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(54) **STRETCH FILM WINDING TOOL, STRETCH FILM WINDING DEVICE, AND STRETCH FILM**

(57) There is provided a stretch film wrapping manipulation tool in which a core body, which is a bar-like member or a cylindrical shaft-like member, is inserted into a roll body of the stretch film in a cylindrical shape and a pair of grippers are provided on opposite end sides of the core body to be gripped by the hands of a user. A coupling portion for connecting the core body and the gripper is provided on the opposite ends of the core body. An attaching/detaching mechanism is arranged between at least one of the grippers of the pair and the coupling portion to freely attach and detach the gripper and the coupling portion. Thus, the stretch film can be mounted on the roll body R in a very simple manner. Further, the gripper can be held by the palm and the finger tips are made free. Thus, the tension of the stretch film can be fine-tuned.

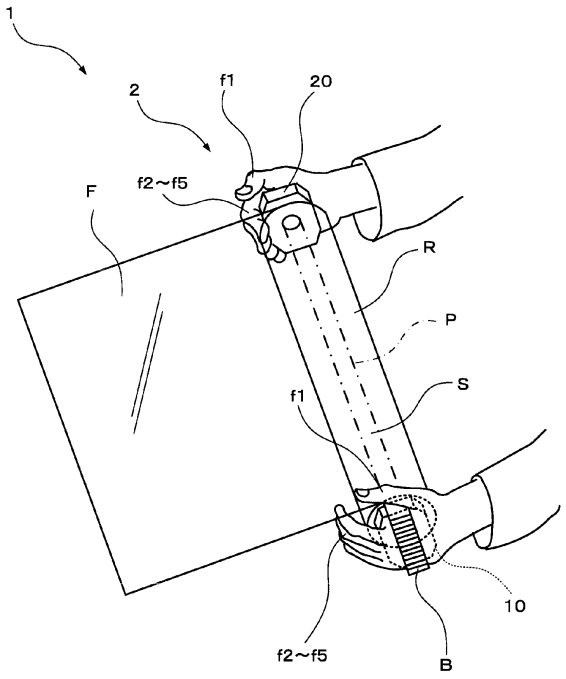

Figure 1

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Description

[Technical Field]

[0001] The present invention relates to a stretch film wrapping manipulation tool and the like for using a synthetic resin film for use in packaged goods for hand wrap application.

[Background Art]

[0002] Conventionally, a large number of manipulation tools for hand wrapping a stretch film have been disclosed, available on the market, and provided as a promotional material of the stretch film (for example, see Patent Literature: Japanese Patent Laid-Open No. 08-119242 (paragraphs 0005 to 0007) and Non Patent Literature: hand wrap holder as illustrated in Figures 23 and 24).

[Summary of Invention]

[Technical Problem]

[0003] The hand wrapping manipulation tool for a stretch film of the Patent Literature is a plate-like manipulation tool made of a manipulative material and used by being inserted into a paper core as a roll core of the stretch film. The manipulation tool includes a first shoulder portion having a receiving portion for one end face of the paper core; a grip portion having a receiving portion for the other end face thereof and being continuous to the first shoulder portion; and a handle portion being continuous to the second shoulder portion. The paper core holder portion, the first shoulder portion, and the grip portion can be inserted into the paper core. The second shoulder portion is wider than the inner diameter of the paper core. The handle portion is shorter than the paper core holder portion and has a handgrip in a longitudinal end ridge portion. A stretch film cutter is described to be able to provide at least one end in the width direction of the handle portion.

[0004] When the Patent Literature is used, a board is inserted into the paper core of the stretch film, a handle portion and a band located on the lower end face of this board are folded back toward a hook hole of a grip core on the upper end face thereof to catch a hook on the leading end of the band. With the grip and the handgrip of the band held by the hand, the film is wrapped around a package in a substantially vertical state. Thus,thestretchfilm wrapping manipulation tool of the Patent Literature has a problem in that it is cumbersome to mount the stretch film roll body on the manipulation tool.

[0005] Further, there is another problem of poor workability in performing a wrap operation substantially vertically while holding the grip and the handgrip because of poor stability in holding the roll body, leading to a difficulty in contacting and wrapping the stretch film around the package.

[0006] A hand wrap holder illustrated in Figures 23 and 24 is disclosed in a Non Patent Literature found on the web page of the packing and packaging material related manufacturers and venders on the Internet. The hand wrap holder disclosed in the Non Patent Literature is shown herein in both a plan view and a cross-sectional view drawn based on a commercially available product obtained by the present applicant. As illustrated in the figures, the hand wrap holder includes a bottomed circular inner cylinder 41 having a hand grip elongated hole 43 in a perpendicular direction at the center of the bottom portion 41; and a circular outer cylinder 42 rotatably fitted therein. These two members combined into pairs are used to completely insert the outer cylinder 42 into a paper core P as a core material from opposite ends of a roll body R of a stretch film F. The roll body R is held by both hands with all four fingers except the thumb inserted into the hand grip elongated hole 43 of the inner cylinder 41 and with the roll body R kept substantially vertical (perpendicular), the stretch filmF is wrapped around a package. At this time, the thumb is always kept in contact with the surface of the roll body R so as to impart tension to the stretch film F by the frictional force. The hand wrap holder is described such that the holder can be easily inserted into the roll body R of the stretch film F with a horizontal width of about 500 mm, a length of about 300 m, and a considerable weight, and creates less fatigue due to lightweight.

[0007] The hand wrap holder of the Non Patent Literature is used by being inserted into the paper core P. The size varies between the inner diameter of the paper core P and the outer diameter of the hand wrap holder. When the hand wrap holder is inserted into the paper core P, they may be loosely fitted or tightly fitted, resulting in uncertain fitting. When tightly fit, it is difficult to insert the hand wrap holder into the paper core P, leading to poor insertion. In contrast to this, when loosely fit, the hand wrap holder comes out of the paper core P and the roll body R falls off during wrapping operation.

[0008] Further, the hand wrap work suffers from remarkable reduction in workability, such as that in order to lift the roll body R in an upright standing state on the ground for hand wrap work, the fingers need to be inserted into the hand grip elongated hole of the hand wrap holder to lift the roll body R, but when loosely fitted, only the hand wrap holder comes completely out of the paper core P, and thus the roll body R cannot be lifted up.

[0009] Furthermore, the hand wrap holder disclosed in the Non Patent Literature has a structure of fixing opposite end portions of the roll body R, and hence the outer cylinder is completely inserted into the paper core of the roll body R generally having an inner diameter of about 76 mm (3 inches) . Accordingly, the size of the holder is limited to be equal to or less than the size excluding the thickness (about 5 mm x 2) of the inner cylinder 41 and the outer cylinder 42 fitted therein. As a result, the maximum length of the hand grip elongated

hole is equal to or less than about 66 mm as the size excluding the thickness thereof. However, when an attempt is made to insert all four fingers except the thumb into the hand grip elongated hole with a size of 66 mm or less, only up to the first joints thereof can be inserted at best.

Stable work without effort or fatigue requires up to the second joints of the fingers to be inserted into the hand wrap holder. Otherwise, it would be difficult for adult workers towork comfortably. More specifically, the hand wrap holder disclosed in the Non Patent Literature imposes significant burden on the fingers, and hence the roll body may fall off due to figure fatigue or it is difficult to continue work for a long time. For that reason, currently any one of the index finger and the little finger is pulled out of the hand grip elongated hole for work at the expense of convenience.

[0010] Furthermore, during work of wrapping the stretch film, the relative angle between hands changes at any time depending on the position of wrapping the package, but the hand wrap holder disclosed in the Non Patent Literature cannot be rotated because the holder is fitted and fixed to the roll body R. Accordingly, the change in relative angle between the roll body R and both hands cannot be followed, resulting in poor workability.

[0011] Furthermore, although not publicly known prior to the present application, when the inner diameter of the paper core P is set to about 66 mm, about 25 mm, or the like, the elongated hole cannot be held by an adult worker to wrap. Thus, it is difficult to apply the holder disclosed in the Non Patent Literature and the holder is poor in versatility since the diameter of the paper core is limited to three inches or more.

[0012] Further, in a case of a very long roll such as that a 400 m long stretch film is wound around the paper core with a diameter of three inches, an increase in weight increases the burden on the fingers. Furthermore, an increase in outer diameter of the roll body decreases the workability from the beginning. It is substantially difficult to apply the holder of the Non Patent Literature to the roll body of such a very long film.

[0013] During storage of the roll body, the roll body is kept standing upright with the hand wrap holder positioned in the lower end, which increases the risk of falling-down. If the roll body falls down, the problem is that the stretch film F may be broken or contaminated with dust or sewage from the floor.

[0014] As described above, the conventional wrapping manipulation tool has many unsolved problems such as poor mountability of the stretch film on the roll body R, poor workability in wrapping the stretch film, a risk of falling-down of the roll body R, narrow versatility, and further a high risk of damage and contamination due to falling-down of the roll body R during storage.

[0015] The present invention attempts to solve the problems of such a conventional configuration and an object of the present invention is to provide a wrapping manipulation tool and the like allowing a stretch film to be easily mounted on a roll body, enabling work for a long time without fatigue, eliminating the risk of falling-down of the roll body R, providing good workability and wide versatility, and capable of safely storing the roll body R.

[Solution to Problem]

[0016] The present invention that achieves the above objects is a stretch film wrapping manipulation tool for use with a bar-like member or a cylindrical shaft-like member inserted into a stretch film in a cylindrical shape, the stretch film wrapping manipulation tool comprising: a core body, which is the bar-like member or the cylindrical shaft-like member, inserted into a roll body of the stretch film in a cylindrical shape; a pair of grippers attached to opposite ends of the core body; a coupling portion provided on the opposite ends of the core body and connecting the core body and the gripper; and an attaching/detaching mechanism arranged between at least one of the grippers of the pair and the coupling portion and removably attaching the gripper and the coupling portion.

[0017] In the stretch film wrapping manipulation tool of the above invention, preferably the gripper has an outer diameter being coverable with a palm.

[0018] The stretch film wrapping manipulation tool of the above invention preferably includes a rotation mechanism arranged between at least one of the grippers of the pair and the coupling portion and holding the gripper and the coupling portion in a relatively rotatable manner.

[0019] In the stretch film wrapping manipulation tool of the above invention, both the attaching/detaching mechanism and the rotation mechanism are preferably arranged in at least one of the grippers of the pair.

[0020] In the stretch film wrapping manipulation tool of the above invention, the attaching/detaching mechanism preferably includes an extended portion arranged in one of the gripper and the coupling portion and extending in the diameter direction of the stretch film; an insertion opening arranged in the other one of the gripper and the coupling portion and into which the extended portion is inserted; and an insertion direction engaging step portion being continuous circumferentially behind the insertion opening in an insertion direction and engaged with the extended portion in the insertion direction by causing a relative rotation between the extended portion and the insertion opening.

[0021] In the stretch film wrapping manipulation tool of the above invention, the attaching/detaching mechanism preferably includes a circumferential engaging recessed portion being continuous to the insertion direction engaging step portion in an opposite direction of the insertion direction and engaged with the extended portion circumferentially by accommodating the extended portion.

[0022] In the stretch film wrapping manipulation tool of the above invention, the attaching/detaching mechanism preferably has an urging member causing the extended portion accommodated in the circumferential engaging

recessed portion to be urged to a bottom side of the circumferential engaging recessed portion.

[0023] The stretch film wrapping manipulation tool of the above invention preferably includes a hand grip belt which is arranged in at least one of the grippers of the pair and into which a hand can be inserted.

[0024] In the stretch film wrapping manipulation tool of the above invention, the gripper preferably has a maximum thickness of 40 mm or less and 3 mm or more along a longitudinal direction of the stretch film and a maximum size of 100 mm or less and 30 mm or more in the diameter direction of the stretch film.

[0025] In the stretch film wrapping manipulation tool of the above invention, the core body preferably has a maximum outer diameter of 65 mm or less.

[0026] The stretch film wrapping manipulation tool of the above invention preferably includes a cylindrical core body cover into which the core body is inserted and which is arranged to be relatively rotatable with respect to the core body.

[0027] The present invention that achieves the above objects is a stretch film wrapping apparatus including the above stretch film wrapping manipulation tool and the stretch film.

[0028] In the stretch film wrapping apparatus of the above invention, the stretch film preferably has an inner diameter of 75 mm or less.

[0029] In the stretch film wrapping apparatus of the above invention, the stretch film preferably has a core-less structure without a paper core located on an inner peripheral surface.

[0030] The present invention that achieves the above objects is a stretch film set to the above stretch film wrapping manipulation tool.

[0031] The stretch film of the above invention preferably has a core-less structure without a paper core located on an inner peripheral surface.

[0032] According to the above invention, the gripper is freely attached to and detached from the core body, and hence can be easily attached to the stretch film. Further, the gripper and the core body are rotatable relative to each other, and hence a relative angle change between both hands occurring when wrapping the stretch film can be flexibly followed. Thus, good workability is obtained.

[0033] The above invention adds a hand grip belt allowing a hand to be inserted thereinto to the gripper and hence can prevent the stretch film from falling off. As a result, the above invention can prevent falling-down during storage at wrapping work and can prevent contamination with dust or sewage from the floor which tends to occur at falling-down. In particular, the stretch film can be safely stored by hooking the hand grip belt to a hook or the like provided on a wall or a pillar.

[0034] Further, according to the structure of the present invention, the size of the gripper is not limited to the size of the inner diameter of the stretch film. In light of this, the gripper has a diametrical size of 100 mm or less and 30 mm or more and a thickness of 40 mm or less and 3 mm or more; and the core body has an outer diameter of 65 mm or less. As a result, the stretch film has a wide selection range and hence provides a wide versatility. Specifically, the external shape of the core body only needs to be smaller in size than the inner diameter of the stretch film. Thus, such a thin core body can be free from the limit of the inner diameter of the stretch film and provides a vide versatility.

[0035] As said before, according to the stretch film wrapping manipulation tool of the present invention, the stretch film can be easily mounted. Further, since the gripper is freely rotatable, a relative angle change between both hands occurring when wrapping the stretch film can be flexibly followed. Thus, good workability is obtained.

[0036] Furthermore, since the gripper is set to a predetermined size, the gripper can be held so as to be covered with and pressed by the left and right palms from outside during wrapping work. Thus, the load on the fingers of both hands is greatly reduced. Accordingly, the fingers of both hands are made substantially free. The degree of rolling out the stretch film can be adjusted while the side surfaces of the gripper are held by the free fingers of the left and right hands and the surface of the stretch film is pressed by the fingers of the left and right hands. As a result, extremely excellent workability is obtained.

[0037] Still further, an addition of the hand grip belt to the gripper allowing a hand to be inserted into can prevent the stretch film from falling off due to fatigue of fingers.

[0038] Further, the gripper can be gripped in a very easy manner since the gripper has a diametrical size of 100 mm or less and 30 mm or more and a thickness of 40 mm or less and 3 mm or more regardless of the size of the inner diameter of the stretch film. Furthermore, since the core body has an outer diameter of 65 mm or less, any core body with an outer diameter meeting the size of the inner diameter of the stretch film may be used. In particular, a wide versatility can be obtained such as an application to a core-less stretch film without a paper core.

[0039] Further, the belt provided in the gripper can be used to store the stretch film by being hooked to a hook or the like provided on a wall or a pillar, which can prevent falling-down during storage and can prevent contamination with dust or sewage from the floor.

[Advantageous Effects of Invention]

[0040] As described above, the wrapping manipulation tool of the present invention can easily mount the stretch film on the roll body R. Further, since the gripper can be held by the palm, the need to hook fingers is eliminated and the fingers can be freely moved during work. As a result, the tension of the stretch film can be fine-tuned by contacting the finger tips to the stretch film. Further, a relative angle change between both hands occurring when wrapping the stretch film can be flexibly followed. Furthermore, since the burden on the fingers is reduced,

working for a long time does not impose fatigue on fingers, thus providing good workability. Still furthermore, the risk of falling-down of the stretch film due to fatigue of fingers can be eliminated and a falling-down during storage and a contamination from the floor can be prevented. Yet furthermore, various sizes of stretch film can be handled, thus providing excellent versatility.

[0041] Note that the present invention can be applied to packaging of cardboard boxes for use in the industrial fields requiring somewhat large packages on a base plate and a floor surface, regular shaped objects such as pipes, as well as irregular shaped objects such as grain and pasture in the agriculture and dairy farming field.

[Brief Description of Drawings]

[0042]

[Figure 1] Figure 1 is a perspective view of an example of using a hand wrapping apparatus for a stretch film according to a first embodiment.

[Figure 2] Figure 2 is a sectional view of each component constituting a first gripper.

[Figure 3] Figure 3 is a sectional view of an assembly of the first gripper.

[Figure 4] Figure 4 is a top plan view of the first gripper.

[Figure 5] Figure 5 is a sectional view of each component of a core body and a screw receiving body fixed in the vicinity of an upper end thereof.

[Figure 6] Figure 6 is a sectional view of an assembly in a state in which the screw receiving body is mounted in the vicinity of the upper end of the core body.

[Figure 7] Figure 7 is a sectional view of each component constituting a second gripper.

[Figure 8] Figure 8 is a sectional view of an assembly of the second gripper.

[Figure 9] Figure 9 is a bottom plan view of the second gripper.

[Figure 10] Figure 10 is a sectional view in a state in which the second gripper is coupled to one end of the core body that passes through the paper core of the roll body and the first gripper is mounted on the other end of the core body.

[Figure 11] Figure 11 is a sectional view of an assembly of a hand wrapping apparatus for a stretch film according to a second embodiment.

[Figure 12] Figure 12 is a sectional view of each component constituting a first gripper.

[Figure 13] Figure 13 is a sectional view of each component of a core body and a fixed body fixed in the vicinity of an upper end thereof.

[Figure 14] Figure 14 is a perspective view of a cross section of the fixed body when viewed from obliquely above.

[Figure 15] Figure 15 is a sectional view of an assembly of the first gripper.

[Figure 16] Figure 16 is a sectional view of the assembly describing a method of using the wrapping apparatus.

[Figure 17] Figure 17 is a sectional view of the assembly describing a method of using the wrapping apparatus.

[Figure 18] Figure 18 is a sectional view of the assembly describing a method of using the wrapping apparatus.

[Figure 19] Figure 19 is a sectional view of an assembly of a hand wrapping apparatus for a stretch film according to another configuration example 1.

[Figure 20] Figure 20 is a sectional view of an assembly of a hand wrapping apparatus for a stretch film according to still another configuration example 1.

[Figure 21] Figure 21 is a sectional view of an assembly of a hand wrapping apparatus for a stretch film according to yet another configuration example 1.

[Figure 22] Figure 22 is a sectional view of an assembly of a hand wrapping apparatus for a stretch film according to another configuration example 2.

[Figure 23] Figure 23 is a plan view of a holder of Non-Patent Document obtained from commercially available products and drawn by the present applicant.

[Figure 24] Figure 24 is a cross-sectional view along line Y-Y in Figure 23 illustrating the holder of Non-Patent Document obtained from commercially available products and drawn by the present applicant.

[Description of Embodiments]

[0043] Now, embodiments of the present invention will be described referring to the accompanying drawings.

[0044] Figure 1 is a perspective view of an example of using a hand wrapping apparatus (hereinafter referred to as a wrapping apparatus) 1 for a stretch film according to a first embodiment of the present invention. The wrapping apparatus 1 is configured to include a stretch film F, and a hand wrapping manipulation tool 2 (hereinafter referred to as a manipulation tool 2) for the stretch film F.

[0045] This manipulation tool 2 includes a core body S as a bar-like member or a cylindrical shaft-like member to be inserted into a paper core P of a roll body R for a stretch film F; and a pair of grippers 10 and 20 attached to opposite ends of the core body S. When used, a surface 104 (see Figure 2) of a first gripper 10 and a surface 205 (see Figure 7) of a second gripper 20 are held so as to be covered with the left and right palms respectively; and a side surface 105 of the first gripper 10 and a side surface 206 of the second gripper 20 are gripped by the left and right fingers f1 to f5. At the same time, wrapping work is performed such that the free fingers f1 to f5 are used to press the surface of the roll body R so as to adjust the wrap of the stretch film F by applying an appropriate tension to the stretch film F while adjusting the strength of the pressing force.

[0046] Here, the core body S is a cylindrical shaft-like member and has a maximum outer diameter of 65 mm or less. According to the present embodiment, the outer diameter of the core body S is less than 25 mm, or actually 20 mm so as to be able to use a stretch film with an inner diameter of 66 mm or less, or preferably 25 mm.

[0047] Figures 2 to 4 each illustrate a perimeter structure including the first gripper 10. The manipulation tool 2 includes the first gripper 10, an attaching/detaching lever 11, a screw body 12 as a component of a coupling tool 50, and a belt B attached to the first gripper portion 10.

[0048] The first gripper 10 is a plate-like member having an outer diameter allowing the fingers to be freely manipulated in a state of being covered with the palm. Specifically, the size of the first gripper 10 is such that the maximum thickness H along the longitudinal direction (hereinafter referred to as a longitudinal direction) of the stretch film F is 40 mm or less and 3 mm or more; and the maximum size W in the diameter direction (hereinafter referred to as a radial direction) of the stretch film F is 100 mm or less and 30 mm or more. A planar portion 104 is held so as to be covered with and pressed by the palm during wrapping. A side portion 105 of the first gripper 10 is gripped by free fingers f1 to f5. As a result, the manipulation tool 2 is securely held by the palm and the fingers f1 to f5.

[0049] Further, the first gripper 10 includes an accommodating portion 101 formed in an outside planar portion 104 and serving as a recess for accommodating an attaching/detaching lever 11; a through-hole 102 formed continuously in an axial direction in a bottom surface of the accommodating portion 101 so as to pass a screw body 12 therethrough; and a film accommodating portion 103 formed in an inside surface 106 on the opposite side of the planar portion 104 and serving as a recess for accommodating a tip portion (edge) of the paper core P for the stretch film F.

[0050] The hand grip belt B is a strip-like member made of a fabric material. A bolt hole B3 is formed on the side portion 105 of the first gripper 10. Aholdingplate (washer) B2 having an opening so as to face the bolt hole B3 is arranged. An end portion of the belt B is pinched between the side portion 105 and the holding plate B2. In this state, opposite ends of the belt B are fixed to the first gripper 10 by fixing a bolt B1 to a bolt hole B3 of the side portion 105 passing through the holding plate B2.

[0051] The attaching/detaching lever 11 is a plate member of a size capable of being held in the accommodating portion 101. A through-hole 113 for passing through an upper portion of the screw body 12 is arranged in the center thereof. Further, the attaching/detaching lever 11 has a bolt hole 111 formed along the radial direction and opened on a side surface of the through-hole 113.

[0052] The screw body 12 includes a columnar coupling portion 121 having a bolt hole 122 for coupling with the attaching/detaching lever 11 in the radial direction; a columnar holding portion 124 being continuous to the coupling portion 121 inwardly in the longitudinal direction thereof and having a larger diameter than that of the coupling portion 121; and a threaded region 123 being continuous to the holding portion 124 inwardly in the longitudinal direction thereof, the threaded region 123 being made of a columnar member having a smaller diameter than that of the holding portion 124 and externally threaded on the outer periphery. The threaded region 123 is threadedly fitted in a screw receiving portion 301 of a screw receiving body 30 in the coupling tool 50. The outer diameter of the holding portion 124 is set so as to substantially match the inner diameter of the core body S. Accordingly, an outer peripheral surface of the holding portion 124 abuts against an inner peripheral surface of the core body S, and thereby increases the rigidity in the bending direction.

[0053] Figures 5 and 6 illustrate the columnar screw receiving body 30 as a component of the coupling tool 50 and the core body S to which the screw receiving body 30 is fixed respectively. The screw receiving body 30 includes a screw receiving region 301 having an internally threaded end face in the longitudinal direction, and an insertion portion 304 being continuous to the screw receiving region 301 inwardly in the longitudinal direction thereof. The insertion portion 304 has a coupling hole 302 passing therethrough in the radial direction. Two coupling holes 302 are spaced at a predetermined interval from each other in the longitudinal direction. A resilient pin 60 for connecting to the core body S is inserted into the coupling hole 302. Note that the coupling hole 302 may be a bolt hole. Then, a bolt can be used to connect to the core body S.

[0054] A coupling hole 303 for connecting the screw receiving body 30 by means of the resilient pin 60 is formed in the vicinity of the end portion of the core body S. The outer diameter of the screw receiving body 30 is set to be substantially the same as or a little smaller than the inner diameter of the core body S. Accordingly, the screw receiving body 30 is accommodated completely inside the vicinity of the end portion of the core body S. In a state in which the position of the coupling hole 302 of the screw receiving body 30 matches the position of the coupling hole 303 of the core body S, the resilient pin 60 is inserted to fix both bodies. Note that the present embodiment illustrates a case in which the core body S has a cylindrical shape, but may have a bar structure filled inside. In a case in which the core body S has a bar structure, a recessed portion for accommodating the screw receiving body 30 may be formed in the vicinity of the end portion of the shaft. Note that the present embodiment illustrates a case in which the screw receiving body 30 is completely accommodated inside the core body S, but for example, the screw receiving body 30 may be coupled to an end portion of the core body S so as to stretch from the end portion of the core body S. Note also that for example, a metal material or the like may be used to integrally form the core body S and the screw receiving body 30.

[0055] As illustrated in Figure 10, the first gripper 10, the attaching/detaching lever 11, the screw body 12, and the screw receiving body 30 are assembled in the following procedure. First, the coupling portion 121 of the screw body 12 is rotatably inserted into the through-hole 102 of the first gripper 10, and further protruded into the accommodating portion 101 to be fitted in a fitting portion 113 of the attaching/detaching lever 11. Subsequently, the position of a bolt hole 111 on the side of the attaching/detaching lever 11 matches the position of a bolt hole 122 on the side of the screw body 12, and then a bolt 112 is screwed into both holes to connect the attaching/detaching lever 11 and the screw body 12. As a result, the first gripper 10 is sandwiched in between the attaching/detaching lever 11 and the screw body 12, but not connected thereto. Accordingly, the first gripper 10 can be rotated freely relatively around a periphery of the coupling portion 121 of the screw body 12. Therefore, this configuration can allow a relative rotation (phase difference) between the first gripper 10 and the second gripper 20 to be described later. Thus, a change in angle between left and right hands during use can be flexibly followed. A structure including the first gripper 10, the screw body 12 of the coupling tool 50, and the attaching/detaching lever 11 corresponds to a rotation mechanism cited in the present invention.

[0056] As already described, the screw receiving body 30 is fixed inside the core body S. In this state, the holding portion 124 and the threaded region 123 of the screw body 12 attached to the first gripper 20 are inserted into inside the core body S, and a user uses the attaching/detaching lever 11 to rotate the screw body 12. As a result, the threaded region 123 of the screw body 12 is threadedly fitted in the screw receiving region 301 of the screw receiving body 30 to form the coupling tool 50. Thus, the screw body 12 can be freely attached to and detached from the screw receiving body 30 by rotating the attaching/detaching lever 11 left and right around the core body S. The screw structure including the screw body 12 and the screw receiving body 30 corresponds to an attaching/detaching mechanism cited in the present invention.

[0057] Figures 7 to 9 illustrate a state of a perimeter structure including the second gripper 20. The manipulation tool 2 includes the second gripper 20 and a coupling tool 21. The coupling tool 21 is used to connect the second gripper 20 and an end portion of the core body S. The second gripper 20 is a plate-like member having an outer diameter allowing the fingers to be freely manipulated in a state of being covered with the palm. Specifically, the size of the second gripper 20 is such that the maximum thickness H along the longitudinal direction is 40 mm or less and 3 mm or more; and the maximum size W in the diameter direction is 100 mm or less and 30 mm or more. When the second gripper 20 is covered with the palm, the fingers f1 to f5 are made free. Then, the fingers f1 to f5 can be used to press the surface of the roll body R and thereby freely manipulate the degree of rolling out the stretch film F.

[0058] The second gripper 20 includes an accommodating portion 203 formed in an outside planar portion 205 and serving as a recess for accommodating a part of the coupling tool 21; a through-hole 202 formed continuously in a bottom surface of the accommodating portion 203 so as to pass the part of the coupling tool 21 therethrough; a film accommodating portion 201 formed in an inside surface 207 on the opposite side of the planar portion 205 and serving as a recess for accommodating a tip portion (edge) of the paper core P for the stretch film F; and a bolt hole 204 formed in the longitudinal direction of the stretch film F for connecting the gripper 20 and the coupling tool 21. Note that a total of four openings 209 are formed in the second gripper 20 for reducing weight.

[0059] Meanwhile, the coupling tool 21 is extended in the radial direction to include a plate-like coupling portion 22 accommodated in the accommodating portion 203 of the second gripper 20; and a columnar insertion portion 23 continuously formed inwardly in the longitudinal direction from the coupling portion 22. A bolt hole for connecting to the second gripper 20 is formed in the coupling portion 22 in the longitudinal direction thereof. A coupling hole 231 is formed in the insertion portion 23 so as to pass therethrough in the radial direction. Two coupling holes 231 are spaced at a predetermined interval from each other in the longitudinal direction. A resilient pin 60 for connecting to the core body S is inserted into the coupling hole 231.

[0060] A coupling hole 233 for connecting the coupling tool 21 by means of the resilient pin 60 is formed in the vicinity of the end portion of the core body S to which the coupling tool 21 is fixed. The outer diameter of the insertion portion 23 in the coupling tool 21 is set to be substantially the same as or a little smaller than the inner diameter of the core body S. Accordingly, the insertion portion 23 is inserted completely inside the vicinity of the end portion of the core body S. In a state in which the position of the coupling hole 231 of the insertion portion 23 matches the position of the coupling hole 233 of the core body S, the resilient pin 60 is inserted to fix both bodies.

[0061] When the second gripper 20 and the coupling tool 21 are assembled, first, the insertion portion 23 of the coupling tool 21 is inserted into the through-hole 202 of the second gripper 20 from outside to inside to hold the coupling portion 22 of the coupling tool 21 in the accommodating portion 203 of the second gripper 20. Further, in a state in which the position of a bolt hole of the coupling portion 22 matches the position of a bolt hole 204 of the second gripper 20, both holes are connected to each other by means of a bolt 221. Subsequently, the insertion portion 23 of the coupling tool 21 is inserted into the core body S to fix both holes by means of the resilient pin 60.

[0062] As illustrated in Figure 10, the manipulation tool 2 as a finished product according to the present embod-

iment is such that the screw receiving body 30 is inserted into inside one end of the core body S; and the coupling tool 21 and the second gripper 20 are attached to the other end of the core body S. The band B, the attaching/detaching lever 11, and the screw body 12 are attached to the first gripper 10. In the manipulation tool 2, one end of the core body S is passed through the paper core P of the roll body R for the stretch film F. Subsequently, the screw body 12 of the first gripper 10 is inserted into an end portion of the core body S and then the attaching/detaching lever 11 is rotated to connect the screw body 12 and the screw receiving body 30. When the stretch film F is exhausted, the attaching/detaching lever 11 is reversely rotated to detach the first gripper 10 and the used paper core P is removed and discarded.

[0063] According to the present embodiment, the second gripper 20 is completely fixed to the core body S and hence cannot be rotated. Accordingly, a relative rotation between the second gripper 20 and the attaching/detaching lever 11 causes a relative rotation between the screw receiving portion 30 fixed inside the core body S and a screw portion 12 fixed to the attaching/detaching lever 11, and thereby both can be connected to each other. Thus, the first gripper 10 can be detached very easily.

[0064] Further, during use, the first gripper 10 held by the palm and fingers are sandwiched in between the attaching/detaching lever 11 and the coupling tool 50, but are not fixed to each other. Thus, the first gripper 10 can be freely rotated around the coupling tool 50. Thus, if a relative angle change in both hands occurs during wrapping of the stretch filmF, rotational flexibility flexibly adapted to the change can be obtained.

[0065] Even if a relative angle change occurs between the first gripper 10 and the second gripper 20 during use, no relative angle change occurs between the screw body 12 and the screw receiving body 30 in the coupling portion 50 because the first gripper 10 is freely rotatable. Accordingly, during use, the fitted state between the screw portion 12 and the screw receiving portion 30 can be prevented from being loosed.

[0066] Note that according to the present embodiment, when the stretch film is wrapped, the paper core P rolls out the stretch film F while relatively rotating along the periphery of the core body S. At this time, a slight friction occurs between the core body S and the paper core P, and this frictional force causes the paper core P to rotate. Even in such a case, since the attachable and detachable structure including the screw body 12 and the screw receiving body 30 is arranged on the side of the freely rotatable first gripper 10, no relative rotation occurs between the screw body 12 and the screw receiving body 30 as long as the second gripper 20 is fixed to the core body S.

[0067] Note that according to the present embodiment, the screw body 12 and the screw receiving body 30 are formed with left hand screw threads (counterclockwise). The direction of rolling out the stretch film F is displayed. Then, even if the frictional force acting between the paper core P and the core body S causes the core body S to rotate, the force can be acted in a direction of further strongly tightening the screw body 12 and the screw receiving portion 30. In other word, an effective use of this slight frictional force can prevent the first gripper 10 from coming off during wrapping work. It is apparent that when the direction of rolling out the stretch film F is displayed reversely, the screw body 12 and the screw receiving body 30 may be formed with right hand screw threads (clockwise).

[0068] Further, according to the present embodiment, during wrapping work, the worker holds the first gripper 10 by the palm with one hand inserted into the belt B of the first gripper 10 and holds the second gripper 20 by the palm of the other hand. Accordingly, a plurality of fingers f1 to f5 (particularly the thumb) of both hands are made free, and hence the surface of the roll body R of the stretch film F can be pressed by the finger tips while the side surfaces of the first gripper 10 and the second gripper 20 are being held. The degree of pressing force can be increased or decreased to appropriately adjust the speed and tension for rolling out the stretch film F during wrapping work. As a result, the risk of falling-down of the roll body R is eliminated and good workability is obtained. Further, when the wrapping work is finished, the stretch film F can be cut at any position by strongly pressing the surface of the stretch film roll body R by means of the thumb f1. Particularly in comparison with a case in which a plurality of fingers are inserted into grooves and holes for holding, the present embodiment provides a structure allowing the first gripper 10 and the second gripper 20 to be held by the hand so as to be covered from outside, and hence the fingers f1 to f5 (particularly the thumb) are made free. Accordingly, the fingers f1 to f5 are not pressed during work, and hence fatigue can be reduced. Further, the outside surfaces of the first gripper 10 and the second gripper 20 are flat, and hence the wrapping apparatus 1 can be stably standing upright on the ground.

[0069] Figure 11 illustrates a wrapping apparatus (hereinafter referred to as a wrapping apparatus) 1 according to a second embodiment of the present invention. Note that in the figure and the following description, the same reference numerals or characters are assigned to the parts and members which are the same as or similar to those in the first embodiment; and thus the detailed description thereof is omitted and the following description will focus on the differences from the first embodiment.

[0070] The wrapping apparatus 1 of the second embodiment is the same as that of the first embodiment except the first gripper 10 and the perimeter structure in the manipulation tool 2. As illustrated in Figure 12, the first gripper 10 includes an accommodating portion 101 formed in an outside planar portion 104 and serving as a recess for accommodating an attaching/detaching lever 11; a through-hole 102 formed continuously in the axial direction in a bottom surface of the accommodating

portion 101 so as to pass an engaging body 12 therethrough; and a film accommodating portion 103 formed in an inside surface 106 on the opposite side of the planar portion 104 and serving as a recess for accommodating a tip portion (edge) of the paper core P for the stretch film F.

[0071] The attaching/detaching lever 11 is a plate member of a size capable of being held in the accommodating portion 101. A bolt hole 111 for connecting to an engaging body 13 serving as a component of a coupling tool 50 is arranged in the center thereof.

[0072] The engaging body 13 includes a columnar coupling portion 131 having a longitudinal bolt hole 132 for connecting to the attaching/detaching lever 11; a columnar holding portion 134 being continuous to the coupling portion 131 inwardly in the longitudinal direction thereof and having a larger diameter than that of the couplingportion 131; and an insertion region 133 being continuous to the holdingportion 134 inwardly in the longitudinal direction thereof, the insertion region 133 being made of a columnar member having a smaller diameter than that of the holding portion 134 and having a compression spring 80 and a washer 82 on an outer periphery thereof. A pinhole 135 is formed on the leading end side of the insertion region 133 so as to pass therethrough in the diameter direction. An extended pin 62 corresponding to an extended portion cited in the present invention is fixed to the pinhole 135. Opposite ends of the extended pin 62 protrude in the diameter direction from the insertion region 133. The outer diameter of the holding portion 134 is set so as to substantially match the inner diameter of the core body S. Accordingly, an outer peripheral surface of the holding portion 134 abuts against an inner peripheral surface of the core body S, and thereby increases the rigidity in the bending direction.

[0073] Figures 13 and 14 illustrate a columnar fixed body 31 serving as a component of the coupling tool 50. The fixed body 31 includes an engaging region 311; and an insertion portion 314 being continuous to the engaging region 311 inwardly in the longitudinal direction thereof. The insertion portion 314 has a coupling hole 312 so as to pass therethrough in the radial direction. A resilient pin 60 for connecting to the core body S is inserted into the coupling hole 312.

[0074] The engaging region 311 includes an insertion opening 313 formed on an end face on the side of the engaging body 13; an insertion hole 314 formed continuously in the longitudinal direction of the insertion opening 313; an annular circumferential groove 315 continuously formed circumferentially behind the insertion hole 314 (here, inwardly in the longitudinal direction); and a counter insertion direction recessed portion 316 arranged continuously to the circumferential groove 315 on an opposite side (here, outside in the longitudinal direction) of the insertion direction.

[0075] The inner diameters of the insertion opening 313 and the insertion hole 314 are set to be greater than the diameter of the insertion region 133 of the engaging body 13 and less than the outer diameter of the compression spring 80 or the washer 82. Thus, when the insertion region 133 of the engaging body 13 is inserted into the insertion hole 314 through the insertion opening 313, the washer 82 abuts against an end face of the fixed body 31 to press the compression spring 82. Note that a relief groove 317 for avoiding the interference with the extendedpin 62 is formed in the insertion opening 313 and the insertion hole 314 in the longitudinal direction thereof . This relief groove 317 guides the extended pin 62 in the longitudinal direction. The circumferential groove 315 formed continuously to the insertion hole 314 circumferentially guides the extended pin 62. Thus, an insertion direction step portion 318 including corners of the relief groove 317 and the circumferential groove 315 is engaged with the extended pin 62 in the longitudinal direction. This engagement prevents the engaging body 13 from coming out of the fixed body 31. The counter insertion direction recessed portion 316 formed continuously in the circumferential groove 315 is circumferentially formed to have a relative angle difference from the relief groove 317 and is suspended just before reaching the end face of the fixed body 13. Thus, the extended pin 62 is circumferentially guided by the circumferential groove 315 and further is guided to the side opposite to the insertion direction by the counter insertion direction recessed portion 316 to be held at an end view point of the groove. In this state, the circumferential direction step portion 319 including corners of the circumferential groove 315 and the counter insertion direction recessed portion 316 is circumferentially engaged with the extended pin 62. As a result, unless the extended pin 62 accommodated in the counter insertion direction recessed portion 316 is pushed back in the insertiondirection, the extended pin 62 and the engaging body 13 cannot be rotated circumferentially inside the fixed body 31.

[0076] As described above, the extended pin 62, the engaging body 13, the fixed body 31, the compression spring 80, and the like constitute the attaching/detaching mechanism cited in the present invention.

[0077] Note that a coupling hole 303 for connecting the fixed body 31 by means of the resilient pin 60 is formed in the vicinity of the end portion of the core body S. The outer diameter of the fixed body 31 is set to be substantially the same as or a little smaller than the inner diameter of the core body S. Accordingly, the fixed body 31 is accommodated completely inside the vicinity of the end portion of the core body S. In a state in which the position of the coupling hole 312 of the fixed body 31 matches the position of the coupling hole 303 of the core body S, the resilient pin 60 is inserted to fix both bodies.

[0078] As illustrated in Figure 15, the first gripper 10, the attaching/detaching lever 11, and the engaging body 13 are assembled in the following procedure. First, the coupling portion 131 of the engaging body 13 is rotatably inserted into the through-hole 102 of the first gripper 10, and further protruded from the bottom surface of the accommodating portion 101 to be fitted in a fitting portion

113 of the attaching/detaching lever 11. Subsequently, the position of a bolt hole 111 on the side of the attaching/detaching lever 11 matches the position of a bolt hole 132 on the side of the engaging body 13, and then a bolt 112 is screwed into both holes to connect the attaching/detaching lever 11 and the engaging body 13. As a result, the first gripper 10 is sandwiched in between the attaching/detaching lever 11 and the engaging body 13, but not connected thereto. Accordingly, the first gripper 10 can be rotated freely relatively around a periphery of the coupling portion 131 of the engaging body 13. A structure including the first gripper 10, the engaging body 13 of the coupling tool 50, and the attaching/detaching lever 11 corresponds to the rotation mechanism cited in the present invention.

[0079] Further, the compression spring 80 is inserted over the insertion region 133 of the engaging body 13, further the washer 82 is inserted, and then the extended pin 62 is fixed to the pinhole 135. As a result, the extended pin 62 causes the washer 82 to be engaged with the compression spring 80, which can prevent the washer 82 and the compression spring 80 from coming out of the insertion region 133. Thus, the assembly of the first gripper 10 and the like complete.

[0080] When the manipulation tool 2 is used, first one end of the core body S is passed through the paper core P of the roll body R for the stretch film F. Subsequently, as illustrated in Figure 16, the engaging body 13 of the first gripper 10 is inserted from an end portion of the core body S and further as illustrated in Figure 17, the extended pin 62 is pushed inside along the relief groove 317. At this time, the washer 82 abuts against an end face of the fixed body 31 to cause the compression spring 80 to shrink. Subsequently, as illustrated in Figure 17, the attaching/detaching lever 11 is rotated to guide the extended pin 62 along the circumferential groove 315. Note that a slight rotation of the attaching/detaching lever 11 immediately causes the extended pin 62 to be engaged with the insertion direction step portion 318, and then a force for shrinking the compression spring 80 is not required. When the angle of the extended pin 62 matches the angle of the counter insertion direction recessed portion 316 as illustrated in Figure 18, the restoring force of the compression spring 80 urges the extended pin 62 to move toward the bottom side of the counter insertion direction recessed portion 316 as illustrated in Figure 11, and the extended pin 62 is automatically guided along the counter insertion direction recessed portion 316 toward the side opposite to the insertion direction. As a result, the extended pin 62 abuts against the bottom of the counter insertion direction recessed portion 316 to be held. Unless the extended pin 62 is pushed back in the insertion direction against the restoring force of the compression spring 80, the extended pin 62 and the engaging body 13 cannot be rotated circumferentially inside the fixed body 31. Note that the first gripper 10 can be detached from the core body S by the aforementioned procedure in reverse.

[0081] The wrapping apparatus 1 of the second embodiment allows the first gripper 10 to be attached to and detached from the core body S in a very simple manner, thus further increasing work efficiency. In particular, since both the attaching/detaching mechanism and the rotation mechanism are arranged on the side of the first gripper 10 and the core body S is fixed to the side of the second gripper 20, an external force causing a relative rotation between the fixed body 31 and the engaging body 13 hardly occurs during use. Accordingly, the external force acting on the extended pin 62 can be reduced to be small, and hence the size of the coupling tool 50 including the extended pin 62 can be reduced. As a result, the diameter of the core body S can be reduced to up to less than 25 mm.

[0082] Note that the second embodiment exemplifies a coil spring as the urging member, but the present invention is not limited to this. For example, rubber, a plate spring, and other resilient structures may be used as needed.

[0083] Further, the second embodiment exemplifies a case in which the attaching/detaching mechanism is arranged inside the core body S, but the present invention is not limited to this. For example, like the wrapping apparatus 1 of another configuration example 1 schematically illustrated in Figures 19 to 21, the extended portion 63 extending in the diameter direction can be arranged in an end portion of the coupling tool 50 fixed to the core body S so as to form the insertion opening 117, the insertion direction engaging step portion 118, and the counter insertion direction recessed portion 119 on the side of the first gripper portion 10. An engaging projection 64 is engaged with the extended portion 63 so as to face the counter insertion direction recessed portion 119. The extended portion 63 is inserted into the insertion opening 117 of the first gripper 10 and then the first gripper 10 is rotated by 90 degrees to engage the counter insertion direction recessed portion 119 with the engaging projection 64. Thereby, the first gripper 10 can be easily attached and detached. The present configuration example uses the elastic deformation of the extended portion 63 as the urging member. Although not particularly illustrated here, the rotation mechanism is preferably arranged on the side of the second gripper 20.

[0084] Thus, according to the wrapping apparatus of the present embodiment, the outer diameter of the core body S is set to 65 mm or less and hence the inner diameter of the stretch film F can be set to 75 mm or less. For example, in the case of the stretch film F using the paper core P, the inner diameter of the paper core P can be set to 75 mm or less. For example, the present embodiment uses the paper core P with an inner diameter of 25 mm. Accordingly, in comparison with a widely used paper core with an inner diameter of more than 75 mm, the maximum outer diameter of the stretch film F when the same amount of film is wrapped can be greatly reduced. The stretch film F is consumed in large amounts and hence transported in large amounts by containers

or the like. Thus, a reduction in outer diameter of the stretch film F itself can greatly reduce the logistics costs. As a result, energy consumption during transportation is reduced, leading to a reduction in environmental impact attracting increased attention in recent years. Particularly, the present wrapping apparatus has the core body S on the side of the manipulation tool, and hence can use a so-called core-less structure without the paper core P for the stretch film F. Note that frictional resistance between the stretch film F and the core body S may increase. Thus, for example, like the wrapping apparatus 1 of other configuration example 2 of the second embodiment as illustrated in Figure 22, the manipulation tool 2 preferably has a cylindrical core body cover S2 arranged outside the core body S to allow a relative rotation with respect to the core body S. Even if the stretch film F of a core-less structure is closely attached to the core body cover S2, workability can be improved because the core body cover S2 is freely rotatable. As a result, the paper core P to be discarded can be eliminated. Thus, the costs of the roll body R can be reduced and the roll body R for the stretch film F with less discard costs can be obtained.

[0085] Note that the present invention is not limited to the above embodiments and apparently various modifications can be made to the present invention without departing from the spirit and scope of the present invention.

Claims

1. A stretch film wrapping manipulation tool for use with a bar-like member or a cylindrical shaft-like member inserted into a stretch film in a cylindrical shape, the stretch film wrapping manipulation tool comprising:

   a core body, which is the bar-like member or the cylindrical shaft-like member, inserted into a roll body of the stretch film in a cylindrical shape;
   a pair of grippers attached to opposite ends of the core body and held by hands of a user;
   a coupling portion provided on the opposite ends of the core body and connecting the core body and the gripper; and
   an attaching/detaching mechanism arranged between at least one of the grippers of the pair and the coupling portion and removably attaching the gripper and the coupling portion.

2. The stretch film wrapping manipulation tool according to Claim 1, wherein the gripper has an outer diameter being coverable with a palm.

3. The stretch film wrapping manipulation tool according to any one of Claims 1 and 2, further comprising a rotation mechanism arranged between at least one of the grippers of the pair and the coupling portion and holding the gripper and the coupling portion in a relatively rotatable manner.

4. The stretch film wrapping manipulation tool according to Claim 3, wherein both the attaching/detaching mechanism and the rotation mechanism are arranged in at least one of the grippers of the pair.

5. The stretch film wrapping manipulation tool according to any one of Claims 1 to 4, wherein
   the attaching/detaching mechanism includes:

   an extended portion arranged in one of the gripper and the coupling portion and extending in the diameter direction of the stretch film;
   an insertion opening arranged in the other one of the gripper and the coupling portion and into which the extended portion is inserted; and
   an insertion direction engaging step portion being continuous circumferentially behind the insertion opening in an insertion direction and engaged with the extended portion in the insertion direction by causing a relative rotation between the extended portion and the insertion opening.

6. The stretch film wrapping manipulation tool according to Claim 5, wherein
   the attaching/detaching mechanism has a counter insertion direction recessed portion being continuous to the insertion direction engaging step portion in an opposite direction of the insertion direction and engaged with the extended portion circumferentially by accommodating the extended portion.

7. The stretch film wrapping manipulation tool according to Claim 6, wherein
   the attaching/detaching mechanism has an urging member causing the extended portion accommodated in the counter insertion direction recessed portion to be urged to a bottom side of the counter insertion direction recessed portion.

8. The stretch film wrapping manipulation tool according to any one of Claims 1 to 7, further comprising a hand grip belt which is arranged in at least one of the grippers of the pair and into which a hand can be inserted.

9. The stretch film wrapping manipulation tool according to any one of Claims 1 to 8, wherein
   the gripper has a maximum thickness of 40 mm or less and 3 mm or more along a longitudinal direction of the stretch film and a maximum size of 100 mm or less and 30 mm or more in the diameter direction of the stretch film.

10. The stretch film wrapping manipulation tool according to any one of Claims 1 to 9, wherein the core body has a maximum outer diameter of 65 mm or

less.

11. The stretch film wrapping manipulation tool according to any one of Claims 1 to 10, further comprising a cylindrical core body cover into which the core body is inserted and which is arranged to be relatively rotatable with respect to the core body.

12. A stretch film wrapping apparatus comprising the stretch film wrapping manipulation tool according to any one of Claims 1 to 11; and the stretch film.

13. The stretch film wrapping apparatus according to Claim 12, wherein the stretch film has an inner diameter of 75 mm or less.

14. The stretch film wrapping apparatus according to any one of Claims 12 and 13, wherein the stretch filmhas a core-less structure without a paper core located on an inner peripheral surface.

15. A stretch film mounted on the stretch film wrapping manipulation tool according to any one of Claims 1 to 11.

16. The stretch film according to Claim 15, wherein the stretch film has an inner diameter of 75 mm or less.

17. The stretch film according to any one of Claims 15 and 16, wherein the stretch film has a core-less structure without a paper core located on an inner peripheral surface.

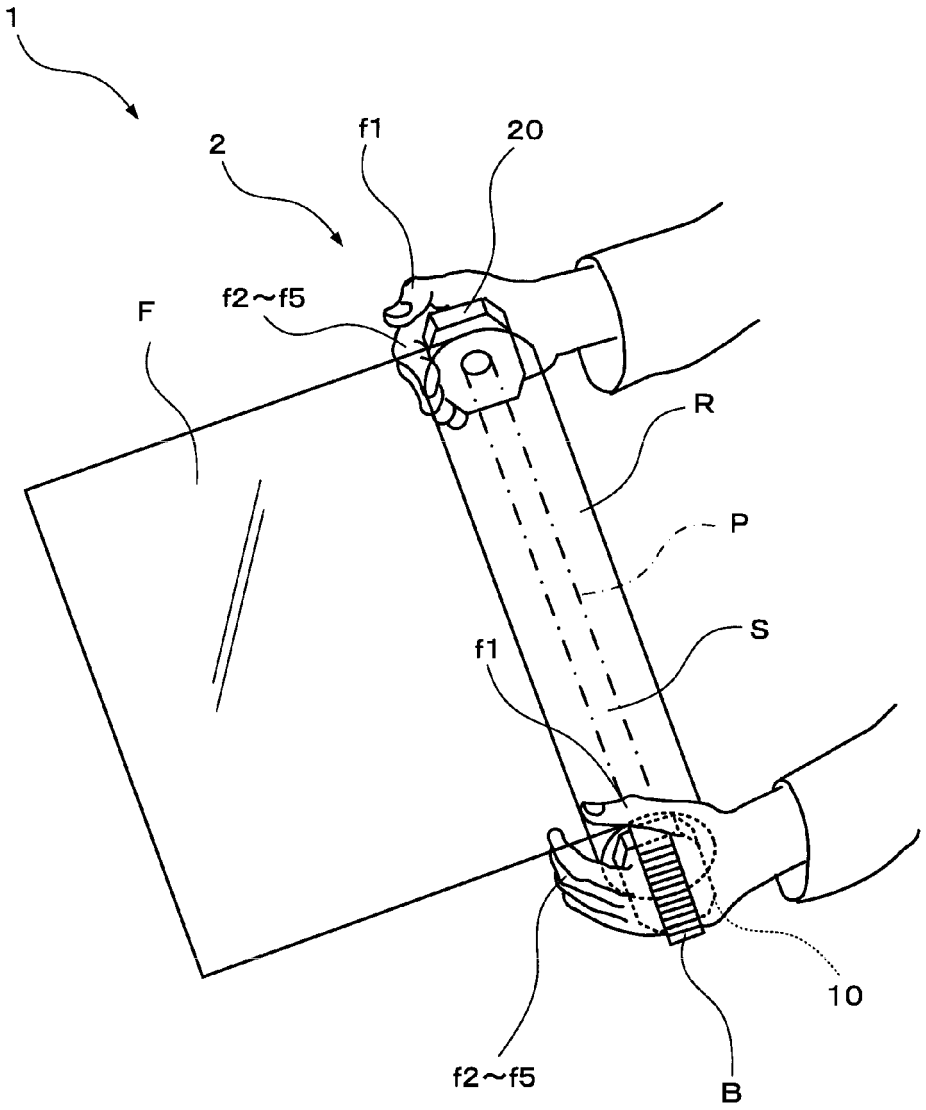

Figure 1

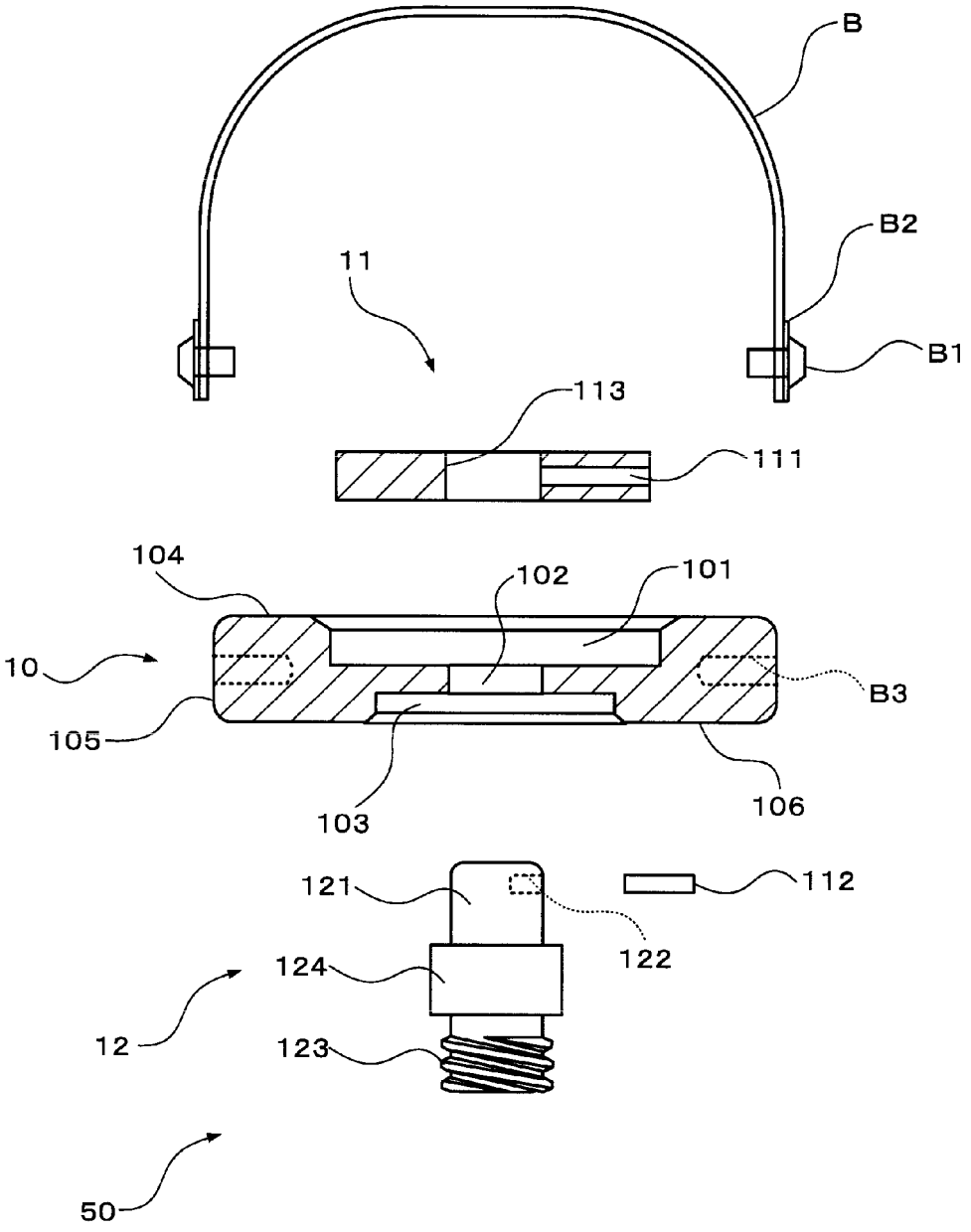
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Figure 2

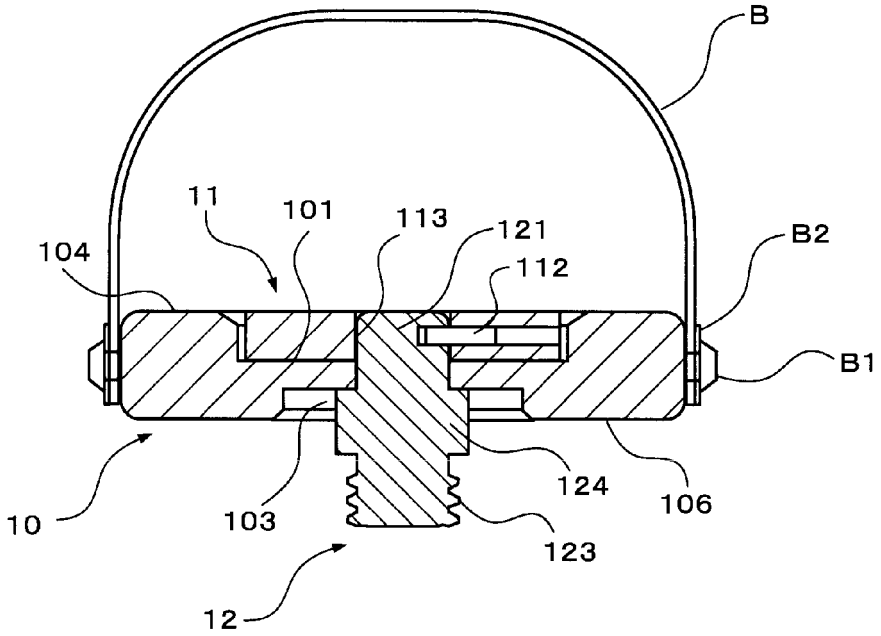


Figure 3

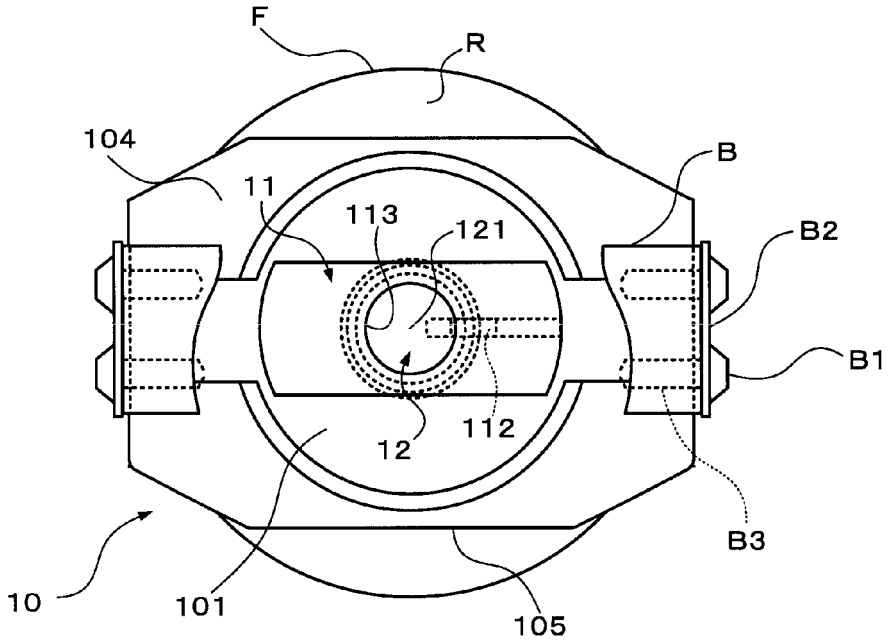


Figure 4

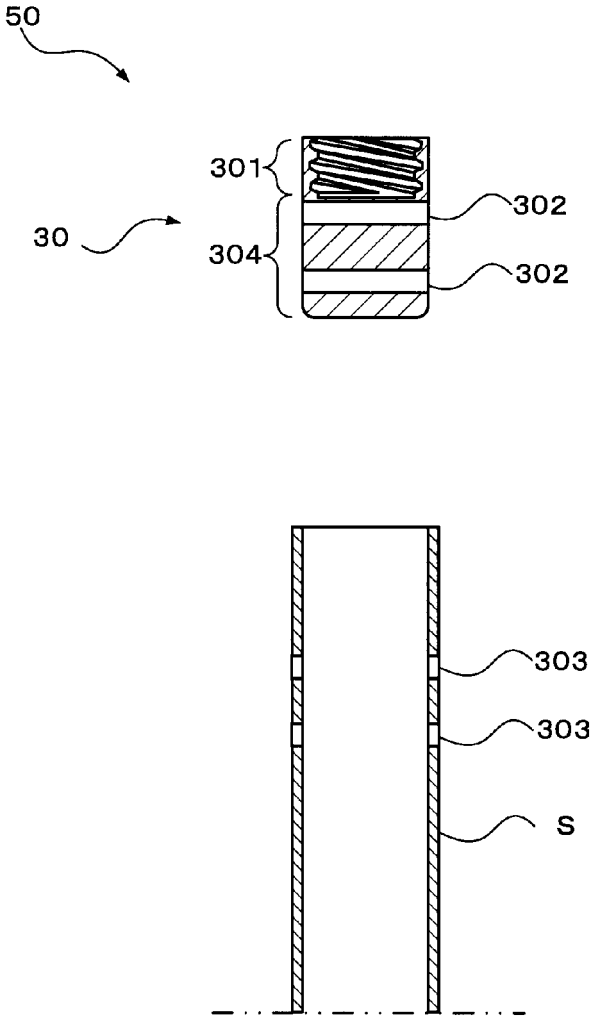
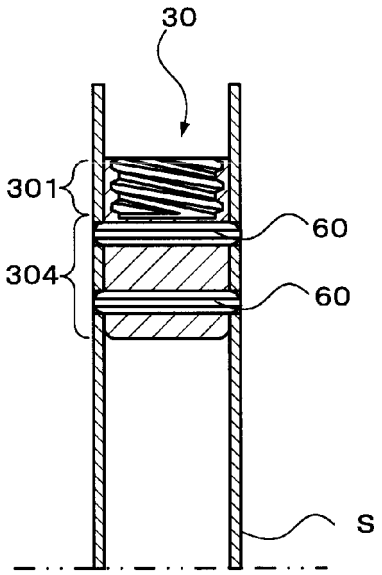


Figure 5



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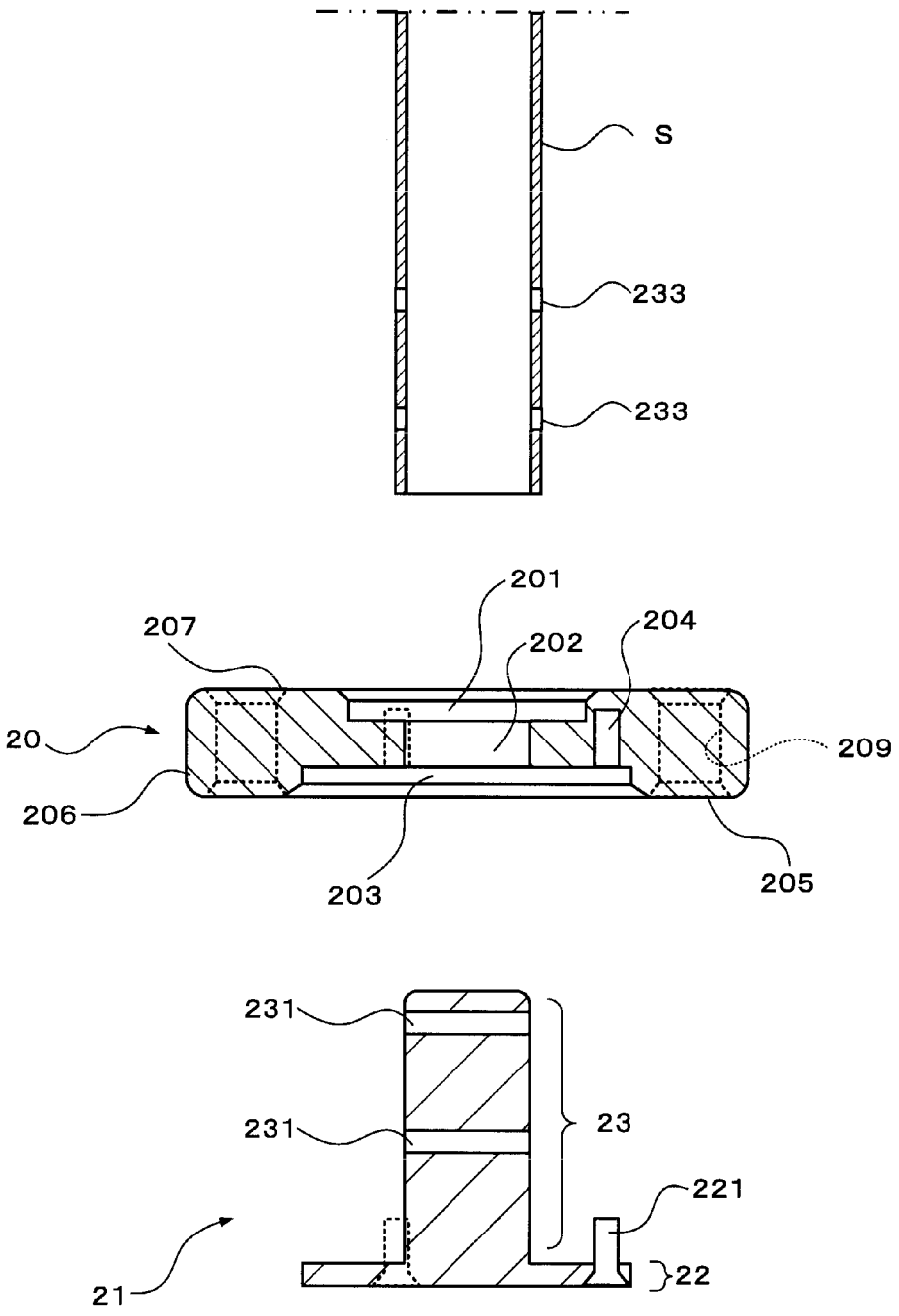

Figure 7

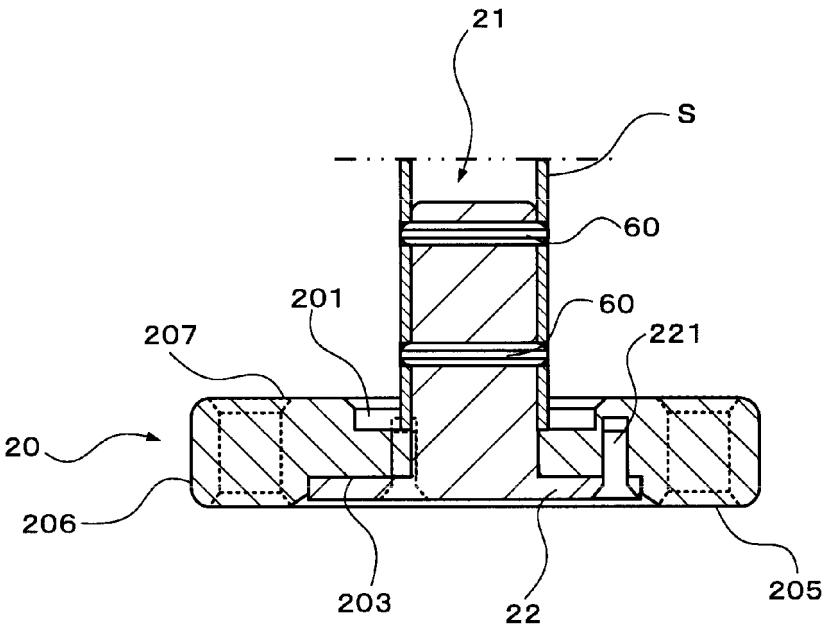

Figure 8

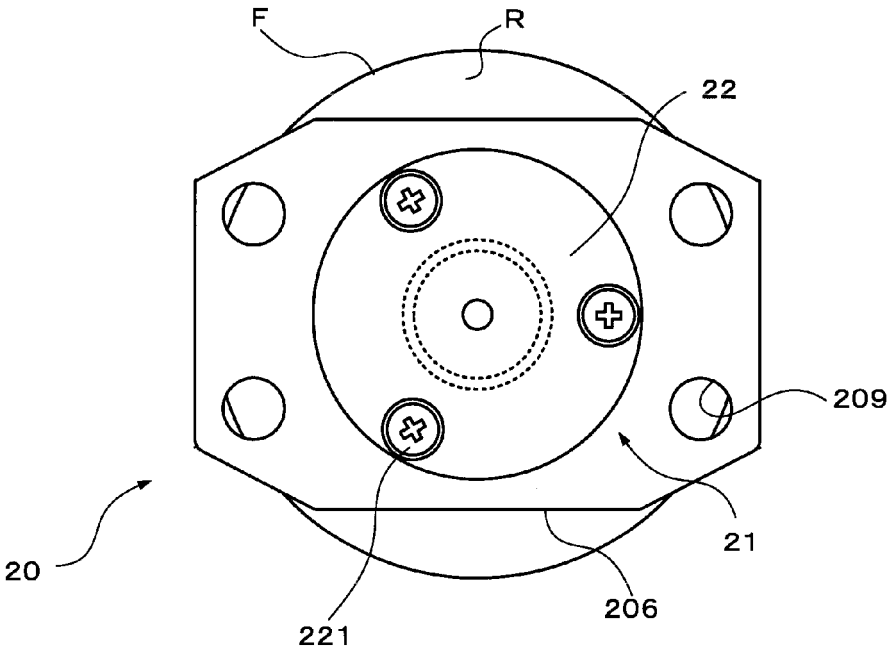

Figure 9

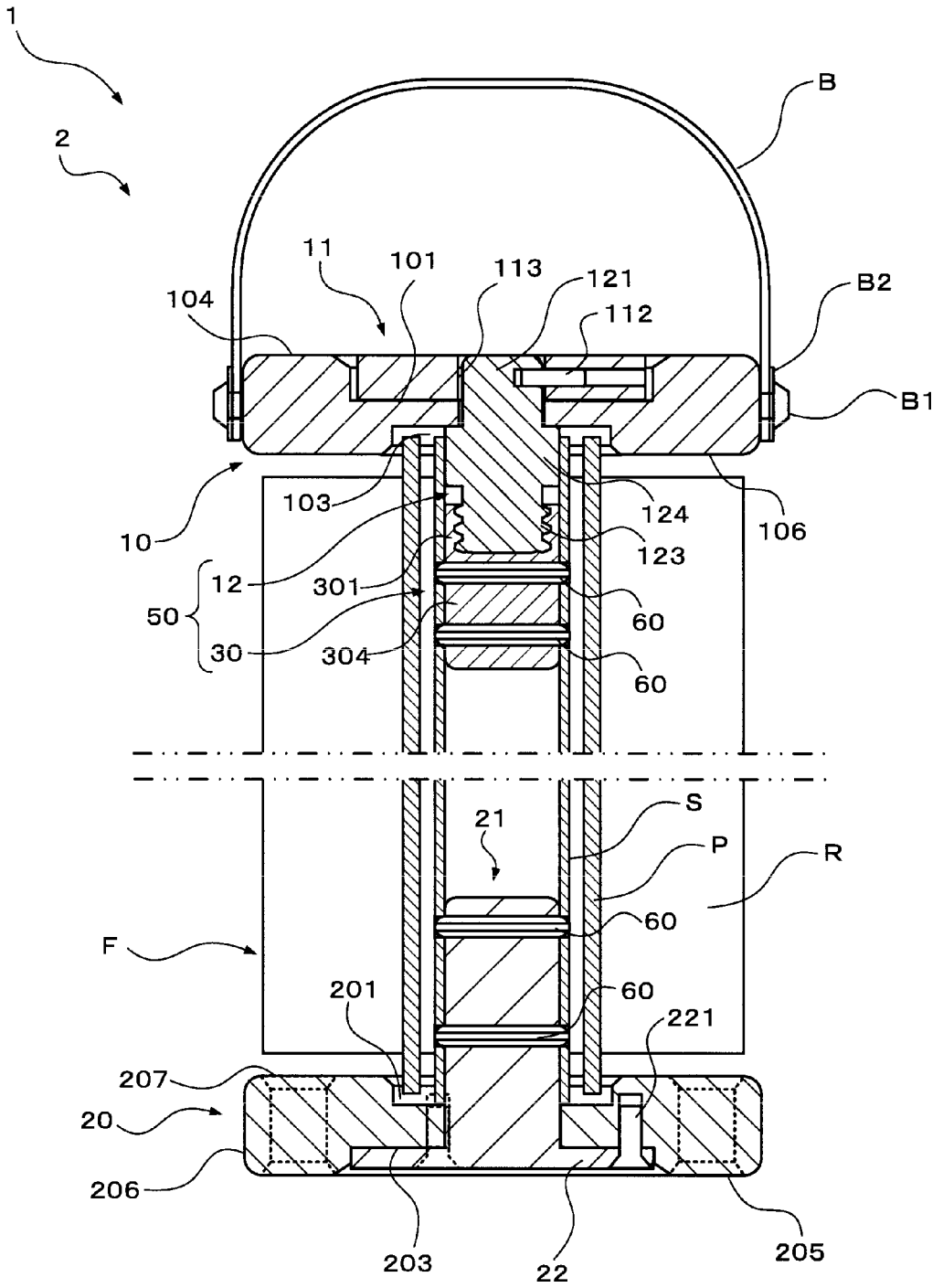
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Figure 10

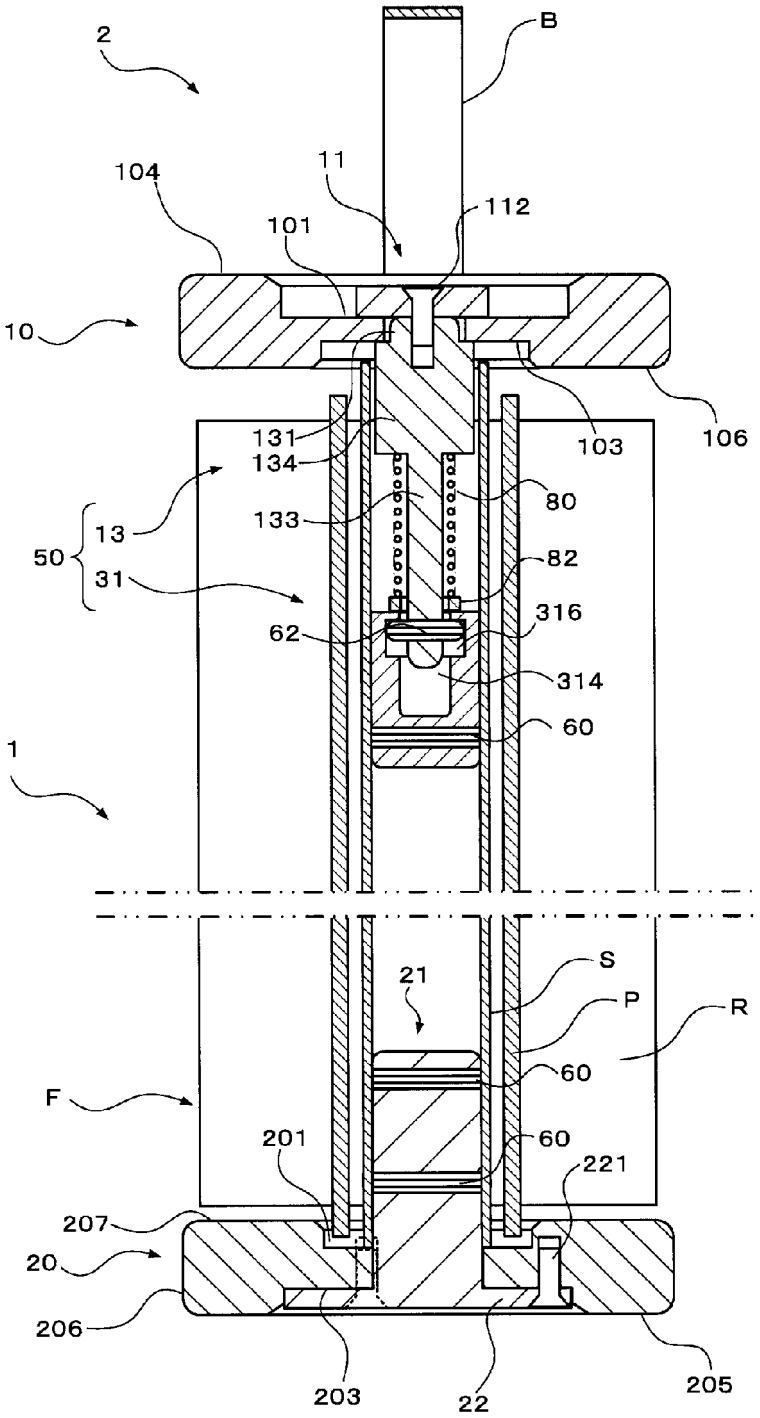
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Figure 11

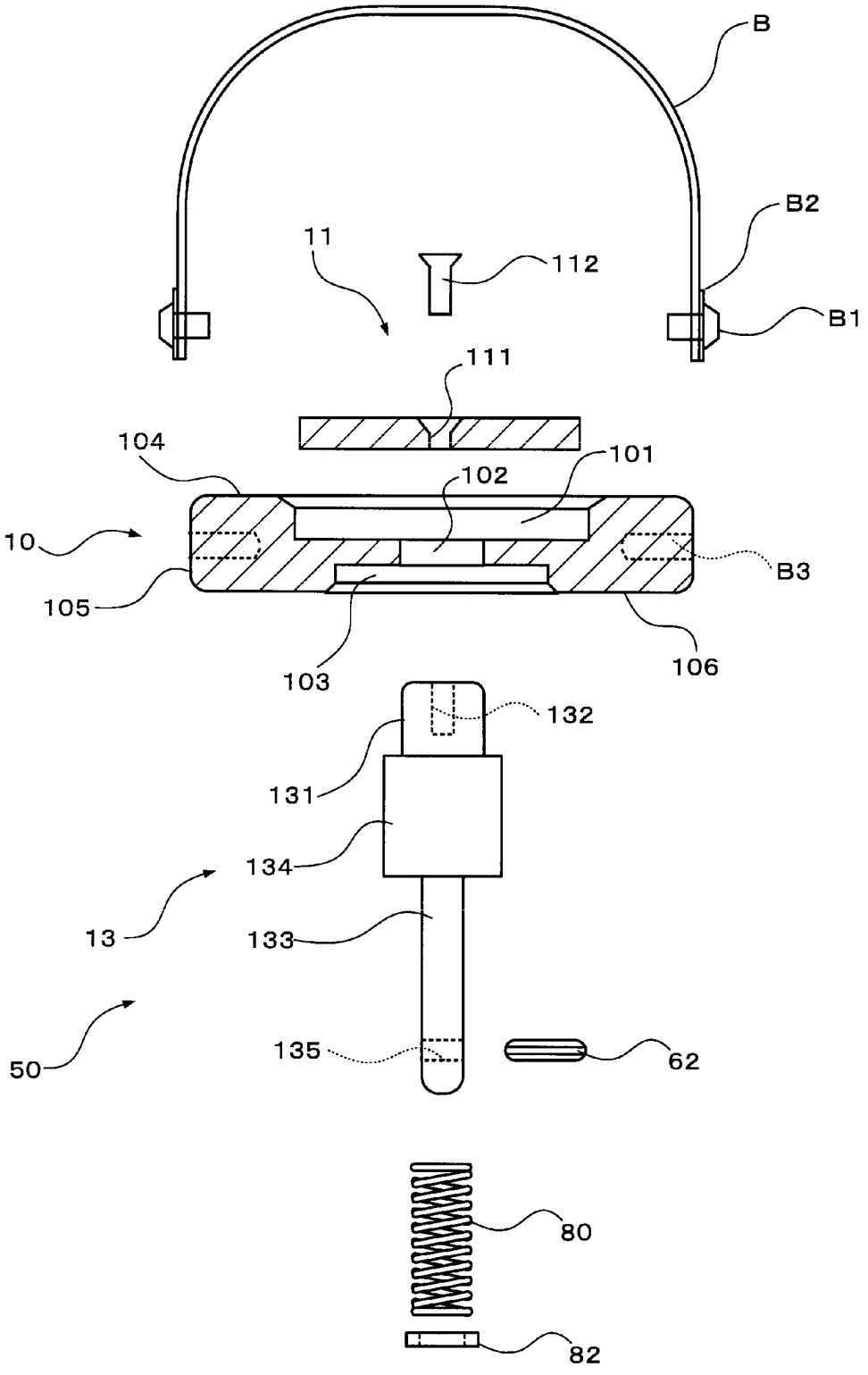
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Figure 12

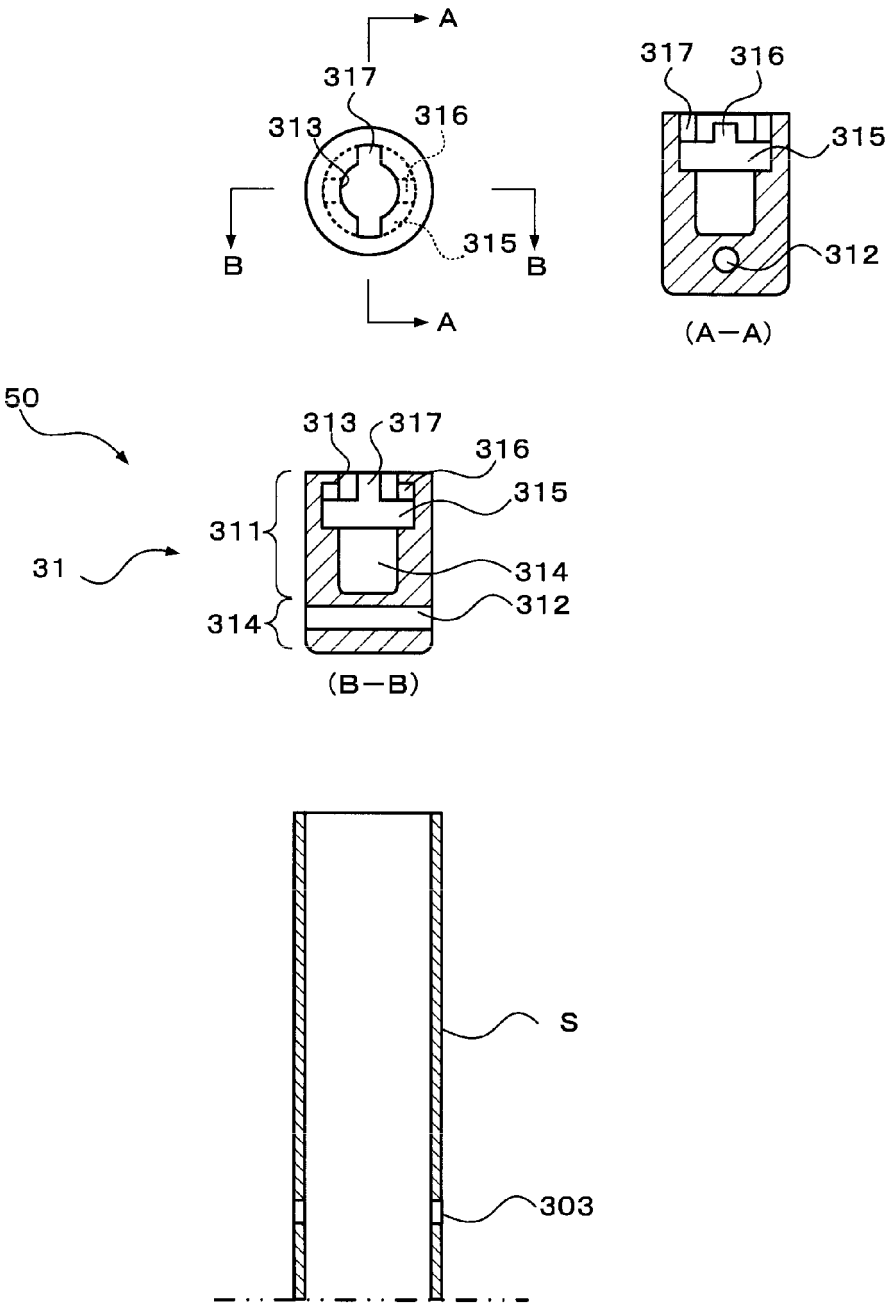
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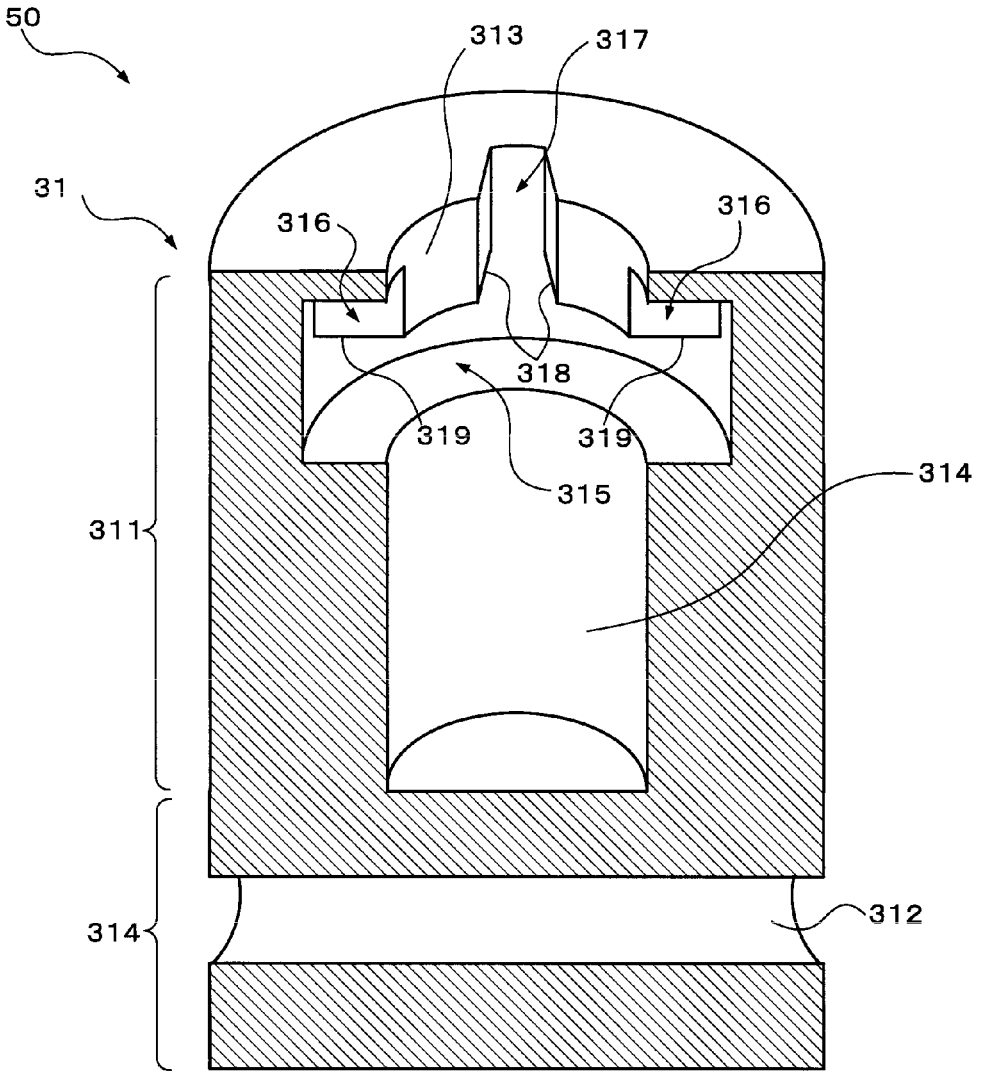
Figure 13



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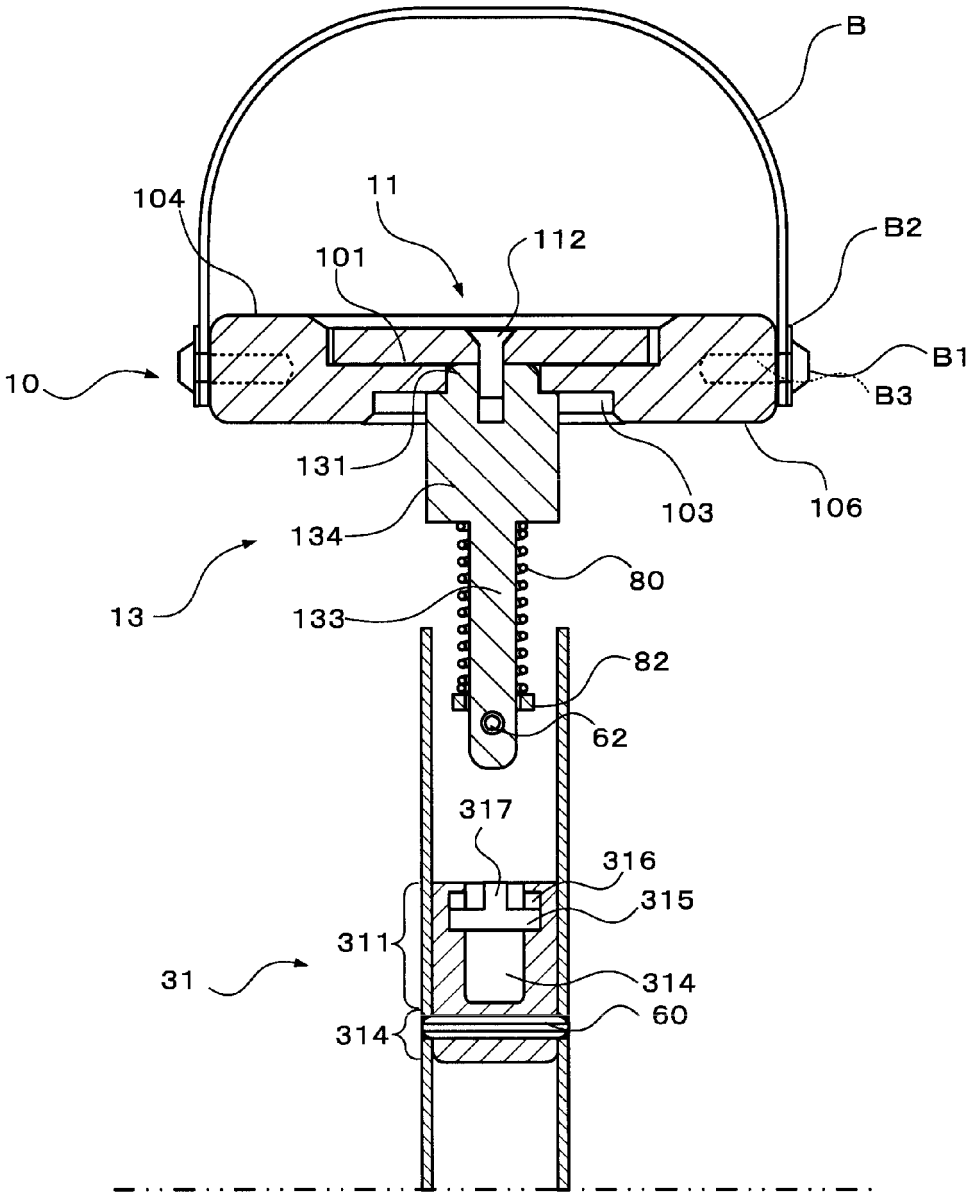
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Figure 15

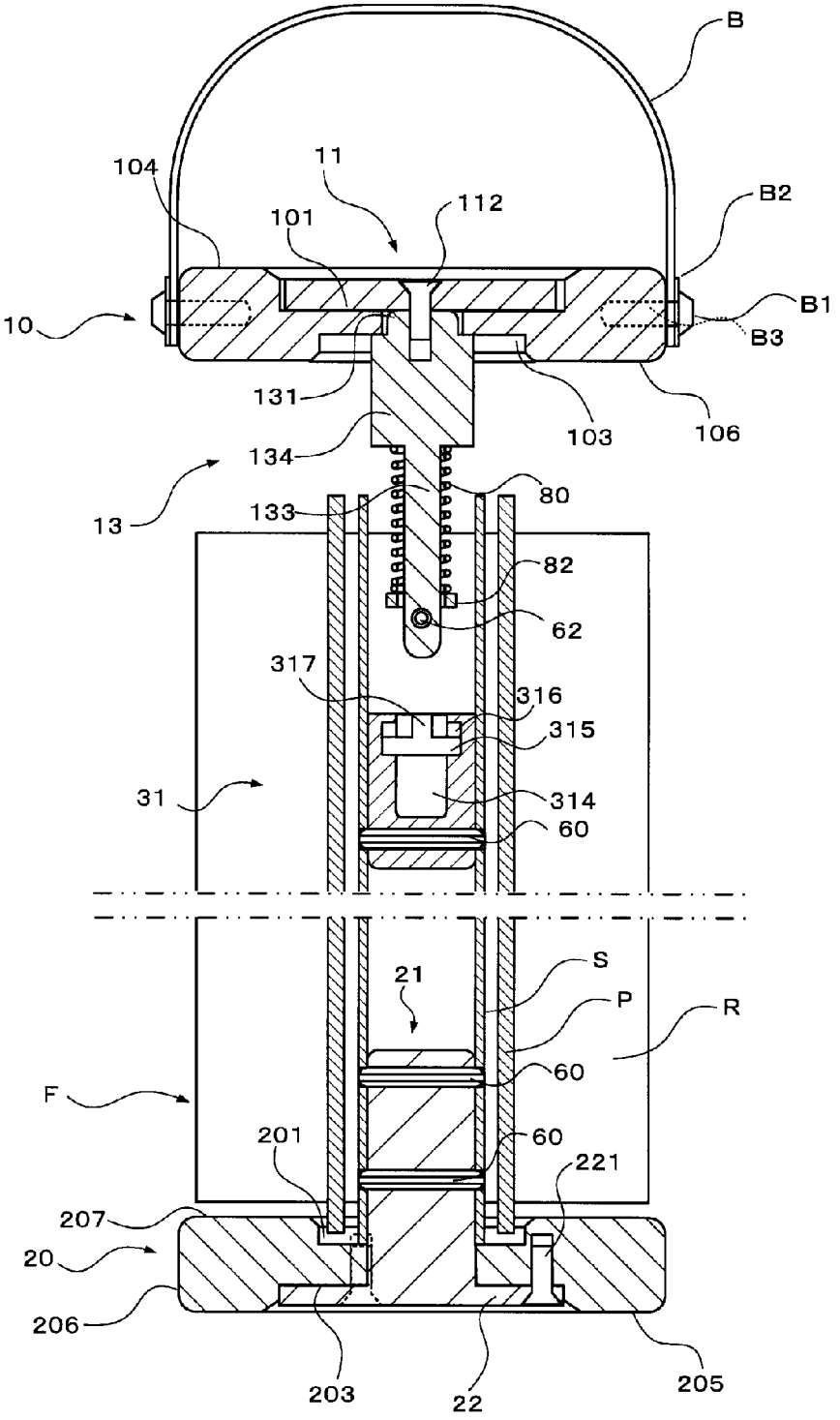
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Figure 16

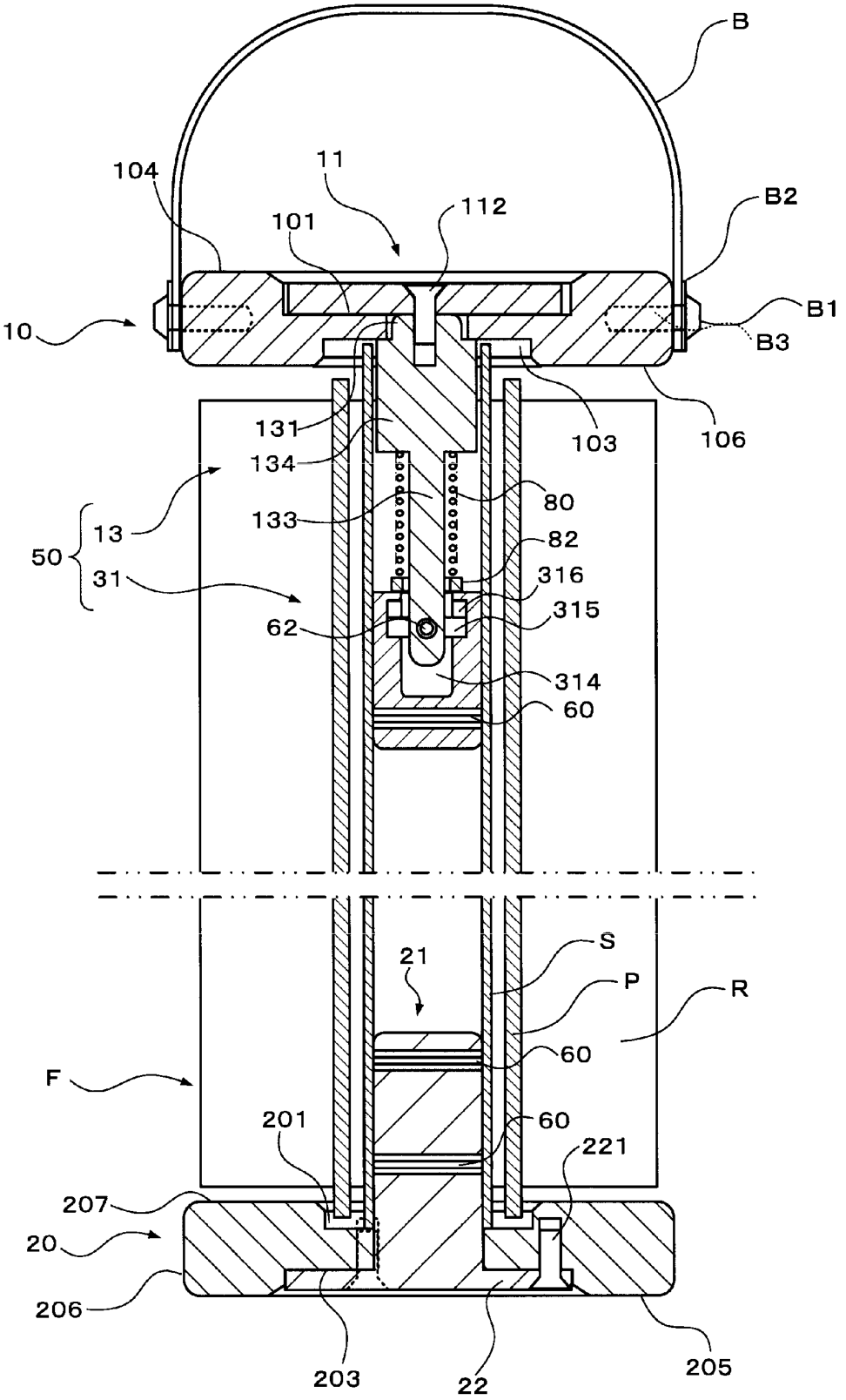
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Figure 17

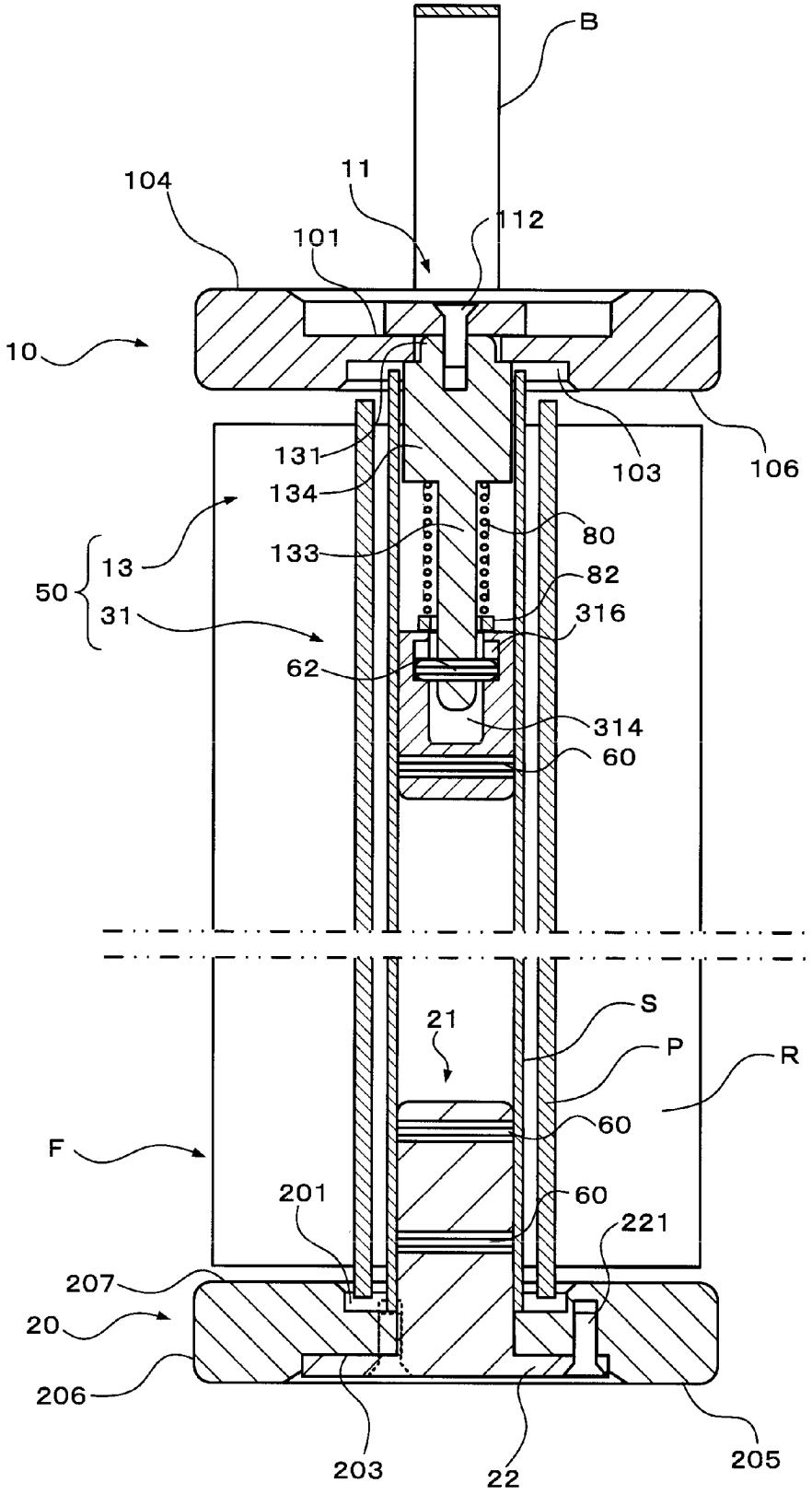
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Figure 18

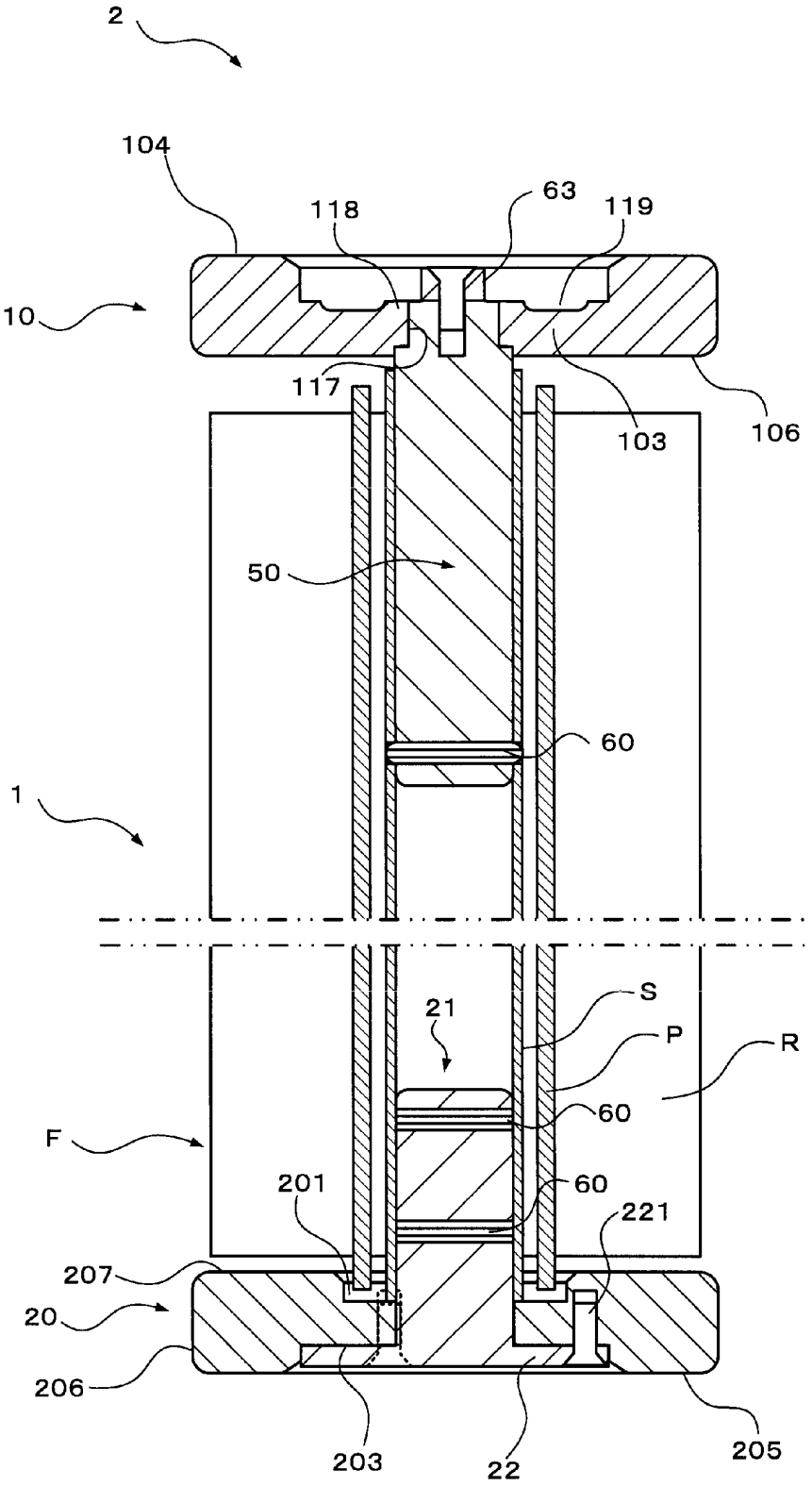
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Figure 19

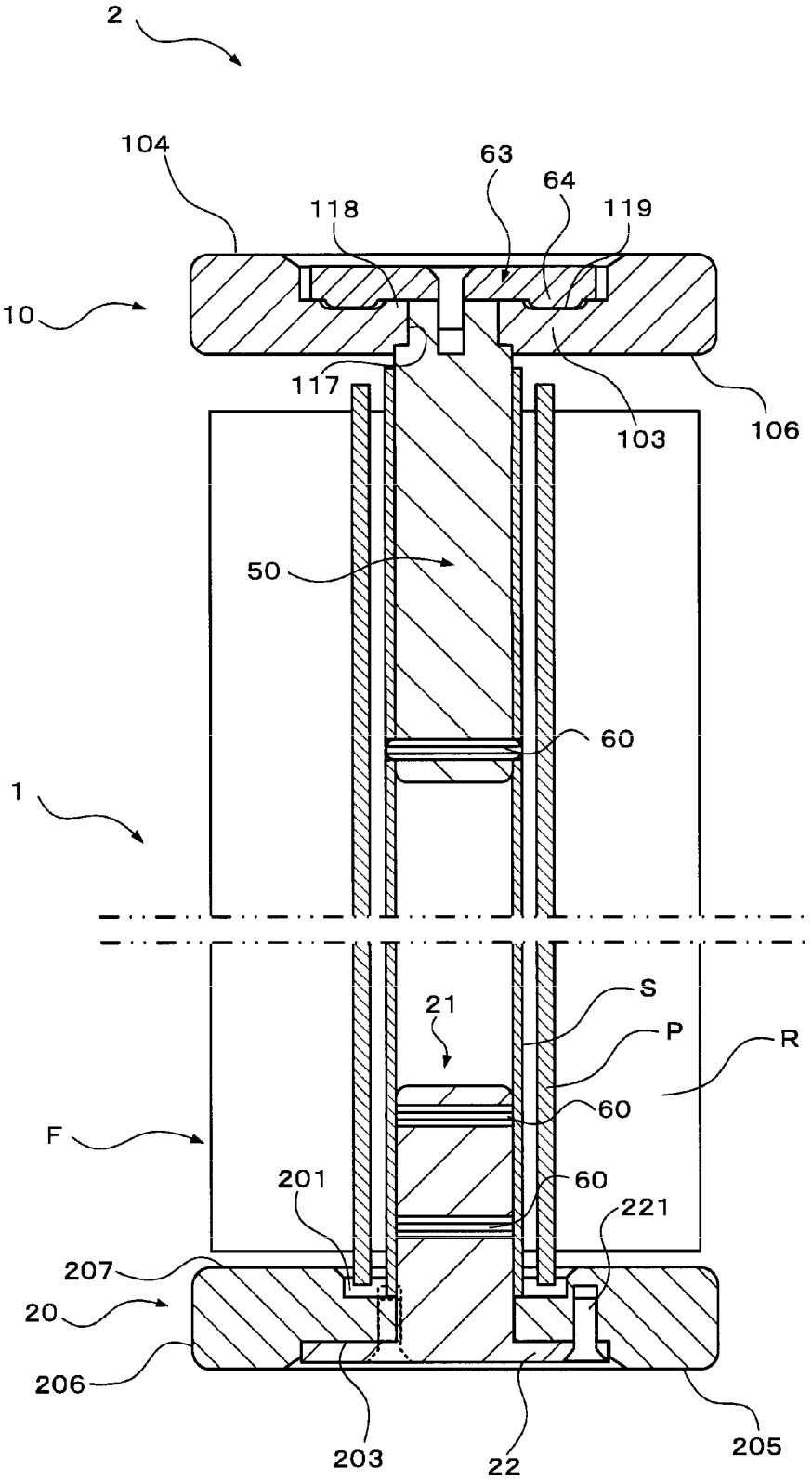
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Figure 20

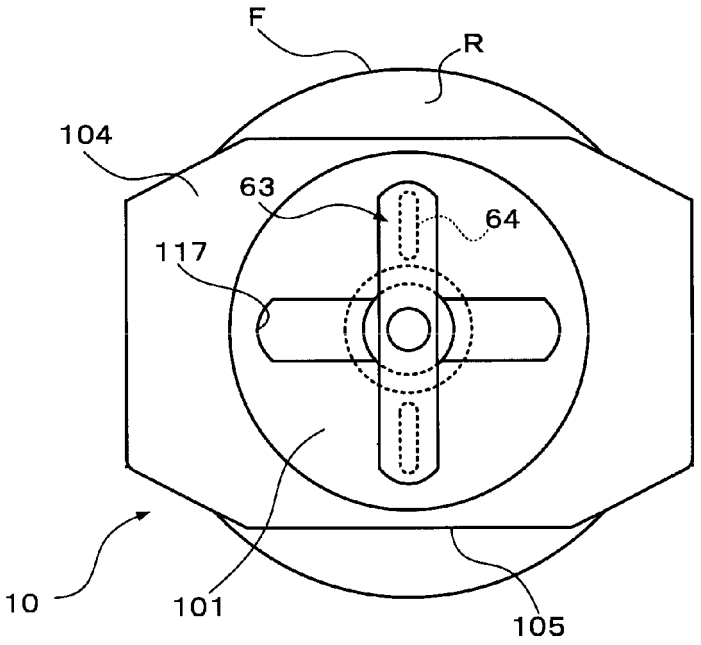

Figure 21

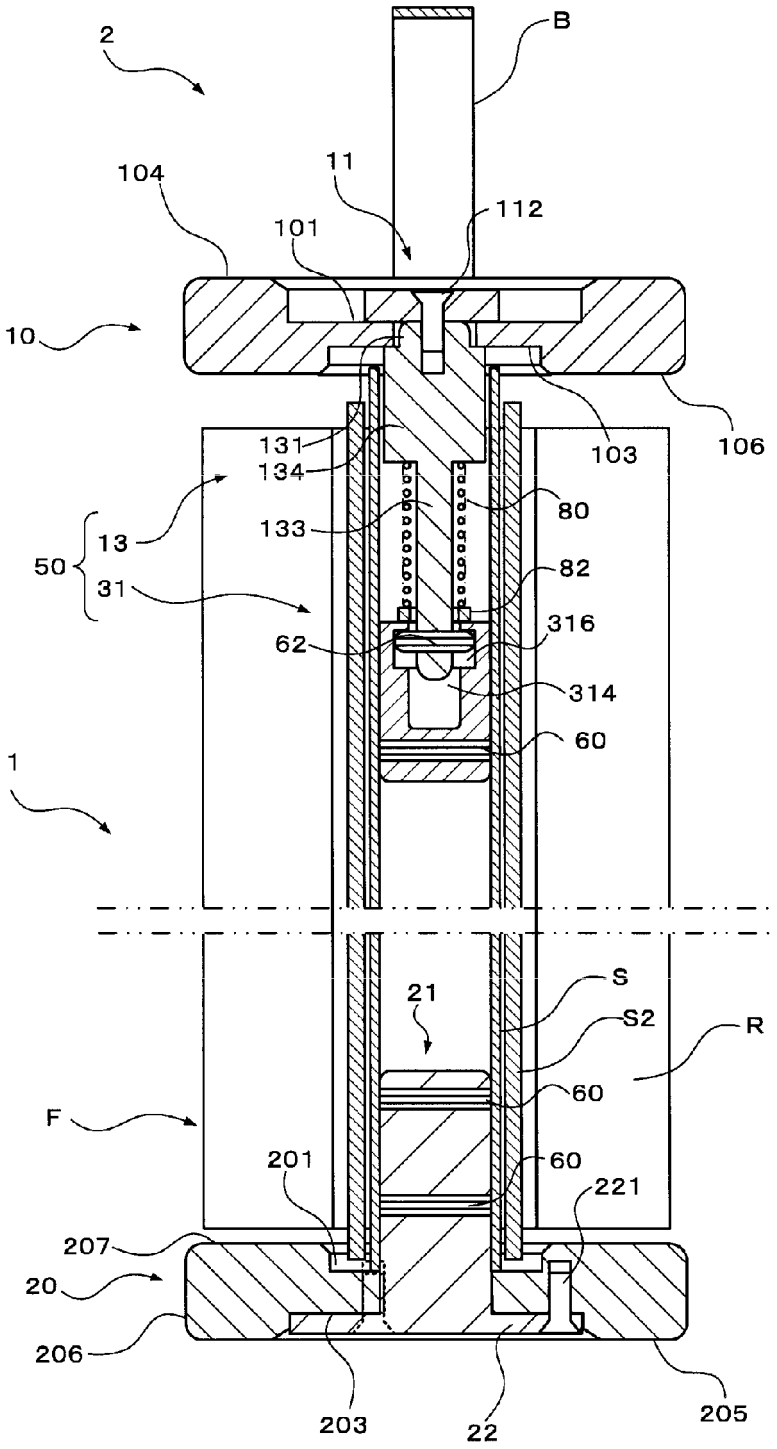
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Figure 22

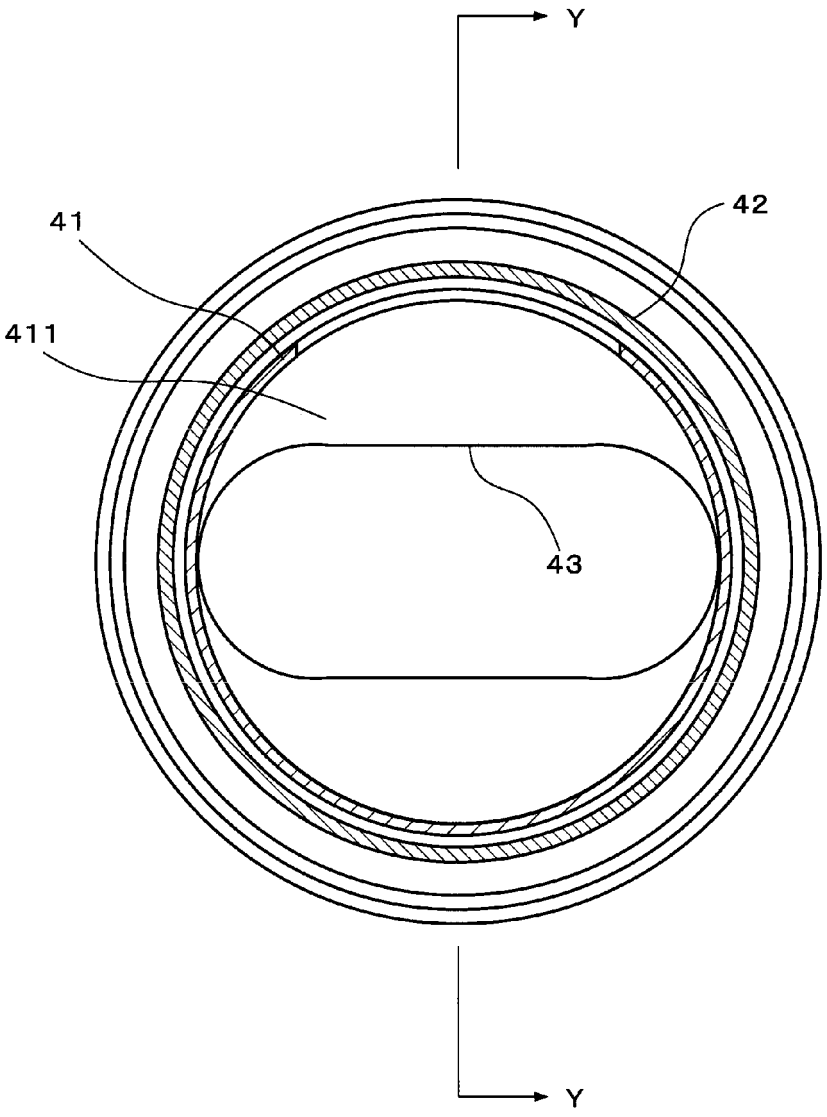

Figure 23

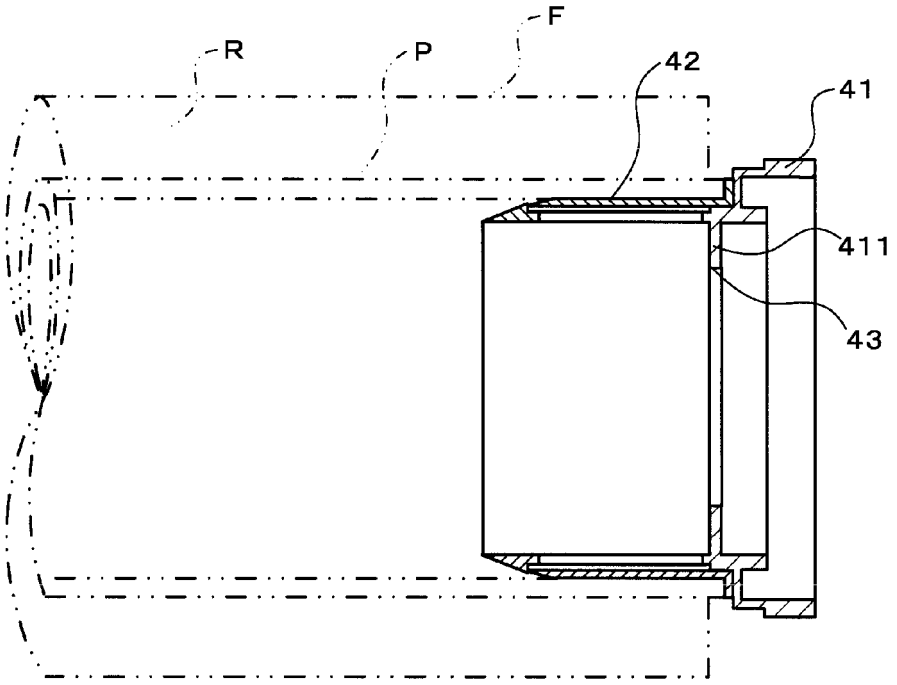

Figure 24

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/062006

A. CLASSIFICATION OF SUBJECT MATTER
B65B67/10(2006.01)i, *B65D25/52*(2006.01)i, *B65D83/08*(2006.01)i

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)
B65B67/10, B65D25/52, B65D83/08

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010

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 Y A	JP 3145936 U (Sutora System Kabushiki Kaisha), 30 October 2008 (30.10.2008), paragraphs [0013] to [0018]; fig. 2 to 8 (Family: none)	1-4,8-10, 12-17 11 5-7
Y	JP 3076872 U (Sanei Polymer Kabushiki Kaisha), 20 April 2001 (20.04.2001), paragraph [0004]; fig. 1 to 5 (Family: none)	11

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"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)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"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
"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
"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
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 October, 2010 (07.10.10)	19 October, 2010 (19.10.10)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/062006

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The matter common to the inventions in claims 1 - 17 is relevant to the matter specified in claim 1. However, the search revealed that the afore-said matter is not novel, since said matter is disclosed in JP 3145936 U (Sutora System Kabushiki Kaisha), 30 October 2008 (30.10.2008), paragraphs [0013] - [0018], fig. 2 - 8.

(continued to extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/062006

Continuation of Box No.III of continuation of first sheet(2)

As a result, the above-said matter does not make contribution over the prior art, and therefore, the common matter is not a special technical feature in the meaning of the second sentence of PCT Rule 13.2.

Consequently, those inventions do not have a technical relationship involving one or more same or corresponding special technical feature, and therefore cannot be considered to be so linked as to form a single general inventive concept.

Form PCT/ISA/210 (extra sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 8119242 A **[0002]**