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(71) Applicant: **INAX CORPORATION**
Tokoname-Shi, Aichi 479 (JP)

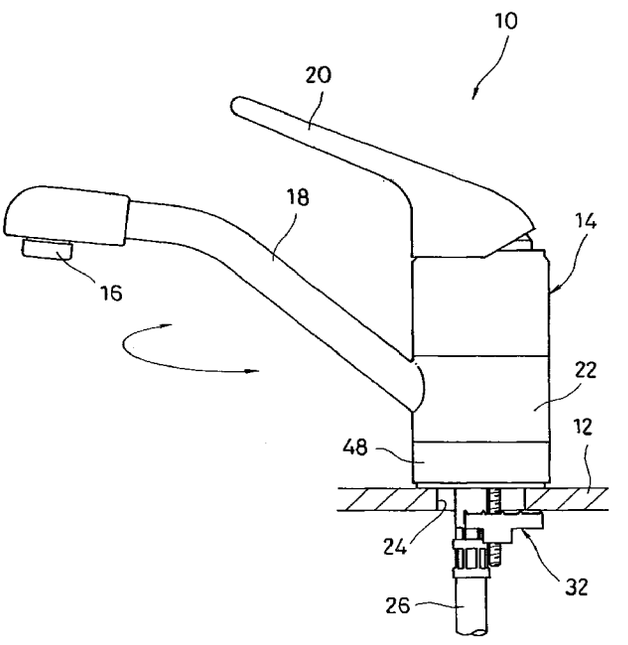
(72) Inventor: **Nagata, Masaaki**
Tokoname-shi, Aichi (JP)

(74) Representative:
Kraus, Walter, Dr. et al
Patentanwälte Kraus, Weisert & Partner
Thomas-Wimmer-Ring 15
80539 München (DE)

(54) Structure for fixing faucet

(57) A structure for fixing a faucet to a counter by using an adapter assembly. In the structure, an adapter and a holder for vertically clamping the counter therebetween are shifted relative to each other about a bolt connecting the adapter and the holder so as to prevent the backlash of the faucet in the rotational direction. An adapter assembly has only one holder 32 formed in a circular arc shape extending along a hole of the counter and having a long circumference length. The holder 32 is connected to the adapter 30 by screwing two bolts 34, 36 at both ends of the holder 32 in the circumferential direction.

Fig.1



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Description

Field of the Invention

The present invention relates to a structure for fixing an article such as a faucet to furniture such as a counter. More particularly, the present invention relates to a structure suitable for allowing a faucet to be easily and securely attached to a counter by work only at the top side of the counter using a base member (adapter) fixed to the counter. The present invention also relates to a structure for fixing a wall type article such as a towel rack to a wall by using the base member.

Back ground of the art

Conventionally employed as a structure for fixing a desired article, e.g. a faucet, to a mounting surface of a mounting base, e.g. a top of a counter, is a structure as shown in Fig. 21.

This structure includes a threaded pipe 202 attached to a faucet 200, a mounting hole 206 formed in a counter 204 in which the threaded pipe 202 is inserted, and a fixing nut 208 capable of screwing onto the threaded pipe 202. This structure allows the faucet 200 to be fixed to the counter 204 by inserting the threaded pipe 202 into the mounting hole 206 from the mounting surface, i.e. the top, and screwing the fixing nut 208 onto the threaded pipe 202 at the hidden side of the counter 204.

This structure, however, requires screwing and fastening up the fixing nut 208 at the hidden side of the counter 204. There is a problem that this lowers the work efficiency of installation and takes a lot of time to fixing the faucet.

For solving this problem, an adapter assembly to be attached to a counter is proposed. A faucet is fixed to the counter by the adapter assembly.

Figs. 22A, 22B show an example of well-known structures using such an adapter assembly (JPA S63-312435).

In these figures, numeral 210 designates an adapter assembly comprising an adapter 212, a pair of holders 214, and screw members 216 of which number (two) corresponds to the number of the holders 214.

In this structure, the screw members 216 are first screwed into corresponding tapped holes 218 of the holders 214, respectively. Then, the pair of holders 214 are directed inward to face each other, that is the holders 214 are rotated toward the center of the mounting hole 206. In this state, the holders 214 are inserted into the mounting hole 206 from the top side of the counter 204.

After inserted, the holders 214 are both rotated to face outward at the hidden side of the counter 204 and brought into contact with the underside of the counter 204. In this state, the screw members 216 are screwed up at the top side of the counter 204 to install the adapter assembly 210 in the counter in such a manner that the counter 204 is sandwiched between the adapter 212 and the holders 214.

After that, a lower end portion of the faucet 200 is fitted onto the adapter 212 and the faucet 200 is fixed to the adapter 212 with a fastener, thereby fixing the faucet 200 to the counter 204.

This structure has advantage that the adapter assembly 210 and the faucet 200 can be fixed to the mounting surface of the counter 204 only by work at the top side of the counter 204.

This structure has, however, the following problem. Since the holders 214 are each connected to the adapter 212 by one screw member 216, when the faucet 200, generally a spout 220, is exerted with force in the rotational direction exceeding its allowable limit, each holder 214 rotates and displaces about the axis of the corresponding screw member 216 relative to the adapter 212. This makes the faucet 200 shaky in the rotational direction so that the strength of fixation of the faucet 200 in the rotational direction around the mounting hole 206 is low relative to the counter 204.

Also there is a possibility that the holder 214 comes off the underside of the counter 204 to the mounting hole 206 due to the rotation of the holder 214.

While the above description is made as regard to the case of fixing the faucet to a mounting base such as a counter, the above problems are common to cases of fixing an article other than the faucet to a predetermined mounting base.

In case of fixing a faucet to the mounting hole in a counter or a flange of a wash basin, since the faucet is arranged behind a sink or a wash basin, the work of fixing the faucet should be executed behind the sink or the wash basin so that a worker should take a very painful posture for this work, thereby lowering the work efficiency of installation. Further, a special crank tool is required for tightening a nut from the front of the sink or wash basin.

Therefore, various structures have been proposed for allowing a faucet to be fixed to a mounting hole in a mounting base such as a counter or a flange of a wash basin only by work at the top side of the mounting base.

As one of the structures, a structure comprises an annular base member disposed on a top of a counter, a mounting member disposed on a underside of the counter, and a bolt inserted into a hole formed in the base member and then screwed into a tapped hole of the mounting member to fix the base whereby a faucet is fixed to the base. The structure is known in the art (JPA H08-93012).

Figs. 38 through 40 are perspective views showing the structure of JPA H08-93012. A counter 360 is provided with a mounting hole 361 (Fig. 40) formed therein on which an annular base member 363 is disposed. A horseshoe member 364 is disposed beneath the mounting hole 361. The base member 363 and the horseshoe member 364 are provided with openings 365, 366 (Fig.

39), respectively. As shown in Fig. 39, a bolt 367 is inserted into the openings 365 and 366 and a nut 368 is screwed onto an end of the bolt 367. After that, the horseshoe member 364 is inserted into the mounting hole 361 downwardly as shown in Fig. 40 so that the horseshoe member 364 is faced to the underside of the edge of the mounting hole 361.

Then, the bolt 367 is screwed up and the edge of the mounting hole 361 is clamped between the horseshoe member 364 and the base member 363, thereby fixing the base member 363 to the counter 360.

The base member 363 is provided with external thread formed on the outer periphery. A faucet 369 is fixed to the base member 363 using a fastening nut 370, like a union nut.

The horseshoe member 364 is provided with a slit 371 integrated into the opening 365 and the nut 368 is provided with projections 372 engaging with the slit 371. Before screwing the bolt 367, the bolt 367 is pulled up in such a manner that the horseshoe member 364 comes in contact with the underside of the counter 360 and then the projections 372 of the nut 368 engages with the slit 371. Therefore, the bolt 367 can be screwed without involving the nut 368 in rotation. After that, a licking member 373 is inserted into a central hole 374 of the base member 363 to prevent the rotation of the horseshoe member 364 so that the bolt 367 is tightened.

In the conventional structure of fixing faucet as mentioned above, the faucet 369 is fixed to the base member 363 by the fastening nut 370. The fastening nut 370 is however conspicuous, not only spoiling the beauty but also becoming easy to suffer mischief of loosing the nut.

Therefore, the applicant of this application has proposed, in Japanese Patent Application No. H09-133583, a structure of fixing a faucet in which the lower end of the faucet is fitted onto the base member and the faucet is fixed to the base member by a machine screw.

Figs. 26A and 27A are longitudinal sectional views showing the structure of fixing the faucet according to the invention of the application No. H09-133583, Figs. 26B and 27B are sectional views taken along a line 26B-26B of Fig. 26A and a line 27B-27B of Fig. 27A, respectively, and Figs. 28 and 29 are sectional views taken along a line 28-28 of Fig. 26A and a line 29-29 of Fig. 27A, respectively. Figs. 30 and 31 are exploded perspective views for explaining the structure.

A mounting hole 304 is formed in a counter 301 between a back guard 302 and a sink 303. A base member 380 is fixed to the counter 301 through the mounting hole 304 by a horseshoe washer 382 and bolts 384.

The base member 380 is provided with two projections 383 projecting from the inner surface thereof and through holes 383H formed in the projections 383 into which the bolts 384 are inserted, respectively.

The base member 380 is also provided with four small projections 385 projecting from the inner surface thereof which project downwardly from the lower end of the base member to come in contact with the inner surface of the mounting hole 304.

A faucet body 386 has a concave portion 388 at the bottom thereof which fits onto the base member 380 and connected to the base member 380 by a machine screw 390 and an engaging member 392.

The base member 380 is provided with a tapped hole 394 at a portion facing the front of the counter 301. The machine screw 390 is screwed into the tapped hole 394 through a head hole 396 formed in the faucet body 386 and an opening 412 formed in a cover ring 410 described later.

The engaging member 392 is held by a window 400 formed in a lower portion of the faucet body 386. The window 400 comprises, as shown in Fig. 30 and Fig. 31, stepped portions 402, each of which a pin 392c of the engaging member 392 comes into contact with, and a concave portion 404 into which a head 392a of the engaging member 392 is fitted. The engaging member 392 comprises the disc-like head 392a, a pair of legs 392b projecting from the head 392a, and four pins 392c projecting from the upper and lower faces of the respective legs 392b.

The legs 392b are elastic. When no external force is exerted on the legs 392b, the legs 392c project from the inner surface of the faucet body 386 through the window 400. The base member 380 is provided with concave portions 406 in the outer surface thereof into which the legs 392b are entered, respectively. The cover ring 410 covers to surround a lower outer periphery of the faucet body 386. The cover ring 410 has the opening 412.

For fixing the faucet body 386 to the counter 301, the base member 380 is first fixed to the counter 301 by the washer 382 and the bolts 384 and then the concave portion 388 of the faucet body 386 is fitted onto the base member 380. The engaging member 392 is previously fitted in the window 400 of the faucet body 386 and the faucet body 386 is previously covered by the cover ring 410.

In this case, the opening 412 of the cover ring 410 and the head hole 396 of the faucet body 386 are previously aligned. In this state, the head 392a of the engaging member 392 is pressed by the cover ring 410 and the legs 392b are housed in the window 400. As the pins 392c are in contact with the stepped portions 402, the head 392a is pressed from the outside into the window 400 by the cover ring 410 so that the legs 392b are housed in the window 400 as shown in Fig. 29.

In this state where the legs 392b are housed in the window 400, the faucet body 386 is fitted onto the base member 380 (Figs. 27, 29). Then, the machine screw 390 is screwed into the tapped hole 394 through the opening 412 and the head hole 396 by a screwdriver D.

After that, the cover ring 410 is turned by 180° in the circumferential direction of the faucet to align the opening 412 and the head 392a of the engaging member 392

so that the head 392a enters into the opening 412. As shown in Figs. 26, 28, the legs 392b project from the inner surface of the faucet body 386 to enter in the concave portions 406, respectively. In this manner, the faucet body 386 is securely fixed to the counter 301.

In this structure, the faucet body 386 is securely fixed to the base member 380 by the machine screw 390 at the front side and by the engaging member 392 at the rear side. Even when a lever of the faucet is operated, no backlash produces in the faucet body 386.

Since the head of the machine screw 390 is covered by the cover ring 410, users of the sink 303 cannot see the machine screw 390 so as not to spoil the beauty. The cover ring 410 is prevented from rotating by the head 392a of the engaging member 392. Therefore, the cover ring 410 is not easy to suffer mischief of rotating the cover ring 410.

As shown in Fig. 27, the machine screw 390 can be screwed into the tapped hole 394 by a tool such as a screwdriver at the front of the faucet 310. Since hands of worker may be disposed in the sink 303 during this working, it is easy to work so that the machine screw 390 can be tightened easily and firmly.

Figs. 32 through 37 are explanatory views of a base member and a structure of fixing faucet using the base member disclosed in Japanese Patent Application No. H09-11178 of which applicant is the same as this application, Fig. 32 is a sectional view showing the structure of fixing the faucet according to an embodiment of the application No. H09-11178, Fig 33 is an exploded view of the same, Fig. 34 is a perspective view of a mounting member, Fig. 35 is an exploded view showing a way of mounting the base member, Fig. 36 is a plan view showing a state of mounting the base member, and Fig. 37 is a sectional view taken along a line 37-37 of Fig. 36.

A mounting hole 304 is formed in a counter 301 as a mounting plate between a back guard 302 and a sink 303. A base member 305 is fixed to the counter 301 through the mounting hole 304 by bolts 306 and mounting members 307. The base member 305 is formed in annular shape and is provided with two convex portions 305a projecting from the inner surface thereof and through holes 305b formed in the convex portions 305a into which the bolts 306 are inserted, respectively.

Each mounting member 307 comprises, as shown in Fig. 34, a tongue portion 307a which comes in contact with the underside of the counter 301, a square block-like stopper 307b which comes in contact with the inner periphery of the mounting hole 304, and a tapped hole 307c.

As shown in Fig. 35, the bolts 306 are inserted into the through holes 305b and the mounting members 307 are screwed onto ends of the bolts 306, respectively. During this, the tongue portions 307 are directed to face the center of the base member 305. In this state, the mounting members 307 are put into the mounting hole 304 downwardly until the base member 305 sits on the top of the counter 301. After that, the bolts 306 are screwed by a screwdriver so that the mounting members 307 turn with the bolts 306 by half circle as shown by an arrow θ of Fig. 36 and the stoppers 307b come in contact with the inner surface of the mounting hole 304 so as to prevent the further rotation of the mounting members 307. In this state, the tongue portions 307a are positioned beneath the counter 301. By further rotating the bolts 306, the mounting members 307 move upward by its thread function so that the tongue portions 307a come in contact with the underside of the counter 301. By tightening up the bolts 306 sufficiently, the edge of the mounting hole 304 is firmly sandwiched vertically between the base member 305 and the mounting members 307 whereby the base member 305 is securely fixed to the counter 301.

After that, the faucet 310 is mounted to the base member 305. The faucet 310 is provided with a concavity 319a at the bottom thereof The faucet 310 is mounted to the base member 305 in such a manner that the concavity 319a is fitted onto the base member 305, After that, a machine screw 309 is inserted into a hole 308 formed in a rear face of the faucet 310 and is screwed into a tapped hole 309a of the base member 305, thereby fixing the faucet 310 to the base member 305.

The faucet 310 is a single-lever combination faucet of kitchen type comprising a faucet body 312 connected to a hot-water supply pipe 311H and a water supply pipe (described later with reference to Fig. 24), a mixing mechanism 313 disposed above the faucet body 312, a lever 314 for operating the mixing mechanism 313, an upper casing 315 covering the mixing mechanism 313, a middle casing 317 provided with a spout 316 integrally formed therein, and a top casing 318 puffed on the upper casing 315.

The faucet body 312 comprises a cylindrical lower body 319 having the concavity 319a fitted onto the base member 305, a middle body 320 extending upwardly from the lower body 319, and an upper body 321 above the middle body 320.

A hot-water supply hole 322 and a water supply hole (not shown) connected to the hot-water supply pipe 311H and the water supply pipe 311L are formed through the middle body 320 and the upper body 321 and communicate with a hot-water supply port and a water supply port of a fixed valve element 323 in the mixing mechanism 313. By operating the lever 314 vertically and horizontally, the communicating condition among the hot-water supply port and the water supply port and a combination port is switched by a movable valve element 324 so as to control the water temperature and rate of flow (mixed water) to a mixed water feed path 325 formed in the upper body 321. The mixed water is spouted from the end of the spout 316 through a mixed water chamber 326 in the middle casing 317.

As mentioned above, for fixing the faucet 310 to the counter 301, the base member 305 is fist fixed to the counter 301 by the bolts 306 and the mounting mem-

bers 307 and then the faucet 310 is fixed to the base member 305. The base member 305 can be mounted just by inserting downwardly the mounting members 307 into the mounting hole 304 and screwing the bolts 306 at the top side of the counter 301. Further, the bolts 306 are not required to be lifted and just required to be screwed.

When the above faucet is a normal combination faucet not of a shower type (for washing hair) as shown in Figs. 32 through 37, the water supply pipe 311L and the hot-water supply pipe 311H extend downwardly from the roof portion of the concavity 319a of the faucet body 312 as shown in Fig. 24.

When the faucet is a shower type combination faucet 310' as shown in Fig. 25, a discharge pipe 311M for the mixed water also extends downwardly from the roof portion of the concavity 319a as shown in Fig. 25. A hose 311h is connected to the end of the mixed-water discharge pipe 311M. The hose 311h is returned to the inside of the faucet body through the base member and is further connected to a shower head 316h through the spout 316'. The shower head 316h is detachably mounted to the end of the spout 316'.

Such a base member used for fixing the shower type faucet has a relatively small outer diameter substantially the same as that of the faucet body and an inner diameter of the base member is smaller than the outer diameter.

Since projections are formed on the inner surface of the base member of small inner diameter, an inner space of the base member 303, 380, into which pipes are inserted, is considerably small.

In case of the faucet not of shower type, the water supply pipe 311L and the hot-water supply type 311H are disposed at the front side of the faucet as shown in Fig. 24, while in case of the shower type faucet 310'as shown in Fig. 25, the water supply pipe 311L and the hot-water supply type 311H are disposed at the rear side of the faucet because the hose 311h should be disposed at the front side of the faucet. Therefore, the base member 305 for the shower type faucet should be reversed from the position of the case of normal type. The same is true of the case of the base member 380.

In case of the faucet not of shower type, the convex portions 305a are positioned at the rear side of the faucet to form a relatively large space S_1 at the front side of the base member so that the water supply pipe 311L and the hot-water supply pipe 311H are inserted into the space S_1. A space S_2 formed behind the convex portions 305a is not enough to receive the two pipes 311L and 311H.

On the other hand, in case of the shower type faucet, three pipes: the water supply pipe 3112L; the hot-water supply pipe 311H; and the mixed-water discharge pipe 311M, should be inserted, the base member is directed so that the convex portions 305a are positioned at the front side as shown in Fig. 25B to form the space S_1 at the rear side.

As mentioned above, it is required to understand the correct direction of the base member 305, 380, which allows the faucet to be fixed only at the top side, according to the type of a faucet and to mount the base member in the correct direction.

In the most construction fields, the base member 305, 380 may be mounted by a plumber. Since most of plumbers are not experienced in mounting this kind of base member, the plumber sometimes errs the direction of the base member and mounts the base member to the counter in the wrong direction. In this case, when intended to mount the faucet to the base member, pipes cannot be inserted to the base member so that the base member should be detached and mounted again. This doubles the trouble of fixing work.

It is an object of the present invention to eliminate such an error of the direction of the base member so as to significantly improve the work efficiency of installation.

Fig. 44A is a perspective view showing an example of conventional shower type combination faucet and Fig. 44B is an enlarged sectional view taken along a line 44B-44B of Fig. 44A. A faucet 510 is provided with a lever 512 at the upper portion thereof in such a manner that the lever 512 can pivot vertically and horizontally. The faucet 510 is provided with a drum portion 514 at the middle portion thereof in such a manner that the drum portion 514 can rotate in the circumferential direction and is provided with a spout 516 projecting from the drum portion 514. A spout head 518 is detachably attached to the tip of the spout 516. A hose 520 connected to the spout head 518 is withdrawn into the faucet 510 from the spout 516. The hose 520 extends downwardly through the faucet 510 and is connected to the mixed-water discharge pipe 522.

Besides the mixed-water discharge pipe 522, a water supply pipe 524 and a hot-water supply pipe 526 extend downwardly form the faucet 510. Water and hot water from the water supply pipe 524 and the hot-water supply pipe 526 are mixed by a mixing valve (not shown) disposed at an upper portion of the faucet 510 to supply mixed water at a desired temperature. The mixed water is spouted from the spout head 518 through the mixed-water discharge pipe 522 and the hose 520. By operating the lever 512, ON/OFF can be switched and the mixing ratio of hot water can be controlled.

Fig. 45 is an exploded perspective view of main parts of this combination faucet. A body 530 comprises an upper body 530U, to which the mixed-water discharge pipe 522, the water supply pipe 524 and the hot-water supply pipe 526 are connected, a cylindrical lower body 530B, and a rear wall-like middle body 530M for connecting the upper body 530U and the lower body 530B. The inside of the upper body 530U is divided into a water chamber, a hot-water chamber, and a mixed-water chamber. The top surface of the upper body 530 U has a water port 532 formed above the water cham-

ber, a hot-water port 534 formed above the hot-water chamber, and a mixed-water port 536 formed above the mixed-water chamber.

The mixing valve is disposed on the top of the body 530 and a top cover 538 (Figs. 44A and 44B) is fitted so as to cover the mixing valve. A O-ring 540 (Fig. 45) is disposed between the upper body 530U and the drum portion 514 to seal therebetween.

The front side of the middle body 530M is an open area. The hose 520 withdrawn in the spout 516 is entered into the body 530 through this open area and is pulled out from the lower body 530B in the same manner as the pipes 522, 524, 526. The lower end of the hose 520 is provided with a union nut 542 (Figs 44A, 44B) to connect the hose 520 with the lower end of the mixed-water discharge pipe 522.

In case of the shower type faucet, besides the mixed-water discharge pipe 522, the water supply pipe 524, and the hot-water supply pipe 526, the hose 520 is also withdrawn in the cylindrical lower body 530B as shown in Figs. 44A, 44B, and 45. Since the diameter of the lower block 530B is quite small, the union nut 542 at the end of the hose 520 collides with the mixed-water discharge pipe 522, the water supply pipe 524 and the hot-water supply pipe 526, which are made of metal, during inserting the hose 520 into the spout 516 and pulling out the hose 520 from the lower block 530B so that it is difficult to insert the hose 520 in the body 530 due to the friction.

Particularly when the fixing work of the faucet is executed at the top side using the base member as shown in Figs. 26A through 31 and 38 through 40, the union nut 542 at the end of the hose collides with a corner portion of inner periphery of the base member so that it takes a lot of time to insert the hose.

It is an object of the present invention to solve such a problem and to facilitate insertion of a hose into a body of a shower-type faucet.

In a structure of fixing faucet disclosed in Japanese Patent Application No. 09-11178 shown in Figs. 32 through 35, the faucet 310 can be fixed to the counter 301 only by fixing the base member 305 to the counter 301 with the bolts 306 and the mounting members 307 and fitting and fixing the faucet 310 to the base member 305 with the machine screw 309. Therefore, the fixing work is easy.

Since the head of the machine screw 309 for fixing the faucet 310 to the base member 305 is, however, exposed outside, the machine screw 309 is easy to suffer mischief. The machine screw 309 should be screwed in the rear face (the back side) of the faucet 310 in order to prevent mischief so that it takes a lot of time to screw the machine screw 309.

It is an object of the present invention to provide a structure of fixing a faucet which allows easy and secure installation of the faucet and further provides well durability.

Summary of the Invention

A fixing structure of the present invention includes an adapter assembly comprises: an adapter disposed on an upper or front surface of a mounting base to which an article is attached; a holder which is inserted into the hole from the upper or front side of the mounting base in such a manner that the holder is disposed to overlap a rear surface of the mounting base and cooperates with the adapter to vertically clamp the mounting base; and bolts for connecting the adapter and the holder through the hole and tightening the mounting base by the adapter and the holder. The adapter assembly is attached to the mounting base and the article is fixed to the adapter body, whereby the article is fixed to the mounting base. The holder is connected to the adapter by at least two bolts.

In this structure, since the adapter and the holder are connected by a plurality of bolts, the adapter and the holder do not shift in the rotational direction even when external force in the rotational direction is exerted on the article after installation, thereby improving the fixing strength in the rotational direction.

Therefore, the article does not become loose in the circumferential direction on the mounting surface of the mounting base and the holder does not come off the underside of the mounting base through the hole.

The present invention is suitably applied to a case of fixing a faucet to a mounting base such as a counter.

The holder may be formed in a curved shape extending along the periphery of the hole to correspond the shape of the hole and the circumferential length of the holder may be set to be larger than the diametral length of the holder.

This structure allows the holder to be in contact with the underside of the mounting base over large area along a long distance in the circumferential direction, thereby improving the clamping force of the holder and the adapter.

According to this structure, only one holder is enough for the adapter assembly, thereby reducing the number of parts.

Since the holder is long in the circumferential direction, the adapter and the holder are connected by the bolts at positions spaced apart from each other in the circumferential direction, thereby improving the resistivity against distortion of the adapter and the holder in the rotational direction and thus effectively improving the strength in the rotational direction.

The bolts are preferably disposed at or around the both ends of the holder in the circumferential direction.

Since the holder is formed in the circular arc shape corresponding to the shape of the hole, the holder does not interfere the insertion of e.g. supply pipes, for supplying water in case of fixing a faucet, into the hole, thereby ensuring a large space in the hole.

According to the present invention, the holder may be made up of a straight and rectangular member.

The holder may be retractable in the longitudinal direction in such a manner that the maximum size of the holder is larger than the diameter of the hole while the minimum size of the holder is shorter than the diameter of the hole.

In this case, it is easy to insert the holder into the hole. Further, the holder can be inserted into the hole after a pair of bolts are previously screwed into a pair of tapped holes of the holder so that the holder and the adapter are connected to each other. After the insertion, both ends of the holder can overlap the underside of the mounting base, thereby improving the work efficiency of installation of the adapter assembly.

When the holder is formed in the curved shape, the holder may be deformable at a predetermined portion thereof in the closing direction of coming closer to each other or in the opening direction of spacing apart from each other, thereby facilitating the insertion of the holder into the hole. Further, the holder can be inserted into the hole after the holder and the adapter are connected to each other by a pair of bolts, thereby improving the work efficiency of installation of the adapter assembly.

When a pair of bolts are screwed into tapped holes of the holder through the adapter, the holes of the adapter are preferably elongated holes to allow the bolts to move relative to the holder to correspond to the shortening and lengthening or the closing or opening deformation of the holder.

When the holder is in the curved shape and deformable in the closing and opening direction, it is preferable that the holder can elastically deform in the closing direction and can return to the original shape by its restitutive force.

In this case, when the deforming force is canceled after inserting the holder elastically deformed in the closing direction into the hole, the holder can automatically return to the original shape to overlap the underside of the mounting base, thereby facilitating the fixing work of the adapter assembly.

When the holder is in the curved shape and elastically deformable, the holder may be made of resin and is provided with a thin-wall portion in a predetermined portion in the circumferential direction whereby the holder is deformable.

When the holder is retractable in the longitudinal direction or is deformable to be inserted into the hole, the holder may have a guide face formed in the bottom thereof and wherein the guide face is brought in contact with the periphery of the hole and is exerted with operating force so as to deform in a shape to allow the holder to be inserted into the hole.

Therefore, the holder can be easily inserted into the hole.

According to the present invention, after the holder is inserted into the hole in a state where the adapter and the holder are previously connected by one of the bolts, the holder is moved to overlap the underside of the mounting base by rotating the holder about one of the bolts at the hidden side of the mounting base such as a counter at a predetermined angle.

After that, the other bolt should be screwed into the other taped hole of the holder. It is preferable that the other tapped hole of the holder is positioned in such a manner that the other bolt can just fit to the tapped hole.

The adapter assembly may further comprise a positioning means for align the other tapped hole of the holder and the other bolt. In this structure, the other bolt can be easily screwed into the other tapped hole of the holder.

The holder may be provided with a stopper which comes in contact with the other bolt in a direction in which the holder rotates about the one bolt and the stopper may constitute the positioning means. In this structure, the alignment can be easily made by rotating the holder to bring the stopper in contact with the other bolt.

The stopper may be an elastic clip which elastically fits to the other bolt. This structure prevents the drift of the holder due to the rebound just after the stopper comes in contact with the other bolt by the rotation of the holder and also prevents the holder from moving apart from the other bolt due to the looseness between the other bolt and the stopper when screwing the other bolt into the tapped hole under the condition that the stopper is in contact with the other bolt.

The stopper may be made of magnet or a magnet is attached to the stopper and the other bolt is made of magnetic material so as to prevent the wobble between the other bolt and the stopper because of the magnetic adsorption therebetween.

The adapter may be provided with a stopper extending downwardly from the bottom thereof which comes in contact with the holder in a direction in which the holder rotates about one of the bolts to position the holder and the stopper may constitute the positioning means. Also in this structure, the holder can be positioned in the proper position.

The adapter assembly may further comprises a resisting means for rotating the holder together with the bolt when rotating the bolt screwed into the tapped hole of the holder. Therefore, the holder can be rotated just by rotating the bolt at the mounting surface side of the mounting base and the holder can be easily positioned to a predetermined position.

Coating material or grease may be applied to the surface of the bolt or the tapped hole to increase the frictional force and this may constitute the resisting means. A nut for preventing the falling of the holder which is screwed onto the lower end of the bolt may function as a lock nut. The lock nut may constitute the resisting means.

The adapter may be provided with a flange formed all around the periphery thereof at the face side to be seated on the mounting base. Therefore, a large contact area between the adapter and the mounting surface, i.e. large sealing area, can be secured.

The base member of the present invention is a base member to be fixed to a faucet mounting plate such as a counter through a hole, a faucet being fixed by engaging the faucet with the base member from the upper side. The base member is a cylindrical member disposed in such a manner that the axial direction thereof extends perpendicularly to the faucet mounting plate, the base member is asymmetrical with the back-and-fore direction in the state installed to the faucet mounting plate, and the base member is applied with a mark to indicate the front or rear side of the base member.

The mark applied on the base member facilitates the recognition of the correct direction of the base member. The mark is made by coloring because it is easy to distinguished.

The base member of the present invention is symmetrical with the lateral direction in the state installed to the faucet mounting plate, as well as the base member of prior applications shown in Figs. 26 through 31 and Figs. 32 through 37, the base member has a pair of convex portions formed symmetrically with the lateral direction on the inner surface of the base member, wherein the convex portions are each provided with a through hole penetrating vertically and the convex portions are shifted to the front or rear side with reference to the center of the base member so that the base member is asymmetrical with the back-and-forth direction.

The structure of the present invention is used for fixing a faucet to a counter by using such a base member.

In this case, the faucet is provided with a mark for indicating the mounting direction of the base member so that a plumber intending to fix the faucet can select the correct direction of the base member according to the mark.

For example, when the base member is applied with a color A (e.g. blue) on the front side and with a color B (e.g. black) on the rear side, the color A side of the base member is put to face the front in case where the faucet has the color A, the color B side of the base member is put to face the front in case where the faucet has the color B. Therefore, the same base member can be used both to a faucet with two pipes: a water supply pipe and a hot-water supply pipe as shown in Fig. 24 and to a faucet with a mixed-water discharge pipe and a hose besides the two pipes and the base member can be easily to recognize the correct direction of the base member.

A faucet of the present invention comprises: a faucet body to which a water supply pipe, a hot-water supply pipe, and a mixed-water discharge pipe are connected and extend downwardly; a spout pipe laterally projecting from the faucet body; a spout head detachably attached to the end of the spout pipe; and a hose which is connected to the spout head, downwardly penetrates the spout pipe and the faucet body, and is connected to the mixed-water discharge pipe, wherein the faucet has a lower part which fits to the base member mounted on the mounting base through the hole whereby the faucet is fixed, the lower part of the faucet is an annular part through which the water supply pipe, the hot-water supply pipe, the mixed-water discharge pipe and the hose are inserted. The faucet is preferably provided with a guide piece for guiding the insertion of the hose, the guide piece extending from the annular part to the inside of the hole.

The guide piece for guiding the hose enables the hose to smoothly pass through the faucet body when inserting the hose into the faucet for installing the faucet.

The guide piece preferably comprises a cylindrical portion through which the hose is inserted, and a projection laterally projecting from an upper portion of the cylindrical portion and being in contact with the inner surface of the annular part, the outer surface of the cylindrical portion is contact with the hot-water supply pipe, the water supply pipe, and the mixed-water discharge pipe. It is preferable that the guide piece has a standing portion vertically standing on the cylindrical portion along the respective pipes. It is further preferable that the cylindrical portion and said standing portion are each provided with concavities into which the respective pipes are fitted. This structure allows the faucet to firmly withstand, by the guide piece, lateral force exerted on the pipes.

According to the present invention, the faucet is preferably provided with a backup guide piece disposed at the opposite side of the guide piece with reference to the respective pipes, the backup guide piece being in contact with the inner surface of the annular part and the respective pipes. More Preferably, the backup guide piece is provided with concavities to which the respective pipes are fitted. This structure allows the faucet to firmly withstand, by the guide piece, lateral force exerted on the pipes.

In a structure for fixing a faucet of the present invention in which a base member is fixed to the mounting base through a hole of a counter and the faucet is fitted onto the base member at the top side of the counter, the base member is a cylindrical member disposed in such a manner the axial direction thereof extends perpendicularly to the counter, the lower end of the faucet is fitted onto the base member, the faucet is fixed to the base member by a screw fastener screwed into the base member through the lower portion of the faucet, a cover ring is rotatably fitted around the lower portion of the faucet to conceal the screw fastener, the cover ring has an opening or a recess at the rear side of the faucet, the opening or recess is formed to face the screw fastener by turning the cover ring, the lower portion of the faucet has a concave portion formed in the outer surface thereof, into which an elastic engaging member is inserted, and a part of the engaging member engages the opening or recess to prevent the rotation of the cover ring.

In this structure, the screw fastener is covered by

the cover ring so that the screw fastener is not visible even when the screw fastener is screwed at the front of the faucet, thereby improving the beauty and preventing the screw fastener from suffering mischief.

According to the present invention, the engaging member engages with the opening or recess of the cover ring, thereby preventing the undesired rotation the cover ring about the faucet.

In this structure of this invention, it is preferable that the screw fastener is disposed on the front side of the faucet and the engaging member is disposed on the lateral side or the rear side of the faucet.

The present invention can be also applied in order to fix a wall type article such as a towel rack or a handrail to a wall.

In a structure for fixing a wall type article in which a base member is fixed to a wall through a hole and the wall type article is engaged to the base member at the front of the wall whereby the wall type article is fixed, the base member is a cylindrical member disposed in such a manner the axial direction thereof extends perpendicularly to the wall, the wall type article is fitted onto the base member, the wall type article is fixed to the base member by a screw fastener screwed into the base member through the side face of the wall type article, a cover ring is rotatably fitted around the wall type article to conceal the screw fastener, the cover ring has an opening or a recess, the opening or recess is formed to face the screw fastener by turning the cover ring, the wall type article has a concave portion formed in the outer surface thereof into which an elastic engaging member is inserted, and a part of the engaging member engages the opening or recess to prevent the rotation of the cover ring.

Brief Description of the Drawings

Fig. 1 is a view showing a structure of fixing a faucet to the counter as an embodiment of the present invention in its installed state;
Fig. 2 is an enlarged view showing main parts of the structure shown in Fig. 1;
Fig. 3 is a view showing the main parts of Fig. 2 in the state where a faucet and an adapter assembly are separated from each other;
Figs. 4A, 4B are views showing the constitution of the adapter assembly of Fig. 3;
Fig. 5 is a perspective view showing an adapter of the adapter assembly from the bottom thereof;
Fig. 6 is a view showing the adapter assembly in the state where the adapter, a holder, and screw members are separated from each other;
Fig. 7 is a view showing the adapter assembly attached to the counter;
Fig. 8 is a plan view of the adapter in the adapter assembly;
Figs. 9A, 9B are views illustrating steps of the procedure for attaching the adapter assembly to the counter;
Fig. 10 is a view illustrating a step following Fig. 9 of the procedure for attaching the adapter assembly to the counter;
Fig. 11 is a view illustrating a step following Fig. 10 of the procedure for attaching the adapter assembly to the counter;
Fig. 12 is a view showing main parts of another embodiment of the present invention;
Fig. 13 is a view showing main parts of further another embodiment of the present invention;
Figs. 14A, 14B are views showing still another embodiment of the present invention;
Figs. 15A, 15B are views showing even further another embodiment of the present invention;
Fig. 16 is a view illustrating some steps of the procedure for attaching an adapter assembly to a counter of the embodiment of Fig. 15;
Fig. 17 is a view illustrating steps following Fig. 16;
Fig. 18 is a view illustrating some steps different from the steps of Fig. 16 of the procedure for attaching the adapter assembly of the embodiment of Fig. 15;
Figs. 19A, 19B are views showing further another embodiment of the present invention;
Fig. 20 is a view showing still another embodiment of the present invention;
Fig. 21 is a view showing an example of conventional structure of fixing a faucet;
Figs. 22A, 22B are views showing an example of conventional structure of fixing a faucet by using an adapter assembly;
Figs. 23A, 23B are perspective views of a base member showing an embodiment;
Figs. 24A, 24B are a perspective view and a sectional view showing the mounted state of a faucet;
Figs. 25A, 25B are a perspective view and a sectional view showing the mounted state of the faucet;
Figs. 26A, 26B are sectional views showing an embodiment of a prior application;
Figs. 27A, 27B are sectional views showing the embodiment of Fig. 26 on the way of installation;
Fig. 28 is a sectional view taken along a line 28-28 of Fig. 26;
Figs 29 is a sectional view taken along a line 29-29 of Fig. 27;
Fig. 30 is an exploded perspective view showing the fixing structure of Fig. 26;
Fig. 31 is an exploded perspective view showing the fixing structure of Fig. 26;
Fig. 32 is a sectional view showing an embodiment of another prior application;
Fig. 33 is an exploded view for explaining the structure of the embodiment of Fig. 32;
Fig. 34 is a perspective view for explaining the structure of the embodiment of Fig. 32;
Fig. 35 is an exploded view for explaining the structure of the embodiment of Fig. 32;

Fig. 36 is a plan view for explaining the structure of the embodiment of Fig. 32;

Fig. 37 is a sectional view for explaining the structure of the embodiment of Fig. 32;

Fig. 38 is an exploded perspective view showing an example of related art;

Fig. 39 is an exploded perspective view showing an example of related art;

Fig. 40 is a sectional view showing an example of related art;

Fig. 41 is an exploded perspective view of a faucet of an embodiment of the present invention;

Fig. 42 is a partial sectional view showing the condition of the installation of the faucet shown in Fig. 41;

Fig. 43 is a sectional view taken along a line 43-43 of Fig. 42;

Figs. 44A, 44B are a perspective view and a sectional view showing a conventional faucet;

Fig. 45 is an exploded view of main parts of the faucet shown in Figs. 44A and 44B;

Figs 46A, 46B are sectional views showing an embodiment of the present invention;

Figs. 47A, 47B are sectional views showing the embodiment of Figs. 46A, 46B on the way of installation;

Fig. 48 is an exploded perspective view showing an cover ring and a faucet body of the embodiment of Figs. 46A, 46B;

Fig. 49 is a perspective view showing the faucet body of the embodiment of Figs. 46A, 46B,

Fig. 50 is a perspective view showing the faucet body of the embodiment of Figs. 46A, 46B from the bottom thereof;

Fig. 51 is a perspective view showing main parts of the faucet in the embodiment of Figs. 46A, 46B; and

Fig. 52 is a perspective view showing another embodiment.

Description of the Preferred Embodiments

Hereinafter, embodiments of the present invention will be described with reference to the attached drawings.

Fig. 1 shows a faucet attached to a counter (mounting base). In this figure, numeral 10 designates the faucet as an article and numeral 12 designates the counter.

The faucet 10 comprises a faucet body 14 perpendicularly standing on the counter 12, a spout pipe 18 extending from the faucet body 14 and having a spout 16 from which water is spouted, and a control lever 20 pivotally disposed to an upper portion of the faucet body 14.

The base end of the spout pipe 18 is fixed to a cylindrical portion 22 which is rotatably fitted to the faucet body 14. The spout pipe 18 can pivot laterally together with the cylindrical portion 22.

The faucet body 14 has a stopper (not shown) for defining the limit of lateral pivotal movement of the spout pipe 18 so that the spout pipe 18 can pivot laterally within a angular range defined by the stopper.

The faucet 10 is attached to the counter 12 through a hole 24 formed in the counter 12.

Numeral 26 designates supply pipes for supplying water and hot water to the faucet 10. The upper end of the supply pipes 26 are connected to the faucet body 14 through the hole 24.

As shown in Fig. 2, the faucet 10 is mounted to the counter 12 by an adapter assembly 28.

Figs. 4A, 4B, 5, 6, 7, and 8 concretely show the structure of the adapter assembly 28.

The adapter assembly 28 comprises an adapter 30, a holder 32, and a pair of bolts 34, 36 as shown in Figs. 4A, 4B.

The adapter 30 to be seated on the top (mounting surface) of the counter 12 is an upper counterpart of a mechanism for clamping the counter and is generally formed in a cylindrical shape. The adapter 30 is provided with an annular flange 38 formed on the outer periphery at the counter 12 side. The flange 38 is sealingly in contact with the top of the counter 12 through a ring-like sealing member 40.

The adapter 30 has an annular protrusion 42 projecting downwardly from the bottom of the adapter 30. The ring-like sealing member 40 is attached to the bottom of the adapter 30 in such a manner as to fit onto the annular protrusion 42.

The adapter 30 is provided with upper and lower annular grooves 44 formed in the outer periphery thereof into which ring-like sealing members 46 are fitted, respectively. The adapter 30 is sealingly in contact with the inner periphery of a cylindrical portion 48 (Fig. 2), which will be described later and is disposed on the lower end of the faucet body 14, through the ring-like sealing members.

The adapter 30 is provided with semi-circular bosses 50 (two bosses in this embodiment) projecting inwardly formed on the inner surface thereof (Fig. 8). The bosses 50 are each provided with a through hole 52 penetrating vertically the boss as shown in Figs. 6 and 8, into which the bolt 34, 36 is inserted.

The adapter 30 is also provided with four semi-circular projections 54 formed in the inner surface thereof in such a manner that the projections 54 are spaced apart with predetermined distances in the circumferential direction (Fig. 8). The adapter 30 has guide protrusions 56 projecting downwardly from the bottoms of the projections 54, respectively, to a level lower than the bottom of the flange 38.

The guide protrusions 56 are fitted in the hole 24 with a predetermined clearance to guide the adapter 30 so that the adapter 30 is mounted to the counter 12 through the hole 24.

The guide protrusions 56 facilitate the positioning of

the adapter 30 in the proper position. That is, the bottom of the adapter 30 can be properly brought in contact with the top of the counter 12 around the hole 24 to prevent the adapter 30 from being set in an offset place relative to the hole 24. Therefore, a large contact area between the adapter 30 and the counter 12, i.e. large sealing area, can be secured.

A holder 32 is put on the underside of the counter 12 as shown in Figs. 2 and 4 to sandwich the counter 12 with the adapter 30. The holder 32 is provided with a plurality of teeth 58 formed on the upper surface throughout the periphery of the holder 32. These teeth 58 are firmly pressed against the underside of the counter 12.

The holder 32 is generally formed in a curved configuration, more particularly in a circular arc configuration of which length in the circumferential direction is longer than that of a half circle of the hole 24.

The holder 32 has projections 60, 62 projecting inwardly formed on the inner surface thereof at positions near the circumferential ends. The projections 60, 62 are each provided with a tapped hole 64 penetrating vertically the projection 60, 62 as shown in Fig. 6. The bolts 34, 36 are screwed into the respective tapped holes 64 of the projections 60, 62.

One projection 62 is formed at a position lower than the other projection 60 and is provided with a semi-circular elastic clip (contact portion) 66 as an alignment means on the upper surface thereof. The elastic clip 66 is formed concentrically with the tapped hole 64.

The bolt 34 is longer than the bolt 36 by a fixed length, whereby the bolt 34 is screwed in the tapped hole 64 and the lower end of the bolt 34 projects from the bottom of the bottom of the holder 32 until the bolt 36 reaches the tapped hole 64 in the holder 32. A nut 68 (Fig. 6, Fig. 11) is screwed onto the lower end of the bolt 34 projecting downwardly from the bottom of the holder 32.

The nut 68 prevents the holder 32 from falling. The nut 68 also functions as a lock nut (resistant member) for turning the holder 32 with the rotation of the bolt 34 prior to the installation to the counter 12.

The procedure of fixing the adapter assembly 28 of this embodiment to the counter 12 will be described with reference to Figs. 9 through 11.

As shown in Fig. 9A, the longer bolt 34 is screwed into one through hole 52 of the adapter 30 and the tapped hole 64 of the holder 32 until the lower ends of the bolt 34 projects from the bottom of the holder 32. The nut 68 is screwed onto the projecting lower end of the bolt 34 and is fully screwed up whereby the nut 68 functions as a lock nut to turn the holder 32 together with the bolt 34.

The holder 32 is then rotated right about the bolt 34 in such a manner that the free end of the holder 32 radially projects from the adapter 30 as shown in Fig. 9A. Then, the adapter assembly 28 is inclined as shown in Fig. 9B. In this state, the holder 32 is inserted into the hole 24 from the free end thereof.

Therefore, the holder 32 can be easily inserted into the hole 24 and positioned at the hidden side of the counter 12.

After that, the shorter bolt 36 is inserted downwardly into the other through hole 52. The lower portion of the bolt 36 projects downwardly from the bottom of the adapter 30.

Following the above step, the bolt 34 is rotated to turn the holder 32 together with the bolt 34 at the hidden side of the counter 12 as shown in Fig. 10.

Once the holder 32 is turned to a position along the periphery of the hole 24 as shown by an arrow A of Fig. 10, the elastic clip 66 elastically fits to the shorter bolt 36 whereby the tapped hole 64 formed in the projection 62 is positioned coaxially with the bolt 36.

The bolt 36 is then screwed into the tapped hole 64 now facing the bolt 36 as shown in Fig. 11. Further screwing the bolts 34 and 36 into the tapped holes 36 pull up the holder 32 from the position shown in Fig. 11 so that the holder 32 comes in contact with the underside of the counter 12 around the hole 24 (Fig. 7).

By screwing up the bolts 34 and 36, the counter 12 is firmly vertically clamped between the adapter 30 and the holder 32. In this manner, the adapter assembly 28 is attached to the counter 12.

In this state, the guide protrusions 56 of the adapter 30 are fitted in the hole 24 with the predetermined clearance and the bottom surface of the flange 38 of the adapter 30 is sealingly contact with the top of the counter 12 through the ring-like sealing member 40 with predetermined pressure. Fig. 7 shows this state.

Since the bolt 34 is further screwed, the nut 68 no longer functions as a lock nut and, from now on, functions only as a member of preventing the falling of the holder 32 as shown in Fig. 7.

After the adapter assembly 28 is mounted to the counter 12 as mentioned above, the cylindrical portion 48 at lower end of the faucet body 14 is fitted onto the adapter 30 as shown in Fig. 3 and a fastening screw 70 is screwed into a tapped hole 78 of the adapter 30 through an opening 74 of a cover ring 72, which is rotatably disposed around the faucet body, and an opening 76 of the cylindrical portion 48. Therefore, the faucet body 14 and the adapter 30 are fixedly connected to each other not to rotate relative to each other.

The cover ring 72 is then rotated to conceal the opening 76 of the cylindrical portion 48 and the fastening screw 70 in the faucet body 14. A face cap 80 is fitted in the opening 74 of the cover ring 72 to close the opening 74 (Fig. 2).

Since the holder 32 is connected to the adapter 30 by screwing the two bolts 34, 36 in this embodiment, the displacement of the holder 32 relative to the adapter 30 in the rotational direction does not occur even when external force in the rotational direction is exerted on the faucet 10 after installation. Large fixing strength in the rotational direction can be obtained, thereby solving

such trouble that the faucet 10 is coming loose on the counter 12 in the rotational direction and that the holder 32 is coming out from the hidden side through the hole 24.

The holder 32 is formed in a circular arc shape extending along the periphery of hole 24 and having the long circumferential length so that the holder 32 can be in contact with the underside of the counter 12 over large area along the long distance in the circumferential direction, thereby improving the clamping force of the holder 32 and the adapter 30, exerted to the counter 12.

According to the structure, only one holder 32 is enough to fix the adapter assembly 28, thereby reducing the number of parts.

Since the holder 32 is long in the circumferential direction, the adapter 30 and the holder 32 are connected by the bolts 34, 36 at positions spaced apart from each other in the circumferential direction, thereby improving the resistivity against distortion of the adapter 30 and the holder 32 in the rotational direction and thus effectively improving the strength in the rotational direction.

Since the holder 32 is formed in the circular arc shape corresponding to the shape of the hole 24, the holder 32 does not interfere the insertion of the supply pipes 26 or the like into the hole 24, thereby ensuring a large space in the hole 24.

In this embodiment, the elastic clip 66 is disposed as a positioning member for positioning the holder in the right place in such a manner that the bolt 36 and the tapped hole 64 are arranged coaxially with each other, whereby the bolt 36 and the tapped hole 64 can be easily arranged concentrically with each other just by turning the holder 32 for screwing the bolt 36 into the tapped hole 64.

Since the elastic clip 66 is elastically fitted to the bolt 36 to prevent the drift of the holder 32, once the holder 32 is positioned, the holder never drift out of place when screwing the bolt 36 into the tapped hole 64 after positioning the holder 32 by rotation. Therefore, the bolt 36 can be screwed into the tapped hole 64 with keeping the holder 32 in the right place.

In the structure of this embodiment, since the nut 68 functions as a lock nut, the holder 32 can be turned together with the bolt 34 just by rotating the bolt 34 after inserting the holder 32 into the hole 24. The holder 32 can be smoothly turned at the hidden side of the counter 12 until the elastic clip 66 fits to the bolt 36.

As one of means for turning the holder 32 with the bolt 34, coating material or grease may be applied to the surface of the bolt 34 or the tapped hole 64 to increase the frictional force.

The flange 38 is disposed over the whole circumferential length of the adapter 30 at the counter 12 side in this embodiment, thereby ensuring a large contact area, i.e. a large sealing area, between the adapter 30 and the top of the counter 12.

Fig. 12 shows another embodiment of the present invention. The holder 32 has a circular arc stopper 90 standing from a portion of the periphery of the tapped hole 64. The holder 32 is positioned in the rotational direction by that the stopper 90 is brought in contact with the bolt 36.

The bolt 36 is made of magnetic material and the stopper 90 is made of magnet or a magnet is attached to the stopper 90 so as to prevent the wobble between the bolt 36 and the stopper 90 because of the magnetic adsorption between the bolt 36 and the magnet . An arrow A in Fig. 12 shows the rotational direction and range of the holder 32.

Fig. 13 shows further another embodiment of the present invention. The adapter 30 is provided with rectangular plate-like stopper 82 extending downwardly from the bottom thereof. The bolt 36 and the tapped hole 64 of the holder 32 are arranged coaxially with each other by that the stopper 82 is brought in contact with the inner surface of the holder 32.

Figs. 14A, 14B show still another embodiment of the present invention. A holder 92 is formed in a rectangular plate-like shape, i.e. straight and rectangular shape, of which length in the longitudinal direction is larger than the diameter of the hole 24.

The holder 92 is disposed to across the diameter of the hole 24 at the hidden side of the counter 12. The bolts 34, 36 are inserted into through holes 52 of the adapter 30 disposed on the top of the counter 12 and are then screwed into a pair of tapped holes 64, 64 formed in the holder 92 so that the counter 12 is clamped vertically between the adapter 30 and the holder 92 to fix the adapter assembly 28 to the counter 12.

Also in this embodiment, since the holder 92 and the adapter 30 are connected to each other by the two bolts 34, 36, large fixing strength in the rotational direction can be obtained.

Figs. 15A, 15B show even further another embodiment of the present invention.

The adapter 30 has bosses 50 each provided with a through holes 94 of which horizontal section is like an elongated hole so that a bolt 34, 36 inserted into the through hole 94 can move within the through hole 94 in the horizontal direction.

The holder 96 is generally formed in a straight and rectangular shape as well as the embodiment of Fig. 14. The holder 96 comprises a middle portion 98, both end portions 100, 100 in the longitudinal direction which are formed separately from the middle portion 98.

The end portions 100, 100 are disposed in such a manner as to slide relative to the middle portion 98 in the longitudinal direction. That is, in this embodiment, the holder 96 is retractable in the longitudinal direction. The retraction rate of the holder 92 is set in such a manner that the maximum size of the holder 96 in the longitudinal direction, i.e. in the state where the end portions are positioned to be fully spaced apart from each other, is larger than the diameter of the hole 24 while the min-

imum size of the holder 96 in the longitudinal direction, i.e. in the state where the end portions 100, 100 are in closest position to each other, is shorter than the diameter of the hole 24.

The end portions 100, 100 are each provided with a sloped guide face 102 inclined upwardly toward the end.

An example of procedure of fixing the adapter assembly 28 in this embodiment to the counter 12 will be described with reference to Figs. 16 through 17.

First, the holder 96 is set to be the maximum size as shown in (I) of Fig. 16 and is brought near the hole 24 in this state in order to insert the holder 96 in the hole 24.

The guide faces 102 come in contact with the periphery of the hole 24 as shown in (II) of Fig. 16. As force is exerted downwardly on the holder 96 from this state, the holder 96 is automatically shortened until the holder 96 becomes so small to be inserted into the hole 24 because the guide faces 102 guide for the shortening as shown in (III) of Fig. 16. That is, the both end portions 100, 100 slide in the direction of coming closer to each other.

According to the sliding of the end portions 100, 100, the bolts 34, 36 come closer to each other within the range of the through holes 94.

After the states of (II) and (III) of Fig. 16, the holder 96 is inserted into the hole 24. After that, the holder 96 is lengthened as shown in (IV) of Fig. 17.

The holder 96 may be lengthened by exerting force in the direction of arrows B in (IV) of Fig. 17 on the bolts 34, 36. Alternatively, a return spring may be previously set inside of the holder 96 so that the holder 96 is lengthened by the both end portions 100, 100 is pressed outwardly by the spring force of the return spring.

After that, the adapter assembly 28 is fixed to the counter 12 by screwing up the bolts 34, 36 as shown in (V) of Fig. 17.

The installation of the adapter 28 to the counter 12 in this embodiment may be made by another procedure as shown in Fig. 18.

The holder 96 is previously set in the shortened state as shown by arrows B in (I) of Fig. 18 and is then inserted into the hole 24 in this state as shown in (II) of Fig. 18. After the insertion, the holder 96 is lengthened by pressing the bolts 34, 36 in the direction of arrows C in (II) of Fig. 18 and the adapter assembly 28 is fixed to the counter 12 by screwing up the bolts 34, 36.

Figs. 19A, 19B show further another embodiment of the present invention.

In this embodiment, a holder 104 is made of resin to be generally formed in a curved configuration, more particularly in a circular arc configuration.

Also in this embodiment, the length in the circumferential direction of the holder 104 is longer than that of a half circle of the hole 24.

The holder 104 is provided with a notch 106 formed in the inner surface at the center of the circumferential direction so that a thin-wall portion 108 is formed by the notch 106. The holder 104 can elastically deform at the thin-wall portion 108 in the closing direction of arrows F in Fig. 19B and can return to the original shape by its restitutive force when the deforming force is canceled.

Since the holder 104 is deformed in the closing direction (arrow F direction), the holder 104 can be inserted in its standing attitude into the hole 24 without inclining the holder 104.

The holder 104 may be deformed by gripping the both ends in the direction of coming closer to each other, i.e. the closing direction. Alternatively, the holder 104 may be deformed by exerting inward forces on middle portions of the bolts 34, 36 or by exerting inward forces on portions of the bolts 34, 36 projecting from the upper ends of the through holes 94. Alternatively, the holder 104 is provided with an annular and sloped guide face 102 on the bottom thereof whereby the holder 104 may be guided by the guide face 102 to be deformed.

After inserting the holder 104 into the hole 24, the exerted force is canceled so that the holder 104 spreads in the original shape to be overlapped on the underside of the counter 12. After that, the adapter assembly 28 is fixed to the counter 12 by screwing up the bolts 34, 36.

Fig. 20 is still another embodiment of the present invention and shows an example in which the present invention is applied to an article other than faucets.

In this figure, numeral 110 designates a handrail as an article which has a cylindrical portion 111 at the end thereof.

The handrail 110 is attached to a wall 112 as a mounting base through a hole 116 formed in the wall 112 by using the adapter assembly 28.

To be concretely described, the adapter assembly 28 is attached to the wall 112 and the cylindrical portion 111 is fitted to the adapter 30 of the adapter assembly 28. The adapter 30 has a tapped hole 122 and the cylindrical portion 111 has an opening 120. The handrail 110 may be fixed to the wall 122 by screwing a machine screw 118 into the tapped hole 122 of the adapter 30 through the opening 120 of the cylindrical portion 111.

The adapter assembly 28 may be any one of the aforementioned embodiments. The example of Fig. 20 is shown using the adapter assembly 28 of the embodiment shown in Fig. 15.

Though the embodiments of the present invention are described in detail, the embodiments are only exemplary so that the present invention may be applied to an article other than the faucet and the handrail and various changes may be made therein without departing from the spirit and scope of the invention.

Figs. 23A, 23B are perspective view of a base member according to an embodiment. Fig. 23B is a perspective view as seen from the opposite side of Fig. 23A.

A base member 380' of this embodiment is the same as the base member 380 of Figs. 26 through 31 but having another tapped hole 395 at the diametral opposite side of the tapped hole 394 and having two

pairs of recesses 406, each pair being formed in such a manner that the tapped hole 394, 395 is positioned therebetween. The base member 380' is symmetrical in its plan view with a direction of connecting the tapped holes 394 and 395. As well as the aforementioned base member 380, the base member 380' is provided with two projections 383 projecting from the inner surface thereof and through holes 383H formed in the projections 383 into which bolts are inserted, respectively, in which the through holes 383H extends parallel to the axis of the cylindrical base member 380'. The projections 383 are positioned near the tapped hole 395 than the tapped hole 394. Therefore, a large space S_1 is formed at the tapped hole 394 side and a small space S_2 is formed at the tapped hole 395 side with reference to a line connecting the projections 383 and 383.

A portion of the end face of the base member 380' above the tapped hole 394 is marked with a blue mark A and a portion of the end face above the tapped hole 395 is marked with a black mark B.

The bottom of the faucet (for example, the outer surface of the cover ring 410 in Fig. 30) is also marked with a blue or black mark.

The other components of the base member 380' are the same as the base member 380.

By using the base member 380', either a two pipe-type faucet as shown in Fig. 24 and a three pipe & one hose type faucet as shown in Fig. 25 can be mounted to a counter. In this case, it is expressed in the assembling instruction or a corrugated fiberboard container that the base member 380' should be set in such a manner that the mark of the same color as the mark on the faucet is positioned toward the front of the counter. Therefore, even a plumber not experienced in mounting this kind of base member can set the base member 380' on the counter in the correct direction without confusion.

For example, when the bottom of the faucet is marked with blue mark, the base member 380' is set to the counter in such a manner that the side marked with the blue mark A is positioned to face the front. It should be noted that the colors are not limited to blue and black and may be red, yellow, green and the like. Alternatively, it may be previously decided that the side marked with the same color as the color marked on the faucet is positioned to be the rear side.

Though the mark is preferably applied by ink, paint or the like, the coloring may be provided by any method.

The mark may be applied by any other method providing discrimination. But the coloring is preferable because of its simplicity.

As described above, this structure allows the faucet to be easily and securely fixed to a mounting base such as a counter at the top side of the mounting base. In this case, the structure provides easy discrimination of the correct direction of the base member regardless of the type of faucet, thereby improving the work efficiency of installation.

Fig. 41 is an exploded perspective view of a faucet of an embodiment, Fig. 42 is a partial sectional view showing the condition of the installation of the faucet shown in Fig. 41, and Fig. 43 is a sectional view taken along a line 43-43 of Fig. 42.

In this embodiment, a hose guide piece 546 and a pipe guide piece 550 are inserted into the body 530 of which components are the same as the body 530 of Fig. 44A, 44B.

The hose guide piece 546 comprises a cylindrical portion 546a, a flange 546b formed in a semi-circular jaw-like configuration projecting outwardly from an upper edge of the cylindrical portion 546a, and a standing portion 546c extending upwardly from a rear portion of the upper end of the cylindrical portion 546a. The hose guide piece 546 is provided with concavities 548a, 548b, and 548c formed in outer surfaces of the cylindrical portion 546a and the standing portion 546c and extending vertically, into which a mixed-water discharge pipe 522, a water supply pipe 524, and a hot-water supply pipe 526 are inserted, respectively.

The outer periphery of the flange 546b is formed in a circular arc shape extending along the inner periphery of the lower body 530B of the body 530.

The pipe guide piece 550 comprises a curved wall 550a and a flange 550b formed in a semi-circular jaw-like configuration projecting outwardly from an upper edge of the curved wall 550a.

The curved wall 550a is in such a configuration like a half of cylinder which is divided in the axial direction. The outer surface of the curved wall 550a is curved like cylinder. The curved wall 550a is provided with three concavities 552a, 552b, 552c formed in the inner surface thereof and extending vertically, into which the mixed-water discharge pipe 522, the water supply pipe 524, and the hot-water supply pipe 526 are inserted, respectively.

The outer periphery of the flange 550b is formed in a circular arc shape extending along the inner periphery of the lower body 530B of the body 530.

When the guide pieces 546, 550 as structured above are inserted into the lower body 530B of the body 530, the outer surfaces of the flanges 546b, 550b of the respective guide pieces 546, 550 are in contact with the inner surface of the lower body 530B of the body 530 and the pipes 522, 524, 526 are fitted into the concavities 548a, 548b, 548c of the guide piece 546 and the concavities 552a, 552b, 552c of the guide piece 550 so that the guide pieces 546, 550 are suitably housed in the body 530.

When the hose 520 is entered into the lower body 530B from the spout 516, the end of the hose 520 is guided by the guide piece 546 so that the hose 520 can smoothly pass through the lower body 530B. In this embodiment, the hose guide piece 546 has the standing portion 546c. Since the hose 520 is inserted from the inclined spout 516, the union nut 542 disposed on the end of the hose 520 diagonally and downwardly collides with the standing portion 546c, slides downwardly along

the standing portion 546c to enter into the cylindrical portion 546a, and is smoothly drawn out from the cylindrical portion 546a to below the faucet.

In this embodiment, the pipe guide piece 550 is also housed in the lower body 530B of the body 530 as well as the hose guide piece 546 so that the pipes 522, 524, 526 are sandwiched between the guide pieces 546 and 550. That is, the pipes 522, 524, 526 are supported to the lower body 530B by the guide pieces 546, 550, thereby preventing stress concentrations on joints (normally brazed) between the pipes 522, 524, 526 and the body 530 when lateral external force is exerted on the pipes 522, 524, and 526 and thus improving the durability of the joints between the pipes 522, 524, 526 and the body 530.

In this embodiment, the faucet with the guide pieces 546, 550 is fixed to the counter by the same structure as that shown in Figs. 26A, 26B through 31. That is, the base member 380 is fixed to the counter 301 by the horseshoe washer 382 and the bolts 384. Then, the faucet without the hose 520 is fitted downwardly onto the base member 380. The machine screw 390 is screwed into the tapped hole 394 of the base member 380 through the opening 412 of the cover ring 410 and then the cover ring 410 is turned by 180∞ to engage the head 392a of the engaging member 392 with the opening 412.

After fixing the faucet to the counter, the hose 520 is inserted into the spout 516 of the faucet and is drawn out to below the counter 301. The hose 520 is connected to the lower end of the mixed-water discharge pipe 522 by the union nut 542. Further, a water pipeline and a hot-water pipeline are connected to the water supply pipe 524 and the hot-water supply pipe 526, respectively.

As described above, the hose can be easily inserted when the faucet is installed, thereby significantly improving the work efficiency of installation.

Figs. 46A, 47A are vertical sectional views showing a structure of fixing faucet according to an embodiment, Figs. 46B, 47B are sectional views taken along a line 46B-46B and a line 47B-47B of Figs. 46A and 47A, respectively, Figs. 48, 49, 50 are perspective views showing the inside of a faucet body, and Fig. 51 is a perspective view showing the state where a water pipeline and a hot-water pipeline are connected to the faucet body.

A mounting hole 704 is formed in a counter 701 between a back guard 702 and a sink 703. A base member 780 is fixed to the counter 701 through the mounting hole 704 by a horseshoe washer 782 and bolts 784. A faucet body 786 has a concave portion 788 at the bottom thereof which fits to the base member 780 and connected to the base member 780 by a machine screw 790 and an engaging member 792.

The base member 780 is provided with a tapped hole 794 at a portion facing the front of the counter 701. The machine screw 790 is screwed into the tapped hole 794 through a head hole 796 formed in the faucet body 786 and an opening 812 formed in a cover ring 810 described later.

The engaging member 792 is held by a recess 800 formed in a lower portion of the outer periphery of the faucet body 786. The recess 800 comprises, as shown in Fig. 48 and Fig. 50, groove portions 802, each of which each leg 792b of the engaging member 792 comes into contact with, and a circular concave portion 804 into which a head 792a of the engaging member 792 is fitted.

The engaging member 792 comprises the disc-like head 792a and a pair of legs 792b projecting from the head 792a. The legs 792b are elastic to bias the head 792a to project from the concave portion 804.

The cover ring 810 covers to surround a lower outer periphery of the faucet body 786. The cover ring 810 has the opening 812 and a concavity 814 which are formed to face each other in the diametral direction.

For fixing the faucet 786 to the counter 701, the base member 780 is first fixed to the counter 701 by the washer 782 and the bolts 784 and then the concave portion 788 of the faucet body 786 is fitted onto the base member 780. The engaging member 792 is previously fitted in the recess 800 of the faucet body 786 and the faucet body 786 is previously covered by the cover ring 810.

In this case, the opening 812 of the cover ring 810 and the head hole 796 of the faucet body 786 are previously aligned (Fig. 47). In this state, the head 792a of the engaging member 792 is housed in the concavity 814 so that the cover ring 810 is in the softly locked state.

In this state, the faucet body 786 is fitted onto the base member 780 and the opening 812 and the head hole 796 are arraigned with the tapped hole 794 (Figs. 47A, 47B). Then, the machine screw 790 is screwed into the tapped hole 794 through the opening 812 and the head hole 796 by a screwdriver D.

After that, the cover ring 811 is turned by 180° in the circumferential direction of the faucet. As shown in Figs. 46A, 46B, the head 792a of the engaging member 792 is inserted into the opening 812. In this manner, the faucet body 786 is securely fixed to the counter 701.

In this structure, the faucet body 786 is fitted to the base member 780 and is securely fixed to the base member 780 by the machine screw 790 so that even when a lever of the faucet is operated, no backlash produces in the faucet body 786.

Since the head of the machine screw 790 is covered by the cover ring 810, users of the sink 703 cannot see the head of the machine screw 790 so as not to spoil the beauty. The cover ring 810 is prevented from rotating by the head 792a of the engaging member 792. Therefore, the cover ring 810 is prevented from rotating by someone's mischief.

The cover ring 810 can be turned by pressing the head 792a inside from the state shown in Fig. 46.

As shown in Figs. 47A, 47B, the machine screw 790 can be screwed into the tapped hole 794 by a tool such as a screwdriver at the front of the faucet 710. Since hands of worker may be disposed in the sink 703 during this working, it is easy to work so that the machine screw 790 can be tightened easily and firmly.

As shown in Fig. 50, the top of the concave portion 788 of the faucet body 786 is provided with a water pipe port 820 and a hot-water pipe port 822 to which a water pipeline 830 and a hot-water pipeline 832 (Fig. 51) are connected, respectively. As shown in Fig. 48, 49, the upper surface of the faucet body 786 is provided with a water port 840 and a hot-water port 842 communicating with the water pipe port 820 and the hot-water pipe port 822, respectively, and further provided with a mixed-water port 844. A mixing valve is disposed above the faucet body 786 so that water from the water port 840 and hot water from the hot-water port 842 are mixed by the mixing valve and the mixed water enters into a mixed-water chamber in the faucet body 786 from the mixed-water port 844. The mixed-water chamber communicates with a mixed water path 846 extending around the faucet body 786. The inside of the mixed water path 846 communicates with the inside of the spout 850. The mixing valve is controlled by a single lever (not shown) disposed at the top of the faucet.

The present invention may be applied to a case of attaching a base member 902 to a wall 900 to fix a wall type article such as a towel rack 904 or a handrail (not shown) to the base member 902. To fix the towel rack 904 to the base member 902, the aforementioned structure for fixing the faucet body to the base member is used.

Though the cover ring has the opening 812, a recess may be formed instead of the opening 812.

As described above, the structure of this invention allows a faucet to be easily and securely fixed to a counter at the top thereof. According to this invention, it can provide an nice-looking faucet after installation.

The present invention allows a wall type article such as a towel rack or a handrail to be easily and securely fixed to a wall.

Claims

1. A structure in which an article is fixed to an upper or front surface of a mounting base, the structure comprising:

   (a) the mounting base having a hole to which the article is mounted;
   (b) an adapter disposed on the upper or front surface of the mounting base;
   and
   (c) a holder which is inserted into the hole from the upper or front side of the mounting base in such a manner that the holder is disposed to overlap an under or rear surface of the mounting base; the structure characterized in

   that the adapter and the holder connected to each other with at least two bolts inserted in said hole are pressed in the direction of coming closer to each other to fix the adapter to the mounting base, and
   that after the adapter is fixed to the mounting base, said article is fixed to the adapter.

2. A structure for fixing an article as claimed in claim 1, wherein said article is a faucet to be fixed to said mounting base such as a counter.

3. A structure for fixing an article as claimed in claim 1 or 2, wherein said holder is formed in a curved shape extending along the periphery of said hole to correspond the shape of the hole and the circumferential length of said holder is set to be larger than the diametrical length of said holder.

4. A structure for fixing an article as claimed in claim 1 or 2, wherein said holder is made up of a straight and rectangular member.

5. A structure for fixing an article as claimed in claim 4, wherein said holder is retractable in the longitudinal direction, and the retraction rate of said holder is set in such a manner that the maximum size of the holder is larger than the diameter of said hole while the minimum size of the holder is shorter than the diameter of said hole.

6. A structure for fixing an article as claimed in claim 3, wherein said holder is deformable at a predetermined portion thereof in the closing direction of coming closer to each other or in the opening direction of spacing apart from each other.

7. A structure for fixing an article as claimed in claim 5 or 6, wherein said holder has at least one guide face formed in the bottom thereof and wherein said guide face is brought in contact with the periphery of said hole and is exerted with operating force so as to deform in a shape to allow the holder to be inserted into the hole.

8. A structure for fixing an article as claimed in any one of claims 1 through 7, further comprising a positioning means for align one of tapped holes of said holder and one of said bolts.

9. A structure for fixing an article as claimed in claim 8, wherein said holder is provided with a stopper which comes in contact with said one of bolts in a direction in which said holder rotates about the other bolt and wherein said stopper constitutes said positioning means.

10. A structure for fixing an article as claimed in claim 9, wherein said stopper is an elastic clip which elastically fits to said one of bolts.

11. A structure for fixing an article as claimed in claim 8, wherein said adapter is provided with a stopper extending downwardly from the bottom thereof which comes in contact with said holder in a direction in which said holder rotates about one of said bolts to position said holder and wherein said stopper constitutes said positioning means.

12. A structure for fixing an article as claimed in any one of claims 1 through 11, further comprising a resisting means disposed directly or indirectly between said one of bolts and the corresponding tapped hole to produce stress between the bolt and the tapped hole when rotating the bolt to transmit the rotation of the bolt to the holder to rotate the holder with the bolt.

13. A structure for fixing an article as claimed in any one of claims 1 through 12, wherein said adapter is provided with a flange formed all around the periphery thereof at the face side to be seated on the mounting base.

14. A base member which is to be installed at a faucet mounting hole perforating a faucet mounting plate such as a counter, and to which a faucet is fixed by engaging the faucet with the base member from above, said base member characterized in

that said base member is a cylindrical member disposed in such a manner that the axial direction thereof extends perpendicularly to the faucet mounting plate,
that said base member is asymmetrical with the back-and-fore direction in the state installed to the faucet mounting plate, and
that said base member is applied with a mark to indicate the front or rear side of the base member.

15. A base member as claimed in claim 14, wherein said base member is symmetrical with the lateral direction in the state installed to the faucet mounting plate, said base member having a pair of convex portions formed symmetrically with the lateral direction on the inner surface of said base member, said convex portions being each provided with a through hole penetrating vertically, and wherein said convex portions are shifted to the front or rear side with reference to the center of the base member so that the base member is asymmetrical with the back-and-fore direction.

16. A base member as claimed in any one of claims 14 or 15, wherein the mark is made by coloring.

17. A structure for fixing a faucet in which the base member claimed in any one of claims 14 through 16 is fixed to the mounting base through said hole and the faucet is fitted and fixed to the base member, wherein

the faucet is provided with a mark for indicating the mounting direction of said base member.

18. A structure for fixing a faucet in which the base member claimed in claim 15 is fixed to the mounting base through said hole and the faucet is fitted and fixed to the base member, wherein

said pair of convex portions are shifted at the front side in said base member, three pipes: a water supply pipe; a hot-water supply pipe; and a mixed-water discharge pipe are inserted into the base member behind said pair of convex portions, and
a shower hose connected to said mixed-water discharge pipe is inserted in front of the three pipes.

19. A structure for fixing a faucet in which the base member claimed in claim 15 is fixed to the mounting base through said hole and the faucet is fitted and fixed to the base member, wherein

said pair of convex portions are shifted at the rear side in said base member, and

two pipes: a water supply pipe and a hot-water supply pipe are inserted into the base member in front of said pair of convex portions.

20. A structure for fixing a faucet in which the base member claimed in claim 16 is fixed to the mounting base through said hole and the faucet is fitted and fixed to the base member, wherein

the front side of the base member is marked with a color A and the rear side of the base member is marked with a color B,
a portion on the outer surface of the bottom of said faucet is marked with the color A.

21. A structure for fixing a faucet in which the base member claimed in claim 16 is fixed to the mounting base through said hole and the faucet is fitted and fixed to the base member, wherein

the front side of the base member is marked with a color A and the rear side of the base member is marked with a color B, and
a portion on the outer surface of the bottom of

said faucet is marked with the color B.

22. A faucet comprising:

a faucet body to which a water supply pipe, a hot-water supply pipe, and a mixed-water discharge pipe are connected and extend downwardly;
a spout pipe laterally projecting from the faucet body;
a spout head detachably attached to the end of the spout pipe; and
a hose which is connected to the spout head, downwardly penetrates the spout pipe and the faucet body, and is connected to said mixed-water discharge pipe, wherein
said faucet has a lower part which fits to the base member mounted on the mounting base through the hole from the upper side whereby the faucet is fixed,
the lower part of said faucet is an annular part through which said water supply pipe, the hot-water supply pipe, the mixed-water discharge pipe and the hose are inserted,
said faucet characterized by a guide piece for guiding the insertion of said hose, said guide piece extending from said annular part to the inside of said hole.

23. A faucet as claimed in claim 22, wherein said guide piece comprises a cylindrical portion through which said hose is inserted, and a projection laterally projecting from an upper portion of said cylindrical portion and being in contact with the inner surface of said annular part, the outer surface of said cylindrical portion is contact with said hot-water supply pipe, said water supply pipe, and said mixed-water discharge pipe.

24. A faucet as claimed in claim 23, wherein said guide piece has a standing portion vertically standing on said cylindrical portion along the respective pipes.

25. A faucet as claimed in claim 23 or 24, said cylindrical portion and said standing portion are each provided with concavities into which the respective pipes are fitted.

26. A faucet as claimed in any one of claims 23 through 25, further comprising a backup guide piece disposed at the opposite side of said guide piece with reference to said respective pipes, said backup guide piece being in contact with the inner surface of said annular part and said respective pipes.

27. A faucet as claimed in claim 26, wherein said backup guide piece is provided with concavities to which the respective pipes are engaged.

28. A structure for fixing a faucet in which a base member is fixed to the mounting base through a hole of a counter and the faucet is fitted onto the base member at the top side of the counter whereby said faucet is fixed, wherein

said base member is a cylindrical member disposed in such a manner the axial direction thereof extends perpendicularly to the counter,
the lower end of said faucet is fitted onto the base member,
said faucet is fixed to said base member by a screw fastener screwed into said base member through the lower portion of said faucet,
a cover ring is rotatably fitted around the lower portion of said faucet to conceal the screw fastener
said cover ring has an opening or a recess at the rear side of the faucet,
said opening or recess is formed to face the screw fastener by turning said cover ring,
said lower portion of said faucet has a concave portion formed in the outer surface thereof, into which an elastic engaging member is inserted, and
a part of said engaging member engages said opening or recess to prevent the rotation of the cover ring.

29. A structure for fixing a faucet as claimed in claim 28, wherein said screw fastener is disposed on the front side of said faucet and said engaging member is disposed on the lateral side or the rear side of said faucet.

30. A structure for fixing a faucet as claimed in claim 28 or 29, wherein said concave portion comprises a concavity formed in the outer surface of said faucet and extending in the circumferential direction, said engaging member comprising a head and a pair of legs, said legs being elastically inserted into said concavity and said head being engaged in said opening or recess.

31. A structure for fixing a wall type article in which a base member is fixed to a wall through a hole and the wall type article is engaged to the base member at the front of the wall whereby the wall type article is fixed, wherein

said base member is a cylindrical member disposed in such a manner the axial direction thereof extends perpendicularly to the wall,
said wall type article is fitted onto the base member,
said wall type article is fixed to said base member by a screw fastener screwed into said base member through the side face of said wall type

article,

a cover ring is rotatably fitted around said wall type article to conceal the screw fastener,

said cover ring has an opening or a recess,

said opening or recess is formed to face the screw fastener by turning said cover ring,

said wall type article has a concave portion formed in the outer surface thereof into which an elastic engaging member is inserted, and

a part of said engaging member engages said opening or recess to prevent the rotation of the cover ring.

Fig.1

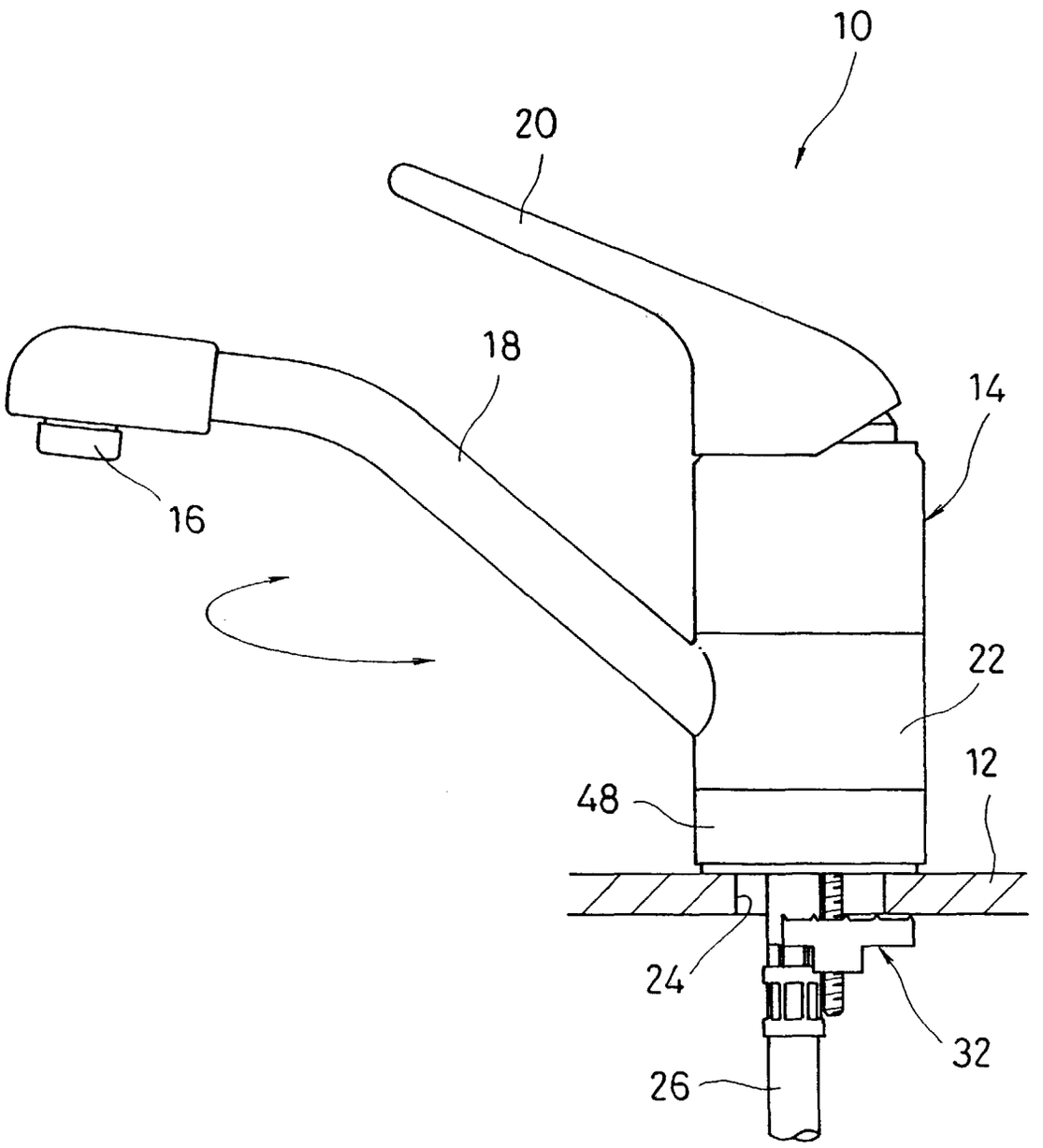


Fig.2

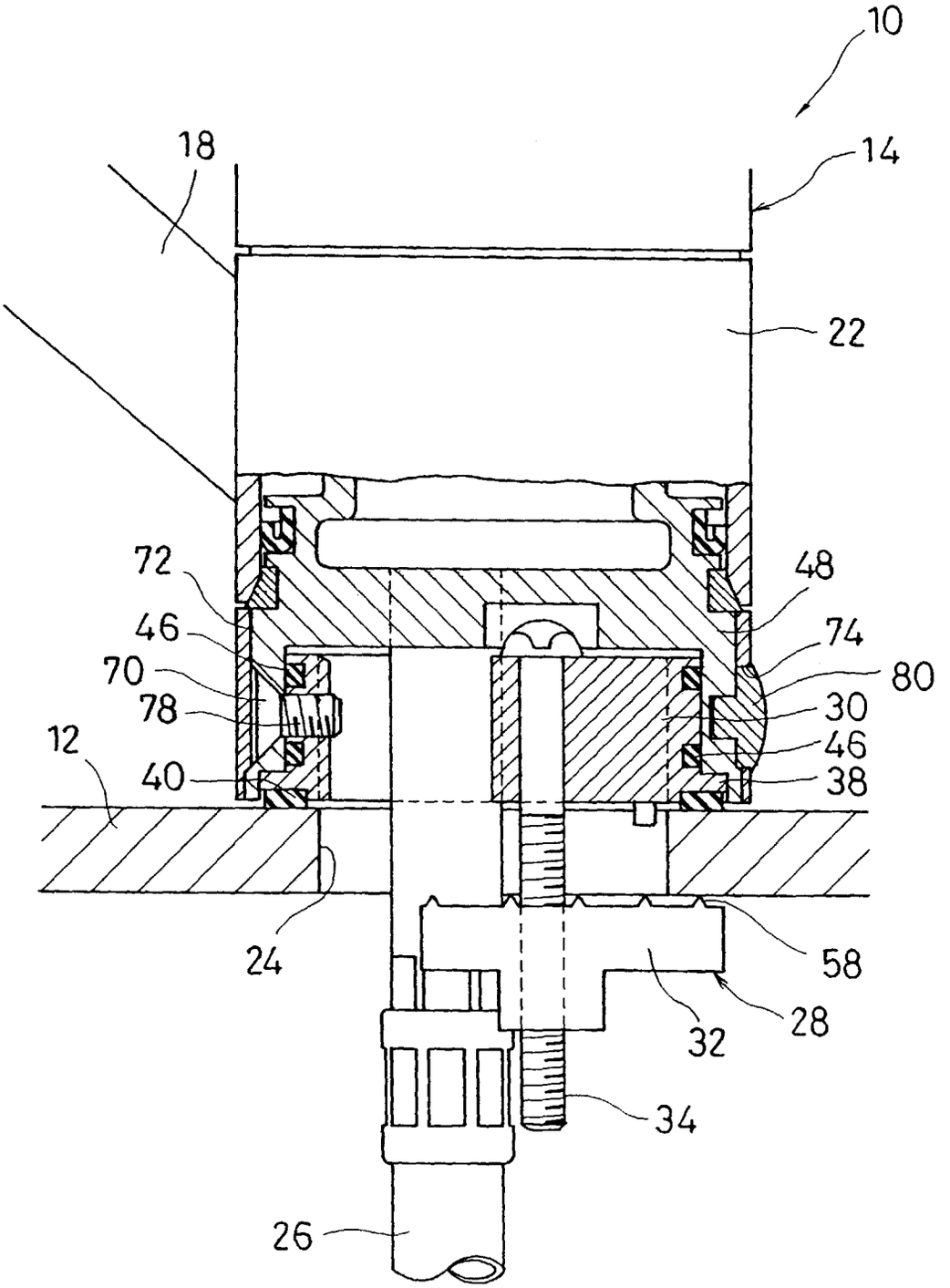


Fig.3

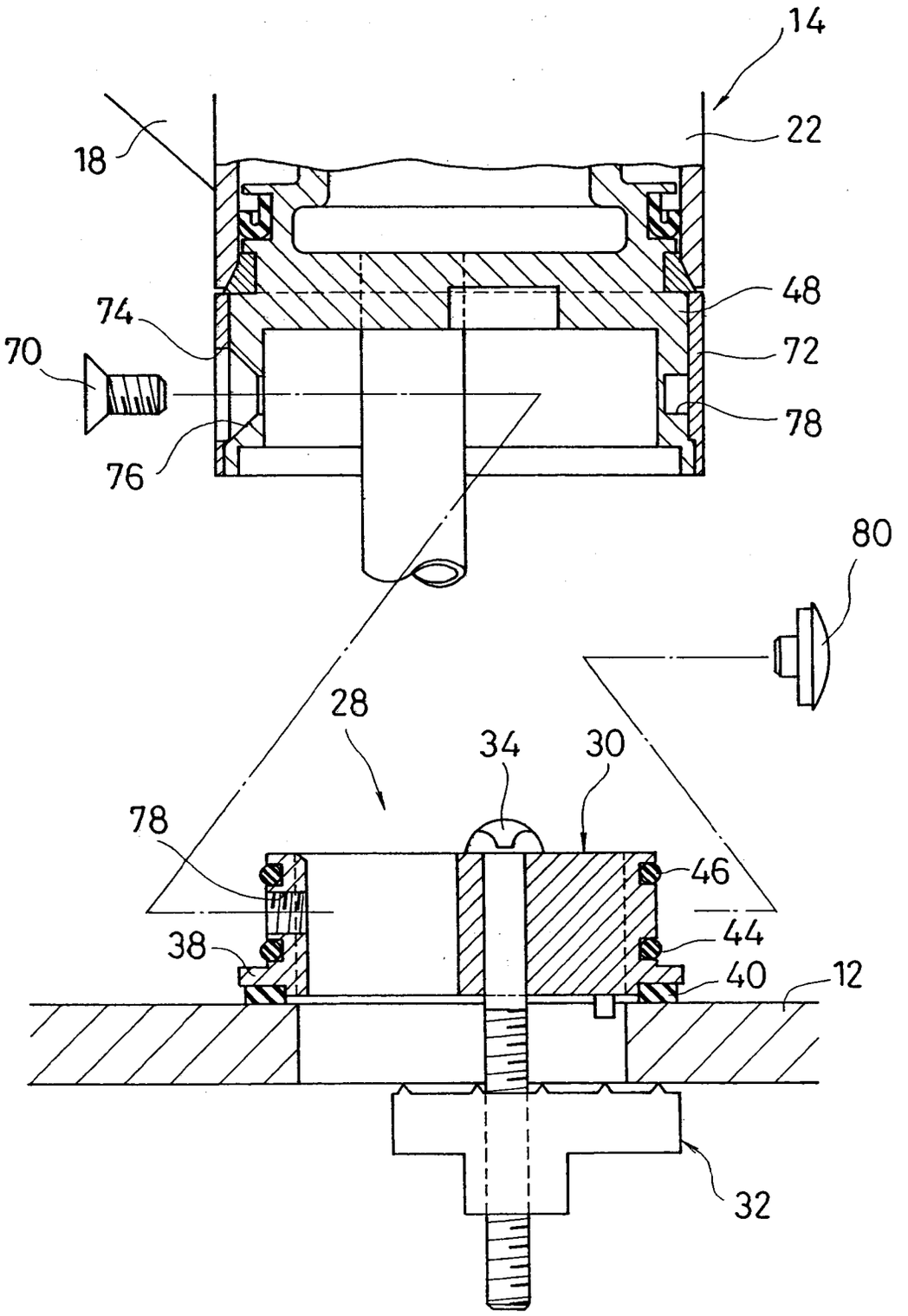


Fig.4A

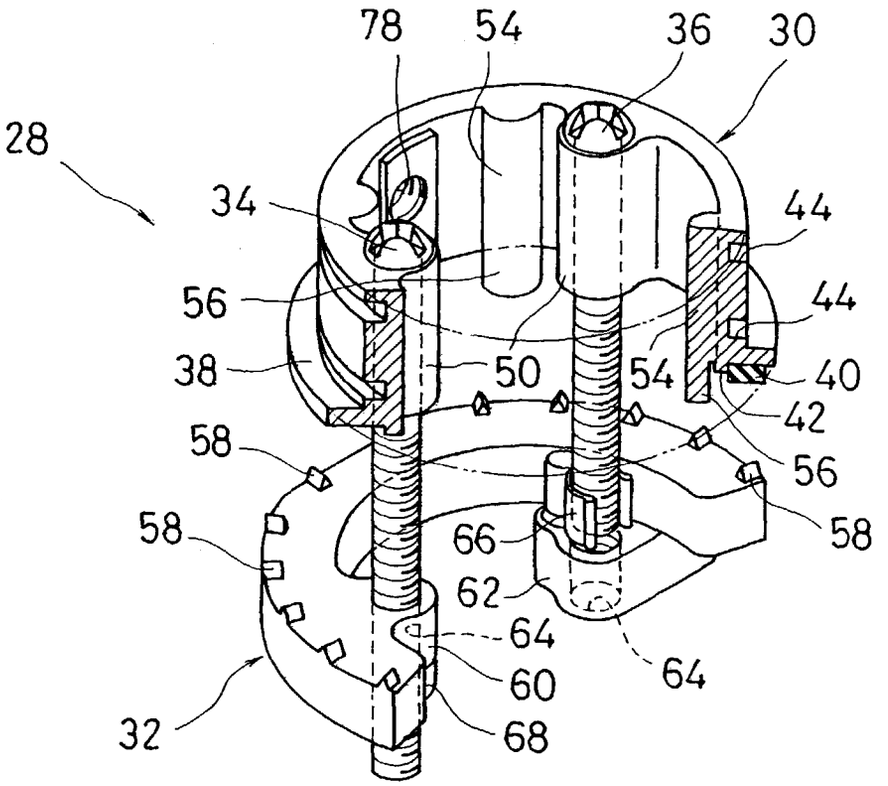

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Fig.4B

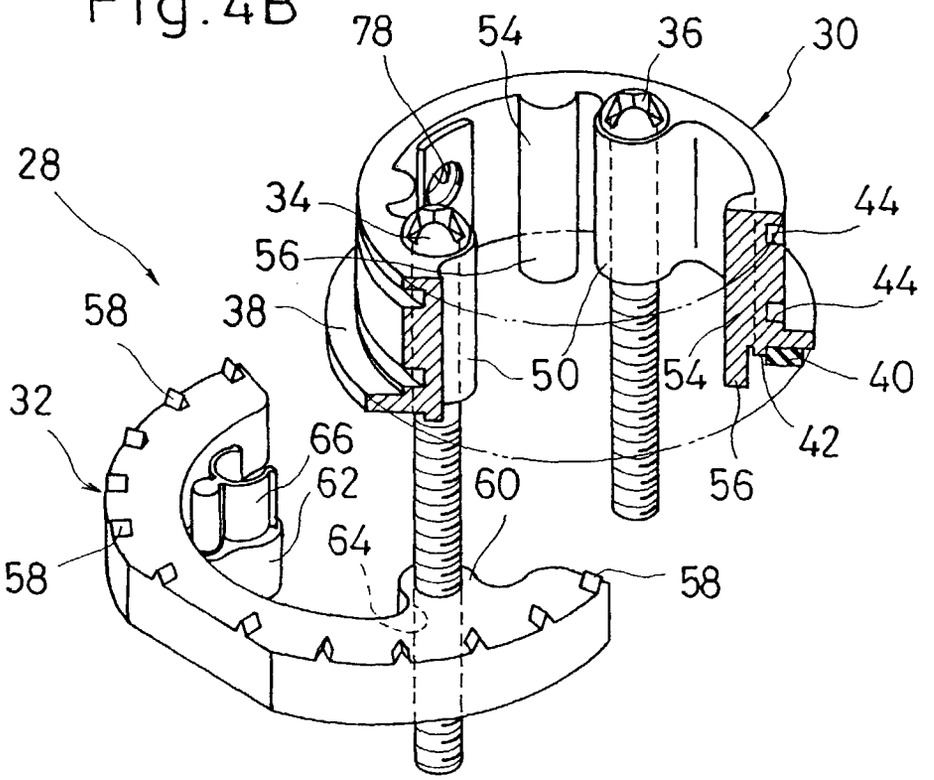

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Fig.5

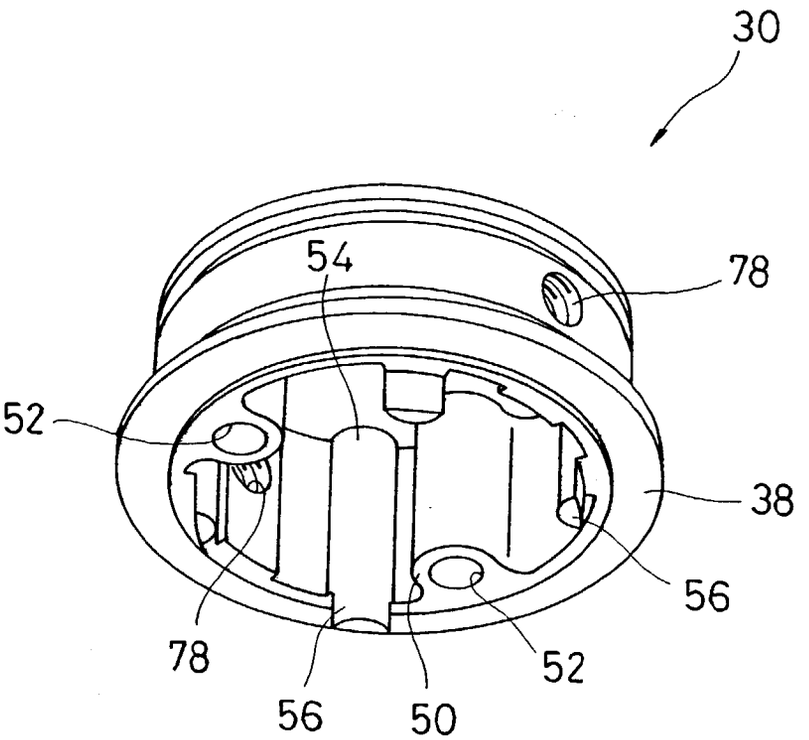


Fig.6

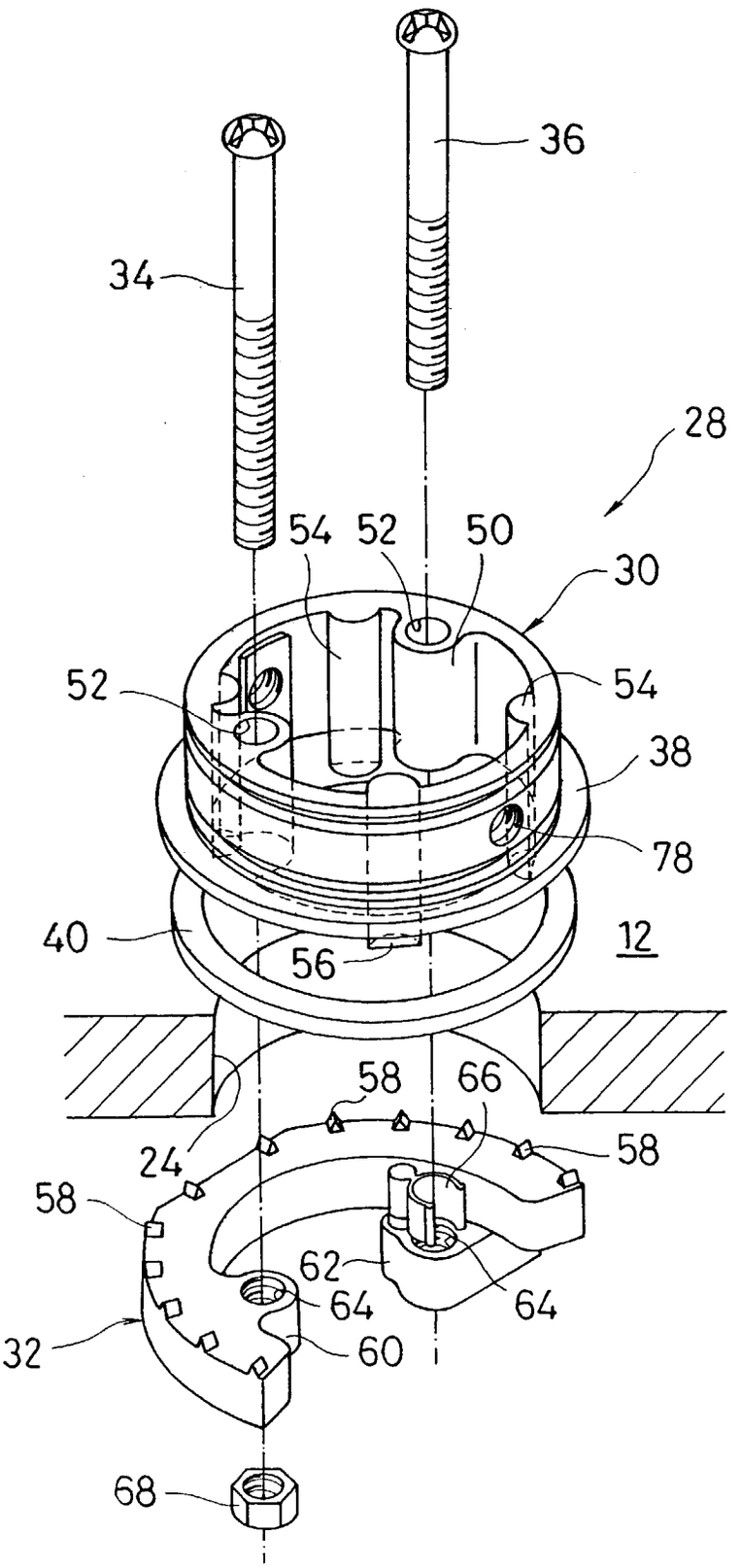

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Fig.7

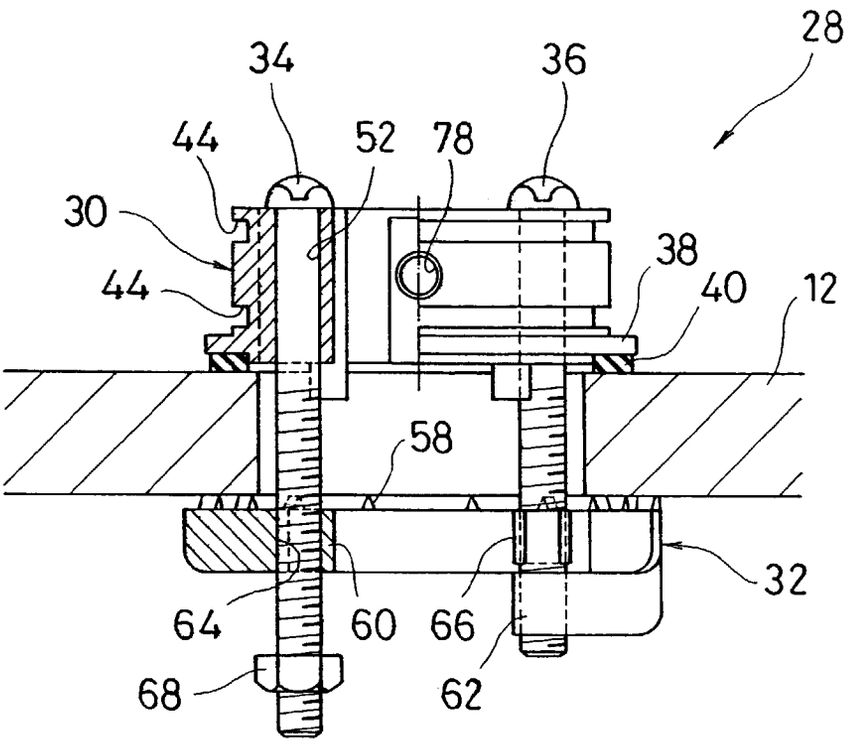


Fig.8

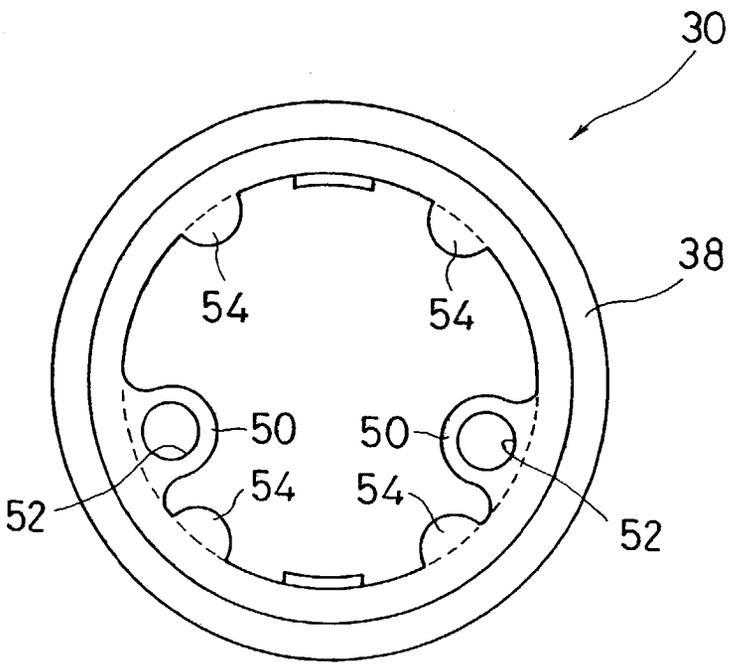


Fig.9A

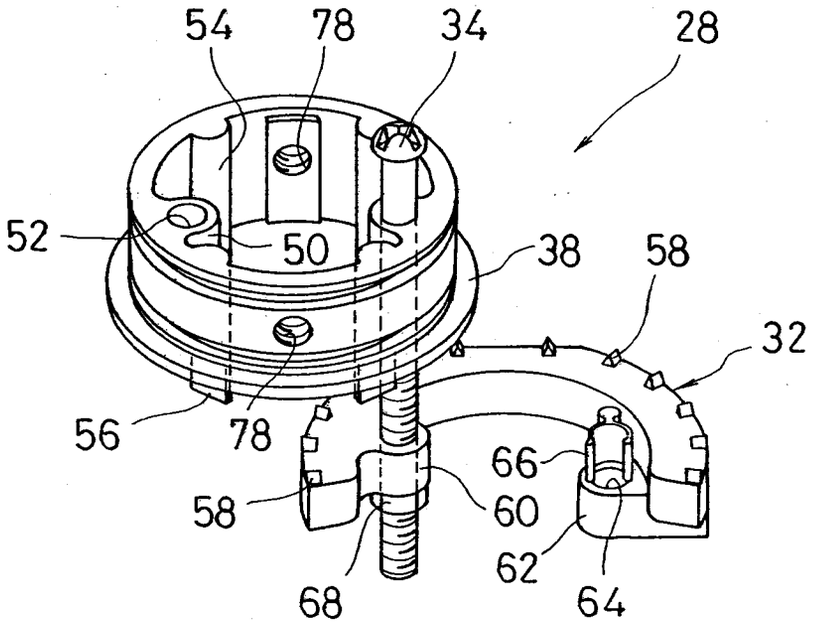

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Fig.9B

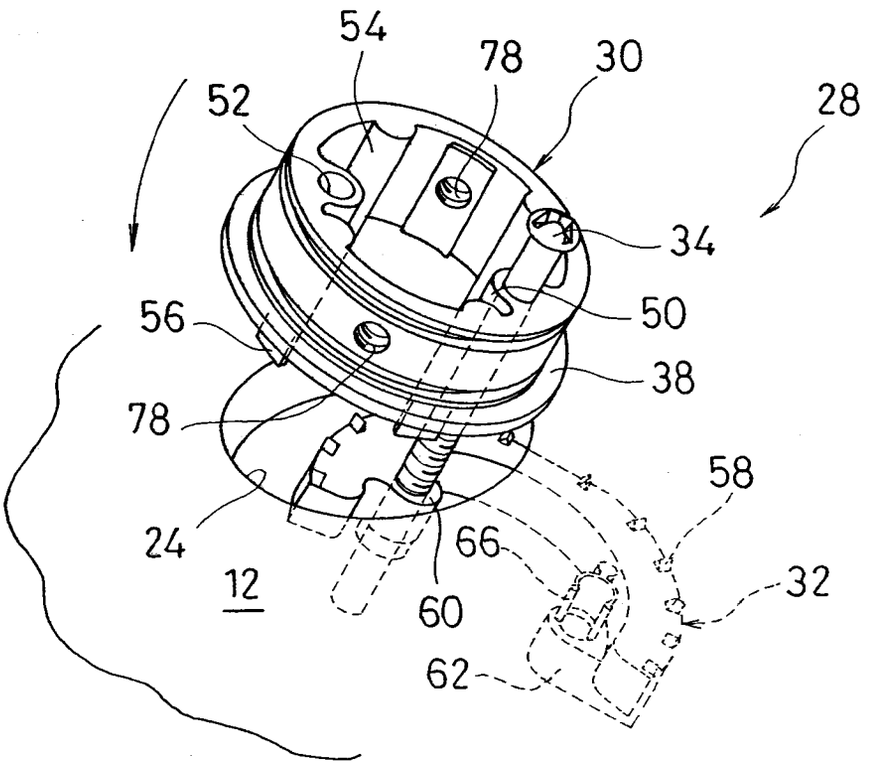

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Fig.10

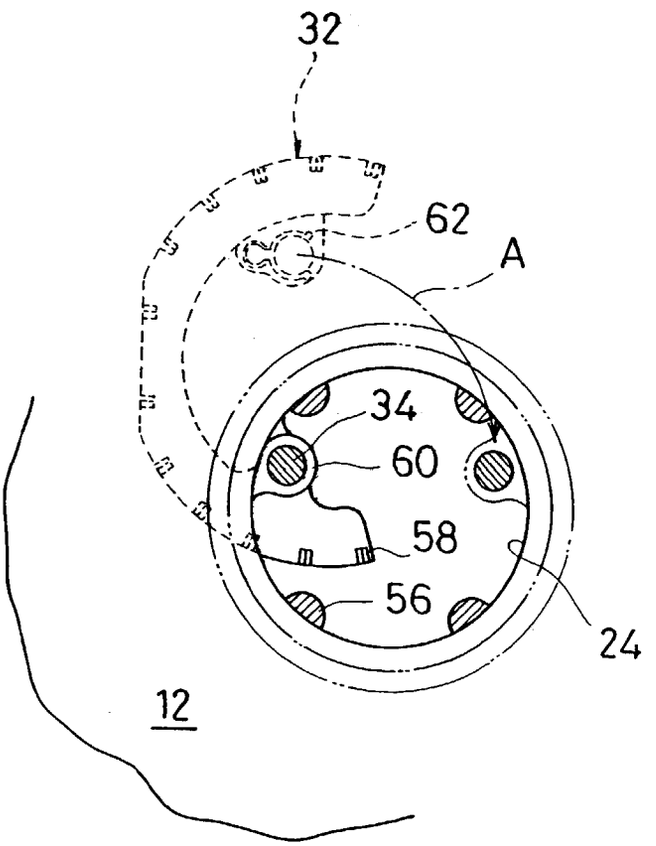


Fig.11

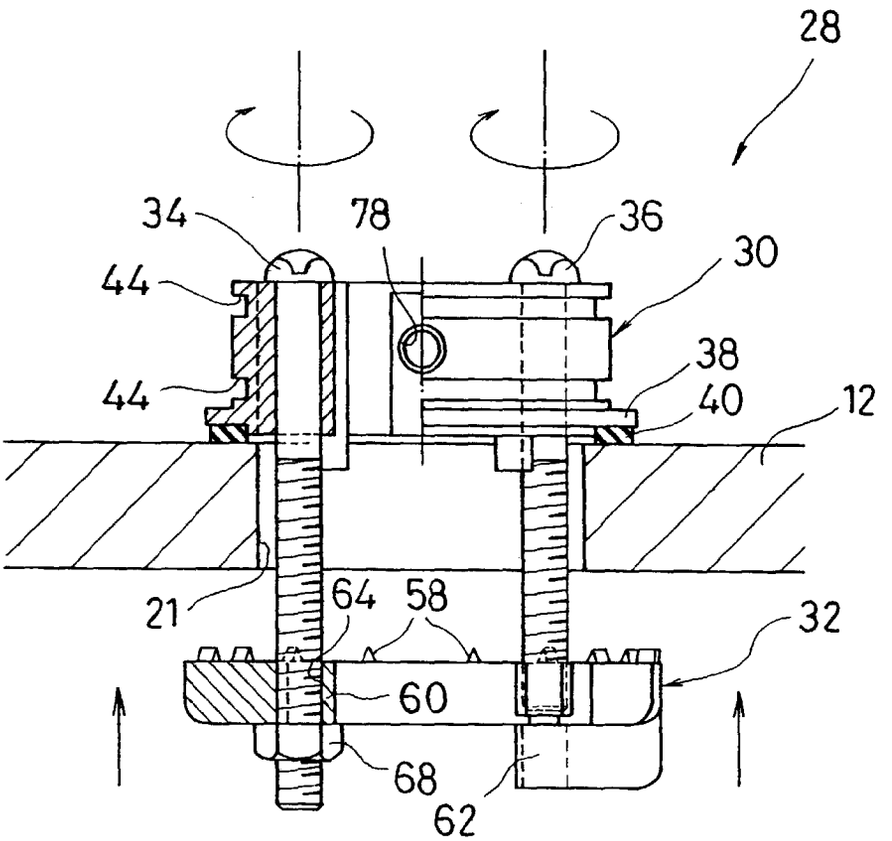


Fig.12

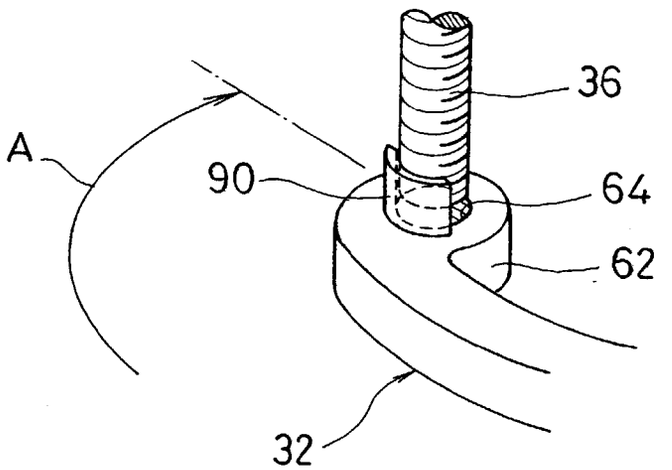


Fig.13

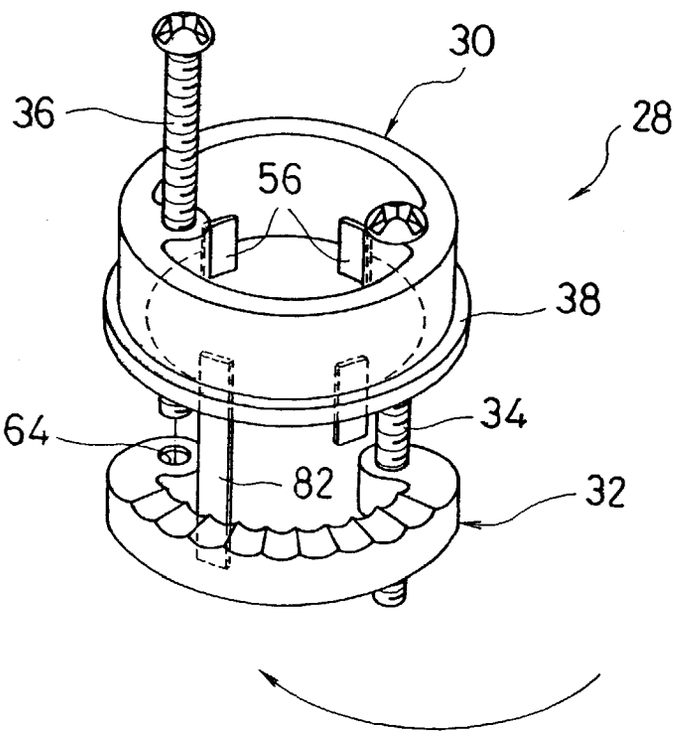


Fig.14A

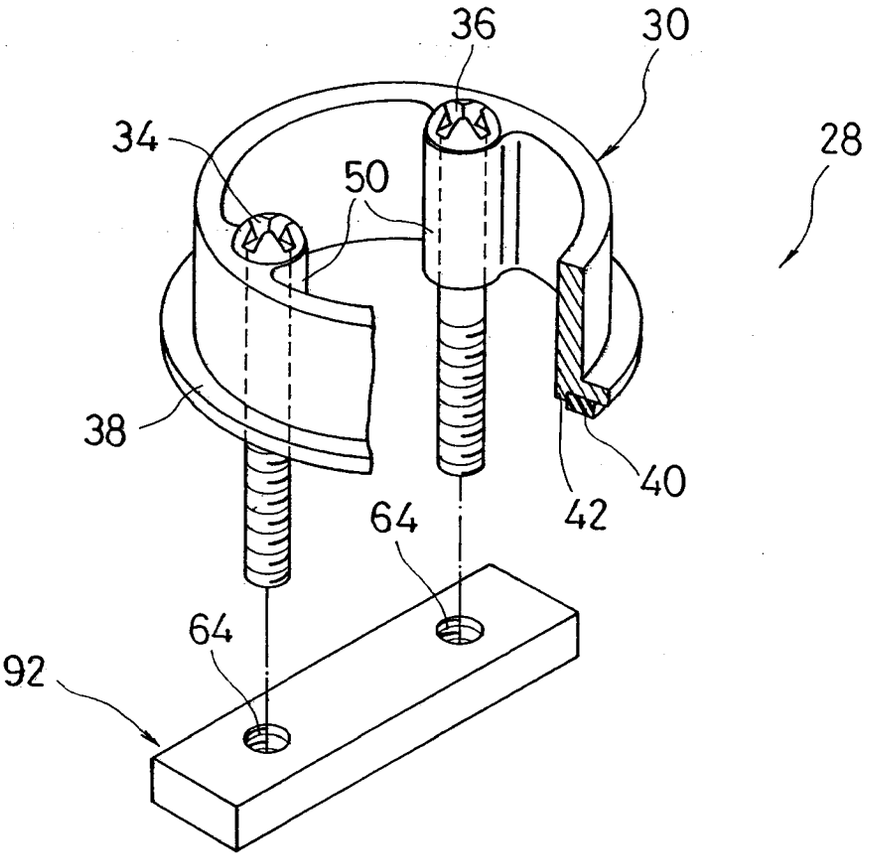


Fig.14B

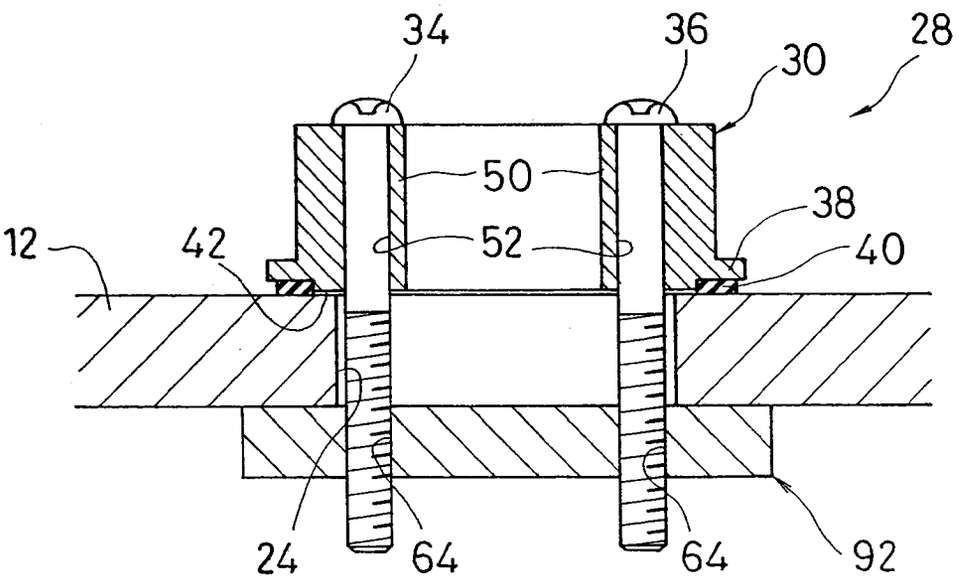


Fig. 15A

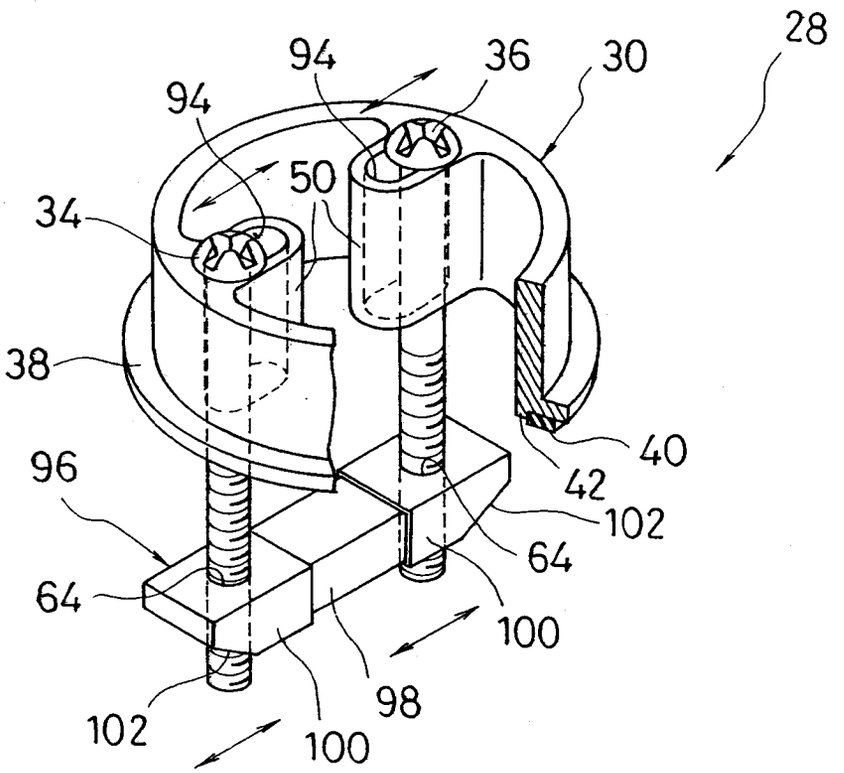


Fig. 15B

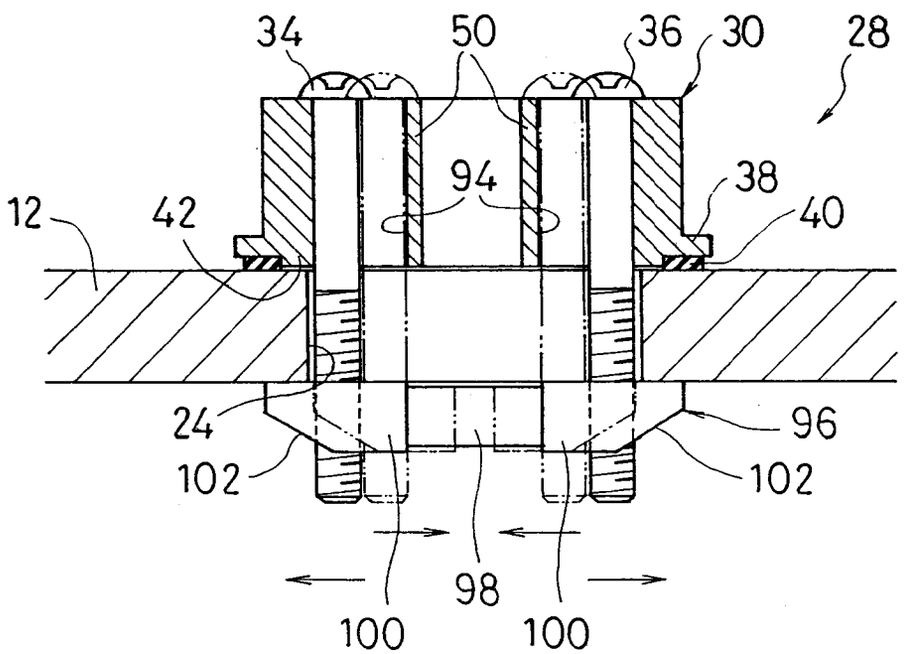


Fig.16

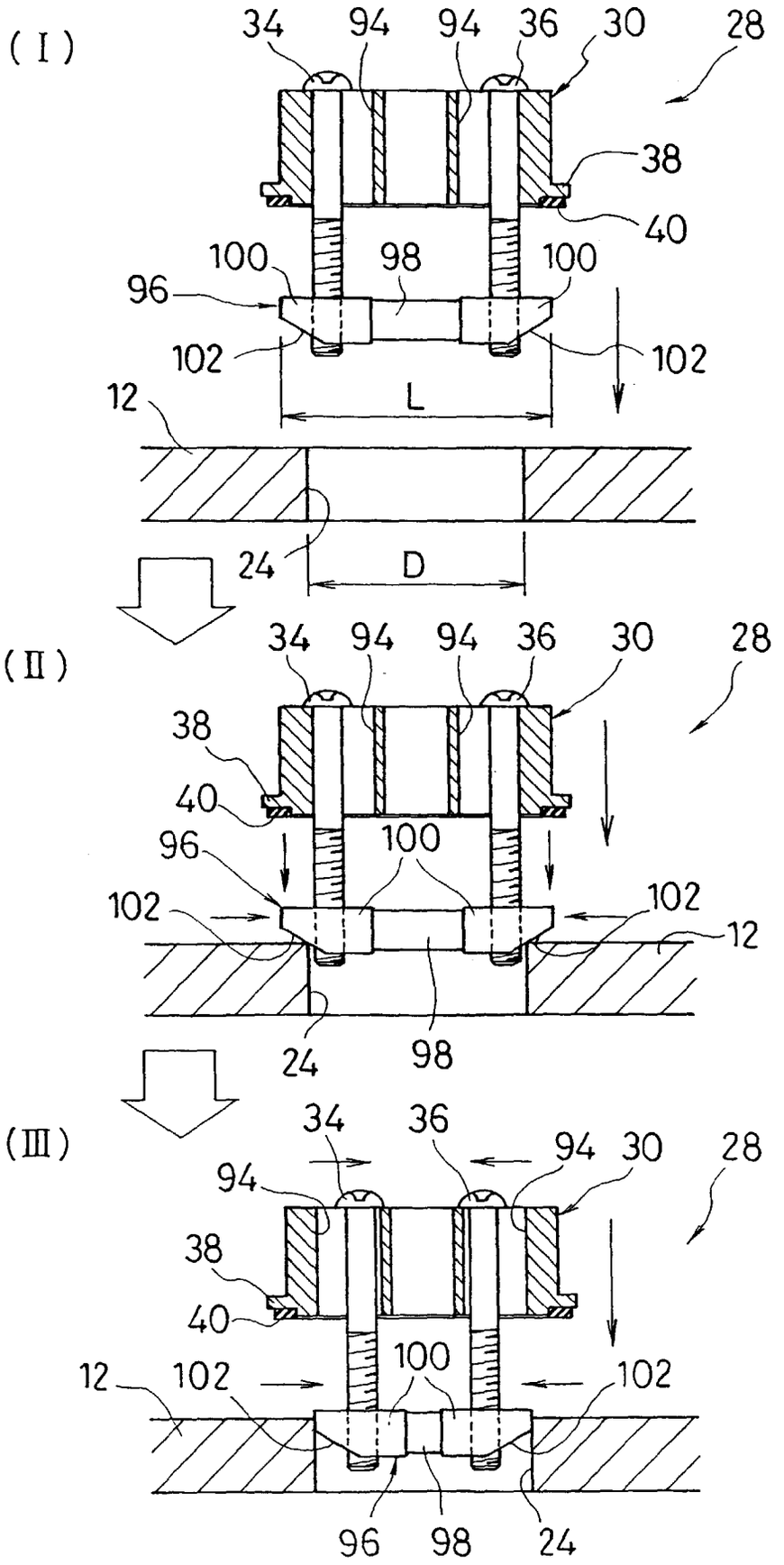

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Fig.17

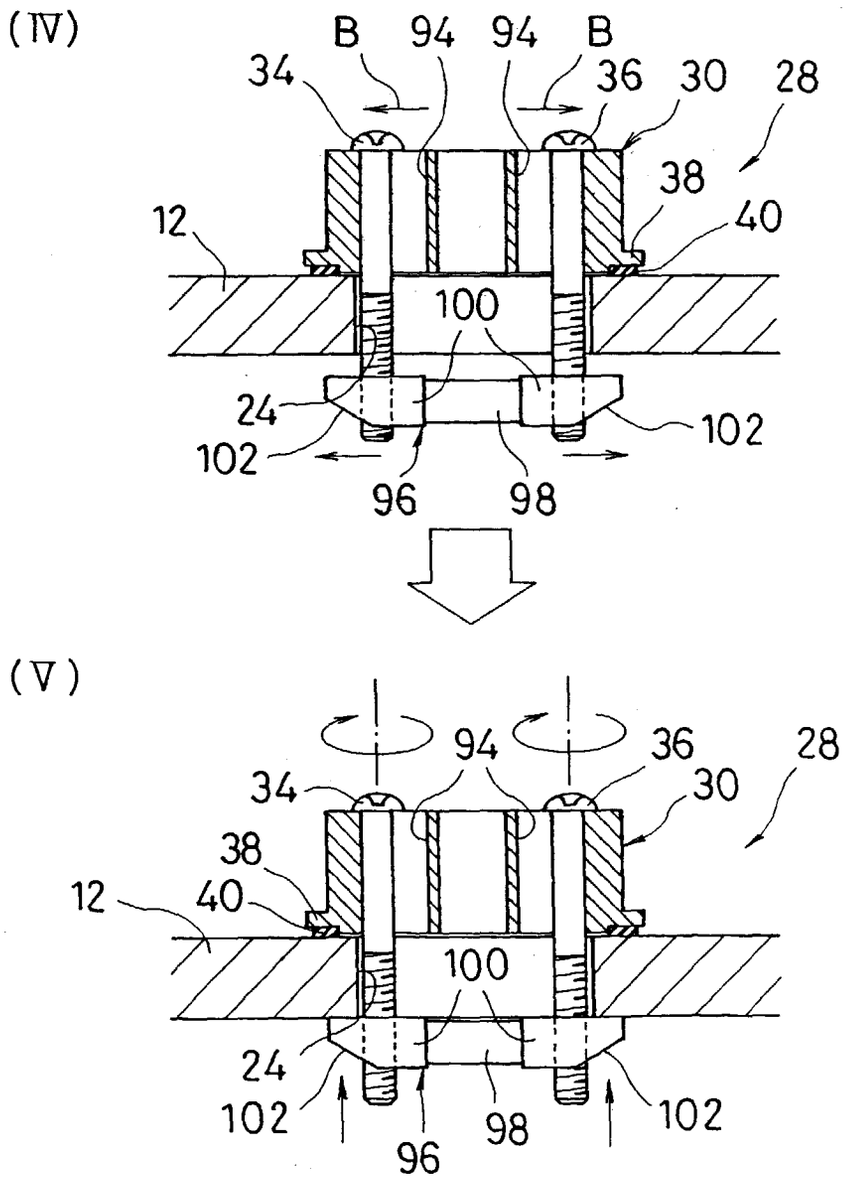

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Fig.18

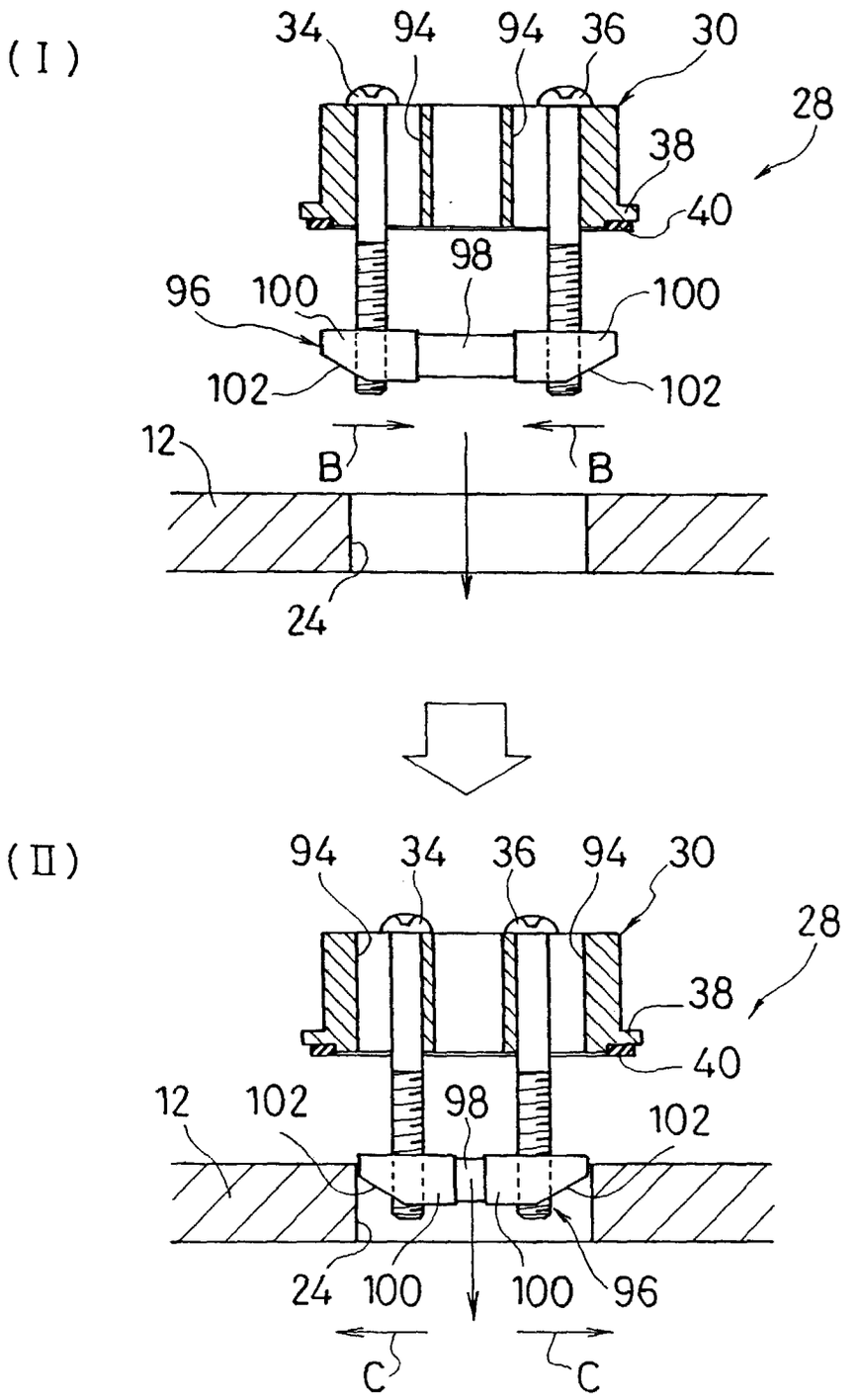

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(II)
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Fig.19A

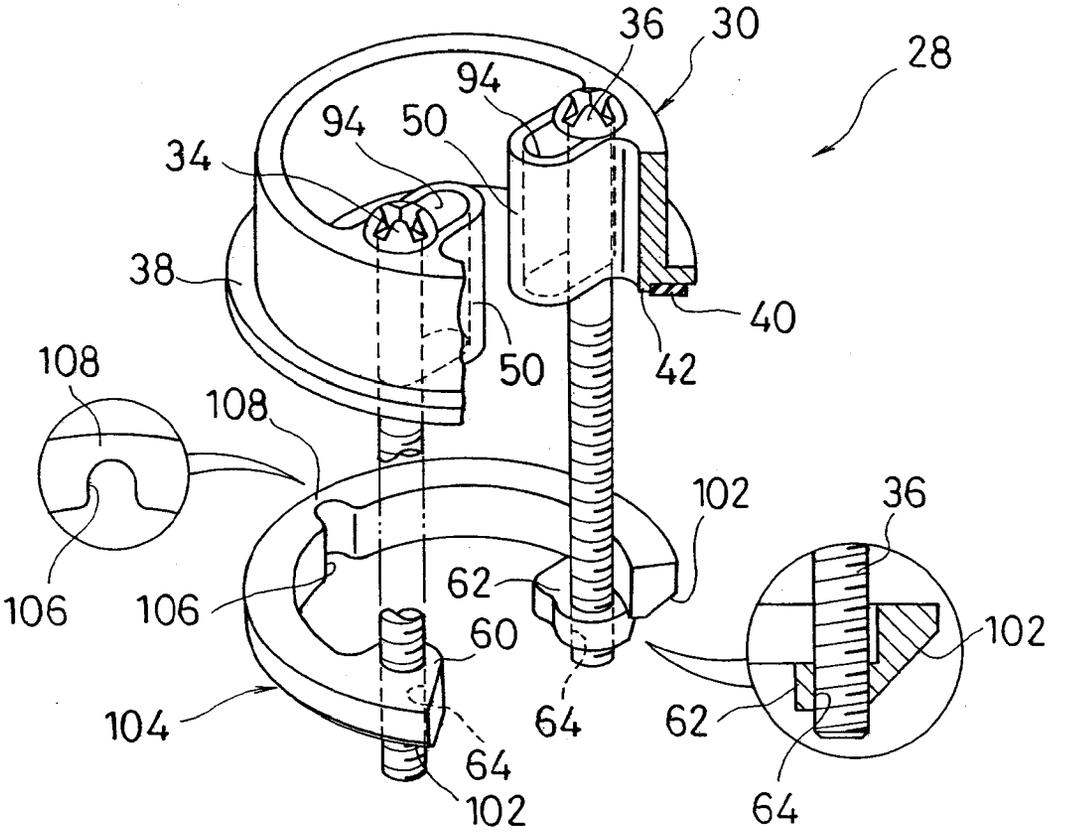


Fig.19B

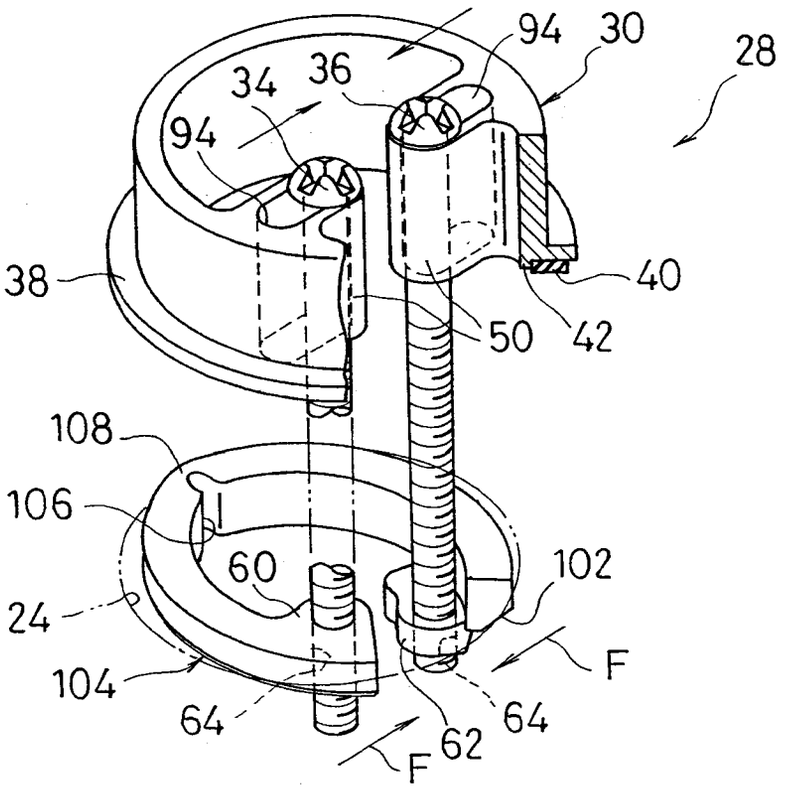


Fig. 20

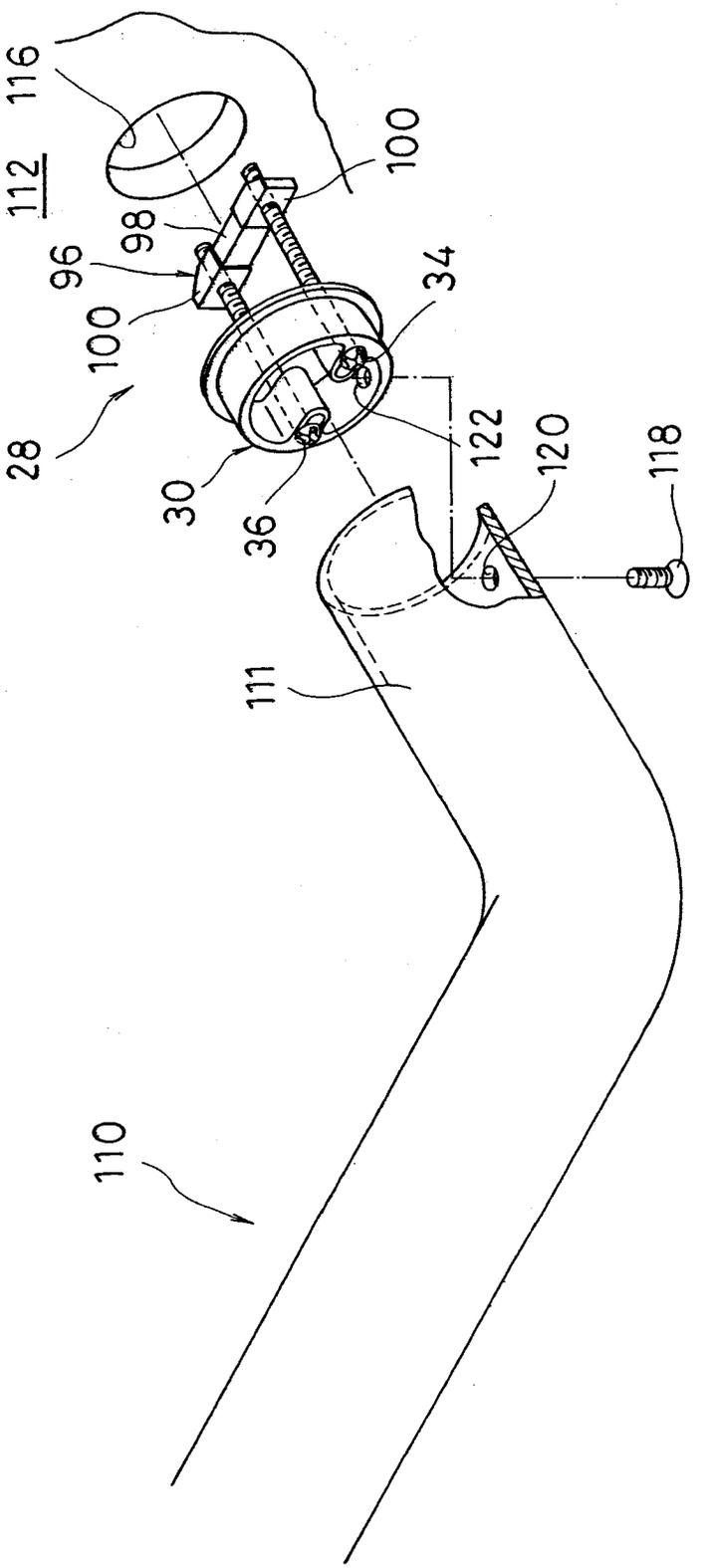


Fig.21

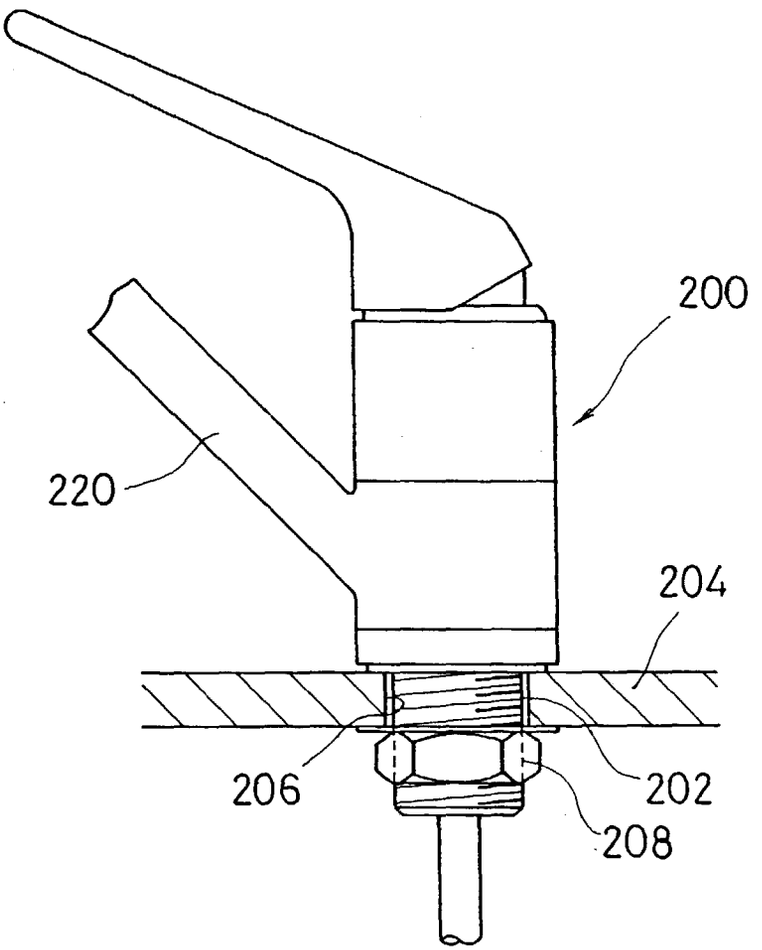


Fig.22A

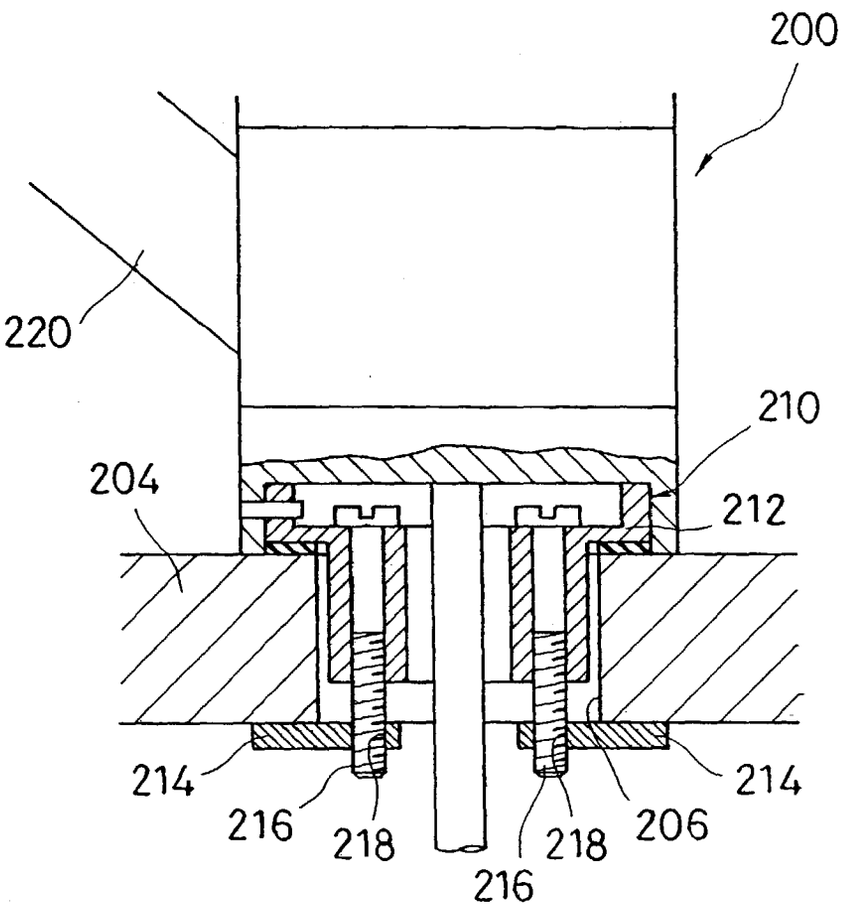


Fig.22B

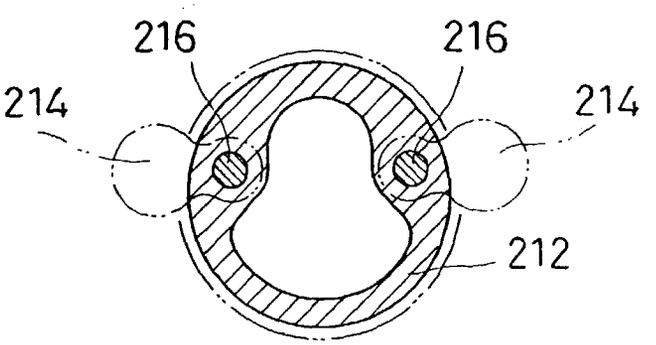


Fig.23A

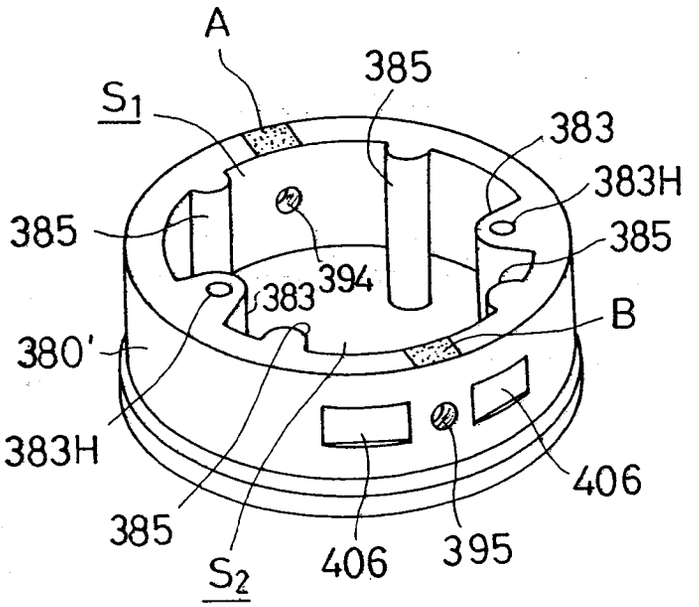


Fig.23B

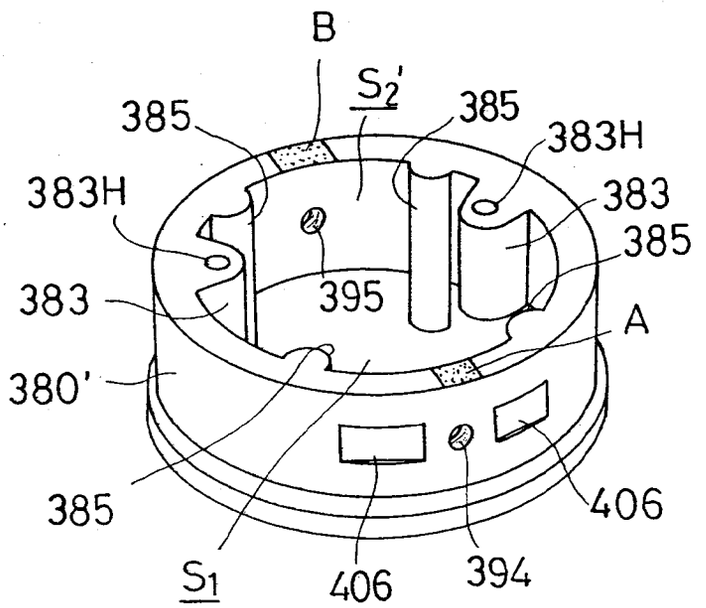


Fig.24A

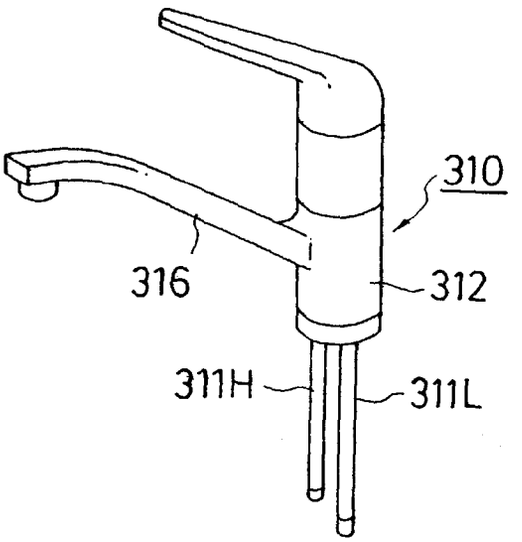


Fig.24B

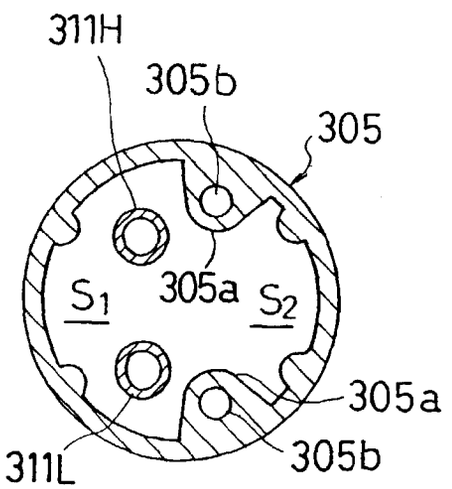


Fig.25A

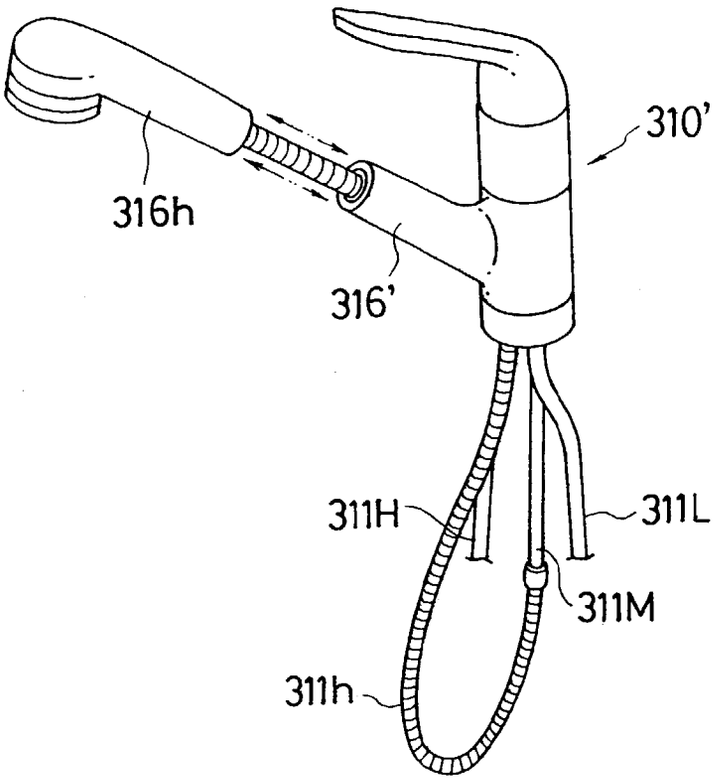


Fig.25B

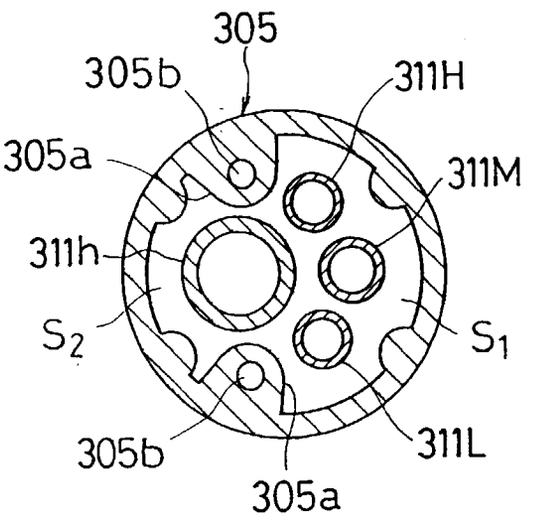


Fig.26A

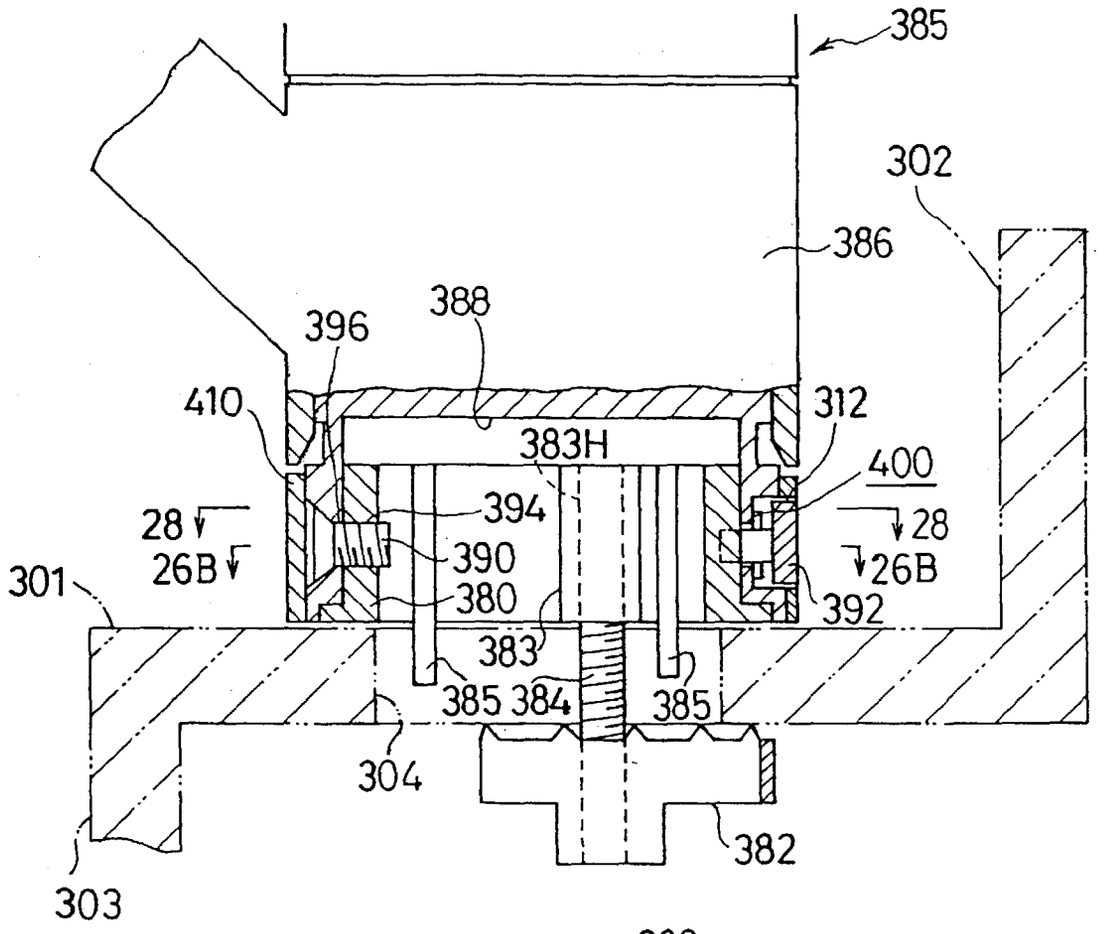


Fig.26B

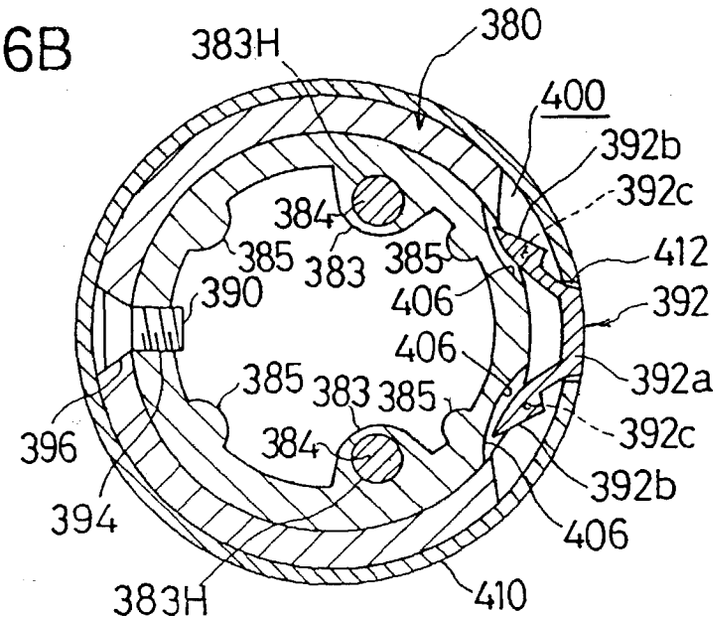


Fig.27A

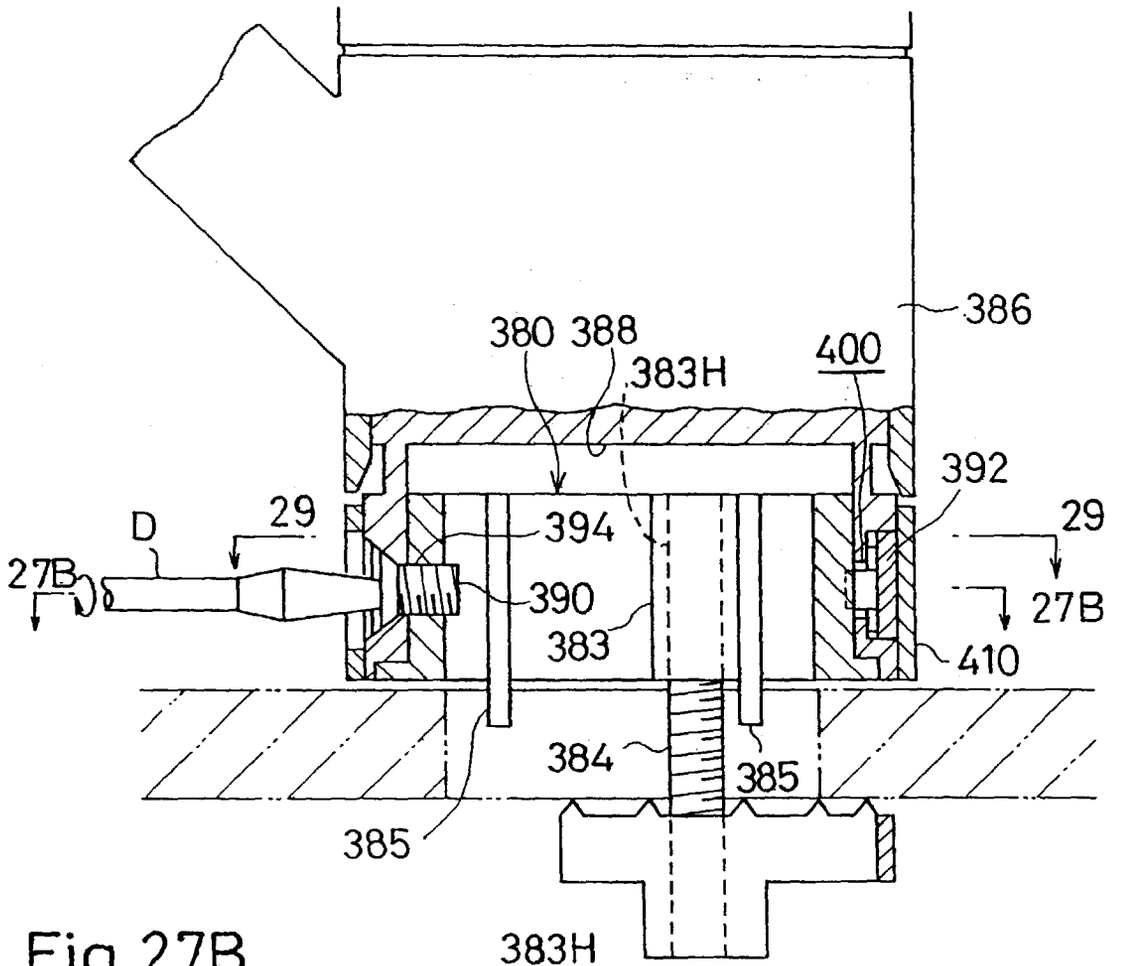


Fig.27B

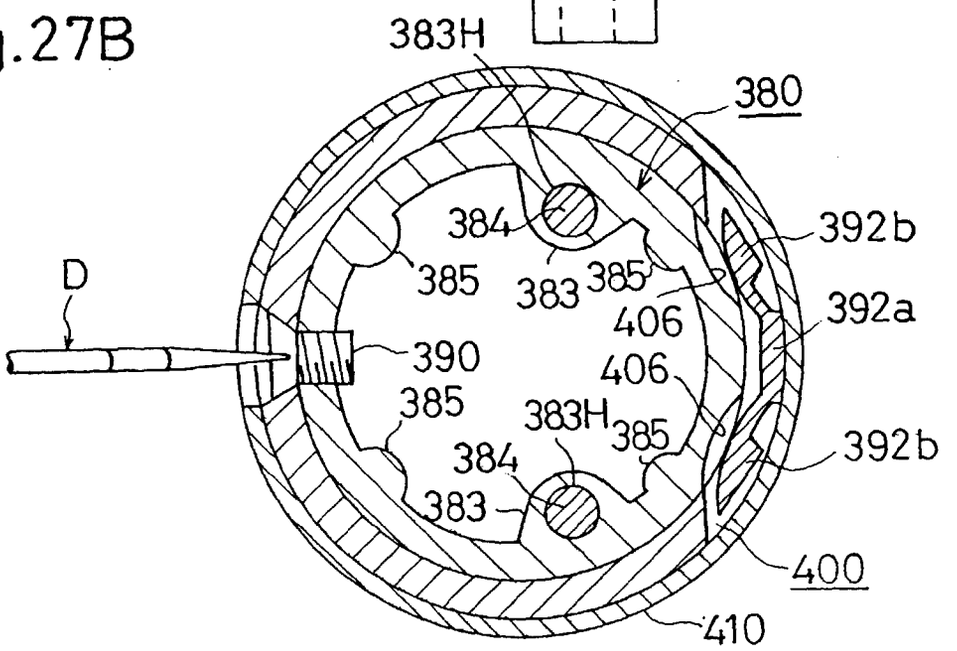


Fig. 28

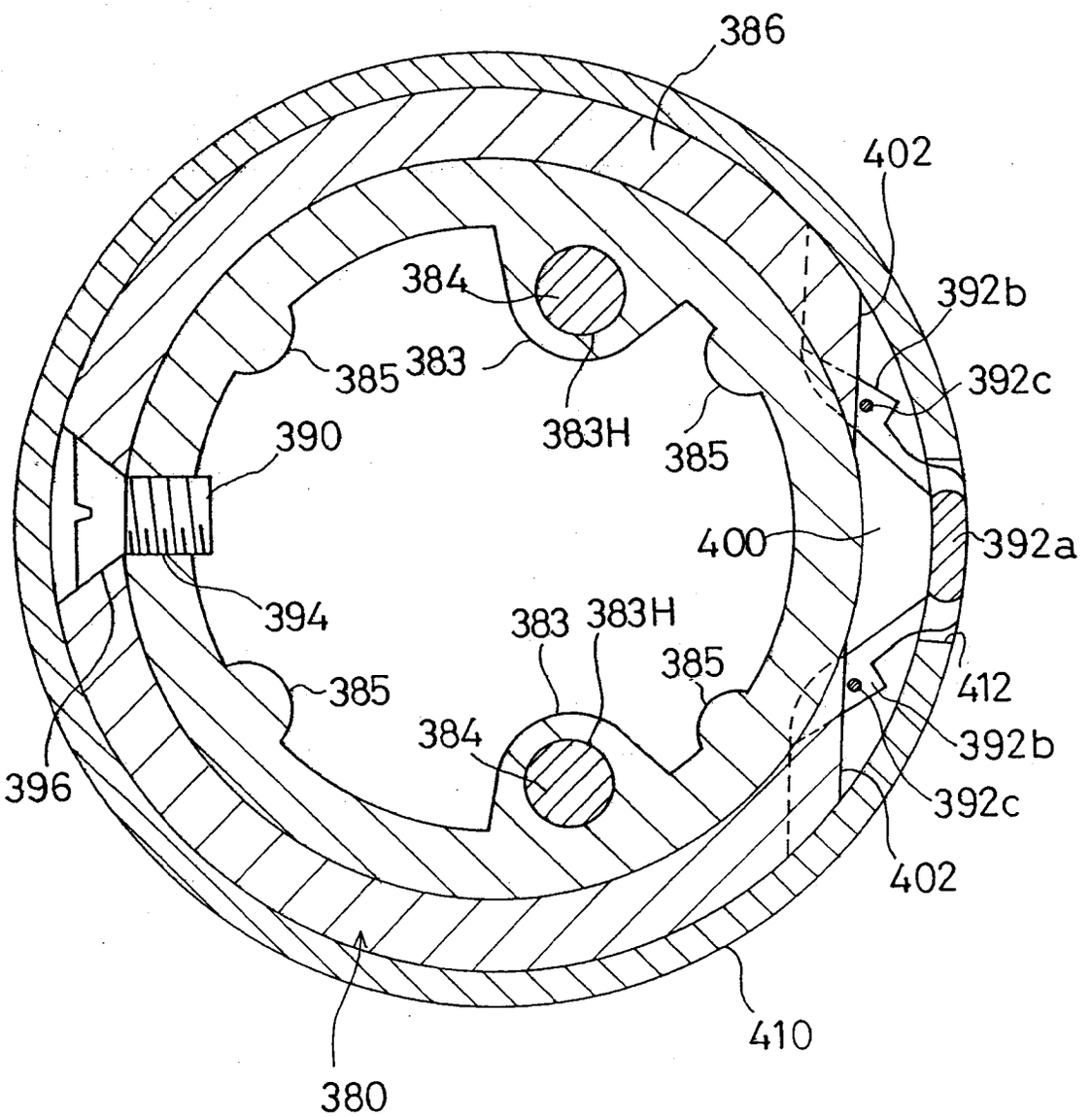

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Fig. 29

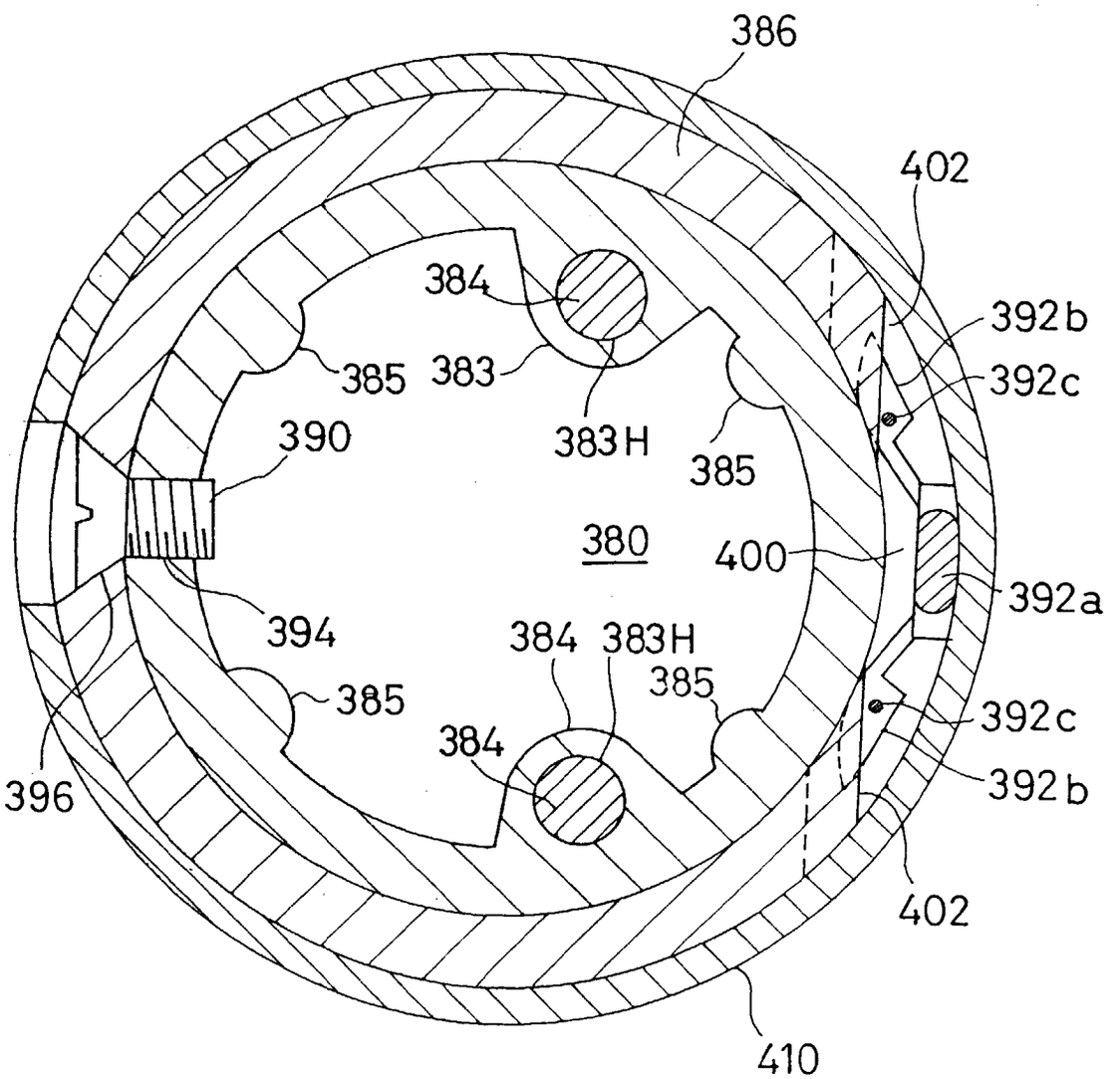

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Fig.30

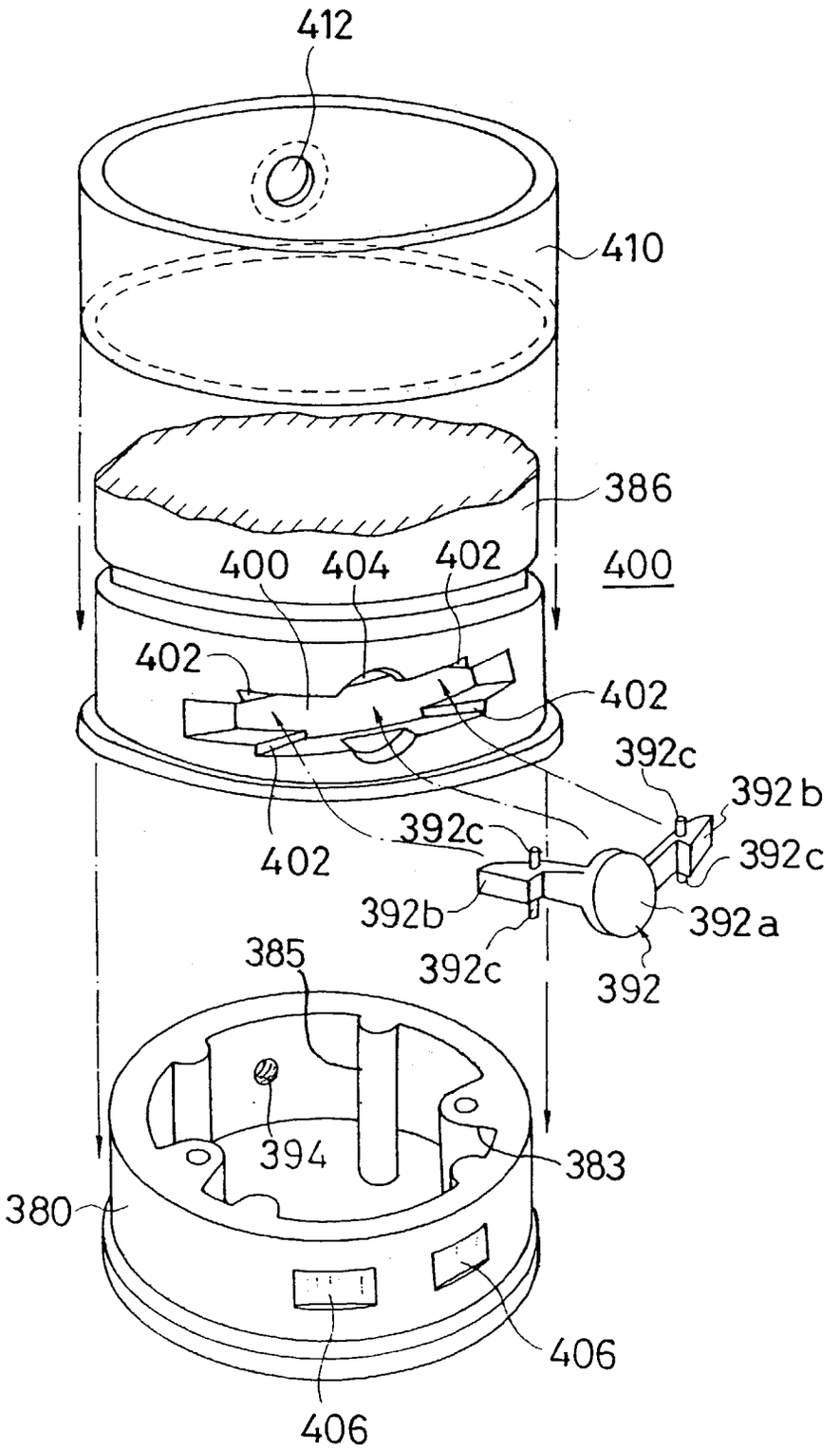

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Fig.31

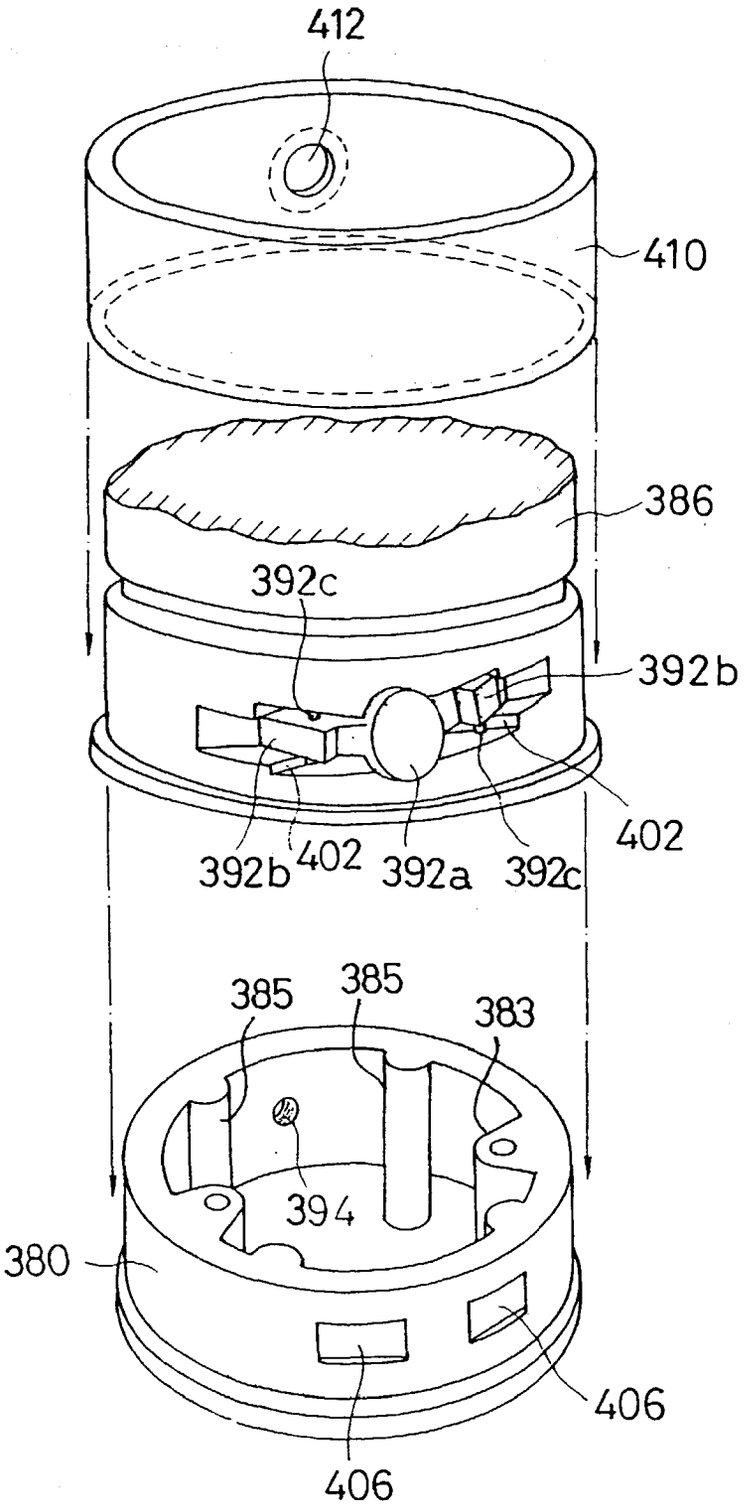

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Fig.32

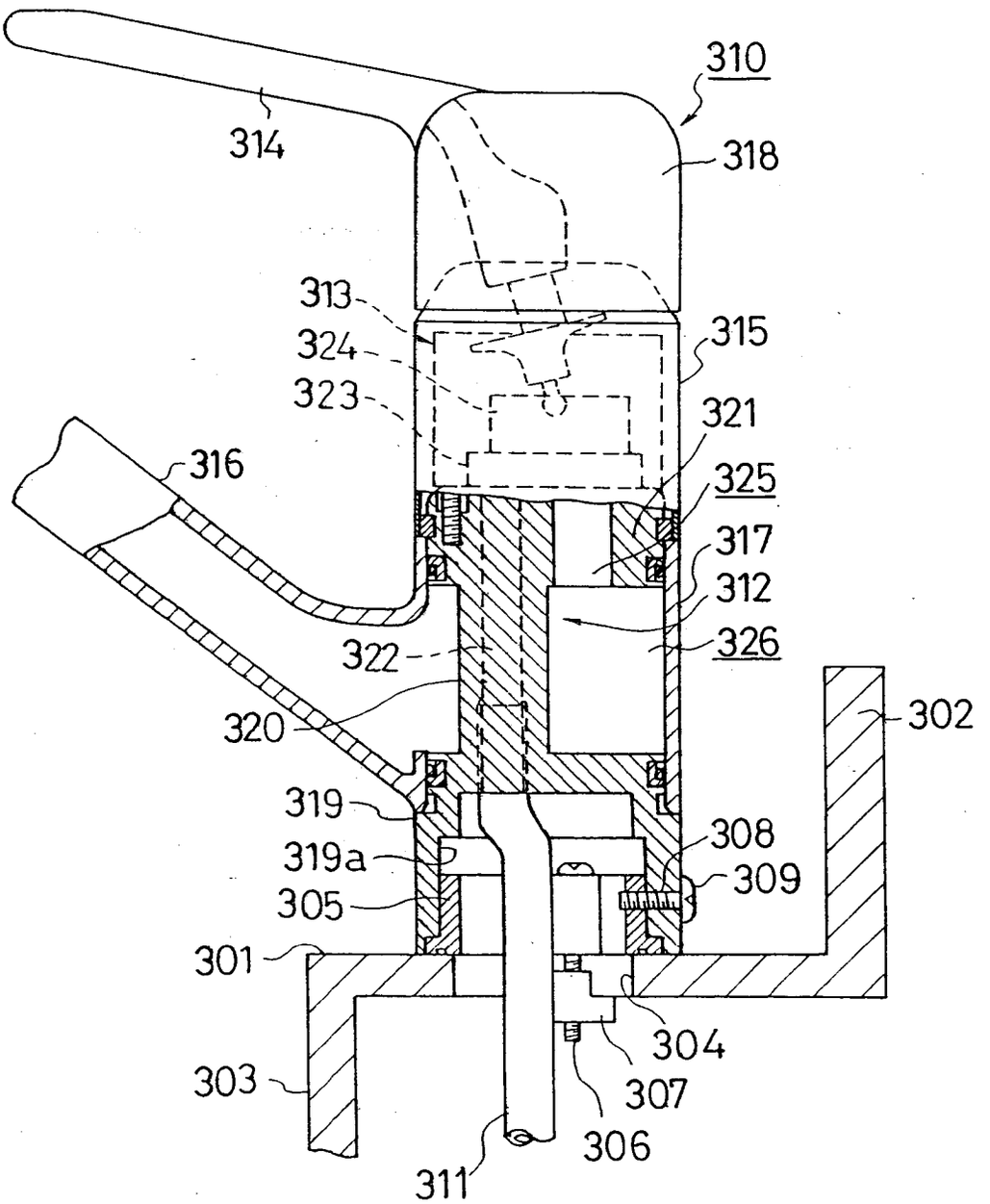

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Fig.33

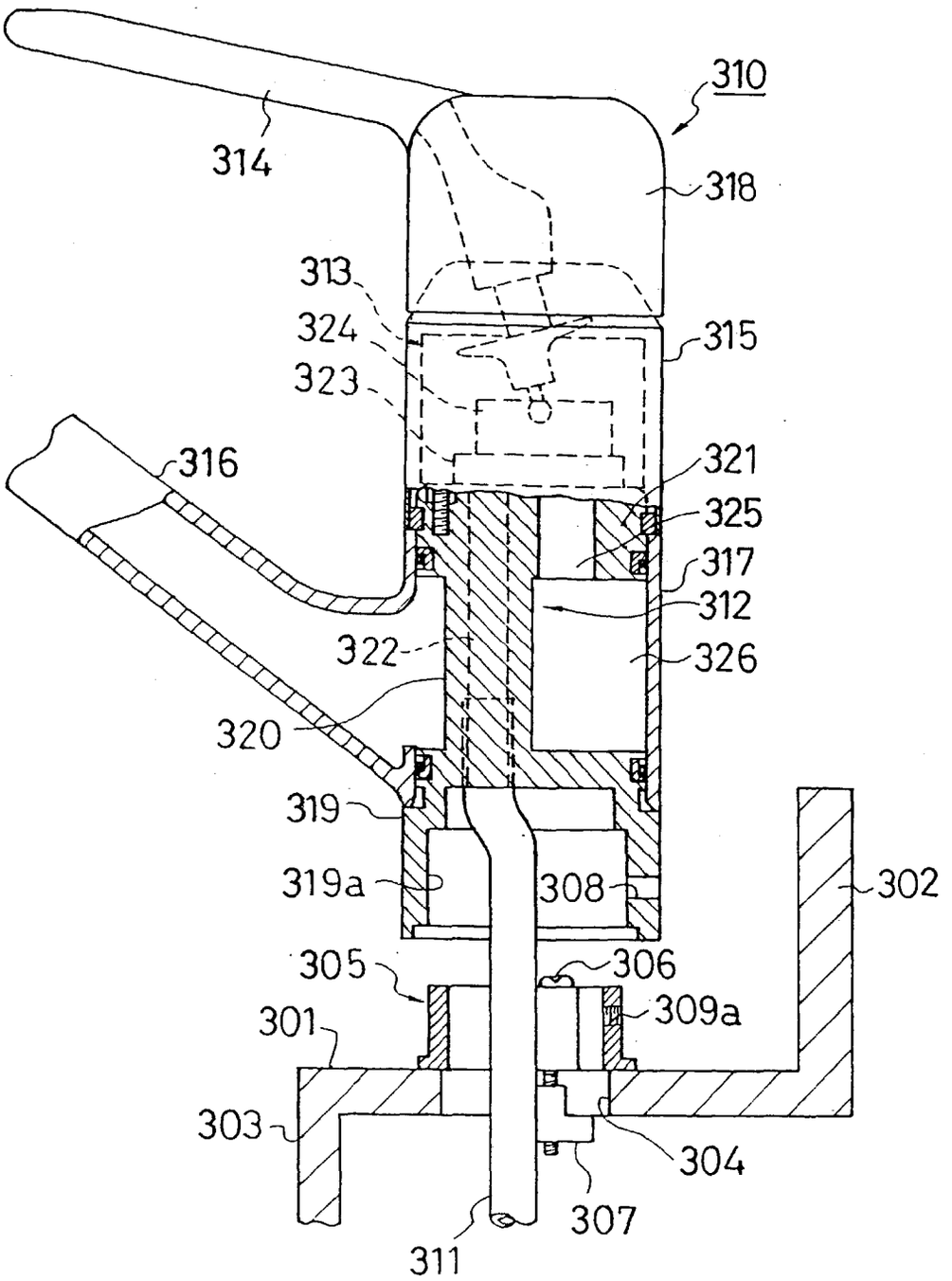

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Fig.34

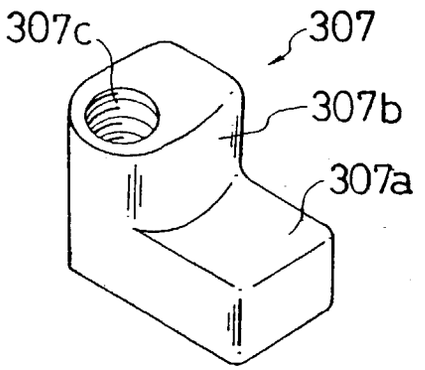


Fig.35

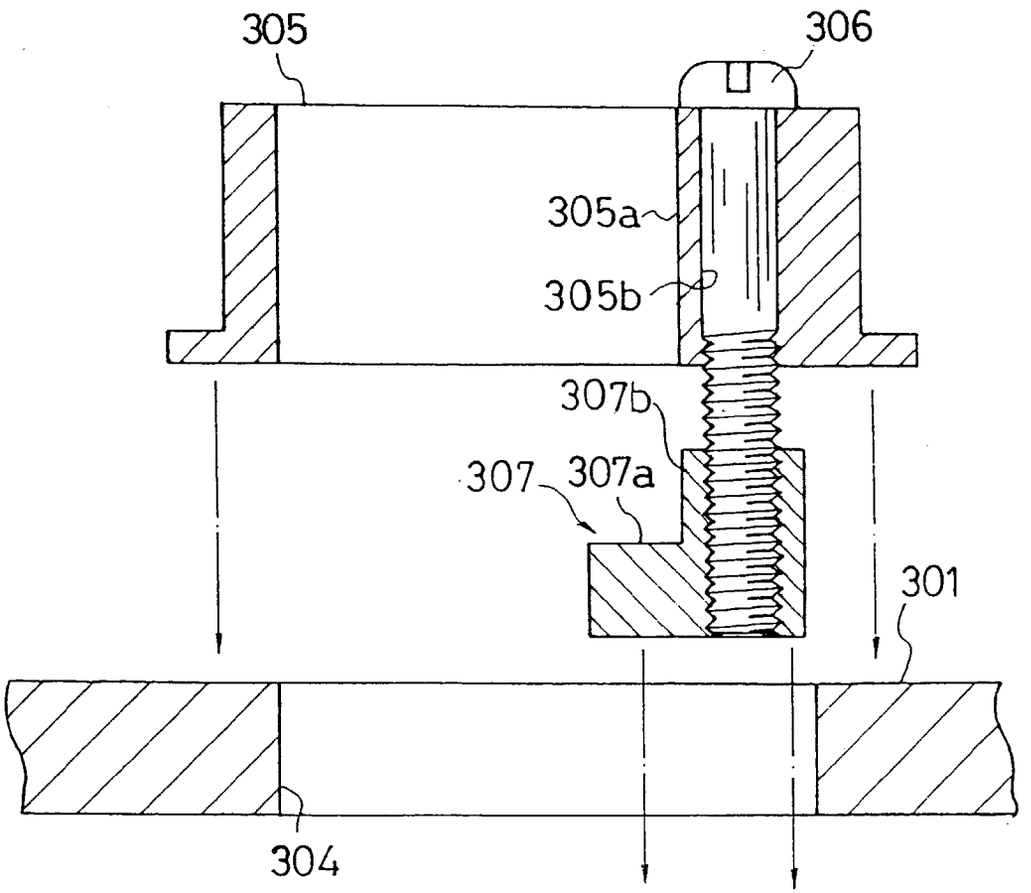


Fig.36

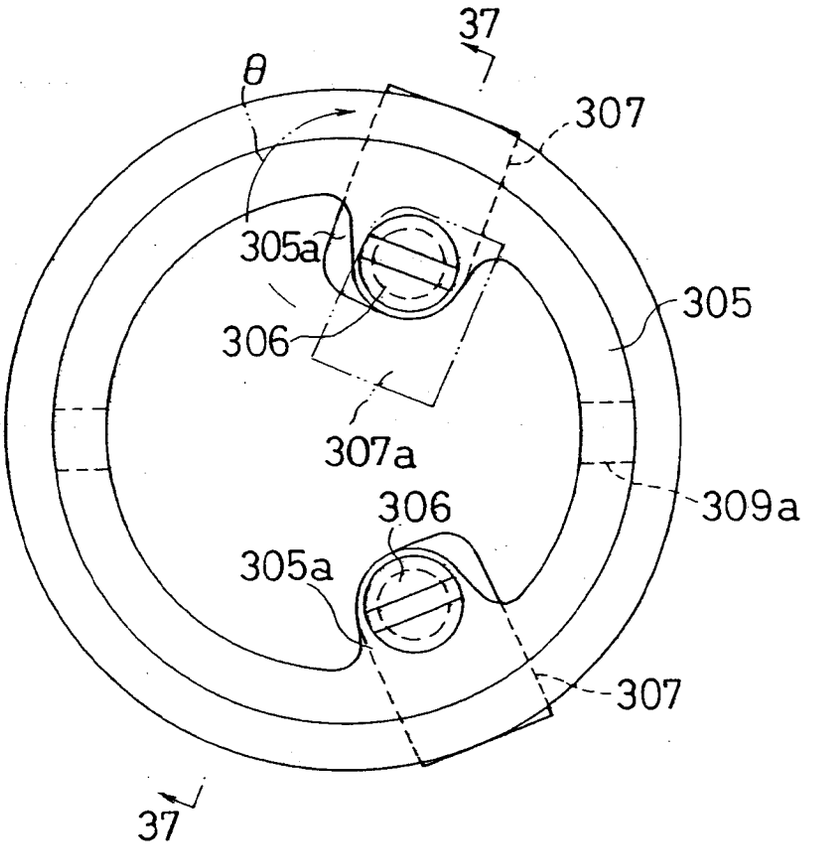

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Fig.37

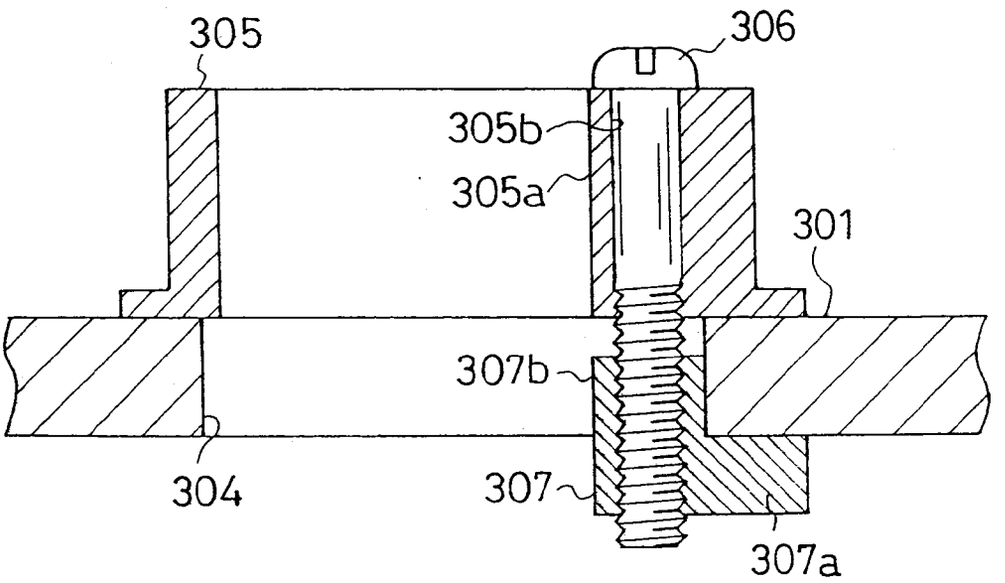

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Fig.38

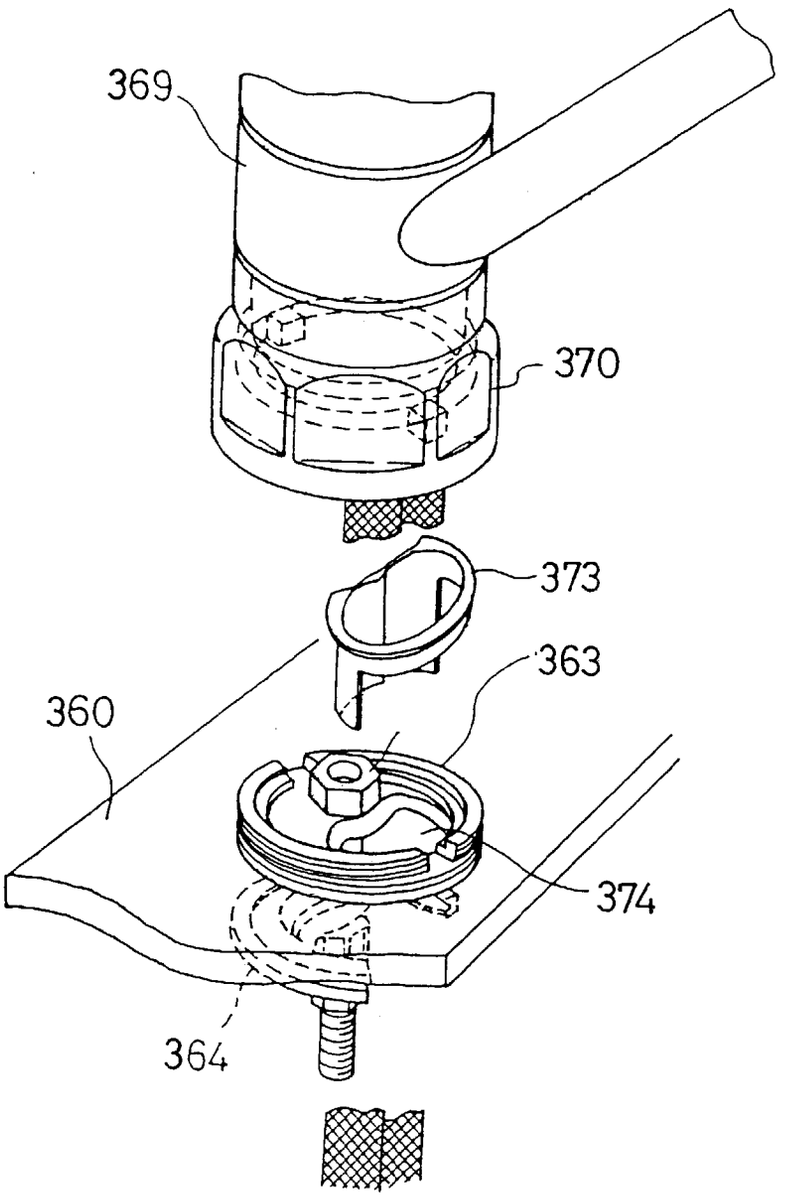


Fig.39

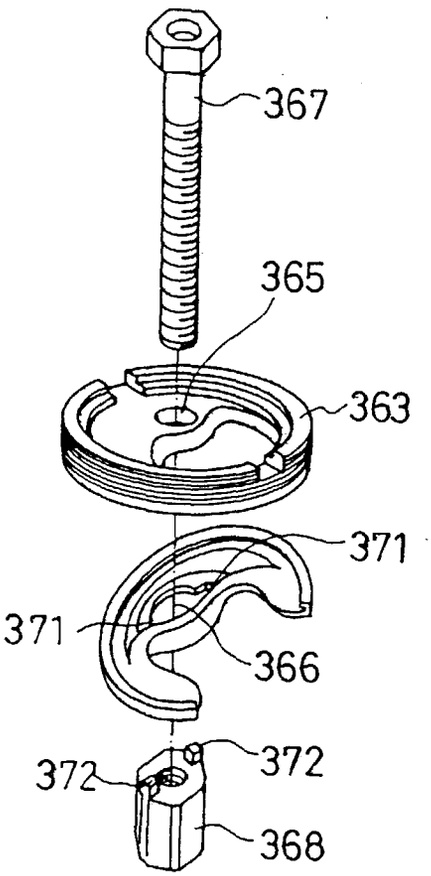


Fig.40

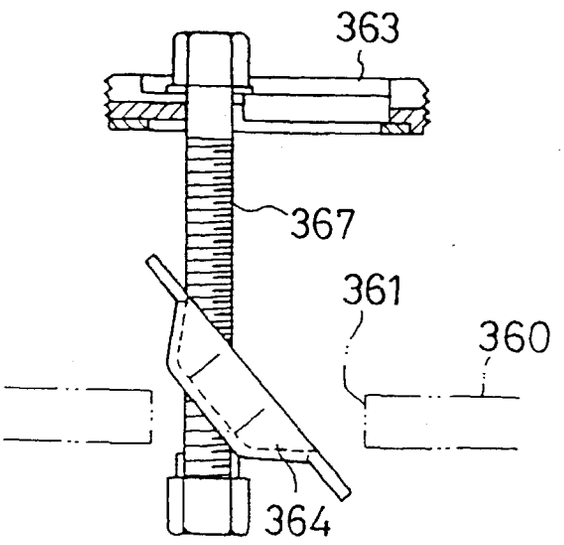


Fig.41

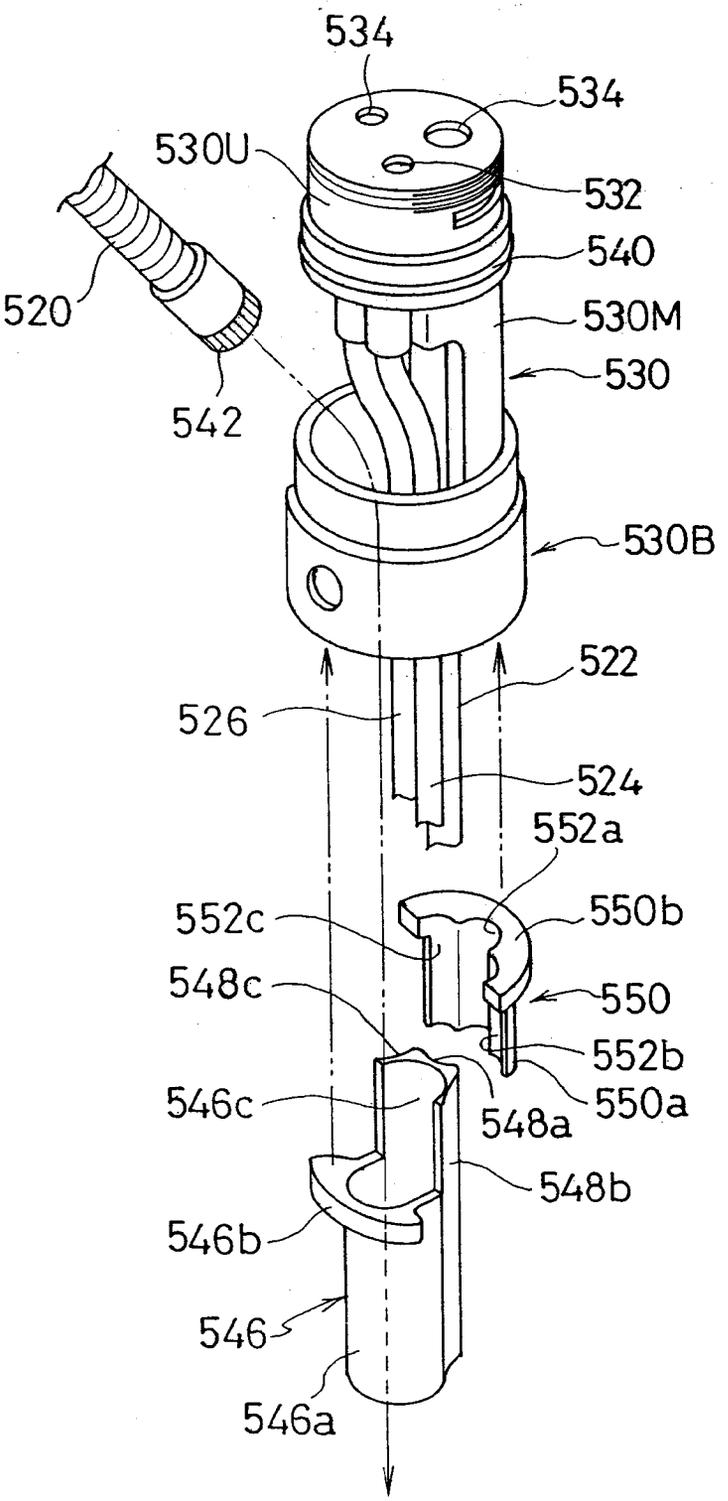

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Fig.42

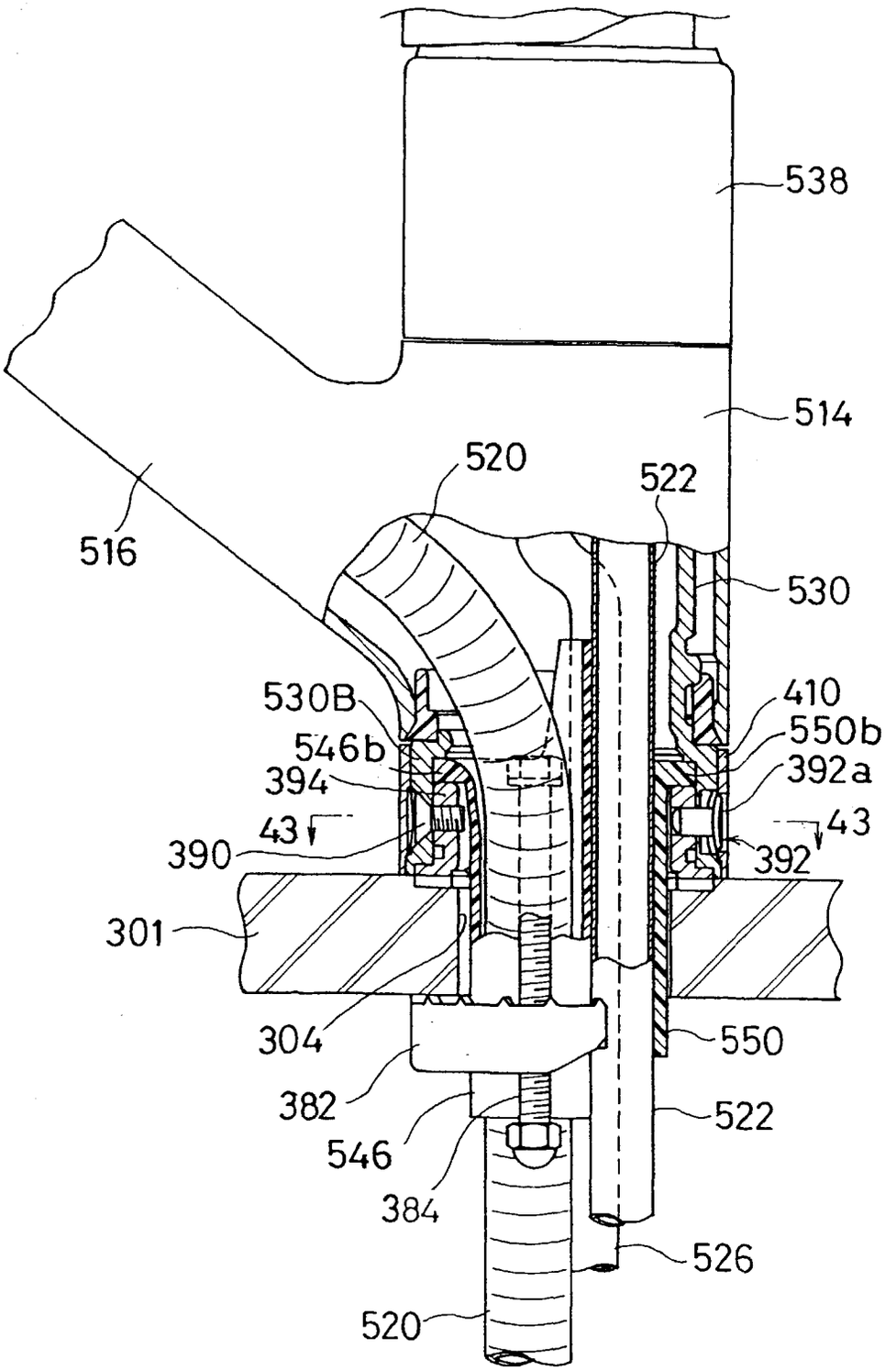

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Fig.43

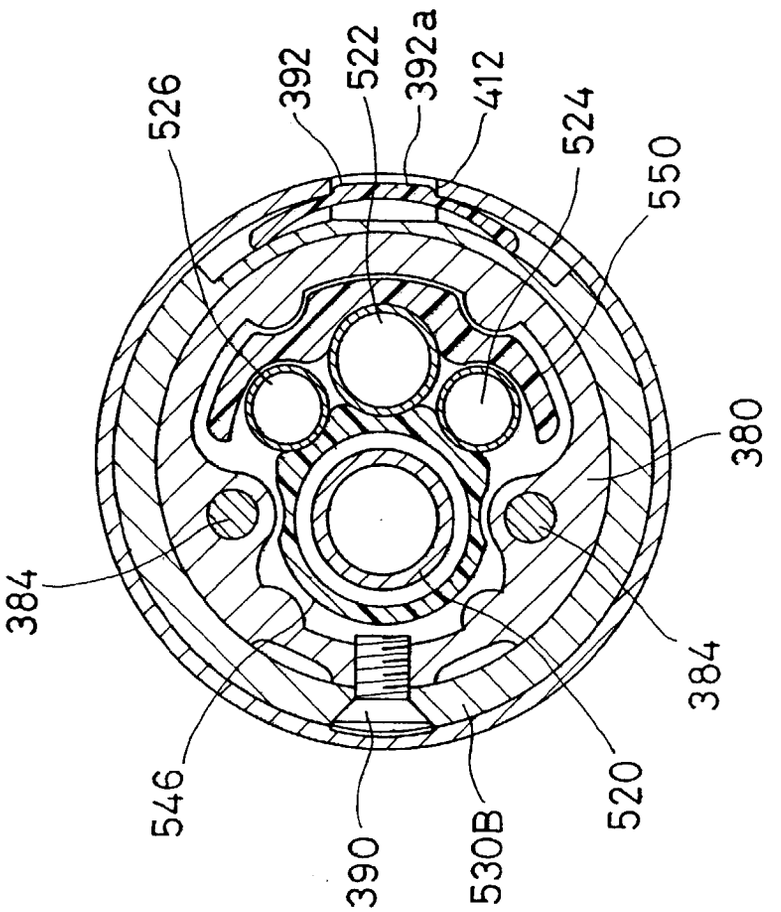


Fig.44A

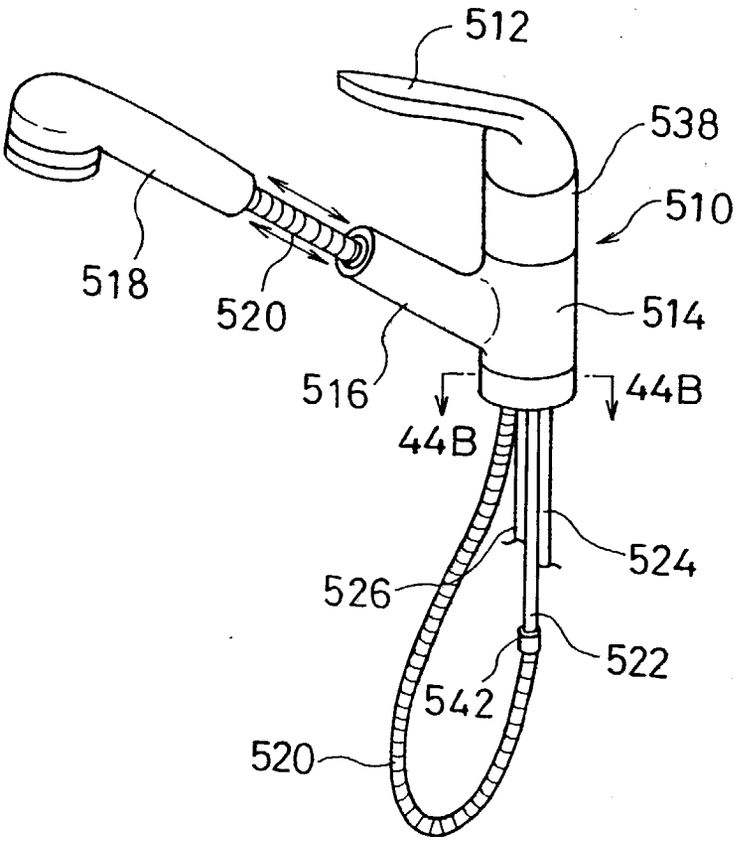


Fig.44B

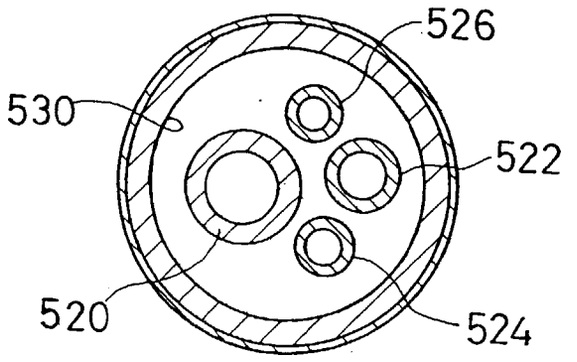


Fig.45

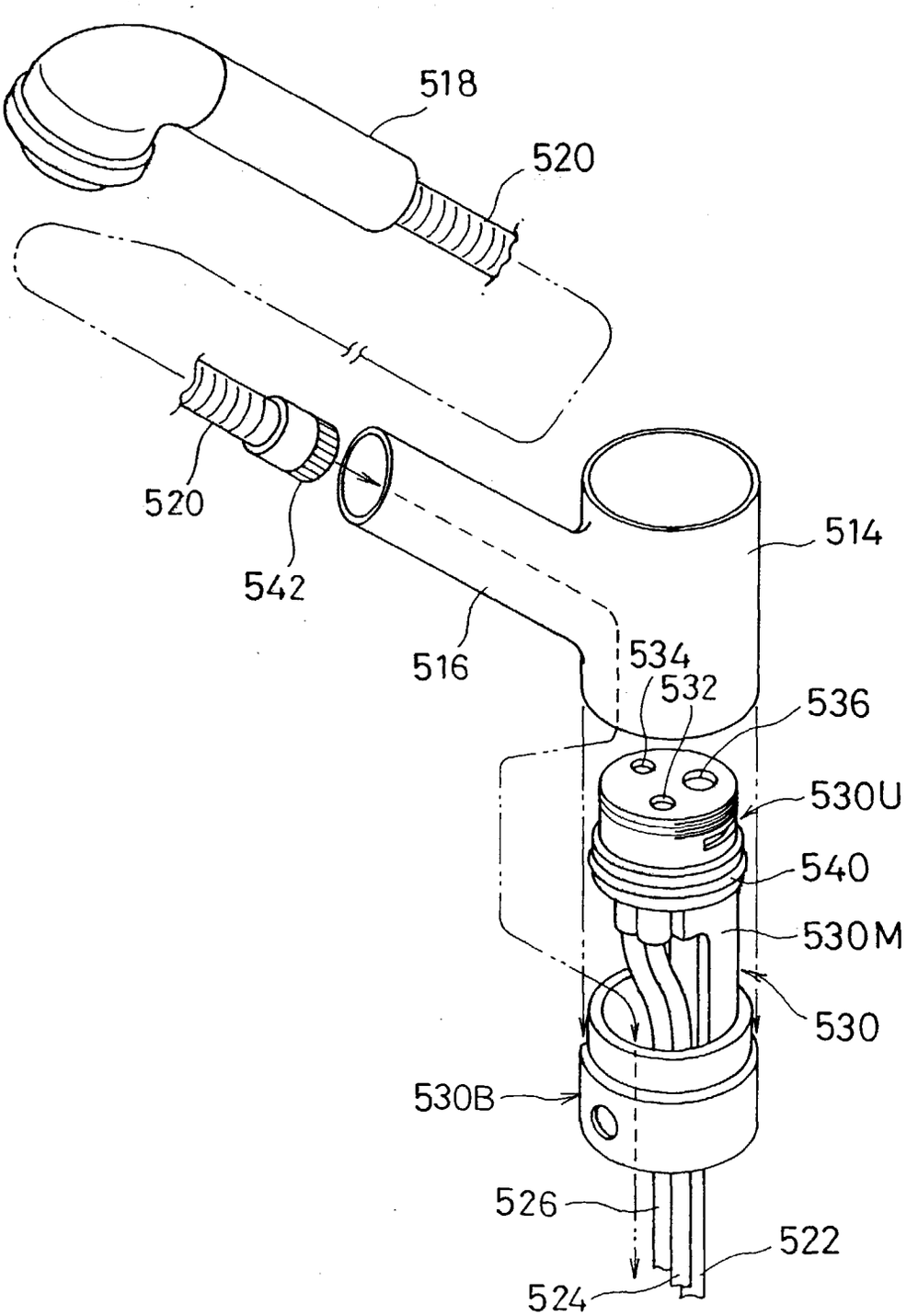

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Fig.46A

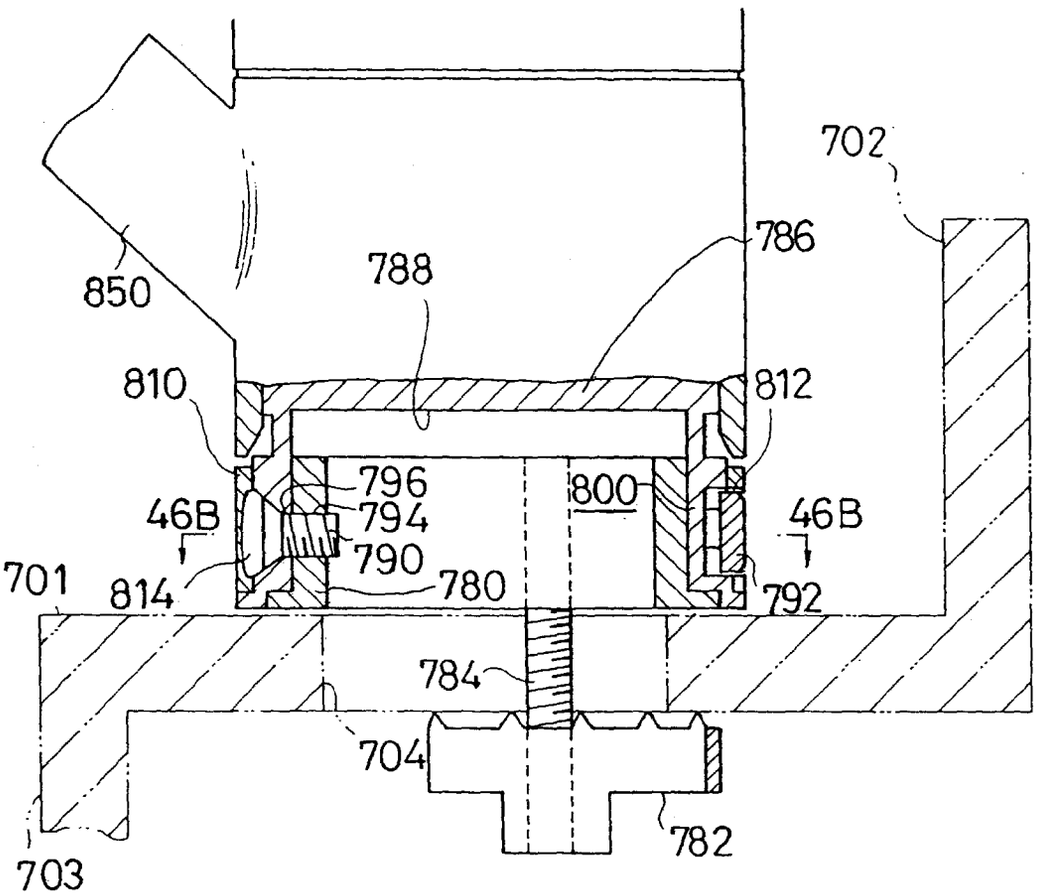


Fig.46B

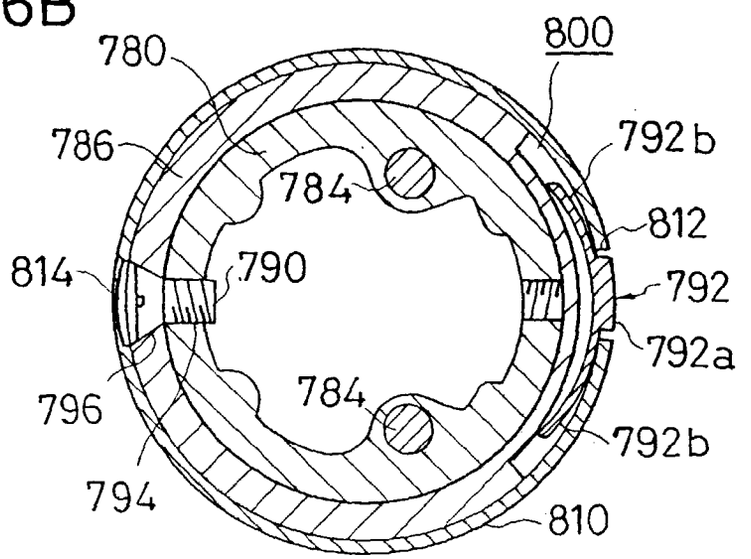


Fig.47A

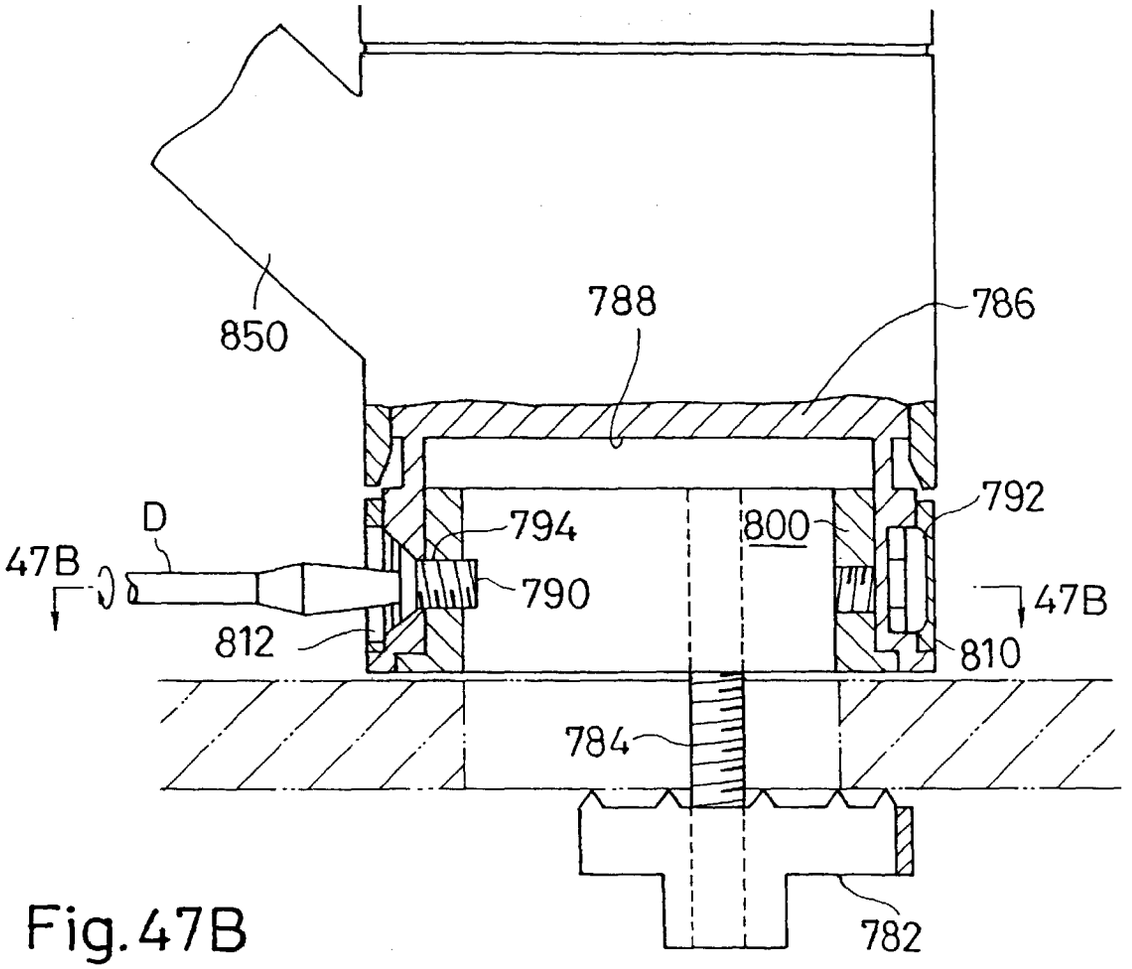


Fig.47B

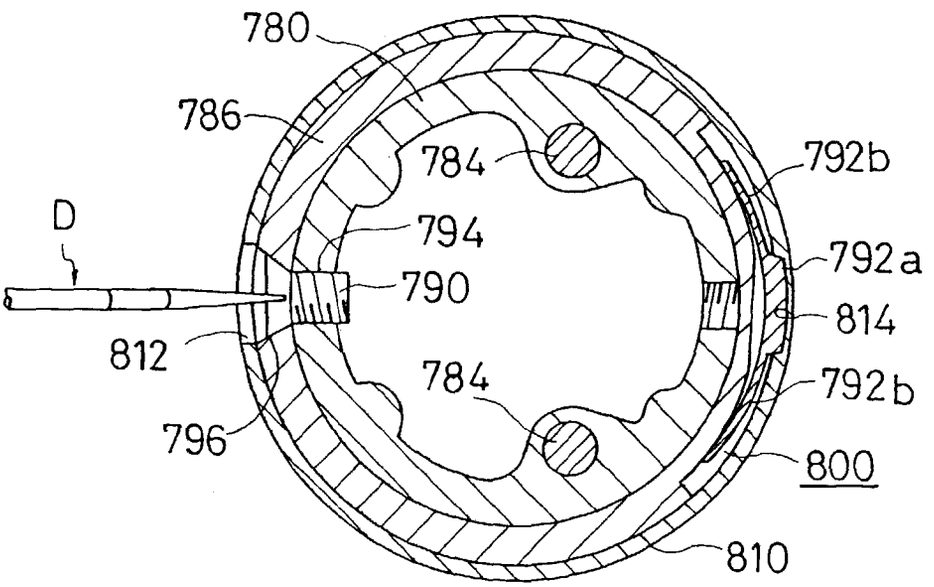


Fig.48

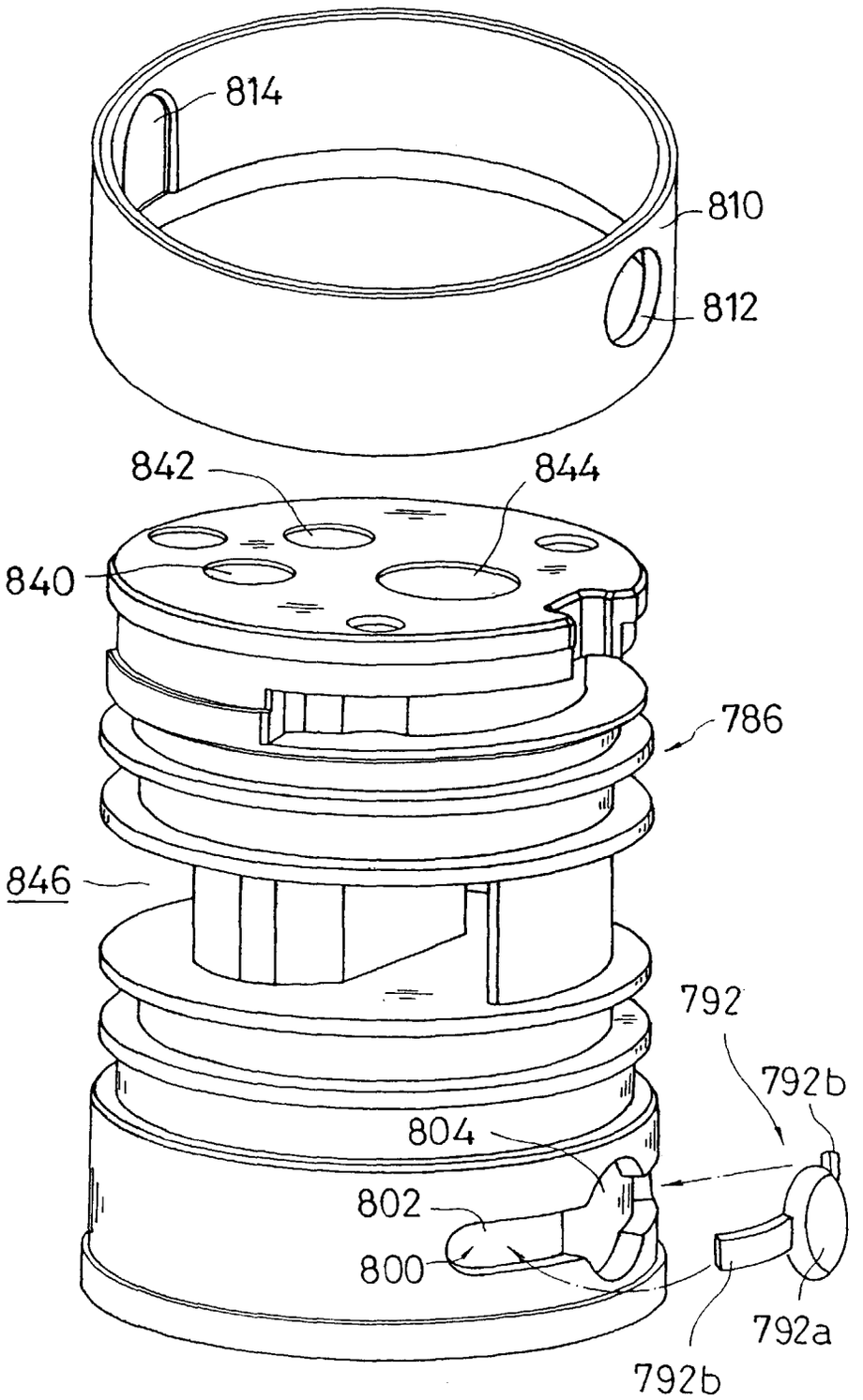


Fig.49

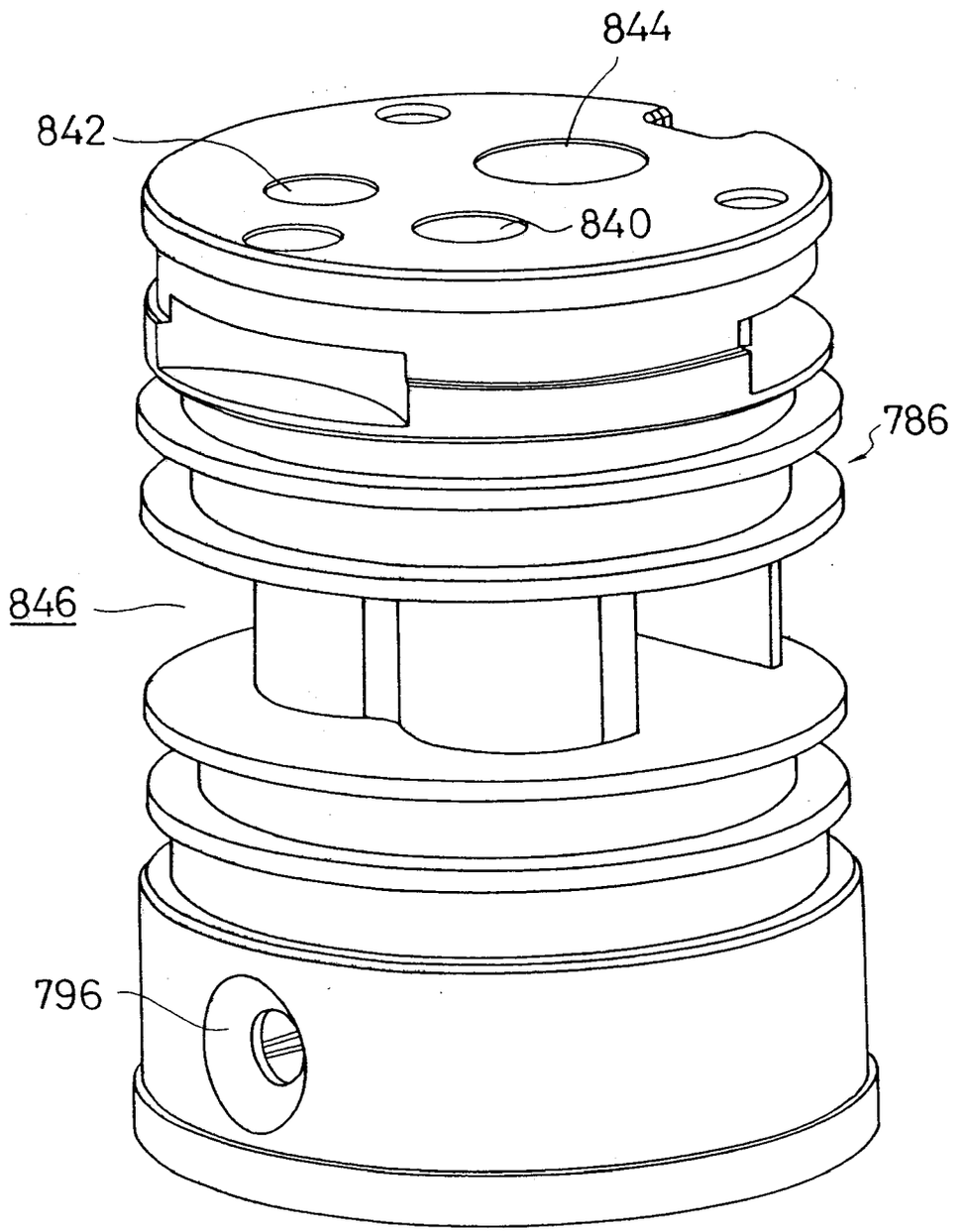


Fig.50

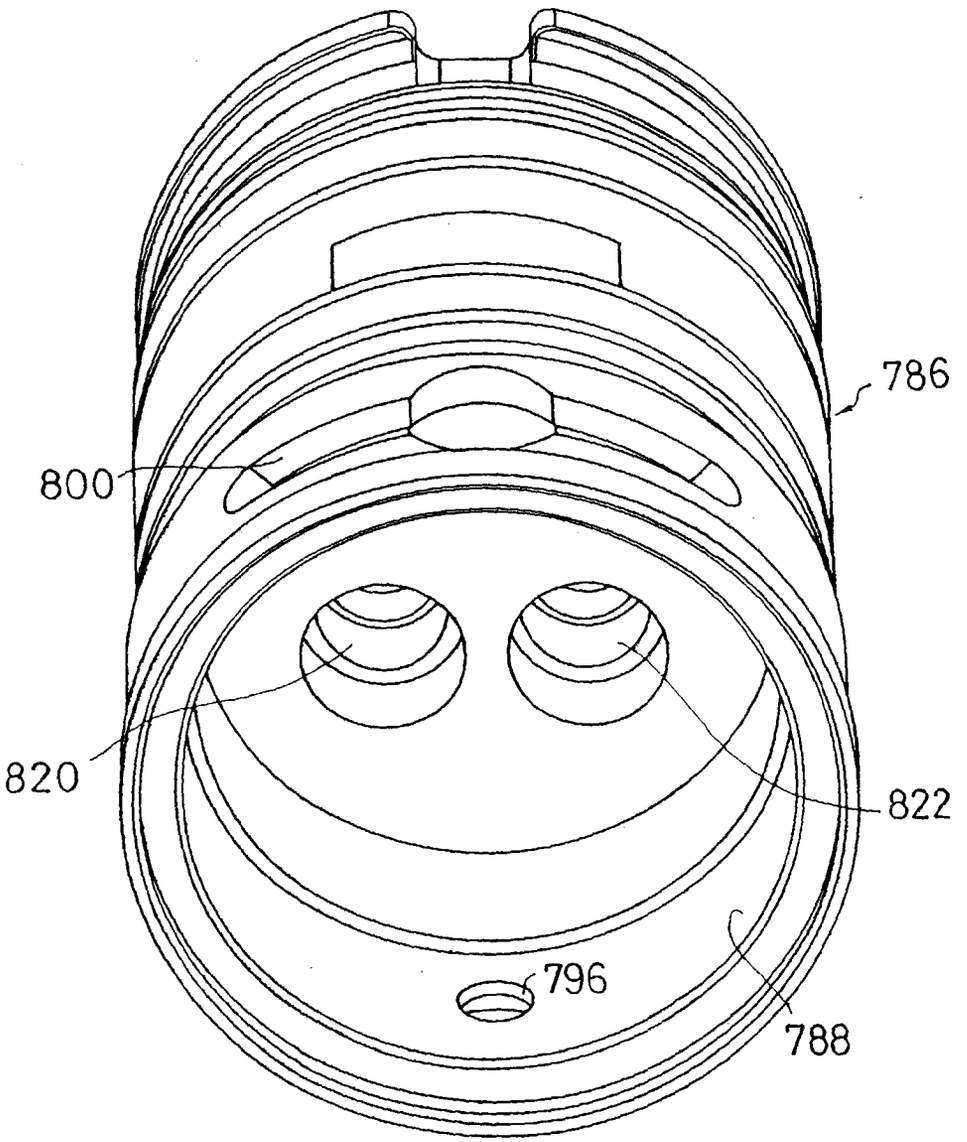


Fig.51

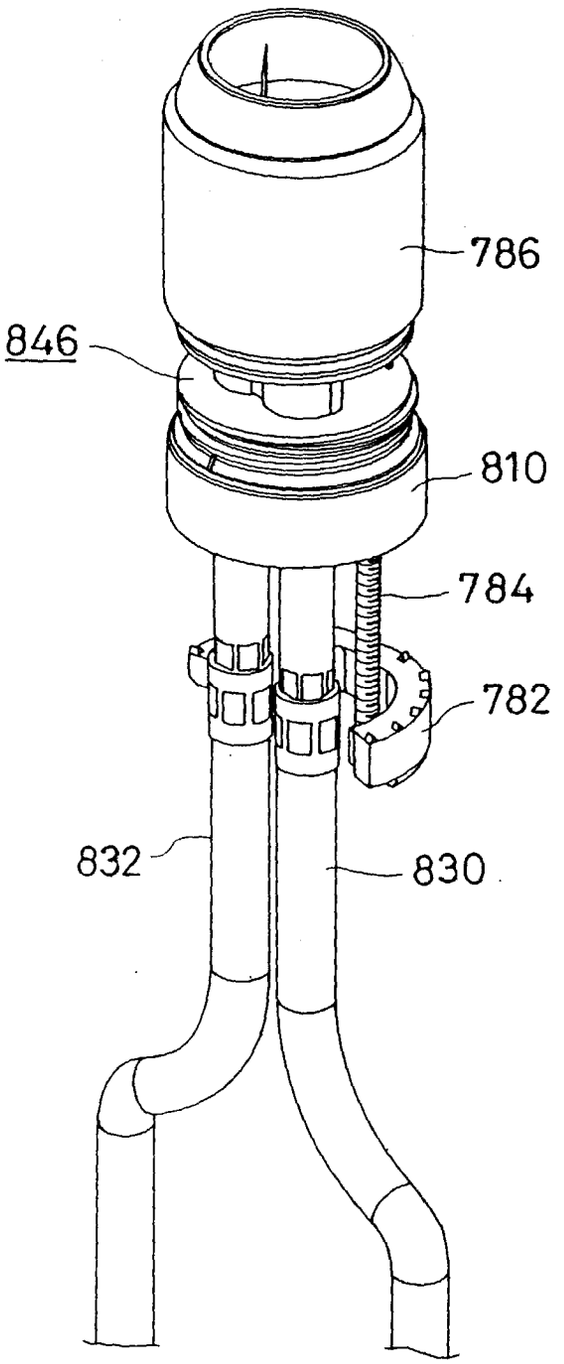


FIG.52

