

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

**ISSUANCE OF A GENERAL EXCLUSION ORDER AND CEASE AND DESIST
ORDERS; TERMINATION OF INVESTIGATION**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to issue: (1) a general exclusion order barring entry of certain toner cartridges and components thereof that infringe certain patents asserted in this investigation; and (2) cease and desist orders directed against certain domestic defaulting respondents. The Commission has terminated this investigation.

FOR FURTHER INFORMATION CONTACT: Michael Liberman, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3115. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at <http://www.usitc.gov>. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at <http://edis.usitc.gov>. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 ("Section 337"), on June 12, 2014, based on a complaint filed by Canon Inc. of Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia (collectively, "Canon"). 79 *Fed. Reg.* 33777-78 (Jun. 12, 2014). The complaint alleges a violation of section 337 by reason of infringement of certain claims of U.S. Patent Nos. 8,280,278 ("the '278 patent"); 8,630,564 ("the '564 patent"); 8,682,215 ("the '215 patent"); 8,676,090 ("the '090 patent"); 8,369,744 ("the '744 patent"); 8,565,640 ("the '640 patent"); 8,676,085 ("the '085 patent"); 8,135,304 ("the '304 patent"); and 8,688,008 ("the '008 patent"). *Id.* The notice of investigation named thirty-three companies as respondents. *Id.* The Commission's Office of Unfair Import Investigations was

also named as a party. Subsequently, the investigation was partially terminated based on withdrawal of the complaint as to all asserted claims of the following patents: (1) the '744 patent; (2) the '640 patent; (3) the '085 patent; and (4) the '304 patent.

During the investigation, the ALJ issued initial determinations ("IDs") terminating the investigation based on consent orders as to fifteen respondents: Print-Rite Holdings Ltd.; Print-Rite N.A., Inc.; Union Technology Int'l (M.C.O.) Co. Ltd.; Print-Rite Unicorn Image Products Co. Ltd.; Innotech Precision Ltd.; Ninestar Image Tech Limited; Zhuhai Seine Technology Co., Ltd.; Ninestar Technology Company, Ltd.; Seine Tech (USA) Co., Ltd.; Nano Pacific Corporation; International Laser Group, Inc.; Ink Technologies Printer Supplies, LLC; LD Products, Inc.; Linkyo Corporation; and Katun Corporation. *See* ALJ Order Nos. 13 (*not reviewed* Nov. 4, 2014), 16 (*not reviewed* Nov. 24, 2014), 28 (*not reviewed* Apr. 3, 2015), 29 (*not reviewed* Apr. 3, 2015), 30 (*not reviewed* Apr. 3, 2015), 31 (*not reviewed* Apr. 3, 2015), and 32 (*not reviewed* Apr. 3, 2015). The ALJ also issued an ID terminating the investigation based on Canon's withdrawal of allegations as to two respondents, Seine Image Int'l Co., Ltd. and Ninestar Image Tech, Ltd. *See* ALJ Order No. 4 (*not reviewed* Aug. 1, 2014). Likewise, the ALJ issued another ID terminating the investigation as to respondent Seine Image (USA) Co., Ltd. due to the corporate dissolution of the respondent. *See* ALJ Order No. 27 (*not reviewed* Apr. 1, 2015).

The ALJ also issued IDs finding the following ten respondents in default: Acecom, Inc. -San Antonio of San Antonio, Texas; ACM Technologies, Inc. of Corona, California; Shenzhen ASTA Official Consumable Co., Ltd. of Longgang District, Shenzhen, China; Do It Wiser LLC of Alpharetta, Georgia; Grand Image Inc. of City of Industry, California; Green Project, Inc. of Hacienda Heights, California; Nectron International, Inc. of Sugar Land, Texas; Online Tech Stores, LLC of Reno, Nevada; Printronic Corporation of Santa Ana, California; and Zinyaw LLC of Houston, Texas. *See* Order Nos. 6 (*not reviewed* Aug. 25, 2014), 12 (*not reviewed* Oct. 1, 2014), 15 (*not reviewed* Nov. 17, 2014).

The remaining five named respondents are Aster Graphics, Inc. of Placentia, California; Jiangxi Yibo E-Tech Co., Ltd. of Xinyu City, Jiangxi, China; Aster Graphics Co., Ltd. of Zhongshan, Guangdong, China; The Supplies Guys, LLC of Midland Park, New Jersey; and American Internet Holdings, LLC of Midland Park, New Jersey. Each of them has acknowledged and stipulated that it has failed to act within the meaning of Commission Rule 210.17, at least because it failed to file a prehearing statement and brief in accordance with the Procedural Schedule (Order No. 9), and that it therefore has no standing to contest Canon's evidence and arguments that it has violated section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337. *See* Stipulation Regarding the Status of the Aster and Supplies Guys Respondents (Feb. 26, 2015).

On May 12, 2015, the ALJ issued an ID (Order No. 34) granting Canon's motion for summary determination of violation and recommending the issuance of a general exclusion order and several cease and desist orders. No party petitioned for review of the ID.

The Commission determined to affirm the ALJ's finding of a violation of section 337. The Commission also determined to review, and on review, to strike or modify certain portions of the ID. Furthermore, the Commission requested briefing on the issues of remedy, the public interest and bonding. *See 80 Fed. Reg. 37299-301* (Jun. 30, 2015). Canon and the Commission investigative attorney filed timely submissions pursuant to the Commission's Notice. No other parties filed any submissions in response to the Commission's Notice.

Having reviewed the submissions filed in response to the Commission's Notice and the evidentiary record, the Commission has determined that the appropriate form of relief in this investigation is a general exclusion order barring entry of certain toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent; claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent; claims 23, 26, 27, and 29 of the '215 patent; claims 1-4 of the '090 patent; and claims 1, 7-9, 11, 12, and 34 of the '008 patent. The Commission has also determined to issue cease and desist orders directed against Acecom, Inc.-San Antonio; Do It Wiser LLC; Grand Image Inc.; Green Project, Inc.; Nectron International, Inc.; Online Tech Stores, LLC; Printronic Corporation; and Zinyaw LLC. The Commission has further determined that the public interest factors enumerated in subsections (d)(1), (f)(1), and (g)(1) (19 U.S.C. §§ 1337(d)(1), (f)(1), (g)(1)) do not preclude issuance of the general exclusion order and cease and desist orders. Additionally, the Commission has determined that a bond in the amount of one hundred (100) percent of the entered value is required to permit temporary importation of the articles in question during the period of Presidential review (19 U.S.C. § 1337(j)). The Commission has also issued an opinion explaining the basis for the remedy. The investigation is terminated.

The Commission's orders and the record upon which it based its determination were delivered to the President and to the United States Trade Representative on the day of their issuance. The Commission has also notified the Secretary of the Treasury of the orders.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in Part 210 of the Commission's Rules of Practice and Procedure (19 C.F.R. Part 210).

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

GENERAL EXCLUSION ORDER

The Commission has determined that there is a violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), in the unlawful importation and sale of certain toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189, 192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”), asserted in this investigation.

Having reviewed the record of this investigation, including the written submissions of the parties, the Commission has made its determination on the issues of remedy, the public interest, and bonding. The Commission has determined that a general exclusion from entry for consumption is necessary to prevent circumvention of an exclusion order limited to products of named persons and because there is a pattern of violation of Section 337 and it is difficult to identify the source of infringing products. Accordingly, the Commission has determined to issue a general exclusion order prohibiting the unlicensed importation of infringing toner cartridges and components thereof (“covered products”).

The Commission has also determined that the public interest factors enumerated in 19 U.S.C. § 1337(d) do not preclude the issuance of the general exclusion order, and that the

bond during the Presidential review period shall be in the amount of one hundred (100) percent of the entered value for all covered products in question.

Accordingly, the Commission hereby **ORDERS** that:

1. Toner cartridges and components thereof that are covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent are excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining terms of the patents, except under license of the patent owner or as provided by law.

2. Notwithstanding paragraph 1 of this Order, the aforesaid toner cartridges and components thereof are entitled to entry into the United States for consumption, entry for consumption from a foreign-trade zone, or withdrawal from a warehouse for consumption under bond in the amount of one hundred (100) percent of the entered value of the products, pursuant to subsection (j) of Section 337 (19 U.S.C. § 1337(j)) and the Presidential Memorandum for the United States Trade Representative of July 21, 2005 (70 *Fed. Reg.* 43251), from the day after this Order is received by the United States Trade Representative until such time as the United States Trade Representative notifies the Commission that this Order is approved or disapproved but, in any event, not later than sixty days after the date of receipt of this Order.

3. At the discretion of U.S. Customs and Border Protection ("CBP") and pursuant to procedures that it establishes, persons seeking to import toner cartridges and components thereof that are potentially subject to this Order may be required to certify that they are familiar with the terms of this Order, that they have made appropriate inquiry, and thereupon state that, to the best

of their knowledge and belief, the products being imported are not excluded from entry under paragraph 1 of this Order. At its discretion, CBP may require persons who have provided the certification described in this paragraph to furnish such records or analyses as are necessary to substantiate the certification.

4. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to toner cartridges and components thereof imported by and for the use of the United States, or imported for, and to be used for, the United States with the authorization or consent of the Government.

5. The Commission may modify this Order in accordance with the procedures described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

6. The Secretary shall serve copies of this Order upon each party of record in this investigation and upon CBP.

7. Notice of this Order shall be published in the *Federal Register*.

By order of the Commission.



Lisa R. Barton
Office of the Secretary

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Acecom, Inc.-San Antonio, d/b/a InkSell.com of San Antonio, Texas, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189, 192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Acecom, Inc.-San Antonio, d/b/a InkSell.com of San Antonio, Texas.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

- (B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Do It Wiser LLC, d/b/a Image Toner of Alpharetta, Georgia, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189, 192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Do It Wiser LLC, d/b/a Image Toner of Alpharetta, Georgia.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

- (B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'L. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Grand Image Inc., d/b/a Grand Image USA, d/b/a INK4S.com of City of Industry, California, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189,192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Grand Image Inc., d/b/a Grand Image USA, d/b/a INK4S.com of City of Industry, California.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

- (B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Office of the Secretary

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Green Project, Inc. of Hacienda Heights, California, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189,192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Green Project, Inc. of Hacienda Heights, California.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

(B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;

(C) advertise imported covered products;

(D) solicit U.S. agents or distributors for imported covered products; or

(E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII.

Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Office of the Secretary

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Nectron International, Inc. of Sugar Land, Texas, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189,192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Nectron International, Inc. of Sugar Land, Texas.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

(B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;

(C) advertise imported covered products;

(D) solicit U.S. agents or distributors for imported covered products; or

(E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII.

Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Lisa R. Barton". The signature is stylized and cursive.

Lisa R. Barton
Secretary to the Commission

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Online Tech Stores, LLC, d/b/a SuppliesOutlet.com, d/b/a SuppliesWholesalers.com, d/b/a OnlineTechStores.com of Reno, Nevada, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189,192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Online Tech Stores, LLC, d/b/a SuppliesOutlet.com, d/b/a SuppliesWholesalers.com, d/b/a OnlineTechStores.com of Reno, Nevada.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

(B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;

(C) advertise imported covered products;

(D) solicit U.S. agents or distributors for imported covered products; or

(E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² *See* Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Printronic Corporation, d/b/a Printronic.com, d/b/a InkSmile.com of Santa Ana, California, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189,192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

I.

Definitions

As used in this order:

(A) “Commission” shall mean the United States International Trade Commission.

(B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.

(C) “Respondent” shall mean Printronic Corporation, d/b/a Printronic.com, d/b/a InkSmile.com of Santa Ana, California.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

- (B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Lisa R. Barton". The signature is stylized with a large, looping initial "L" and "B".

Lisa R. Barton
Secretary to the Commission

Issued: August 31, 2015

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN TONER CARTRIDGES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-918

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Zinyaw LLC, d/b/a TonerPirate.com of Houston, Texas, cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of U.S. Patent No. 8,280,278 (“the ‘278 patent”); claims 171, 176, 179, 181, 189,192, and 200 of U.S. Patent No. 8,630,564 (“the ‘564 patent”); claims 23, 26, 27, and 29 of U.S. Patent No. 8,682,215 (“the ‘215 patent”); claims 1-4 of U.S. Patent No. 8,676,090 (“the ‘090 patent”); and claims 1, 7-9, 11, 12, and 34 of U.S. Patent No. 8,688,008 (“the ‘008 patent”) (collectively, “the Asserted Patents”), in violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Canon Inc. of Tokyo, Japan; Canon U.S.A., Inc. of Melville, New York; and Canon Virginia, Inc. of Newport News, Virginia.
- (C) “Respondent” shall mean Zinyaw LLC, d/b/a TonerPirate.com of Houston, Texas.

(D) "Person" shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) "United States" shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms "import" and "importation" refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term "covered products" shall mean toner cartridges and components thereof covered by one or more of claims 160, 165, and 166 of the '278 patent, claims 171, 176, 179, 181, 189, 192, and 200 of the '564 patent, claims 23, 26, 27, and 29 of the '215 patent, claims 1-4 of the '090 patent, and claims 1, 7-9, 11, 12, and 34 of the '008 patent.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of, Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining terms of the Asserted Patent, the Respondent shall not:

(A) import or sell for importation into the United States covered products;

- (B) market, distribute, sell, or otherwise transfer (except for exportation), in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

**IV.
Conduct Permitted**

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the relevant Asserted Patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

**V.
Reporting**

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this order through December 31, 2015. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission: (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-918") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainants' counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Record-Keeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made or received in the usual and ordinary course of business,

¹ Complainants must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must have signed on to the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the last expiration date of the Asserted Patents.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to sections V-VI of this order should be made in accordance with Section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under Section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this order on its own motion or in accordance with the procedure described in Section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty-day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 *Fed. Reg.* 43251 (Jul. 21, 2005)), subject to Respondent posting a

bond in the amount of one hundred percent (100%) of the entered value of each covered product. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this order are subject to the entry bond as set forth in the general exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by complainants in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68.) The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary, (a) the Secretary will serve an acceptance letter on all parties and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal, or unless Respondent exports or destroys the products subject to this bond and provides certification to that effect satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved, or not disapproved, by the United States Trade Representative, upon service on Respondent of an

² See Footnote 1.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

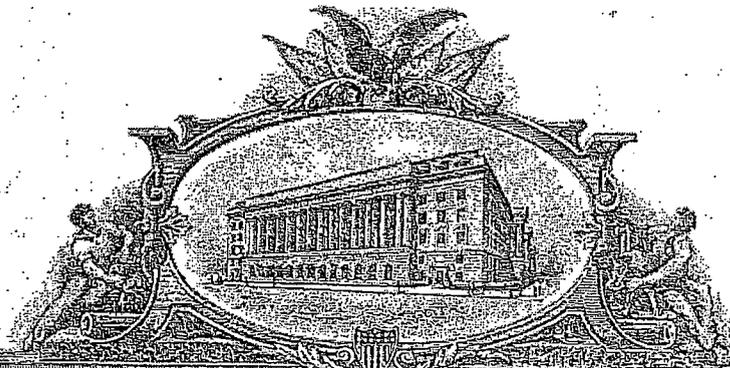
By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: August 31, 2015

U. 7459644



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME;

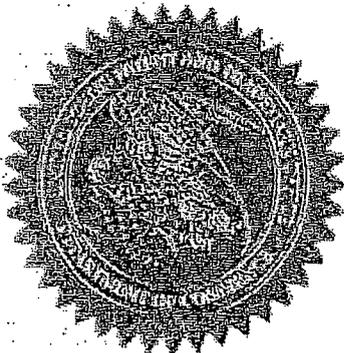
**UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office**

January 29, 2014

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM
THE RECORDS OF THIS OFFICE OF:**

**U.S. PATENT: 8,280,278
ISSUE DATE: October 02, 2012**

**By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office**




**R. PONDEXTER
Certifying Officer**



US008280278B2

(12) **United States Patent**
Ueno et al.

(10) **Patent No.:** US 8,280,278 B2
(45) **Date of Patent:** Oct. 2, 2012

(54) **PROCESS CARTRIDGE,
ELECTROPHOTOGRAPHIC IMAGE
FORMING APPARATUS, AND
ELECTROPHOTOGRAPHIC
PHOTOSENSITIVE DRUM UNIT**

FOREIGN PATENT DOCUMENTS

CN 1346077 4/2002
(Continued)

OTHER PUBLICATIONS

(75) **Inventors:** Takahito Ueno, Mishima (JP); Shigeo Miyabe, Numazu (JP); Masanari Morioka, Numazu (JP); Masato Hisano, Susono (JP)

Singapore Search Report and Written Opinion in Singapore Application No. 200903015-6, issued Jan. 5, 2010.

(Continued)

(73) **Assignee:** Canon Kabushiki Kaisha, Tokyo (JP)

Primary Examiner — Mark R Gaworecki

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 319 days.

(74) *Attorney, Agent, or Firm* — Fitzpatrick, Cella, Harper & Scinto

(21) **Appl. No.:** 11/964,518

(57) **ABSTRACT**

(22) **Filed:** Dec. 26, 2007

A process cartridge for use with a main assembly of an electrophotographic image forming apparatus, the main assembly including a driving shaft, to be driven by a motor, having a rotational force applying portion, wherein the process cartridge is dismountable from the main assembly in a direction substantially perpendicular to an axial direction of the driving shaft, the process cartridge includes i) an electrophotographic photosensitive drum having a photosensitive layer at a peripheral surface thereof, the electrophotographic photosensitive drum being rotatable about an axis thereof; ii) process means actable on the electrophotographic photosensitive drum; iii) a coupling member engageable with the rotational force applying portion to receive a rotational force for rotating the electrophotographic photosensitive drum, the coupling member being capable of taking a rotational force transmitting angular position for transmitting the rotational force for rotating the electrophotographic photosensitive drum to the electrophotographic photosensitive drum and a disengaging angular position in which the coupling member is inclined away from the axis of the electrophotographic photosensitive drum from the rotational force transmitting angular position, wherein when the process cartridge is dismounted from the main assembly of the electrophotographic image forming apparatus in a direction substantially perpendicular to the axis of the electrophotographic photosensitive drum, the coupling member moves from the rotational force transmitting angular position to the disengaging angular position.

(65) **Prior Publication Data**

US 2008/0152388 A1 Jun. 26, 2008

(30) **Foreign Application Priority Data**

Dec. 22, 2006 (JP) 2006-346190
Feb. 22, 2007 (JP) 2007-042665
Dec. 21, 2007 (JP) 2007-330303

(51) **Int. Cl.**
G03G 21/16 (2006.01)

(52) **U.S. Cl.** 399/111; 399/167

(58) **Field of Classification Search** 399/110,
399/111, 167

See application file for complete search history.

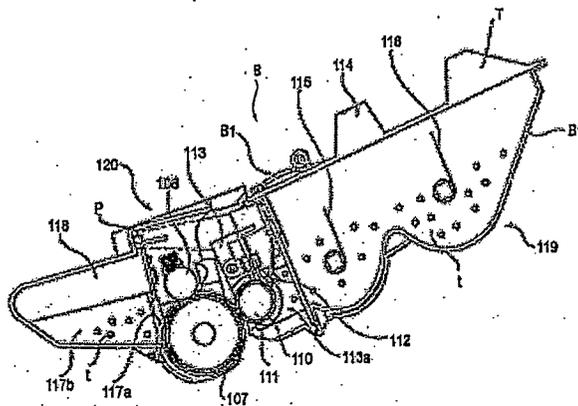
(56) **References Cited**

U.S. PATENT DOCUMENTS

4,065,941 A 1/1978 Aoki
4,439,257 A 3/1984 Santo et al.
4,829,335 A 5/1989 Kanemitsu et al. 399/111
5,168,319 A 12/1992 Kimura et al.
5,331,373 A 7/1994 Nomura et al. 355/200
5,452,056 A 9/1995 Nomura et al. 355/200
5,463,446 A 10/1995 Watanabe et al. 355/200
5,583,630 A 12/1996 Kimura et al.

(Continued)

275 Claims, 108 Drawing Sheets



U.S. PATENT DOCUMENTS

5,585,889	A	12/1996	Shishido et al.	355/200
5,640,650	A	6/1997	Wafanabe et al.	
5,839,028	A	11/1998	Nomura et al.	
5,878,309	A	3/1999	Nomura et al.	
5,878,310	A	3/1999	Noda et al.	399/117
5,903,803	A	5/1999	Kawai et al.	399/116
5,926,666	A	7/1999	Miura et al.	
5,943,529	A	8/1999	Miyabe et al.	399/111
5,946,531	A	8/1999	Miura et al.	399/111
5,950,047	A	9/1999	Miyabe et al.	399/111
5,966,567	A	10/1999	Matsuzaki et al.	
5,993,101	A	11/1999	Kohno et al.	
6,029,031	A	2/2000	Yokomori et al.	399/109
6,032,002	A	2/2000	Yokomori et al.	
6,061,535	A	5/2000	Yokomori et al.	
6,064,843	A	5/2000	Isobe et al.	399/111
6,072,968	A	6/2000	Nomura et al.	399/113
6,115,569	A	9/2000	Akutsu	
6,128,452	A	10/2000	Miyabe et al.	
6,154,623	A	11/2000	Suzuki et al.	
6,167,219	A	12/2000	Miyamoto et al.	
6,173,140	B1	1/2001	Suzuki et al.	
6,175,705	B1	1/2001	Harada et al.	
6,215,969	B1	4/2001	Nomura et al.	
6,249,663	B1	6/2001	Alzawa et al.	
6,256,467	B1	7/2001	Yokomori et al.	
6,282,390	B1	8/2001	Miyabe et al.	399/111
6,301,458	B1	10/2001	Mori et al.	
6,317,572	B1	11/2001	Miyabe et al.	399/111
6,336,017	B1	1/2002	Miyamoto et al.	399/116
6,349,191	B1	2/2002	Willis	
6,351,620	B1	2/2002	Miyabe et al.	399/111
6,366,748	B1	4/2002	Takeuchi et al.	
6,385,416	B1	5/2002	Horikawa et al.	
6,415,121	B1	7/2002	Suzuki et al.	
6,418,296	B1	7/2002	Aizawa et al.	
6,473,580	B1	10/2002	Inomata	399/167
6,517,439	B1	2/2003	Sears	
6,519,431	B1	2/2003	Toba et al.	
6,542,706	B2	4/2003	Toba et al.	399/111
6,546,220	B1	4/2003	Asakura et al.	
6,549,736	B2	4/2003	Miyabe et al.	399/111
6,574,446	B2	6/2003	Kitayama	
6,603,939	B1	8/2003	Toba et al.	399/103
6,608,980	B2	8/2003	Murayama et al.	399/111
6,678,488	B2	1/2004	Toba et al.	399/111
6,704,522	B2	3/2004	Sasago et al.	
6,714,746	B2	3/2004	Morioka et al.	399/27
6,714,752	B2	3/2004	Ueno et al.	399/117
6,795,666	B2	9/2004	Miyabe et al.	
6,823,153	B2	11/2004	Ueno et al.	
6,829,455	B2	12/2004	Yasumoto et al.	399/167
6,834,175	B2	12/2004	Murayama et al.	
6,836,629	B2	12/2004	Miyabe et al.	399/111
6,898,391	B2	5/2005	Numagami et al.	
6,898,399	B2	5/2005	Morioka et al.	399/167
6,912,365	B2	6/2005	Ueno et al.	399/25
6,931,226	B2	8/2005	Chadani et al.	399/100
6,934,485	B2	8/2005	Miyabe et al.	399/90
6,937,832	B2	8/2005	Sato et al.	399/111
6,954,600	B2	10/2005	Fujita et al.	
6,954,601	B2	10/2005	Numagami et al.	
6,963,706	B2	11/2005	Morioka et al.	399/111
6,968,146	B1	11/2005	Fujita et al.	399/258
6,970,668	B2	11/2005	Ueno et al.	
6,978,099	B2	12/2005	Ueno et al.	
7,003,247	B2	2/2006	Koishi et al.	399/167
7,062,200	B2	5/2006	Ueno et al.	
7,079,787	B2	7/2006	Ogino et al.	
7,092,658	B2	8/2006	Yasumoto et al.	399/167
7,121,205	B2	10/2006	Ono et al.	
7,127,192	B2	10/2006	Batori et al.	399/104
7,136,604	B2	11/2006	Chadani et al.	399/90
7,139,502	B2	11/2006	Koishi et al.	399/93
7,149,457	B2	12/2006	Miyabe et al.	399/114
7,155,141	B2	12/2006	Sato et al.	399/114
7,158,736	B2	1/2007	Sato et al.	399/111
7,164,875	B2	1/2007	Miyabe et al.	399/111

7,174,122	B2	2/2007	Fujita et al.	399/258
7,184,690	B2	2/2007	Ueno et al.	399/117
7,200,349	B2	4/2007	Sato et al.	
7,209,682	B2	4/2007	Numagami et al.	399/167
7,212,768	B2	5/2007	Numagami et al.	399/111
7,224,925	B2	5/2007	Sato et al.	
7,248,810	B2	7/2007	Miyabe et al.	399/90
7,315,710	B2	1/2008	Ueno et al.	399/117
7,349,657	B2	3/2008	Sato et al.	
7,366,452	B2	4/2008	Fujita et al.	
7,526,228	B2	4/2009	Shiraki	
7,529,507	B2	5/2009	Ohashi et al.	
7,537,410	B2	5/2009	Parisi et al.	
7,603,059	B2	10/2009	Marumoto	
2002/0025191	A1	2/2002	Kitayama	
2002/0044794	A1*	4/2002	Nishiuwatoko et al.	399/167
2002/0057928	A1	5/2002	Yasumoto et al.	
2003/0059233	A1	3/2003	Jang et al.	
2004/0086300	A1*	5/2004	Kawai et al.	399/167
2005/0105936	A1	5/2005	Morioka et al.	
2005/0191092	A1	9/2005	Toso et al.	
2006/0008289	A1	1/2006	Sato et al.	399/106
2006/0034637	A1	2/2006	Kim et al.	
2006/0051133	A1	3/2006	Koishi et al.	399/167
2006/0093398	A1	5/2006	Hayakawa	
2006/0182465	A1	8/2006	Funamoto et al.	
2006/0228127	A1	10/2006	Miyabe et al.	
2006/0240896	A1	10/2006	Ohashi et al.	464/158
2006/0269318	A1	11/2006	Ueno et al.	
2007/0110478	A1	5/2007	Numagami et al.	399/167
2007/0122188	A1	5/2007	Igarashi	
2007/0196131	A1	8/2007	Sato	
2007/0264048	A1	11/2007	Kuroda	
2008/0025757	A1	1/2008	Sato et al.	
2008/0152388	A1	6/2008	Ueno et al.	
2008/0240796	A1	10/2008	Morioka et al.	
2008/0260428	A1	10/2008	Ueno et al.	
2009/0196655	A1	8/2009	Takigawa et al.	

FOREIGN PATENT DOCUMENTS

EP	1 178 370	A2	2/2002
EP	1199610		4/2002
EP	1628165		2/2006
JP	57-153844		9/1982
JP	60-249729		12/1985
JP	61-092967		6/1986
JP	1-164818		6/1989
JP	4-119363		4/1992
JP	4-240870		8/1992
JP	5-341589		12/1993
JP	8-030168		2/1996
JP	11-15265		1/1999
JP	11-325097		11/1999
JP	2000-120715		4/2000
JP	2000-137360		5/2000
JP	2002-031153		1/2002
JP	2002-048148		2/2002
JP	2002048148	A *	2/2002
JP	2002-250435		9/2002
JP	2003-162137		6/2003
JP	2003-202727		7/2003
JP	2004-45603		2/2004
JP	2004045603	A *	2/2004
JP	2004-85393		3/2004
JP	2004-198822		7/2004
JP	3728104		10/2005
JP	2006-72160		3/2006
JP	2006-072160		3/2006
JP	2006072160	A *	3/2006
JP	2007-052185		3/2007
JP	2007-218403		8/2007
JP	2007-240007		9/2007
JP	2009-104101		5/2009

OTHER PUBLICATIONS

International Search Report and Written Opinion of the International Searching Authority dated Dec. 25, 2007, in International Application No. PCT/JP2007/075364.

Australian Search Report and Written Opinion, dated Nov. 24, 2009, which was enclosed with an Invitation to Respond to Written Opinion dated Dec. 22, 2009, in Singapore Application No. 200903732-6. English-language translation of Japanese Patent Document No. 11-15265 A.
English-language translation of Japanese Patent Document No. 2003-202727 A.
International Search Report and Written Opinion in PCT/JP2008/056259, dated Jun. 16, 2008.
Singapore Search Report and Written Opinion in Singapore Application No. 200903005-7, issued Jan. 5, 2010.
International Search Report and Written Opinion of the International Searching Authority dated Apr. 11, 2008, in International Application No. PCT/JP2007/075366.
Office Action in Russian Patent Application No. 2009128196, dated Nov. 3, 2010, with English translation.
Japanese Office Action dated Mar. 16, 2010, in counterpart Japanese Application No. 2007-330303.
Office Action in Chinese Patent Application No. 200780047584.6, dated Nov. 1, 2010, with English translation.
Office Action in Korean Patent Application No. 10-2009-7015430, dated Nov. 17, 2011.
English Translation of Jan. 17, 2011 Office Action in Korean Patent Application No. 10-2009-7015430.

Office Action in Korean Patent Application No. 10-2009-7015474, dated Jan. 17, 2011, with English translation.
Office Action in Korean Patent Application No. 10-2009-7022191, dated Feb. 17, 2011.
English translation of Japanese Laid-open Patent Application Hei No. 1-164818.
Official Communication in Korean Patent Application No. 10-2009-7022510, issued Aug. 8, 2011.
Official Communication in Canadian Patent Application No. 2,670,502, dated Nov. 10, 2011.
Office Action in Indonesia Patent Application No. W-00200901748, dated Mar. 30, 2011 (with partial translation).
Office Action in Japanese Patent Application No. 2007-330304, dated Nov. 22, 2011, with English translation.
Notice of Acceptance in Australian Patent Application No. 2007339163, dated Feb. 3, 2012.
Notice of Allowance in Korean Patent Application No. 10-2009-7022510, mailed May 3, 2011.
Decision on Grant in Russian Patent Application No. 2009128196/28(039172), mailed Apr. 18, 2012 (with English Translation).
Office Action in Taiwanese Patent Application No. 096149780, mailed Jun. 11, 2012 (with English translation).
Official Communication in European Patent Application No. 07 860 559.9, mailed Jul. 17, 2012.

* cited by examiner

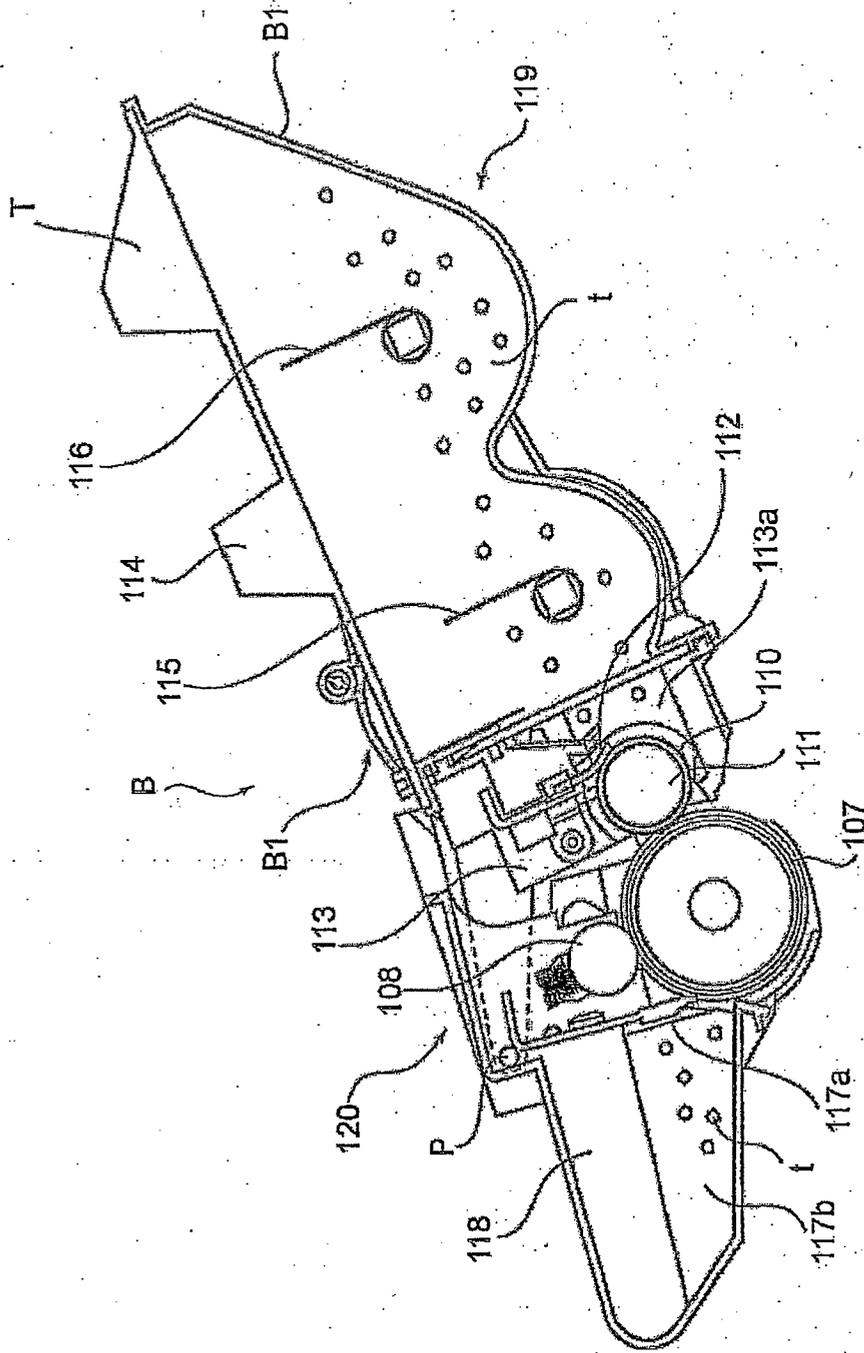


FIG. 1

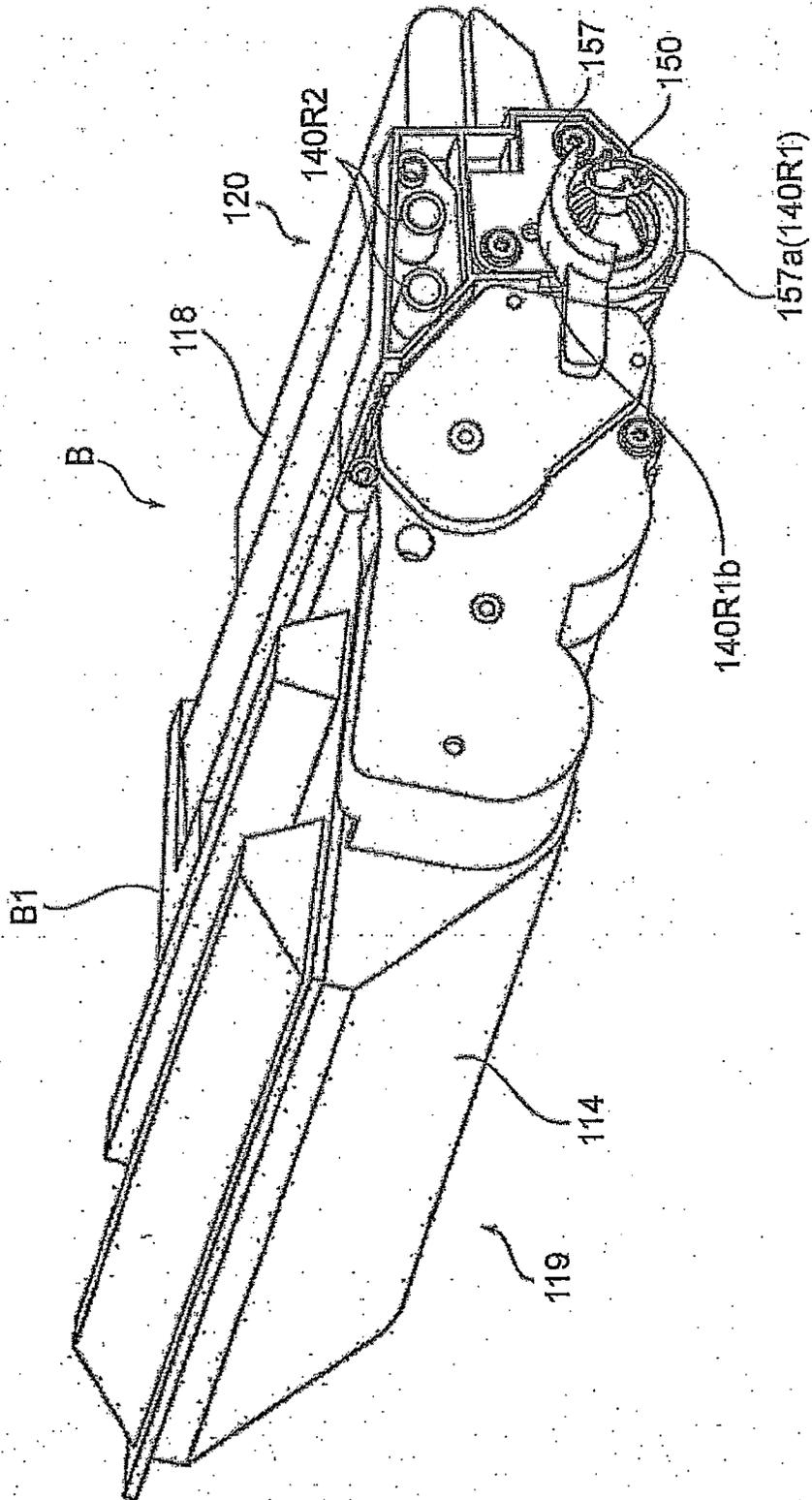


FIG. 2

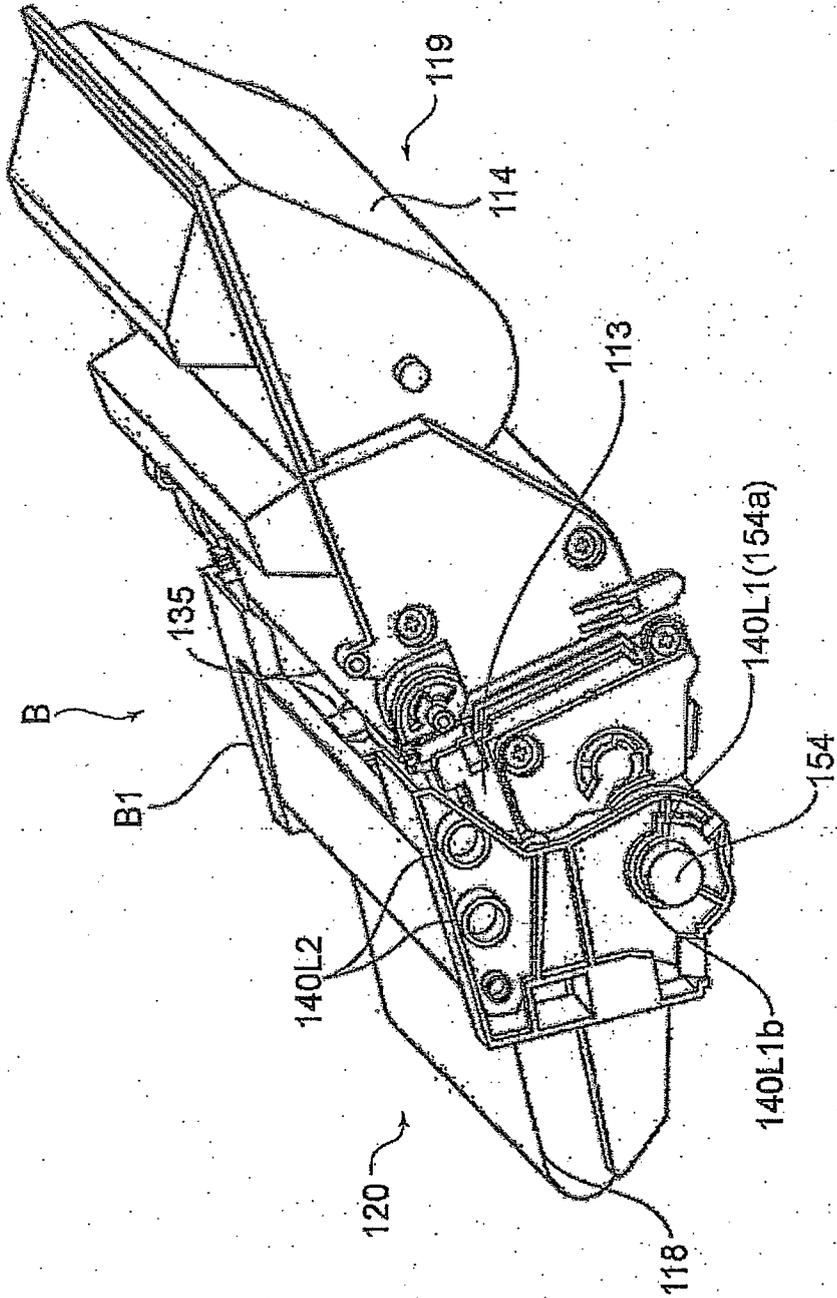


FIG. 3

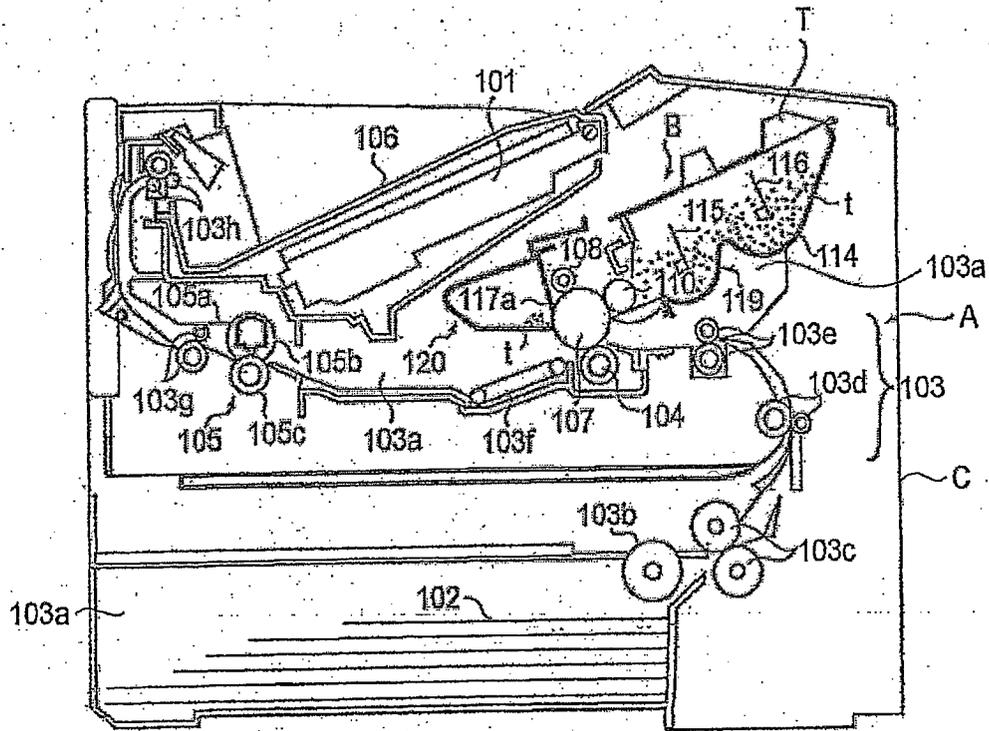


FIG. 4

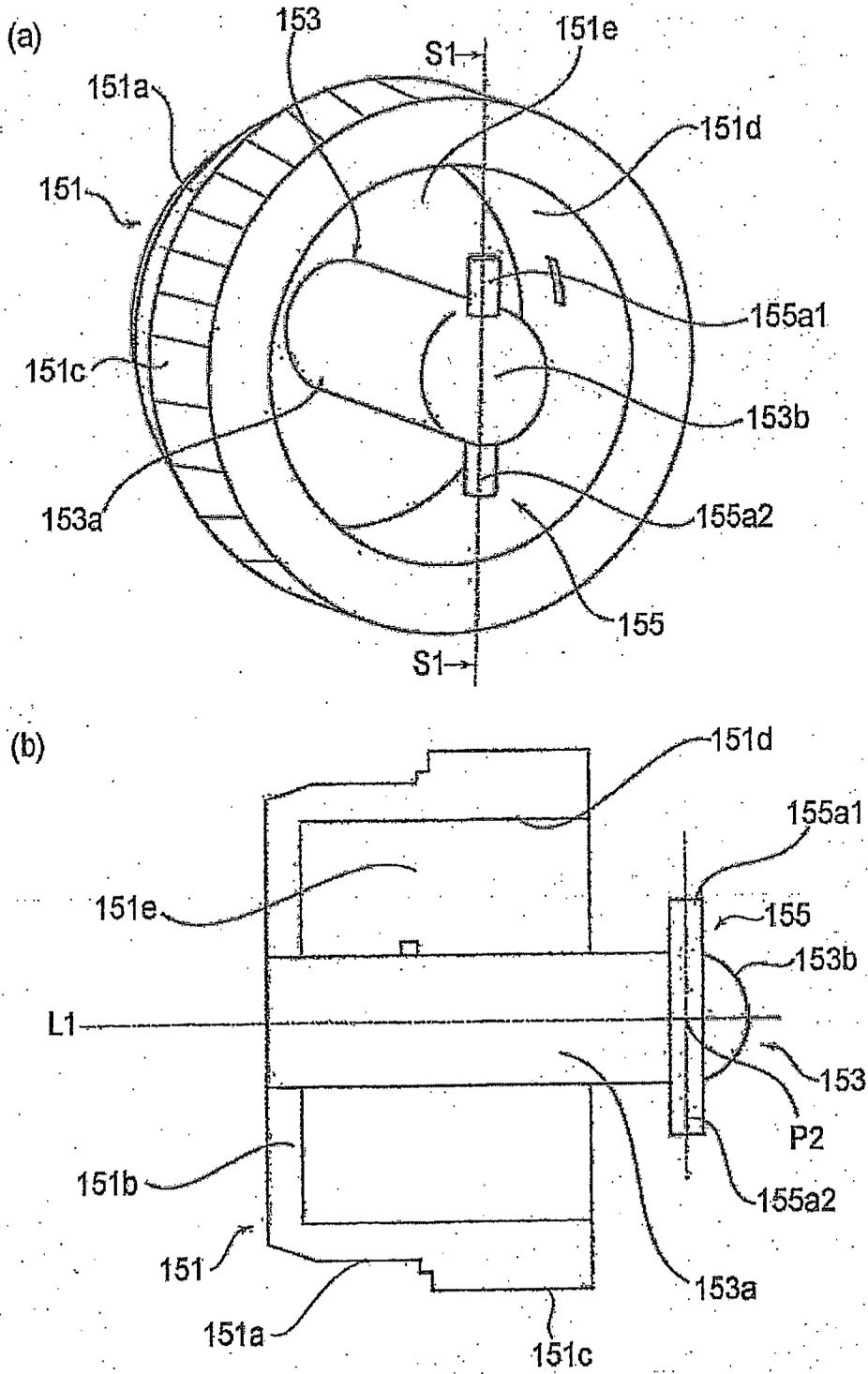


FIG. 5

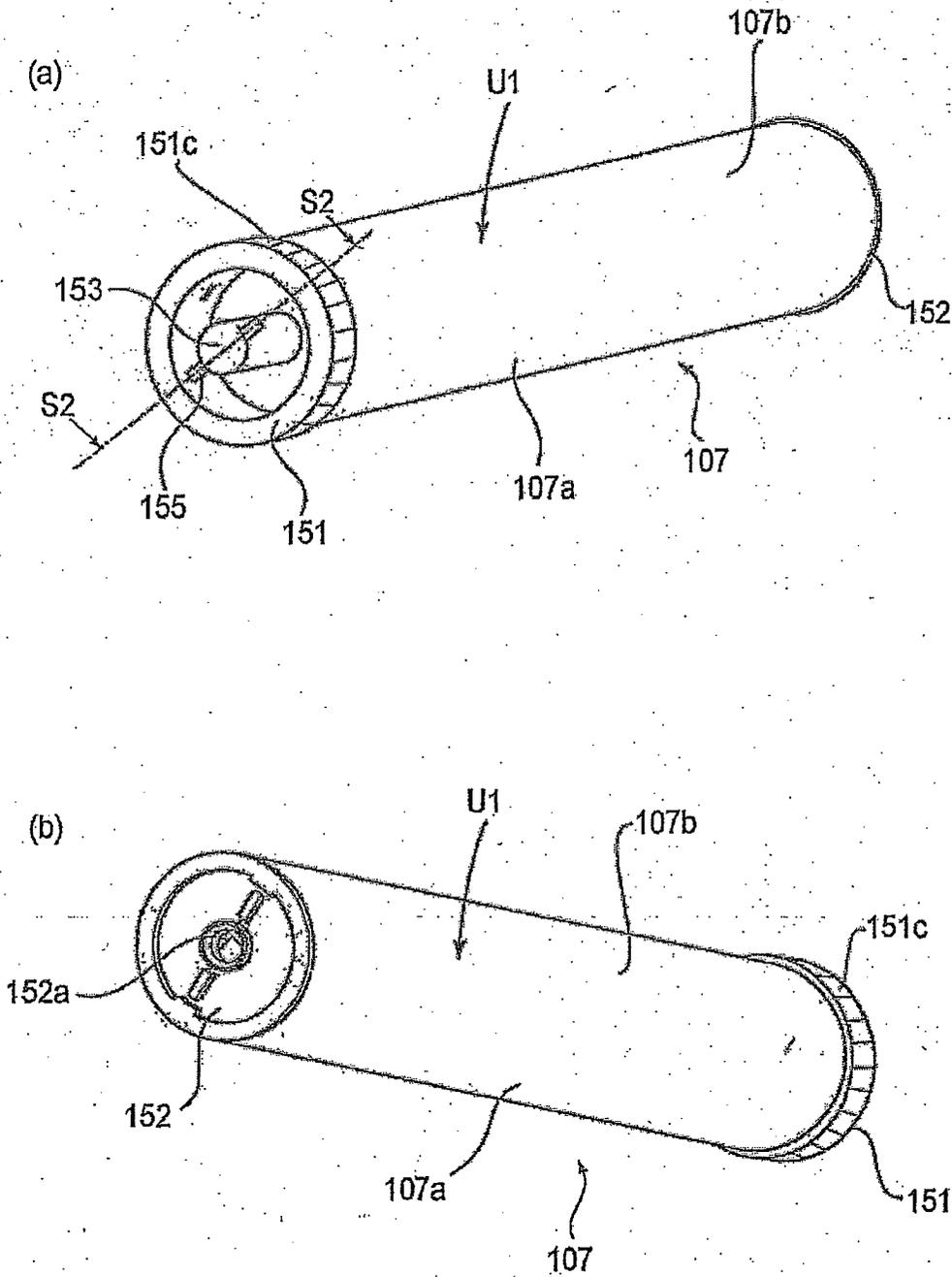


FIG. 6

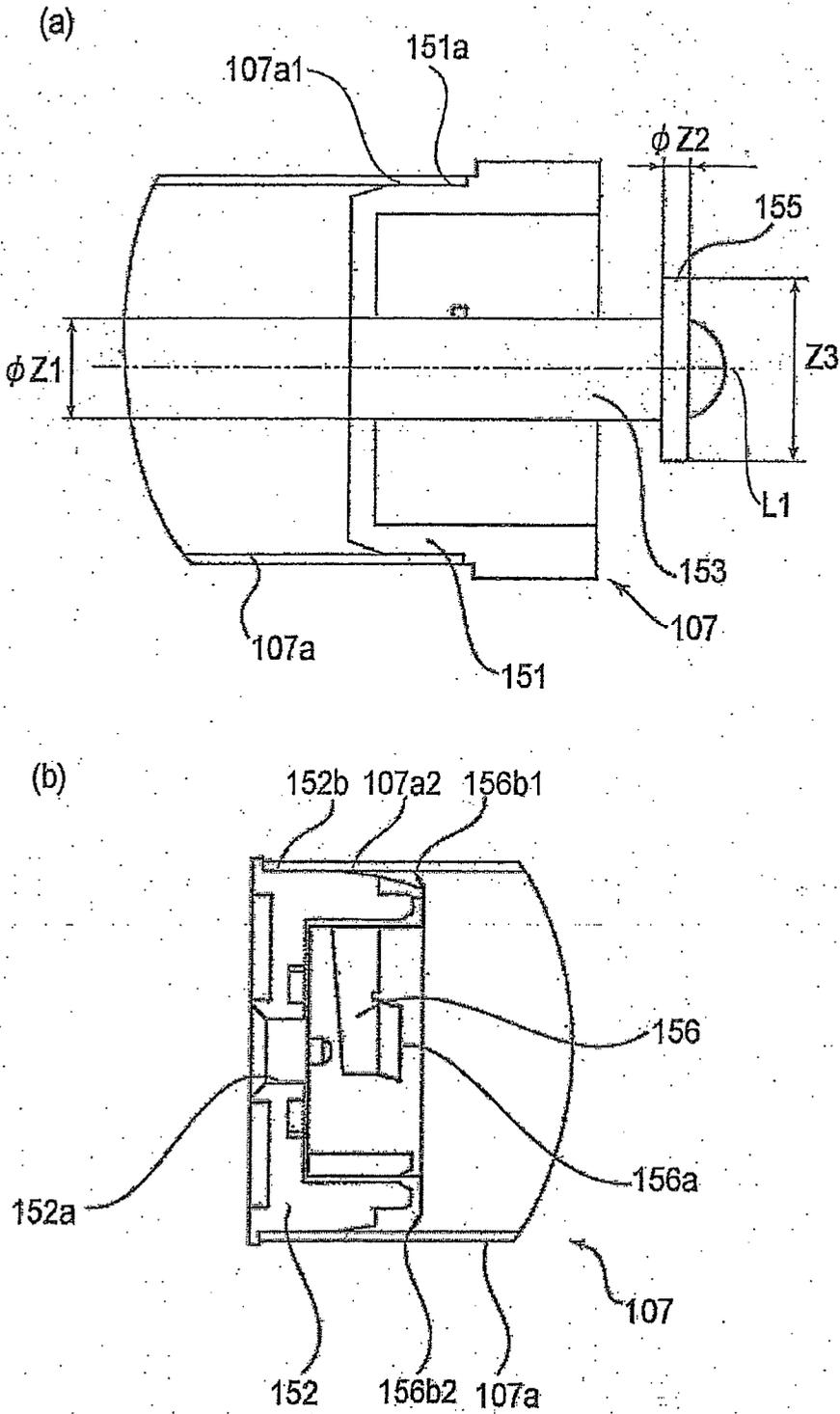


FIG. 7

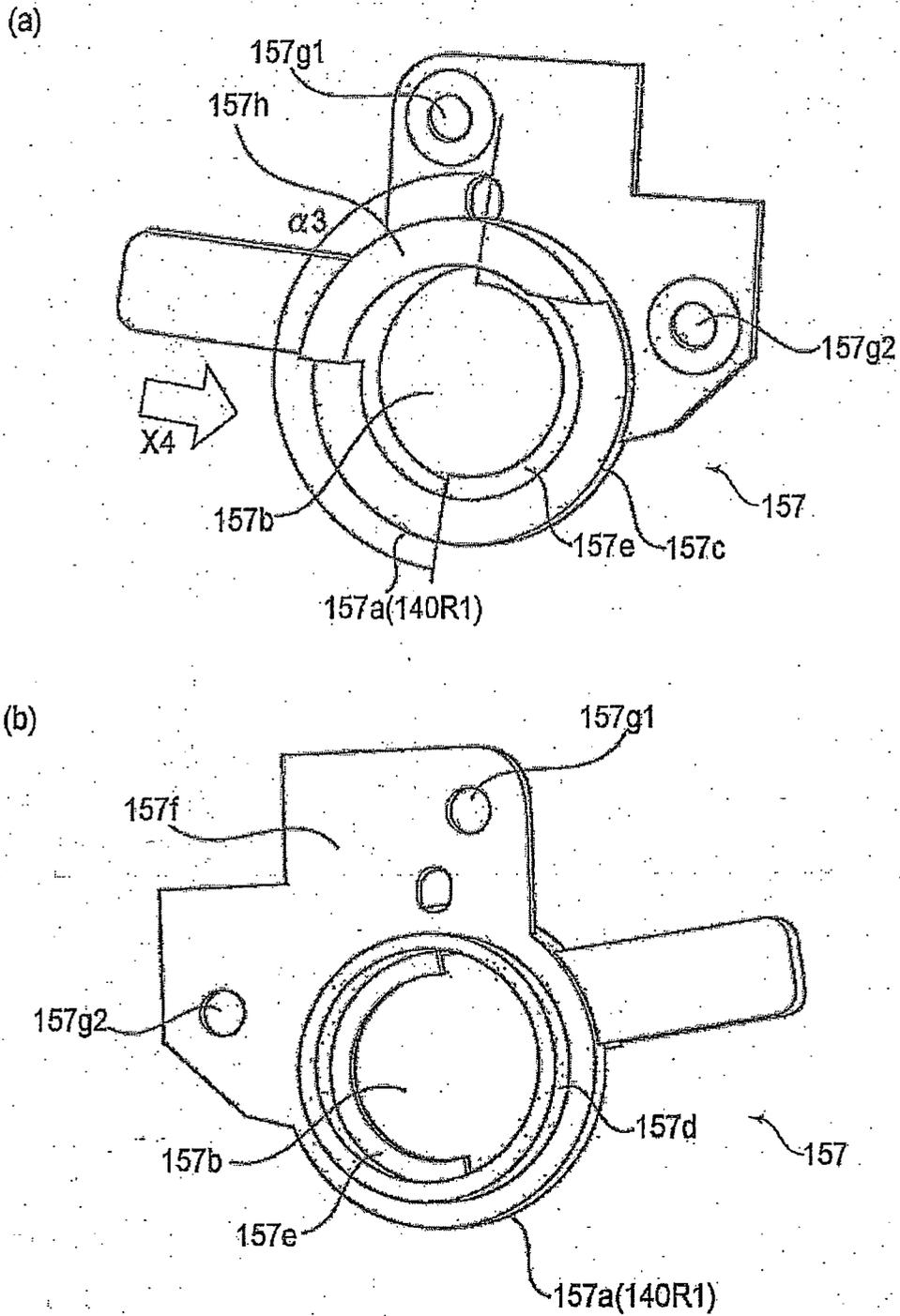


FIG. 9

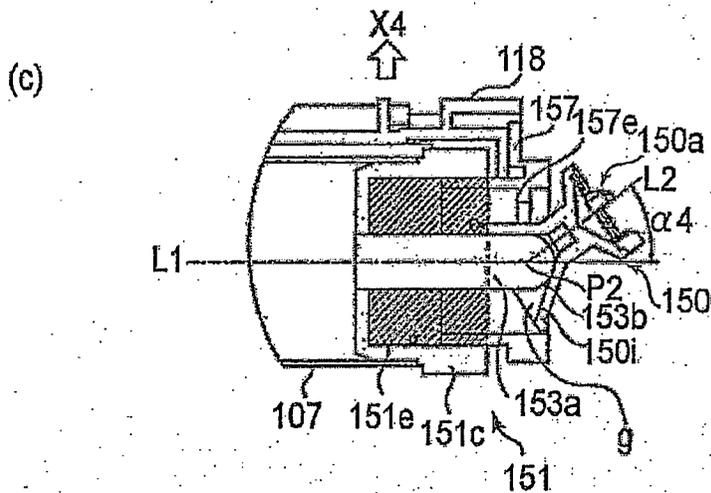
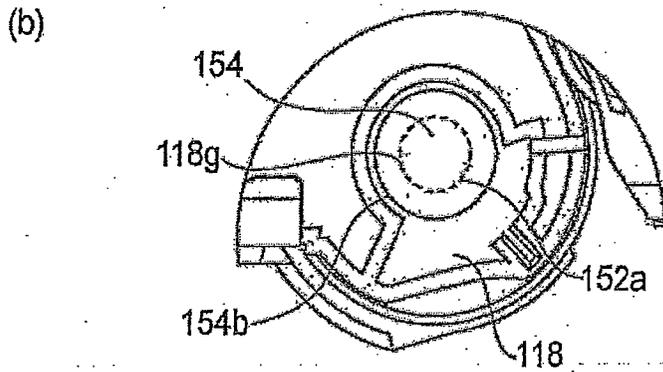
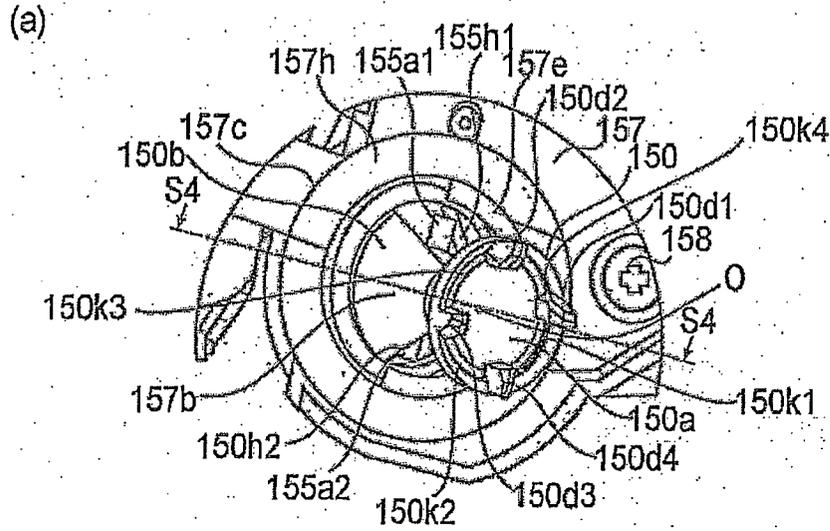


FIG. 10

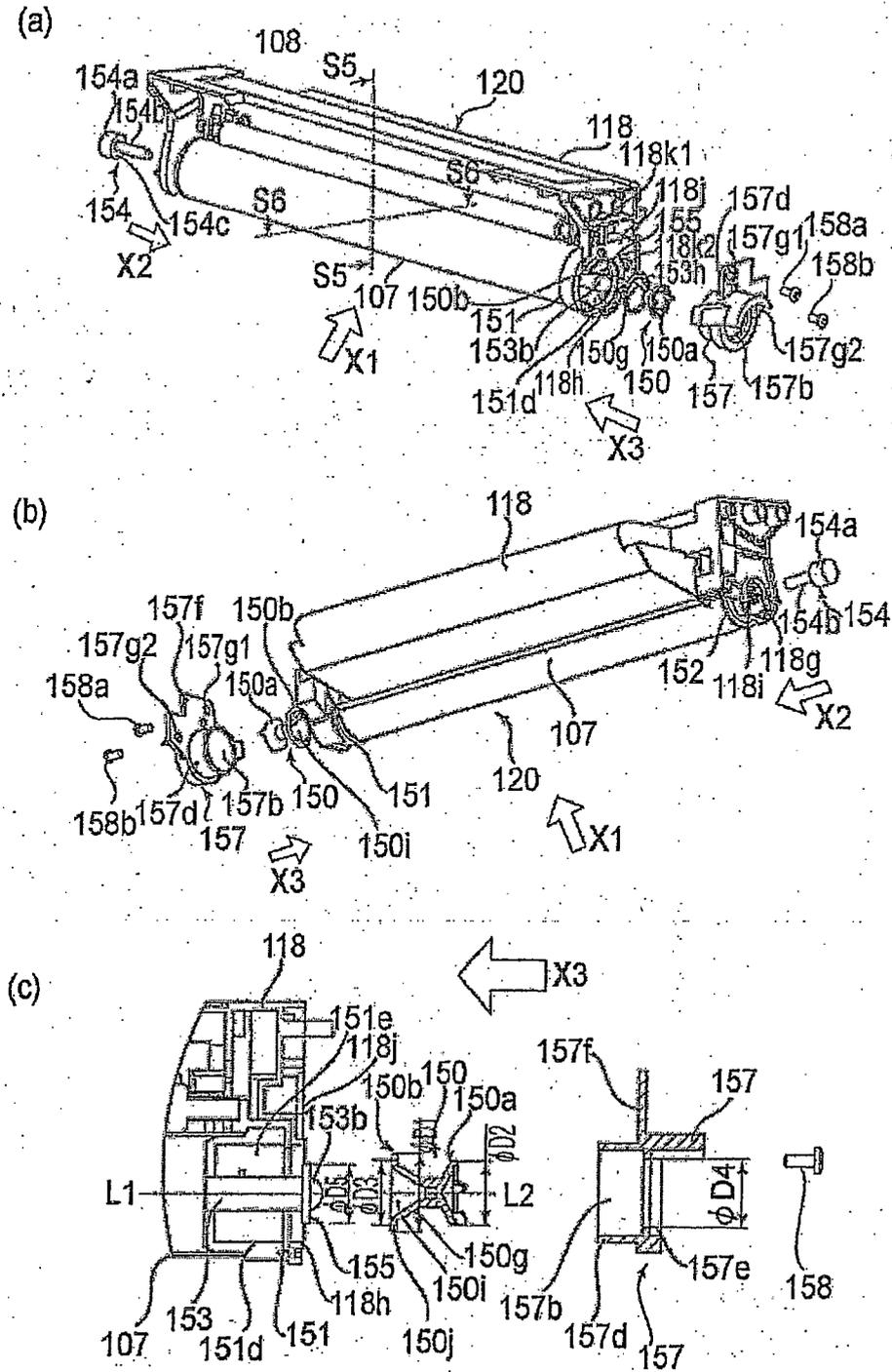


FIG. 11

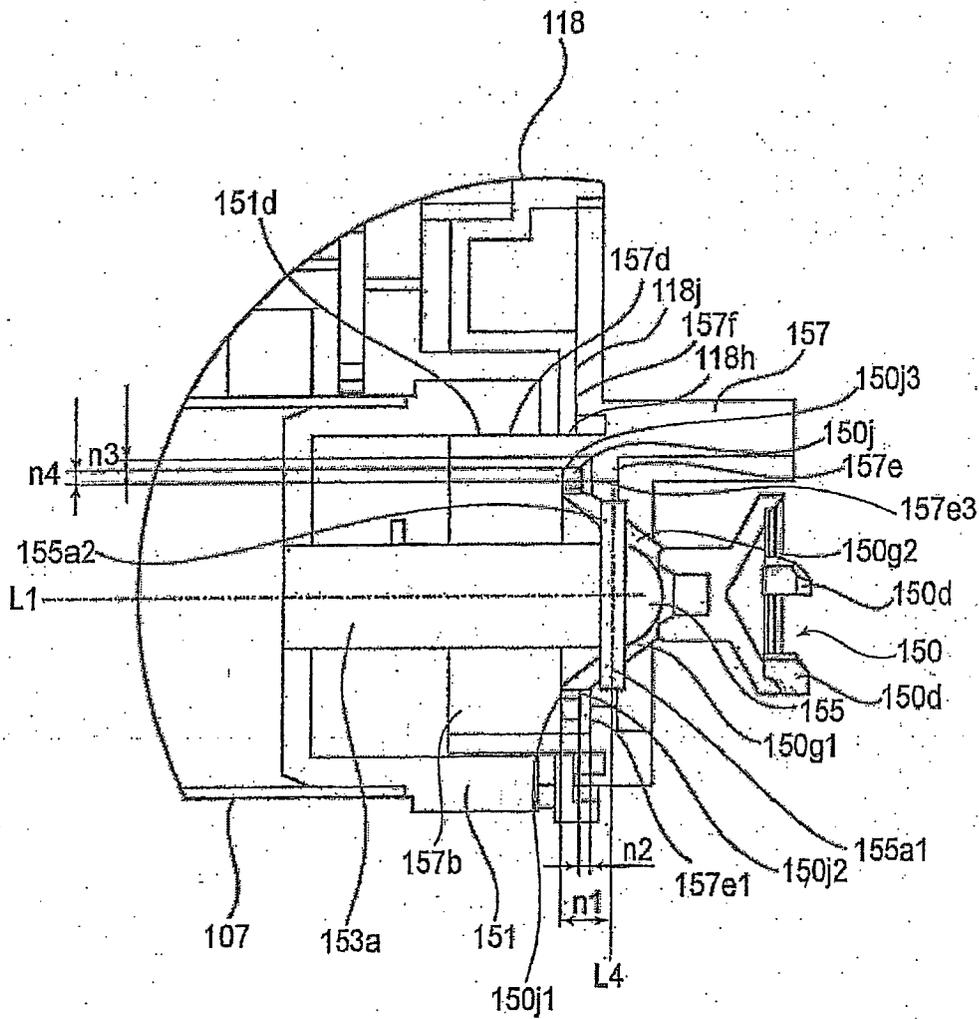


FIG. 12

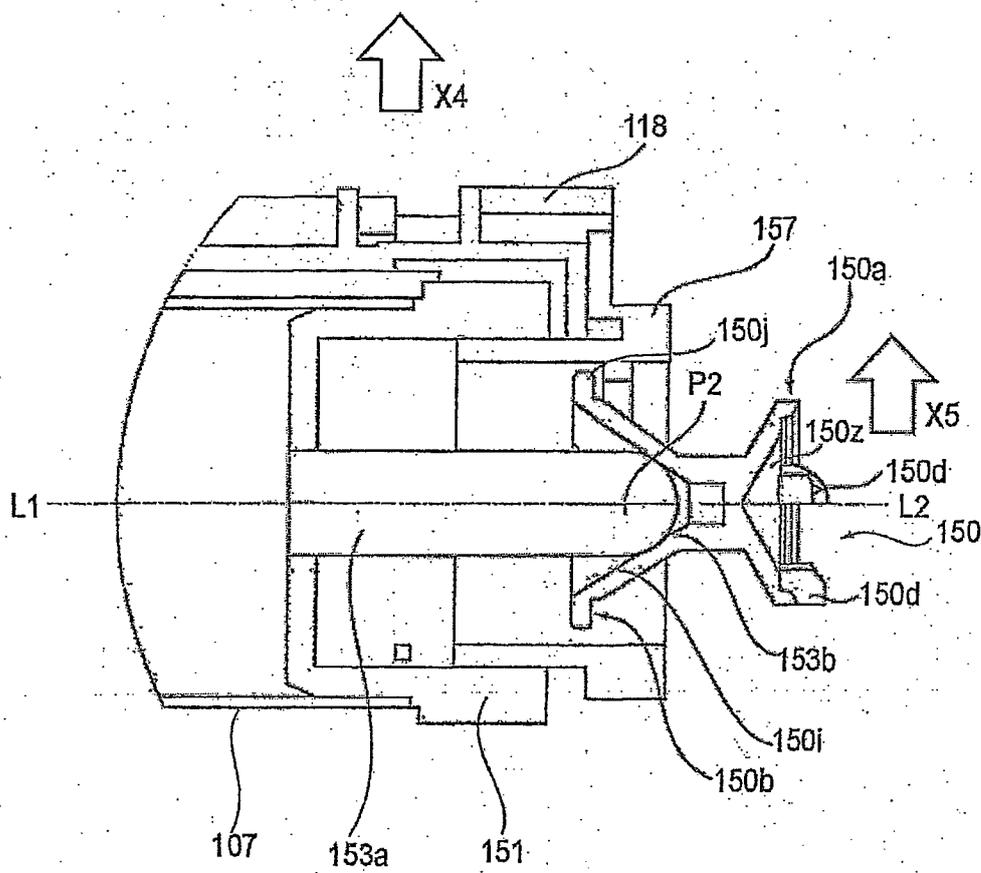


FIG. 13

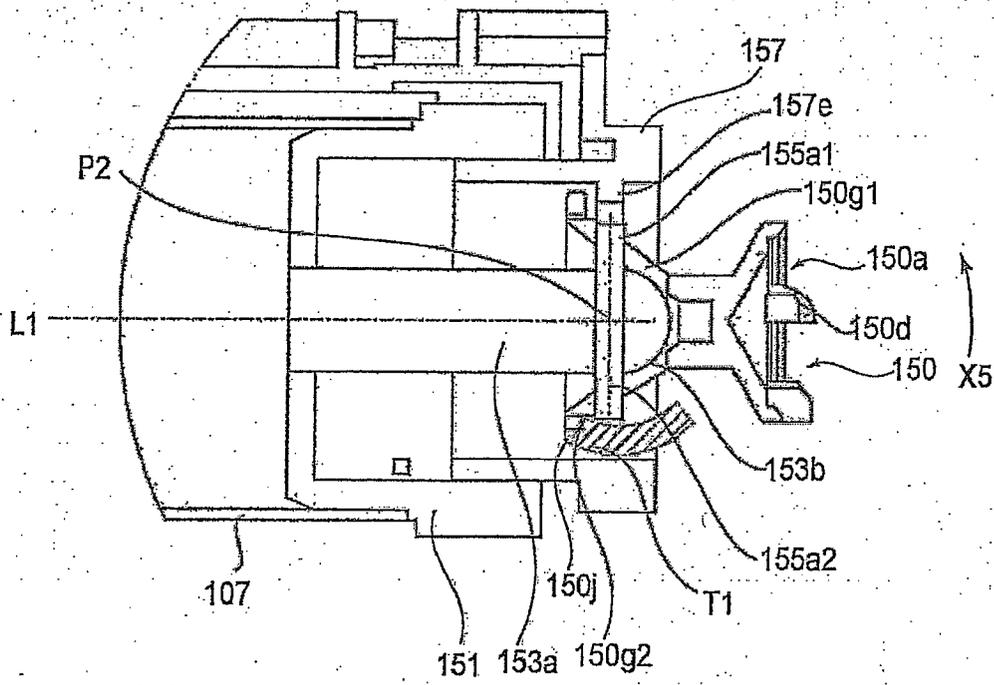


FIG. 14

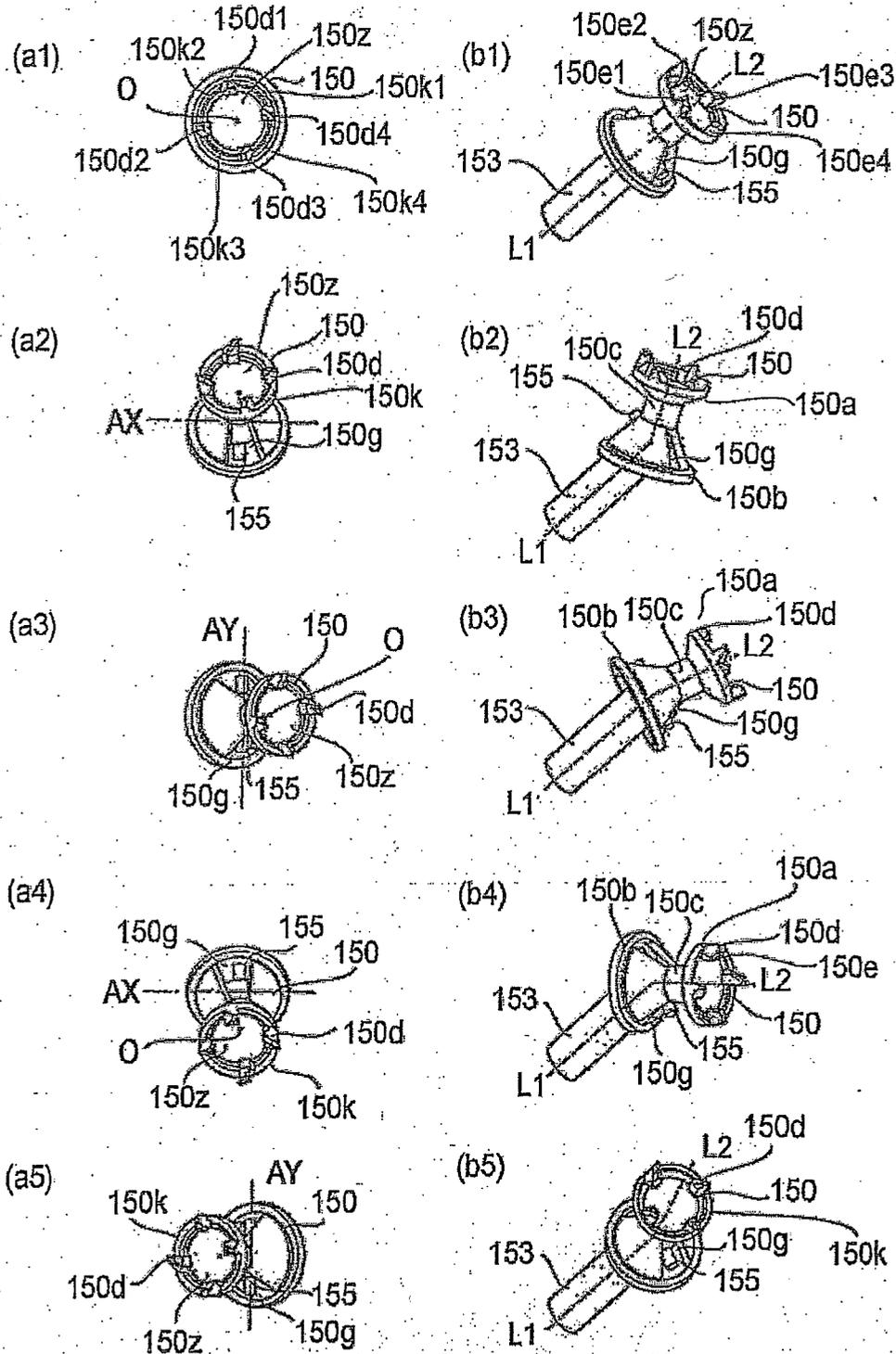


FIG. 15

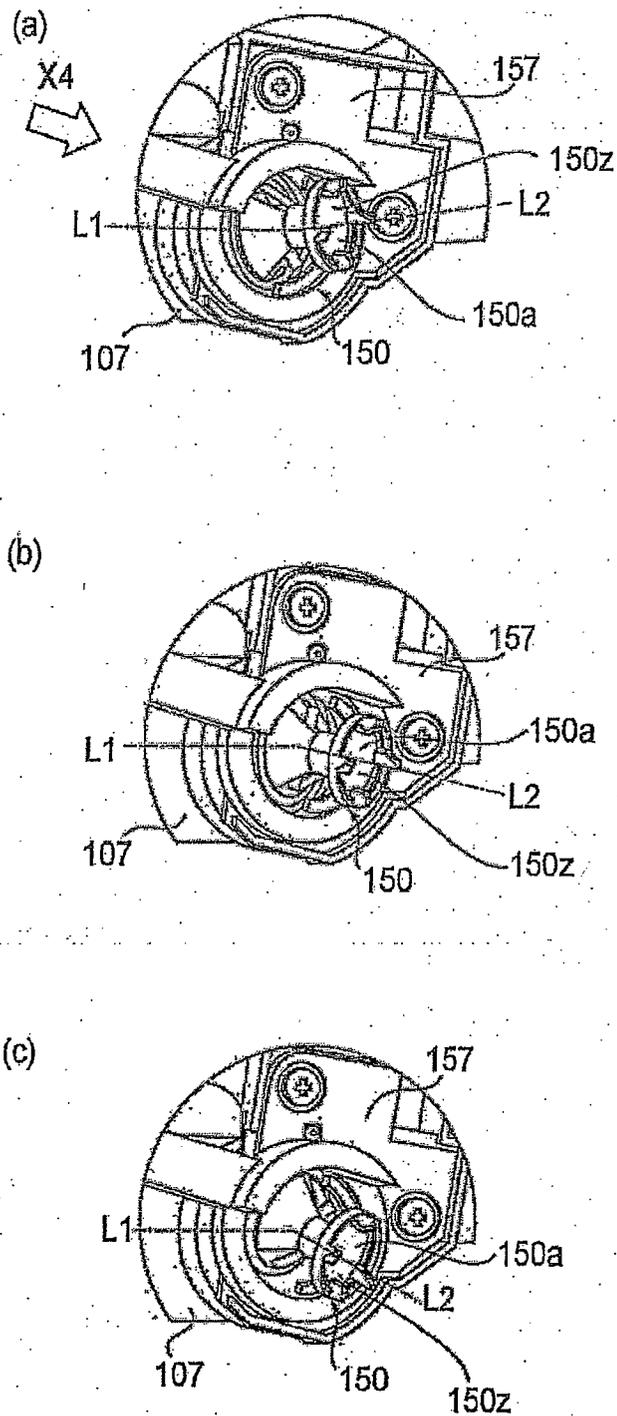


FIG. 16

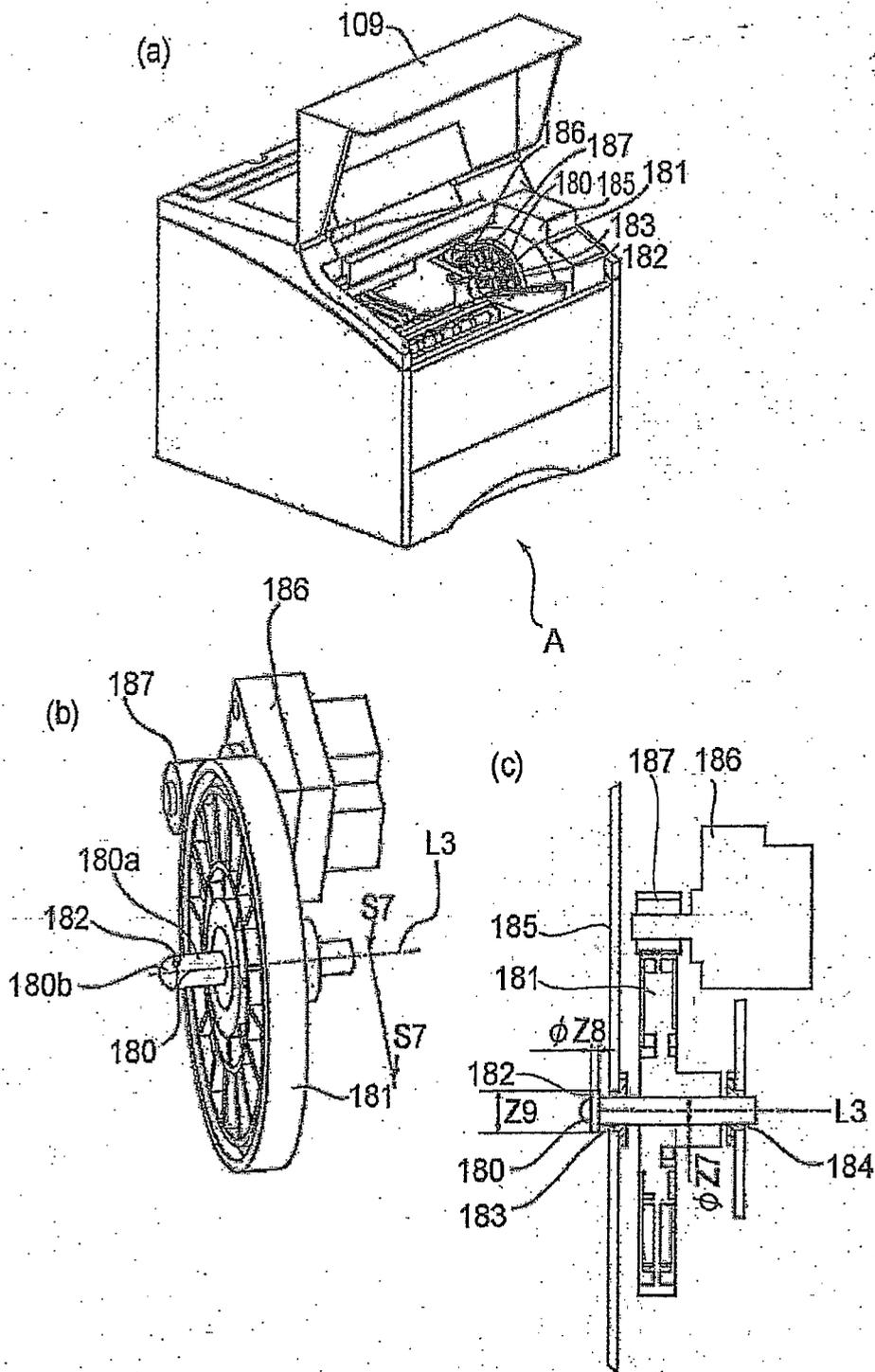


FIG. 17

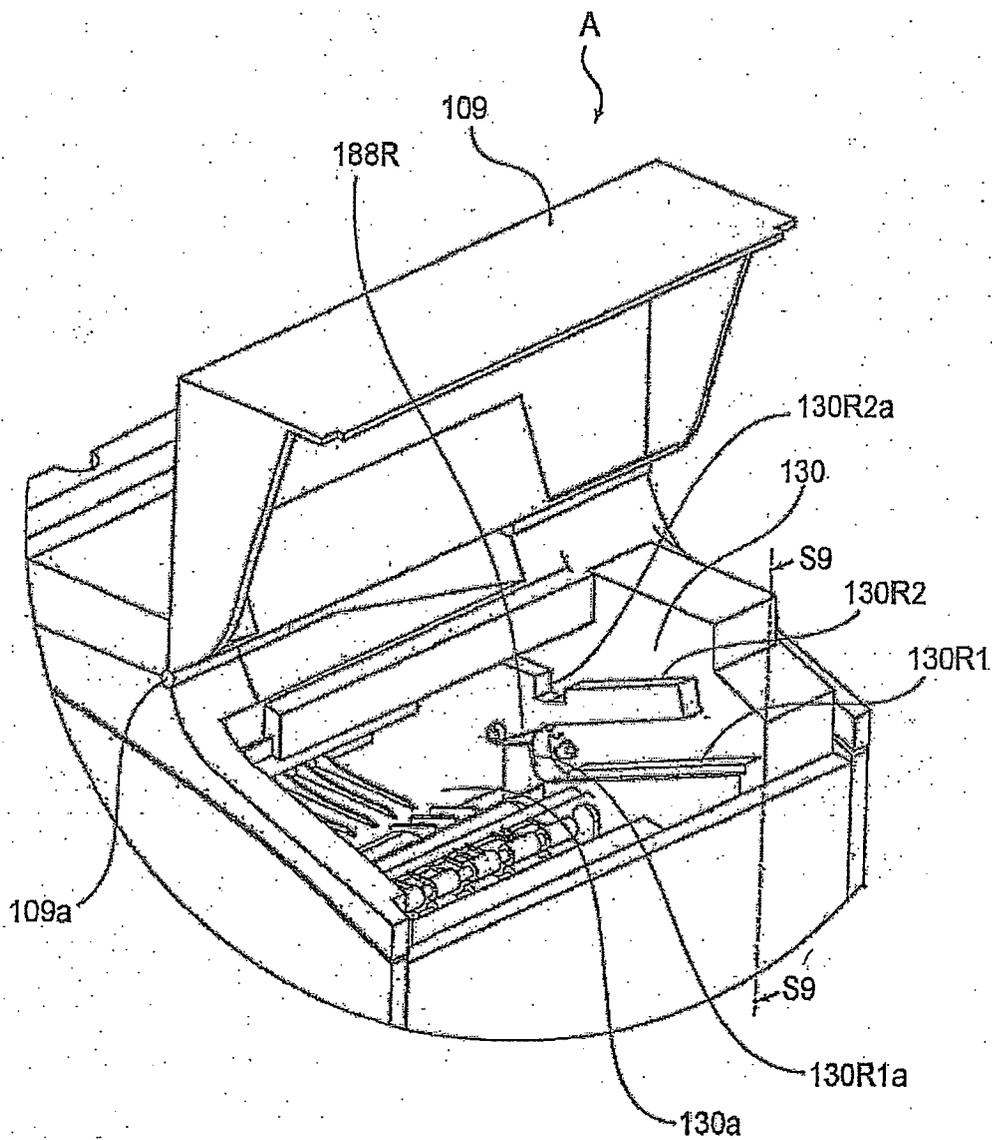


FIG. 18

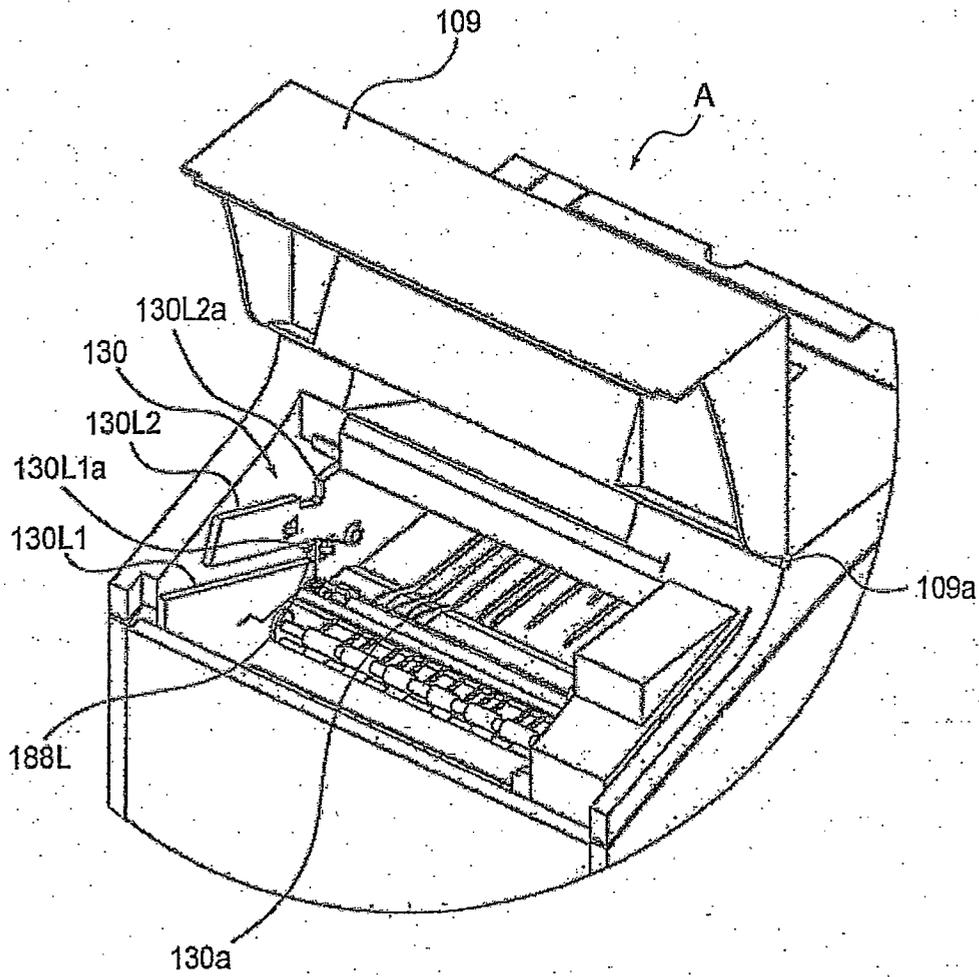


FIG. 19

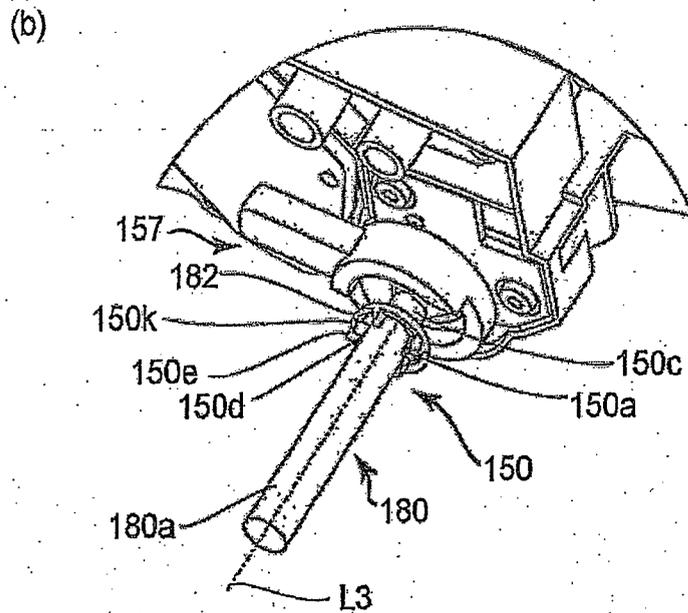
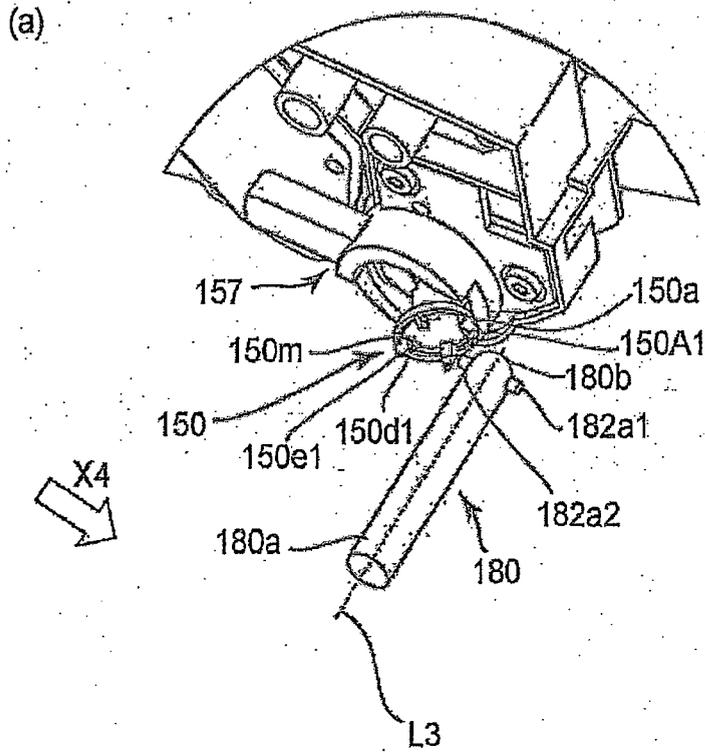


FIG. 21

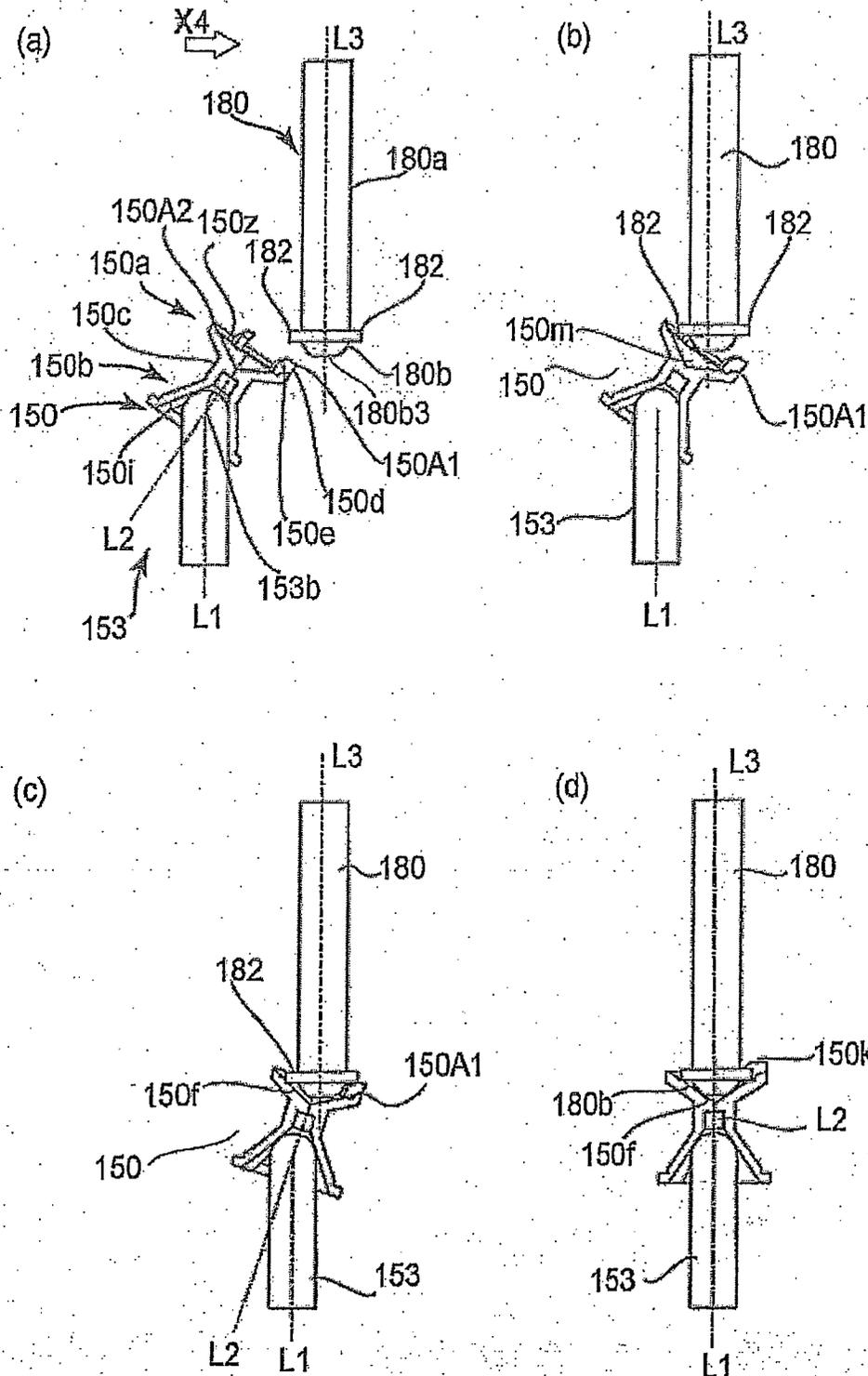
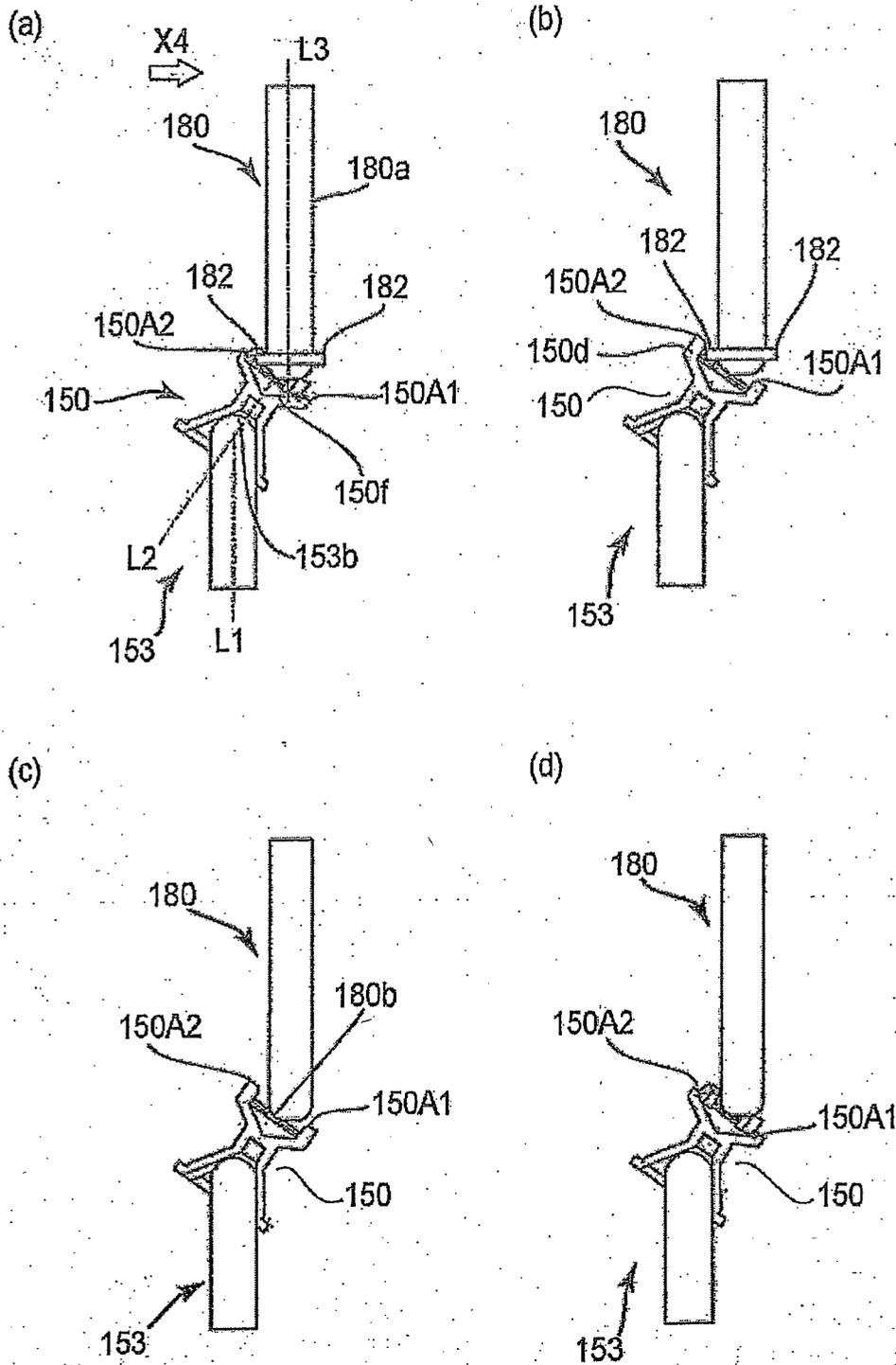


FIG. 22



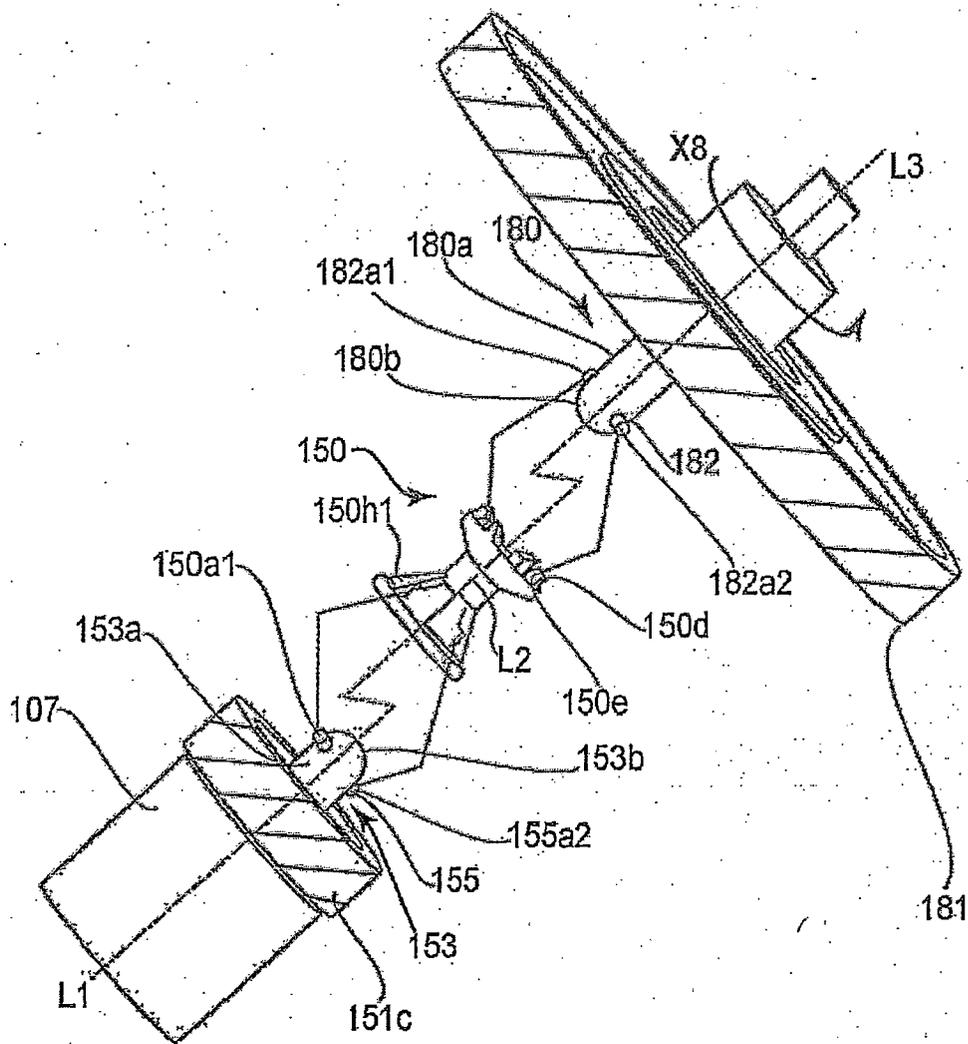


FIG. 24

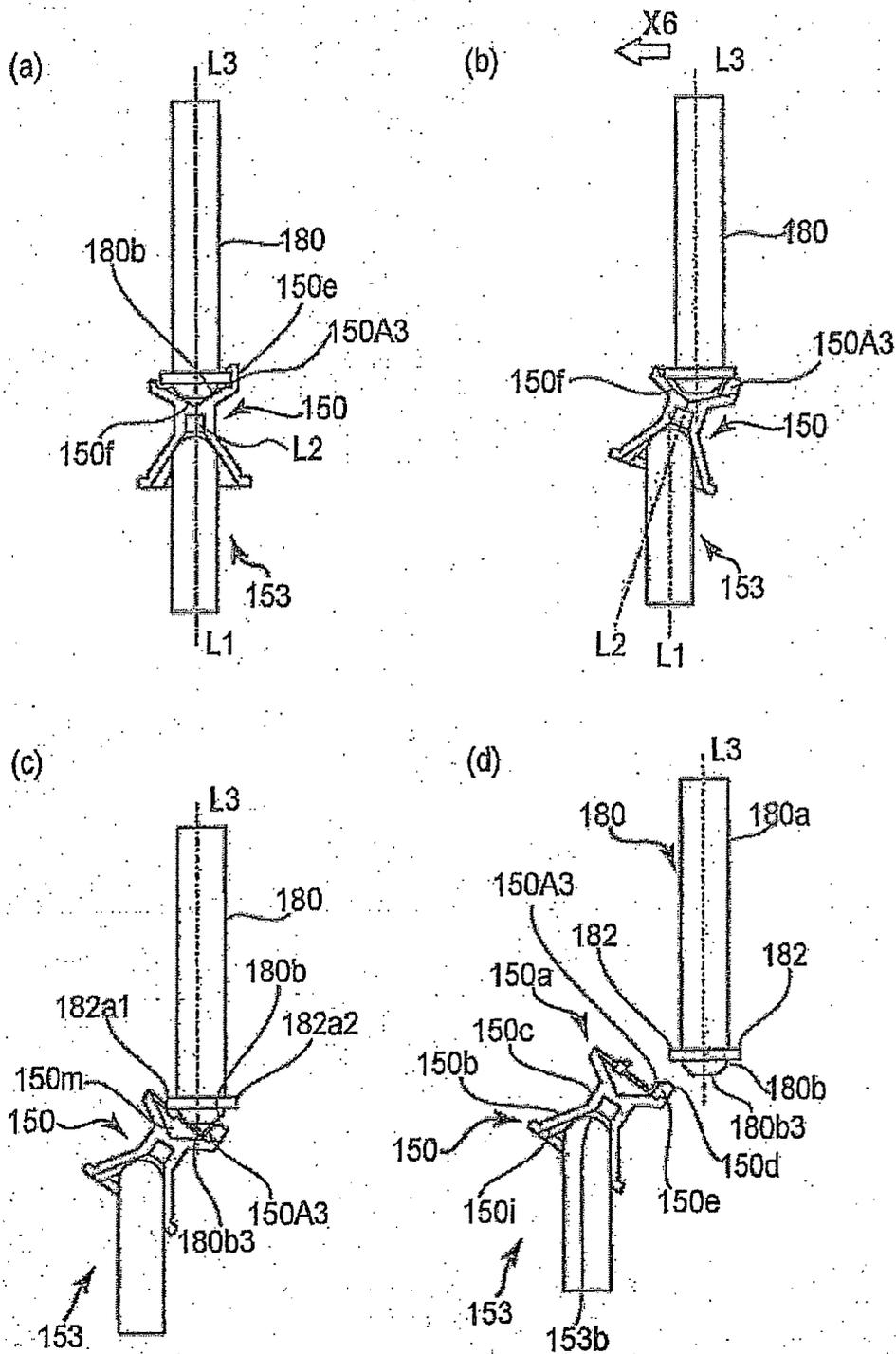


FIG. 25

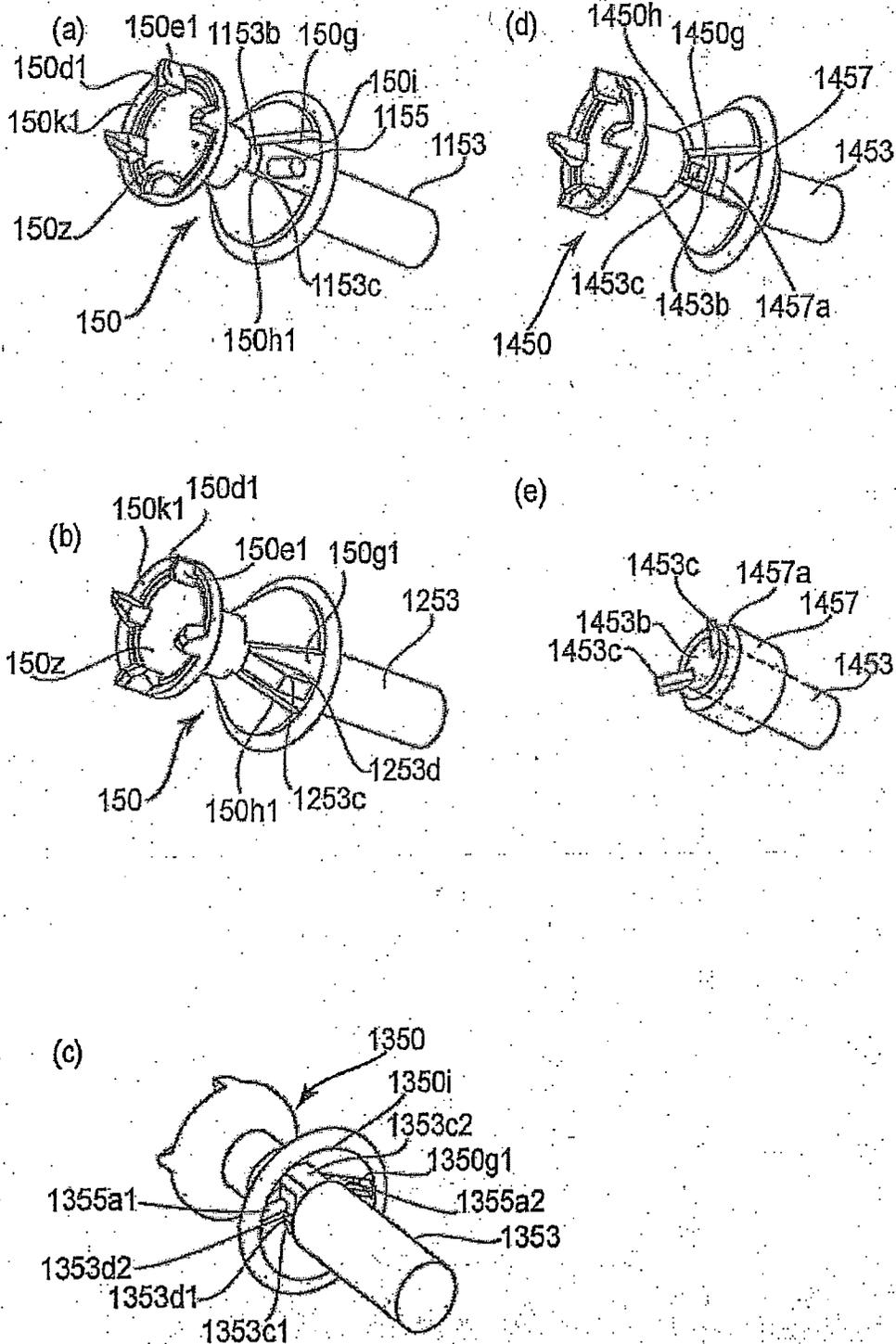


FIG. 26

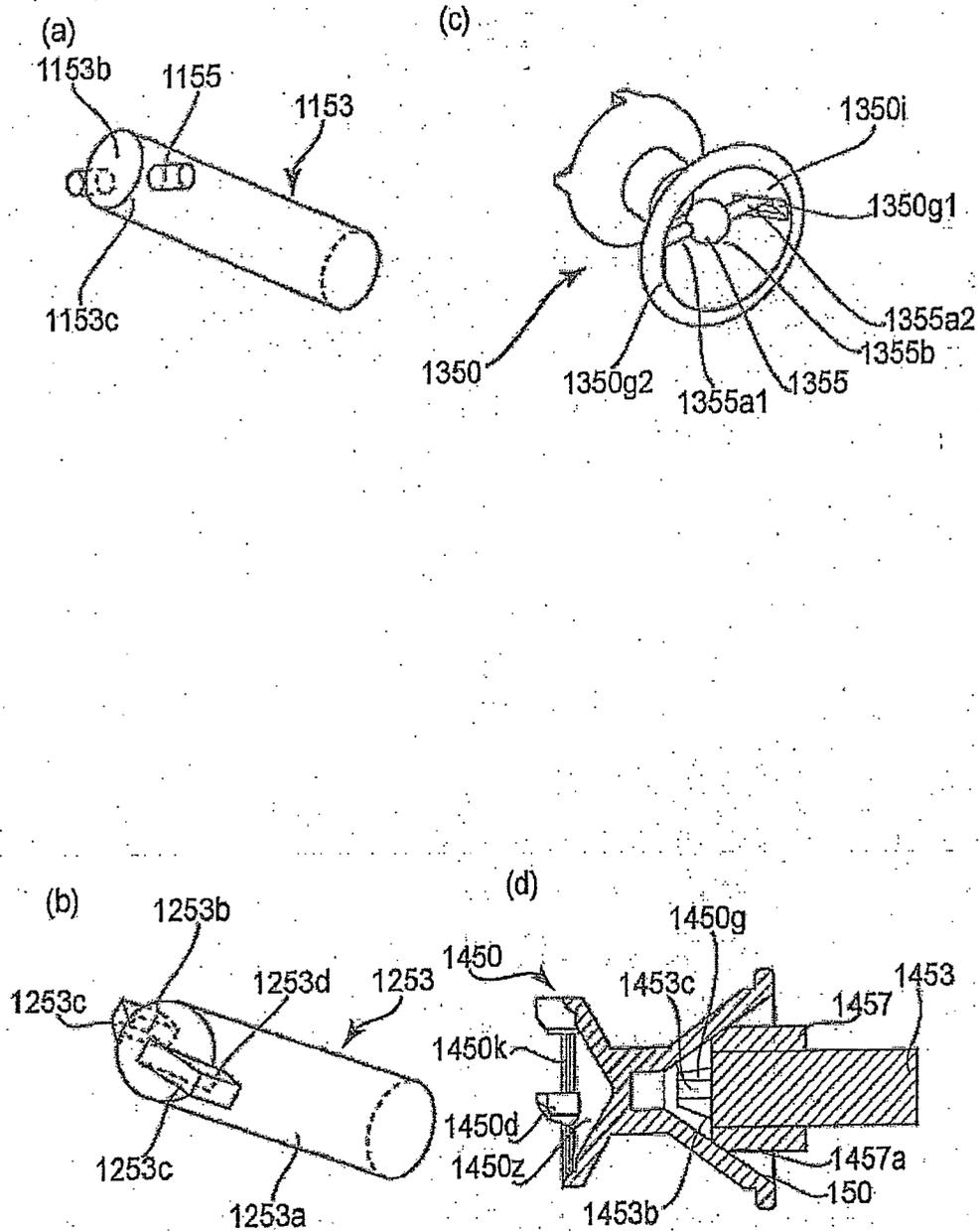


FIG. 27

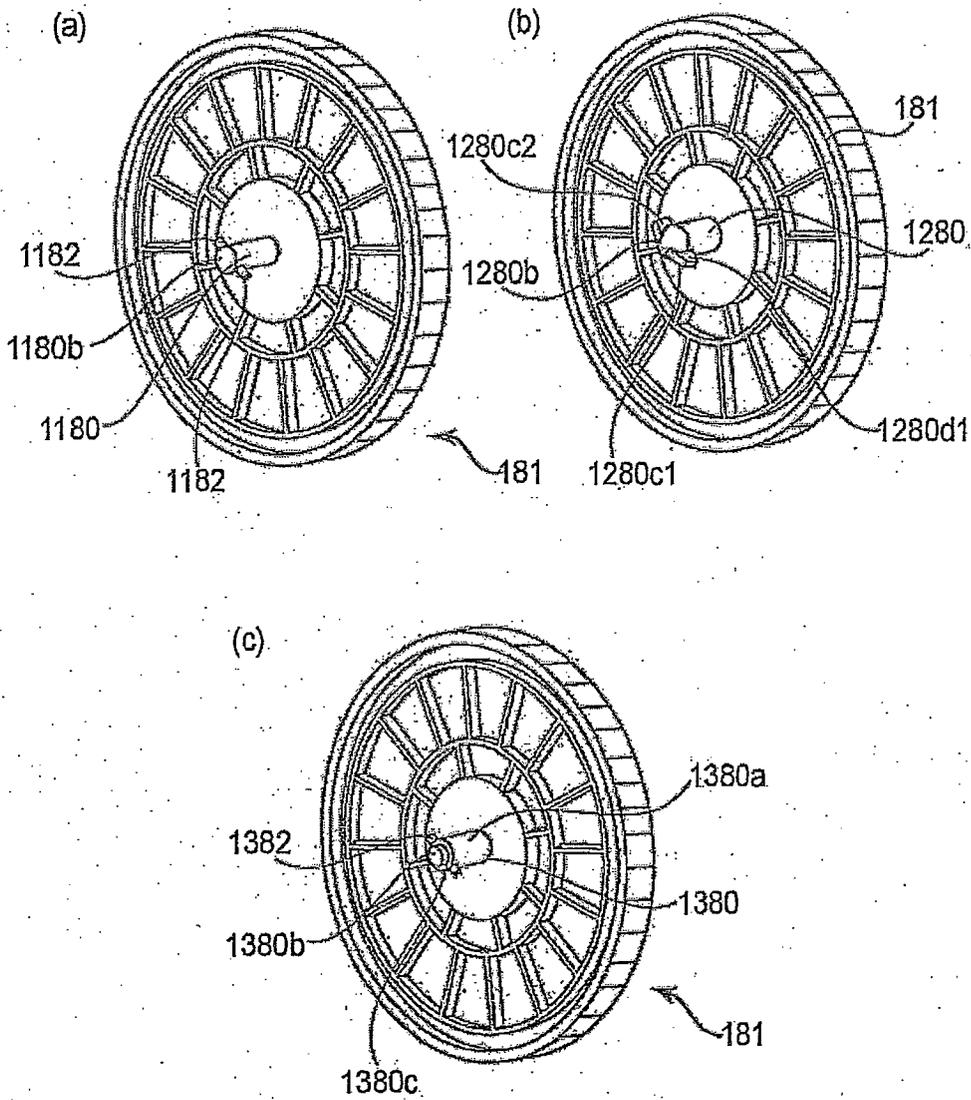


FIG. 28

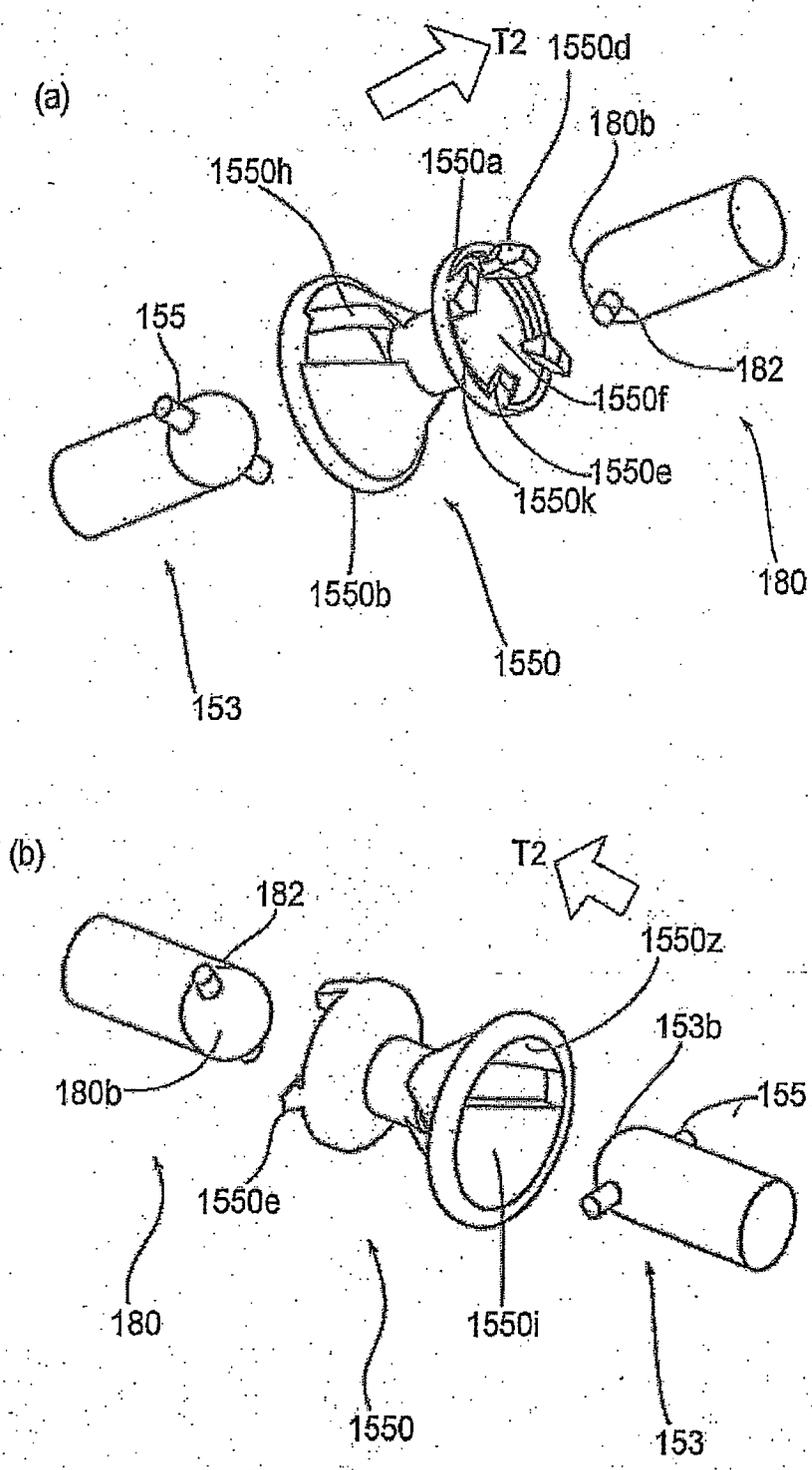


FIG. 30

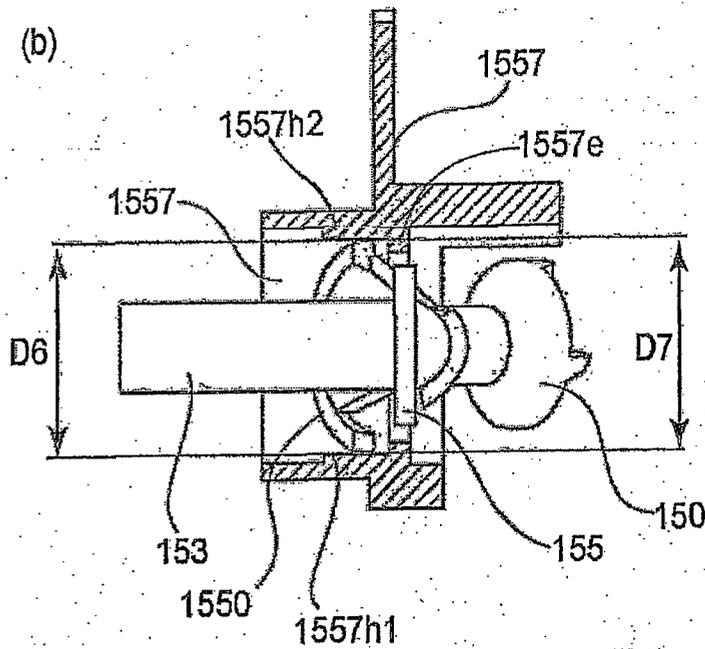
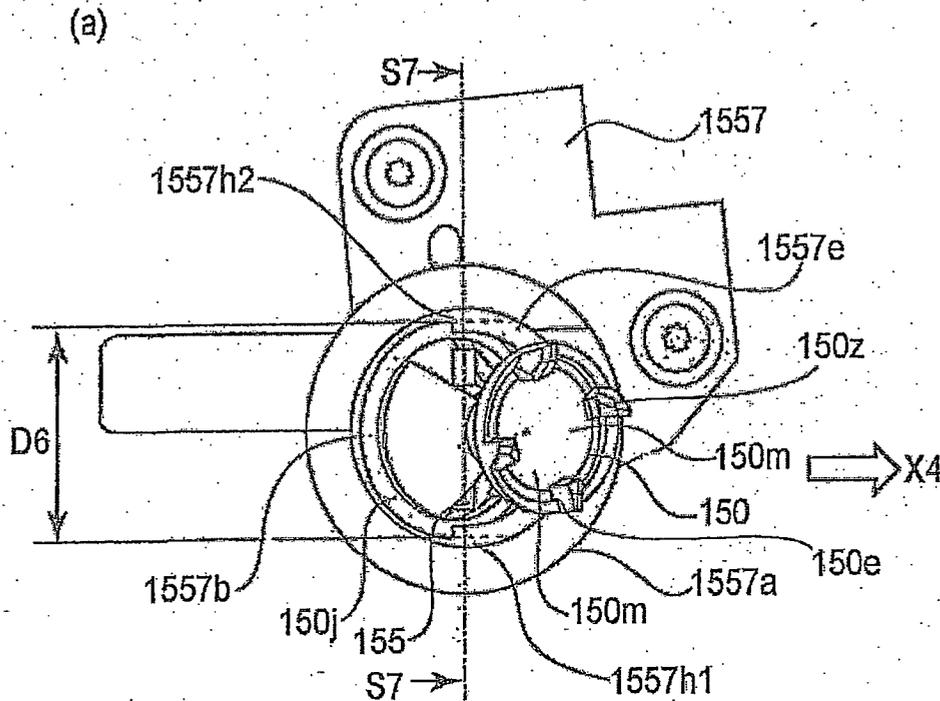
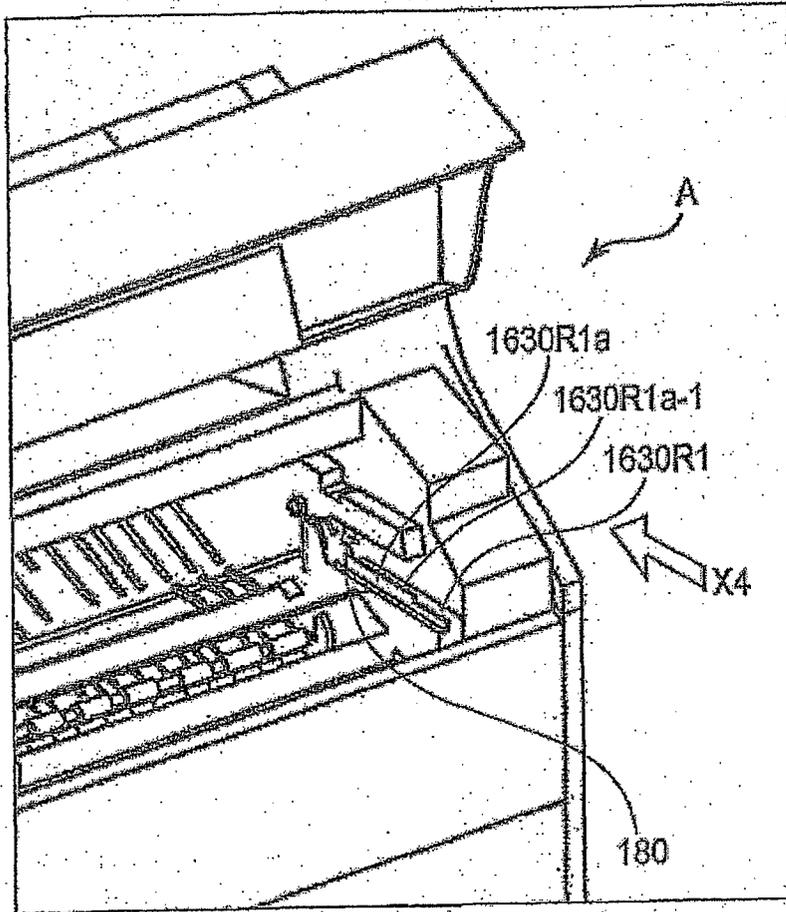


FIG. 31

(a)



(b)

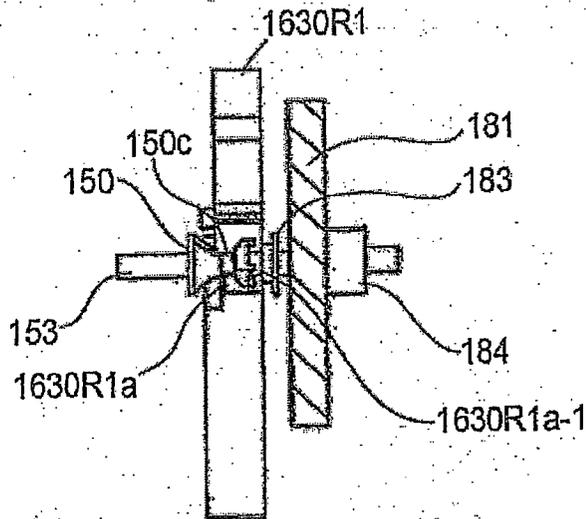


FIG. 32

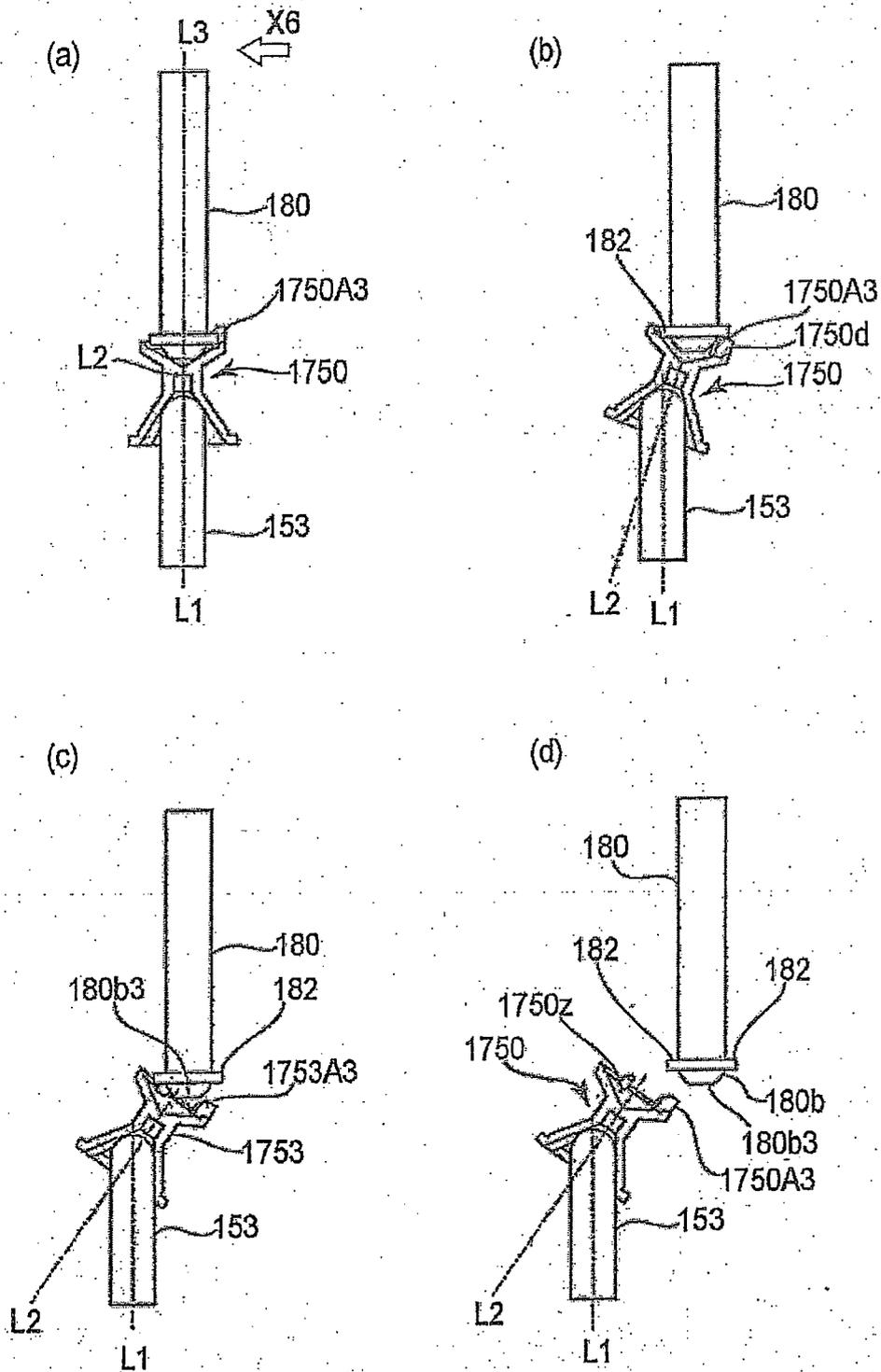


FIG. 33

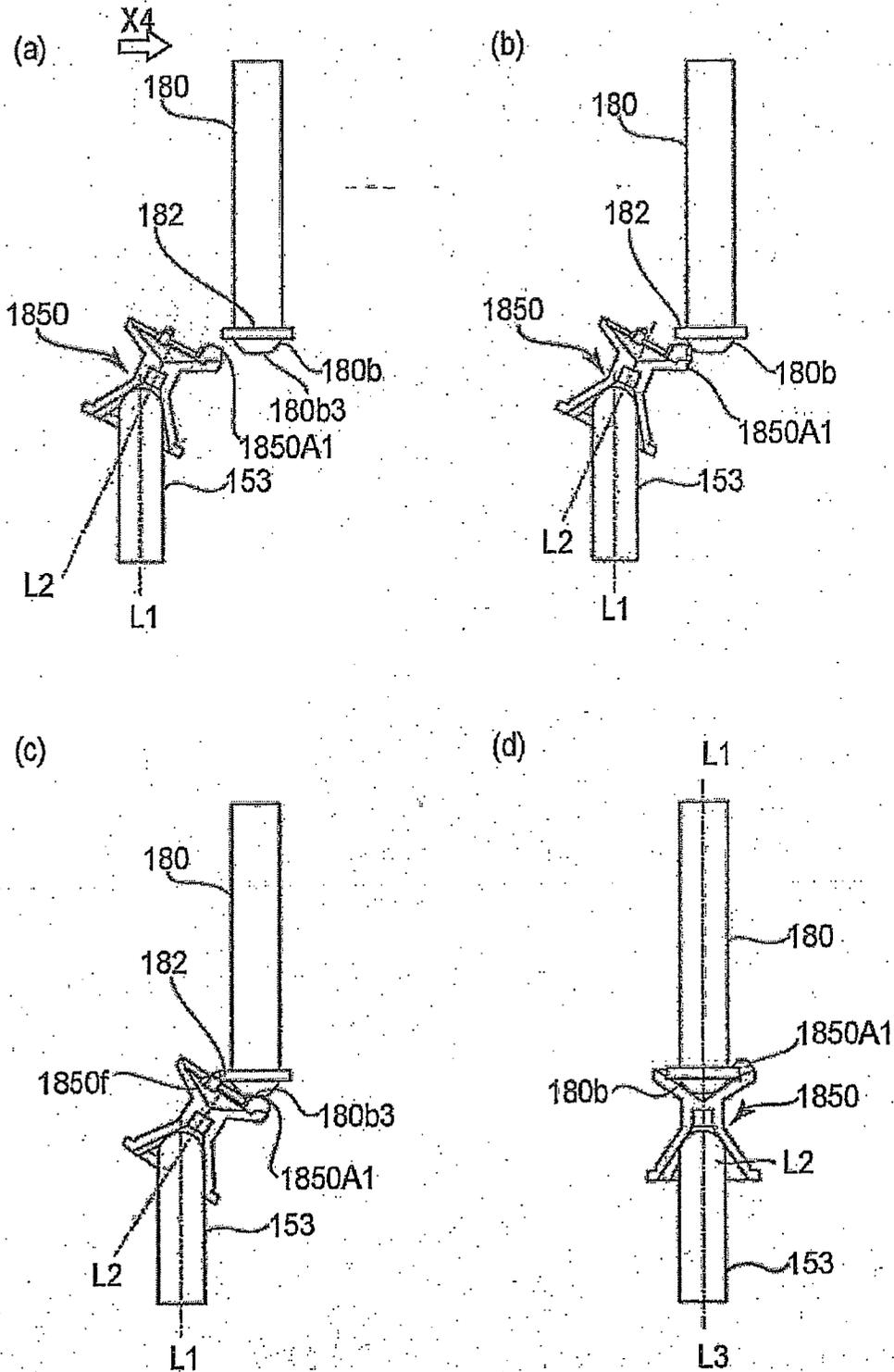
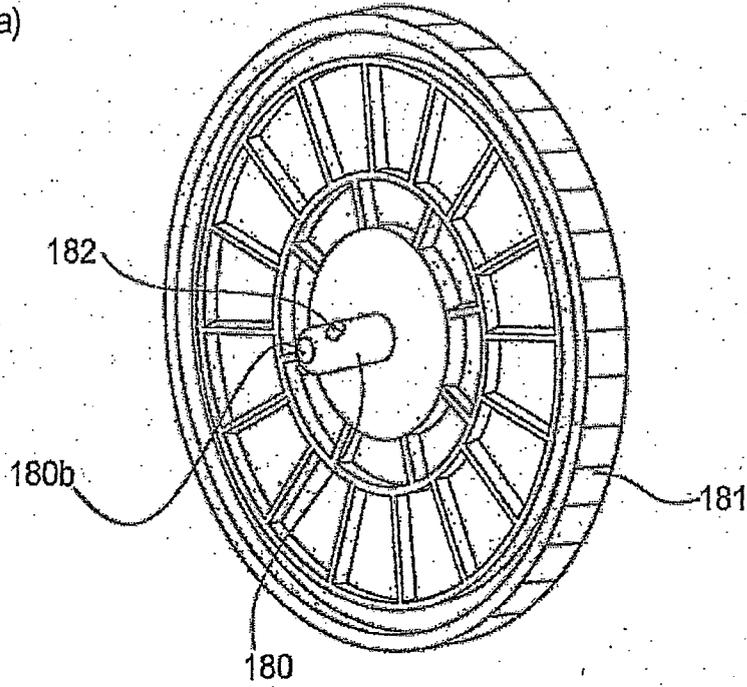


FIG. 34

(a)



(b)

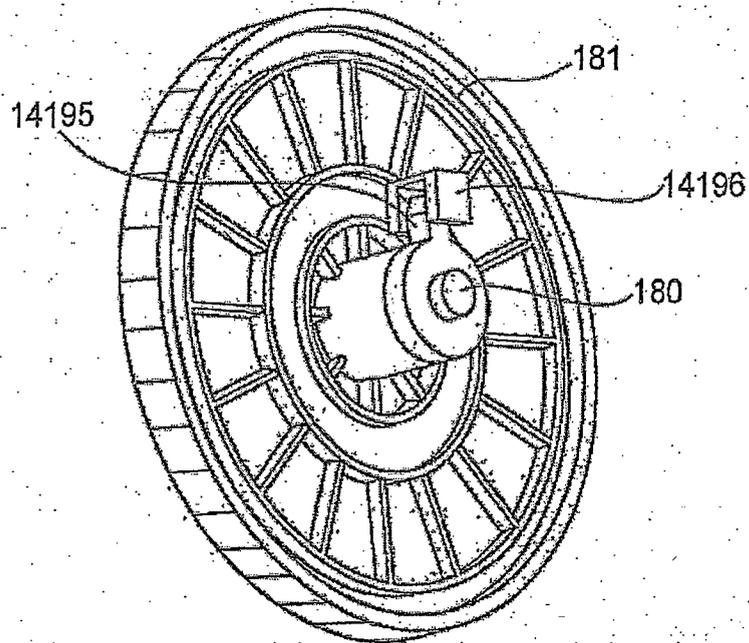


FIG. 35

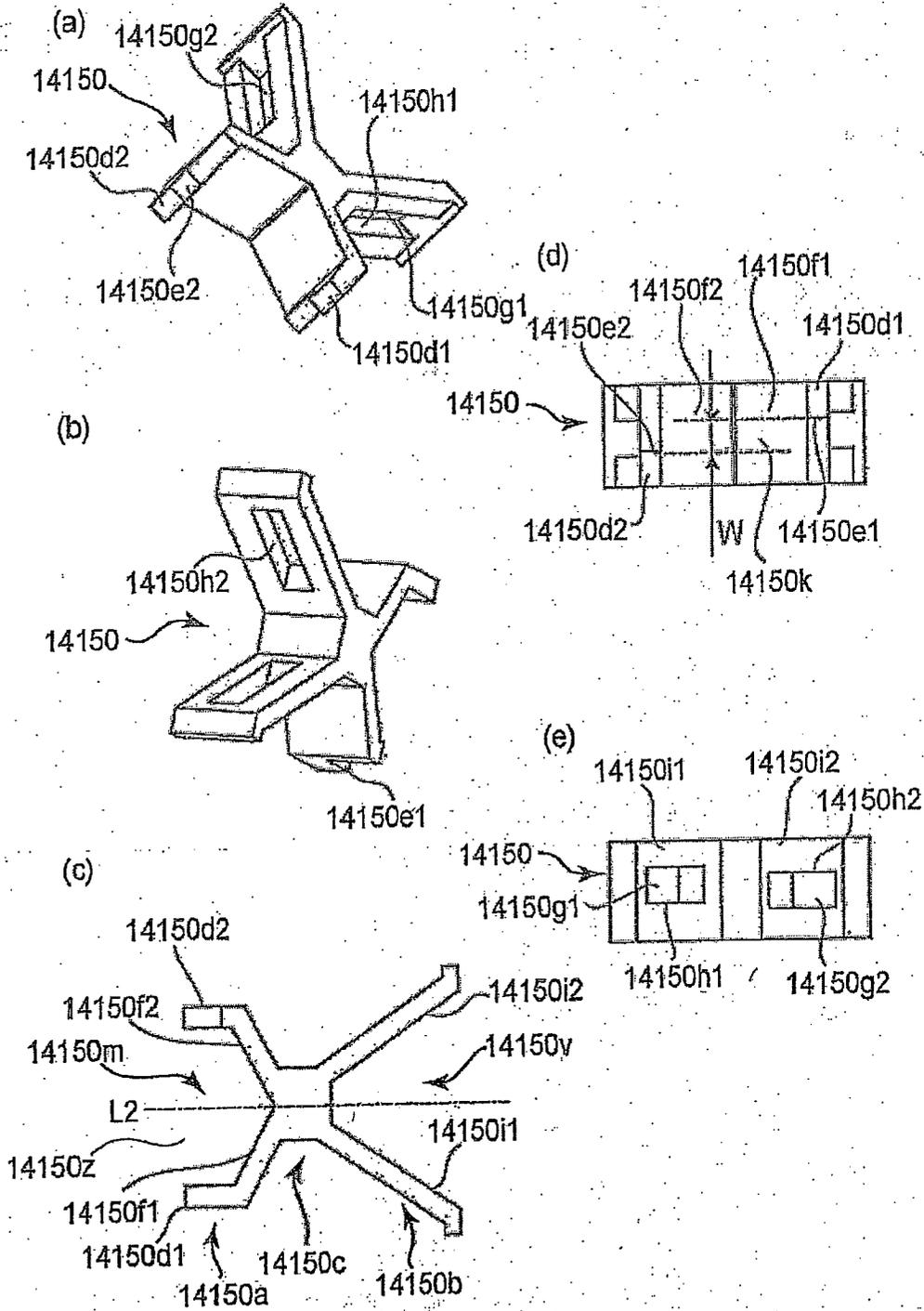


FIG. 36

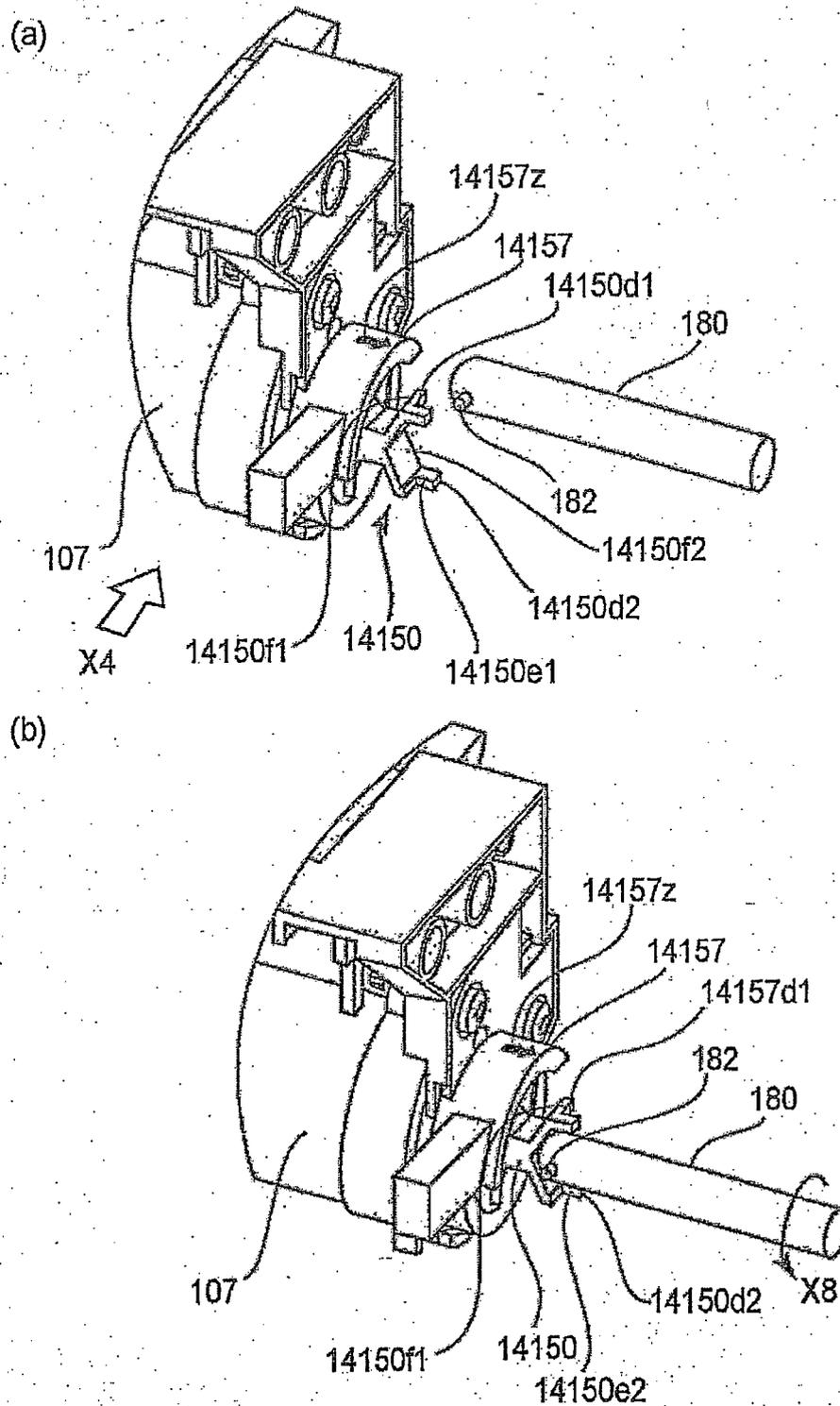
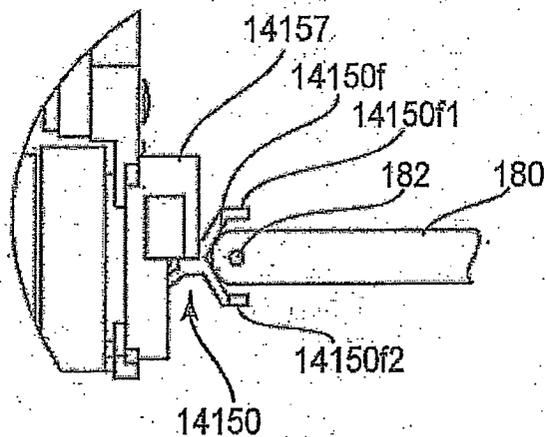


FIG. 37

(a)



(b)

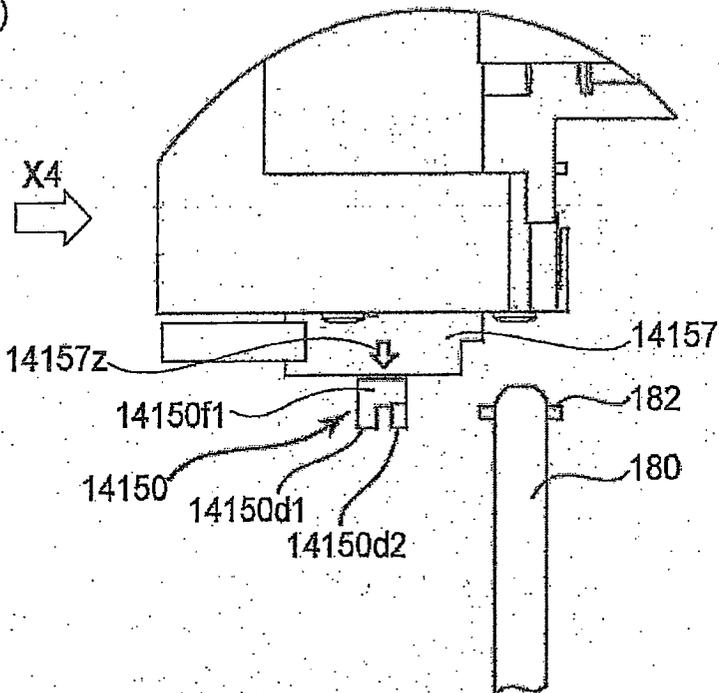


FIG. 38

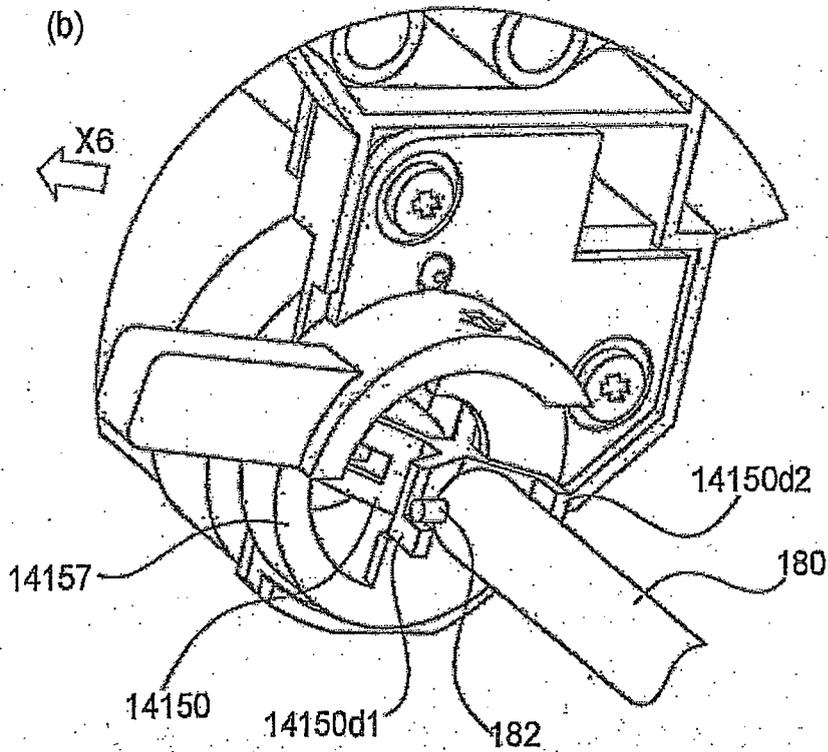
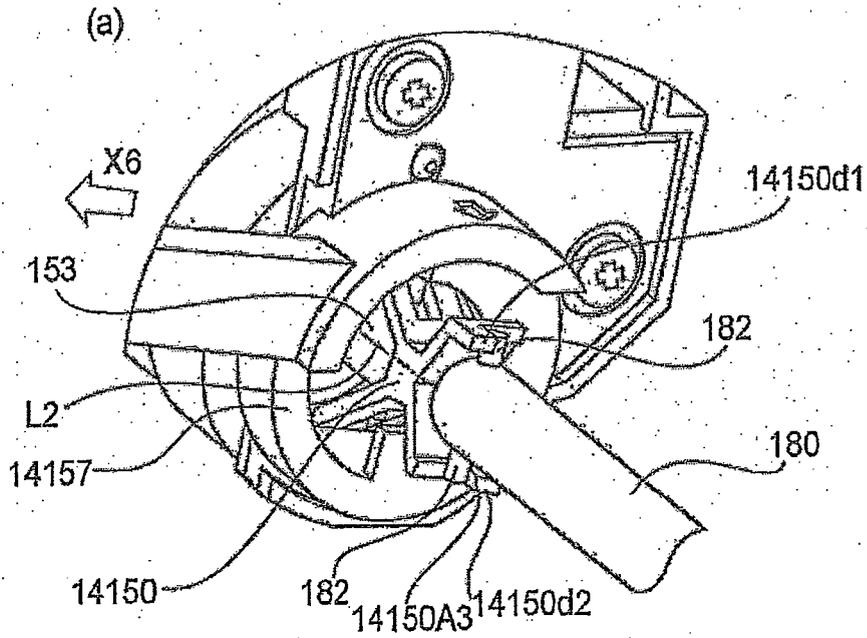


FIG. 39

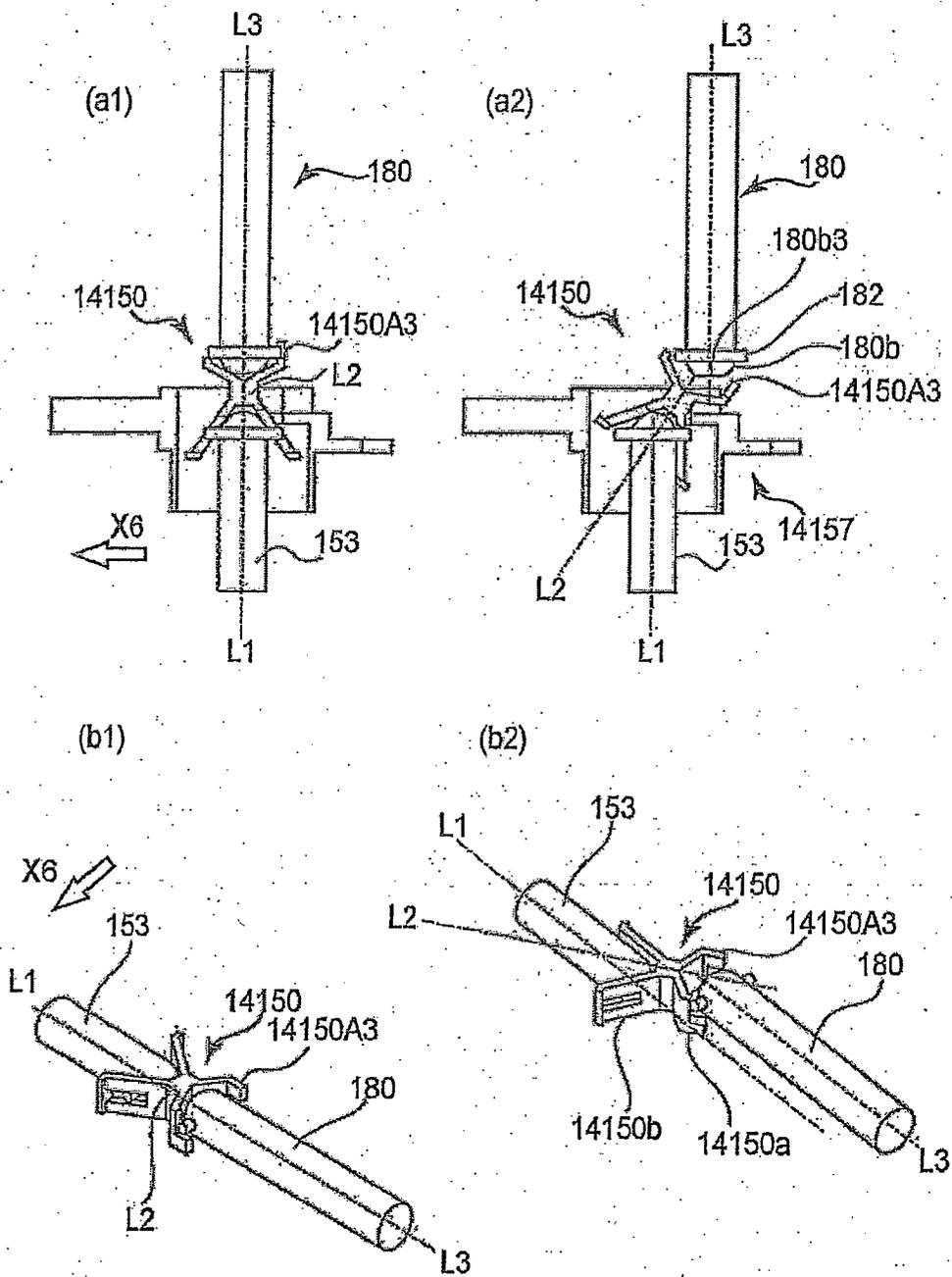


FIG. 40

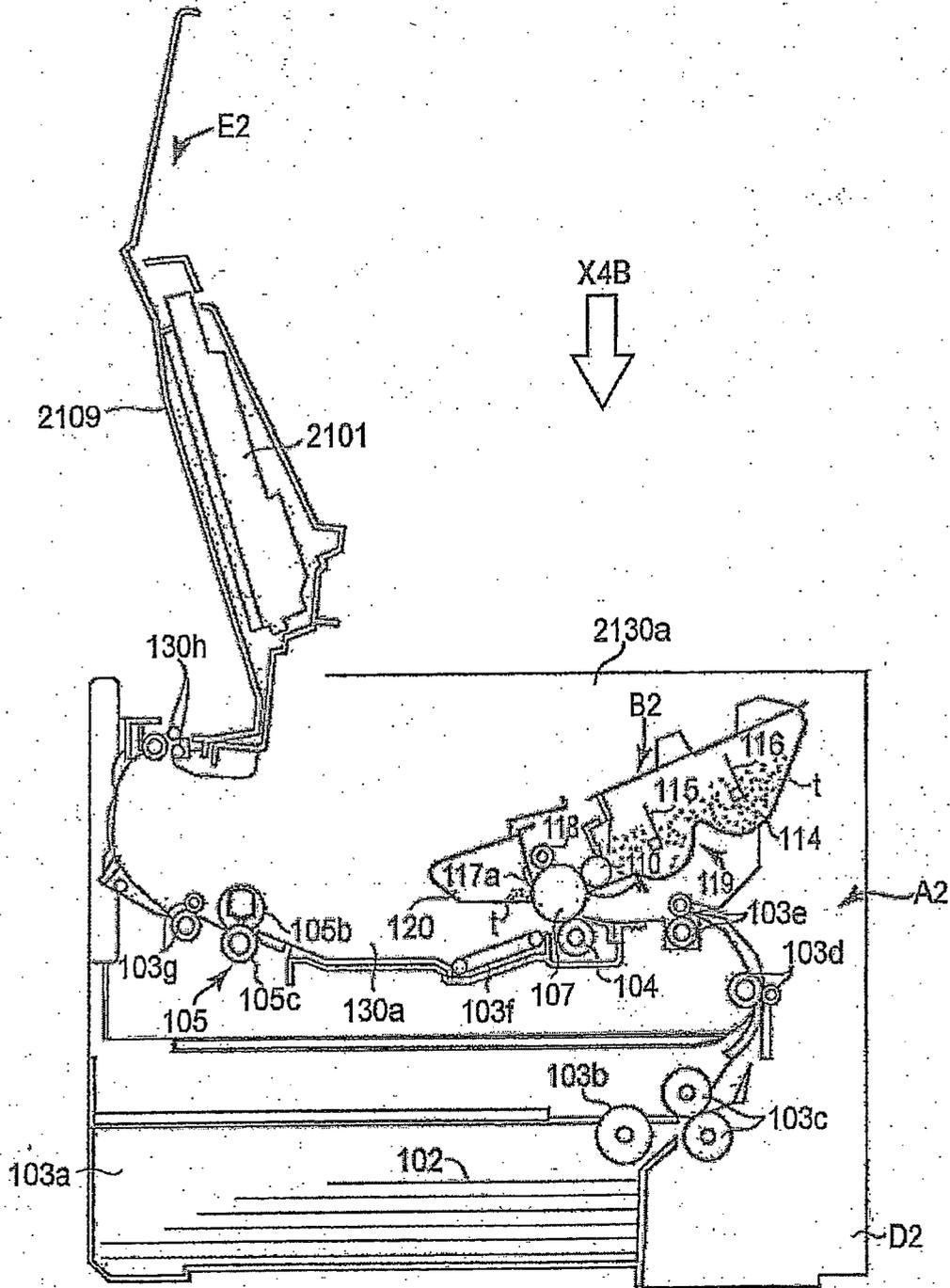


FIG. 41

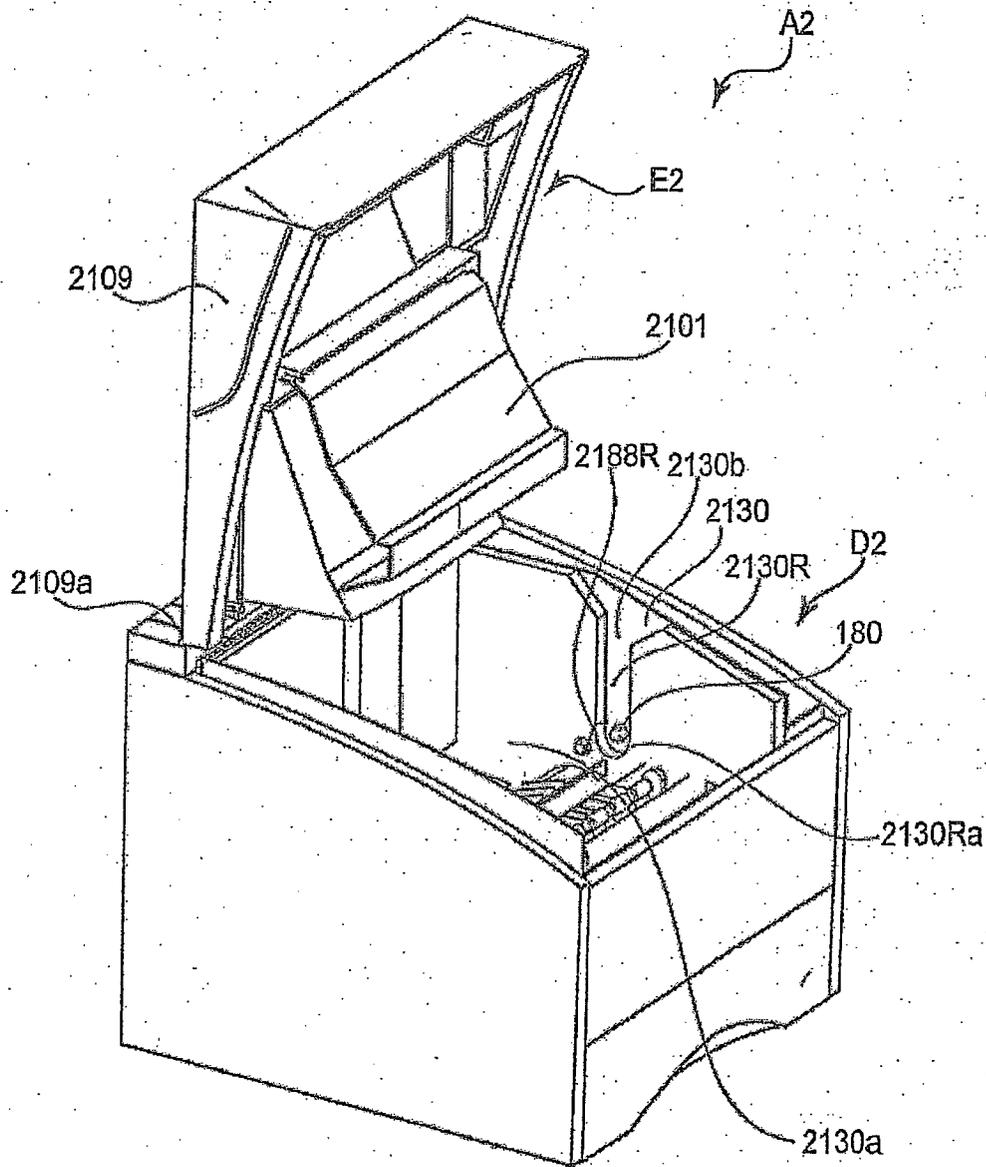


FIG. 42

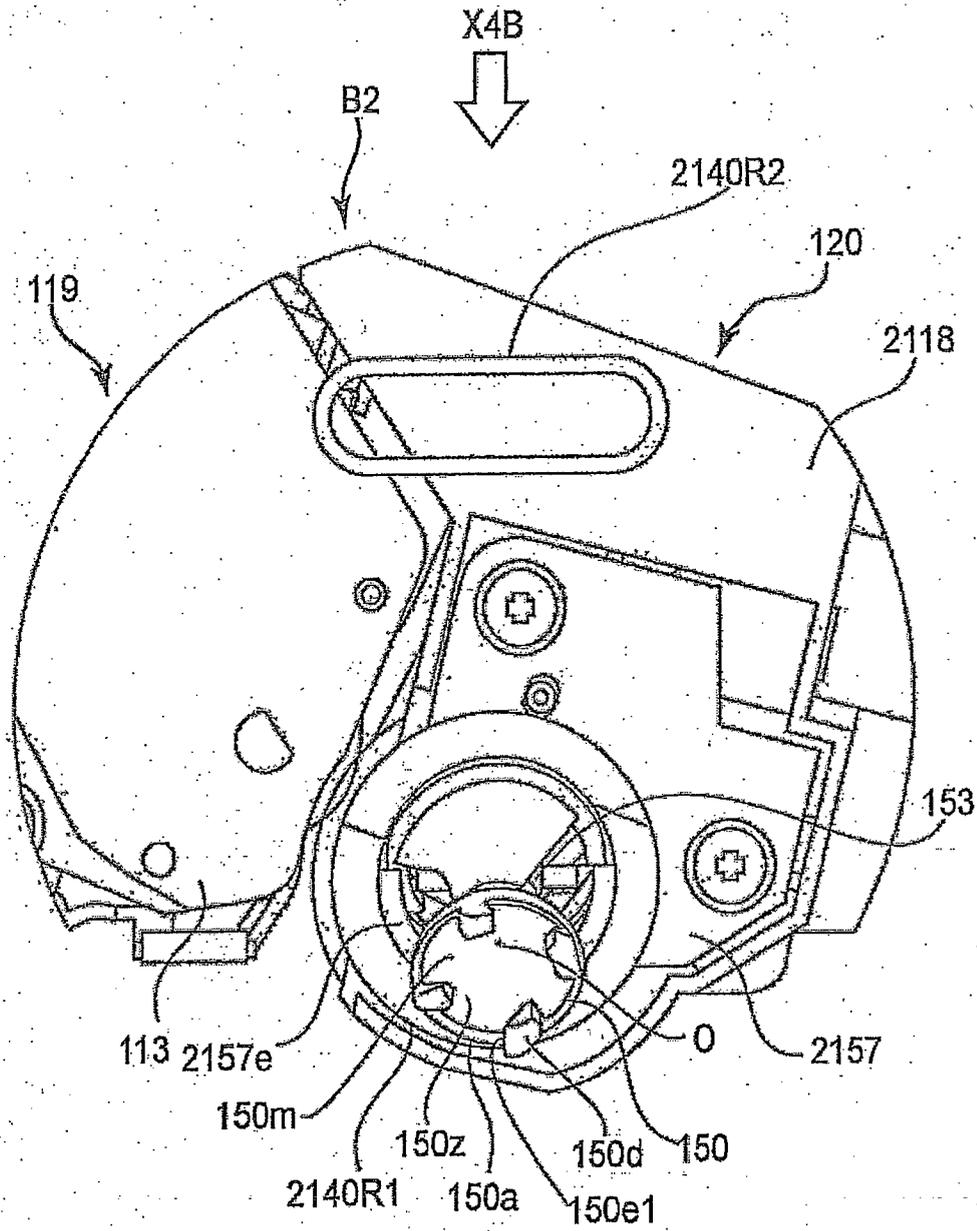


FIG. 43

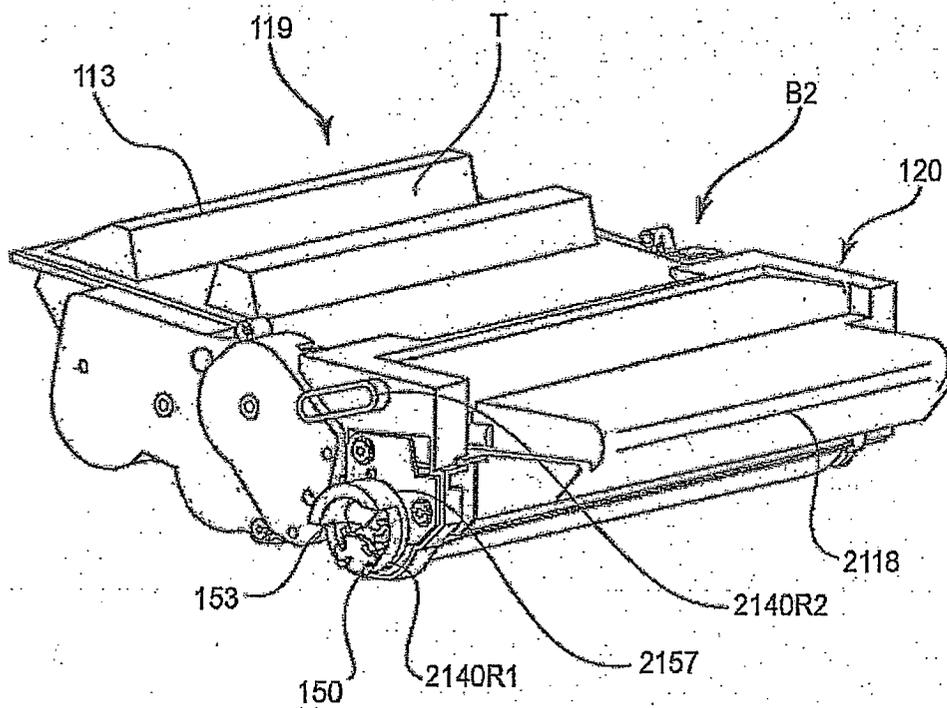


FIG. 44

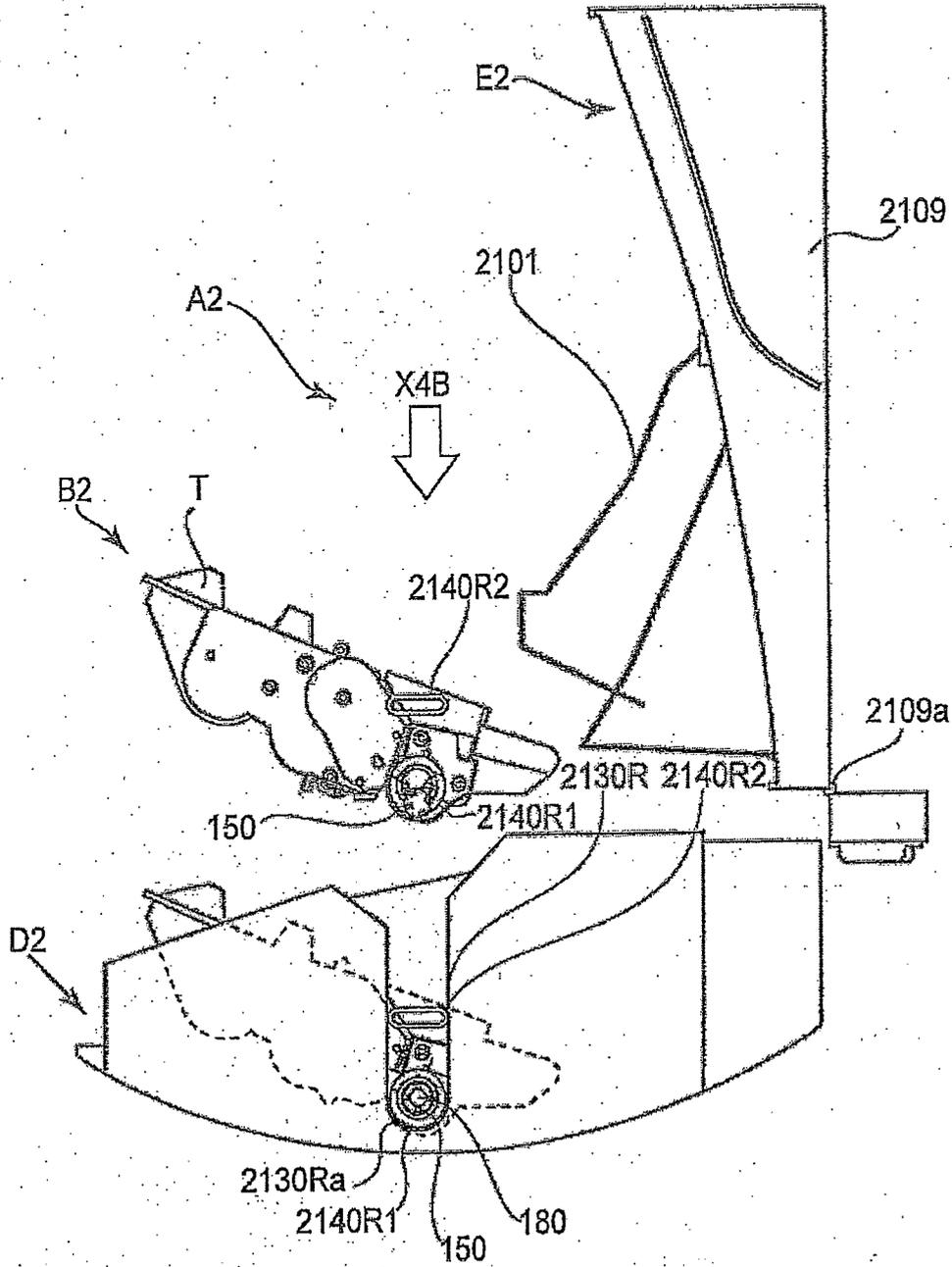


FIG. 45

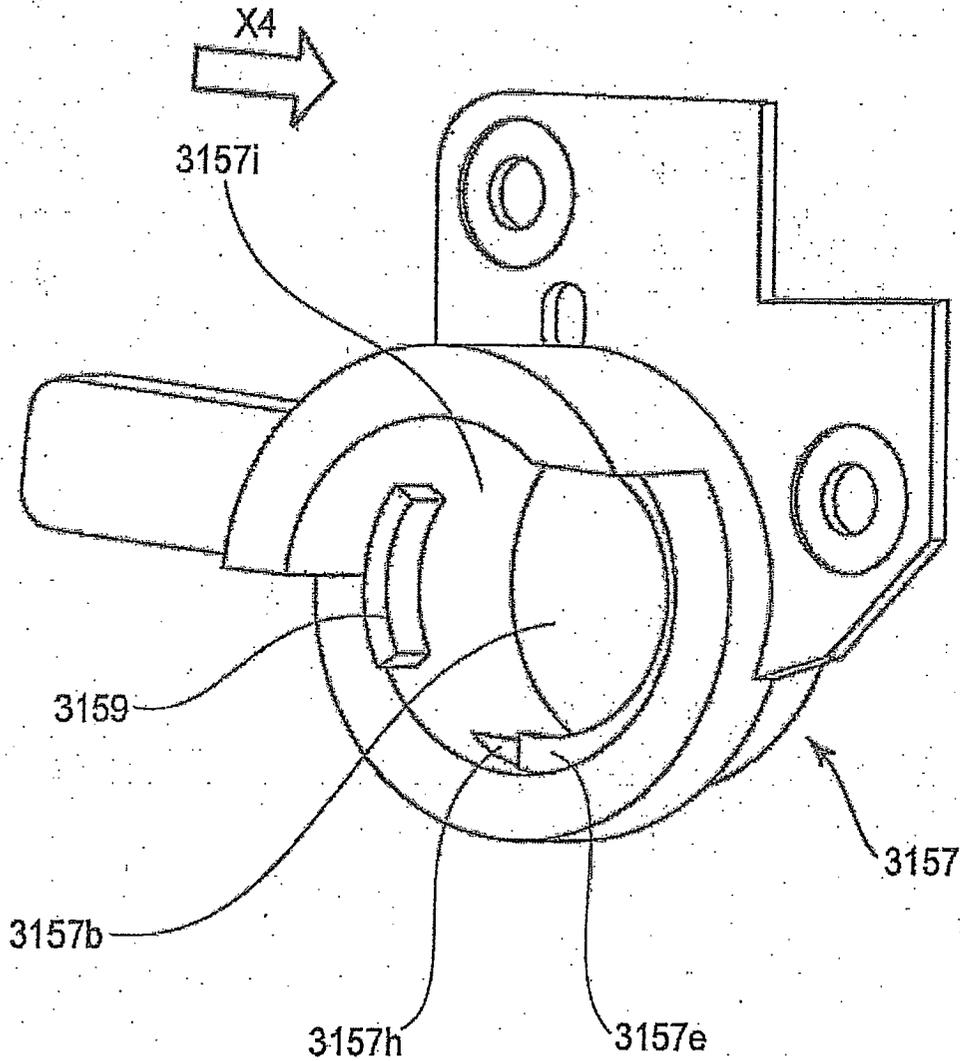


FIG. 46

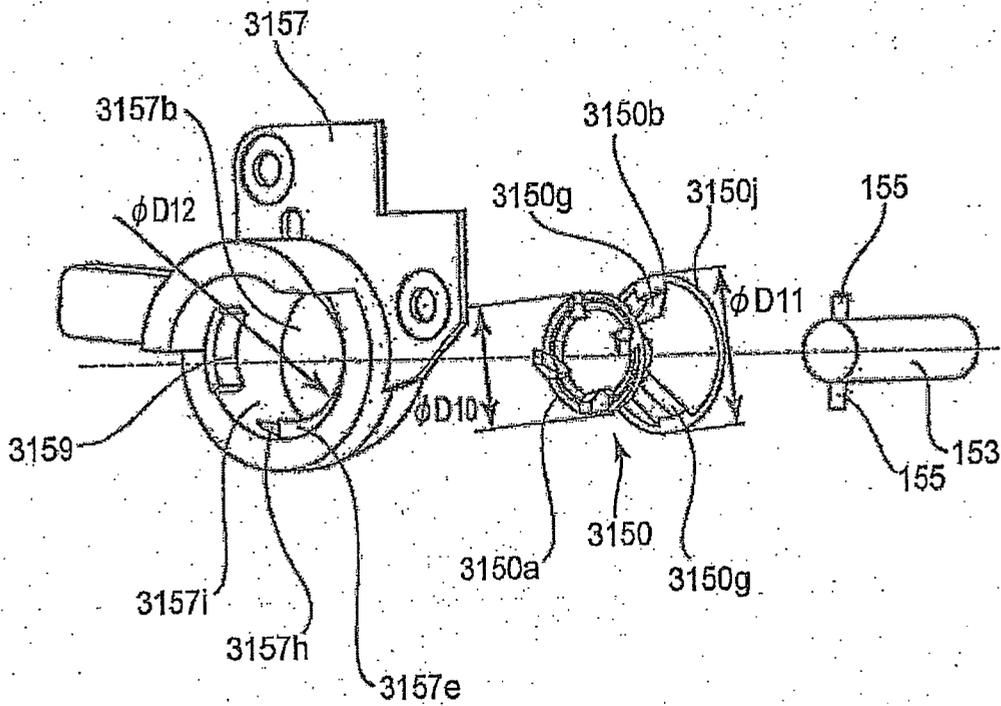


FIG. 47

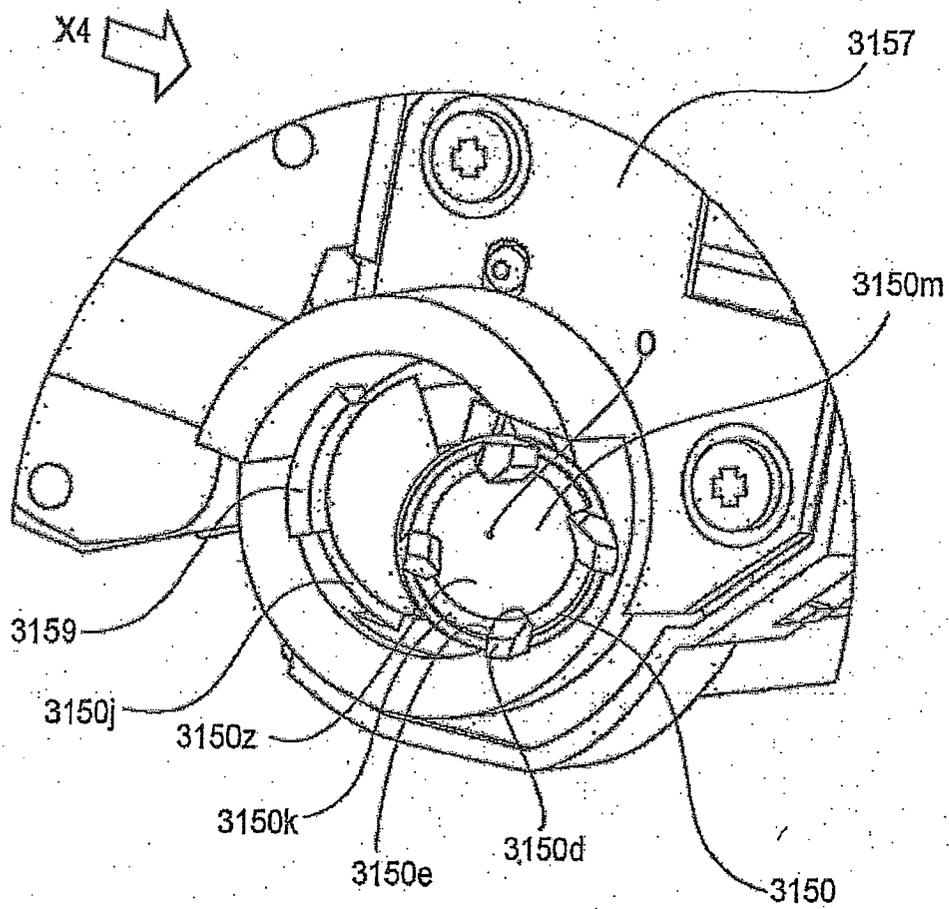


FIG. 48

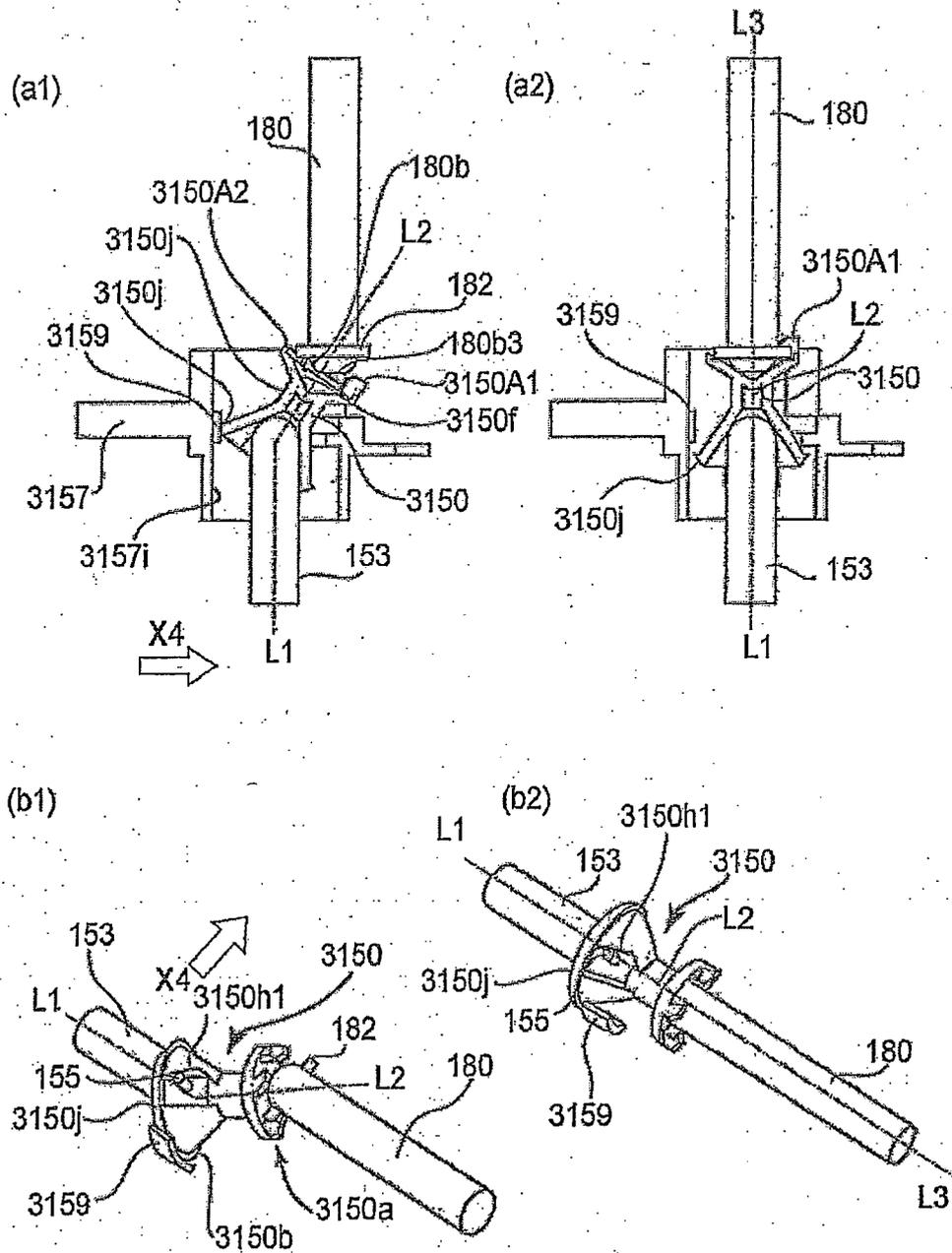


FIG. 49

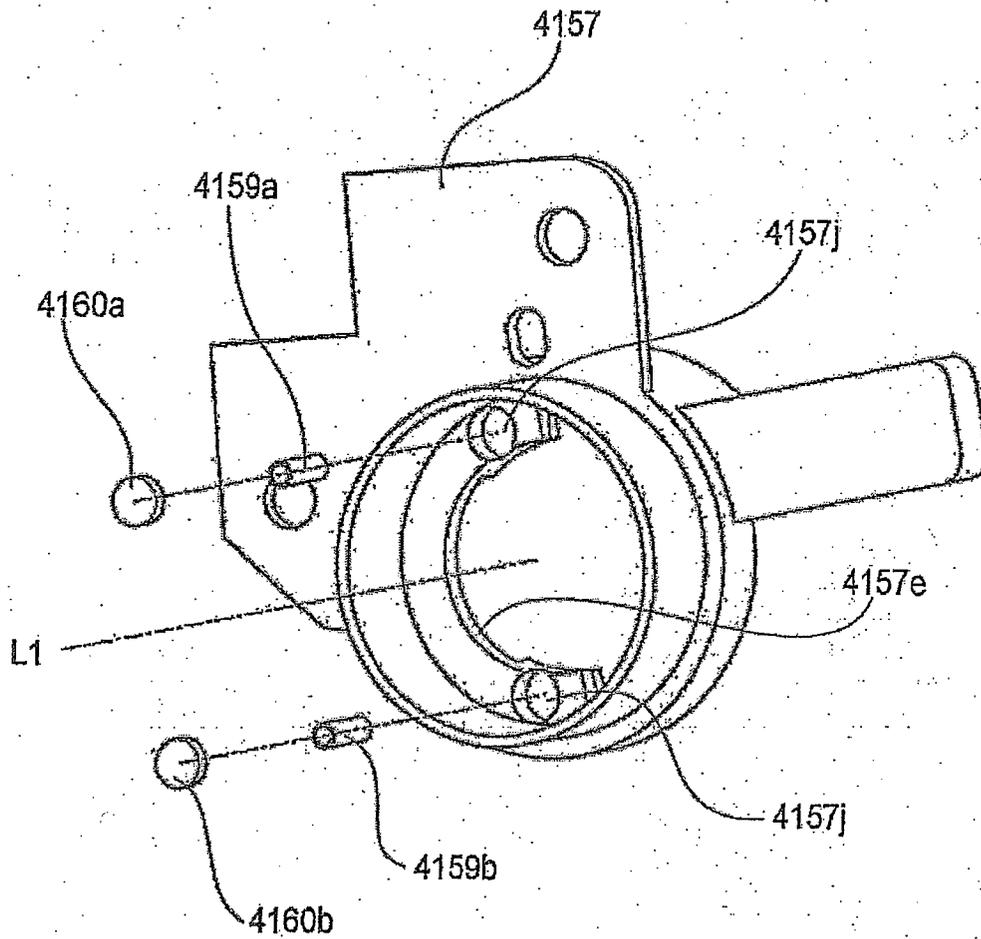


FIG. 50

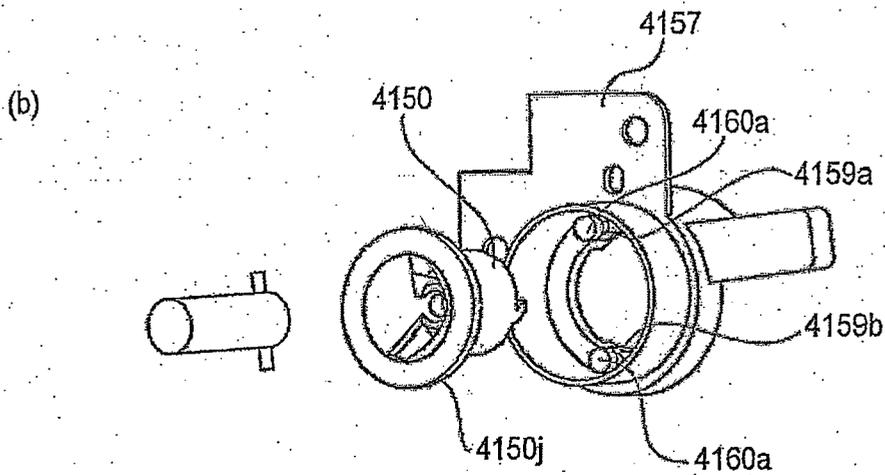
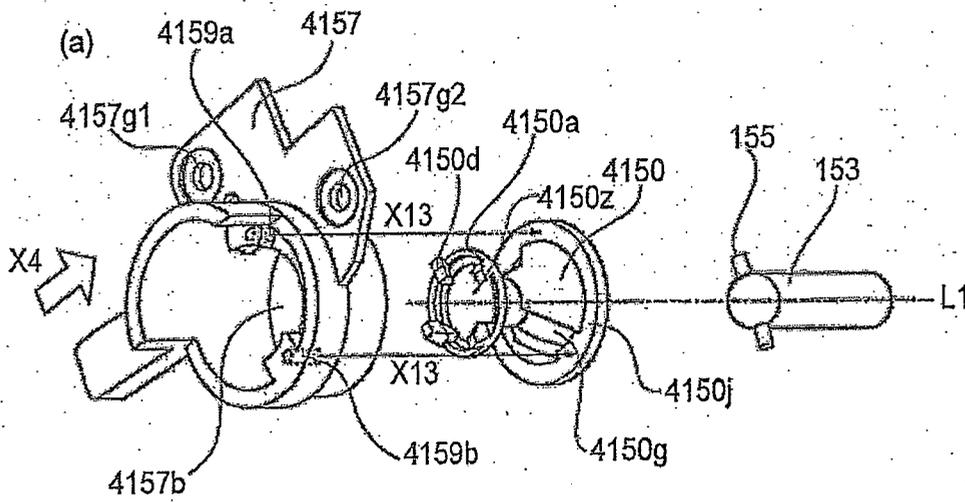


FIG. 51

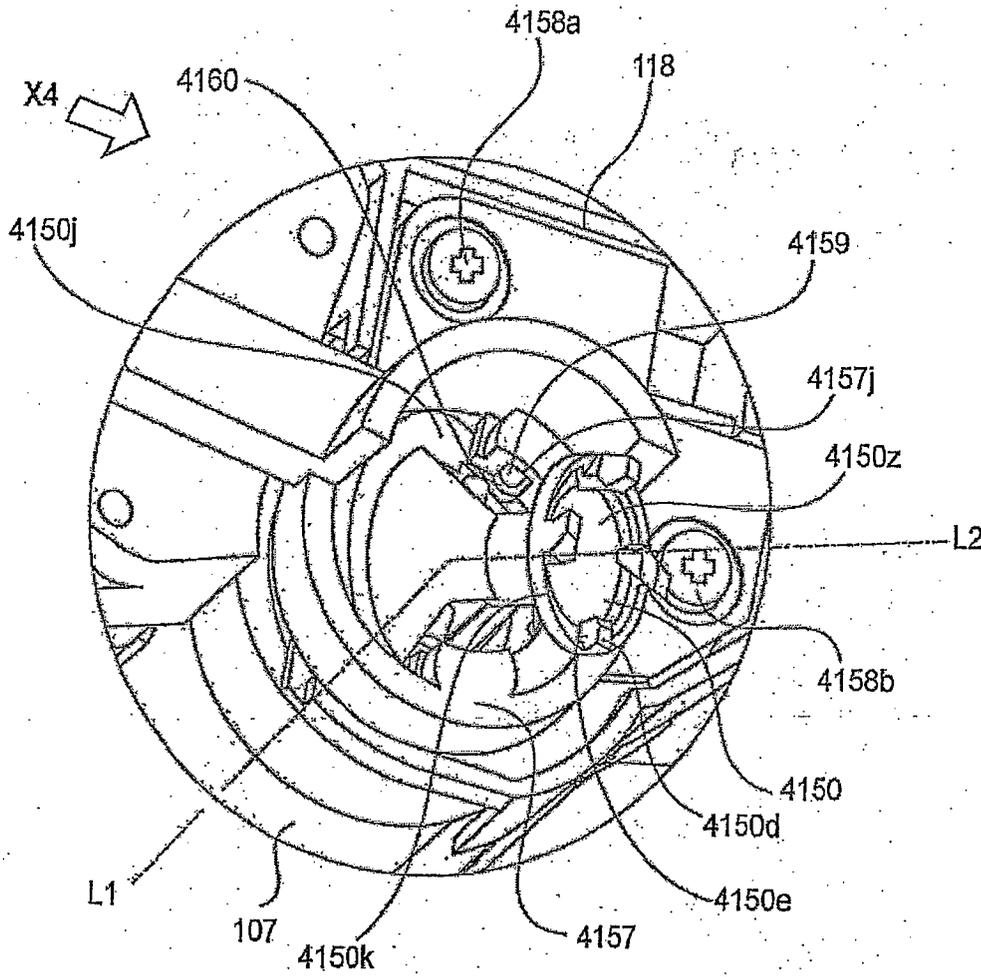


FIG. 52

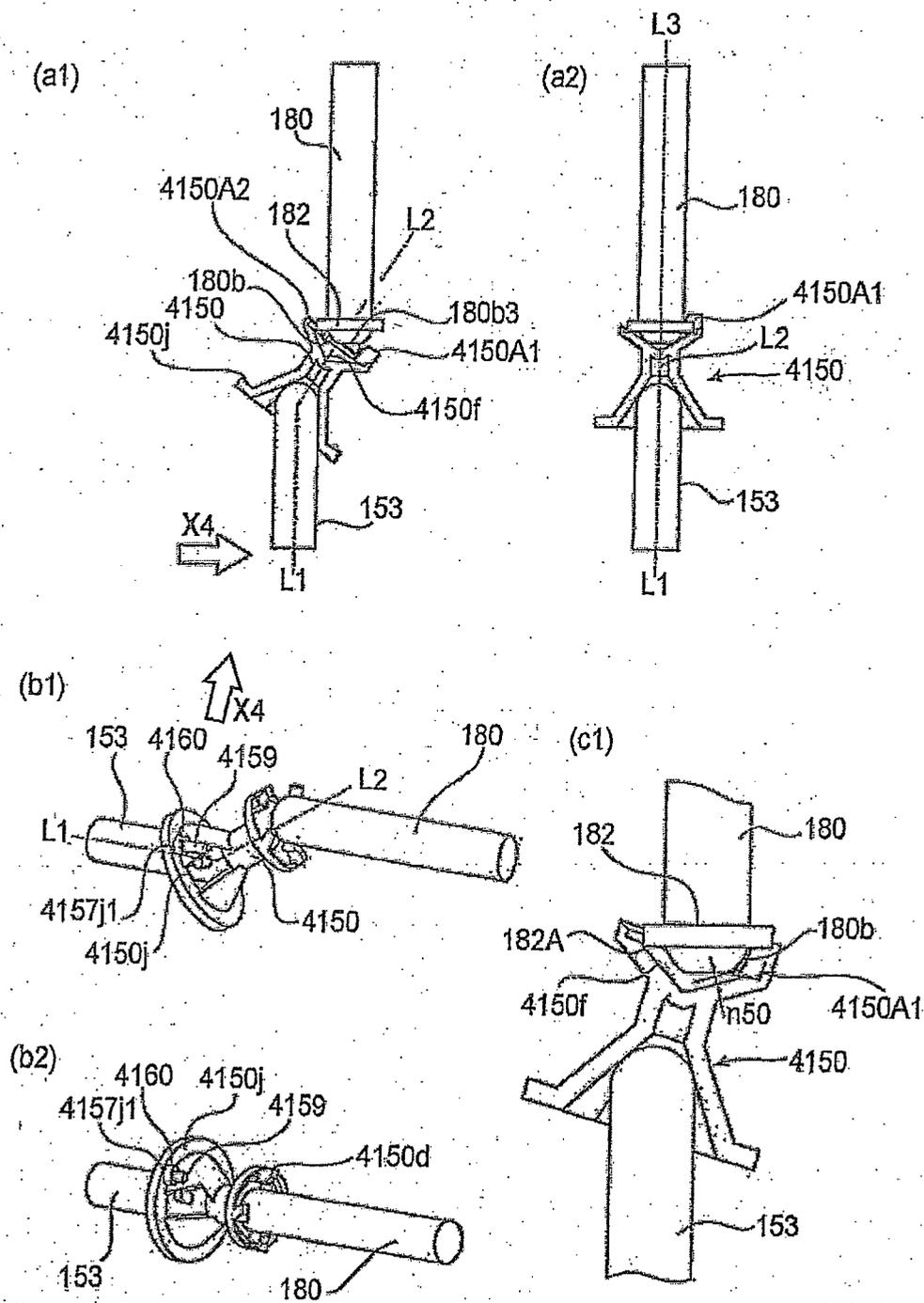


FIG. 53

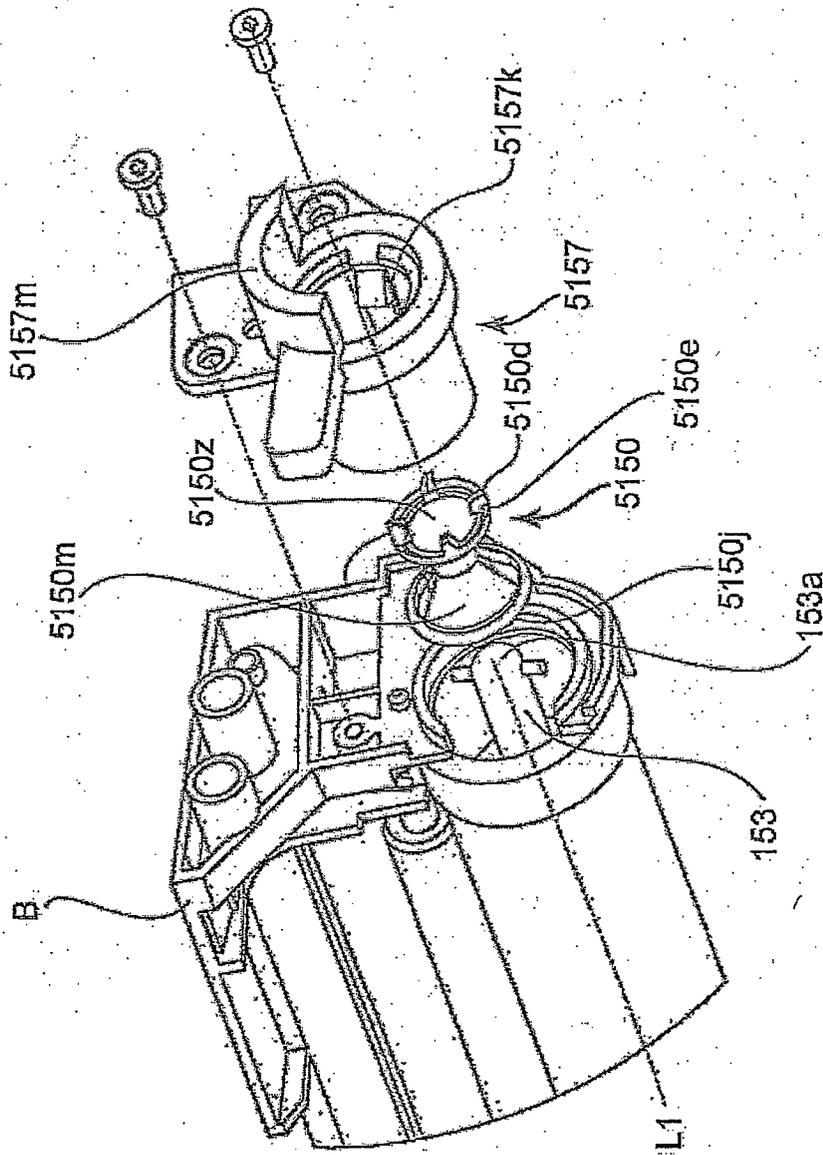


FIG. 54

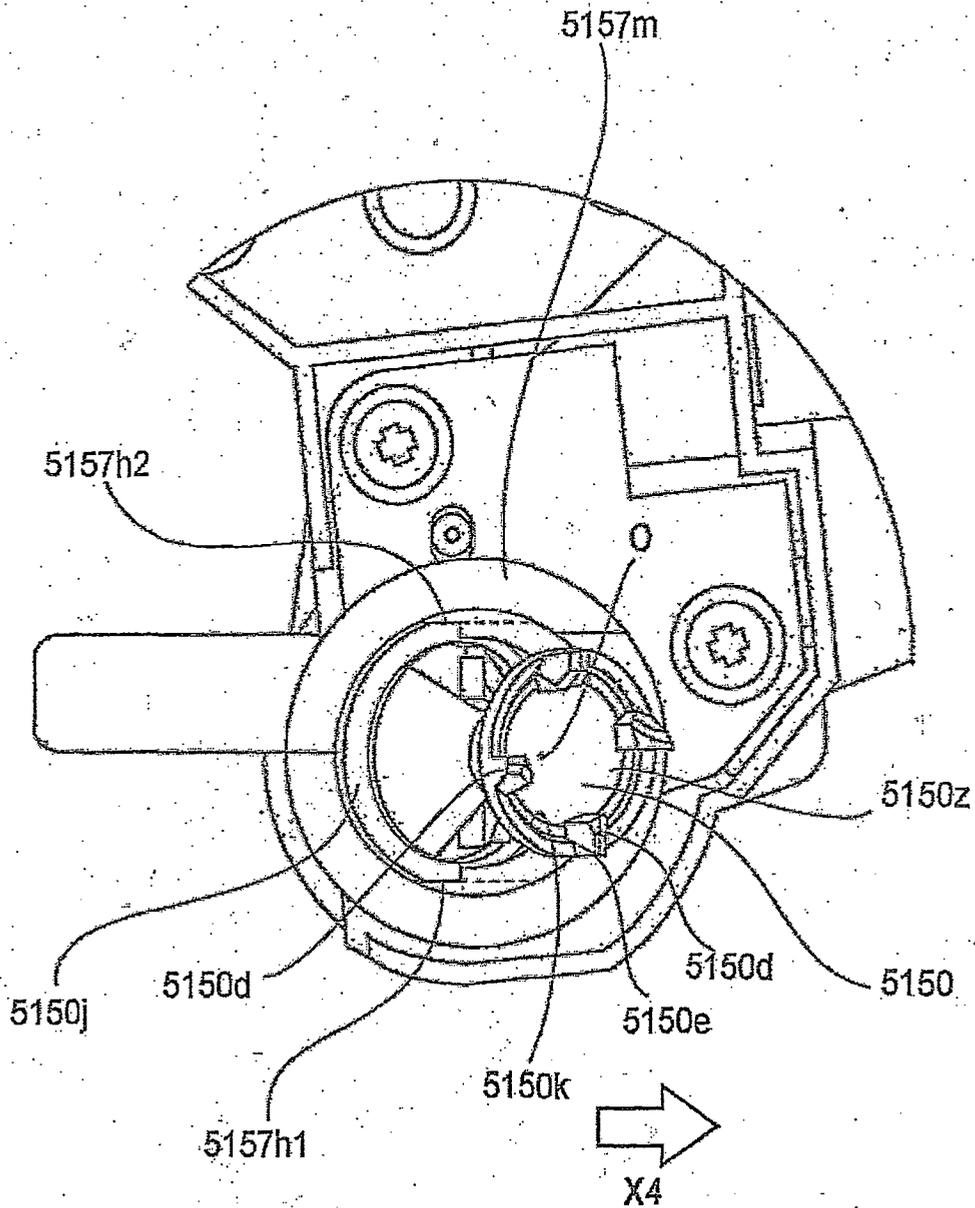


FIG. 55

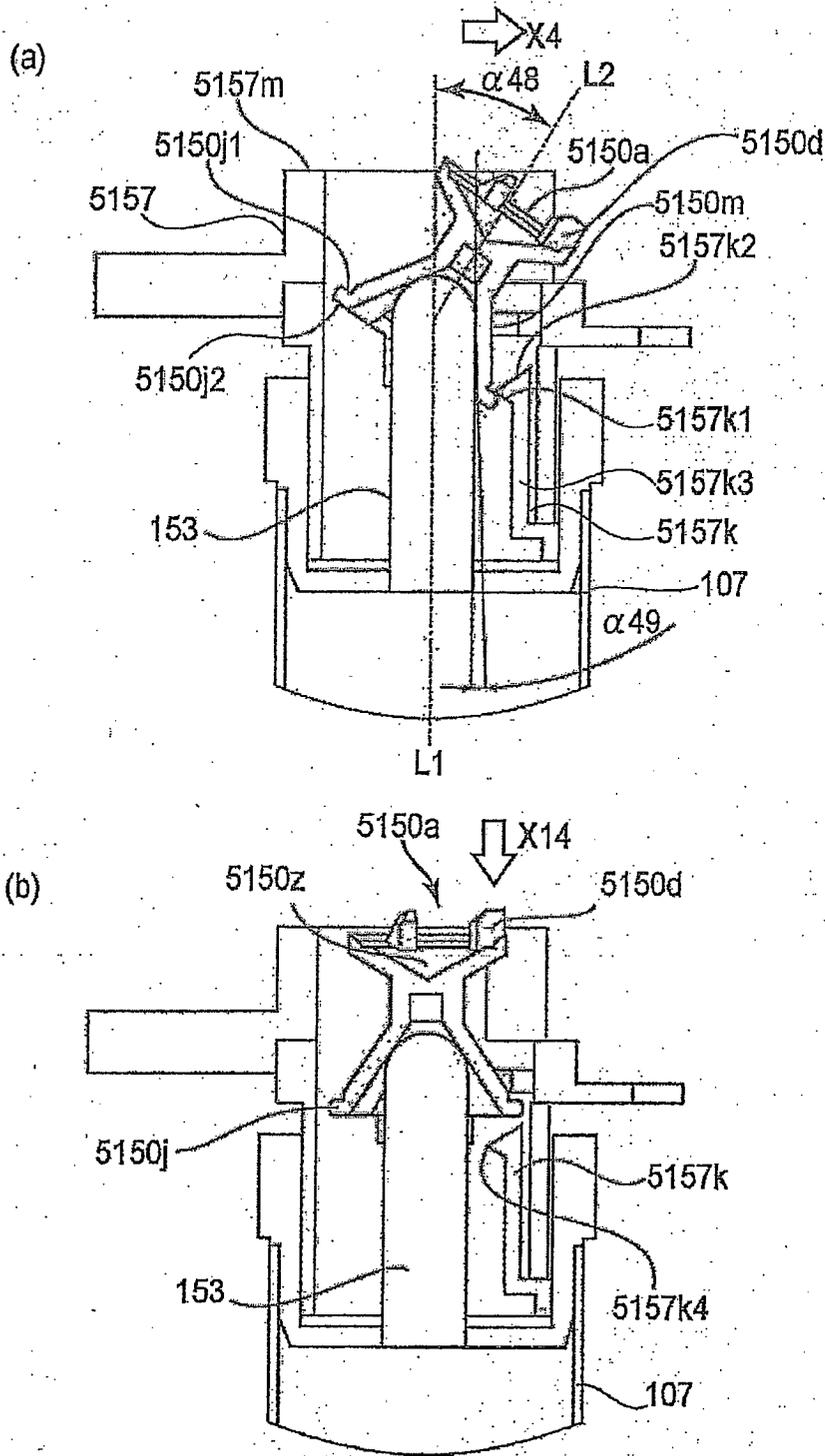


FIG. 56

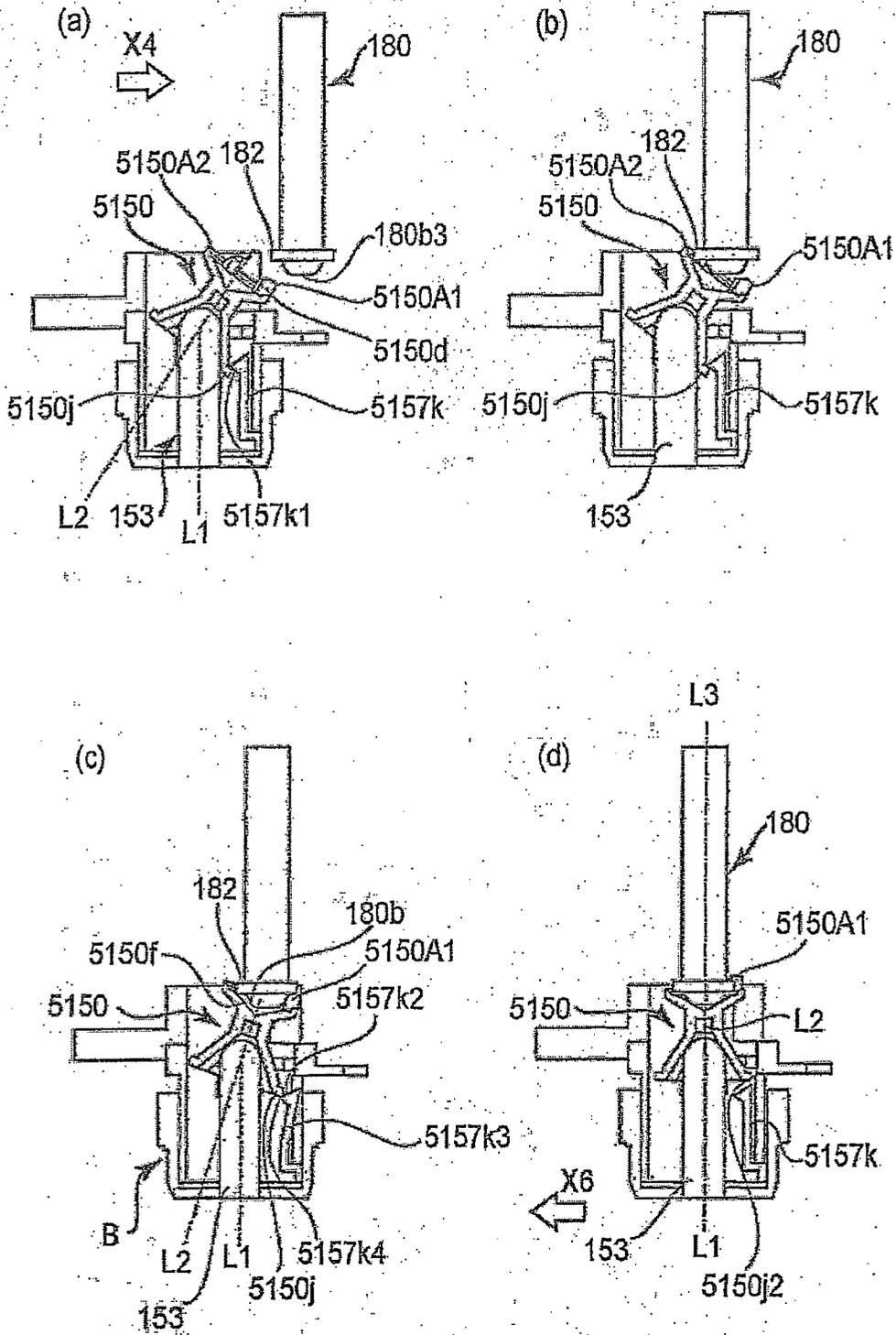


FIG. 57

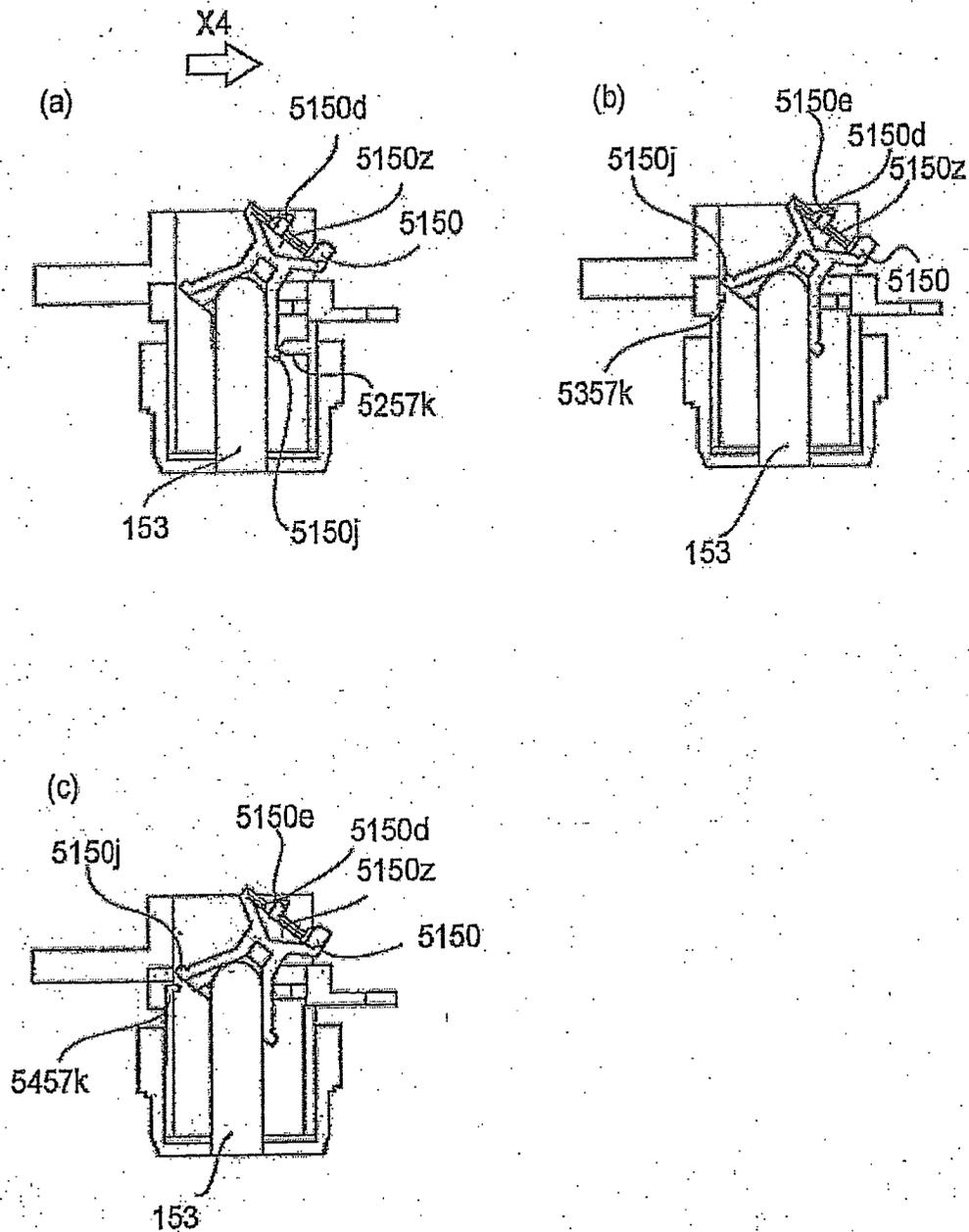


FIG.58

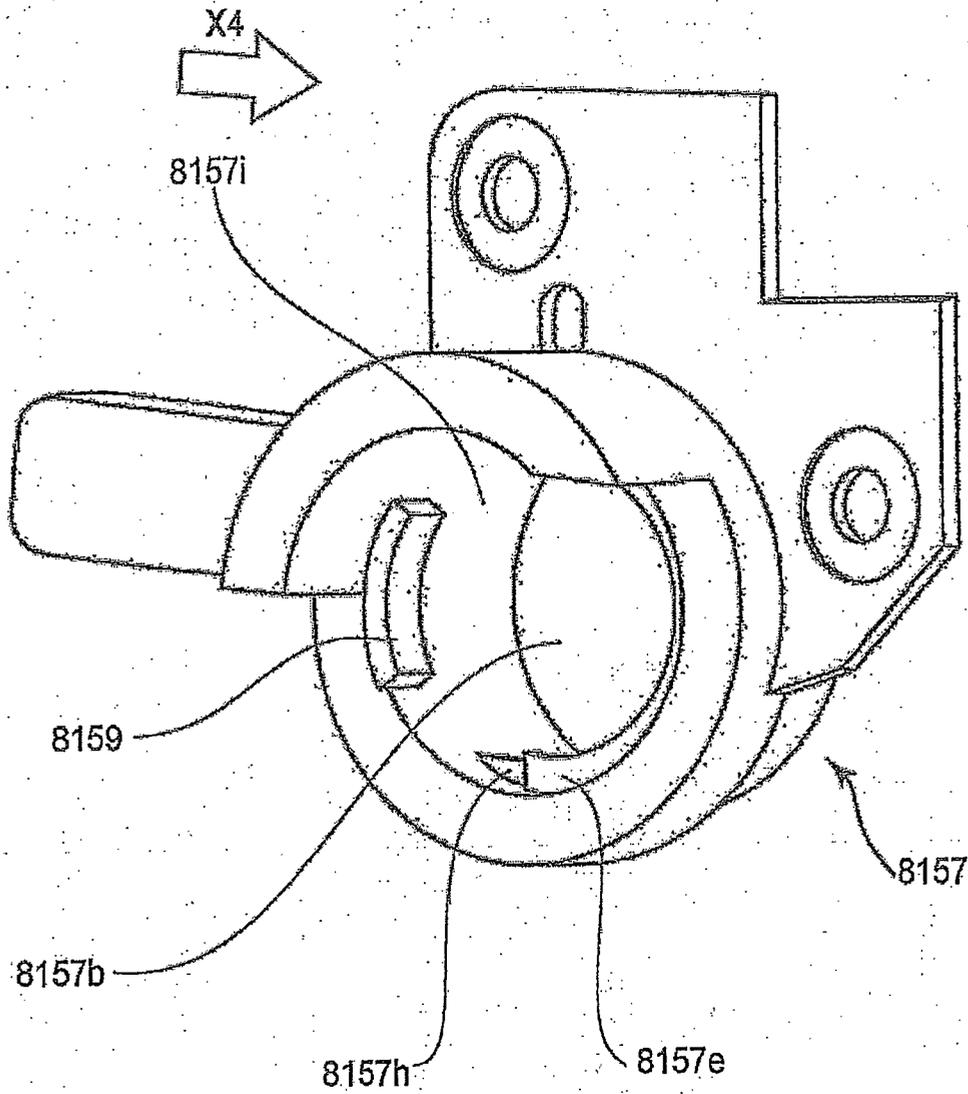


FIG. 59

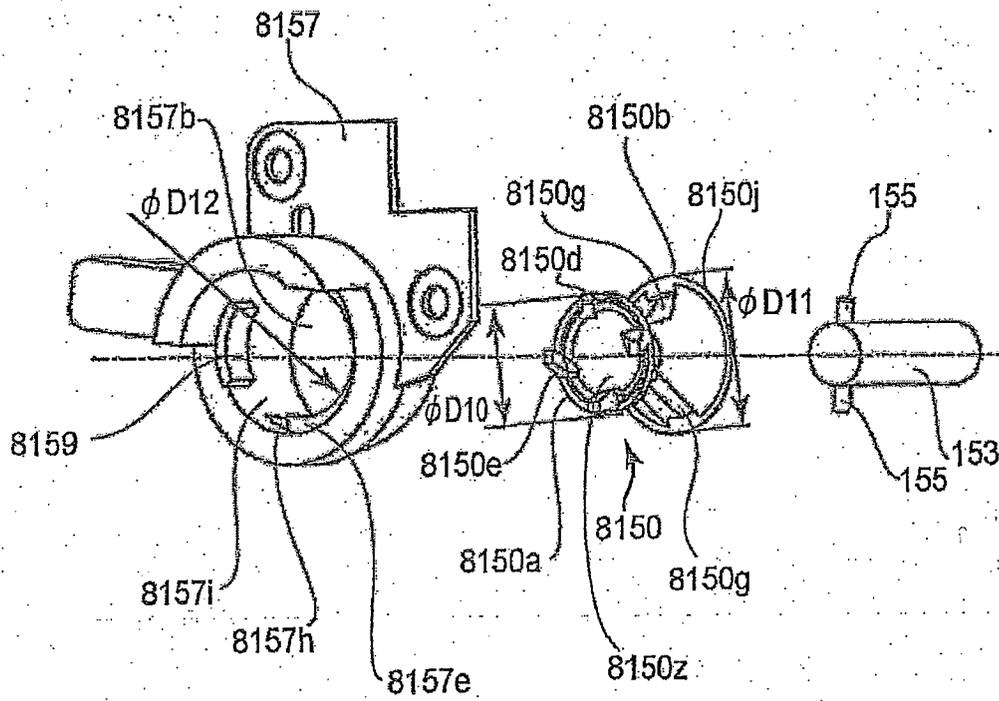


FIG. 60

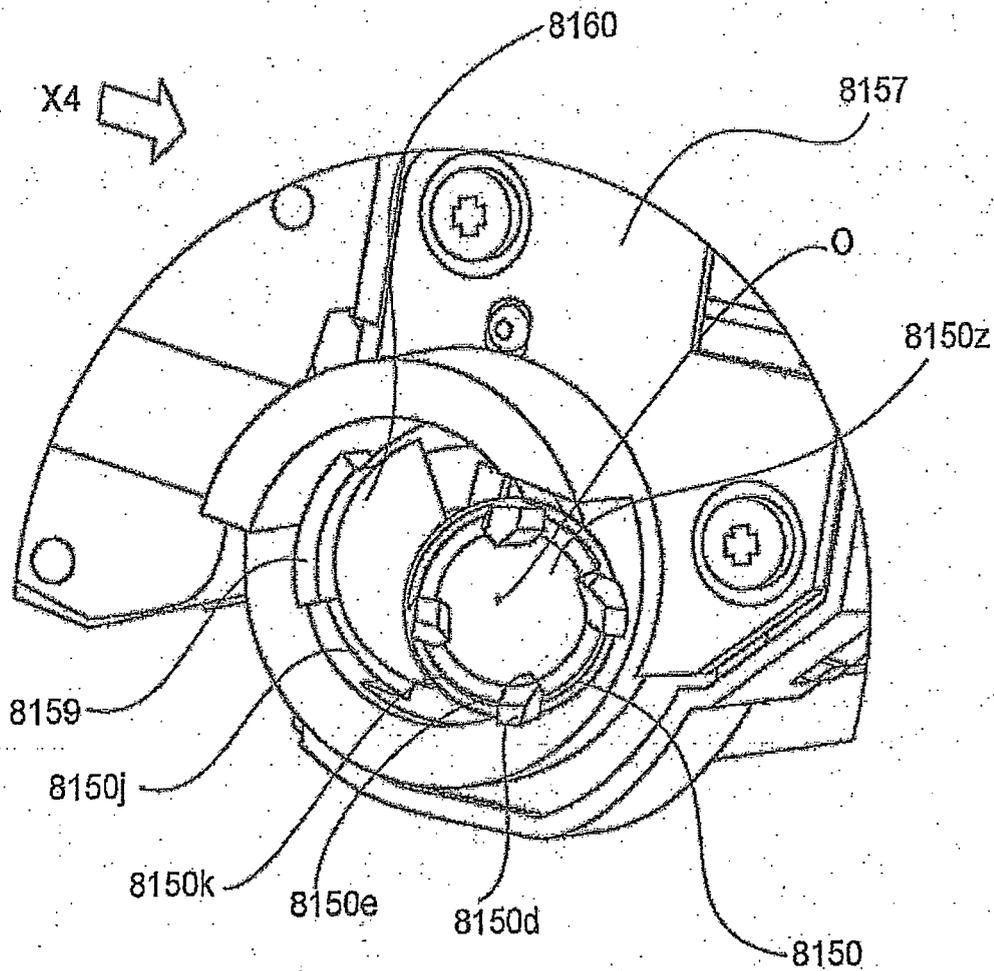


FIG. 61

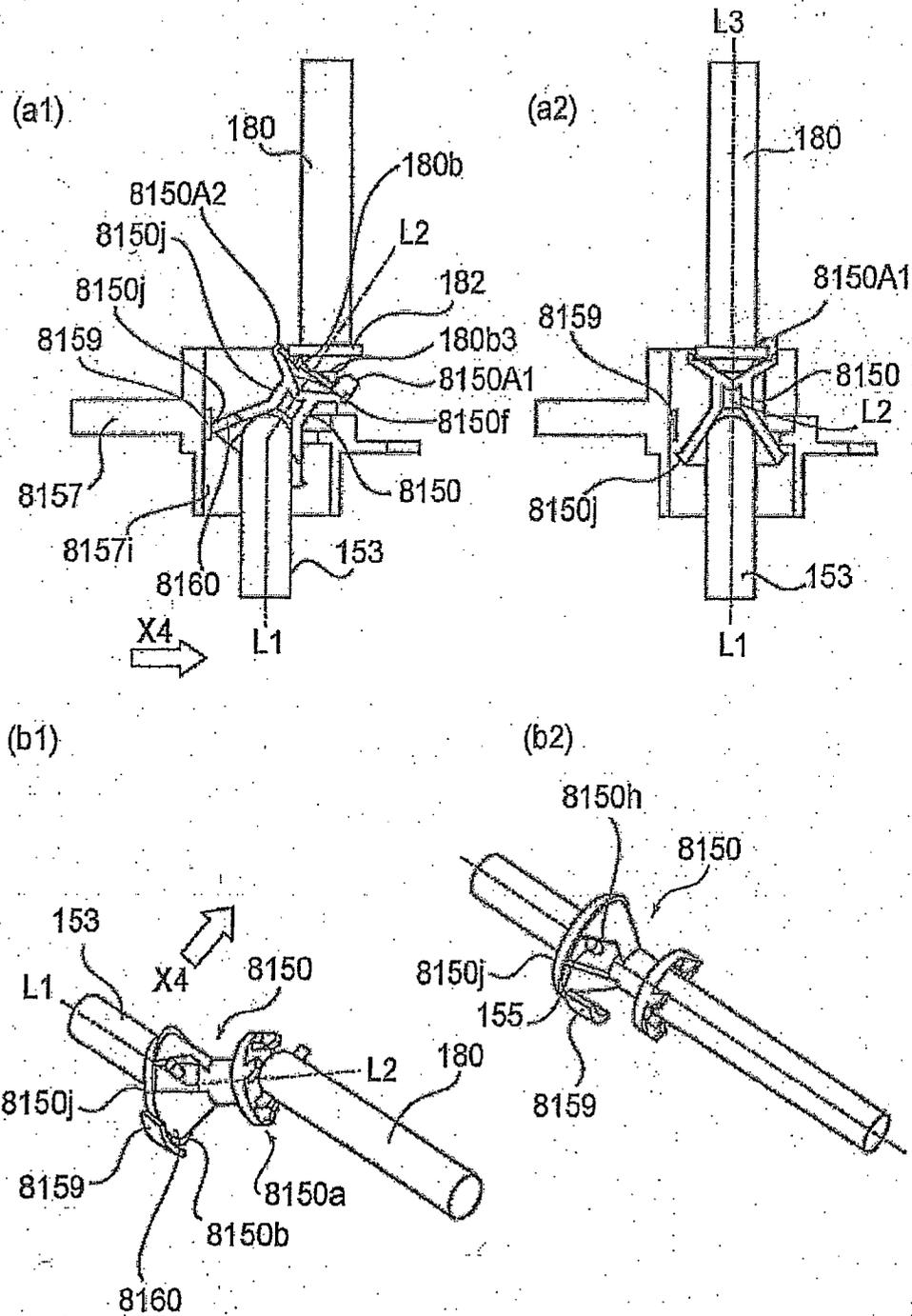


FIG. 62

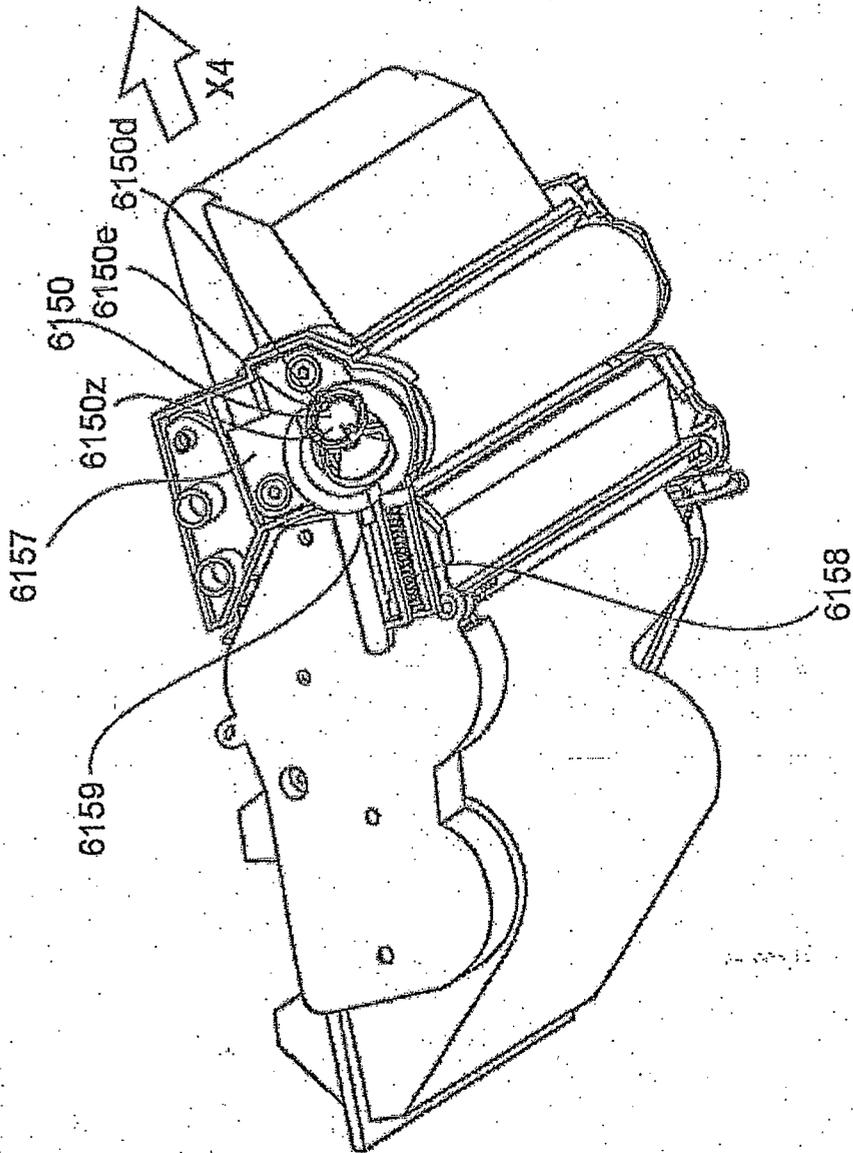


FIG. 63

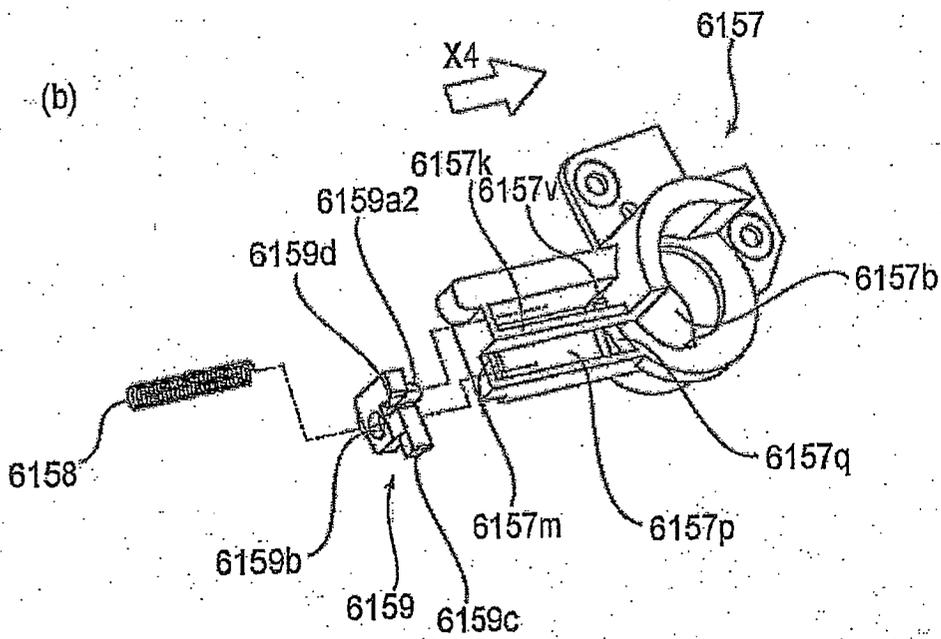
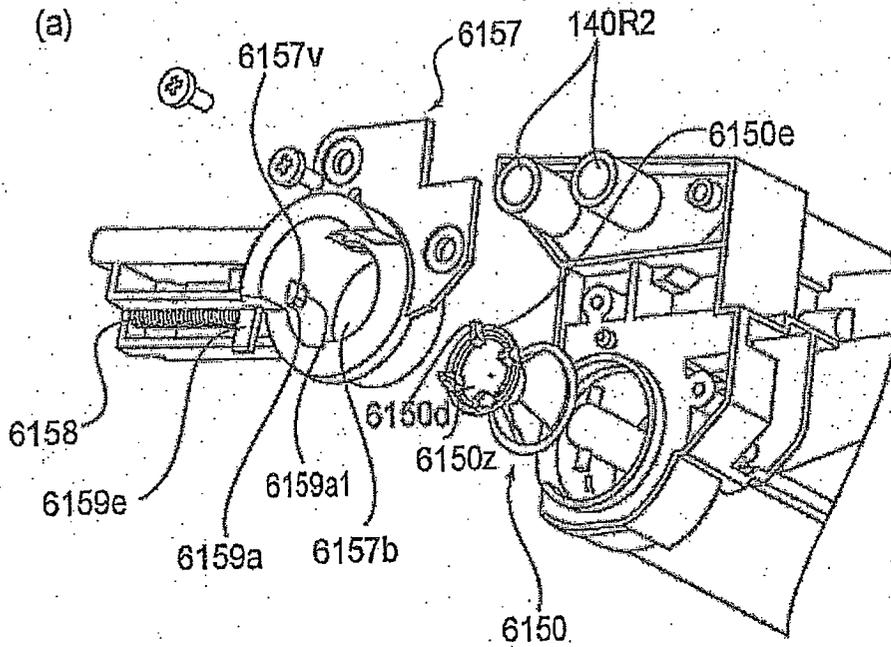


FIG. 64

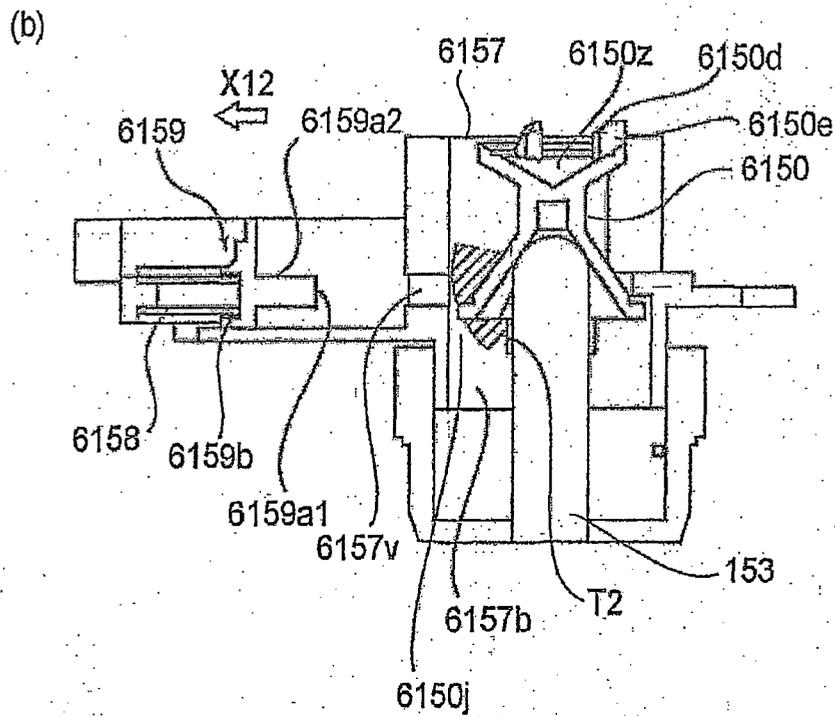
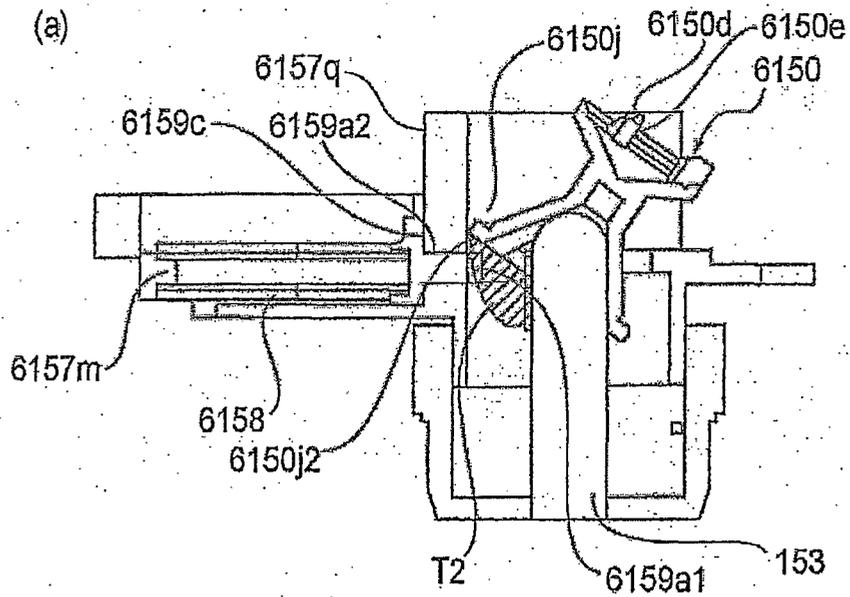


FIG. 65

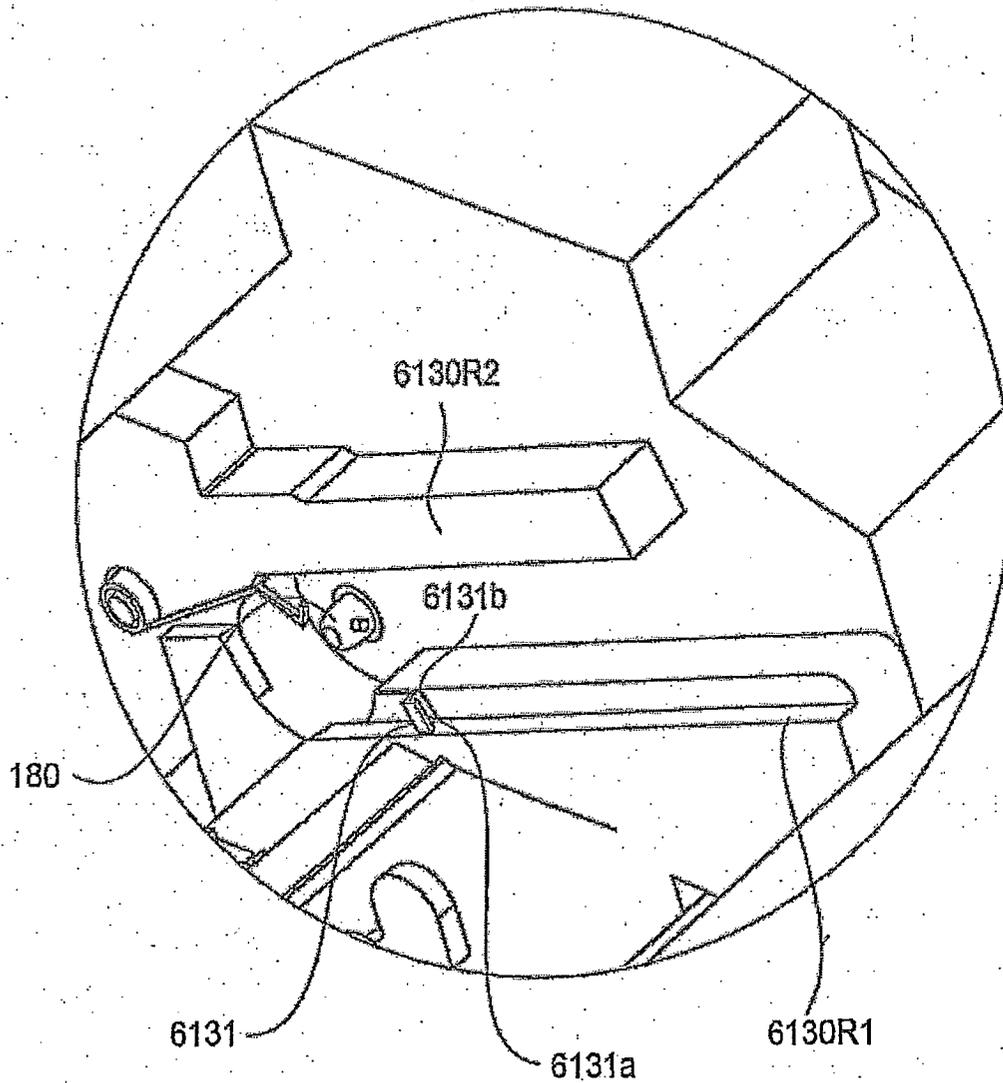


FIG. 66

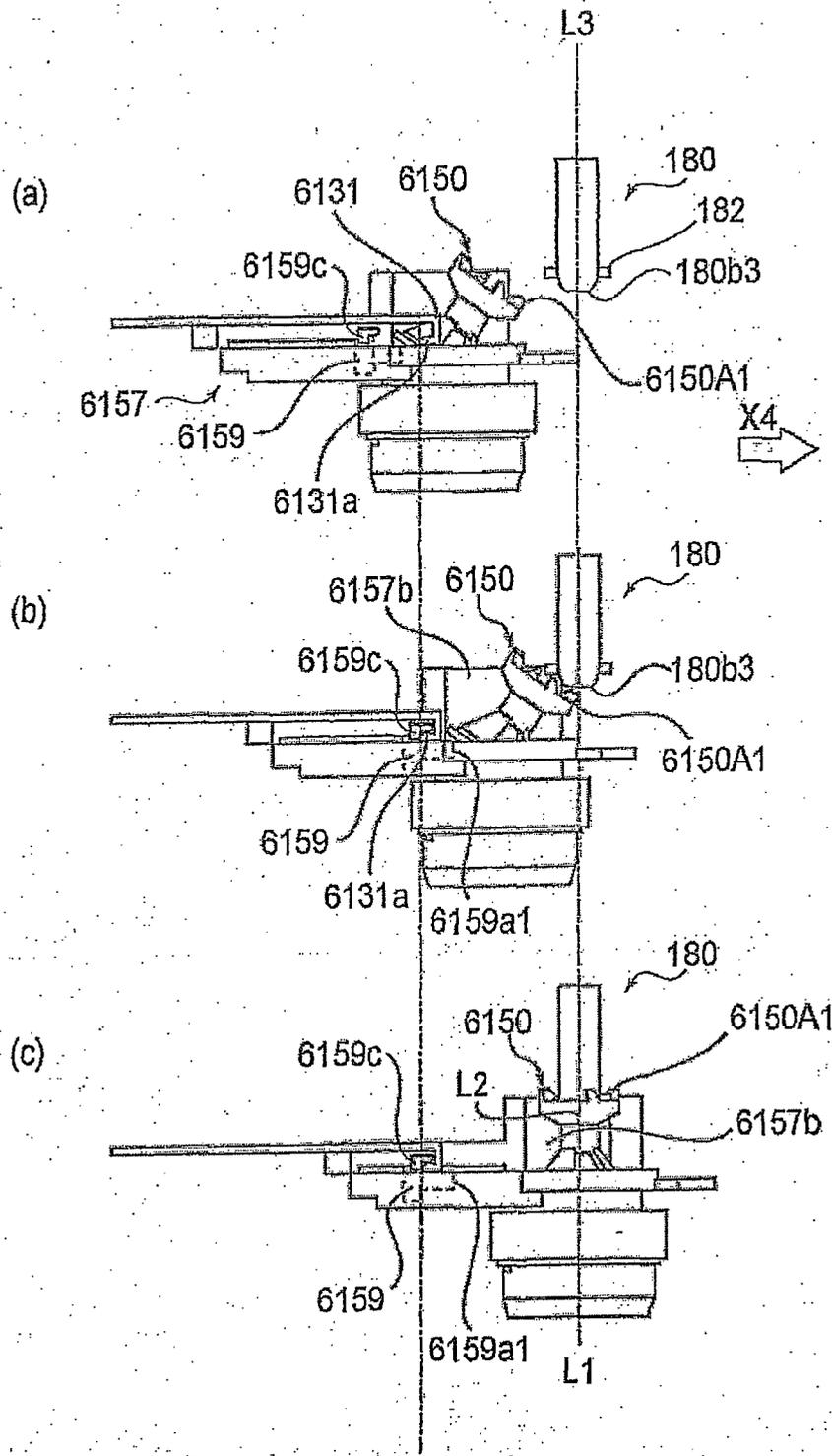


FIG. 67

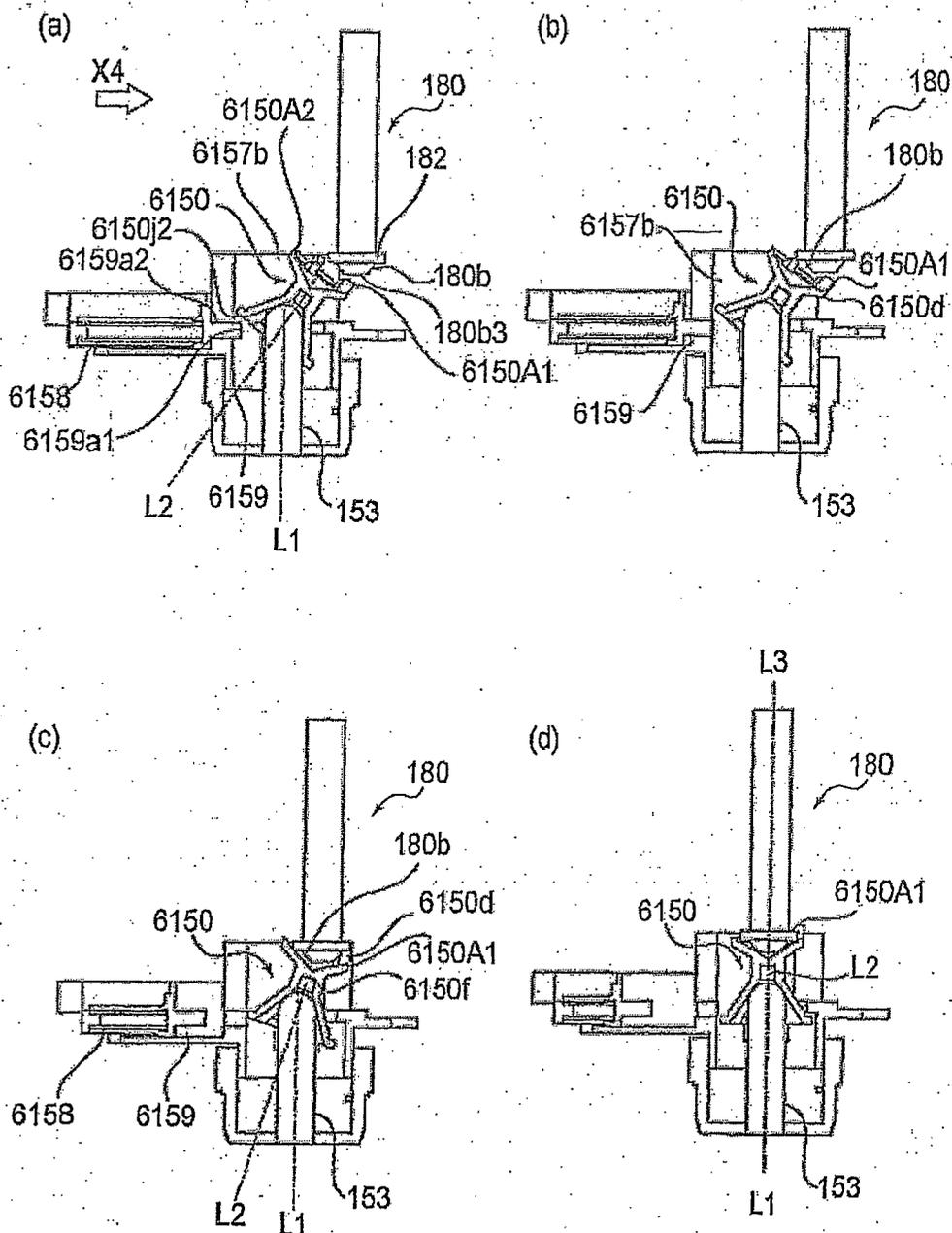


FIG. 68

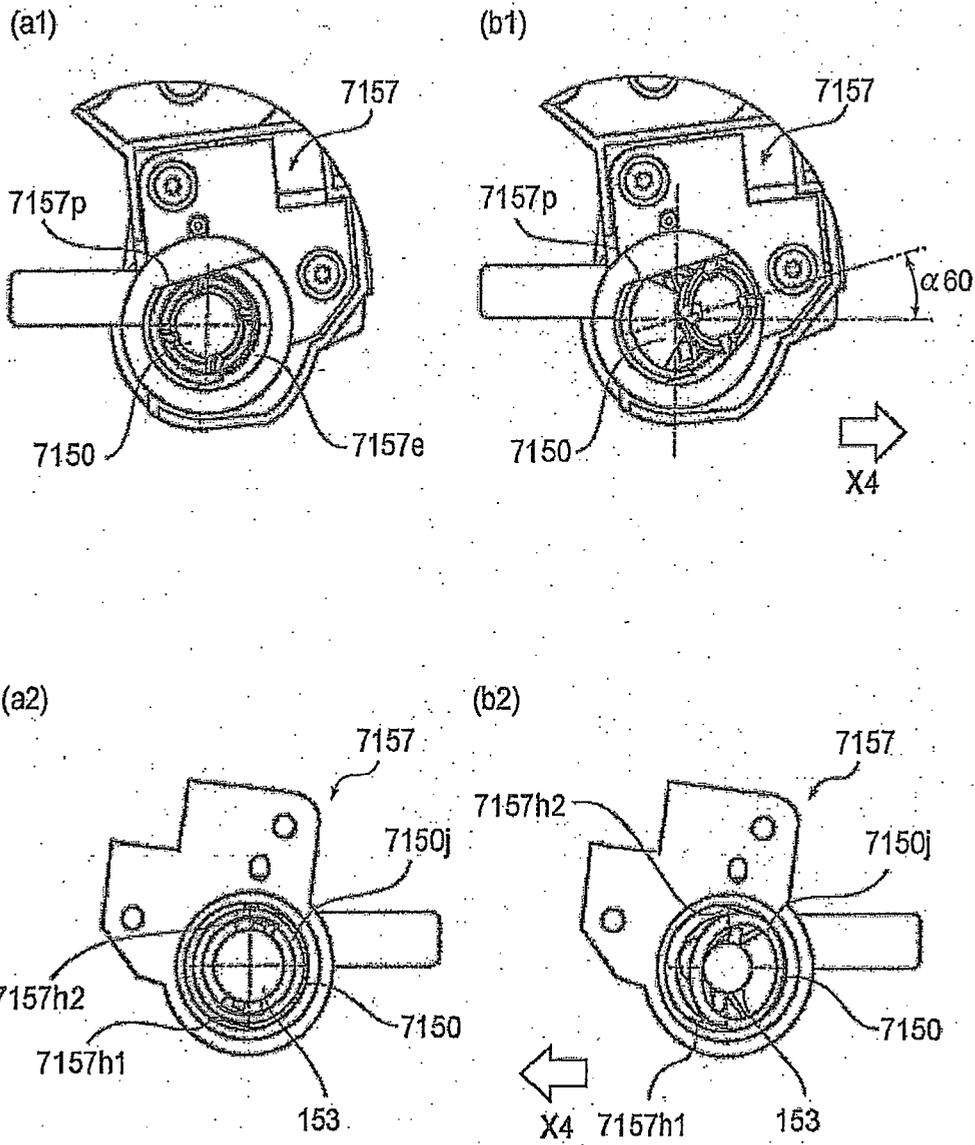


FIG. 69

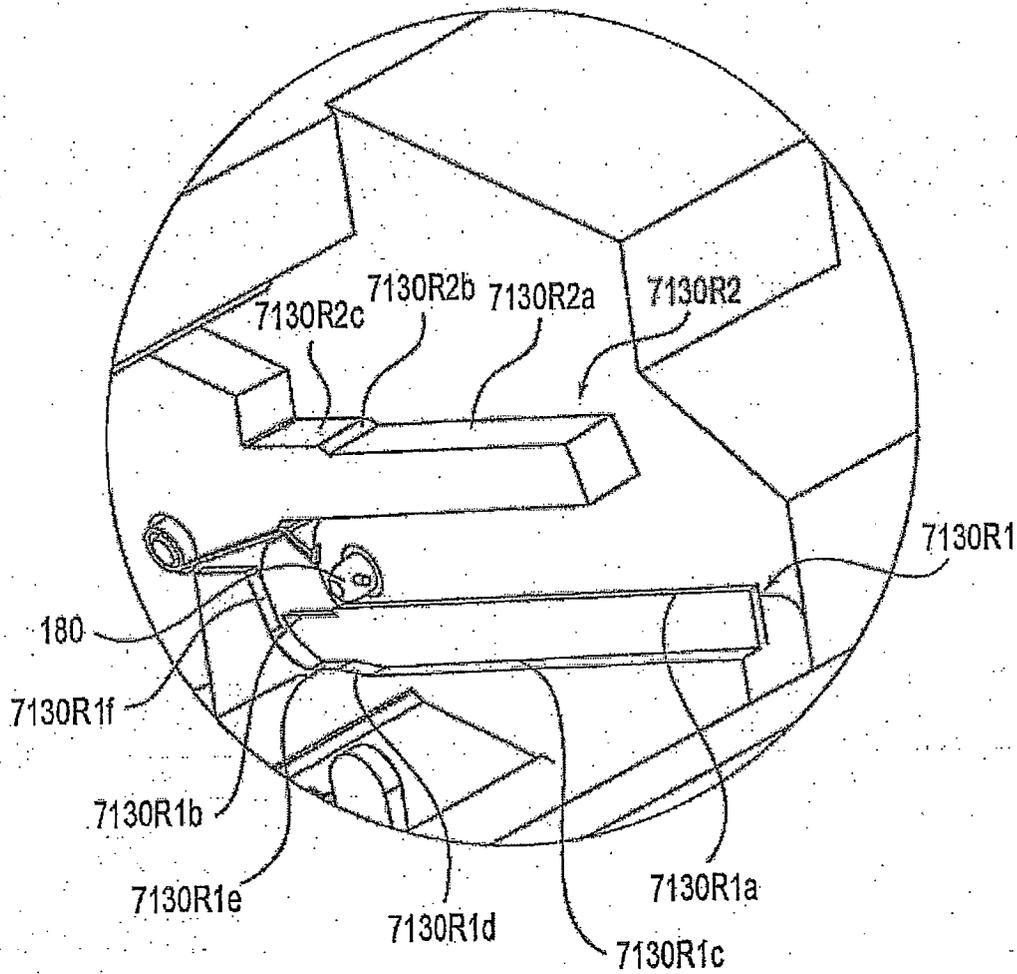


FIG. 70

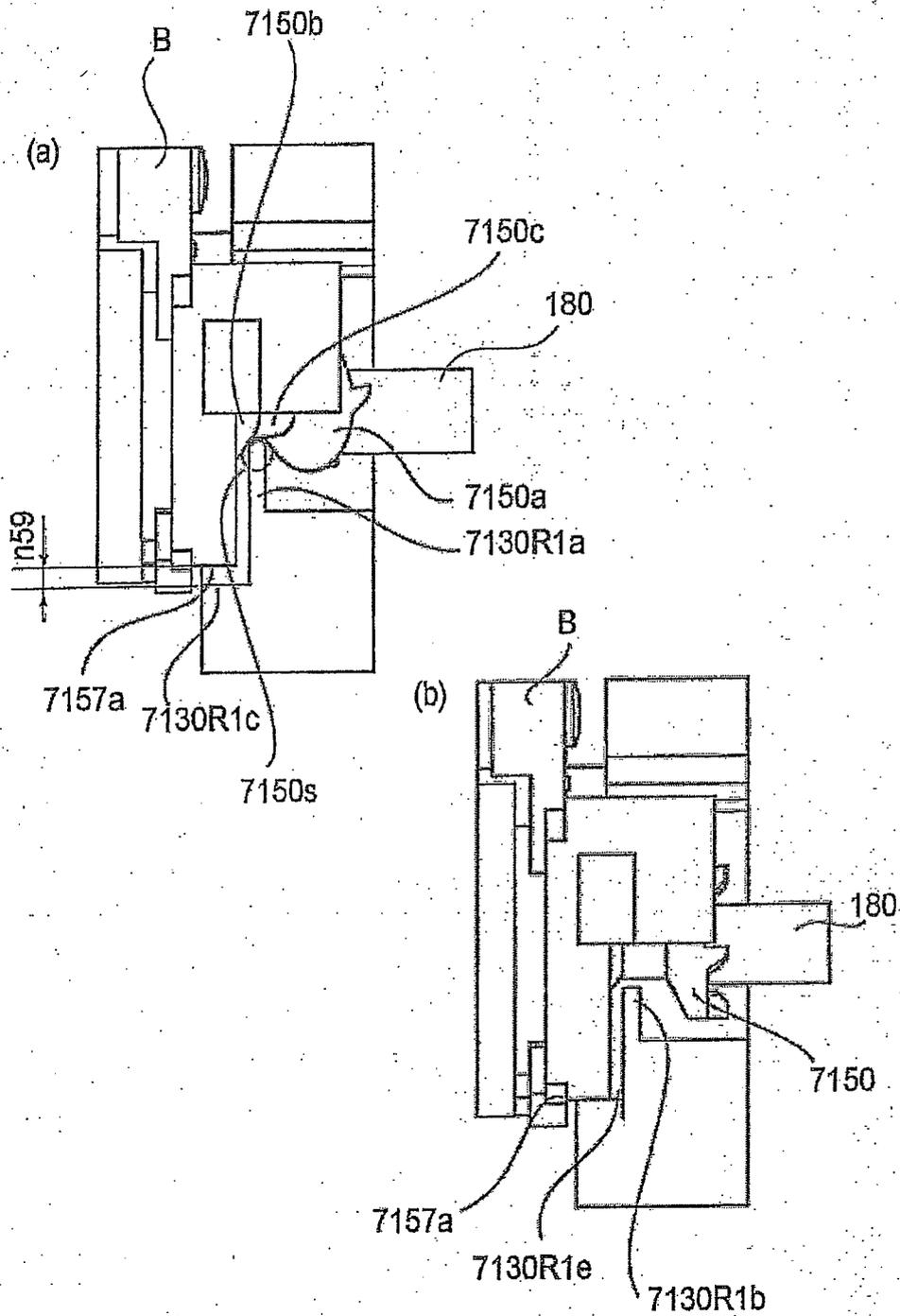


FIG. 71

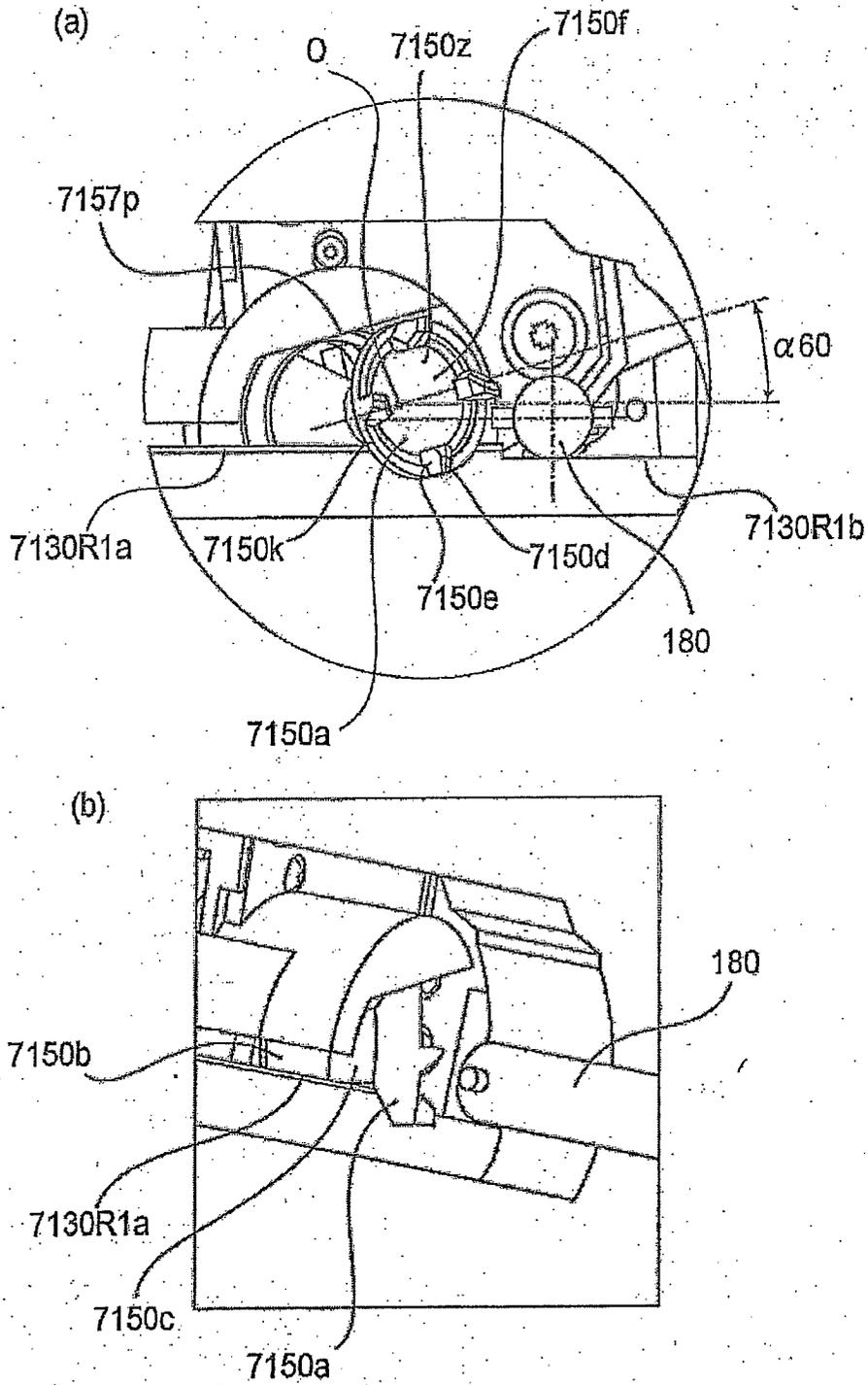


FIG. 72

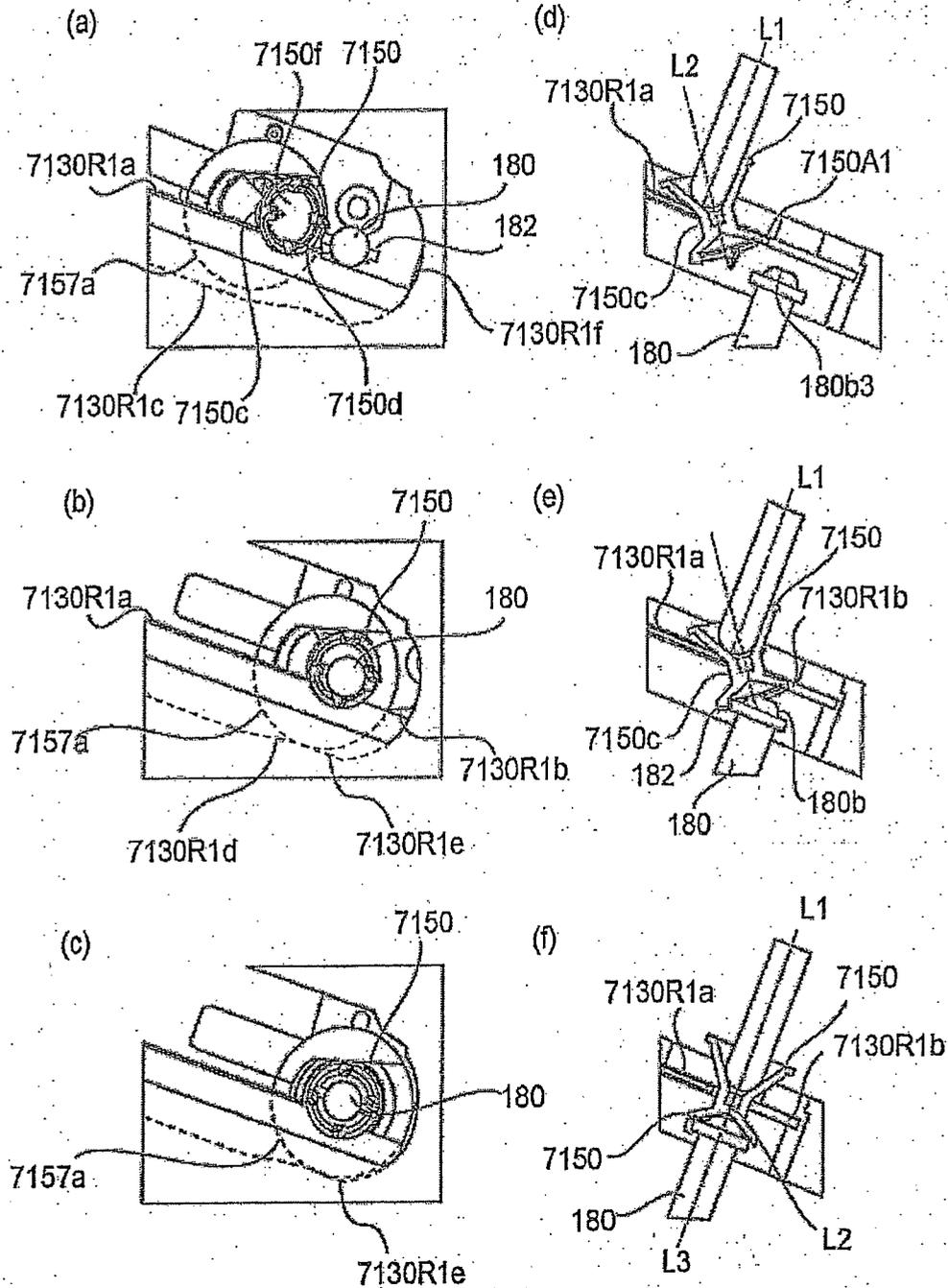


FIG. 73

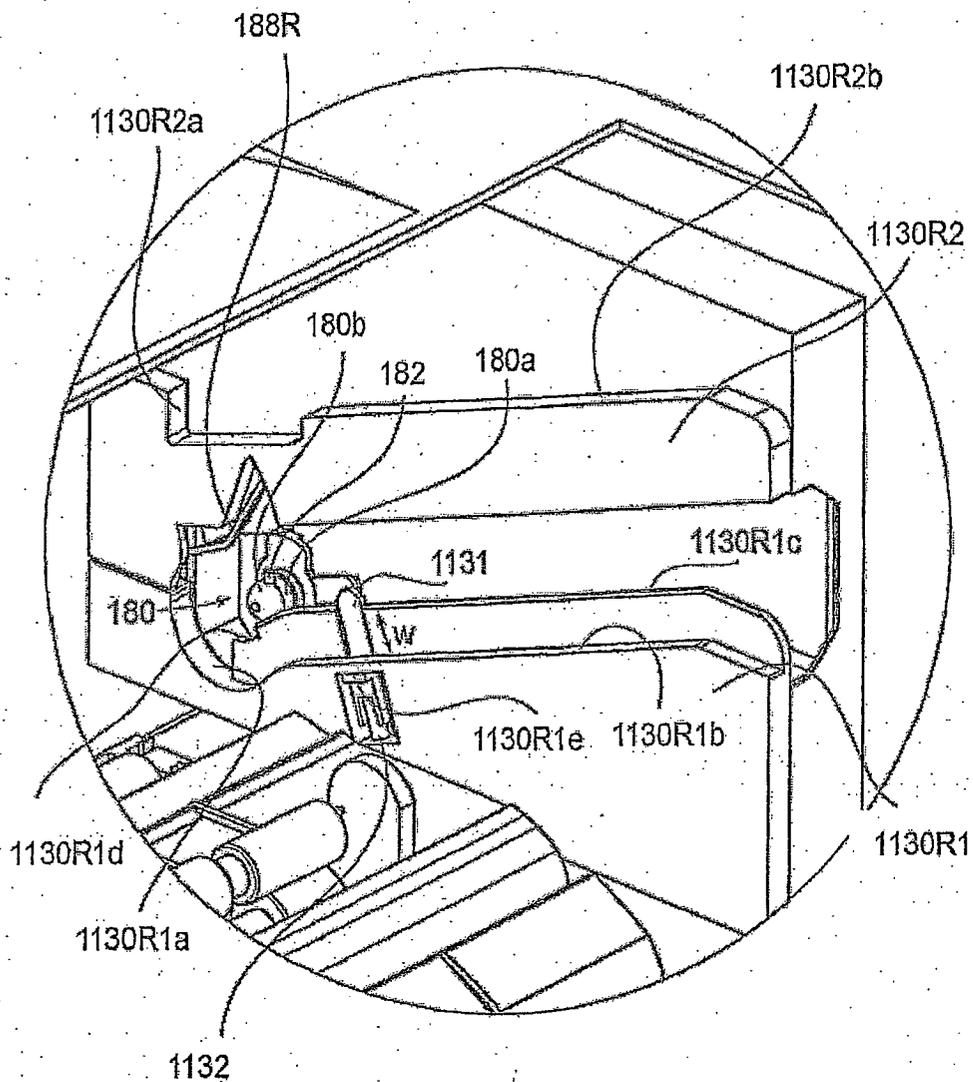


FIG. 74

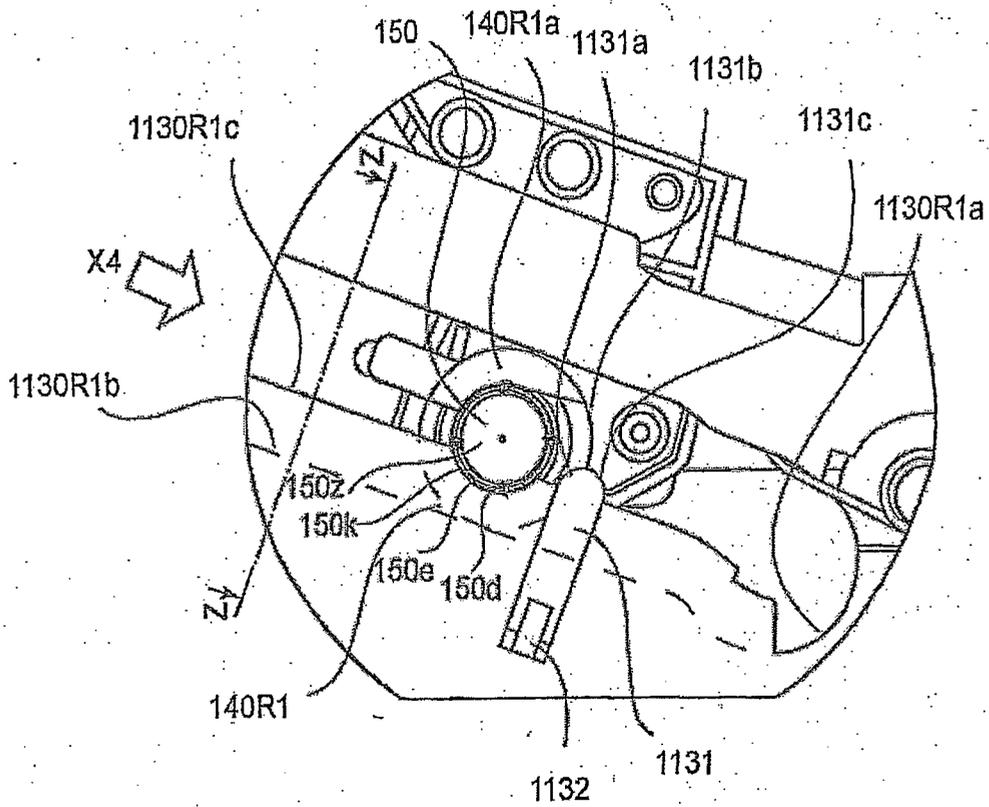


FIG. 75

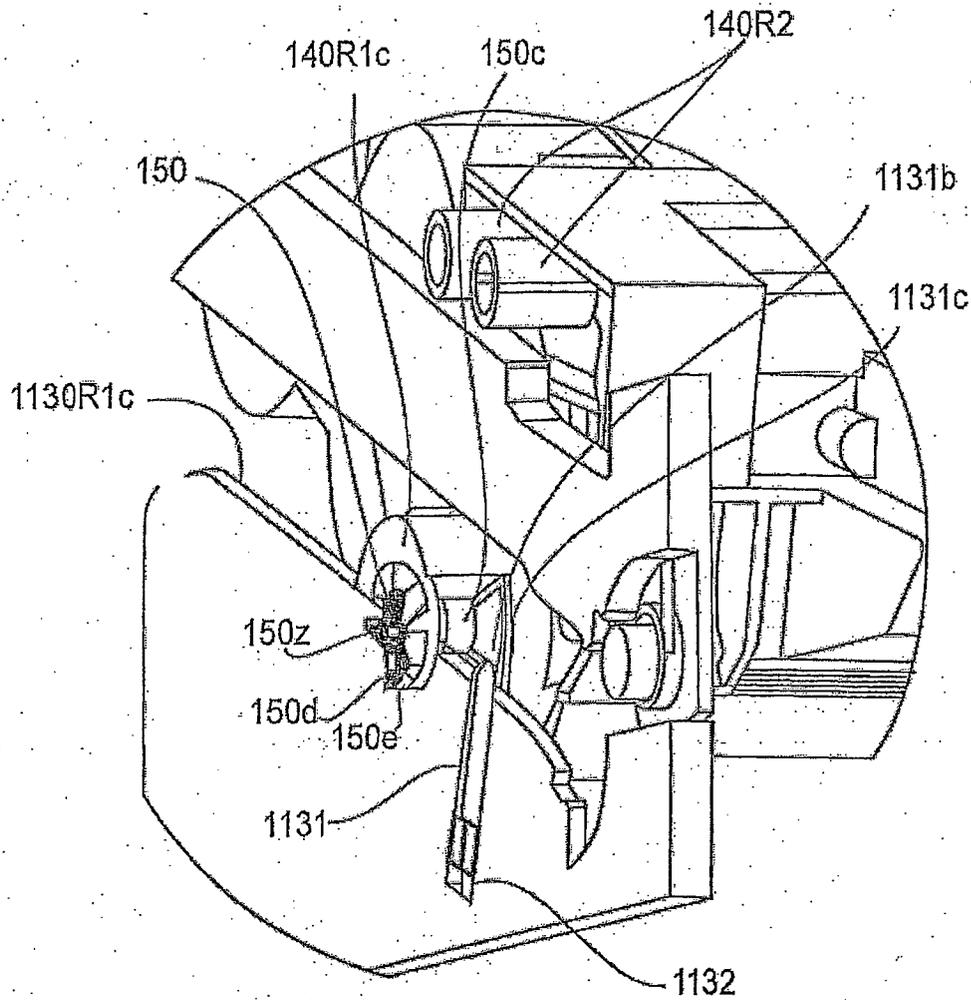


FIG. 76

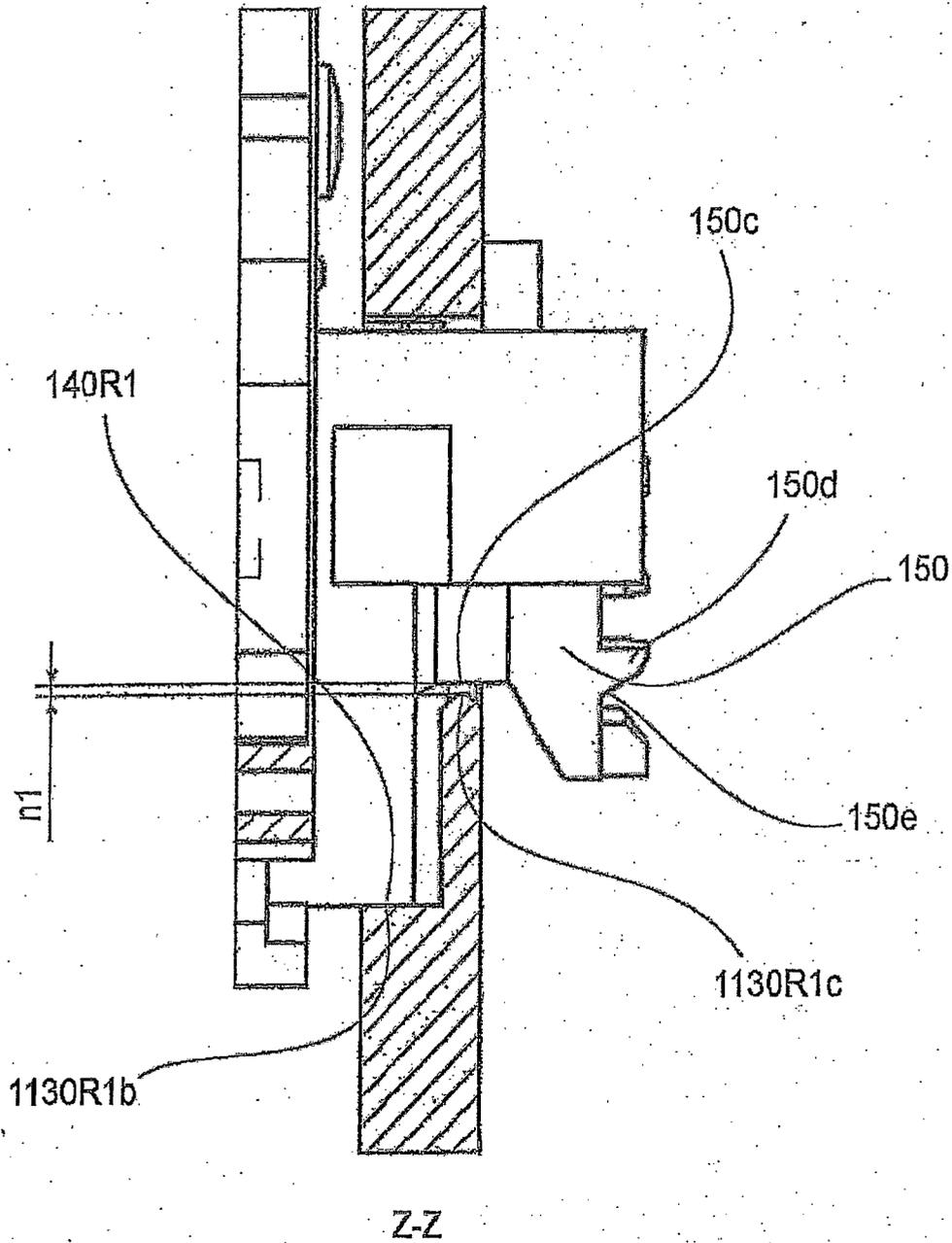


FIG. 77

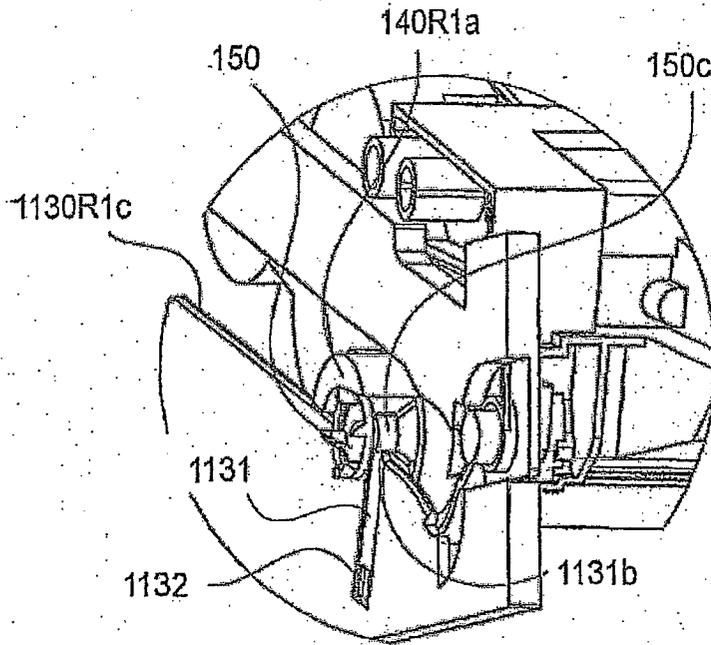


FIG. 78

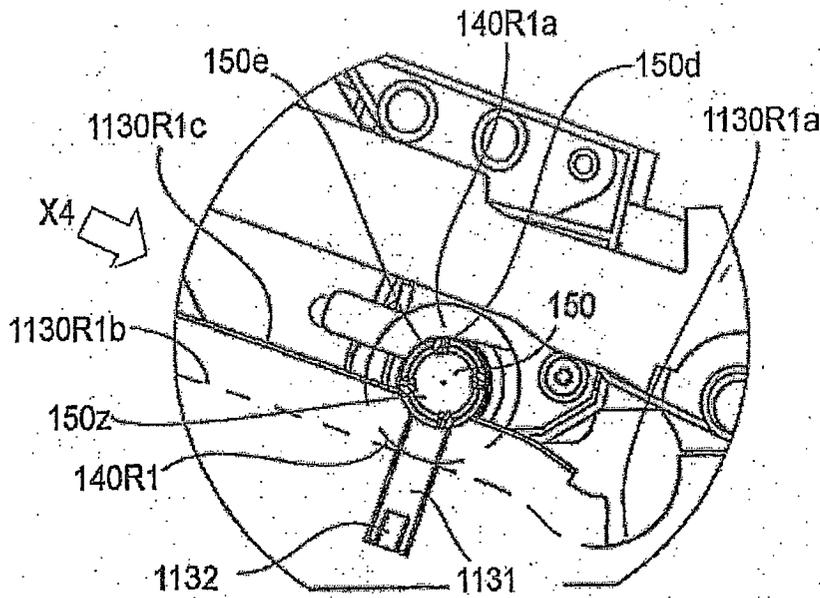


FIG. 79

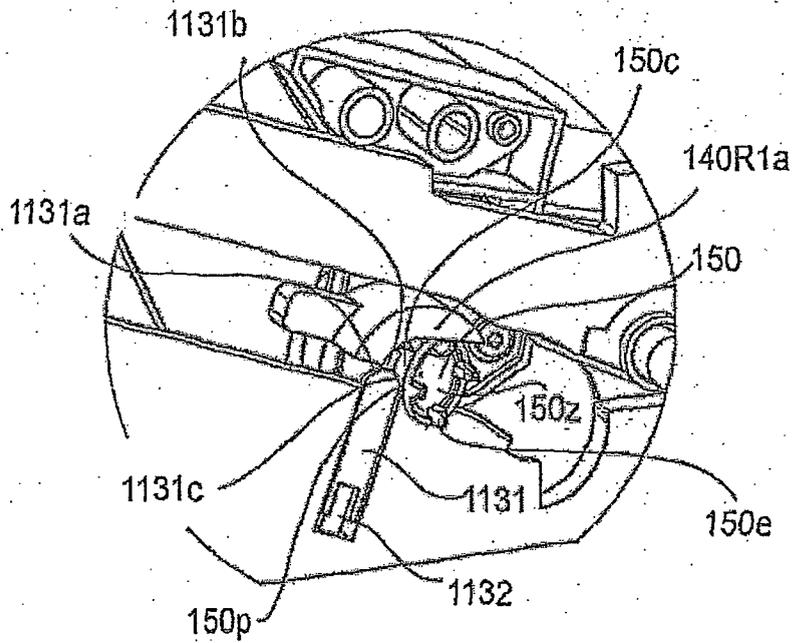


FIG. 80

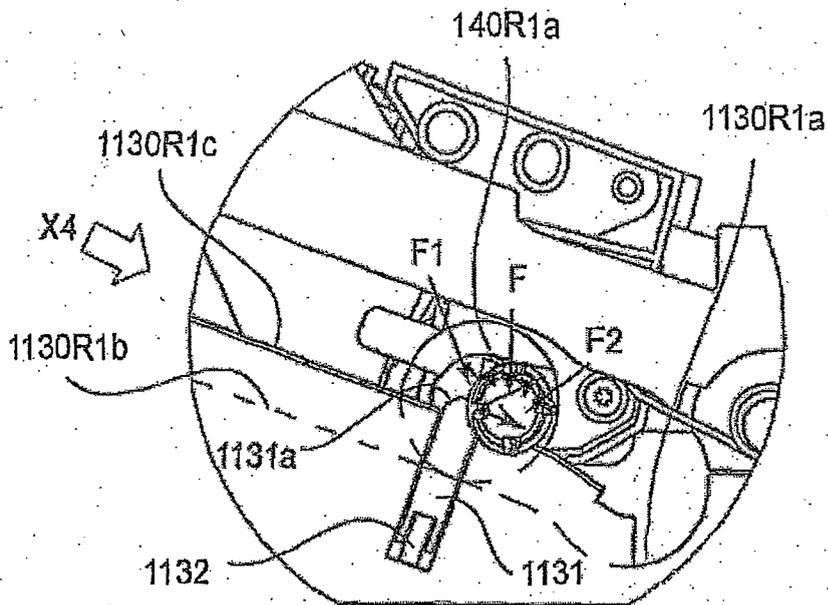


FIG. 81

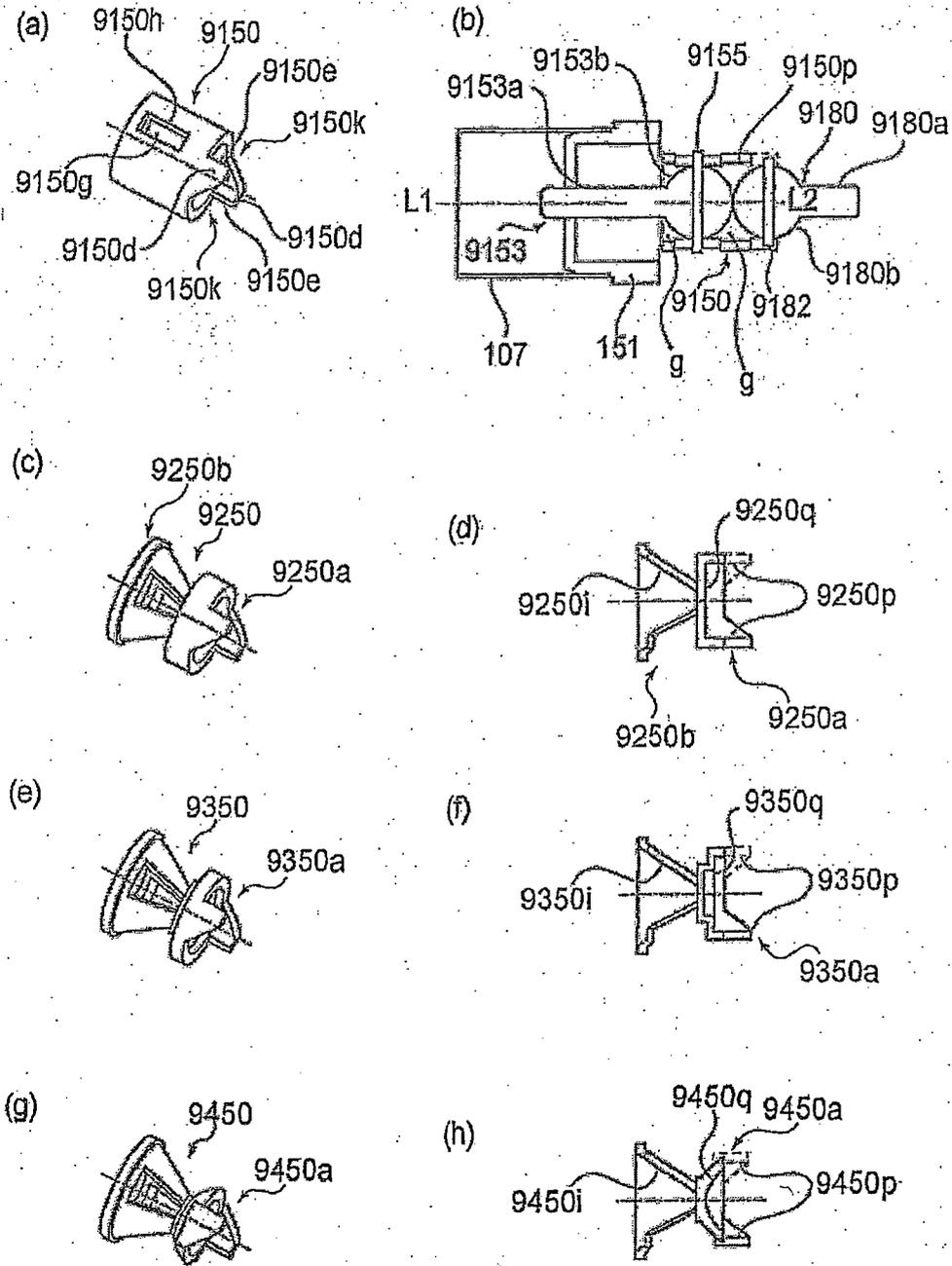


FIG. 85

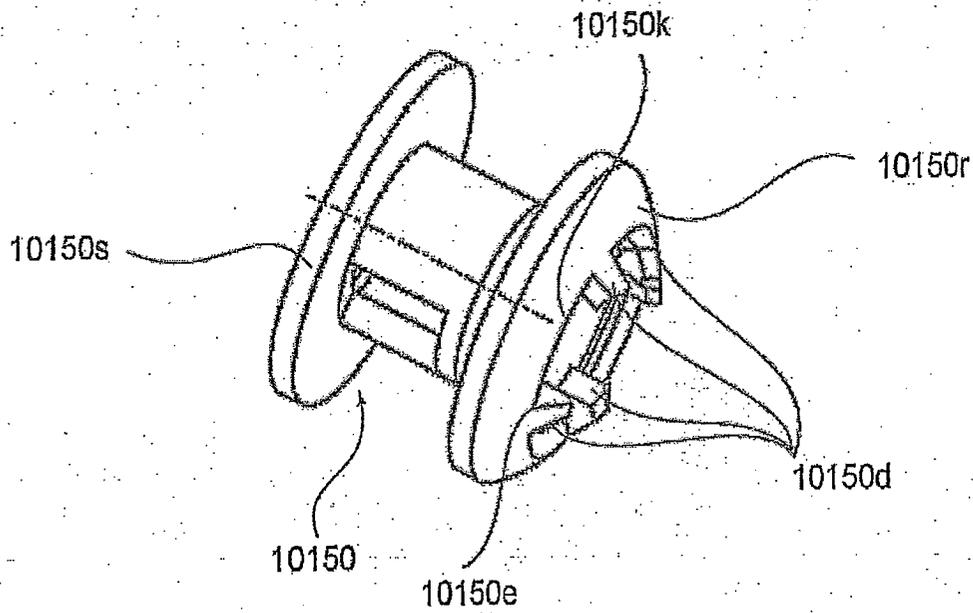


FIG. 86

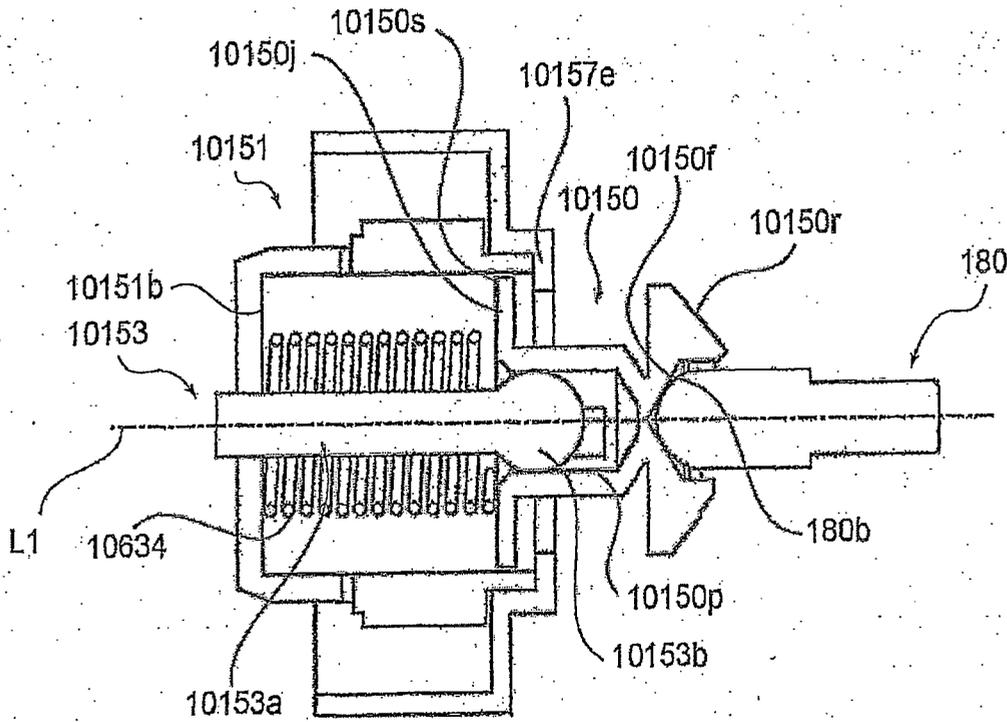


FIG. 87

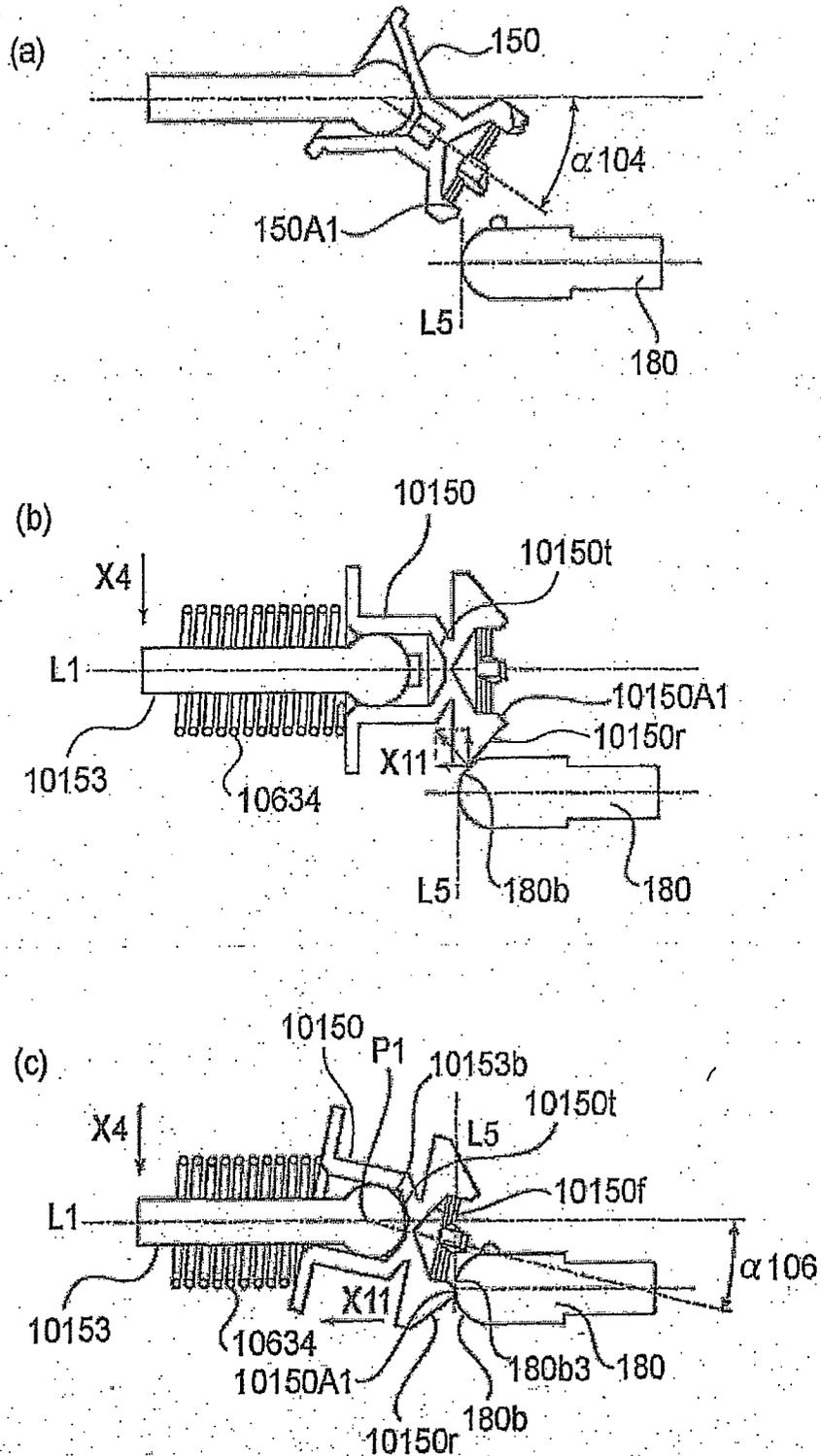


FIG. 88

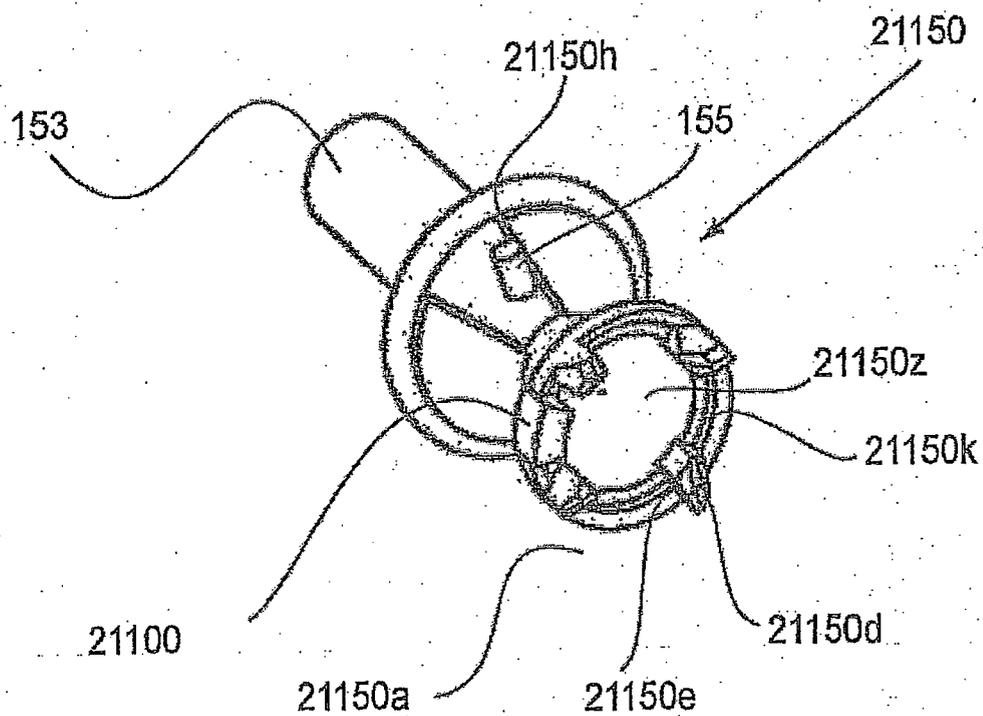


FIG. 89

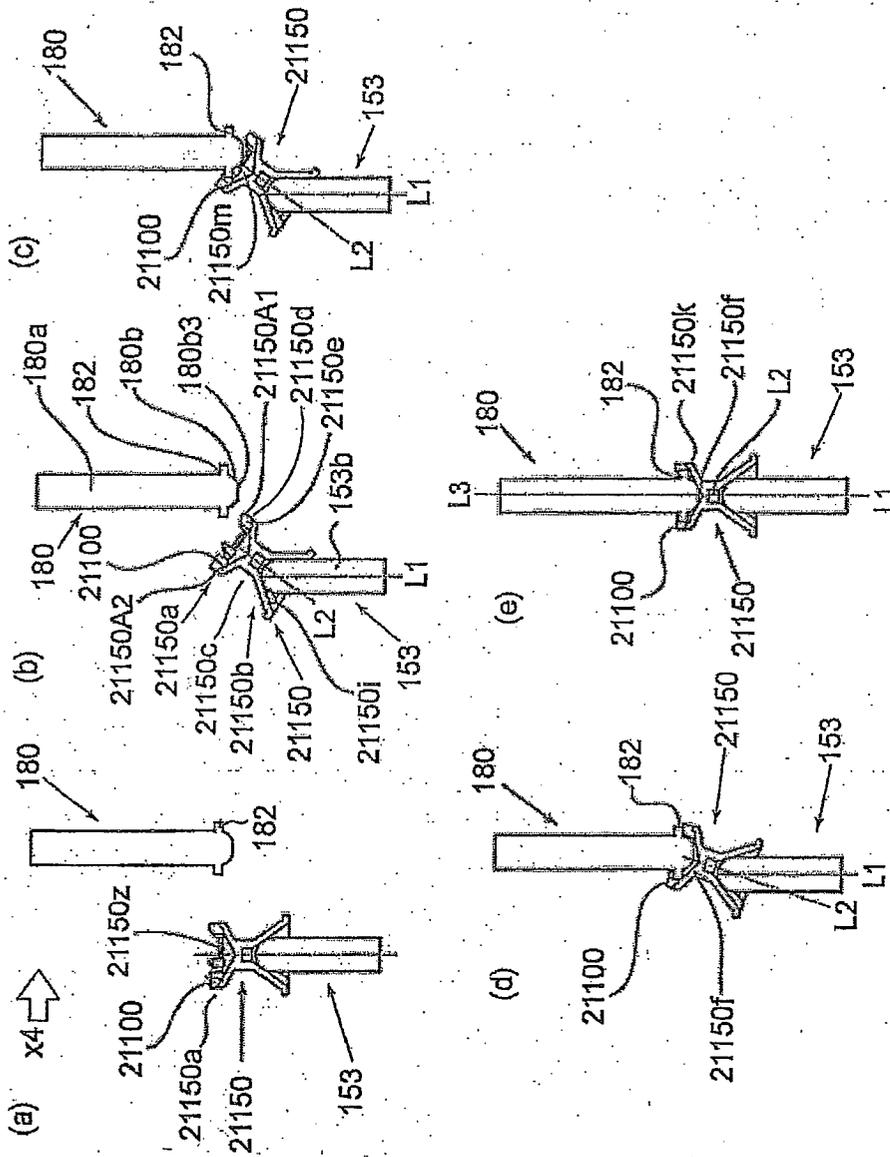


FIG. 90

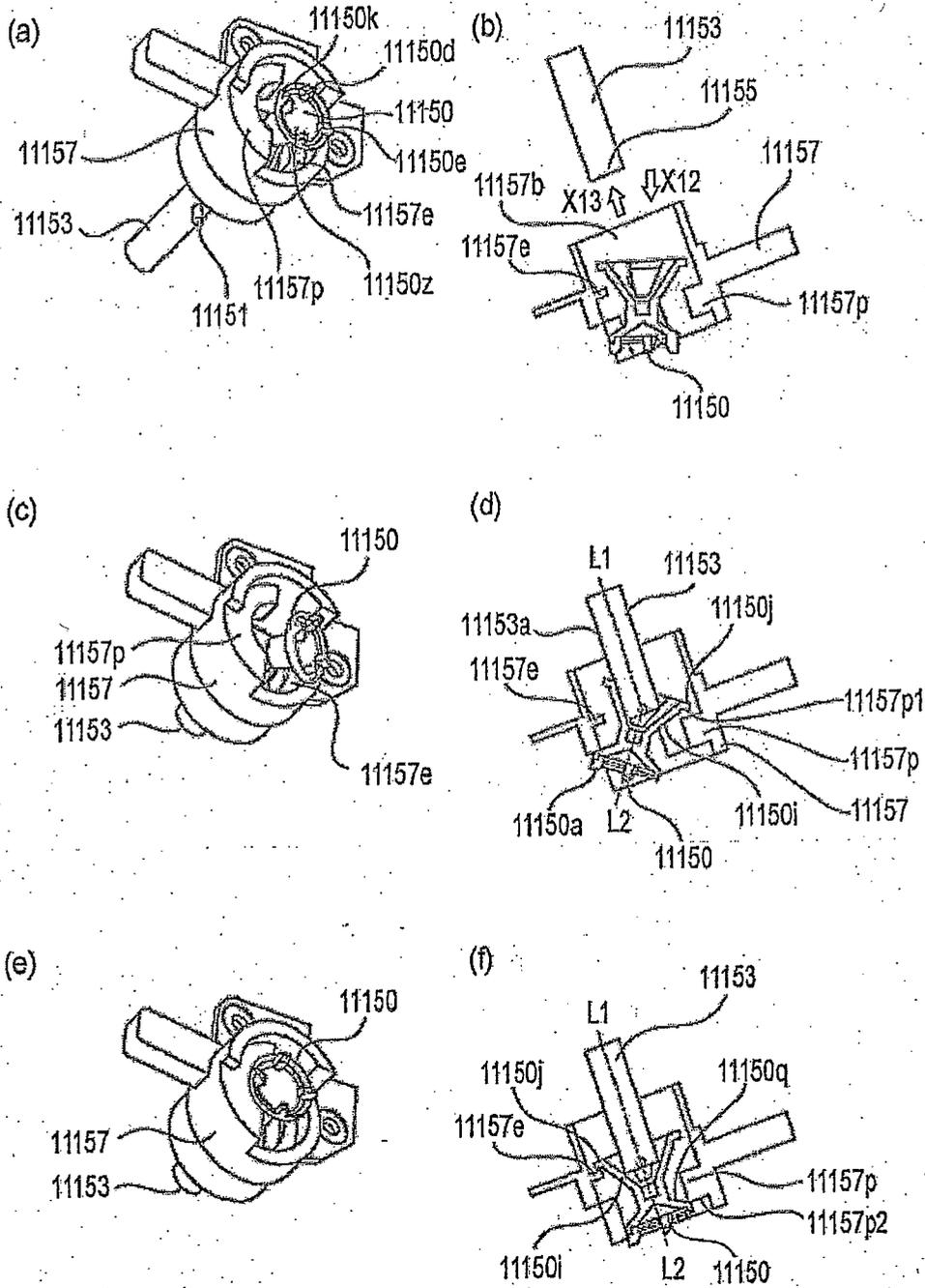
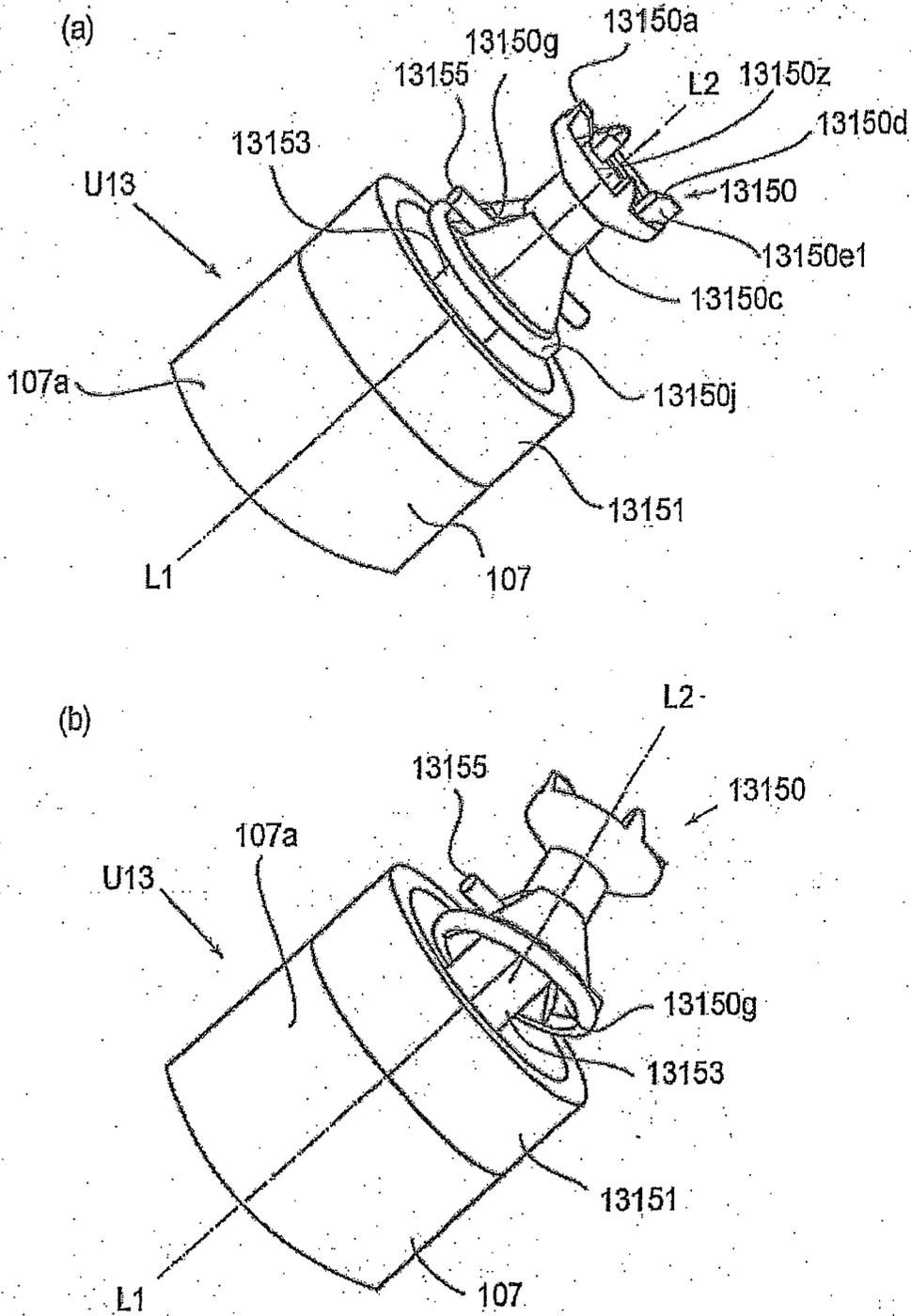


FIG. 91



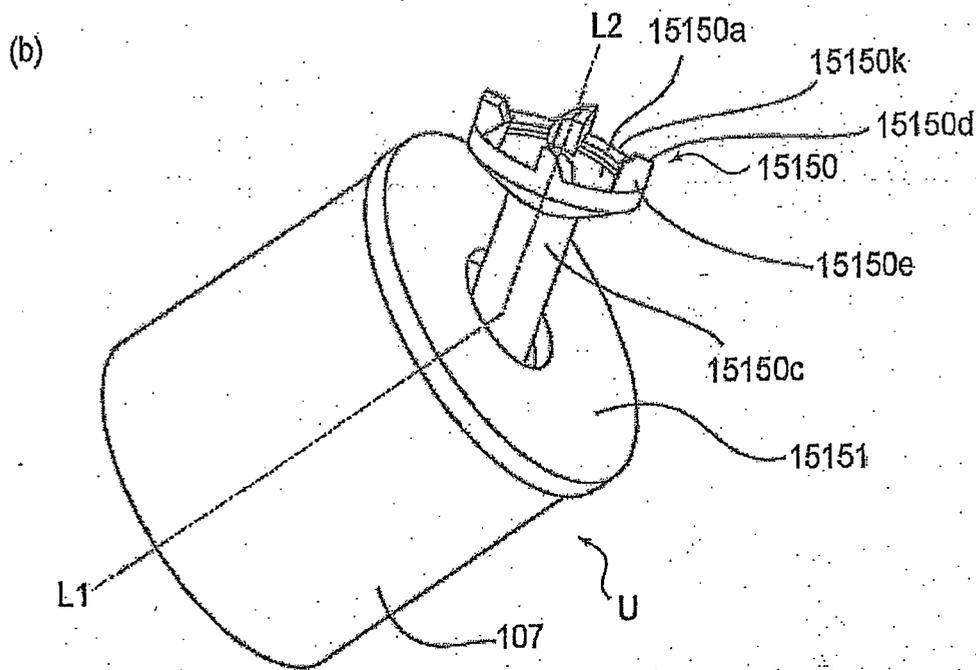
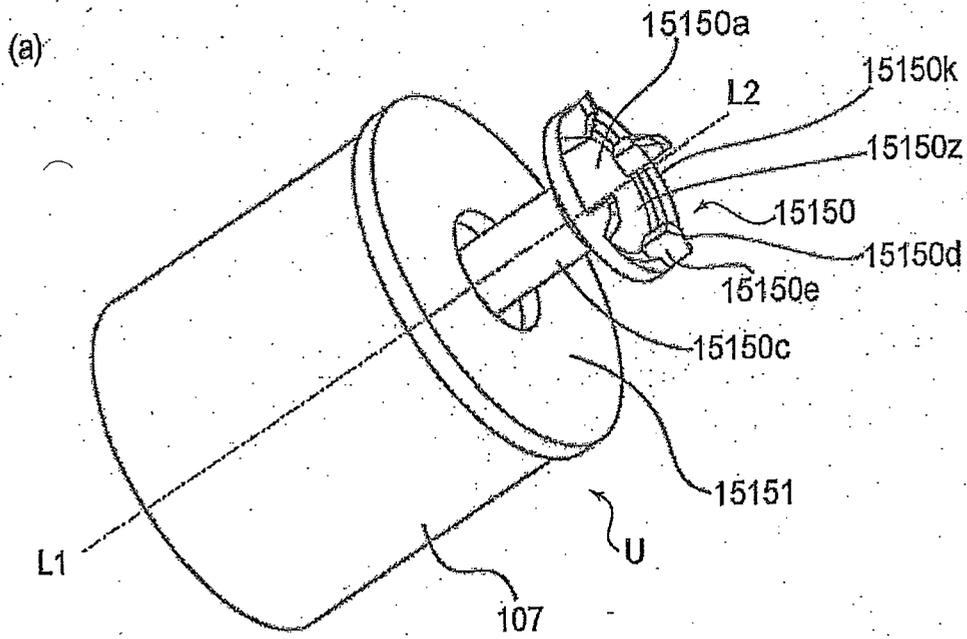


FIG. 93

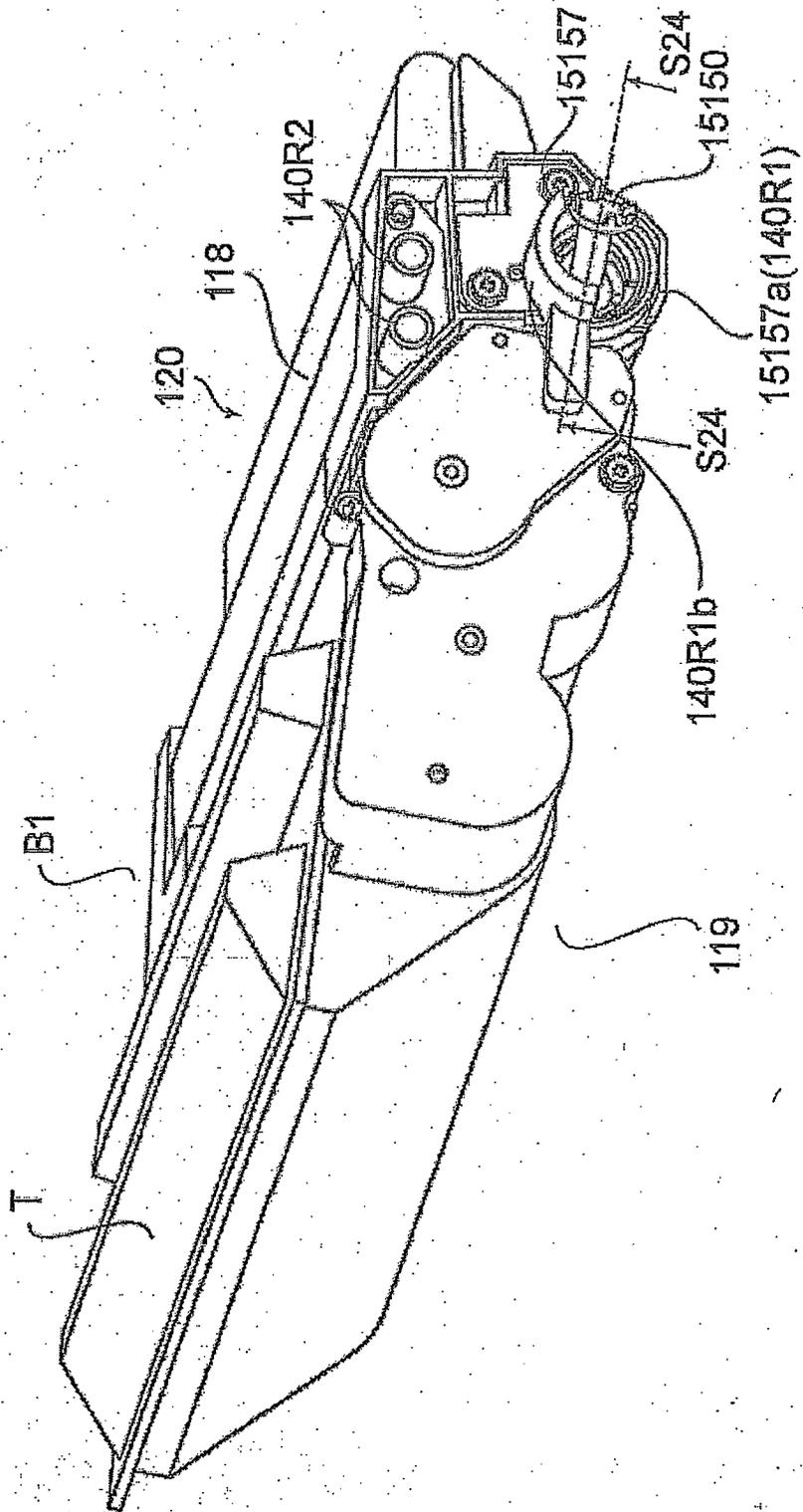


FIG. 94

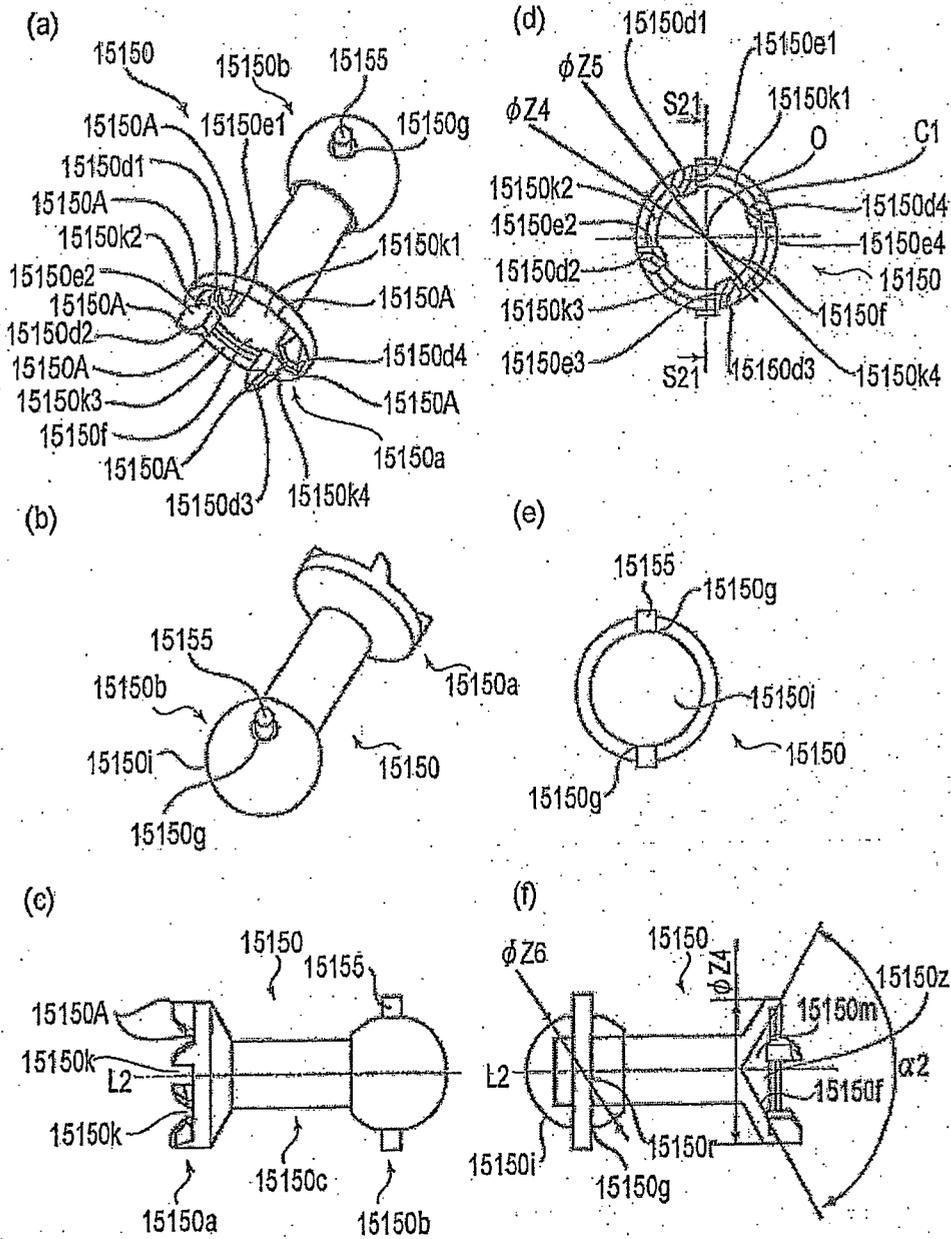


FIG. 95

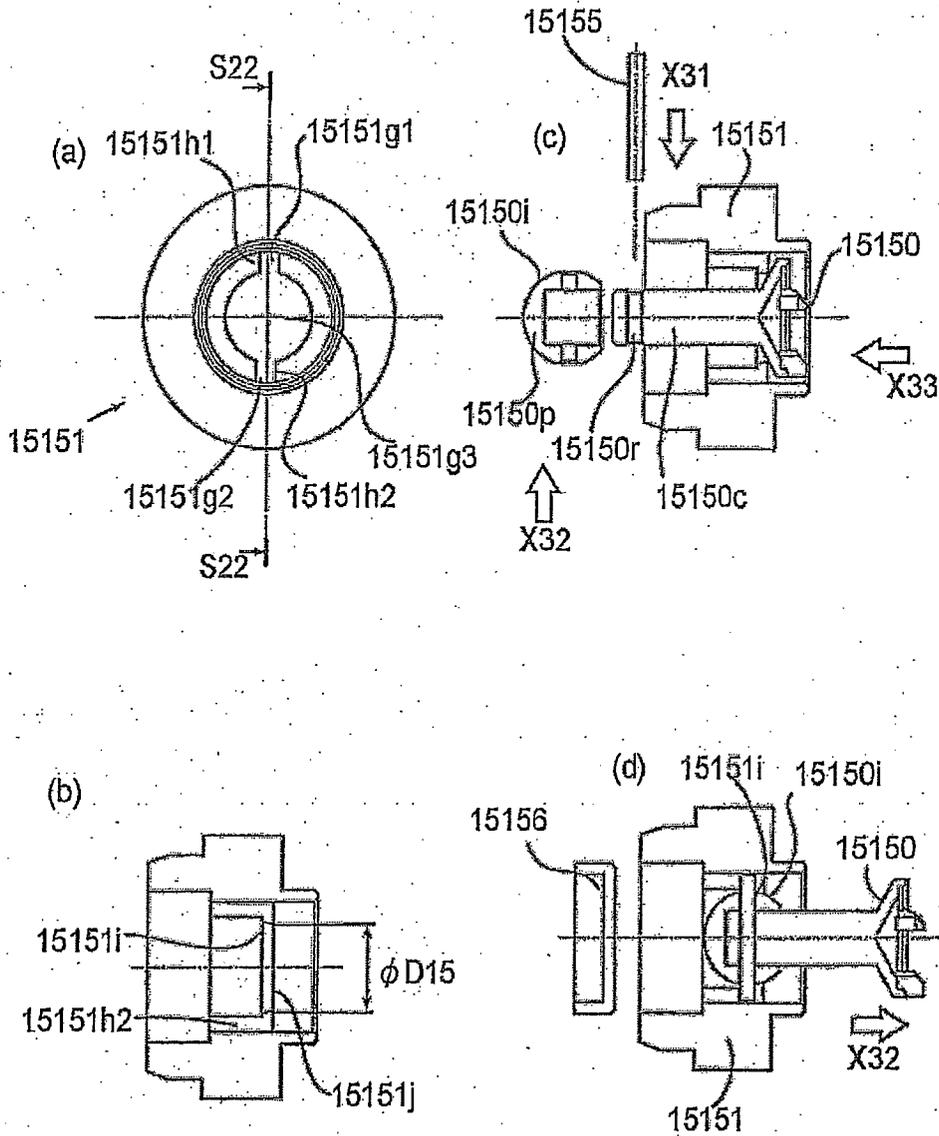


FIG.96

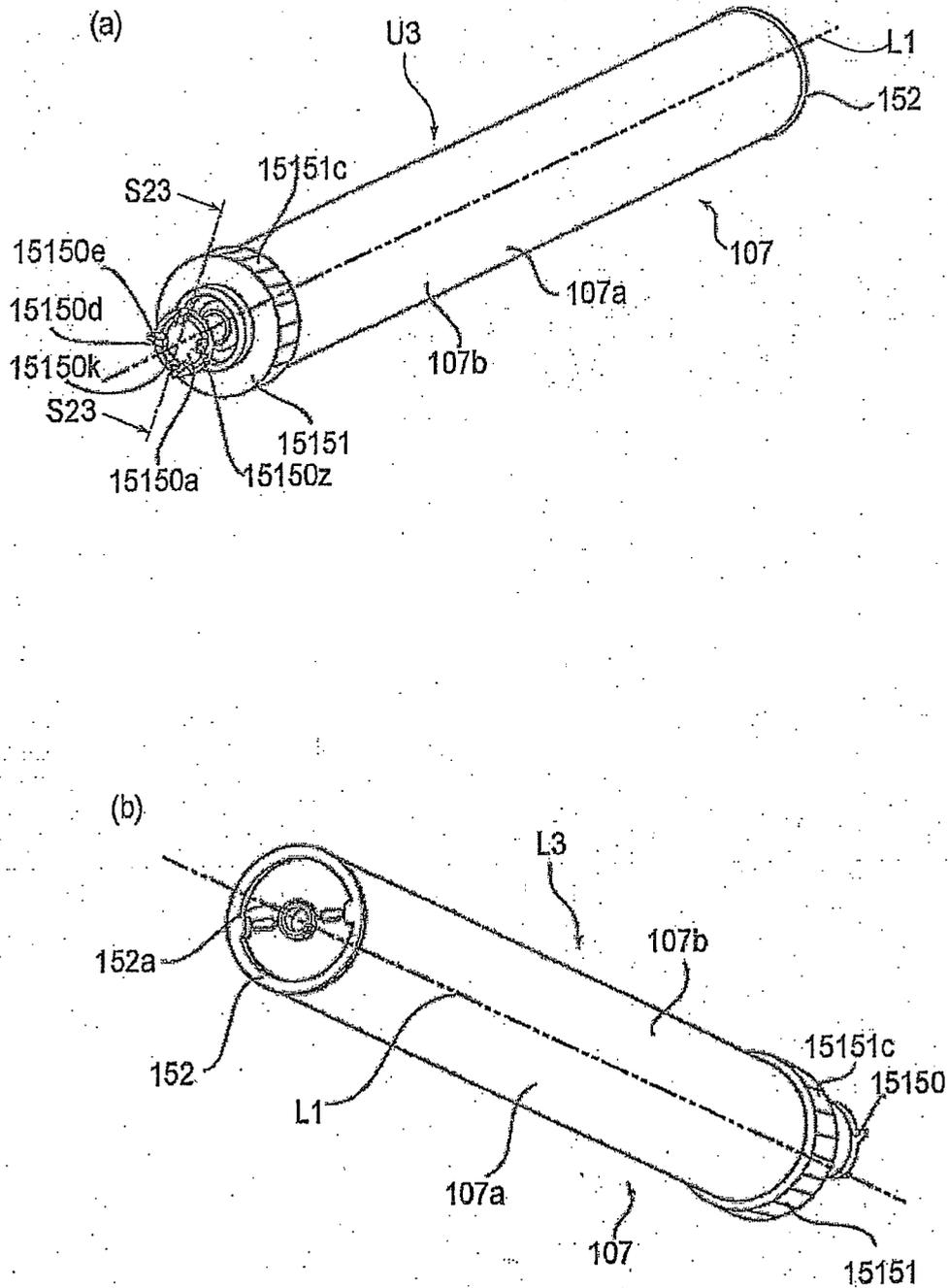


FIG.97

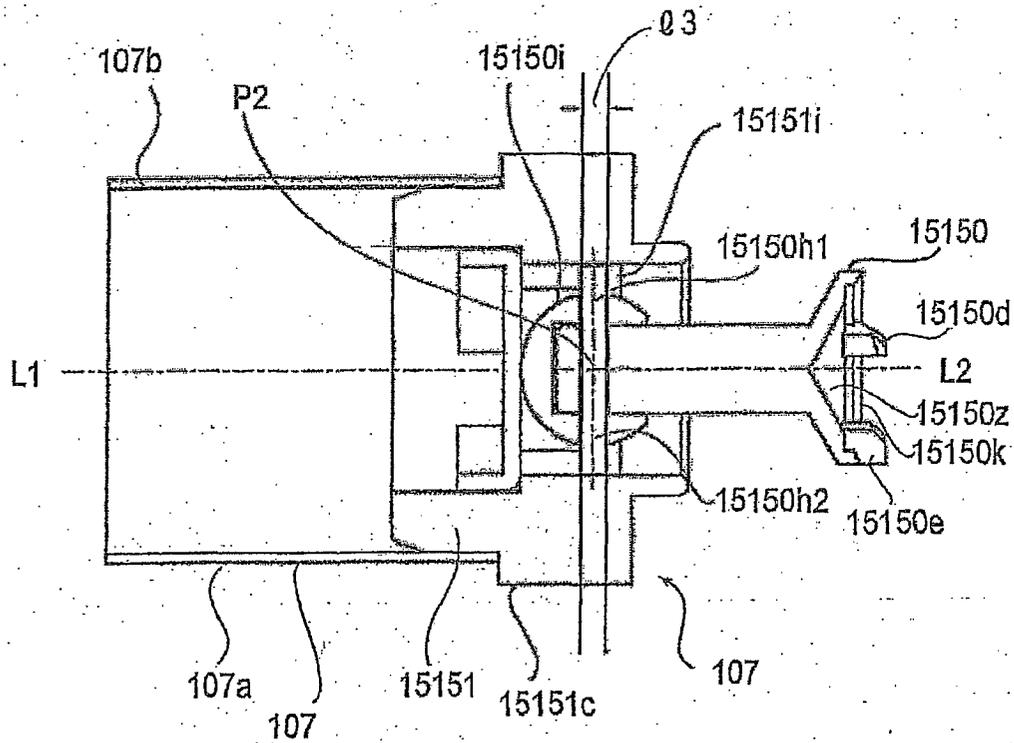


FIG.98

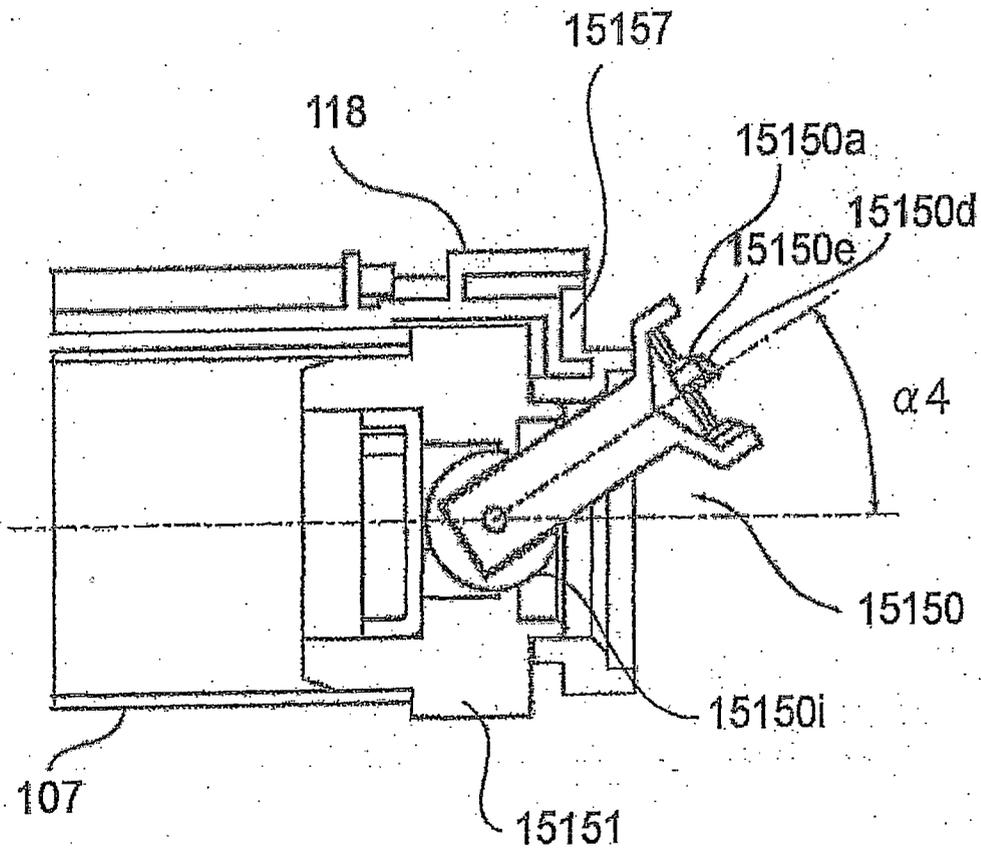


FIG. 99

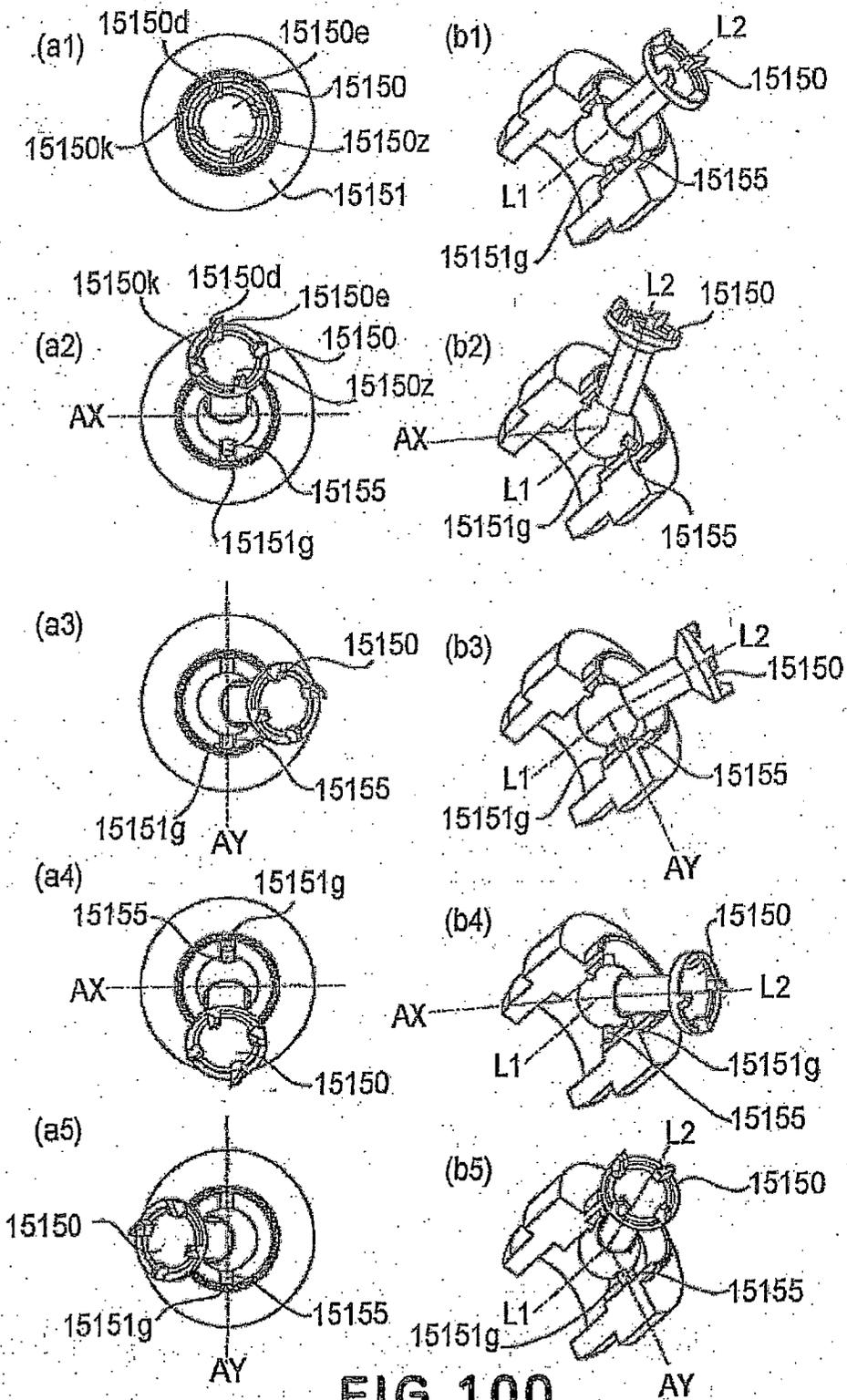


FIG. 100

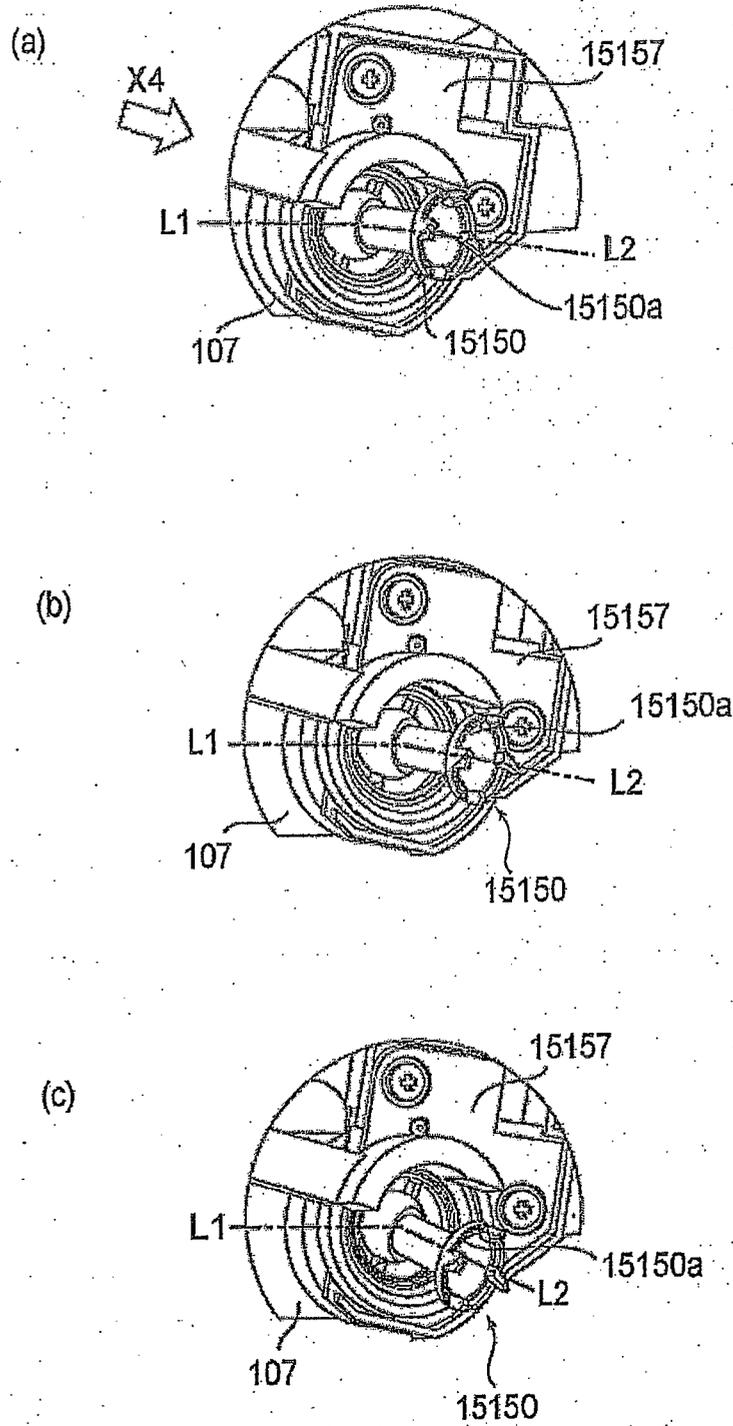
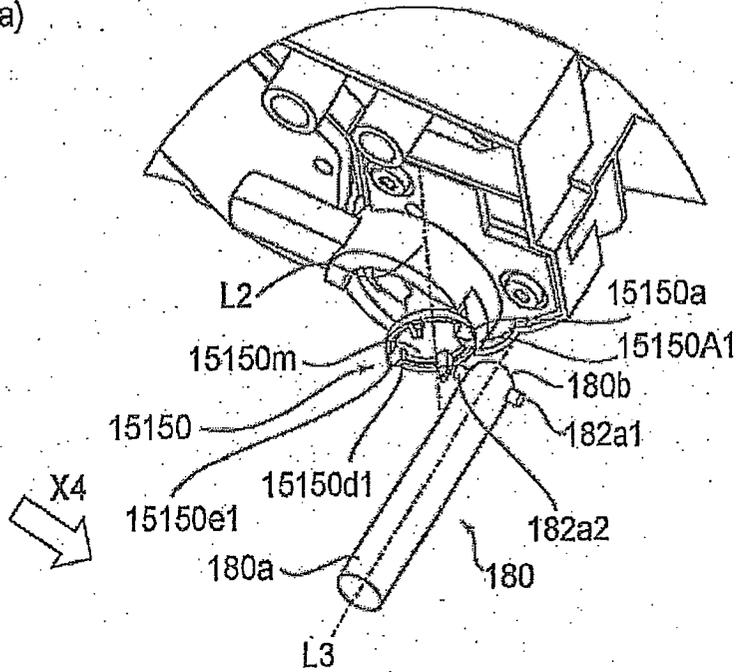


FIG. 101

(a)



(b)

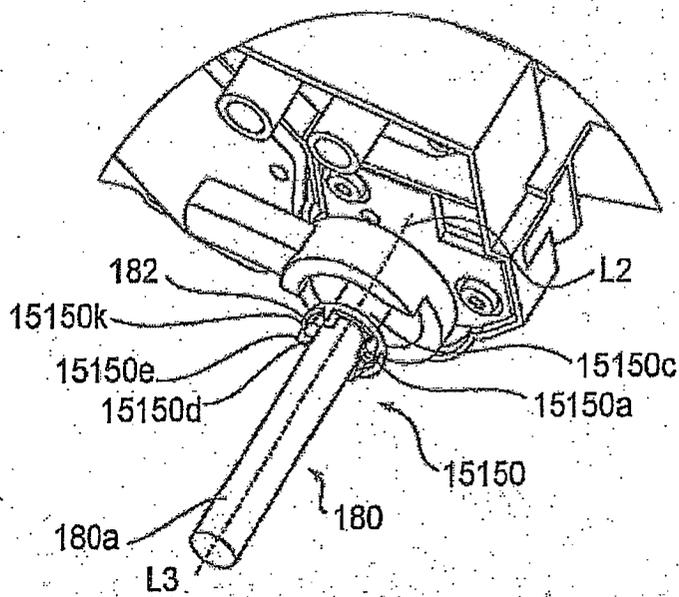


FIG. 102

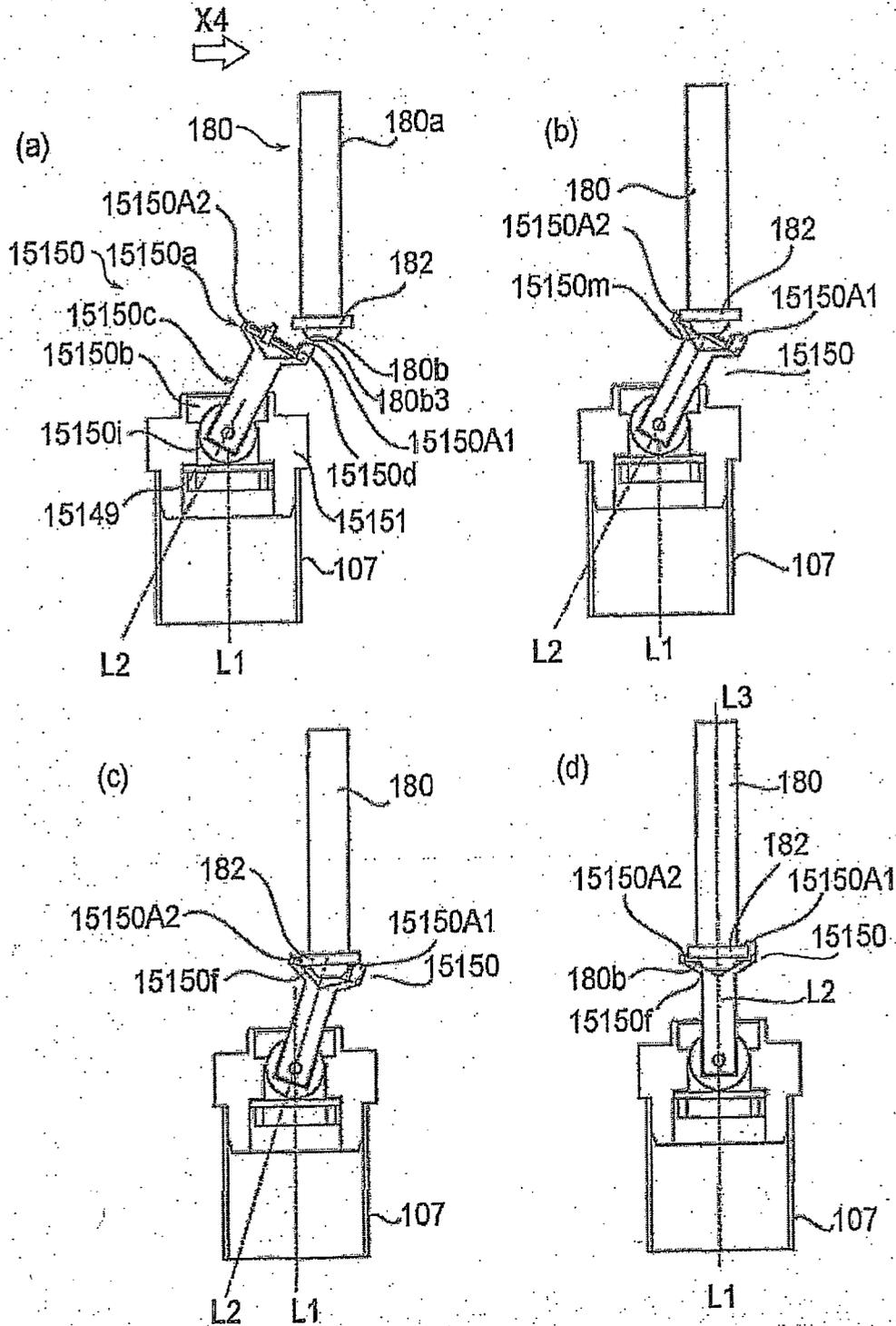


FIG. 103

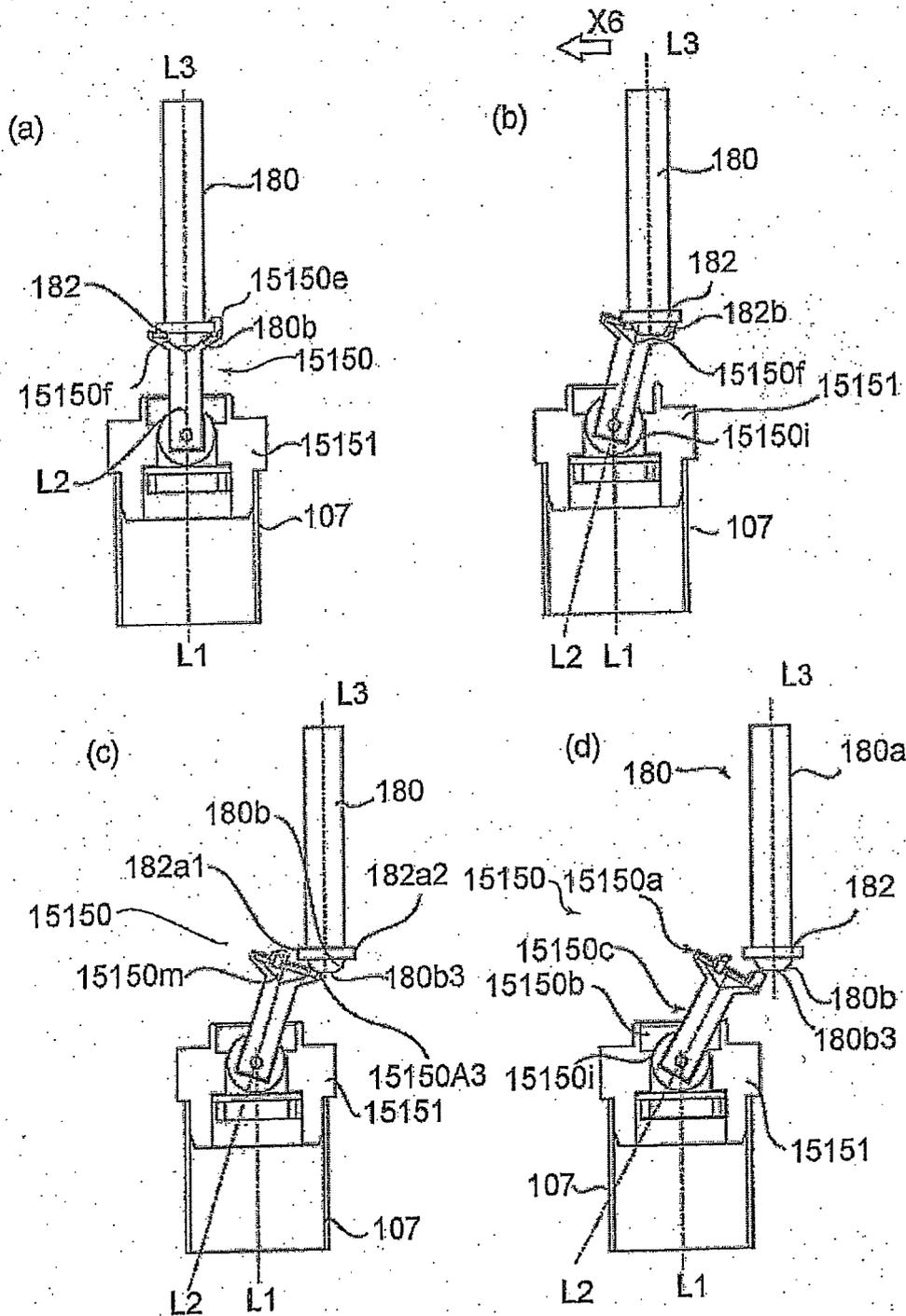


FIG. 105

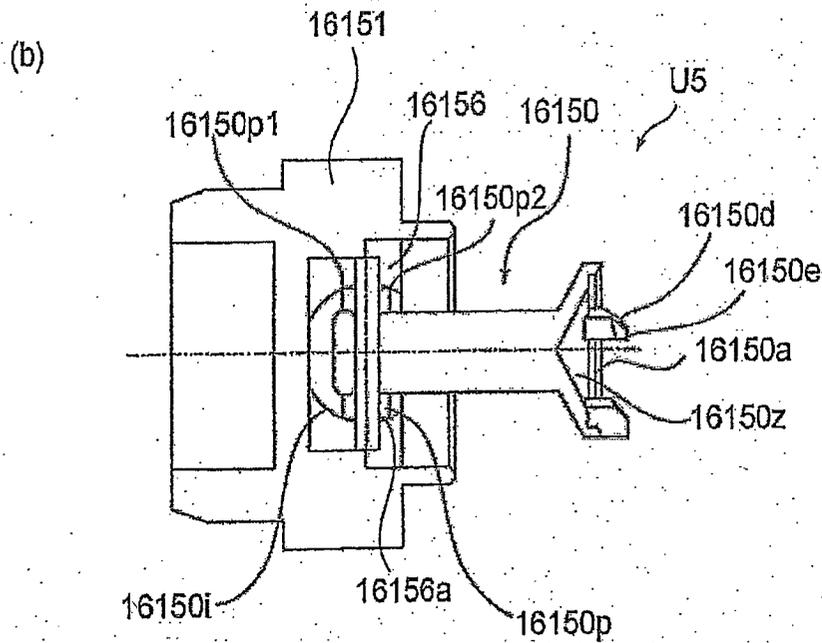
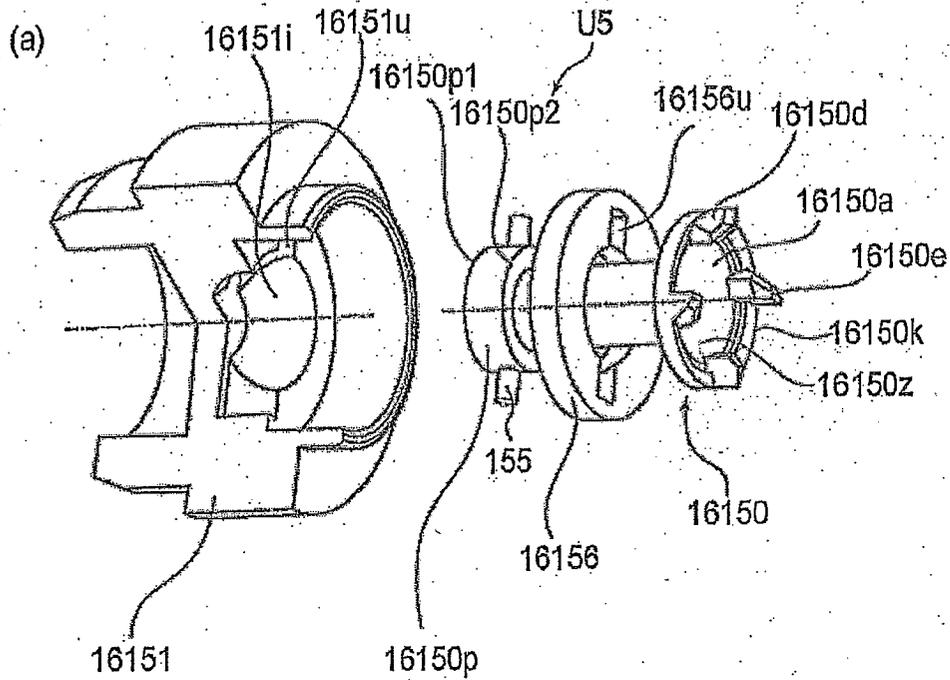


FIG. 106

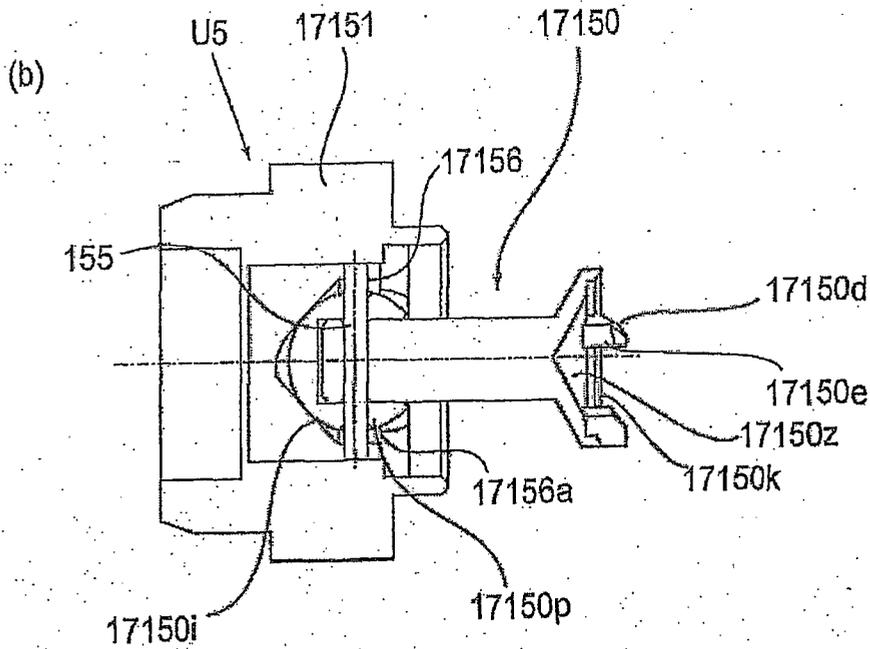
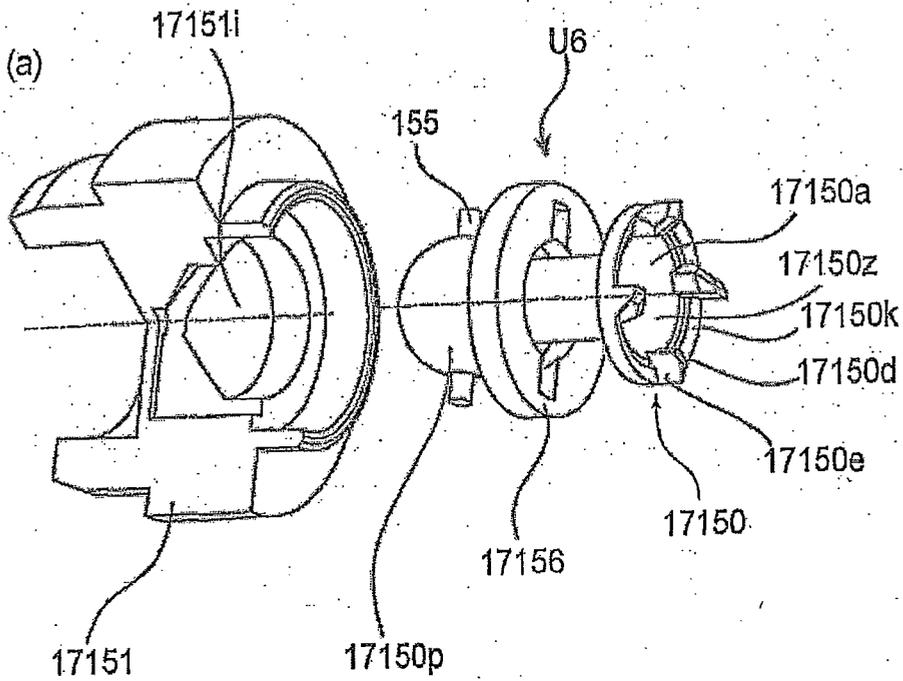


FIG. 107

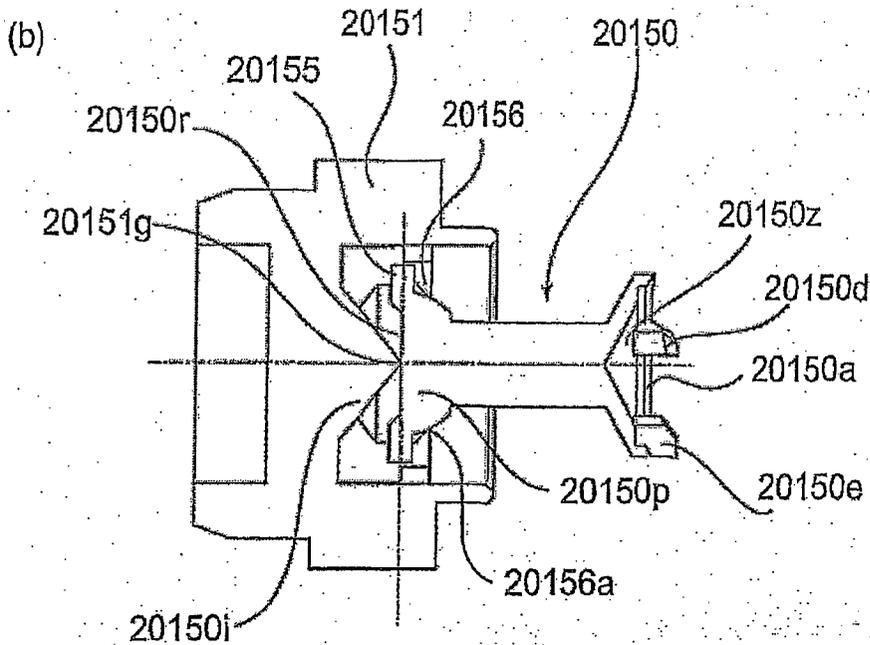
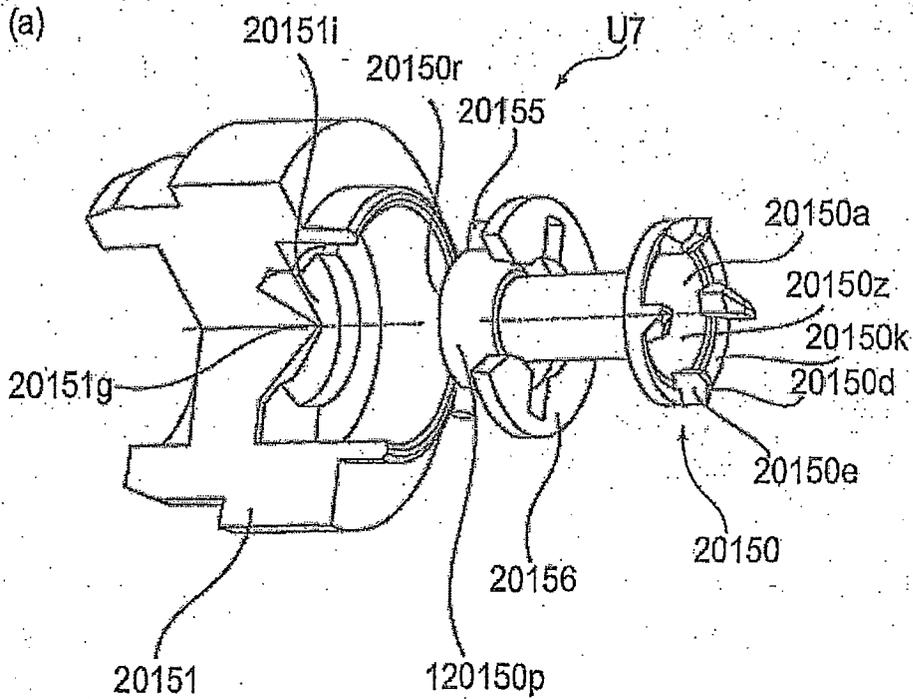


FIG. 108

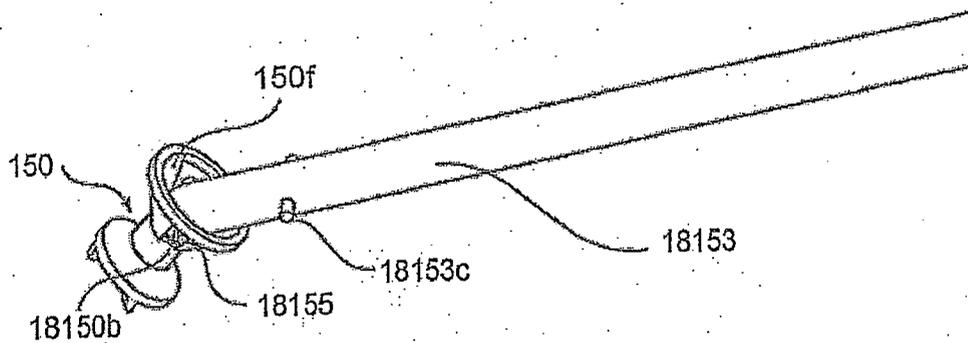


FIG. 109

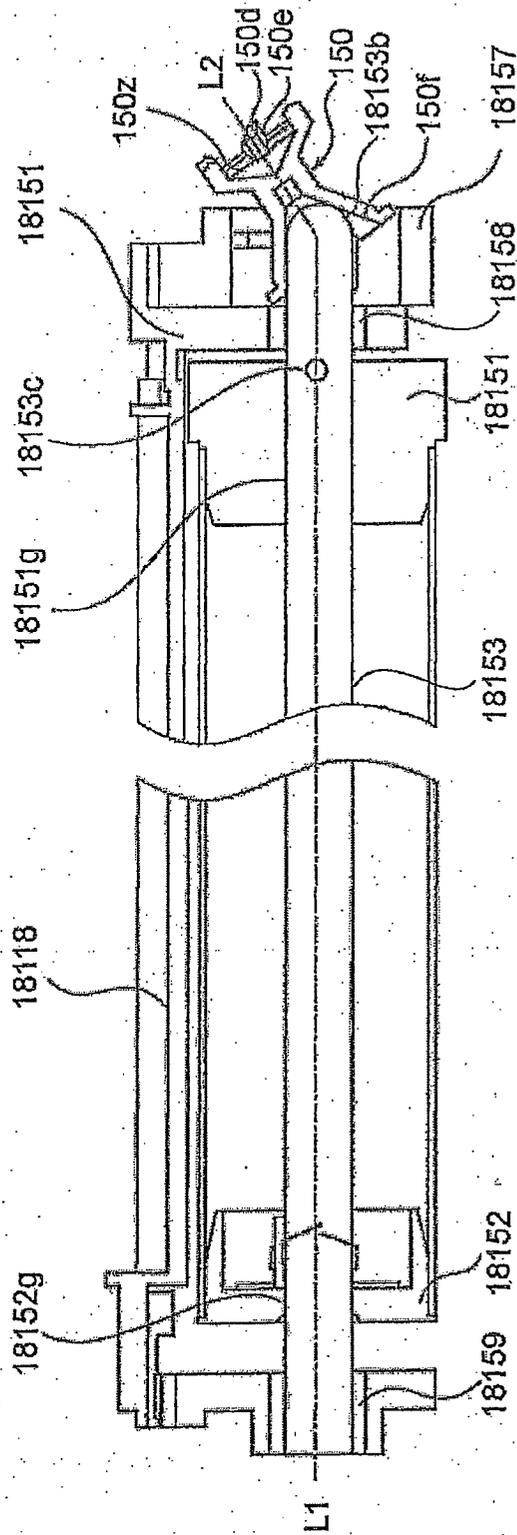


FIG. 110

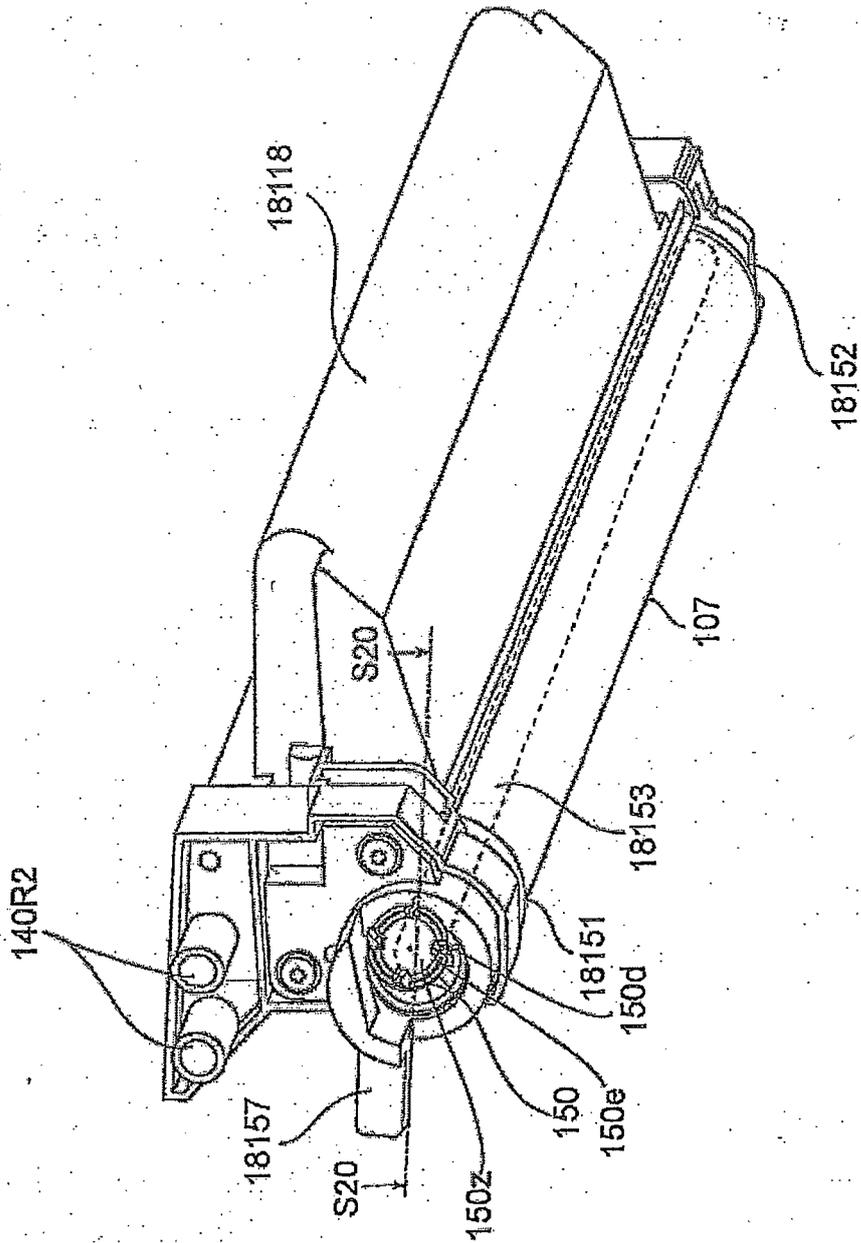


FIG. 111

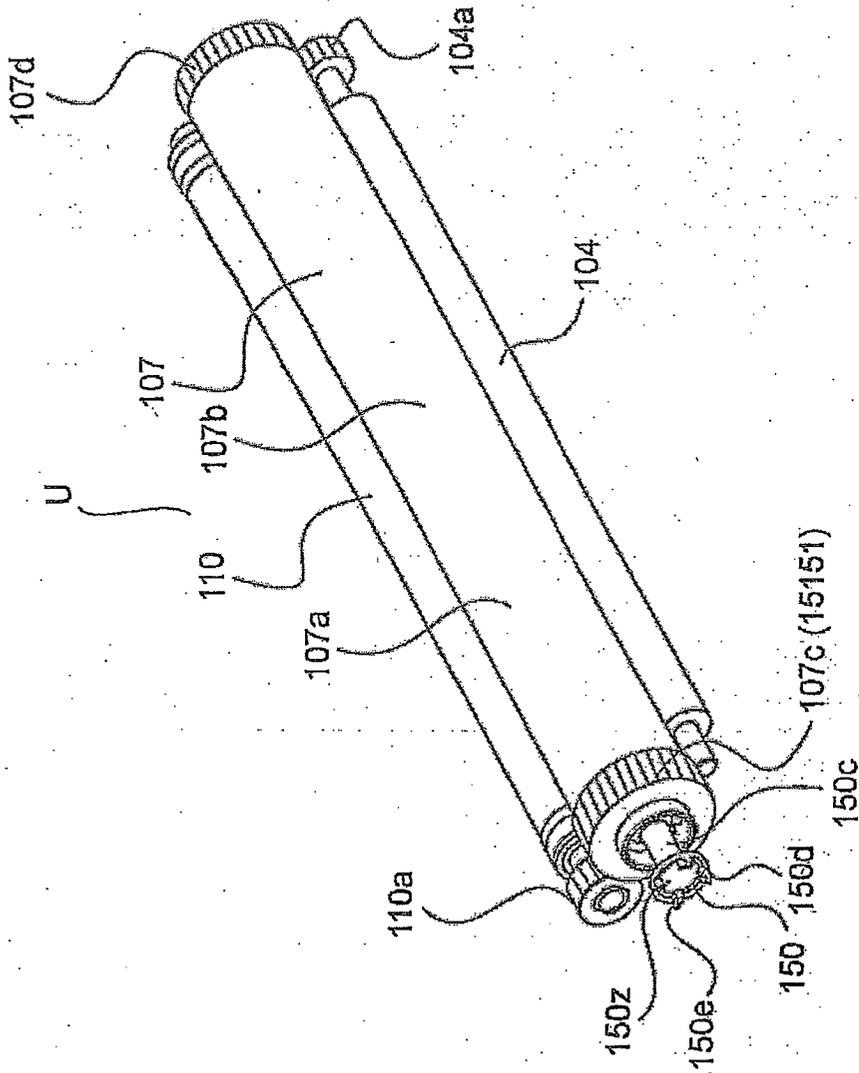


FIG. 112

1

**PROCESS CARTRIDGE,
ELECTROPHOTOGRAPHIC IMAGE
FORMING APPARATUS, AND
ELECTROPHOTOGRAPHIC
PHOTOSENSITIVE DRUM UNIT**

FIELD OF THE INVENTION AND RELATED
ART

The present invention relates to a process cartridge, an electrophotographic image forming apparatus to which the process cartridge is detachably mountable, and an electrophotographic photosensitive drum unit.

Examples of the electrophotographic image forming apparatus include an electrophotographic copying machine, an electrophotographic printer (a laser beam printer, an LED printer, and so on), and the like.

The process cartridge is prepared by integrally assembling an electrophotographic photosensitive member and process means acting on the electrophotographic photosensitive member into a unit (cartridge) and is mounted to and demounted from a main assembly of the electrophotographic image forming apparatus. For example, the process cartridge is prepared by integrally assembling the electrophotographic photosensitive member and at least one of a developing means, a charging means, and a cleaning means as the process means into a cartridge. Accordingly, examples of the process cartridge include a process cartridge prepared by integrally assembling the electrophotographic photosensitive member and three process means consisting of the developing means, the charging means, and the cleaning means into a cartridge; a process cartridge prepared by integrally assembling the electrophotographic photosensitive member and the charging means as the process means into a cartridge; and a process cartridge prepared by integrally assembling the electrophotographic photosensitive member and two process means consisting of the charging means and the cleaning means.

The process cartridge is detachably mountable to an apparatus main assembly by a user by himself (herself). Accordingly, maintenance of the apparatus can be performed by the user by himself without relying on a service person. As a result, operability of the maintenance of the electrophotographic image forming apparatus.

In a conventional process cartridge, the following constitution for receiving a rotational driving force, for rotating a drum shaped electrophotographic photosensitive member (hereinafter referred to as a "photosensitive drum"), from an apparatus main assembly is known.

On a main assembly side, a rotatable member for transmitting a driving force of a motor and a non circular twisted hole, which is provided at a center portion of the rotatable member and has a cross section integrally rotatable with the rotatable member and provided with a plurality of corners, are provided.

On a process cartridge side, a non circular twisted projection, which is provided at one of longitudinal ends of a photosensitive drum and has a cross section provided with a plurality of corners, is provided.

When the rotatable member is rotated in an engaged state between the projection and the hole in the case where the process cartridge is mounted to the apparatus main assembly, a rotational force of the rotatable member is transmitted to the photosensitive drum in a state in which an attraction force toward the hole is exerted on the projection. As a result, the rotational force for rotating the photosensitive drum is transmitted from the apparatus main assembly to the photosensitive drum (U.S. Pat. No. 5,903,803).

2

Further, a method in which a photosensitive drum is rotated by engaging a gear fixed to the photosensitive drum constituting a process cartridge has been known (U.S. Pat. No. 4,829,335).

However, in the conventional constitution described in U.S. Pat. No. 5,903,803, the rotatable member is required to be moved in a horizontal direction when the process cartridge is mounted to or demounted from the main assembly by being moved in a direction substantially perpendicular to an axial line of the rotatable member. That is, the rotatable member is required to be horizontally moved by an opening and closing operation of a main assembly cover provided to the apparatus main assembly. By the opening operation of the main assembly cover, the hole is moved apart from the projection. On the other hand, by the closing operation of the main assembly cover, the hole is moved toward the projection so as to be engaged with the projection.

Accordingly, in the conventional process cartridge, a constitution for moving the rotatable member in a rotational axis direction by the opening and closing operation of the main assembly cover is required to be provided to the main assembly.

In the constitution described in U.S. Pat. No. 4,829,335, without moving the driving gear provided to the main assembly along the axial line direction thereof, the cartridge can be mounted to and demounted from the main assembly by being moved in a direction substantially perpendicular to the axial line. However, in this constitution a driving connection portion between the main assembly and the cartridge is an engaging portion between gears, so that it is difficult to prevent rotation non uniformity of the photosensitive drum.

SUMMARY OF THE INVENTION

A principal object of the present invention is to provide a process cartridge, a photosensitive drum unit used in the process cartridge, and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable, capable of solving the above described problems of the conventional process cartridges.

Another object of the present invention is to provide a process cartridge capable of smoothly rotating a photosensitive drum by being mounted to a main assembly provided with no mechanism for moving a main assembly side coupling member, in its axial line direction, for transmitting a rotational force to the photosensitive drum by an opening and closing operation of a main assembly cover. A further object of the present invention is to provide a photosensitive drum unit used in the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is mountable and from which the process cartridge is demountable.

A further object of the present invention is to provide a process cartridge demountable from a main assembly of an electrophotographic image forming apparatus provided with a driving shaft in a direction perpendicular to an axial line of the driving shaft. A further object of the present invention is to provide a photosensitive drum unit used in the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable.

A further object of the present invention is to provide a process cartridge mountable to a main assembly of an electrophotographic image forming apparatus provided with a driving shaft in a direction substantially perpendicular to an axial line of the driving shaft. A further object of the present invention is to provide a photosensitive drum unit used in the

process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable.

A further object of the present invention is to provide a process cartridge mountable to and demountable from a main assembly of an electrophotographic image forming apparatus provided with a driving shaft in a direction substantially perpendicular to an axial line of the driving shaft. A further object of the present invention is to provide a photosensitive drum unit used in the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable.

A further object of the present invention is to provide a process cartridge which compatibly realized that the process cartridge is demountable from a main assembly provided with a driving shaft in a direction substantially perpendicular to an axial line of the driving shaft and is capable of smoothly rotating the photosensitive drum. A further object of the present invention is to provide a photosensitive drum unit used in the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable.

A further object of the present invention is to provide a process cartridge which compatibly realizes that the process cartridge is mountable to a main assembly provided with a driving shaft in a direction substantially perpendicular to an axial line of the driving shaft and is capable of smoothly rotating the photosensitive drum. A further object of the present invention is to provide a photosensitive drum unit used in the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable.

A further object of the present invention is to provide a process cartridge which compatibly realizes that the process cartridge is mountable to and demountable from a main assembly provided with a driving shaft in a direction substantially perpendicular to an axial line of the driving shaft and is capable of smoothly rotating the photosensitive drum. A further object of the present invention is to provide a photosensitive drum unit used in the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable.

According to the present invention, there is provided a process cartridge which can be demounted from a main assembly of an electrophotographic image forming apparatus provided with the drive shaft in a direction substantially perpendicular to an axis of a drive shaft

According to the present invention, there is provided a photosensitive drum unit usable with the process cartridge and an electrophotographic image forming apparatus to which the process cartridge is detachably mountable

According to the present invention, there is provided a process cartridge mountable, in a direction substantially perpendicular to an axis of a drive shaft, to a main assembly of an electrophotographic image forming device provided with the drive shaft

According to the present invention, there is provided a photosensitive drum unit usable with the process cartridge and an electrophotographic image forming apparatus with the detachably mountable process cartridge

According to the present invention, there is provided a process cartridge which can be mounted and dismounted, in a direction substantially perpendicular to an axis of a drive shaft, to a main assembly of an electrophotographic image forming apparatus provided with the drive shaft

According to the present invention, there is provided a photosensitive drum unit usable with the process cartridge

and an electrophotographic image forming apparatus relative to which the process cartridge can be mounted and demounted

According to the present invention, a process cartridge is mounted to a main assembly which is not provided with a mechanism for moving a main assembly side drum coupling member for transmitting a rotational force to a photosensitive drum to an axial direction, and can rotate the photosensitive drum smoothly

According to the present invention, a process cartridge can be demounted in a direction substantially perpendicular to an axis of a drive shaft provided in a main assembly, and simultaneously, the smooth rotation of a photosensitive drum can be carried out

According to the present invention, a process cartridge can be mounted in a direction substantially perpendicular to an axis of a drive shaft provided in a main assembly, and simultaneously, the smooth rotation of a photosensitive drum can be carried out

According to the present invention, a process cartridge is mountable and dismountable in a direction substantially perpendicular to an axis of a drive shaft provided in a main assembly, and simultaneously, the smooth rotation of a photosensitive drum can be carried out.

These and other objects, features, and advantages of the present invention will become more apparent upon consideration of the following description of the preferred embodiments of the present invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional side elevation of a cartridge according to an embodiment of the present invention.

FIG. 2 is a perspective view of the cartridge according to the embodiment of the present invention.

FIG. 3 is a perspective view of the cartridge according to the embodiment of the present invention.

FIG. 4 is a sectional side elevation of an apparatus main assembly according to the embodiment of the present invention.

FIG. 5 is a perspective view and a longitudinal sectional view of a drum flange (drum shaft) according to the embodiment of the present invention.

FIG. 6 is a perspective view of a photosensitive drum according to the embodiment of the present invention.

FIG. 7 is longitudinal sectional views of the photosensitive drum according to the embodiment of the present invention.

FIG. 8 is perspective views and a longitudinal sectional view of a coupling according to the embodiment of the present invention.

FIG. 9 is perspective views of a drum bearing member according to the embodiment of the present invention.

FIG. 10 is detailed views of a side surface of the cartridge according to the embodiment of the present invention.

FIG. 11 is exploded perspective views and longitudinal sectional views of the coupling and the bearing member according to the embodiment of the present invention.

FIG. 12 is a longitudinal sectional view after the assembling of the cartridge according to the embodiment of the present invention.

FIG. 13 is a longitudinal sectional view after the assembling of the cartridge according to the embodiment of the present invention.

FIG. 14 is a longitudinal sectional view of the cartridge according to the embodiment of the present invention.

FIG. 15 is perspective views which illustrate a combined state of the drum shaft and the coupling.

FIG. 16 is perspective views which illustrate an inclined state of the coupling.

FIG. 17 is perspective views and a longitudinal sectional view of a driving structure of the apparatus main assembly according to the embodiment of the present invention.

FIG. 18 is a perspective view of a cartridge set portion of the apparatus main assembly according to the embodiment of the present invention.

FIG. 19 is a perspective view of the cartridge set portion of the apparatus main assembly according to the embodiment of the present invention.

FIG. 20 is sectional views which illustrate a process of the mounting of the cartridge to the apparatus main assembly according to the embodiment of the present invention.

FIG. 21 is perspective views which illustrate a process of the engagement between the drive shaft and the coupling according to the embodiment of the present invention.

FIG. 22 is perspective views which illustrate a process of the engagement between the drive shaft and the coupling according to the embodiment of the present invention.

FIG. 23 is perspective views which illustrate the coupling of the apparatus main assembly and the coupling of the cartridge according to the embodiment of the present invention.

FIG. 24 is an exploded perspective view which illustrates the drive shaft, the driving gear, the coupling, and the drum shaft according to the embodiment of the present invention.

FIG. 25 is perspective views which illustrate a process of the disengagement of the coupling from the drive shaft according to the embodiment of the present invention.

FIG. 26 is perspective views which illustrate the coupling and the drum shaft according to the embodiment of the present invention.

FIG. 27 is perspective views which illustrate the drum shaft according to the embodiment of the present invention.

FIG. 28 is perspective views which illustrate a drive shaft and a driving gear according to the embodiment of the present invention.

FIG. 29 is perspective views which illustrate the coupling according to the embodiment of the present invention, and side views.

FIG. 30 is exploded perspective views which illustrate the drum shaft, the drive shaft, and the coupling according to the embodiment of the present invention.

FIG. 31 shows a side view and a longitudinal section of the side surface of the cartridge according to the embodiment of the present invention.

FIG. 32 is a perspective view and a view, as seen from the device of the cartridge set portion of the apparatus main assembly, according to the embodiment of the present invention.

FIG. 33 is longitudinal sectional views which illustrate a dismounting process from the apparatus main assembly of the cartridge according to the embodiment of the present invention.

FIG. 34 is longitudinal sectional views which illustrate a mounting process to the apparatus main assembly of the cartridge according to the embodiment of the present invention.

FIG. 35 is perspective views which illustrate phase control means for a drive shaft according to a second embodiment of the present invention.

FIG. 36 is perspective views which illustrate a mounting operation of a cartridge according to the embodiment of the present invention.

FIG. 37 is perspective views of a coupling according to the embodiment of the present invention.

FIG. 38 is top plan views of a mounted state of the cartridge as seen in a mounting direction according to the embodiment of the present invention.

FIG. 39 is perspective views which illustrate a drive stop state of the process cartridge (photosensitive drum) according to the embodiment of the present invention.

FIG. 40 is longitudinal sectional views and perspective views which illustrate a dismounting operation of the process cartridge according to the embodiment of the present invention.

FIG. 41 is a sectional view which illustrates the state where a door provided in an apparatus main assembly is opened according to a third embodiment of the present invention.

FIG. 42 is a perspective view which illustrates a mounting guide of a driving side of the apparatus main assembly according to the embodiment of the present invention.

FIG. 43 is a side view of the driving side of the cartridge according to the embodiment of the present invention.

FIG. 44 is a perspective view as seen from the driving side of the cartridge according to the embodiment of the present invention.

FIG. 45 is side view which illustrates an inserting state of the cartridge to the apparatus main assembly according to the embodiment of the present invention.

FIG. 46 is a perspective view which illustrates an attaching state of a locking member to a drum bearing member according to a fourth embodiment of the present invention.

FIG. 47 is an exploded perspective view which illustrates the drum bearing member, a coupling, and a drum shaft according to the embodiment of the present invention.

FIG. 48 is a perspective view which illustrates a driving side of the cartridge according to the embodiment of the present invention.

FIG. 49 is perspective views and longitudinal sectional views which illustrate an engaged state between a drive shaft and a coupling according to the embodiment of the present invention.

FIG. 50 is an exploded perspective view which illustrates a state where a pressing member was mounted to a drum bearing member according to a fifth embodiment of the present invention.

FIG. 51 is exploded perspective views which illustrate the drum bearing member, a coupling, and a drum shaft according to the embodiment of the present invention.

FIG. 52 is a perspective view which illustrates the driving side of a cartridge according to the embodiment of the present invention.

FIG. 53 is perspective views and longitudinal sectional views which illustrate an engaged state between a drive shaft and the coupling according to the embodiment of the present invention.

FIG. 54 is an exploded perspective view which illustrates a cartridge before assembling the major members according to a sixth embodiment of the present invention.

FIG. 55 is a side view which illustrates a driving side according to the embodiment of the present invention.

FIG. 56 is schematic longitudinal sectional views of a drum shaft and a coupling according to the embodiment of the present invention.

FIG. 57 is longitudinal sectional views which illustrate the engagement between a drive shaft and coupling according to the embodiment of the present invention.

FIG. 58 is sectional views which illustrate a modified example of a coupling locking member according to the embodiment of the present invention.

FIG. 59 is a perspective view which illustrates an attaching state of a magnet member to a drum bearing member according to a seventh embodiment of the present invention.

FIG. 60 is an exploded perspective view which illustrates the drum bearing member, a coupling, and a drum shaft according to the embodiment of the present invention.

FIG. 61 is a perspective view which illustrates a driving side of the cartridge according to the embodiment of the present invention.

FIG. 62 is perspective views and longitudinal sectional views which illustrate an engaged state between a drive shaft and coupling according to the embodiment of the present invention.

FIG. 63 is a perspective view which illustrates the driving side of a cartridge according to an eighth embodiment of the present invention.

FIG. 64 is an exploded perspective views which illustrate a state before the assembly of a bearing member according to the embodiment of the present invention.

FIG. 65 is longitudinal sectional views which illustrate the structures of a drum shaft, a coupling, and a bearing member according to the embodiment of the present invention.

FIG. 66 is a perspective view which illustrates a driving side of an apparatus main assembly guide according to the embodiment of the present invention.

FIG. 67 is longitudinal sectional views which illustrate a disengagement state of a locking member according to the embodiment of the present invention.

FIG. 68 is longitudinal sectional views which illustrate the engagement between a drive shaft and a coupling according to the embodiment of the present invention.

FIG. 69 is side views which illustrate a driving side of a cartridge according to a ninth embodiment of the present invention.

FIG. 70 is a perspective view which illustrates a driving side of an apparatus main assembly guide according to the embodiment of the present invention.

FIG. 71 is side views which illustrate a relation between the cartridge and the main assembly guide according to the embodiment of the present invention.

FIG. 72 is perspective views which illustrate a relation between the main assembly guide and the coupling according to the embodiment of the present invention.

FIG. 73 is side views, as seen from the driving side, which illustrate a process of the mounting to the main assembly of the cartridge, according to the embodiment of the present invention.

FIG. 74 is a perspective view which illustrates a driving side of a main assembly guide according to a tenth embodiment of the present invention.

FIG. 75 is a side view which illustrates a relation between the main assembly guide and a coupling according to the embodiment of the present invention.

FIG. 76 is a perspective view which illustrates a relation between the main assembly guide and the coupling according to the embodiment of the present invention.

FIG. 77 is a side view which illustrates a relation between the cartridge and the main assembly guide according to the embodiment of the present invention.

FIG. 78 is perspective views which illustrate a relation between the main assembly guide and the coupling according to the embodiment of the present invention.

FIG. 79 is a side view which illustrates a relation between the main assembly guide and the coupling according to the embodiment of the present invention.

FIG. 80 is a perspective view which illustrates a relation between the main assembly guide and the coupling according to the embodiment of the present invention.

FIG. 81 is a side view which illustrates a relation between the main assembly guide and the coupling according to the embodiment of the present invention.

FIG. 82 is a perspective view and a sectional view of a coupling according to an eleventh embodiment of the present invention.

FIG. 83 is a perspective view and a sectional view of the coupling according to the embodiment of the present invention.

FIG. 84 is a perspective view and a sectional view of the coupling according to the embodiment of the present invention.

FIG. 85 is perspective views and sectional views of a coupling according to a twelfth embodiment of the present invention.

FIG. 86 is perspective views which illustrate a coupling according to a thirteenth embodiment of the present invention.

FIG. 87 is a sectional view which illustrates a drum shaft, a drive shaft, the coupling, and an urging member according to the embodiment of the present invention.

FIG. 88 is sectional views which illustrate the drum shaft, the coupling, a bearing member, and the drive shaft according to the embodiment of the present invention.

FIG. 89 is a perspective view which illustrates a drum shaft and a coupling according to a 14th embodiment of the present invention.

FIG. 90 is perspective views which illustrate a process of the engagement between a drive shaft and coupling according to the embodiment of the present invention.

FIG. 91 is perspective views and sectional views which illustrate a drum shaft, a coupling, and a bearing member according to a 15th embodiment of the present invention.

FIG. 92 is perspective views which illustrate a supporting method for a coupling (mounting method) according to a 16th embodiment of the present invention.

FIG. 93 is perspective views which illustrate a supporting method for a coupling (mounting method) according to a 17th embodiment of the present invention.

FIG. 94 is a perspective view of a cartridge according to an embodiment of the present invention.

FIG. 95 illustrates only a coupling according to the embodiment of the present invention.

FIG. 96 illustrates a drum flange having a coupling according to an embodiment of the present invention.

FIG. 97 is sectional views taken along S22-S22 of FIG. 84.

FIG. 98 is a sectional view of a photosensitive drum unit according to an embodiment of the present invention.

FIG. 99 is a sectional view taken along S23-S23 of FIG. 85.

FIG. 100 is perspective views which illustrate a combined state of a drum shaft and a coupling according to an embodiment of the present invention.

FIG. 101 is perspective views which illustrate an inclined state of a coupling according to an embodiment of the present invention.

FIG. 102 is perspective views which illustrate a process of the engagement between a drive shaft and a coupling according to an embodiment of the present invention.

FIG. 103 is perspective views which illustrate a process of the engagement between a drive shaft and a coupling according to an embodiment of the present invention.

FIG. 104 is an exploded perspective view which illustrates a drive shaft, a driving gear, a coupling, and a drum shaft according to an embodiment of the present invention.

FIG. 105 is perspective views which illustrate a process of the disengagement of a coupling from a drive shaft according to an embodiment of the present invention.

FIG. 106 is perspective views which illustrate a combined state between a drum shaft and a coupling according to an embodiment of the present invention.

FIG. 107 is perspective views which illustrate a combined state between a drum shaft and a coupling according to an embodiment of the present invention.

FIG. 108 is perspective views showing a combined state between a drum shaft and a coupling according to an embodiment of the present invention.

FIG. 109 is a perspective view of a first frame unit which has a photosensitive drum, as seen from the driving side, according to an embodiment of the present invention.

FIG. 110 is a perspective view which illustrates a drum shaft and a coupling according to an embodiment of the present invention.

FIG. 111 is a sectional view taken along S20-S20 in FIG. 79.

FIG. 112 is a perspective view of a photosensitive drum unit according to an embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The process cartridge and an electrophotographic image forming apparatus according to an embodiment of the present invention will be described.

Embodiment 1

(1) Brief Description of Process Cartridge

A process cartridge B to which an embodiment of the present invention is applied will be described with reference to FIGS. 1 to 4. FIG. 1 is a sectional view of the cartridge B. FIGS. 2 and 3 are perspective views of the cartridge B. FIG. 4 is a sectional view of an electrophotographic image forming apparatus main assembly A (hereinafter referred to as an "apparatus main assembly A"). The apparatus main assembly A corresponds to a portion of the electrophotographic image forming apparatus from which the cartridge B is excluded.

Referring to FIGS. 1 to 3, the cartridge B includes an electrophotographic photosensitive drum 107. The photosensitive drum 107 is rotated by receiving a rotational force from the apparatus main assembly A by a coupling mechanism when the cartridge B is mounted in the apparatus main assembly A as shown in FIG. 4. The cartridge B is mountable to and demountable from the apparatus main assembly A by a user.

A charging roller 108 as a charging means (process means) is provided in contact with an outer peripheral surface of the photosensitive drum 107. The charging roller 108 electrically charges the photosensitive drum 107 by voltage application from the apparatus main assembly A. The charging roller 108 is rotated by the rotation of the photosensitive drum 107.

The cartridge B includes a developing roller 110 as a developing means (process means). The developing roller 110 supplies a developer to a developing area of the photosensitive drum 107. The developing roller 110 develops an electrostatic latent image formed on the photosensitive drum 107 with the developer t. The developing roller 110 contains therein a magnet roller (fixed magnet) 111. In contact with a peripheral surface of the developing roller 110, a developing blade 112 is provided. The developing blade 112 defines an amount of the developer t to be deposited on the peripheral surface of the developing roller 110. The developing blade 112 imparts triboelectric charges to the developer t.

The developer t contained in a developer accommodating container 114 is sent to a developing chamber 113a by rotation of stirring members 115 and 116, so that the developing roller 110 supplied with a voltage is rotated. As a result, a developer layer to which the electric charges are imparted by the developing blade 112 is formed on the surface of the developing roller 110. The developer t is transferred onto the photosensitive drum 107 depending on the latent image. As a result, the latent image is developed.

The developer image formed on the photosensitive drum 107 is transferred onto a recording medium 102 by a transfer roller 104. The recording medium 102 is used for forming an image of the developer thereon and, e.g., is recording paper, label, OHP sheet, and so on.

In contact with the outer peripheral surface of the photosensitive drum 107, an elastic cleaning blade 117a as a cleaning means (process means) is disposed. The cleaning blade 117a elastically contacts the photosensitive drum 107 at its end and removes the developer t remaining on the photosensitive drum 107 after the developer image is transferred onto the recording medium 102. The developer t removed from the surface of the photosensitive drum 107 by the cleaning blade 117a is accommodated in a removed developer reservoir 117b.

The cartridge B is integrally constituted by a first frame unit 119 and a second frame unit 120.

The first frame unit 119 is constituted by a first frame 113 as a part of a cartridge frame B1. The first frame unit 119 includes the developing roller 110, the developing blade 112, the developing chamber 113a, the developer accommodating container 114, and the stirring members 115 and 116.

The second frame unit 120 is constituted by a second frame 118 as a part of the cartridge frame B1. The second frame unit 120 includes the photosensitive drum 107, the cleaning blade 117a, the removed developer reservoir 117b, and the charging roller 108.

The first frame unit 119 and the second frame unit 120 are rotatably connected with each other by a pin P. By an elastic member 135 (FIG. 3) provided between the first and second frame units 119 and 120, the developing roller 110 is pressed against the photosensitive drum 107.

The user attaches (mounts) the cartridge B to a cartridge mounting portion 130a of the apparatus main assembly A by gripping a grip. During the mounting, as described later, a driving shaft 130 (FIG. 17) of the apparatus main assembly A and a coupling member 150 (described later) as a rotational force transmitting part of the cartridge B are connected with each other in synchronism with the mounting operation of the cartridge B. The photosensitive drum 107 or the like is rotated by receiving the rotational force from the apparatus main assembly A.

(2) Description of Electrophotographic Image Forming Apparatus

With reference to FIG. 4, the electrophotographic image forming apparatus using the above described cartridge B will be described.

In the following, a laser beam printer will be described as an example of the apparatus main assembly A.

During image formation, the surface of the rotating photosensitive drum 107 is electrically charged uniformly by the charging roller 108. Then, the surface of the photosensitive drum 107 is irradiated with laser light, depending on image information, emitted from an optical means 101 including unshown members such as a laser diode, a polygonal mirror, a lens, and a reflecting mirror. As a result, on the photosensitive drum 107, an electrostatic latent image depending on the

image information is formed. The latent image is developed by the above described developing roller 110.

On the other hand, in synchronism with the image formation, the recording medium 102 set in a cassette 103a is conveyed to a transfer position by a feeding roller 103b and conveying roller pairs 103c, 103d and 103e. At the transfer position, the transfer roller 104 as a transfer means is disposed. To the transfer roller 104, a voltage is applied. As a result, the developer image formed on the photosensitive drum 107 is transferred onto the recording medium 102.

The recording medium 102 onto which the developer image is transferred is conveyed to a fixing means 105 through a guide 103f. The fixing means 105 includes a driving roller 105c and a fixing roller 105b containing therein a heater 105a. To the passing recording medium 102, heat and pressure are applied, so that the developer image is fixed on the recording medium 102. As a result, on the recording medium 102, an image is formed. Thereafter, the recording medium 102 is conveyed by roller pairs 103g and 103h and discharged on a tray 106. The above described roller 103b, the conveying roller pairs 103c, 103d and 103e, the guide 103f, the roller pairs 103g and 103h, and the like constitute a conveying means 103 for conveying the recording medium 102.

The cartridge mounting portion 130a is a portion (space) for mounting the cartridge B therein. In a state in which the cartridge B is positioned in the space, the coupling member 150 (described later) of the cartridge B is connected with the driving shaft of the apparatus main assembly A. In this embodiment, the mounting of the cartridge B to the mounting portion 130a is referred to as mounting of the cartridge B to the apparatus main assembly A. Further, demounting (removal) of the cartridge B from the mounting portion 130b is referred to as demounting of the cartridge B from the apparatus main assembly A.

(3) Description of Constitution of Drum Flange

First, a drum flange at a side where the rotational force is transmitted from the apparatus main assembly A to the photosensitive drum 107 (hereinafter simply referred to a "drive side") will be described with reference to FIG. 5. FIG. 5(a) is a perspective view of the drum flange at the drive side and FIG. 5(b) is a sectional view of the drum flange taken along S1-S1 line shown in FIG. 5(a). Incidentally, with respect to an axial line direction of the photosensitive drum, a side opposite from the drive side is referred to as a "non-drive side").

A drum flange 151 is formed of a resinous material by ejection molding. Examples of the resinous material may include polyacetal, polycarbonate, and so on. A drum shaft 153 is formed of a metallic material such as iron, stainless steel, or the like. Depending on a load torque for rotating the photosensitive drum 107, it is possible to select appropriately the materials for the drum flange 151 and the drum shaft 153. For example, the drum flange 151 may also be formed of the metallic material and the drum shaft 153 may also be formed of the resinous material. When both of the drum flange 151 and the drum shaft 153 are formed of the resinous material, they can be integrally molded.

The flange 151 is provided with an engaging portion 151a which engages with an inner surface of the photosensitive drum 107, a gear portion (helical gear or spur gear) 151c for transmitting a rotational force to the developing roller 110, and an engaging portion 151d rotatably supported on a drum bearing. More specifically, as for the flange 151, the engaging portion 151a engages with one end of a cylindrical drum 107a as will be described hereinafter. These are disposed co-axially with a rotation axis L1 of the photosensitive drum 107. And, the drum engaging portion 151a has a cylindrical shape, and a base 151b perpendicular thereto is provided. The base 151b

is provided with a drum shaft 153 outwardly projected with respect to the direction of the axis L1. This drum shaft 153 is co-axial with the drum engaging portion 151a. These are fixed so as to be co-axial with the rotation axis L1. As for the fixing method thereof the press-fitting, the bonding, the insert molding, and so on are available, and they are selected properly.

The drum shaft 153 comprises the circular column portion 153a which has a projection configuration, and is disposed so as to be co-axially with the rotation axis of the photosensitive drum 107. The drum shaft 153 is provided on the end part of the photosensitive drum 107 on the axis L1 of the photosensitive drum 107. In addition, the drum shaft 153 is about 5-15 mm in diameter in consideration of the material, the load, and the space. A free end portion 153b of the circular column portion 153a has a semi-spherical surface configuration so that it can incline smoothly, when an axis of a drum coupling member 150 which is a rotating force transmitting portion inclines, as will be described in detail hereinafter. In addition, in order to receive the rotational force from the drum coupling member 150, a rotating force transmitting pin (rotating force receiving member (portion) 155 are provided on the photosensitive drum 107 side of the free end of the drum shaft 153. The pin 155 is extended in the direction substantially perpendicular to the axis of the drum shaft 153.

The pin 155 as the rotational force receiving member has a cylindrical shape which has a diameter smaller than that of the circular column portion 153a of the drum shaft 153, and is made of the metal or the resin material. And, it is fixed by press-fitting, bonding, and so on to the drum shaft 153. And, the pin 155 is fixed in the direction which the axis thereof intersects the axis L1 of the photosensitive drum 107. Preferably, it is desirable to dispose the axis of the pin 155 so as to pass the center P2 of the spherical surface of the free end portion 153b of the drum shaft 153 (FIG. 5(b)). Although the free end portion 153b is the semi-spherical surface configuration actually, the center P2 is the center of a phantom spherical surface that the semi-spherical surface makes the part thereof. In addition, the number of the pins 155 can be selected properly. In this embodiment, a single pin 155 is used from the standpoint of the assembling property and in order to transmit driving torque assuredly. The pin 155 passes said center P2, and is through the drum shaft 153. And, the pin 155 is outwardly projected at the positions of the peripheral surface of the drum shaft 153 which are diametrically opposite (155a1, 155a2). More particularly, the pin 155 is projected in the direction perpendicular to the axis (axis L1) of the drum shaft 153 relative to the drum shaft 153 at the two opposite places (155a1, 155a2). By this, the drum shaft 153 receives the rotational force from the drum coupling member 150 at the two places. In this embodiment, the pin 155 is mounted to the drum shaft 153 in the range of 5 mm from the free end of the drum shaft 153. However, this does not limit the present invention.

In addition, a space portion 151e formed by the engaging portion 151d and the base 151b receives a part of drum coupling member 150, in mounting the drum coupling member 150 (which will be described hereinafter) to the flange 151.

In this embodiment, the gear portion 151a for transmitting the rotational force to the developing roller 110 is mounted to the flange 151. However, the rotation of the developing roller 110 may be transmitted not through the flange 151. In that case, the gear portion 151c is unnecessary. However, in the case of disposing the gear portion 151a at the flange 151, integral molding, with the flange 151, of the gear portion 151a can be utilized.

The flange 151, the drum shaft 153, and the pin 155 function as the rotational force receiving member which receives the rotational force from the drum coupling member 150 as will be described hereinafter.

(4) Structure of Electrophotographic Photosensitive Member Drum Unit

Referring to FIG. 6 and FIG. 7, the structure of an electrophotographic photosensitive member drum unit ("drum unit") will be described. FIG. 6 (a) is a perspective view, as seen from the driving side, of the drum unit U1, and FIG. 6 (b) is a perspective view as seen from the non-driving side. In addition, FIG. 7 is a sectional view taken along S2-S2 of FIG. 6 (a).

The photosensitive drum 107 has a cylindrical drum 107a coated with a photosensitive layer 107b on the peripheral surface.

The cylindrical drum 107a has an electroconductive cylinder, such as the aluminum, and the photosensitive layer 107b applied thereon. The opposite ends thereof are provided with the drum surface and the substantially co-axial opening 107a1, 107a2, in order to engage the drum flange (151, 152). More particularly, the drum shaft 153 is provided on the end part of the cylindrical drum 107a co-axially with the cylindrical drum 107a. Designated by 151c is a gear and transmits a rotational force which the coupling 150 received from a drive shaft 180 to a developing roller 110. The gear 151c is integrally molded with the flange 15.

The cylinder 107a may be hollow or solid.

As to the drum flange 151 of the driving side, since it has been described in the foregoing, the description is omitted.

A drum flange 152 of the non-driving side is made of the resin material similarly to the driving side with injection molding. And, a drum engaging portion 152b and a bearing portion 152a are substantially co-axially disposed with each other. In addition, the flange 152 is provided with a drum grounding plate 156. The drum grounding plate 156 is an electroconductive thin plate (metal). The drum grounding plate 156 includes contact portions 156b1, 156b2 which contact the inner surface of the electroconductive cylindrical drum 107a, and a contact portion 156a which contacts the drum grounding shaft 154 (which will be described hereinafter). And, for the purpose of grounding the photosensitive drum 107, the drum grounding plate 156 is electrically connected with the apparatus main assembly A.

A drum flange 152 of the non-driving side is made of the resin material, similarly to the driving side with injection molding. And, a drum engaging portion 152b and a bearing portion 152a are substantially co-axially disposed with each other. In addition, the flange 152 is provided with a drum grounding plate 156. The drum grounding plate 156 is an electroconductive thin plate (metal). The drum grounding plate 156 includes contact portions 156b1, 156b2 which contact the inner surface of the electroconductive cylindrical drum 107a, and a contact portion 156a which contacts the drum grounding shaft 154 (which will be described hereinafter). And, for the purpose of grounding the photosensitive drum 107, the drum grounding plate 156 is electrically connected with the apparatus main assembly A.

Although it has been described that the drum grounding plate 156 is provided in the flange 152, the present invention is not limited to such an example. For example, the drum grounding plate 156 may be disposed at the drum flange 151, and it is possible to select properly the position which can be connected with the ground.

Thus, the drum unit U1 comprises the photosensitive drum 107 which has the cylinder 107a, the flange 151, the flange 152, the drum shaft 153, the pin 155, and the drum grounding plate 156.

(5) Rotational Force Transmitting Portion (Drum Coupling Member)

The description will be made, referring to FIG. 8 as to an example of the drum coupling member which is the rotational force transmitting portion. FIG. 8 (a) is a perspective view, as seen from the apparatus main assembly side, of the drum coupling member; FIG. 8 (b) is a perspective view, as seen from the photosensitive drum side, of the drum coupling member; and FIG. 8 (c) is a view seen in the direction perpendicular to the direction of the coupling rotation shaft L2. In addition, FIG. 8 (d) is the side view, as seen from the apparatus main assembly side, of the drum coupling member, FIG. 8 (e) is the Figure, as seen from the photosensitive drum side, and FIG. 8 (f) is a sectional view taken along S3 in FIG. 8 (d).

The drum coupling member ("coupling") 150 engages with a drive shaft 180 (FIG. 17) of the apparatus main assembly A in the state where the cartridge B is mounted set to the installation section 130a. In addition, the coupling 150 is disengaged from the drive shaft 180, when the cartridge B is taken out from the apparatus main assembly A. And, the coupling 150 receives a rotational force from a motor provided in the apparatus main assembly A through the drive shaft 180 in the state where it is engaged with the drive shaft 180. In addition, the coupling 150 transmits the rotational force thereof to the photosensitive drum 107. The materials available for the coupling 150 are the resin materials, such as polyacetal and the polycarbonate PPS. However, in order to raise a rigidity of the coupling 150, the glass fibers, the carbon fibers, and so on may be mixed in the above described resin material correspondingly to a required load torque. In the case of mixing said material, the rigidity of the coupling 150 can be raised. In addition, in the resin material, the metal may be inserted, then the rigidity may further be raised, and the whole coupling may be manufactured from the metal and so on.

The coupling 150 mainly comprises three portions.

The first portion is engageable with the drive shaft 180 (which will be described hereinafter), and it is a coupling side driven portion 150a for receiving the rotational force from the rotational force transmitting pin 182 which is a rotational force applying portion (main assembly side rotational force transmitting portion) provided on the drive shaft 180. In addition, the second portion is engageable with the pin 155, and it is a coupling side driving portion 150b for transmitting the rotational force to the drum shaft 153. In addition, the third portion is a connecting portion 150c for connecting the driven portion 150a and the driving portion 150b with each other (FIGS. 8 (c) and (f)).

The driven portion 150a, the driving portion 150b, and the connecting portion 150c may be molded integrally, or, alternatively, the separate parts may be connected with each other. In this embodiment, these are integrally molded with resin material. By this, the manufacturing of the coupling 150 is easy and the accuracy as the parts is high. As shown in FIG. 8(f) the driven portion 150a is provided with a drive shaft insertion opening portion 150m which expands toward the rotation axis L2 of the coupling 150. The driving portion 150b has a drum shaft insertion opening portion 150l which expands toward the rotation axis L2.

The opening 150m has a conical driving shaft receiving surface 150f as an expanded part which expands toward the drive shaft 180 side in the state where the coupling 150 is mounted to the apparatus main assembly A. The receiving

surface 150f constitutes a recess 150z as shown in FIG. 8 (f). The recess 150z includes the opening 150m at a position opposite the side adjacent the photosensitive drum 107 with respect to the direction of the axis L2.

By this, regardless of rotation phase of the photosensitive drum 107 in the cartridge B, the coupling 150 can pivot among a rotational force transmitting angular position, a pre-engagement angular position, and a disengaging angular position relative to the axis L1 of the photosensitive drum 107 without being prevented by the free end portion of the drive shaft 180. The rotational force transmitting angular position, the pre-engagement angular position, and the disengaging angular position will be described hereinafter.

A plurality of projections (the engaging portions) 150d1-150d4 are provided at equal intervals on a circumference about the axis L2 on an end surface of the recess 150z. Between the adjacent projections 150d1, 150d2, 150d3, 150d4, the standing-by portions 150k1, 150k2, 150k3, 150k4 are provided. An interval between the adjacent projections 150d1-150d4 is larger than the outer diameter of the pin 182, so that the rotational force transmitting pins of the drive shaft 180 provided in the apparatus main assembly A (rotational force applying portions) 182 are received. The recesses between the adjacent projections are the standing-by portions 150k1-k4. When the rotational force is transmitted to the coupling 150 from the drive shaft 180, the transmission pins 182a1, 182a2 are received by any of the standing-by portions 150k1-k4. In addition, in FIG. 8 (d), the rotational force reception surfaces (rotational force receiving portions) 150e crossing with a rotational direction of the coupling 150 and (150e1-150e4) are provided in the downstream with respect to the clockwise direction (X1) of each projection 150d. More particularly, the projection 150d1 has a receiving surface 150e1, the projection 150d2 has a receiving surface 150e2, the projection 150d3 has a receiving surface 150e3, and, a projection 150d4 has a receiving surface 150e4. In the state where the drive shaft 180 rotates, the pin 182a1, 182a2 contacts to any of the receiving surface 150e1-150e4. By doing so, the receiving surface 150e contacted by the pin 182a1, 182a2 is pushed by the pin 182. By this, the coupling 150 rotates about the axis L2. The receiving surface 150e1-150e4 is extended in the direction crossing with the rotational direction of the coupling 150.

In order to stabilize the running torque transmitted to the coupling 150 as much as possible, it is desirable to dispose the rotational force receiving surfaces 150e on the same circumference that has the center on the axis L2. By this, the rotational force transmission radius is constant and the running torque transmitted to the coupling 150 is stabilized. In addition, as for the projections 150d1-150d4, it is preferable that the position of the by coupling 150 is stabilized by the balance of the forces which the coupling receives. For that reason, in this embodiment, the receiving surfaces 150e are disposed at the diametrically opposed positions (180 degrees). More particularly, in this embodiment, the receiving surface 150e1 and the receiving surface 150e3 are diametrically opposed relative to each other, and the receiving surface 150e2 and the surface 150e4 are diametrically opposed relative to each other (FIG. 8 (d)). By this arrangement, the forces which the coupling 150 receives constitute a force couple. Therefore, the coupling 150 can continue rotary motion only by receiving the force couple. For this reason, the coupling 150 can rotate without the necessity of being specified in the position of the rotation axis L2 thereof. In addition, as for the number thereof, as long as the pins 182 of the drive shaft 180 (the rotational force applying portion) can enter the standing-by portions 150k1-150k2, it is possible to select suitably. In this

embodiment, as shown in FIG. 8 the four receiving surfaces are provided. This embodiment is not limited to this example. For example, the receiving surfaces 150e (projections 150d1-150d4) do not need to be disposed on the same circumference (the phantom circle C1 and FIG. 8(d)). Or, it is not necessary to dispose at the diametrically opposed positions. However, the effects described above can be provided by disposing the receiving surfaces 150e as described above.

Here, in this embodiment, the diameter of the pin is approximately 2 mm, and a circumferential length of the stand-by portion 150k is approximately 8 mm. The circumferential length of the stand-by portion 150k is an interval between adjacent projections 150d (on the phantom circle). The dimensions are not limiting to the present invention.

Similarly to the opening 150m, a drum shaft insertion opening portion 150i has a conical rotational force receiving surface 150f of an as an expanded part which expands toward the drum shaft 153 in the state where it is mounted to the cartridge B. The receiving surface 150f constitutes a recess 150g, as shown in FIG. 8 (f).

By this, irrespective of the rotation phase of the photosensitive drum 107 in the cartridge B, the coupling 150 can pivot among a rotational force transmitting angular position, a pre-engagement angular position, and a disengaging angular position to the drum axis L1 without being prevented by the free end portion of the drum shaft 153. The recess 150g is constituted in the illustrated example by a conical receiving surface 150f which it has centering on the axis L2. The standby openings 150g1 or 150g2 ("opening") are provided in the receiving surface 150f (FIG. 8b). As for the coupling 150, the pins 155 can be inserted into the inside of this opening 150g1 or 150g2 so that it may be mounted to the drum shaft 153. And, the size of the openings 150g1 or 150g2 is larger than the outer diameter of the pin 155. By doing so, irrespective of the rotation phase of the photosensitive drum 107 in the cartridge B, the coupling 150 is pivotable among the rotational force transmitting angular position and the pre-engagement angular position (or disengaging angular position) as will be described hereinafter without being prevented by the pin 155.

More particularly, the projection 150d is provided adjacent to the free end of the recess 150z. And, the projections (projections) 150d project in the intersection direction crossing with the rotational direction in which the coupling 150 rotates, and are provided with the intervals along the rotational direction. And, in the state where the cartridge B is mounted to the apparatus main assembly A, the receiving surfaces 150e engage to or abutted to the pin 182, and are pushed by the pin 182.

By this, the receiving surfaces 150e receive the rotational force from the drive shaft 180. In addition, the receiving surfaces 150e are disposed in equidistant from the axis L2, and constitute a pair interposing the axis L2 they are constituted by the surface in the intersection direction in the projections 150d. In addition, the standing-by portions (recesses) 150k are provided along the rotational direction, and they are depressed in the direction of the axis L2.

The standing-by portion 150k is formed as a space between the adjacent projections 150d. In the state where the cartridge B is mounted to the apparatus main assembly A, the pin 182 enters the standing-by portion 150k, and it stands by for being driven. And, when the drive shaft 180 rotates, the pin 182 pushes the receiving surface 150e.

By this, the coupling 150 rotates.

The rotational force receiving surface (rotational force receiving member (portion)) 150e may be disposed inside of the driving shaft receiving surface 150f. Or, the receiving

surface 150e may be provided in the portion outwardly projected from the receiving surface 150f with respect to the direction of the axis L2. When the receiving surface 150e is disposed inside of the receiving surface 150f, the standing-by portion 150k is disposed inside of the receiving surface 150f.

More particularly, the standing-by portion 150k is the recess provided between the projections 150d in the inside of the arc part of the receiving surface 150f. In addition, when the receiving surface 150e is disposed at the position which outwardly projects, the standing-by portion 150k is the recess positioned between the projections 150d. Here, the recess may be a through hole extended in the direction of the axis L2, or it may be closed at one end thereof. More particularly, the recess is provided by the space region provided between the projection 150d. And, what is necessary is just to be able to enter the pin 182 into the region in the state where the cartridge B is mounted to the apparatus main assembly A.

These structures of the standing-by portion apply similarly to the embodiments as will be described hereinafter.

In FIG. 8(e), the rotational force transmitting surfaces (the rotational force transmitting portions) 150h1 and (150h1 or 150h2) are provided in the upstream, with respect to the clockwise direction (X1), of the opening 150g1 or 150g2. And, the rotational force is transmitted to the photosensitive drum 107 from the coupling 150 by the convection sections 150h1 or 150h2 contacting to any of the pins 155a1, 155a2. More particularly, the transmitting surfaces 150h1 or 150h2 push the side surface of the pin 155. By this, the coupling 150 rotates with the center thereof aligned with the axis L2. The transmitting surface 150h1 or 150h2 is extended in the direction crossing with the rotational direction of the coupling 150.

Similarly to the projection 150d, it is desirable to dispose the transmitting surfaces 150h1 or 150h2 diametrically opposed relative to each other on the same circumference.

At the time of manufacturing the drum coupling member 150 with an injection molding, the connecting portion 150c may become thin. This is because the coupling is manufactured so that the driving force receiving portion 150a, the driving portion 150b and the connecting portion 150c have a substantially uniform thickness. When the rigidity of the connecting portion 150c is insufficient, therefore, it is possible to make the connecting portion 150c thick so that driven portion 150a, the driving portion 150b, and the connecting portion 150c have the substantially equivalent thickness.

(6) Drum Bearing Member

The description will be made, referring to FIG. 9, about a drum bearing member. FIG. 9(a) is a perspective view, as seen from a drive shaft side, and FIG. 9(b) is a perspective view, as seen from the photosensitive drum side.

The drum bearing member 157 rotatably supports the photosensitive drum 107 on the second frame 118. In addition, the bearing member 157 has a function of positioning the second frame unit 120 in the apparatus main assembly A. Further, it has the function of retaining the coupling 150 so that the rotational force can be transmitted to the photosensitive drum 107.

As shown in FIG. 9 an engaging portion 157d positioned to the second frame 118 and a peripheral part 157c positioned in the apparatus main assembly A are substantially co-axially disposed. The engaging portion 157d and the peripheral part 157c are annular. And, the coupling 150 is disposed in the space portion 157b inside thereof. The engaging portion 157d and the peripheral part 157c are provided with a rib 157e for retaining the coupling 150 in the cartridge B in the neighborhood of the central portion with respect to the axial direction. The bearing member 157 is provided with holes 157g1 or 157g2 which penetrate the abutment surface 157f and the

fixing screw for fixing the bearing member 157 to the second frame 118. As will be described hereinafter, the guide portion 157a for mounting and demounting on and the cartridge B relative to the apparatus main assembly A is integrally provided on the bearing member 157.

(7) Coupling Mounting Method

Referring to FIG. 10-FIG. 16, the description will be made as to the mounting method of the coupling. FIG. 10(a) is an enlarged view, as seen from the driving side surface, of the major part around the photosensitive drum. FIG. 10(b) is an enlarged view, as seen from the non-driving side surface, of the major part. FIG. 10(c) is a sectional view taken along S4-S4 of FIG. 10(a). FIGS. 11(a) and (b) are an exploded perspective views which illustrate the state before attachment of the primary members of the second frame unit. FIG. 11(c) is a sectional view taken along S5-S5 in FIG. 11(a). FIG. 12 is a sectional view which illustrates a state after attaching. FIG. 13 is a sectional view taken along S6-S6 of FIG. 11(a). FIG. 14 is a sectional view which illustrates a state after rotating the coupling and the photosensitive drum through 90 degrees from the state of FIG. 13. FIG. 15 is a perspective view which illustrates the combined state of the drum shaft and the coupling. FIG. 15(a1)-(a5) are front views, as seen from the axial direction of the photosensitive drum, and FIG. 15(b1)-(b5) are perspective views. FIG. 16 is a perspective view which illustrates the state where the coupling is inclined in the process cartridge.

As shown in FIG. 15 the coupling 150 is mounted so that the axis L2 thereof can incline in any direction relative to the axis L1 of the drum shaft 153 (coaxial with the photosensitive drum 107).

In FIG. 15(a1) and FIG. 15(b1), the axis L2 of the coupling 150 is co-axial with the axis L1 of the drum shaft 153. The state when the coupling 150 is inclined upward from this state is illustrated in FIGS. 15(a2) and (b2). As shown in this Figure, when the coupling 150 is inclined toward the opening 150g side, the opening 150g moves along the pin 155. As a result, the coupling 150 is inclined about an axis AX perpendicular to the axis of the pin 155.

In FIGS. 15(a3) and (b3), the state where the coupling 150 is inclined rightward is shown. As shown in this Figure, when the coupling 150 inclines in the orthogonality direction of the opening 150g, the opening 150g rotates about the pin 155. The axis of rotation is the axis line AY of the pin 155.

The state where the coupling 150 is inclined downward is shown in FIGS. 15(a4) and (b4), and the state where the coupling 150 is inclined leftward is shown in FIGS. 15(a5) and (b5). The rotation axes AX and AY have been described in the foregoing.

In the directions different from the inclining direction described in the foregoing, for example, in the 45-degree direction in FIG. 15(a1) and so on, the inclination is made by combining the rotations in the axes AX and the directions of AY. Thus, the axis L2 can be pivoted in any direction relative to the axis L1.

More particularly, the transmitting surface (rotational force transmitting portion) 150h is movable relative to the pin (rotational force receiving portion) 155. The pin 155 has the transmitting surface 150 in the movable condition. And, the transmitting surface 150h and the pin 155 are engaged to each other in the rotational direction of the coupling 150. In this manner, the coupling 150 is mounted to the cartridge. In order to accomplish this, the gap is provided between the transmitting surface 150h and the pin 155. By this, the coupling 150 is pivotable in all directions substantially relative to the axis L1.

As described above, the opening 150g is extended in the direction (the rotational axis direction of the coupling 150)

crossing with the projection direction of the pins 155 at least. Therefore, as has been described hereinbefore, the coupling 150 is pivotable in all the directions.

It has been mentioned that the axis L2 is slantable or inclinable in any direction relative to the axis L1. However, the axis L2 does not necessarily need to be linearly slantable to the predetermined angle in the full range of 360-degree direction in the coupling 150. For example, the opening 150g can be selected to be slightly wider in the circumferential direction. By doing so, the time of the axis L2 inclining relative to the axis L1, even if it is the case where it cannot incline to the predetermined angle linearly, the coupling 150 can rotate to a slight degree around the axis L2. Therefore, it can be inclined to the predetermined angle. In other words, the amount of the play in the rotational direction of the opening 150g is selected properly if necessary.

In this manner, the coupling 150 is revolvable or swingable over the full-circumference substantially relative to drum shaft (rotational force receiving member) 153. More particularly, the coupling 150 is pivotable over the full-circumference thereof substantially relative to the drum shaft 153.

Furthermore, as will be understood from the foregoing explanation, the coupling 150 is capable of whirling in and substantially over the circumferential direction of the drum shaft 153. Here, the whirling motion is not a motion with which the coupling itself rotates about the axis L2, but the inclined axis L2 rotates about the axis L1 of the photosensitive drum, although the whirling here does not preclude the rotation of the coupling per se about the axis L2 of the coupling 150.

The process of the assembling the parts will be described.

First, the photosensitive drum 107 is mounted in the direction X1 in FIG. 11 (a) and FIG. 11 (b). At this time, the bearing portion 151d of the flange 151 is made to substantially co-axially engage with the centering portion 118h of the second frame 118. In addition, bearing hole 152a (FIG. 7 of the flange 152 (a)) is substantially co-axially engaged with the centering portion 118g of the second frame 118.

The drum grounding shaft 154 is inserted into the direction X2. And, the centering portion 154b is penetrated through the bearing hole 152a (FIG. 6b) and the centering hole 118g (FIG. 10 (b)). At this time, the centering portion 154b and the bearing hole 152a are supported so that the photosensitive drum 107 is rotatable. On the other hand, the centering portion 154b and the centering hole 118g are supported fixedly by the press-fitting and so on. By this, the photosensitive drum 107 is rotatably supported relative to the second frame. Alternatively, it may be fixed non-rotatably relative to the flange 152, and the drum grounding shaft 154 (centering portion 154b) may be rotatably mounted to the second frame 118.

The coupling 150 and the bearing member 157 are inserted in the direction X3. First, the driving portion 150b is inserted toward the direction X3 downstream, while maintaining the axis L2 (FIG. 11c) in parallel with X3. At this time, the phase of the pin 155 and the phase of the opening 150g are matched with each other, and the pin 155 is made inserted into the openings 150g 1 or 150g 2. And, the free end portion 153b of the drum shaft 153 is abutted to the drum bearing surface 150i. The free end portion 153b is the spherical surface and the drum bearing surface 150i is a conic surface. That is, the drum bearing surface 150i of the conic surface which is the recess, and the free end portion 153b of the drum shaft 153 which is the projection contact to each other. Therefore, the driving portion 150b side is positioned relative to the free end portion 153b. As has been described hereinbefore, when the coupling 150 rotates by the transmission of the rotational

force from the apparatus main assembly A, the pin 155 positioned in the opening 150g will be pushed by the rotational force transmission surfaces (the rotational force transmitting portions) 150h 1 or 150h 2 and (FIG. 8b). By this, the rotational force is transmitted to the photosensitive drum 107. Thereafter, the engaging portion 157d is inserted downstream with respect to the direction X3. By this, a part of coupling 150 is received in the space portion 157b. And, the engaging portion 157d supports the bearing portion 151d of the flange 151, so that the photosensitive drum 107 is rotatable. In addition, the engaging portion 157d engages with the centering portion 118h of the second frame 118. The abutment surface 157j of the bearing member 157 abuts to the abutment surface 118j of the second frame 118. And, the screws 158a, 158b are penetrated through the holes 157g 1 or 157g 2, and they are fixed to the screw holes 118k 1, 118k 2 of the second frame 118, so that the bearing member 157 is fixed to the second frame 118 (FIG. 12).

The dimensions of the various portions of the coupling 150 will be described. As shown in FIG. 11 (c), a maximum outer diameter of the driven portion 150a is $\Phi D2$, a maximum outer diameter of the driving portion 150b is $\Phi D1$, and a small diameter of the standby opening 150g is $\Phi D3$. In addition, a maximum outer diameter of the pin 155 is $\Phi D5$, and an inner diameter of the retention rib 157e of the bearing member 157 is $\Phi D4$. Here, the maximum outer diameter is the outer diameter of a maximum rotation locus about the axis L1 or the axis L2. At this time, since $\Phi D5 < \Phi D3$ is satisfied, the coupling 150 can be assembled to the predetermined position by the straight mounting operation in the direction X3 therefore, the assembling property is high (the state after the assembly is shown in FIG. 12). The diameter of the inner surface $\Phi D4$ of the retention rib 157e of the bearing member 157 is larger than $\Phi D2$ of the coupling 150, and smaller than $\Phi D1$ ($\Phi D2 < \Phi D4 < \Phi D1$). By this, just the step attached to the direction X3 straight is sufficient to assemble the bearing member 157 to the predetermined position. For this reason, the assembling property can be improved (the state after the assembly is shown in FIG. 12).

As shown in FIG. 12, the retention rib 157e of the bearing member 157 is disposed closely to a flange portion 150j of the coupling 150 in the direction of the axis L1. More specifically, in the direction of the axis L1, the distance from an end surface 150j 1 of the flange portion 150j to the axis L1 of the pin 155 is n1. In addition, the distance from an end surface 157e 1 of the rib 157e to the other end surface 157j 2 of the flange portion 150j is n2. The distance n2 < distance n1 is satisfied.

In addition, with respect to the direction perpendicular to the axis L1, the flange portion 150j and the rib 157e are disposed so that they are overlapped relative to each other. More specifically, the distance n4 from the inner surface 157e 3 of the rib 157e to the outer surface 150j 3 of the flange portion 150j is the overlap amount n4 with respect to the orthogonality direction of the axis L1.

By such settings, the pin 155 is prevented from disengaging from the opening 150g. That is, the movement of the coupling 150 is limited by the bearing member 157. Thus, the coupling 150 does not disengage from the cartridge. The prevention of disengagement can be accomplished without additional parts. The dimensions described above are desirable from the standpoint of reduction of manufacturing and assembling costs. However, the present invention is not limited to these dimensions.

As described above (FIG. 10 (c) and FIG. 13), the receiving surface 150i which is the recess 150g of the coupling 150 is in contact with the free end surface 153b of the drum shaft 153

which is the projection. Therefore, the coupling 150 is swung along the free end portion (the spherical surface) 153b about the center P2 of the free end portion (the spherical surface) 153b in other words, the axis L2 is pivotable substantially in all directions irrespective of the phase of the drum shaft 153. The axis L2 of the coupling 150 is pivotable in all directions substantially. As will be described hereinafter, in order that the coupling 150 may engage with the drive shaft 180, the axis L2 is inclined toward the downstream with respect to the mounting direction of the cartridge B relative to the axis L1, just before the engagement. In other words, as shown in FIG. 16, the axis L2 inclines so that the driven portion 150a positions at the downstream side with respect to the mounting direction X4 relative to the axis L1 of the photosensitive drum 107 (the drum shaft 153). In FIGS. 16 (a)-(c), although the positions of the driven portion 150a slightly differ relative to each other, they are positioned at the downstream side with respect to the mounting direction X4 in any case.

The still more detailed description will be made.

As shown in FIG. 12, a distance n3 between a maximum outer diameter part and bearing member 157 of the driving portion 150b is selected so that a slight gap is provided between them. By this, as has been described hereinbefore, the coupling 150 is pivotable.

As shown in FIG. 9, the rib 157e is a semi-circular rib. The rib 157e is disposed at the downstream with respect to the mounting direction X4 of the cartridge B. Therefore, as shown in FIG. 10 (c), the driven portion 150a side of the axis L2 is greatly pivotable in the direction X4. In other words, the driving portion 150b side of the axis L2 is greatly pivotable in the direction of angle $\alpha 3$ at phase (FIG. 9(a)) at which the rib 157e is not disposed. FIG. 10 (c) illustrates the state where the axis L2 inclines. In addition, it can also be pivoted to the state substantially parallel to the axis L1 by which it is shown in FIG. 13 from the state of the inclined axis L2 shown in FIG. 10 (c). In this manner, the rib 157e is disposed. By this, the coupling 150 can be mounted by the simple method to the cartridge B. Further, in addition, no matter the drum shaft 153 may stop with what phase, the axis L2 is pivotable relative to the axis L1. The rib is not limited to the semi-circular rib. As long as the coupling 150 is pivotable to the predetermined direction, and it is possible to mount the coupling 150 to Cartridge B (photosensitive drum 107), any rib is usable. In this manner, the rib 157e has a function as the regulating means for regulating the inclining direction of the coupling 150.

In addition, a distance n2 (FIG. 12) in the direction of the axis L1 from the rib 157e to the flange portion 150j is shorter than a distance n1 from the center of the pin 155 to the driving portion 150b side edge. By this, the pin 155 does not disengage from the opening 150g.

As described above, the coupling 150 is supported by the both of the drum shaft 153 and the drum bearing 157 substantially. More particularly, the coupling 150 is mounted to the cartridge B by the drum shaft 153 and the drum bearing 157 substantially.

The coupling 150 has a play (the distance n2) in the direction of the axis L1 relative to the drum shaft 153. Therefore, the receiving surface 150i (the conic surface) may not contact snugly the drum shaft free end portion 153b (the spherical surface). In other words, the center of the pivoting may deviate from the center of curvature P2 of the spherical surface. However, even in such a case, the axis L2 is pivotable relative to the axis L1. For this reason, the purpose of this embodiment can be accomplished.

In addition, maximum possible inclination angle $\alpha 4$ (FIG. 10 (c)) between the axis L1 and the axis L2 is the one half of

the taper angle ($\alpha 1$, FIG. 8(f)) between the axis L2 and the receiving surface 150i. The receiving surface 150i has conical shape and the drum shaft 153 has the cylindrical shape. For this reason, the gap g of angle $\alpha 1/2$ is provided between them. By this, the taper angle $\alpha 1$ changes, and therefore, the inclination angle $\alpha 4$ of the coupling 150 are set to the optimal value. In this manner, since the receiving surface 150i is the conic surface, the circular column portion 153a of the drum shaft 153 is satisfactory with the simple cylindrical shape. In other words, the drum shaft does not need to have a complicated configuration. Therefore, the machining cost of the drum shaft can be suppressed.

In addition, as shown in FIG. 10 (c), when the coupling 150 inclines, a part of coupling can circumvent into illustration) by space portion 151e (hatching of the flange 151. By this, the lightening cavity (Space portion 151e) of the gear portion 151c can be used without futility. Therefore, effective use of the space can be done. Incidentally, the lightening cavity (Space portion 151e) is not usually used.

As described above, in the embodiment of FIG. 10 (c), the coupling 150 is mounted so that a part of a coupling 150 may locate at the position which overlaps the gear portion 151c with respect to the direction of the axis L2. In the case of the flange which does not have the gear portion 151c, a part of coupling 150 can further enter into the cylinder 107a.

When the axis L2 inclines, the width of the opening 150g is selected in consideration of the size of the pin 155 so that the pin 155 may not interfere.

More particularly, the transmitting surface (rotational force transmitting portion) 150h is movable relative to the pin (rotational force receiving portion) 155. The pin 155 has the transmitting surface 150 in the movable condition. And, the transmitting surface 150h and the pin 155 are engaged to each other in the rotational direction of the coupling 150. In this manner, the coupling 150 is mounted to the cartridge. In order to accomplish this, the gap is provided between the transmitting surface 150h and the pin 155. By this, the coupling 150 is pivotable in all directions substantially relative to the axis L1.

The locus of the flange portion 150j when the driven portion 150a side inclines in the direction X5 is illustrated by the region T1 in FIG. 14. As shown in the Figure, even if the coupling 150 inclines, the interference with the pin 155 does not occur, and therefore, the flange portion 150j can be provided over the full-circumference of the coupling 150 (FIG. 8 (b)). In other words, the shaft receiving surface 150i has conical shape, and therefore, when the coupling 150 inclines, the pin 155 does not enter in the region T1. For this reason, the cutting away range of the coupling 150 is minimized. Therefore, the rigidity of the coupling 150 can be assured.

In the above described mounting process, the process (the non-driving side) in the direction X2 and the process (the driving side) in the direction X3 may be exchanged.

The bearing member 157 has been described as being fixed on the screws to the second frame 118. However, the present invention is not limited to such an example. For example, like the bonding, if the bearing member 157 is fixable to the second frame 118, the any method will be usable.

(8) Drive Shaft and Driving Structure of the Apparatus Main Assembly

Referring to FIG. 17, the description will be made as to the structure for driving the photosensitive drum 107 in the apparatus main assembly A. FIG. 17 (a) is a partly broken perspective view of the side plate of the driving side in the state where the cartridge B is not mounted to the apparatus main assembly A. FIG. 17 (b) is a perspective view which illustrates only the drum driving structure. FIG. 17 (c) is the sectional view taken along S7-S7 of FIG. 17 (b).

The drive shaft 180 has the substantially similar structure as the above described drum shaft 153. In other words, the free-end portion 180b thereof forms a semispherical surface. In addition, it has a rotational force transmitting pin 182 as a rotational force applying portion of the main part 180a of the cylindrical shape which penetrates the center substantially. The rotational force is transmitted to the coupling 150 by this pin 182.

A drum driving gear 181 substantially co-axial with the axis of the drive shaft 180 is provided on the longitudinally opposite side of the free end portion 180b of the drive shaft 180. The gear 181 is fixed non-rotatably relative to the drive shaft 180. Therefore, the rotation of the gear 181 will also rotate the drive shaft 180.

In addition, the gear 181 is engaged with a pinion gear 187 for receiving the rotational force from the motor 186. Therefore, the rotation of the motor 186 will rotate the drive shaft 180 through the gear 181.

In addition, the gear 181 is rotatably mounted to the apparatus main assembly A by the bearing members 183, 184. At this time, the gear 181 does not move relative to the direction of the axial direction L3 of the drive shaft 180 (the gear 181), that is, it is positioned with respect to the axial direction L3. Therefore, the gears 181 and the bearing members 183 and 184 can be closely disposed relative to each other with respect to the axial direction. In addition, the drive shaft 180 does not move with respect to the direction thereof of the axis L3. Therefore, the drive shaft 180 and the gap between the bearing members 183 and 184 have the sizes which permit the rotation of the drive shaft 180. For this reason, the position of the gear 181 with respect to the diametrical direction relative to the gear 187 is determined correctly.

In addition, although it has been described that the drive is directly transmitted to the gear 181 from the gear 187, the present invention is not limited to such an example. For example, it is the satisfactory using a plurality of gears on account of the motor disposed at the apparatus main assembly A. Alternatively, it is possible to transmit the rotational force by a belt and so on.

(9) Main Assembly Side Mounting Guide for Guiding Cartridge B

As shown in FIGS. 18 and 19, the mounting means 130 of this embodiment includes main assembly guides 130R1, 130R2, 130L1, 130L2 provided in the apparatus main assembly A.

They are provided opposed to the both side surfaces of the cartridge mounting space (the cartridge set portion 130a) provided in the apparatus main assembly A (the driving side surface in FIG. 18) (the side surface in FIG. 19 in which it does not drive). The main assembly guides 130R1, 130R2 are provided in the main assembly opposed to the driving side of the cartridge B, and they are extended along the mounting direction of the cartridge B. On the other hand, the main assembly guides 130L1, 130L2 are provided in the main assembly side opposed to the non-driving side of the cartridge B, and they are extended along the mounting direction of the cartridge B. The main assembly guides 130R1, 130R2 and the main assembly guides 130L1, 130L2 are opposed to each other. At the time of mounting the cartridge B to the apparatus main assembly A these guides 130R1, 130R2, 130L1, 130L2 guide the cartridge guides as will be described hereinafter. At the time of mounting the cartridge B to the apparatus main assembly A, the cartridge door 109 which can be opened and closed relative to the apparatus main assembly A about a shaft 109a is opened. And, the mounting, into the apparatus main assembly A, of the cartridge B is completed by closing the door 109. At the time of taking out the cartridge B from the

apparatus main assembly A, the door 109 is opened. These operations are effected by the user.

(10) Positioning Portion, Relative to Mounting Guide and Apparatus Main Assembly A for Cartridge B

As shown in FIGS. 2 and 3, in this embodiment, the outer periphery 157a of the outside end of the bearing member 157 functions also as a cartridge guide 140R1. In addition, the outer periphery 154a of the outside end of the drum grounding shaft 154 functions also as a cartridge guide 140L1.

In addition, the one longitudinal end (the driving side) of the second frame unit 120 is provided with the cartridge guide 140R2 on the upper portion of the cartridge guide 140R1. And, the other end (the non-driving side) in the longitudinal direction is provided with the cartridge guide 140L2 on the upper portion of the cartridge guide 140L1.

More particularly, the one longitudinal end of the photo-sensitive drum 107 is provided with the cartridge side guides 140R1, 140R2 outwardly projected from the cartridge frame B1. In addition, the other end in the longitudinal direction is provided with the cartridge side guides 140L1, 140L2 outwardly projected from the cartridge frame B1. The guides 140R1, 140R2, 140L1, 140L2 is projected toward the along said longitudinal direction here and there outside. More particularly, the guides 140R1, 140R2, 140L1, 140L2 are projected from the cartridge frame B1 along the axis L1. And, at the time of mounting the cartridge B to the apparatus main assembly A, and at the time of demounting the cartridge B from the apparatus main assembly A the guide 140R1 is guided by the guide 130R1, and the guide 140R2 is guided by the guide 130R2. In addition, at the time of mounting the cartridge B to the apparatus main assembly A and at the time of demounting the cartridge B from the apparatus main assembly A the guide 140L1 is guided by the guide 130L1, and the guide 140L2 is guided by the guide 130L2. In this manner, the cartridge B is mounted to the apparatus main assembly A, moving in the direction substantially perpendicular to the axial direction L3 of the drive shaft 180, and it is similarly demounted from the apparatus main assembly A. In addition, in this embodiment, the cartridge guides 140R1, 140R2 are molded integrally with the second frame 118. However, separate members are usable as the cartridge guides 140R1, 140R2.

(11) Mounting Operation of Process Cartridge

Referring to FIG. 20, the mounting operation, into the apparatus main assembly A, of the cartridge B will be described. FIG. 20 shows the mounting process. FIG. 20 is a sectional view taken along S9-S9 of FIG. 18.

As shown in FIG. 20 (a), the door 109 is opened by the user. And, the cartridge B is dismountably mounted relative to the cartridge mounting means 130 (the installation section 130a) provided in the apparatus main assembly A.

At the time of mounting the cartridge B to the apparatus main assembly A, in the driving side, the cartridge guides 140R1, 140R2 are inserted along the main assembly guides 130R1, 130R2, as shown in FIG. 20 (b). In addition, also about the non-driving side, the cartridge guides 140L1, 140L2 (FIG. 3) are inserted along the main assembly guides 130L1, 130L2 (FIG. 19).

When the cartridge B is further inserted in the direction of the arrow X4, the coupling between the drive shaft 180 and the cartridge B is established and then, the cartridge B is mounted to the predetermined position (the installation section 130a) (the provision). In other words, as shown in FIG. 20 (c), the cartridge guide 140R1 contacts to the positioning portion 130R1a of the main assembly guide 130R1, and the cartridge guide 140R2 contacts to the positioning portion 130R2a of the main assembly guide 130R2. In addition, the