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(54) **IMAGE FORMING APPARATUS INCLUDING LOCKING MEMBER CONFIGURED TO LOCK PHOTOSENSITIVE DRUM RELATIVE TO DRAWER**

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(57) **ABSTRACT**

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An image forming apparatus includes: a housing; a drum cartridge as a first cartridge including a photosensitive drum; a second cartridge accommodating toner; and a drawer movable between an inside position where the drawer in its entirety is positioned inside the housing and an outside position where at least a part of the drawer is positioned outside the housing. The drum cartridge is attachable to and detachable from the drawer. The drawer includes: a side plate configured to receive the photosensitive drum; and a locking member supported by the side plate. The locking member is movable relative to the side plate between a locking position where the locking member locks the photosensitive drum to the side plate and an unlocking position where the locking member unlocks the photosensitive drum from the side plate in an attached state of the drum cartridge to the drawer.

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Mar. 18, 2021 (JP) ..... 2021-044549

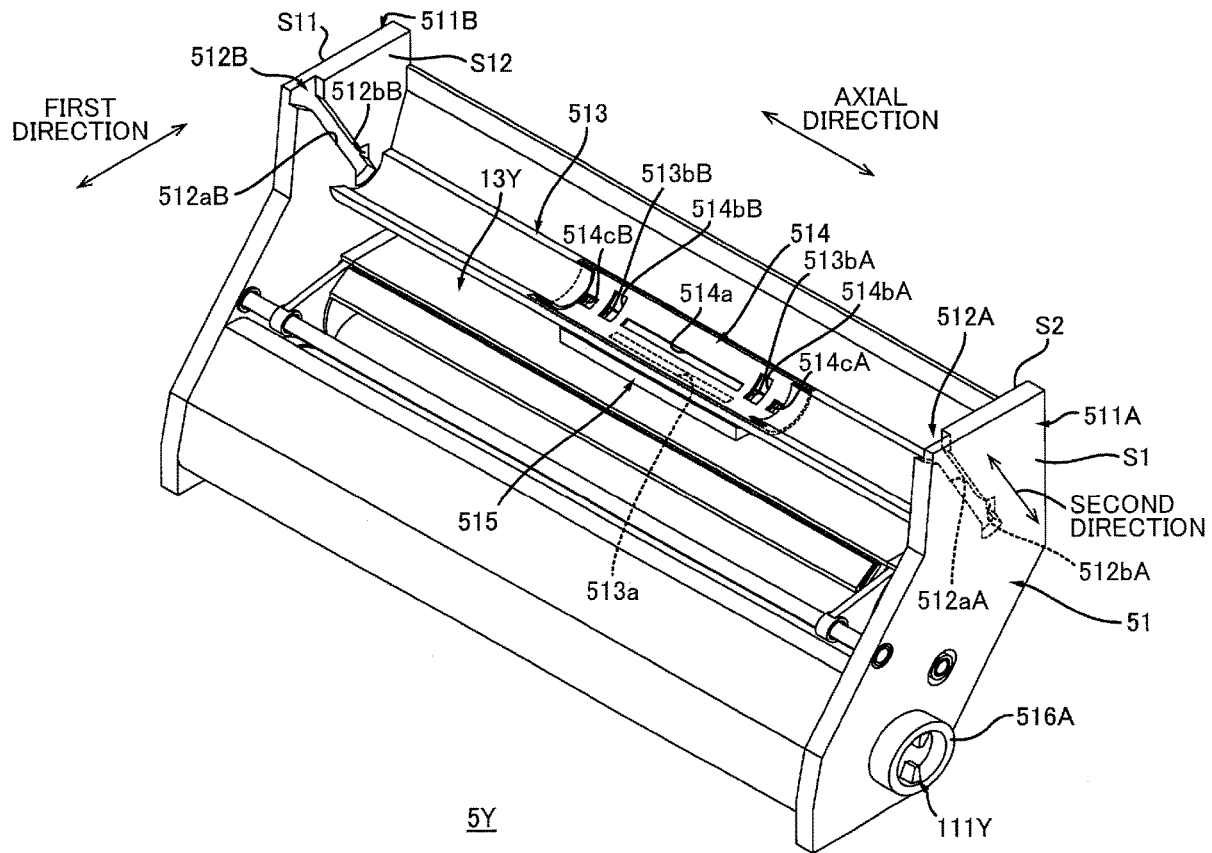


FIG. 1

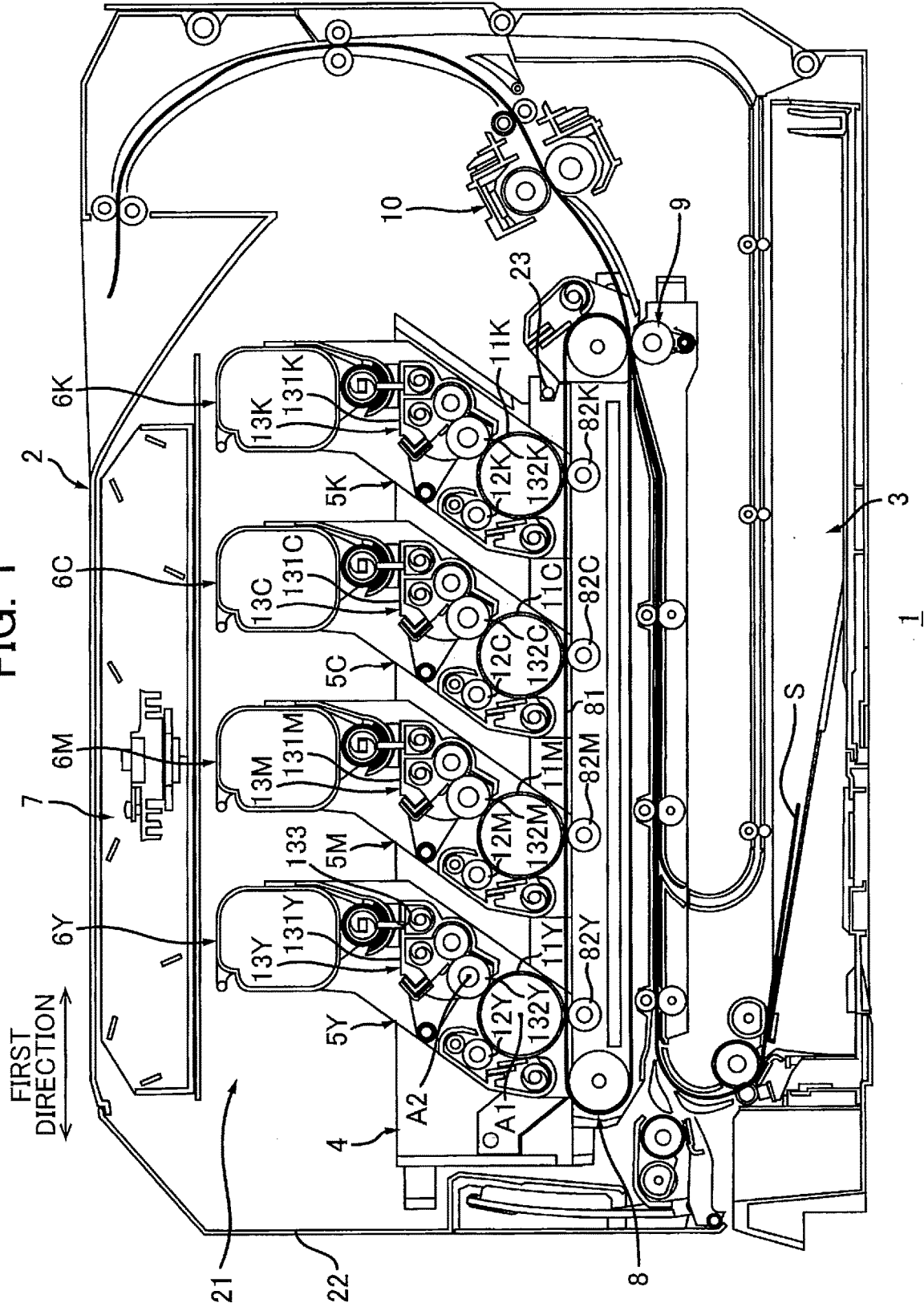


FIG. 2

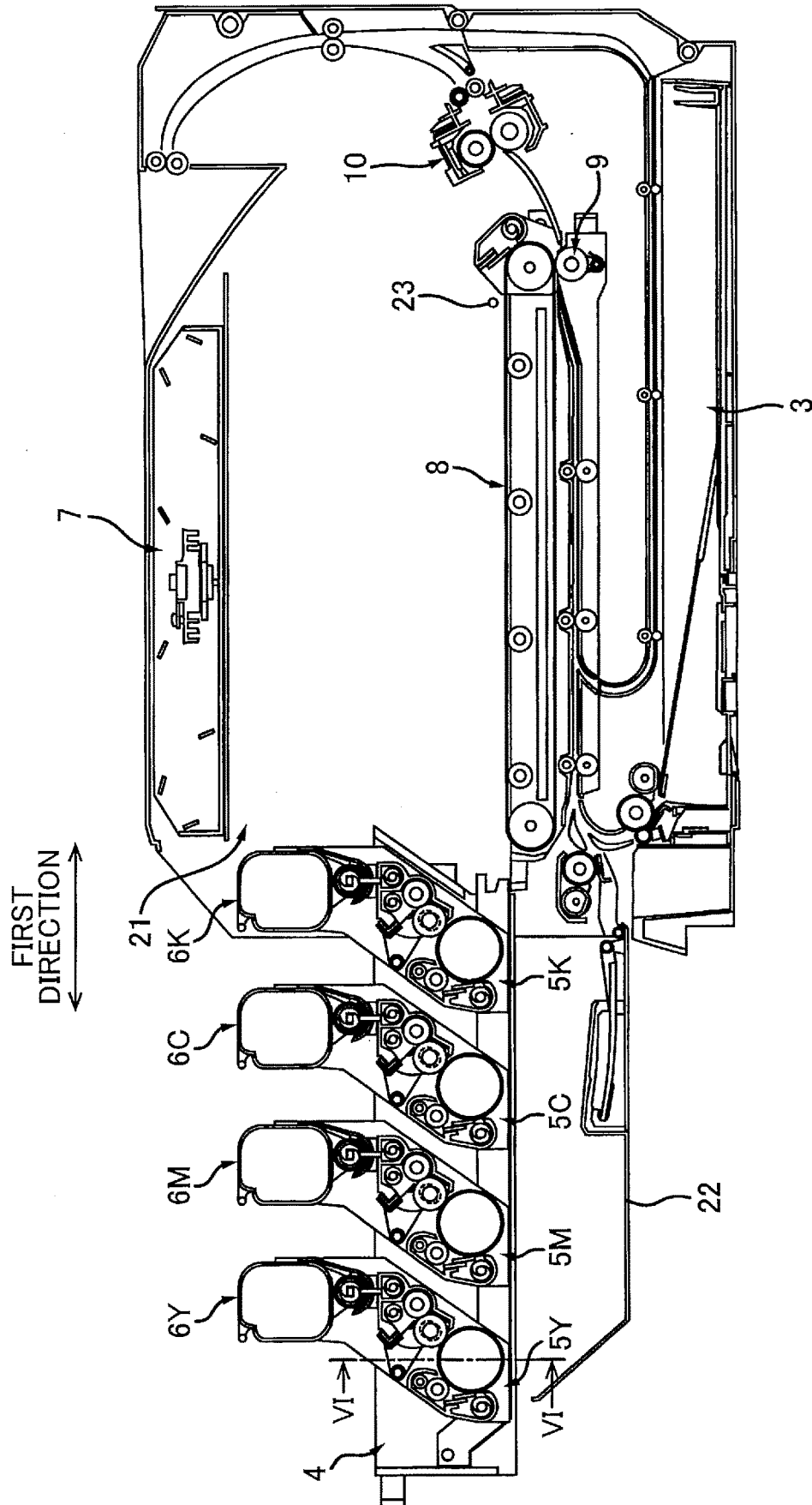


FIG. 3

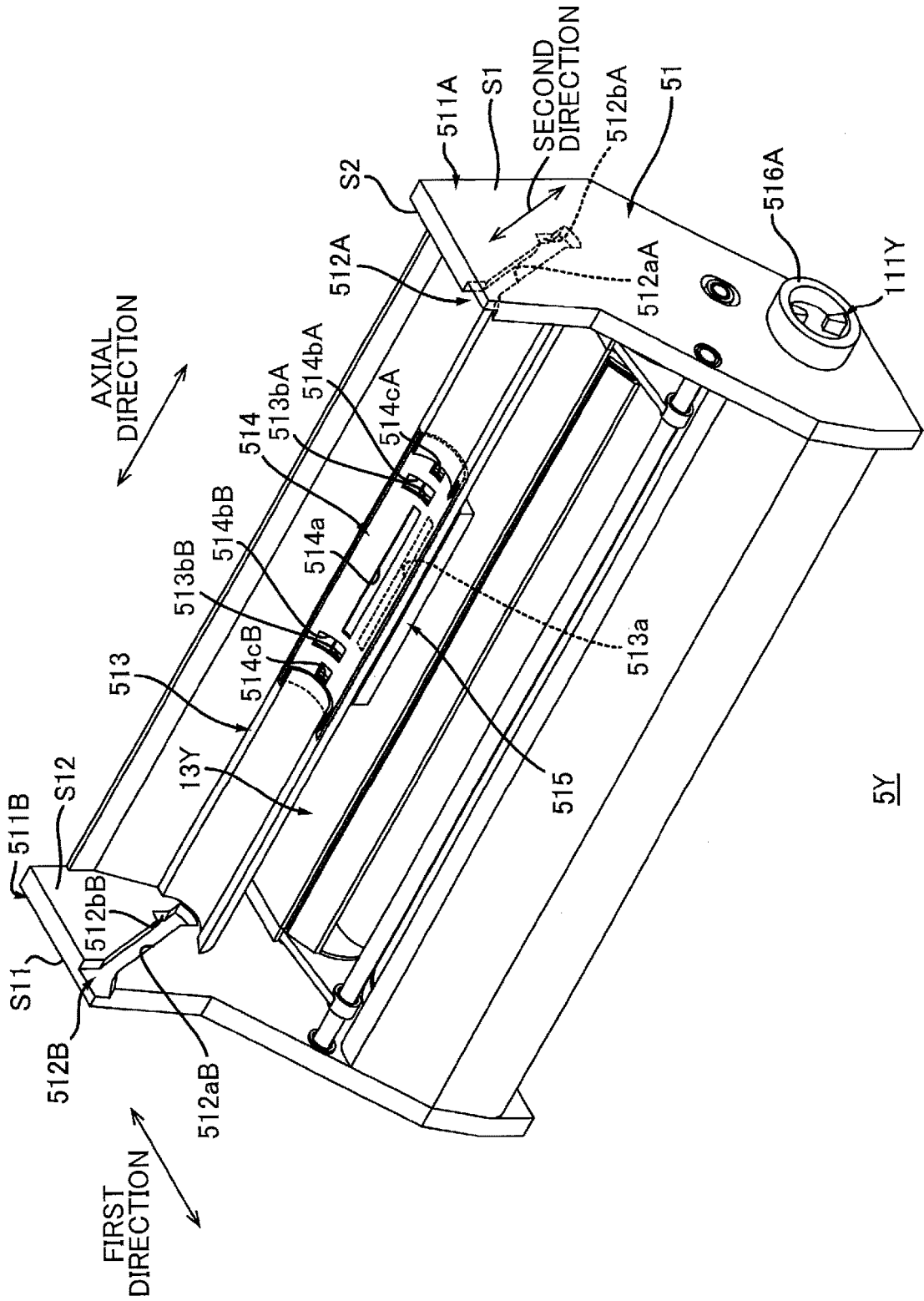


FIG. 4

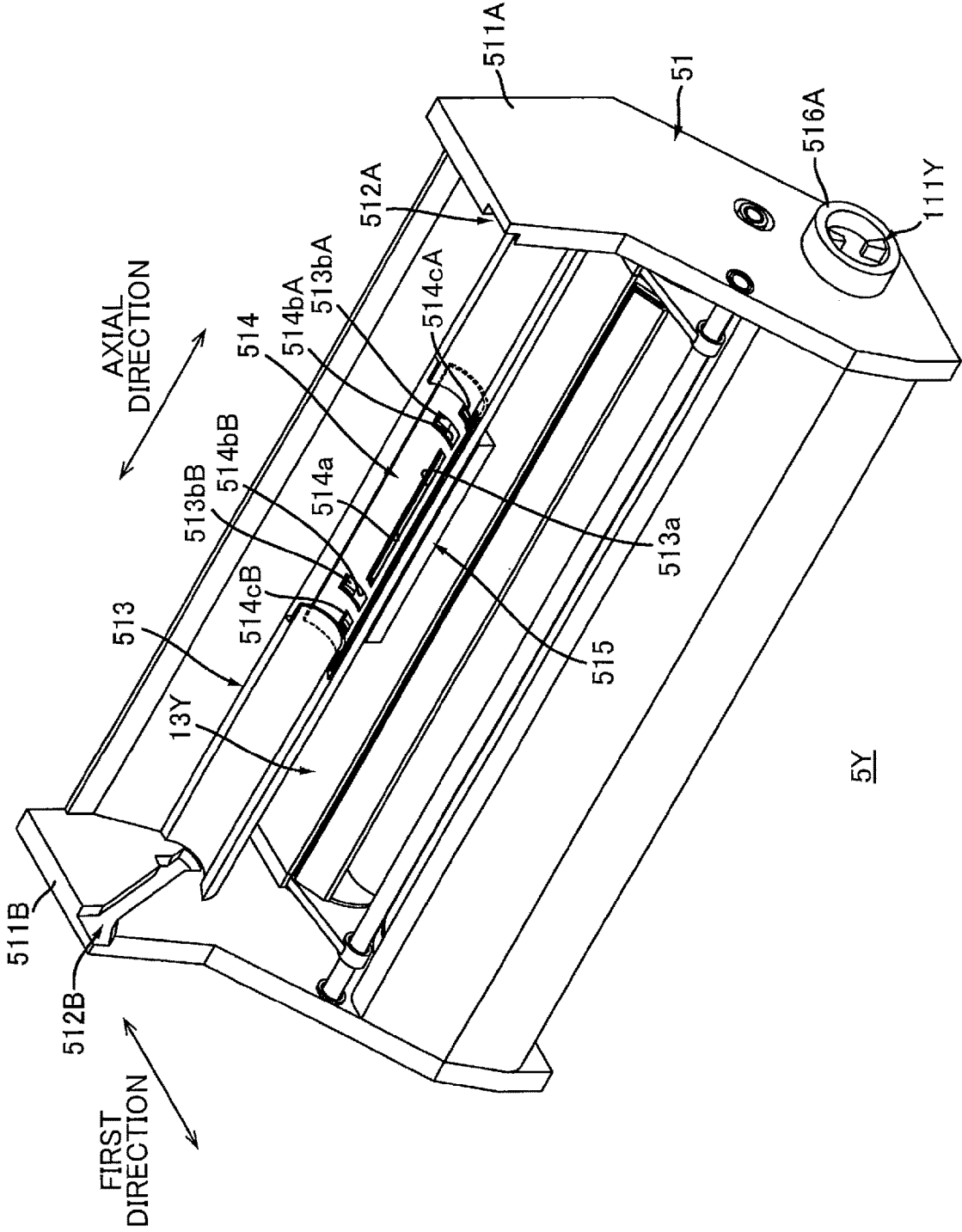
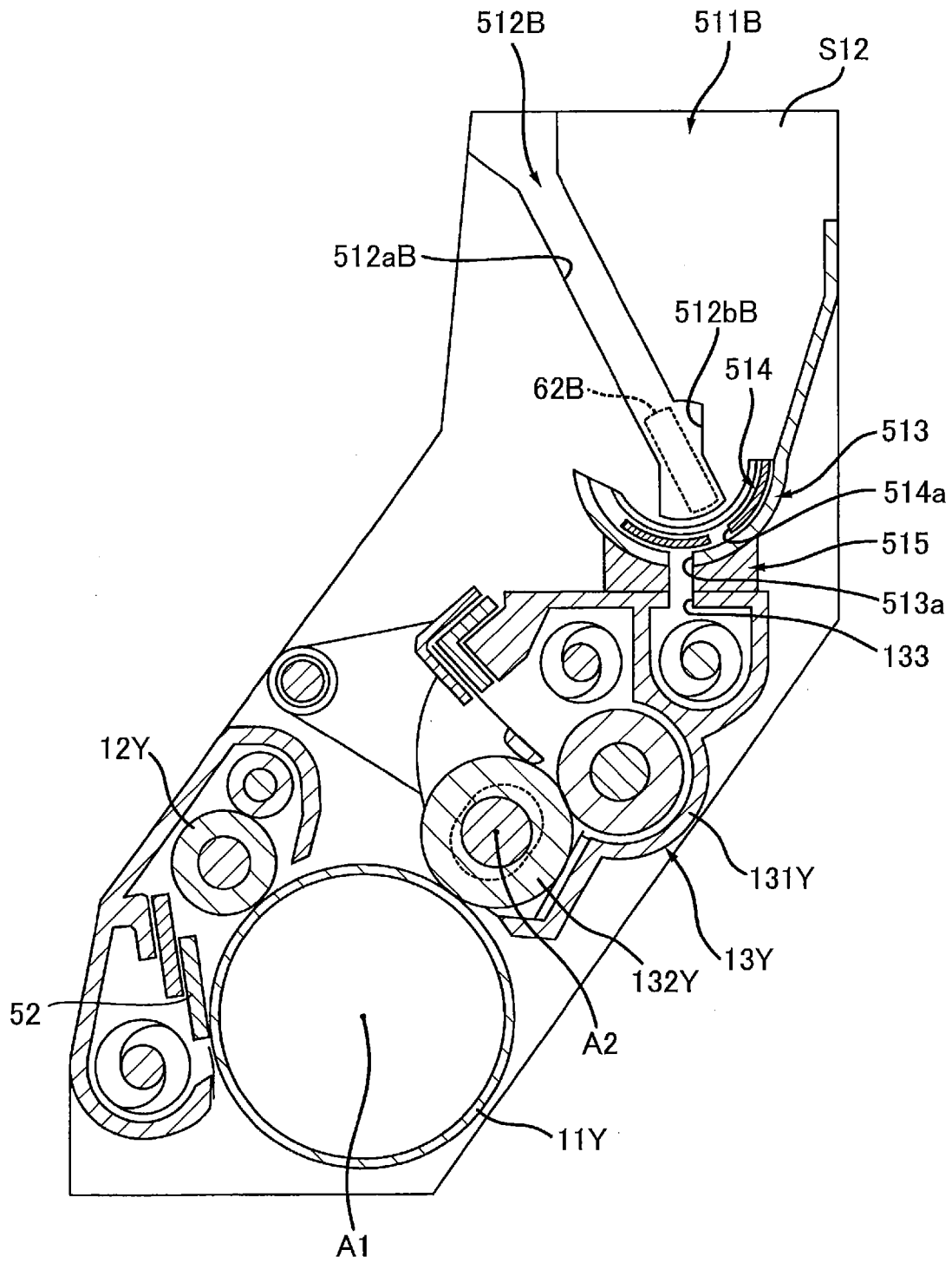


FIG. 5



5Y

FIG. 6

AXIAL DIRECTION  $\longleftrightarrow$

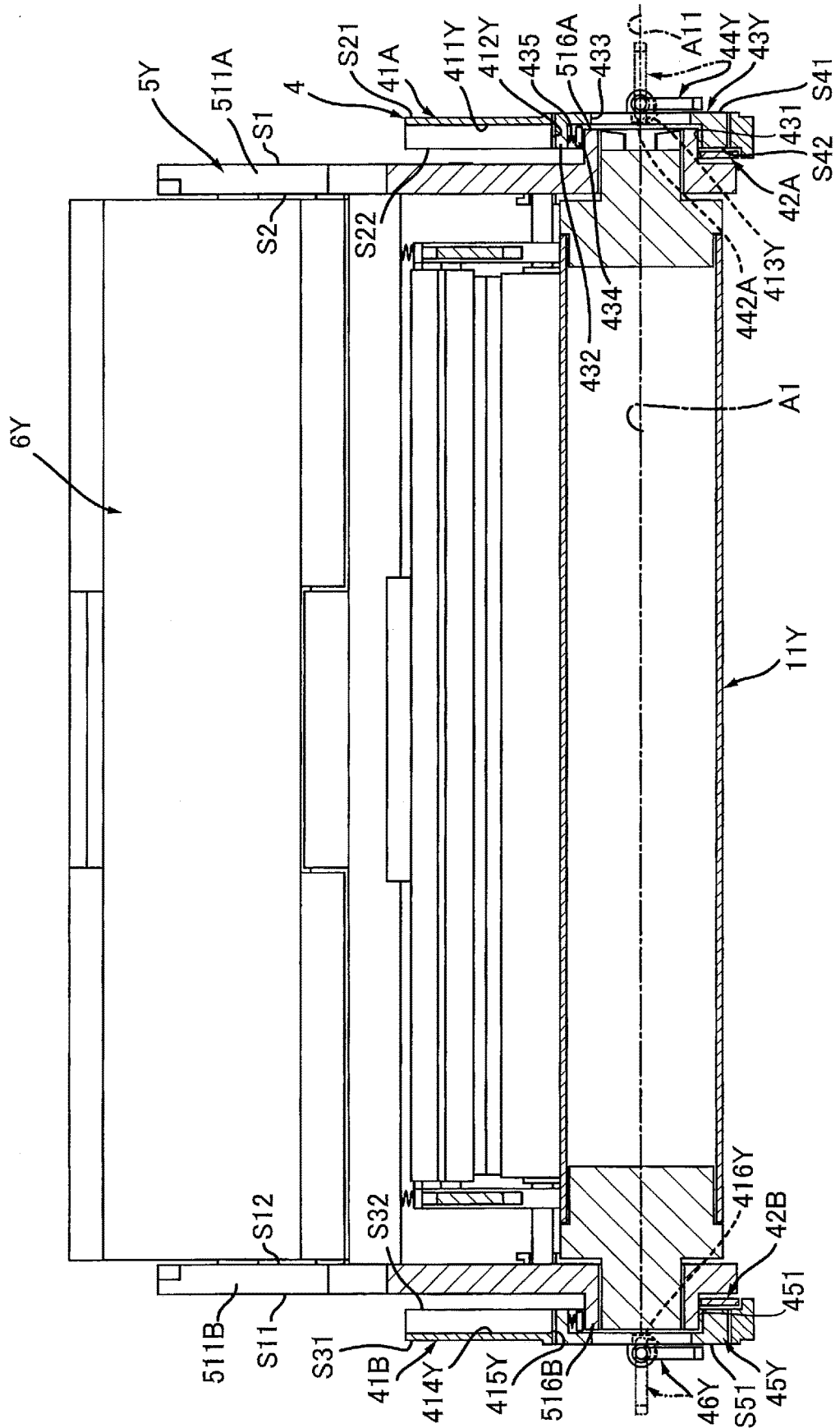


FIG. 7

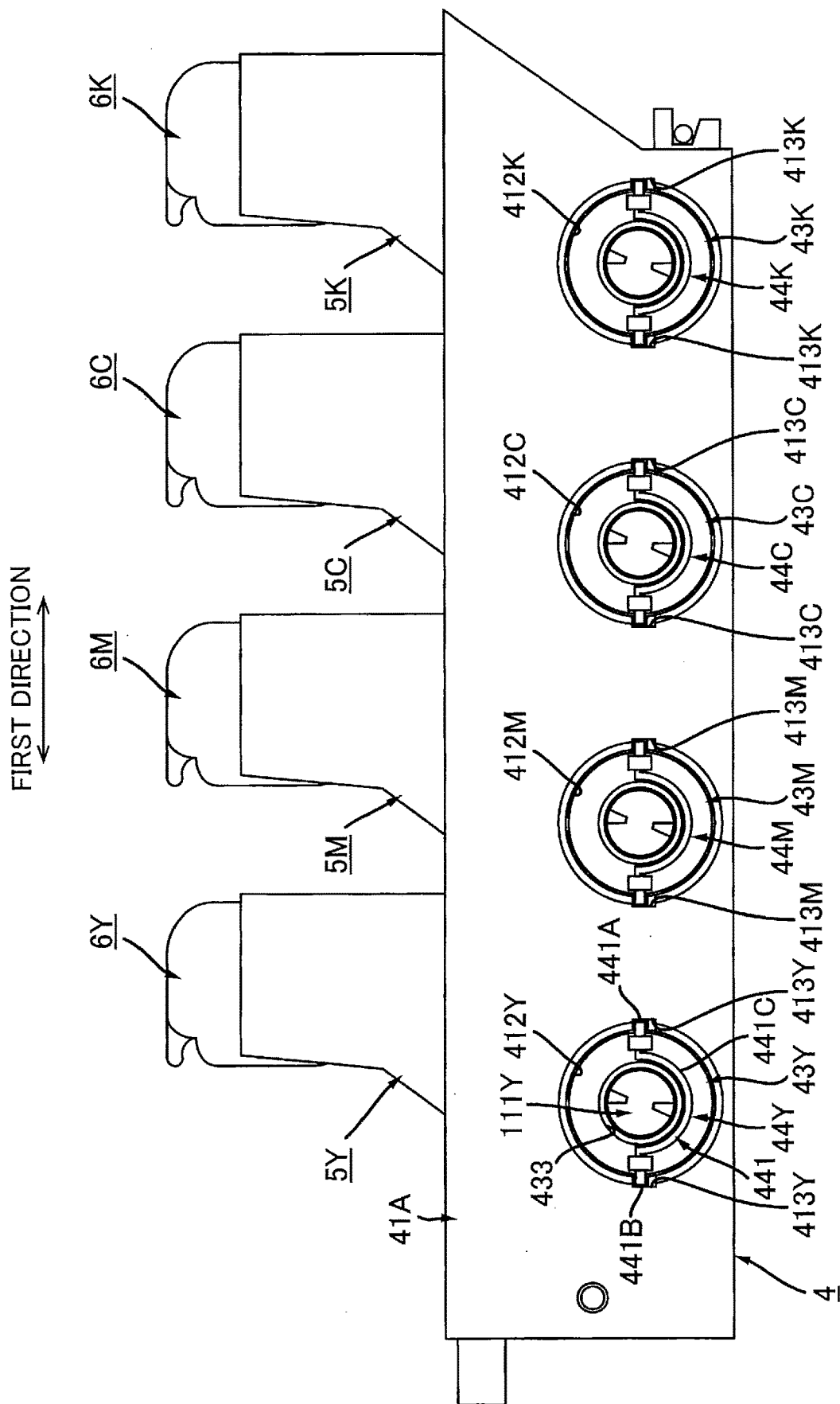




FIG. 8

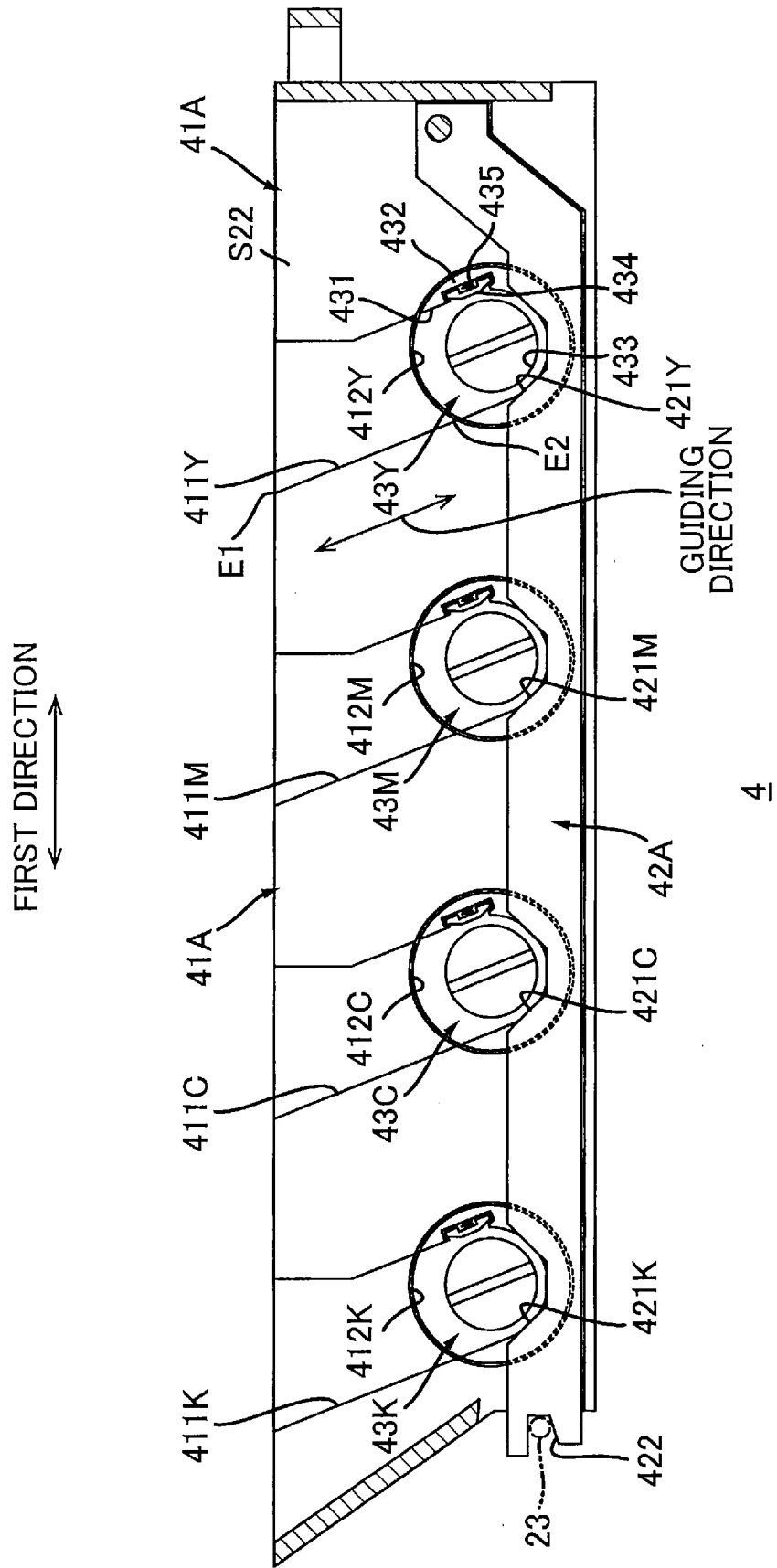


FIG. 9

FIRST DIRECTION  $\longleftrightarrow$

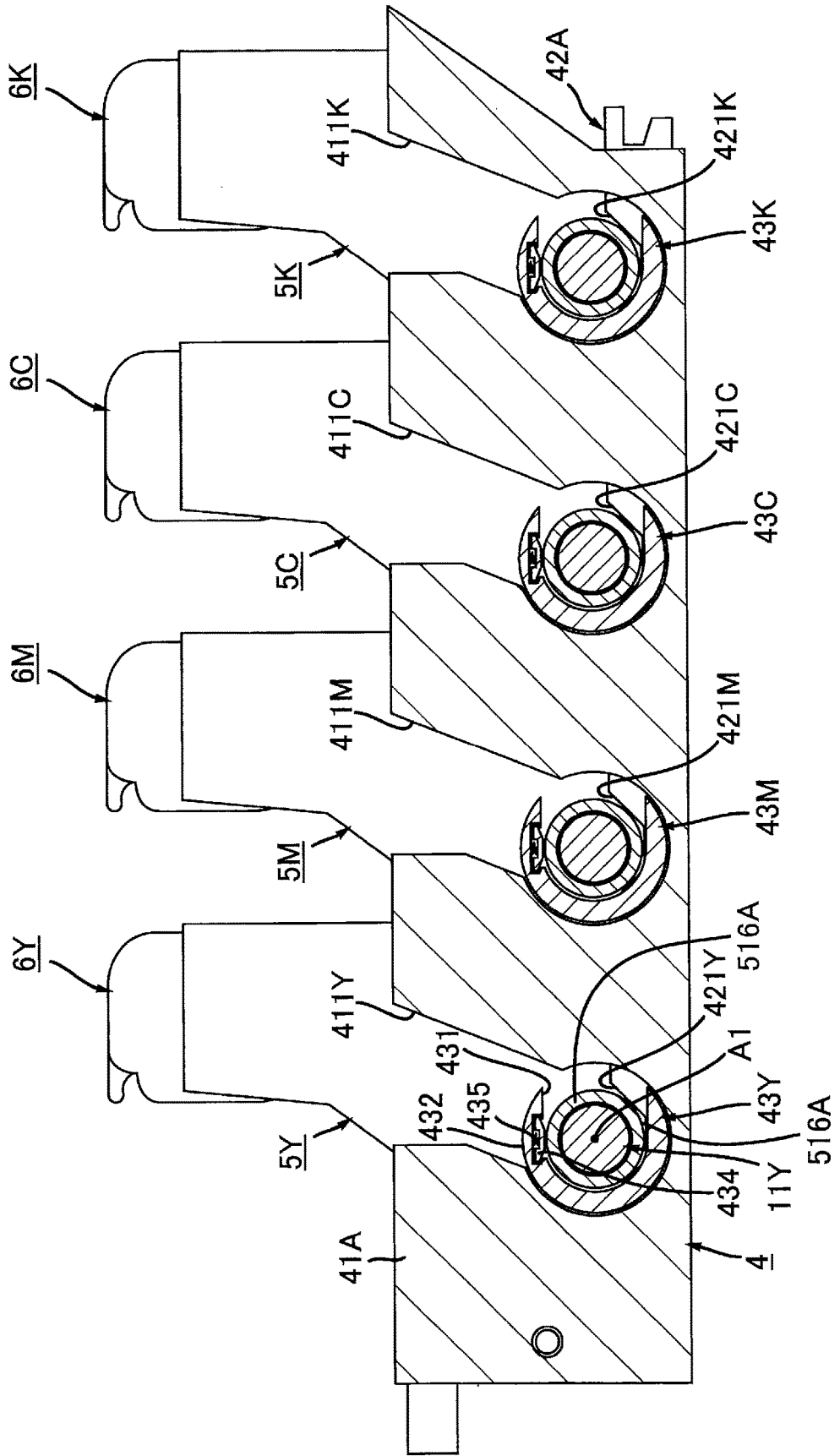


FIG. 10

FIRST DIRECTION →

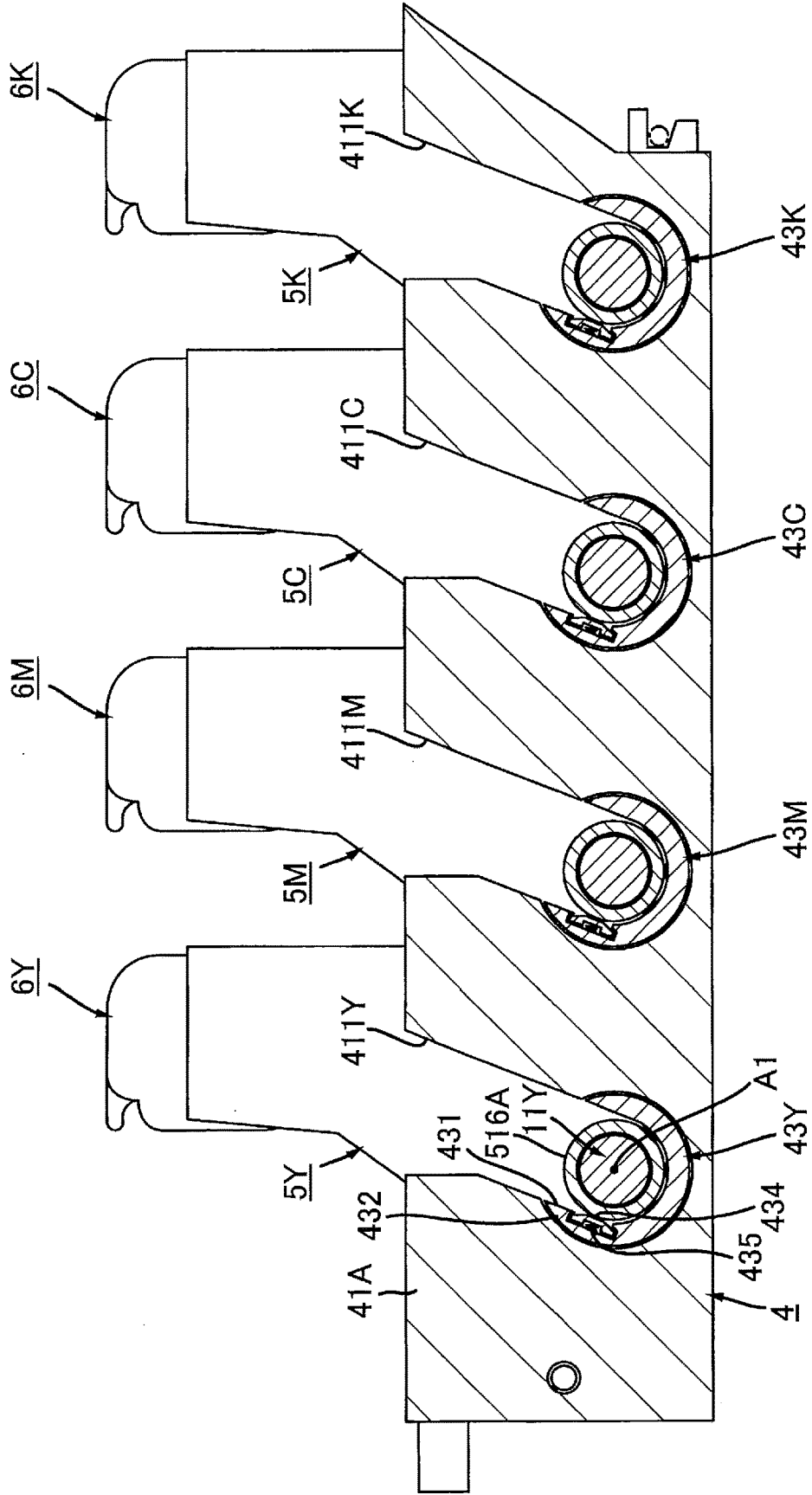


FIG. 11

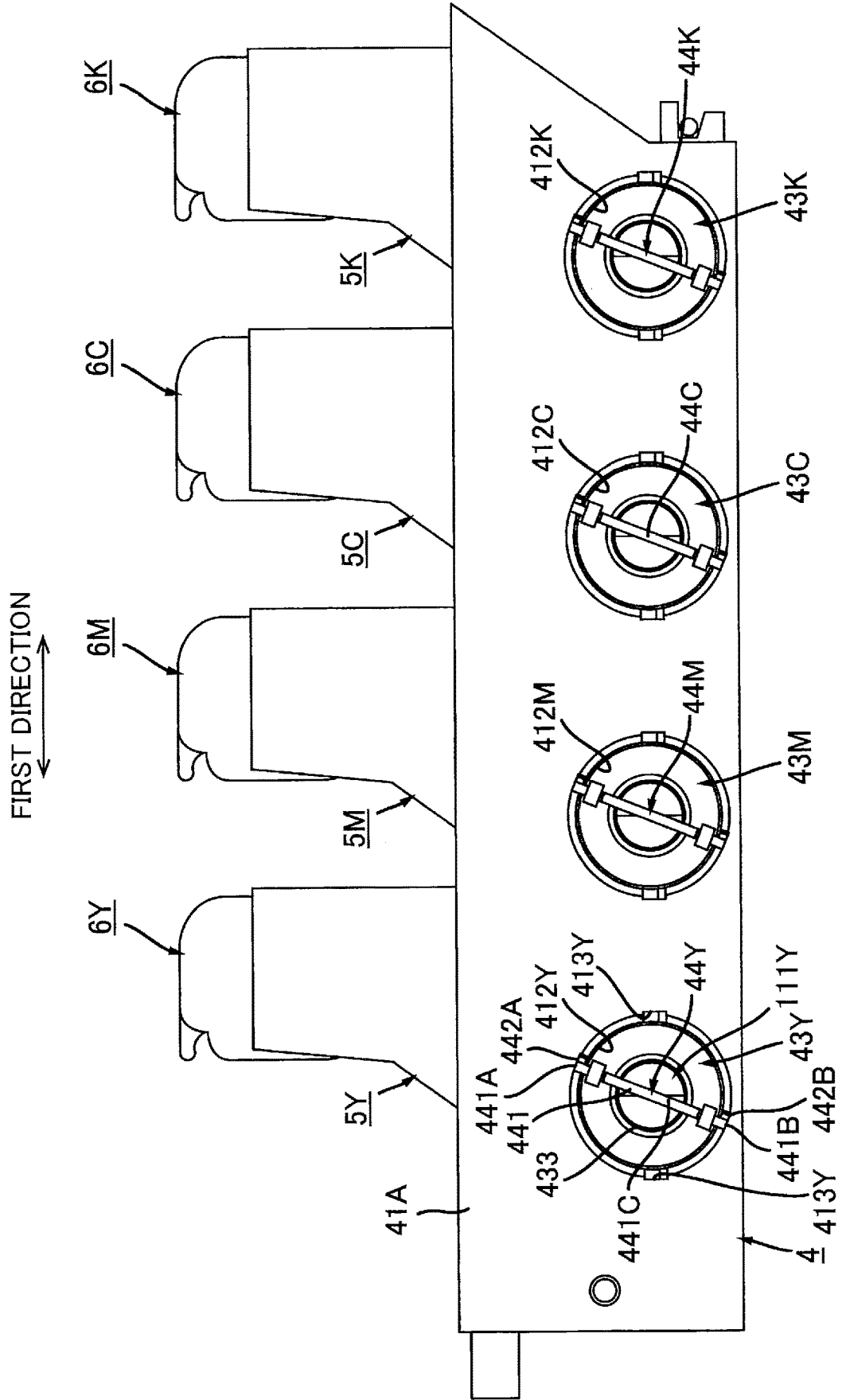


FIG. 12

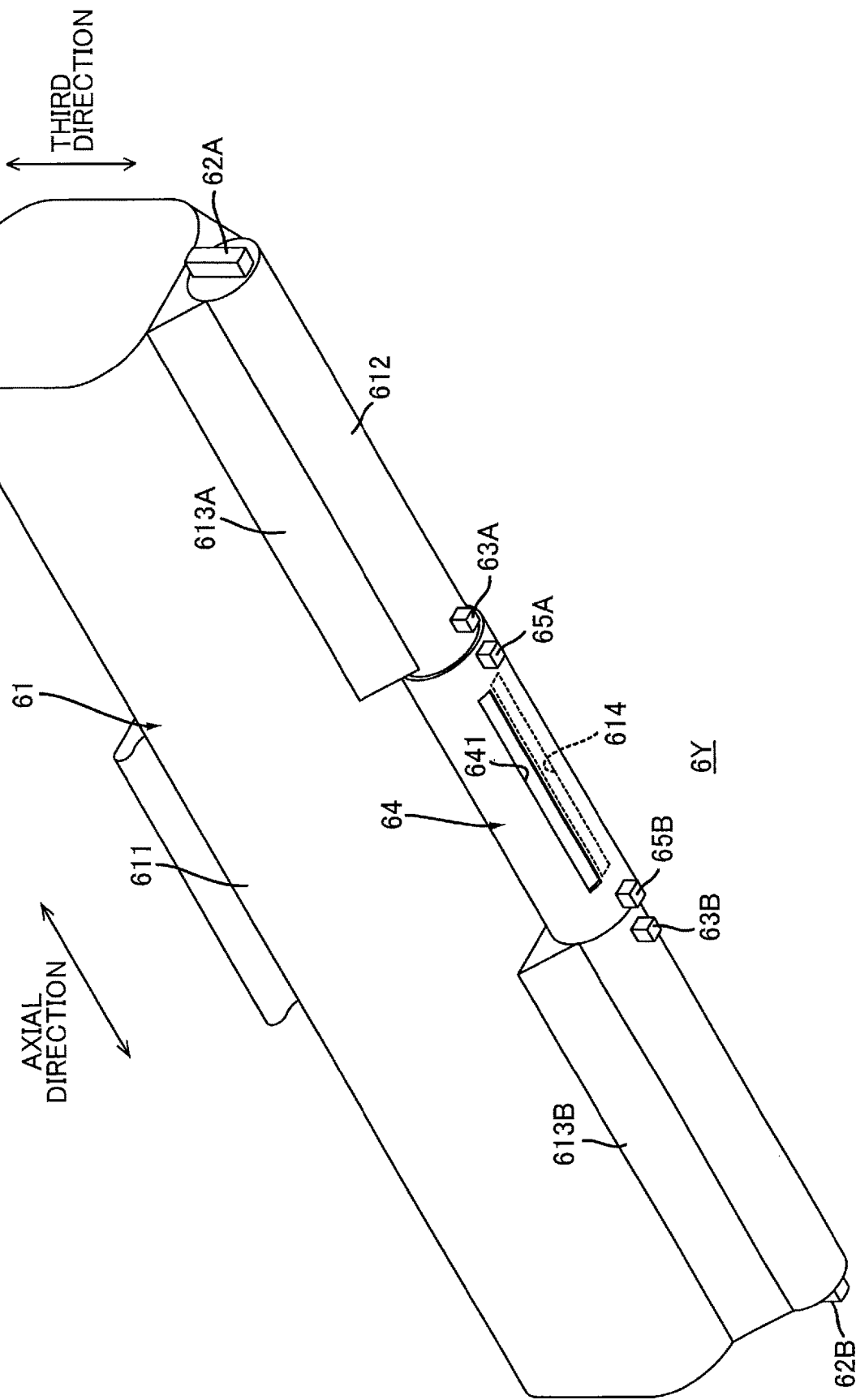


FIG. 13

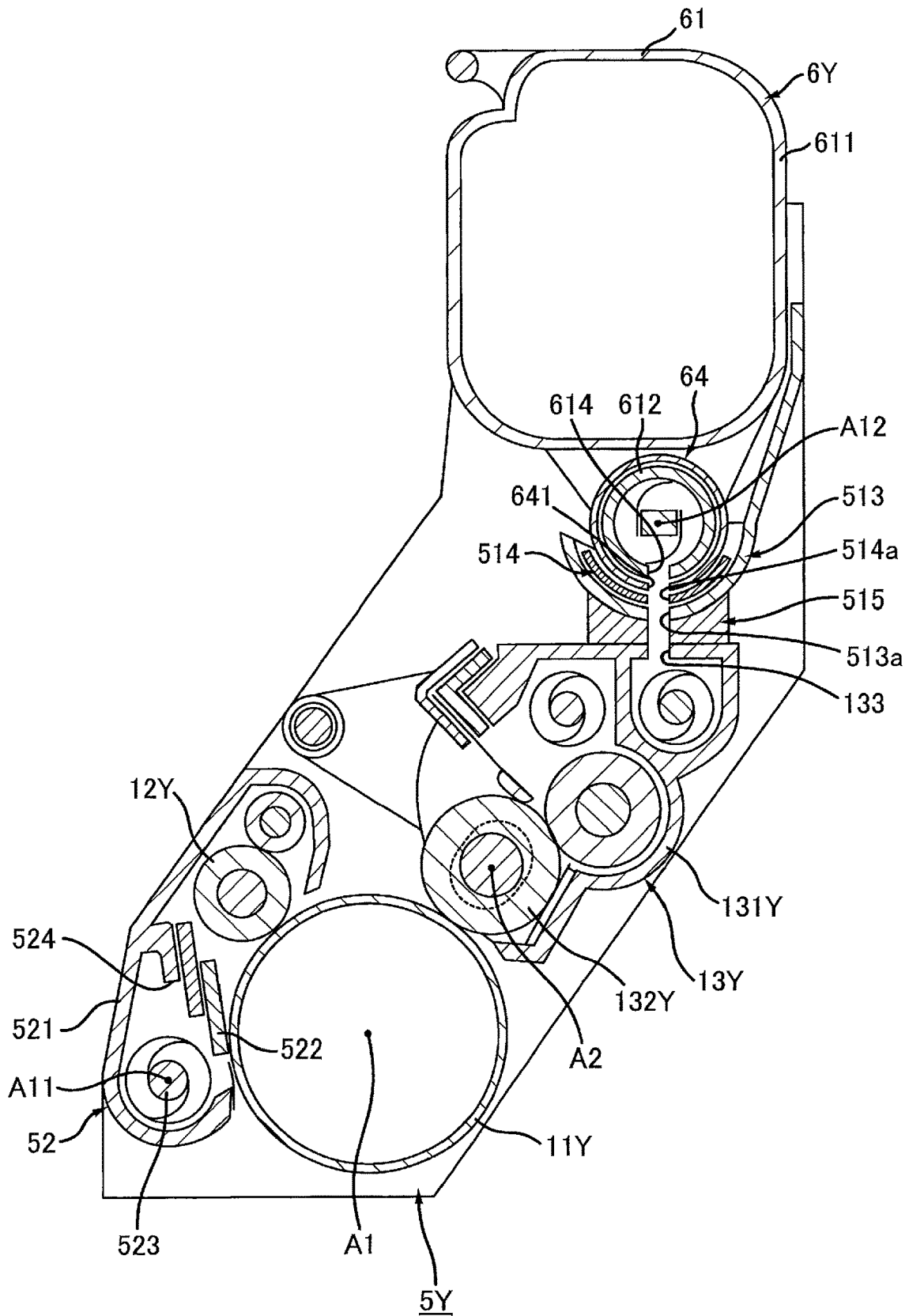


FIG. 14

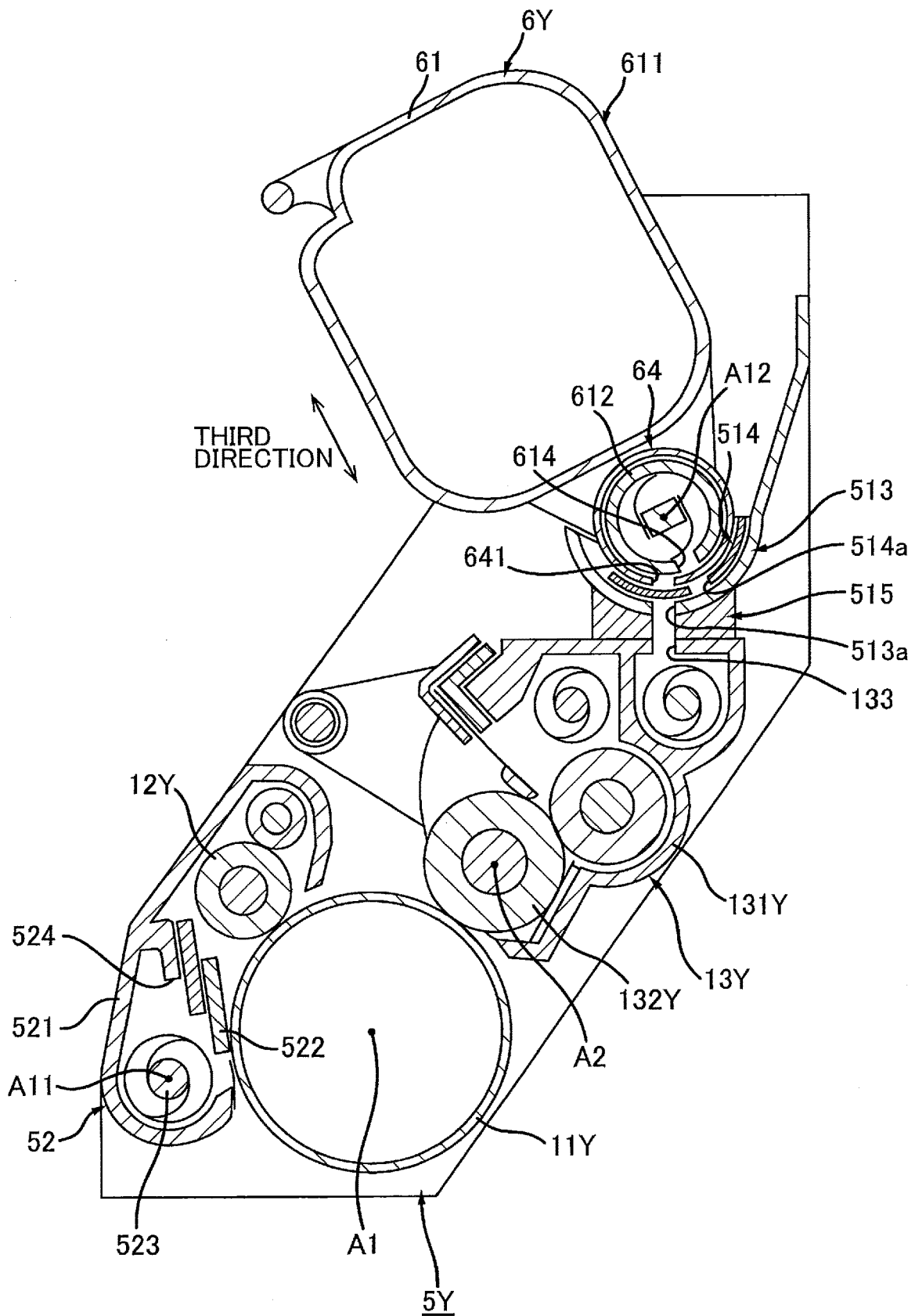


FIG. 15

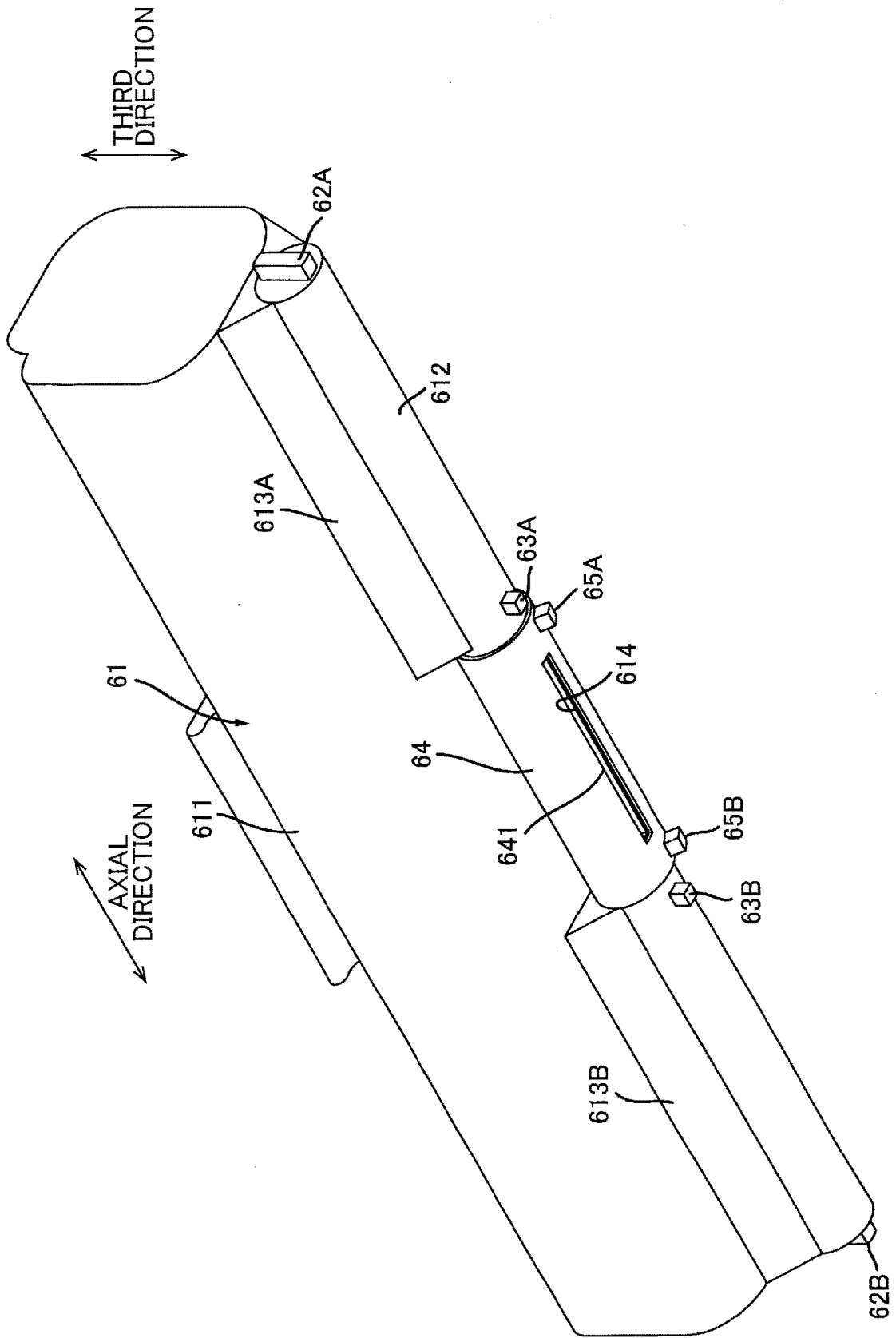




FIG. 16

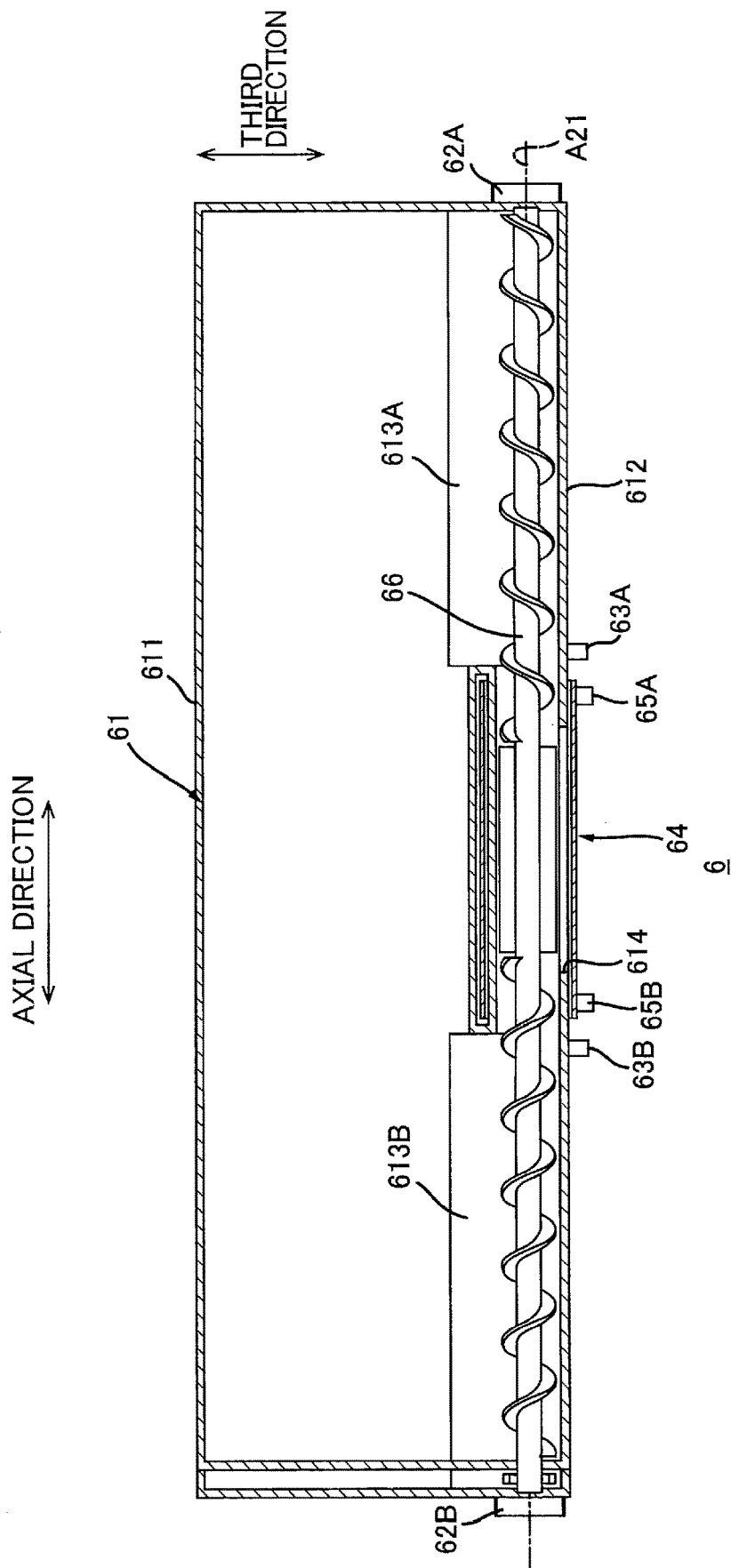


FIG. 17

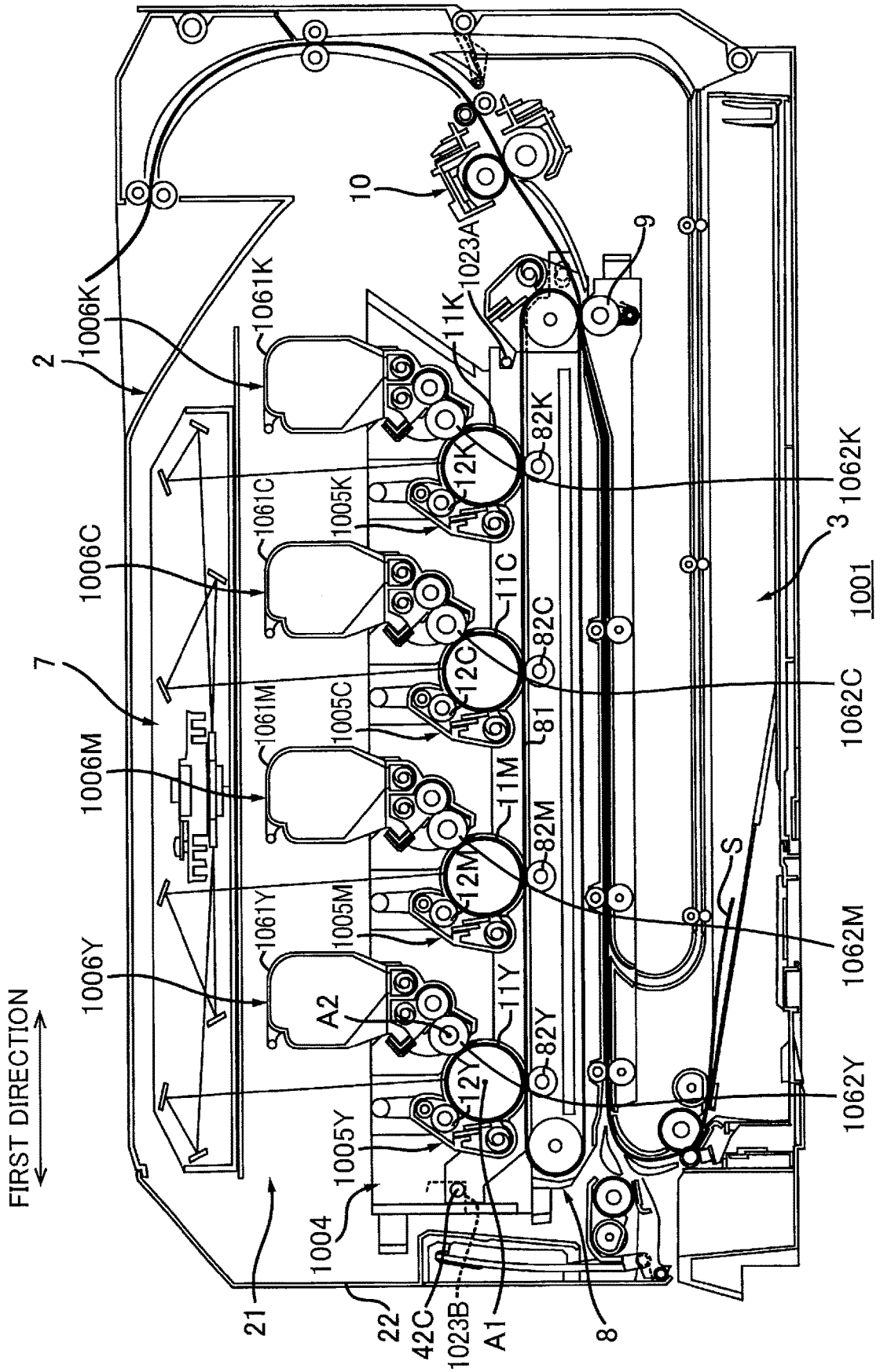


FIG. 18

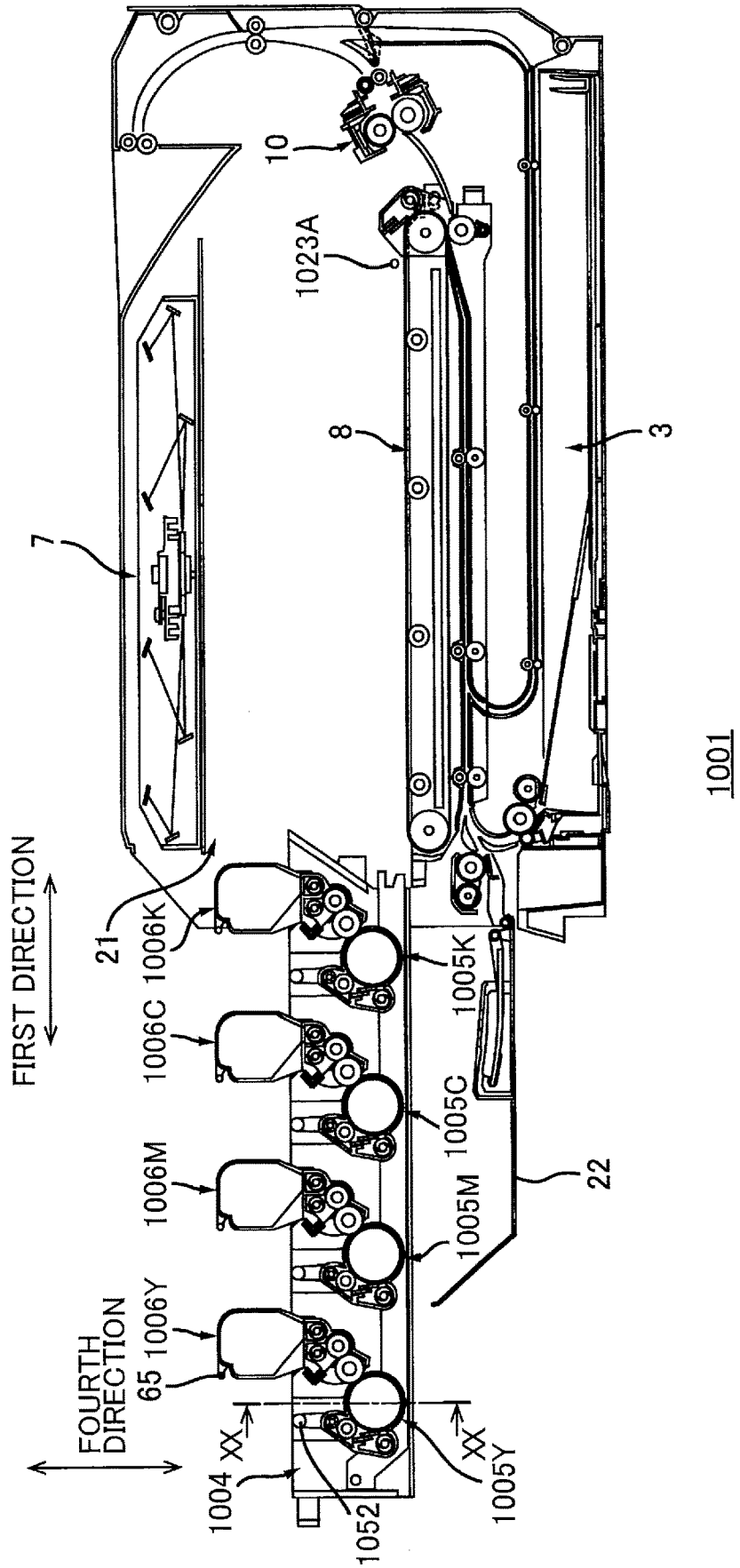


FIG. 19A

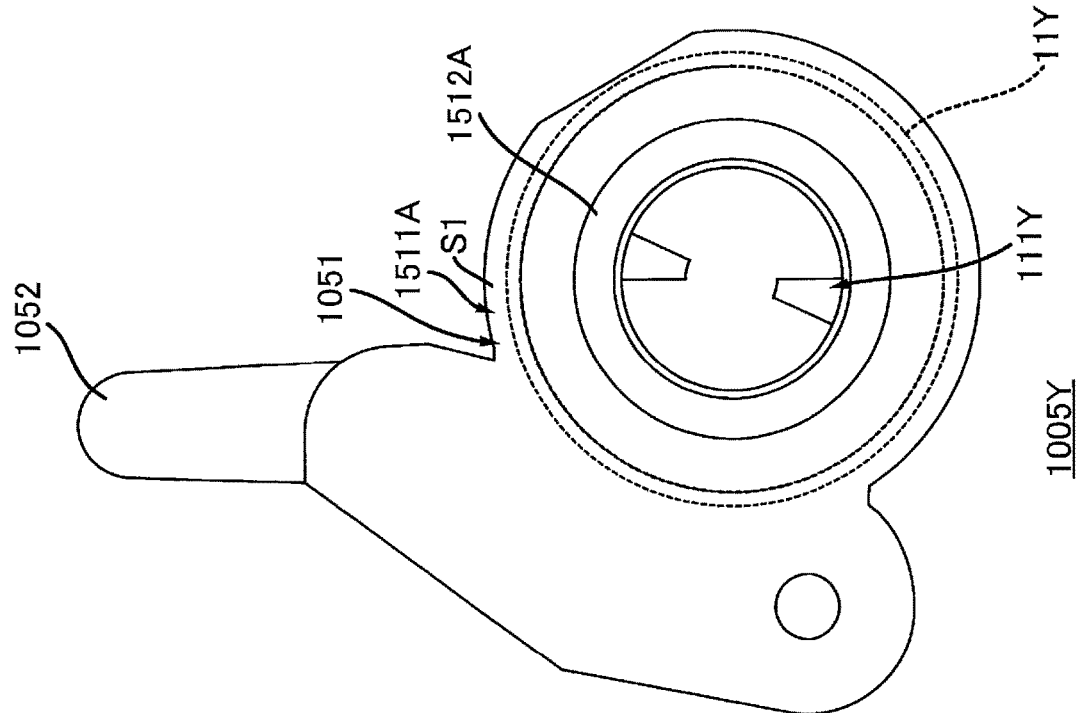


FIG. 19B

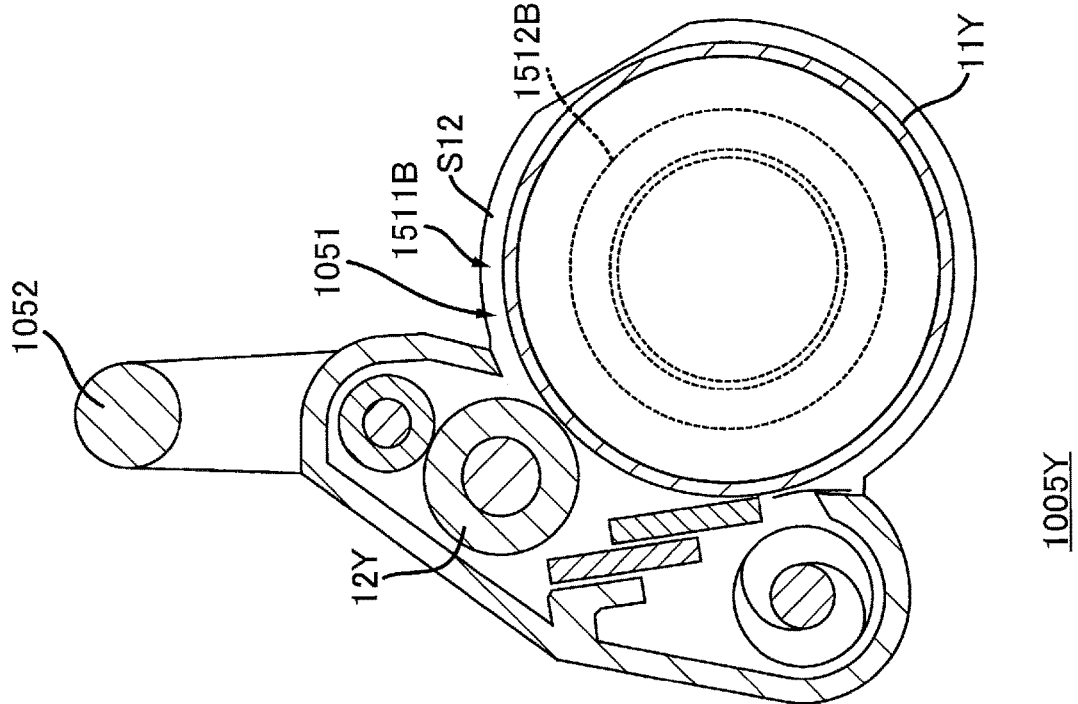


FIG. 20

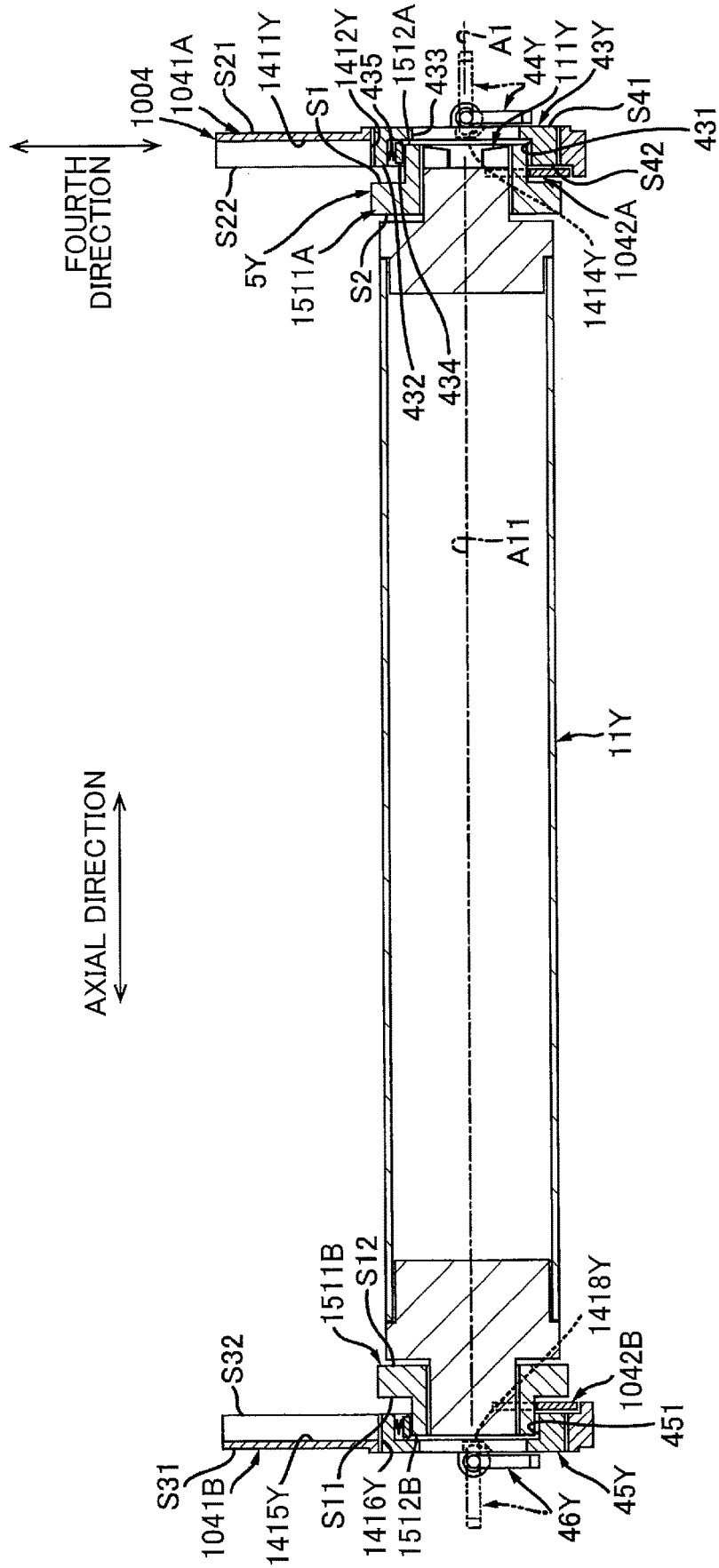


FIG. 21

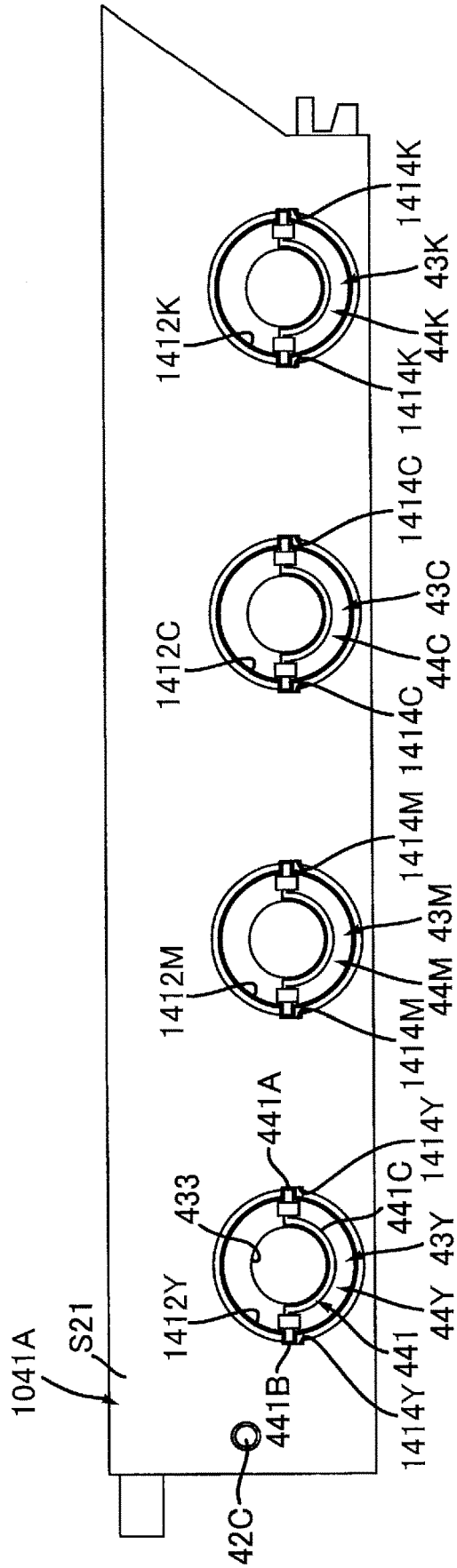


FIG. 22

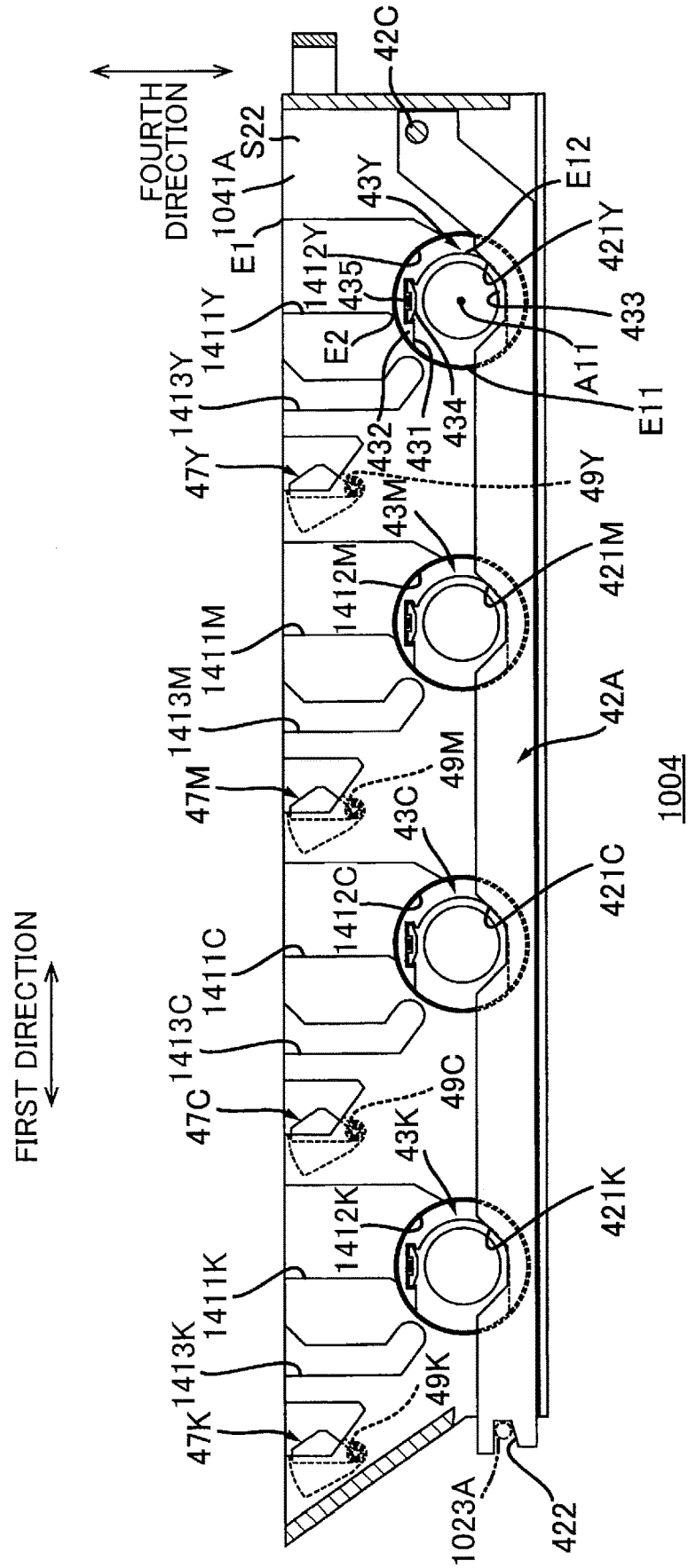


FIG. 23

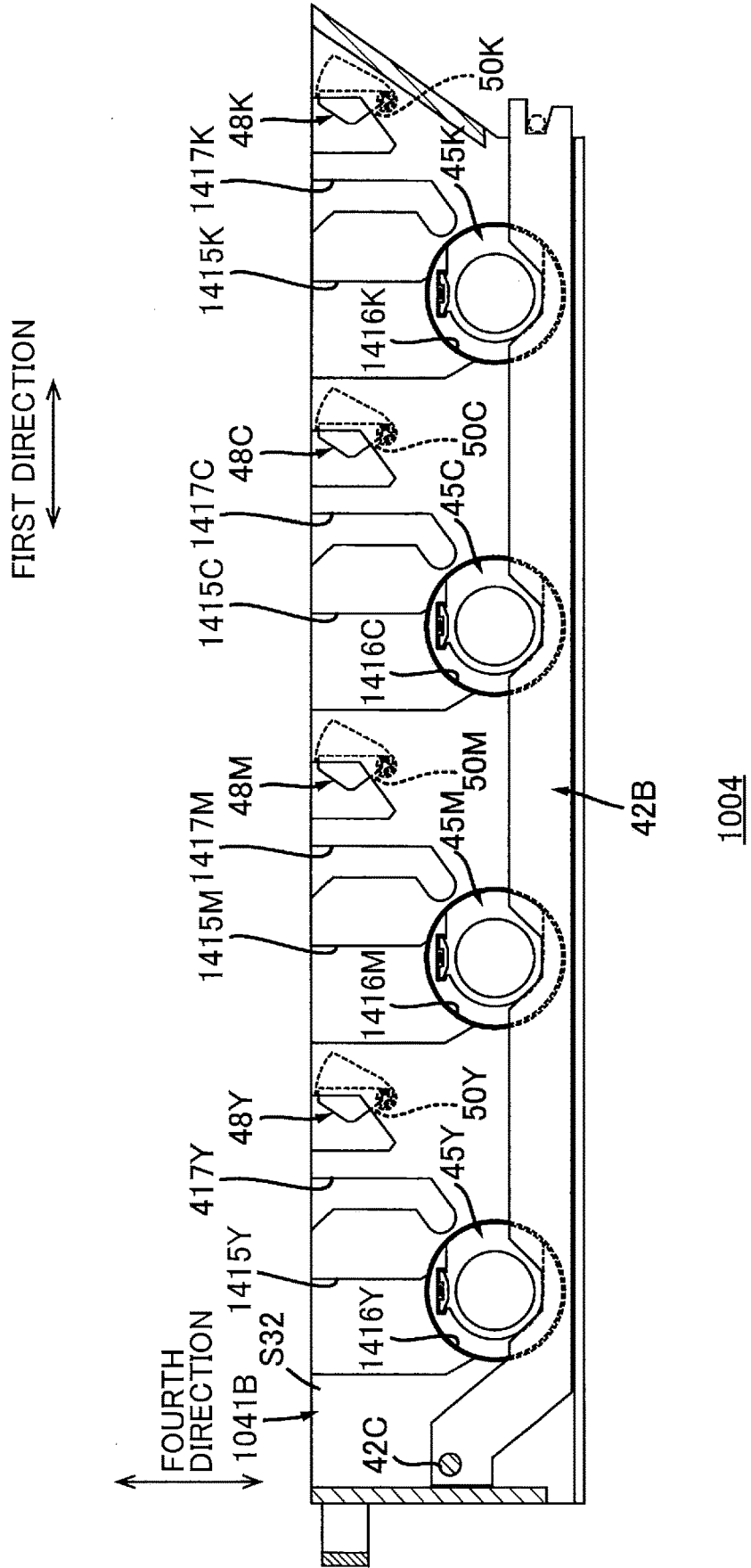




FIG. 24

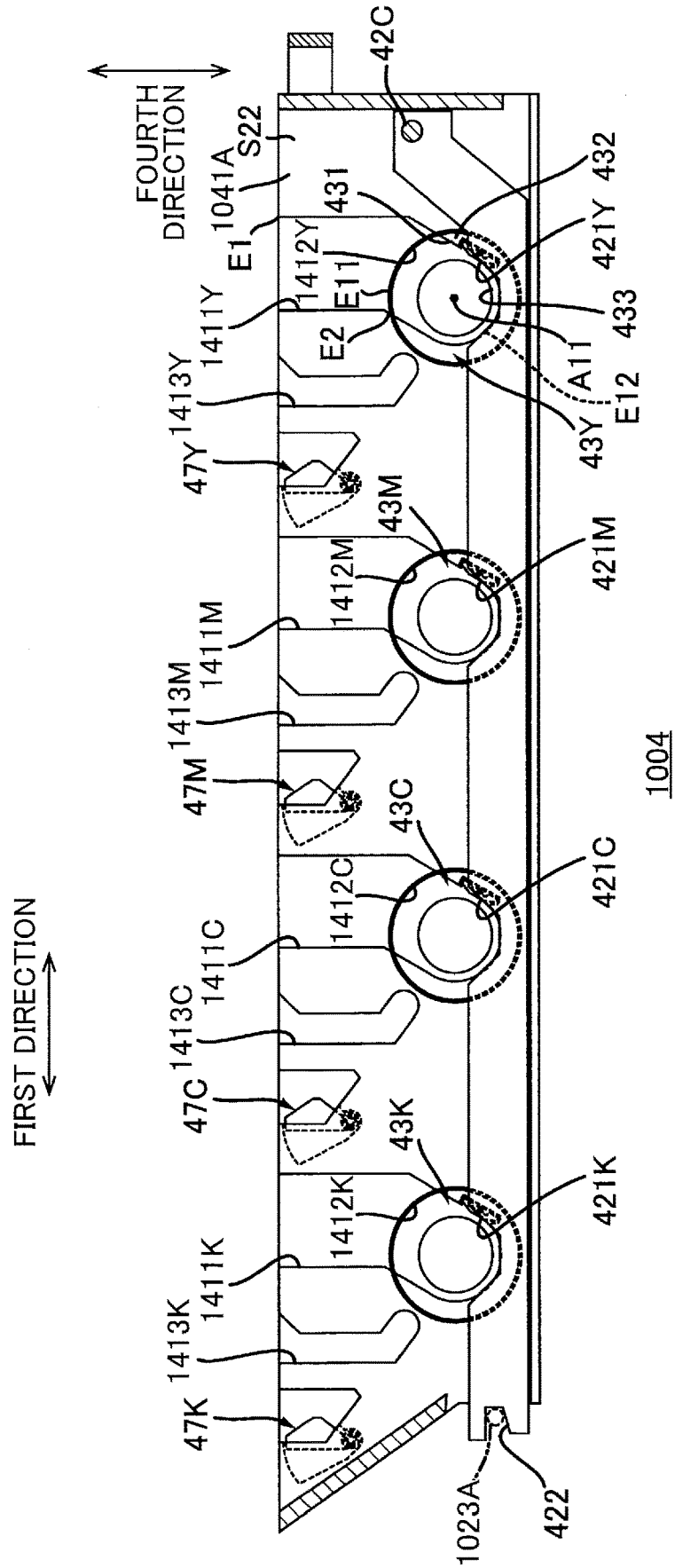


FIG. 25

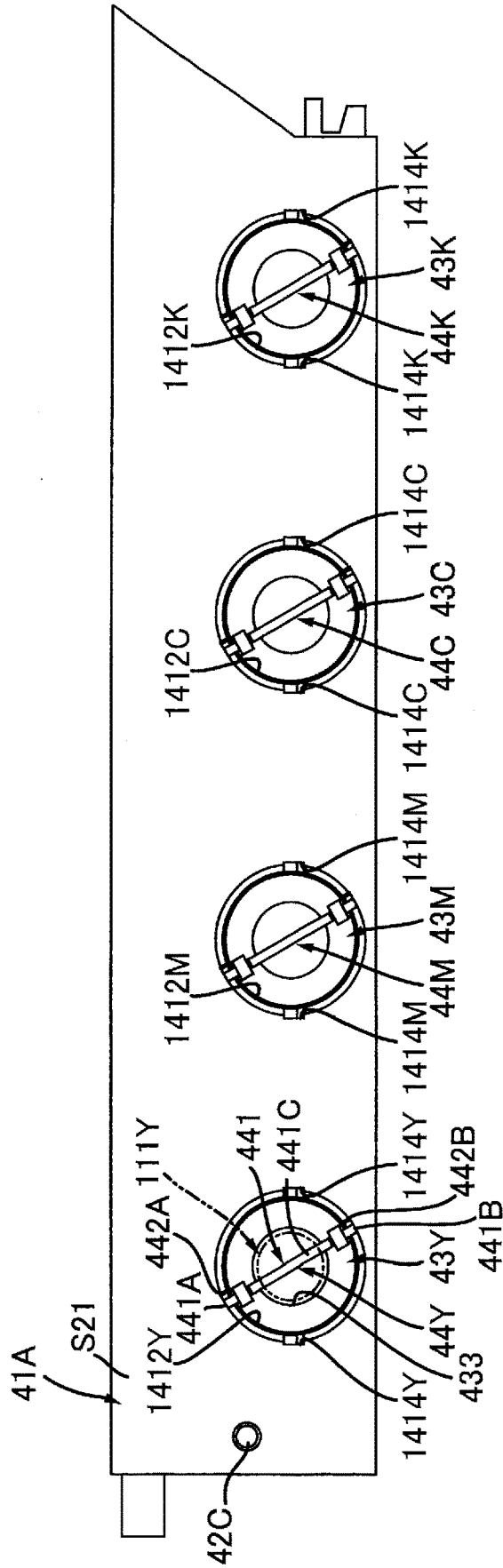
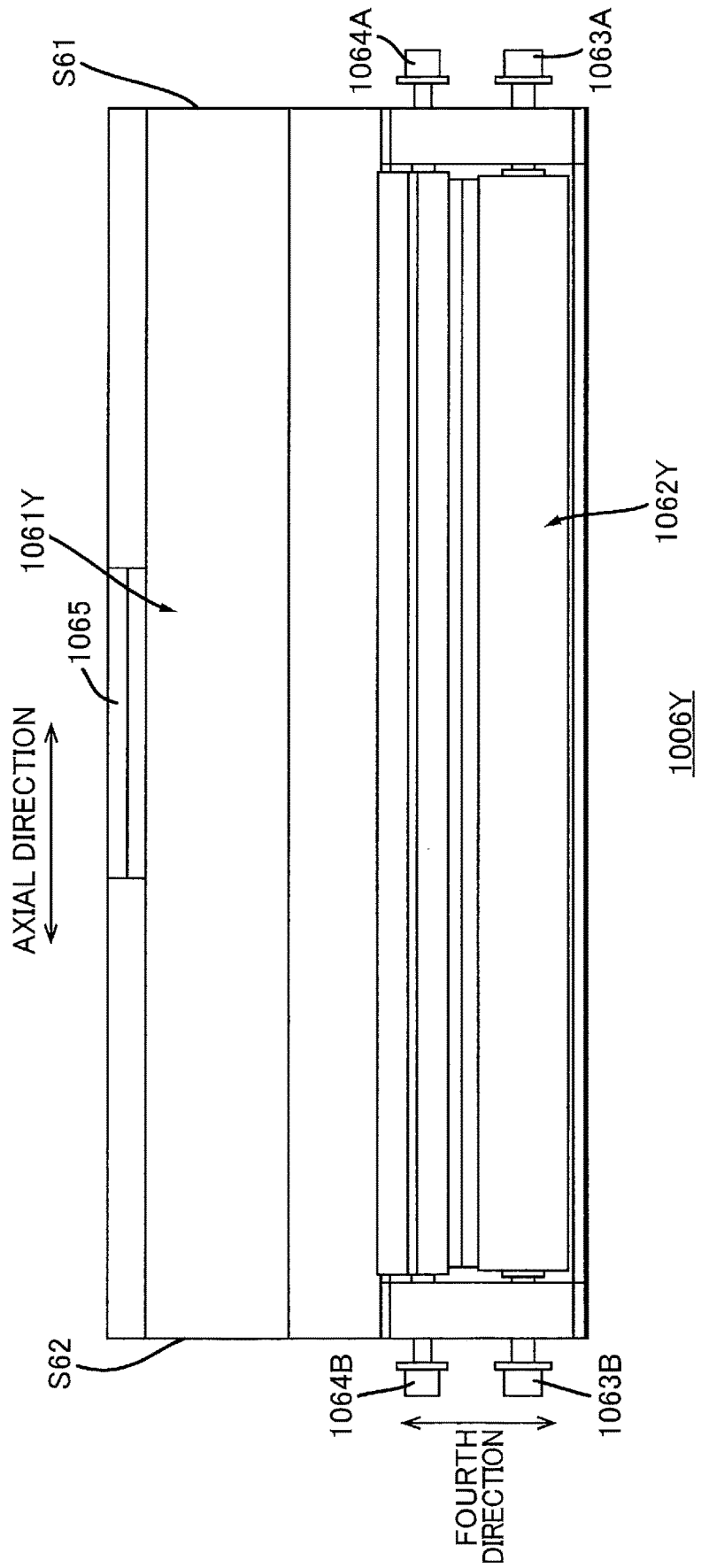


FIG. 26



**IMAGE FORMING APPARATUS INCLUDING  
LOCKING MEMBER CONFIGURED TO  
LOCK PHOTOSENSITIVE DRUM RELATIVE  
TO DRAWER**

**CROSS REFERENCE TO RELATED  
APPLICATION**

[0001] This application claims priorities from Japanese Patent Application Nos. 2021-032136 filed Mar. 1, 2021, and 2021-044549 filed Mar. 18, 2021. The entire contents of the priority applications are incorporated herein by reference.

**BACKGROUND**

[0002] There has been known an image forming apparatus in which a toner cartridge is attachable to and detachable from a drawer including a photosensitive drum.

[0003] Further, also known is another conventional image forming apparatus including a drum cartridge provided with a photosensitive drum, and a developing cartridge provided with a developing roller. The drum cartridge and the developing cartridge are attachable to and detachable from a drawer.

**SUMMARY**

[0004] With such one conventional image forming apparatus, there may be a demand of modification in that a drum unit including the photosensitive drum and a developing roller is attachable to and detachable from the drawer, and the toner cartridge is attachable to and detachable from the drum unit. In such a modification, displacement of the drum unit with respect to the drawer may likely to occur when a user attaches or detaches the toner cartridge to or from the drum unit that is attached to the drawer. Hence, positioning accuracy of the photosensitive drum relative to a housing of the image forming apparatus may be lowered due to displacement of the drum unit with respect to the drawer.

[0005] Further, according to the other conventional image forming apparatus, a user attaches or detaches the developing cartridge to or from the drawer in a state where the drum cartridge is attached to the drawer. In such attachment or detachment, the drum cartridge may likely to be displaced relative to the drawer. Hence, positioning accuracy of the photosensitive drum relative to a housing of the image forming apparatus may be lowered due to displacement of the drum cartridge with respect to the drawer.

[0006] In view of the foregoing, it is an object of the disclosure to provide an image forming apparatus capable of suppressing degradation of the positioning accuracy of the photosensitive drum relative to the housing.

[0007] In order to attain the above and other objects, the disclosure provides an image forming apparatus including: a housing; a drum cartridge as a first cartridge including a photosensitive drum; a second cartridge in which toner is accommodatable; and a drawer. The drawer is movable between an inside position where the drawer in its entirety is positioned inside the housing and an outside position where at least a part of the drawer is positioned outside the housing. The drum cartridge is attachable to and detachable from the drawer. The drawer includes: a side plate configured to receive the photosensitive drum; and a locking member supported by the side plate. The locking member is movable relative to the side plate between a locking position

where the locking member locks the photosensitive drum to the side plate and an unlocking position where the locking member unlocks the photosensitive drum from the side plate in an attached state of the drum cartridge to the drawer.

[0008] With this structure, in case of exchange of the second cartridge for a new second cartridge in the state where the drum cartridge is attached to the drawer, exchange of the second cartridge for the new second cartridge can be performed relative to the drum cartridge while the photosensitive drum is locked to the drawer by the locking member. Hence, displacement of the photosensitive drum relative to the drawer can be suppressed during exchanging work of the second cartridge. As a result, lowering positioning accuracy of the photosensitive drum relative to the housing due to the exchanging work can be restrained. According to the first embodiment the second cartridge is a toner cartridge configured to accommodate therein toner, and according to the second embodiment the second cartridge is a developing cartridge including a developing roller.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0009] The particular features and advantages of the embodiment(s) as well as other objects will become apparent from the following description taken in connection with the accompanying drawings, in which:

[0010] FIG. 1 is a schematic view illustrating a general structure of an image forming apparatus;

[0011] FIG. 2 is a schematic view for description of movement of a drawer illustrated in FIG. 1, and particularly illustrating a state where a cover is at its open position and the drawer is at its outside position;

[0012] FIG. 3 is a perspective view of a drum cartridge, and particularly illustrating a state where a toner shutter of the drum cartridge is at its closed position;

[0013] FIG. 4 is a perspective view of the drum cartridge illustrated in FIG. 3, and particularly illustrating a state where the toner shutter is at its open position;

[0014] FIG. 5 is a cross-sectional view of the drum cartridge illustrated in FIG. 3 taken along a plane passing through a toner inlet opening;

[0015] FIG. 6 is a cross-sectional view of the drawer and the drum cartridge taken along the line VI-VI in FIG. 2;

[0016] FIG. 7 is a side view of the drawer illustrated in FIG. 6;

[0017] FIG. 8 is a cross-sectional view of the drawer taken along a plane passing through a center in an axial direction of the drawer;

[0018] FIG. 9 is a cross-sectional view of the drawer illustrated in FIG. 6 taken along a plane passing through a drawer guide and a lock guide;

[0019] FIG. 10 is a cross-sectional view of the drawer and particularly illustrating a state where a lock member is at its unlock position;

[0020] FIG. 11 is a side view of the drawer illustrated in FIG. 7 and particularly illustrating a state where the lock member is at the unlock position;

[0021] FIG. 12 is a perspective view of a toner cartridge, and particularly illustrating a state where a toner shutter of the toner cartridge is at its closed position;

[0022] FIG. 13 is a cross-sectional view of the drum cartridge and the toner cartridge attached thereto, and particularly illustrating a state where the toner cartridge is at its first position;

[0023] FIG. 14 is a cross-sectional view of the drum cartridge and the toner cartridge attached thereto, and particularly illustrating a state where the toner cartridge is at its second position;

[0024] FIG. 15 is a perspective view of the toner cartridge illustrated in FIG. 12, and particularly illustrating a state where the toner shutter of the toner cartridge is at its open position;

[0025] FIG. 16 is a cross-sectional view of the toner cartridge illustrated in FIG. 12 taken along a plane passing through a toner discharge opening;

[0026] FIG. 17 is a schematic view illustrating a general structure of an image forming apparatus;

[0027] FIG. 18 is a schematic view for description of movement of a drawer illustrated in FIG. 17, and particularly illustrating a state where a cover is at its open position and the drawer is at its outside position;

[0028] FIG. 19A is a side view of a drum cartridge provided in the image forming apparatus illustrated in FIG. 17;

[0029] FIG. 19B is a cross-sectional view of the drum cartridge;

[0030] FIG. 20 is a cross-sectional view of the drum cartridge taken along the line XX-XX in FIG. 18;

[0031] FIG. 21 is a side view of the drawer illustrated in FIGS. 20A and 20B;

[0032] FIG. 22 is a cross-sectional view of the drawer illustrated in FIGS. 20A and 20B as viewed in a direction directing to an inner surface of a side plate 1041A;

[0033] FIG. 23 is a cross-sectional view of the drawer illustrated in FIGS. 20A and 20B as viewed in a direction directing to an inner surface of another side plates 1041B;

[0034] FIG. 24 is a cross-sectional view of the drawer illustrated in FIG. 22, and particularly illustrating a state where a locking member is positioned at an unlocking position;

[0035] FIG. 25 is a side view of the drawer illustrated in FIG. 21, and particularly illustrating a state where the locking member is positioned at the unlocking position; and

[0036] FIG. 26 is a front view of a developing cartridge provided in the image forming apparatus illustrated in FIG. 17.

## DETAILED DESCRIPTION

### First Embodiment

[0037] An image forming apparatus according to a first embodiment will be described with reference to FIGS. 1 through 16.

#### [0038] 1. Image Forming Apparatus 1

[0039] An outline of the image forming apparatus will be described with reference to FIGS. 1 through 3. As illustrated in FIG. 1, the image forming apparatus 1 includes a housing 2, a sheet cassette 3, a drawer 4, a plurality of drum cartridges 5Y, 5M, 5C, 5K, a plurality of toner cartridges 6Y, 6M, 6C, 6K, an exposure unit 7, a belt unit 8, a transfer roller 9, and a fixing unit 10. Each of the drum cartridges 5Y, 5M, 5C, 5K is an example of a “first cartridge,” and each of the toner cartridges 6Y, 6M, 6C, 6K is an example of a “second cartridge.”

#### [0040] 1.1 Housing 2

[0041] The housing 2 accommodates therein the sheet cassette 3, the drawer 4, the plurality of drum cartridges 5Y, 5M, 5C, 5K, the plurality of toner cartridges 6Y, 6M, 6C,

6K, the exposure unit 7, the belt unit 8, the transfer roller 9, and the fixing unit 10. The housing 2 has an opening 21, and includes a cover 22 and a positioning member 23.

[0042] The housing has one end in a first direction provided with a side wall where the opening 21 is formed. The cover 22 is movable between a closed position as illustrated in FIG. 1 and an open position as illustrated in FIG. 2. The cover 22 closes the opening 21 when the cover 22 is at the closed position. The cover 22 opens the opening 21 when the cover 22 is at the open position.

[0043] The positioning member 23 extends in the axial direction. The axial direction will be described later. The positioning member 23 has a solid cylindrical shape. The positioning member 23 is made from metal such as stainless steel.

#### [0044] 1.2 Sheet Cassette 3

[0045] As illustrated in FIG. 1, the sheet cassette 3 is configured to accommodate therein a sheet S. The sheet S stored in the sheet cassette 3 is configured to be conveyed to the transfer roller 9.

#### [0046] 1.3 Drawer 4

[0047] As illustrated in FIG. 2, the drawer 4 is movable in the first direction through the opening 21 between an inside position illustrated in FIG. 1 and an outside position illustrated in FIG. 2 in a state where the cover 22 is at the open position. As illustrated in FIG. 1, the drawer 4 in its entirety is positioned inside the housing 2 when the drawer 4 is at the inside position. As illustrated in FIG. 2, at least a part of the drawer 4 is positioned outside the housing 2 when the drawer 4 is at the outside position.

#### [0048] 1.4 Drum Cartridges 5Y, 5M, 5C, 5K

[0049] Each of the drum cartridges 5Y, 5M, 5C, 5K is attachable to and detachable from the drawer 4. Specifically, each of the drum cartridges 5Y, 5M, 5C, 5K is attachable to and detachable from the drawer 4 when the drawer 4 is at the outside position.

[0050] Incidentally, description as to each of the drum cartridges 5M, 5C, 5K is the same as the description of the drum cartridge 5Y. Therefore, description of the drum cartridges 5M, 5C, 5K will be omitted.

[0051] As illustrated in FIG. 1, the drum cartridge 5Y includes a photosensitive drum 11Y, a charger 12Y, and a developing unit 13Y.

#### [0052] 1.4.1 Photosensitive Drum 11Y

[0053] The photosensitive drum 11Y extends in the axial direction. The axial direction crosses the first direction in the attached state of the drum cartridge 5Y to the drawer 4. Preferably, the axial direction is perpendicular to the first direction in the attached state of the drum cartridge 5Y to the drawer 4. The photosensitive drum 11Y is rotatable about a drum axis A1. The drum axis A1 extends in the axial direction. As illustrated in FIG. 3, the photosensitive drum 11Y includes a coupling 111Y.

[0054] The coupling 111Y is positioned at one end portion in the axial direction of the photosensitive drum 11Y. The coupling 111Y is rotatable along with the rotation of the photosensitive drum 11Y. The coupling 111Y is fitted with a main coupling (not illustrated) provided in the housing 2 in a state where the drawer 4 is positioned at the inside position and the drum cartridge 5Y is attached to the drawer 4. The coupling 111Y is rotated upon receipt of driving force from the main coupling.

**[0055]** 1.4.2 Charger **12Y**

**[0056]** As illustrated in FIG. 1, the charger **12Y** is configured to charge a peripheral surface of the photosensitive drum **11Y**. In the present embodiment, a charge roller is provided as the charger **12Y**. However, a Scorotron charger is also available as the charger **12Y**.

**[0057]** 1.4.3 Developing Unit **13Y**

**[0058]** The developing unit **13Y** is configured to supply toner to the photosensitive drum **11Y**. Specifically, the developing unit **13Y** includes a developing casing **131Y** and a developing roller **132Y**.

**[0059]** 1.4.3.1 Developing Casing **131Y**

**[0060]** The developing casing **131Y** is configured to accommodate therein toner supplied from the toner cartridge **6Y**. The developing casing **131Y** is formed with a developing opening **133**. Toner in the toner cartridge **6Y** is entered in the developing casing **131Y** through the developing opening **133**. The developing casing **131Y** supports the developing roller **132Y**.

**[0061]** 1.4.3.2 Developing Roller **132Y**

**[0062]** The developing roller **132Y** is configured to supply toner in the developing casing **131Y** to the photosensitive drum **11Y**. The developing roller **132Y** is in contact with the photosensitive drum **11Y**. However, the developing roller **132Y** may be movable away from the photosensitive drum **11Y**. The developing roller **132Y** extends in the axial direction. The developing roller **132Y** is rotatable about a developing axis **A2** extending in the axial direction.

**[0063]** 1.6 Toner Cartridges **6Y**, **6M**, **6C**, **6K**

**[0064]** The toner cartridge **6Y** is configured to accommodate therein toner to be supplied to the photosensitive drum **11Y**. The toner cartridge **6Y** is attachable to and detachable from the drum cartridge **5Y**. The toner cartridge **6Y** is configured to supply toner to the developing unit **13Y** in the attached state of the toner cartridge **6Y** to the drum cartridge **5Y**.

**[0065]** The toner cartridge **6M** is configured to accommodate therein toner to be supplied to the photosensitive drum **11M**. The toner cartridge **6M** is attachable to and detachable from the drum cartridge **5M**. The toner cartridge **6M** is configured to supply toner to the developing unit **13M** in the attached state of the toner cartridge **6M** to the drum cartridge **5M**.

**[0066]** The toner cartridge **6C** is configured to accommodate therein toner to be supplied to the photosensitive drum **11C**. The toner cartridge **6C** is attachable to and detachable from the drum cartridge **5C**. The toner cartridge **6C** is configured to supply toner to the developing unit **13C** in the attached state of the toner cartridge **6C** to the drum cartridge **5C**.

**[0067]** The toner cartridge **6K** is configured to accommodate therein toner to be supplied to the photosensitive drum **11K**. The toner cartridge **6K** is attachable to and detachable from the drum cartridge **5K**. The toner cartridge **6K** is configured to supply toner to the developing unit **13K** in the attached state of the toner cartridge **6K** to the drum cartridge **5K**.

**[0068]** 1.7 Exposure Unit **7**

**[0069]** The exposure unit **7** is configured to expose each peripheral surface of each of the photosensitive drums **11Y**, **11M**, **11C**, **11K** to lights in a state where the drawer **4** is at the inside position and the drum cartridges **5Y**, **5M**, **5C**, **5K** are attached to the drawer **4**. A laser scanner unit is provided as the exposure unit **7**.

**[0070]** 1.8 Belt Unit **8**

**[0071]** The belt unit **8** is positioned below the drum cartridges **5Y**, **5M**, **5C**, **5K** in the state where the drawer **4** is at the inside position and the drum cartridges **5Y**, **5M**, **5C**, **5K** are attached to the drawer **4**. The belt unit **8** includes an intermediate transfer belt **81** and a plurality of transfer rollers **82Y**, **82M**, **82C**, **82K**.

**[0072]** The intermediate transfer belt **81** is in contact with the photosensitive drums **11Y**, **11M**, **11C**, **11K** in the state where the drawer **4** is at the inside position and the drum cartridges **5Y**, **5M**, **5C**, **5K** are attached to the drawer **4**.

**[0073]** The transfer roller **82Y** is configured to transfer toner on the photosensitive drum **11Y** to the intermediate transfer belt **81**. The transfer roller **82M** is configured to transfer toner on the photosensitive drum **11M** to the intermediate transfer belt **81**. The transfer roller **82C** is configured to transfer toner on the photosensitive drum **11C** to the intermediate transfer belt **81**. The transfer roller **82K** is configured to transfer toner on the photosensitive drum **11K** to the intermediate transfer belt **81**.

**[0074]** 1.9 Transfer Roller **9**

**[0075]** The transfer roller **9** is configured to transfer toner on the intermediate transfer belt **81** to the sheet **S**. Specifically, the sheet **S** conveyed from the sheet cassette **3** toward the transfer roller **9** is moved past a portion between the transfer roller **9** and the intermediate transfer belt **81** and is conveyed to the fixing unit **10**. At this time, the transfer roller **9** transfers the toner on the intermediate transfer belt **81** to the sheet **S**.

**[0076]** 1.10 Fixing Unit **10**

**[0077]** The fixing unit **10** is configured to heat and press the sheet **S** on which toner is transferred to fix toner to the sheet **S**. The sheet **S** moved past the fixing unit **10** is discharged on an upper surface of the housing **2**.

**[0078]** 2. Details of Drum Cartridge **5Y**

**[0079]** Next, the drum cartridge **5Y** will be described in detail with reference to FIGS. **3** through **6**. Incidentally, the "first direction" described below as to the drum cartridge **5Y** is the defined in the attached state of the drum cartridge **5Y** to the drawer **4**.

**[0080]** As illustrated in FIG. **3**, the drum cartridge **5Y** includes a drum frame **51** in addition to the above-described photosensitive drum **11Y**, the charger **12Y**, and the developing unit **13Y**.

**[0081]** The drum frame **51** supports the photosensitive drum **11Y**, the charger **12Y**, the developing unit **13Y**, and a drum cleaner **52**. The drum frame **51** includes drum side plates **511A**, **511B**, toner guides **512A**, **512B**, a receiving portion **513**, a toner shutter **514**, a sealing member **515**, and sleeve portions **516A**, **516B** (see FIG. **6**).

**[0082]** 2.1 Drum Side Plates **511A**, **511B**

**[0083]** The drum side plate **511A** is positioned at one end portion in the axial direction of the drum cartridge **5Y**. The drum side plate **511A** has an outer surface **51** and an inner surface **S2**. The inner surface **S2** is positioned between the outer surface **51** and the drum side plate **511B** in the axial direction.

**[0084]** The drum side plate **511B** is positioned at another end portion in the axial direction of the drum cartridge **5Y**. The drum side plate **511B** is positioned apart from the drum side plate **511A** in the axial direction. The drum side plate **511B** has an outer surface **S11** and an inner surface **S12**. The inner surface **S12** is positioned between the outer surface **S11** and the drum side plate **511A** in the axial direction.

**[0085] 2.2 Toner Guides 512A, 512B**

**[0086]** The toner guide 512A is positioned on the inner surface S2 of the drum side plate 511A. The toner guide 512A is positioned opposite to the developing unit 13Y with respect to the receiving portion 513. The toner guide 512A is in the form of a groove. The toner guide 512A includes a guide portion 512aA and a locking portion 512bA.

**[0087]** The guide portion 512aA extends in a second direction. The second direction crosses the first direction and the axial direction. Specifically, the second direction crosses the first direction and is perpendicular to the axial direction. As will be described later, the toner cartridge 6Y has protrusions 62A, 62B (see FIG. 12). When the toner cartridge 6Y is attached to the drum cartridge 5Y, the guide portion 512aA guides the travel of the protrusion 62A. The guide portion 512aA has one end portion and another end portion in the second direction. The other end portion of the guide portion 512aA is positioned between the one end portion of the guide portion 512aA and the receiving portion 513 in the second direction.

**[0088]** The locking portion 512bA is positioned at the other end portion of the guide portion 512aA. The locking portion 512bA extends in a direction crossing the second direction. The locking portion 512bA also extends in a direction perpendicular to the first direction and the axial direction.

**[0089]** The toner guide 512B is positioned on the inner surface S12 of the drum side plate 511B. The toner guide 512B includes a guide portion 512aB and a locking portion 512bB. The guide portion 512aB has a configuration the same as that of the guide portion 512aA. The locking portion 512bB has a configuration the same as that of the locking portion 512bA. When the toner cartridge 6Y is attached to the drum cartridge 5Y, the guide portion 512aB guides the travel of the protrusion 62B.

**[0090] 2.3 Receiving Portion 513**

**[0091]** As will be described later, the toner cartridge 6Y further includes a second accommodating portion 612 (see FIG. 12). The receiving portion 513 receives the second accommodating portion 612 in a state where the toner cartridge 6Y is supported by the drum cartridge 5Y. The receiving portion 513 extends in the axial direction. The receiving portion 513 has one end portion in the axial direction connected to the drum side plate 511A. The receiving portion 513 has another end portion in the axial direction connected to the drum side plate 511B. The receiving portion 513 has a semi cylindrical shape. The receiving portion 513 has a toner inlet opening 513a and a plurality of holes 513bA, 513bB.

**[0092]** The toner inlet opening 513a is positioned at a center portion in the axial direction of the receiving portion 513. The toner inlet opening 513a is in communication with the developing opening 133 (see FIG. 5) of the developing casing 131Y.

**[0093]** The hole 513bA is positioned between the toner inlet opening 513a and the drum side plate 511A in the axial direction. The hole 513bA is positioned apart from the toner inlet opening 513a in the axial direction.

**[0094]** The hole 513bB is positioned between the toner inlet opening 513a and the drum side plate 511B in the axial direction. The hole 513bB is positioned opposite to the hole 513bA with respect to the toner inlet opening 513a in the axial direction. The hole 513aB is positioned apart from the toner inlet opening 513a in the axial direction.

**[0095] 2.4 Toner Shutter 514**

**[0096]** The toner shutter 514 is attached to the receiving portion 513. The toner shutter 514 is movable between a closed position (see FIG. 3) and an open position (see FIG. 4). As illustrated in FIG. 3, the toner shutter 514 closes the toner inlet opening 513a when the toner shutter 514 is at the closed position. As illustrated in FIG. 4, the toner shutter 514 opens the toner inlet opening 513a when the toner shutter 514 is at the open position. The toner shutter 514 has a toner shutter opening 514a, a plurality of through-holes 514bA, 514bB, and a plurality of through-holes 514cA, 514cB.

**[0097]** The toner shutter opening 514a extends in the axial direction. At least a part of the toner shutter opening 514a is in communication with the toner inlet opening 513a in a state where the toner shutter 514 is at the open position. Hence, the toner inlet opening 513a is opened in the state of open position of the toner shutter 514. On the other hand, as illustrated in FIG. 3, the toner shutter opening 514a is positioned away from the toner inlet opening 513a in the state of closed position of the toner shutter 514.

**[0098]** The through-hole 514bA is positioned between the toner shutter opening 514a and the drum side plate 511A in the axial direction. The through-hole 514bA is positioned apart from the toner shutter opening 514a in the axial direction. The through-hole 514bA extends in the moving direction of the toner shutter 514. As illustrated in FIGS. 3 and 4, the through-hole 514bA is in communication with the hole 513bA not only in the state where the toner shutter 514 is at the closed position but also in the state where the toner shutter 514 is at the open position.

**[0099]** As illustrated in FIG. 3, the through-hole 514bB is positioned between the toner shutter opening 514a and the drum side plate 511B in the axial direction. The through-hole 514bB is positioned opposite to the through-hole 514bA with respect to the toner shutter opening 514a in the axial direction. The through-hole 514bB is positioned apart from the toner shutter opening 514a in the axial direction. The through-hole 514bB extends in the moving direction of the toner shutter 514. As illustrated in FIGS. 3 and 4, the through-hole 514bB is in communication with the hole 513bB not only in the state where the toner shutter 514 is at the closed position but also in the state where the toner shutter 514 is at the open position.

**[0100]** As illustrated in FIG. 3, the through-hole 514cA is positioned between the through-hole 514bA and the drum side plate 511A in the axial direction. The through-hole 514cA is positioned opposite to the toner shutter opening 514a with respect to the through-hole 514bA in the axial direction.

**[0101]** The through-hole 514cB is positioned between the through-hole 514bB and the drum side plate 511B in the axial direction. The through-hole 514cB is positioned opposite to the toner shutter opening 514a with respect to the through-hole 514bB in the axial direction.

**[0102] 2.5 Sealing Member 515**

**[0103]** As illustrated in FIGS. 3 and 5, the sealing member 515 is interposed between the receiving portion 513 and the developing casing 131Y. The sealing member 515 is configured to seal a gap between the receiving portion 513 and the developing casing 131Y. The sealing member 515 encompasses the toner inlet opening 513a and the developing opening 133. A sponge is one example of the sealing member 515.

[0104] 2.6 Sleeve Portions 516A, 516B

[0105] As illustrated in FIG. 3, the sleeve portion 516A is positioned opposite to the drum side plate 511B with respect to the drum side plate 511A in the axial direction. The sleeve portion 516A extends from the outer surface 51 of the drum side plate 511A. The sleeve portion 516A is integral with the drum side plate 511A. However, the sleeve portion 516A may be a segment attached to the drum side plate 511A. The sleeve portion 516A extends in the axial direction. The sleeve portion 516A supports one end portion in the axial direction of the photosensitive drum 11Y.

[0106] As illustrated in FIG. 6, the sleeve portion 516B is positioned opposite to the drum side plate 511A with respect to the drum side plate 511B in the axial direction. The sleeve portion 516B extends from the outer surface S11 of the drum side plate 511B. The sleeve portion 516B is integral with the drum side plate 511B. However, the sleeve portion 516B may be a segment attached to the drum side plate 511B. The sleeve portion 516B extends in the axial direction. The sleeve portion 516A supports another end portion in the axial direction of the photosensitive drum 11Y.

[0107] 3. Details of Drawer 4

[0108] The drawer 4 will be described in detail with reference to FIGS. 6 through 11.

[0109] Incidentally, the “axial direction” described below as to the drawer 4 is defined in the attached state of the drum cartridge 5Y to the drawer 4.

[0110] The drawer 4 includes two side plates 41A, 41B (see FIG. 6), two positioning plates 42A, 42B (see FIG. 6), a plurality of locking members 43Y, 43M, 43C, 43K (see FIG. 7), a plurality of levers 44Y, 44M, 44C, 44K (see FIG. 7), a plurality of locking members 45Y (see FIG. 6), 45M, 45C, 45K, and a plurality of levers 46Y (see FIG. 6), 46M, 46C, 46K. Incidentally, the locking members 45M, 45C, 45K and the levers 46M, 46C, 46K are not illustrated.

[0111] 3.1 Side Plate 41A

[0112] As illustrated in FIG. 6, the side plate 41A constitutes one end portion in the axial direction of the drawer 4. The side plate 41A faces the drum side plate 511A in the axial direction in the attached state of the drum cartridge 5Y to the drawer 4. In the attached state of the drum cartridge 5Y to the drawer 4, the side plate 41A is positioned opposite to the drum side plate 511B with respect to the drum side plate 511A in the axial direction.

[0113] The side plate 41A has an outer surface S21 and an inner surface S22. In the attached state of the drum cartridge 5Y to the drawer 4, the outer surface S21 is positioned opposite to the drum cartridge 5Y with respect to the inner surface S22 in the axial direction. The inner surface S22 is positioned between the outer surface S21 and the side plate 41B in the axial direction. The inner surface S22 faces the drum cartridge 5Y in the attached state of the drum cartridge 5Y to the drawer 4.

[0114] As illustrated in FIG. 8, the side plate 41A has a plurality of drawer guides 411Y, 411M, 411C, 411K, a plurality of through-holes 412Y, 412M, 412C, 412K, a plurality of holes 413Y (see FIG. 7), a plurality of holes 413M (see FIG. 7), a plurality of holes 413C (see FIG. 7), and a plurality of holes 413K (see FIG. 7). In other words, the drawer 4 has the plurality of drawer guides 411Y, 411M, 411C, 411K, the plurality of through-holes 412Y, 412M, 412C, 412K, the plurality of holes 413Y, the plurality of holes 413M, the plurality of holes 413C, and the plurality of holes 413K.

[0115] 3.1.1 Drawer Guides 411Y, 411M, 411C, 411K

[0116] The drawer guides 411Y, 411M, 411C, 411K are arrayed with each other at intervals in the first direction.

[0117] The drawer guide 411Y is configured to guide travel of the drum cartridge 5Y relative to the drawer 4. Specifically, the drawer guide 411Y guides travel of the one end portion in the axial direction of the photosensitive drum 11Y in the attached state of the drum cartridge 5Y to the drawer 4. The drawer guide 411Y is positioned in the inner surface S22 of the side plate 41A. The drawer guide 411Y extends in a guiding direction crossing the first direction and the axial direction. Specifically, the guiding direction crosses the first direction and is perpendicular to the axial direction.

[0118] The drawer guide 411Y has one end portion E1 and another end portion E2 in the guiding direction. The other end portion E2 is positioned between the one end portion E1 and the locking member 43Y in the guiding direction. The drawer guide 411Y is in the form of a recess. However, the drawer guide 411Y may be a rib. The sleeve portion 516A (see FIG. 6) of the drum cartridge 5Y is fitted with the drawer guide 411Y when the drum cartridge 5Y is attached to the drawer 4.

[0119] The drawer guides 411M, 411C, 411K each have a configuration the same as that of the drawer guide 411Y. Therefore, further description as to the drawer guides 411M, 411C, 411K will be omitted.

[0120] 3.1.2 Through-holes 412Y, 412M, 412C, 412K

[0121] The through-hole 412Y is positioned at a deep side of the drawer guide 411Y in the guiding direction. In other words, the through-hole 412Y is positioned opposite to the one end portion E1 of the drawer guide 411Y with respect to the other end portion E2 of the drawer guide 411Y in the guiding direction. The through-hole 412Y has a circular shape. As illustrated in FIG. 6, the through-hole 412Y extends throughout the thickness of the side plate 41A, i.e., from the inner surface S22 to the outer surface S21.

[0122] The through-holes 412M, 412C, 412K each have a configuration the same as that of the through-hole 412Y. Therefore, further description as to the through-holes 412M, 412C, 412K will be omitted.

[0123] 3.1.3 Holes 413Y, 413M, 413C, 413K

[0124] As illustrated in FIGS. 6 and 7, the holes 413Y are positioned in the outer surface S21 of the side plate 41A. The holes 413Y are positioned at an edge of the through-hole 412Y. The holes 413Y are recessed from the outer surface S21 toward the inner surface S22 in the axial direction. However, a through-hole is also available as the hole 413Y.

[0125] The description as to the holes 413Y is also applied to the holes 413M, 413C, 413K. Therefore, further description as to the holes 413M, 413C, 413K will be omitted.

[0126] 3.2 Side Plate 41B

[0127] As illustrated in FIG. 6, the side plate 41B constitutes another end portion in the axial direction of the drawer 4. The side plate 41B is positioned apart from the side plate 41A in the axial direction. The side plate 41B faces the drum side plate 511B in the axial direction in the attached state of the drum cartridge 5Y to the drawer 4. In the attached state of the drum cartridge 5Y to the drawer 4, the side plate 41B is positioned opposite to the drum side plate 511A with respect to the drum side plate 511B in the axial direction. The side plate 41B has an outer surface S31 and an inner surface S32. The inner surface S32 is positioned between the outer surface S31 and the side plate 41A in the axial direction.



[0128] The side plate 41B has a plurality of drawer guides 414Y, 414M, 414C, 414K, a plurality of through-holes 415Y, 415M, 415C, 415K, a plurality of holes 416Y, a plurality of holes 416M, a plurality of holes 416C, and a plurality of holes 416K. The drawer guides 414M, 414C, 414K, the through-holes 415M, 415C, 415K, and holes 416M, 416C, 416K are not illustrated.

[0129] 3.2.1 Drawer Guides 414Y, 414M, 414C, 414K

[0130] The drawer guides 414Y, 414M, 414C, 414K are arrayed with each other at intervals in the first direction.

[0131] The drawer guide 414Y is configured to guide the travel of the drum cartridge 5Y relative to the drawer 4 in cooperation with the drawer guide 411Y. The drawer guide 414Y is positioned in the inner surface S32 of the side plate 41B. The drawer guide 414Y extends in the guiding direction. The drawer guide 414Y is in the form of a recess. However, the drawer guide 414Y may be a rib. The sleeve portion 516B of the drum cartridge 5Y is fitted with the drawer guide 414Y when the drum cartridge 5Y is attached to the drawer 4.

[0132] The drawer guides 414M, 414C, 414K each have a configuration the same as that of the drawer guide 414Y. Therefore, further description as to the drawer guides 414M, 414C, 414K will be omitted.

[0133] 3.2.2 Through-Holes 415Y, 415M, 415C, 415K

[0134] The through-hole 415Y is positioned at a deep side of the drawer guide 414Y in the guiding direction. The through-hole 415Y has a circular shape. The through-hole 415Y extends throughout the thickness of the side plate 41B, i.e., from the inner surface S32 to the outer surface S31.

[0135] The through-holes 415M, 415C, 415K have configuration the same as that of the through-hole 415Y. Therefore, further description as to the through-holes 415M, 415C, 415K will be omitted.

[0136] 3.2.3 Holes 416Y, 416M, 416C, 416K

[0137] As illustrated in FIG. 6, the holes 416Y are positioned in the outer surface S31 of the side plate 41B. The holes 416Y are positioned at an edge of the through-hole 415Y in the same manner of the holes 413Y relative to the through hole 412Y. The holes 416Y are recessed from the outer surface S31 toward the inner surface S32 in the axial direction. However, a through-hole is also available as the hole 416Y.

[0138] The description as to the holes 416Y is also applicable to the holes 416M, 416C, 416K. Therefore, further description as to the holes 416M, 416C, 416K will be omitted.

[0139] 3.3 Positioning Plates 42A, 42B

[0140] As illustrated in FIG. 5, the positioning plate 42A is positioned at the one end portion in the axial direction of the drawer 4. The positioning plate 42A is positioned inward of the inner surface S22 of the side plate 41A in the axial direction. In other words, the positioning plate 42A is positioned between the side plate 41A and the side plate 41B in the axial direction. As illustrated in FIG. 8, the positioning plate 42A extends in the first direction, and is made from metal such as stainless steel and iron.

[0141] As illustrated in FIG. 6, in the attached state of the drum cartridges 5Y, 5M, 5C, 5K to the drawer 4, the positioning plate 42A is in contact with each one end portion of each of the photosensitive drums 11Y, 11M, 11C, 11K to fix positions of the photosensitive drums 11Y, 11M, 11C, 11K. Specifically, as illustrated in FIG. 8, the positioning

plate 42A has a plurality of recessed portions 421Y, 421M, 421C, 421K and a counterpart positioning portion 422.

[0142] The positioning plate 42B is positioned at the other end portion in the axial direction of the drawer 4. The positioning plate 42B is positioned inward of the inner surface S32 of the side plate 41B in the axial direction. In other words, the positioning plate 42B is positioned between the side plate 41A and the side plate 41B in the axial direction. In the state where the drum cartridges 5Y, 5M, 5C, 5K are attached to the drawer 4, the positioning plate 42B is in contact with each other end portion of each of the photosensitive drums 11Y, 11M, 11C, 11K to fix positions of the photosensitive drums 11Y, 11M, 11C, 11K. The positioning plate 42B extends in the first direction.

[0143] 3.3.1 Recessed Portions 421Y, 421M, 421C, 421K

[0144] The one end portion of the photosensitive drum 11Y is fitted with the recessed portion 421Y in the attached state of the drum cartridge 5Y to the drawer 4. The recessed portion 421Y is overlapped with the locking member 43Y in the axial direction. Specifically, in a state where the locking member 43Y is positioned at its locking position, the recessed portion 421Y is overlapped with a lock guide 431 (see FIG. 10) of the locking member 43Y in the axial direction. Details of the locking position and the lock guide 431 will be described later.

[0145] The recessed portions 421Y, 421M, 421C, 421K are arrayed with each other in the first direction at intervals. Description as to the recessed portion 421Y is applicable to the recessed portions 421M, 421C, 421K. Therefore, further description as to the recessed portions 421M, 421C, 421K will be omitted.

[0146] 3.3.2 Counterpart Positioning Portion 422

[0147] The counterpart positioning portion 422 is subjected to positioning by the positioning member 23 provided in the housing 2 when the drawer 4 is at its inside position. In other words, the positioning member 23 of the housing 2 fixes a position of the positioning plate 42A relative to the housing 2 when the drawer 4 is at the inside position.

[0148] The counterpart positioning portion 422 is positioned at one end portion in the first direction of the positioning plate 42A. The counterpart positioning portion 422 contacts the positioning member 23 in a state where the drawer 4 is at the inside position. According to the present embodiment, the counterpart positioning portion 422 is in the form of a notch. The positioning member 23 of the housing 2 is fitted with the notch when the drawer 4 is at the inside position.

[0149] 3.4 Locking Members 43Y, 43M, 43C, 43K

[0150] As illustrated in FIG. 7, the locking member 43Y is positioned in the through-hole 412Y of the side plate 41A. The locking member 43Y has a disc-like shape. The locking member 43Y is movable between a locking position (see FIG. 9) and an unlocking position (see FIG. 10) in the attached state of the drum cartridge 5Y to the drawer 4. Specifically, the locking member 43Y is rotatable about a first axis A11 (see FIG. 6) between the locking position and the unlocking position. The first axis A11 extends in the axial direction. According to the present embodiment, the first axis A11 is coincident with the drum axis A1 (see FIG. 6). That is, the locking member 43Y is rotatable about the drum axis A1 between the locking position and the unlocking position. Incidentally, the first axis A11 may be offset from the drum axis A1.

[0151] As illustrated in FIG. 9, the locking member 43Y locks the photosensitive drum 11Y to the drawer 4 in a case where the locking member 43Y is positioned at the locking position in the attached state of the drum cartridge 5Y to the drawer 4. The expression “the locking member 43Y locks the photosensitive drum 11Y to the drawer 4” implies that the locking member 43Y permits the photosensitive drum 11Y to be immovable in the direction of separating the photosensitive drum 11Y from the drawer 4.

[0152] As illustrated in FIG. 10, the photosensitive drum 11Y is released from the drawer 4 in a case where the locking member 43Y is positioned at the unlocking position in the attached state of the drum cartridge 5Y to the drawer 4.

[0153] As illustrated in FIG. 6, the locking member 43Y has an outer surface S41 and an inner surface S42. The inner surface S42 is positioned between the outer surface S41 and the side plate 41B of the drawer 4. The inner surface S42 faces the outer surface S1 of the drum side plate 511A in the attached state of the drum cartridge 5Y to the drawer 4. As illustrated in FIG. 8, the locking member 43Y has a through-hole 433, and includes the lock guide 431, a locking portion 432, a pressure member 434, and a spring 435.

[0154] Incidentally, the description as to the locking member 43Y is applicable to the locking members 43M, 43C, 43K. Therefore, further description as to the locking members 43M, 43C, 43K will be omitted.

[0155] 3.4.1 Lock Guide 431

[0156] The lock guide 431 extends in a direction crossing the drum axis A1 corresponding to the locking member 43Y. The sleeve portion 516A (see FIG. 3) of the drum cartridge 5Y is fitted with the lock guide 431 in the attached state of the drum cartridge 5Y to the drawer 4. Hence, the one end portion in the axial direction of the photosensitive drum 11Y (see FIG. 6) is fitted with the lock guide 431 in the attached state of the drum cartridge 5Y to the drawer 4.

[0157] As illustrated in FIG. 9, the lock guide 431 extends in a direction crossing the guiding direction in a state where the locking member 43Y is at its locking position. In other words, the lock guide 431 extends in a direction crossing the extending direction of the drawer guide 411Y in the state where the locking member 43Y is at its locking position. The lock guide 431 is disconnected from the drawer guide 411Y in the state where the locking member 43Y is at its locking position.

[0158] Hence, the sleeve portion 516A cannot be moved past the lock guide 431 in case of displacement of the drum cartridge 5Y in the guiding direction in a state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at its locking position. Accordingly, the drum cartridge 5Y is incapable of being released from the drawer 4 as long as the locking member 43Y is at its locking position in the attached state of the drum cartridge 5Y to the drawer 4.

[0159] On the other hand, as illustrated in FIG. 10, the lock guide 431 extends in the guiding direction in a state where the locking member 43Y is at the unlocking position. In other words, the lock guide 431 extends in the extending direction of the drawer guide 411Y in the state where the locking member 43Y is at the unlocking position. The lock guide 431 is connected to the drawer guide 411Y in the state where the locking member 43Y is at the unlocking position.

[0160] Hence, the sleeve portion 516A can be released from the lock guide 431 in case of displacement of the drum

cartridge 5Y in the guiding direction in a state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at its unlocking position. Accordingly, the drum cartridge 5Y is capable of being released from the drawer 4 as long as the locking member 43Y is at its unlocking position in the attached state of the drum cartridge 5Y to the drawer 4.

[0161] 3.4.2 Locking Portion 432

[0162] The locking portion 432 is a wall portion constituting a part of the locking member 43Y. The locking portion 432 has a surface defining the lock guide lock guide 431.

[0163] As illustrated in FIG. 9, the locking portion 432 extends in a direction crossing the guiding direction in the state where the locking member 43Y is at its locking position. In other words, the locking portion 432 extends in the direction crossing the extending direction of the drawer guide 411Y in the state where the locking member 43Y is at its locking position. The locking portion 432 is positioned between the one end portion of the photosensitive drum 11Y and the drawer guide 411Y in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at its locking position. Accordingly, the sleeve portion 516A is incapable of being released from the lock guide 431 in case of displacement of the drum cartridge 5Y in the guiding direction in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at its locking position. As a result, the locking portion 432 locks the photosensitive drum 11Y to the drawer 4 as long as the locking member 43Y is at its locking position in the attached state of the drum cartridge 5Y to the drawer 4.

[0164] On the other hand, as illustrated in FIG. 10, the locking portion 432 extends in the guiding direction in the state where the locking member 43Y is at the unlocking position. In other words, the lock guide 431 extends in the extending direction of the drawer guide 411Y in the state where the locking member 43Y is at the unlocking position. The locking portion 432 is retracted from a position between the one end portion of the photosensitive drum 11Y and the drawer guide 411Y in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the unlocking position. Hence, the sleeve portion 516A can be released from the lock guide 431 in case of displacement of the drum cartridge 5Y in the guiding direction in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at its unlocking position.

[0165] 3.4.3 Through-Hole 433

[0166] As illustrated in FIG. 8, the through-hole 433 is positioned at a center of the locking member 43Y. The through-hole 433 is positioned within the lock guide 431. The through-hole 433 has a circular shape. As illustrated in FIG. 7, the coupling 111Y of the photosensitive drum 11Y is exposed to an outside through the through-hole 433 in the attached state of the drum cartridge 5Y to the drawer 4. The through-hole 433 permits the main coupling (not illustrated) to extend therethrough to fit with the coupling 111Y in the attached state of the drum cartridge 5Y to the drawer 4 and in the state where the drawer 4 is at the inside position.

[0167] 3.4.4 Pressure Member 434

[0168] As illustrated in FIG. 9, the pressure member 434 is attached to the locking portion 432. The pressure member 434 is positioned between the one end portion of the photosensitive drum 11Y and the drawer guide 411Y in the state where the drum cartridge 5Y is attached to the drawer

4 and the locking member 43Y is at the locking position. The pressure member 434 is positioned opposite to the positioning plate 42A with respect to the one end portion of the photosensitive drum 11Y in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the locking position.

[0169] The pressure member 434 presses against the sleeve portion 516A of the drum cartridge 5Y toward the positioning plate 42A in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the locking position. In other words, the pressure member 434 presses against the one end portion of the photosensitive drum 11Y toward the positioning plate 42A in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the locking position. Specifically, the pressure member 434 presses against the one end portion of the photosensitive drum 11Y toward the recessed portion 421Y of the positioning plate 42A in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the locking position.

[0170] On the other hand, as illustrated in FIG. 10, the pressure member 434 is retracted from a position between the one end portion of the photosensitive drum 11Y and the drawer guide 411Y in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the unlocking position. Hence, the pressure applied from the pressure member 434 to the one end portion of the photosensitive drum 11Y is released in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the unlocking position.

[0171] 3.4.5 Spring 435

[0172] As illustrated in FIG. 9, the spring 435 urges the pressure member 434. Specifically, the spring 435 urges the pressure member 434 toward the one end portion of the photosensitive drum 11Y in the attached state of the drum cartridge 5Y to the drawer 4.

[0173] The spring 435 urges the pressure member 434 toward the positioning plate 42A in the state where the drum cartridge 5Y is attached to the drawer 4 and the locking member 43Y is at the locking position.

[0174] 3.5 Levers 44Y, 44M, 44C, 44K

[0175] In the following description, only the lever 44Y will be described, since the description as to the lever 44Y is applicable to the levers 44M, 44C, 44K.

[0176] As illustrated in FIGS. 6 and 7, the lever 44Y is attached to the outer surface S41 of the locking member 43Y. Hence, the lever 44Y is movable along with the locking member 43Y. The lever 44Y is positioned outward of the outer surface S21 of the side plate 41A in the axial direction. In other words, the lever 44Y is positioned opposite to the side plate 41B with respect to the side plate 41A. The lever 44Y is operated by a user to move the locking member 43Y. Specifically, the lever 44Y is operated by the user to move the locking member 43Y between the locking position (see FIG. 9) and the unlocking position (see FIG. 10).

[0177] The lever 44Y has a function to lock the locking member 43Y at the locking position. Specifically, as illustrated in FIG. 6, the lever 44Y is movable between a first position and a second position in a state where the locking member 43Y is positioned at the locking position. The first position and the second position of the lever 44Y are indicated by a solid line and an imaginary line in FIG. 6, respectively.

[0178] The lever 44Y is locked to the side plate 41A in the state where the locking member 43Y is at the locking position and the lever 44Y is at the first position. Hence, the lever 44Y locks the locking member 43Y at the locking position. The lever 44Y extends along the outer surface S21 of the side plate 41A when the lever 44Y is at the first position.

[0179] On the other hand, the lever 44Y is unlocked from the side plate 41A in the state where the locking member 43Y is at the locking position and the lever 44Y is at the second position. Hence, the lever 44Y unlocks the locking member 43Y at the locking position. The locking member 43Y is movable between the locking position and the unlocking position when the lever 44Y is at the second position. The lever 44Y extends outward in the axial direction from the outer surface S21 of the side plate 41A when the lever 44Y is at the second position.

[0180] Incidentally, the lever 44Y is immovable from the second position to the first position in the state where the lever 44Y is at the second position and the locking member 43Y is moved from the locking position. Hence, the lever 44Y abuts against an abutment portion of the housing 2 in a case where the drawer 4 is moved from the outside position (see FIG. 2) to the inside position (see FIG. 1) in a state where the lever 44Y is at the second position. This can restrain the drawer 4 from being positioned at the inside position with the state where the locking member 43Y is not positioned at the locking position. As a result, this prompts the user to lock the locking member 43Y at the locking position. According to the present embodiment, the abutment portion is the opening 21 of the housing 2. That is, the housing 2 includes the abutment portion.

[0181] Further, as illustrated in FIGS. 6 and 11, the lever 44Y covers at least a part of the coupling 111Y in the axial direction in a state where the drum cartridge 5Y is attached to the drawer 4 and the lever 44Y is at the second position. This can restrain the main coupling (not illustrated) from being fitted with the coupling 111Y even in a case where the drawer 4 is positioned at the inside position with a state where the locking member 43Y is not positioned at the locking position. Hence, start of the image forming operation with the unlocking state of the photosensitive drum 11Y to the drawer 4 can be suppressed. The lever 44Y includes a lever body 441 and two protrusions 442A, 442B.

[0182] 3.5.1 Lever Body 441

[0183] The lever body 441 extends in a diametrical direction of the photosensitive drum 11Y in a state where the drum cartridge 5Y is attached to the drawer 4 and the lever 44Y is at the second position. In other words, the lever 44Y extends in the diametrical direction of the photosensitive drum 11Y in the state where the drum cartridge 5Y is attached to the drawer 4 and the lever 44Y is at the second position. The lever body 441 includes a first end portion 441A, a second end portion 441B, and an arcuate portion 441C.

[0184] The first end portion 441A and the second end portion 441B are one end portion and another end portion in the extending direction of the lever 44Y, respectively. That is, the lever 44Y includes the first end portion 441A and the second end portion 441B in the extending direction thereof. The second end portion 441B is positioned opposite to the first end portion 441A with respect to the through-hole 433 of the locking member 43Y.

[0185] As illustrated in FIG. 7, the arcuate portion 441C is positioned along an edge of the through-hole 433 when the lever 44Y is at the first position. Hence, the lever 44Y is not positioned over the through-hole 433 of the locking member 43Y when the lever 44Y is at the first position.

[0186] 3.5.2 Protrusions 442A, 442B

[0187] As illustrated in FIG. 11, the protrusion 442A protrudes from the first end portion 441A of the lever body 441. The protrusion 442A is integral with the lever body 441. However, a protrusion 442A which is a separate piece may be attached to the first end portion 441A of the lever body 441.

[0188] The protrusion 442B protrudes from the second end portion 441B of the lever body 441. The protrusion 442B is integral with the lever body 441. However, a protrusion 442B which is a separate piece may be attached to the second end portion 441B of the lever body 441.

[0189] As illustrated in FIG. 6, the protrusion 442A of the lever 44Y is engaged with one of the two holes 413Y of the side plate 41A and the protrusion 442B of the lever 44Y is engaged with remaining one of the two holes 413Y in the state where the locking member 43Y is at the locking position and the lever 44Y is at the first position. Hence, the lever 44Y is locked to the side plate 41A.

[0190] The protrusion 442A of the lever 44Y is disengaged from one of the two holes 413Y of the side plate 41A and the protrusion 442B of the lever 44Y is disengaged from remaining one of the two holes 413Y in the state where the locking member 43Y is at the locking position and the lever 44Y is at the second position. Hence, the lever 44Y is unlocked from the side plate 41A.

[0191] 3.6 Locking Members 45Y, 45M, 45C, 45K

[0192] The locking member 45Y is positioned in the through-hole 415Y of the side plate 41B. The description as to the locking member 43Y is applicable to the locking member 45Y. Therefore, further description as to the locking member 45Y will be omitted. Further, the description as to the locking member 43Y is also applicable to the locking members 45M, 45C, 45K. Therefore, further description as to the locking members 45M, 45C, 45K will be omitted.

[0193] 3.7 Levers 46Y, 46M, 46C, 46K

[0194] The lever 46Y is attached to an outer surface S51 of the locking member 45Y. The description as to the lever 44Y is applicable to the lever 46Y. Therefore, further description as to the lever 46Y will be omitted. Further, the description as to the lever 44Y is also applicable to the levers 46M, 46C, 46K. Therefore, further description as to the levers 46M, 46C, 46K will be omitted.

[0195] 4. Details of Toner Cartridge 6Y

[0196] The toner cartridge 6Y will be described in detail with reference to FIGS. 12 through 16. In the following description, only the toner cartridge 6Y will be described, since the description as to the toner cartridge 6Y is applicable to the toner cartridges 6M, 6C, 6K. Further, the “axial direction” described below as to the toner cartridge 6Y is defined in the attached state of the toner cartridge 6Y to the drum cartridge 5Y.

[0197] As illustrated in FIG. 12, the toner cartridge 6Y extends in the axial direction. The toner cartridge 6Y includes a toner casing 61, a plurality of protrusions 62A 62B, a plurality of protrusions 63A, 63B, a toner shutter 64, a plurality of protrusions 65A, 65B, and a toner conveying member 66 (see FIG. 16).

[0198] 4.1 Toner Casing 61

[0199] In the attached state of the toner cartridge 6Y to the drum cartridge 5Y, the toner casing 61 is pivotally movable about a second axis A12 between a cartridge first position (see FIG. 13) and a cartridge second position (see FIG. 14). In other words, in the attached state of the toner cartridge 6Y to the drum cartridge 5Y, the toner cartridge 6Y is pivotally movable about the second axis A12 between the cartridge first position and the cartridge second position. The second axis A12 extends in the axial direction.

[0200] In the state where the toner casing 61 is at the cartridge first position illustrated in FIG. 13, the protrusions 62A and 62B (see FIG. 12) are engaged with the locking portions 512bA and 512bB (see FIG. 3) of the drum cartridge 5Y, respectively. Hence, the toner cartridge 6Y is locked to the drum cartridge 5Y in the state where the toner casing 61 is at the cartridge first position. The expression “the toner cartridge 6Y is locked to the drum cartridge 5Y” implies that toner cartridge 6Y is not separable from the drum cartridge 5Y.

[0201] In the state where the toner casing 61 is at the cartridge second position illustrated in FIG. 14, the protrusions 62A and 62B are disengaged from the locking portions 512bA and 512bB of the drum cartridge 5Y, respectively. Hence, the toner cartridge 6Y is unlocked from the drum cartridge 5Y in the state where the toner casing 61 is at the cartridge second position.

[0202] As illustrated in FIG. 12, the toner casing 61 extends in the axial direction. The toner casing 61 includes a first accommodating portion 611, the second accommodating portion 612, and a plurality of connecting portions 613A, 613B.

[0203] 4.1.1 First Accommodating Portion 611

[0204] The first accommodating portion 611 extends in the axial direction. The first accommodating portion 611 has a hollow cylindrical shape. The first accommodating portion 611 is configured to accommodate therein toner. In other words, the toner casing 61 is configured to accommodate therein toner.

[0205] 4.1.2 Second Accommodating Portion 612

[0206] The second accommodating portion 612 is positioned apart from the first accommodating portion 611 in a third direction. The second accommodating portion 612 defines the second axis A12. The third direction crosses the axial direction. Preferably, the third direction is perpendicular to the axial direction. The second accommodating portion 612 extends in the axial direction. The second accommodating portion 612 has a hollow cylindrical shape. The second accommodating portion 612 has an internal volume smaller than that of the first accommodating portion 611. The second accommodating portion 612 has a toner discharge opening 614. In other words, the toner casing 61 has the toner discharge opening 614.

[0207] The toner discharge opening 614 is positioned between the protrusions 63A and 63B in the axial direction. The toner discharge opening 614 is positioned at a center portion in the axial direction of the second accommodating portion 612. The toner discharge opening 614 extends in the axial direction. The toner discharge opening 614 is configured to discharge therethrough the toner in the toner casing 61.

[0208] 4.1.3 Connecting Portions 613A, 613B

[0209] The connecting portion 613A is positioned between one end portion in the axial direction of the first accommodating portion 611 and one end portion in the axial

direction of the second accommodating portion 612. The connecting portion 613A connects the one end portion in the axial direction of the first accommodating portion 611 to the one end portion in the axial direction of the second accommodating portion 612.

[0210] The connecting portion 613B is positioned between another end portion in the axial direction of the first accommodating portion 611 and another end portion in the axial direction of the second accommodating portion 612. The connecting portion 613B is positioned spaced away from the connecting portion 613A in the axial direction. The connecting portion 613B connects the other end portion in the axial direction of the first accommodating portion 611 to the other end portion in the axial direction of the second accommodating portion 612.

[0211] The second accommodating portion 612 is in communication with the first accommodating portion 611 through the connecting portions 613A and 613B. Toner accommodated in the first accommodating portion 611 is introduced into the second accommodating portion 612 through the connecting portions 613A and 613B.

[0212] 4.2 Protrusions 62A 62B

[0213] The protrusion 62A is positioned at one end in the axial direction of the toner cartridge 6Y. Specifically, the protrusion 62A is positioned at one end in the axial direction of the second accommodating portion 612. The protrusion 62A protrudes outward in the axial direction from the one end in the axial direction of the second accommodating portion 612. The protrusion 62A extends in a diametrical direction of the second accommodating portion 612. The protrusion 62A extends in the third direction.

[0214] The protrusion 62B is positioned at another end in the axial direction of the toner cartridge 6Y. Specifically, the protrusion 62B is positioned at another end in the axial direction of the second accommodating portion 612. The protrusion 62A protrudes outward in the axial direction from the other end in the axial direction of the second accommodating portion 612. The protrusion 62B extends in the diametrical direction of the second accommodating portion 612. The protrusion 62B extends in the third direction.

[0215] 4.3 Protrusions 63A, 63B

[0216] The protrusion 63A is positioned between the toner discharge opening 614 and the protrusion 62A in the axial direction. The protrusion 63A is positioned between the toner shutter 64 and the protrusion 62A in the axial direction. The protrusion 63A is positioned opposite to the first accommodating portion 611 with respect to the second accommodating portion 612 in the third direction. The protrusion 63A protrudes in the third direction from the outer peripheral surface of the second accommodating portion 612.

[0217] The protrusion 63B is positioned apart from the protrusion 63A in the axial direction. The protrusion 63B is positioned opposite to the protrusion 63A with respect to the toner discharge opening 614 in the axial direction. The protrusion 63B is positioned between the toner discharge opening 614 and the protrusion 62B in the axial direction. The protrusion 63B is positioned opposite to the protrusion 63A with respect to the toner shutter 64 in the axial direction. The protrusion 63B is positioned between the toner shutter 64 and the protrusion 62B in the axial direction. The protrusion 63B is positioned opposite to the first accommodating portion 611 with respect to the second accommodating portion 612 in the third direction. The protrusion 63B

protrudes in the third direction from the outer peripheral surface of the second accommodating portion 612.

[0218] 4.4 Toner Shutter 64

[0219] The toner shutter 64 is positioned between the connecting portions 613A and the 613B. The toner shutter 64 is positioned on the peripheral surface of the second accommodating portion 612. The toner shutter 64 is movable relative to the toner discharge opening 614 between a toner closing position (see FIG. 12) and a toner opening position (see FIG. 15). The toner shutter 64 closes the toner discharge opening 614 in a state where the toner shutter 64 is at the toner closing position as illustrated in FIG. 12.

[0220] As illustrated in FIG. 14, the toner shutter 64 is positioned at the toner closing position in a state where the toner cartridge 6Y is attached to the drum cartridge 5Y and the toner casing 61 is positioned at the cartridge second position. The toner shutter 64 opens the toner discharge opening 614 in a state where the toner shutter 64 is at the toner opening position as illustrated in FIG. 15. As illustrated in FIG. 13, the toner shutter 64 is at the toner opening position in a state where the toner cartridge 6Y is attached to the drum cartridge 5Y and the toner casing 61 is at the cartridge first position.

[0221] As illustrated in FIG. 12, the toner shutter 64 extends in the axial direction. The toner shutter 64 has a hollow cylindrical shape. The toner shutter 64 has an opening 641 extending in the axial direction. The opening 641 is displaced from the toner discharge opening 614 when the toner shutter 64 is at the toner closing position. On the other hand, at least a part of the opening 641 is communicated with the toner discharge opening 614 in a state where the toner shutter 64 is at the toner opening position.

[0222] 4.5 Protrusions 65A, 65B

[0223] As illustrated in FIG. 12, the protrusion 65A is positioned on the outer peripheral surface of the toner shutter 64. The protrusion 65A protrudes outward from the outer peripheral surface of the toner shutter 64. The protrusion 65A is positioned between the opening 641 and the protrusion 63A in the axial direction.

[0224] The protrusion 65B is positioned apart from the protrusion 65A in the axial direction. The protrusion 65B is positioned opposite to the protrusion 65A with respect to the opening 641. The protrusion 65B is positioned on the outer peripheral surface of the toner shutter 64. The protrusion 65B protrudes outward from the outer peripheral surface of the toner shutter 64. The protrusion 65B is positioned between the opening 641 and the protrusion 63B in the axial direction.

[0225] 4.6 Toner Conveying Member 66

[0226] As illustrated in FIG. 16, the toner conveying member 66 is positioned inside the second accommodating portion 612. The toner conveying member 66 is rotatable about an axis A21 extending in the axial direction. The toner conveying member 66 extends along the axis A21. The toner conveying member 66 is configured to convey toner introduced into the second accommodating portion 612 through the connecting portions 613A and the 613B toward the toner discharge opening 614.

[0227] 5. Work for Exchanging Toner Cartridge 6Y

[0228] Next, the work for exchanging the toner cartridge 6Y for a new toner cartridge 6Y will be described with reference to FIGS. 1 through 3, 6, 7, and 12 through 14. As illustrated in FIGS. 1 and 2, firstly, the user moves the

drawer 4 from the inside position (see FIG. 1) to the outside position (see FIG. 2) for exchanging the toner cartridge 6Y for a new toner cartridge 6Y.

[0229] As illustrated in FIGS. 6 and 7, the locking member 43Y is at the locking position and the lever 44Y is at the first position in the state where the drawer 4 is at the outside position. The locking member 43Y is locked at the locking position because of the first position of the lever 44Y. The photosensitive drum 11Y is locked to the drawer 4 because of the locking position of the locking member 43Y.

[0230] Then, the user moves the toner casing 61 from the cartridge first position (see FIG. 13) to the cartridge second position (see FIG. 14). As a result, as illustrated in FIG. 14, the toner shutter 64 of the toner cartridge 6Y is positioned at the toner closing position and the toner shutter 514 of the drum cartridge 5Y is positioned at the closed position with the state where the toner casing 61 is at the cartridge second position.

[0231] Then, the user pulls the toner cartridge 6Y in the third direction from the drum cartridge 5Y. Hence, the toner cartridge 6Y is released from the drum cartridge 5Y. At this time, displacement of the photosensitive drum 11Y relative to the drawer 4 can be suppressed, since the photosensitive drum 11Y is locked to the drawer 4.

[0232] Next, in order to attach the toner cartridge 6Y to the drum cartridge 5Y attached to the drawer 4 that is at the outside position, the user firstly engages the protrusions 62A and 62B (see FIG. 12) with the toner guides 512A and 512B (see FIG. 3), respectively.

[0233] With such engagements, the second accommodating portion 612 of the toner cartridge 6Y is guided toward the receiving portion 513 by the toner guides 512A and 512B. As a result, the second accommodating portion 612 is fitted with the receiving portion 513 as illustrated in FIG. 14, whereupon the toner cartridge 6Y is supported by the drum cartridge 5Y. At this time, the toner casing 61 is positioned at the cartridge second position.

[0234] In the state where the toner cartridge 6Y is supported by the toner cartridge 6Y and toner casing 61 is at the cartridge second position, the protrusion 65A (see FIG. 12) protrudes through the through-hole 514bA (see FIG. 3) of the toner shutter 514 and is fitted with the hole 513bA (see FIG. 3) of the receiving portion 513, and the protrusion 65B (see FIG. 12) protrudes through the through-hole 514bB (see FIG. 3) of the toner shutter 514 and is fitted with the hole 513bB (see FIG. 3) of the receiving portion 513. The toner shutter 64 is fixed to the receiving portion 513 upon fitting engagement of the protrusions 65A and 65B with the holes 513bA and 513bB of the receiving portion 513, respectively.

[0235] Further, the protrusions 63A and 63B (see FIG. 12) are fitted with the through-holes 514cA and 514cB (see FIG. 3) of the toner shutter 514, respectively. Because of this fitting engagement, the toner shutter 514 becomes movable along with the toner casing 61.

[0236] Then, the user moves the toner casing 61 from the cartridge second position as illustrated in FIG. 14 to the cartridge first position as illustrated in FIG. 13. That is, the toner casing 61 is pivotally moved about the second axis A12 of the second accommodating portion 612.

[0237] The toner shutter 64 is moved from the toner closing position to the toner opening position relative to the toner casing 61 because of the pivotal movement of the toner casing 61 from the cartridge second position to the cartridge first position. Further, the toner shutter 514 is moved from

the closed position to the open position in accordance with the movement of the toner casing 61 from the cartridge second position to the cartridge first position.

[0238] As illustrated in FIG. 13, the toner shutter 64 is at the toner opening position, and the toner shutter 514 is at the open position as a result of movement of the toner casing 61 to the cartridge first position. Hence, the toner discharge opening 614 is brought into communication with the toner inlet opening 513a. Accordingly, the toner inlet opening 513a allows the toner discharged from the toner discharge opening 614 to pass through the toner inlet opening 513a.

[0239] Next, the user moves the drawer 4 from the outside position to the inside position. As such, exchange of the toner cartridge 6Y for the new toner cartridge 6Y is completed.

[0240] 6. Work for Exchanging Drum Cartridge 5Y.

[0241] Next, the work for exchanging the drum cartridge 5Y for a new drum cartridge 5Y will be described with reference to FIGS. 1 through 3 and 6 through 11. Incidentally, the exchange of the drum cartridge 5Y may be performed with the attached state of the toner cartridge 6Y to the drum cartridge 5Y, or with the detached state of the toner cartridge 6Y from the drum cartridge 5Y.

[0242] As illustrated in FIGS. 1 and 2, firstly, the user moves the drawer 4 from the inside position (see FIG. 1) to the outside position (see FIG. 2) for exchanging the drum cartridge 5Y for a new drum cartridge 5Y.

[0243] As illustrated in FIGS. 6 and 7, the locking member 43Y is at the locking position and the lever 44Y is at the first position in the state where the drawer 4 is at the outside position. Further, the locking member 45Y is at the locking position and the lever 46Y is at the first position.

[0244] The locking member 43Y is locked at the locking position because of the first position of the lever 44Y. Further, the locking member 45Y is locked at the locking position because of the first position of the lever 46Y. The photosensitive drum 11Y is locked to the drawer 4 because of the locking positions of the locking member 43Y and the 45Y.

[0245] Then, the user pivotally moves the lever 44Y from the first position to the second position. The locking member 43Y is unlocked from the side plate 41A in accordance with the movement of the lever 44Y to the second position. Further, the user pivotally moves the lever 46Y from the first position to the second position. The locking member 45Y is unlocked from the side plate 41B in accordance with the movement of the lever 46Y to the second position.

[0246] Then, as illustrated in FIGS. 7 and 11, the user rotates the locking member 43Y from the locking position to the unlocking position. Further, the user rotates the locking member 45Y (see FIG. 6) from the locking position to the unlocking position. As a result, the photosensitive drum 11Y is unlocked from the drawer 4 in the state where the locking members 43Y and 45Y are positioned at the unlocking position.

[0247] Then, the user pulls the drum cartridge 5Y out of the drawer 4. As a result, the sleeve portion 516A (see FIGS. 3 and 10) of the drum cartridge 5Y is disengaged from the lock guide 431 (see FIG. 10) of the locking member 43Y, and the sleeve portion 516B (see FIG. 6) of the drum cartridge 5Y is disengaged from the lock guide 451 (see FIG. 6) of the locking member 45Y. Thus, the drum cartridge 5Y is released from the drawer 4.

[0248] Then, in order to attach the drum cartridge 5Y to the drawer 4 in the state where the drawer 4 is at the outside position, the user firstly engages the sleeve portions 516A and 516B with the drawer guides 411Y and 414Y of the drawer 4, respectively, as illustrated in FIG. 6. Hence, the drum cartridge 5Y is guided by the drawer guides 411Y and 414Y and is attached to the drawer 4.

[0249] After attachment of the drum cartridge 5Y to the drawer 4, the sleeve portion 516A of the drum cartridge 5Y is fitted with the lock guide 431 of the locking member 43Y and the sleeve portion 516B of the drum cartridge 5Y is fitted with the lock guide of the locking member 45Y.

[0250] Next, as illustrated in FIGS. 7 and 11, the user grasps the lever 44Y positioned at the second position, and rotates the locking member 43Y from the unlocking position to the locking position. Further, the user grasps the lever 46Y (see FIG. 6) positioned at the second position, and rotates the locking member 45Y (see FIG. 6) from the unlocking position to the locking position.

[0251] As a result, as illustrated in FIG. 9, the photosensitive drum 11Y is locked to the drawer 4 with the state where the locking member 43Y is at the locking position, and the locking member 45Y is at the locking position.

[0252] Then, the user moves the lever 44Y from the second position to the first position. Further, the user moves the lever 46Y from the second position to the first position. Then, the user moves the drawer 4 from the outside position to the inside position. As such, work for exchange of the drum cartridge 5Y for the new drum cartridge 5Y is completed.

#### Second Embodiment

[0253] Next, an image forming apparatus 1001 according to a second embodiment will be described with reference to FIG. 17. through 26, wherein like parts and components are designated by the same reference numerals as those shown in FIGS. 1 through 16 to avoid duplicating description.

[0254] 7. Image Forming Apparatus 1001

[0255] A general structure of the image forming apparatus 1001 will be described with reference to FIGS. 17 through 19A.

[0256] The image forming apparatus 1001 according to the second embodiment is generally the same as the image forming apparatus 1 of the first embodiment except that in the second embodiment, developing cartridges 1006Y, 1006M, 1006C, 1006K are provided instead of the toner cartridges 6Y, 6M, 6C, 6K.

[0257] 7.1 Housing 2

[0258] The housing 2 accommodates therein a drawer 1004, a plurality of drum cartridges 1005Y, 1005M, 1005C, 1005K, the plurality of developing cartridges 1006Y, 1006M, 1006C, 1006K, and positioning members 1023A, 1023B in addition to the above-described sheet cassette 3, the exposure unit 7, the belt unit 8, the transfer roller 9, and the fixing unit 10.

[0259] The positioning member 1023A is the same as the positioning member 23 of the first embodiment. The positioning member 1023A is configured to fix a position of one end portion in the first direction of the drawer 1004 to the housing 2 similar to the positioning member 23.

[0260] The other positioning member 1023B is positioned apart from the positioning member 1023A in the first direction. The positioning member 1023B has a notch. The

positioning member 1023B is configured to fix a position of another end portion in the first direction of the drawer 1004 to the housing 2.

[0261] 7.2 Drum Cartridges 1005Y, 1005M, 1005C, 1005K

[0262] The drum cartridges 1005Y, 1005M, 1005C, 1005K according to the second embodiment are different from the drum cartridges 5Y, 5M, 5C, 5K according to the first embodiment in that the drum cartridges 1005Y, 1005M, 1005C, 1005K do not include the developing units 13Y, 13M, 13C, 13K according to the first embodiment. Specifically, the drum cartridge 1005Y includes the photosensitive drum 11Y and the charger 12Y. Each of the drum cartridges 1005Y, 1005M, 1005C, 1005K is an example of the “first cartridge”.

[0263] 7.3 Developing Cartridges 1006Y, 1006M, 1006C, 1006K

[0264] Each of the developing cartridges 1006Y, 1006M, 1006C, 1006K is attachable to and detachable from the drawer 1004. Specifically, each of the developing cartridges 1006Y, 1006M, 1006C, 1006K is attachable to and detachable from the drawer 1004 in a state where the drawer 1004 is at the outside position. Each of the developing cartridges 1006Y, 1006M, 1006C, 1006K is an example of the “second cartridge”.

[0265] The developing cartridge 1006Y is configured to supply toner to the photosensitive drum 11Y. The developing cartridge 1006M is configured to supply toner to the photosensitive drum 11M. The developing cartridge 1006C is configured to supply toner to the photosensitive drum 11C. The developing cartridge 1006K is configured to supply toner to the photosensitive drum 11K.

[0266] Incidentally, the description as to the developing cartridge 1006Y is applicable to the developing cartridges 1006M, 1006C, 1006K. Therefore, further description as to the developing cartridges 1006M, 1006C, 1006K will be omitted.

[0267] The developing cartridge 1006Y includes a developing casing 1061Y and a developing roller 1062Y. The developing casing 1061Y is configured to accommodate therein toner to be supplied to the photosensitive drum 11Y. The developing casing 1061Y supports the developing roller 1062Y.

[0268] 8. Details of Drum Cartridge 1005Y

[0269] The drum cartridge 1005Y will be described in detail with reference to FIGS. 19A through 20. As illustrated in FIGS. 19A and 19B, the drum cartridge 1005Y includes a drum frame 1051 and a first handle 1052 in addition to the above-described photosensitive drum 11Y and the charger 12Y.

[0270] 8.1 Drum Frame 1051

[0271] The drum frame 1051 supports the photosensitive drum 11Y and the charger 12Y. As illustrated in FIG. 20, the drum frame 1051 includes drum side plates 1511A, 1511B corresponding to the drum side plate 511A, 511B of the first embodiment and sleeve portions 1512A, 1512B.

[0272] 8.1.1 Drum Side Plates 1511A, 1511B

[0273] The drum side plate 1511A constitutes one end portion in the axial direction of the drum cartridge 1005Y. The drum side plate 1511A has an outer surface S1 and an inner surface S2. The inner surface S2 is positioned between the outer surface S1 and the drum side plate 1511B in the axial direction.

[0274] As illustrated in FIGS. 19A and 20, the drum side plate 1511B constitutes another end portion in the axial direction of the drum cartridge 1005Y. The drum side plate 1511B is positioned apart from the drum side plate 1511A in the axial direction. The drum side plate 1511B has an outer surface S11 and an inner surface S12. The inner surface S12 is positioned between the outer surface S11 and the drum side plate 1511A in the axial direction.

[0275] 8.1.2 Sleeve Portions 1512A, 1512B

[0276] Description as to the sleeve portions 516A, 516B in relation to the drum side plates 511A, 511B according to the first embodiment is also applicable to the sleeve portions 1512A, 1512B. Therefore, further description as to the sleeve portions 1512A, 1512B will be omitted.

[0277] 8.2 First Handle 1052

[0278] As illustrated in FIGS. 19A and 19B, the first handle 1052 is positioned at an upper end of the drum frame 1051 in the attached state of the drum cartridge 1005Y to the drawer 1004. The first handle 1052 extends upward from the drum frame 1051 in the attached state of the drum cartridge 1005Y to the drawer 1004. The first handle 1052 is integral with the drum frame 1051. However, the first handle 1052 may be fixed to the drum frame 1051.

[0279] As illustrated in FIG. 18, the first handle 1052 is accommodated in the drawer 1004 in the attached state of the drum cartridge 1005Y to the drawer 1004. In other words, the first handle 1052 is positioned below an upper end of the drawer 1004 in the attached state of the drum cartridge 1005Y to the drawer 1004. The first handle 1052 is gripped by a user for detaching the drum cartridge 1005Y from the drawer 1004.

[0280] 9. Details of Drawer 1004

[0281] The drawer 1004 will be described in detail with reference to FIGS. 20 through 25. As illustrated in FIGS. 20 through 23, the drawer 1004 includes side plates 1041A, 1041B (see FIG. 20) corresponding to the side plates 41A, 41B of the first embodiment, the two positioning plates 1042A, 1042B (see FIG. 20) corresponding to the side plates 41A, 41B of the first embodiment, the plurality of locking members 43Y, 43M, 43C, 43K (see FIG. 21), the plurality of levers 44Y, 44M, 44C, 44K (see FIG. 21), the plurality of locking members 45Y, 45M, 45C, 45K (see FIG. 23), and the plurality of levers 46Y (see FIG. 20), 46M, 46C, 46K.

[0282] In the second embodiment, the drawer 1004 further includes a positioning shaft 42C, a plurality of developing pressure members 47Y, 47M, 47C, 47K (see FIG. 22), a plurality of developing pressure members 48Y, 48M, 48C, 48K (see FIG. 23), a plurality of developing pressure springs 49Y, 49M, 49C, 49K (see FIG. 22), and a plurality of developing pressure spring 50Y, 50M, 50C, 50K (see FIG. 23). Incidentally, the levers 46M, 46C, 46K are not illustrated.

[0283] 9.1 Side Plate 1041A

[0284] With reference to FIG. 20, the description as to the side plate 41A in relation to the drum side plate 511A, the outer surface S21, and the inner surface S22 is applicable to the side plate 1041A.

[0285] As illustrated in FIGS. 21 and 22, the side plate 1041A has a plurality of drawer guides 1411Y, 1411M, 1411C, 1411K (see FIG. 22), the plurality of through-holes 1412Y, 1412M, 1412C, 1412K (see FIG. 22), a plurality of developing guides 1413Y, 1413M, 1413C, 1413K (see FIG. 22), a plurality of holes 1414Y (see FIG. 21), a plurality of holes 1414M (see FIG. 21), a plurality of holes 1414C (see

FIG. 21), and a plurality of holes 1414K (see FIG. 21). The drawer guides 1411Y, 1411M, 1411C, 1411K correspond to the drawer guides 411Y, 411M, 411C, 411K of the first embodiment. The plurality of holes 1414Y, the plurality of holes 1414M, the plurality of holes 1414C, and the plurality of holes 1414K correspond to the plurality of holes 413Y, the plurality of holes 413M, the plurality of holes 413C, and the plurality of holes 413K of the first embodiment, respectively.

[0286] In other words, the drawer 1004 has the plurality of drawer guides 1411Y, 1411M, 1411C, 1411K, the plurality of through-holes 1412Y, 1412M, 1412C, 1412K, a plurality of developing guides 1413Y, 1413M, 1413C, 1413K, the plurality of holes 1414Y, the plurality of holes 1414M, the plurality of holes 1414C, and the plurality of holes 1414K.

[0287] 9.1.1 Drawer Guides 1411Y, 1411M, 1411C, 1411K

[0288] The drawer guides 1411Y, 1411M, 1411C, 1411K are arrayed with each other at intervals in the first direction as illustrated in FIG. 22.

[0289] As illustrated in FIG. 20, the drawer guide 1411Y is configured to guide travel of the drum cartridge 1005Y relative to the drawer 1004. Specifically, the drawer guide 411Y guides travel of the one end portion in the axial direction of the photosensitive drum 11Y in the attached state of the drum cartridge 1005Y to the drawer 1004. The drawer guide 1411Y is positioned in the inner surface S22 of the side plate 1041A.

[0290] As illustrated in FIG. 22, the drawer guide 1411Y extends in a fourth direction crossing the first direction and the axial direction. Specifically, the fourth direction is perpendicular to the first direction and the axial direction. The drawer guide 1411Y has one end portion E1 and another end portion E2 in the fourth direction. The other end portion E2 is positioned between the one end portion E1 and the locking member 43Y in the fourth direction. The drawer guide 1411Y is in the form of a recess. However, the drawer guide 1411Y may be a rib. The sleeve portion 1512A (see FIG. 20) of the drum cartridge 1005Y is fitted with the drawer guide 1411Y when the drum cartridge 1005Y is attached to the drawer 1004.

[0291] The drawer guides 1411M, 1411C, 1411K have configuration the same as that of the drawer guide 1411Y. Therefore, further description as to the drawer guides 1411M, 1411C, 1411K will be omitted.

[0292] 9.1.2 Through-Holes 1412Y, 1412M, 1412C, 1412K

[0293] As illustrated in FIGS. 20 and 22, the through-hole 1412Y is positioned at a deep side of the drawer guide 1411Y in the fourth direction. In other words, the through-hole 1412Y is positioned opposite to the one end portion E1 of the drawer guide 1411Y with respect to the other end portion E2 of the drawer guide 1411Y in the fourth direction. The through-hole 1412Y has a circular shape. The through-hole 1412Y extends throughout the thickness of the side plate 1041A, i.e., from the inner surface S22 (see FIG. 20) to the outer surface S21 (see FIG. 20).

[0294] The through-hole 1412M, 1412C, 1412K each have a configuration the same as that of the through-hole 1412Y. Therefore, further description as to the through-hole 1412M, 1412C, 1412K will be omitted.



[0295] 9.1.3 Developing Guides **1413Y**, **1413M**, **1413C**, **1413K**

[0296] As illustrated in FIG. 22, the developing guide **1413Y** is positioned in the inner surface **S22** of the side plate **1041A**. The developing guide **1413Y** is positioned between the drawer guide **1411Y** and the drawer guide **1411M**. The developing guide **1413Y** is positioned between the drawer guide **1411Y** and the developing pressure member **47Y**. The developing guide **1413Y** extends in the fourth direction.

[0297] The developing guide **1413Y** is configured to guide the developing cartridge **1006Y** when the developing cartridge **1006Y** is attached to the drawer **1004**. Specifically, a protrusion **1063A** (see FIG. 26, described later) of the developing cartridge **1006Y** is fitted with the developing guide **1413Y** when the developing cartridge **1006Y** is attached to the drawer **1004**. The developing guide **1413Y** is configured to guide the protrusion **1063A** during attachment of the developing cartridge **1006Y** to the drawer **1004**. Hence, the developing guide **1413Y** guides the one end portion in the axial direction of the developing roller **1062Y** when the developing cartridge **1006Y** is attached to the drawer **1004**.

[0298] The developing guide **1413M** is positioned between the drawer guide **1411M** and the drawer guide **1411C**. The developing guide **1413M** is positioned between the drawer guide **1411M** and the developing pressure member **47M**. The developing guide **1413M** is configured to guide the developing cartridge **1006M** when the developing cartridge **1006M** is attached to the drawer **1004**.

[0299] The developing guide **1413C** is positioned between the drawer guide **1411C** and the drawer guide **1411H**. The developing guide **1413C** is positioned between the drawer guide **1411C** and the developing pressure member **47C**. The developing guide **1413C** is configured to guide the developing cartridge **1006C** when the developing cartridge **1006C** is attached to the drawer **1004**.

[0300] The developing guide **1413K** is positioned opposite to the drawer guide **1411C** with respect to the drawer guide **1411K**. The developing guide **1413K** is positioned between the drawer guide **1411K** and the developing pressure member **47K**. The developing guide **1413K** is configured to guide the developing cartridge **1006K** when the developing cartridge **1006K** is attached to the drawer **1004**.

[0301] The description as to the developing guide **1413Y** is applicable to the developing guides **1413M**, **1413C**, **1413K**. Therefore, further description as to the developing guides **1413M**, **1413C**, **1413K** will be omitted.

[0302] 9.1.4 Holes **1414Y**, **1414M**, **1414C**, **1414K**

[0303] As described above, the plurality of holes **1414Y** correspond to the plurality of holes **1414Y** of the first embodiment. As illustrated in FIGS. 20 and 21, the holes **1414Y** are positioned in the outer surface **S21** of the side plate **1041A**. The holes **1414Y** are positioned at an edge of the through-hole **1412Y**. The holes **1414Y** are recessed from the outer surface **S21** toward the inner surface **S22** in the axial direction. However, a through-hole is also available as the hole **1414Y**.

[0304] As described above, the plurality of holes **1414M**, the plurality of holes **1414C**, and the plurality of holes **1414K** correspond to the plurality of holes **413M**, the plurality of holes **413C**, and the plurality of holes **413K** of the first embodiment, respectively. The description as to the holes **1414Y** is also applied to the holes **1414M**, **1414C**,

**1414K**. Therefore, further description as to the holes **1414M**, **1414C**, **1414K** will be omitted.

[0305] 9.2 Side Plate **1041B**

[0306] As illustrated in FIG. 20, the side plate **1041B** is at the position the same as the side plate **41B** of the first embodiment as is apparent from FIG. 6.

[0307] As illustrated in FIGS. 20 and 23, the side plate **1041B** has a plurality of drawer guides **1415Y**, **1415M**, **1415C**, **1415K** (see FIG. 23), the plurality of through-holes **1416Y**, **1416M**, **1416C**, **1416K** (see FIG. 23), a plurality of developing guides **1417Y**, **1417M**, **1417C**, **1417K** (see FIG. 23), a plurality of holes **1418Y** (see FIG. 20), a plurality of holes **1418M**, a plurality of holes **1418C**, and a plurality of holes **1418K**. Incidentally, the holes **1418M**, **1418C**, **1418K** are not illustrated.

[0308] The drawer guides **1415Y**, **1415M**, **1415C**, **1415K** correspond to the drawer guides **414Y**, **414M**, **414C**, **414K** of the first embodiment. The plurality of through-holes **1416Y**, **1416M**, **1416C**, **1416K** correspond to the plurality of through-holes **415Y** (FIG. 6), **415M**, **415C**, **415K** of the first embodiment. The plurality of holes **1418Y**, the plurality of holes **1418M**, the plurality of holes **1418C**, and the plurality of holes **1418K** correspond to the plurality of holes **416Y** (FIG. 6), the plurality of holes **416M**, the plurality of holes **416C**, and the plurality of holes **416K** of the first embodiment, respectively.

[0309] 9.2.1 Drawer Guides **1415Y**, **1415M**, **1415C**, **1415K**

[0310] The drawer guides **1415Y**, **1415M**, **1415C**, **1415K** are arrayed with each other at intervals in the first direction.

[0311] The drawer guide **1415Y** is configured to guide travel of the drum cartridge **1005Y** relative to the drawer **1004** in cooperation with the drawer guide **1411Y**. The drawer guide **1415Y** is positioned in the inner surface **S32** of the side plate **1041B**. The drawer guide **1415Y** extends in the fourth direction. The drawer guide **1415Y** is in the form of a recess. However, the drawer guide **1415Y** may be a rib. The sleeve portion **1512B** of the drum cartridge **1005Y** is fitted with the drawer guide **1415Y** when the drum cartridge **1005Y** is attached to the drawer **1004**.

[0312] The drawer guides **1415M**, **1415C**, **1415K** each have a configuration the same as that of the drawer guide **1415Y**. Therefore, further description as to the drawer guides **1415M**, **1415C**, **1415K** will be omitted.

[0313] 9.2.2 Through-Holes **1416Y**, **1416M**, **1416C**, **1416K**

[0314] As described above the through-holes **1416Y**, **1416M**, **1416C**, **1416K** correspond to the through-holes **415Y** (FIG. 6), **415M**, **415C**, **415K** of the first embodiment. As illustrated in FIGS. 20 and 23, the through-hole **1416Y** is positioned at a deep side of the drawer guide **1415Y** in the fourth direction. The through-hole **1416Y** has a circular shape. The through-hole **1416Y** extends throughout the thickness of the side plate **1041B**, i.e., from the inner surface **S32** to the outer surface **S31** of the side plate **1041B**.

[0315] The description as to the through-hole **1416Y** is also applicable to the through holes **1416M**, **1416C**, **1416K**, and therefore, further description as to the through-holes **1416M**, **1416C**, **1416K** will be omitted.

[0316] 9.2.3 Developing Guides **1417Y**, **1417M**, **1417C**, **1417K**

[0317] As illustrated in FIG. 23, the developing guides **1417Y**, **1417M**, **1417C**, **1417K** are positioned in the inner surface **S32** of the side plate **1041B**. The description as to the

developing guide **1413Y** (see FIG. 22) is applicable to each of the developing guides **1417Y**, **1417M**, **1417C**, **1417K**, and therefore, further description as to the developing guides **1417Y**, **1417M**, **1417C**, **1417K** will be omitted.

[0318] 9.2.4 Holes **1418Y**, **1418M**, **1418C**, **1418K**

[0319] As described above, the holes **1418Y**, **1418M**, **1418C**, **1418K** correspond to the holes **416Y** (FIG. 6), holes **416M**, the holes **416C**, and the holes **416K** of the first embodiment, respectively. As illustrated in FIG. 20, the hole **1418Y** is positioned in the outer surface **S31** of the side plate **1041B**. Similar to the hole **1414Y** (see FIG. 21), the hole **1418Y** is positioned on the edge of the through-hole **1416Y**. The hole **1418Y** is recessed in the axial direction from the outer surface **S31** to the inner surface **S32**. Alternatively, a through-hole may be available as the hole **1418Y**.

[0320] The description as to the hole **1418Y** is applicable to the holes **1418M**, **1418C**, **1418K**, and therefore, further description as to the holes **1418M**, **1418C**, **1418K** will be omitted.

[0321] 9.3 Positioning Plate **1042A**

[0322] With reference to FIGS. 20 and 22, the positioning plate **1042A** is the same as the positioning plate **42A** of the first embodiment. Specifically, as illustrated in FIG. 22, the positioning plate **1042A** has the plurality of recessed portions **421Y**, **421M**, **421C**, **421K** and the counterpart positioning portion **422** similar to the positioning plate **42A**. The counterpart positioning portion **422** is subjected to positioning by the positioning member **1023A** provided in the housing **2** when the drawer **1004** is at its inside position. In other words, the positioning member **1023A** of the housing **2** fixes a position of the positioning plate **1042A** relative to the housing **2** when the drawer **1004** is at the inside position.

[0323] 9.4 Positioning Plate **1042B**

[0324] The description as to the positioning plate **42B** of the first embodiment and the description as to the positioning plate **1042A** are applicable to the positioning plate **1042B** with reference to FIGS. 20 and 23. Therefore, further description as to the positioning plate **1042B** will be omitted.

[0325] 9.5 Positioning Shaft **42C**

[0326] As illustrated in FIG. 17, the positioning shaft **42C** is positioned at the other end portion in the first direction of the drawer **1004**. The positioning shaft **42C** extends in the axial direction. In a state where the drawer **1004** is at the inside position, the positioning shaft **42C** is fitted with a notch of a positioning member **1023B** of the housing **2**. Hence, the other end portion in the first direction of the drawer **1004** is subjected to positioning with respect to the housing **2**. The positioning shaft **42C** has a solid cylindrical shape. The positioning shaft **42C** is made from metal such as stainless steel and iron.

[0327] According to the second embodiment, the positioning shaft **42C** extends throughout the thickness of the other end portion in the first direction of the positioning plate **1042A** and the other end portion in the first direction of the side plate **1041A**. The positioning shaft **42C** may integrally extend from the side plate **1041A** of the drawer **1004**. The position of the counterpart positioning portion **422** of the positioning plates **1042A**, **1042B** is different from the position of the positioning shaft **42C** in the fourth direction. In other words, corresponding positions of the positioning member **1023A** of the housing **2** and the notch of the positioning member **1023B** of the housing **2** are different from each other in the fourth direction.

[0328] 9.6 Locking Members **43Y**, **43M**, **43C**, **43K**

[0329] The locking members **43Y**, **43M**, **43C**, **43K** are illustrated in FIG. 21. Locking position of the locking members **43Y**, **43M**, **43C**, **43K** is illustrated in FIG. 22. Unlocking position of the locking members **43Y**, **43M**, **43C**, **43K** is illustrated in FIG. 24. Details of the locking members **43Y**, **43M**, **43C**, **43K** are described in the description of the first embodiment.

[0330] 9.6.1 Lock Guide **431**

[0331] The configuration of the lock guide **431** is already described in the description of the first embodiment. According to the second embodiment, the lock guide **431** has a first end portion **E11** and a second end portion **E12** in an extending direction thereof. The second end portion **E12** is positioned apart from the first end portion **E11** in the extending direction of the lock guide **431**. The sleeve portion **1512A** (see FIG. 19A) of the drum cartridge **1005Y** is fitted with the lock guide **431** in the attached state of the drum cartridge **1005Y** to the drawer **1004**. Hence, the one end portion in the axial direction of the photosensitive drum **11Y** (see FIG. 20) is fitted with the lock guide **431** in the attached state of the drum cartridge **1005Y** to the drawer **1004**.

[0332] The lock guide **431** extends in the first direction in a state where the locking member **43Y** is at its locking position. In other words, the lock guide **431** extends in a direction crossing the extending direction of the drawer guide **1411Y** in the state where the locking member **43Y** is at its locking position. The lock guide **431** is disconnected from the drawer guide **1411Y** in the state where the locking member **43Y** is at its locking position. In the state where the locking member **43Y** is at its locking position, the first end portion **E11** of the lock guide **431** is positioned between the second end portion **E12** of the lock guide **431** and the developing pressure member **47Y** in the extending direction of the lock guide **431**.

[0333] Hence, the sleeve portion **1512A** cannot be moved past the lock guide **431** in case of displacement of the drum cartridge **1005Y** in the fourth direction in a state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at its locking position. Accordingly, the drum cartridge **1005Y** is incapable of being released from the drawer **1004** as long as the locking member **43Y** is at its locking position in the attached state of the drum cartridge **1005Y** to the drawer **1004**.

[0334] On the other hand, as illustrated in FIG. 24, the lock guide **431** extends in the extending direction of the drawer guide **1411Y** in a state where the locking member **43Y** is at the unlocking position. The lock guide **431** is connected to the drawer guide **1411Y** in the state where the locking member **43Y** is at the unlocking position. Specifically, the first end portion **E11** of the lock guide **431** is connected to the drawer guide **1411Y** in the state where the locking member **43Y** is at its unlocking position.

[0335] Hence, the sleeve portion **1512A** can be released from the lock guide **431** in case of displacement of the drum cartridge **1005Y** in the fourth direction in a state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at its unlocking position. Accordingly, the drum cartridge **1005Y** is capable of being released from the drawer **1004** as long as the locking member **43Y** is at its unlocking position in the attached state of the drum cartridge **1005Y** to the drawer **1004**.

**[0336]** 9.6.2 Locking Portion **432**

**[0337]** The locking portion **432** is illustrated in FIGS. **20** and **22**. Configuration of the locking portion **432** is already described in the description of the first embodiment.

**[0338]** The locking portion **432** extends in the first direction in the state where the locking member **43Y** is at its locking position as illustrated in FIG. **22**. In other words, the locking portion **432** extends in the direction crossing the extending direction of the drawer guide **1411Y** in the state where the locking member **43Y** is at its locking position. The locking portion **432** is positioned between the one end portion of the photosensitive drum **11Y** and the drawer guide **1411Y** in the state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at its locking position. Accordingly, the sleeve portion **1512A** is incapable of being released from the lock guide **431** in case of displacement of the drum cartridge **1005Y** in the fourth direction in the state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at its locking position. As a result, the locking portion **432** locks the photosensitive drum **11Y** to the drawer **1004** as long as the locking member **43Y** is at its locking position in the attached state of the drum cartridge **1005Y** to the drawer **1004**.

**[0339]** On the other hand, as illustrated in FIG. **24**, the locking portion **432** extends in the extending direction of the drawer guide **1411Y** in the state where the locking member **43Y** is at the unlocking position. The locking portion **432** is retracted from a position between the one end portion of the photosensitive drum **11Y** and the drawer guide **1411Y** in the state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at the unlocking position. Hence, the sleeve portion **1512A** can be released from the lock guide **431** in case of displacement of the drum cartridge **1005Y** in the fourth direction in the state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at its unlocking position.

**[0340]** 9.6.3 Through-Hole **433**

**[0341]** The through-hole **433** is illustrated in FIGS. **20** and **22**. The through-hole **433** is already described in the description of the first embodiment.

**[0342]** 9.6.4 Pressure Member **434**

**[0343]** The pressure member **434** is illustrated in FIGS. **20**, **22** and **24**. The pressure member **434** is already described in the description of the first embodiment. The pressure member **434** presses against the sleeve portion **1512A** of the drum cartridge **1005Y** toward the positioning plate **1042A** in the state where the drum cartridge **5Y** is attached to the drawer **4** and the locking member **43Y** is at the locking position. Specifically, the pressure member **434** presses against the one end portion of the photosensitive drum **11Y** toward the recessed portion **421Y** of the positioning plate **1042A** in the state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at the locking position.

**[0344]** On the other hand, as illustrated in FIG. **24**, the pressure member **434** is retracted from a position between the one end portion of the photosensitive drum **11Y** and the drawer guide **1411Y** in the state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at the unlocking position. Hence, the pressure applied from the pressure member **434** to the one end portion of the photosensitive drum **11Y** is released in the

state where the drum cartridge **1005Y** is attached to the drawer **1004** and the locking member **43Y** is at the unlocking position.

**[0345]** 9.6.5 Spring **435**

**[0346]** The spring **435** is illustrated in FIGS. **20** and **22**. The spring **435** is already described in the description of the first embodiment.

**[0347]** 9.7 Levers **44Y**, **44M**, **44C**, **44K**

**[0348]** The lever levers **44Y**, **44M**, **44C**, **44K** are illustrated in FIGS. **20**, **21**, and **25**. The levers **44Y**, **44M**, **44C**, **44K** are already described in the description of the first embodiment.

**[0349]** 9.7.1 Lever Body **441**

**[0350]** The lever body **441** is illustrated in FIGS. **21** and **25**. The lever body **441** is already described in the description of the first embodiment.

**[0351]** 9.7.2 Protrusions **442A**, **442B**

**[0352]** The protrusions **442A**, **442B** are illustrated in FIG. **25**. The protrusions **442A**, **442B** are already described in the description of the first embodiment.

**[0353]** As illustrated in FIG. **20**, the protrusion **442A** of the lever **44Y** is engaged with one of the two holes **1414Y** of the side plate **1041A** and the protrusion **442B** of the lever **44Y** is engaged with remaining one of the two holes **1414Y** in the state where the locking member **43Y** is at the locking position and the lever **44Y** is at the first position. Hence, the lever **44Y** is locked to the side plate **41A**.

**[0354]** The protrusion **442A** of the lever **44Y** is disengaged from one of the two holes **1411Y** of the side plate **1041A** and the protrusion **442B** of the lever **44Y** is disengaged from remaining one of the two holes **1414Y** in the state where the locking member **43Y** is at the locking position and the lever **44Y** is at the second position. Hence, the lever **44Y** is unlocked from the side plate **1041A**.

**[0355]** 9.8 Locking Members **45Y**, **45M**, **45C**, **45K**

**[0356]** The locking member **45Y** is positioned in the through-hole **1416Y** of the side plate **1041B**. The description as to the locking member **43Y** is applicable to the locking member **45Y**. Therefore, further description as to the locking member **45Y** will be omitted. Further, the description as to the locking member **43Y** is also applicable to the locking members **45M**, **45C**, **45K**. Therefore, further description as to the locking members **45M**, **45C**, **45K** will be omitted.

**[0357]** 9.9 Levers **46Y**, **46M**, **46C**, **46K**

**[0358]** The lever is illustrated in FIG. **20**. The lever **46Y** is attached to the outer surface of the locking member **45Y**. The description as to the lever **44Y** is applicable to the lever **46Y**. Therefore, further description as to the lever **46Y** will be omitted. Further, the description as to the lever **44Y** is also applicable to the levers **46M**, **46C**, **46K**. Therefore, further description as to the levers **46M**, **46C**, **46K** will be omitted.

**[0359]** 9.10 Developing Pressure Members **47Y**, **47M**, **47C**, **47K**

**[0360]** As illustrated in FIG. **22**, the developing pressure member **47Y** is attached to the side plate **1041A**. The developing pressure member **47Y** is positioned between the drawer guide **1411Y** and the drawer guide **1411M** in the first direction. The developing pressure member **48Y** is positioned opposite to the drawer guide **1411Y** with respect to the developing guide **1413Y** in the first direction. Further, in the attached state of the drum cartridge **1005Y** and the developing cartridge **1006Y** to the drawer **1004**, the developing pressure member **47Y** is positioned opposite to the

photosensitive drum 11Y with respect to the developing roller 1062Y in a direction from the drum axis A1 (see FIG. 17) to the developing axis A2 (see FIG. 17).

[0361] In the attached state of the drum cartridge 1005Y and the developing cartridge 1006Y to the drawer 1004, the developing pressure member 47Y is configured to urge the developing cartridge 1006Y toward the photosensitive drum 11Y. Specifically, in the attached state of the developing cartridge 1006Y to the drawer 1004, the developing pressure member 47Y presses against a protrusion 1064A (see FIG. 26) of the developing cartridge 1006Y toward the photosensitive drum 11Y. The protrusion 1064A will be described later.

[0362] The developing pressure member 47M is attached to the side plate 1041A. The developing pressure member 47M is positioned between the drawer guide 1411M and the drawer guide 1411C in the first direction. In the attached state of the drum cartridge 1005M and the developing cartridge 1006M to the drawer 1004, the developing pressure member 47M is configured to urge the developing cartridge 1006M toward the photosensitive drum 11M.

[0363] The developing pressure member 47C is attached to the side plate 1041A. The developing pressure member 47C is positioned between the drawer guide 1411C and the drawer guide 1411K in the first direction. In the attached state of the drum cartridge 1005C and the developing cartridge 1006C to the drawer 1004, the developing pressure member 47C is configured to urge the developing cartridge 1006C toward the photosensitive drum 11C.

[0364] The developing pressure member 47K is attached to the side plate 1041A. The developing pressure member 47K is positioned opposite to the drawer guide 1411C with respect to the drawer guide 1411K in the first direction. In the attached state of the drum cartridge 1005K and the developing cartridge 1006K to the drawer 1004, the developing pressure member 47K is configured to urge the developing cartridge 1006K toward the photosensitive drum 11K.

[0365] The description as to the developing pressure member 47Y is applicable to the developing pressure members 47M, 47C, 47K. Therefore, further description as to the developing pressure members 47M, 47C, 47K will be omitted.

[0366] 9.11 Developing Pressure Members 48Y, 48M, 48C, 48K

[0367] As illustrated in FIG. 23, the developing pressure members 48Y, 48M, 48C, 48K are attached to the side plate 1041B. The description as to the developing pressure member 47Y is applicable to the developing pressure members 48Y, 48M, 48C, 48K. Therefore, further description as to the developing pressure members 48Y, 48M, 48C, 48K will be omitted.

[0368] 9.12 Developing Pressure Springs 49Y, 49M, 49C, 49K

[0369] As illustrated in FIG. 22, the developing pressure spring 49Y is configured to urge the developing pressure member 47Y. In the attached state of the developing cartridge 1006Y to the drawer 1004, the developing pressure spring 49Y urges the developing pressure member 47Y toward the protrusion 1064A (see FIG. 26) of the developing cartridge 1006Y. A torsion spring is one example of the developing pressure spring 49Y. The description as to the developing pressure spring 49Y is applicable to the devel-

oping pressure springs 49M, 49C, 49K. Therefore, further description as to the developing pressure springs 49M, 49C, 49K will be omitted.

[0370] 9.13 Developing Pressure Spring 50Y, 50M, 50C, 50K

[0371] As illustrated in FIG. 23, the developing pressure spring 50Y is configured to urge the developing pressure member 48Y. In the attached state of the developing cartridge 1006Y to the drawer 1004, the developing pressure spring 50Y is configured to urge the developing pressure member 48Y toward a protrusion 1064B (see FIG. 26) of the developing cartridge 1006Y. The protrusion 1064B will be described later. A torsion spring is one example of the developing pressure spring 50Y. The description as to the developing pressure spring 50Y is applicable to the developing pressure spring 50M, 50C, 50K. Therefore, further description as to the developing pressure spring 50M, 50C, 50K will be omitted.

[0372] 10. Details of Developing Cartridge 1006Y

[0373] The developing cartridge 1006Y will be described in detail with reference to FIG. 26. Incidentally, the following description as to the developing cartridge 1006Y is applicable to the developing cartridges 1006M, 1006C, 1006K. Therefore, further description as to the developing cartridges 1006M, 1006C, 1006K will be omitted. Further, the “axial direction” described below as to the developing cartridge 1006Y is defined in the attached state of the developing cartridge 1006Y to the drum cartridge 1005Y.

[0374] The developing cartridge 1006Y includes the protrusion 1063A, a protrusion 1063B, the protrusion 1064A, the protrusion 1064B, and a second handle 1065 in addition to the above-described developing casing 1061Y and the developing roller 1062Y.

[0375] 10.1 Protrusions 1063A, 1063B

[0376] The protrusion 1063A extends from one side surface S61 in the axial direction of the developing casing 1061Y. The protrusion 1063A is integral with the developing casing 1061Y. Alternatively, the protrusion 1063A may be attached to the side surface S61. The protrusion 1063A extends in the axial direction. The protrusion 1063A has a hollow cylindrical shape. The protrusion 1063A receives one end portion of the shaft of the developing roller 1062Y.

[0377] The protrusion 1063B extends from another side surface S62 in the axial direction of the developing casing 1061Y. The protrusion 1063B is positioned opposite to the protrusion 1063A with respect to the developing casing 1061Y in the axial direction. The protrusion 1063B is integral with the developing casing 1061Y, or may be attached to the side surface S62. The protrusion 1063B extends in the axial direction. The protrusion 1063B has a hollow cylindrical shape. The protrusion 1063B receives another end portion of the shaft of the developing roller 1062Y.

[0378] 10.2 Protrusions 1064A, 1064B

[0379] The protrusion 1064A extends from the one side surface S61 in the axial direction of the developing casing 1061Y. The protrusion 1064A is integral with the developing casing 1061Y. Alternatively, the protrusion 1064A may be attached to the side surface S61. The protrusion 1064A is positioned apart from the protrusion 1063A in the fourth direction. In the attached state of the drum cartridge 1005Y and the developing cartridge 1006Y to the drawer 1004, the protrusion 1064A is positioned opposite to the photosensitive drum 11Y with respect to the protrusion 1063A in the

direction from the drum axis A1 to the developing axis A2. In the attached state of the developing cartridge 1006Y to the drawer 1004, the protrusion 1064A is urged toward the photosensitive drum 11Y by the developing pressure member 47Y (see FIG. 22). The protrusion 1064A extends in the axial direction. The protrusion 1064A has a hollow cylindrical shape.

[0380] The protrusion 1064B extends from the other side surface S62 in the axial direction of the developing casing 1061Y. The protrusion 1064B is integral with the developing casing 1061Y. Alternatively, the protrusion 1064B may be attached to the side surface S62. The protrusion 1064B is positioned apart from the protrusion 1063B in the fourth direction. In the attached state of the drum cartridge 1005Y and the developing cartridge 1006Y to the drawer 1004, the protrusion 1064B is positioned opposite to the photosensitive drum 11Y with respect to the protrusion 1063B in the direction from the drum axis A1 to the developing axis A2. In the attached state of the developing cartridge 1006Y to the drawer 1004, the protrusion 1064B is urged toward the photosensitive drum 11Y by the developing pressure member 48Y (see FIG. 23). The protrusion 1064B extends in the axial direction. The protrusion 1064B has a hollow cylindrical shape.

[0381] 10.3 Second Handle 1065

[0382] As illustrated in FIGS. 18 and 26, the second handle 1065 is positioned at an upper end of the developing casing 1061Y in the attached state of the developing cartridge 1006Y to the drawer 1004. The second handle 1065 is integral with the developing casing 1061Y. Alternatively, the second handle 1065 may be attached to the developing casing 1061Y.

[0383] As illustrated in FIG. 18, the second handle 1065 protrudes out of the drawer 1004 in the attached state of the developing cartridge 1006Y to the drawer 1004. In other words, the second handle 1065 is positioned above the upper end of the drawer 1004 in the attached state of the developing cartridge 1006Y to the drawer 1004. More specifically, in the attached state of the drum cartridge 1005Y and the developing cartridge 1006Y to the drawer 1004, the second handle 1065 is positioned above the first handle 1052 of the drum cartridge 1005Y. The second handle 1065 is configured to be grasped by the user for detaching the developing cartridge 1006Y from the drawer 1004 in the attached state of the developing cartridge 1006Y to the drawer 1004.

[0384] 11. Work for Exchanging Developing Cartridge 1006Y.

[0385] Next, the work for exchanging the developing cartridge 1006Y for a new developing cartridge 1006Y will be described with reference to FIGS. 17 through 23 and 26. As illustrated in FIGS. 17 and 18, firstly, the user moves the drawer 1004 from the inside position (see FIG. 17) to the outside position (see FIG. 18) for exchanging the developing cartridge 1006Y for a new developing cartridge 1006Y.

[0386] As illustrated in FIGS. 21 and 22, the locking member 43Y is at the locking position and the lever 44Y is at the first position in the state where the drawer 4 is at the outside position. Further, as illustrated in FIGS. 20 and 23, the locking member 45Y is at the locking position and the lever 46Y is at the first position.

[0387] The locking member 43Y is locked at the locking position because of the first position of the lever 44Y. Further, the locking member 45Y is locked at the locking

position because of the first position of the lever 46Y. The photosensitive drum 11Y is locked to the drawer 1004 because of the locking positions of the locking members 43Y and 45Y.

[0388] Then, the user grasps the second handle 1065 to pull the developing cartridge 1006Y in the fourth direction from the drawer 1004 as illustrated in FIG. 18. Hence, the developing cartridge 1006Y is released from the drawer 1004. At this time, displacement of the photosensitive drum 11Y relative to the drawer 1004 can be suppressed, since the photosensitive drum 11Y is locked to the drawer 1004.

[0389] Next, in order to attach the developing cartridge 1006Y to the drum cartridge 1005Y attached to the drawer 1004 that is at the outside position, the user firstly engages the protrusions 1063A and 1063B (see FIG. 26) with the developing guide 1413Y (see FIG. 22) and the developing guide 1417Y (see FIG. 23), respectively. With such engagements, the developing cartridge 1006Y is guided by the developing guides 1413Y, 1417Y and is attached to the drawer 1004.

[0390] Next, the user moves the drawer 1004 from the outside position (see FIG. 18) to the inside position (see FIG. 17). As such, exchange of the developing cartridge 1006Y for the new developing cartridge 1006Y is completed.

[0391] 12. Work for Exchanging Drum Cartridge 1005Y

[0392] Next, work for exchanging the drum cartridge 1005Y for a new drum cartridge 1005Y will be described with reference to FIGS. 17 through 24. Incidentally, the exchange of the drum cartridge 1005Y may be performed with the attached state of the developing cartridge 1006Y to the drum cartridge 1005Y, or with the detached state of the developing cartridge 1006Y from the drum cartridge 1005Y.

[0393] As illustrated in FIGS. 17 and 18, firstly, the user moves the drawer 1004 from the inside position (see FIG. 17) to the outside position (see FIG. 18) for exchanging the drum cartridge 1005Y for a new drum cartridge 1005Y.

[0394] As illustrated in FIGS. 21 and 22, the locking member 43Y is at the locking position and the lever 44Y is at the first position in the state where the drawer 1004 is at the outside position. Further, the locking member 45Y is at the locking position and the lever 46Y is at the first position as illustrated in FIGS. 20 and 23.

[0395] The locking member 43Y is locked at the locking position because of the first position of the lever 44Y. Further, the locking member 45Y is locked at the locking position because of the first position of the lever 46Y. The photosensitive drum 11Y is locked to the drawer 1004 because of the locking positions of the locking members 43Y and 45Y.

[0396] Then, the user pivotally moves the lever 44Y from the first position to the second position. The locking member 43Y is unlocked from the side plate 1041A in accordance with the movement of the lever 44Y to the second position. Further, the user pivotally moves the lever 46Y from the first position to the second position. The locking member 45Y is unlocked from the side plate 1041B in accordance with the movement of the lever 46Y to the second position.

[0397] Then, as illustrated in FIGS. 22 and 24, the user rotates the locking member 43Y from the locking position to the unlocking position. Further, the user rotates the locking member 45Y (see FIG. 23) from the locking position to the unlocking position. As a result, the photosensitive drum 11Y

is unlocked from the drawer **1004** in the state where the locking members **43Y** and **45Y** are positioned at the unlocking position.

**[0398]** Then, the user grasps the first handle **1052** and pulls the first handle **1052** to detach the drum cartridge **1005Y** out of the drawer **1004**. As a result, the sleeve portion **1512A** (see FIG. **20**) of the drum cartridge **1005Y** is disengaged from the lock guide **431** (see FIGS. **20** and **24**) of the locking member **43Y**, and the sleeve portion **1512B** (see FIG. **20**) of the drum cartridge **5Y** is disengaged from the lock guide **451** (see FIG. **20**) of the locking member **45Y**. Thus, the drum cartridge **1005Y** is released from the drawer **1004**.

**[0399]** Then, in order to attach the drum cartridge **1005Y** to the drawer **1004** in the state where the drawer **1004** is at the outside position, the user firstly engages the sleeve portions **1512A**, **1512B** with the drawer guides **1411Y** and **1415Y** of the drawer **1004**, respectively, as illustrated in FIG. **20**. Hence, the drum cartridge **1005Y** is guided by the drawer guides **1411Y** and **1415Y** and is attached to the drawer **1004**.

**[0400]** After attachment of the drum cartridge **1005Y** to the drawer **1004**, the sleeve portion **1512A** of the drum cartridge **1005Y** is fitted with the lock guide **431** of the locking member **43Y** and the sleeve portion **1512B** of the drum cartridge **1005Y** is fitted with the lock guide **451** of the locking member **45Y**.

**[0401]** Next, as illustrated in FIGS. **21** and **25**, the user grasps the lever **44Y** positioned at the second position, and rotates the locking member **43Y** from the unlocking position to the locking position. Further, the user grasps the lever **46Y** (see FIG. **20**) positioned at the second position, and rotates the locking member **45Y** (see FIG. **20**) from the unlocking position to the locking position.

**[0402]** As a result, as illustrated in FIGS. **22** and **23**, the photosensitive drum **11Y** is locked to the drawer **1004** with the state where the locking member **43Y** is at the locking position, and the locking member **45Y** is at the locking position.

**[0403]** Then, the user moves the lever **44Y** from the second position to the first position. Further, the user moves the lever **46Y** from the second position to the first position. Then, the user moves the drawer **4** from the outside position to the inside position. As such, work for exchange of the drum cartridge **1005Y** for the new drum cartridge **1005Y** is completed.

**[0404]** 13. Functions and Advantages

**[0405]** (1) In the image forming apparatus **1** according to the first embodiment, in case of exchange of the toner cartridge **6Y** for the new toner cartridge **6Y** with the state where the drum cartridge **5Y** is attached to the drawer **4**, as illustrated in FIG. **2**, the exchanging work of the toner cartridge **6Y** relative to the drum cartridge **5Y** can be performed with the state where the photosensitive drum **11Y** is locked to the drawer **4** by the locking member **43Y** as illustrated in FIG. **9**. Therefore, displacement of the photosensitive drum **11Y** relative to the drawer **4** can be suppressed during exchanging work of the toner cartridge **6Y**. As a result, lowering positioning accuracy of the photosensitive drum **11Y** relative to the housing **2** can be suppressed.

**[0406]** (2) In the image forming apparatus **1001** according to the second embodiment, in case of exchange of the developing cartridge **1006Y** for the new developing cartridge **1006Y** with the state where the drum cartridge **1005Y**

is attached to the drawer **1004**, as illustrated in FIG. **18**, the exchanging work of the developing cartridge **1006Y** relative to the drawer **1004** can be performed with the state where the photosensitive drum **11Y** is locked to the drawer **1004** by the locking member **43Y**. Therefore, displacement of the photosensitive drum **11Y** relative to the drawer **1004** can be suppressed during exchanging work of the developing cartridge **1006Y**. As a result, lowering positioning accuracy of the photosensitive drum **11Y** relative to the housing **2** can be suppressed similar to the first embodiment.

**[0407]** (3) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. **9**, **10**, **22**, and **24**, the locking member **43Y** is rotatable about the first axis **A11** extending in the axial direction between the locking position (see FIGS. **9** and **22**) and the unlocking position (see FIGS. **10** and **24**). Therefore, the locking member **43Y** does not need to be moved in the axial direction for moving the locking member **43Y** between the locking position and the unlocking position. As a result, a space saving in the axial direction is attainable.

**[0408]** (4) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. **9**, **10**, **22**, and **24**, the locking member **43Y** is rotatable about the drum axis **A1** between the locking position (see FIGS. **10** and **22**) and the unlocking position (see FIGS. **10** and **24**). Therefore, movable range of the locking member **43Y** relative to the photosensitive drum **11Y** can be reduced. As a result, an increase in size of the drawer **4**, **1004** due to the provision of the locking member **43Y** can be suppressed.

**[0409]** (5) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. **10** and **24**, the extending direction of the lock guide **431** is coincident with the extending direction of the drawer guide **411Y**, **1411Y** and the lock guide **431** is connected to the drawer guide **411Y**, **1411Y** in the state where the locking member **43Y** is at the unlocking position. Therefore, in case of attachment of the drum cartridge **5Y**, **1005Y** to the drawer **4**, **1004** with the state where the locking member **43Y** is at the unlocking position, the one end portion in the axial direction of the photosensitive drum **11Y** can be guided not only by the drawer guide **411Y**, **1411Y** but also by the lock guide **431**, so that the one end portion can be smoothly fitted with the locking member **43Y**.

**[0410]** Further, as illustrated in FIGS. **9** and **22**, the lock guide **431** extends in the direction crossing the extending direction of the drawer guide **411Y**, **1411Y** in the state where the locking member **43Y** is at the locking position. Therefore, the one end portion in the axial direction of the photosensitive drum **11Y** can be locked to the drawer **4**, **1004** with the state where the drum cartridge **5Y**, **1005Y** is attached to the drawer **4**, **1004** and the locking member **43Y** is at the locking position.

**[0411]** (6) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. **9** and **22**, in the state where the drum cartridge **5Y**, **1005Y** is attached to the drawer **4**, **1004** and the locking member **43Y** is at the locking position, the locking portion **432** is positioned between the one end portion of the photosensitive drum **11Y** and the drawer guide **411Y**, **1411Y**. With this structure, the one end portion in the axial direction of the photosensitive drum **11Y** can be locked to the drawer **4**, **1004** by the locking portion **432** in the state where the drum cartridge **5Y**, **1005Y** is attached to the drawer **4**, **1004** and the locking member **43Y** is at the locking position.

[0412] (7) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. 9 and 22, the locking member 43Y includes the pressure member 434. The pressure member 434 presses against the one end portion of the photosensitive drum 11Y toward the positioning plate 42A, 1042A in the attached state of the drum cartridge 5Y, 1005Y to the drawer 4, 1004. Hence, the one end portion of the photosensitive drum 11Y can be pressed toward the positioning plate 42A, 1042A by making use of the locking member 43Y.

[0413] (8) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. 6 and 20, the lever 44Y is positioned outward of the outer surface S21 of the side plate 41A, 1041A. Hence, the lever 44Y is easily accessible to the user, i.e., the user can operate the locking member 43Y at the outside of the side plate 41A, 1041A, and as a result, the user can smoothly move the locking member 43Y.

[0414] (9) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. 6, 7, 20 and 21, the lever 44Y is locked to the side plate 41A, 1041A in the state where the locking member 43Y is at the locking position and the lever 44Y is at the first position. Therefore, the locking member 43Y can be locked at the locking position by making use of the lever 44Y.

[0415] (10) In the image forming apparatus according to the first and second embodiments, as indicated by the imaginary line illustrated in FIGS. 6 and 20, the lever 44Y abuts on the abutment portion of the housing 2 in case of movement of the drawer 4, 1004 from the outside position toward the inside position with the state where the lever 44Y is at the second position. This abutment can suppress the drawer 4, 1004 from further moving toward the inside position with the state that the lever 44Y is at the second position. As a result, this abutment prompts the user to move the locking member 43Y to the locking position and to move the lever 44Y to the first position in case of moving the drawer 4, 1004 from the outside position toward the inside position.

[0416] (11) In the image forming apparatus according to the first and second embodiments, as illustrated in FIGS. 11 and 25, the lever 44Y covers at least the part of the coupling 111Y in the axial direction of the photosensitive drum 11Y in the state where the drum cartridge 5Y, 1005Y is attached to the drawer 4, 1004 and the lever 44Y is at the second position. Therefore, the lever 44Y protruding from the side plate 41A, 1041A can restrain the main coupling from fitting with the coupling 111Y in case where the drawer 4, 1004 is positioned at the inside position with the state where the lever 44Y is at the second position. As a result, start of the image forming operation with the state where the photosensitive drum 11Y is unlocked from the drawer 4, 1004 can be suppressed.

[0417] (12) In the image forming apparatus according to the second embodiment, as illustrated in FIG. 22, the first end portion E11 of the lock guide 431 is positioned between the second end portion E12 of the lock guide and the developing pressure member 47Y in the extending direction of the lock guide 431 in the state where the locking member 43Y is at the locking position.

[0418] Hence, the force transmitted from the developing pressure member 47Y to the drum cartridge 1005Y through the developing cartridge 1006Y is directed in the direction from the first end portion E11 to the other end portion E12

of the lock guide 431. This can restrain the one end portion of the photosensitive drum 11Y from being inadvertently released from the lock guide 431 due to the force applied from the developing pressure member 47Y.

[0419] (13) In the image forming apparatus according to the second embodiment, as illustrated in FIG. 18, the first handle 1052 of the drum cartridge 1005Y is accommodated in the internal space of the drawer 1004 in the attached state of the drum cartridge 1005Y to the drawer 1004. On the other hand, the second handle 1065 of the developing cartridge 1006Y protrudes out of the drawer 1004 in the attached state of the developing cartridge 1006Y to the drawer 1004.

[0420] Hence, in a case where the user is about to exchange the developing cartridge 1006Y for the new developing cartridge 1006Y in the state where the drum cartridge 1005Y and the developing cartridge 1006Y are attached to the drawer 1004, the second handle 1065 of the developing cartridge 1006Y is more accessible to the user than the first handle 1052 is to the user. As a result, unwanted detachment of the drum cartridge 1005Y can be suppressed when the user is about to exchange the developing cartridge 1006Y in the state where both the drum cartridge 1005Y and the developing cartridge 1006Y are attached to the drawer 1004.

[0421] 14. Modifications

[0422] The drum cartridges 5Y, 5M, 5C, 1005Y, 1005M, 1005C may not be provided in the image forming apparatus 1 and 1001, so that the image forming apparatus functions as a monochromatic printer. Further, the locking member 43Y may be a linearly movable component instead of the rotationally movable component.

[0423] While the description has been made in detail with reference to the specific embodiments, it would be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the disclosure.

What is claimed is:

1. An image forming apparatus comprising:

- a housing;
- a drum cartridge as a first cartridge comprising a photosensitive drum;
- a second cartridge in which toner is accommodatable; and
- a drawer movable between an inside position where the drawer in its entirety is positioned inside the housing and an outside position where at least a part of the drawer is positioned outside the housing, the drum cartridge being attachable to and detachable from the drawer, the drawer comprising:
  - a side plate configured to receive the photosensitive drum; and
  - a locking member supported by the side plate and movable relative to the side plate locks the photosensitive drum to the side plate and an unlocking position where the locking member unlocks the photosensitive drum from the side plate in an attached state of the drum cartridge to the drawer.

2. The image forming apparatus according to claim 1, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, and wherein the locking member is rotatable about a first axis extending in the axial direction between the locking position and the unlocking position.

3. The image forming apparatus according to claim 1, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, and wherein the locking member is rotatable about the drum axis between the locking position and the unlocking position.
4. The image forming apparatus according to claim 1, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, and wherein the locking member has a disc like shape and has a lock guide configured to guide one end portion in the axial direction of the photosensitive drum in the attached state of the drum cartridge to the drawer, the locking member having a through-hole having a circular shape and positioned at a radially center portion of the locking member and within the lock guide.
5. The image forming apparatus according to claim 1, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, wherein the drawer further comprises a drawer guide configured to guide one end portion in the axial direction of the photosensitive drum when the drum cartridge is attached to the drawer, wherein the locking member has a lock guide with which the one end portion of the photosensitive drum is fitted in the attached state of the drum cartridge to the drawer, and wherein the lock guide extends in a direction crossing an extending direction of the drawer guide in the state where the locking member is at the locking position, and the lock guide extends in the extending direction of the drawer guide and is communicated with the drawer guide in the state where the locking member is at the unlocking position.
6. The image forming apparatus according to claim 1, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, wherein the drawer further comprises a drawer guide configured to guide one end portion in the axial direction of the photosensitive drum when the drum cartridge is attached to the drawer, wherein the locking member comprises a locking portion configured to lock the photosensitive drum to the side plate of the drawer, wherein the locking portion is configured to be positioned between the one end portion in the axial direction of the photosensitive drum and the drawer guide in a state where the drum cartridge is attached to the drawer and the locking member is at the locking position, and wherein the locking portion is configured to be retracted from the position between the one end portion in the axial direction of the photosensitive drum and the drawer guide in a state where the drum cartridge is attached to the drawer and the locking member is at the unlocking position.
7. The image forming apparatus according to claim 6, wherein the drawer further comprises a positioning plate configured to be in contact with the one end portion in the axial direction of the photosensitive drum to fix a position of the photosensitive drum in the attached state of the drum cartridge to the drawer, and wherein the locking member further comprises a pressure member configured to press the one end portion in the axial direction of the photosensitive drum toward the positioning plate in the attached state of the drum cartridge to the drawer.
8. The image forming apparatus according to claim 7, wherein the locking member further comprises a spring configured to urge the pressure member toward the one end portion in the axial direction of the photosensitive drum in the attached state of the drum cartridge to the drawer.
9. The image forming apparatus according to claim 7, wherein the positioning plate has a recessed portion configured to fit with the one end portion in the axial direction of the photosensitive drum in the attached state of the drum cartridge to the drawer, and wherein the pressure member is configured to press the one end portion in the axial direction of the photosensitive drum toward the recessed portion in the attached state of the drum cartridge to the drawer.
10. The image forming apparatus according to claim 7, wherein the housing comprises a positioning member configured to fix a position of the positioning plate in a state where the drawer is at the inside position, and wherein the positioning plate further has a counterpart positioning portion configured to be in contact with the positioning member in the state where the drawer is at the inside position.
11. The image forming apparatus according to claim 10, wherein the positioning member has a solid cylindrical shape, and wherein the counterpart positioning portion is in a form of a notch with which the positioning member is fitted in the state where the drawer is at the inside position.
12. The image forming apparatus according to claim 1, wherein the drawer further comprises a lever configured to move the locking member between the locking position and the unlocking position, the lever being movable along with the locking member.
13. The image forming apparatus according to claim 12, wherein the side plate of the drawer has:
  - an inner surface facing the drum cartridge in the attached state of the drum cartridge to the drawer;
  - an outer surface positioned opposite to the drum cartridge with respect to the inner surface in the attached state of the drum cartridge to the drawer; and
  - a through-hole extending from the inner surface to the outer surface,wherein the locking member is positioned within the through-hole of the side plate, and wherein the lever is positioned outward of the outer surface.
14. The image forming apparatus according to claim 13, wherein the lever is movable between a first position where the lever extends along the outer surface and a second position protruding outward from the outer surface with the state where the locking member is at the locking position, wherein the lever is configured to be locked to the side plate in a state where the locking member is at the locking position and the lever is at the first position, and wherein the lever is configured to be unlocked from the side plate in a state where the locking member is at the locking position and the lever is at the second position.



15. The image forming apparatus according to claim 14, wherein the lever comprises a protrusion, wherein the side plate has a hole, wherein the protrusion of the lever is configured to be engaged with the hole to lock the lever to the side plate in the state where the locking member is at the locking position and the lever is at the first position, and wherein the protrusion of the lever is configured to be disengaged from the hole to unlock the lever from the side plate in the state where the locking member is at the locking position and the lever is at the second position.
16. The image forming apparatus according to claim 14, wherein the housing comprises an abutment portion configured to be abutted by the lever when the drawer moves from the outside position toward the inside position in the state where the lever is at the second position.
17. The image forming apparatus according to claim 14, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction and the photosensitive drum comprises a coupling positioned at the one end portion in the axial direction of the photosensitive drum, wherein the locking member has a through-hole permitting the coupling to be exposed to an outside in the attached state of the drum cartridge to the drawer, and wherein the lever is configured to cover at least a part of the coupling in the axial direction in the state where the drum cartridge is attached to the drawer and the lever is at the second position.
18. The image forming apparatus according to claim 17, wherein the lever extends in a diametrical direction of the photosensitive drum in the state where the drum cartridge is attached to the drawer and the lever is at the second position, the lever having first end portion and a second end portion positioned opposite to the first end portion with respect to the through-hole of the locking member in an extending direction of the lever.
19. The image forming apparatus according to claim 1, wherein the second cartridge is a toner cartridge attachable to and detachable from the drum cartridge.
20. The image forming apparatus according to claim 19, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, and wherein the toner cartridge is pivotally movable about a second axis extending in the axial direction of the photosensitive drum between a cartridge first position at which the toner cartridge is locked to the drum cartridge and a cartridge second position at which the toner cartridge is unlocked from the drum cartridge in the attached state of the toner cartridge to the drum cartridge.
21. The image forming apparatus according to claim 1, wherein the second cartridge is a developing cartridge comprising a developing roller.
22. The image forming apparatus according to claim 1, wherein the drawer further comprises a developing guide configured to guide the developing cartridge when the developing cartridge is attached to the drawer.
23. The image forming apparatus according to claim 1, wherein the drawer further comprises a developing pressure member configured to press the developing cartridge toward the photosensitive drum in a state where the drum cartridge and the developing cartridge are attached to the drawer.
24. The image forming apparatus according to claim 23, wherein the drawer further comprises a developing pressure spring configured to urge the developing pressure member toward the developing cartridge in a state where the developing cartridge is attached to the drawer.
25. The image forming apparatus according to claim 23, wherein the photosensitive drum is rotatable about a drum axis extending in an axial direction, wherein the drawer further comprises a drawer guide configured to guide one end portion in the axial direction of the photosensitive drum when the drum cartridge is attached to the drawer, and wherein the locking member comprises a lock guide with which the one end portion of the photosensitive drum is fitted in the attached state of the drum cartridge to the drawer, the lock guide having:  
a first end portion connected to the drawer guide in a state where the lock member is at the unlocking position; and  
a second end portion positioned apart from the first end portion in an extending direction of the lock guide, the first end portion being positioned between the second end portion and the developing pressure member in the extending direction of the lock guide in a state where the locking member is at the locking position.
26. The image forming apparatus according to claim 1, wherein the drum cartridge comprises a first handle configured to be accommodated within the drawer in a state where the drum cartridge is attached to the drawer, and wherein the developing cartridge comprises a second handle configured to protrude out of the drawer in a state where the developing cartridge is attached to the drawer.

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