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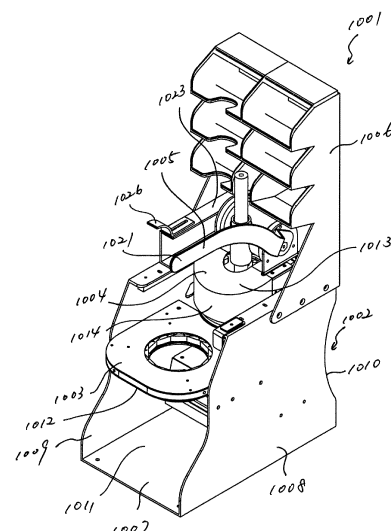
(57) A sealing machine for sealing, with a lid, an opening part of a container having the opening part and an edge part forming an outer circumferential edge of the opening part, includes:

a holding part including a holding body that holds the container in a state where the edge part of the container is exposed; and a joining force applying part including a joining body for joining the lid to an edge part formed on a periphery of the opening part.

The holding part is formed so that a lid formed in advance into a sheet can be disposed so as to face the opening part of the holding body.

The joining part joins the lid formed in advance into a sheet to the container.

Fig.1



Description

Technical Field

[0001] The present invention relates to a sealing machine and a sealing method for sealing a container by sealing a lid in the container.

Background Art

[0002] Conventionally, in various stores such as a convenience store, a supermarket, and a fast food store, various beverages such as coffee and carbonated beverages, and food and drink including food items such as a daily dish (hereinafter, also referred to as a "content") are generally accommodated in containers and provided. In addition, conventionally, a product containing contents in a container in advance has been displayed and provided in a store, or store staffs have provided a product containing contents in a container on the spot in response to an order from a customer. In recent years, in addition to such a conventional method of providing, a method of providing has also been performed in which a customer stores contents in a container and brings back the contents.

[0003] In general, a method of storing and providing contents in a container is performed by covering the container storing the contents. There are various modes of covering the container, and as one of the modes, a heat sealing method of welding the lid to the container by applying heat, an ultrasonic welding method of joining the container and the lid by applying ultrasonic waves, and the like are known. According to these methods, since the lid is joined to the edge part formed at the periphery of the opening part of the container, the container is formed in a sealed state. As described above, in order to seal the inside of the container by joining the lid to the edge part of the container, it is common to use a sealing machine for joining and sealing the lid to the container. Examples of a conventionally known sealing machine include a device described in Patent Literature 1 described below. The sealing machine (sealing device) described in Patent Literature 1 seals a container by heat-sealing a film member as a lid member to an edge part of the container. The sealing machine includes a device main body, a support part that supports the container, and a thermal pressure plate for heat-sealing the film member to the container instructed by the support part. The support part is configured to be slidable between a position where the support part is extended to the front side of the front surface of the device main body (a position outside the device main body) and a position below the thermal pressure plate in the device main body. The support part is located at a position outside the device main body when the container is supported, and slides to a position below the thermal pressure plate when the lid is sealed to the supported container. When the lid is sealed to the container by the thermal pressure plate at this position, the support part slides from a position below the thermal

pressure plate to a position outside the device main body. The purchaser who has purchased the beverage or the like can take the container from the support part located at a position outside the device main body and take it home.

Citation List

Patent Literature

[0004] Patent Literature 1: Japanese Utility Model Registration No. 3152023

Summary of Invention

Technical Problem

[0005] The sealing machine disclosed in Patent Literature 1 described above has a configuration in which a long body of a film wound in a roll shape is provided on a roller (active roller) on one side, a distal end of the film wound in the roll shape is attached to a roller (passive roller) on the other side, and the film provided on the active roller is sequentially unwound and wound around the passive roller as the passive roller rotates. The part for sealing the film to the container is between the active roller and the passive roller, and the part is configured to perform cutting from the film of the long body to a form according to the size and shape of the container and heat sealing to the container.

[0006] However, in the case of the sealing machine in which the film is cut into a predetermined size and shape from the long body of the film and heat-sealed to the container as described above, the long body of the film in a state of being cut out into a predetermined shape or the like is wound around the passive roller. The long body of the film wound around the passive roller has to be finally discarded, and there is a problem that the loss of the film after the lid is punched out is very large. In addition, in the case of the sealing machine described in Patent Literature 1, since the film is cut from the long body of the film and provided when the film is heat-sealed to the container, there is also a possibility that dust generated when the film is cut is mixed into the container.

[0007] Further, the sealing machine described in Patent Literature 1 requires a mechanism for cutting the film in addition to a mechanism for heat-sealing the film to the container. Therefore, not only the configuration of the sealing machine tends to be complicated, but also, for example, when store staffs inspect or clean the inside of the sealing machine, the store staff or the like may erroneously touch the mechanism for cutting the film and may get injured.

[0008] The present invention has been made in view of such a problem, and an object of the present invention is to provide a sealing machine and a sealing method capable of greatly reducing loss of a material forming a lid, preventing contamination of dust into a container, and

further simplifying the overall configuration of the device.

Solution to Problem

[0009] The gist of the present invention is the following (1) to (15). 5

(1) A sealing machine for sealing, with a lid, an opening part of a container having the opening part and an edge part forming an outer circumferential edge of the opening part, the sealing machine comprises: a holding part including a holding body that holds the container in a state where the edge part of the container is exposed; and a joining force applying part including a joining body for joining the lid to an edge part formed on a periphery of the opening part, wherein the holding part is formed so that a lid formed in advance into a sheet can be disposed so as to face the opening part of the holding body, and the joining part joins the lid formed in advance into a sheet to the container. 10

(2) The sealing machine according to (1), wherein a moving part that displaces at least one of the joining part and the holding part such that a state in approaching where the joining body and the holding body are in contact with each other via the container held by the holding part and the lid located on the container and a state in separating where the joining body and the holding body are separated from each other than the state in approaching can be formed, in which the joining part joins the lid to the container in response to the moving part forming the state in approaching as a trigger. 15 20 25 30

(3) The sealing machine according to (1), further comprises: a positioning part that includes a guide body that guides a position of the lid to a predetermined space. 35

(4) The sealing machine according to (3), wherein a plurality of the guide bodies hang down from a predetermined position of the joining part toward the holding body, and an arrangement of the plurality of guide bodies is determined such that the lid is gripped by the plurality of the guide bodies to be located in the space. 40

(5) The sealing machine according to (1), wherein the joining body is provided with an energy application part that applies energy to a contact part between the lid and the container. 45

(6) The sealing machine according to (5), wherein the energy application part applies at least one type of energy selected from a group consisting of electric energy, vibration energy, and thermal energy. 50

(7) The sealing machine according to (1), comprises: an insertion part into which the lid is insertable; and a transport part that transports the lid inserted from the insertion part toward the space. 55

(8) The sealing machine according to (2), wherein the holding part includes an insertion part that has a

through hole penetrating between a front surface and a rear surface and is formed in the through hole such that the container is insertable, and a support part that is located below the insertion part, is in contact with a bottom part of the container, and supports the bottom part, and a position in an inner height direction of a contact part between the support part and the bottom part varies with a transition between the state in approaching and separating.

(9) The sealing machine according to (3), in which in the holding part, an insertion part into which the container is insertable is formed to penetrate between a front surface and a rear surface of the holding part, and the positioning part is formed around the insertion part.

(10) The sealing machine according to (3), in which the positioning part is formed of a material having softness.

(11) The sealing machine according to (3), in which the positioning part is formed of a material having heat resistance.

(12) The sealing machine according to (1), including: a storage part that accommodates a lid assembly in which the lids are stacked; a disperser that individually disperses the lid from the storage part; and a transfer part that transfers the lid dispersed by the disperser toward the holding part, in which the lid is disposed on the container from the storage part via the transfer part in response to the container disposed in the holding part as a trigger.

(13) The sealing machine according to (12), in which a plurality of the storage parts are provided, a dimension of a lid accommodated in at least one of the storage parts is different from a dimension of a lid accommodated in another one of the storage parts, and the storage part storing a lid disposed on the container is selected from the transfer part according to a size of the container disposed in the holding part, and the lid is disposed on the container from the selected storage part via the transfer part.

(14) The sealing machine according to (12), in which the transfer part includes an atmosphere part that temporarily retains the lid sent from the storage part, and in response to the container disposed in the holding part as a trigger, the lid disposed in the atmosphere part is disposed on the container, and the lid is fed from the storage part to the atmosphere part of the transfer part.

(15) The sealing machine according to (12), in which the storage part has an opening at a lower end, and the disperser is configured to take out the lid from the opening at the lower end of the storage part.

Advantageous Effects of Invention

[0010] According to the present invention, the lid can be reliably joined to the container without complicating the configuration of the device. In addition, it is possible to

greatly reduce the risk of contamination of dust and the like even when the lid is joined to the container, and it is also possible to greatly reduce the loss of the material for forming the lid.

Brief Description of Drawings

[0011]

Fig. 1 is an external perspective view illustrating a sealing machine according to a first embodiment according to the present invention.

Fig. 2 is an external perspective view of the sealing machine.

Fig. 3 is an exploded perspective view of the sealing machine.

Fig. 4 is an explanatory view for explaining an operation of the sealing machine.

Fig. 5 is an explanatory view for explaining the operation of the sealing machine.

Fig. 6 is an external perspective view of a sealing machine according to a second embodiment.

Fig. 7 is an explanatory view for explaining the operation of the sealing machine.

Fig. 8 is a perspective view of the sealing machine.

Fig. 9 is an exploded perspective view of the sealing machine.

Fig. 10 is an external view of a sealing machine according to a third embodiment.

Fig. 11 is a perspective view for explaining an internal configuration of the sealing machine.

Fig. 12 is a perspective view for explaining a configuration of a sealing part of the sealing machine.

Fig. 13 is an explanatory view for explaining a configuration of a sealing part.

Fig. 14 is a schematic diagram illustrating another example of a holding part.

Fig. 15 is an explanatory view for explaining a configuration of a holding jig constituting the holding part.

Fig. 16 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

Fig. 17 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

Fig. 18 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

Fig. 19 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

Fig. 20 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

Fig. 21 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

Fig. 22 is an explanatory view for explaining a configuration of the holding jig constituting the holding part.

5 Description of Embodiments

[0012] Hereinafter, one embodiment and the like of a sealing machine and a sealing method according to the present invention will be described with reference to the drawings. Note that, in the present specification and the drawings, configurations having substantially the same functional configuration are denoted by the same reference numerals, and redundant description is omitted.

[0013] The following description is a preferred specific example of the sealing machine and the sealing method according to the present invention, and the content of the present invention is not limited to the described embodiments and the like. In the following description, directions such as front and rear, left and right, and up and down are indicated in consideration of convenience of description, but the content of the present invention is not limited to these directions. In the example of Fig. 1, a Z-axis direction is defined as an up-down direction (upper side is a +Z direction, lower side is a -Z direction), an X-axis direction is defined as a front-rear direction (front side is in a +X direction, and rear side is a -X direction), and a Y-axis direction is defined as a left-right direction (right side is a +Y direction, left side is a -Y direction), and the description will be given based on these. The same applies to each of Fig. 2 and subsequent drawings.

[0014] The magnitude ratios such as the sizes of the sealing machine and each member illustrated in each of Fig. 1 and the like are described for convenience, and do not limit actual magnitude ratios. The same applies to each of Fig. 2 and subsequent drawings with respect to these directions and the magnitude ratio. Furthermore, the configuration of each part described in detail below is not limited to being applied to each embodiment, modification, and the like, and may be appropriately applied to other embodiments, modifications, and the like.

[0015] A sealing machine according to a first embodiment according to the present invention will be described. As illustrated in Fig. 1, a sealing machine 1001 according to the present embodiment has an aspect in which a person (hereinafter, referred to as a "user") who seals a lid on a container manually performs sealing. The sealing machine 1001 includes a housing 1002, a holding part 1003, a sealing part 1004, an operation part 1005, and a storage part 1006. The housing 1002 is a member serving as a base of the sealing machine 1001. The housing 1002 is formed by molding a metal plate of a conventionally known material such as iron or stainless steel. In the sealing machine according to the present embodiment, a bottom plate 1007, a right plate 1008, a left plate 1009, a rear plate 1010, and the like of the housing 1002 are formed by a conventionally known method such as welding, bending, or the like. However, a method of molding the housing 1002 is not limited to the

above, and the housing 1002 may be formed by another method. The bottom plate 1007 is a plate-like member positioned at a lower part of the sealing machine 1001, and through holes are formed at four positions of front, rear, left, and right. For example, rubber feet or the like can be attached to these four through holes. The right plate 1008, the left plate 1009, and the rear plate 1010 are formed to stand from the bottom plate 1006. In addition, the right plate 1008 and the rear plate 1010, and the left plate 1009 and the rear plate 1010 are integrated with each other by joining or the like. As a result, an accommodation space 1011 is formed in the housing 1002. The accommodation space 1011 is a space for arranging and attaching various components and members constituting the sealing machine 1001. In addition, the right plate 1008 and the left plate 1009 are formed by bending or the like at a predetermined position from the end part so that the end part faces the inward direction at the upper end part. An opening hole for attaching and fixing a socket for supplying a force to the sealing machine 1001 is formed in the rear plate 1010.

[0016] The holding part 1003 is for holding the container at the time of sealing, and is disposed in the accommodation space 1011 in the housing 1002. The holding part 1003 includes a holding base part 1012 and a holding member 1 (hereinafter, also referred to as a "holding jig 1"). The holding base part 1012 is a member serving as a base for attaching and fixing the holding member 1. The holding base part 1012 includes a holding member fixing part for mounting and fixing the holding member 1, and a holding base fixing part for mounting and fixing the holding member 1 to the right plate 1008 and the left plate 1009 by a method such as screwing. The holding base part is preferably attached and fixed to the right plate 1008 and the left plate 1009 such that the holding member 1 is horizontally disposed when the holding member 1 is attached, and the holding base fixing part is preferably processed such that an outer surface of the holding base fixing part is along an inner surface of the right plate. The holding base fixing part may be formed by bending both ends of a forming member for forming the holding base part, or a member for forming the holding base fixing part and a member for forming the holding member mounting part may be formed separately, and these members may be joined by a method such as welding. In addition, the holding base part may be formed by a method other than the above-described method. The configuration of the holding jig 1 constituting the holding part 1003 will be described later.

[0017] The sealing part 1004 is for sealing the container by sealing a lid on a circumferential edge part of the container. As illustrated in Fig. 1 and the like, the sealing part 1004 includes a heater 1013 and a cover member 1014. The heater 1013 includes a heater body 1015, a board 1016, and a spring member (not illustrated) as a pressing force applying member provided between the heater body 1015 and the board 1016. Although heater body 1015 is formed in a disk shape in the present

embodiment, a shape and a size of the heater body 1015 may be arbitrarily changed according to a shape and a size of a container and a lid which are objects to be sealed. Extending from the heater body 1015 is a lead wire for supplying power to the heater body 1015. The board 1016 is located above the heater body 1015, and increases the compressive force of the heater body 1015 by compressing and deforming the spring member at the time of pressing. The spring member is for increasing the compressive force applied to the edge parts of the lid and the container when the lid and the container are pressed by the heater body 1015. The compressive force of the spring member can adjust the biasing force of the heater body 1015 by adjusting the length at the normal time other than the time of pressing.

[0018] The cover member 1014 is a cover-shaped member formed to cover the periphery of the heater 1013 (at least the front of the heater 1013). This cover member blocks heat radiated from heater body 1015, and can also prevent a user from touching the heater 1013 (heater body 1015) when the user holds the container in the holding part 1003. Note that a conventionally known material can be arbitrarily selected and used as the cover member 1014, but since the cover member is disposed near the heater 1013, it is preferable to use a material that is hardly affected by heat radiated from the heater 1013.

[0019] A moving part 1017 is for moving the sealing part 1004 between a first position X1 and a second position X2. The moving part 1017 includes guide rails attached to the right plate 1008 and the left plate 1009, and a moving body 1018 that moves along the guide rails. The moving body 1018 is connected to the sealing part 1004 and the operation part 1005 to be described later, and when the moving body 1018 moves along the guide rail 1017, the sealing part 1004 and the operation part 1019 can integrally move between the first position and the second position.

[0020] The operation part 1005 includes a gear 1019, a rack 1020, and a lever 1021. The rack 1020 has one end coupled to the board 1016 of the heater 1013, and is configured to be slidable in the up-down direction. The gear 1019 is disposed so as to mesh with the teeth of the rack 1020, and the rack 1020 can move in the Z-axis direction (up-down direction) according to the rotation of the gear 1019. The lever 1021 is connected to the gear 1019 via a shaft member 1021, and when a user operates the lever 1021, the gear 1019 rotates, and the rack 1020 and the heater 1013 connected to the rack 1020 move in the Z direction according to the rotation of the gear 1019.

[0021] A lock receiving part 1023 is attached to an upper end part of the left plate 1009 in the housing 1002. A lock part 1024 is formed on the operation part 1005. The lock part 1024 and the lock receiving part 1023 have a positional relationship in which the lock part 1024 enters the lock receiving part 1023. In addition, the lock part 1024 is provided at a position that varies in accordance with the rotation of the gear 1019 accompanying the turning operation of the lever 1021. That is, the lock

part 1024 is provided at a position radially outside the rotating shaft when the gear 1019 rotates, and is configured to move in the up-down direction while drawing an arc with the rotating operation when the gear 1019 rotates. Specifically, the lock part 1024 is provided at a position that is shifted in the upward direction when the lever 1021 is turned in the lowering direction (that is, the operation of lowering the heater 1013), and is shifted in the downward direction when the lever 1021 is rotated in the upward direction (that is, the operation of raising the heater 1013). The lock receiving part 1023 has a ceiling surface 1025 as a locking surface, and is configured to be able to restrict the turning operation in the lowering direction of the lever 1021 when the lock part 1024 abuts on the ceiling surface 1025. An unlock part 1026 is provided on the front end side of the lock receiving part 1023. The unlock part 1026 has no part that abuts on the lock part 1024, and is configured to release the turning operation of the lever 1021 in the lowering direction, that is, the restriction of the movement of the heater 1013 falling in the downward direction.

[0022] Next, a configuration of the holding jig 1 constituting the holding part 1003 and various modifications thereof will be described.

[0023] A holding jig 10 includes a holding body 11. The holding jig 10 is formed in a rectangular shape in plan view, but this is an example, and it is not prohibited that the holding jig has another shape. The outer circumferential shape of the holding jig 10 may be any of a circular shape, a tongue shape, an elliptical shape, a polygonal shape, and the like in addition to the rectangular shape in plan view. For example, the outer circumferential shape of the holding jig 10 is formed in a tongue shape in plan view. In the present embodiment, for convenience of description, it is described that a gap is generated between a receiving member 13 and a displacement element 14 to be described later. However, a case where a state in which the gap is generated with a displacement of the displacement element 14 is formed, and a case where a state in which the receiving member 13 and the displacement element 14 are in contact with each other is formed (a case where there is no gap) may occur.

(Holding target)

[0024] The holding jig 10 can be used for holding a holding target. Therefore, the holding jig 10 is a concept including a structure that can be used as a so-called container holding jig or a container supporting jig. The holding target is an object to be held by the holding jig 10, and examples of the holding target include a container, a laminate in which a container and a lid are stacked, an integrated product of a container and a lid, and the like. The holding target includes an object held by the upper end edge part of the through hole of the holding jig and an object held by the circumferential surface part of the through hole of the holding jig.

(Base plate)

[0025] In the holding jig 10, the holding body 11 is provided on a base plate 12. In this example, in the holding body 11, a plurality of displacement elements 14 and a receiving member 13 to be described later are disposed on the upper surface (plate upper surface) of the base plate 12. However, this is not limited to the case where the holding jig 10 includes the base plate 12. The base plate 12 may be omitted as long as the holding body 11 is not disassembled, that is, a combination of a plurality of displacement elements 14 described later is not individually disassembled, and the displacement elements 14 can be prevented from being detached from the holding body 11. The material of the base plate 12 is not particularly limited, but is not particularly limited, such as metal, plastic, wood, glass, and ceramic, but the base plate 12 is preferably made of metal from the viewpoint of excellent strength. In the base plate 12, an auxiliary hole 17 is formed at a position corresponding to a through hole 16 described later. The auxiliary hole 17 is formed in a shape that is substantially inscribed in the shape of a circumferential surface part 16A of the through hole 16 in plan view of the holding jig 10 in a state where the size of the through hole 16 is enlarged. As the size of the through hole 16 fluctuates so that the size of the through hole 16 decreases, an edge part 17A of the auxiliary hole 17 is located outside the through hole 16 in plan view of the holding jig 10.

(Holding body)

[0026] The holding body 11 has a through hole 16, and has a plurality of displacement elements 14 forming at least a part of the through hole 16. The through hole 16 is formed by the plurality of displacement elements 14. In addition, the holding body 11 includes a receiving member 13 outside the displacement element 14 in a case where a direction toward the through hole 16 is an inner side. More specifically, the holding body 11 includes an annular structure 15 including the plurality of displacement elements 14, and further includes the receiving member 13 outside the annular structure 15. In the holding jig 10, the displacement element 14 may be disposed in a non-annular shape. Further, for example, it is an example of the holding jig 10, and the through hole 16 may be configured by a combination of the displacement element 14 and a non-displacement member that is not displaced. In this example, the displacement elements 14 are arranged in a non-annular shape.

(Through hole)

[0027] The through hole 16 of the holding body 11 is formed such that the size can be changed according to the displacement of the displacement element 14 as described later. The through hole 16 has a diameter enough to have a function of communicating with a

holding target M. The through hole 16 has a circumferential surface part 16A and an upper end edge part 16B. In a case where the holding target M is a container 200 having a main body part 210 with the upper side opened and a bottom part 220 in the description of the sealing machine, forming a space 230 surrounded by the main body part 210 and the bottom part 220 therein, and having a flange part 240 extending outward toward the upper end (upper edge part 250) of the main body part 210, the circumferential surface part 16A faces an outer circumferential surface 210A of the main body part 210 (outer circumferential surface of the container 200), and the upper end edge part 16B faces the flange part 240. The flange part 240 may have a flat shape or a curled shape. In the following description, in a case where the description is made using a container, the description will be continued using a case where the holding target is the container 200 as described above, the shape of the main body part 210 is decreasingly tapered from the upper end toward the lower end, and the main body of the container 200 is opened on the upper surface side. The upper end edge part 16B indicates a part that forms an upper end edge of the through hole 16 in a case where it is assumed that the container 200 communicates with the holding jig 10 in a substantially up-down direction. In a case where the container 200 is inserted into the holding jig 10, the container 200 is preferably inserted so as to penetrate the through hole 16 from the upper end edge part 18B side.

[0028] The size of the through hole 16 is changed within a predetermined range according to the displacement of the displacement element 14. In a case where the size of the through hole 16 is in the enlarged state, the size is determined in advance. The enlarged state is a state in which the size of the through hole 16 is increased as a state determined according to conditions such as the size of the holding target M and the arrangement of the displacement elements 14. The size of the through hole 16 is obtained in a case where the displacement element 14 is displaced to a position in contact with a restriction wall part 21. In addition, a case where the size of the through hole 16 is reduced is also determined in advance. The reduced state is a state in which the size of the through hole 16 is reduced as a state determined according to conditions such as the size of the holding target M and the arrangement of the displacement elements 14. For example, in an example referred to in a first modification to be described later, the size of the through hole 16 is obtained in a case where the displacement element 14 is displaced until an elastic member 22 to be described later has a natural length. In addition, for example, in a case where the holding target M is the container 200 having a shape decreasingly tapered downward, regarding the relationship between the holding target M and the reduced state, a size slightly larger than the size of the lower end of the container 200 may be determined as the size of the through hole 16 corresponding to the reduced state of the through hole 16. Regarding the relationship between the size of the holding target M and the enlarged state, a

size slightly larger than the size of the upper end (excluding the flange part 240) of the container 200 may be determined as the size of the through hole 16 corresponding to the enlarged state of the through hole 16. Note that, in a case where the size of the through hole 16 is changed, the size of the through hole 16 may be changed so as to have shapes similar to each other before and after the change, or the size of the through hole 16 may be changed so as not to be similar to each other. The case where the size of the through hole 16 is reduced includes a case where the size of the through hole 16 is substantially zero.

(Specification of size of through hole)

[0029] The size of the through hole 16 is determined such that, assuming a state in which a center CT of the through hole 16 is aligned with the displacement element 14, one through hole 16 is arranged on the front side, and the other through hole 16 is arranged on the rear side, in a case where the other through hole 16 is exposed, the other through hole 16 is smaller than the one through hole 16, and in a case where the one through hole and the other through hole 16 match, the one through hole 16 and the other through hole 16 have the same size, and in a case where the other through hole 16 is not exposed and the other through hole 16 is not the same, the other through hole 16 is larger than the one through hole 16. The sizes of the through hole 16 and the auxiliary holes 17 and 18 are determined by the diameter of the largest inscribed circle of the through hole 16 and the diameters of the auxiliary holes 17 and 18.

(Displacement element)

[0030] In the holding jig 10, the plurality of displacement elements 14 are annularly arranged. Here, "annularly arranged" indicates a state in which a predetermined position is set as a reference position (the center CT of the through hole 16), and the predetermined position is arranged so as to surround the periphery of the reference position. The case of being annularly arranged includes a case where a plurality of adjacent displacement elements 14 overlap each other when a direction away from the reference position (a direction extending outward from the reference position along a plane whose normal is the thickness direction of the holding jig 10) is a line-of-sight direction. The displacement element 14 indicates an object (element piece that can be displaced) that moves such as moving or rotating a position by receiving an action of a pressing force, electricity, magnetism, or the like from the outside. Examples of the displacement element 14 include a movable element, a rotor, and the like. The movable element is a tangible object that moves in position. The rotor is a tangible object that moves rotationally. It is sufficient that there is a case where the displacement element 14 is arranged such that at least a part thereof can be recognized from the

through hole 16, and it is not prohibited that a part that is not exposed to the through hole 16 when the size of the through hole 16 is a predetermined size exists in a part (some) of the plurality of displacement elements 14.

(Layout of displacement element)

[0031] Regarding the layout of the displacement elements 14, in a case where a direction away from the reference position is a line-of-sight direction, a plurality of adjacent displacement elements 14 overlap each other, and the adjacent displacement elements 14 are in contact with each other. The displacement elements 14 arranged in an annular shape form an annular structure 15 as a whole. A penetrating part (a part penetrating in the direction along the Z-axis direction) is formed inside the annular structure 15, and this penetrating part is a through hole 16. Therefore, the plurality of displacement elements 14 form the through hole 16. However, this is not limited to the case where the through hole 16 is formed by a penetrating part formed by arranging the displacement element 14 in an annular shape. For example, a case where the through hole 16 is formed by the displacement element 14 and the wall part 53 is not excluded. As indicated by a broken line, the size of the exposed region ER varies as the displacement element 14 slides in the direction of arrow SL, and the size of the through hole 16 varies according to the variation in the size of the exposed region ER.

[0032] Further, the plurality of displacement elements 14 are annularly arranged such that the shape of the through hole 16 is substantially a regular polygon in plan view of the holding body 11 (in plan view of the holding jig 10), but the arrangement (layout) of the plurality of displacement elements 14 is not limited to this example. For example, the plurality of displacement elements 14 may be arranged such that the shape of the through hole 16 is a shape close to a rectangle, or the plurality of displacement elements 14 may be arranged such that the shape of the through hole 16 is a polygon other than a regular polygon. Four displacement elements 14 are arranged, and the through hole 16 is formed in a rectangular shape. Further, in this example, the displacement element 14 is formed in a substantially right triangle shape in plan view of the holding jig 10, and a length LB of one side on the end surface side facing the through hole 16 is longer than a length LA of one side extending substantially at a right angle to the one side. As the displacement element 14 slides in the direction of arrow SL, the size of the exposed region ER fluctuates as indicated by a broken line, and the size of the through hole 16 fluctuates according to the fluctuation of the size of the exposed region ER. In addition, as will be described later, in a case where the side surface of the displacement element 14 has a curved shape, the plurality of displacement elements 14 may be arranged such that the through hole 16 is circular among the plurality of displacement elements 14.

(Exposed region of displacement element)

[0033] In the surface of the displacement element 14 (for example, a first side surface 14A1 of a side surface 14A), a region forming the circumferential surface part 16A of the through hole 16 is an exposed region ER exposed toward the through hole 16. The size of the exposed region ER is determined according to the size of the through hole 16. In at least some of the displacement elements 14, the exposed region ER of the displacement element 14 exposed to the circumferential surface part 16A of the through hole 16 fluctuates as the displacement element 14 is displaced in a displacement direction T. As the size of the through hole 16 decreases, the exposed region ER of the displacement element 14 forming the through hole 16 decreases. In addition, as the exposed region ER of the displacement element 14 decreases, a region (covered region CR) that comes into contact with the adjacent displacement element 14 and is covered by the adjacent displacement element 14 in the surface of the displacement element 14 increases. As the size of the through hole 16 increases, the exposed region ER of the displacement element 14 increases. In addition, as the exposed region ER of the displacement element 14 increases, the region (covered region CR) covered by the adjacent displacement element 14 in the surface of the displacement element 14 decreases. As described above, in the holding jig 10, as each of the displacement elements 14 is displaced in the displacement direction T, the exposed region ER of each of the displacement elements 14 exposed to the circumferential surface part 16A of the through hole 16 fluctuates. Note that this is an example, and if the size of the through hole 16 can be changed, it is not prohibited that the size of the exposed region ER does not fluctuate for some of the displacement elements 14.

(Shape of displacement element)

[0034] The shape of each of the displacement elements 14 has a triangular shape in plan view, and is formed in a triangular plate shape having a predetermined thickness. The plurality of displacement elements 14 are formed substantially uniformly. However, this does not limit the shape of the displacement elements 14, and does not prohibit at least some of the plurality of displacement elements 14 from having different shapes from other displacement elements 14. For example, as the shapes of the plurality of displacement elements 14 forming the through hole 16, there may be a triangular shape, a trapezoidal shape, or a shape having a curved part.

(Size of displacement element)

[0035] The plurality of displacement elements 14 are formed to be substantially uniform in size. However, this does not prohibit the case where the sizes of at least

some of the displacement elements 14 among the plurality of displacement elements 14 are different from each other.

(Material of displacement element)

[0036] The material of the displacement element 14 is not particularly limited, and is not particularly limited, such as metal, plastic, wood, glass, and ceramic. From the viewpoint of excellent rubbing and excellent ease of molding, the material of the displacement element 14 is preferably plastic. In a case where the displacement element 14 is made of plastic, the displacement element 14 preferably has a cushioning property, and from this viewpoint, the displacement element 14 is preferably made of a porous polymer material. Examples of the porous polymer material include a foamable polymer material and the like. The plastic may have elasticity or poor elasticity. In a case where the displacement element 14 is easily elastically deformed, the size of the through hole 16 can be smoothly changed even if the side surface of the displacement element 14 is formed in a curved shape, or even if the plurality of displacement elements 14 are arranged such that the through hole 16 is circular in the plurality of displacement elements 14. In addition, it is preferable that the material of the displacement element 14 is metal (including an alloy) from the viewpoint of being excellent in the strength of the displacement element 14 and the small wear due to friction at the time of rubbing. In a case where the material of the displacement element 14 is metal, specific examples of the material of the displacement element 14 can include iron, copper, aluminum, stainless steel, and the like. From the viewpoint of suppressing generation of rust, the material of the displacement element 14 is preferably an aluminum alloy or stainless steel.

(Displacement direction of displacement element)

[0037] Each of the displacement elements 14 slides on the upper surface (plate upper surface) of the base plate 12. Therefore, the displacement element 14 is displaced in the surface direction (XY plane direction) of the base plate 12. At this time, in plan view of the holding body 11, the displacement direction T of the displacement element 14 is predetermined for each of the displacement elements 14. The displacement direction T of the displacement element 14 is determined according to the shape and arrangement of the displacement element 14. The displacement direction T of each of the displacement elements 14 is determined according to the direction of a bottom side 140 of the displacement element 14. In this example, with a direction along an extending direction of the triangular bottom side 140 forming the displacement element 14 as a displacement direction T, the displacement element 14 is linearly displaced along the displacement direction T. At this time, since such a direction is set as the displacement direction T, the adjacent displacement

elements 14 can be interlocked as described later. The displacement element 14 is linearly displaced along the displacement direction T, but the displacement direction T is not limited to the case of being linear. For example, the displacement element 14 may be configured to be displaced in an arc shape or the like. In a case where the displacement element 14 has a triangular shape in plan view, the bottom side 140 is defined as the shortest side among the three sides, but this is a definition for convenience of description and is not limited thereto. In the case of arcuate displacement, it is preferable to use an elastically deformable material such as rubber for the displacement element 14.

(Interlocking of adjacent displacement elements)

[0038] The adjacent displacement elements 14 are interlocked as described above. Interlocking means that the displacement element 14 adjacent thereto is also displaced with the displacement of one displacement element 14. The interlocking structure is not particularly limited, but is realized by an arrangement structure of adjacent displacement elements 14. Adjacent displacement elements 14 are in contact with each other on the side surfaces 14A (first side surface 14A1). Then, one displacement element 14 of the adjacent displacement elements 14 applies a pressing force to the other displacement element 14. The other displacement element 14 is displaced by the action of the pressing force.

[0039] In a case where one displacement element 14 of the adjacent displacement elements 14 moves along a guide part 20 (described later) corresponding to the one displacement element 14, a pressing force is applied to the other displacement element 14, and the other displacement element 14 moves along the guide part 20 corresponding to the other displacement element 14 based on the pressing force. When one displacement element 14 moves along the displacement direction T, a pressing force can be applied to the other displacement element 14 so as to press the other displacement element 14 in an oblique direction with respect to the extending direction of the guide part 20 of the other displacement element. Therefore, the other displacement element 14 is displaced along the guide part 20 by the pressing force received from the one displacement element 14. Note that the case of displacement along the guide part 20 is not limited to the case where the guide part 20 and the displacement element 14 move while being in contact with each other, and may include a case where the guide part 20 and the displacement element 14 move while being in partial contact with each other within a range in which the function of the guide part 20 is not lost, and a case where the guide part 20 and the displacement element 14 temporarily separate from each other.

(Sliding of adjacent displacement elements)

[0040] The adjacent displacement elements 14 slide on each other. At this time, they slide with each other along the displacement direction T determined with respect to each of the displacement elements 14. The adjacent displacement elements 14 are in contact with each other on the side surface 14A (first side surface 14A1), and the adjacent displacement elements 14 are displaced along the predetermined displacement direction T such that the side surfaces 14A rub against each other. Note that the concept that two objects slide includes a case where the two objects slide smoothly and a case where the two objects move while rubbing. In a case where the adjacent displacement elements 14 slide, it is preferable that frictional force acts between the adjacent displacement elements 14. In this case, the frictional force in the direction different from the sliding direction of the adjacent displacement elements 14 is preferably larger than the frictional force in the sliding direction of the adjacent displacement elements 14. Further, the case where the adjacent displacement elements 14 slide includes not only the case where the adjacent displacement elements 14 slide in a state of being always in contact with each other, but also the case where there is a moment at which the adjacent displacement elements 14 separate.

[0041] Further, all the adjacent displacement elements 14 are arranged on the base plate 12, and the adjacent displacement elements 14 are prevented from overlapping each other in the up-down direction. Accordingly, by equalizing the thicknesses of the adjacent displacement elements 14, it is possible to avoid formation of irregularities along the circumferential direction of the through hole 16 in the upper end edge part 16B of the through hole 16. In the upper end edge part 16B of the through hole 16, the positions of the upper surfaces 14B of the adjacent displacement elements 14 are aligned. With such a configuration, in a case where the holding jig 10 is used in the later-described sealing machine, the contact part in the up-down direction between the upper end edge part 16B of the through hole 16 and the flange part 240 of the container 200 in the holding jig 10 is made substantially uniform, and the container 200 can be pressed against the later-described pressing body 310 at substantially the same timing.

(Receiving member)

[0042] The holding body 11 is provided with a receiving member 13 outside the annular structure 15. The receiving member 13 can function as a structure having a restricting structure 19 described later. The receiving member 13 is formed in an annular shape, and an outer circumferential surface 13A of the receiving member 13 is formed in a shape corresponding to an outer circumferential surface 11A of the holding body 11. An inner circumferential surface 13B of the receiving member

13 is formed in a shape corresponding to an outer circumferential surface 15A of the annular structure 15. The receiving member 13 is fixed on the base plate 12, and the annular structure 15 is formed so as to face the inner circumferential surface 13B of the receiving member 13, whereby the annular structure 15 can be suppressed from being displaced with respect to the base plate 12, and thus, the displacement element 14 can be suppressed from being displaced with respect to the base plate 12.

(Material of receiving member)

[0043] The material of the receiving member 13 is not particularly limited, but is preferably the same material as the displacement element 14 from the viewpoint of ease of manufacturing.

[0044] Although the receiving member 13 is formed of one member, the receiving member 13 may be formed of a combination structure in which divided bodies divided into a plurality of parts are combined (not illustrated).

(Restricting structure)

[0045] The holding body 11 includes a restricting structure 19. The restricting structure 19 is a structure (displacement direction restricting structure) that restricts the displacement direction T. The restricting structure 19 restricts the displacement direction T of at least some of the displacement elements 14. The restricting structure 19 includes a guide part 20. The guide part 20 is formed on the receiving member 13. The guide part 20 illustrated in this example restricts the displacement direction T such that the displacement element 14 is linearly displaced from a first position to a second position.

(First position and second position)

[0046] The first position is a position (for example, the position of the displacement element 14) of the displacement element 14 determined in a case where the size of the through hole 16 is in a predetermined enlarged state. The second position is a position (for example, the position of the displacement element 14) of the displacement element 14 determined in a case where the size of the through hole 16 is in a predetermined reduced state. Note that the case where the restricting structure 19 includes the guide part 20 is an example of the restricting structure 19, and the restricting structure 19 is not limited thereto. In the description of the first embodiment, for convenience of description, a case where the restricting structure 19 has a structure including the guide part 20 will be described as an example.

(Guide part)

[0047] The guide part 20 may be provided for at least some of the displacement elements 14, and is provided

for each of the displacement elements 14. The guide part 20 restricts the movement of the displacement element 14 so as to limit the displacement direction of the displacement element 14. The guide part 20 is provided corresponding to each of the displacement elements 14 and guides the displacement element 14 in a predetermined direction. The guide part 20 is formed by a guide wall part 23 facing one side surface (a second side surface 14A2 formed at the position of the bottom side 140) of the displacement element 14 in the receiving member 13. The guide part 20 guides the movement of the displacement element 14 such that the displacement direction T of the displacement element 14 is a direction along the wall surface of the guide wall part 23 of the guide part 20 corresponding to the displacement element 14. The wall surface direction of the guide wall part 23 forming the guide part 20 is aligned with the extending direction of the bottom side of the triangle (the surface direction of the second side surface 14A2) forming the shape of the displacement element 14. In this example, since the directions of the bottom sides of the adjacent displacement elements 14 (the surface directions of the second side surfaces 14A2) are different, the wall surface directions of the guide wall parts 23 corresponding to the respective displacement elements 14 are also different from each other. It is preferable that the length of the guide part 20 is substantially aligned with a displacement range (movement range of the displacement element 14 when the position of the displacement element 14 is moved from the first position to the second position) of the displacement element 14 or larger than the displacement range. Note that the configuration of the guide part 20 is not limited as long as the displacement direction T of the displacement element 14 can be restricted.

(Restriction wall part)

[0048] The holding body 11 preferably includes the restriction wall part 21 that restricts the displacement distance of at least one displacement element 14. The restriction wall part 21 has a wall surface 21A that comes into contact with the displacement element 14 in a case where the displacement element 14 is displaced to a predetermined position. For example, in the restriction wall part 21, in a case where the displacement element 14 moves to the first position in the displacement direction T, the first side surface 14A1 of the displacement element 14 comes into contact with the wall surface 21A of the restriction wall part 21, and is restricted from further moving in the displacement direction T from the first position in a direction opposite to the direction toward the second position. Therefore, the restriction wall part 21 restricts the displacement distance of the displacement element 14.

[0049] The restriction wall part 21 is formed on the receiving member 13, and shares an end edge of the restriction wall part 21 with an end edge of the guide part 20. An angle formed by the wall surface 21A of the

restriction wall part 21 and the wall surface of the guide wall part 23 of the guide part 20 is an acute angle. In this example, in plan view of the holding member, the receiving member 13 forms a substantially V-shaped wall part 24 that forms the restriction wall part 21 and the guide wall part 23 for each of the displacement elements 14. The V-shaped wall parts 24 are formed so as to be annularly arranged corresponding to the arrangement of the displacement elements 14. A curved wall surface part 25 curved in a C shape in plan view of the receiving member 13 is formed at a position of an end edge of the restriction wall part 21 and an end edge of the guide part 20. The curved wall surface part 25 can prevent the corner (vertex 141) of the displacement element 14 from coming into contact with the positions of the end edge of the restriction wall part 21 and the end edge of the guide part 20.

[1-2 Operation and Effect]

[0050] According to the first embodiment, the exposed region ER of the displacement element 14 forming the circumferential surface part 16A of the through hole 16 changes with the displacement of the displacement element 14, and the size of the through hole 16 can be changed. Even for a plurality of types of containers 200 having different sizes as the holding target M, the container 200 and the upper end edge part 16B of the through hole 16 can be brought into contact with each other by the same holding jig 10, and the container 200 can be supported by the upper end edge part 16B of the through hole 16.

[0051] Further, according to the holding jig 10 of the first embodiment, since the size of the through hole 16 can be changed with the displacement of the displacement element 14, it is possible to cope with a case where the size itself of the main body part 210 of the container 200 is changed.

[0052] For example, in a case where the holding target M is the container 200, the container 200 has the main body part 210 with the upper side opened and the bottom part 220, the space 230 is formed inside, and the flange part 240 extending outward toward the upper end side of the main body part 210, when the holding jig 10 holds the holding target M in the through hole 16, the circumferential surface part 16A faces the outer circumferential surface 210A of the main body part 210 (the outer circumferential surface of the container 200), and the upper end edge part 16B faces the flange part 240. Regarding the cross section of the main body part 210, in a case where the shape of the outer circumferential surface 210A of the main body part 210 is a tapered shape decreasingly tapered downward, the size of the lower side part (part close to the bottom part 220) of the main body part 210 is smaller than the size of the vicinity of the flange part 240. In a case where the container 200 is disposed inside the through hole 16 of the holding jig 10 and the holding jig 10 is moved upward, only the holding jig 10 is pulled upward as long as the size of the outer

circumferential surface 210A of the main body part 210 is smaller than the size of the through hole 16 when the through hole 16 of the holding jig 10 is in a reduced state. Eventually, when the size of the outer circumferential surface 210A of the main body part 210 matches the size of the through hole 16 in a case where the through hole 16 of the holding jig 10 is in a reduced state, the through hole 16 of the holding jig 10 and the outer circumferential surface 210A of the main body part 210 come into contact with each other. When the weight of the container 200 is equal to or more than a predetermined weight, the holding jig 10 slides upward with respect to the main body part 210 of the container 200 while being in contact with the main body part 210 of the container 200. At this time, the container 200 may or may not move in the upward direction together with the holding jig 10. The holding jig changes (enlarges) the size of the through hole 16 by the displacement of the displacement element 14 according to the size of the main body part 210 of the container 200 while rubbing in the upward direction in contact with the main body part 210 of the container 200. When the upper end edge part 16B of the through hole 16 of the holding jig 10 comes into contact with the flange part 240 of the container 200 while the holding jig 10 moves in the upward direction, the holding jig 10 holds the container 200 and moves in the upward direction together with the container 200. As described above, according to the holding jig 10, since the size of the through hole 16 can be changed, the upper end edge part 16B of the holding jig 10 can be brought into contact with the flange part 240 even in a case where the size itself of the main body part 210 of the container 200 is changed.

[0053] A positioning structure 35 is provided on the upper surface side (+Z direction side) of a protective plate 33 in the holding jig 10 of the sealing machine 1001 according to the present embodiment. The positioning structure 35 includes a plurality of rotating members 43. In the holding jig 10 illustrated in this example, a support shaft 42 is provided in accordance with the rotating member 43. In the holding jig 10 illustrated in this example, the support shaft 42 is disposed in a region above the protective plate 33. The support shaft 42 supports the rotating member 43. In this example, the support shaft 42 penetrates a hole part 48A of a bearing 48 of the rotating member 43 from a head part 47 constituted by the upper end side part of the support shaft 42 and reaches the protective plate 33. The support shaft 42 is fixed to the protective plate 33. A predetermined part on a distal end 42A side (-Z direction side) of the support shaft 42 advances to the protective plate 33, and a part of the support shaft 42 that advances to the protective plate 33 is fixed to the protective plate 33. At this time, a method of fixing the part of the support shaft 42 that has advanced to the protective plate 33 to the protective plate 33 is not particularly limited. For example, a screw structure (so-called semi-screw) may be formed in a part of the outer circumferential surface from the distal end (lower end) of the support shaft 42 to a predetermined position (a prede-

termined position toward the upper side), and at least a part of the part having the screw structure formed in the protective plate 33 may be screwed to fix the part of the support shaft 42, which has advanced to the protective plate 33, to the protective plate 33.

(Rotating member)

[0054] The rotating member 43 is rotatable about the support shaft 42. In addition, the rotating member 43 includes a bearing 48 having a hole part 48A penetrating vertically, an arm 44 connected to a predetermined position on the upper end side of the outer circumferential surface of the bearing 48 and extending in a direction away from the bearing 48, and a pin 45 hanging down from a distal end part 44A of the arm 44. The arrangement of the rotating member 43 is not particularly limited as long as the function of defining the position of the second holding target described above can be performed. Two sets (combination of a rotating member 43A and a rotating member 43B, and combination of a rotating member 43C and a rotating member 43D) of combinations of two rotating members are arranged so as to be adjacent to each other outside the through hole 16 (that is, four rotating members 43). The combination of one set of the rotating members 43 (the combination of the rotating member 43A and the rotating member 43B) and the combination of another set of the rotating members 43 (the combination of the rotating member 43C and the rotating member 43D) are disposed at opposite positions (the -X direction side and the +X direction side) with the center CT of the through hole 16 interposed therebetween at positions along the outer periphery of the through hole 16. The combination of the rotating members 43 and 43 is configured such that a rotation direction K4 of one rotating member 43 and the rotation direction K4 of the other rotating member 43 are opposite to each other. For example, in an example of the combination of the rotating member 43A and the rotating member 43B, when the rotating member 43A rotates in the +K4 direction, the rotating member 43B rotates in the -K4 direction. When the rotating member 43A rotates in the -K4 direction, the rotating member 43B rotates in the +K4 direction. As a result, the rotating member 43A and the rotating member 43B can rotate such that the pins 45 approach each other, and can rotate such that the pins 45 move away from each other. The same applies to the combination of the rotating member 43C and the rotating member 43D in that the rotating operation can be performed such that the rotation directions K4 are opposite to each other.

(Gear)

[0055] The structure for performing the rotating operation in which the rotation directions K4 are opposite to each other is not particularly limited. This is realized by a meshing structure of the gears 46 and 46. For example, in a case where a combination of the rotating members 43A

and 43B is taken as an example, the gear 46 is fixed to the lower end side of the bearing 48 of the rotating member 43A, and the gear 46 is also fixed to the lower end side of the bearing 48 of the rotating member 43B. The gears 46 and 46 disposed on the rotating members 43A and 43B are engaged with each other to rotate in opposite directions. The configuration of the gear 46 is similar for the combination of the rotating member 43C and the rotating member 43D.

[0056] Although the pin 45 is provided in the rotating member 43, the lower end (distal end 45A) of the pin 45 is preferably located below the upper surface of the protective plate 33 and slightly above the upper surface 14B of the displacement element 14.

[0057] In addition, the pin 45 extends obliquely downward toward the center CT from the connection part with the arm 44 toward the distal end 45A, but this is an example. For example, the pin 45 may extend vertically downward. The pin 45 may be partially or entirely bent or curved.

(Rotation range of arm)

[0058] The rotation range (the maximum value of the turning angle along the direction of arrow K3) of the arm 44 in the rotating member 43 is not particularly limited. For example, in plan view of the holding jig 10, the rotation range of the arm 44 may be determined within a range in which the distal end 45A of the pin 45 falls within the formation region of an auxiliary hole 18 of the protective plate 33. In addition, the rotation range of the arm 44 may be determined in a range in which the distal end 45A of the pin 45 goes out of the formation region of the auxiliary hole 18 of the protective plate 33. The position of the arm 44 in a case where the distal end part 44A of the arm 44 is located closest to the center CT is not particularly limited. Positioning is performed for each combination of the rotating members 43 and 43. For example, regarding the positioning of the arm 44 of the rotating member 43A and the arm 44 of the rotating member 43B, the arm 44 of the rotating member 43A and the arm 44 of the rotating member 43B are positioned so that the arm 44 of the rotating member 43A and the arm 44 of the rotating member 43B can rotate in the +K4 direction and the -K4 direction, respectively, according to the size of the second holding target when the second holding target is disposed above the first holding target. Even in a case where the first holding target is held by the upper end edge part 16B of the through hole 16, the arm 44 of the rotating member 43A and the arm 44 of the rotating member 43B can rotate in the +K4 direction and the -K4 direction, respectively, according to the size of the first holding target. The positioning of the arm 44 is similarly applied to the arm 44 of the rotating member 43C and the arm 44 of the rotating member 43D.

[0059] The rotating member 43 is preferably biased such that the distal end part 44A of the arm 44 rotates in a direction approaching the center CT of the through hole

16. In this case, in a case where the first holding target and the second holding target are held by the holding jig 10, even if the rotating member 43 rotates so that the distal end part 44A of the arm 44 moves away from the center CT of the through hole 16, the first holding target and the second holding target are removed from the holding jig 10, whereby the rotating member 43 can rotate in a direction in which the distal end part 44A of the arm 44 approaches the center CT of the through hole 16, and can return to a substantially original position.

(Escape part)

[0060] When the rotation range of the arm 44 is determined in a range in which the distal end 45A of the pin 45 goes out of the formation region of the auxiliary hole 18 of the protective plate 33, an escape part 49 is preferably formed. In this case, even if the distal end 45A of the pin 45 is positioned below the upper surface of the protective plate 33, it is possible to avoid a possibility that the distal end 45A of the pin 45 collides with the protective plate 33 as the rotating member 43 rotates. The escape part 49 is formed of an arc-shaped cut part in plan view of the holding jig 10, but this is an example, and the structure of the escape part 49 is not limited to such an example. The size of the escape part 49 may be appropriately determined according to conditions such as the size of the first holding target and the second holding target.

(Extending part)

[0061] The positioning structure 35 is preferably provided with a first extending part 50 and a second extending part 51 as extending parts extending from the rotating member 43 in a direction away from the support shaft 42. The first extending part 50 and the second extending part 51 are formed on an outer circumferential end of the gear 46, and are parts protruding outward from teeth of the gear 46. The first extending part 50 is formed at a position where the distal end part 44A of the arm 44 rotates in a direction away from the center CT of the through hole 16 when coming into contact with a protruding member 410 described later. The second extending part 51 is formed at a position in contact with a rotation restricting member 52 in a case where the distal end part 44A of the arm 44 rotates in a direction approaching the center CT of the through hole 16. Therefore, the rotation restricting member 52 is disposed at a position where the rotation restricting member can be brought into contact with the second extending part 51. In a case where the distal end part 44A of the arm 44 of the rotating member 43 rotates in a direction approaching the center CT of the through hole 16, the rotation of the rotating member 43 can be stopped at a position where the second extending part 51 and the rotation restricting member 52 are in contact with each other. The first extending part 50 and the second extending part 51 are provided on the rotating members 43B and 43D, and the rotating members 43A and 43C

interlock with the rotating operation of the rotating members 43B and 43D via the movement of the gear 46, so that the rotation ranges of the rotating members 43A and 43C are restricted according to the restriction of the rotation of the rotating members 43B and 43D.

[0062] Next, operations and effects of the sealing machine 1001 according to the present embodiment will be described. In this sealing machine, normally, the sealing part 1004 is located at the first position, and a container or the like is not disposed on the holding part 1003. When the user seals the lid in the container, the container is held by the holding jig 1 of the holding part 1003. At this time, the lower end part of the container is inserted from above the holding jig 1, and the lower end of the curled part formed at the upper end part of the container is brought into contact with the inner end part of the displacement element of the holding jig 1 to be held. Thereafter, the user picks up the lever 1021 of the operation part 1005 and moves the sealing part 1004 from the first position to the second position. At this time, since the operation part 1005 is provided with the lock part 1024 and the displacement of the lock part 1024 in the up-down direction is restricted by the lock receiving part 1023, when the lever 1021 is operated in the lowering direction before the sealing part 1004 is located at the second position, that is, at a position from the first position to the second position, the lock part 1024 hits the ceiling surface 1025 of the lock receiving part 1023, and further operation of the lever 1021 is restricted. Therefore, the operation of the lever 1021 also restricts the operation of the lowering heater 1013.

[0063] When the sealing part 1004 is located at the second position, the lock part 1024 reaches the position where the unlock part is formed. At the position where the unlock part 1026 is formed, displacement of the lock part 1024 in the up-down direction is not restricted even if the user performs an operation of turning the lever 1021 in the downward direction. Therefore, the user can perform an operation of turning the lever 1021 in the downward direction. When the lever 1021 is turned in this way, the gear 1019 connected to the lever via the shaft member 1022 rotates, and the rack 1020 meshed with the gear 1019 moves downward. Since the heater 1013 is attached to one end of the rack 1020, when the rack 1020 moves downward, the heater 1013 moves downward accordingly. That is, when the user performs the operation of turning the lever 1021 in the downward direction, the operation of lowering the heater 1013 can be performed accordingly.

[0064] With such a configuration, in the sealing machine 1001, the user can reliably operate the lever 1021 only when the heater 1013 is located at the second position, that is, the position where the container and the lid can be joined (immediately above the container and the lid in the present embodiment), and the lid and the edge part of the container can be reliably joined by the operation of the lever 1021. In addition, as described above, the operation of lowering the heater 1013 in a

place other than the second position is abandoned, and thus, it is possible to reliably eliminate a malfunction of erroneously lowering the heater 1013 in a place where the lid or the container is not present, and a defect of erroneously lowering the heater in the heating state at the time of cleaning, for example.

[0065] Further, according to the sealing machine of the present embodiment, since a positioning member in the holding jig 1 is provided, the lid can be accurately positioned with respect to the container. In addition, when the sealing part 1004 moves from the first position to the second position, the positioning member transitions from a state of positioning the lid to a state of releasing the positioning of the lid. At this time, since the state in which the lid is already positioned by the positioning member is maintained, even if the positioning state by the positioning member is released when the sealing part 1004 approaches, the lid remains at the already positioned position. Therefore, it is possible to join the lid and the container in a state where the positional accuracy of the lid with respect to the container is greatly improved. When the heater 1013 descends to join the lid and the container, the positioning member is located at a position not interfering with the heater 1013. Therefore, it is also possible to eliminate the occurrence of a failure in joining the lid and the container due to the presence of the positioning member.

[0066] Furthermore, in the sealing machine according to the present embodiment, since the holding part 1003 does not move and the sealing part 1004 moves from the first position to the second position, vibration and impact applied to the container can be greatly reduced. Therefore, it is possible to prevent the contents from scattering or leaking out of the container when the container receives an impact. As a result, it is possible to greatly reduce scattering of food, drink or the like as contents around the sealing machine, so that it is possible to maintain a sanitary state for a long period of time, and it is also possible to use the sealing machine in a comfortable state for the user.

[0067] When a predetermined time elapses after the heater starts pressing the lid and the container, the user is notified that the sealing of the container is completed by, for example, changing the color of a lamp, sending a voice message, or the like. Looking at the display (notification) or the like, the user operates the lever in a direction opposite to the H direction. When the lever is operated in this direction, the rack moves upward by the above-described transmission mechanism, and accordingly, the heater also is raised from the position in contact with the lid. After the lever is returned to the predetermined position, the sealing part is moved from the second position to the first position. The user takes out the container held by the holding jig and feeds the container to a meal.

[0068] In the sealing machine according to the present embodiment, the lid can be accurately positioned with respect to the container, and the occurrence of positional

displacement after sealing by the user can be significantly reduced. In addition, since the sealing machine according to the present invention seals the container using the sheet-like lid, it is possible to greatly reduce the loss of the member forming the lid as compared with the case of sealing the container while sequentially punching the long body wound in a roll shape. In addition, in the sealing machine according to the present invention, since it is not necessary to set the above-described long body in the sealing machine, the sealing machine can be downsized, and it is very advantageous even in a case where the sealing machine is installed in a limited space, for example, in a case where the sealing machine is installed in a store or the like.

[0069] Next, a sealing machine according to a second embodiment according to the present invention will be described. The sealing machine according to the present embodiment includes a base part 1027, a holding part 1003, a sealing part 1004, and an operation part 1005. Note that description and illustration of the storage part described in the previous embodiment are omitted in the present embodiment. In addition, since the configuration of the holding part 1003 according to the present embodiment is similar to that described above, the description thereof will be omitted here.

[0070] As illustrated in Figs. 6 to 9, the base part 1027 is a part serving as a base of the sealing machine 1001. In the base part, the bottom plate part, the right plate, the left plate, and the upper plate part are joined and integrated by welding or the like. In addition, the holding part 1003 is formed to be attached and fixed to the upper plate, and a penetrating part penetrating in the plate thickness direction of the upper plate part is formed at a part corresponding to a part where the through hole of the holding part 1003 is formed to be opened. In the upper plate, a right plate and a left plate are joined and integrated inside an end part of the upper plate in the left-right direction, and a guide rail 1017 constituting a moving part is provided at an end part of the upper plate on the right side of the right plate and an end part of the upper plate on the left side of the left plate. A sealing part and an operation part to be described later are configured to be movable along the guide rail.

[0071] The sealing machine 1001 according to the present embodiment is configured such that the sealing part 1004 is accommodated in an upper cover body 1027 and a lower cover body 1028, a handle 1029 is attached to the front surface of the upper cover body 1027, and a user can take the handle 1029 by hand and move the handle in the front-rear direction. Such movement is performed by the moving body 1018 engaged with the guide rail 1017 moving along the guide rail 1017. An operation panel 1030 constituting an operation part is provided on the front surface of the lower cover body 1028. The operation panel 1030 is for operating the sealing machine 1001, and is configured to perform various kinds of adjustment and operations such as turning on/off a power supply of the sealing machine 1001

and adjustment of a set temperature of the heater 1013. Note that the operation panel 1030 may be any conventionally known operation panel selected and adopted, and may be, for example, a button-type operation panel or a touch-panel-type operation panel. In addition, those other than these may be appropriately used.

[0072] The sealing part 1004 is accommodated and disposed inside the upper cover body 1027 and the lower cover body 1028 as described above. The sealing part 1004 according to the present embodiment includes a drive motor 1031 and a transmission mechanism 1032, and is configured such that a driving operation of the drive motor 1031 is transmitted to the transmission mechanism 1032, whereby the heater body 1015 of the heater 1013 performs a lowering operation and a raising operation. As a trigger for the drive motor 1031 to start driving, for example, a state in which the sealing part 1004 moves from the first position to the second position and is located at the second position for a predetermined time (for example, 0.5 seconds to 5 seconds) can be cited. Note that the above is an example, and setting may be performed such that another configuration serves as a trigger to start the operation.

[0073] According to the sealing machine according to the present embodiment, positioning is performed by the positioning member when the user sets the container on the holding part and places the lid on the container. When the user pulls the handle 1029 of the upper cover body 1027 frontward, the sealing part 1003 located at the first position moves to the second position. When the sealing part 1003 that has reached the second position is detected to be located at the position for a predetermined time by, for example, a sensor member, a limit switch, or the like, the drive motor 1031 starts driving. When the drive motor 1031 starts driving, the transmission mechanism 1032 starts operation accordingly, and the heater 1013 starts the lowering operation. Next, the heater body 1015 of the heater 1013 starts to press the lid and the container while applying heat. Whether the heater body 1015 reaches a position where the lid or the like can be pressed may be determined by any method such as detecting the position by, for example, a rotation amount of the drive motor or a limit switch. When it is detected that a predetermined time (for example, 2 seconds to 5 seconds) has elapsed since the start of pressing, the drive motor 1031 rotates in the reverse direction from the previous rotation to raise the heater body 1015. Then, when the user takes the handle 1029 by hand and pushes the container joined with the lid backward, the container joined with the lid can be taken out. Then, the user picks up the container joined with the lid and feeds the container to a meal.

[0074] As described above, in the sealing machine according to the present embodiment, the user only needs to perform the operation of gripping and pulling the handle and the operation of returning the handle to the original position, so that the lid can be joined to the container with a very simple operation. In addition, the

sealing machine according to the present embodiment can also obtain the same operation and effect as those described for the sealing machine according to the previous embodiment.

[0075] Next, a sealing machine of a third embodiment according to the present invention will be described with reference to Figs. 10 to 13. A sealing machine 1001 according to the present embodiment includes a housing 1002, a holding part 1003, a sealing part 1004, and an operation part 1005. The sealing machine 1001 may be provided with a storage part for storing a large amount of lid bodies on the upper surface of the housing 1002, but is omitted here. In the sealing machine 1001 according to the present embodiment, since the configuration of the holding jig 1 constituting the holding part 1003 and the configuration of the operation panel 1030 constituting the operation part 1005 are similar to those described above, the description thereof is omitted here. The housing 1002 has an accommodation space 1011 that houses various control components 1033 constituting the holding part 1003, the sealing part 1004, and the operation part 1005 in the sealing machine 1001. In addition, the housing 1002 according to the present embodiment is configured such that one end of the upper cover body 1027 is joined to the rear plate with a component such as a hinge on the rear surface, and can be opened to the rear side by the hinge. In addition, in the sealing machine 1001 according to the present embodiment, the sealing part 1004 is configured as one unitized module, and only the sealing part 1004 can be replaced. With such a configuration, it is only necessary to replace the unitized module of the sealing part 1004, for example, for maintenance, malfunction handling, and the like of the sealing machine, so that work efficiency can be greatly improved.

[0076] In addition, the sealing machine 1001 according to the present embodiment has an insertion part into which the lid is inserted. An insertion part 1034 has an insertion port 1035, and a driving roller and a driven roller are provided behind the insertion port 1035. The driving roller is connected to a rotating shaft of the motor, and is configured to be able to perform a rotating operation by rotation of the motor. Further, the driven roller is provided such that a circumferential surface thereof is in contact with a circumferential surface of the driving roller, and when the driving roller is rotating, the driven roller is configured to perform a rotating operation by receiving a rotational force of the driving roller. When the user inserts the lid, the insertion part 1034 detects that the lid is inserted by, for example, a sensor member or the like. According to the detection result by the sensor member, the motor starts the operation of rotating the rotating shaft, and accordingly, the driving roller and the driven roller also start the rotating operation. At this time, when the distal end of the lid inserted into the insertion port by the user reaches the part where the driving roller and the driven roller are in contact with each other, the lid is taken into the housing by the driving roller and the driven roller.

[0077] The configuration of the sealing part 1004 including the drive motor 1031 and the transmission mechanism 1032 that transmits the driving force of the drive motor 1031 to the heater body 1015 described above is similar to that described above, and thus the description thereof is omitted here. In addition, the sealing part 1004 is different from the above-described point in that a positioning member 1035 is provided. The positioning part member 1035 is provided so as to be positioned, for example, at four positions on the front, rear, left, and right of the heater body 1015 close to the heater body 1015. Further, these four positioning members 1035 are configured such that the positioning members 1035 positioned in the left-right direction are positioned at predetermined positions at a short distance from each other by a spring member or the like, for example. The distance therebetween is preferably a distance smaller than the diameter of the lid. With such a configuration, it is preferable that when the lid inserted from the insertion part 1034 is conveyed, the interval between the positioning members is expanded and contracted following the outer shape of the lid. Note that the positioning member 1035 can be formed using, for example, a metal material, but other than the metal material, for example, a resin material having heat resistance, a resin material having softness, or the like can also be used. In a case where a metal material is used as the material of the positioning part seat 1035, it is preferable to wind, for example, a member formed of a resin material around the positioning member 1035 located on the back side. With such a configuration, when the lid inserted from the insertion part 1034 comes into contact with the positioning member 1035 on the back side, it is possible to reduce a risk that the lid may bounce back due to the impact of the contact, and it is possible to prevent a decrease in positioning accuracy due to this.

[0078] Although not illustrated in the drawings, a sheet material having heat resistance may be disposed between the heater body 1015 and the lid, and the sheet material may be always interposed when the heater body 1015 is pressed against the lid. In this way, when the lid is heated and joined, it is possible to prevent dust that may be generated from the surface of the lid from adhering to the surface of the heater body 1015 facing the lid. In addition, depending on the lid, there is a possibility that the lid sticks to the surface of the heater body by the heat applied from the heater body 1015, but the possibility of sticking can be eliminated by interposing such a sheet material.

[0079] The holding part 1003 is provided with a support part 1036 that supports the bottom of the container. The support part 1036 is configured to move in the up-down direction in conjunction with the holding jig 1 when the holding jig 1 is housed in the housing 1002. That is, a slope part 1037 is provided on the inner surface of the right plate of the housing 1002, and a protrusion 1039 of the support part 1036 passes through a groove 1038 formed in the slope part 1037, so that the support part can

also move in the up-down direction along with the movement of the holding part 1003 in the front-rear direction. The support part 1036 is operated so as to be located at a high position close to the holding jig 1 when the holding jig 1 is located outside the housing 1002, to be sequentially lowered in height position as the holding jig 1 moves into the housing 1002, and to be located at the lowermost end when the holding jig is located inside the housing 1002.

[0080] In the sealing machine according to the present embodiment, when the container is inserted into the penetrating part of the holding part, the sensor member provided in the support part detects the container and starts the operation. This operation is an operation of first drawing the holding part into the housing. At that time, the support part is moved from a relative upper position to a relative lower position by the slope part, and the holding part is drawn into the housing 1002. Thereafter, when the user inserts the lid into the insertion port, the motor of the insertion port starts driving, and the lid is drawn into the housing by the rotation of the driving roller and the driven roller. The lid is disposed in a state of being positioned at a predetermined position on the container by the positioning member. The heater body 1015 descends to join the lid to the container by heat sealing. Thereafter, the heater body 1015 is raised, and the holding part is pushed out from the inside of the housing to the outside of the housing. At that time, the support part is raised from a lower position to an upper position along the slope part, contrary to the above. Accordingly, the container whose bottom part is supported by the support part is also raised, and the user can easily hold the container.

[0081] Fig. 14 illustrates a modification of the holding part 1003. The holding part 1003 is applicable to each of the sealing machines of the embodiments described above. The holding part 1002 is used when the diameter (size) of the container is constant. In this case, the user places the lid on the container to perform positioning. At that time, in the holding part 1003 according to this modification, since the positioning parts are provided at four locations around the opening part into which the container is inserted, it is possible to easily position the lid and to improve the positioning accuracy. Note that, the number, shape, and size of the positioning parts are arbitrary, and are not limited thereto.

[0082] Although the sealing machine according to the present invention has been described above, the above is merely an example of the sealing machine according to the present invention, and the present invention is not limited thereto. Therefore, the present invention can be appropriately changed without departing from the gist of the present invention.

Reference Signs List

[0083]

1001 sealing machine
1002 housing

1003 holding part
1004 sealing part
1005 operation part
1006 storage part
5 1007 bottom plate
1008 right plate
1009 left plate
1010 rear plate
1011 accommodation space
10 1012 holding base part
1013 heater
1014 cover member
1015 heater body
1016 board
15 1017 guide rail
1018 moving body
1019 gear
1020 rack
1021 lever
20 1022 shaft member
1023 lock receiving part
1024 lock part
1025 ceiling surface
1026 unlock part
25 1027 upper cover body
1028 lower cover body
1029 handle
1030 operation panel
1031 drive motor
30 1032 transmission mechanism
1033 control component
1034 insertion part
1035 positioning member

35 Claims

1. A sealing machine for sealing, with a lid, an opening part of a container having the opening part and an edge part forming an outer circumferential edge of the opening part, the sealing machine comprises:

a holding part including a holding body that holds the container in a state where the edge part of the container is exposed; and a joining force applying part including a joining body for joining the lid to an edge part formed on a periphery of the opening part, wherein the holding part is formed so that a lid formed in advance into a sheet can be disposed so as to face the opening part of the holding body, and the joining part joins the lid formed in advance into a sheet to the container.

2. The sealing machine according to claim 1, comprising:

a moving part that displaces at least one of the joining part and the holding part such that a state

- in approaching where the joining body and the holding body are in contact with each other via the container held by the holding part and the lid located on the container and a state in separating where the joining body and the holding body are separated from each other than the state in approaching can be formed, wherein the joining part joins the lid to the container in response to the moving part forming the state in approaching as a trigger.
3. The sealing machine according to claim 1, further comprising: a positioning part that includes a guide body that guides a position of the lid to a predetermined space.
 4. The sealing machine according to claim 3, wherein
 - a plurality of the guide bodies hang down from a predetermined position of the joining part toward the holding body, and
 - an arrangement of the plurality of guide bodies is determined such that the lid is gripped by the plurality of the guide bodies to be located in the space.
 5. The sealing machine according to claim 1, wherein the joining body is provided with an energy application part that applies energy to a contact part between the lid and the container.
 6. The sealing machine according to claim 5, wherein the energy application part applies at least one type of energy selected from a group consisting of electric energy, vibration energy, and thermal energy.
 7. The sealing machine according to claim 1, comprising:
 - an insertion part into which the lid is insertable; and
 - a transport part that transports the lid inserted from the insertion part toward the space.
 8. The sealing machine according to claim 2, wherein
 - the holding part includes an insertion part that has a through hole penetrating between a front surface and a rear surface and is formed in the through hole such that the container is insertable, and a support part that is located below the insertion part, is in contact with a bottom part of the container, and supports the bottom part, and a position in an inner height direction of a contact part between the support part and the bottom part varies with a transition between the state in
- approaching and separating.
9. The sealing machine according to claim 3, wherein in the holding part, an insertion part into which the container is insertable is formed to penetrate between a front surface and a rear surface of the holding part, and the positioning part is formed around the insertion part.
 10. The sealing machine according to claim 3, wherein the positioning part is formed of a material having softness.
 11. The sealing machine according to claim 3, wherein the positioning part is formed of a material having heat resistance.
 12. The sealing machine according to claim 1, comprising:
 - a storage part that accommodates a lid assembly in which the lids are stacked;
 - a disperser that individually disperses the lid from the storage part; and
 - a transfer part that transfers the lid dispersed by the disperser toward the holding part, wherein the lid is disposed on the container from the storage part via the transfer part in response to the container disposed in the holding part as a trigger.
 13. The sealing machine according to claim 12, wherein
 - a plurality of the storage parts are provided, a dimension of a lid accommodated in at least one of the storage parts is different from a dimension of a lid accommodated in another one of the storage parts, and
 - the storage part storing a lid disposed on the container is selected from the transfer part according to a size of the container disposed in the holding part, and the lid is disposed on the container from the selected storage part via the transfer part.
 14. The sealing machine according to claim 12, wherein
 - the transfer part includes an atmosphere part that temporarily retains the lid sent from the storage part, and
 - in response to the container disposed in the holding part as a trigger, the lid disposed in the atmosphere part is disposed on the container, and the lid is fed from the storage part to the atmosphere part of the transfer part.

15. The sealing machine according to claim 12,
wherein

the storage part has an opening at a lower end,
and
the disperser is configured to take out the lid
from the opening at the lower end of the storage
part.

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Fig.1

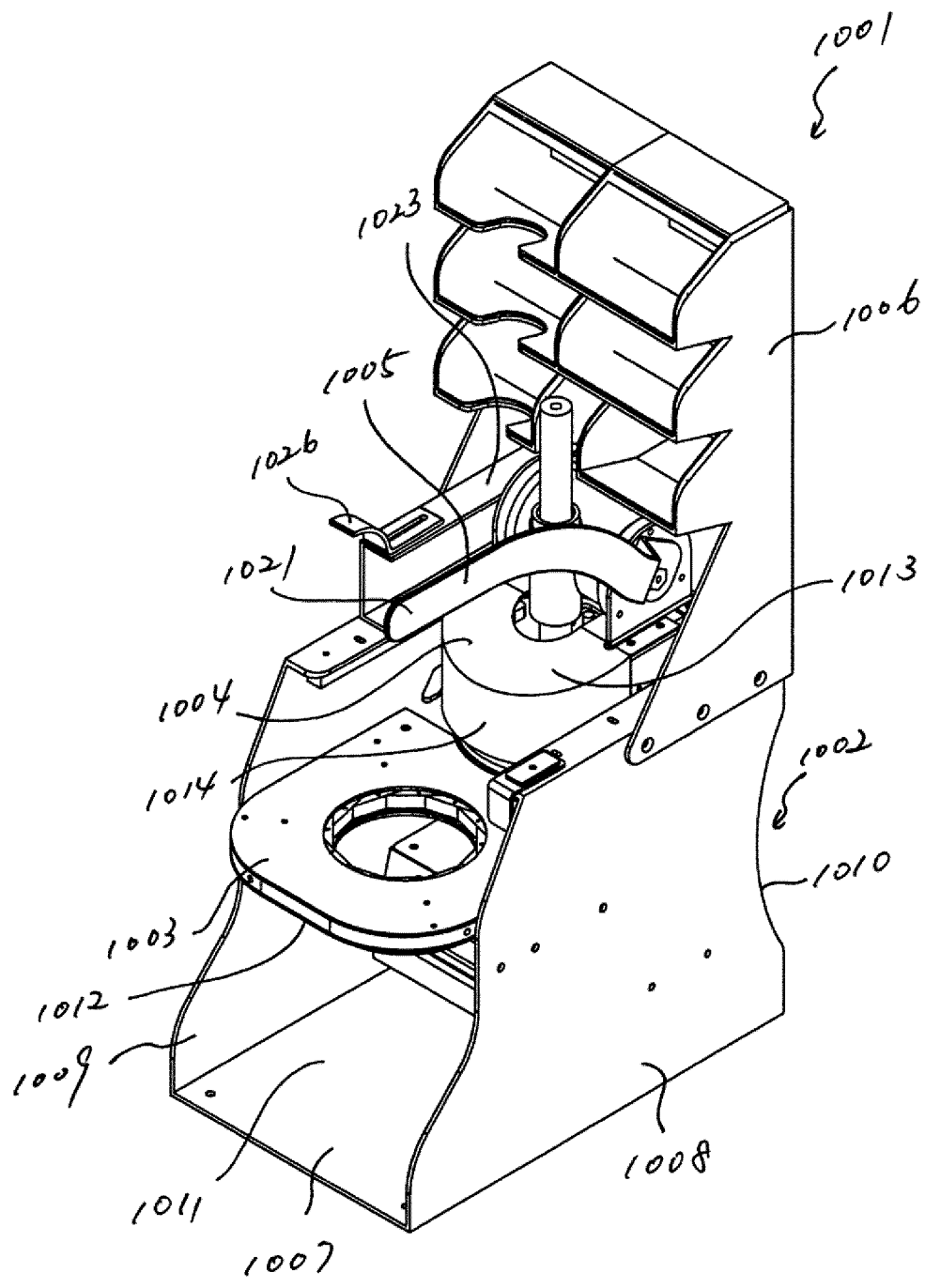


Fig.2

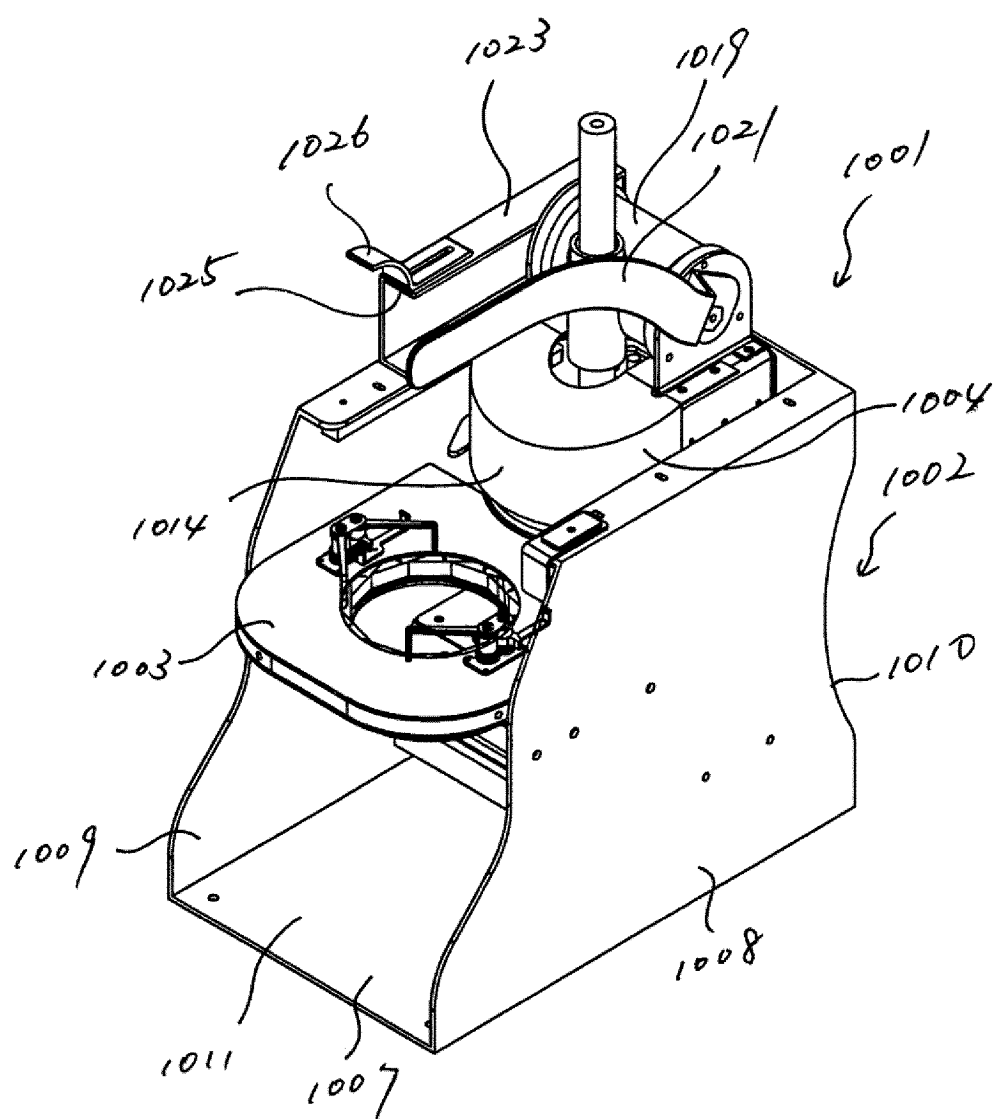


Fig.3

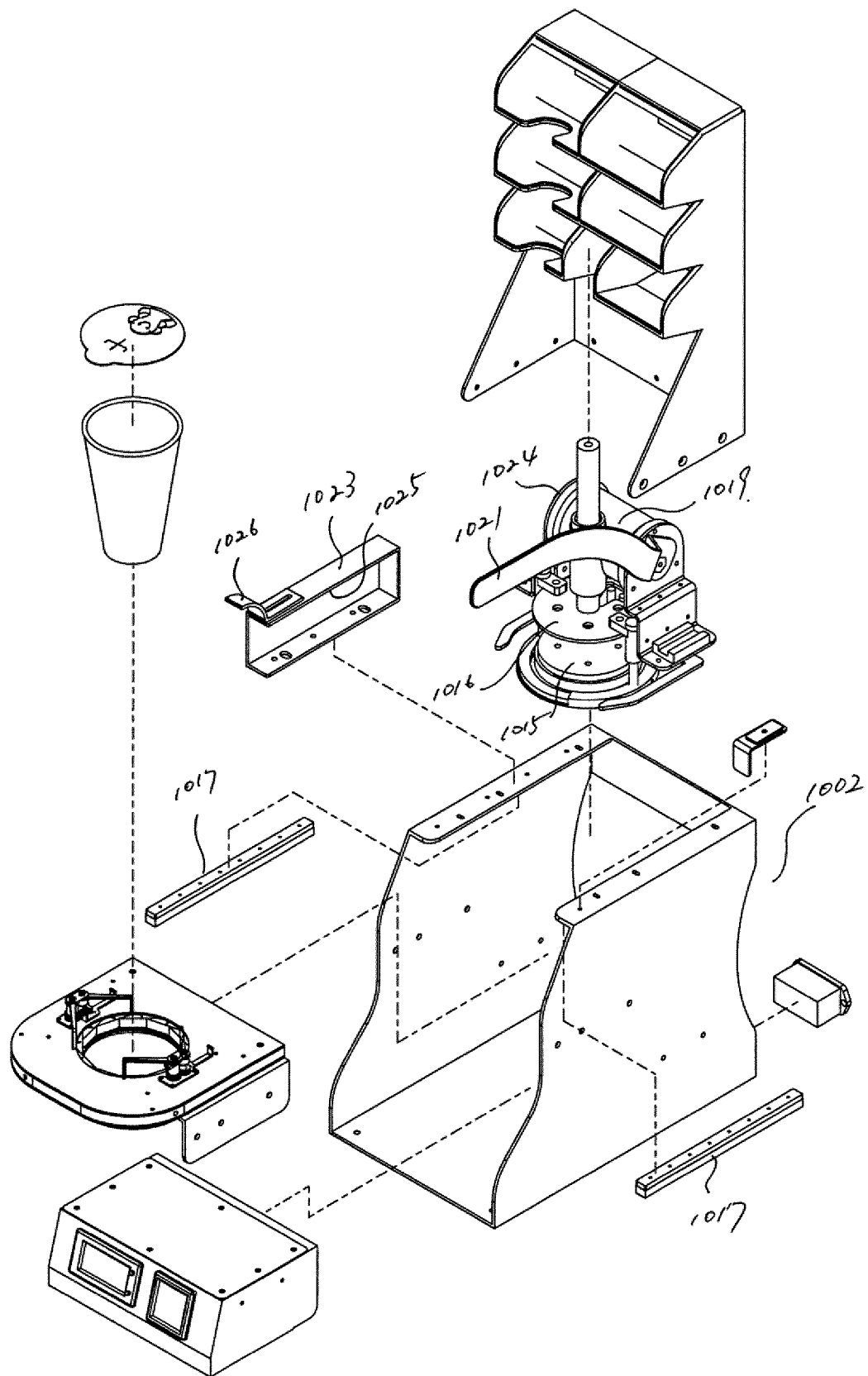


Fig.4

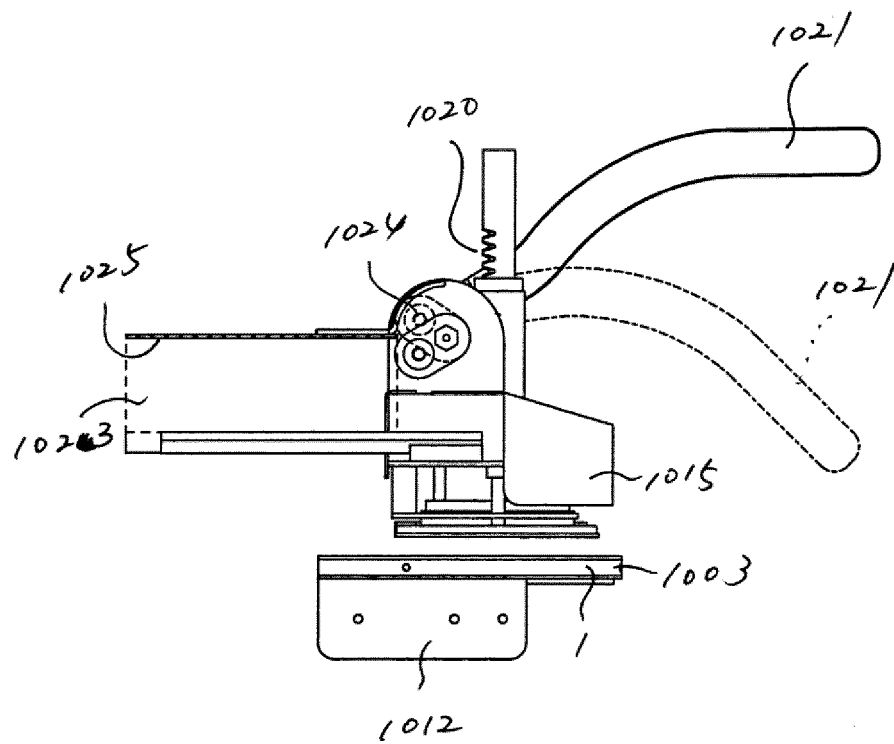
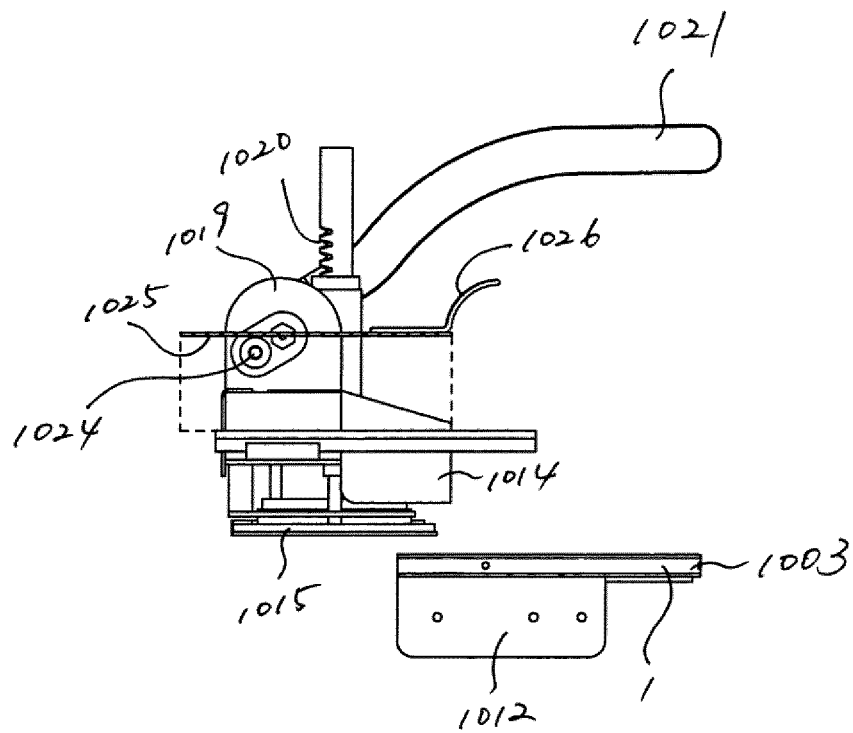


Fig.5

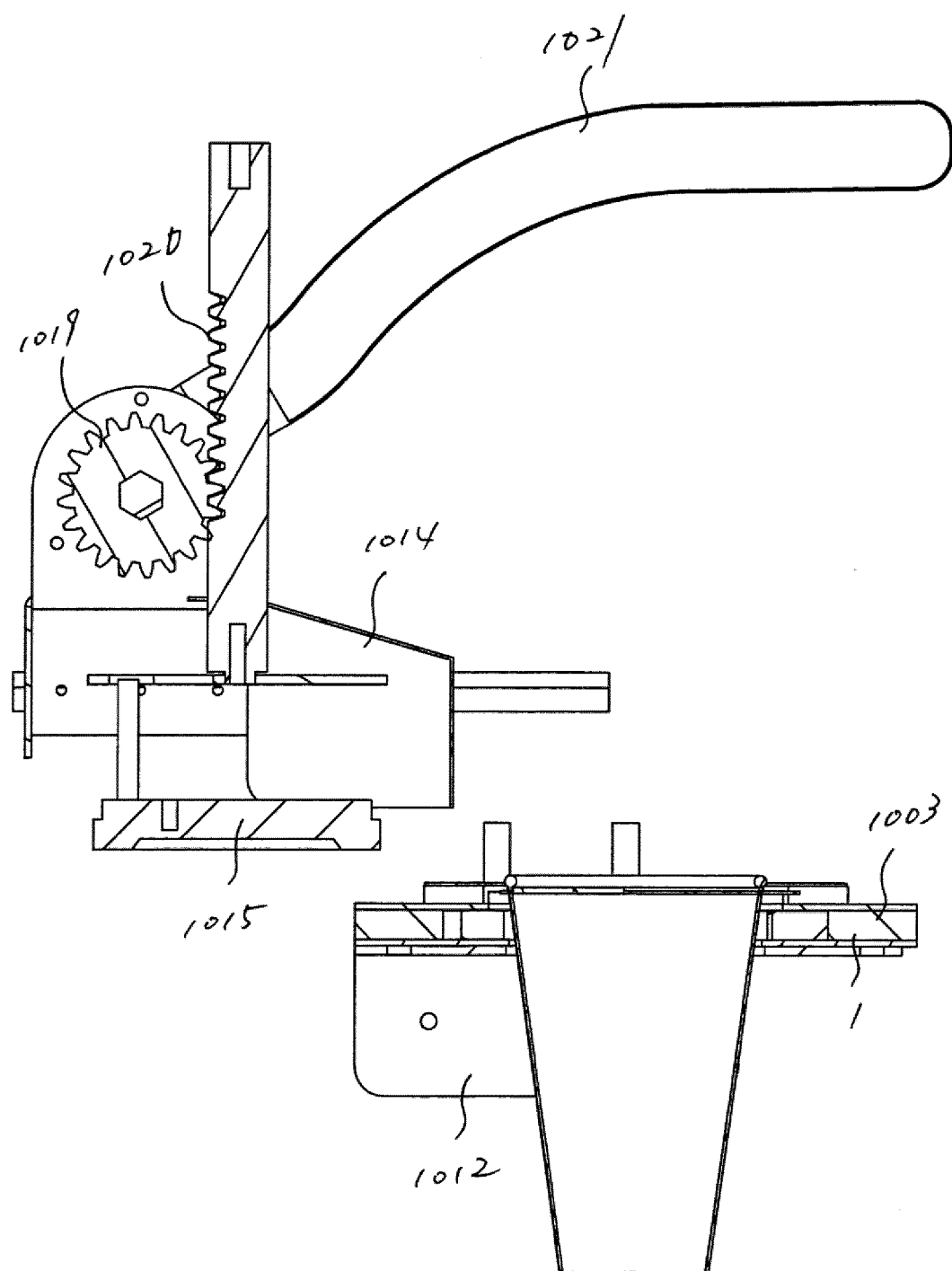


Fig.6

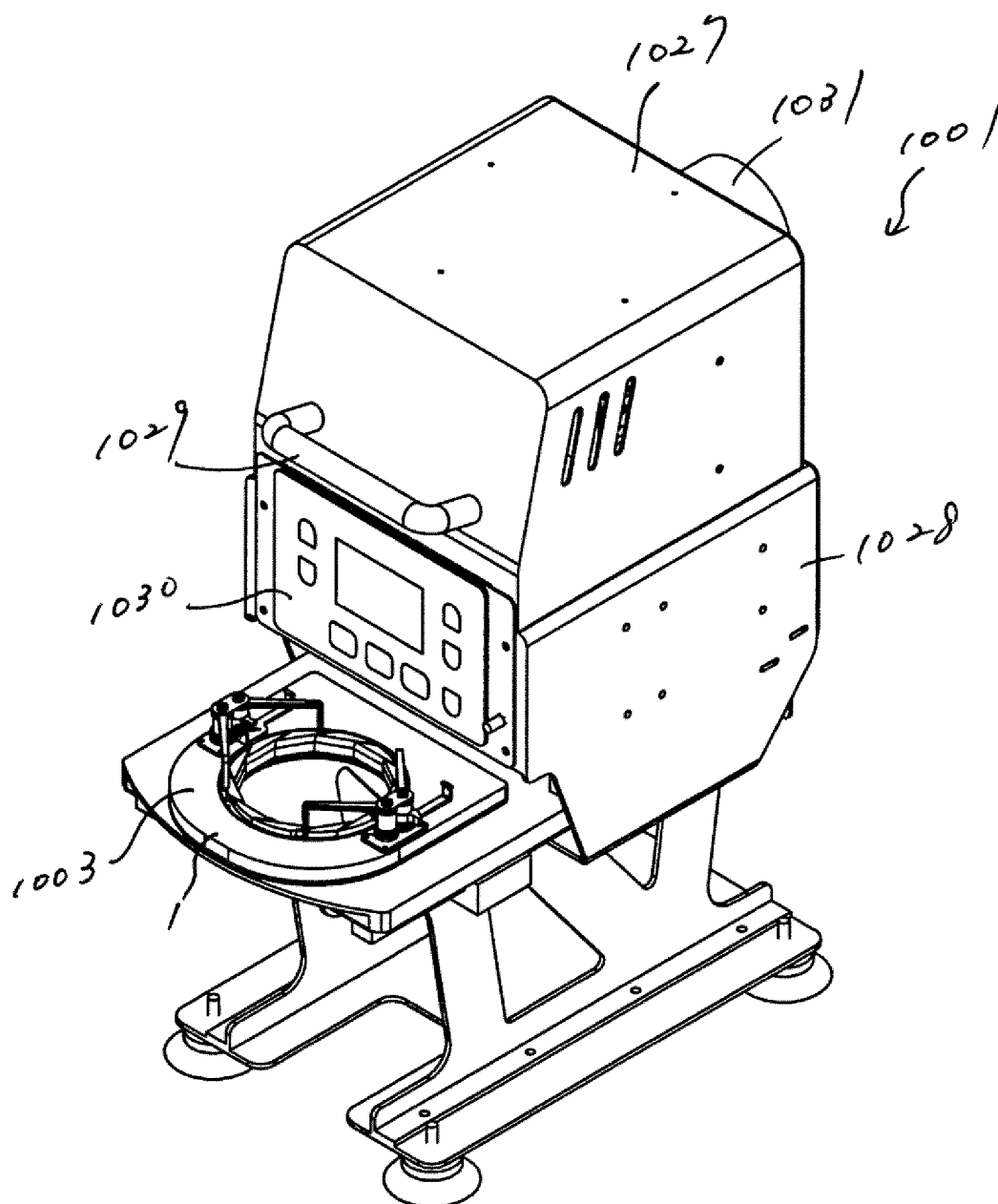


Fig.7

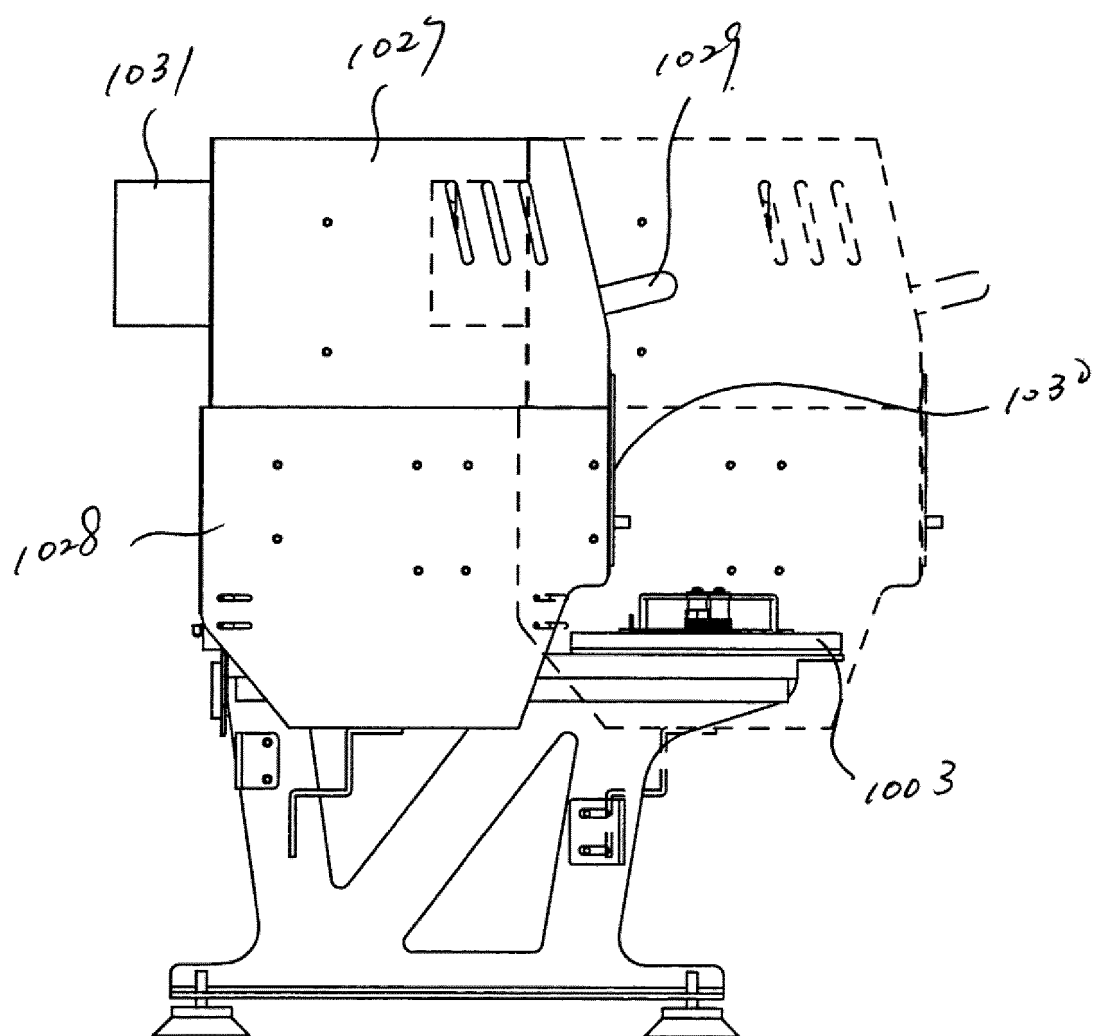


Fig.8

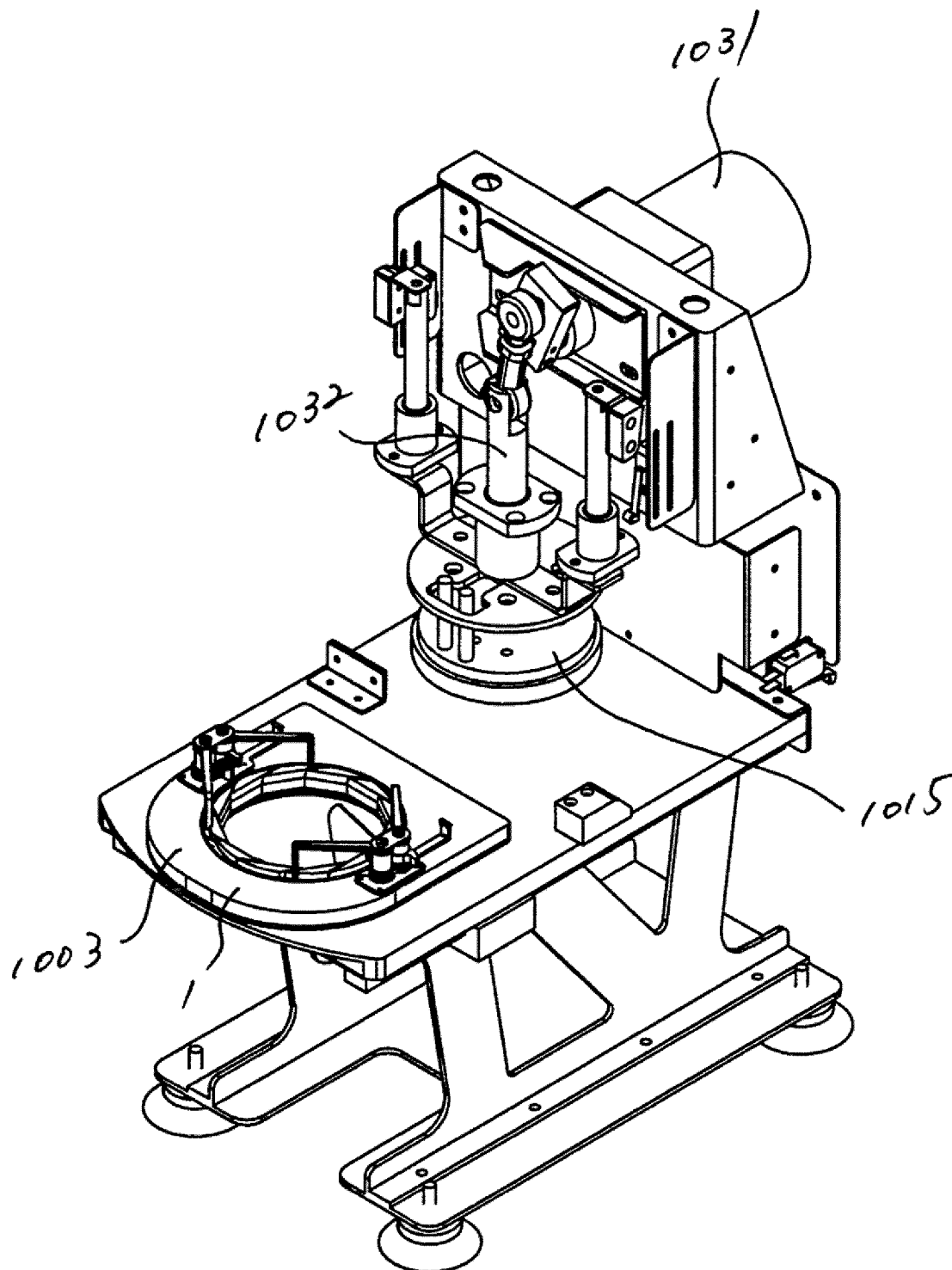


Fig.9

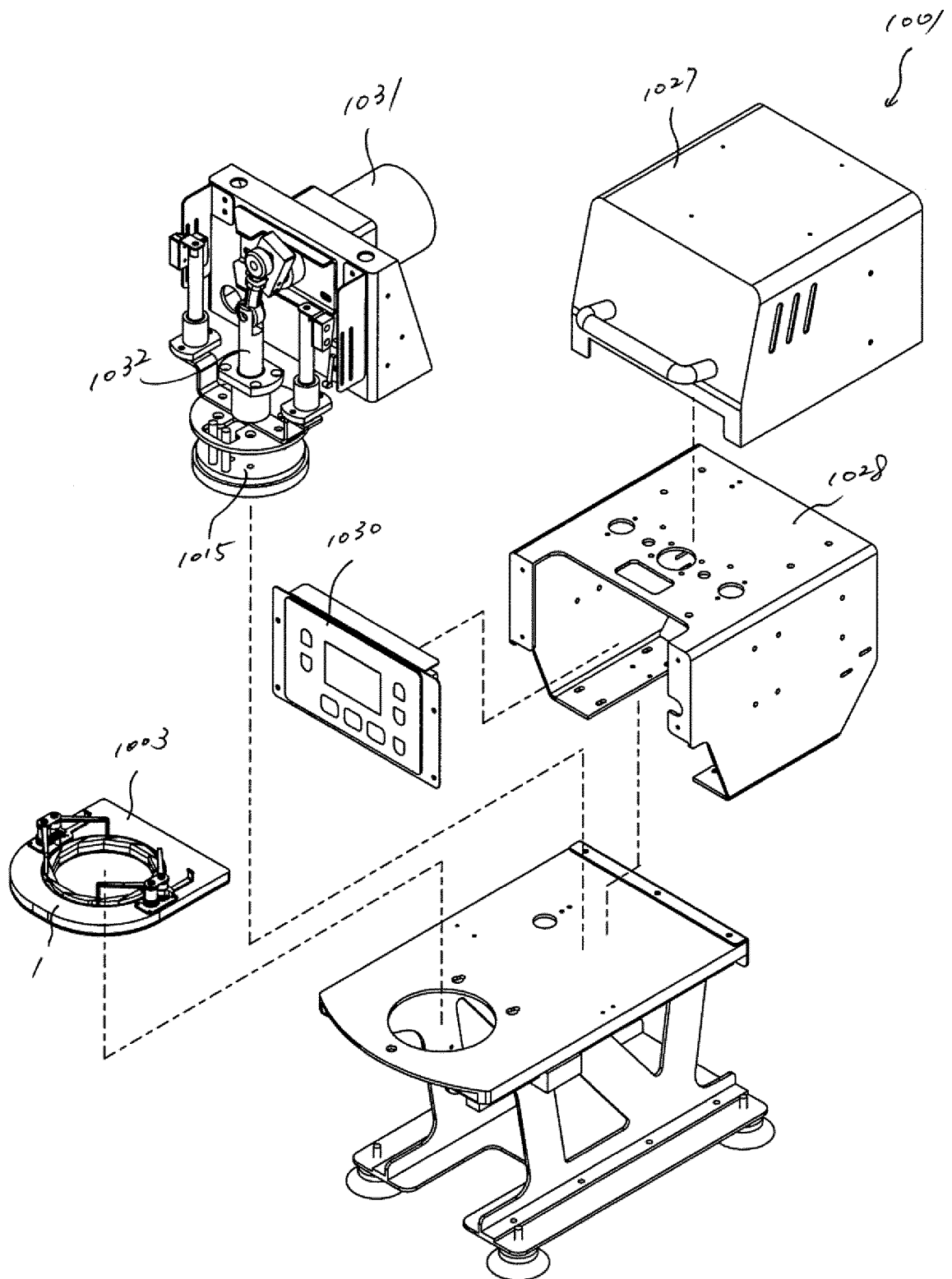


Fig.10

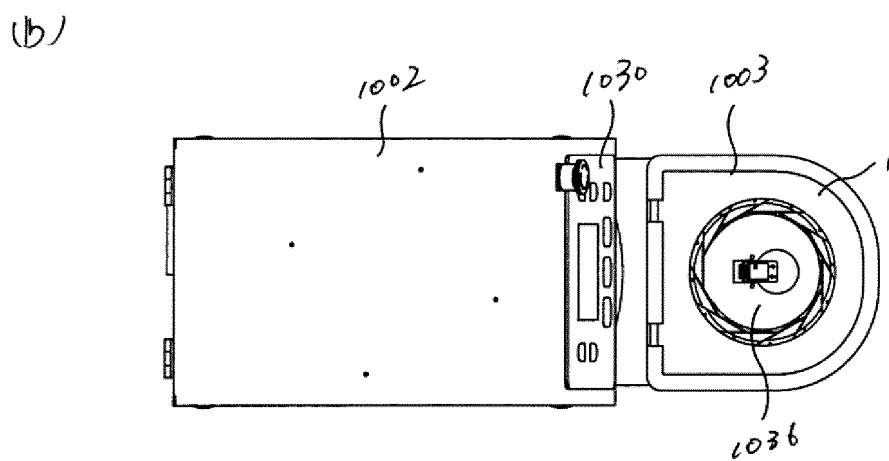
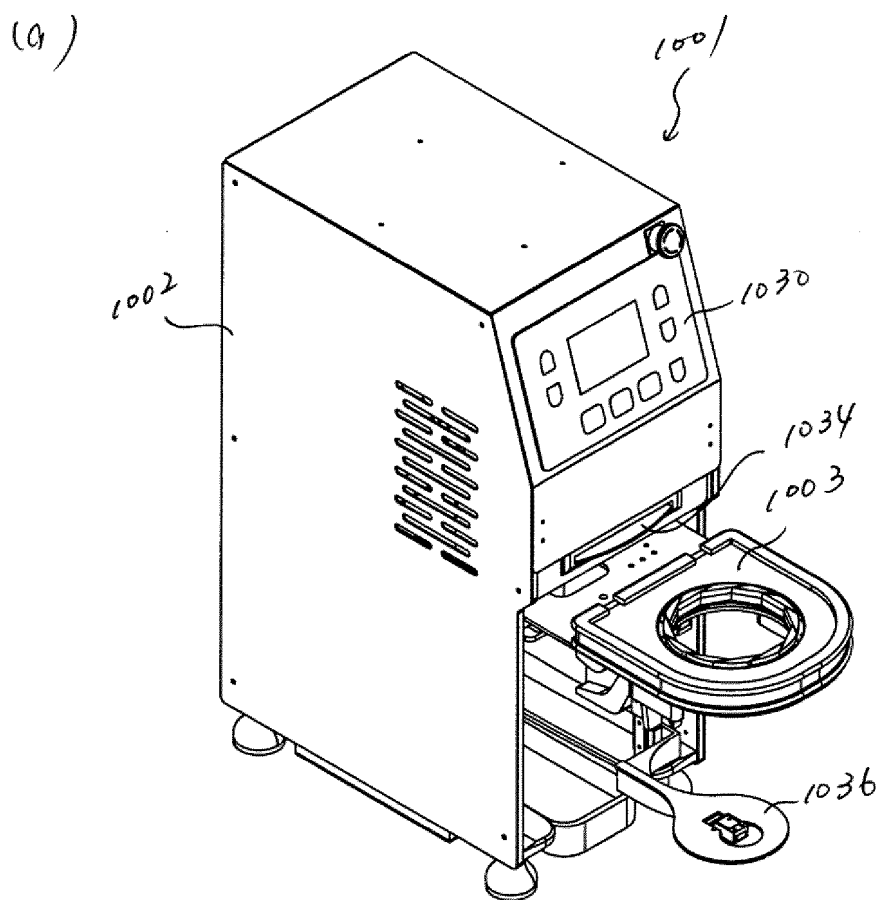


Fig.11

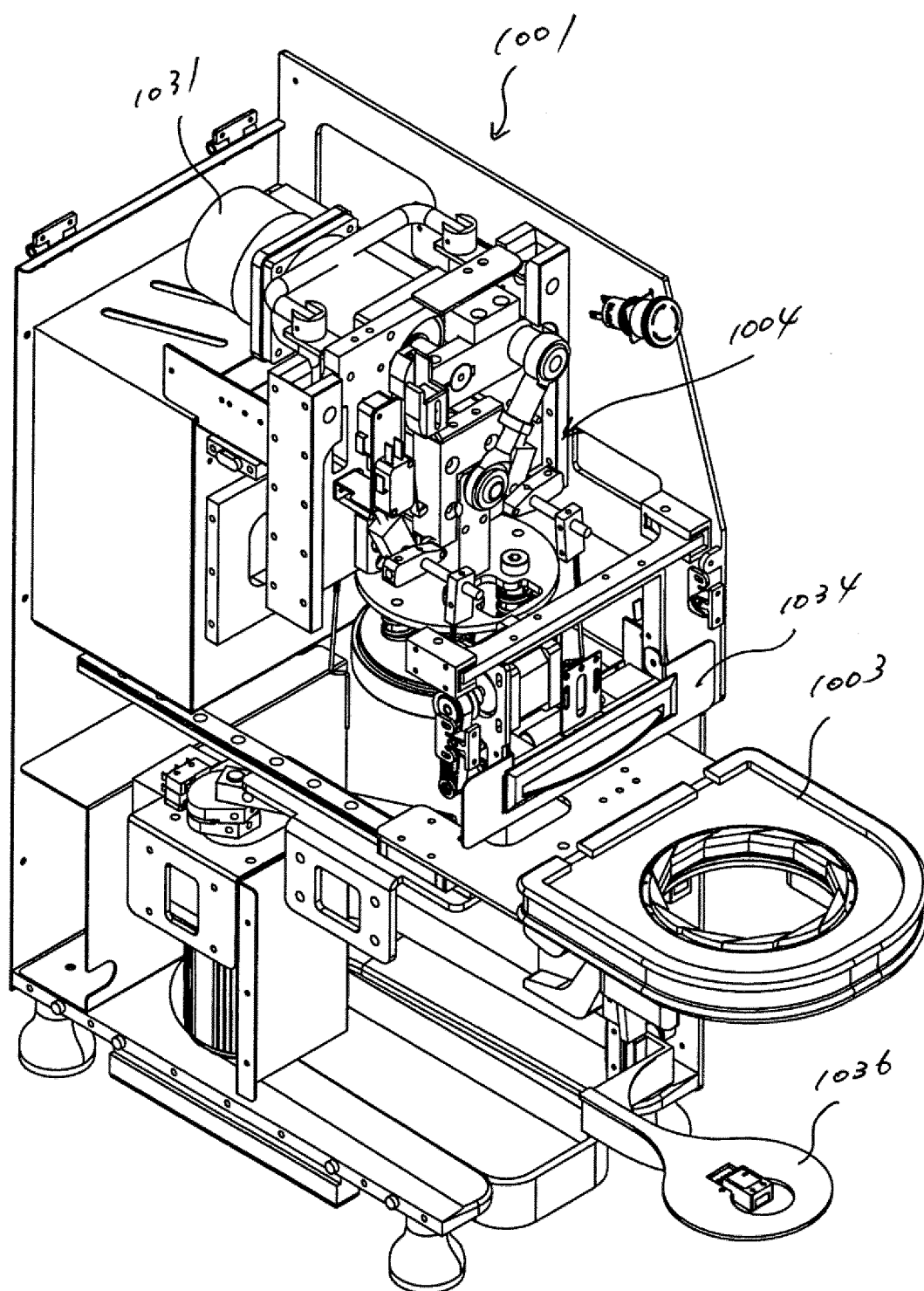


Fig.12

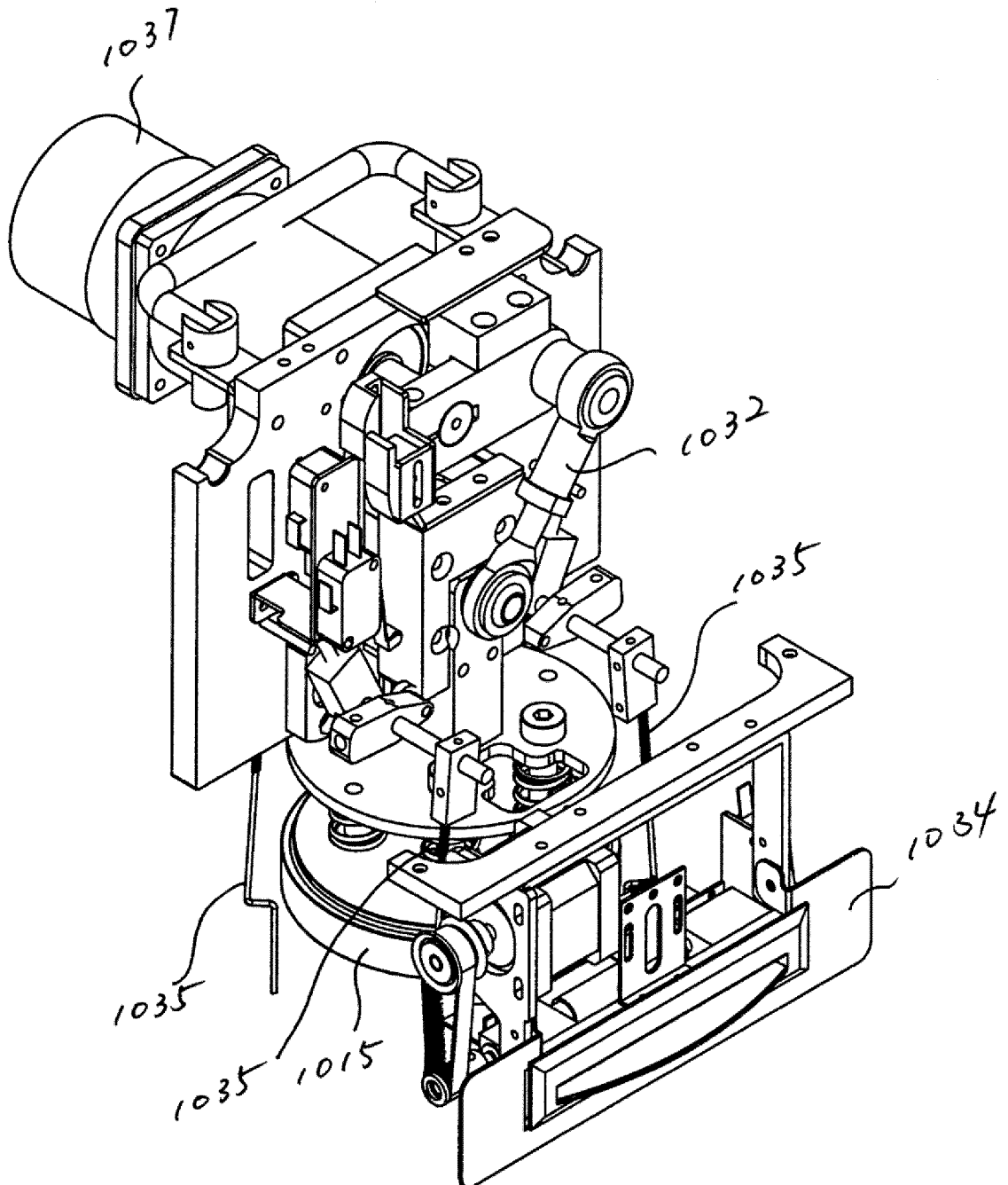


Fig.13

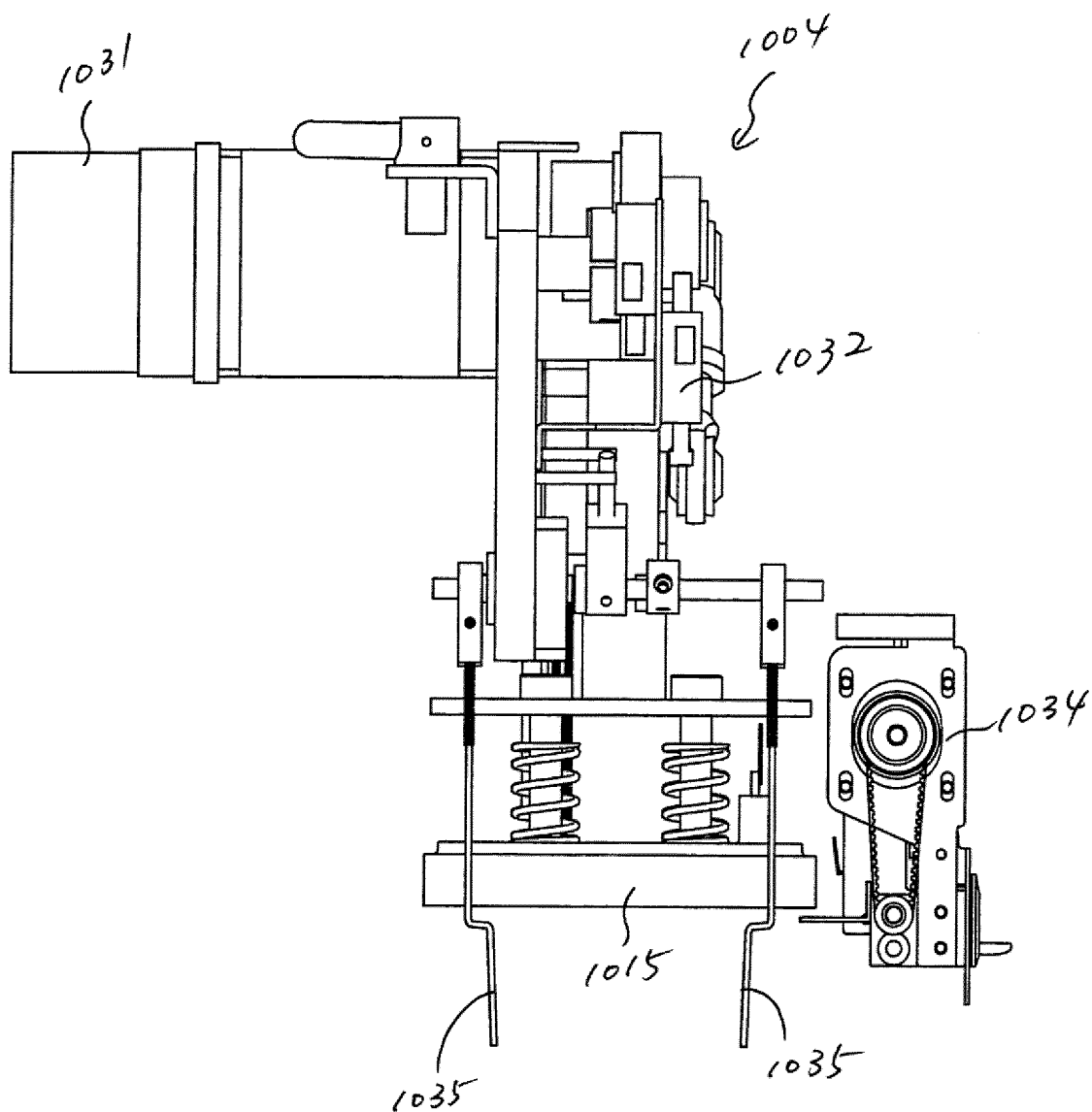


Fig.14

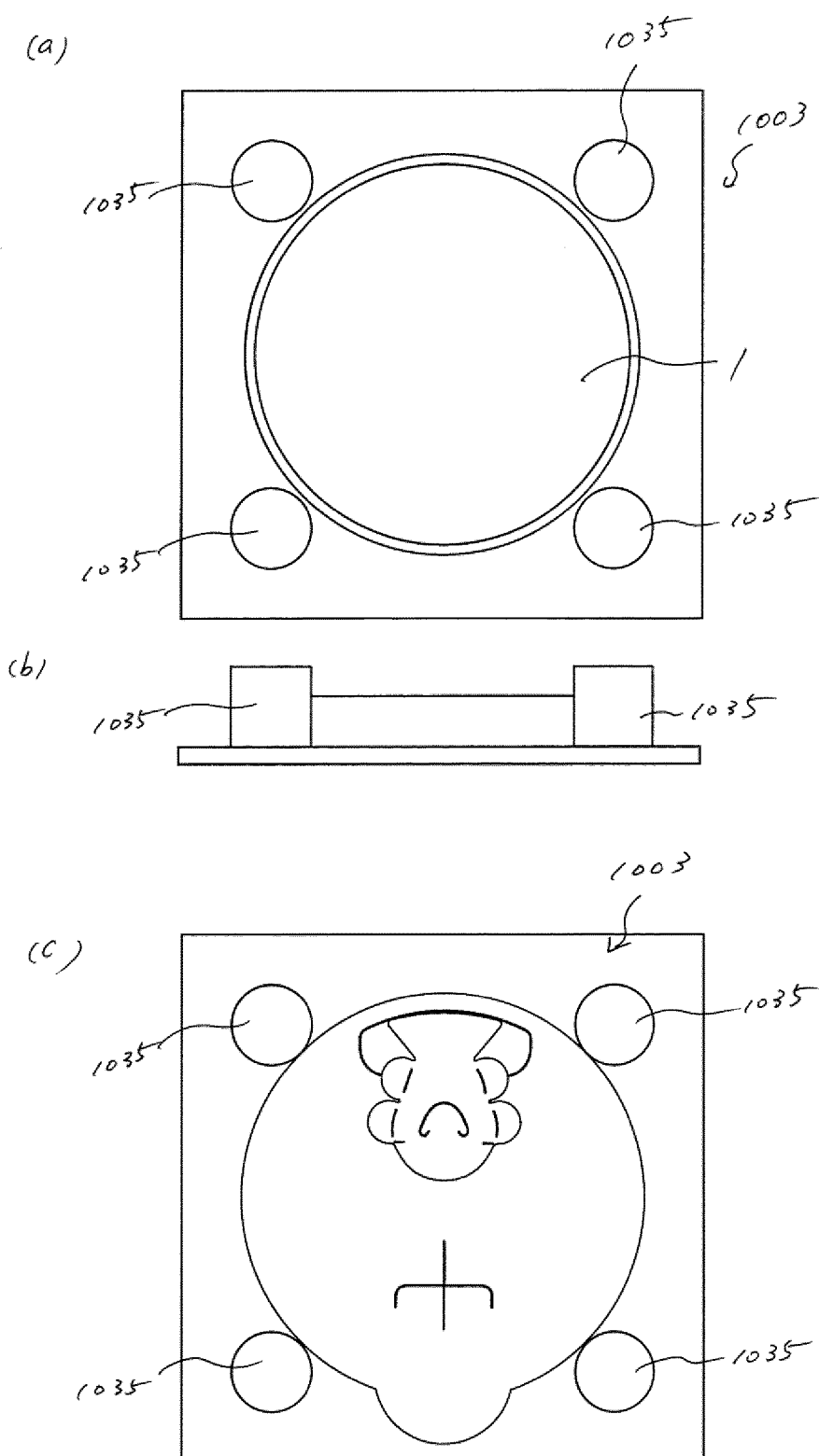


Fig.15

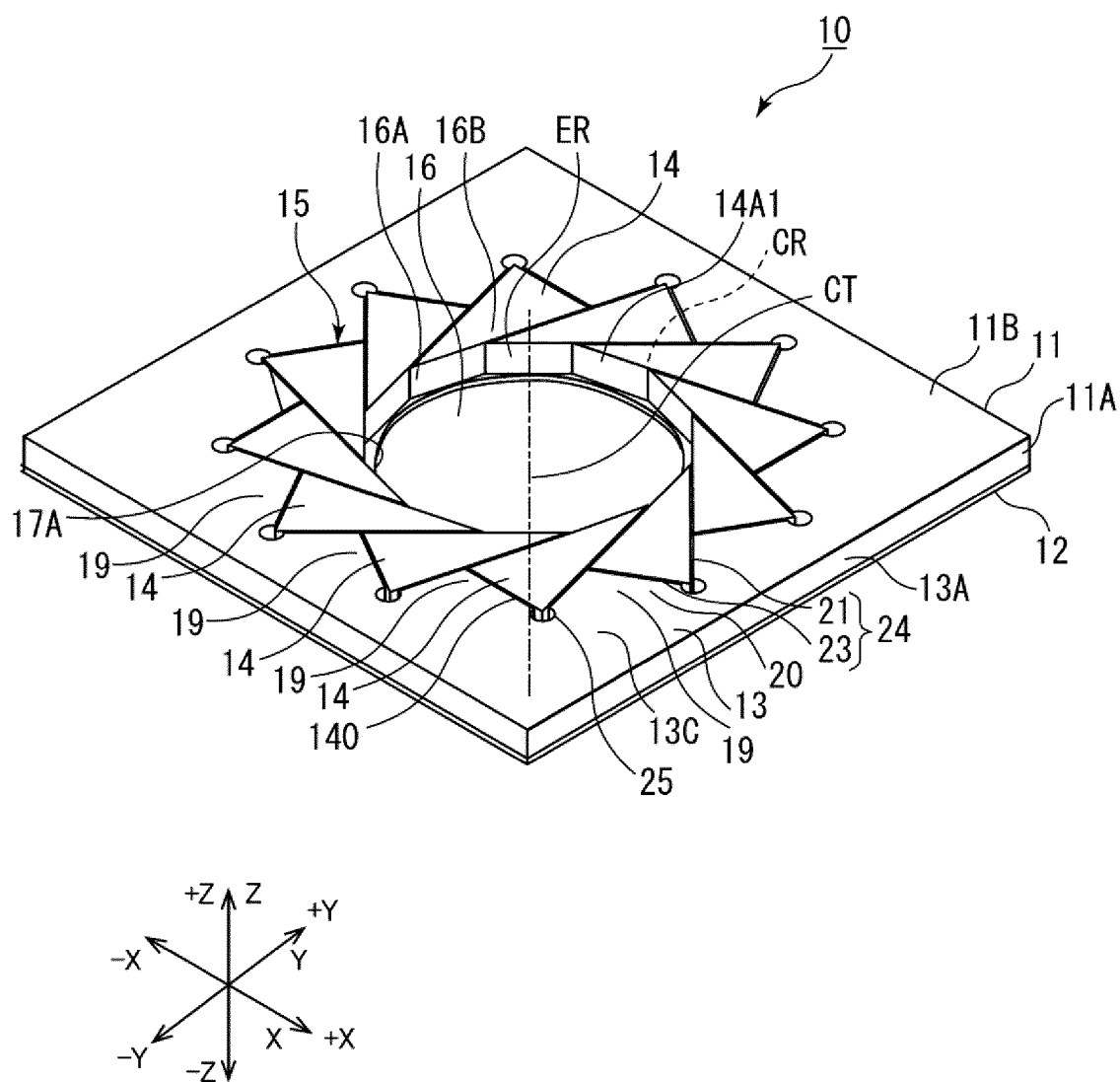


Fig.16

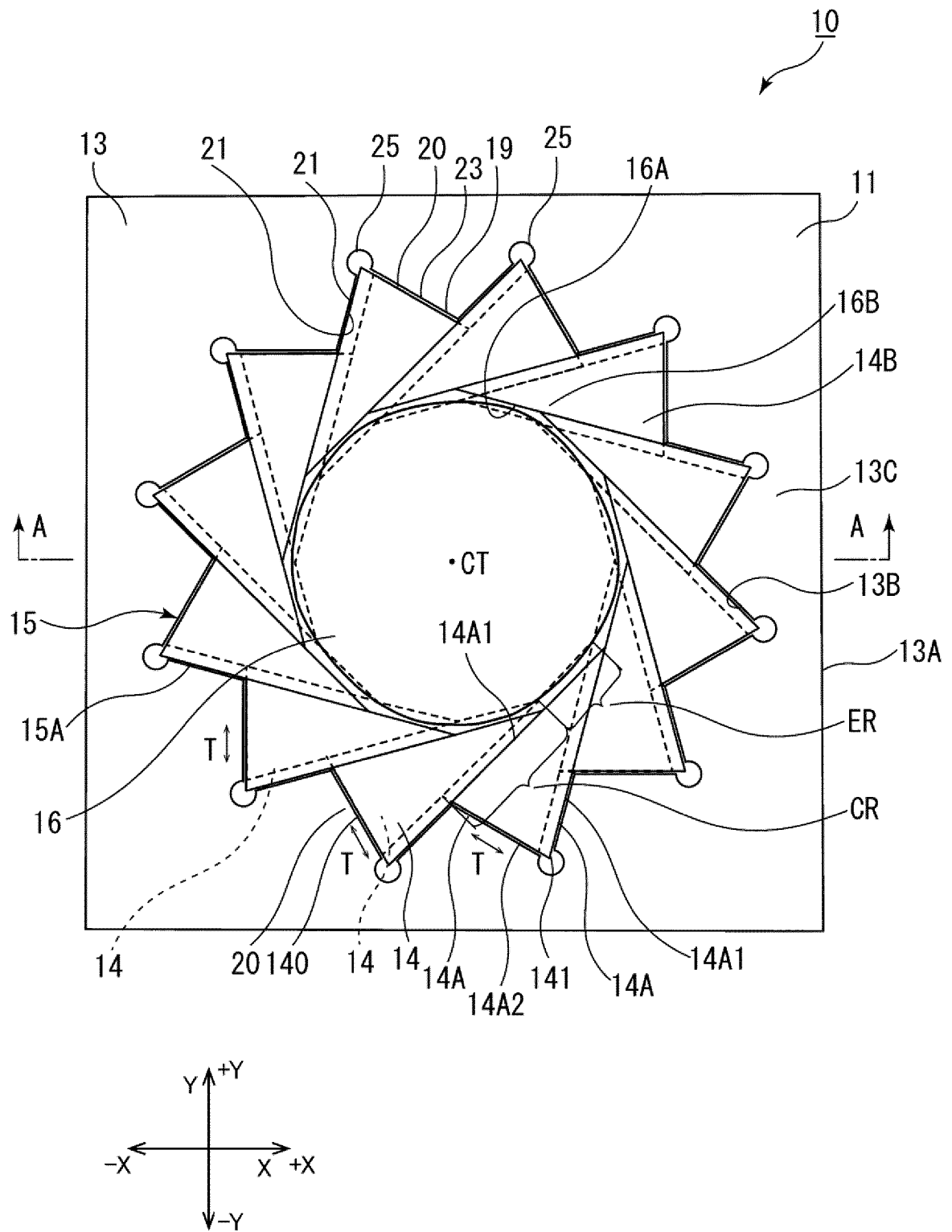


Fig.17

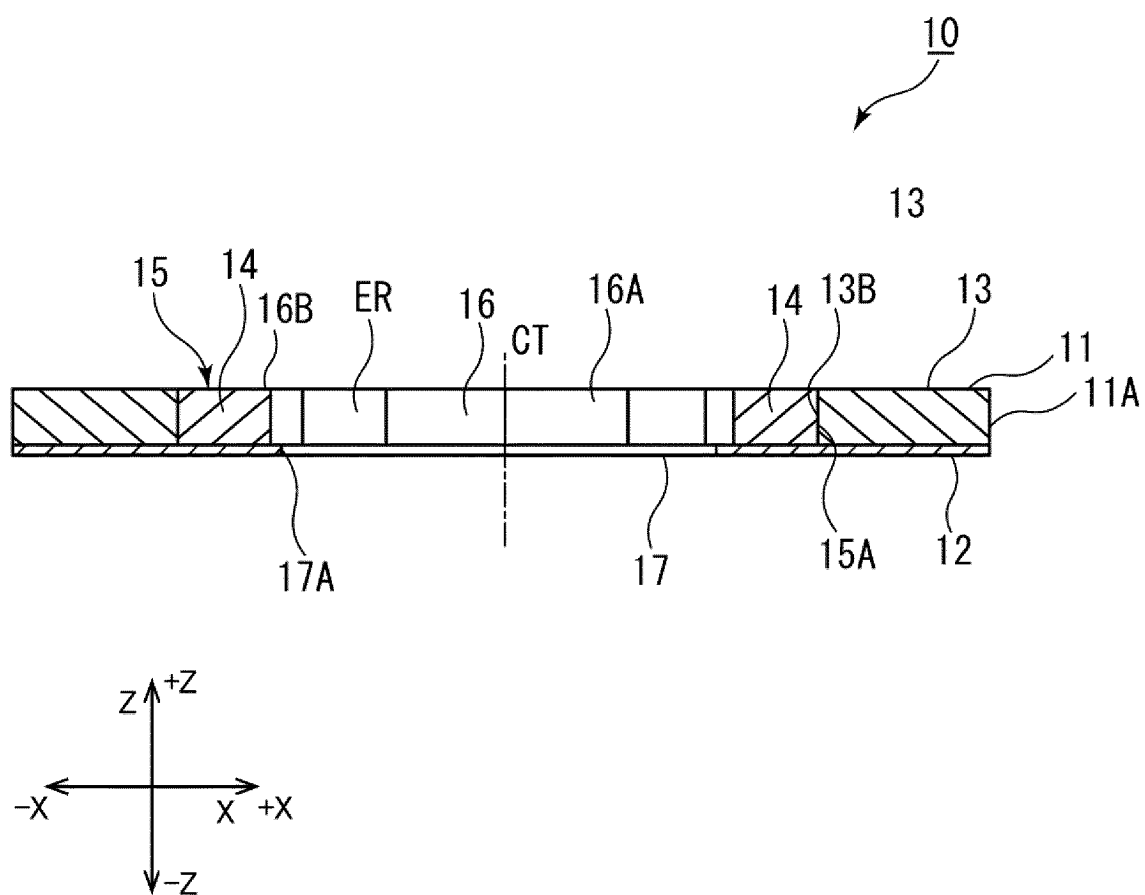


Fig.18

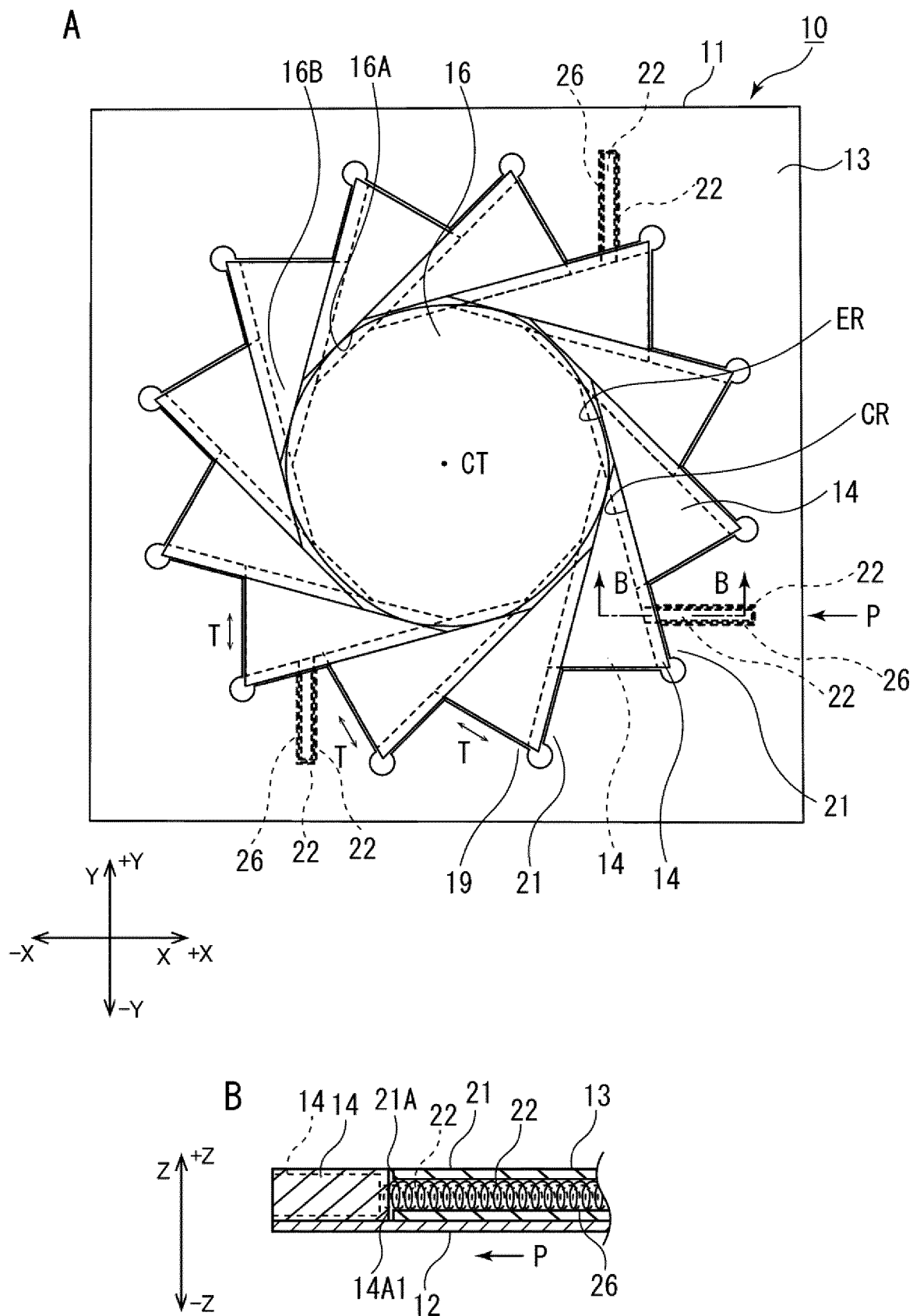


Fig.19

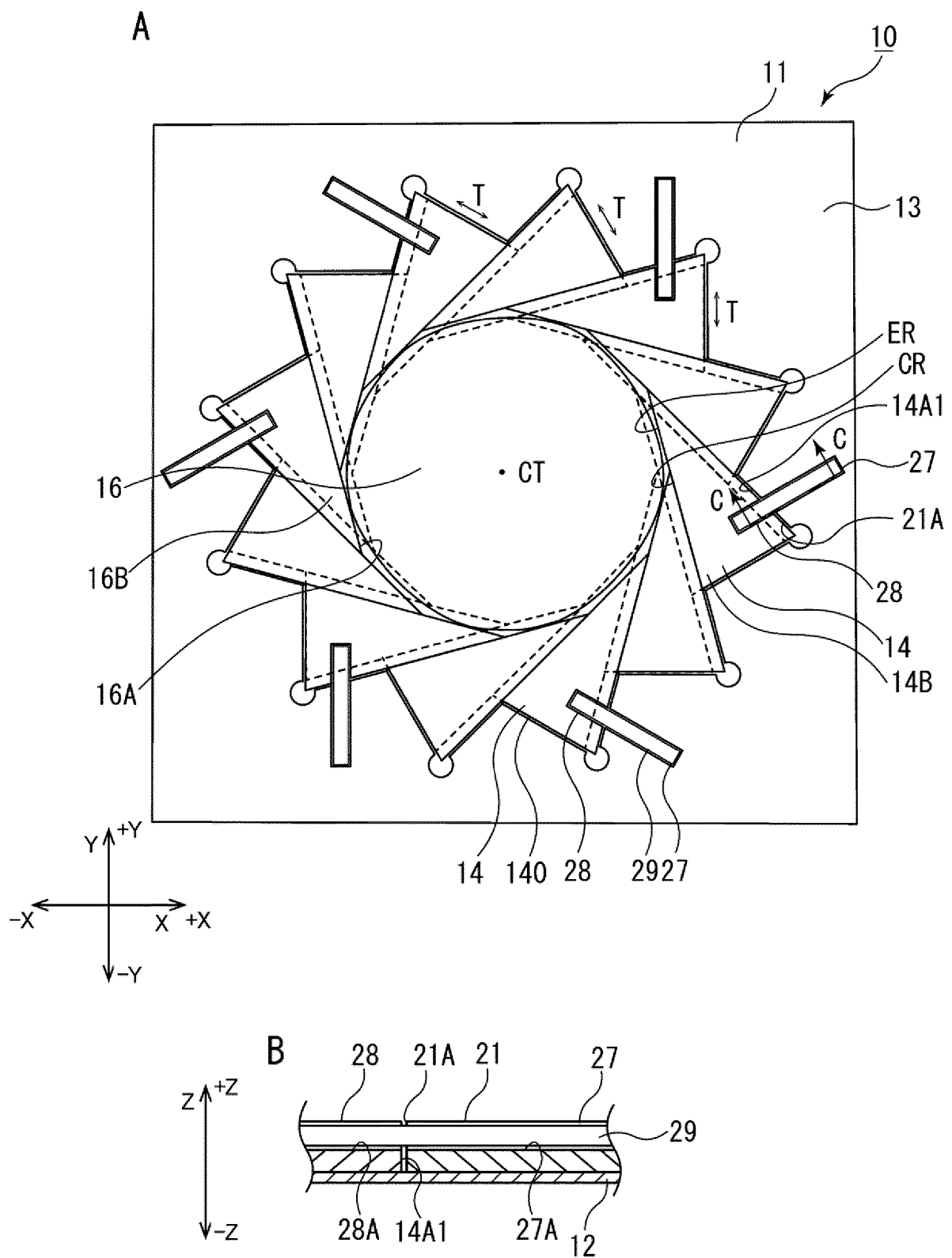


Fig.20

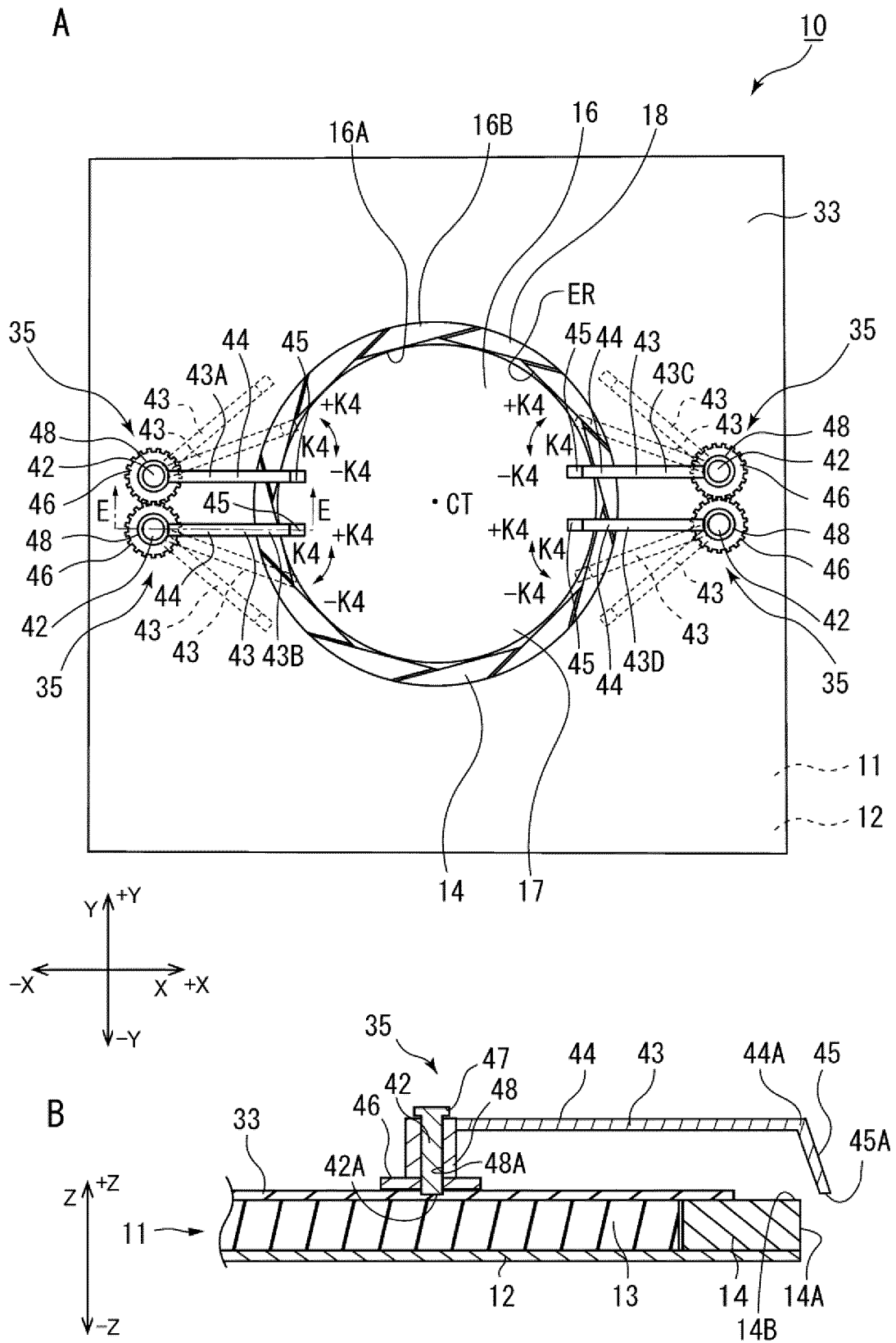


Fig.21

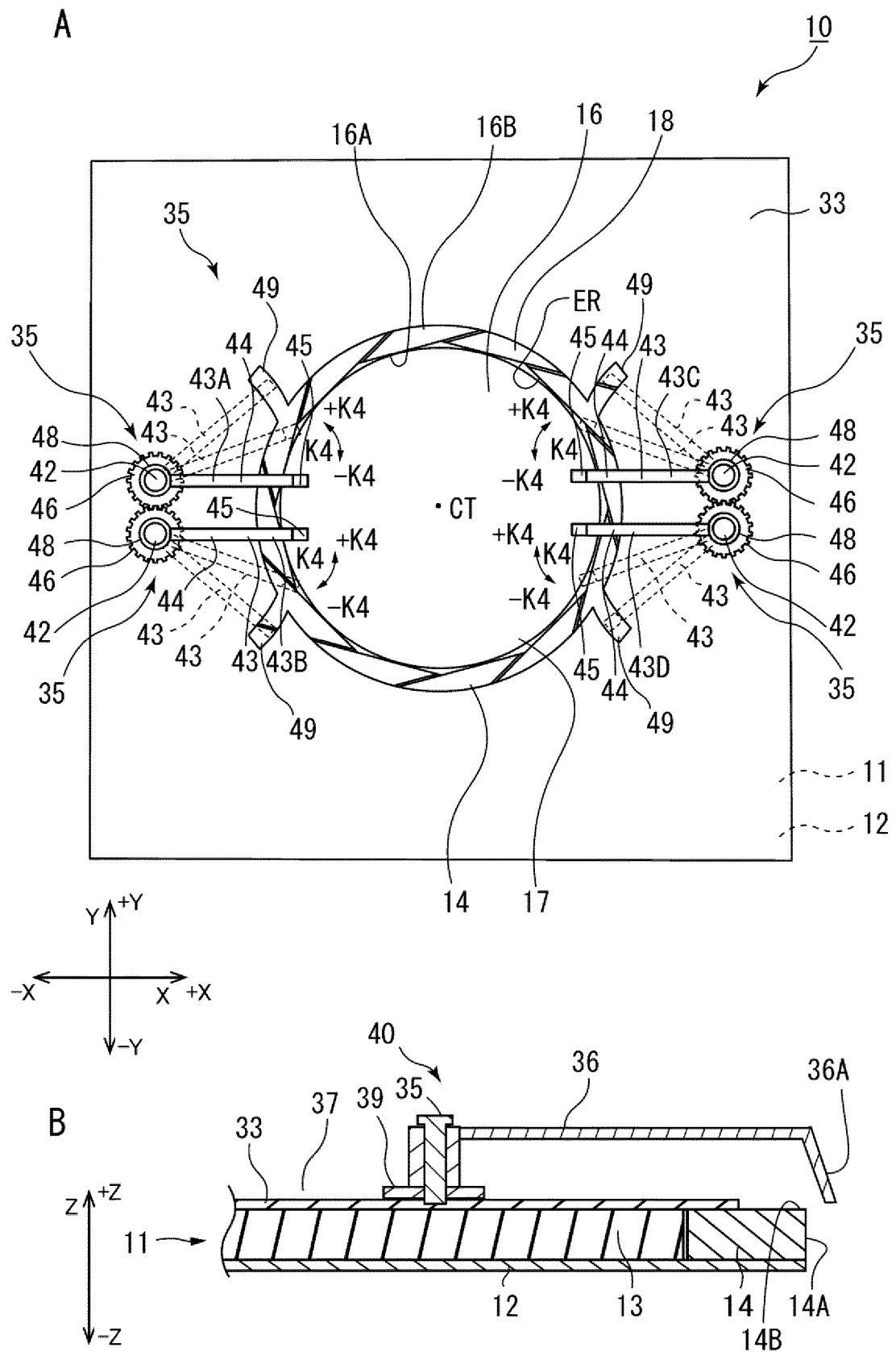
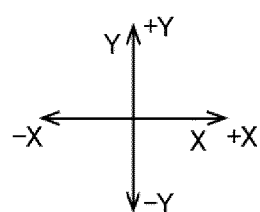
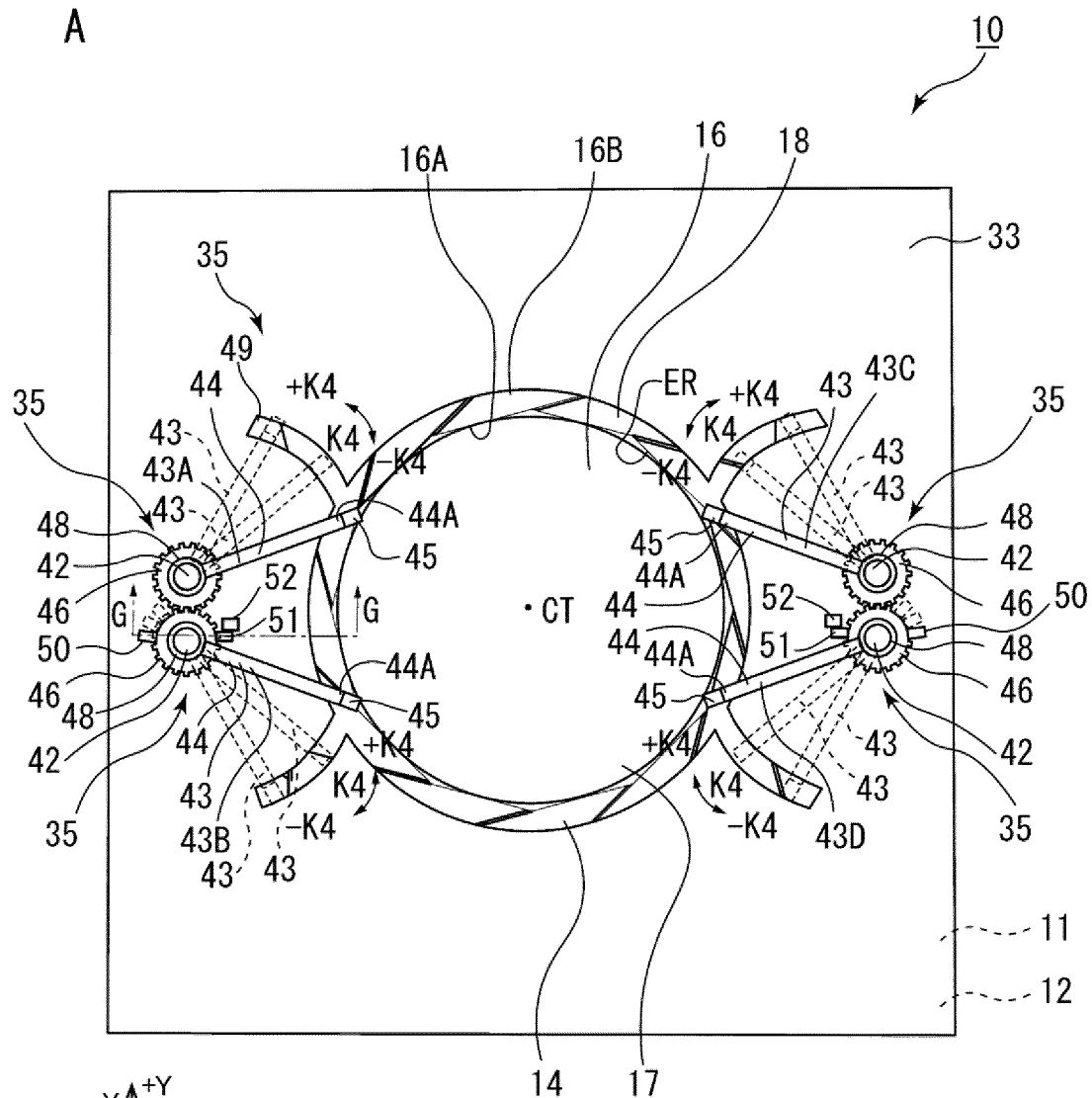
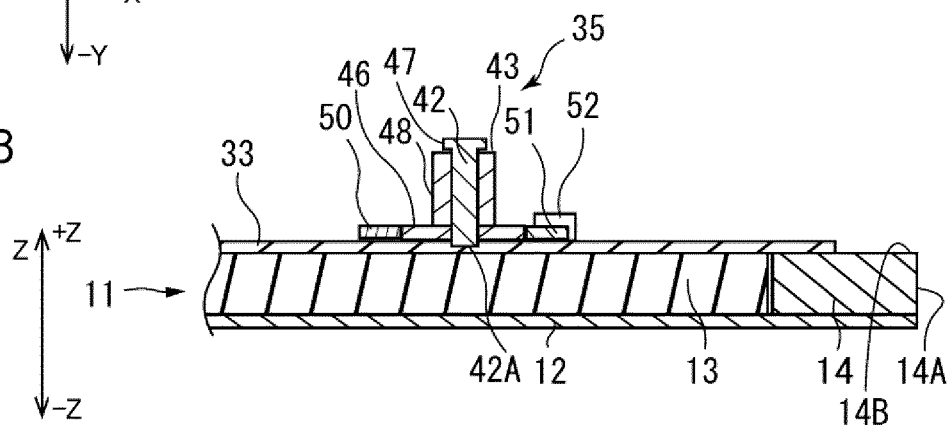


Fig.22

A



B



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2023/023241

A. CLASSIFICATION OF SUBJECT MATTER

B65B 7/28(2006.01)i

FI: B65B7/28 A

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65B7/28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2023
 Registered utility model specifications of Japan 1996-2023
 Published registered utility model applications of Japan 1994-2023

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2000-177704 A (ISHIDA CO., LTD.) 27 June 2000 (2000-06-27) paragraphs [0030]-[0096], fig. 1-21	1-3, 5-7, 9-12, 14
Y		8, 13
X	JP 2018-199494 A (SHIBUYA PACKAGING SYSTEM CORP.) 20 December 2018 (2018-12-20) paragraphs [0009]-[0013], [0020]-[0028], fig. 1-6	1-3, 5-7, 9-12, 14-15
Y		13
X	JP 2013-193774 A (TOPPAN PRINTING CO., LTD.) 30 September 2013 (2013-09-30) paragraphs [0021]-[0026], [0039], fig. 3, 4	1, 3, 5-7, 9-11
Y		2, 8
X	JP 11-348908 A (SANGYO KIKI KENKYUSHO KK) 21 December 1999 (1999-12-21) paragraphs [0017]-[0025], fig. 1-4	1-7, 10-12, 14-15
Y		13
Y	JP 3152023 U (Y-FANG SEALING MACHINE LTD.) 16 July 2009 (2009-07-16) paragraphs [0036]-[0039]	2, 8

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2023/023241

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2000-62707 A (TAITO CORP.) 29 February 2000 (2000-02-29) paragraph [0026]	13

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2023/023241

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2000-177704 A	27 June 2000	(Family: none)	
JP 2018-199494 A	20 December 2018	(Family: none)	
JP 2013-193774 A	30 September 2013	(Family: none)	
JP 11-348908 A	21 December 1999	(Family: none)	
JP 3152023 U	16 July 2009	(Family: none)	
JP 2000-62707 A	29 February 2000	(Family: none)	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 3152023 U [0004]