(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 511 105 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
17.10.2012 Bulletin 2012/42

(21) Application number: **10835859.9**

(22) Date of filing: **30.11.2010**

(51) Int Cl.:
B43L 19/00 *(2006.01)* ***B43K 8/00*** *(2006.01)*
B43M 11/06 *(2006.01)* ***B65H 35/07*** *(2006.01)*

(86) International application number:
PCT/JP2010/071312

(87) International publication number:
WO 2011/070937 (16.06.2011 Gazette 2011/24)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **08.12.2009 JP 2009278842**

(71) Applicant: **Kokuyo Co., Ltd.**
Osaka 537-8686 (JP)

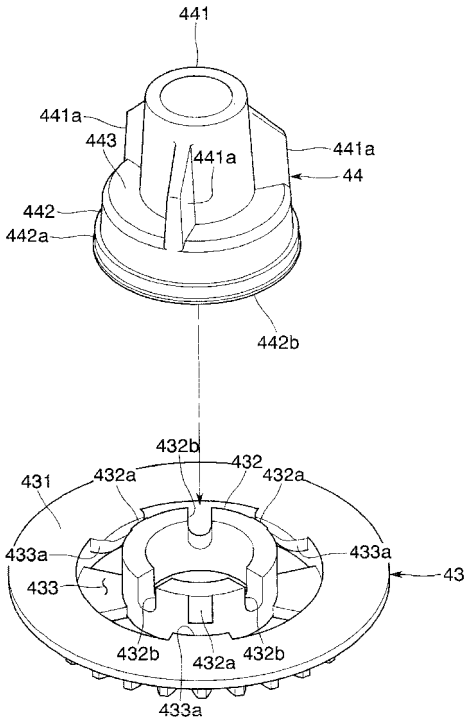
(72) Inventor: **MATSUSHITA, Kinya**
Osaka-shi
Osaka 537-8686 (JP)

(74) Representative: **Talbot-Ponsonby, Daniel Frederick**
Marks & Clerk LLP
Fletcher House
Heatley Road
The Oxford Science Park
Oxford OX4 4GE (GB)

(54) **TRANSFER TOOL**

(57) In a transfer tool T which feeds out a transfer tape from a feeding reel 21 and takes up the tape around a take-up reel 23 via a transfer head 22 and makes rotation of the feeding reel 21 and rotation of the take-up reel 23 interlocked with each other through a power transmission device 9, a slip mechanism 8 is formed between a gear member 43, which is an element of the power transmission device 9, and a support shaft member 44 which is slidable with respect to the gear member 43 and supports the feeding reel 21. The slip mechanism 8 includes a boss section 432 provided on the gear member 43 and separated from an outer teeth portion 431 through an annular groove 433, a plurality of inward projecting pieces 433a provided intermittently in the circumferential direction on the annular groove 433 and projecting from the inner peripheral face of the annular groove 433, and a fitting portion 442 provided on the support shaft member 44, having a substantially cylindrical shape continuous in the circumferential direction and in which the boss section 432 is inserted and at least a part thereof is housed in the annular groove 433, and generating friction between itself and the boss section 432.

Fig.14



EP 2 511 105 A1

Description

Technical Field

[0001] The present invention relates to a transfer tool used when a transferring object such as an adhesive, a correction tape, a pigment and the like is transferred on a sheet of paper or any other transfer target surfaces.

Background Art

[0002] In this type of transfer tool, a transfer tape to which a transferring object is made to adhere is fed out of a feeding reel and taken up around a take-up reel via a transfer head, and rotation of the feeding reel and rotation of the take-up reel are interlocked with each other through a power transmission device.

[0003] When a remaining amount of the tape wound around the feeding reel decreases and an amount of the tape taken up around the take-up reel increases due to consumption of the transferring object, substantial winding diameter of the feeding reel decreases and substantial winding diameter of the take-up reel increases. Then, take-up speed of the tape around the take-up reel increases, and tension of the tape increases.

[0004] In order to prevent such an increase in tension, in many cases, a slip mechanism (friction clutch mechanism) is interposed between a gear member on the feeding side, which is an element of a power transmission device, and a support shaft member which supports the feeding reel, for allowing a difference in rotation speed between them.

[0005] The slip mechanism disclosed in the following Patent Literature is composed of an annular projecting ridge also working as a spring retainer formed in the middle of a shaft portion extending in the shaft center direction from the gear member and inserted into the support shaft member and a locking claw engaged with the projecting ridge of the shaft portion formed on an opening end edge of the support shaft member as a retainer. Moreover, a compression coil spring is arranged in a gap between the gear member and the support shaft member. The coil spring exerts an elastic biasing force so as to separate the gear member and the support shaft member from each other in the shaft center direction and reinforces the engagement between the projecting ridge and the locking claw whereby a friction torque is generated.

[0006] In the above-described known slip mechanism, mechanism dimension in the shaft center direction tends to become larger since the support shaft member is separated from the gear member, which incurs an increase in the transfer tool main body employing the mechanism. Moreover, there is inconvenience that if the size of the gear member or the support shaft member, which is a mechanism component, is to be made as small as possible, it becomes difficult to assemble a coil spring which can generate a sufficient elastic biasing force.

Citation List

Patent Literature

[0007]

Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2005-047201

Summary of Invention

Technical Problem

[0008] The present invention is made in view of the above and has an object to effectively promote size reduction of a mechanism by eliminating a coil spring from the slip mechanism mounted on a transfer tool.

Solution to Problem

[0009] In the present invention, in a transfer tool which feeds out a transfer tape from a feeding reel and takes up the tape around a take-up reel via a transfer head and makes rotation of the feeding reel and rotation of the take-up reel interlocked with each other through a power transmission device, a slip mechanism is formed between a gear member, which is an element of the power transmission device, and a support shaft member which is slidable with respect to the gear member and supports either the feeding reel or the take-up reel. The slip mechanism includes a boss section provided on the gear member and separated from an outer teeth portion through an annular groove, a plurality of inward projecting pieces provided intermittently in the circumferential direction on the annular groove and projecting from the inner peripheral face of the annular groove, and a fitting portion provided on the support shaft member, having a substantially cylindrical shape continuous in the circumferential direction and in which the boss section is inserted and at least a part thereof is housed in the annular groove, and generating friction between itself and the boss section and/or the inward projecting pieces. The support shaft member might be integrated with the feeding reel or the take-up reel around which the tape is wound.

[0010] With such a tool, the dimensions of the gear member and the support shaft member or the dimension of the slip mechanism having them as mechanism components can be made as small as possible.

[0011] If the boss section has a projecting portion projecting from the outer peripheral face thereof and generates friction between the fitting portion and the projecting portion or between the fitting portion and the inward projecting pieces, friction torque can be easily adjusted to an appropriate value.

[0012] A number of the projecting portions are preferably formed intermittently in the circumferential direction.

[0013] If the projecting portions and the inward projecting pieces are opposed to each other in the radial direc-

tion, the fitting portion of the support shaft member can be accurately positioned by partially sandwiching it with the projecting portions and the inward projecting pieces. That is, large eccentricity of the shaft center of the support shaft member from the shaft center of the gear member can be prevented.

[0014] In the configuration in which the torque is transmitted by friction between the boss section and the fitting portion, the projecting portion is in close contact with the inner peripheral face of the fitting portion, and the inward projecting pieces are close to or in close contact with the outer peripheral face of the fitting portion.

[0015] If a part of the fitting portion is a flange extending outward from the other portions and the inward projecting pieces are close to or in close contact with the flange, strength of the fitting portion can be reinforced by the flange, and deformation of the fitting portion can be suppressed.

[0016] If the distal end side of the boss section is partially notched and the boss section is not continuous in the circumferential direction but discontinuous due to the notch, contraction elastic deformation in the radial direction of the boss section is promoted, and appropriate friction torque can be generated between the inner periphery of the fitting portion and the outer periphery of the boss section (or its projecting portion) by utilizing the repulsive force.

[0017] If the fitting portion of the support shaft member has an outside dimension that can be inserted into either the feeding reel or the take-up reel, the fitting portion can also contribute to pivotal support of the reel, and an effect can be exerted in size reduction of the dimension of the transfer tool in the direction of the shaft center.

[0018] If the support shaft member is configured such that the fitting portion is consecutively provided on the base end side of the base shaft portion having a diameter smaller than that of the fitting portion, a rib is made to project from the outer peripheral face of the base shaft portion, and the outside end face of the rib and the outer peripheral face of the fitting portion are substantially flush with each other, an operation of inserting/removing the support shaft member with respect to the reel is smoothened.

Advantageous Effects of Invention

[0019] According to the present invention, the size of the mechanism can be effectively downsized by eliminating a coil spring from the slip mechanism to be mounted on a transfer tool.

Brief Description of Drawings

[0020]

Fig. 1 is a front view illustrating a transfer tool according to an embodiment of the present invention.
Fig. 2 is a front view illustrating the transfer tool according to the embodiment.
Fig. 3 is an exploded perspective view illustrating the transfer tool according to the embodiment.
Fig. 4 is an exploded perspective view illustrating a housed mode of a refill according to the embodiment.
Fig. 5 is an exploded perspective view illustrating the housed mode of the refill according to the embodiment.
Fig. 6 is an exploded perspective view illustrating the housed mode of the refill according to the embodiment.
Fig. 7 is an exploded perspective view illustrating a mounted state of a slide frame according to the embodiment.
Fig. 8 is an operation explanatory diagram of a cap opening/closing mechanism according to the embodiment.
Fig. 9 is an operation explanatory diagram of the cap opening/closing mechanism according to the embodiment.
Fig. 10 is an operation explanatory diagram of the cap opening/closing mechanism according to the embodiment.
Fig. 11 is a diagram illustrating idle rotation preventing mechanism according to the embodiment.
Fig. 12 is an operation explanatory diagram of a releasing mechanism according to the embodiment.
Fig. 13 is an operation explanatory diagram of the releasing mechanism according to the embodiment.
Fig. 14 is an exploded perspective view illustrating a clutch member and a feeding-sided gear constituting a slip mechanism according to the embodiment.
Fig. 15 is a rear view illustrating the feeding-sided gear according to the embodiment.
Fig. 16 is a rear view illustrating a pair of the clutch member and the feeding-sided gear according to the embodiment.
Fig. 17 is a plane sectional view illustrating the slip mechanism according to the embodiment.
Fig. 18 is a perspective view illustrating a variation of the feeding-sided gear constituting the slip mechanism.
Fig. 19 is a perspective view illustrating another variation of the feeding-sided gear constituting the slip mechanism.
Fig. 20 is a plane sectional view illustrating a variation of the slip mechanism.

Description of Embodiments

[0021] An embodiment of the present invention will be described by referring to the attached drawings. A transfer tool T in this embodiment illustrated in Figs. 1 to 17 has a transfer tool main body 1 and a replaceable refill 2 housed inside the transfer tool main body 1 as major elements.

[0022] The refill 2 holds a transferring object such as an adhesive, a correction tape, a pigment and the like

and includes a feeding reel 21 formed by winding a transfer tape to which the transferring object is made to adhere, a transfer head 22 for pressing and transferring the transferring object wound around the transfer tape fed out of the feeding reel 21 to a transfer target surface, a take-up reel 23 which takes up the transfer tape having passed through the transfer head 22, and a refill frame 24 which supports the feeding reel 21, the transfer head 22, and the take-up reel 23 as illustrated in Figs. 3, 5, and 6.

[0023] The transfer tool main body 1 includes an outer case 3 forming the outer face of the transfer tool T, a slide frame 4 mounted on the outer case 3 slidably in the longitudinal direction to support the refill 2, a knock mechanism 5, which is a selection and holding mechanism which selectively holds the slide frame 4 at either a housed position S or a use position U, a cap 6 supported by the outer case 3 in a cantilever manner, and a cap opening/closing mechanism 7 which drives the cap 6 from a closed position C to an open position O or in the opposite direction in conjunction with movement of the slide frame 4 as illustrated in Figs. 5 and 7.

[0024] The outer case 3 includes a first case member 31, a second case member 32 detachably attached to the first case member 31, and a third case member 33 having an outer face substantially flush with the outer face of the second case member 32 as illustrated in Figs. 3 and 5. Moreover, a first opening 3a through which the transfer head 22 is exposed and a second opening 3b through which a knock rod 51 of the knock mechanism 5, which will be described later, is exposed are formed in this outer case 3.

[0025] The first case member 31 has a face plate portion 311 and a peripheral wall portion 312 provided upright from the peripheral edge portion of the face plate portion 311 as illustrated in Fig. 3 and 5. A guide claw 311a for guiding the sliding movement direction of the slide frame 4 is provided on the inner face of the face plate portion 311. Moreover, mounting claws 312a to be engaged with the third case member 33 are provided on the end portion on the second opening 3b side of the peripheral wall portion 312. Furthermore, mounting claws 312b to be engaged with the second case member 32 are provided on the end portion and the center part in the longitudinal direction on the first opening 3a side of the peripheral wall portion 312.

[0026] The second case member 32 has a face plate portion 321 opposing the face plate portion 311 of the first case member 31 and a peripheral wall portion 322 provided suspending from a portion excluding the front end portion of the face plate portion 321 as illustrated in Figs. 3 and 5. The second case member 32 is attached to the first case member 31 by engaging an engaging hollow portion, not shown, provided in this peripheral wall portion 322 with the mounting claw 312b provided on the first case member 31. A mounting claw 321a to be attached to the third case member 33 is provided on the rear end portion of the face plate portion 321.

[0027] The third case member 33 has a face plate portion 331 opposing the face plate portion 311 of the first case member 31 and flush with the face plate portion 321 of the second case member 32 and a peripheral wall portion 332 provided suspending from a portion excluding the front end portion of the face plate portion 331 as illustrated in Fig. 3. The third case member 33 is attached to the first case member 31 by engaging an engaging hollow portion, not shown, provided in this peripheral wall portion 332 with the mounting claw 312a provided on the first case member 31. Moreover, a locking hollow portion, not shown, that can be engaged with the mounting claw 321a of the second case member 32 is provided in the face plate portion 311. The slide frame 4 is housed in the outer case 3 formed of the first, second and third case members 31, 32, and 33 in a state in which the mounting claw 321 a of the second case member 32 is engaged with the locking hollow portion of the third case member 33, as illustrated in Figs. 3 and 5.

[0028] The slide frame 4 includes a slide frame main body 41 slidably supported by the guide claw 311 a of the first case member 31, a feeding-sided shaft 42 projecting to the side directed to the second case member 32 from the slide frame main body 41 and forming the rotation center of the feeding reel 21, a feeding-sided gear 43, which is a gear member pivotally supported by the feeding-sided shaft 42, a clutch member 44, which is a support shaft member pivotally supported similarly by the feeding-sided shaft 42 and supports the feeding reel 21, a first intermediate gear 45 meshed with the feeding-sided gear 43, a second intermediate gear 46 meshed with a first intermediate gear 45, and a take-up shaft 47 pivotally supporting the take-up reel 23 on the refill frame 24 side and forming the rotation center of the take-up reel 23 as illustrated in Figs. 3 and 7. Moreover, the slide frame 4 is driven by the knock mechanism 5 from the housed position S to the use position U or in the opposite direction. The feeding-sided gear 43 and the clutch member 44 constitute a slip mechanism 8 (friction clutch mechanism). The slip mechanism 8 will be described later.

[0029] The knock mechanism 5 has the same mechanism as a widely known knock mechanism used for writing materials. Specifically, the knock mechanism 5 includes the knock rod 51 inserted through the second opening 3b of the outer case 3, a knock cam, not shown, having the rear end portion connected to this knock rod 51 and the front end portion connected to the slide frame 4, and a coil spring 52, which is biasing means having a moving end, that is, a rear end portion connected to the slide frame 4 and a fixed end, that is, a front end portion connected to a fixed-side retainer 313 side provided on the first case member 31. The coil spring 52 of the knock mechanism 5 has the fixed end connected to the fixed-side retainer 313 provided on the face plate portion 311 of the first case member 31, as described above and the free end is connected to a moving-side retainer 411 provided on the slide frame 4. Moreover, a spring support

rod 411a extending in the direction toward the fixed-side retainer 313 is provided projecting from the moving-side retainer 411, and the coil spring 52 is inserted through the spring support rod 411 a. On the other hand, a support rod insertion hole 313a through which the spring support rod 411a can be inserted is provided in the fixed-side retainer 313, and the spring support rod 411a passes through the support rod insertion hole 313a when the slide frame 4 moves. This knock mechanism 5 is configured to drive the slide frame 4 to the use position U if an operation to press the knock rod 51 is applied while the slide frame 4 is arranged at the housed position S and to hold the slide frame 4 at the use position U when the slide frame 4 is moved to the use position U. On the other hand, if an operation to press the knock rod 51 is applied while the slide frame 4 is held at the use position U, the knock mechanism 5 is configured to move the slide frame 4 to the housed position S by a biasing force of the coil spring 52 and to hold the slide frame 4 as it is at the housed position S.

[0030] The cap 6 can move between the closed position C which shields the transfer head 22 and the open position O where the transfer head 22 is exposed to the outside and includes a support portion 61 supported by the face plate portion of the first case member 31 in a cantilever manner, a shielding portion 62 connected to the distal end of the support portion 61 and shielding the transfer head 22 at the closed position C, and plate-piece shaped stopper portion 63 connected to the shielding portion 62 and following the peripheral wall portions 312 and 322 of the first and second case members 31 and 32 as illustrated in Figs. 1 to 5 and 7 to 10. Guide claws 611 and 612 engaged with an arc-shaped guide slit 311 b formed in the face plate portion 311 of the first case member 31 are provided on the support portion 61. When the guide claws 611 and 612 move in the guide slit 311 b, the cap 6 rotates and moves around the shaft along the normal line of the face plate portion 311 of the first case member 31. Then, as described above, the shielding portion 62 is connected to the distal end of this support portion 61. The shielding portion 62 is a plate-shaped portion shielding the first opening 3a of the outer case 3 at the closed position C, and the stopper portion 63 is connected to one end portion of this shielding portion 62. The stopper portion 63 is a plate-piece shaped portion along the peripheral wall portions 312 and 322 of the first and second case members 31 and 32 as described above and regulates rotation and movement of the cap 6 by being abutted to the first and second case members 31 and 32 at the open position O.

[0031] The cap opening/closing mechanism 7 drives the cap 6 from the closed position C to the open position O or in the opposite direction in conjunction with the movement of the slide frame 4. Specifically, this cap opening/closing mechanism 7 is composed by using a cap driving projection 71 provided on the face on the side directed to the first case member 31 of the face plate portion of the slide frame 4, cap guide ribs 72 provided on the both side edges of the face directed to the first case member 31 of the slide frame 4, and a driven portion 73 which is a projection having a U-shaped section provided on the rear part of the support portion 61 of the cap 6 and driven by the cap driving projection 71 and the cap guide ribs 72. The driven portion 73 integrally has a first wall body 731 located on the transfer head 22 side of the cap driving projection 71 when the cap 6 is located at the closed position C, a second wall body 732 located on the knock rod 51 side of the cap driving projection 71 when the cap 6 is located at the open position O, and a third wall body 733 located on the knock rod 51 side of the cap driving projection 71 when the cap 6 is located at the closed position C.

[0032] When the slide frame 4 moves from the housed position S illustrated in Fig. 8 to an intermediate position between the housed position S and the use position U illustrated in Fig. 9, the cap driving projection 71 presses the first wall body 731 of the driven portion 73 to drive the cap 6, and the guide claw 611 of the cap 6 moves in the guide slit 311b, so that the cap 6 is moved from the closed position C to the intermediate position between the closed position C and the open position O. When the slide frame 4 further moves from the intermediate position between the housed position S and the use position U illustrated in Fig. 9 to the use position U illustrated in Fig. 10, the driven portion 73 and the cap guide ribs 72 are brought into contact with each other to drive the cap 6, and the guide claw 611 of the cap 6 continuously moves in the guide slit 311 b, so that the cap 6 is moved from the intermediate position between the closed position C and the open position O to the open position O. On the other hand, when the slide frame 4 moves from the open position O to the housed position S, the cap opening/closing mechanism 7 operates in the direction opposite to that described above. That is, when the slide frame 4 moves from the use position U to the intermediate position between the housed position S and the use position U, the driven portion 73 and the cap guide ribs 72 are brought into contact with each other to drive the cap 6, and the guide claw 611 of the cap 6 moves in the guide slit 311b so that the cap 6 is moved to the intermediate position between the closed position C and the open position O. After that, the contact between the driven portion 73 and the cap guide ribs 72 is lost, but the driven portion 73 is in contact with the cap driving projection 71, and this cap driving projection 71 sequentially presses the second wall body 732 and the third wall body 733 of the driven portion 73, to drive the cap 6. When the guide claw 611 of the cap 6 continuously moves in the guide slit 311 b, the cap 6 is moved to the closed position C.

[0033] Moreover, in this embodiment, a cap holding portion 74 which holds the cap 6 at the open position O is provided. This cap holding portion 74 functions when a holding projection 741 provided on one end portion in the longitudinal direction of the guide claw 611 of the cap 6 is engaged with a holding hollow portion 742 provided on the back face of the slide frame 4 and engaged with

the holding projection 741.

[0034] Thus, turning to the refill 2 again, the refill 2 is movable between the use position U where the transfer head 22 is exposed integrally with the slide frame 4 to the outside and the housed position S where the transfer head 22 is housed in the transfer tool main body 1 while being supported by the slide frame 4 of the transfer tool main body 1. Moreover, this refill 2 includes an idle rotation preventing mechanism 25 which prevents rotation of the feeding reel 21 when not in use.

[0035] The refill frame 24 has a feeding reel support portion 241 which pivotally supports the feeding reel 21, a take-up reel support portion 242 which pivotally supports the take-up reel 23, a ratchet claw 243 engaged with ratchet teeth 23a provided on the take-up reel 23 and preventing reverse rotation of the take-up reel 23, and a locking arm 244 having a locking claw 244x engaged with locking teeth 21 a provided on the feeding reel 21 provided at the distal end. Moreover, an engagement receiving portion 245 having an oval hole 245a inside is provided in the end portion on the transfer head 22 side of this refill frame 24. The engagement receiving portion 245 has an engagement pin 412 provided on the slide frame 4 housed in the oval hole 245a inside the engagement receiving portion 245 while the refill 2 is mounted on the slide frame 4. The engagement receiving portion 245 and the engagement pin 412 form a movable engagement portion K which supports the refill frame 24 movably with respect to the slide frame 4.

[0036] A mesh hole 211 which receives a rotational force transmitted from the clutch member 44 when the transfer tape is pulled out in respect to the above-described feeding reel support portion 241 is provided at the center part of the feeding reel 21. Moreover, as described above, the locking teeth 21a engaged with the locking claw 244x of the refill frame 24 are provided on the face of the feeding reel 21 directed to the refill frame 24 side. Moreover, in this embodiment, the transfer tape is wound around the feeding reel 21 with the transferring object held on the inner face, that is, the face on the side directed to the center of the feeding reel 21 so as to reduce a portion where the transferring object is exposed when not in use for a long time such as during transportation, storage and the like. The transfer tape fed out from the portion on the side of the feeding reel 21 opposite to the transfer target surface is guided by the portion of the take-up reel 23 directed to the transfer target surface and led to the transfer head 22.

[0037] The take-up reel 23 has a take-up reel main body 231 forming the main body of the take-up reel 23 and supported by the take-up reel support portion 242, the ratchet teeth 23a provided on the refill frame 24 side of the take-up reel main body 231 and engaged with the ratchet claw 243 of the refill frame 24, and a take-up gear 232 provided on the side opposite to the slide frame 4 of the take-up reel main body 231 and capable of meshing with the second intermediate gear 46 of the slide frame 4. The take-up gear 232 has a bevel gear shape so as to be easily meshed with the second intermediate gear 46 in replacement of the refill 2. Moreover, in this embodiment, this take-up reel 23 is arranged on the side closer to the transfer head 22 than the feeding reel 21.

[0038] The idle rotation preventing mechanism 25 prevents rotation of the refill frame 24 by engaging the locking claw 244x provided at the distal end of the locking arm 244 of the refill frame 24 with the locking teeth 21 a provided on the feeding reel 21 as illustrated in Figs. 11 and 12. More specifically, the locking arm 244 has an arm main body 244a extending in the longitudinal direction of the refill frame 24, a shaft portion 244b extending toward the both side edges of the refill frame 24 from the intermediate portion of the arm main body 244a, and an elastic support portion 244c directed to the both side edges of the refill frame 24 from the shaft portion 244b and extending in the direction directed to the transfer head 22. The arm main body 244a is capable of a seesaw motion around a fulcrum 244z set at the intermediate portion. This fulcrum 244z is a spot abutted to an arm support portion 413 provided projecting to the side of the refill frame 24 from the end edge on the side of the knock rod 51 of the slide frame 4. Moreover, a projection 244y abutted to a lock releasing projection 321 b provided on the second case member 32 with movement of the refill 2 is provided on the end portion on the side of the knock rod 51 of the arm main body 244a. If this projection 244y is abutted to the lock releasing projection 321 b, the arm main body 244a rotates and moves around the fulcrum 244z as a shaft and the locking claw 244x is separated from the locking teeth 21a as illustrated in Fig. 13. While the projection 244y of the locking arm 244 is abutted to the lock releasing projection 321 b, an elastic force to the direction to engage the locking claw 244x with the locking teeth 21 a is accumulated in the locking arm 244. Thus, a notch portion 24x is provided in a portion around the arm main body 244a of the refill frame 24 so as to be able to move this arm main body 244a in the thickness direction of the refill frame 24.

[0039] Moreover, a releasing mechanism K for releasing the rotation prevented state of the refill 2 by the idle rotation preventing mechanism 25 is provided between the refill 2 and the second case member 32. The releasing mechanism K is composed by using the projection 244y provided on the locking arm 244 and the lock releasing projection 321 b provided on the second case member 32. This releasing mechanism K functions as follows while the transfer tool T is in use.

[0040] When the transfer tool T is in use, by operating the knock mechanism 5, the slide frame 4 and the refill frame 24 supported by this slide frame 4 are moved from the housed position S to the use position U. At this time, when the refill frame 24 is moved to the use position U, the projection 244y of the locking arm 244 is abutted to the lock releasing projection 321 b of the second case member 32, the arm main body 244a is rotated and moved around the fulcrum 244z as a shaft, and the locking claw 244x at the distal end portion of the locking arm

244 is separated from the locking teeth 21a of the feeding reel 21, as illustrated in Fig. 13. As a result, the feeding reel 21 can rotate.

[0041] On the contrary, when the transfer tool T is not in use, by operating the knock mechanism 5, the slide frame 4 and the refill frame 24 supported by this slide frame 4 are moved from the use position U to the housed position S. At this time, when the refill frame 24 is moved from the use position U, the state in which the projection 244y of the locking arm 244 is abutted to the lock releasing projection 321 b of the second case member 32 is released. At that time, the arm main body 244a is rotated and moved by the elastic force around the fulcrum 244z as a shaft, and the locking claw 244x at the distal end portion of this locking arm 244 is engaged with the locking teeth 21a of the feeding reel 21 as illustrated in Fig. 12. As a result, the rotation of the feeding reel 21 is regulated again.

[0042] Subsequently, the slip mechanism (friction clutch mechanism) 8 formed of the feeding-sided gear 43 and the clutch member 44 will be described in detail. In use of the transfer tool T, if the user grasps the transfer tool main body 1 and moves the transfer tool main body 1 while pressing the transfer head 22 and the transfer tape onto the transfer target surface, the transfer tape wound around the transfer head 22 is pulled to the transfer target surface, and the transfer tape is pulled out of the feeding reel 21. The rotation driving force given by the transfer tape to the feeding reel 21 is transmitted to the clutch member 44 rotated integrally with the feeding reel 21 and is further transmitted from the clutch member 44 to the feeding-sided gear 43. The feeding-sided gear 43, the first intermediate gear 45, and the second intermediate gear 46 constituting a power transmission device 9 transmit this rotation driving force to the take-up gear 232. The take-up gear 232 is integrally molded with the take-up reel 23, and the take-up reel 23 rotated and driven through the take-up gear 232 takes up the tape having transferred the transferring object.

[0043] When a remaining amount of the tape wound around the feeding reel 21 decreases and the amount of the tape taken up by the take-up reel 23 increases at the same time, the substantial winding diameter of the feeding reel 21 decreases and the substantial winding diameter of the take-up reel 23 increases. Since a speed increasing rate (or speed decreasing rate) of the feeding-sided gear 43 and the take-up gear 232 is constant, the winding speed of the tape around the take-up reel 23 increases and the tension of the tape rises if nothing is done.

[0044] In order to prevent such increase in the tension, the slip mechanism 8 is provided in which the clutch member 44 is made to slip with friction with respect to the feeding-sided gear 43 so as to generate a difference in the rotation numbers between the both, and the tape feeding speed of the feeding reel 21 is made to match the tape take-up speed of the take-up reel 23. The slip degree in the slip mechanism 8, in other words, the difference in the rotation numbers between the clutch member 44 and the feeding-sided gear 43 is 0 or small if the transfer tape is not used yet and increases as the transfer tape is used and the remaining amount decreases.

[0045] As illustrated in Figs. 14 and 15, the feeding-sided gear 43 has an outer teeth portion 431 on which outer teeth meshed with the first intermediate gear 45 is formed on the outer periphery, a boss section 432 located at the center portion and extending in the shaft center direction, and an annular groove 433 opened in the shaft center direction separating the outer teeth portion 431 and the boss section 432 from each other. The boss section 432 has a substantially thick cylindrical shape but is cut away on the distal end side at plural spots and is not continuous in the circumferential direction but discontinuous due to those notches 432b. In the illustrated example, a plurality of notches 432b (three) are formed, but the number of the notches 432b may be one. In addition, a plurality of projecting portions 432a are provided intermittently in the circumferential direction on the outer peripheral face thereof. Each of the projecting portions 432a is somewhat swollen from the outer peripheral face of the boss section 432. A plurality of inward projecting pieces 433a are provided intermittently in the circumferential direction on the annular groove 433. Each of the inward projection pieces 433a extends inward in the radial direction from the inner peripheral face (the face directed to the inside on the outer peripheral side among the both wall faces opposing in the radial direction) of the annular groove 433 so as to narrow the opening width of the annular groove 433, and each opposes each of the projecting portions 432a in the radial direction.

[0046] The clutch member 44 has a base shaft portion 441 and a fitting portion 442 consecutively provided on the base end side of the base shaft portion 441 as illustrated in Figs. 14 and 16. The base shaft portion 441 has a long and substantially cylindrical shape having a diameter smaller than that of the fitting portion 442, and the fitting portion 442 has a short and substantially cylindrical shape having a diameter larger than that of the base shaft portion 441. The base shaft portion 441 and the fitting portion 442 are both thinner than the boss section 432 and are continuous in the circumferential direction in a circle without disconnection. The fitting portion 442 continues to the base shaft portion 441 through a continuing portion 443 having a hollow disk shape orthogonal to the shaft center direction. A part of the fitting portion 442 becomes a flange 442a extending in the radial direction outward than the other portions. An outward projecting piece 442b projecting from the outer peripheral face of the flange 442a is provided on the terminal edge of this flange 442a. The outward projecting piece 442b has a substantially annular shape continuous in the circumferential direction. A plurality of ribs 441 a projects in the radial direction from the outer peripheral face of the base shaft portion 441. Each of the ribs 441a joins to the base shaft portion 441 and the continuing portion 443. The outer end face of each of the ribs 441a□continues to the

outer peripheral face of the fitting portion 442 on the base end side substantially in a flush state, and the distal end side is tapered.

[0047] The clutch member 44 is assembled to the feeding-sided gear 43 by inserting the boss section 432 into the fitting portion 442 and also by inserting the flange 442a of the fitting portion 442 in the annular groove 433 at the same time. The projecting portion 432a of the boss section 432 is brought into close contact with the inner peripheral face of the fitting portion 442 in a state in which the clutch member 44 is assembled to the feeding-sided gear 43 as illustrated in Figs. 15 and 17. Also, the inward projecting pieces 433a of the annular groove 433 are close to or in close contact with the outer peripheral face of the fitting portion 442 and particularly with the outer peripheral face of the flange 442a. Moreover, the distal end face of the boss section 432 is close to or in close contact with the face on the base end side of the continuing portion 443. Furthermore, the outward projecting piece 442b is positioned on the inner depth in the shaft center direction (the direction to the base end side of the boss section 432 or the upper side in Fig. 17) than the inward projecting pieces 433a. A retaining structure in which removal of the boss section 432 from the fitting portion 442 is suppressed and thus, removal of the clutch member 44 from the feeding-sided gear 43 is suppressed is formed by means of the engagement between the outward projecting piece 442b and the inward projecting pieces 433a.

[0048] In this slip mechanism 8, the torque is transmitted by sliding friction between the inner peripheral face of the fitting portion 442 of the clutch member 44 and the projecting portion 432a of the boss section 432 in the feeding-sided gear 43. The boss section 432 in which the notch 432b is formed is capable of elastic deformation so as to reduce the diameter, and friction torque with appropriate intensity can be generated by pressing the projecting portion 432a onto the inner peripheral face of the fitting portion 442 by repulsion of the elastic deformation. The inward projecting pieces 433a projecting from the inner peripheral face of the annular groove 433 are close to the outer peripheral face of the fitting portion 442, and these inward projecting pieces 433a regulate relative displacement of the fitting portion 442 in the radial direction with respect to the boss section 432. Therefore, the boss section 432 is not largely deformed to be plastically deformed, and durability of the mechanism and retaining of the boss section 432 can be maintained.

[0049] The feeding-sided gear 43 and the clutch member 44 are both pivotally supported by a feeding core 42 integrally molded with the slide frame 4. That is, the feeding-sided gear 43 and the clutch member 44 are rotatably supported by the slide frame 4 by inserting the feeding core 42 into the boss section 432 and into the inner cavity of the base shaft portion 441 from the feeding-sided gear 43 side as illustrated in Fig. 17. Moreover, if the refill 2 is mounted on the slide frame 4, the base shaft portion 441 of the clutch member 44 and a portion excluding the flange 442a of the fitting portion 442 are housed in the feeding reel 21. The ribs 441 a projecting from the base shaft portion 441 of the clutch member 44 are hooked by the irregularity of the inner periphery of the feeding reel 21 and play the role of synchronizing the rotation of the feeding reel 21 with the rotation of the clutch member 44.

[0050] According to this embodiment, in the transfer tool T in which the transfer tape is fed out of the feeding reel 21 and taken up by the take-up reel 23 via the transfer head 22 and the rotation of the feeding reel 21 and the rotation of the take-up reel 23 are interlocked with each other through the power transmission device 9, the slip mechanism 8 is constituted between the gear member 43, which is an element of the power transmission device 9, and the support shaft member 44 which is slidable with respect to the gear member 43 and supports the feeding reel 21. The slip mechanism 8 includes the boss section 432 provided on the gear member 43 and separated from the outer teeth portion 431 through the annular groove 433, the plurality of inward projecting pieces 433a provided on the annular groove 433 intermittently in the circumferential direction and projecting from the inner peripheral face of the annular groove 433, and the fitting portion 442 provided on the support shaft member 44, having a substantially cylindrical shape continuous in the circumferential direction and in which the boss section 432 is inserted and at least a part thereof is housed in the annular groove 433, and generating friction between itself and the boss section 432. Therefore, the dimensions of the gear member 43 and the support shaft member 44 and the dimension of the slip mechanism 8 composed of them as the mechanism component can be made as small as possible.

[0051] Since the boss section 432 has the projecting portion 432a projecting from the outer peripheral face thereof and generates friction between the fitting portion 442 and the projecting portion 432a, friction torque can be adjusted easily to an appropriate value.

[0052] It is preferable that a plurality of the projecting portions 432a are formed intermittently in the circumferential direction.

[0053] Since the projecting portions 432a and the inward projecting pieces 433a are opposed to each other in the radial direction, the fitting portion 442 of the support shaft member 44 can be partially sandwiched by the projecting portions 432a and the inward projecting pieces 433a to be accurately positioned. That is, large eccentricity of the shaft center of the support shaft member 44 from the shaft center of the gear member 43 can be prevented.

[0054] The configuration is made such that the torque is transmitted mainly by friction between the boss section 432 and the fitting portion 442. The projecting portion 432a is brought into close contact with the inner peripheral face of the fitting portion 442, and the inward projecting pieces 433a are brought close to or in close contact with the outer peripheral face of the fitting portion 442.

[0055] Since a part of the fitting portion 442 is a flange

442a extending outward than the other portions and the inward projecting pieces 433a are close to or in close contact with the flange 442a, the intensity of the fitting portion 442 can be reinforced by the flange 442a and deformation of the fitting portion 442 can be suppressed.

[0056] Since the distal end side of the boss section 432 is partially notched and the boss section 432 is not continuous in the circumferential direction but discontinuous due to the notch 432b, contraction elastic deformation in the radial direction of the boss section 432 is promoted, and appropriate friction torque can be generated between the inner periphery of the fitting portion 442 and the outer periphery of the boss section 432 or its projecting portion 432a by utilizing the repulsive force.

[0057] Since the fitting portion 442 of the support shaft member 44 has the outside dimension that can be inserted into the feeding reel 21, the fitting portion 442 can also contribute to pivotal support of the reel 21, and size reduction of the dimension of the transfer tool T in the direction of the shaft center can be exerted.

[0058] Since the support shaft member 44 is configured such that the fitting portion 442 is consecutively provided on the base end side of the base shaft portion 441 having a diameter smaller than that of the fitting portion 442, the rib 441a is made to project from the outer peripheral face of the base shaft portion 441, and the outside end face of the rib 441a and the outer peripheral face of the fitting portion 442 are substantially flush with each other, the operation of inserting/removing the support shaft member 44 with respect to the reel 21 in replacement of the refill 2 is smoothened.

[0059] The present invention is not limited to the above embodiment described in detail. Examples are enumerated as follows. In the above embodiment, the friction is generated between the inner peripheral face of the fitting portion 442 of the support shaft member 44 and the projecting portion 432a on the outer peripheral face of the boss section 432 of the gear member 43, but it may be so configured that the projecting portion 432a is not molded on the boss section 432 but a wide range of the outer peripheral face of the boss section 432 is brought into sliding contact with the inner peripheral face of the fitting portion 442.

[0060] The projecting portion 432a of the boss section 432 may be molded into a shape extending in the circumferential direction instead of the small shape illustrated in Fig. 14 and the like. For example, the projecting portion 432a may be a projecting ridge extending in the circumferential direction as illustrated in Fig. 18. By forming the projecting portion as above, an area where the projecting portion 432a and the inner peripheral face of the fitting portion 442 are in contact is increased in the circumferential direction. Therefore, a risk of the inner peripheral face of the fitting portion 442 becoming plastically deformed with temporal change and locally indented due to the projecting portion 432a having a small shape pressing on the inner peripheral face of the fitting portion 442 is reduced.

[0061] Also, as illustrated in Fig. 19, the projecting portion 432a having the projecting ridge shape extending in the circumferential direction may be inclined to change in the shaft center direction. Then, when slip is generated and the support shaft member 44 is relatively rotated with respect to the feeding-sided gear 43, a contact spot where the projecting portion 432a is in contact with the inner peripheral face of the fitting portion 442 is displaced in the shaft center direction. Thus, plastic deformation or abrasion of the inner peripheral face of the fitting portion 442 is further suppressed, the life of the slip mechanism is prolonged and can bear use for a long time.

[0062] The projecting portion 432a of the boss section 432 may be formed as a disk-shaped projecting ridge continuing for a circle instead of intermittent in the circumferential direction.

[0063] In the above embodiment, the friction is generated between the inner peripheral face of the fitting portion 442 of the support shaft member 44 and (the projecting portion 432a of) the outer peripheral face of the boss section of the gear member 43, but it may so configured that the outer peripheral face of the fitting portion 442 of the support shaft member 44 and the inward projecting piece 433a of the annular groove 433 of the gear member 43 are brought into close contact with each other so that the friction is generated between the both, together with or instead of the above configuration.

[0064] To mold the flange 442a on the fitting portion 442 of the support shaft member 44 is not indispensable. The outer peripheral face of the fitting portion 442 not having the flange 442a may be brought close to or into close contact with the inward projecting piece 433a.

[0065] The inward projecting piece 433a may continue for one circle in the circumferential direction. The outward projecting piece 442b may be formed so that the outward projecting piece does not continue for one circle in the circumferential direction but is partially discontinuous.

[0066] In the above embodiment, the slip mechanism 8 is disposed on the side of the feeding reel 21 which feeds out the tape, but the similar slip mechanism may be disposed on the side of the take-up reel 23 which takes up the tape. In this case, the support shaft member which pivotally supports the take-up reel 23 and a gear member to which the support shaft member is assembled and meshed with the intermediate gear 46 are provided on the take-up reel 23 side.

[0067] Moreover, in the disposable transfer tool T for which a refill is not replaced, the reel 21 around which the tape is wound and the support shaft member 44 which supports the reel 21 may be integrated.

[0068] In addition, the retaining structure to suppress removal of the boss section 432 from the fitting portion 442 is not limited to the mode as in the above embodiment, either. For example, a hollow extending in the circumferential direction of either one of the inner peripheral face of the annular groove 433 and the outer peripheral face of the fitting portion 442 close to or in close contact with this inner peripheral face (or the flange 442a forming

a part of the fitting portion 442) is formed, while a projecting piece or a projecting ridge to be inserted into this hollow is formed on the other so as to realize the retaining structure using the engagement between the projection and hollow of the both as illustrated in Fig. 20. Fig. 20 illustrates a mode in which the hollow 433b is provided on the annular groove 443 side and the projecting piece or projecting ridge 442c is provided on the fitting portion 442 side.

[0069] Other specific configurations of each part are capable of various deformations within a range not departing from the gist of the present invention.

Industrial Applicability

[0070] The present invention can be used as a transfer tool which transfers the transferring object such as an adhesive, a correction tape, a pigment and the like to a sheet and other transfer target surfaces.

Reference Signs List

[0071]

T	transfer tool
21	feeding reel
43	gear member
431	outer teeth portion
432	boss section
432a	projecting portion
432b	notch
433	annular groove
433a	inward projecting piece
44	support shaft member
441	base shaft portion
441a	rib
442	fitting portion
442a	flange
442b	outward projecting piece
8	slip mechanism

Claims

1. A transfer tool which feeds out a transfer tape from a feeding reel and takes up the tape around a take-up reel via a transfer head and makes rotation of the feeding reel and rotation of the take-up reel interlocked with each other through a power transmission device, comprising:

a slip mechanism formed between a gear member, which is an element of the power transmission device, and a support shaft member which is slidable with respect to the gear member and supports either the feeding reel or the take-up reel, wherein
the slip mechanism includes:
a boss section provided on the gear member and separated from an outer teeth portion through an annular groove;
a plurality of inward projecting pieces provided intermittently in a circumferential direction on the annular groove and projecting from the inner peripheral face of the annular groove; and
a fitting portion provided on the support shaft member, having a substantially cylindrical shape continuous in the circumferential direction and in which the boss section is inserted and at least a part thereof is housed in the annular groove, and generating friction between itself and either one of or the both of the boss section and the inward projecting pieces.

2. The transfer tool according to claim 1, wherein
the boss section has a projecting portion projecting from the outer peripheral face thereof and generates friction between the fitting portion and the projecting portion or between the fitting portion and the inward projecting pieces.

3. The transfer tool according to claim 2, wherein
a plurality of the projecting portions are formed intermittently in the circumferential direction.

4. The transfer tool according to claim 3, wherein
the projecting portions and the inward projecting pieces are opposed to each other in the radial direction.

5. The transfer tool according to claim 2, 3 or 4, wherein
the projecting portion is in close contact with the inner peripheral face of the fitting portion, and the inward projecting pieces are close to or in close contact with the outer peripheral face of the fitting portion.

6. The transfer tool according to claim 1, 2, 3, 4 or 5, wherein
a part of the fitting portion is a flange extending outward than the other portions; and
the inward projecting pieces are close to or in close contact with the flange.

7. The transfer tool according to claim 1, 2, 3, 4, 5 or 6, wherein
a distal end side of the boss section is partially notched and is not continuous in the circumferential direction but discontinuous due to the notch.

8. The transfer tool according to claim 1, 2, 3, 4, 5, 6 or 7, wherein
the fitting portion of the support shaft member has an outside dimension that can be inserted into either the feeding reel or the take-up reel.

9. The transfer tool according to claim 8, wherein
the support shaft member has the fitting portion consecutively provided on a base end side of a base shaft portion having a diameter smaller than that of the fitting portion;
a rib made to project from the outer peripheral face of the base shaft portion;
and
an outside end face of the rib and an outer peripheral face of the fitting portion are substantially flush with each other.

Fig. 1

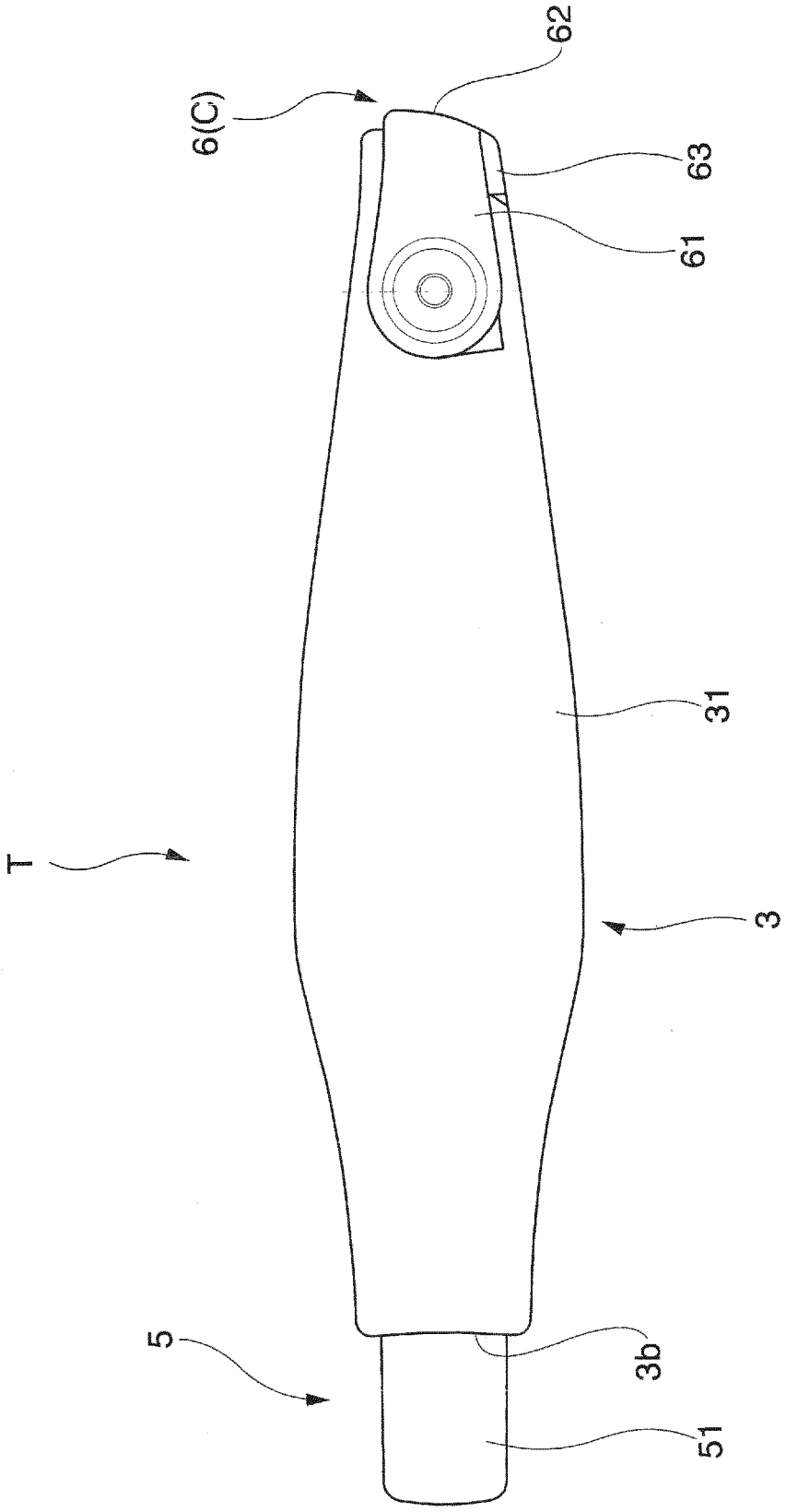


Fig.2

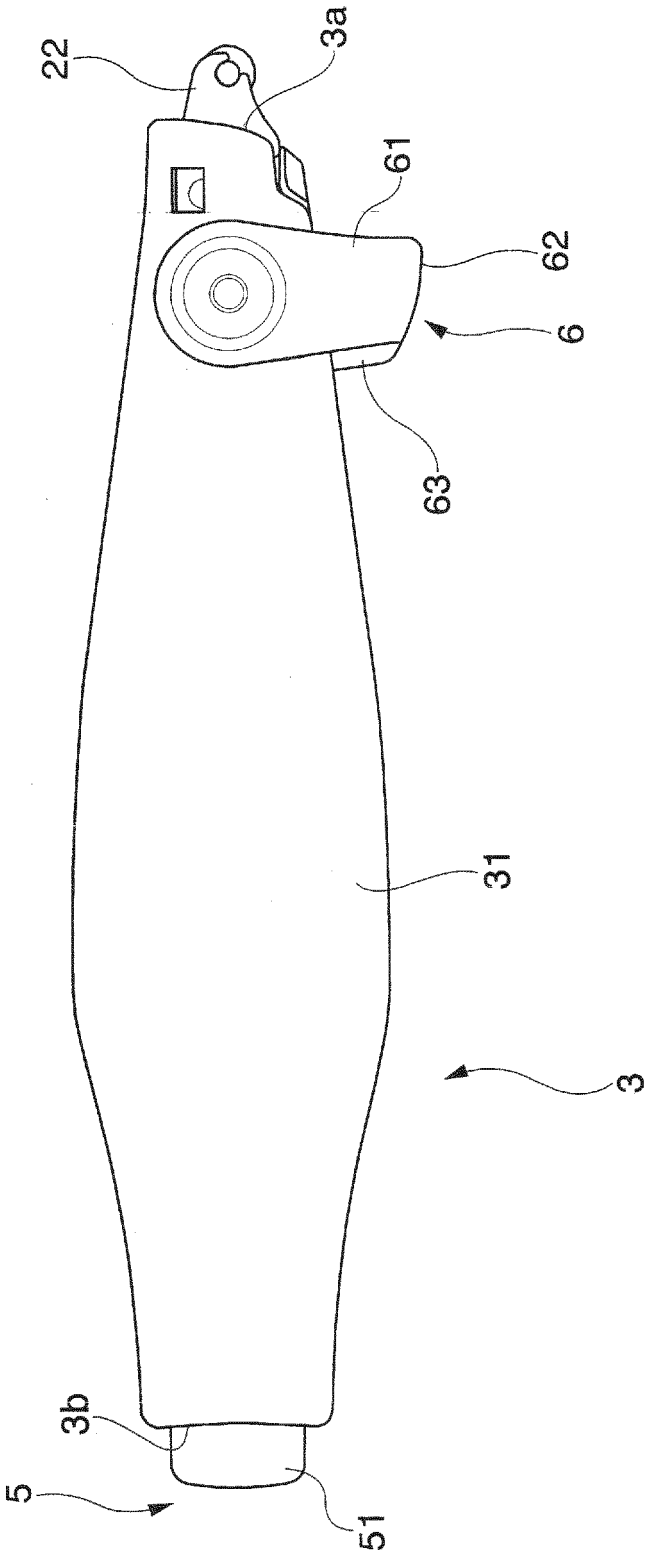


Fig.3

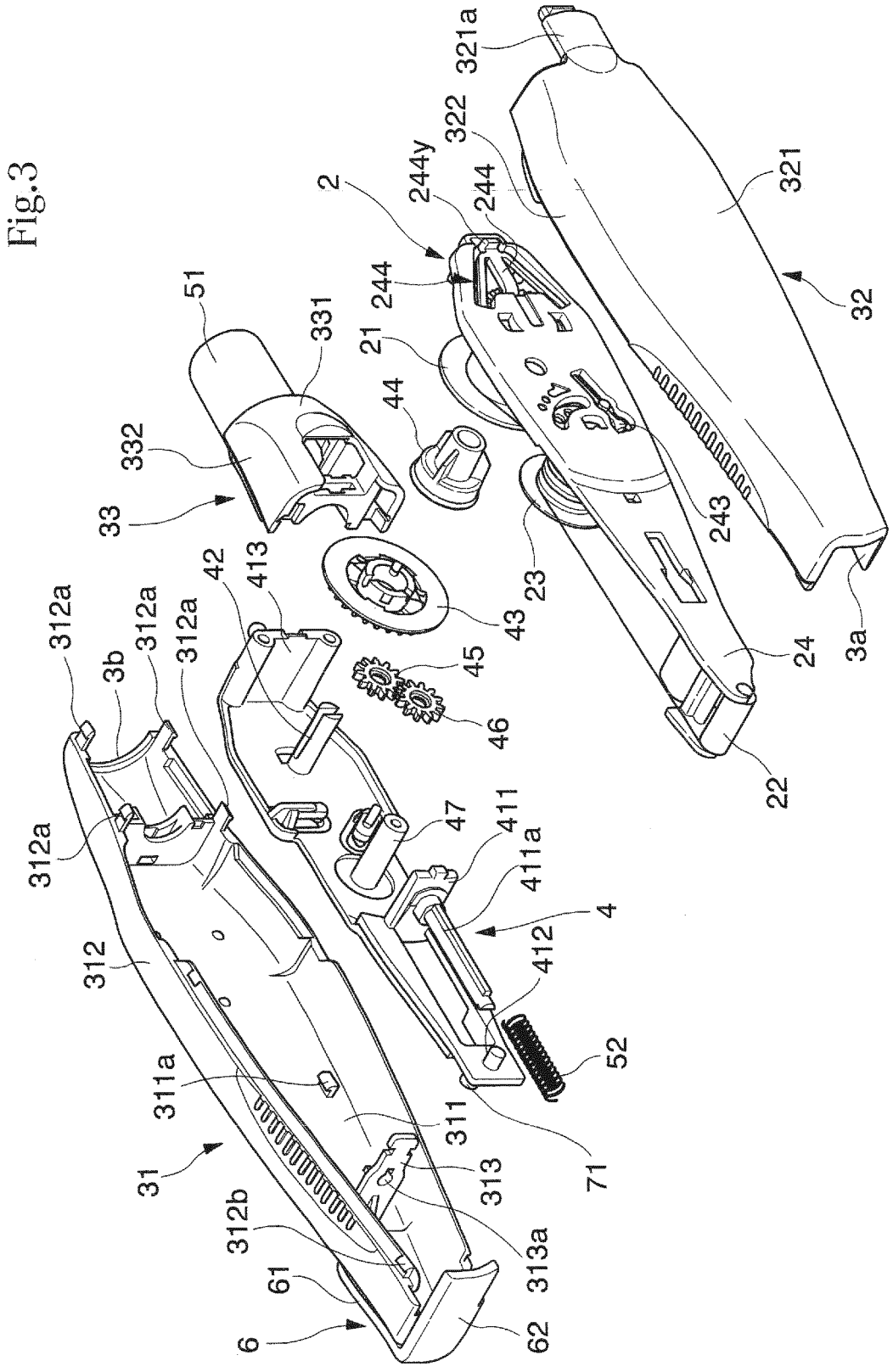

321a
322
244y
244
2
321
244
51
331
21
32
44
332
33
243
42
413
23
43
312a
3b
45
24
3a
46
22
47
411
411a
4
312
412
52
311a
311
71
31
313
312b
313a
61
6
62

Fig.4

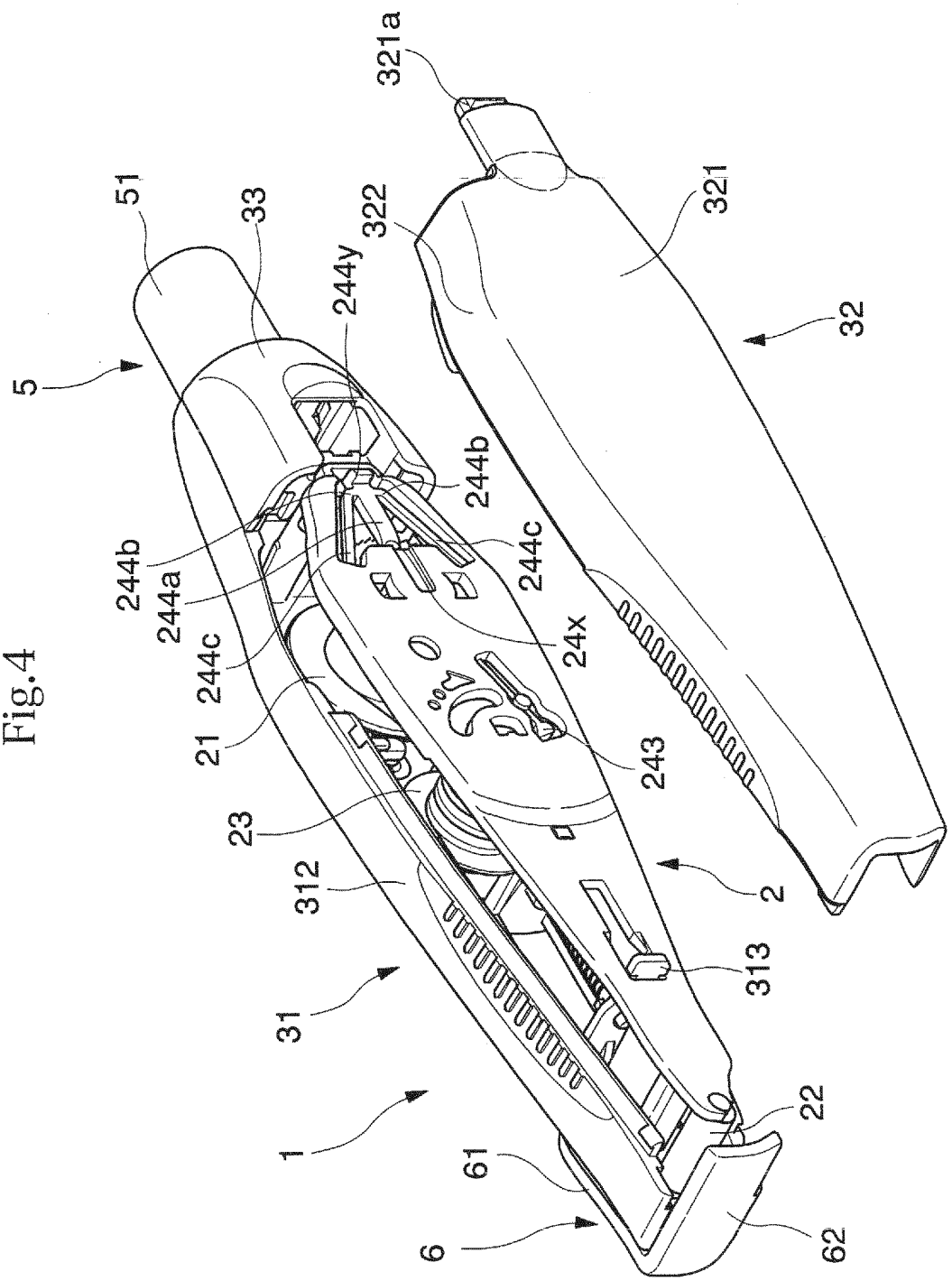

321a
51
33
322
321
244y
32
5
244b
244b
244a
244c
244c
24x
244c
21
243
23
2
312
313
31
1
22
61
6
62

Fig.5

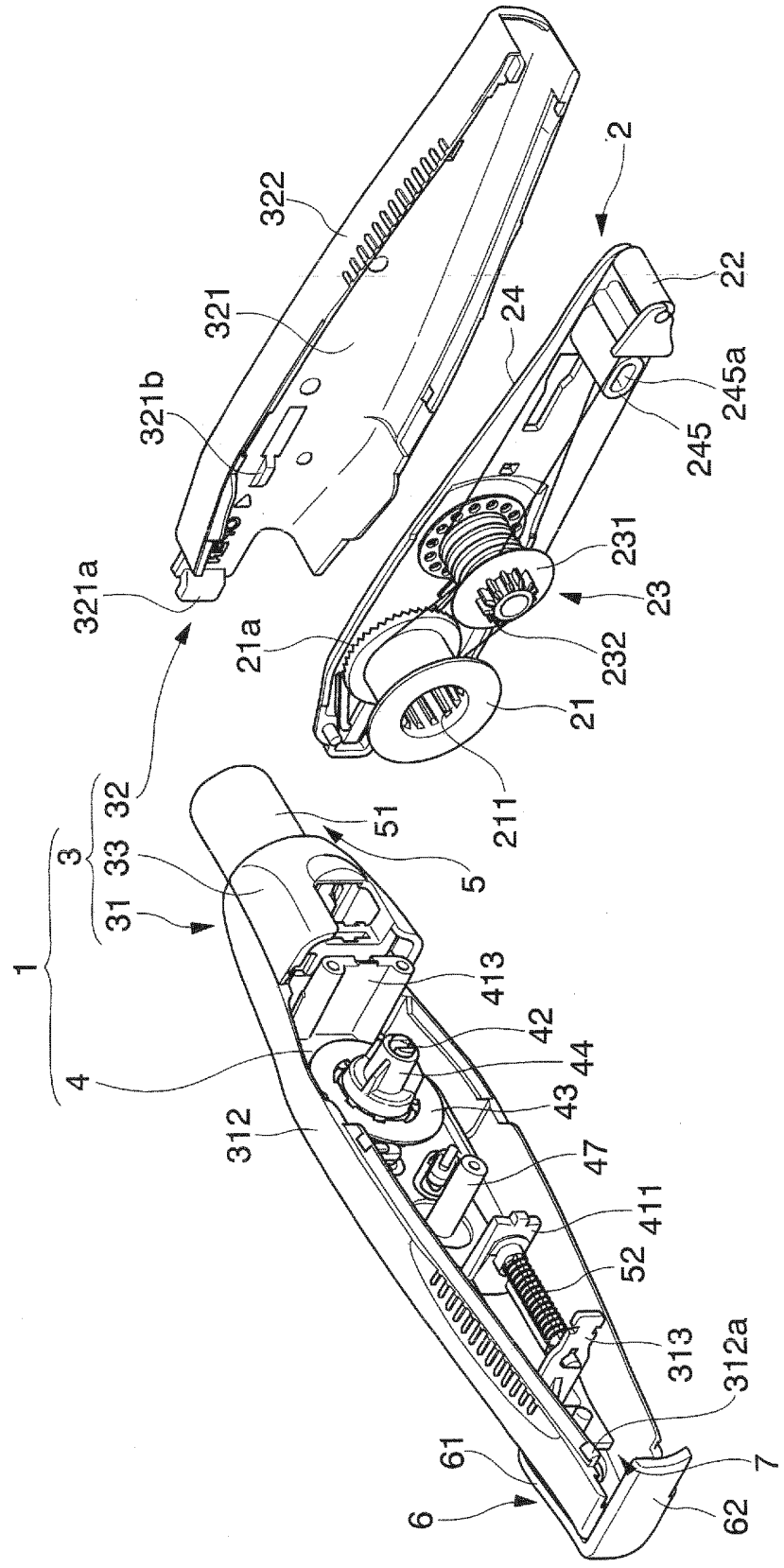

322
321
321b
321a
32
33
31
3
1
4
2
22
24
245a
245
231
23
232
21a
21
211
51
5
413
42
44
43
312
47
411
52
313
312a
61
6
7
62

Fig.6

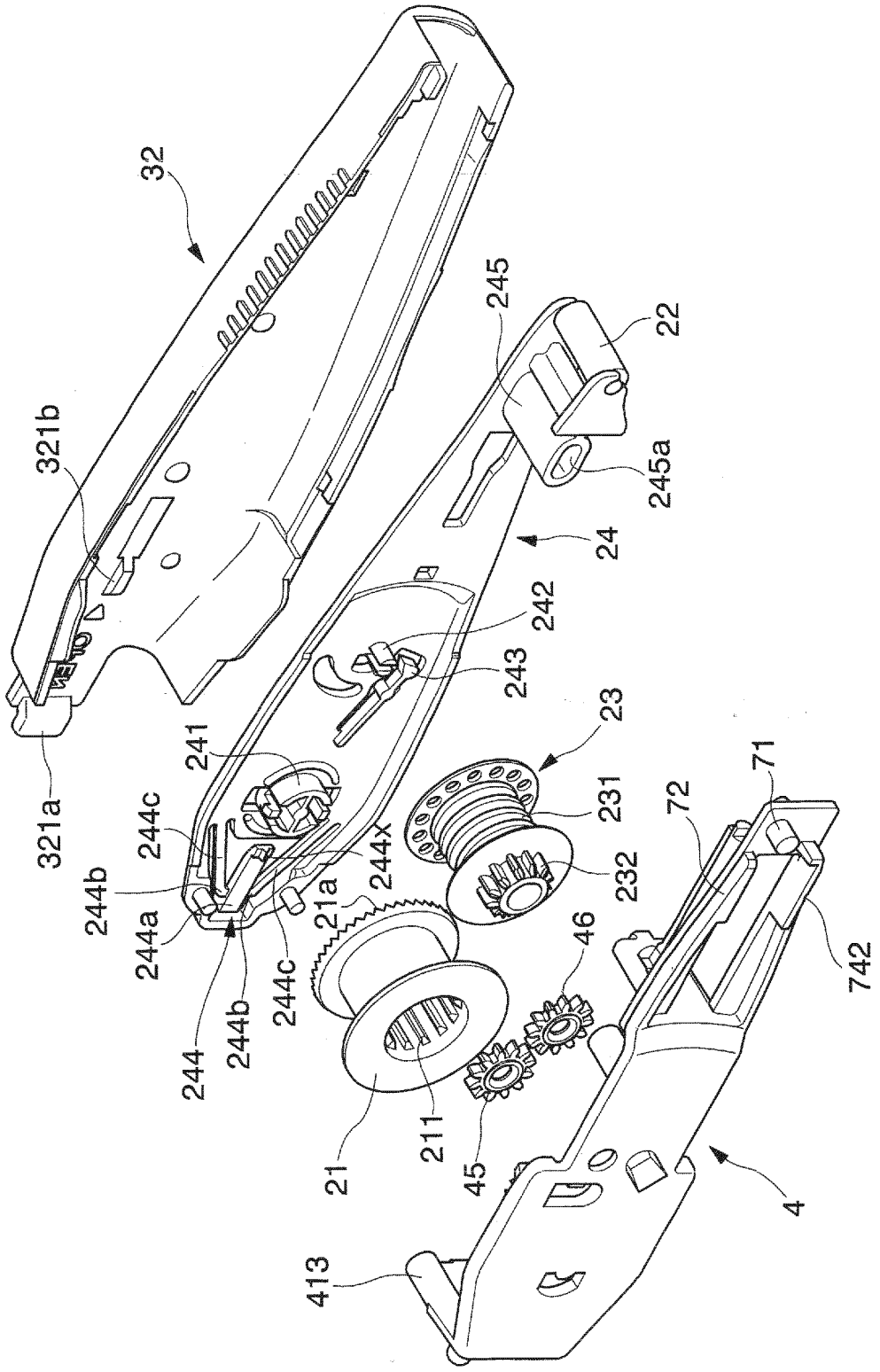

32
321b
321a
245
22
245a
24
242
243
241
23
231
232
244c
244b
244a
244x
21a
244
244b
244c
46
72
71
742
21
211
45
4
413

Fig.7

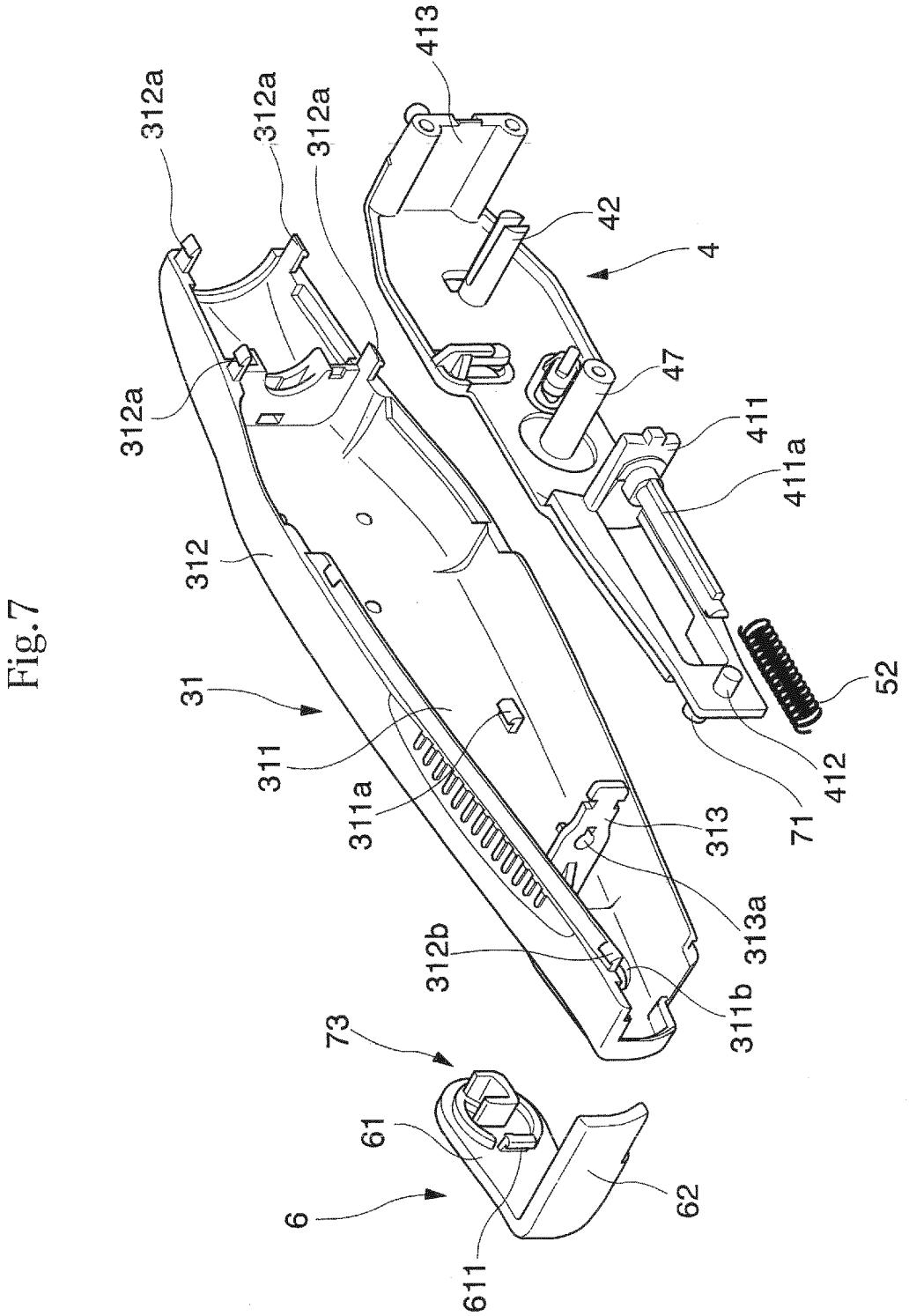

413
312a
312a
312a
42
4
312a
47
411
411a
312
31
311
311a
313
71
412
52
313a
312b
311b
73
61
6
62
611

Fig.8

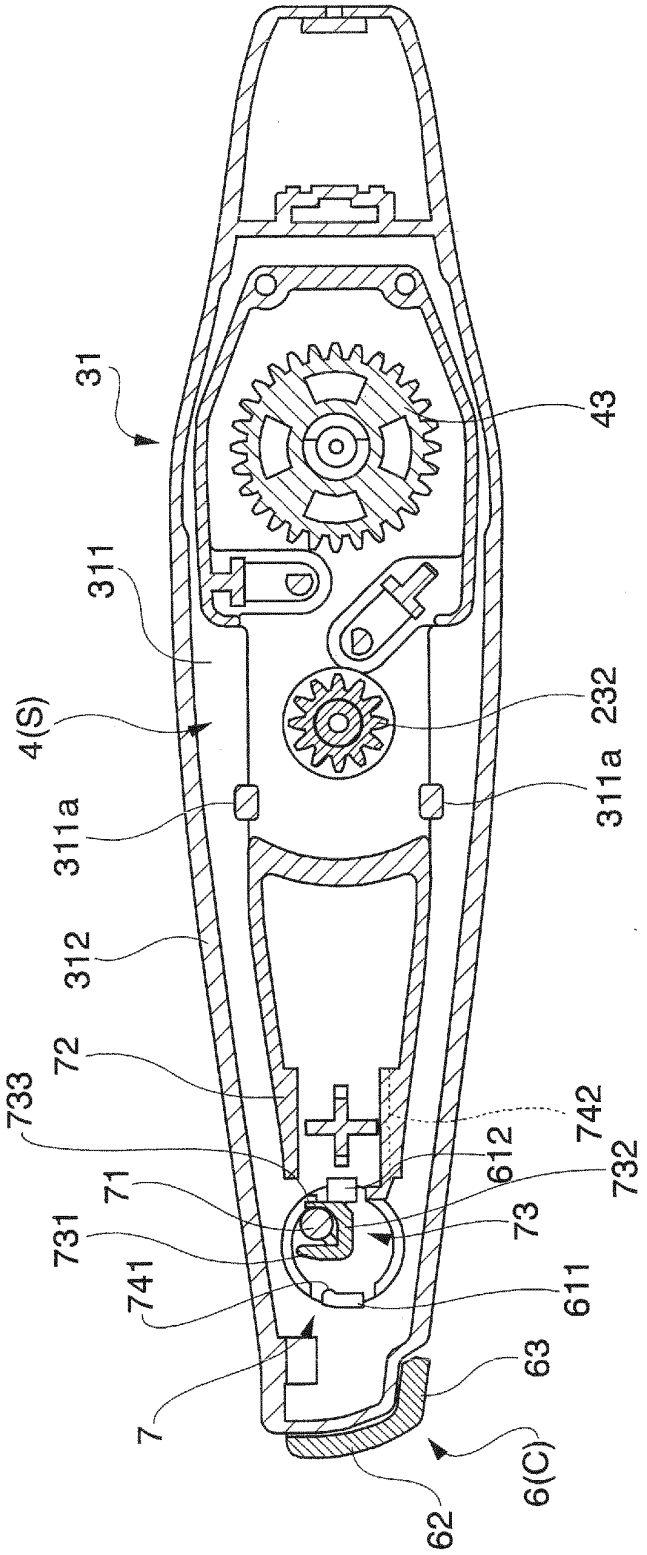

31
43
311
4(S)
232
311a
311a
312
72
733
742
612
732
71
731
73
741
611
7
63
6(C)
62

Fig.9

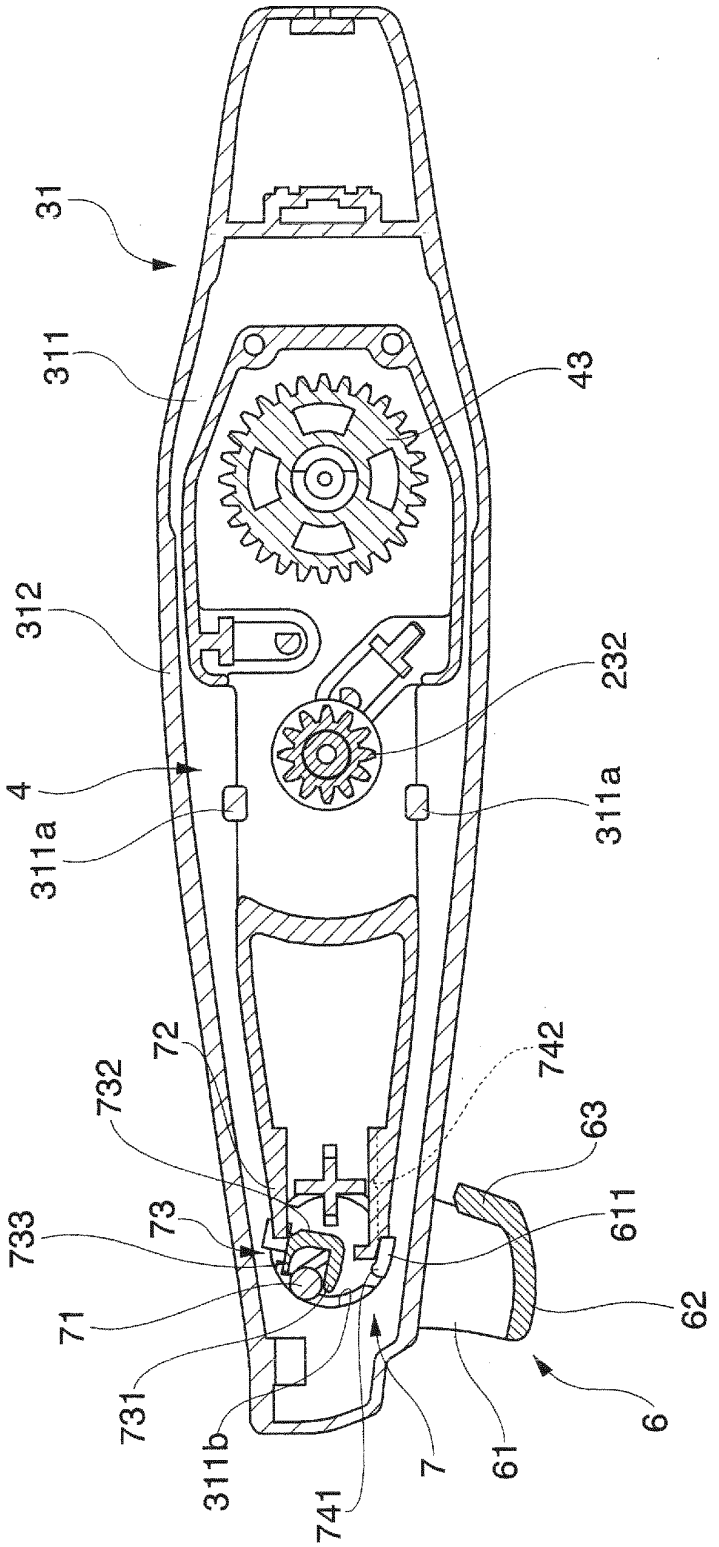

31
311
43
312
232
4
311a
311a
72
742
732
63
733
73
611
71
62
731
6
311b
7
61
741

Fig.10

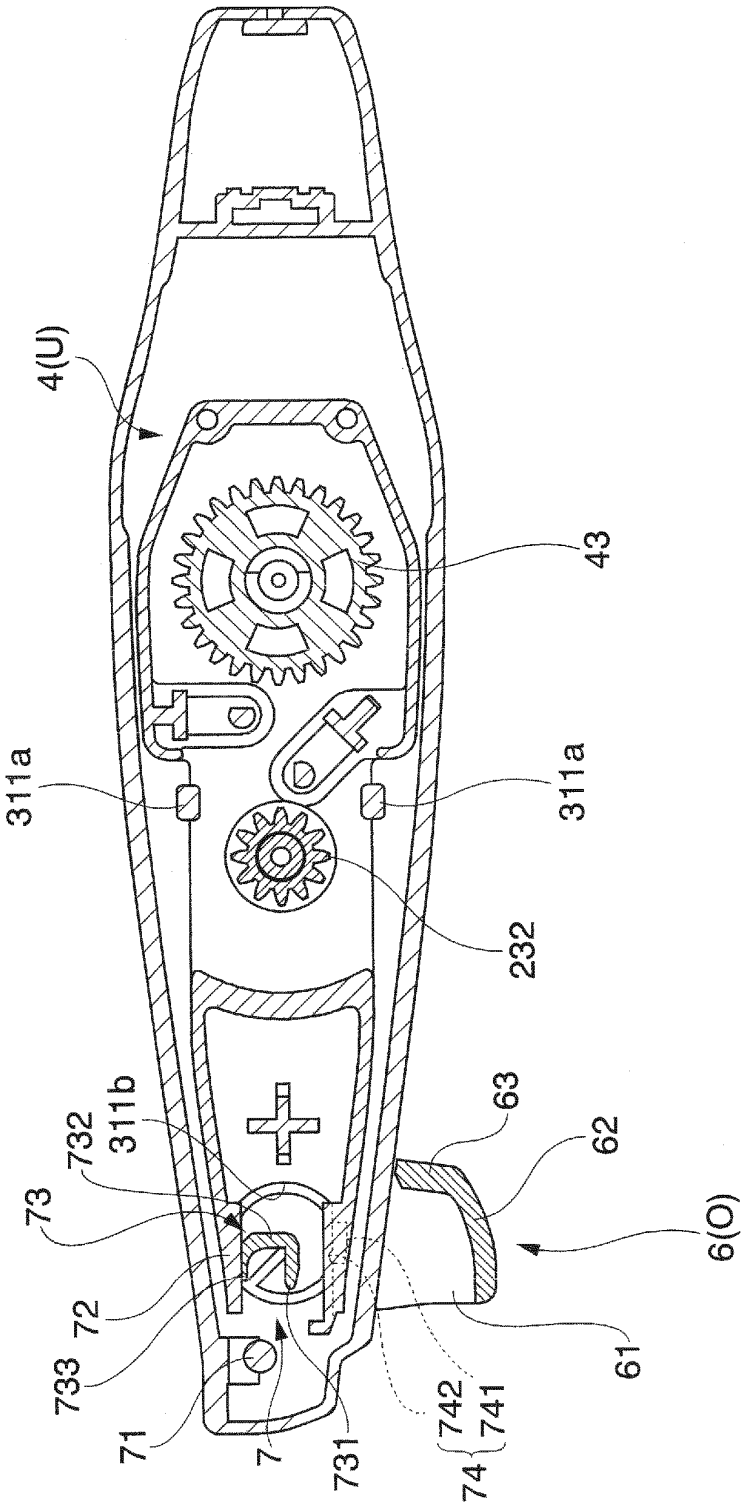

4(U)
43
311a
311a
232
63
62
311b
732
73
6(O)
72
733
71
7
731
742
741
74
61

Fig.11

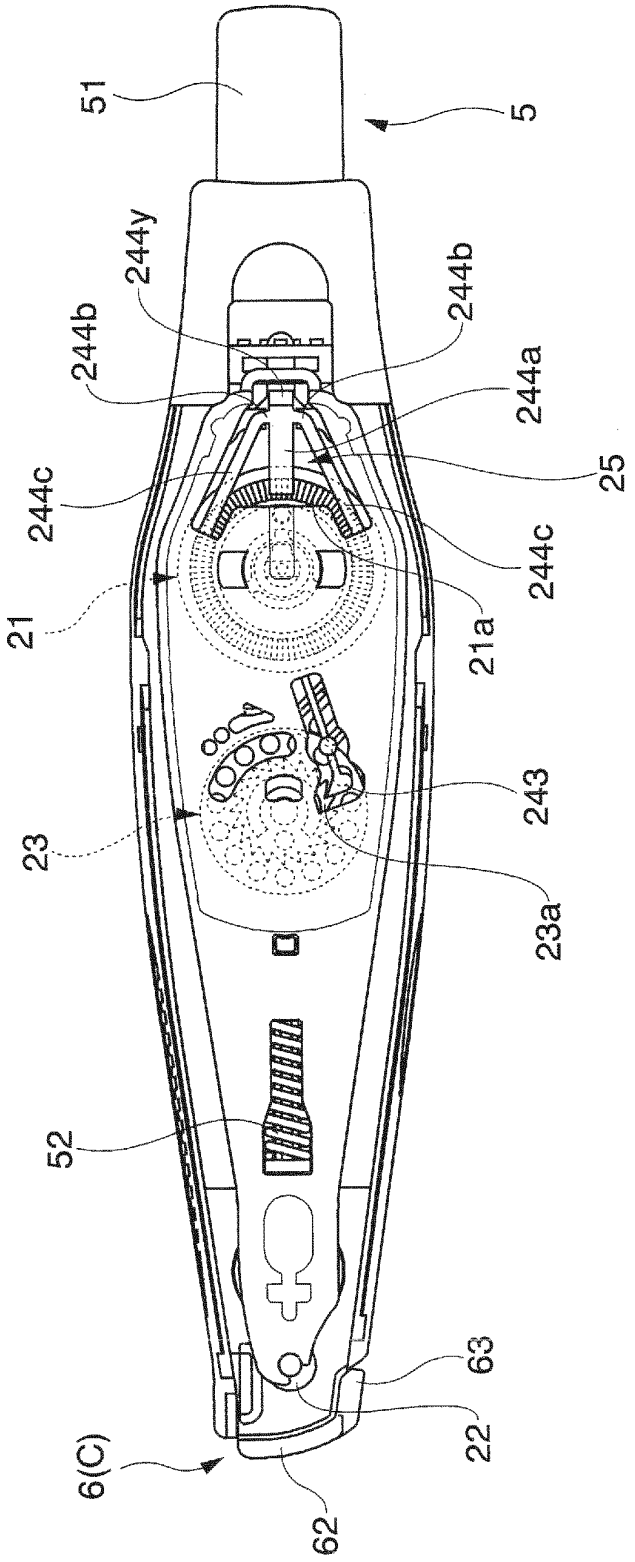

51
5
244y
244b
244b
244a
25
244c
244c
21
21a
243
23
23a
52
63
22
6(C)
62

Fig.12

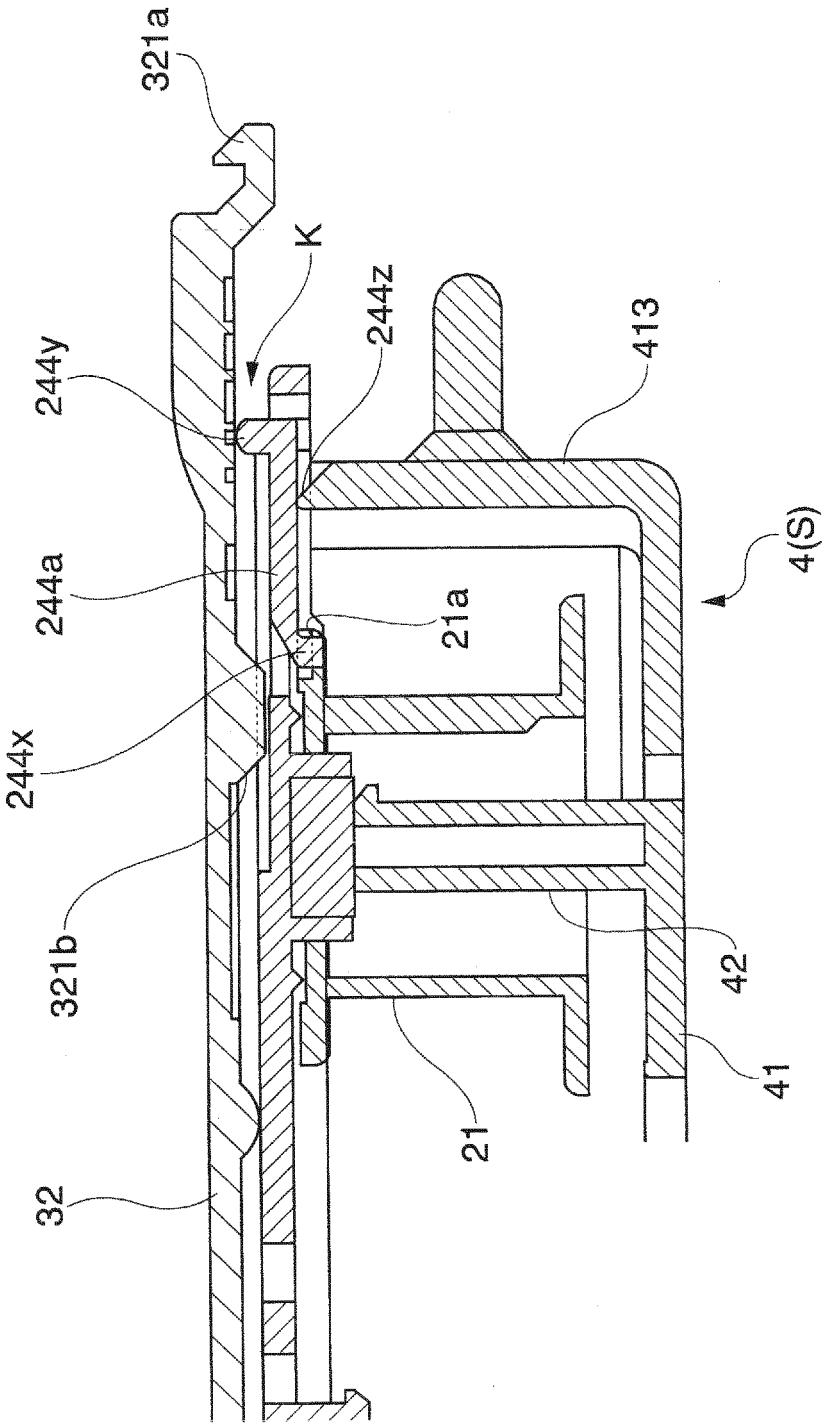


Fig.13

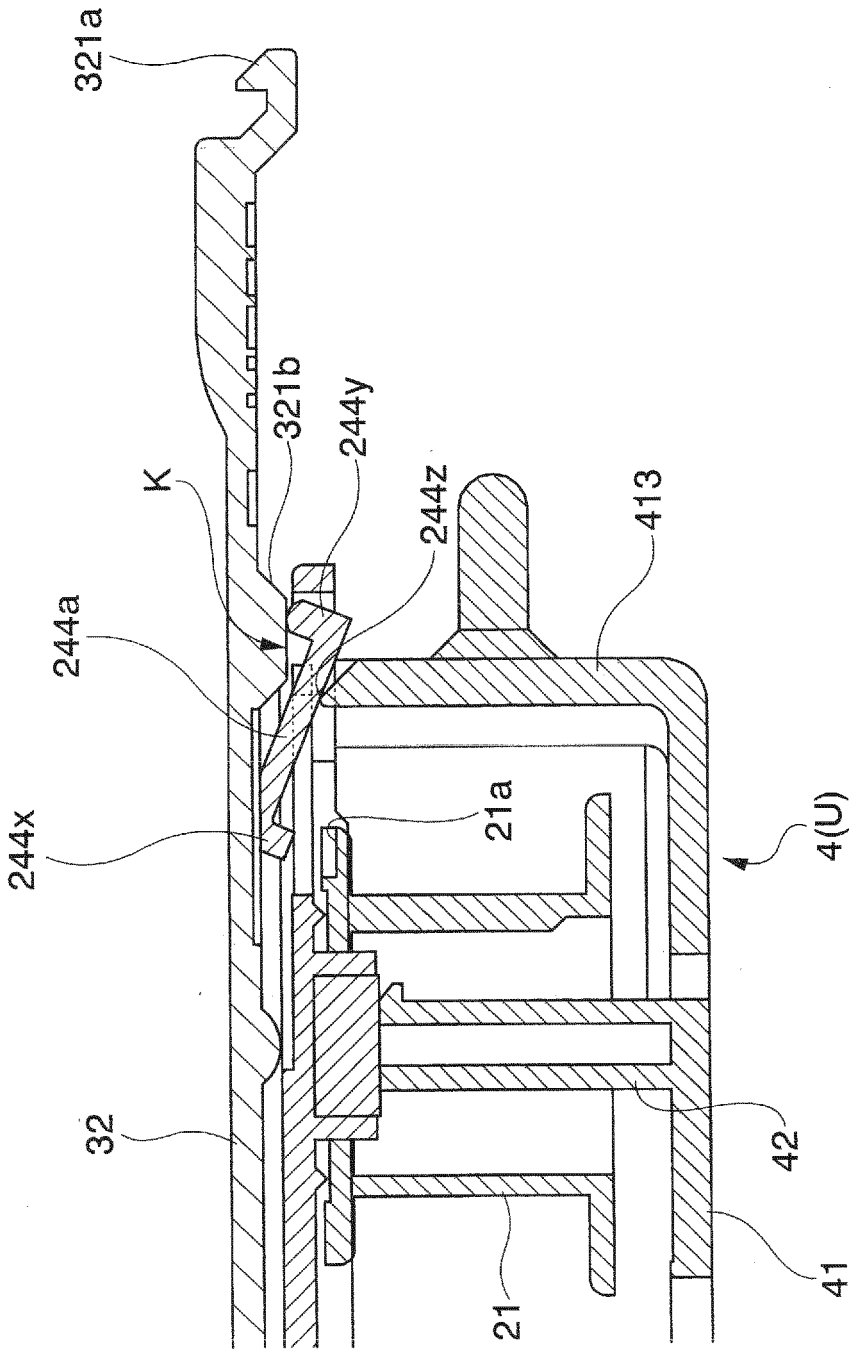


Fig.14

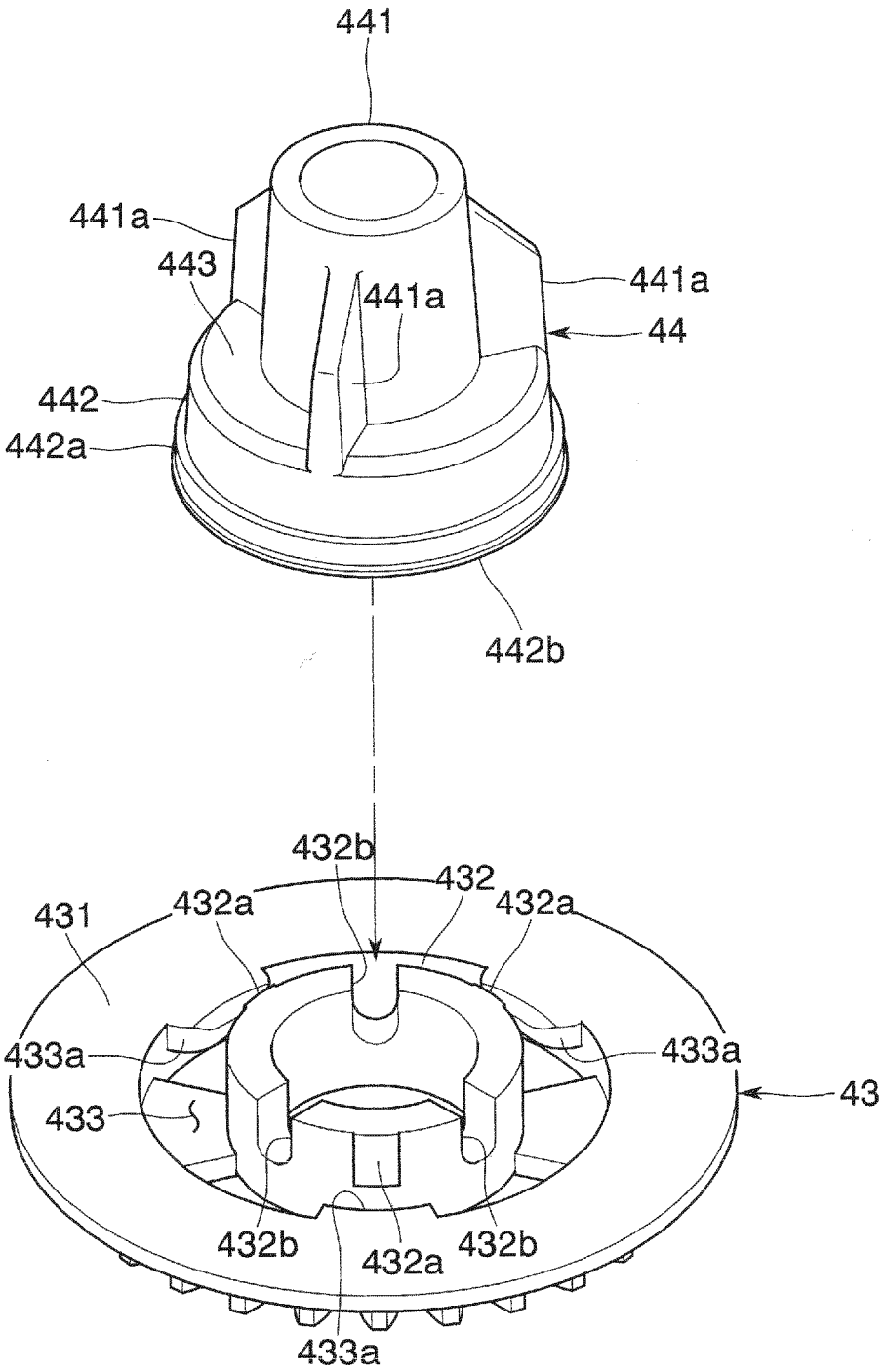

441
441a
443
441a
441a
44
442
442a
442b
432b
432
431
432a
432a
433a
433a
433
43
432b
432a
432b
433a

Fig.15

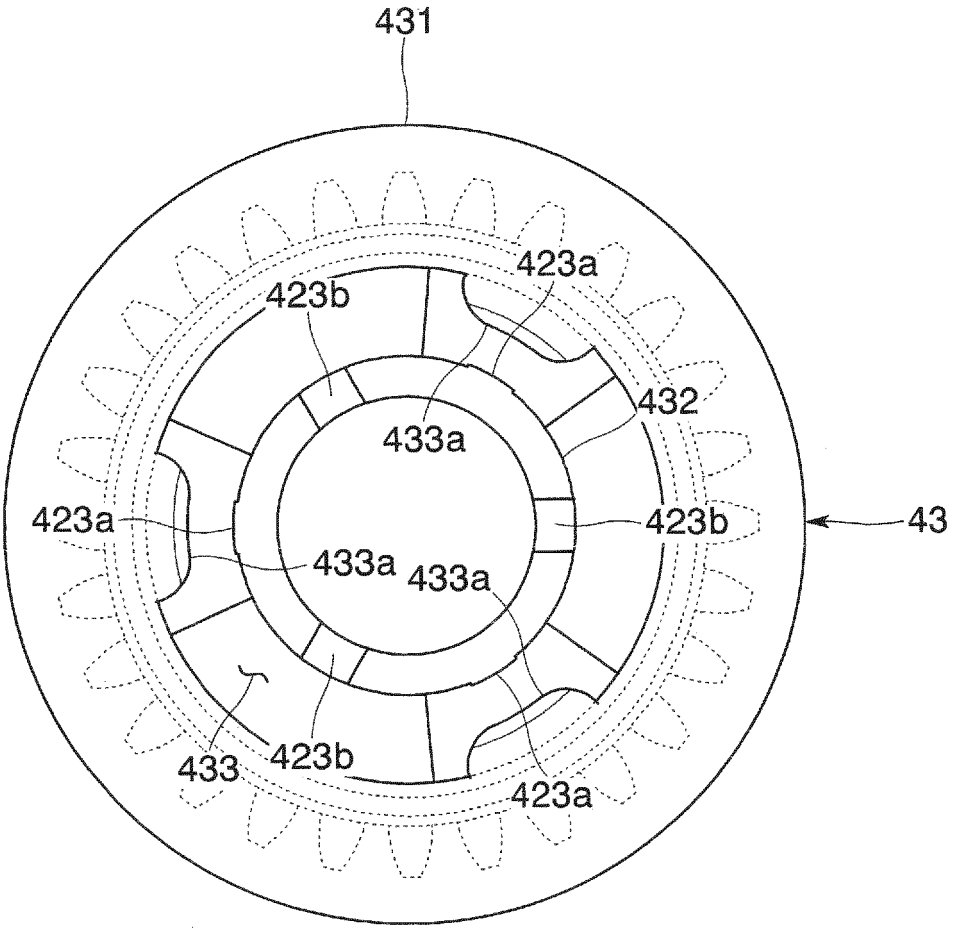


Fig.16

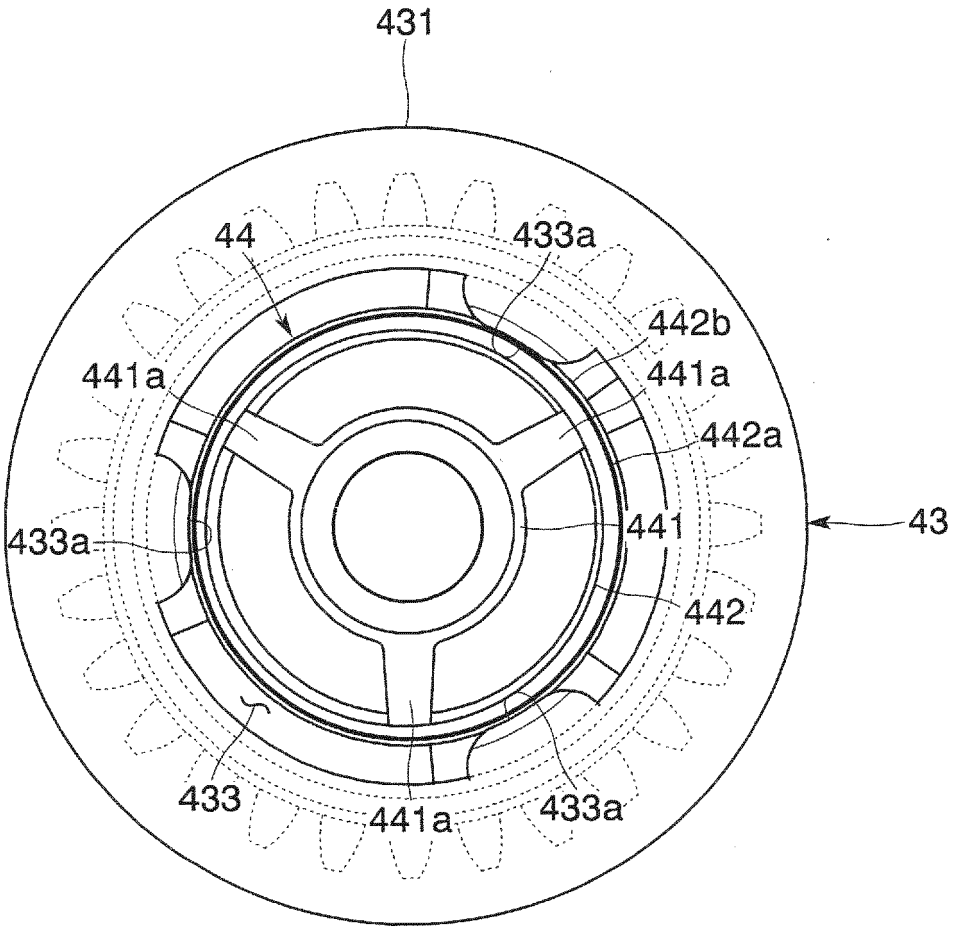


Fig.17

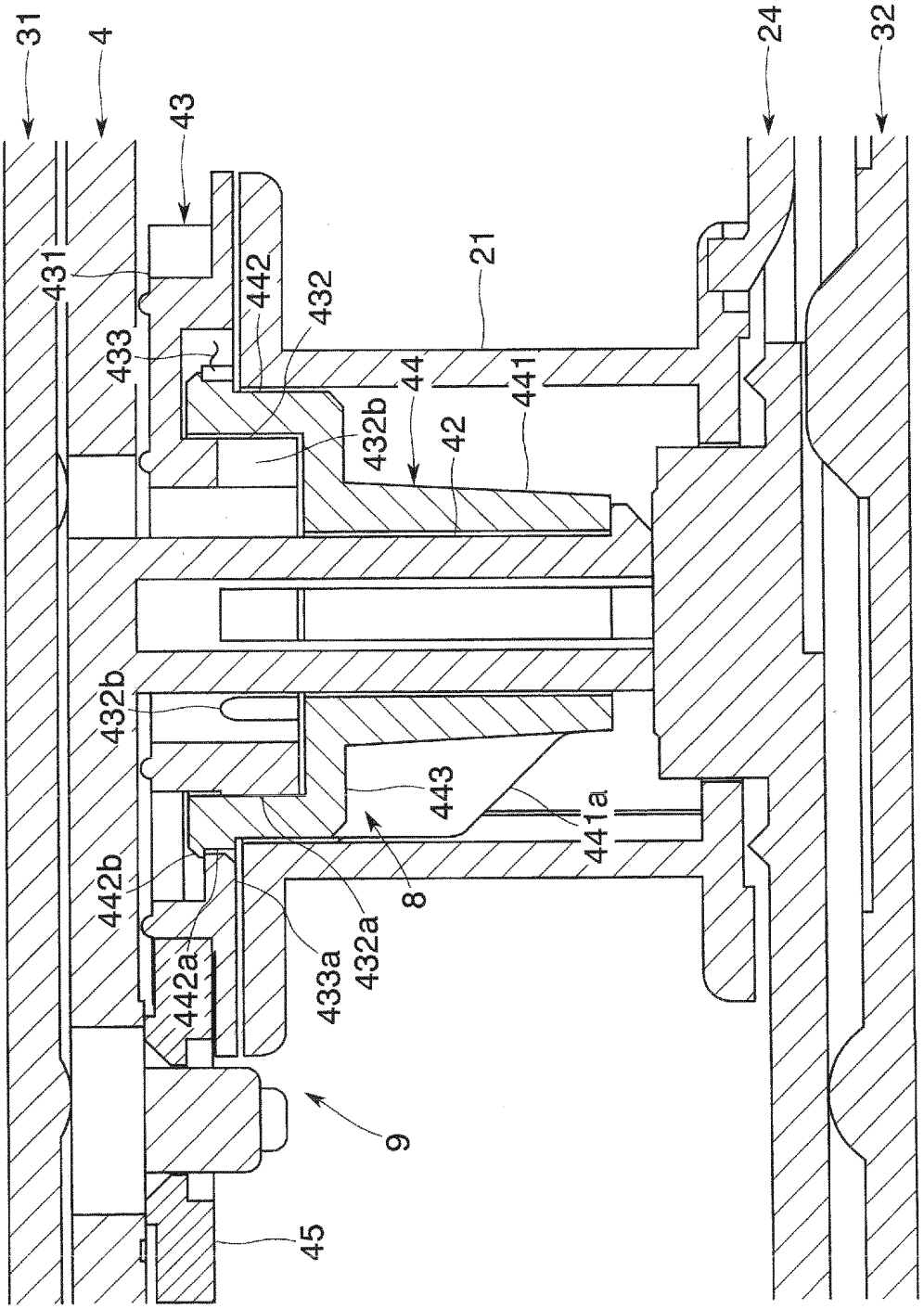

31
4
43
24
32
431
442
432
21
433
44
441
432b
42
432b
443
441a
442b
8
442a
432a
433a
9
45

Fig.18

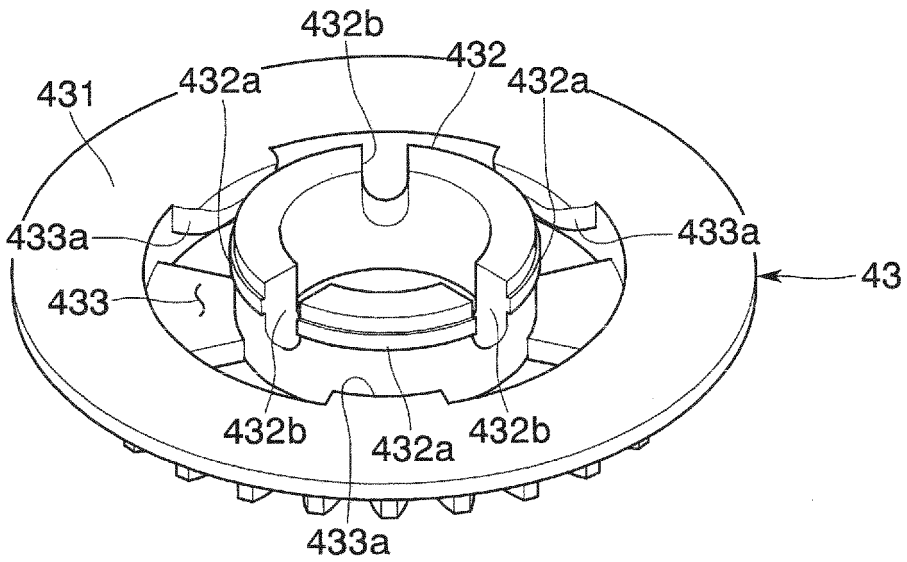


Fig.19

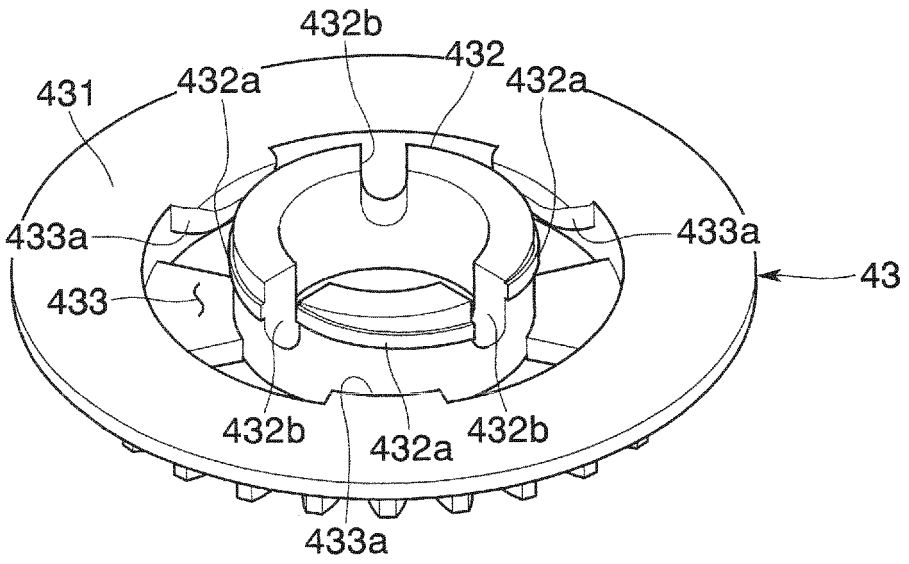
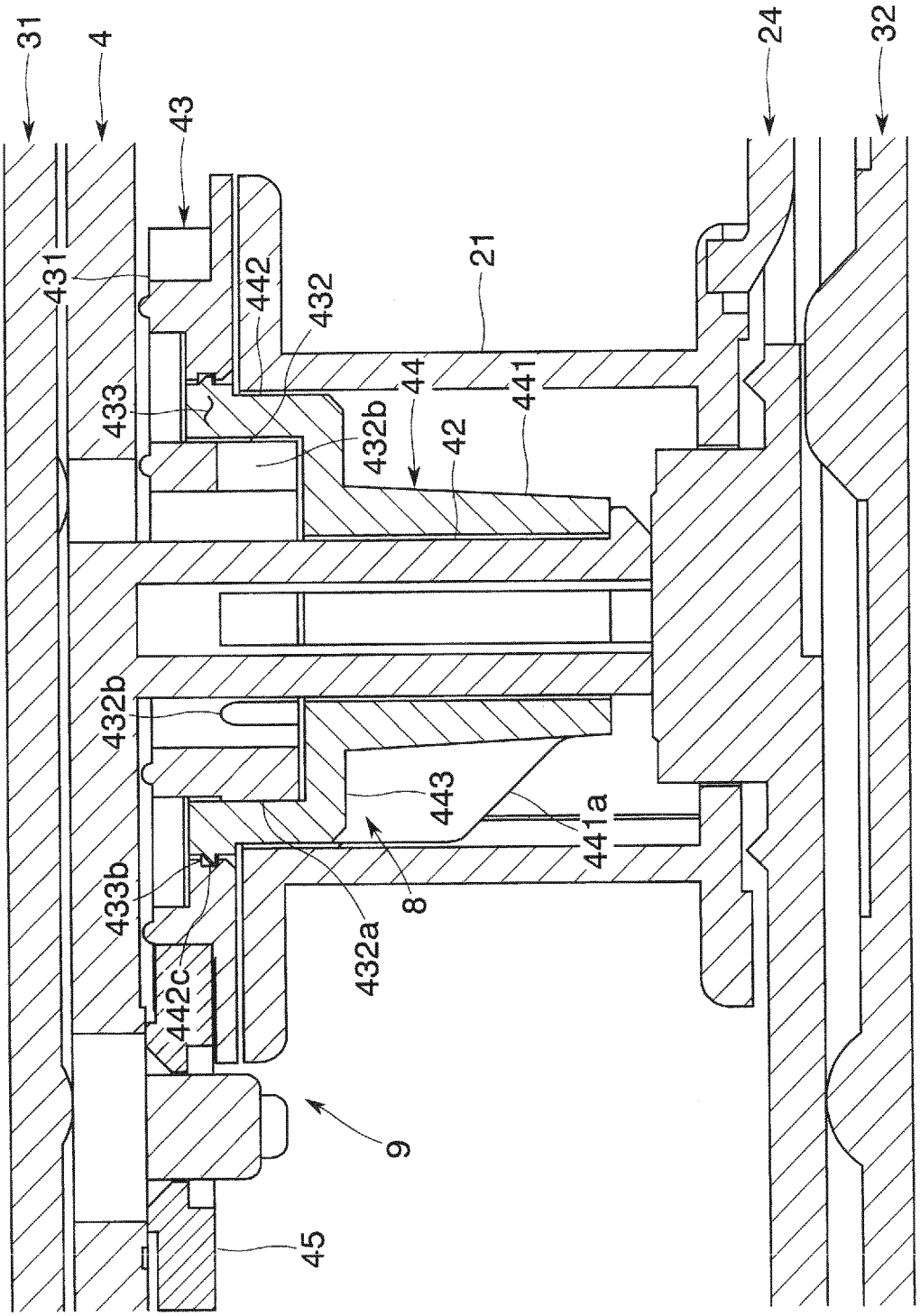


Fig.20


31
4
43
24
32
431
442
432
21
433
44
441
432b
42
432b
443
441a
433b
8
432a
442c
9
45

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/071312

A. CLASSIFICATION OF SUBJECT MATTER
B43L19/00(2006.01)i, *B43K8/00*(2006.01)i, *B43M11/06*(2006.01)i, *B65H35/07*(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B43L19/00, B43K8/00, B43M11/00, B43M11/06, B65H35/07

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2011
Kokai Jitsuyo Shinan Koho	1971-2011	Toroku Jitsuyo Shinan Koho	1994-2011

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 9-104562 A (Seed Rubber Co., Ltd.), 22 April 1997 (22.04.1997), entire text; all drawings & US 6521045 B1 & US 6808565 B1 & EP 767128 A3 & EP 1203741 A1 & DE 69632494 T2 & DE 69633099 T2 & AU 6804096 A & AU 726054 B & ES 2219475 T & HK 1043779 A & ES 2225861 T & HK 1006934 A & KR 10-0228008 B & CN 1157780 A & CA 2187464 A1	1-9
A	JP 2000-229499 A (Tombow Pencil Co., Ltd.), 22 August 2000 (22.08.2000), entire text; all drawings (Family: none)	1-9

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
06 January, 2011 (06.01.11)	18 January, 2011 (18.01.11)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/071312

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2532967 Y2 (General Corp.), 16 April 1997 (16.04.1997), entire text; all drawings (Family: none)	1-9

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2005047201 A **[0007]**