface on the opposite side of movable mold 2 in sprue bushing 8.

Fixed side template 6 is composed of a cavity block 17 nearly in the shape of a disc which acts as a cavity forming member that is fixed to fixed side bottom plate 7 by a bolt 16, and a fixed side positioning ring 19 nearly in the shape of a ring which acts as a positioning member that is fixed to fixed side bottom plate 7 by bolt 18. This fixed side positioning ring 19 fits into a ledge portion 20, which is formed in the outer periphery of the surface opposing movable mold 2, of fixed side bottom plate 7 and the outer peripheral side of cavity block 17, and is centered relative to cavity block 17 at the stage of metal mold fabrication. Fixed side positioning ring 19 has a tapered

surface 21 on the inner peripheral surface of the portion on the side of movable mold 2 for which its diameter becomes larger moving towards the side of movable mold 2. The angle of this tapered surface 21 relative to the direction of opening and closing of the mold bodies is about 3 through 30°.

In addition, cylindrical guide pins 22 are respectively fixed to two corner portions located on a nearly diagonal line in fixed side bottom plate 7. In these guide pins 22, a flange portion 23 formed on the side of one of their ends contacts fixed side bottom plate 7, while the end from flange portion 23 fits into a hole portion 24 formed in fixed side bottom plate 7, and is fixed by an auxiliary member 25 and a bolt 26. Guide pins 22 protrude to the side of movable mold 2 along the direction of opening and closing of the mold bodies. Moreover, a flange-shaped stopper 27 is fixed on the end surfaces of guide pins 22.

In addition, a ledge portion 31 is formed in the outer peripheral portion of the portion located on the side of movable mold 2 in cavity block 17, and an outer ring batten in the shape of a ring fits into this ledge portion 31 and is fixed by a bolt 33. On the other hand, an inner peripheral stamper clamp 35 having a nearly cylindrical shape, which acts as a cylindrical member, is fit into and fixed in a through hole 34 serving as a hole portion formed in the central portion of cavity block 17. A stamper 36, which forms the grooved portion and land portion of an optical disc, is removably installed in cavity block 17, and the previously mentioned inner peripheral stamper clamp 35 clamps the inner peripheral portion of this stamper 36. Reference symbol 37 indicates a claw portion formed on the end of inner peripheral stamper clamp 35 that holds down the inner peripheral portion of this stamper 36. In addition, a sprue bushing 8 fits into inner peripheral stamper clamp 35, and an indented portion 38 is formed in the end of sprue bushing 8 on the side of movable mold 2 by a fixed side bushing 8a which is fitted into the outer peripheral side of this sprue bushing 8.

Movable mold 2 is provided with a movable side template 41, a movable side support plate 42 fixed on the surface on the opposite side from fixed mold 1 in this movable side template 41, and a movable side bottom plate 44 fixed by a bolt 43 to the surface on the opposite side from fixed mold 1 in this movable side support plate 42.

This movable side bottom plate 44 is attached to the movable side platen of an injection molding machine.

Movable side template 41 is composed of a nearly disc-shaped core block 46 that is fixed to movable side support plate 42 by a bolt 45 and acts as a cavity forming member, and a nearly ring-shaped movable side positioning ring 48 that is fixed to movable side support plate 42 by a bolt 47 and acts as a positioning member.

Movable side positioning ring 48 fits into a ledge portion 49, which is formed in the outer peripheral portion of the surface opposed to fixed mold 1 in movable side support plate 42, and the outer peripheral side of core block 46, and is centered relative to core block 46 at the stage of metal mold fabrication. In addition, movable side positioning ring 48 has a tapered surface 50 into which tapered surface 21 of fixed side positioning ring 19 contacts and taper-fits when the mold bodies are closed. Moreover, a spacer 51 that is contacted by fixed side positioning ring 19 is located on the outer peripheral side of this tapered surface 50 and is fixed by a bolt 52 to the surface opposing fixed side positioning ring 19 in movable side positioning ring 48. Namely, fixed side positioning ring 19 and movable side positioning ring 48 constitute faucet and spigot fitting.

Through holes 56 and 57 are respectively formed in the two corner portions located on a nearly diagonal line in the above movable side support plate 42 and movable side bottom plate 44. In addition, guide pin 22 on the side of the above fixed mold 1 and a guide pin receiver 58, which fits while allowing to slide freely along the direction of opening and closing of each mold body, are incorporated in through hole 56 of movable side support plate 42. These guide pin receivers 58 are composed of a cylindrical guide bushing 59, which fits into and is fixed inside through hole 56, and a retainer 60 incorporated while allowing to slide freely in the inner peripheral side of this guide bushing 59 and which is formed from a slide wheel bearing or slide roller bearing and so forth, and guide pin 22 is constantly fit into the inner peripheral side of retainer 60. Furthermore, stopper 27 of this guide pin 22 prevents retainer 60 from coming out. On the other hand, the end of guide pin 22 is inserted into through hole 57.

In addition, a ledge portion 66 is formed in the outer peripheral portion of the portion of core block 46 on the side of fixed mold 1, and a ring-shaped outer ring 67 fits into this ledge section 66 while allowing to slide freely along the direction of opening and closing of the mold bodies. Furthermore, reference symbol 68 indicates a bolt for preventing outer ring 67 from coming off. In addition, a slide bearing 69 is interposed between outer ring 67 and core block 46. When the mold bodies are closed, outer ring 67 contacts outer ring batten 32 on the side of fixed mold 1 and forms the outer peripheral surface of an optical disc.

In addition, a nearly ring-shaped air blow-off pin 77 fits into an indented portion 76 formed in the central portion of core block 46 on the side of fixed mold 1, and is fixed by a bolt 78. An air pathway 79 formed in core block 46 and movable side support plate 42 connects a gap between the inner peripheral surfaces of this indented portion 76 and air blow-off pin 77.

A nearly cylindrical ejector sleeve 81 fits into air blow-off pin 77 while allowing to slide freely over only a prescribed range along the direction of opening and closing of the mold bodies. This ejector sleeve 81 passes through core block 46 and one end is located within movable side support plate 42. In addition, a slide bearing 82 is interposed between ejector sleeve 81 and movable side support plate 42. Moreover, ejector sleeve 81 is pressed toward the opposite side of fixed mold 1 by a spring 83. Furthermore, reference symbol 84 indicates a regulating plate fixed within movable side support plate 42 for regulating the sliding range of ejector sleeve 81.

A gate cutting sleeve 86 in the form of a nearly cylindrical gate cutting member is fit into ejector sleeve 81 while allowing to slide freely over a prescribed range only along the direction of opening and closing of the mold bodies. This gate cutting sleeve 86 passes through ejector sleeve 81 and regulating plate 84, and a slide bearing 87 is interposed between gate cutting sleeve 86 and ejector sleeve 81. In addition, a flange portion 88 formed on one end of gate cutting sleeve 86 is located on the side closest to movable side bottom plate 44 than regulating plate 84. Moreover, a gate cutting sleeve 86 is pressed towards the opposite side of fixed mold 1 by a spring 89.

An ejector plate 91 is supported on movable side bottom plate 44 while allowing

to slide freely over a prescribed range only along the direction of opening and closing of the mold bodies. This ejector plate 91 is pressed towards the opposite side of fixed mold 1 by a spring 92. An ejector pin 93 fixed on ejector plate 91 is fit into gate cutting sleeve 86 while allowing to slide freely. In addition, a linking pin 94 fixed on ejector plate 91 passes through flange portion 88 of gate cutting sleeve 86 and regulating plate 84 and is contacted by ejector sleeve 81. Moreover, a receiving portion 95 protruding from flange portion 88 of the above gate cutting sleeve 86 passes through ejector plate 91 while allowing to slide freely.

In addition, a gate 96 that connects sprue 10 on the side of fixed mold 1 to product cavity 3 is formed between the outer peripheral portion of the end of sprue bushing 8 on the side of fixed mold 1 and the outer peripheral portion of the end of gate cutting sleeve 86 on the side of movable mold 2. In addition, as a result of gate cutting sleeve 86 fitting into indented portion 38 of sprue bushing 8, the resin serving as the molding material inside sprue 10 and the resin inside product cavity 3, namely an optical disc, are severed in gate 96, and an opening hole is formed in the central portion of this optical disc. Thus, in fixed mold 1, a portion of the optical disc is formed not only by cavity block 17, but also by inner peripheral stamper clamp 35 and the outer peripheral portion of the end of sprue bushing 8. In addition, in movable mold 2, a portion of the optical disc is formed by not only core block 46, but also by air blow-off pin 77 and ejector sleeve 81.

Next, an explanation is provided of a method of forming an optical disc using the metal mold device for forming an optical disc described above. Both guide pins 22 of fixed mold 1 are continuously fit into guide pin receivers 58 of movable mold 2 regardless of the opening and closing of fixed mold 1 and movable mold 2. As a result of this, fixed mold 1 and movable mold 2 are centered. Thus, the central axis of cavity block 17 of fixed mold 1 and the central axis of core block 46 of movable mold 2 are located on the same line.

When forming an optical disc, first fixed mold 1 and fixed mold 2 are closed, and product cavity 3 is formed between fixed mold 1 and movable mold 2. Furthermore, in the state in which the mold bodies are closed in this manner, outer ring

67 of movable mold 2 contacts stamper 36 of fixed mold 1, and positioning rings 19 and 48 of fixed mold 1 and movable mold 2 fit together in the manner of a faucet and spigot, resulting in mutual taper-fitting of their tapered surfaces 21 and 50. Next, molding material in the form of molten thermoplastic resin is injected into sprue 10 from the nozzle of an injection molding machine. This resin flows from sprue 10 into product cavity 3 through gate 96 (filling step). Furthermore, since the initial clamping force on fixed mold 1 and movable mold 2 is comparatively weak, fixed mold 1 and movable mold 2 open slightly by about, for example, 0.1-0.3 mm due to the pressure of the resin filled into product cavity 3, and the tapered surfaces 21 and 50 of positioning rings 19 and 48 are separated slightly.

After resin is filled into product cavity 3 in this manner, gate cutting sprue 86 moves to the side of fixed mold 1 and fits into indented portion 38 of sprue bushing 8 of this fixed mold 1 as a result of receiving portion 95 of gate cutting sprue 86 being pushed towards fixed mold 1 by a pushing rod not shown provided on the injection molding machine side. As a result, together with sprue 10 and product cavity 3 being cut off in gate 96, an opening hole is formed in the central portion of this optical disc (gate cutting step). In addition, nearly the entirety of movable mold 2, including core block 46, moves to the side of fixed mold 1 as a result of increasing the clamping strength on fixed mold 1 and movable mold 2. As a result, the resin is compressed inside product cavity 3 (compression step). At the point this compression step is completed, tapered surfaces 21 and 50 of positioning rings 19 and 48 of fixed mold 1 and movable mold 2 again taper-fit together. As a result, fixed mold 1 and movable mold 2 are reliably centered beyond completion of the compression step.

Moreover, after the resin, namely the optical disc, in this product cavity 3 has cooled and solidified, fixed mold 1 and movable mold 2 are opened. Accompanying this, the formed optical disc and resin solidified inside sprue 10 are first separated from fixed mold 1. Next, ejection pin 93 together with ejection plate 91 move to the side of fixed mold 1, eject resin solidified inside sprue 10 and separate it from movable mold 2 as a result of ejection plate 91 being pushed towards the side of fixed mold 1 by a pushing rod not shown provided on the injection molding machine side. In addition,

ejection sleeve 81 moves to the side of fixed mold 1, ejects the inner peripheral portion of the optical disc and separates it from movable mold 2 as a result of being pushed by linking pin 94 fixed on ejection plate 91. Furthermore, during this mold separation, as a result of air supplied from air pathway 79 being blown out from the gap between air blow-off pin 77 and core block 46, the vacuum between the optical disc and movable mold 2 is broken. The separated optical disc is then removed by a removal robot not shown. At this time, the removal robot accesses the optical disc between fixed mold 1 and movable mold 2 by way of the corner portions at which guide pins 22 and guide pin receivers 58 are not present.

According to the constitution of the above embodiment, since fixed mold 1 and movable mold 2 are centered by fitting guide pins 22 provided on fixed mold 1 into guide pin receivers 58 provided on movable mold 2 while allowing to slide freely in the direction of opening and closing of the mold bodies, even in the state in which fixed mold 1 and movable mold 2 are opened and their tapered surfaces 21 and 50 of positioning rings 19 and 48 are separated from each other, fixed mold 1 and movable mold 2 can be centered. Namely, although fixed mold 1 and movable mold 2 are opened slightly in the filling, gate cutting and compression steps after they are temporarily closed, at that time as well, fixed mold 1 and movable mold 2 can be maintained somewhat accurately in a centered state in opposition to the gravitational force applied to fixed mold 1 and movable mold 2. Thus, when gate cutting sleeve 86 of movable mold 2 is fit into indented portion 38 of fixed mold 1 in the gate cutting step, gate cutting sleeve 86 is accurately and reliably fit into indented portion 38. As a result, together with the opening hole of the optical disc being able to be accurately formed at a prescribed location, the occurrence of burrs and other defects in this opening hole can be prevented.

In addition, in the state in which fixed mold 1 and movable mold 2 are finally and completely closed and product cavity 3 reaches the final product shape following completion of the compression step and beyond, fixed mold 1 and movable mold 2 are centered as a result of tapered surfaces 21 and 50 of position rings 19 and 48 of fixed mold 1 and movable mold 2 taper-fitting. At this time, since positioning rings 19 and

48 are respectively fixed to fixed mold 1 and movable mold 2 in a movable state without being supported, the centering performed by positioning rings 19 and 48 is more reliable and accurate than centering by guide pins 22 and guide pin receivers 58 alone.

Moreover, although two sets of guide pins 22 and guide pin receivers 58 are provided in the above embodiment, since final centering of fixed mold 1 and movable mold 2 is performed by positioning rings 19 and 48, while that by guide pins 22 and guide pin receivers 58 is only auxiliary, it is sufficient to only provide them at two corner portions of fixed mold 1 and movable mold 2. Moreover, when the formed optical disc is removed by opening fixed mold 1 and movable mold 2, as a result of a removal robot entering between fixed mold 1 and movable mold 2 by way of corner portions at which guide pins 22 and guide pin receivers 58 are absent, guide pins 22 and guide pin receivers 58 do not obstruct removal of the optical disc.

Furthermore, the present invention is not limited to the above embodiment, but rather can be carried out in various variations. For example, although guide pins 22 are provided on fixed mold 1, and guide pin receivers 58, into which these guide pins 22 fit while allowing to slide freely, are provided on movable mold 2, guide pins may conversely be provided on the movable mold, while guide pin receivers may be provided on the fixed mold. In addition, although two sets of guide pins 22 and guide pin receivers 58 are provided in the above embodiment, there may be one set or three or more sets.

## CLAIMS

1. A method of forming an optical disc comprising: a filling step in which a first mold body and second mold body are closed, a product cavity that forms an optical disc is formed between these mold bodies, and a molding material is filled into the product cavity from a material pathway formed in the first mold body; a gate cutting step in which an opening hole of the optical disc is formed and the material pathway and product cavity are severed by fitting a gate cutting member provided in the second mold body into an indented portion formed in the first mold body; and a compression step in which the molding material inside the product cavity is compressed by increasing the clamping force on both mold bodies and closing both mold bodies that have been opened by the pressure of the molding material inside the product cavity; wherein, by fitting a guide pin provided one of the two mold bodies into a guide pin receiver provided on the other mold body while allowing to slide freely in the directions of opening and closing of both mold bodies, both mold bodies are centered in the filling step, gate cutting step and compression step, and at the point when the compression step is completed, both mold bodies are centered by mutually taper-fitting positioning members respectively fixed to mutually opposing surfaces of both mold bodies.
2. A metal mold device for forming an optical disc comprising: a pair of mold bodies that open and close by mutually moving and form between them a product cavity that forms an optical disc when they are closed, positioning members respectively fixed on mutually opposing surfaces of these mold bodies that respectively have tapered surfaces that taper-fit together, a guide pin provided one of the pair of mold bodies, and a guide pin receiver provided on the other mold body in which the guide pin fits while allowing to slide freely along the direction of opening and closing of the mold bodies.
3. A metal mold device for forming an optical disc according to claim 2, wherein the guide pin and guide pin receiver are provided only at two corner portions located on a nearly diagonal line on the mold bodies.