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(54) **FIXING DEVICE CAPABLE OF GROUNDING FIXING BELT AND PRESSURE ROLLER USING SINGLE RESISTIVE ELEMENT AND IMAGE FORMING APPARATUS**

(71) Applicant: **KYOCERA Document Solutions Inc.**, Osaka (JP)

(72) Inventors: **Masakazu UEHARA**, Osaka (JP); **Tomohiro WATATANI**, Osaka (JP)

(73) Assignee: **KYOCERA Document Solutions Inc.**, Osaka (JP)

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CPC ***G03G 15/2053*** (2013.01); ***G03G 15/2064*** (2013.01); ***G03G 15/80*** (2013.01)

(57) **ABSTRACT**

A fixing device includes: an endless fixing belt; a pressure roller capable of being brought into tight contact against the fixing belt; a heater which is provided on an inside of the fixing belt, receives through the fixing belt a pressure due to tight contact against the pressure roller, and heats the fixing belt; a support sheet metal which is provided in an interior of the fixing belt and supports the heater; a first conductive member, a second conductive member, and a resistive element. The first conductive member contacts an end of the support sheet metal projecting laterally beyond an edge of the fixing belt. The second conductive member contacts an end of the pressure roller. The first conductive member is engaged and connected to the second conductive member and the second conductive member is connected through the resistive element to a body to which the fixing device is mounted.

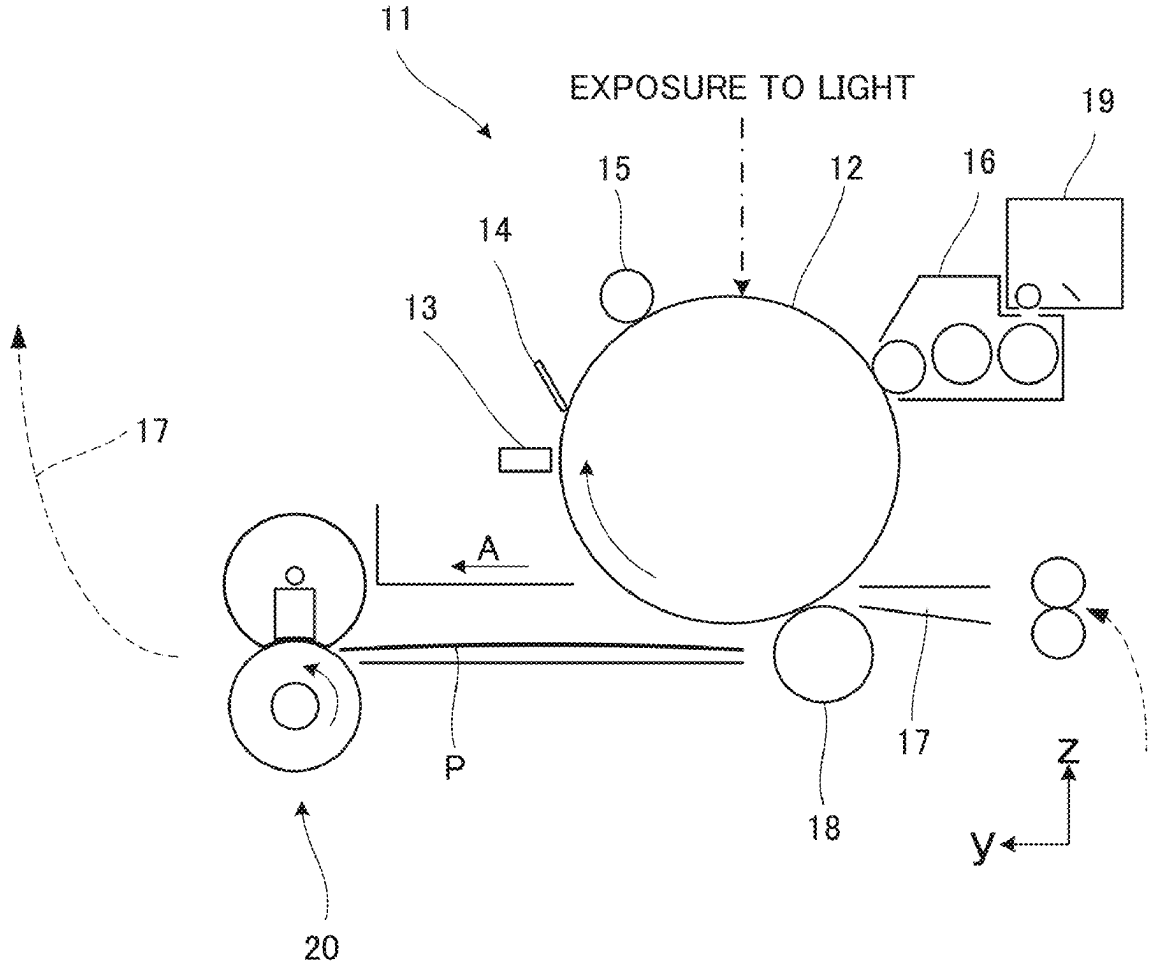


Fig.1

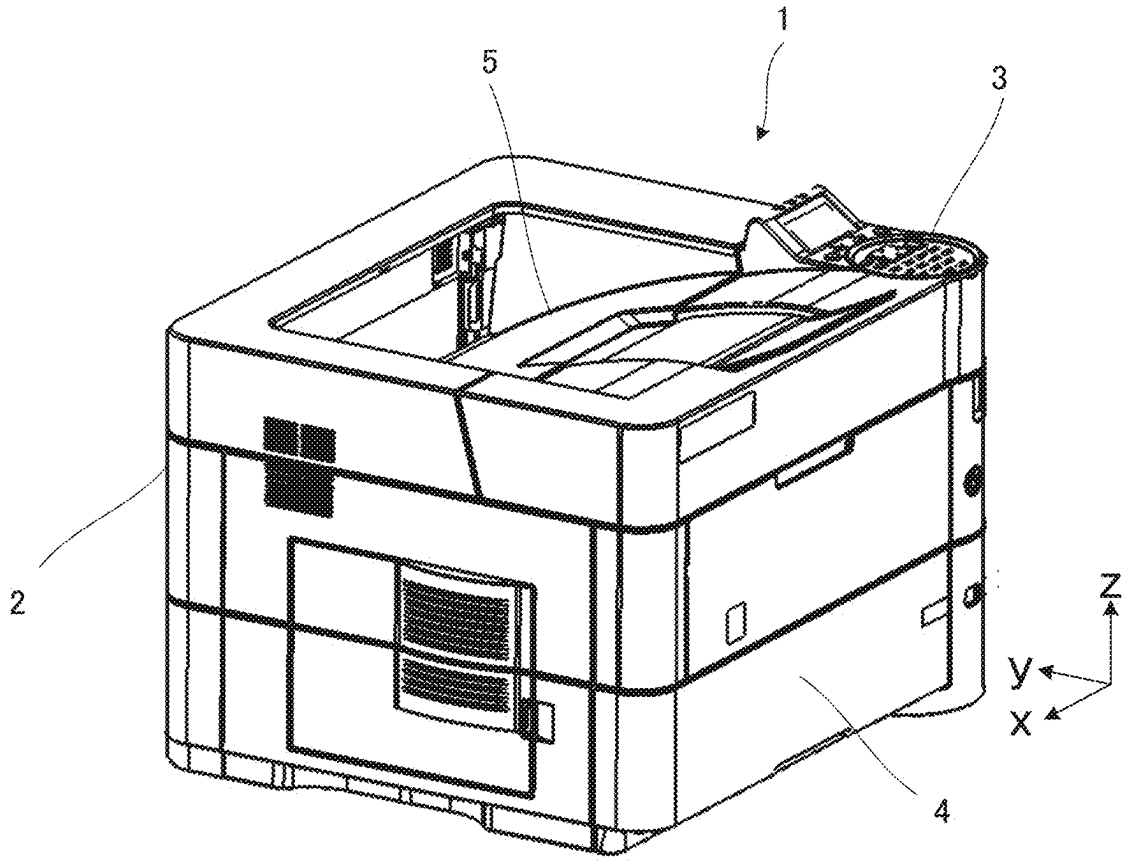


Fig.2

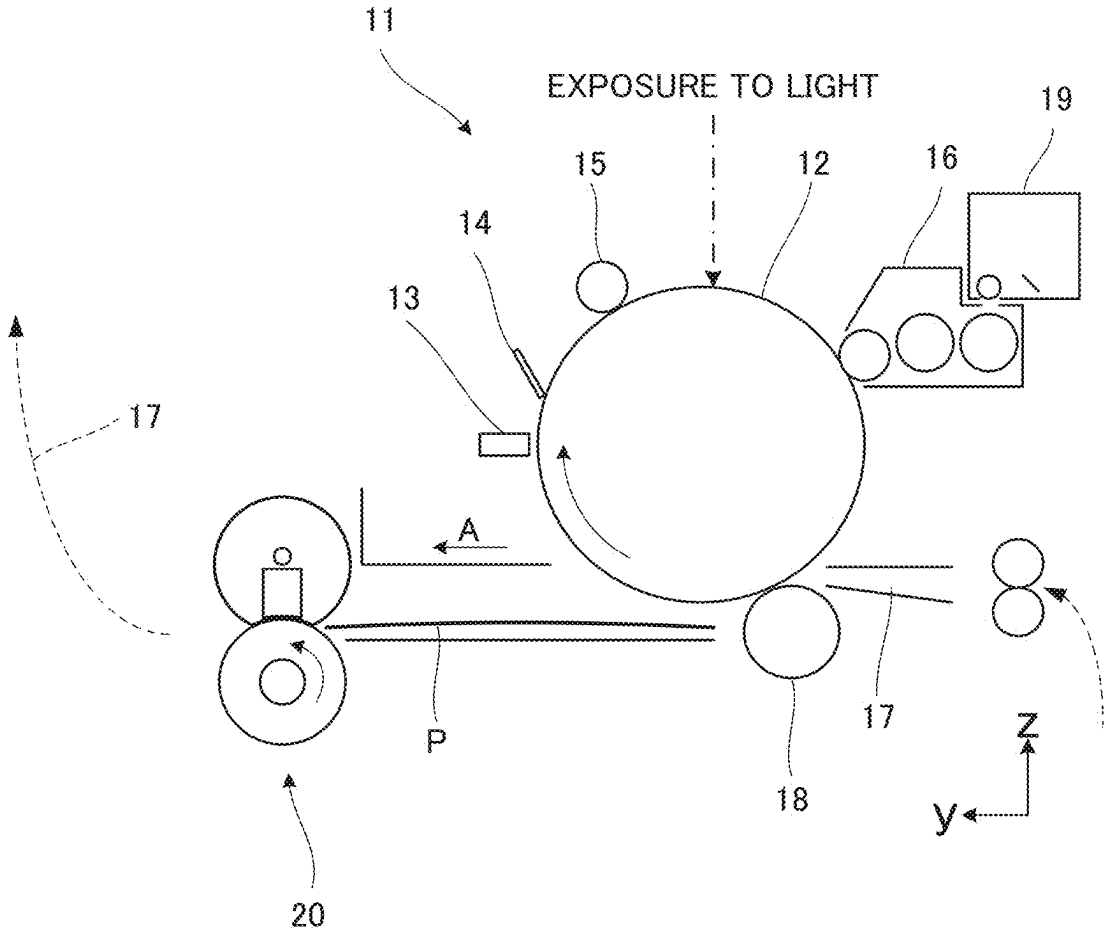


Fig.3

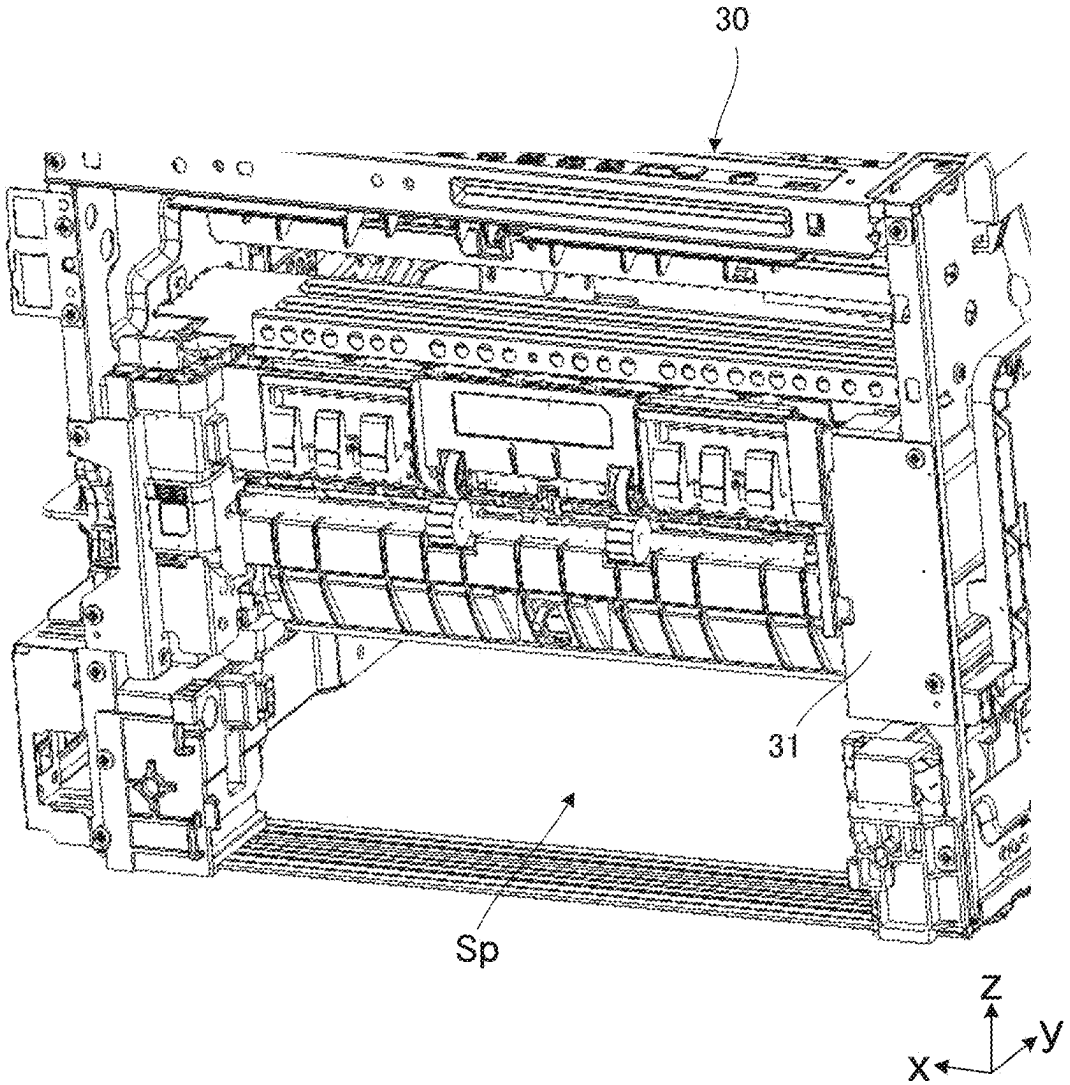
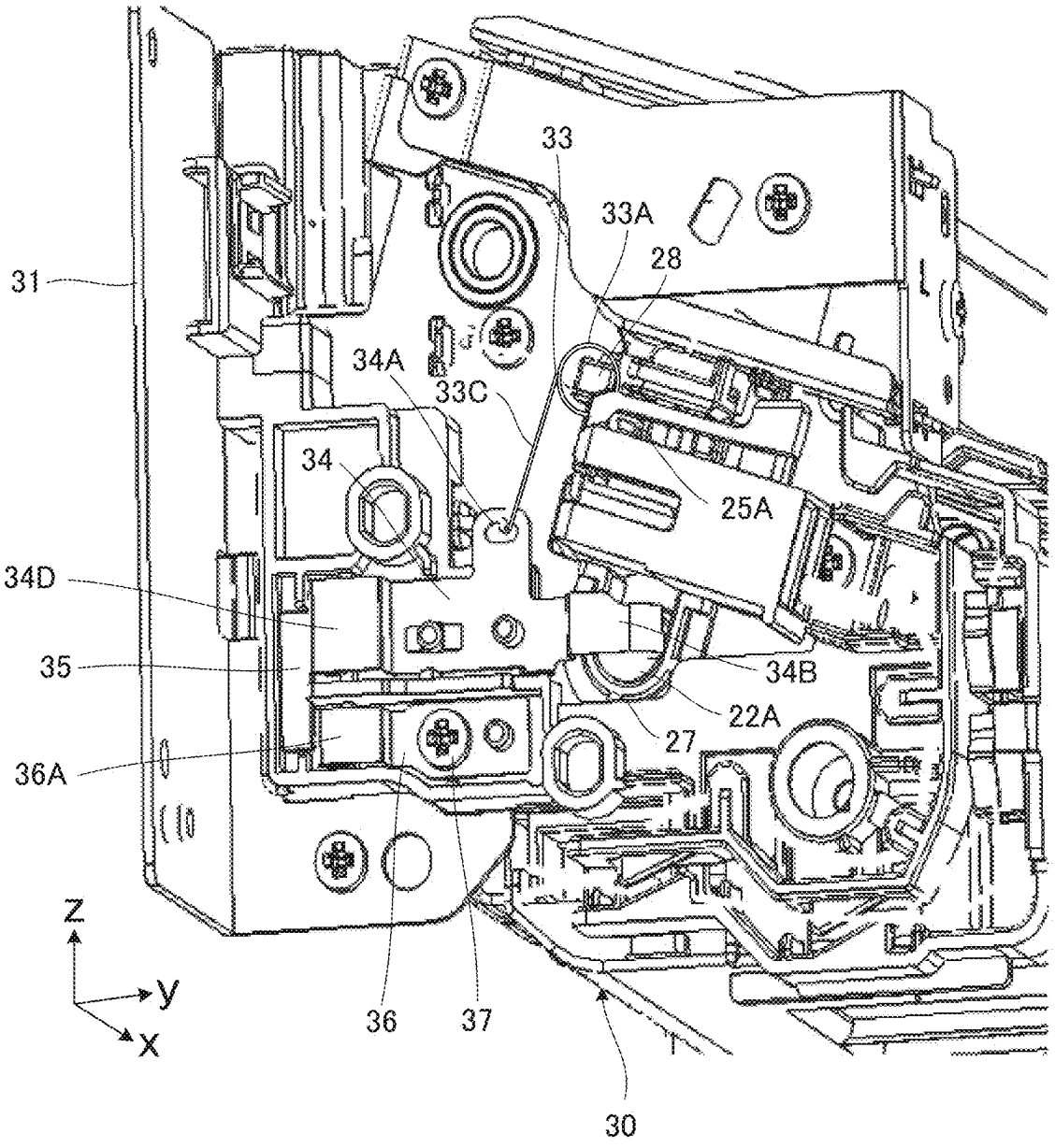


Fig.4



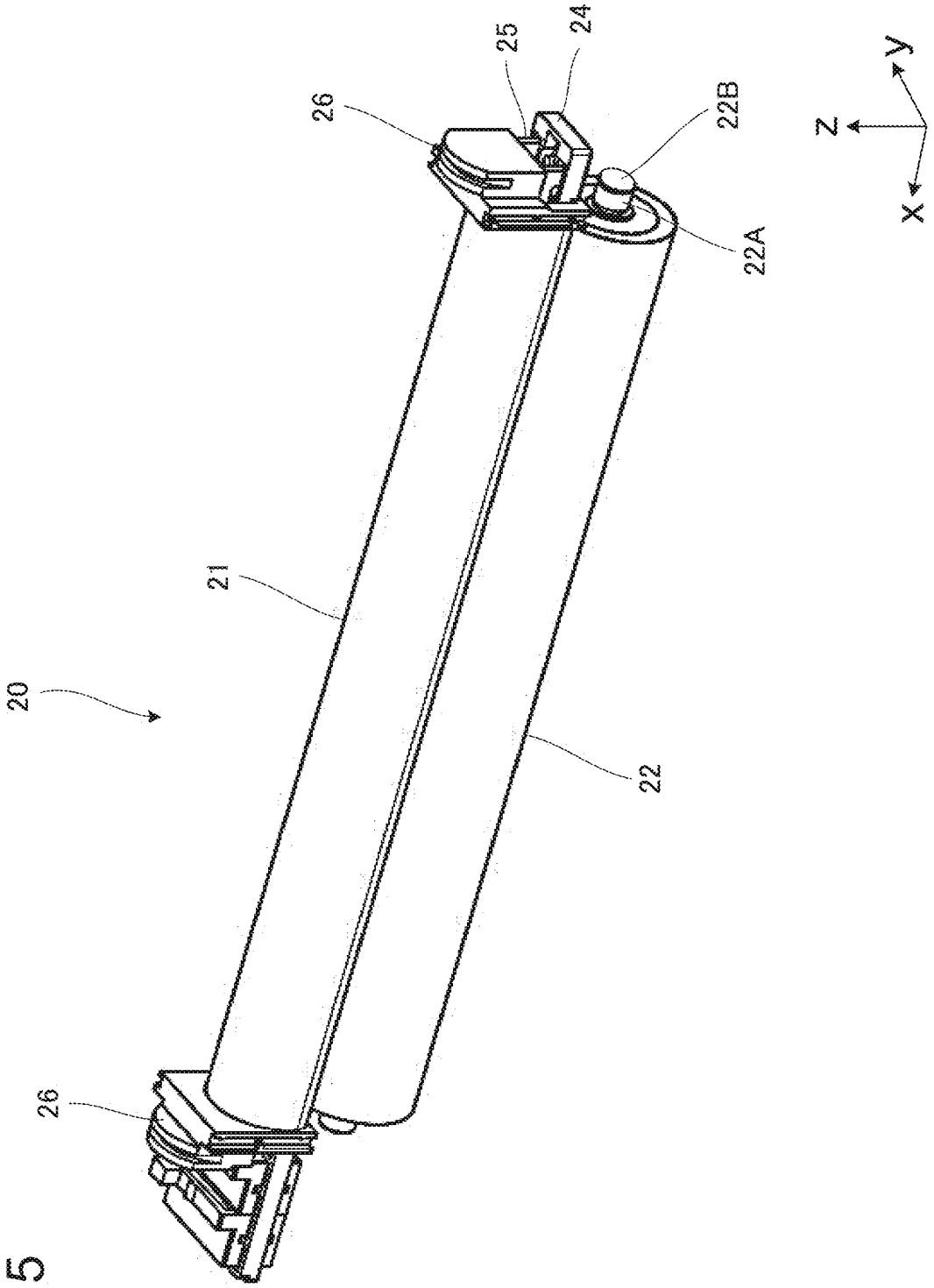


Fig.5

Fig.6A

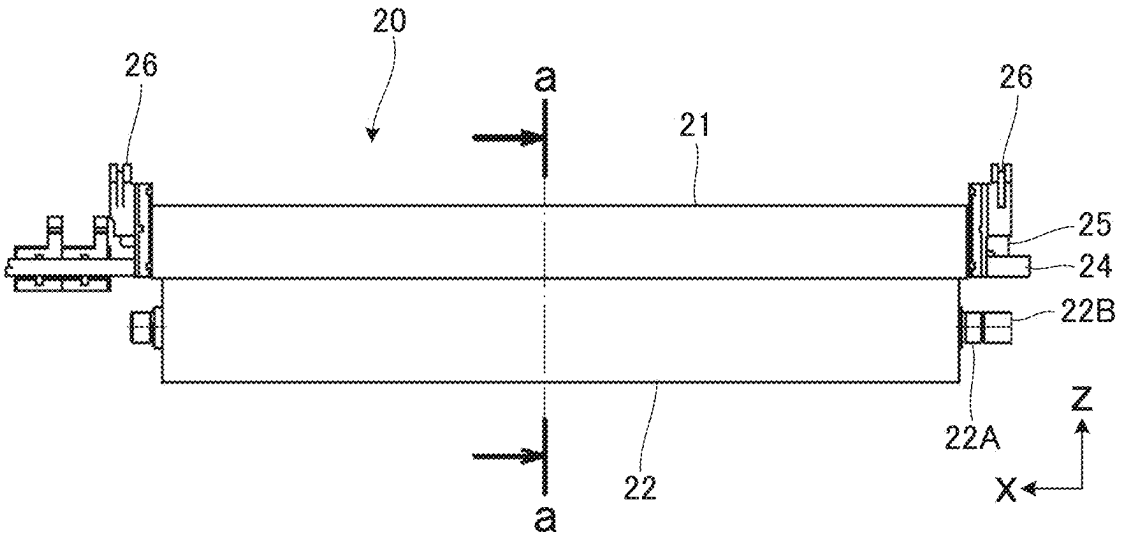

20
26
a
21
26
25
24
22B
22A
Z
X
22
a

Fig.6B

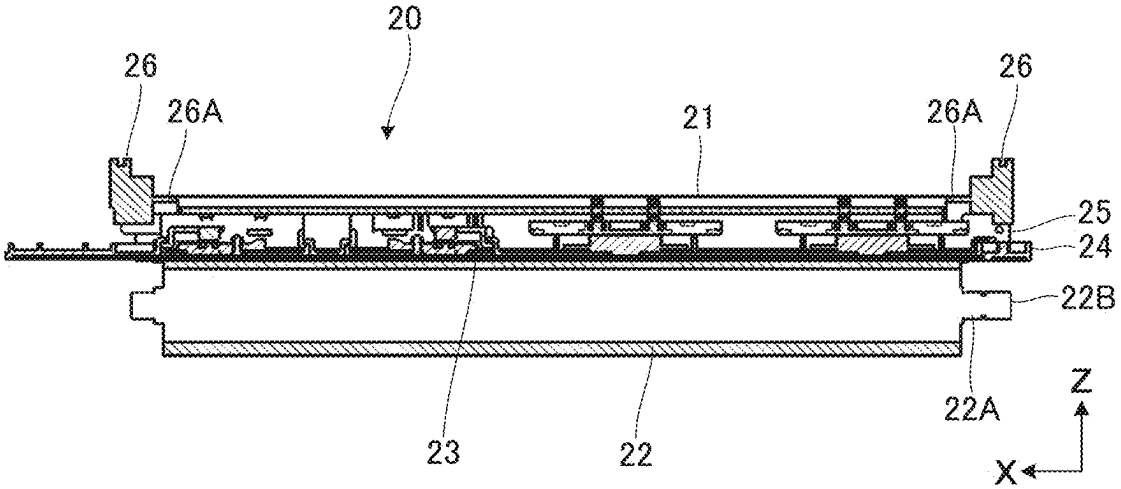

20
26
26A
21
26A
26
25
24
22B
22A
Z
X
23
22

Fig.7A

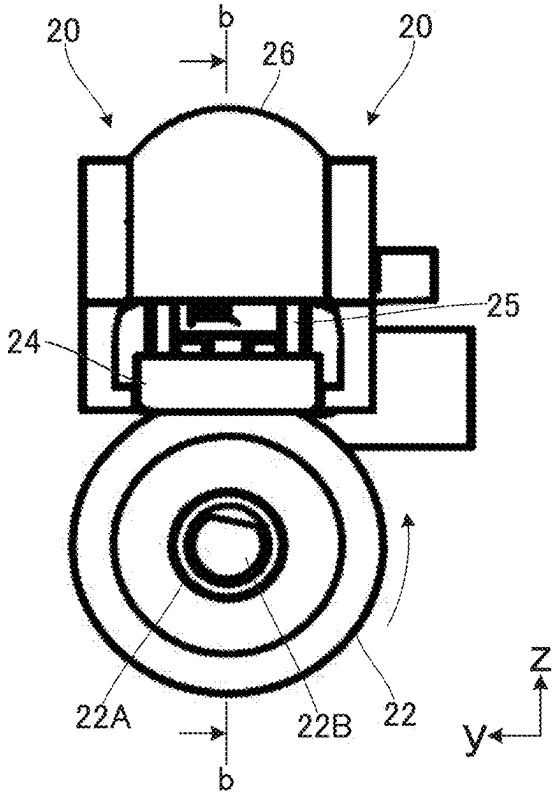


Fig.7B

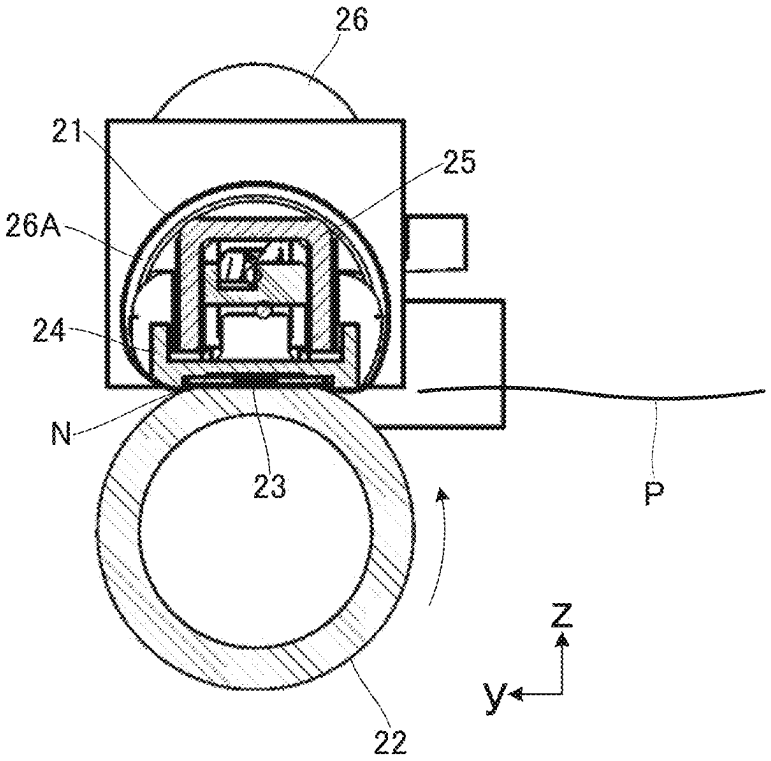


Fig.8

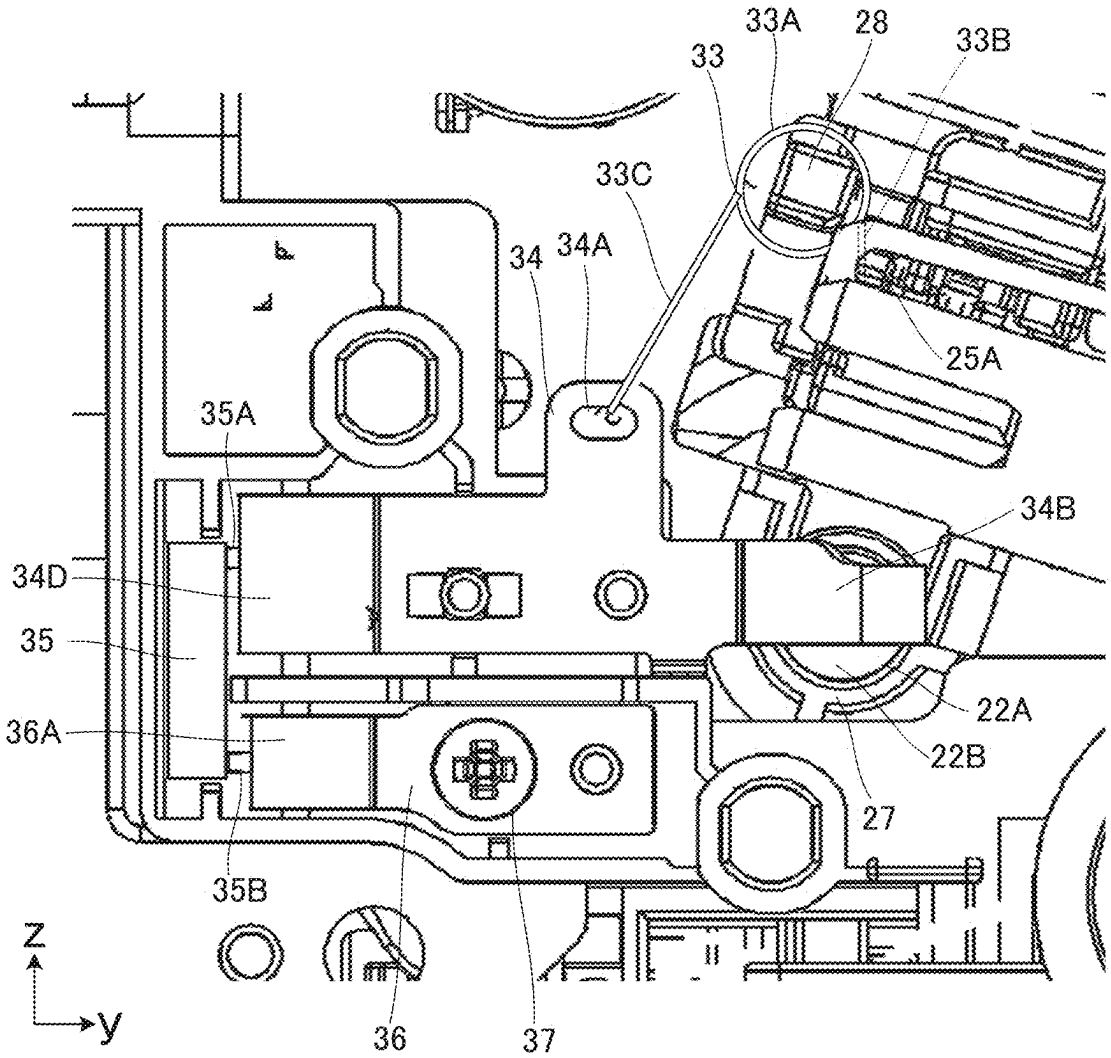

33A
28
33B
33
33C
34
34A
25A
35A
34B
34D
35
36A
22A
22B
27
35B
Z
y
36
37

Fig.9

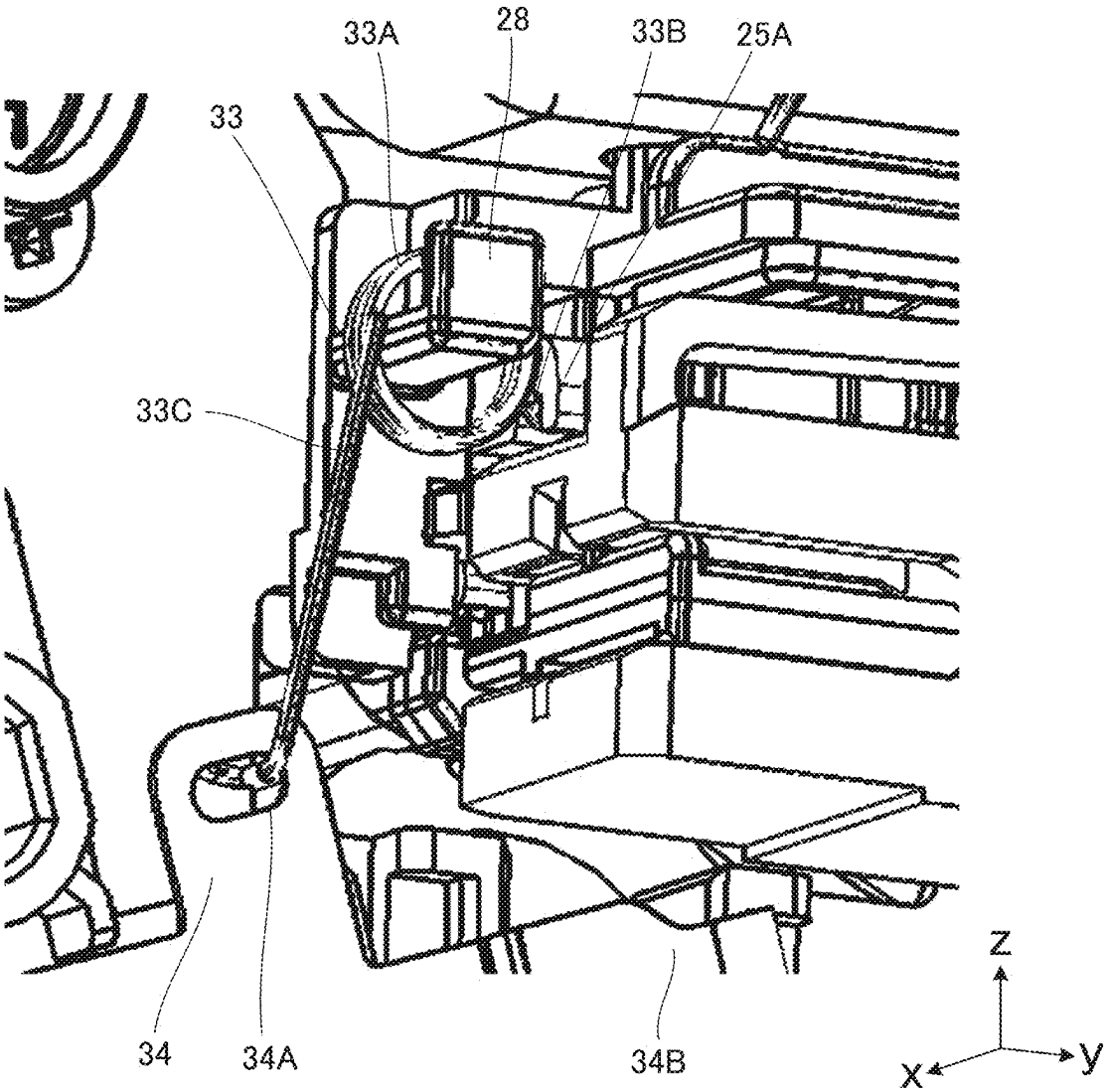


Fig.10

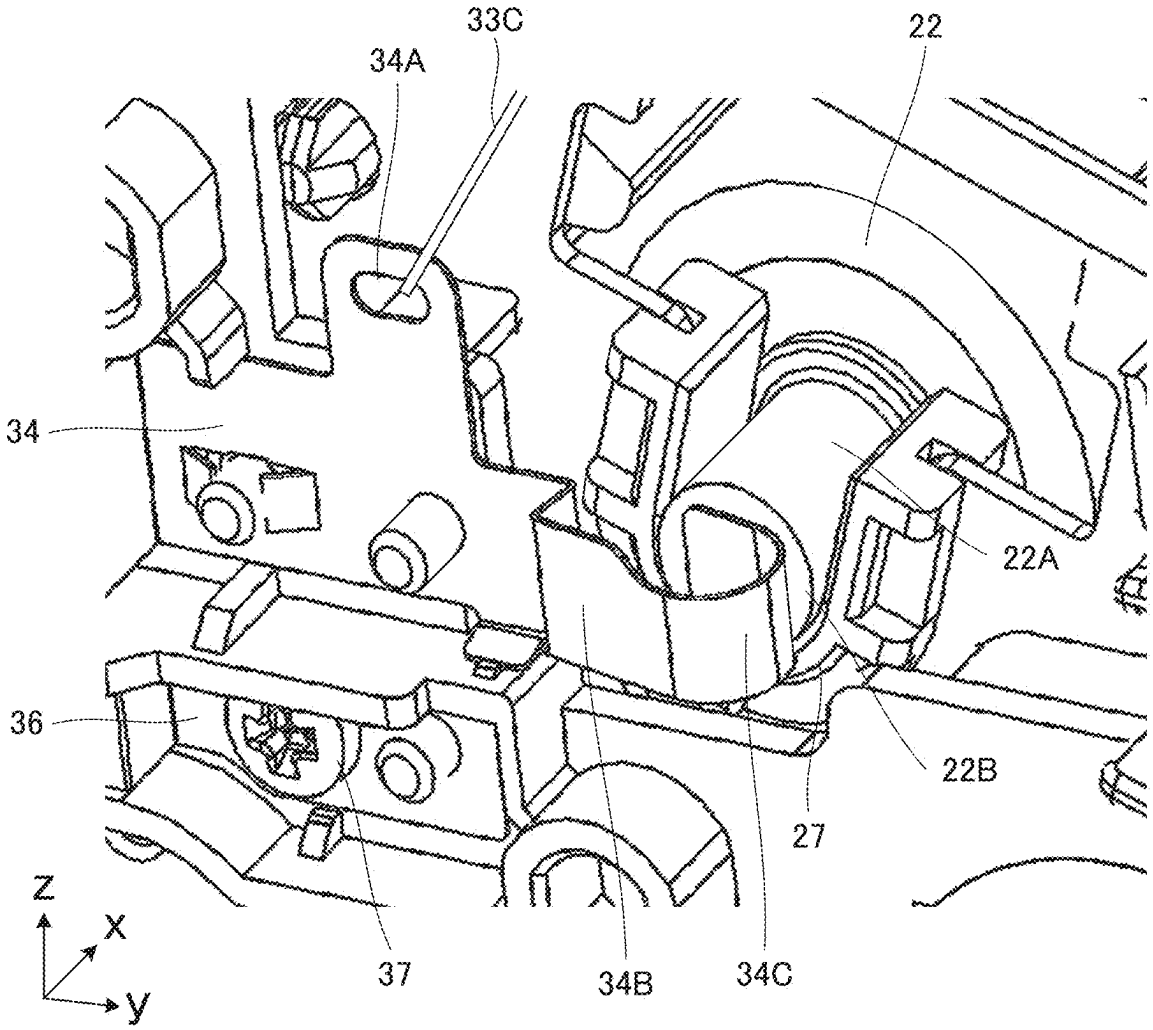


Fig.11

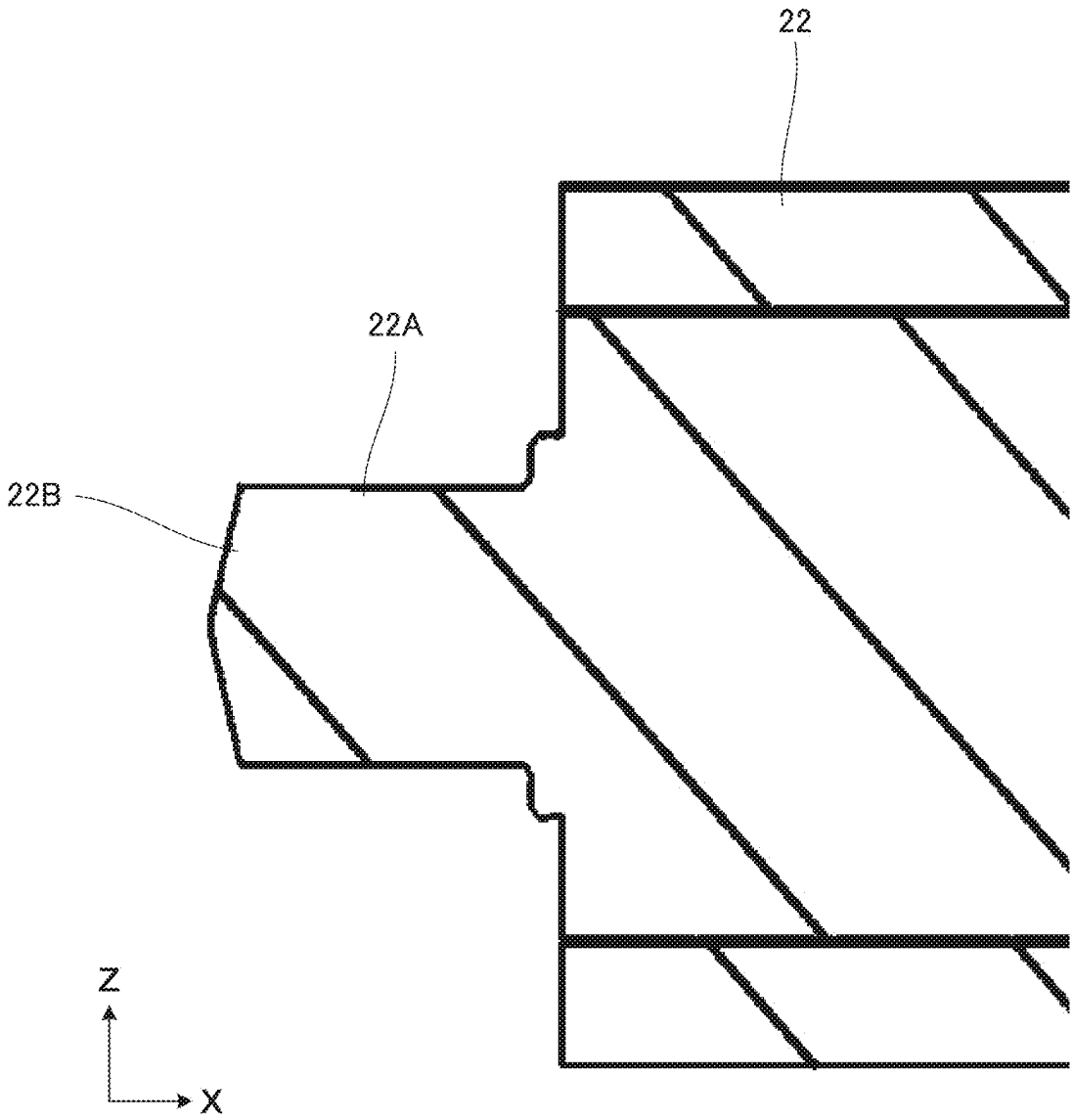


Fig.12

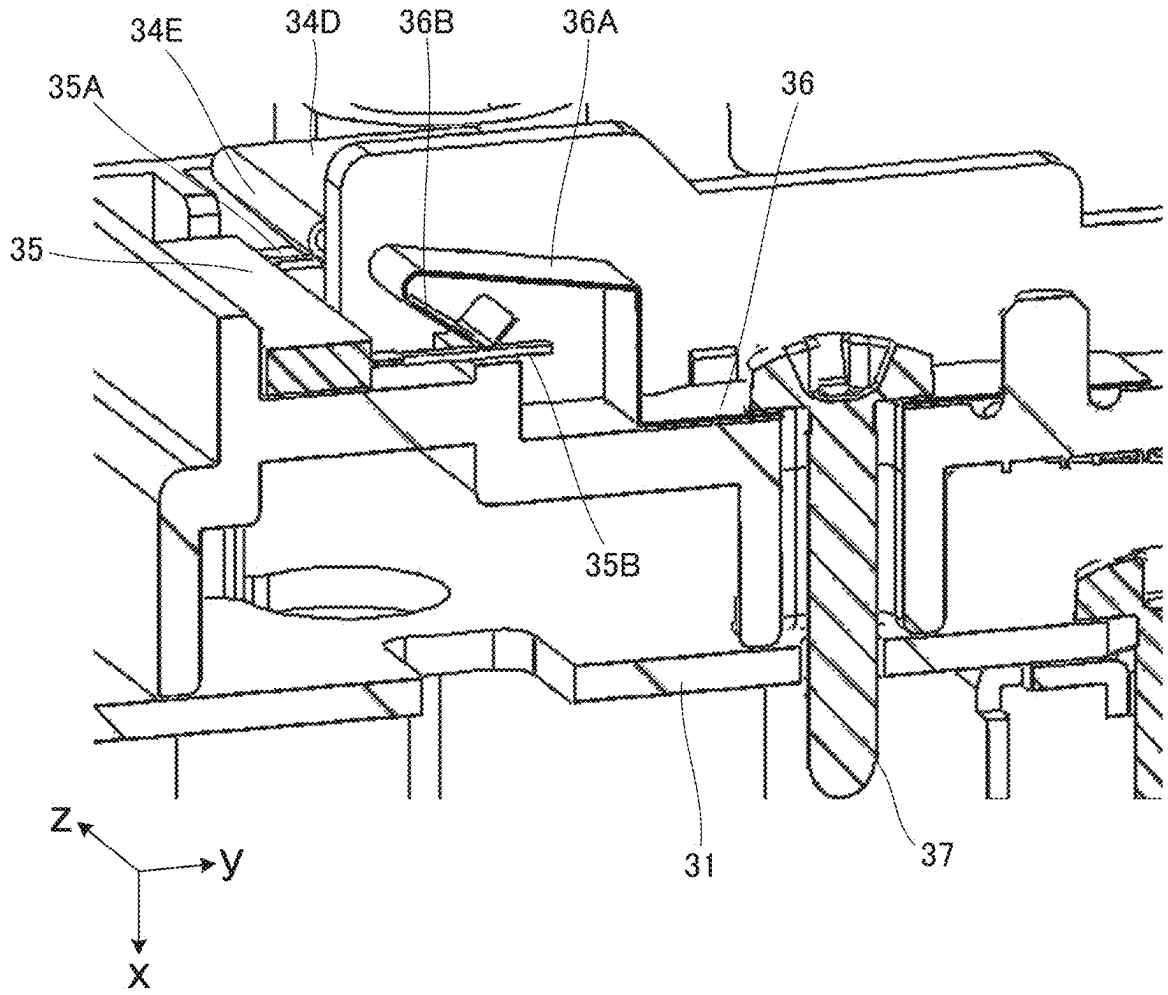
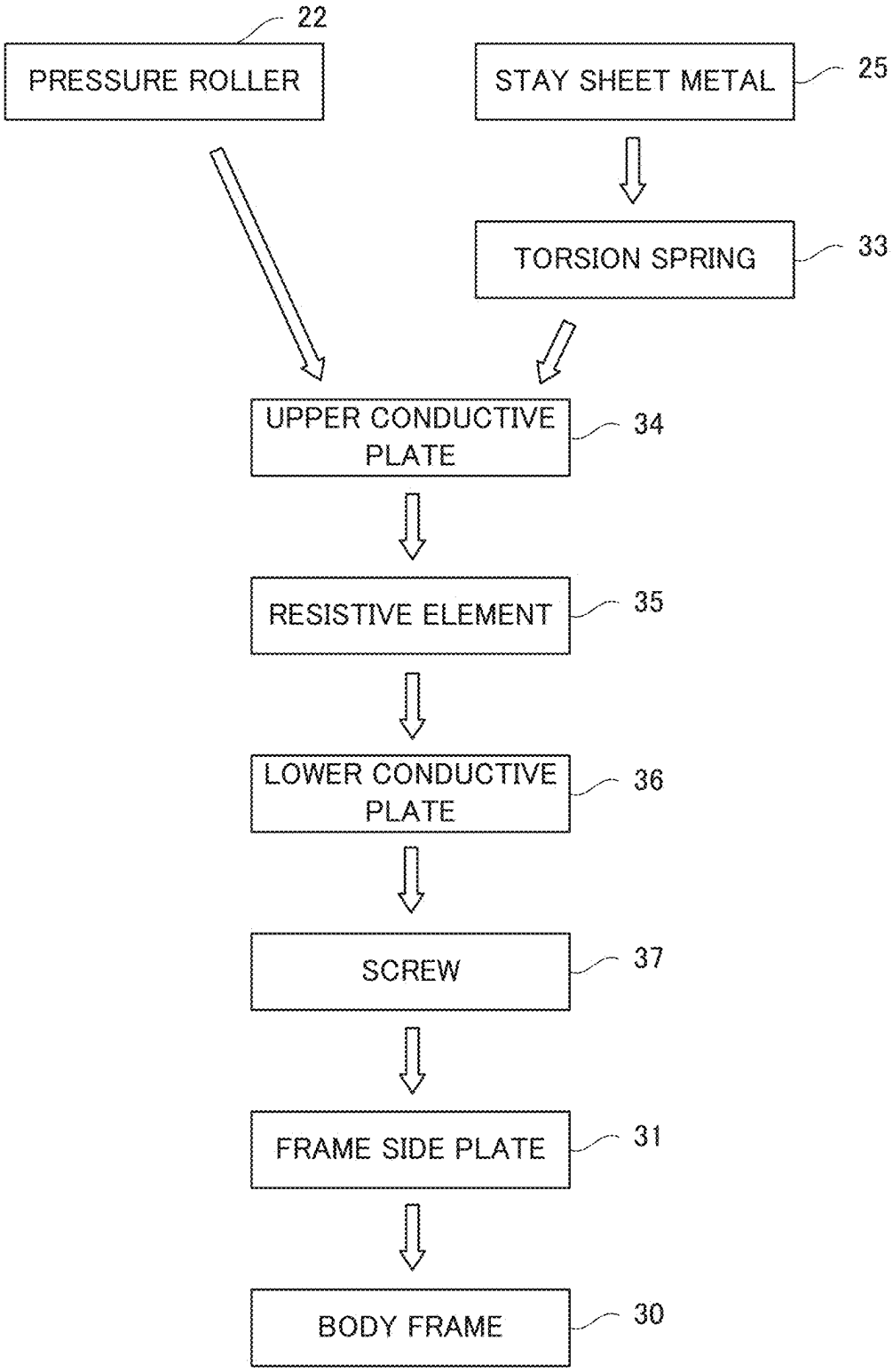


Fig.13


22
PRESSURE ROLLER
STAY SHEET METAL
25
TORSION SPRING
33
UPPER CONDUCTIVE PLATE
34
RESISTIVE ELEMENT
35
LOWER CONDUCTIVE PLATE
36
SCREW
37
FRAME SIDE PLATE
31
BODY FRAME
30

FIXING DEVICE CAPABLE OF GROUNDING FIXING BELT AND PRESSURE ROLLER USING SINGLE RESISTIVE ELEMENT AND IMAGE FORMING APPARATUS

INCORPORATION BY REFERENCE

[0001] This application claims priority to Japanese Patent Application No. 2024-023266 filed on 19 Feb. 2024, the entire contents of which are incorporated by reference herein.

BACKGROUND

[0002] The present disclosure relates to fixing devices capable of fixing an image formed on a recording paper sheet by passing the recording paper sheet through a nip area between an endless fixing belt and a pressure roller and image forming apparatuses using the fixing devices.

[0003] A fixing device brings a pressure roller into tight contact against an endless fixing belt to create a nip area between the fixing belt and the pressure roller and allows a recording paper sheet to pass through the nip area to fix an image formed on the recording paper sheet. In the fixing device, for the sake of safety, the fixing belt and the pressure roller should preferably be appropriately connected to a grounding portion of the fixing device.

[0004] For example, there is known a general image forming apparatus including a fixing device using a film heating method. The fixing device using a film heating method includes a cylindrical film, a heater in contact with the inner periphery of the film, and a pressure roller forming a nip area through the film together with the heater, wherein the heater is grounded through the film, the pressure roller, and a resistive element to a frame ground (hereinafter, referred to as an FG) of an apparatus body.

[0005] If, in the above structure, a discharge occurs between the film and the FG, a voltage dividing effect of the resistive element between the pressure roller and the FG cannot be obtained, a high-potential surge voltage is applied to a protective layer for the heater and, thus, the protective layer for the heater is dielectrically broken down. Therefore, in the general image forming apparatus as described above, a power-supply line connected to the heater is provided with a lightning arrester capable of discharging at a stable voltage regardless of the polarity of the surge voltage, thus preventing a high-potential surge voltage from being applied to the heater.

[0006] There is also known a general fixing device which includes a fixing film, a heater that heats the fixing film, and a pressure roller that forms a nip area together with the fixing film when brought into tight contact against the fixing film, and in which a roller including a conductive rubber and an insulating or high-resistance releasable layer is used as the pressure roller.

[0007] In this general fixing device, two resistive elements having different resistances are provided in parallel between the pressure roller and a grounding portion of the fixing device and appropriately selected to ground the pressure roller. Under this structure, in the general fixing device described above, the voltage applied to the fixing belt is gradually increased until it reaches a specified voltage value, thus preventing the occurrence of pinhole leakage of the releasable layer of the pressure roller.

SUMMARY

[0008] A technique improved over the aforementioned techniques is proposed as one aspect of the present disclosure.

[0009] A fixing device according to an aspect of the present disclosure includes an endless fixing belt, a pressure roller, a heater, a support sheet metal, a first conductive member, a second conductive member, and a resistive element. The pressure roller is capable of being brought into tight contact against the fixing belt. The heater is provided on an inside of the fixing belt, receives through the fixing belt a pressure due to tight contact against the pressure roller, and heats the fixing belt. The support sheet metal is provided in an interior of the fixing belt and supports the heater. The first conductive member contacts an end of the support sheet metal projecting laterally beyond an edge of the fixing belt. The second conductive member contacts an end of the pressure roller. The first conductive member is engaged and connected to the second conductive member and the second conductive member is connected through the resistive element to a body to which the fixing device is mounted.

[0010] An image forming apparatus according to another aspect of the present disclosure includes the above-described fixing device and an image forming device. The image forming device forms an image on a recording paper sheet. The fixing device pinches the recording paper sheet in a nip area between the fixing belt and the pressure roller and fixes the image formed on the recording paper sheet by heat and pressure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1** is a perspective view showing an appearance of an image forming apparatus to which a fixing device according to an embodiment of the present disclosure is applied.

[0012] FIG. **2** is a cross-sectional view schematically showing an image forming device and the fixing device.

[0013] FIG. **3** is a perspective view showing an internal structure of the image forming apparatus.

[0014] FIG. **4** is a perspective view showing one end of a near-side portion of a body frame equipped with the fixing device when viewed diagonally below.

[0015] FIG. **5** is a perspective view showing the fixing device.

[0016] FIG. **6**A is a front view showing the fixing device.

[0017] FIG. **6**B is a cross-sectional view showing the fixing device when taken along the line b-b in FIG. **7**A.

[0018] FIG. **7**A is a side view showing the fixing device.

[0019] FIG. **7**B is a cross-sectional view showing the fixing device when taken along the line a-a in FIG. **6**A.

[0020] FIG. **8** is a side view showing in magnification the one end of the near-side portion of the body frame.

[0021] FIG. **9** is a perspective view showing in magnification an end of a stay sheet metal, a torsion spring, an upper conductive plate, and surrounding portions of them.

[0022] FIG. **10** is a perspective view showing in magnification the upper conductive plate, a shaft of a pressure roller, and surrounding portions of them.

[0023] FIG. **11** is a cross-sectional view showing the profile of an end portion of a shaft of the pressure roller.

[0024] FIG. **12** is a perspective view showing in magnification the upper conductive plate, a resistive element, a lower conductive plate, and surrounding portions of them.

[0025] FIG. **13** is a diagram for illustrating a first current path from the stay sheet metal to the body frame and a second current path from the pressure roller to the body frame.

DETAILED DESCRIPTION

[0026] Hereinafter, a description will be given of an embodiment of the present disclosure with reference to the drawings. FIG. **1** is a perspective view showing an appearance of an image forming apparatus **1** to which a fixing device according to an embodiment of the present disclosure is applied. FIG. **2** is a cross-sectional view schematically showing an image forming device **11** and a fixing device **20** in the image forming apparatus **1**. In FIGS. **1** to **12**, the directions of the arrow x, the arrow y, and the arrow z represent the depthwise direction, the widthwise direction, and the heightwise direction, respectively.

[0027] As shown in FIGS. **1** and **2**, an apparatus body **2** of the image forming apparatus **1** is provided with a plurality of components for implementing various functions of the image forming apparatus **1**. For example, the apparatus body **2** is provided with an image forming device **11**, a fixing device **20**, an operation device **3**, a sheet feed cassette **4**, a sheet output tray **5**, and so on.

[0028] The image forming device **11** forms an image represented by image data on a recording paper sheet P fed from the sheet feed cassette **4**. The recording paper sheet P with the image formed thereon is subjected to fixation processing by the fixing device **20** and then ejected to the sheet output tray **5**.

[0029] The operation device **3** includes, for example, a start key, a determination key for use in determining inputs on various operations, numerical entry keys for use in entering numerical values, and so on. The operation device **3** accepts user's instructions regarding various types of operations and processing. The operation device **3** includes a display device that displays operation guidance and other types of information for the user.

[0030] The image forming device **11** electrophotographically forms a toner image on a recording paper sheet P fed from the sheet feed cassette **4**. The image forming device **11** includes a photosensitive drum **12**, a destaticizing device **13**, a cleaning device **14**, a charging device **15**, a developing device **16**, a toner container **19**, and so on.

[0031] The photosensitive drum **12** rotates in the direction of the arrow. The destaticizing device **13** removes electric charge on the surface of the photosensitive drum **12**. The cleaning device **14** cleans the surface of the photosensitive drum **12**. The charging device **15** uniformly charges the surface of the photosensitive drum **12**. The developing device **16** develops an electrostatic latent image, which has been formed on the surface of the photosensitive drum **12** when exposed to light by the exposure device, into a toner image. The toner container **19** supplies toner to the developing device **16**.

[0032] The photosensitive drum **12** is pressed by and against a transfer roller **18** provided below the photosensitive drum **12** to create a nip area between the photosensitive drum **12** and the transfer roller **18**.

[0033] A recording paper sheet P fed from the sheet feed cassette **4** is conveyed in the direction of the arrow A through a conveyance path **17**. The recording paper sheet P is passed through the nip area between the photosensitive drum **12** and the transfer roller **18** and, thus, the toner image on the surface of the photosensitive drum **12** is transferred to the recording paper sheet P. The recording paper sheet P is conveyed to the fixing device **20**.

[0034] Heat and pressure are applied to the recording paper sheet P by the fixing device **20** and, thus, the toner image on the recording paper sheet P is fixed. The recording paper sheet P is then conveyed from the fixing device **20** through the upwardly curved conveyance path **17** and ejected to the sheet output tray **5** provided on the top of the image forming apparatus **1**.

[0035] FIG. **3** is a perspective view showing an internal structure of the image forming apparatus **1**. As shown in FIG. **3**, the image forming apparatus **1** includes a body frame **30** constructed by combining molded members made of synthetic resin and sheet metals. The body frame **30** supports the components of the image forming apparatus **1**. A space Sp into and out of which the sheet feed cassette **4** is to be inserted and pulled is provided below the body frame **30**. The image forming device **11** is mounted in the back side of the body frame **30** above the space Sp and the fixing device **20** is mounted in the near side of the body frame **30** above the space Sp.

[0036] FIG. **4** is a perspective view showing one end of a near-side portion of the body frame **30** equipped with the fixing device **20** when viewed diagonally below. As shown in FIG. **4**, a frame side plate **31** made of metal is provided on the one end of the near-side portion of the body frame **30**. As will be described in detail later, one end of a shaft **22**A of the pressure roller **22** of the fixing device **20** is supported at the one end of the near-side portion of the body frame **30** and one end **25**A of a stay sheet metal **25** for the fixing belt **21** projects at the one end of the near-side portion of the body frame **30**.

[0037] Next, a description will be given in detail of the fixing device **20**. FIG. **5** is a perspective view showing the fixing device **20**. FIG. **6**A is a front view showing the fixing device **20**. FIG. **6**B is a cross-sectional view showing the fixing device **20** when taken along the line b-b in FIG. **7**A. FIG. **7**A is a side view showing the fixing device **20**. FIG. **7**B is a cross-sectional view showing the fixing device **20** when taken along the line a-a in FIG. **6**A.

[0038] As shown in FIGS. **5**, **6**A, **6**B, **7**A, and **7**B, the fixing device **20** includes the fixing belt **21**, the pressure roller **22**, a sheet heater **23**, a heater holder **24**, the stay sheet metal **25**, a pair of holders **26**, and so on. The sheet heater **23** corresponds to the heater defined in CLAIMS and the stay sheet metal **25** corresponds to the support sheet metal defined in CLAIMS.

[0039] The fixing belt **21** is an endless belt. The fixing belt **21** is a sheet-shaped belt in which a base material layer made of metal, synthetic resin or others, an elastic layer made of silicone rubber or others, a releasable layer made of synthetic resin or others, and so on are layered one on another. The fixing belt **21** has flexibility.

[0040] The pair of holders **26** are molded products made of synthetic resin. The pair of holders **26** include respective annular frame portions **26**A. When both the annular frame portions **26**A are inserted into the inside of the fixing belt **21** from both the edges (lateral ends) of the fixing belt **21**, the outer peripheries of the annular frame portions **26**A come into contact with the both lateral end portions of the inner periphery of the fixing belt **21** and, thus, the fixing belt **21** is held by the pair of holders **26**.

[0041] The interior of the fixing belt **21** is provided with the sheet heater **23**, the heater holder **24**, and the stay sheet metal **25**. The sheet heater **23** is in sliding contact with a lower portion of the inner periphery of the fixing belt **21**. The heater holder **24** supports the sheet heater **23**. The stay sheet metal **25** supports the heater holder **24**.

[0042] The sheet heater **23**, the heater holder **24**, and the stay sheet metal **25** extend in the longitudinal direction of the fixing belt **21** and project beyond both the edges of the fixing belt **21**. The heater holder **24** is a molded product made of synthetic resin.

[0043] The stay sheet metal **25** is formed in the shape of a U-section, for example, by sheet-metal working and has a sufficient strength and rigidity. Each of the holders **26** is supported by the body frame **30** to which the fixing device **20** is mounted, the stay sheet metal **25** is supported at both ends by the respective holders **26**, the heater holder **24** is supported by the stay sheet metal **25**, and the sheet heater **23** is held by the heater holder **24**.

[0044] Therefore, the stay sheet metal **25** is supported by the pair of holders **26** and thus supports the heater holder **24** and the sheet heater **23**. As a result, the pair of holders **26**, the stay sheet metal **25**, the heater holder **24**, and the sheet heater **23** are integrally supported.

[0045] The pressure roller **22** is composed of: a metallic cylinder or cylindrical solid; and a layer made of synthetic resin or others and covering the outer periphery of the cylinder or cylindrical solid. The shaft **22**A of the pressure roller **22** is supported rotatably by a sliding bearing **27** and provided in parallel with the center of rotation of the fixing belt **21**. The sliding bearing **27** is a molded product of synthetic resin. The sliding bearing **27** is opened at the top and receives the shaft **22**A of the pressure roller **22** through the open space in the top thereof to thus support the shaft **22**A rotatably.

[0046] The pair of holders **26** are supported, at both lateral sides of the body frame **30** to which the fixing device **20** is mounted, movably toward and away from the shaft **22**A of the pressure roller **22**. The fixing belt **21** is disposed above the pressure roller **22**. Each of the holders **26** is moved downward and toward the shaft **22**A of the pressure roller **22** by a biasing force of a spring or the like. The stay sheet metal **25**, the heater holder **24**, and the sheet heater **23** are also moved downward by the biasing force.

[0047] Thus, the fixing belt **21** is moved closer to and brought into tight contact against the pressure roller **22** and the pressure roller **22** is pressed through the fixing belt **21** against the sheet heater **23**. As a result, the outer periphery of the pressure roller **22** and the outer periphery of the fixing belt **21** are brought into tight contact with each other over a wide range and a nip area N is created over the wide range.

[0048] When the rotary drive force of a motor is transmitted to the shaft **22**A of the pressure roller **22** and, thus, the pressure roller **22** is driven into rotation in the direction of the arrow, the fixing belt **21** is rotated in a direction opposite to the direction of rotation of the pressure roller **22**. Furthermore, the sheet heater **23** is activated to apply heat to the fixing belt **21** and, thus, the temperature of the fixing belt **21** is set at a specified temperature suitable for fixation.

[0049] When in this state a recording paper sheet Pis conveyed to the nip area N, heat and pressure are applied to the recording paper sheet P in the nip area N and, thus, the toner image on the recording paper sheet P is fixed by heat and pressure.

[0050] In the general image forming apparatus described previously, the heater is grounded through the film, the pressure roller, and the resistive element. However, because the film is made of an insulating material, the heater, the film, and the pressure roller in the above structure cannot be said to be grounded in terms of direct current and the structure is that for addressing a pulsed surge voltage.

[0051] Furthermore, although in the general fixing device described previously the pressure roller is grounded through either one of the two resistive elements, the grounding of the heater is not taken into consideration.

[0052] For example, when a paper jam or the like occurs between the fixing belt and the pressure roller, the user does the work of removing the jammed recording paper sheet. Therefore, in order to ensure the safety of the user's work, the fixing belt, the heater, the pressure roller, and so on should preferably be grounded through respective resistive elements having respective appropriate resistances.

[0053] However, both the above-described general image forming apparatus and fixing device are not configured to ground the fixing belt and the pressure roller through respective resistive elements.

[0054] Unlike the above general techniques, in the above embodiment, the stay sheet metal **25** of the fixing belt **21** and the pressure roller **22** are grounded through a resistive element having an appropriate resistance for each of these components in order to ensure the safety of the user's work of removing a jammed recording paper sheet P.

[0055] In addition, since the fixing belt **21**, the sheet heater **23**, and the heater holder **24** are in contact with or have a very short insulation distance from the stay sheet metal **25**, the fixing belt **21**, the sheet heater **23**, and the heater holder **24** are also grounded through the resistive element.

[0056] Meanwhile, generally, when two electric current paths are provided for the purpose of grounding the fixing belt and the pressure roller through respective resistive elements, this may present problems of increased size of the device and increased complexity in structure. With respect to these problems, in the fixing device **20** according to the above embodiment, both the fixing belt **21** and the pressure roller **22** are grounded, but the current paths for the grounding is simplified by the use of a single resistive element **35** for the grounding.

[0057] As shown in FIG. **4**, one end of the shaft **22**A of the pressure roller **22** of the fixing device **20** is supported at the one end of the near-side portion of the body frame **30** and the one end **25**A of the stay sheet metal **25** projecting beyond an edge of the fixing belt **21** projects at the one end of the near-side portion of the body frame **30**.

[0058] FIG. **8** is a side view showing in magnification the one end of the near-side portion of the body frame **30**. As shown in FIGS. **4** and **8**, the frame side plate **31**, a torsion spring **33**, an upper conductive plate **34**, the resistive element **35**, a lower conductive plate **36**, and a screw **37** are provided at the one end of the near-side portion of the body frame **30**. The torsion spring **33**, the upper conductive plate **34**, the lower conductive plate **36**, and the screw **37** are made of metal and have electric conductivity.

[0059] The torsion spring **33** corresponds to the first conductive member defined in CLAIMS, the upper conductive plate **34** corresponds to the second conductive member defined in CLAIMS, and the lower conductive plate **36**, the screw **37**, and the frame side plate **31** correspond to at least one different conductive member defined in CLAIMS.

[0060] As described previously, the body frame **30** is constructed by combining synthetic resin molded members and sheet metal members. The upper conductive plate **34** and the lower conductive plate **36** are secured at fixed positions on the synthetic resin molded member of the body frame **30** and are mutually insulated. The resistive element **35** is connected via respective leads **35**A and **35**B thereof to the upper conductive plate **34** and the lower conductive plate **36**, respectively. The screw **37** connects and fastens the lower conductive plate **36** to the metallic frame side plate **31**. The screw **37** makes the lower conductive plate **36** and the frame side plate **31** electrically connected with each other.

[0061] FIG. **9** is a perspective view showing in magnification the one end **25**A of the stay sheet metal **25**, the torsion spring **33**, the upper conductive plate **34**, and surrounding portions of them. As shown in FIGS. **9** and **8**, a ring-shaped portion **33**A of the torsion spring **33** is fitted on a projection **28** as a separate member provided on an end of the holder **26** and, thus, the torsion spring **33** is supported by the projection **28**. One arm **33**B of the torsion spring **33** contacts the one end **25**A of the stay sheet metal **25** and, thus, the torsion spring **33** is electrically connected with the stay sheet metal **25**. The other arm **33**C of the torsion spring **33** is bent and inserted into an engagement hole **34**A of the upper conductive plate **34** and, thus, the torsion spring **33** contacts and is electrically connected with the upper conductive plate **34**.

[0062] The torsion spring **33** biases its arms **33**B and **33**C toward spreading them apart. Thus, even when the stay sheet metal **25** moves with the movement of the holders **26**, the contact of the one arm **33**B with the one end **25**A of the stay sheet metal **25** and the contact of the other arm **33**C with the engagement hole **34**A of the upper conductive plate **34** are maintained.

[0063] FIG. **10** is a perspective view showing in magnification the upper conductive plate **34**, the shaft **22**A of the pressure roller **22**, and surrounding portions of them. As shown in FIG. **10**, the upper conductive plate **34** includes a bent portion **34**B. A distal side of the bent portion **34**B is formed into a distal portion **34**C having a U-shape as viewed from above. The upper conductive plate **34** is electrically connected with the shaft **22**A of the pressure roller **22** by elastically deforming the bent portion **34**B to press the distal portion **34**C against the shaft **22**A by the elastic force of the bent portion **34**B.

[0064] FIG. **11** shows the profile of an end portion of the shaft **22**A of the pressure roller **22**. As shown in FIG. **11**, the end **22**B of the shaft **22**A of the pressure roller **22** is formed into a conical shape having an apex at which the center of rotation of the pressure roller **22** projects farthest laterally in the direction of extension of the shaft **22**A. Therefore, even when the shaft **22**A of the pressure roller **22** rotates, the position of the apex of the shaft **22**A remains unchanged and the apex of the shaft **22**A is always brought into tight contact against a fixed point of the distal portion **34**C of the bent portion **34**B. As a result, electrical connection between the shaft **22**A of the pressure roller **22** and the upper conductive plate **34** can be stably maintained.

[0065] FIG. **12** is a perspective view showing in magnification the upper conductive plate **34**, the resistive element **35**, a lower conductive plate **36**, and surrounding portions of them. As shown in FIGS. **12** and **8**, the leads **35**A and **35**B of the resistive element **35** are drawn from both the respective ends of the resistive element **35**.

[0066] The upper conductive plate **34** includes a bent portion **34**D. A distal side of the bent portion **34**D is formed into a distal portion **34**E bent in a triangle shape as viewed from above. The bent portion **34**D of the upper conductive plate **34** is elastically deformed and the lead **35**A extending from one end of the resistive element **35** is clamped between the distal portion **34**E of the bent portion **34**D and the synthetic resin molded member of the body frame **30** by the elastic force of the bent portion **34**D. Thus, the upper conductive plate **34** is electrically connected with the resistive element **35** by bringing the lead **35**A extending from the one end of the resistive element **35** into tight contact against the upper conductive plate **34**.

[0067] Likewise, the lower conductive plate **36** includes: a bent portion **36**A; and a distal portion **36**B formed as a distal-side portion of the bent portion **36**A and bent in a triangle shape as viewed from above. The bent portion **36**A of the lower conductive plate **36** is elastically deformed and the lead **35**B extending from the other end of the resistive element **35** is clamped between the distal portion **36**B of the bent portion **36**A and the synthetic resin molded member of the body frame **30** by the elastic force of the bent portion **36**A. Thus, the lower conductive plate **36** is electrically connected with the resistive element **35** by bringing the lead **35**B extending from the other end of the resistive element **35** into tight contact against the lower conductive plate **36**.

[0068] Furthermore, as shown in FIG. **12**, the screw **37** is screwed through a hole in the lower conductive plate **36** and the synthetic resin molded member of the body frame **30** into the metallic frame side plate **31**, thus fastening the lower conductive plate **36**. In this manner, the screw **37** electrically connects the lower conductive plate **36** with the frame side plate **31**.

[0069] As thus far described, in this embodiment, one arm **33**B of the torsion spring **33** contacts and is electrically connected with the one end **25**A of the stay sheet metal **25**, the other arm **33**C of the torsion spring **33** contacts and is electrically connected with the upper conductive plate **34**, the one end **22**B of the shaft **22**A of the pressure roller **22** contacts and is electrically connected with the bent portion **34**B of the upper conductive plate **34**, the bent portion **34**D of the upper conductive plate **34** contacts and is electrically connected with the lead **35**A extending from one end of the resistive element **35**, the bent portion **36**A of the lower conductive plate **36** contacts and is electrically connected with the lead **35**B extending from the other end of the resistive element **35**, and the screw **37** electrically connects the lower conductive plate **36** with the frame side plate **31**. Furthermore, the frame side plate **31** is fastened and electrically connected to the sheet metal member of the body frame **30**.

[0070] Therefore, as shown in FIG. **13**, a first current path is formed in order of the stay sheet metal **25**, the torsion spring **33**, the upper conductive plate **34**, the resistive element **35**, the lower conductive plate **36**, the screw **37**, the frame side plate **31**, and the body frame **30**. As a result, the stay sheet metal **25** is grounded through the resistive element **35** to the body frame **30**. In addition, since the fixing belt **21**, the sheet heater **23**, and the heater holder **24** are in contact with or have a very short insulation distance from the stay sheet metal **25**, the fixing belt **21**, the sheet heater **23**, and the heater holder **24** are also grounded through the resistive element **35** to the body frame **30**.

[0071] On the other hand, a second current path is formed in order of the shaft **22**A of the pressure roller **22**, the upper conductive plate **34**, the resistive element **35**, the lower conductive plate **36**, the screw **37**, the frame side plate **31**, and the body frame **30**. As a result, the pressure roller **22** is grounded through the resistive element **35** to the body frame **30**.

[0072] Both the first current path and the second current path pass direct current and alternating current. Therefore, the safety of the user's work, such as the removal of a recording paper sheet jammed between the fixing belt **21** and the pressure roller **22**, can be ensured.

[0073] In comparison between the first current path and the second current path, the upper conductive plate **34**, the resistive element **35**, the lower conductive plate **36**, the screw **37**, and the frame side plate **31** are shared between both the current paths and only the torsion spring **33** is a dedicated component of the first current path. Therefore, a single resistive element is used and the current paths for grounding is simplified.

[0074] Furthermore, since the stay sheet metal **25** is connected through the torsion spring **33** to the upper conductive plate **34** and the pressure roller **22** is connected to the upper conductive plate **34**, the stay sheet metal **25** and the pressure roller **22** can be equalized in potential and the potential can be stably maintained.

[0075] Although in the above embodiment a black-and-white printer is used as the image forming apparatus **1** according to the present disclosure, this is merely illustrative and the image forming apparatus according to the present disclosure may be a multicolor printer, other types of electronic apparatuses, such as a multifunction peripheral or a copy machine, or other types of image forming apparatuses, such as a facsimile machine. The structure and processing described with reference to FIGS. **1** to **13** are merely an embodiment of the present disclosure and not intended to limit the present disclosure to these structure and processing.

[0076] While the present disclosure has been described in detail with reference to the embodiments thereof, it would be apparent to those skilled in the art the various changes and modifications may be made therein within the scope defined by the appended claims.

What is claimed is:

1. A fixing device comprising:

an endless fixing belt;

a pressure roller capable of being brought into tight contact against the fixing belt;

a heater which is provided on an inside of the fixing belt, receives through the fixing belt a pressure due to tight contact against the pressure roller, and heats the fixing belt;

a support sheet metal which is provided in an interior of the fixing belt and supports the heater;

a first conductive member that contacts an end of the support sheet metal projecting laterally beyond an edge of the fixing belt;

a second conductive member that contacts an end of the pressure roller; and

a resistive element,

wherein the first conductive member is engaged and connected to the second conductive member and the second conductive member is connected through the resistive element to a body to which the fixing device is mounted.

2. The fixing device according to claim **1**, wherein

an end of a shaft of the pressure roller is formed into a conical shape having an apex at which a center of rotation of the pressure roller projects farthest laterally in a direction of extension of the shaft, and

the second conductive member is pressed against the apex of the conical shape by an elastic force of the second conductive member.

3. The fixing device according to claim **1**, wherein the first conductive member is pressed against the support sheet metal by an elastic force of the first conductive member.

4. The fixing device according to claim **1**,

further comprising at least one different conductive member,

wherein the resistive element is connected through the at least one different conductive member to a body frame to which the fixing device is mounted.

5. The fixing device according to claim **4**, wherein the different conductive member comprises a metallic frame side plate connected to the body frame, a conductive plate connected to the resistive element, and a screw that electrically connects the conductive plate with the frame side plate.

6. The fixing device according to claim **1**, further comprising a sliding bearing made of synthetic resin and supporting the shaft of the pressure roller rotatably.

7. An image forming apparatus comprising:

the fixing device according to claim **1**; and

an image forming device that forms an image on a recording paper sheet,

wherein the fixing device pinches the recording paper sheet in a nip area between the fixing belt and the pressure roller and fixes the image formed on the recording paper sheet by heat and pressure.

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