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(54) **Tape cartridge for coating film transfer tool and coating film transfer tool**

Bandkassette für ein Übertragungswerkzeug für Beschichtungsfilm und ein Übertragungswerkzeug für Beschichtungsfilm

Cassette à bande pour un outil de transfert de film de revêtement et un outil de transfert de film de revêtement

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a tape cartridge for use with a coating film transfer tool for transferring a coating film on a coating film transfer tape to a surface of a sheet or the like, which may be replaceably placed in a case of the coating film transfer tool, comprising:

a support base having the geometric shape and dimensions for allowing accommodation in the case;
a pay-out reel rotatably provided on the support base, and having the coating film transfer tape wound thereabout;
a winding reel rotatably provided on the support base for collecting the coating film transfer tape after use; and
a coating film transfer head provided on the support base for pressing the coating film transfer tape on a transfer area of said surface:

the case having pay-out and winding rotation parts for engaging and supporting the reels.

[0002] The present invention also relates to a transfer tool for applying a coating film to a surface of a sheet and the like, comprising the tape cartridge set out above and a case receiving the tape cartridge, the case having pay-out and winding rotation parts engaging and supporting the reels.

[0003] Mainly, the tool is used as an erasing tool for correcting errors and the like on the sheet or the like, by applying to the area of the error a coating film which is the same colour as the sheet or the like. The tape is a consumable item and the tape cartridge is a refill for the tool.

Description of the Related Art

[0004] EP 0 556 406 A1 and DE 39 11 402 A1 show coating film transfer tools. As examples of a coating film transfer tool, the inventors have already proposed a coating film transfer tool disclosed in Japanese Laid-open Patent No. 5-138097 and Japanese Laid-open Utility Model No. 5-13800, for example.

[0005] Figures 26(a) and (b) hereof show the general arrangement of the tool disclosed in the Japanese specifications referred to above. There is a pay-out reel (c) with a coating film transfer tape (b) wound thereabout and a winding reel (d) for collecting the coating film transfer tape (b) after use are provided rotatably in a case (a) that is held by hand for operation thereof as shown in FIGs. 26 (a) and (b). In a leading end of the case (a), a coating film transfer head (f) is provided projectingly for pressing the coating film transfer tape (b) onto a transfer area (correction area in a sheet surface) (e). The coating film transfer tape (b) paid out from the pay-out reel (c) is arranged such that it is dragged through the pressing part (g) in a leading end of the head (f) and windingly held about the winding reel (d).

[0006] In such case, the case (a) is a depressed box geometrically and dimensionally sufficient for containing the pay-out reel (c) and winding reel (d). Flat front and back surfaces of the case (a), that is, front and back surfaces with respect to the sheet surface of FIGs. 26 (a) and (b) provide gripping surfaces for manually operating the tool.

[0007] In a coating film transfer tool shown in FIG. 26 (a), the pressing part (g) in a leading end of the head (f) is arranged such that the coating film transfer tape (b) is guided as it is wound about the pay-out reel (c) and winding reel (d), and the tool is constructed for allowing so-called vertical pulling use that is suitable for correcting, for example, a part of such sentence written in a vertical line in Japanese and the like. On the other hand, in a coating film transfer tool shown in FIG. 26 (b), the pressing part (g) of head (f) is arranged such that the coating film transfer tape (b) is guided generally facing against the gripping surface of case (a), and the tool is constructed for allowing so-called lateral pulling use that is suitable for correcting, for example, a part of such sentence written in a lateral line in English and the like.

[0008] Then, in order to erase an error by using the coating film transfer tools, the gripping surfaces of case (a) are held by fingers, and the case (a) is moved in the specified direction (shown by arrow in FIG. 26 (a) or vertical to the sheet surface in FIG. 26 (b)), respectively, while the coating film transfer tape (b) is tightly pressed against the correction area (e). In such manner, a corrective paint layer of the coating film transfer tape (b) in the pressing part (g) of head (f) is applied onto the correction area (e), a letter or the like in the area is erased, and the used coating film (b) is collected by the winding reel (d).

[0009] Incidentally, effective use of earth resources has been particularly emphasized in these days, and it is desirable in a coating film transfer tool of the type to have so-called refill type structure for allowing replacement of the coating film transfer tape (b) only that is a consumable supply, because saving of resources is demanded.

[0010] In this respect, in a coating film transfer tool of vertical pulling type shown in FIG. 26 (a), various tape cartridges replaceably employed in the case (a) are proposed. Such tape cartridges provided as a consumable supply can be generally classified to structures composed of a combination of four components in total, that is, the coating film transfer tape (b), the pay-out reel (c), winding reel (d) and head (f) and a combination of three components in total, that is the coating film transfer tape (b), pay-out reel (c), and winding reel (d).

[0011] In a tape cartridge of the former type, all four

components (b), (c), (d) and (f) are provided in a plastic container, and they are completely replaced for a used cartridge. On the other hand, in a tape cartridge of the latter type, the three components (b), (c) and (d) are temporarily held by a holding member which is removed in replacement of a used tape cartridge.

[0012] However, either type of the tape cartridge has such problem as described below, and further modification has been demanded.

[0013] That is, in the former, most of main components of the coating film transfer tool are replaced as consumable items, and all such components are housed in a plastic container, therefore, many components are used, the structure thereof is complex and bulky, and the cost for manufacturing the replacement parts themselves is high. Thus, such advantage of the refill type as saving of resources and reduction of running cost cannot be sufficiently achieved. Besides, as the plastic container itself is relatively bulky because of the structure, it leads to increase in size of a coating film transfer tool, and has been disadvantageous for providing portableness and easy operation.

[0014] In the case of the latter, because a holding member for temporarily holding the components is used, and replacement thereof is relatively complicated as well as troublesome, it is required to be more or less familiar with the operation, and easy and proper replacement cannot be assured, therefore, to all general users.

[0015] Moreover, in the coating film transfer tool of lateral pulling type shown in FIG. 26 (b), because the pressing part (g) of head (f) guides the coating film transfer tape (b) with the tape generally facing against the gripping surface of the case (a), it has been practically impossible to provide a refill type structure which allows replacement of the coating film transfer tape (b) only. That is because the coating film transfer tape (b) is necessarily twisted 90° in the head (f). It is also difficult for a manufacturer to automatically assemble the tool, which is actually assembled manually by skilled workers.

[0016] On the other hand, in order to provide a refill type structure for allowing replacement of the coating film transfer tape (b), it is required that disassembly and assembly of a coating film transfer tool and replacement of the coating film transfer tape (b) are basically achieved by a user. Thus, the structure should permit the series of operations to be easily, rapidly and properly conducted by a general user when replacing the coating film transfer tape (b).

[0017] EP 0 619 189 A2 discloses a tape cartridge and tool of the type described in the opening paragraphs hereof. However, the support base functions as a positioning means for positioning and holding both the reels both before and after engaging the reels with the pay-out and winding rotation parts. Hence the support base must have the strength to position and hold the reels during use.

[0018] It is a general object of the invention to provide a tape cartridge that eliminates the conventional problems associated with a coating film transfer tool.

[0019] It is another object of the invention to provide a tape cartridge comprising few components in a small and simple structure for achieving a compact coating film transfer tool and allowing easy, rapid and proper replacement.

[0020] It is further object of the invention to provide a coating film transfer tool of the refill type used as a kind of stationery and allowing easy replacement of coating film transfer tapes.

[0021] It is another object of the invention to provide a coating film transfer tool of such refill type for lateral pulling use.

THE INVENTION

[0022] The invention provides a tape cartridge as set forth in Claim 1 and a transfer tool as set forth in Claim 20. Claims 2 to 19 and 21 to 28 specify preferred, optional features of the invention.

[0023] The support base consists of a thin plate member having sufficient strength for holding the reels with a spacing corresponding to the rotation parts and for holding the transfer head mounting member, and its dimensions are selected to be as thin and compact as possible because the support base is required to hold the reels and the head at corresponding positions only until the cartridge has been inserted in the tool. Thereafter, the tool case holds the reels and transfer head sufficiently firmly to withstand the forces applied during use.

[0024] The transfer head for pressing the coating film transfer tape onto the transfer area is provided on the support base, and the coating film transfer tape paid out from the pay-out reel is wound on the winding-in reel through the leading end pressing part of the head.

[0025] The case can have a pair of opposite gripping surfaces so as to be held in hand like a writing tool.

[0026] The head can be rotatably operative between a coating film transfer tape replacement position and application position as well as being fixed at an angle for vertical pulling use, and a pressing part in the leading end of the head can guide the coating film transfer tape as it is wound about the pay-out reel and winding reel in the coating film replacement position and as it generally faces against gripping surfaces of the case of the case in the application position.

[0027] Now, in the case of a tape cartridge according to the invention, because the pay-out and winding reels are attached to the support base, replacement is conducted for each support base.

[0028] In such case, replacement is completed by placing the support base on the rotation parts with the reels held in engagement with the pay-out and winding rotation parts of the coating film transfer tool, and setting a coating film transfer tape to the coating film transfer head of the case.

[0029] In the case of the coating film transfer head dis-

posed on the support base, while both reels are engaged with a pay-out rotation part and a winding rotation part of the case main body of the coating film transfer tool and the head is set on the head holding part provided at the leading end of the case main body, the support base is mounted on the rotation parts, thereby the replacement job is completed.

[0030] In addition, in a coating film transfer tool according to the invention, as the head is rotatably operative between a coating film transfer tape replacement position and an application position, the pressing part in a leading end of the head guides the coating film transfer tape as it is wound about the pay-out and winding reels in the coating film transfer tape replacement position and as it generally faces against gripping surfaces of the case in the application position, two requirements conventionally unachievable, that is, lateral pulling use and replacement of coating film transfer tapes can be met simultaneously in a structure.

[0031] In other words, because a coating film transfer tape is guided by the pressing part of the head as the tape generally faces against gripping surfaces of the case during use, the coating film transfer tape can be pressed tightly against a sheet surface or the like by means of the pressing part of the head by holding the case itself in an attitude similar to that of a writing tool, and a corrective paint layer of the coating film transfer tape is transferred to the sheet surface or the like by moving the case laterally or in the right or left direction with respect to the sheet surface or the like.

[0032] In replacement of a coating film transfer tape, firstly the head is rotated from the application position to the coating film transfer tape replacement position. In such manner, as the coating film transfer tape in the head part is operated from 90° twisted to parallel state in relation to the winding attitude of the pay-out and winding reels so that the coating, film transfer tape can be easily detached with respect to the head, the tape cartridge can be replaced by opening the case in that state.

[0033] Here, such expression that the coating film transfer tape "generally faces against gripping surfaces of the case" means that front and back surfaces of a coating film transfer tape generally face against gripping surfaces of the case, that is, the front and back surfaces of the coating film transfer tape are generally in the same direction as that of gripping surfaces of the case or in parallel therewith, which applies throughout the specification.

[0034] The above and other objects and features of the invention will be clearly appreciated by reading a detailed description of embodiments of the invention in connection with attached drawings and novel features of the invention depicted in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] Figs. 1 to 7 and 13 are not part of the invention.

[0036] FIG. 8 is a magnified perspective view for explaining operation of a backstop arrangement of an erasing transfer tool.

[0037] FIGS. 1 (a) and 11(b) are perspective views of part of the tool.

[0038] FIGS. 12(a) and 12(b) are perspective views of the tool.

[0039] FIGS. 14(a) and 14(b) are perspective views, showing the tool in use.

[0040] FIG. 15 is an exploded perspective view of an embodiment of an erasing transfer tool of the invention.

[0041] FIG. 16 is a perspective view showing a tape cartridge of the erasing tool.

[0042] FIG. 17 is a front view of the tape cartridge.

[0043] FIG. 18 is a sectional view along line II-II in FIG. 17, showing the tape cartridge.

[0044] FIG. 19 is an exploded perspective view of the tape cartridge.

[0045] FIG. 20 is a sectional view for explaining the mounting.

[0046] FIG. 21 is an exploded perspective view of an internal structure of a case main body of the erasing tool.

[0047] FIG. 22 shows the clutch mechanism of the erasing tool, FIG. 22 (a) being a sectional view and FIG. 22 (b) being a perspective view showing a friction member of the clutch mechanism.

[0048] FIG. 23 shows the mounting structure of coating film transfer head of the erasing tool, FIG. 23 (a) being a front view showing a partial section of the relation between the coating film transfer head and head mounting part of support base, specifically showing the coating film transfer head at the coating film transfer tape replacement position, and FIG. 23 (b) being a partially cut-away front view showing the relation between the coating film transfer head and rotationally operated part of the case, specifically showing the coating film transfer head at the application position.

[0049] FIG. 24 is a magnified side view of a modified example of the leading end pressing part of the coating film transfer head of the erasing tool.

[0050] FIG. 26 is a partially cut-away front view of an internal structure of a conventional erasing tool.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0051] Referring now to the drawings, preferred embodiments of the invention are described in detail below.

[0052] FIG. 15 through FIG. 23 show the tape cartridge and coating film transfer tool according to the invention, and same reference numerals throughout the drawings represent identical or similar constituent members or elements.

[0053] The coating film transfer tool according to an embodiment of the present invention is shown in FIG. 15 through FIG. 23.

[0054] The coating film transfer tool 101 is an erasing tool.

[0055] The erasing tool 101 comprises, as shown in FIG. 15, a tape cartridge C having a coating film transfer head H, tape driving part D, and rotationally operated part R attached to a case 2 that can be hand-held for operation. In the erasing tool 101, the head H can be rotationally operated between a coating film transfer tape replacement position (and vertical pulling position) X shown in FIG. 12(a) and an application position (lateral pulling position) Y in FIGs. 12(b) and 13(b). The component parts are described one by one below.

I. Case 2:

[0056] The case 2 is formed in a flat box-like shape as shown, and has front contour and width dimensions sufficient for incorporating the tape cartridge C and tape driving part D. As described later, flat front and back surfaces 2a, 2b of the case 2 provide gripping surfaces for manually holding the tool during operation.

[0057] The case 2 is a plastic molding obtained by injection or other molding method, and comprises divided blocks of a main case body 3 and a cap 4. For this purpose, in an opening of the main case body 3, a fitting recess 3a is provided over the entire circumference thereof, and an engagement part 3b is provided at the rear end. A fitting rib 4a of the cap 4 is fitted to the fitting recess 3a, and an engagement claw 4b of the cap 4 is engaged with the engagement part 3b. At the leading ends of the case main body 3 and cap 4, cylindrical halves 3c and 4c to be combined integrally by a cap member 5 are provided respectively.

[0058] For assembling the case 2, first of all, the engagement claw 4b in the cap 4 is brought in engagement with the engagement claw in the case main body 3, and the cylindrical halves 3c, 4c are assembled and integrated with each other, while the fitting rib 4a is fitted in the fitting recess 3a, then the cap member 5 is fitted into this assembled portion (cylindrical leading end) 6, thereby completing the assembly. Although not shown, instead of the engagement structure of the engagement part 3b and engagement claw 4b, the cap 4 may be pivoted to the case main body 3 so as to be free to open and close in the vertical direction.

[0059] The cap 4 has three remainder monitor windows 8a to 8c for monitoring the remaining amount of the coating film transfer tape T.

II. Tape cartridge C:

[0060] The tape cartridge C is a component replaceable as a consumable item. Its detailed structure is shown in FIGs. 16 to 19. The tape cartridge C comprises a pay-out reel 11 with the coating film transfer tape T wound thereabout, a winding reel 12 for collecting used coating film transfer tape T', and the coating film transfer head H for pressing the coating film transfer tape T onto a transfer area, all mounted on a support base 10, being detachably attached to the tape driving part D of the case main body 3 as shown in FIG. 20.

[0061] The support base 10 is composed of a thin flat plate, and its material and dimensions are selected to be as thin and compact as possible within a range of providing a strength sufficient for holding the reels 11, 12 and the coating film transfer head H. In other words, the support base 10 is required to function for holding the reels 11, 12 and head H at corresponding positions only until they are attached to the tape driving part D and the cylindrical leading end 6 as the head holding part. Therefore, the support base 10 is desired to be as thin and compact as possible, as far as a minimum strength for achieving the function is assured.

[0062] In the illustrated embodiment, the support base 10 is made of AS (acrylonitrile-styrene) resin or ABS (acrylonitrile-butadiene-styrene) resin. The thickness of the support base 10 is set at 1 mm or less. A front shape of the support base 10 is nearly an oval form along the outer circumference of the reels 11, 12, as shown in FIG. 17. At the leading end portion of the support base 10, a head mounting part 90 is provided integrally. A surface or upper surface 10a of the support base 10 serves as a running and guiding surface of the coating film transfer tape T.

[0063] The pay-out reel 11 and winding reel 12 are provided with hollow drum parts 11a, 12a, respectively, for winding the coating film transfer tape T thereabout. The drum parts 11a, 12a have, in their center, attachment holes 11b, 12b with such tooth profile engagement parts as serration or spline.

[0064] The drum parts 11a, 12a of the reels 11, 12 are rotatably supported with support ends thereof in support holes 10b, 10c of the support base 10. Specifically, annular fitting grooves 13, 13 are formed in a support end of the drum parts 11a, 12a, respectively. These fitting grooves 13, 13 are rotatably fitted and supported in an inner edge of the support holes 10b, 10c. In this connection, in an outer circumferential part of the support holes 10b, 10c, as shown in FIG. 19, a plurality of slits 14, 14 ... are radially extended for inserting the drum parts, respectively.

[0065] The coating film transfer tape T is wound about an outer circumference of the drum part 11a in the pay-out reel 11, and a leading end in the pay-out side is connected to an outer circumference of the drum part 12a in the winding reel 12. The coating film transfer tape T structurally consists of, for example, a film base (about 25 to 38 μm thick) of a plastic material such as polyester and acetate films or paper, a release agent layer such as vinyl chloride-vinyl acetate copolymer resin and low molecular polyethylene formed in one side of the film base, a white corrective paint layer over the release agent layer and an adhesive (pressure sensitive adhesive) layer such as pressure sensitive polyurethane further applied over the paint layer (detailed structure not shown). For the corrective paint layer, so-called dry type paint is employed that allows writing in a corrected area immediately after the paint is transferred.

[0066] A free end of the drum part 11a in the pay-out reel 11 is left as an open end. A free end of the drum part 12a in the winding reel 12 is provided with a guide flange 15 for running the tape.

[0067] In this connection, moreover, the support base 10 is provided with a tape protective wall 17 for protecting the outer circumference of the coating film transfer tape T wound about the pay-out reel 11. This tape protective wall 17 is a thin plate having the same thickness as the support base 10. The tape protective wall 17 is provided upright and integrally along the rear edge of the support base 10 so as to cover the outer circumference of the pay-out reel 11, more specifically, the outer circumference of the coating film transfer tape T wound thereabout.

[0068] By this tape protective wall 17, when assembling the tape cartridge C, the coating film transfer tape T is prevented from being dislocated from the pay-out reel 11 accidentally, and when handling the tape cartridge C, it covers and protects the coating film layer on the outermost surface of the coating film transfer tape T, that is, the corrective paint layer. This tape protective wall 17 may be provided at least over the shown range, from the viewpoint of lightening, downsizing and simplifying the stucture of the tape cartridge C, but a specific forming range may be adequately varied depending on the purpose.

[0069] As shown in FIG. 20, the configuration of the reels 11, 12 on the support base 10 is determined so that the attachment holes 11b, 12b are coaxial, respectively, with the pay-out rotation part 30 and winding rotation part 31 of the tape driving part D mentioned below.

[0070] Additionally, a pair of guide pins 20, 21 are integrally provided upright for guiding the coating film transfer tape T, in the support base 10 near the mounting positions of the reels 11, 12. The guide pin 20 is for guiding the coating film transfer tape T paid out of the pay-out reel 11. The other guide pin 21 is for guiding the coating film transfer tape T' that is taken up on the winding reel 12.

[0071] Further, a collared guide roller 22 is freely rotatably pivoted on the guide pin 21 at the winding side. By means of such arrangement, smooth and neat winding guide of the coating film transfer tape T' is encouraged, and if there is a coating film left over on the coating film transfer tape T' due to transfer failure, the trouble of the coating film transfer tape T' being wound into the guide pin 21 can be avoided securely. A similar guide roller may be also attached to the guide pin 20 of the pay-out side.

[0072] Besides, to prevent loosening of the coating film transfer tape T before mounting, the pay-out reel 11 and winding reel 12 are prevented from rotating by a stopper 25 as indicated by double dot chain line in FIGs. 17 and 18. This stopper 25 is made of a material similar to that of the support base 10. The stopper 25 is formed in such shape and dimensions, as shown in the figures, that it extends over the attachment holes 11b, 12b of reels 11, 12, and provided with a pair of engagement projections 25a, 25b in a lower surface thereof. Then, by removable fitting engagement between the engagement projections 25a, 25b and the attachment holes 11b, 12b, respectively, the reels 11, 12 are stopped and held against rotation. The stopper 25 may be made of paper.

III. Coating film transfer head H:

[0073] The coating film transfer head H is designed to press the coating film transfer tape T onto a correction area (transfer area) of an error or the like on the sheet of paper. This head H is mounted on a head mounting part 90 integral with the support base 10 rotatably about its axial center.

[0074] The head H is a plastic integral forming having a certain elasticity. The head H consists of a mounting member or head main body 65 for guiding and pressing the coating film transfer tape T, and a bearing 66 borne rotatably.

[0075] The head main body 65 is a thin plate slightly wider than the coating film transfer tape T. The head main body 65 is tapered in section so as to gradually thin down toward the leading end, and its leading end 65a is the pressing part for pressing the coating film transfer tape T. At both edges of the head main body 65, guide flanges 65b, 65b are formed for guiding the running of the coating film transfer tape T.

[0076] The bearing 66 is semicylindrical with an arcuate section and an open top as shown in FIG. 23. In the central part of this semicylindrical bearing 66, the head main body 65 is formed integrally as shown in the drawing. The open part 31a of this bearing 31 is a tape setting opening to the head main body 65. The tape setting opening 68 is disposed so that the coating film transfer tape T may be directly inserted when already wound about the reels 11, 12 when the head H is at the coating film transfer tape replacement position X (FIG. 12(a)), and it is designed so that it is easy to place the coating film transfer tape T in the head main body 65.

[0077] The basal end portion of the bearing 66 is rotatably supported on the head mounting part 90, and the remaining leading end portion is rotatably supported on the cylindrical leading end 6 of the case 2 when mounting onto the case 2.

[0078] In addition, as shown in FIG. 23(a), in the mounting structure of the bearing 66 onto the head mounting part 90, a positioning protrusion 92 projects from the outer circumference of the basal end portion of the bearing 66. At the leading end 90a of the head mounting part 90 for supporting the bearing 66, an engagement opening 93 to be engaged with the protrusion 92 is extended in the circumferential direction.

[0079] By the engagement of the protrusion 92 and engagement opening 93, the head H is positioned in the axial direction in the head mounting part 66, and is mounted rotatably about its axial center. Hence, while

maintaining a simple structure, the ease of operation when replacing the tape by the user is assured.

[0080] The rotational range of the head H in this case is defined by the circumferential length of the engagement opening 93 engaged with the protrusion 92, and in the illustrated example, more specifically, it is set corresponding to the rotational operation range of the head H by the rotationally operated part R mentioned later.

[0081] The leading end 90a of the head mounting part 90 is mounted on a mounting part main body 90b integral with the support base 10. This mounting part main body 90b has an inside cylindrical guide surface corresponding to the inside cylindrical surface of the bearing 66, thereby a tape guide part for guiding the coating film transfer tape T in cooperation with the guide pins 20, 21 is formed. This tape guide part 90b makes the job easy and secure when setting the coating film transfer tape T on the guide pins 20, 21 and head H when assembling the tape cartridge C. Moreover, the tape guide part 90b prevents, same as the tape protective wall 17, the coating film transfer tape T from being dislocated unexpectedly from the setting state, and covers and protects, when handling the tape cartridge C, the coating film layer on the outermost surface of the coating film transfer tape T, that is, the corrective paint layer.

[0082] In thus constituted tape cartridge C, as shown in FIG. 20 (a) (b), it is set by one touch by mounting the support base 10 on the both rotation parts 30, 31 while engaging the both reels 11, 12 and the head H with the both rotation parts 30, 31 of the tape driving part D and the cylindrical half 3c of the case main body 3 from the upper side, respectively. On the other hand, by directly lifting the support base 10 to the upper side, the reels 11, 12 and head H can be easily detached instantly from the rotation parts 30, 31 and cylindrical half 3c, respectively.

IV. Tape driving part D:

[0083] The tape driving part D is provided in the main case body 3. The tape driving part D comprises mainly, as shown in FIGs. 20 and 21, a pay-out rotation part 30 for rotatably driving the pay-out reel 11, a winding rotation part 31 for rotatably driving the winding reel 12, an interlocking part 32 for interlocking the rotation parts 30, 31, and a clutch mechanism 33.

[0084] The pay-out rotation part 30 comprises a drive side rotary gear 44 for composing the interlocking part 32, and a driven member 46.

[0085] A hollow rotary shaft 44a of the drive side rotary gear 44 is rotatably borne on a hollow support shaft 47 provided upright on the inner side of the case main body 3. At the leading end of the hollow support shaft 47, a stopper is provided for preventing the rotary shaft 44a from slipping out.

[0086] The driven member 46 composes a tape winding part together with the drum 11a of the pay-out reel 11, and is formed in a hollow cylindrical shape. This driven member 46 is rotatably provided on the rotary shaft 44a of the drive side rotary gear 44. On the outer circumference of the driven member 46, a toothed engagement part 46a such as serration and spline is formed as shown in the drawing. At the leading end of the rotary shaft 44a, a stopper is provided to prevent the driven member 46 from slipping out.

[0087] The winding rotation part 31 has a driven side rotary gear 48 for composing the interlocking part 42. A hollow rotary shaft 48a of the rotary gear 48 is rotatably borne on a hollow support shaft 49 provided upright on the inner surface of the case main body 3. At the leading end of the hollow support shaft 49, a stopper is provided for preventing the rotary shaft 48a from slipping out. On the outer circumference of the rotary shaft 48a, a toothed engagement part 55 such as serration and spline is formed.

[0088] The interlocking part 32 is composed of the drive side rotary gear 44 and driven side rotary gear 48. The both rotary gears 44, 48 are engaged with each other at a specific gear ratio. Accordingly, the winding rotation part 31 is rotated in interlock with the pay-out rotation part 30 always at a specific rotation ratio. This rotation ratio, that is, the gear ratio of the both gears 44 and 48 is determined properly so that the coating film transfer tape T may be paid out and wound smoothly, in consideration of the winding diameters of the coating film transfer tape T on the pay-out reel 11 and winding reel 12.

[0089] The clutch mechanism 33 is designed to synchronize the pay-out speed and winding speed of the coating film transfer tape T in the pay-out reel 11 and winding reel 12, and is provided in the pay-out rotation part 30.

[0090] A specific constitution of the clutch mechanism 33 is shown in FIG. 22 (a). The clutch mechanism 33 has a friction member 51 interposed between the drive side rotary gear 44 and driven member 46.

[0091] As the friction member 51, an elastomer O-ring as shown in FIG. 22 (b) is used. The O-ring 51 composes a power transmission part between the drive side rotary gear 44 as the rotation driving part, and the driven member 46 as the tape winding part 45. This O-ring 51 is specifically a silicone rubber ring having a circular section. The O-ring 51 is elastically interposed between the confronting end surfaces in the axial direction of both members 44, 46, and these three members contact mutually in frictional engagement state.

[0092] Therefore, in power transmission of the clutch mechanism 33, the frictional force by thrust load acting between the both members 44, 46 is utilized. This frictional force is set to the optimum value mainly by properly adjusting the distance between the engagement surfaces of the both members 44, 46, and the diameter of the section of the O-ring 51.

[0093] Moreover, as shown in FIG. 21, the winding rotation part 31 is provided with a reverse rotation preventive mechanism 60 for preventing reverse rotation of the

both reels 11, 12. The specific structure of the reverse rotation preventive mechanism 60 is shown in FIG. 8.

[0094] Although not shown in the drawings, in relation to the reverse rotation preventive mechanism 60, a conventional rewinding mechanism may be provided in the tape driving part D for correcting the looseness of the coating film transfer tape T.

[0095] Accordingly, by pressing action of the coating film transfer head H described later, when a tensile force (in the direction of arrow A) applied to the coating film transfer tape T acts as a rotational torque to the pay-out reel 11, the drive side rotary gear 44 is rotated through the tape winding parts 45 (11a and 46) of the pay-out reel 11, and clutch mechanism 33. The rotational torque effects rotation of the driven side rotary gear 48 and further the winding reel 12 in interlock through the interlock part 32, thereby winding up the coating film transfer tape T' automatically after use.

[0096] In this case, the ratio of rotation (corresponding to the ratio of outer diameters) between the drive side rotary gear 44 and driven side rotary gear 48 is unchanged at any time, while the ratio of outer diameter between the coating film transfer tape T about the pay-out reel 11 and the coating film transfer tape T' about the winding reel 12 changes in the time course, and is inconstant. It means that the outer diameter of the coating film transfer tape T about the pay-out reel 11 is gradually reduced as the tape is used, while the outer diameter of the coating film transfer tape T' about the winding reel 12 is increased on the contrary.

[0097] Therefore, the winding speed of the winding reel 12 is increased in comparison with the pay-out speed of pay-out reel 11 as time elapses, and the synchronism of the two speeds is broken and the rotational torque acting to the pay-out reel 11 is also gradually increased. Then, as the rotational torque overcomes the frictional force of the clutch mechanism 33, and the tape winding parts 45 (11a, 46) slip and rotate relatively on the drive side rotary gear 44. As a result, the rotational torque difference between the reels 11 and 12 is canceled, and the pay-out speed and winding speed are mutually synchronized, thereby assuring smooth running of the coating film transfer tape T.

V. Rotationally operated part R:

[0098] The rotationally operated part R is for rotationally operating the head H of the tape cartridge C. The rotationally operated part R comprises a cap member 5 as an operating member detachably attached to the cylindrical leading end 6 (see FIGs. 11(a) and 11(b)), and a positioning part 71 provided on an outer circumference or the cylindrical leading end 6.

[0099] The cap member 5 is an integral molding of plastic material, and comprises a base part 72 fitted over the cylindrical leading end 6, and an engagement part 73 integrally engaged with the head H in the rotating direction.

[0100] The base part 72 serves as an assembly fixing member for the case 2 and as a rotationally operated part. A cylindrical bore of the base part 72 is set so that it can be rotatably fitted over the outer circumference of cylindrical leading end 6, and that multiple toothed anti-slip ribs are formed on an outer circumference thereof as shown in the drawing. The engagement part 73 is provided with a through hole 74 for receiving the head H. The shape and dimension of the through hole 74 are set so that the cap member 5 and the head H are integrally engaged with each other in the rotating direction, when the head H is inserted, as shown in FIG. 23(b).

[0101] The positioning part 71 is for resiliently positioning and fixing the cap member 5 in position in the direction of rotation. A pair of positioning parts 71, 71 are provided at the confronting positions on the outer circumference of the cylindrical leading end 6. The pair of positioning parts 71, 71 are identical in structure, and the positioning part 71 on the side of cylindrical half 4c in the cap 4 is described below.

[0102] The positioning part 71 comprises a fit-in guide groove 71a extending linearly in the axial direction of the cylindrical leading end 6, and an anchor guide groove 71b extending from an end of the fit-in guide groove 71a in the circumferential direction of the cylindrical leading end 6. In the embodiment shown, the anchor guide groove 71b is formed in a range of central angle of 90° of the cylindrical leading end 6, as shown in FIG. 23 (b). Moreover, first and second engagement parts 75a and 75b are provided at both ends of the anchor guide groove 71b.

[0103] The first and second engagement parts 75a and 75b are formed as recesses deeper than the guide grooves 71a, 71b. The engagement recesses 75a, 75b are disengageably engaged with an engagement projection 76 that is provided on an inner circumference of the cap member 5. In other words, the shape and dimension of the engagement projection 76 are set so that it is guided along the guide grooves 71a, 71b, while it is elastically changed in shape to some relative extent, and fitted in the engagement recesses 75a, 75b through elastic restoration.

[0104] The engagement configuration of the engagement projection 76 and engagement recesses 75a, 75b is as follows.

[0105] That is, when the engagement projection 76 of cap member 5 is in engagement with the first engagement recess 75a, the head H is in a coating film transfer tape replacement position (vertical pulling position) X, as shown in FIG. 12(a). In such state, the pressing part 65a of head H guides the coating film transfer tape T in a same attitude as it is wound about the pay-out reel 11 and winding reel 12, that is, with front and back surfaces of the coating film transfer tape T oriented generally perpendicularly (orthogonally) to the gripping surfaces 2a, 2b.

[0106] On the other hand, when the engagement projection 76 is in engagement with the second engage-

ment recess 75b (see FIG. 23(b)), the head H is, as shown in FIG. 12(b), in an application position (lateral pulling position) Y. In such state, the pressing part 65a of head H guides the coating film transfer tape T in such attitude that it is generally faced against the gripping surfaces 2a, 2b of case 2, that is, with the front and back surfaces of coating film transfer tape T facing in the direction approximately same as that of (in parallel with) the gripping surfaces 2a, 2b.

[0107] In this way, when the head H is at the coating film transfer tape replacement position X, the cap member 5 is fitted onto the cylindrical leading end 6 of the case 2 as shown in FIG. 11(a), and from this state, by rotating and operating the cap member 5 together with the head H from the coating film transfer tape replacement position X to the application position Y, the case 2 is assembled and fixed.

[0108] Now, operation of the erasing tool 101 constructed in such manner is described below.

A. Operation:

[0109] The tool 101 can be used in two different ways by rotating the cap member 5, and selectively positioning the head H in one of two positions, the vertical pulling position X and the pulling position Y.

(i) Vertical pulling use:

[0110] This is suitable for partially correcting a sentence vertically written, for example, in Japanese. For such operation, as shown in FIG. 14(a), the gripping surfaces 2a, 2b of case 2 are held by fingers like a writing tool, and in this state, the pressing part 65a of head H is brought into contact with the starting end (upper end) of a correction area (transfer area) 80 containing an error or the like to be corrected on a sheet surface. Then the case 2 is moved vertically or downward in relation to the sheet surface, and stopped at the terminal end (lower end) of the correction area 80.

[0111] In such operation, the corrective paint layer (white) of coating film transfer tape T in the pressing part 65a of head H is separated from the film base, and transferred to cover the correction area 80. The error or the like of the correction area 80 is thereby erased, and a correct letter can be readily written thereon.

(ii) Lateral pulling use:

[0112] This is suitable for partially correcting a sentence laterally written, for example, in English. For such operation, as shown in FIG. 14(b), the gripping surfaces 2a, 2b of case 2 are held by fingers like a writing tool, and the pressing part 65a of head H is brought into contact with the starting end (left end) of a correction area 80 with the tool held, as described above. Then, by moving the case 2 laterally or rightward in relation to the sheet surface, and stopping it at the terminal end (right end) of the correction area 80, an error or the like is erased, and a correct letter can be readily written thereon.

B. Replacement of tape cartridge C:

[0113] When the coating film transfer tape T is completely used, and wound on the winding reel 12 being collected from the pay-out reel 11, the tape cartridge C should be replaced with a new one according to the following steps.

(i) The case 3 is disassembled and opened. First, the cap member 5 is drawn out from the cylindrical leading end 6 of the case 2 as shown in FIG. 11(a).

In this case, when the head H is at the vertical pulling operation position, that is, at the coating film transfer tape replacement position X, the cap member 5 can be pulled out directly. On the other hand, when the head H is at the lateral pulling operation position Y, by rotating the cap member 5, the head H is pulled out after rotating from the lateral pulling operation position Y to the coating film transfer tape replacement position X.

In succession, when the cap 4 is at the upper side, the cylindrical half 4c is lifted to the upper side, and the cap 4 is detached from the case main body 3, or opened.

(ii) The used tape cartridge C (empty pay-out reel 11 + winding reel 12 collecting used coating film transfer tape T' + head H) is directly taken out of the case main body 3.

That is, by lifting the support base 10 directly to the upper side, the pay-out reel 11, winding reel 12, and head H are simultaneously detached from the pay-out rotation part 30 and winding rotation part 31 of the tape driving part D, and the cylindrical half 3c of the case main body 3.

(iii) A new tape cartridge C (pay-out reel 11 winding a new coating film transfer tape T + winding reel 12 + head H) is mounted on the case main body 3 in the above procedure.

That is, the guide pins 20, 21, and head H are provided in the support base 10, and setting of the coating film transfer tape T on the guide pins 20, 21 and head H is already completed in the production step of tape cartridge C. Therefore, when replacing this tape, it is only enough to set the tape cartridge C in the case main body 3.

(iv) Then by assembling the case 2 again in the reverse procedure of the above, replacement of used and new tape cartridges is over.

[0114] As shown in the drawing, since the rotating range of the head H is set corresponding to the rotational operation range of the head H by the cap member 5, even for an inexperienced user, it is easy and secure to position the head H into the cylindrical half 3c in job (iii)

and rotate the cap member 5 in succeeding job (iv). Hence, ease of operation for replacing the tapes is assured, and misoperation is effectively prevented.

[0115] The embodiment described above is only a preferred mode of carrying out the invention, and it is appreciated that the invention is not limited thereto, and various design modifications may be made in the invention without departing from the spirits and scope thereof. For example, modifications described below are possible.

Tape cartridge C:

[0116] (1) By employing a film base formed in one side thereof with an adhesive layer over a release agent layer as the coating film transfer tape T, the tool can be used as an adhesive applicator for transferring only the adhesive layer to a sheet surface and the like.

[0117] In this case, for easy and secure transfer of the adhesive layer, as shown in FIG. 24, a transfer roller 110 is rotatably attached as a leading end pressing part to the leading end of the head main body 65 of the head H by means of a support pin 111, and it is more preferably when it is constituted so that the transfer roller 110 presses the coating film transfer tape T while rotating.

[0118] (2) As the specific structure of the support base 10, it is not limited by the illustrated example alone, as far as it is composed of a thin wall plate member having enough strength for keeping the both reels 11, 12 at an interval corresponding to the both rotation parts 30, 31 of the tape drive unit D in embodiment 1, or as far as it is composed of a thin wall plate member having enough strength for keeping the both reels 11, 12 and the head H corresponding to the both rotation parts 30, 31 of the tape drive unit D and the cylindrical leading end 6 of the case main body 3 in the illustrated embodiment.

[0119] The support base 10 may be composed of a paper board material, and in this case, from the viewpoint of keeping strength, the guide pins 20, 21 are preferred to be provided at the case main body 3 side. Correspondingly thereto, the support base 10 is provided with a notch or insertion hole (not shown) as the portion for inserting the guide pins 20, 21.

[0120] (3) Although the free end of drum part 11a in the pay-out reel 11 is an open end in the embodiment shown, considering a manufacturing process and cost of the tape cartridge C, it may be arranged such that a guide flange 120 for tape running similar to that of the winding reel 12 may be removably attached to the free end of drum part 11a, as shown by a double dot chain line in FIG. 18.

[0121] With such arrangement, the guide flange 120 can be removed when winding the coating film transfer tape T. Then, by attaching the guide flange 120 after winding of the tape is completed, the coating film transfer tape T can be more smoothly paid out, or when conveying or replacing the tape cartridge C, the trouble of the coating film transfer tape T dislocating out of the drum 11a can be securely prevented.

Basic structure of the coating film transfer tool 1:

[0122] (4) The specific structure of the interlock part 32 is not limited to the illustrated example alone, but may be properly modified.

[0123] For example, a structure for making use of the frictional force by radial load may be employed, as opposed to a structure for making use of frictional force by thrust load is employed as described in relation to the present embodiment. Either structure may be freely selected depending on the purpose.

[0124] (5) In the illustrated embodiment, the head H can be rotated to both vertical pulling operation position X and lateral pulling operation position Y, so that vertical pulling use and lateral pulling use can be freely selected, but the invention may be also applied to the coating film transfer tool of the structure fixed to either method of use. For example, in the structure for lateral pulling use only, the vertical pulling operation position X in the illustrated embodiment is omitted, so that the first and second engagement parts 75a, 75b may be omitted.

[0125] As specifically described herein, in the tape cartridge of the invention, a pay-out reel mounting a coating film transfer tape and a winding reel for collecting the coating film transfer tape after use are rotatably provided on a support base of a thin wall flat plate, and the both reels are designed to be engaged, detachably and integrally rotatably, with pay-out rotation part and winding rotation part provided rotatably in the case, and therefore the used and new cartridges can be replaced easily, promptly and securely, by a single touch, together with the support base.

[0126] That is, while the reels are being engaged with the pay-out rotation part and winding rotation part of the case main body, only by putting the support base on the both rotation parts and setting the coating film transfer tape on the coating film transfer head of the case main body, replacement job is over. Therefore, for a general user, not requiring skill in job, easy and secure replacement job is guaranteed.

[0127] In particular, this replacement job may be done easily and securely, without having to set the coating film transfer tape on the head by the user, as far as the coating film transfer head for pressing the coating film tape onto the transfer area is provided in the support base, and the coating film transfer tape being paid out from the pay-out reel is designed to be wound about the winding reel through the leading end pressing part of the head.

[0128] Still more, the support base is a thin wall flat plate, and constituent parts including the both reels are held by this support base only, and therefore the number of parts may be reduced, the structure is small and compact, and the product cost is lowered. As a result, while sufficiently making the advantage of the refill structure capable of saving resources and lowering the running

cost, the coating film transfer tool itself can be reduced in size, and its portability and ease of hand-held operation can be maintained.

[0129] Besides, in the coating film transfer tool of the invention, the head can be rotated between the coating film transfer tape replacement position and application position, and when the leading end pressing part of the head is at the coating film transfer tape replacement position, the coating film transfer tape is guided as being wound on the pay-out reel and winding reel, and when the leading end pressing part of the head is at the application position, the coating film transfer tape is guided as being nearly opposite to the gripping surfaces of the case, thereby the structure is realized to satisfy the two hitherto impossible requests of lateral pulling use and replacement of coating film transfer tape.

[0130] The practical embodiment shown in the detailed description of the invention is taken only for clarifying technical details of the invention only, and the invention, therefore, is not limited to the embodiment described above, and should not be understood in a narrow sense, but should be understood in a broad sense that various modifications may be made in the invention.

Claims

1. A tape cartridge (C) for use with a coating film transfer tool (1) for transferring a coating film on a coating film transfer tape (T) to a surface of a sheet or the like, which may be replaceably placed in a case (2) of the coating film transfer tool (1), comprising:

a thin and flat support base (10) having the geometric shape and dimensions for allowing accommodation in the case (2);
a pay-out reel (11) rotatably provided on the support base (10), and having the coating film transfer tape (T) wound thereabout;
a winding reel (12) rotatably provided on the support base (10) for collecting the coating film transfer tape (T) after use; and
a coating film transfer head (H) provided on the support base (10) for pressing the coating film transfer tape (T) on a transfer area (80) of said surface;
the case (2) having pay-out and winding rotation parts (30, 31) for engaging and supporting the reels (11, 12);

characterized in that the support base (10) comprises a thin and flat plate for holding the reels (11, 12) and head (H) at positions corresponding to those of the pay-out and winding rotation parts (30, 31) rotatably provided in the case (2) and of a head holding part (6) provided in the case (2), respectively, one side of each of the reels (11, 12) being rotatably held on the support base (10);

in that the reels (11, 12) and the head (H) are constructed such that when the cartridge (C) is placed in the case (2), the reels (11, 12) are detachably engaged and supported integrally rotatable with the pay-out and winding rotation parts (30, 31), respectively, and the head (H) is detachably held in the head holding part (6); and

in that the thickness of the support base (10) is set to be as thin as possible within a range of providing a minimum strength sufficient for holding the reels (11, 12) and the coating film transfer head (H) only until they are engaged and held by the pay-out and winding rotation parts (30, 31) and the head holding part (6), respectively.

2. The tape cartridge (C) of claim 1, wherein the support base (10) is made of an acrylonitrile-styrene resin or an acrylonitrile-butadiene-styrene resin and has a thickness of about 1 mm or less.

3. The tape cartridge (C) of Claim 1 or 2, wherein the support base (10) provides a guide surface for running the coating film transfer tape (T) along one side thereof.

4. The tape cartridge (C) of any of the preceding Claims, wherein an upright tape protective wall (17) of thin plate is provided integral with the support base (10) so as to cover the outer circumference of the pay-out reel (11).

5. The tape cartridge (C) of any of the preceding Claims, wherein a drum part (11a) of the pay-out reel (11) is rotatably supported in the support base (10), thereby rotatably supporting the pay-out reel (11), and a drum part (12a) of the winding reel is rotatably supported in the support base (10), thereby rotatably supporting the winding reel (12).

6. The tape cartridge (C) of Claim 5, wherein the drum part (11a) of the pay-out reel (11) has an open free end and the drum part (12a) of the take-up reel (12) has a tape guide flange (15) at its free end.

7. The tape cartridge (C) of Claim 6, modified in that a tape guide flange is detachably attached to the free end of the drum part (11a) of the pay-out reel (11).

8. The tape cartridge (C) of any of the preceding Claims, and arranged such that when the cartridge (C) is placed in the case (2), the pay-out and winding rotation parts (30, 31) engage the sides of the reels (11, 12) that are rotationally held on the support base (10), and the other sides of the reels (11, 12) are not substantially engaged by any part of the case (2).

9. The tape cartridge (C) of any of the preceding Claims, wherein the support base (10) is provided with a guide pin (20) for guiding the coating film transfer tape (T) that is paid out from the pay-out reel (11), and a guide pin (21) for guiding the coating film transfer tape (T') that is wound by the winding reel (12).

10. The tape cartridge (C) of Claim 9, wherein a guide roller (22) is freely rotatably supported by the guide pin (21), for rotationally guiding the coating film transfer tape (T).

11. The tape cartridge (C) of any of Claims 1 to 8, wherein the support base (10) is provided with a receiving part for receiving a guide pin provided in the case (2) of the coating film transfer tool (1), for guiding the coating film transfer tape (T).

12. The tape cartridge (C) of any of the preceding Claims, and comprising a disengageable stopper (25) for stopping and holding the reels (11, 12) against rotation.

13. The tape cartridge (C) of any of the preceding Claims, wherein the paid-out leading end of the coating film transfer tape (T) comprises a film base without a coating film, and has a length equal to the distance between the pay-out reel (11) and the transfer head (H).

14. The tape cartridge (C) of any of the preceding Claims, wherein the head (H) is rotatable with respect to the support base (10) about an axis generally at right angles to the axis of the reels (11, 12).

15. The tape cartridge (C) of Claim 14, wherein the head (H) is rotatable through substantively 90° between a first position for application and a second position for application.

16. The tape cartridge (C) of any of the preceding Claims, wherein the head (H) comprises a head main body (65) having a leading end pressing part (65a or 110) and a bearing (66) rotatably borne by a head mounting part (90) on the case (2), the bearing (66) being semi-cylindrical and having a tape setting opening (68), which opening (68) is located so as to allow the coating film transfer tape (T) to pass when the tape (T) is wound on the reels (11, 12), when the head (H) is in a position for replacement of the tape (T).

17. The tape cartridge (C) of Claim 16, wherein a transfer roller (110) forms the leading end pressing part and is rotatably attached to the leading end of the head main body (65).

18. The tape cartridge (C) of Claim 16 or 17, wherein the head mounting part of the support base (10) has a tape guide part having a cylindrical guide surface corresponding to the inside cylindrical surface of the bearing (66) of the head (H).

19. The tape cartridge (C) of any of the preceding Claims, wherein the coating film transfer tape (T) comprises a film base, a releasing agent layer on one side thereof, a white corrective paint layer on the releasing agent layer, and a pressure-sensitive adhesive agent layer on the corrective paint layer.

20. A tape cartridge (C) according to any of Claims 1 to 18, wherein the coating film transfer tape (T) comprises a film base, with a releasing agent layer and an adhesive layer on one side thereof.

21. A transfer tool (1) for applying a coating film to a surface of a sheet or the like, comprising the tape cartridge (C) of any of the preceding Claims, the case (2) having pay-out and winding rotation parts (30, 31) engaging and supporting the reels (11, 12) and a head holding part (6) detachably holding the head (H).

22. The tool (1) of Claim 21, wherein the head-holding part (6) is for engaging a transfer head mounting member (65) when the support base (10) is positioned in the case (2) and preventing movement of the transfer head (H) both in a first direction parallel to the axis of rotation of the pay-out and winding reels (11, 12) and in a second direction at right angles to the first direction and at right angles to the direction in which the tape (T) runs immediately before passing over the transfer head (H).

23. The tool (1) of Claim 22, wherein the second direction is generally at right angles to the plane containing the axis of the pay-out and winding reels (11, 12).

24. The tool (1) of Claim 22, wherein the head-holding part (71) prevents movement of the transfer head (H) in three mutually perpendicular directions.

25. The tool (1) of any of Claims 21 to 24, wherein the head (H) is held in the head holding part (6) at the leading end of the case (2) and is rotatable with respect to the support base (10) about an axis generally at right angles to the axis of the reels (11, 12), and the head (H) has an operation member (72, 74) for rotating the head (H) between a position for transfer tape replacement and a position for application.

26. The tool (1) of Claim 25, wherein the operation member (72) can be engaged with the head-holding

part (6) when the head (H) is in its transfer tape replacement position, and fixes the case (2) by rotating the head (H) from its transfer tape replacement position to its application position.

27. The tool (1) of any of Claims 21 to 26, wherein the leading end pressing part of head (H) guides the transfer tape (T) nearly opposite gripping surfaces (2a, 2b) on the case (2) when the head (H) is in its application position.

28. The tool (1) of any of Claims 21-27, wherein the transfer head (H) is rotatable between a position for transfer tape replacement and a position for application, and a pressing part (65a) in the leading end of the head (H) guides the coating film transfer tape (T) when it is wound about the reels (11, 12), the tape having its faces generally parallel to gripping surfaces (2a, 2b) on the case (2) when the transfer head (H) is in said application position.

Patentansprüche

1. Bandkassette (C) für Verwendung mit einem Beschichtungsfilm-Übertragungswerkzeug (1), zum Übertragen eines auf ein Beschichtungsfilm-Übertragungsband (T) aufgebrachten Beschichtungsfilms auf eine Oberfläche einer dünnen Platte oder dergleichen, die auswechselbar in ein Gehäuse (2) des Beschichtungsfilm-Übertragungswerkzeugs (1) eingelegt werden kann, aufweisend:

eine dünne, ebene Tragbasis (10), die die geometrische Form und die Abmessungen hat, um eine Unterbringung in dem Gehäuse (2) zu ermöglichen;

eine Ablaufspule (11), die auf der Tragbasis (10) drehbar vorgesehen ist, und auf die das Beschichtungsfilm-Übertragungsband (T) aufgewickelt ist;

eine Aurwickelspule (12), die auf der Tragbasis (10) drehbar vorgesehen ist, um das Beschichtungsfilm-Übertragungsband (T) nach der Verwendung aufzunehmen; und

einen Beschichtungsfilm-Übertragungskopf (H), der auf der Tragbasis (10) vorgesehen ist, um das Beschichtungsfilm-Übertragungsband (T) auf ein Übertragungsgebiet (80) der Oberfläche aufzupressen;

wobei das Gehäuse (2) Ablauf- und Aufwikkel-Rotationsteile (30, 31) hat, um in die Spulen (11, 12) einzugreifen und die Spulen zu tragen;

dadurch gekennzeichnet, daß die Tragbasis (10) eine dünne, ebene Platte aufweist, um die Spulen (11, 12) und den Kopf (H) bei Positionen zu halten, die denjenigen der Ablauf- und Aufwickel-Rotationsteile (30, 31), die in dem Gehäuse (2) drehbar vorgesehen sind, bzw. eines Kopfhalteteils (6), das in dem Gehäuse (2) vorgesehen ist, entsprechen, wobei eine Seite von jeder der Spulen (11, 12) auf der Tragbasis (10) drehbar festgehalten wird;

daß die Spulen (11, 12) und der Kopf (H) so gebaut sind, daß dann, wenn die Kassette (C) in das Gehäuse (2) eingelegt wird, die Spulen (11, 12) mit den Ablauf- bzw. Aufwickel-Rotationsteilen (30, 31) herausnehmbar in Eingriff gebracht werden und integral drehbar getragen werden, und der Kopf (H) in dem Kopfhalteteil (6) herausnehmbar festgehalten wird; und

daß die Dicke der Tragbasis (10) so festgelegt ist, daß sie so dünn wie möglich ist, innerhalb eines Bereichs, in dem sie eine minimale Festigkeit aufweist, die ausreicht, um die Spulen (11, 12) und den Beschichtungsfilm-Übertragungskopf (H) festzuhalten, bis sie durch die Ablauf- und Aufwickel-Rotationsteile (30, 31) bzw. den Kopfhalteteil (6) in Eingriff gebracht und festgehalten werden.

2. Bandkassette (C) von Anspruch 1, wobei die Tragbasis (10) aus einem Acrylnitril-Styrol-Harz oder einem Acrylnitril-Butadien-Styrol-Harz besteht und eine Dicke von ungefähr 1 mm oder weniger hat.

3. Bandkassette (C) von Anspruch 1 oder 2, wobei die Tragbasis (10) eine Führungsoberfläche aufweist, um das Beschichtungsfilm-Übertragungsband (T) längs einer Seite der Tragbasis laufen zu lassen.

4. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei eine aufrechte Bandschutzwand (17) aus einer dünnen Platte integral mit der Tragbasis (10) so vorgesehen ist, daß sie den äußeren Umfang der Ablaufspule (11) bedeckt.

5. Bandkassette (C) von irgendeinem vorhergehenden Anspruch, wobei ein Trommelteil (11a) der Ablaufspule (11) in der Tragbasis (10) drehbar getragen wird, wodurch die Ablaufspule (11) drehbar getragen wird, und ein Trommelteil (12a) der Aufwikkelspule in der Tragbasis (10) drehbar getragen wird, wodurch die Aufwickelspule (12) drehbar getragen wird.

6. Bandkassette (C) von Anspruch 5, wobei der Trommelteil (11a) der Ablaufspule (11) ein offenes, freies Ende hat, und der Trommelteil (12a) der Aufwickelspule (12) einen Bandführungsflansch (15) an seinem freien Ende hat.

7. Bandkassette (C) von Anspruch 6, dadurch modifi-

ziert, daß ein Bandführungsflansch an dem freien Ende des Trommelteils (11a) der Ablaufspule (11) abnehmbar befestigt ist.

8. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, so ausgelegt, daß dann, wenn die Kassette (C) in das Gehäuse (2) eingelegt wird, die Ablauf- und Aufwickel-Rotationsteile (30, 31) in die Seiten der Spulen (11, 12), die auf der Tragbasis (10) drehbar festgehalten werden, eingreifen, und in die anderen Seiten der Spulen (11, 12) durch irgendeinen Teil des Gehäuses (2) nicht wesentlich eingegriffen wird.

9. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei die Tragbasis (10) versehen ist mit einem Führungsstift (20) zum Führen des Beschichtungsfilm-Übertragungsbandes (T), das von der Ablaufspule (11) abläuft, und einem Führungsstift (21) zum Führen des Beschichtungsfilm-Übertragungsbandes (T'), das durch die Aufwickelspule (12) aufgewickelt wird.

10. Bandkassette (C) von Anspruch 9, wobei eine Führungsrolle (22) von dem Führungsstift (21) frei drehbar getragen wird, um das Beschichtungsfilm-Übertragungsband (T) drehbar zu führen.

11. Bandkassette (C) von irgendeinem der Ansprüche 1 bis 8, wobei die Tragbasis (10) mit einem Aufnahmeteil zum Aufnehmen eines in dem Gehäuse (2) des Beschichtungsfihn-Übertragungswerkzeugs (1) vorgesehenen Führungsstiftes zum Führen des Beschichtungsfilm-Übertragungsbandes (T) versehen ist.

12. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, aufweisend einen ausrückbaren Anschlag (25), um die Spulen (11, 12) gegenüber Drehung anzuhalten und festzuhalten.

13. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei das abgelaufene, vordere Ende des Beschichtungsfilm-Übertragungsbandes (T) eine Filmbasis ohne einen Beschichtungsfilm aufweist, und eine Länge hat, die gleich der Entfernung zwischen der Ablaufspule (11) und dem Übertragungskopf (H) ist.

14. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei der Kopf (H) um eine Achse, die im allgemeinen einen rechten Winkel mit der Achse der Spulen (11, 12) bildet, bezüglich der Tragbasis (10) drehbar ist.

15. Bandkassette (C) von Anspruch 14, wobei der Kopf (H) zwischen einer ersten Position für die Aufbringung und einer zweiten Position für die Aufbringung über im wesentlichen 90° drehbar ist.

16. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei der Kopf (H) einen Kopfhauptkörper (65) aufweist, der einen Preßteil (65a oder 110) an dem vorderen Ende hat, und ein Lager (66) hat, das von einem Kopfinontageteil (90) auf dem Gehäuse (2) drehbar getragen wird, wobei das Lager (66) halbzylindrisch ist und eine Bandeinstellöffnung (68) hat, wobei die Öffnung (68) so gelegen ist, daß das Beschichtungsfilm-Übertragungsband (T), wenn es auf die Spulen (11, 12) aufgewickelt ist, hindurchlaufen kann, falls der Kopf (H) in einer Position für die Ersetzung des Bandes (T) ist.

17. Bandkassette (C) von Anspruch 16, wobei eine Übertragungsrolle (110) den Preßteil an dem vorderen Ende bildet, und an dem vorderen Ende des Kopfhauptkörpers (65) drehbar befestigt ist.

18. Bandkassette (C) von Anspruch 16 oder 17, wobei der Kopfinontageteil der Tragbasis (10) einen Bandführungsteil hat, der eine zylindrische Führungsfläche hat, die der inneren zylindrischen Oberfläche des Lagers (66) des Kopfes (H) entspricht.

19. Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei das Beschichtungsfilm-Übertragungsband (T) eine Filmbasis, eine Trennmittelschicht auf einer Seite der Filmbasis, eine weiße Korrekturfarbenschicht auf der Trennmittelschicht, und eine druckempfindliche Kleberschicht auf der Korrekturfarbenschicht aufweist.

20. Bandkassette (C) gemäß irgendeinem der Ansprüche 1 bis 18, wobei das Beschichtungsfilm-Übertragungsband (T) eine Filmbasis mit einer Trennmittelschicht und einer Kleberschicht auf einer Seite der Filmbasis aufweist.

21. Übertragungswerkzeug (1) zum Aufbringen eines Beschichtungsfilms auf eine Oberfläche einer dünnen Platte oder dergleichen, aufweisend die Bandkassette (C) von irgendeinem der vorhergehenden Ansprüche, wobei das Gehäuse (2) Ablauf- und Aufwickel-Rotationsteile (30, 31) hat, die in die Spulen (11, 12) eingreifen und die Spulen tragen, und einen Kopfhalteteil (6) hat, der den Kopf (H) abnehmbar festhält.

22. Werkzeug (1) von Anspruch 21, wobei der Kopfhalteteil (6) dazu bestimmt ist, in ein Übertragungskopf-Montageelement (65) einzugreifen, wenn die Tragbasis (10) in dem Gehäuse (2) positioniert wird, und die Bewegung des Übertragungskopfes (H) zu verhindern in sowohl einer ersten Richtung, die parallel zu der Rotationsachse der Ablauf- und der Auf-

wickelspule (11, 12) ist, als auch einer zweiten Richtung, die einen rechten Winkel mit der ersten Richtung bildet, und einen rechten Winkel mit der Richtung bildet, in der das Band (T) unmittelbar vor dem Lauf über den Übertragungskopf (H) läuft.

23. Werkzeug (1) von Anspruch 22, wobei die zweite Richtung im allgemeinen einen rechten Winkel mit der Ebene bildet, die die Achse der Ablauf- und der Aufwickelspule (11, 12) enthält.

24. Werkzeug (1) von Anspruch 22, wobei der Kopfhalteteil (71) eine Bewegung des Übertragungskopfes (H) in drei zueinander senkrechten Richtungen verhindert.

25. Werkzeug (1) von irgendeinem der Ansprüche 21 bis 24, wobei der Kopf (H) in dem Kopfhalteteil (6) bei dem vorderen Ende des Gehäuses (2) festgehalten wird, und bezüglich der Tragbasis (10) um eine Achse drehbar ist, die im allgemeinen einen rechten Winkel mit der Achse der Spulen (11, 12) bildet, und der Kopf (H) ein Betätigungselement (72, 74) hat, um den Kopf (H) zwischen einer Position für die Übertragungsband-Ersetzung und einer Position für die Aufbringung zu drehen.

26. Werkzeug (1) von Anspruch 25, wobei das Betätigungselement (72) in Eingriff mit dem Kopfhalteteil (6) gebracht werden kann, wenn der Kopf (H) in seiner Übertragungsband-Ersetzungsposition ist, und das Gehäuse (2) blockiert durch Drehen des Kopfes (H) von seiner Übertragungsband-Ersetzungsposition in seine Aufbringungsposition.

27. Werkzeug (1) von irgendeinem der Ansprüche 21 bis 26, wobei der Preßteil an dem vorderen Ende des Kopfes (H) der Übertragungsband (T) annähernd gegenüber den Greifoberflächen (2a, 2b) auf dem Gehäuse (2) führt, wenn der Kopf (H) in seiner Aufbringungsposition ist.

28. Werkzeug (1) von irgendeinem der Ansprüche 21-27, wobei der Übertragungskopf (H) drehbar ist zwischen einer Position für die Übertragungsband-Ersetzung und einer Position für die Aufbringung, und ein Preßteil (65a) in dem vorderen Ende des Kopfes (H) das Beschichtungsfilm-Übertragungsband (T) führt, wenn es um die Spulen (11, 12) gewickelt wird, wobei die Flächen des Bandes im allgemeinen parallel zu den Greifoberflächen (2a, 2b) auf dem Gehäuse (2) sind, wenn der Übertragungskopf (H) in der Aufbringungsposition ist.

Revendications

1. Cassette à bande (C) destinée à être utilisée avec un outil de transfert d'un film de revêtement (1) pour transférer un film de revêtement sur une bande de transfert d'un film de revêtement (T) vers une surface d'une feuille ou similaire, pouvant être agencée de manière amovible dans un boîtier (2) de l'outil de transfert du film de revêtement (1), comprenant:

une base de support fine et plate (10) ayant une forme géométrique et des dimensions permettant son logement dans le boîtier (2);
une bobine de déroulement (11) agencée par rotation sur la base de support (10) et comportant une bande de transfert d'un film de revêtement (T) qui y est enroulée;
une bobine d'enroulement (12) agencée par rotation sur la base de support (10) pour collecter la bande de transfert du film de revêtement (T) après l'utilisation; et
une tête de transfert du film de revêtement (12) agencée sur la base de support (10) pour presser la bande de transfert du film de revêtement (T) sur une zone de transfert (80) de ladite surface;
le boîtier (2) comportant des parties rotatives de déroulement et d'enroulement (30, 31) destinées à s'engager dans les bobines (11, 12) et à supporter celles-ci;

caractérisée en ce que la base de support (10) comprend une plaque fine et plate pour retenir les bobines (11, 12) et la tête (H) au niveau de positions correspondant respectivement à celles des parties rotatives de déroulement et d'enroulement (30, 31) agencées par rotation dans le boîtier (2) et à celle d'une partie de retenue de la tête (6) agencée dans le boîtier (2), un côté de chacune des bobines (11, 12) étant retenu par rotation sur la base de support (10);

en ce que les bobines (11, 12) et la tête (H) sont construites de sorte que lorsque la cassette (C) est placée dans le boîtier (2), les bobines (11, 12) s'engagent respectivement de manière amovible dans les parties rotatives de déroulement et d'enroulement (30, 31) et sont supportées par rotation intégrale par celles-ci, la tête (H) étant retenue de manière amovible dans la partie de retenue de la tête (6); et

en ce que l'épaisseur de la base de support (10) est ajustée de sorte à être aussi fine que possible, dans un intervalle assurant une résistance minimale suffisante pour retenir les bobines (11, 12) et la tête de transfert du film de revêtement (H) uniquement jusqu'à leur engagement respectif dans les parties rotatives de déroulement et d'enroulement (30, 31) et la partie de retenue de la tête (6) et leur support correspondant.

2. Cassette à bande (C) selon la revendication 1, dans

laquelle la base de support (10) est composée d'une résine acrylonitrile-styrène ou une résine acrylonitrile-butadiène-styrène et a une épaisseur de l'ordre de 1 mm ou moins.

3. Cassette à bande (C) selon les revendications 1 ou 2, dans laquelle la base de support (10) établit une surface de guidage en vue du déplacement de la bande de transfert du film de revêtement (T) le long d'un côté correspondant.

4. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle une paroi protectrice verticale de la bande (17) de la fine plaque fait partie intégrante de la base de support (10), de sorte à recouvrir la circonférence externe de la bobine de déroulement (11).

5. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle un élément de tambour (11a) de la bobine de déroulement (11) est supporté par rotation dans la base de support (10), supportant ainsi par rotation la bobine de déroulement (11), un élément de tambour (12a) de la bobine d'enroulement étant supporté par rotation dans la base de support (10), supportant ainsi par rotation la bobine d'enroulement (12).

6. Cassette à bande (C) selon la revendication 5, dans laquelle l'élément de tambour (11a) de la bobine de déroulement (11) comporte une extrémité libre ouverte, l'élément de tambour (12a) de la bobine d'enroulement (12) comportant une bride de guidage de la bande (15) au niveau de son extrémité libre.

7. Cassette à bande (C) selon la revendication 6, modifiée en ce qu'une bride de guidage de la bande est fixée de manière amovible sur l'extrémité libre de l'élément de tambour (11a) de la bobine de déroulement (11).

8. Cassette à bande (C) selon l'une quelconque des revendications précédentes, agencée de sorte que lorsque la cassette (C) est placée dans le boîtier (2), les parties rotatives de déroulement et d'enroulement (30, 31) s'engagent dans les côtés des bobines (11, 12) retenues par rotation sur la base de support (10), les autres côtés des bobines (11, 12) n'étant engagés pratiquement par aucune partie du boîtier (2).

9. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle la base de support (10) comporte une goupille de guidage (20) pour guider la bande de transfert du film de revêtement (T) déroulée de la bobine de déroulement (11) et une goupille de guidage (21) pour guider la bande de transfert du film de revêtement (T') enroulée sur la bobine d'enroulement (12).

10. Cassette à bande (C) selon la revendication 9, dans laquelle un rouleau de guidage (22) peut tourner librement et est supporté par la goupille de guidage (21), pour guider par rotation la bande de transfert du film de revêtement (T).

11. Cassette à bande (C) selon l'une quelconque des revendications 1 à 8, dans laquelle la base de support (10) comporte une partie de réception pour recevoir la goupille de guidage agencée dans le boîtier (2) de l'outil de transfert du film de revêtement (1) pour guider la bande de transfert du film de revêtement (T).

12. Cassette à bande (C) selon l'une quelconque des revendications précédentes, comprenant un arrêt à dégagement (25) destiné à arrêter les bobines (11, 12) et à empêcher leur rotation.

13. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle l'extrémité avant déroulée de la bande de transfert du film de revêtement (T) comprend une base de film sans film de revêtement et a une longueur égale à la distance entre la bobine de déroulement (11) et la tête de transfert (H).

14. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle la tête (H) peut tourner par rapport à la base de support (10) autour d'un axe, orienté en général à angle droit par rapport à l'axe des bobines (11, 12).

15. Cassette à bande (C) selon la revendication 14, dans laquelle la tête (H) peut tourner pratiquement de 90° entre une première position d'application et une deuxième position d'application.

16. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle la tête (H) comprend un corps principal de tête (65) comportant une partie de pression d'extrémité avant (65a ou 110) et un palier (66) supporté par rotation par un élément de montage de la tête (90) sur le boîtier (2), le palier (66) étant semi-cylindrique et comportant une ouverture d'ajustement de la bande (68), cette ouverture (68) étant agencée de sorte à permettre le passage de la bande de transfert du film de revêtement (T) lorsque la bande (T) est enroulée sur les bobines (11, 12), la tête (H) se trouvant dans une position destinée au remplacement de la bande (T).

17. Cassette à bande (C) selon la revendication 16, dans laquelle un rouleau de transfert (10) constitue

la partie de pression d'extrémité avant et est fixé par rotation sur l'extrémité avant du corps principal de la tête (65).

18. Cassette à bande (C) selon les revendications 16 ou 17, dans laquelle l'élément de montage de la tête de la base de support (10) comporte un élément de guidage de la bande comportant une surface de guidage cylindrique correspondant à la surface cylindrique interne du palier (66) de la tête (H).

19. Cassette à bande (C) selon l'une quelconque des revendications précédentes, dans laquelle la bande de transfert du film de revêtement (T) comprend une base de film, une couche d'un agent antiadhésif sur un côté correspondant, une couche de peinture correctrice blanche sur la couche de l'agent antiadhésif et une couche d'un agent adhésif autocollant sur la couche de peinture correctrice.

20. Cassette à bande (C) selon l'une quelconque des revendications 1 à 18, dans laquelle la bande de transfert du film de revêtement (T) comprend une base de film avec une couche d'un agent antiadhésif et une couche adhésive sur un côté correspondant.

21. Outil de transfert (1) pour appliquer un film de revêtement sur une surface d'une feuille ou similaire, comprenant la cassette à bande (C) selon l'une quelconque des revendications précédentes, le boîtier (2) comportant des parties rotatives de déroulement et d'enroulement (30, 31) s'engageant dans les bobines (11, 12) et supportant celles-ci, une partie de retenue de la tête (6) retenant de manière amovible la tête (H).

22. Outil (1) selon la revendication 21, dans lequel la partie de retenue de la tête (6) est destinée à s'engager dans un élément de montage de la tête de transfert (65) lorsque la base de support (10) est positionnée dans le boîtier (2) et à empêcher le déplacement de la tête de transfert (H) dans une première direction parallèle à l'axe de rotation des bobines de déroulement et d'enroulement (11, 12) et dans une deuxième direction, à angle droit par rapport à la première direction et à angle droit par rapport à la direction de déplacement de la bande (T) immédiatement avant son passage au-dessus de la tête de transfert (H).

23. Outil (1) selon la revendication 22, dans lequel la deuxième direction forme en général un angle droit par rapport au plan contenant l'axe des bobines de déroulement et d'enroulement (11, 12).

24. Outil (1) selon la revendication 22, dans lequel une partie de retenue de la tête (71) empêche le déplacement de la tête de transfert (H) dans trois directions mutuellement perpendiculaires.

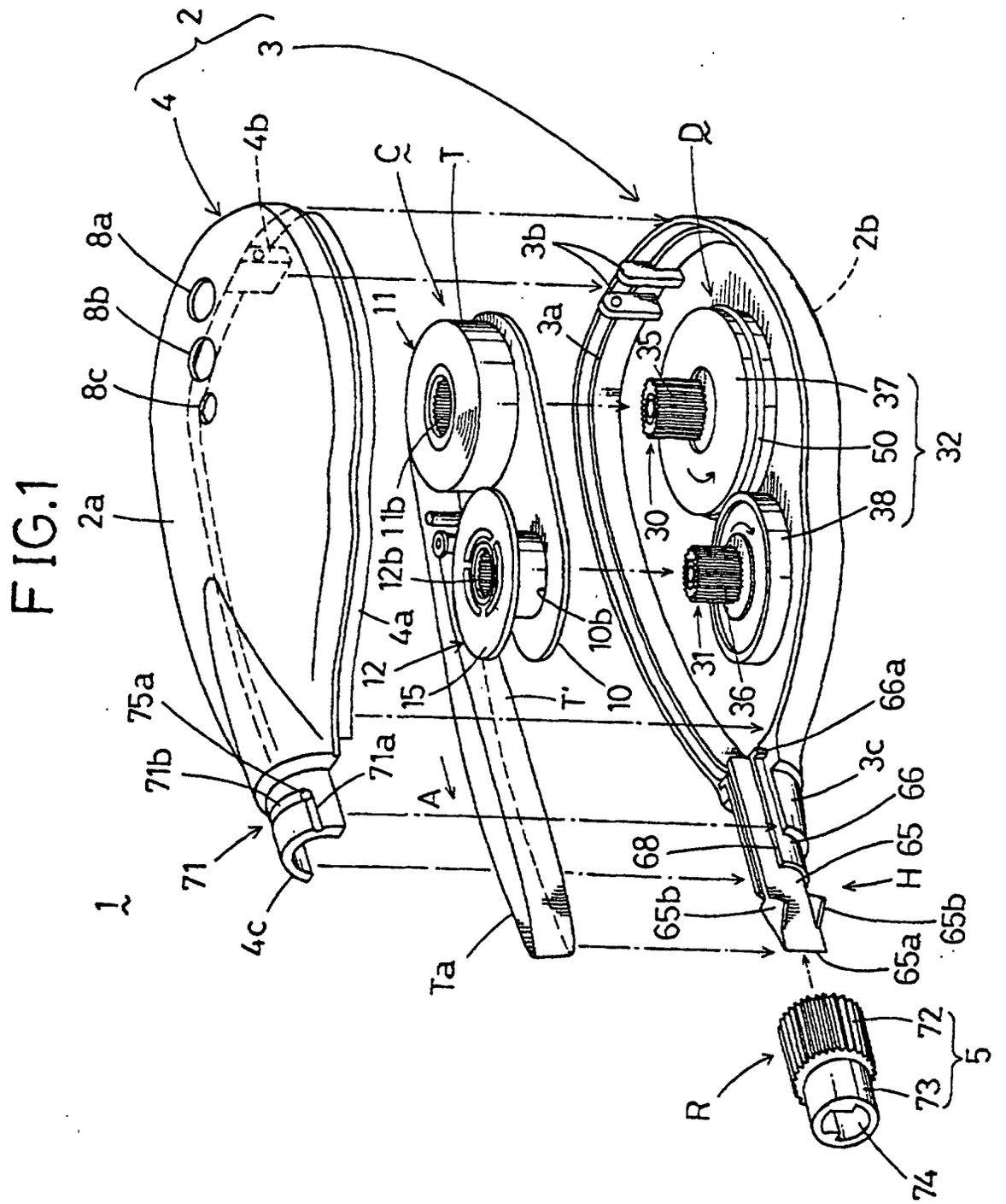
25. Outil (1) selon l'une quelconque des revendications 21 à 24, dans lequel la tête (H) est retenue dans la partie de retenue de la tête (6) au niveau de l'extrémité avant du boîtier (2) et peut tourner par rapport à la base de support (10) autour d'un axe orienté en général à angle droit par rapport à l'axe des bobines (11, 12), la tête (H) comportant un élément opérationnel (72, 74) pour faire tourner la tête (H) entre une position destinée au remplacement de la bande de transfert et une position d'application.

26. Outil (1) selon la revendication 25, dans lequel l'élément opérationnel (72) peut être engagé dans la partie de retenue de la tête (6) lorsque la tête (H) se trouve dans sa position de remplacement de la bande de transfert, et fixe le boîtier (2) en faisant tourner la tête (H) de sa position de remplacement de la bande de transfert vers sa position d'application.

27. Outil (1) selon l'une quelconque des revendications 21 à 26, dans lequel la partie de pression d'extrémité avant de la tête (H) guide la bande de transfert (T) dans une position presque opposée à des surfaces de préhension (2a, 2b) sur le boîtier (2) lorsque la tête (H) se trouve dans sa position d'application.

28. Outil (1) selon l'une quelconque des revendications 21 à 27, dans lequel la tête de transfert (H) peut tourner entre une position destinée au remplacement de la bande de transfert et une position d'application, une partie de pression (65a) dans l'extrémité avant de la tête (H) guidant la bande de transfert du film de revêtement (T) lors de son enroulement sur les bobines (11, 12), les faces de la bande étant en général parallèles à des surfaces de préhension (2a, 2b) sur le boîtier (2) lorsque la tête de transfert (H) se trouve dans ladite position d'application.

FIG.1


1
2
3
4
4b
4c
4a
2a
2b
8a
8b
8c
C
T
T'
Q
11
11b
12
12b
15
10
10b
3a
3b
35
37
50
32
38
30
31
36
66a
3c
66
68
65
H
65b
65a
71
71a
71b
75a
A
Ta
5
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73
74
R

FIG.2

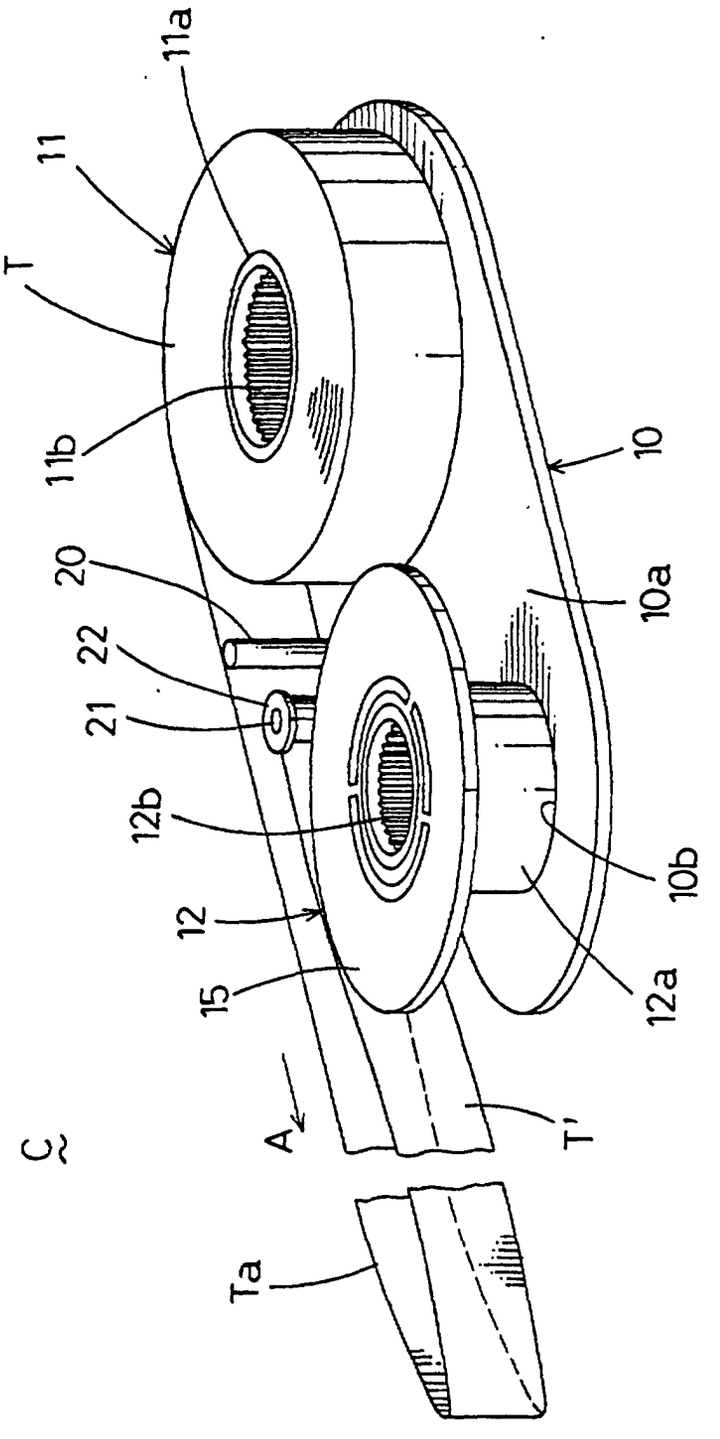
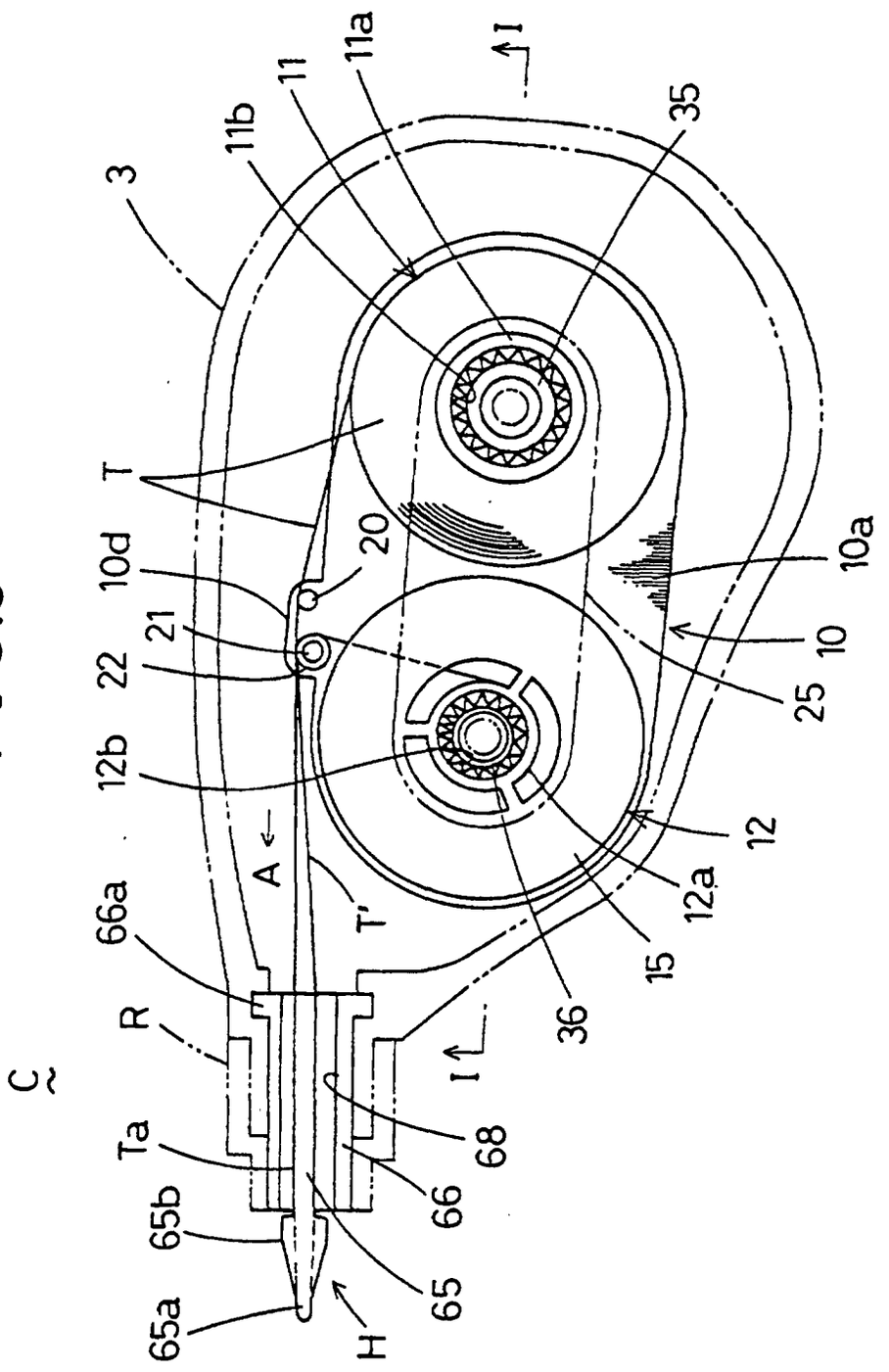


FIG.3


C
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11
11a
I
35
T
10d
20
10a
21
22
25
10
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12
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T'
66a
15
R
36
I
Ta
68
65b
66
65
65a
H

FIG.4

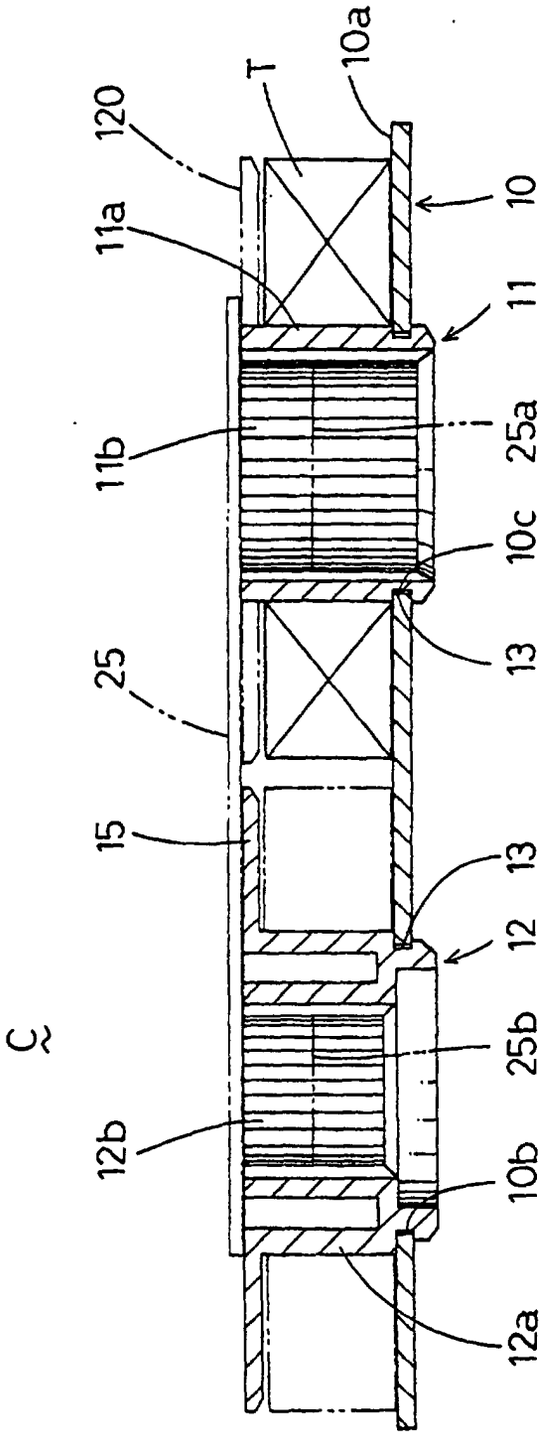


FIG.5

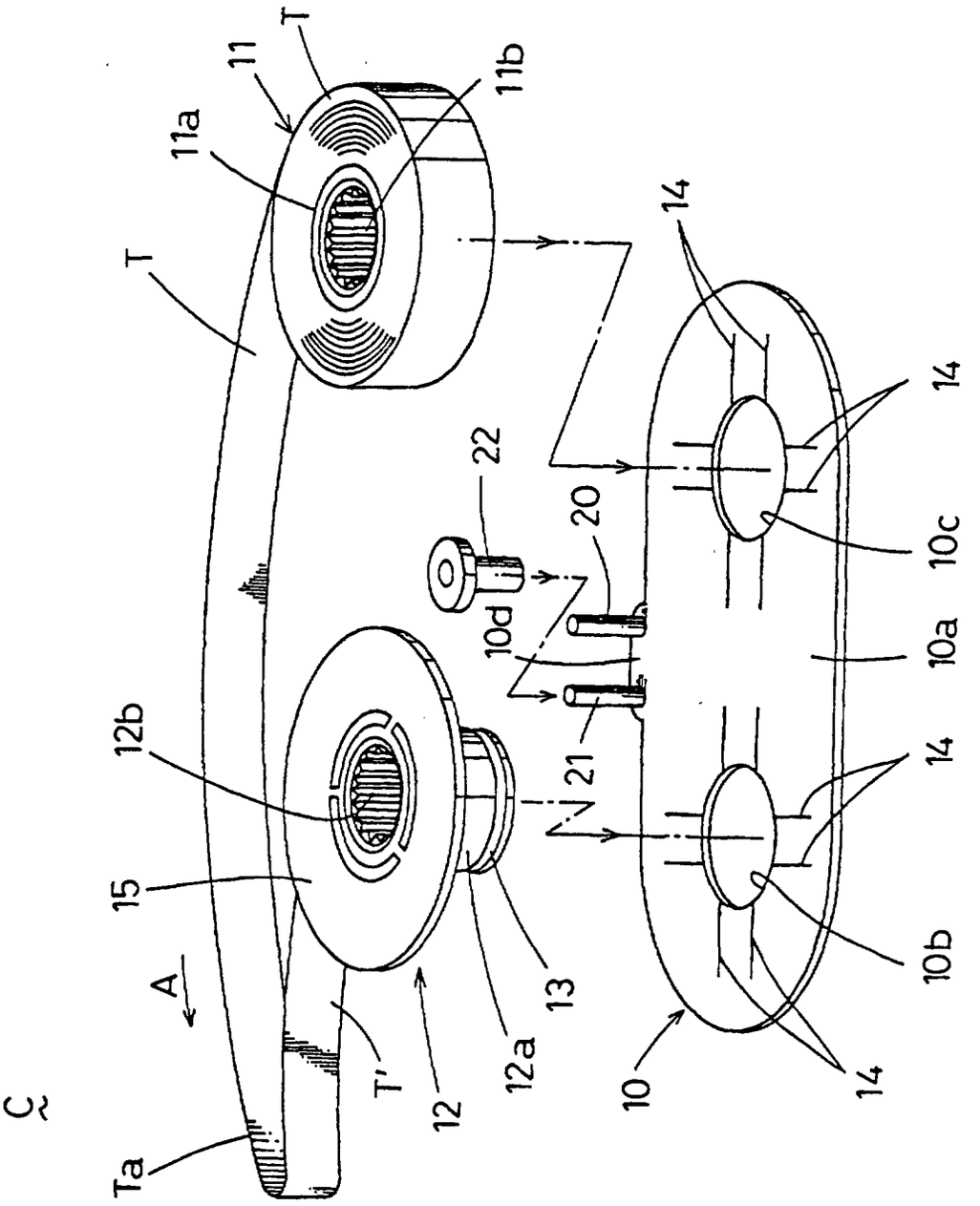
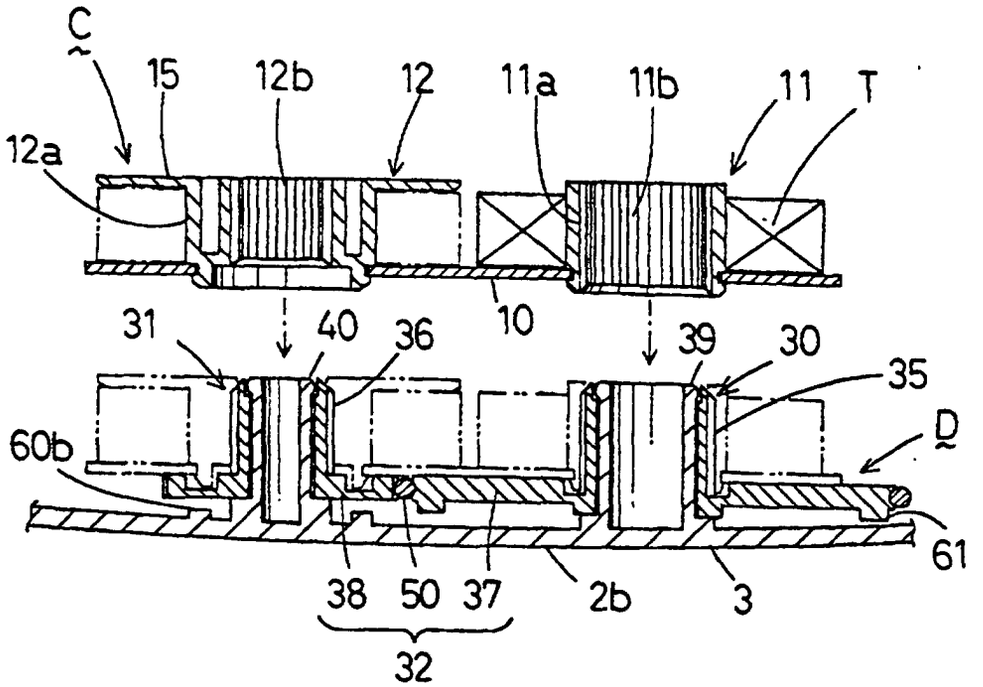


FIG.6

(a)


C
15
12b
12
11a
11b
11
T
12a
31
40
36
10
39
30
35
D
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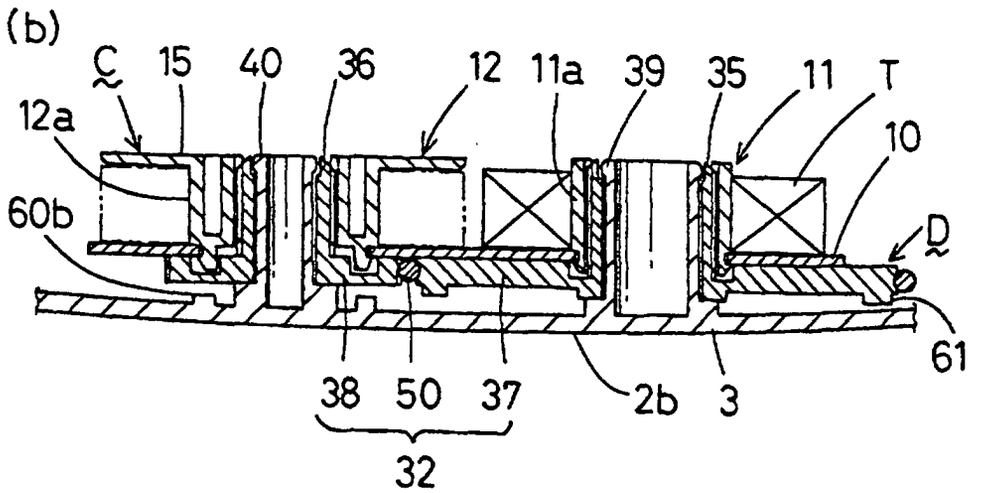
61
38
50
37
2b
3
32

(b)


C
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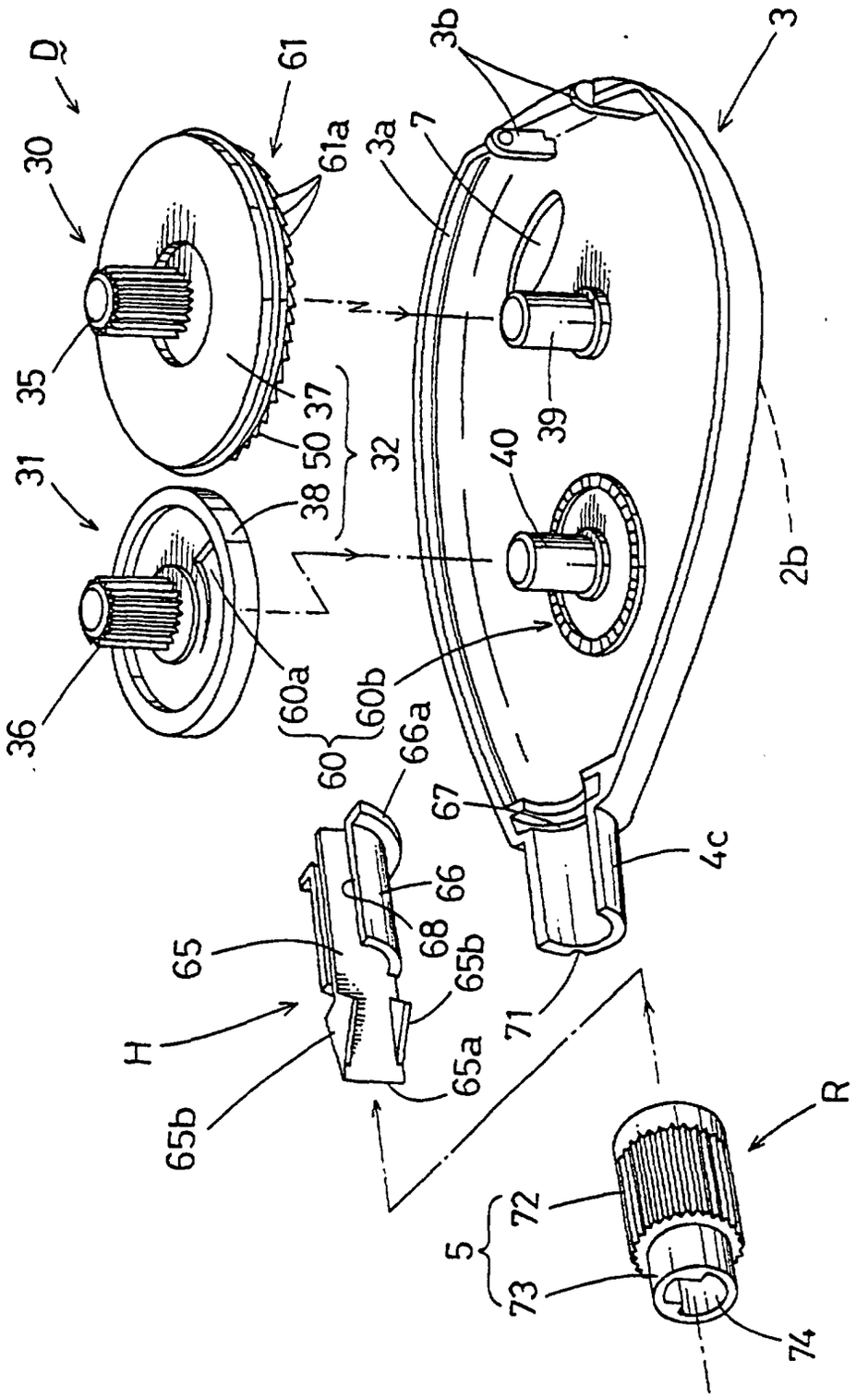
50
37
2b
3
32

FIG.7


D
30
61
61a
3b
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3a
7
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N
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37
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32
31
38
40
2b
36
60a
60b
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H
65a
71
R
5
72
73
74

FIG.8

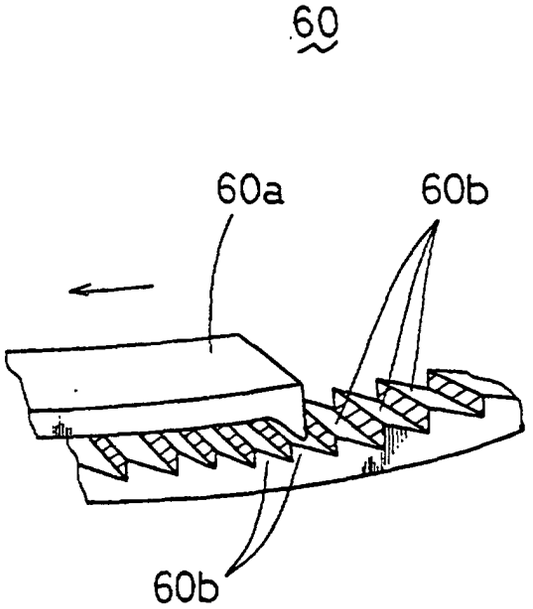
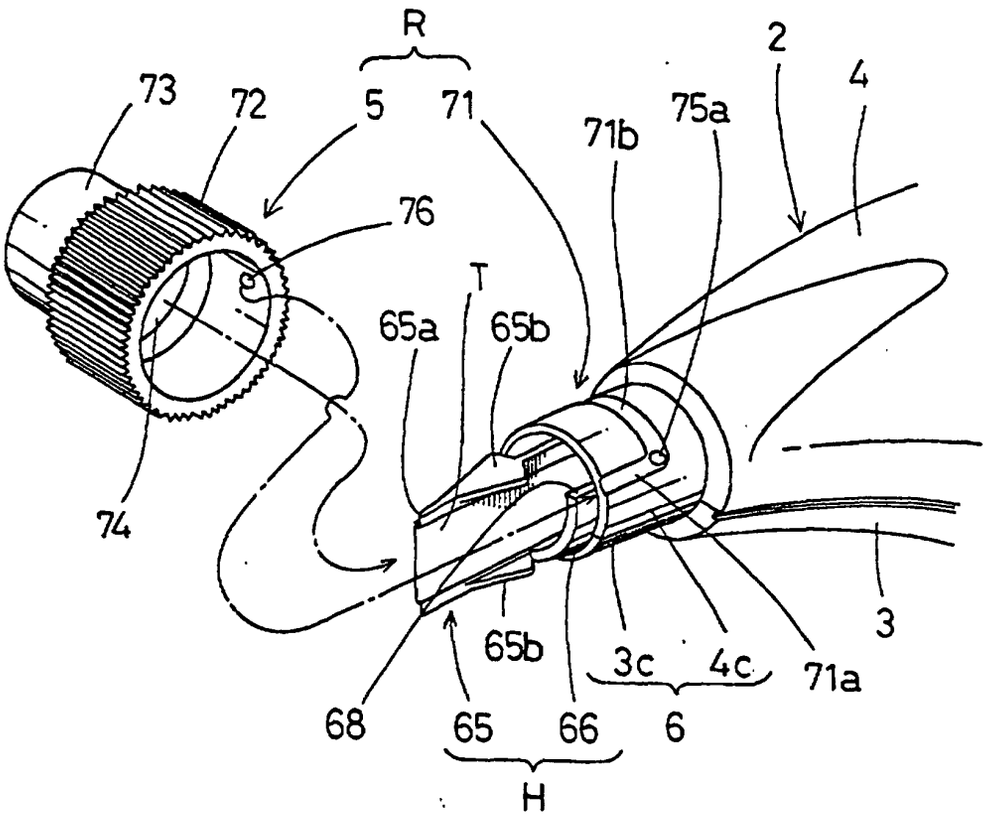


FIG.9

(a)


R
73
72
5
71
2
4
71b
75a
76
T
65a
65b
74
65b
3c
4c
71a
3
68
65
66
6
H

(b)

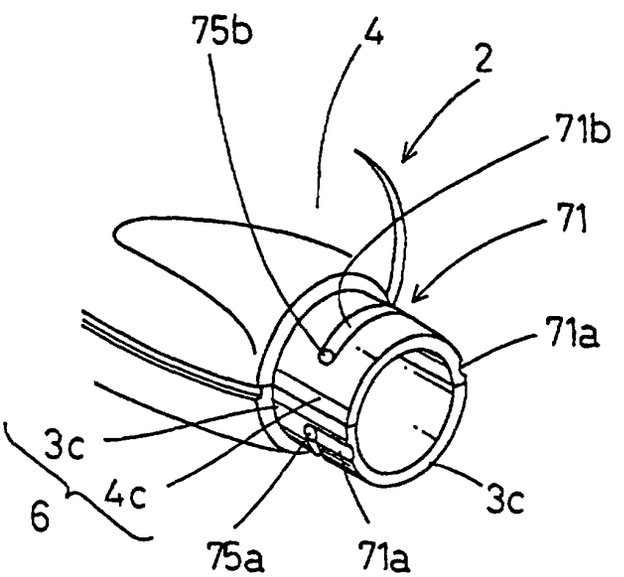

75b
4
2
71b
71
71a
3c
4c
6
3c
75a
71a

FIG.10

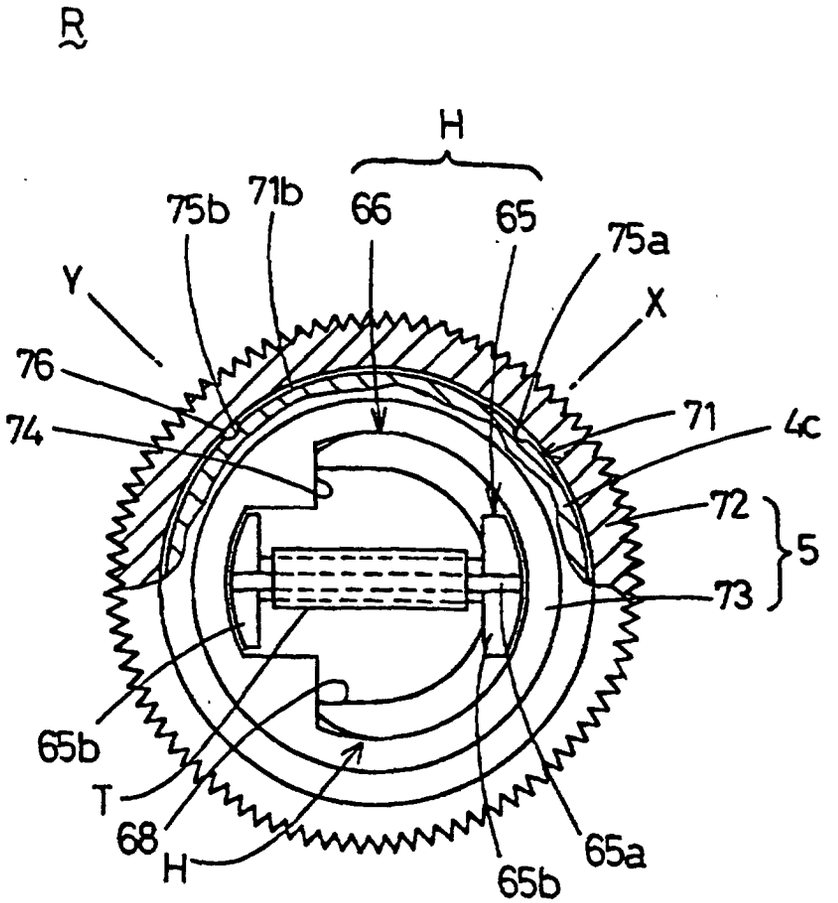
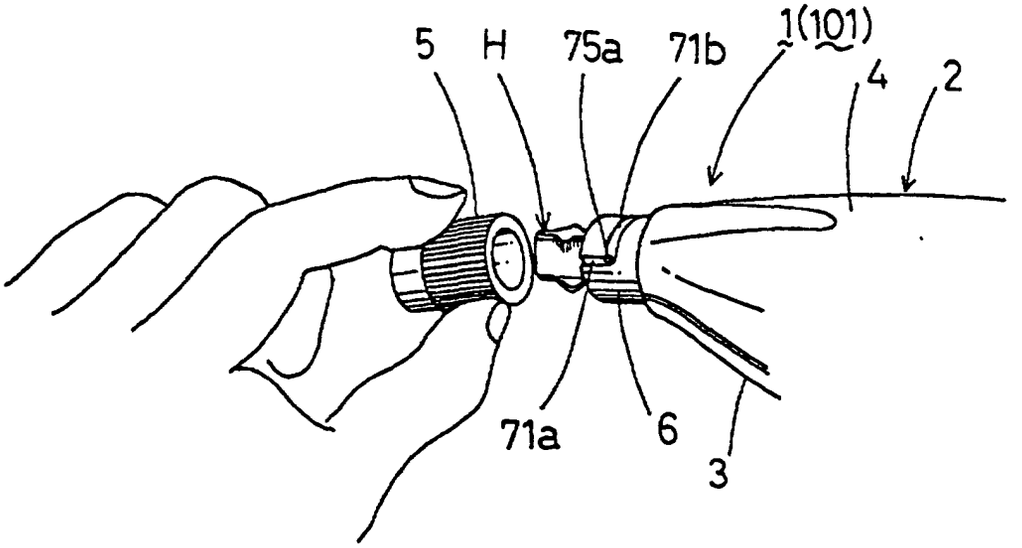


FIG.11

(a)



(b)

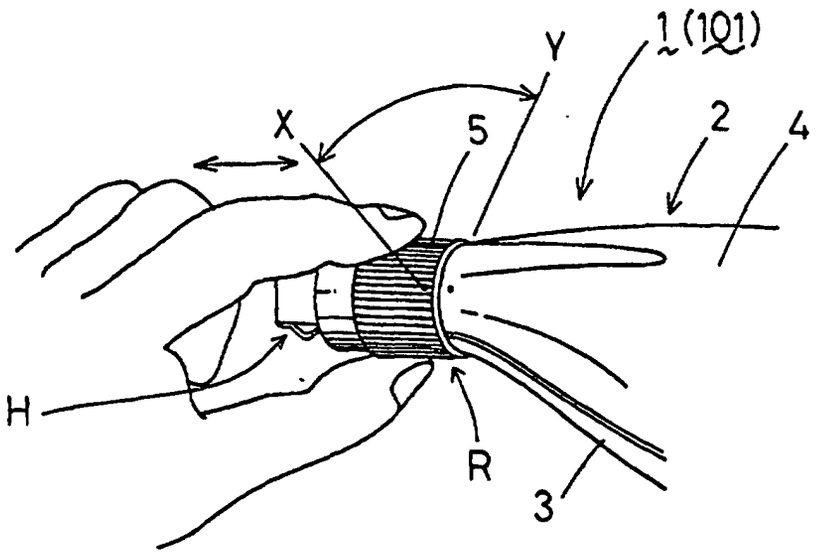


FIG.12

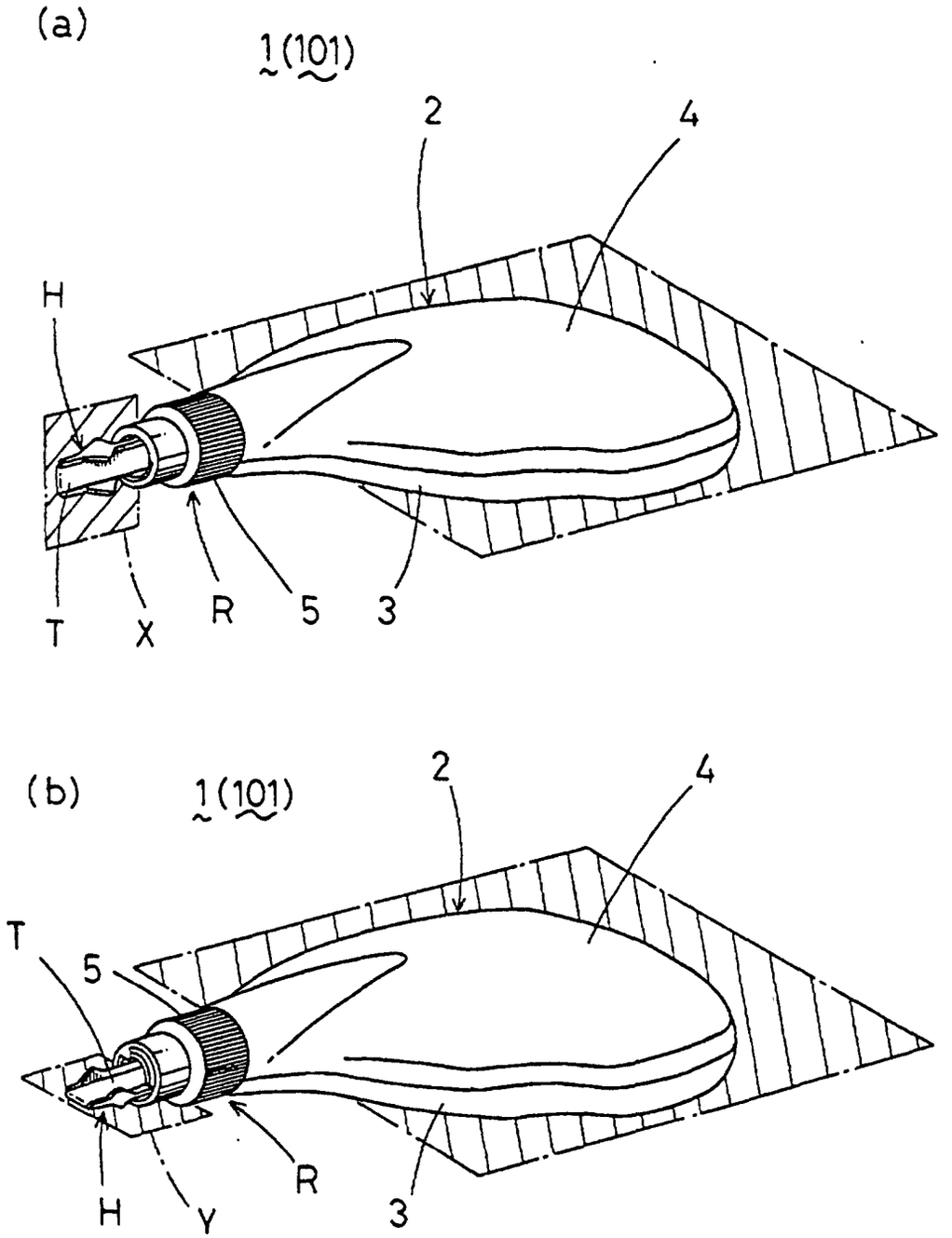
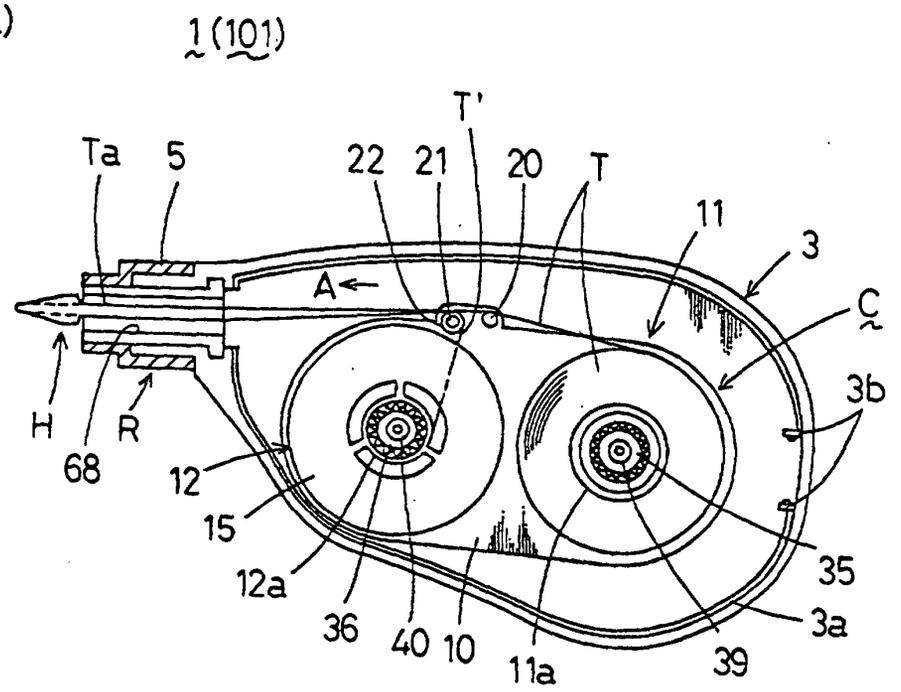


FIG.13

(a)


1 (101)
T'
Ta
5
22
21
20
T
11
3
A
C
3b
H
R
68
12
15
12a
36
40
10
11a
39
35
3a

(b)

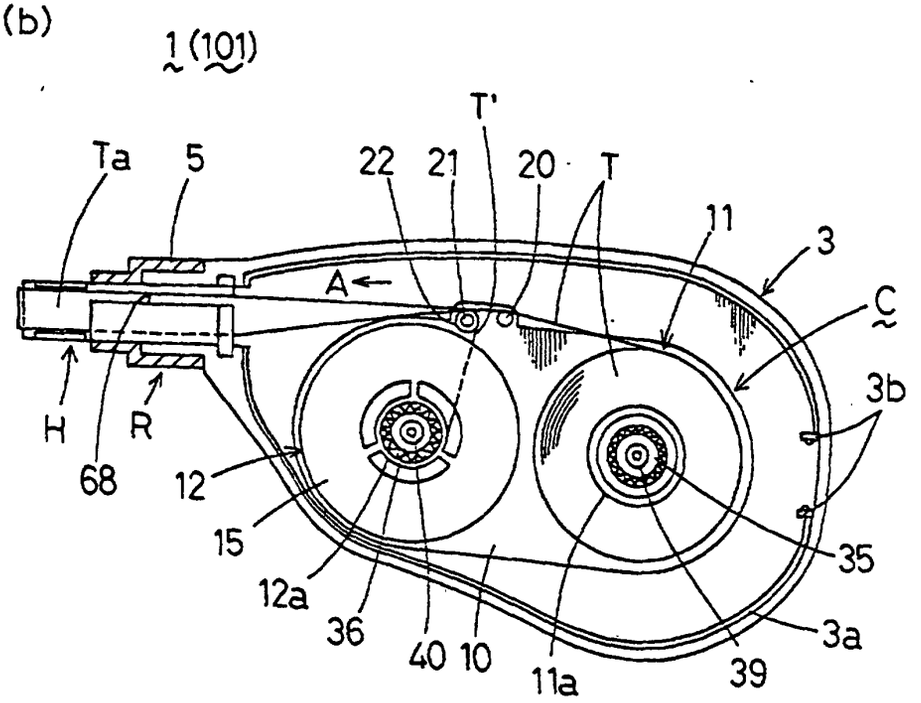

1 (101)
T'
Ta
5
22
21
20
T
11
3
A
C
3b
H
R
68
12
15
12a
36
40
10
11a
39
35
3a

FIG.14

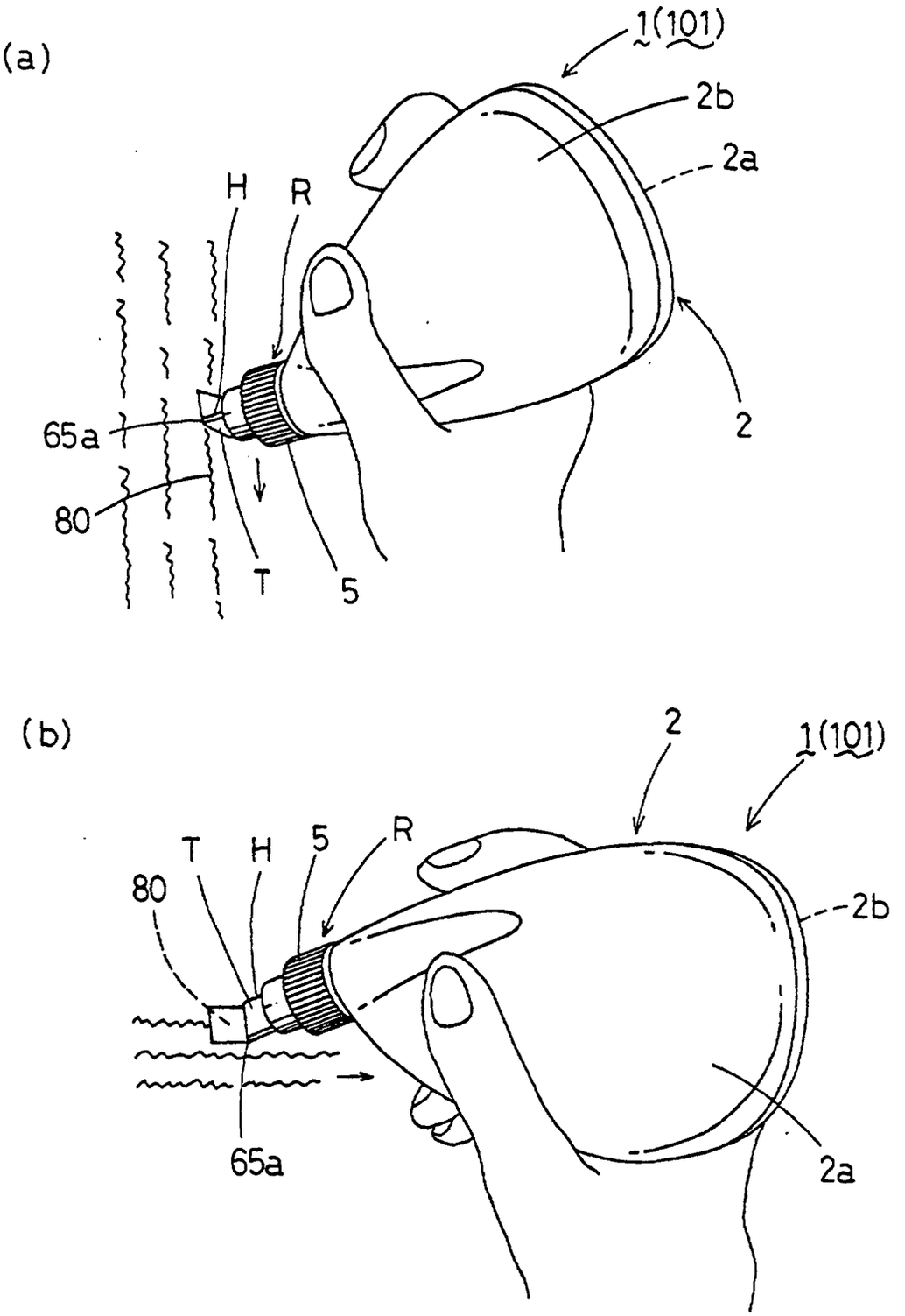


FIG.15

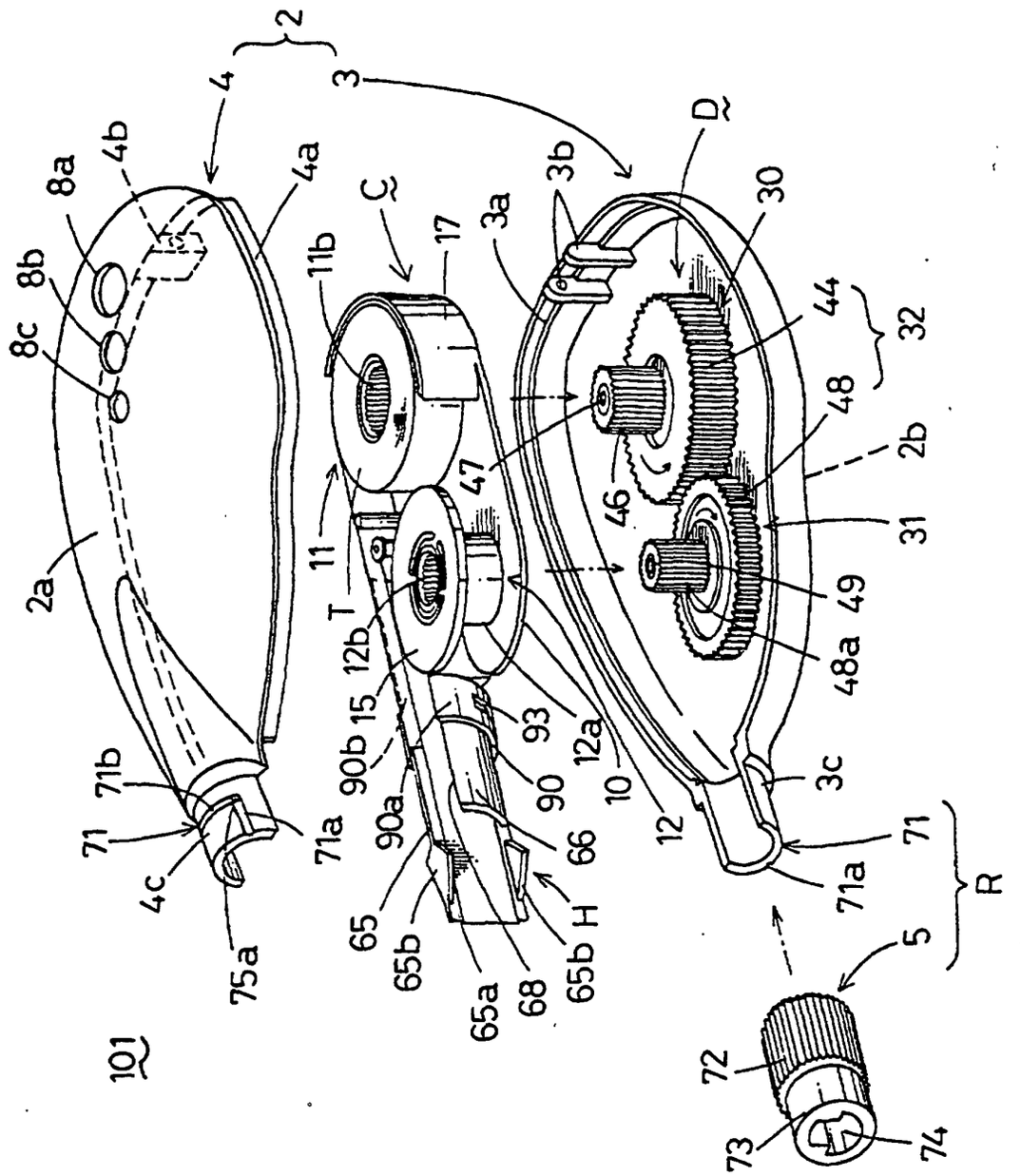

2
4
3
8a
4b
4a
8b
8c
C
11b
17
3a
3b
D
30
44
32
48
2b
47
46
31
49
48a
2a
11
T
12b
15
90b
93
12a
10
12
3c
71
71b
71a
90a
90
66
4c
65
65b
65a
68
H
65b
75a
5
R
72
73
74
101

FIG.16

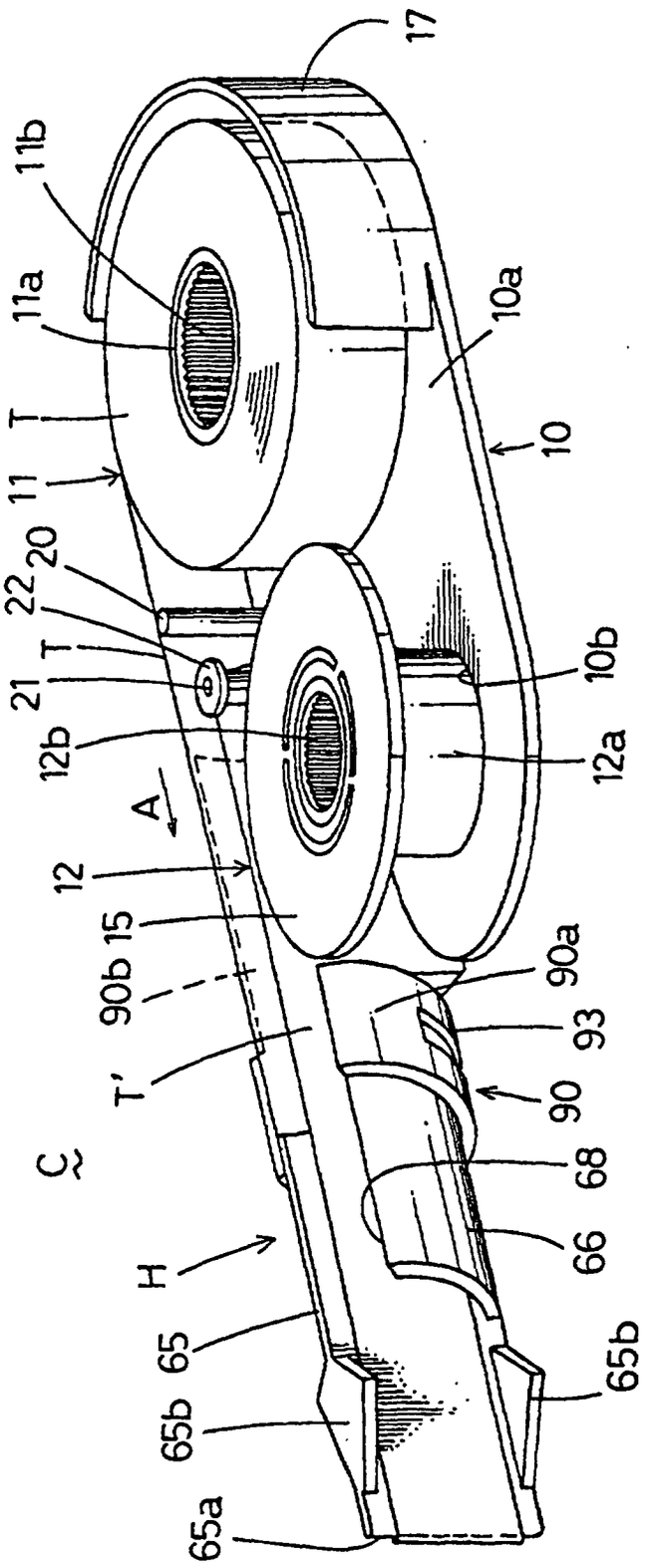

17
11b
11a
10a
T
10
11
20
22
T
21
10b
12b
12a
A
12
15
90b
90a
93
T'
90
C
68
H
66
65
65b
65b
65a

FIG.17

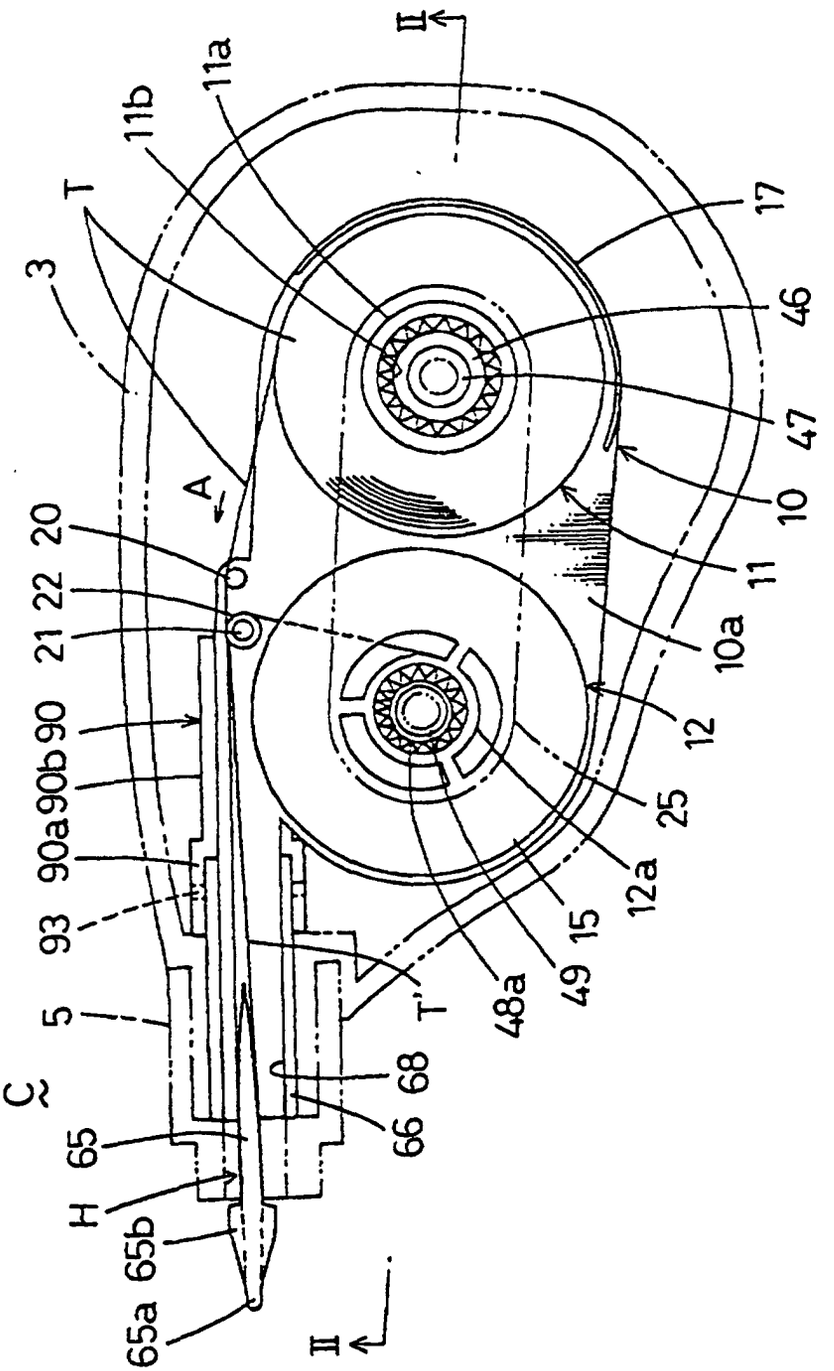

II
11a
11b
T
3
17
46
47
10
11
10a
12
25
12a
15
49
48a
T
A
20
22
21
90
90b
90a
93
5
C
65
H
65b
65a
66
68
II

FIG.18

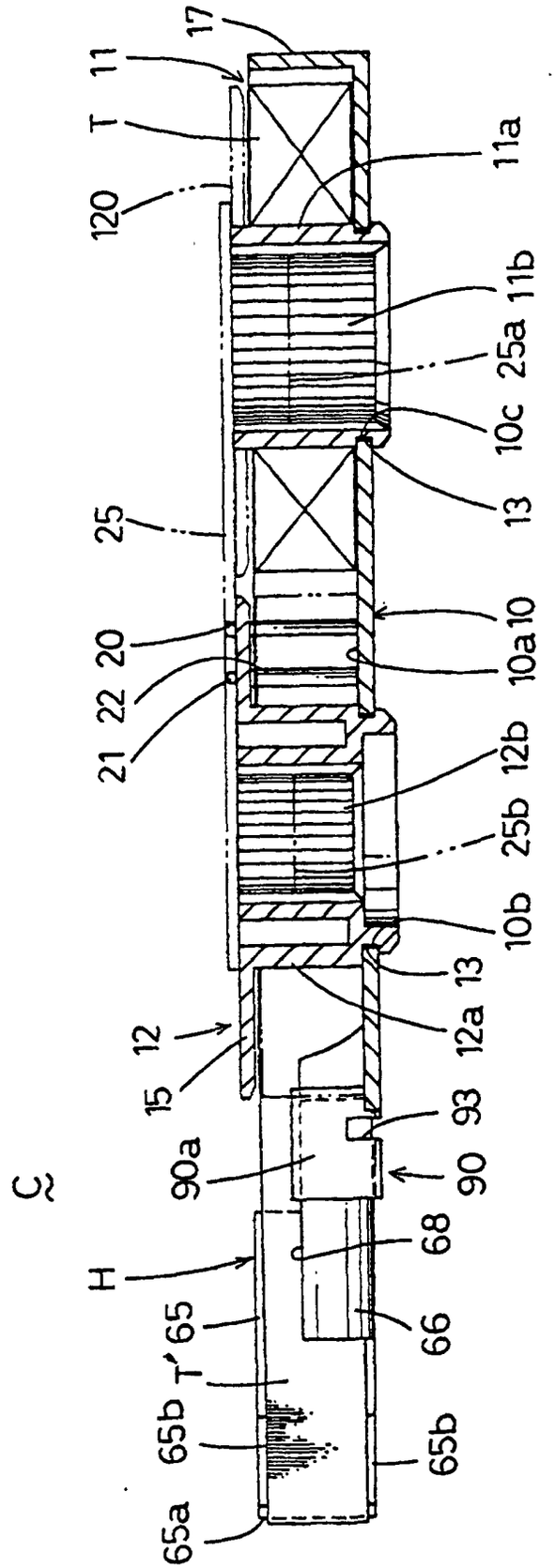

17
11
T
120
11a
11b
25a
10c
13
25
10
10a
20
22
21
12b
25b
10b
13
12a
12
15
93
90a
90
68
H
66
T'
65
65b
65b
65a

FIG.19

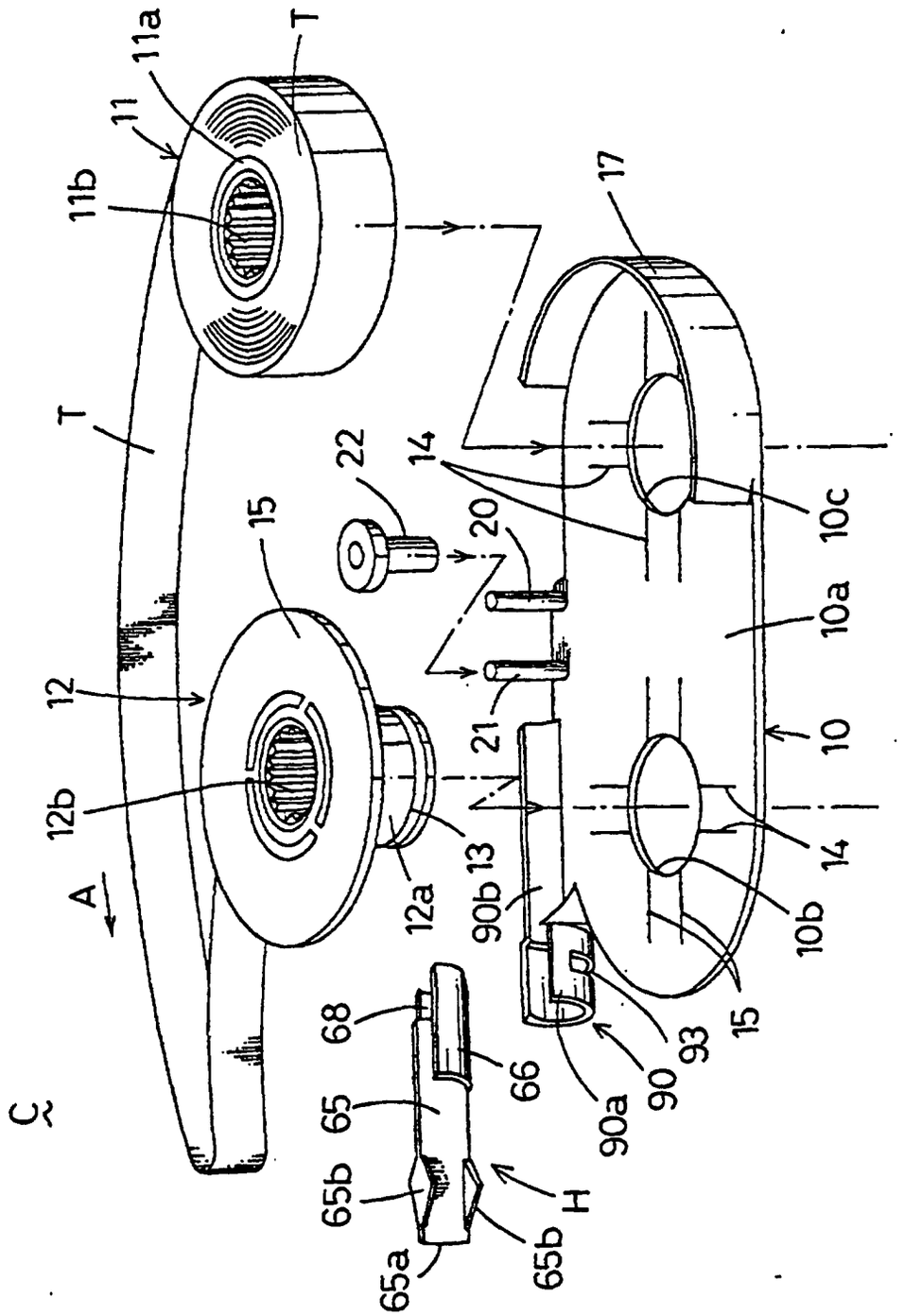

11a
T
11
11b
17
T
22
14
15
20
10c
10a
12
21
10
12b
13
14
A
12a
90b
10b
68
66
15
93
65
90
90a
65b
H
65b
65a

FIG.20

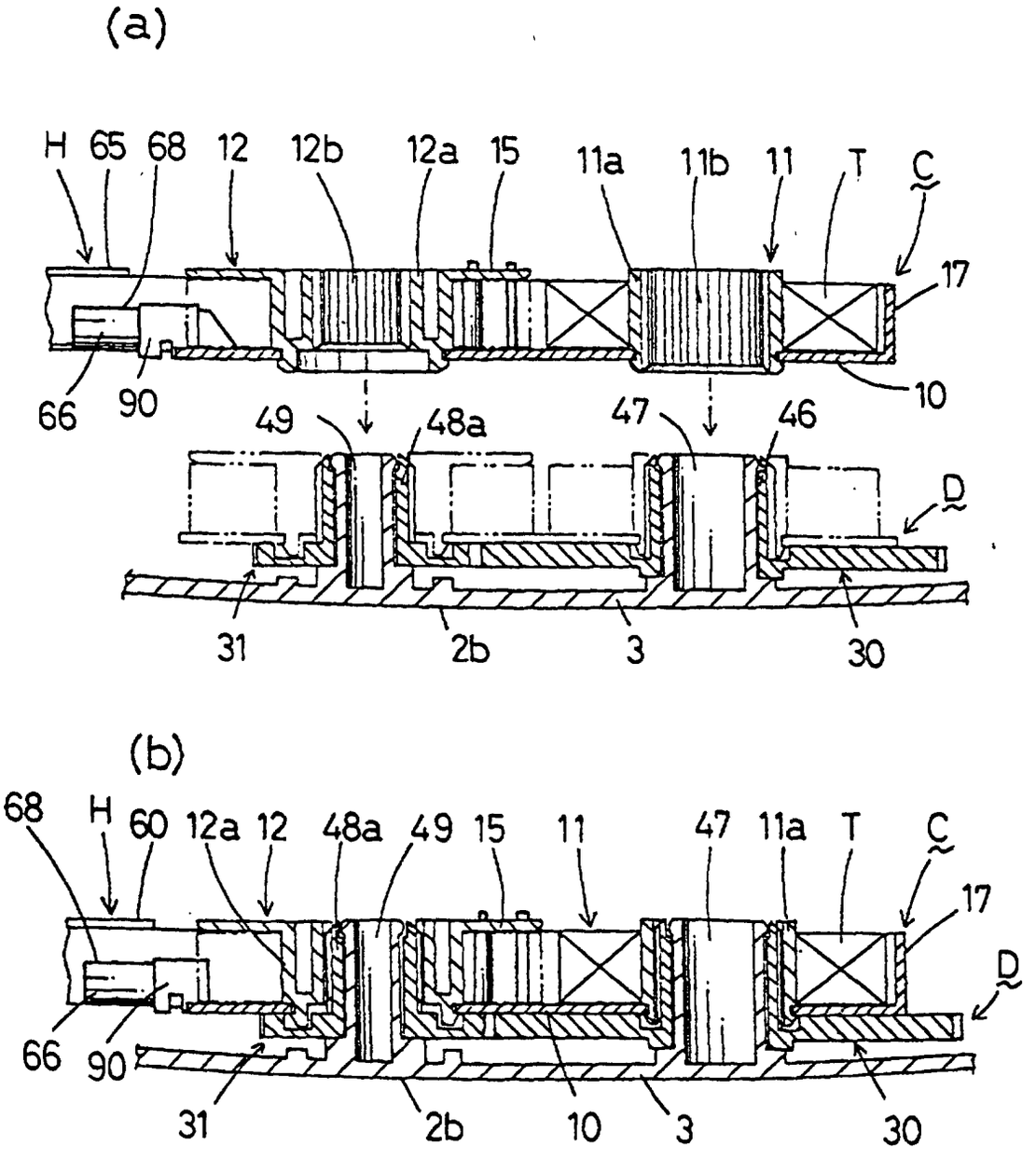

(a)
H
65
68
12
12b
12a
15
11a
11b
11
T
C
17
10
66
90
49
48a
47
46
D
31
2b
3
30
(b)
68
H
60
12a
12
48a
49
15
11
47
11a
T
C
17
D
66
90
31
2b
10
3
30

FIG.21

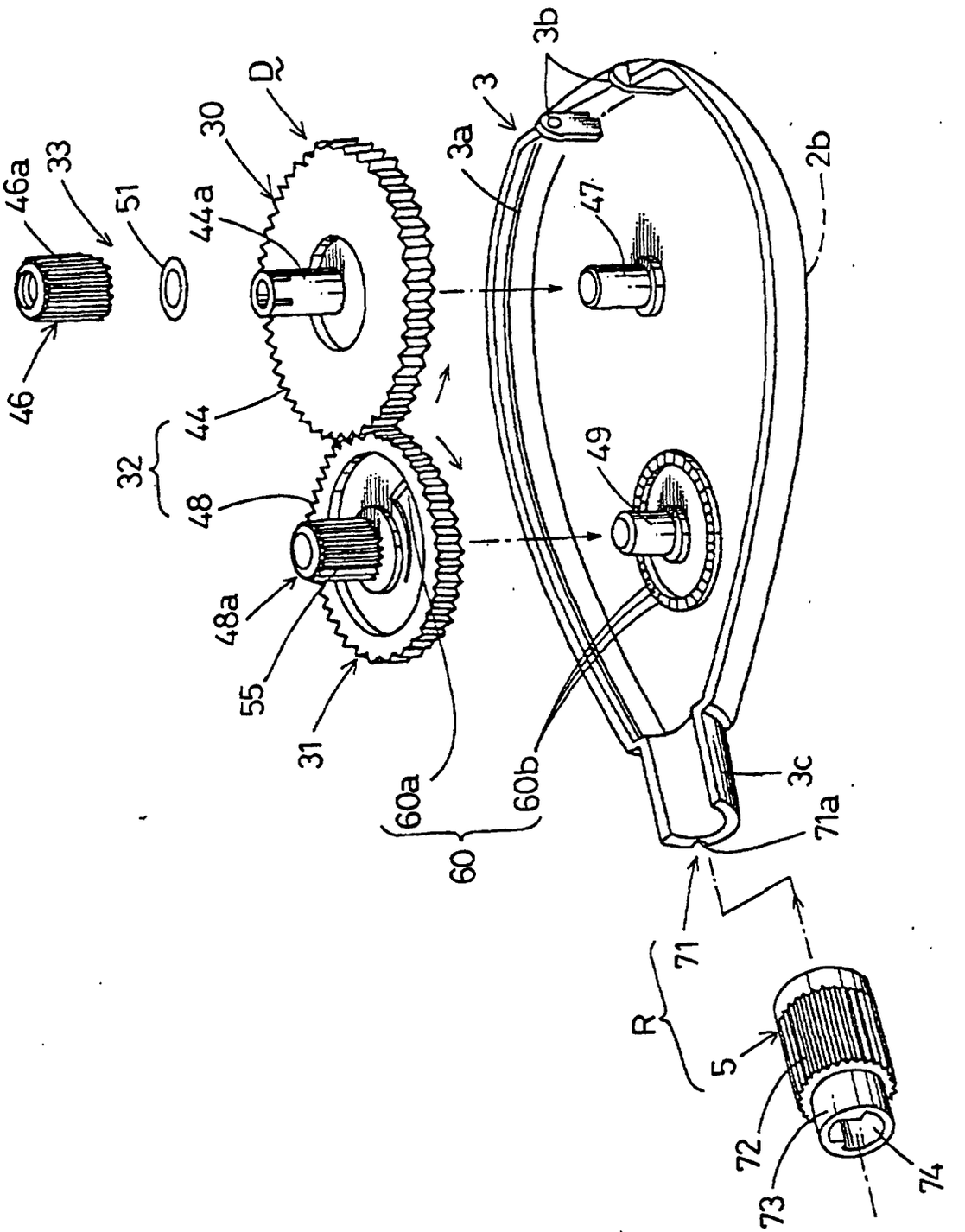

D
30
44a
44
32
48
48a
55
31
60a
60b
60
3
3a
3b
2b
47
49
3c
71a
71
R
5
72
73
74
46
46a
33
51

FIG.22

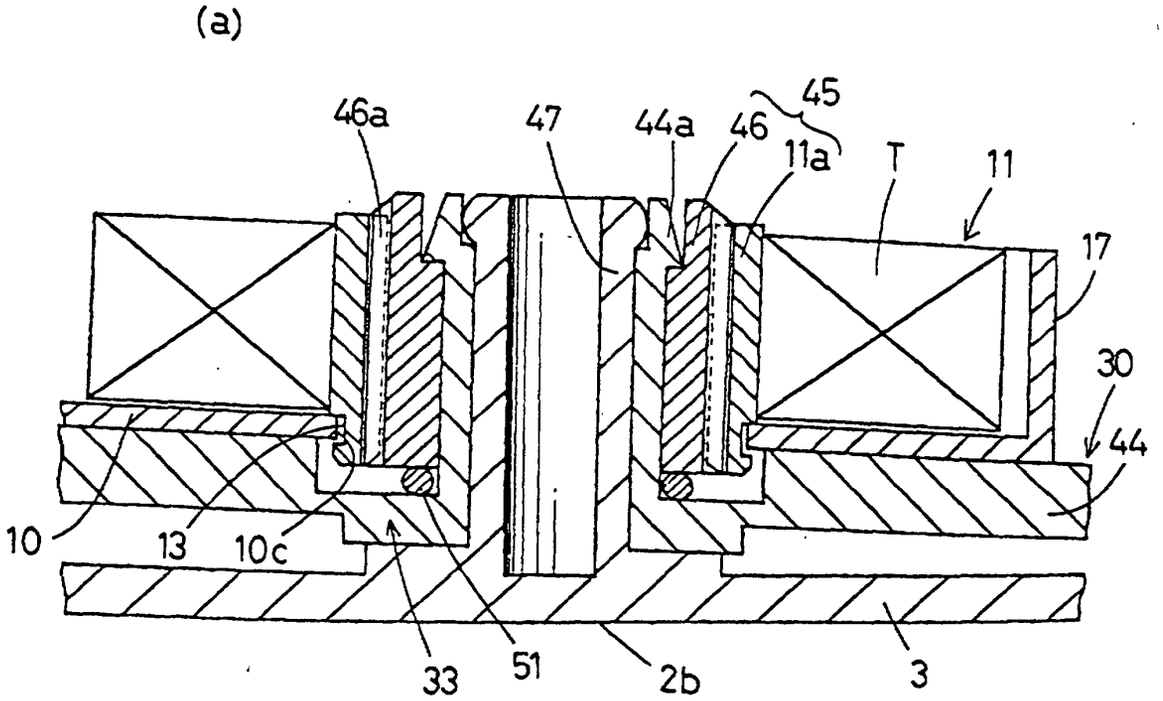
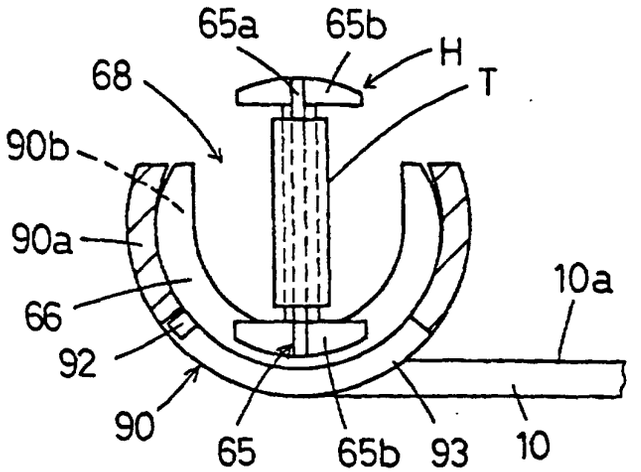


FIG.23

(a)


65a
65b
H
T
68
90b
90a
66
92
90
65
65b
93
10
10a

(b)

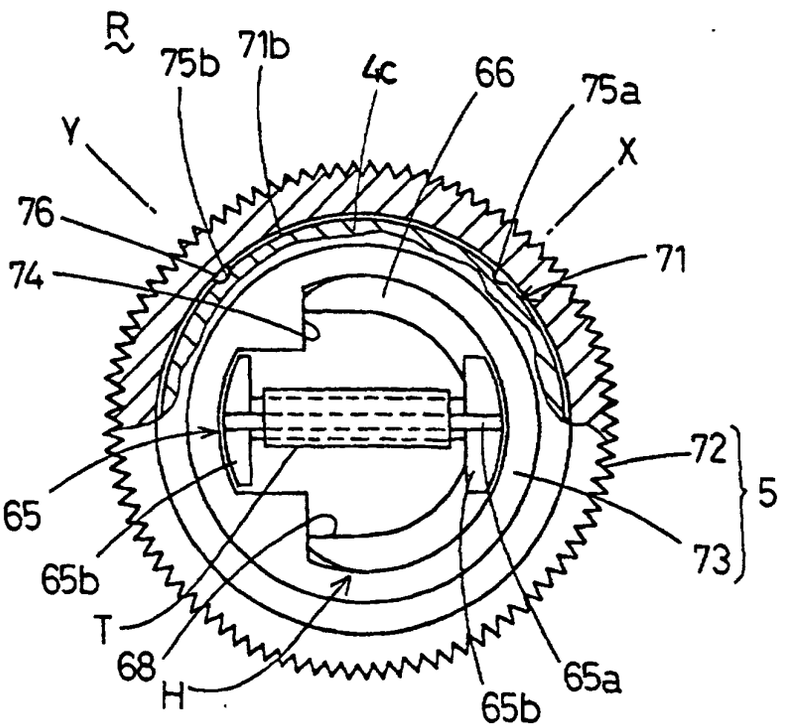

R
75b
71b
4c
66
75a
Y
X
76
74
71
72
5
73
65
65b
T
68
H
65b
65a

FIG. 24

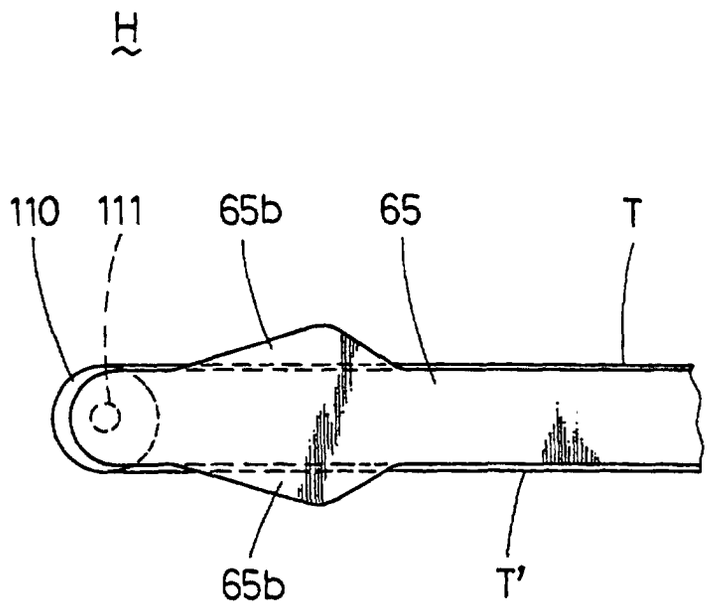


FIG.25

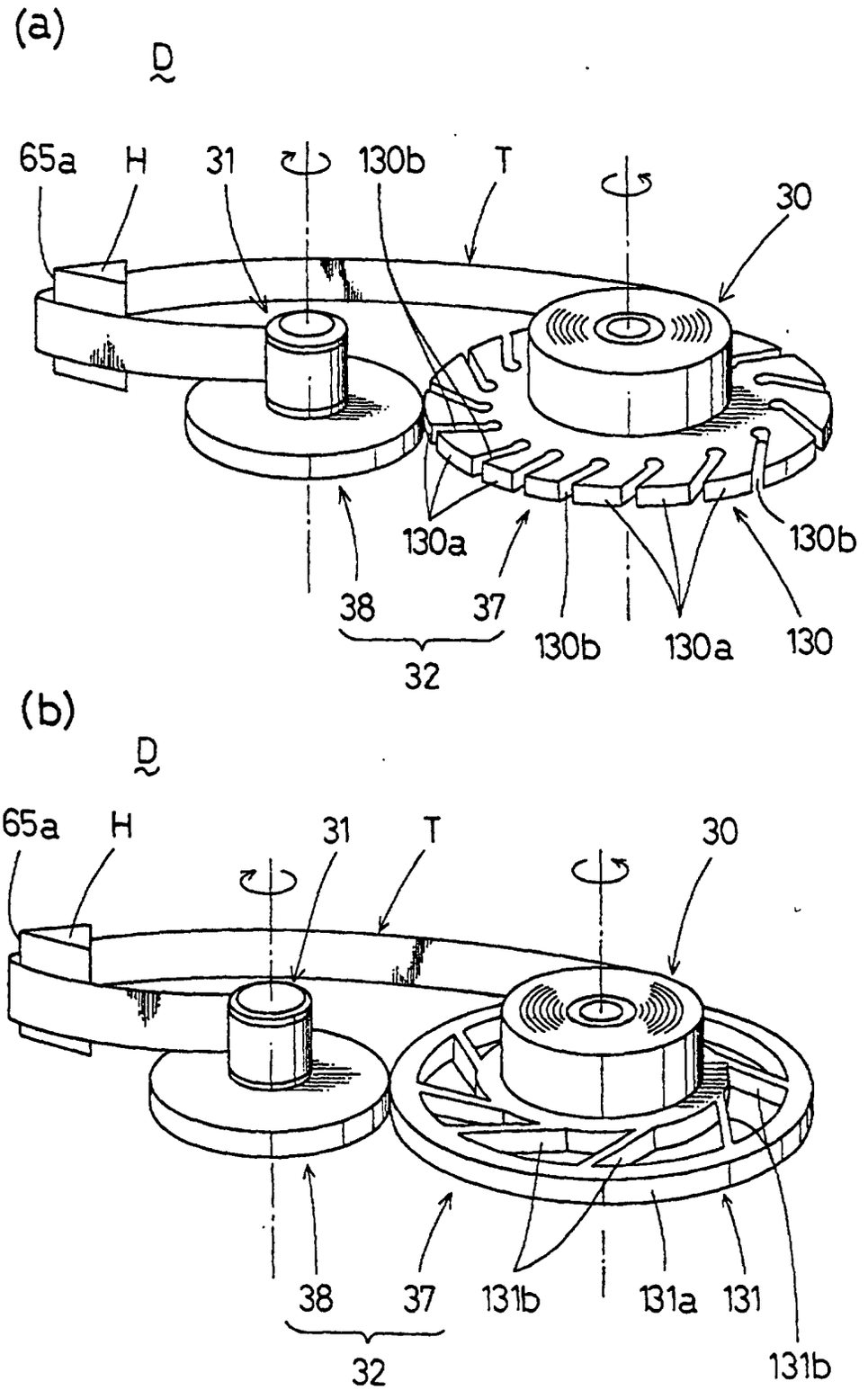
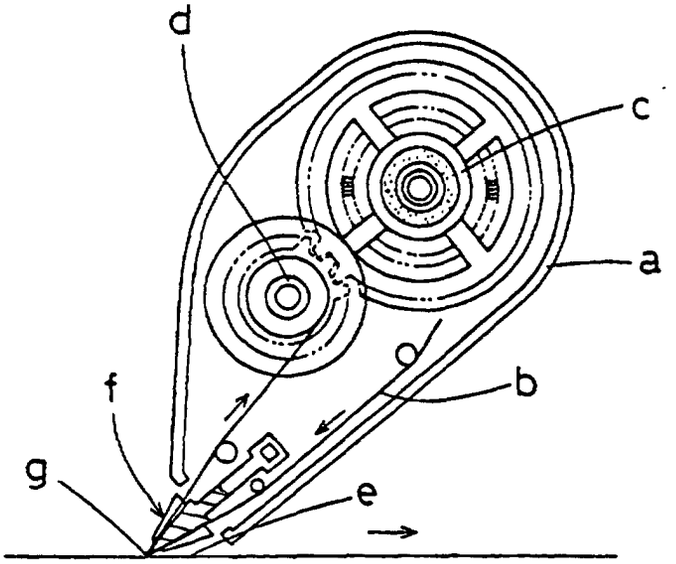

(a)
D
65a
H
31
130b
T
30
130a
130b
38
37
130b
130a
130
32
(b)
D
65a
H
31
T
30
38
37
131b
131a
131
131b
32

FIG.26

(a)



(b)